ROCKY MOUNTAIN ARSENAL

Land Use Control Monitoring Report for Fiscal Year 2018

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U.S. Department of the Army
Shell Oil Company

Prepared by:

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TABLE OF CONTENTS

Section **Page**

1.0 INTRODUCTION 1

2.0 RMA BACKGROUND 1

3.0 CHANGES TO LAND USE CONTROLS 3

4.0 ON-POST OPERABLE UNIT LAND USE CONTROLS 3
- 4.1 RMA Land Use Controls 5
- 4.2 Transferred Property 7

5.0 OFF-POST OPERABLE UNIT LAND USE CONTROLS 7
- 5.1 Off-Post Well Notification Program 7
- 5.2 Shell Property Deed Restrictions 8
- 5.3 Exposure Control and Alternate Water Supply 8

6.0 RMA ENGINEERING CONTROLS 9
- 6.1 Sanitary Sewers 9
- 6.2 Groundwater Remedy Structures 9
- 6.3 Caps and Covers 9

7.0 MONITORING AND EVALUATION 10
- 7.1 Status of Corrective Actions from 2017 Monitoring Report 10
- 7.2 On-Post Operable Unit Land Use Controls 12
  - 7.2.1 RMA 12
  - 7.2.2 Prairie Gateway 14
- 7.3 Off-Post Operable Unit Land Use Controls 16
  - 7.3.1 State Engineer's Office Well Permit Notification 16
  - 7.3.2 Shell Property Deed Restrictions 17
  - 7.3.3 Exposure Control and Alternate Water Supply 17
- 7.4 RMA Engineering Controls 17
  - 7.4.1 Groundwater Remedy Structures 17
  - 7.4.2 Caps and Covers 18
  - 7.4.3 Sanitary Sewers 18

8.0 NOTIFICATIONS 18

9.0 CORRECTIVE ACTIONS 19

10.0 CONCLUSION 20

11.0 REFERENCES 20

LIST OF TABLES

Table 4.0-1 Source and Applicability of the Primary On-Post OU Land Use Controls

Table 4.0-2 Source and Applicability of Other On-Post OU Land Use Controls

Table 4.1-1 Implementation of RMA Land Use Controls

Table 7.1-1 Status of Previous Corrective Actions

Table 7.2.1-1 Evaluation of RMA Land Use Controls

Table 7.2.2-1 Evaluation of Prairie Gateway Use Controls

Table 8.0-1 FY18 Notifications

ACRONYMS AND ABBREVIATIONS

ARAR	Applicable or Relevant and Appropriate Requirements
Army	United States Department of the Army
CBSG	Colorado Basic Standards for Groundwater
CDPHE	Colorado Department of Public Health and Environment
CERCLA	Comprehensive Environmental Response, Compensation, and Liability Act
CFR	Code of Federal Regulations
CSRG	Containment System Remediation Goal
DIMP	Diisopropylmethyl phosphonate
EPA	United States Environmental Protection Agency
ES&H	Environmental Safety and Health
FFA	Federal Facility Agreement
FY	Fiscal Year
ICS	Integrated Cover System
LTCP	RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan
LTMP	Long-Term Monitoring Plan for Groundwater and Surface Water
LUCP	Land Use Control Plan
MDEH	Material Documented as an Explosive Hazard
MOA	Memorandum of Agreement
NPL	National Priorities List
NWR	National Wildlife Refuge
O&M	Operations and Maintenance
OU	Operable Unit
PUD	Planned Unit Development
RCRA	Resource Conservation and Recovery Act
Refuge	Rocky Mountain Arsenal National Wildlife Refuge
Refuge Act	Rocky Mountain Arsenal National Wildlife Refuge Act
RI/FS	Remedial Investigation/Feasibility Study
RMA	Rocky Mountain Arsenal
ROD	Record of Decision
SACWSD	South Adams County Water and Sanitation District
SEO	Office of the State Engineer
SOP	Standard Operating Procedure
SSA	Southern Study Area
TCHD	Tri-County Health Department
USFWS	United States Fish and Wildlife Service
UXO	Unexploded Ordnance
VOC(s)	Volatile Organic Compound(s)

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1.0 INTRODUCTION

As part of the long-term remedy at the Rocky Mountain Arsenal (RMA), land use controls, both institutional and engineering controls, are utilized to ensure protectiveness. Pursuant to the Land Use Control Plan (LUCP) (Navarro 2013), the land use controls are monitored annually to ensure they are being implemented, remain effective, and are protective of human health and the environment.

Section 2 of this report summarizes relevant RMA background, Section 3 presents changes made to land use controls during the monitoring period, Sections 4 and 5 describe the applicable land use controls, and Section 6 discusses engineering controls. Section 7 discusses the monitoring and evaluation of the controls including follow up on any corrective actions from prior years. Section 8 describes required notifications. Section 9 presents corrective actions indicated by the monitoring and evaluation and Section 10 provides conclusions.

This evaluation covers the period for Fiscal Year 2018 (FY18), October 1, 2017 through September 30, 2018.

2.0 RMA BACKGROUND

The United States Department of the Army (Army) established RMA in 1942 to produce chemical warfare agents and incendiary munitions used in World War II. Following the war and through the early 1980s, the Army continued to use these facilities. Beginning in 1946, some RMA facilities were leased to private companies to manufacture industrial and agricultural chemicals. Shell Oil Company, the principal lessee, manufactured primarily pesticides at RMA from 1952 to 1982. Common industrial and waste disposal practices during those years resulted in significant levels of contamination. The principal contaminants include organochlorine pesticides, heavy metals, agent-degradation products and manufacturing by-products, and chlorinated and aromatic solvents.

The RMA was divided into the On-Post Operable Unit (OU) and Off-Post OU. On-Post sites that posed potential immediate risks to human health and the environment were addressed through Interim Response Actions. A Remedial Investigation/Feasibility Study (RI/FS) was conducted for the On-Post OU leading to the actions required by the On-Post Record of Decision (ROD) (FWENC 1996), as amended (TtEC 2005).

Contaminated groundwater migrated north and northwest of RMA prior to construction of the groundwater pump and treat systems. This necessitated creation of the Off-Post OU followed by preparation of an RI/FS and the Off-Post ROD (HLA 1995).

Current and future land use for the On-Post OU is restricted by provisions in the Federal Facility Agreement (FFA) (EPA 1989) and the On-Post ROD. Surrounded by development, the On-Post OU provides a refuge for an abundant diversity of flora and fauna. For this reason the site was designated as a future National Wildlife Refuge (NWR) in the Rocky Mountain Arsenal National Wildlife Refuge Act (Refuge Act) of 1992 (Public Law 1992). The FFA and the On-Post ROD

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.

As components of the On-Post OU remedy were completed, jurisdiction was administratively transferred to the United States Fish and Wildlife Service (USFWS) or other parties after the United States Environmental Protection Agency (EPA) certified that all required response actions had been completed and the areas were deleted from the National Priorities List (NPL). The Rocky Mountain Arsenal National Wildlife Refuge (Refuge) was officially established on April 21, 2004. To date, approximately 94 percent of RMA has been deleted from the NPL, and most of that property has been transferred to the USFWS. The remaining property is retained by the Army for operations and maintenance (O&M) of landfill caps, including the Hazardous Waste Landfill (HWL) and Enhanced Hazardous Waste Landfill (ELF), the Integrated Cover System (ICS) soil covers, and groundwater treatment systems. The property transferred to the USFWS remains subject to land use controls as described in Section 4. Groundwater has also been deleted in the eastern and southern perimeter areas of the RMA. However, groundwater underlying the central and northwestern portions of the site has not met remediation goals and remains on the NPL.

Other parties that received property transfers include Commerce City, South Adams County Water and Sanitation District (SACWSD) and units of local government. Commerce City purchased acreage at the southwest corner and west side of RMA now known as the "Prairie Gateway." SACWSD received the property upon which the Klein Water Treatment Facility (Klein Property) is located. The Colorado Department of Transportation, Commerce City, and the City and County of Denver received 100-foot wide strips of property for public road construction, hereinafter referred to as "100-Foot Highway Setbacks." The Colorado Department of Transportation received a setback to the northwest boundary along Colorado Highway 2, Commerce City received a setback to the north boundary of RMA along 96th Avenue, and the City and County of Denver received a setback to the south boundary of RMA along 56th Avenue. In 2007, the USFWS acquired approximately 148 acres of the Prairie Gateway for incorporation into the refuge. In return, approximately 28 acres of land in Section 33 and approximately 14 acres in the northeast corner of Section 20 were deeded to Commerce City.

The portions of the On-Post OU transferred to other parties (Commerce City, City and County of Denver, SACWSD, and Colorado Department of Transportation) are subject to land use restrictions prohibiting residential or industrial use, use of water as a source of potable water, hunting and fishing for consumptive use, and agricultural use. These restrictions have been incorporated into the deeds for the transferred property. As such, and in accordance with the LUCP, no additional monitoring is required for these properties. However, the LUCP does include a commitment to review the Commerce City Planned Unit Development (PUD) for the Prairie Gateway. The PUD zoning process assigns excluded uses, uses by right, conditional uses and temporary uses to each parcel within the unit.

For the Off-Post OU, remediation of surface media was completed and the surface media was deleted from the NPL. However, groundwater in the off-post OU has not met remediation goals and remains on the NPL. Current and future land use of the Off-Post OU surface area has not been restricted, although groundwater use has been restricted in the Off-Post ROD (HLA 1995).

3.0 CHANGES TO LAND USE CONTROLS

The LUCP was completed in FY14 (Navarro 2013). The final LUCP identifies all land use control requirements in accordance with the RODs for both the On-Post and Off-Post OUs and provides the requirements for land use control maintenance, monitoring, and reporting. There were no changes to the LUCP in FY18.

4.0 ON-POST OPERABLE UNIT LAND USE CONTROLS

For the remainder of this report, the combination of USFWS NWR property and property retained by the Army is referred to as the "RMA."

Because the land use controls for the On-Post and Off-Post OUs differ, they are discussed separately. Discussion for land use controls for the Off-Post OU is provided in Section 5.0. The discussion of On-Post OU controls is further divided into primary controls and other controls.

The primary land use controls applicable to the On-Post OU originate in one or more of the following three sources:

- *Rocky Mountain Arsenal Federal Facility Agreement* (EPA 1989)
- *Rocky Mountain Arsenal National Wildlife Refuge Act of 1992* (Public Law 1992) [as modified by the *National Defense Authorization Act for Fiscal Year 2017* (Public Law 2016)]
- *Record of Decision for the On-Post Operable Unit* (FWENC 1996)

In addition, the LUCP (Navarro 2013) includes several other land use controls not identified in the ROD or FFA. Land use controls for the Off-Post OU, discussed in Section 5.0, are identified in the *Record of Decision for the Off Post Operable Unit* (HLA 1995). The control, the source, and the applicability of the primary on-post land use controls and other on-post land use controls are presented below in Table 4.0-1 and Table 4.0-2, respectively.

Table 4.0-1
Source and Applicability of the Primary On-Post OU Land Use Controls

Control	Source	Applicability
Prohibit residential development	FFA, On-Post ROD[1]	On-Post OU
Prohibit use of property for residential purposes	Refuge Act	Prairie Gateway and 100-Foot Highway Setbacks

Table 4.0-1 (continued)
Source and Applicability of the Primary On-Post OU Land Use Controls

Control	Source	Applicability
Prohibit use of groundwater or surface water as a source of potable water	FFA, Refuge Act[2], On-Post ROD	On-Post OU
Perform risk evaluation prior to non-potable use of groundwater	On-Post ROD	RMA[3]
Prohibit consumption of fish and game taken at RMA	FFA, On-Post ROD	On-Post OU
Prohibit hunting and fishing, except for non-consumptive use	Refuge Act	Prairie Gateway and 100-Foot Highway Setbacks
Prohibit non-remedy agricultural activities such as raising of livestock, crops or vegetables	FFA, Refuge Act[2], On-Post ROD	On-Post OU
Preserve and manage wildlife habitats to protect endangered species, migratory birds, and bald eagles	FFA	RMA[3]
Prohibit major non-remedy alteration of the geophysical characteristics of the RMA if such alteration may likely have an adverse impact on the natural drainage of the Arsenal for floodplain management, recharge of groundwater, operation and maintenance of Response Action Structures, or protection of wildlife habitat(s).	FFA	RMA[3]
Prohibit use of property for industrial purposes	Refuge Act	Prairie Gateway and 100-Foot Highway Setbacks
Provide access related to Comprehensive Environmental Response, Compensation, and Liability Act (CERCLA) response actions (including groundwater remedy structures and monitoring wells)	FFA, Refuge Act[2]	On-Post OU

[1]In addition, the National Wildlife Refuge System Administration Act of 1966 (Public Law 1966) precludes residential development on refuge lands.

[2]Refuge Act applies only to the Prairie Gateway and 100-Foot Highway Setbacks.

[3]RMA consists of Army-retained property and RMA NWR.

Table 4.0-2
Source and Applicability of Other On-Post OU Land Use Controls

Control	Source	Applicability
Prevent excavation of the Buried Lake Sediments Site (Southern Study Area [SSA] Site SSA-3b)	LUCP	Site SSA-3b
Protection of groundwater remedial action structures	LUCP	RMA
Lake level maintenance to support aquatic ecosystems	On-Post ROD	Lower Derby Lake, Lake Ladora and Lake Mary
Restriction for overnight occupational use	LUCP	RMA

Table 4.0-2 (continued)
Source and Applicability of Other On-Post OU Land Use Controls

Control	Source	Applicability
Prohibition on construction and/or use of basements at RMA	1993 Army and USFWS Letters (Spinks 1993, Walker 1993)	RMA
Access controls	LUCP, Army Plan PM-A-101 (Army 2016a)	RMA
Activities management	LUCP, SOP ES&H.210 (Army 2017)	RMA
Access restrictions to ensure integrity of covers; prohibit activities that might damage or impair proper function of covers, including but not limited to, excavation, drilling, tilling, grading or construction.	On-Post ROD, LUCP	RMA caps and covers (HWL, ELF, and ICS)

4.1 RMA Land Use Controls

The primary and other land use controls applicable to the RMA are presented above in Tables 4.0-1 and 4.0-2. These controls are applicable to property transferred from Army to the USFWS for refuge use and to the properties retained by the Army for O&M of caps and covers (HWL, ELF, and ICS) and groundwater treatment systems. Implementation of the land use controls is described in the LUCP. The primary land use controls are implemented by the Army and USFWS through enforcement of the restrictions identified in the FFA, ROD, and Refuge Act.

Table 4.1-1 presents the means by which the other controls are implemented.

Table 4.1-1
Implementation of Other RMA Land Use Controls

Control	Implementation
Overnight occupational use	If USFWS anticipates activities by short-term workers they will submit a description of the activities to the RMA Committee for review and approval of overnight use (RMA Committee 2013). Emergency use of the RMA NWR bunkhouses is authorized without prior approval; however, notification to RMA Committee must be made within 72 hours of use.
Prevent excavation of site SSA-3b	Site SSA-3b is located in Section 12 and contains buried contaminated sediment that was dredged from Upper and Lower Derby Lakes. Contaminated sediments remain at depths of greater than three feet. Unplanned excavation of the site will be prevented using intrusive activity process, markers delineating the restriction area, and worker training as required by the LUCP.

Table 4.1-1 (continued)
Implementation of Other RMA Land Use Controls

Control	Implementation
Protection of groundwater remedial action structures	Inspection requirements and the process to be used when damaged system components are identified are presented in the *Long-Term Monitoring Plan for Groundwater and Surface Water* (LTMP) (TtEC and URS 2010). Damaged system components and corrective actions performed will be documented in the Annual Summary Reports for Groundwater and Surface Water.
Lake level maintenance to support aquatic ecosystems	The On-Post ROD requires that water levels in Lower Derby Lake, Lake Ladora and Lake Mary be maintained to support aquatic ecosystems (FWENC 1996).
Prohibition on use of basements at RMA	Prior to building or using basements at RMA, the Army or USFWS must prepare a feasibility study that addresses the impacts of the use of basements on human health and the environment and documents that the impacts from such use are minimal (Spinks 1993, Walker 1993).
Access Controls	At RMA, access controls described in the LUCP and Army Plan PM-A-101 are used to support the primary land use controls discussed above. These federally-enforceable controls limit RMA access to those with legitimate purpose. In addition, access control to the RMA NWR is maintained by the USFWS and is controlled by regulations governing the National Wildlife Refuge System (50 CFR Parts 25-29). One of the most significant aspects of these regulations is the fact that "No person shall trespass, including but not limited to entering, occupying, using, or being upon, any national wildlife refuge, except as specifically authorized in this Subchapter C or in other applicable Federal regulations" (50 CFR §25.21(a)). Access to areas of the RMA NWR that are not opened to the public is controlled using signs, regulations, and periodic monitoring by USFWS Law Enforcement. The multiple layers of engineering controls include a perimeter fence, gate security, restrictions on visitor access, and remedy-specific systems. Site worker training is required before entry into closed areas of RMA.
Activities Management	Activity management at RMA includes site-specific and project-specific training to provide information relevant to site restrictions and hazards. Intrusive soil activity permits and utility locates are required before performing intrusive activities on site (Army 2017). In addition, signs are maintained as required by existing regulations, plans and procedures to provide visitors and workers with safety information and to advise them of entry into long-term remediation O&M areas.
Access restrictions to ensure integrity of covers; prohibit activities that might damage or impair proper function of covers, including but not limited to, excavation, drilling, tilling, grading or construction.	Access restrictions are maintained through engineering controls, which are monitored pursuant to the *RCRA* [Resource Conservation and Recovery Act]-*Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan* (TtEC 2011a), *Hazardous Waste Landfill Post-Closure Plan* (TtEC 2011b), *Enhanced Hazardous Waste Landfill Post-Closure Plan* (TtEC 2010) and *Basin F Post-Closure Plan* (TtEC 2011c). Prohibited activities require notification and a Non-Routine Action Plan or Corrective Measures Plan prior to performing these activities.
Provide access related to CERCLA response actions	The Refuge Act provides for Army access to Refuge property after transfer of jurisdiction for any CERCLA response actions.

4.2 Transferred Property

The primary land use controls applicable to transferred property are shown above in Table 4.0-1. These primary land use controls were included as deed restrictions when the property was transferred from the Army to other parties. In accordance with the LUCP, no additional monitoring is required for most of the transferred property. However, the LUCP does include a commitment to review the Commerce City Planned Unit Development (PUD) for the Prairie Gateway (Commerce City 2005). The PUD zoning process assigns excluded uses, uses by right, conditional uses and temporary uses to each parcel within the unit. For the Prairie Gateway, the PUD was originally approved by the Commerce City Council on June 6, 2005 and Amendment #1 was subsequently approved on April 7, 2008. The PUD excludes residential, agriculture and industrial uses throughout the PUD. The PUD also provides other excluded uses, most notably child care centers. In 2018, the Army agreed to perform an annual site inspection of transferred property to monitor for activities that could conflict with the land use restrictions. Monitoring activities for the Prairie Gateway PUD are discussed in Section 7.2.2.

5.0 OFF-POST OPERABLE UNIT LAND USE CONTROLS

Land use controls, in the form of institutional controls, were established as part of the selected remedy for the Off-Post OU (HLA 1995). The Off-Post ROD identifies the objective of the institutional controls as "prevent the future use of groundwater exceeding remediation goals." The required institutional controls include a well permit notification program, Shell Property deed restrictions, and exposure control with provisions for alternate water supply as described below. The LUCP provides greater detail on land use controls for the Off-Post OU.

5.1 Off-Post Well Notification Program

The On-Post and Off-Post RODs require the Army to provide the Colorado Office of the State Engineer (SEO) a map where monitoring identifies off-post groundwater that exceeds Containment System Remediation Goals (CSRGs). The Off-Post ROD also states that the SEO will then include a distinctive notice on each well permit application, related correspondence and any resulting well permit and drilling permit, where the off-post groundwater could potentially exceed CSRGs. Discussion with the SEO resulted in agreement for the SEO to provide the required notification only on each approved well permit. This program is known as the Off-Post Well Notification Program.

In 2011, the Off-Post Well Notification Program was modified to include both the potential CSRG exceedance area and the historic area of contamination (PMRMA 2011). The historic off-post area of contamination is defined as the area of diisopropylmethyl phosphonate (DIMP) contamination based on the 0.392 parts per billion detection limit identified in the Off-Post ROD. The two notification areas are shown on Figure 4.1-1 in the LUCP. These notification areas will be used until off-post groundwater is deleted from the NPL, unless there is agreement to change the notification area.

5.2 Shell Property Deed Restrictions

The Off-Post ROD requires a deed restriction that prohibits drilling new alluvial wells and use of deeper groundwater underlying the Shell Property, located adjacent to the northern boundary of RMA, for potable purposes until such groundwater no longer contains contamination in exceedance of groundwater Containment System CSRGs established in the ROD (HLA 1995). The deed restriction is defined in the *Declaration of Covenants among Shell, the United States, and the State of Colorado* dated February 2, 1996 (Shell 1996). The covenants were recorded by the Adams County Clerk and Recorder on June 11, 1996. These covenants "run with, and burden the land … and are enforceable by the United States, through the Army and EPA [U. S. Environmental Protection Agency], and by the State."

In September 2009, EPA completed a Ready for Reuse Determination for most of the Shell Property documenting that the property is ready for use for any purpose allowed under local land use and zoning laws (EPA 2009). The property remains subject to the restrictions specified in the Off-Post ROD. In September 2010, all the off-post surface media, including the Shell Property, was deleted from the NPL.

In addition, as part of the State of Colorado Natural Resource Damages Settlement, 100 acres of the Shell Property was deeded to Commerce City for open space and for use as a stormwater retention area. A conservation easement has been placed on the property as part of the agreement, and the easement is held by Adams County. The conservation easement preserves the property's conservation values in perpetuity and opens the area for limited recreational use.

5.3 Exposure Control and Alternate Water Supply

The Off-Post ROD included exposure control and provision of alternate water supply for domestic well owners in the Off-Post OU. As part of these provisions, the ROD requires:

- Any user of a domestic well within the Off-Post OU that contains groundwater contaminants derived from RMA at concentrations that exceed the remediation goals or Applicable or Relevant and Appropriate Requirements (ARARs) will be provided an alternate water supply. Bottled water will be provided for cooking and drinking until a permanent alternate water supply is provided. Permanent alternate water supplies could include installation of a deep uncontaminated well or connection to a municipal potable water-supply system. This commitment applies to both users of existing domestic wells and users of wells that are lawfully drilled in the future.

As part of a Memorandum of Agreement (MOA) between the Army and Tri-County Health Department (TCHD), TCHD implements an off-post, private well groundwater monitoring program. The MOA defines responsibilities for TCHD to support the objectives of the RMA remediation program and includes private well sampling. Each year, TCHD coordinates with the Army, Shell, EPA, and Colorado Department of Public Health and Environment (CDPHE) to develop a list of private wells to sample to continue monitoring contamination in the off-post OU. Results from the private well sampling program are reviewed each year to evaluate whether

there are groundwater contaminants derived from RMA at concentrations that exceed the Colorado Basic Standards for Groundwater (CBSGs).

6.0 RMA ENGINEERING CONTROLS

Engineering controls are used at RMA to enhance or complement both select remedies and the overall remedy.

6.1 Sanitary Sewers

As part of the remedy for sanitary sewers at RMA, the On-Post ROD required concrete plugging of the void space within abandoned sanitary sewer manholes and placement of aboveground warning signs every 1,000 feet along remaining abandoned sanitary sewer lines to indicate their location underground. The warning sign requirement was achieved by including an engraved brass plate on each plugged manhole and at additional locations where manholes were more than 1,000 feet apart (RVO 1998; TtEC 2008, 2011d, 2013; Navarro 2017). Monitoring and maintenance of the markers is required once every five years. In addition, the Army or USFWS will conduct utility locates to identify abandoned sewer locations prior to intrusive activities, and will notify the regulatory agencies 14 days in advance of any excavation of the abandoned sanitary sewer line.

6.2 Groundwater Remedy Structures

As noted in the LUCP, protection of the groundwater remedial action structures including the treatment facilities, extraction/recharge systems, slurry walls, monitoring wells, and related infrastructure (e.g., electrical systems, instrumentation, access vaults) is part of the O&M of those systems. Inspection requirements and the process to be used when damaged system components are identified are presented in the *Long-Term Monitoring Plan for Groundwater and Surface Water* (TtEC and URS 2010). Damaged system components and corrective actions performed are documented in the Annual Summary Reports for Groundwater and Surface Water. For this reason, the groundwater remedy structures engineering controls/O&M activities are not evaluated as part of this effort.

During development of the LUCP, a concern was identified related to potential public access to groundwater monitoring wells in the RMA NWR public use area. To minimize the potential for exposure to groundwater or damage to these wells, the Army identified wells within close proximity to hiking trails that should be locked and placed locks on them. Inspection of these well locks is included in the land use control reporting (Section 7.4.1).

6.3 Caps and Covers

One purpose of the caps and covers at RMA is to prevent exposure to the wastes contained within. In addition, the On-Post ROD requires access restrictions as part of long-term O&M. For caps and covers, engineering controls that include fences, signs and obelisks with plaques were installed during cap and cover construction and are monitored pursuant to the O&M plans. The O&M plans for the caps and covers areas include:

- *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan* (LTCP), Revision 2 (TtEC 2011a) (for the ICS)
- *Basin F Post-Closure Plan*, Revision 0 (TtEC 2011c)
- *Hazardous Waste Landfill Post-Closure Plan*, Revision 3 (TtEC 2011b)
- *Enhanced Hazardous Waste Landfill Post-Closure Plan*, Revision 0 (TtEC 2010).

Caps and covers have been monitored and evaluated in accordance with requirements provided in these plans. The monitoring results, as well as any corrective actions are reported and tracked in annual reports for the HWL and ELF RCRA caps (Navarro 2018a), Integrated Cover System (ICS) cover (Navarro 2018b), and Basin F cover (Navarro 2018c). No additional monitoring was performed under this effort.

7.0 MONITORING AND EVALUATION

Monitoring and evaluation of land use controls was conducted to ensure that land use control objectives are being met and that protectiveness is adequately maintained. The approach to monitoring was dependent on the type of land use or engineering control and involved either site inspection, documentation review, or inquiries of responsible officials.

7.1 Status of Corrective Actions from 2017 Monitoring Report

There were three corrective actions indicated as a result of the monitoring and evaluation performed in 2017 and one follow up action from previous monitoring years was identified. The issues and corrective actions identified along with the status of each issue are presented in Table 7.1-1.

Table 7.1-1
Status of Previous Corrective Actions

2017 Issue	Corrective Action	Status/Comments
Both the ROD and FFA include statements that the U.S. Government shall retain ownership of RMA. Although the Refuge Act identified specific areas of the RMA for disposal outside federal ownership, additional land has been transferred outside federal control, and there is concern whether this is consistent with the FFA and ROD. (Note, this issue is carried forward from 2016.)	Continue discussion on land transfers to determine whether the LUCP should be revised to include clear direction for any possible future land transfer actions and monitoring requirements necessary for this restriction.	The Army and USFWS met with the regulatory agencies in July 2016 to discuss the issue and options for incorporating requirements into the LUCP; however, the issue was not resolved. No further discussion occurred in FY17 or FY18. On December 20, 2016, CDPHE issued a compliance advisory, asserting a land transfer outside federal control was prohibited by the FFA, ROD, Refuge Act, CERCLA 120(h), and two state policy documents. On September 14, 2017, CDPHE filed a complaint in U.S. District Court making similar allegations. That litigation is ongoing.

Table 7.1-1 (continued)
Status of Previous Corrective Actions

2017 Issue	Corrective Action	Status/Comments
During inspection of locked wells in the Refuge public use area, wells 02529 and 02530 were noted as damaged from prescribed burn activities.	Repair two wells along the Lake Ladora trail that were damaged from prescribed burn activities.	Repairs were completed on November 14, 2017.
Review of well permits issued in FY17 identified one permit that was missing the required groundwater notification language.	Contact the SEO and confirm that all permits issued for the drilling of any new well within the notification areas, including wells replacing existing wells, include the required RMA notification.	No meeting with the SEO was scheduled during FY18. Follow up is necessary to ensure that the well notification program is functioning as required.
Amendment #1 to the Prairie Gateway PUD includes, as a "use-by-right," public gardening for Parcels 3 and 4 of Parcel D located in Section 33 (surrounding the Adams City High School). This issue was first identified in 2009. A letter requesting clarification of the issue was submitted to the Deputy City Manager in September 2010, and a follow up letter was transmitted in March 2016.	Follow up and continued coordination with the Commerce City Planning Department to ensure that the next revision to the Prairie Gateway PUD resolves the issue of the public gardening use-by-right included in Amendment #1 to the PUD.	The Army continues to coordinate with the Commerce City Planning Department to clarify use language on the next amendment to the PUD. Continued follow up is necessary to ensure that the next revision to the PUD will resolve this issue. Additional detail is provided in Section 7.2.2.2.

In addition, there were two issues identified in FY17 for follow up in FY18.

A risk evaluation for potential 1,4-dioxane exposure from nonpotable use of water from the Section 4 wells was initiated in 2017 and needed to be completed in FY18. This evaluation was completed in March 2018 and the results of the evaluation indicate that no significant risks to human health are expected from use of groundwater from the Section 4 wells (Navarro 2018e).

Additional discussion related to the expansion of Wildlife Drive was required to evaluate the need for additional signage and/or written material to provide visitors with information about the site. During FY18, language was developed for inclusion in the USFWS Wildlife Drive brochure that provides general information about the site history including its munitions history. The issue was discussed at the RMA Committee and Council levels and revisions to the brochure were determined to be sufficient to resolve the issue.

Also, although not identified as an issue in the FY17 monitoring report, lack of a visual inspection of transferred property was identified as a concern by EPA during review of the report. In response, the Army agreed to perform an annual inspection of transferred property to

look for evidence of activities that are inconsistent with the existing land use controls or objectives.

7.2 On-Post Operable Unit Land Use Controls

The following sections discuss monitoring results for RMA and the Prairie Gateway.

7.2.1 RMA

The land use controls applicable to the RMA were monitored using inquiries of Army and USFWS personnel and site inspections. The Army continues to manage all Army-retained property including the landfills (HWL and ELF), ICS, Basin F cover, and groundwater treatment systems. The Refuge is managed by the USFWS pursuant to the Refuge Act, the *National Wildlife Refuge System Administration Act of 1966* (Public Law 1966) and its implementing regulations. In addition, the USFWS completed a Comprehensive Conservation Plan, which provides the management plan for the RMA National Wildlife Refuge.

No changes have occurred that might compromise the integrity and efficacy of remedy systems or allow otherwise prohibited activities to occur. The evaluation is presented below in Table 7.2.1-1.

Table 7.2.1-1
Evaluation of RMA Land Use Controls

Control	Evaluation
Prohibit residential development	No residential development has occurred.
Overnight occupational use	During FY18, there were two requests approved for overnight occupational uses of the bunkhouses in accordance with the process described in the LUCP. No unapproved use occurred. Overnight uses were associated with temporary quarters for personnel associated with black-footed ferret surveys and overnight snow removal.
Prohibit use of groundwater or surface water as a source of potable water	Groundwater and surface water have not been used as potable water.
Prohibit agricultural activities	No agricultural activities have occurred.
Prohibit consumption of fish and game taken on the RMA	Taking of fish and game at RMA is prohibited and consumption has not occurred. In December 2015, the USFWS transferred 13 bison to the Crane Trust in Wood River, Nebraska. The Crane Trust provided written verification that all transferred bison are accounted for and no human consumption has occurred.
Preserve and manage wildlife habitats	The USFWS continues to manage wildlife habitat on RMA.
Prohibit major non-remedy alteration of RMA geophysical characteristics	No major non-remedy alterations of RMA geophysical characteristics have occurred due to site activity.

Table 7.2.1-1 (continued)
Evaluation of RMA Land Use Controls

Control	Evaluation
Prohibition on use of basements on RMA	There are two basements on site with occasional use for facility operations and maintenance, one at Building 112, Communications, and one at Building 371, Lake Ladora Pump House. Evaluation of groundwater in the vicinity of these buildings indicates that the vapor intrusion pathway is not a pathway of concern due to no volatile organic compound (VOCs) or very low VOC levels in groundwater (TtEC 2011e). Therefore, continued use of these basements is acceptable. Based upon inquiries of Army and USFWS personnel, no other basements are in use at RMA and none were constructed.
Perform risk evaluation prior to new non-potable use of groundwater	There were no new non-potable uses of groundwater developed during FY18. In 2018, an evaluation of risk from potential 1,4-dioxane exposure was completed for nonpotable use of water from the Section 4 wells. The results of the evaluation indicate that no significant risks to human health are expected from use of groundwater from the Section 4 wells (Navarro 2018e).
Aboveground markers indicating the location of abandoned sanitary sewers	Inspection of the sanitary sewer markers is required once every five years. The next complete inspection is scheduled in FY19.
Lake level maintenance to support aquatic ecosystems	Based upon inquiries of USFWS personnel, through FY18, the water levels in Lower Derby Lake, Lake Ladora and Lake Mary continue to support an aquatic ecosystem in accordance with the On-Post ROD.
Prevent excavation of site SSA-3b	Site SSA-3b was inspected for presence of markers and evidence of disturbance. All markers identified in the LUCP were present and no disturbance of the area was noted.
Access restrictions to ensure integrity of caps/covers; prohibit activities that might damage or impair the proper function of the covers	Engineering controls were maintained on the caps and covers to provide access restrictions. There were no activities that resulted in damage to the caps/covers. Monitoring was completed as required under the relevant plans and the results were provided in annual monitoring reports (Navarro 2018a, 2018b, 2018c).
Protection of groundwater remedial action structures	Monitoring of treatment systems is conducted through observations during the course of normal O&M activities. Repairs are made as needed and reported in the Quarterly Effluent Reports and Annual Summary Reports. In October 2017, there was a vandalism event at the NWBCS. The glass was broken on the emergency power shutdown switch and the switch was activated, resulting in power loss to the plant. In addition, several well caps were removed from the system extraction wells and the well hand/off/auto (HOA) switches were turned out of position. The incident was investigated by the Adam's County Sherriff's Department; however, no arrests were made. The Army informed the regulatory agencies of the incident during the October 2017 RMA Committee meeting. In response to the event and to improve security, the emergency power shutdown switch was moved inside the plant, spring-loaded HOA switches were installed on the wells, and security cameras were installed at each treatment plant. Well locks in the public use area were inspected and all were intact.

Table 7.2.1-1 (concluded)
Evaluation of RMA Land Use Controls

Control	Evaluation
Access controls preventing exposure and maintaining remedy integrity	In FY18 there were no trespass incidents that threatened the integrity or effectiveness of the remedy, or created any potential for exposure. Overall, project-specific access controls continue to provide adequate control to limit access to remediation areas to authorized personnel only.
Activities Management	Intrusive activities require completion of an Intrusive Activity Permit prior to excavation. Project-specific training continues to provide coordination for activity management. In addition, signs were maintained to provide visitors and workers with safety information and to advise them of entry into long-term remediation facilities or waste containment areas.
Provide access related to CERCLA response actions	Based upon inquiries of Army and USFWS personnel, there are no access issues associated with performance of required response actions.

7.2.1.1 Mineral Rights Request

In May 2018, the USFWS received a request for permission to conduct seismic exploration along the northern tier of the Refuge including Sections 19, 20, 23 and 24 for potential development of oil and gas production. Mineral rights in this area are federally owned and the USFWS denied the request.

7.2.2 Prairie Gateway

The land use controls noted in Section 4.2 are applicable to the property transferred from the Army or USFWS to Commerce City or other state or local government agencies. For the Prairie Gateway, appropriate deed restrictions incorporating the FFA and ROD LUCs were included when the property was transferred to Commerce City. In addition, Commerce City implemented a PUD for the Prairie Gateway, which assigns excluded uses, uses by right, conditional uses and temporary uses to each parcel within the unit. The PUD excludes residential, agriculture and industrial uses throughout the PUD. However, the PUD includes potential uses that may be in conflict with the LUCs. Evaluation of the Prairie Gateway PUD land use controls are presented below in Table 7.2.2-1.

Table 7.2.2-1
Evaluation of Prairie Gateway PUD

Control	Evaluation
Prohibit use of property for residential purposes or prohibit residential development	For the Prairie Gateway the deed restrictions are in place, and the PUD prohibition on residential use is being enforced (Commerce City 2005, as amended). However, the Prairie Gateway PUD and Amendment #1 to the PUD include potential uses that may be in conflict with the residential restriction. Inspection of the property did not identify any residential uses. See Section 7.2.2.1 for additional discussion.

Table 7.2.2-1 (continued)
Evaluation of Prairie Gateway PUD

Control	Evaluation
Prohibit use of property for industrial purposes	For the Prairie Gateway, the deed restrictions are in place, and the PUD prohibition on industrial use is being enforced (Commerce City 2005, as amended). Inspection of the property did not identify any industrial uses.
Prohibit agricultural activities	For the Prairie Gateway, deed restrictions are in place; however, the PUD includes a use-by-right for public gardening. See Section 7.2.2.2 for additional discussion. Follow up is identified as a corrective action in Section 9.0 to ensure that the next revision to the Prairie Gateway PUD incorporates changes to preserve this restriction. Inspection of the property did not identify any agricultural uses.
Prohibit use of groundwater or surface water as a source of potable water	With the exception of three Army wells, as a condition of service, all rights to groundwater beneath the Prairie Gateway PUD were transferred and are now owned and controlled by SACWSD. The three Army wells are used exclusively for non-potable refuge and remedy purposes on RMA. A risk assessment was completed supporting use of these wells for remedial actions and refuge management (FWENC 1998). In 2018, an evaluation of risk from potential 1,4-dioxane exposure was completed for nonpotable use of water from the Section 4 wells. The results of the evaluation indicate that no significant risks to human health are expected from use of groundwater from the Section 4 wells (Navarro 2018e). Because permanent surface water features are absent on the Prairie Gateway, consumption is not a concern.

7.2.2.1 Residential Use in the Prairie Gateway Planned Unit Development

The PUD prohibition on residential use is being enforced (Commerce City 2005, as amended). However, the Prairie Gateway PUD and Amendment #1 to the PUD include potential uses that appear inconsistent with the residential restriction. These uses include bed & breakfasts, hotels, motels, public confinement facilities, halfway houses, correctional institutions, and group homes. To date there has been no formal determination that these uses are in conflict with the residential use restriction. In 2013, Commerce City received a determination from CDPHE that development of hotels does not constitute residential use for purposes of the land use restrictions on the property (CDPHE 2013). The remaining uses identified in the PUD were not addressed.

The Army continues to meet regularly with the Commerce City Planning Department to maintain open communications regarding land use control issues. Planning Department personnel have consistently confirmed their awareness of the residential use exclusion for the Prairie Gateway, have confirmed that these uses would not be approved while the residential restriction was in force, and stated that this issue will be corrected at the next revision to the Prairie Gateway PUD. In addition, a visual inspection of the Prairie Gateway was performed to look for evidence of activities that are inconsistent with the existing land use controls or objectives. The inspection did not identify any residential uses.

In December 2016, Congress passed the National Defense Authorization Act for Fiscal Year 2017 (Public Law 2016), which modifies the Refuge Act to include provisions for Commerce City to modify or remove the restriction that prohibits the use of the property for residential or industrial use, provided a determination is made that the property will be protective of human health and the environment for the proposed use with an adequate margin of safety following the modification or removal of the restriction. The determination can be made after completion of a risk assessment and any response actions necessary to protect human health and the environment to allow for the proposed use. Since residential uses identified in the PUD would be preceded by the required risk assessment, there is no corrective action necessary for this issue.

7.2.2.2 Agricultural Activity in the Prairie Gateway Planned Unit Development

As noted in Table 4.2-1, the prohibitions on residential, agricultural and industrial use contained in the deed restrictions are implemented through the Prairie Gateway PUD zoning process (Commerce City 2005, as amended). Monitoring in FY09 identified a potential issue with land use in the PUD. Amendment #1 includes, as a use-by-right, "*(p)ublic gardening and similar cultivation of land, nursery, and supplementary to the primary public use*" for Sub-Parcels 3 and 4 of Parcel D. Parcel D is the northern-most parcel extending from 80th Avenue and Colorado Highway 2 southward, to 72nd Avenue. Sub-parcel 4 begins at 72nd Avenue, surrounds the Adam City High School and extends northward to Quebec Parkway. Sub-parcel 3 is triangular in shape and is located west of Parcel 4, on the west side of the Quebec Parkway.

The FY09 monitoring report included a corrective action to request clarification from the Commerce City Planning Department for the additional use-by-right in Amendment #1 to the PUD. A letter requesting clarification of the issue was submitted to the Deputy City Manager in September 2010 (Army 2010). Although the Army did not receive a formal response to the September 2010 letter, the Commerce City Planning Department has stated that this issue will be corrected in the next revision to the Prairie Gateway PUD. The Army continues to meet regularly with the Commerce City Planning Department to discuss issues related to the Prairie Gateway, and potential changes to the PUD are discussed at these meetings. In March 2016, the Army sent a letter to the City Manager as a reminder of the existing restrictions and potential conflicts present in the PUD (Army 2016c). Commerce City acknowledged their understanding of the restrictions and commitment to coordinate with the Army regarding these issues (Commerce City 2016). Follow up to ensure that the next revision to the PUD resolves this issue is included as a Corrective Action in Section 9.0.

In addition, a visual inspection of the Prairie Gateway was performed to look for evidence of activities that are inconsistent with the existing land use controls or objectives. The inspection did not identify any agricultural uses.

7.3 Off-Post Operable Unit Land Use Controls

7.3.1 State Engineer's Office Well Permit Notification

The TCHD reviewed well permits issued by the SEO for new wells within the notification areas. The TCHD implements these reviews quarterly under the existing MOA and in accordance with

the process outlined in the 2005 Five-Year Review Report (Army 2007). There was one well permit approved for a water supply well during FY18. However, the completed permit mistakenly had the Chemical Sales Company notification language rather than the RMA notification language. TCHD contacted the SEO to alert them to the error and a revised permit was issued with the correct notification language in December 2018. No further action is required.

7.3.2 Shell Property Deed Restrictions

The deed restriction prohibiting drilling new alluvial wells and use of deeper groundwater underlying the Shell Property for potable purposes was recorded in June 1996 and remains in place. As of the close of FY18, no alluvial wells have been constructed and use of the deeper groundwater has not occurred.

7.3.3 Exposure Control and Alternate Water Supply

Results from the private well sampling program, implemented by TCHD, are reviewed each year to evaluate whether there are groundwater contaminants derived from RMA in domestic wells at concentrations that exceed the CBSGs. During FY18, 14 private wells were analyzed for DIMP and 1,4-dioxane concentrations, and there were no exceedances of the CBSGs.

Well 359D, which was constructed in November 2016, was sampled twice in 2018 to verify DIMP levels due to an exceedance of the CBSG in 2017 sampling. A sample from well 359D was collected in July 2017 and the DIMP concentration was 7.72 µg/L. Since the sample result was close to the CBSG of 8 µg/L, a second sample was collected in August 2017 to confirm the result. The DIMP concentration in the confirmation sample was 10.5 µg/L, above the CBSG. The property owner was notified and bottled water was provided after a resident occupied the property. In FY18, samples from well 359D were collected in May and August of 2018 and the DIMP concentrations were 5.99 µg/L and 6.08 µg/L respectively. Since the results are only slightly below the CBSG, bottled water is being provided to the resident of the property and the well will be sampled again in FY19 to confirm the results.

7.4 RMA Engineering Controls

7.4.1 Groundwater Remedy Structures

As noted in Section 6.2, certain wells within the RMA NWR public use area require well locks to minimize the potential for exposure to groundwater or damage to these wells. Each well was inspected to verify that locks were in place and that there had been no disturbance of the wells. All well locks in the public use area were present and there was no evidence of tampering with any of the wells.

Other groundwater remedy structures are monitored pursuant to the LTMP and have not been evaluated as part of this effort. The monitoring results, as well as any corrective actions, are reported and tracked in the *Annual Summary Report for Groundwater and Surface Water Fiscal Year 2017* (Navarro 2018d).

7.4.2 Caps and Covers

As noted in Section 6.3, fences, signs, and obelisks with plaques were installed during cap and cover construction and are being monitored in accordance with the applicable O&M plans. The monitoring results, as well as any corrective actions, are reported and tracked in the annual reports (Navarro 2018a, 2018b, 2018c) and are therefore not evaluated separately as part of this report. There were no issues identified that indicate damage to the cap/cover controls or potential for exposure to contained wastes.

7.4.3 Sanitary Sewers

Based on the durability of the brass markers and the infrequency of intrusive work, field inspection of the sanitary sewer markers is required on a five-year cycle. The most recent complete inspection was performed in FY14; therefore, no site-wide inspection was conducted during this monitoring period. The next inspection is scheduled for FY19.

The land use control requirements for the abandoned sanitary sewers include a notification requirement prior to excavation or disturbance of the sewer. There were no excavations involving the abandoned sanitary sewer during FY18.

8.0 NOTIFICATIONS

The LUCP and On-Post ROD Amendment (TtEC 2005) include notification obligations for violations of land use controls, changes to the LUCP, or certain activities with specific notification requirements. Notification activities during FY18 are presented below in Table 8.0-1. The source for each notification requirement is also noted.

Table 8.0-1
FY18 Notifications

Notification Requirement	Notes
Violation of a land use control that results in a release of hazardous materials or actual exposure of personnel to hazardous materials (LUCP)	No land use control violation resulted in a release of hazardous material or actual exposure of personnel to hazardous materials, so no notification or reporting was required.
Violation of a land use control that compromises remedy integrity (LUCP)	No land use control violation resulted in compromise to remedy integrity, so no notification or reporting was required.
Activity inconsistent with land use control requirements or objectives (ROD Amendment, LUCP)	No activities inconsistent with land use control requirements or objectives were identified.
Actions that may interfere with land use controls (ROD Amendment, LUCP)	No activities were identified that would interfere with land use controls, so no notification was required.
Emergency overnight stay on site (LUCP)	There were no emergency stays during FY18, so no notification was required.
Excavation of the Buried Lake Sediments Site SSA-3b (LUCP)	There was no excavation at site SSA-3b so no notification was required.

Table 8.0-1 (continued)
FY18 Notifications

Notification Requirement	Notes
Excavation of abandoned sanitary sewer line (LUCP)	There were no excavations involving the abandoned sanitary sewer during FY18, so no notification was required.
Dredging in Lower Derby Lake (LUCP)	No dredging occurred so no notification was required.
Changes to the LUCP or proposed land use changes inconsistent with land use control objectives of the selected remedy (ROD Amendment, LUCP)	There were no changes to land use inconsistent with land use control objectives of the selected remedy.
Activity that might damage or impair the proper function of the caps/covers (LUCP)	Notifications were made in accordance with the post-closure plans or Long-Term Care Plan.
Discovery of unexploded ordnance (UXO) or repeated discovery of Material Documented as an Explosive Hazard (MDEH) within same area (LUCP)	There was no discovery of UXO or MDEH so no notification was required.
Changes to the LUCP (LUCP, ROD Amendment)	There were no changes to the LUCP in FY18.

9.0 CORRECTIVE ACTIONS

There were no corrective actions identified based on the monitoring and evaluation performed this year. However, the following previously identified corrective action requires follow up evaluation to ensure that they are properly implemented:

- Follow up and continued coordination with the Commerce City Planning Department to ensure that the next revision to the Prairie Gateway PUD resolves the issue of the public gardening use-by-right included in Amendment #1 to the PUD. Additional detail is provided in Section 7.2.2.2.

- Contact the SEO and confirm that all permits issued for the drilling of any new well within the notification areas, including wells replacing existing wells, include the required RMA notification. TCHD contacted the SEO in December of 2018 and confirmed this requirement.

- Continue discussion on land transfers to determine whether the LUCP should be revised to include clear direction for any possible future land transfer actions and monitoring requirements necessary for this restriction. Note that this issue is on hold pending the outcome of existing litigation.

Although not a corrective action, the following recommendation was also identified:

- Currently, the LUCP does not require visual inspection of transferred property where deed restrictions are in place. However, in FY18 the Army agreed to perform visual inspections of transferred property to monitor for activities that could conflict with

the land use restrictions. The LUCP should be revised to document this inspection requirement.

10.0 CONCLUSION

The land use controls required by the FFA, Refuge Act, On-Post ROD, Off-Post ROD, and LUCP remain effective and continue to be protective of human health and the environment. There is no indication this status is in jeopardy.

11.0 REFERENCES

Army (U.S. Department of the Army)

2017 (Mar. 17) *Intrusive Soil Activity RMA SOP: ES&H.210.* Revision 5.

2016a (June 6) *Rocky Mountain Arsenal Access Plan PM-A-101.* Revision 5.

2016b (Sept. 30) *Final 2015 Five-Year Review Report for Rocky Mountain Arsenal.* Revision 0.

2016c (Mar. 31) Letter to Brian McBroom, Commerce City, City Manager, regarding land uses identified in the Prairie Gateway PUD Zone Document.

2010 (Sept. 22) Letter to Tom Acre, Commerce City Deputy City Manager, requesting clarification of the public gardening use-by-right included in Amendment #1 to the Prairie Gateway PUD Zone Document.

2007 (Nov.) *Final 2005 Five-Year Review Report for Rocky Mountain Arsenal.* Revision 0.

CFR (Code of Federal Regulations - U.S. National Archives and Records Administration)

Title 50. Wildlife and Fisheries. Chapter I, Subchapter C, Parts 25-29.

CDPHE (Colorado Department of Public Health and Environment)

2013 (Mar. 28) Letter to James Hayes, Commerce City Deputy City Manager, regarding concurrence on hotel development of the former Western Tier Parcel of the Rocky Mountain Arsenal.

Commerce City (Commerce City, Colorado)

2016 (Apr. 1) Letter from Chris Cramer, Commerce City Community Development Director, to Charles Scharmann, acknowledging their understanding of the existing land use controls.

2005 (June 6) *Prairie Gateway PUD Zone Document.*

EPA (U.S. Environmental Protection Agency)

2009 (Sept. 3) *Ready for Reuse Determination for a Portion of the Shell Property Within the Offpost Operable Unit of the Rocky Mountain Arsenal National Priorities List Site.*

1989 (Feb. 17) *Federal Facility Agreement for the Rocky Mountain Arsenal. Pursuant to CERCLA Section 120, Docket No. CERCLA VIII-89-13.*

FWENC (Foster Wheeler Environmental Corporation)

1998 (June) *Risk Assessment for Section 4 Water Supply Wells Rocky Mountain Arsenal.*

1996 (June) *Record of Decision for the On-Post Operable Unit, Rocky Mountain Arsenal, Commerce City, Colorado.* Prepared for the Program Manager for Rocky Mountain Arsenal.

HLA (Harding Lawson Associates)

1995 (Dec.) *Rocky Mountain Arsenal Off-post Operable Unit Final Record of Decision, Rocky Mountain Arsenal, Commerce City, Colorado.* Prepared for the Program Manager for Rocky Mountain Arsenal.

Navarro (Navarro Research and Engineering, Inc.)

2018a (June 27) *2018 RCRA Landfills and Groundwater Monitoring Report.* Revision 0.

2018b (Nov. 15) *Annual Covers Report for Integrated Cover System 2018.* Revision 0.

2018c (Nov. 26) *2018 Basin F Cover and Groundwater Monitoring Report.* Revision 0.

2018d (Sept. 21) *Annual Summary Report for Groundwater and Surface Water Fiscal Year 2017.* Revision 0.

2018e (Mar. 5) *Risk Evaluation of 1,4-Dioxane for Nonpotable Use of Groundwater from Section 4 Wells.* Revision 0.

2017 (Feb. 23) *Sanitary Sewer Manhole Plugging Project – Phase II Construction Completion Report. Addendum 2.* Revision 0.

2013 (Oct. 10) *Land Use Control Plan.* Revision 0.

PMRMA (Program Manager Rocky Mountain Arsenal)

2011 (Mar. 31) *Decision Document Off-Post Groundwater Notification Area.*

Public Law

2016 (Dec.) *National Defense Authorization Act for Fiscal Year 2017.* Public Law 114-328. Section 2829C.

1992 (Oct.) *Rocky Mountain Arsenal National Wildlife Refuge Act of 1992.* Public Law 102-402.

1966 (Oct.) *National Wildlife Refuge System Administration Act of 1966.* Public Law 89-669.

RMA Committee

2013 (Aug.) *Decision Document DD-29 Short-Term Use of Bunkhouses.*

RVO (Remediation Venture Office for Rocky Mountain Arsenal)

1998 (Aug. 3) *Sanitary and Chemical Sewer Plugging Project Construction Completion Report.*

Shell (Shell Oil Company)

1996 (Feb.) Declaration of Covenants. *Final Deed Restrictions on the Shell Property North of RMA.*

Spinks, John L. Jr. (Deputy Regional Director, U.S. Fish and Wildlife Service)

1993 (Feb. 3) Letter to Jack McGraw, Acting Regional Administrator of EPA Region VIII, regarding the Construction of Buildings with Basements at RMA.

TtEC (Tetra Tech EC Inc.)

2013 (Mar. 25) *Sanitary Sewer Manhole Plugging Project – Phase II Construction Completion Report. Addendum 1.* Revision 0.

2011a (Sept. 29) *RCRA-Equivalent, 2-, and 3-Foot Covers Long-Term Care Plan.* Revision 2.

2011b (Mar. 16) *Hazardous Waste Landfill Post-Closure Plan.* Revision 3.

2011c (Oct. 6) *Basin F Post-Closure Plan.* Revision 0.

2011d (June 3) *Miscellaneous RMA Structure Demolition and Removal Project – Phase IV and SQI Extension Sanitary Sewer Manhole Plugging Construction Completion Report.* Revision 0.

2011e (Sept. 23) *2010 Five-Year Review Report for Rocky Mountain Arsenal.* Revision 0.

2010 (May 20) *Enhanced Hazardous Waste Landfill Post-Closure Plan.* Revision 0.

2008 (Dec. 10) *Sanitary Sewer Manhole Plugging Project – Phase II Final Construction Completion Report.* Revision 0.

2005 (Oct. 20) *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.*

TtEC and URS Corporation

2010 (Mar. 3) *Long-Term Monitoring Plan for Groundwater and Surface Water.*

Walker, D. Lewis (Deputy Assistant Secretary of the Army, Environment, Safety and Occupational Health)

1993 (Feb. 3) Letter to Jack McGraw, Acting Regional Administrator of EPA Region VIII, regarding the Construction of Buildings with Basements at RMA.