

5.0 ENVIRONMENTAL INFORMATION

5.1 INTRODUCTION

This section presents environmental information related to the decommissioning of the Site by reducing the concentration of COCs in groundwater to concentrations that provide for the release of the Site for unrestricted use and termination of license SNM-928. There are no regulatory deadlines or fixed dates for the initiation or completion of decommissioning activities.

The proposed action involves the extraction of groundwater from impacted areas, followed by removal of uranium by ion exchange and removal of nitrate by biodegradation. A portion of the treated water will be re-injected into upland areas to flush contaminants to groundwater extraction components located in the floodplain. Most of the treated water will be discharged to the Cimarron River in accordance with an Oklahoma Pollution Discharge Elimination System (OPDES) permit.

5.2 PURPOSE AND NEED FOR PROPOSED ACTIONS

The proposed actions are necessary to complete the remaining decommissioning activities needed for NRC to release the Site for unrestricted use and to terminate Materials License SNM-928. License termination is a separate action that requires an NRC finding that the Site meets the criteria for unrestricted release.

This section of the Plan follows the organization presented in NUREG-1748, *Environmental Review Guidance for Licensing Actions Associated with NMSS Programs* (NRC, 2003). Several of the topics referenced in this document are fully presented elsewhere in this Plan and are not completely duplicated herein to reduce duplication of effort and future potential conflicts between different sections of this decommissioning plan.

5.3 NEED FOR THE PROPOSED ACTION

Release of the Site for unrestricted use and termination of the radioactive materials license will result in the restoration of the Site such that it can be converted to beneficial use without the future risks associated from residual licensed material.

Decommissioning activities have been ongoing since 1976 when production activities were terminated. Many of the decommissioning activities were completed in accordance with the licensee's operating license conditions, and the license was amended numerous times as described in Section 1.1. The facilities and remaining processing equipment were decontaminated, and waste and some soil were excavated and packaged for shipment and disposal under License Conditions 18 and

20 of SNM-928 through its 1983 renewal. After excavation of the sanitary lagoons and trenches of BA1, NRC authorized their backfill in License Condition 22 of Amendment 9, issued in December 1992.

The on-site burial of Option 2 material was authorized in License Condition 23 of Amendment 10, issued in November 1994.

Cimarron Corporation submitted its first decommissioning plan on April 19, 1995. Eight responses to NRC comments, clarifying statements made in the decommissioning plan or committing to specific requirements were submitted between 1996 and the issuance of Amendment 15 in July 1999. One of those submittals was the 1998 *Site Decommissioning Plan Groundwater Evaluation Report* (James L. Grant, July 1998), which stated that, based upon knowledge of groundwater impact at the time, it was believed that active groundwater remediation may not be required to achieve license termination for unrestricted use. NRC approved the use of the decommissioning plan (with the eight additional submittals) and stipulated unrestricted release criteria for groundwater, soil, surface contamination, and exposure rate in License Condition 27 of this amendment. Since that time, it was determined that active groundwater remediation is required to reduce uranium concentrations in groundwater to unrestricted release criteria in an acceptable timeframe.

Achieving release of the Site for unrestricted use and license termination significantly reduces the potential for the site to become a legacy site with no financially solvent owner or licensee.

5.4 THE PROPOSED ACTION

The proposed action is to decommission the Site to achieve release for unrestricted use and termination of Radioactive Materials License SNM-928 by implementation of the groundwater remediation program proposed herein. *Facility Decommissioning Plan – Rev 1* is submitted in accordance with 10 CFR 70 38(g). This Plan involves the extraction of impacted groundwater followed by treatment by ion exchange and/or biodegradation. Treated water will be disposed of in one of two ways:

- A portion of the treated water will be reinjected into upland fractured sandstone to drive impacted groundwater to groundwater extractions systems
- Treated water not used for reinjection will be discharged to the Cimarron River in accordance with a discharge permit to be issued by DEQ

Influent and effluent concentrations will be monitored to maintain an inventory of the mass of uranium and U-235 adsorbed by the ion exchange resin. Resin bed(s) will be removed and replaced by fresh resin before the mass of U-235 in unprocessed resin reaches the license possession limit for U-235 of 1,200 grams. Once spent resin is processed and complies with fissile exception criteria, the U-235 in that material will not be constrained by that possession limit. Spent resin will be processed, packaged, and shipped to a licensed disposal facility as LLRW. Biomass will be processed, packaged, and shipped to a municipal solid waste disposal facility.

Periodic groundwater sampling and analysis will provide the necessary data to monitor the progress of groundwater remediation, as well as to modify pumping rates to optimize groundwater remediation. Groundwater extraction, treatment, injection, and discharge will continue until COC concentrations in all wells are below the NRC Criterion. When post-remediation monitoring demonstrates that uranium concentrations remain below the NRC Criterion for a minimum of 12 quarters, treatment for uranium will be discontinued in all areas, the licensee will apply for termination of the license. It is anticipated that a demonstration that residual dose is less than 25 mrem/yr will expedite the license termination process.

5.5 ALTERNATIVES TO THE PROPOSED ACTION

5.5.1 No Action Alternative

Two alternatives to the implementation of this Plan were considered: no action, and “passive” groundwater remediation by monitored natural attenuation. No action would mean:

- Concentrations of licensed material in groundwater would not be reduced to levels that would provide for unrestricted release of the Site
- License conditions currently in effect would be maintained
- Portions of the former Site in which the concentration of uranium in groundwater exceeds unrestricted release criteria would remain released from the license
- Portions of the Site which are releasable for unrestricted use would remain under license

There is no immediate threat to public health and safety because licensed material exceeding unrestricted release criteria is present only in groundwater at depths from 5 to 30 ft below grade in the Cimarron River floodplain, and at slightly greater depths in the upland areas. However, not remediating groundwater at the site would require maintenance of the NRC license and control of access to areas where the concentration of uranium in groundwater exceeds the NRC Criterion.

Funding for decommissioning is limited to the amount available to the Trust. If groundwater is not remediated, funding may not be sufficient to maintain license controls indefinitely. Loss of control over residual licensed material could result in unacceptable exposure to licensed material in the future.

5.5.2 Monitored Natural Attenuation

Monitored natural attenuation (MNA) is a process whereby natural processes such as dispersion and dilution reduce the concentration of contaminants in groundwater over time. Long-term sampling and analysis of groundwater monitors the reduction in concentration. Should MNA be implemented at the site, license controls would remain in effect while periodic sampling and analysis of groundwater, followed by evaluation of the data, would enable the licensee to monitor the natural decline in concentration until groundwater concentrations are below unrestricted release criteria Site-wide.

As with the “No Action” alternative, funding for decommissioning is limited to the amount available to the Trust. If groundwater is not remediated, funding may not be sufficient to the NRC license and control of access to areas where the concentration of uranium in groundwater exceeds the NRC Criterion indefinitely. Loss of control over residual licensed material could result in unacceptable exposure to licensed material in the future.

5.6 AFFECTED ENVIRONMENT

5.6.1 Land Use

Prior to the transfer of the license and the property from Cimarron Corporation to the CERT, the license owned nearly 800 acres of property. The exact acreage varies over time because the north property line is the south bank of the Cimarron River, which meanders within the floodplain. The CERT currently owns approximately 500 acres of property. Of that, approximately 52 acres remain under license.

Figure 5-1 shows how the nearly 800-acre site was divided into 17 areas for final status surveys, labeled Subarea A through Subarea O in Figure 1-2. Subareas A, B, C, D, and E were released for unrestricted use in License Amendment 13, issued April 23, 1996. These were all considered “unimpacted” areas.

The two areas labeled Subarea O and Subarea J were released for unrestricted use in License Amendment 16, issued April 17, 2000.

Subareas H, I, L, and M were released for unrestricted use in License Amendment 17, issued April 23, 2001.

Figure 5-1 also shows the area that remains under license (approximately 52 acres). Most of the area within which groundwater exceeds the NRC Criterion, or within which groundwater treatment for uranium will take place, is located outside of the area that remains under license. Section 6.2, "License Condition 9 – Definition of the Licensed Site", proposes to redefine the licensed site to release areas which have been demonstrated to comply with decommissioning criteria, and to include areas which still require decommissioning.

Final Status Survey Reports have been submitted for Subareas G and N, demonstrating that those areas comply with decommissioning criteria. These two areas contain 32 of the 52 acres which remain under license. Confirmatory surveys for both areas were performed by ORAU; for Subarea G in 2001, and for Subarea N in 2002. Confirmatory surveys confirmed that these areas are releasable for unrestricted use, but NRC has elected not to release these areas until a decommissioning plan that will address groundwater exceeding the license criteria for uranium in groundwater is approved.

Approximately 24 acres of property containing two of the former processing buildings were purchased by Cimarron Holdings LLC in January 2015 (see Figure 5-2). The owner is conducting industrial/commercial operations in those facilities. This parcel contains portions of Subareas H, I, K, and L, which had been released for unrestricted use in License Amendments 16 and 17.

Approximately 117 acres of property located west of Highway 74 was sold to Snake Creek Ranch LLC in April 2015 (see Figure 5-2). This property was formerly used to grow grass for cattle feed by a third party; the current owner's plans are to use the property for grazing and ranching. This parcel contains the western half of Subarea E and all of Subarea J, which were released for unrestricted use in License Amendments 13 and 16.

Approximately 140 acres of property containing most of Subarea A was sold to Cimarron Holdings LLC in November 2017 (see Figure 5-2). This property was used to grow grass for cattle feed by a third party; the current owner's plans are to develop the property for "eco-friendly" manufacturing, warehousing and distribution. Subarea A was released for unrestricted use in License Amendment 13.

Slightly less than one acre, which includes the current office building, was sold in July 2018 (see Figure 5-2). The office building is being leased by the Trustee until its offices can be relocated to the Western Area Treatment Facility discussed in Section 8 of this Plan. This property represents a very small portion of Subareas E and I, which were released for unrestricted use in License Amendments 13 and 17.

Groundwater remediation infrastructure will span several hundred acres of Trust property. The vast majority of this infrastructure will be for the extraction and treatment of groundwater which already complies with decommissioning criteria, but which exceeds State Criteria for uranium, nitrate, or fluoride.

Groundwater remediation infrastructure associated with achieving the decommissioning criteria will be contained within approximately 12 acres of property, concentrated in the following four areas:

- Western Area groundwater extraction infrastructure will consist of groundwater extraction wells and a groundwater extraction trench contained within 6 acres located in Subarea H.
- Impacted groundwater will be transferred from Subarea H to a water treatment facility occupying less than 2 acres in portions of Subareas A and I.
- Treated water will be injected into an injection trench located in Subarea M.
- BA1 groundwater extraction infrastructure will consist of four groundwater extraction wells, two groundwater extraction trenches, and a small treatment facility, altogether occupying approximately 4 acres in portions of Subareas C and F.

Once decommissioning activities have been completed, the remainder of the property will be divested as required by the Trust Agreement. Portions of Subareas I and N, which will include the building constructed for the Western Area Treatment Facility, may be used commercially. The rest of the property is most likely to be used for agricultural development.

Prior to the construction of processing facilities, the property was used for grazing and farming. Throughout the years of construction and licensed operations, much of the property was leased to a third party for farming, grazing, and harvesting grass for cattle feed. These areas are shown in Figure 5-3. Grazing and harvesting grass for cattle feed has continued in those same areas since the decommissioning process began in 1975. The return of the remainder of the property to productive agricultural or commercial/industrial activities will represent a return to beneficial use

of the property. The Trust Agreement requires that the Trustee provide for the disposition of the property and termination of the Trust. Because the property will be releasable for unrestricted use, farming, grazing, commercial/industrial, or recreational use all represent beneficial uses.

5.6.2 Transportation Impact

Figure 1-1 shows that the site can be accessed directly from State Highway 33, State Highway 74, and a section line road that runs along the eastern edge of Section 12. All gates through which materials will be transported during construction and operation will open directly onto one of the two state highways. Both highways experience frequent traffic by freight trucks, farm equipment, and heavily loaded trucks carrying oilfield equipment, pipeline equipment, etc.

Trucks bringing equipment to the site for construction and installation of the groundwater remediation facilities will represent a marginal increase in traffic for a period of several months. Throughout the duration of remediation, trucks bringing resin to the site or taking waste material from the site will represent a minimal increase in truck traffic. Additionally, Cimarron Holdings LLC has granted unrestricted access to roads routed through their property limits. Specific details regarding anticipated personnel, equipment, and vehicle requirements to facilitate construction activities are presented in the following paragraphs. Specific details regarding potential impacts to air quality are presented in Section 5.6.6.

The average number of workers using personally owned vehicles (POVs) will vary during the various phases of construction but could range from as little as 2 workers for a single small crew to as many as 20 or more workers if several activities are occurring concurrently. The direction of their daily travel is unknown but could likely be expected to arrive to the site via Highway 74 from the Oklahoma City metropolitan area to the south, or via Highway 33 through Guthrie from the east.

During operation, the number of workers will vary daily, generally between 1 to 3 workers using POVs. The direction of their daily travel is unknown but could likely be expected to arrive to the site via Highway 74 from the Oklahoma City metropolitan area to the south, or via Highway 33 through Guthrie from the east.

The site hours for construction are anticipated to be between the hours of 6 AM and 7 PM. The site hours for operation are anticipated to be between the hours of 7 AM and 6 PM.

The anticipated types of construction vehicles are described in Section 5.6.6. The number of vehicles will be dependent on the execution plan and construction means and methods.

The types of vehicles employed during operations are described in Section 5.6.6. The number of vehicles will be dependent on the operations being performed. Routine operation and maintenance will involve only a few POV. Single over-the road trucks will enter the site to deliver materials or to ship waste. The frequency of material deliveries is addressed in Sections 8.3.2 and 8.3.3

Construction and operation supplies are likely to come from the south via Highway 74, out of the Oklahoma City metropolitan area, or from the east via Highway 33 through Guthrie.

Given that the marginal traffic impact from transporting material during construction is temporary and the long-term traffic impact during operation of the groundwater remediation systems is minimal, no traffic infrastructure improvements outside of the licensed area are needed.

5.6.3 Geology and Soils

Section 2.5 describes the geology of the Site, as well as the area surrounding the site. The installation, operation, and demobilization of groundwater remediation systems will have no impact on the geology or the soil except for the reduction in concentration of COCs that desorb from soil particles during groundwater extraction. Therefore, the impact of remaining decommissioning activities to Site geology and soil will be a positive impact.

A geotechnical investigation was performed to determine the requirements for earthwork (e.g., excavation, subgrade preparation, fill, etc.), foundations for tanks and buildings, building floor slabs, gravel bases, and pavements. The investigation included an evaluation of seismic hazards and the stipulation of seismic design requirements, as well as the requirements for installation of a septic leach field. A summary of the seismic conditions evaluated, and evaluation results, is provided in Section 2.5.3. The field activities and results of the geotechnical investigation are presented in the Geotechnical Report included as Appendix A.

Additionally, a seismic analysis was conducted on the proposed buried piping network to evaluate unacceptable risks associated with seismic activities in the vicinity of the Site. The results of the analysis indicated satisfactory buried pipe performance for each of the seismic conditions listed in Section 2.5.3.

5.6.4 Water Resources

Decommissioning activities are designed to improve the quality of the shallow groundwater at the Site, which currently discharges to the Cimarron River. Without this groundwater remediation effort, groundwater would otherwise migrate untreated to the river. Removal of contaminants from groundwater treatment will prevent future adverse impact to surface water.

During construction of groundwater remediation and water treatment facilities, surface water will be protected from impact from sediment migration during precipitation events. Best Management Practices (BMPs) for the protection of surface water will be implemented in accordance with a Stormwater Pollution Prevention Plan (SWPPP) prepared in accordance with the OPDES stormwater permit (Appendix B). The SWPPP provided in Appendix B is the one prepared for the 2017/2018 Pilot Test, which involved some of the same construction activities that will be performed during full-scale construction. This SWPPP will be revised for full-scale construction after the 90% design is complete and requests for additional information (RAIs) are received and reviewed.

Figure 5-4 shows the locations of injection and extraction trenches that have been or will be constructed in the western areas of the site. It also shows the location of the Western Area Treatment Facility (WATF), and the trenches that will be dug to run utilities, control wiring, and piping from extraction wells to the WATF and from the WATF to injection trenches. It also shows the location of Outfall 001 and the discharge piping leading to the outfall. The area within which excess spoils (displaced by imported silica gravel) will be placed is also shown on Figure 5-4. The approximate locations of BMPs installed to prevent migration of sediment to surface water also shown on Figure 5-4.

Figure 5-5 shows the locations of injection and extraction trenches that have been or will be constructed in the eastern portion of the site. It also shows the location of the BA1 Treatment Facility and the trenches that will be dug to run utilities, control wiring, and piping from extraction wells to the BA1 Treatment Facility and from the BA1 Treatment Facility to injection trenches. It also shows the location of Outfall 002 and the discharge piping leading to the outfall. The approximate locations of BMPs installed to prevent migration of sediment to surface water also shown on Figure 5-5.

Areas within which BMPs provide for protection of surface water are referred to as the “disturbed areas”. Excavated spoils and imported backfill material (e.g., silica gravel to be used as backfill

for injection and extraction trenches) will be stockpiled within the disturbed areas until they are either returned to the trenches as backfill or transported to the excess spoils placement area. It should be noted that the approximate BMP layouts depicted on Figures 5-4 and 5-5 are estimated and conceptual in nature. Additional BMPs will be installed, as required, for all additional disturbed areas such as equipment laydown areas, soil stockpile and staging areas, etc. These additional areas will be determined during detailed design and feedback from prospective bidders and incorporated in a SWPPP.

Further information on the stockpiling and management of excavated soil during construction of extraction and injection trenches is provided in Sections 8.2.2 and 8.4.1. Further information on the stockpiling and management of excavated soil during construction of water treatment facilities is provided in Section 8.3.1.

During groundwater remediation operations, groundwater will be extracted, treated, and discharged to the Cimarron River in accordance with an OPDES permit which provides for the protection of surface water. Figure 5-4 shows the location of Outfall 001, and Figure 5-5 shows the location of Outfall 002. No treated water will be discharged to onsite reservoirs; the OPDES permit makes no provision for discharge to the onsite reservoirs. Treated water discharged to the river will comply with discharge limits stipulated in OPDES Permit OK0100510 (included in Appendix H). Discharged water will have the same chemical characteristics as the groundwater that is currently discharging to the Cimarron River, except the concentrations of uranium, nitrate, and fluoride will be lower than is currently present in groundwater.

Potable water is provided by Logan County Rural Water District #2. Decommissioning operations will require the use of additional water only for sanitation; this use will be minimal and is not expected to impact users of potable water provided by the Water District.

5.6.5 Ecological Resources

As stated above and depicted on Figures 5-4 and 5-5, groundwater remediation infrastructure associated with achieving the decommissioning criteria will be contained within approximately 12 acres of property. This includes construction of two outfalls (Outfall 001 and 002) to facilitate discharge of treated water to the Cimarron River in accordance with an OPDES permit. BMCD conducted an evaluation of the flora and fauna at the site, including threatened or endangered species.

In general, the property consists of three areas of existing vegetation: Riparian, Floodplain, and Upland. The riparian area is located along the south bank of the Cimarron River at the north property boundary. The area includes a well-developed stand of phreatophyte species including cottonwood and salt cedar with an understory of wildrye, Western wheat, and seaot grasses. The existing Cimarron River floodplain is bound by the south side of the river and the bluffs. This area has a general stand of mixture of native grasses, tree and shrub species including Johnson grass, wildrye, bermudagrass, soap berry, cottonwood, Eastern red cedar, black willow, and cottonwood. The upland area has an excellent stand of generally native tallgrass prairie species including big bluestem, Indiangrass, switchgrass, little bluestem, and sideoats grass with a diverse group of forbs and wildflowers. This area has been historically mowed for hay.

The United States Fish and Wildlife Service (USFWS) lists 19 species of threatened or endangered animals, and one threatened plant, which are listed in and occur in the State of Oklahoma. Of those, four species of threatened or endangered animals occur in Logan County. These include:

- Whooping Crane (*Grus Americana*) - Endangered
- Piping Plover (*Charadrius melodus*) – Threatened
- Arkansas River Shiner (*Notropis girardi*) – Threatened
- Least Tern – (*Sterna antillarum*) – Endangered

An Oklahoma Ecological Services Field Office online project review was performed in June 2018. As part of this process, a letter was submitted stating concurrence with the online assessment concluding that the proposed Project will have no effect or is not likely to adversely affect species protected under the Endangered Species Act. No issues were raised by the USFWS regarding the Bald & Golden Eagle Protection Act and the Migratory Bird Treaty Act. The concurrence from USFWS was received by email receipt and is provided in Appendix C. The 45-day review period expired on July 22, 2018 without further response from the USFWS; therefore, the Section 7 Consultation under the Endangered Species Act is complete for this Project.

BMCD submitted a wetland delineation report to the United States Army Corps of Engineers (USACE) regarding impacts to jurisdictional waters of the United States per Section 404 of the Clean Water Act. Based on review of this submittal and follow up discussions, it was determined by USACE that Nationwide Permit 12 (NWP-12) would be required to construct the Project.

NWP-12 is specific to construction of utility line activities which result in less than ½ acre of loss of jurisdictional waters. Details regarding NWP-12 submittal are presented in Section 5.6.13.

5.6.6 Air Quality

The types of equipment that will likely be utilized during construction and operations activities which have the potential to produce air emissions are summarized below. Estimates of common pollutant constituents generated by general equipment types are presented on Table 5-1.

- Construction of remediation infrastructure: Standard earthmoving machinery and hauling equipment will be used for excavation and trenching, material handling, and clearing, grading, and utility construction. A drilling rig will be used for well installation. A crane, boom lift, or other lifting equipment may be used for equipment and structure placement. Pipe welding equipment will be used to weld piping.
- Construction of treatment systems: Standard earthmoving equipment will be used for site grading and preparation. Concrete trucks and/or mixers and finishing equipment will be used to construct concrete foundations and installation of security fencing. A crane or other lifting equipment will be used to erect the WAA treatment facility, to place tanks, and to place the BA1 uranium treatment system.
- Operation: Over-the-road trucks will transport chemicals, drums of biomass and LLRW, and other supplies. Over-the-road trucks delivering bulk liquid chemicals will use equipment to fill treatment tanks. A forklift will be used to move spent resin vessels, drums of spent resin, fresh resin drums, and bulk bags of inert material used for mixing with spent resin). A pickup truck (or similar vehicle) will be used to tow resin vessels between the BA1 treatment area and the WAA treatment facility, as well as for daily operation and maintenance.

In addition to air quality impacts from construction and operations equipment, low concentrations of nitrogen will be released to the atmosphere during the denitrification process. The extraction and treatment of groundwater, and the subsequent injection and/or discharge of treated water will have no impact on air quality.

5.6.7 Noise Impact

The extraction and treatment of groundwater, and the subsequent injection and/or discharge of treated water will not produce noise that can be heard from neighbors. Individuals working on

site will not be exposed to sound levels that would require hearing protection. Consequently, decommissioning activities will have no noise impact.

To confirm this, ambient noise levels were monitored, and anticipated noise levels were modeled based on conservative assumptions about the noise levels generated by operating equipment. A technical memorandum describing the monitoring, evaluation of data, and modeling of noise levels is included as Appendix D. The following summarizes the information presented in Appendix D.

Ambient, sound level measurements were made at six locations that were accessible and representative of noise-sensitive receivers. Ambient A-weighted Leq sound levels (defined in Appendix D) varied from a low of 34.8 A-weighted decibels (dBA) during the midnight measurements to a high of 67.8 dBA during the morning measurements.

Sound-emitting equipment that is anticipated to be used includes various equipment and pump skids, air compressors, air handling units, and building exhaust fans. All sound emitting equipment was assigned a sound pressure level of 85 dBA at 3 ft horizontally from the equipment. This is a conservative assumption, as some of the equipment may emit much lower sound levels. Based on noise level modeling, there are no significant increases to ambient sound levels at offsite receiver locations. Generally, a 5-decibel change is considered significant, and a 3-decibel change in overall sound is considered noticeable. The largest increase over the quietest measured background ambient sound level is expected to be approximately one decibel. More detailed information on anticipated noise levels is provided in Appendix D.

5.6.8 Historical and Cultural Resources

United States Department of the Interior's National Park Service maintains a list of over 90,000 historic places. The following 13 are located in Logan County:

- Guthrie, Oklahoma
 - Carnegie Library
 - Co-Operative Publishing Company Building
 - Guthrie Armory
 - Guthrie Historic District
 - Logan County Courthouse
 - Scottish Rite Temple
 - St. Joseph Convent and Academy

- Langston, Oklahoma
 - Langston University Cottage Row
 - Morris House
- Marshall, Oklahoma
 - Debo, Angie, House
 - Methodist Church of Marshall
- Mulhall, Oklahoma
 - Mulhall United Methodist Church
 - Oklahoma State Bank Building

None of these sites are located within approximately 9 miles from the Site. Several other historical and cultural resources were reviewed in March 2015. Appendix E contains a memorandum summarizing this research. From this research, no specific cultural or historical sites were identified on the Project Site.

During correspondence associated with the NWP-12 permit extension request (see Section 5.6.13), the USACE requested consultation with the Oklahoma State Historic Preservation Office to evaluate potential cultural resources in the vicinity of the Site. In August 2018, a representative from Burns & McDonnell, in coordination with the Oklahoma State Historic Preservation Office, conducted a background review of the Area of Potential Effects associated with proposed construction activities. Although no previously recorded archeological sites were identified within the Area of Potential Effects during the 2015 or 2018 reviews, guidance was requested from the State Historic Preservation Office regarding how to comply with the obligations detailed in Section 106 of the National Historic Preservation Act, in the event an artifact is encountered during construction. Feedback has not been received as of the preparation of this Plan; however, guidance will be obtained prior to initiating full-scale remediation activities.

5.6.9 Visual/Scenic Resources

The Site has lain essentially dormant for decades. The former process buildings had been removed or had been deteriorating, with no utilities provided or maintenance being performed. The nearly two acres of pavement had deteriorated, with vegetation reclaiming portions of it. Fencing had not been maintained west of Highway 74. Much of the property has become overgrown, and cedar trees have invaded large areas.

The sale of portions of the Site has resulted in the repair of fences and gates west of Highway 74. The sale of approximately 24 acres containing the former processing buildings has resulted in the renovation of the buildings, the repair of pavement, and improved fencing and gating of the Site. Landscaping on the property on which the industrial/commercial operations are being conducted has improved. These portions of the Site are significantly more appealing to the community as well as people driving past the facility on Highway 74.

Viewshed analysis has been conducted to establish the areas in which the proposed site's structures can be viewed and provide an inventory of features that could be visually impacted. This analysis is provided as Appendix F and indicates that no visual impacts to sensitive receptors are anticipated to be associated with this project. Installation and operation of groundwater extraction, transfer, treatment, and injection or discharge will not impact the visual/scenic resource of the site.

Decommissioning activities already completed have already had a positive impact on the visual/scenic resources of the Site, and completing decommissioning activities, with subsequent disposition of the property, will add to that positive impact.

5.6.10 Socioeconomic Impacts

During operation, the licensee employed approximately 175 to 200 workers at the Site. From 1975 to 1997, the licensee employed approximately 20 to 25 workers to perform decommissioning activities. As decommissioning progressed, the number of employees decreased. By the time the license was transferred to the Trust, there were no full-time workers at the site.

Proposed decommissioning activities will require support of no more than three operations and maintenance and health physics personnel. Decommissioning will therefore not significantly impact employment.

Approximately 24 acres containing the former process buildings has been sold, and that property is now used for industrial/commercial operations. The beneficial re-use of these facilities has created several jobs in addition to improving the security of the Site.

Approximately 117 acres of property west of Highway 74 has been sold, and is planned to be used for ranching, expanding the operations of a local rancher.

Upon completion of decommissioning, the remaining approximately 500 acres of property will be sold. It is presumed that a significant portion of this property will be used for agriculture and ranching, and a portion may be used to expand the industrial/commercial operations as an expansion of existing operations.

Specification sheets for construction equipment will not be generated, but standard construction equipment will be utilized as described below. Specifications for equipment utilized during operations are not developed at the 60% design phase. However, the types of equipment that will be utilized during operations which have the potential to produce air emissions are provided in Section 5.6.6.

5.6.11 Public and Occupational Health

Residual levels of radiation above the land surface site-wide are indistinguishable from background. Because impacted groundwater is not used for drinking water, irrigation, or any other activity, there is no current exposure to radioactive material or radioactivity.

Decommissioning activities will involve the concentration of uranium in anion resins, with subsequent packaging, transportation, and disposal at a licensed facility. Personnel will rarely be working in proximity to the anion resin beds (an average of less than eight hours per week), and the exposure rate at 30 cm from the resin beds has been estimated to be less than 30 $\mu\text{R/hr}$.

The treatment facility components have been designed, and operating procedures established, so that the exchange of anion resin, the process of mixing it with non-fissile material to yield a fissile-exempt material for shipping, and the packaging and loading of the fissile-exempt material for transportation and disposal are all conducted in accordance with the As Low As Reasonably Achievable (ALARA) principle. It is not anticipated that any worker will receive a total effective dose equivalency (TEDE) exceeding 100 mrem/yr.

5.6.12 Waste and Hazardous Chemical Management

Waste – Low Level Radioactive Waste

It is anticipated that each anion resin exchange will generate between 50 and 60 ft^3 of waste after blending with sufficient absorbent material to comply with the licensed disposal facility's waste acceptance criteria (WAC). During the first year of operation, as many as thirteen exchanges may occur, yielding between 650 and 800 ft^3 of LLRW. As uranium concentrations decline, anion resin exchanges may become less frequent, reducing the

volume of LLRW generated each successive year. The packaging, transportation, and disposal of spent resin is described further in Section 13.1.1.

Potentially contaminated material which cannot be practically surveyed will be drummed and disposed of as LLRW. Examples of this kind of material are gloves, disposable sampling devices, etc., which contacted licensed material that is sufficiently concentrated that it could exceed release criteria. The packaging, transportation, and disposal of this waste will be the same as for spent resin, as described in Section 13.1.1.

Waste – Solid Waste

Nitrate treatment processes will produce biomass which must be disposed of offsite.

Groundwater will be routed through uranium treatment systems prior to nitrate treatment, so this waste will not accumulate uranium; biomass will be shipped to a municipal solid waste disposal facility as non-hazardous industrial waste, as required by OPDES Permit OK0100510. No blending with inert material is expected for this material, unless absorbent must be added to reduce the liquid content. The biodenitrification system is expected to produce approximately 80 tons of waste (prepared for disposal) per year.

Upon demobilization of the treatment facility equipment used in these processes, components that can be economically surveyed for unrestricted release will be surveyed. All equipment which can be economically surveyed and demonstrated to be releasable will be disposed of at a municipal solid waste or construction and demolition landfill.

The quantities of all wastes discussed above represent an insignificant fraction of the material that the respective disposal sites receive. Section 8 contains more information on the waste-producing processes discussed above.

Hazardous Chemicals

The following sections of the DP describe the chemicals used in and waste generated by the following operations and/or processes:

- Section 8.3.2, “Uranium Treatment Systems”;
- Section 8.3.3, “Biodenitrification Systems”;
- Section 8.7.4, “Biomass Processing”.

The May 25, 2017 response to agency RAIs stated that chemicals used to treat water for injection and to process spent resin would be addressed in this plan. However, current plans are to use only inorganic absorbent to process spent resin, and with the possible exception of filtration, the water treatment systems are expected to generate water that can be injected without the addition of chemicals.

Descriptions of chemicals to be used include:

- Expected quantity
- Storage method
- Transportation mode
- Frequency of use/replacement
- For waste, the regulatory classification (LLRW or non-LLRW, hazardous or non-hazardous)

Section 13.1, “Solid Radioactive Waste” will address the storage of LLRW after processing and prior to loading into trucks for transportation to a licensed disposal facility.

5.6.13 Permits

Stormwater Permit

A Notice of Intent to comply with OPDES General Permit OKR10 was submitted to the DEQ on November 6, 2017. The DEQ authorized the discharge of stormwater in accordance with the general permit in a letter dated June 25, 2018.

As part of the OPDES General Permit requirements, a SWPPP will be developed prior to construction activities and maintained on-site. Appendix B contains a copy of General Permit OKR10 and the SWPPP that was prepared for the 2017/2018 Pilot Test. The SWPPP for the full-scale construction project will be prepared after the 90% design is complete and RAIs have been received and reviewed.

BMPs (likely to consist primarily of silt fence and erosion control blankets) will be installed, and corrective measures will be conducted and documented in accordance with SWPPP requirements. Inspections will be performed and documented throughout construction and will continue in accordance with the permit until vegetation is established and BMPs are

removed. A Notice of Termination for the OPDES General Permit will be submitted following establishment of a minimum 70% coverage with perennial vegetation.

Floodplain Permits

Portions of the groundwater remediation infrastructure will be constructed in the floodplain of the Cimarron River. An application for floodplain development was submitted to Logan County on February 9, 2017. Logan County issued Floodplain Development Permit LG-17-01 on February 28, 2017. A copy of the permit is provided in Appendix G.

The United States Corps of Engineers approved the construction of two water discharge outfalls under the Nationwide Permit for Utility Line Activities (NWP-12) in a letter dated November 9, 2015. This permit expired on March 18, 2017 and an application for permit extension was submitted on June 18, 2018. A historical and cultural resources review was submitted to the Oklahoma Historic Preservation Office on August 6, 2018. A Section 106 review of that submittal must be performed by the Oklahoma Historical Preservation Office before the United States Corps of Engineers can approve the permit extension request.

Discharge Permit

Effluents will be discharged to the Cimarron River via DEQ-permitted Outfalls 001 and 002. In accordance with OPDES Permit No. OK0100510. The OPDES permit is effective for five years and can be renewed should treatment and discharge of treated water continue. A description of the requirements of the OPDES permit is provided in Section 12.2.2. A copy of the OPDES permit is provided in Appendix H.

Underground Injection Permit

Injection of treated water must comply with DEQ's Underground Injection Control (UIC) program. A request for approval to inject treated water was submitted to DEQ on May 6, 2016, and the DEQ approved the injection of treated water in a letter dated June 13, 2016. A revised inventory detailing injection locations and quantities was submitted August 14, 2018. The DEQ approved the injection of treated water in a letter dated September 11, 2018. Because clean water will be injected into contaminated shallow groundwater, no permit is required. However, the quantity of treated water injected into each injection trench will be reported to the DEQ on a monthly basis.

5.7 ENVIRONMENTAL IMPACTS

5.7.1 Radiological Impacts

Radiological impacts may occur during operation of the groundwater remediation system as well as during dismantlement and removal. These potential radiological impacts will require mitigation.

Contamination Control

Day-to-day contamination control will be managed and monitored in accordance with the Radiation Protection Program (RPP). Rigorous implementation of the RPP will eliminate onsite and offsite radiological contamination impacts.

Airborne Contamination

Airborne radioactive contamination is unlikely because radioactively contaminated materials are either water, moist resin, or wet biomass. However, airborne radioactive contamination may be encountered in the form of a solid, liquid or particulates suspended in air. In accordance with the RPP, proper personnel practices and engineering controls will mitigate onsite and offsite impacts due to airborne radioactive contamination.

Discharge of Treated Water

During operation of the groundwater remediation system, discharge of treated water will be controlled and monitored in accordance with an OPDES permit. Treated water will contain concentrations of COCs that are less than their respective MCL and will comply with OPDES permit limits. Compliance with permit limits will be confirmed by periodic sampling as stipulated in the OPDES permit.

Civil Engineering Controls

Civil engineering controls will be required if excavation activities are required during removal of the groundwater treatment system. Standard measures will be implemented to prevent impacts due to potential radioactivity in excavated materials. These measures may include:

- Diversion of surface water away from work areas
- Covering un-active waste stockpiles
- Use of silt fence and/or filter socks

- Control and management of groundwater encountered in excavations

Accidents

There is a slight potential for radiological accidents during the decommissioning activities resulting from the uncontrolled release of radioactive materials to the work area or environment.

These releases would most likely be associated with inadvertent mismanagement of contaminated liquids in the treatment tanks and pipes. Full-time monitoring, in accordance with the RPP, will be conducted during removal of all systems. Draining of tanks and pipes before removal (or moving) will be sufficient to prevent uncontrolled release.

An uncontrolled release of radioactive material could also occur during a transportation accident. Strict adherence with NRC, DOT, and Oklahoma State waste packaging and shipping regulations will mitigate the potential for uncontrolled release due to a traffic accident.

A fire is another possible source of an uncontrolled release of radioactive materials. However, the majority of flammable or combustible materials (e.g. gasoline or diesel fuel) that will be present on Site will be radiologically unimpacted. Potentially contaminated combustibles may include dry active waste such as personnel protective clothing, rags and towels used for site cleanup and decontamination. The radioactivity contained in these materials would not be high enough to result in a significant release during such an incident.

5.7.2 Non-Radiological Impacts

Non-radiological impacts may occur during operation of the groundwater remediation system as well as during dismantlement and removal. These potential non-radiological impacts will require mitigation.

Fugitive Dust

Fugitive dust is particulate matter discharged into the atmosphere due to a construction activity such as dismantling of treatment components, stockpiling of soil, or packaging of waste. A written Dust Control Plan will be prepared and submitted in accordance with applicable County or State requirements.

Dust control requirements, summarized below, will be maintained throughout the duration of decommissioning activities:

- If needed (as determined by the Trustee Project Manager [PM] or Activity Lead), unpaved areas subject to vehicle traffic will be stabilized by being kept wet, treated with a chemical dust suppressant, or covered.
- The speed of any vehicles and equipment traveling across unpaved areas will be no more than 15 miles per hour.
- Storage piles and disturbed areas not subject to vehicular traffic will be stabilized by being kept wet, treated with a chemical dust suppressant, or covered when material is not being added to or removed from the pile.
- If needed (as determined by the Trustee PM or Activity Lead), prior to any ground disturbance, including grading, excavating, and land clearing, sufficient water will be applied to the area to be disturbed to prevent dust emissions from crossing the boundary line.
- As necessary, construction vehicles leaving the site will be cleaned to prevent dust, silt, mud, and dirt from being released or tracked off site.
- When wind speeds are high enough to result in dust emissions crossing the property line, despite the application of dust mitigation measures, grading and earthmoving operations shall be suspended.
- If required by the Dust Control Plan, hand-held dust monitoring equipment, such as DataRAM, will be utilized.

Discharge of Treated Water

During operation of the groundwater remediation system, discharge of treated water will be controlled and monitored in accordance with an OPDES permit. Treated water will contain concentrations of COCs that are less than their respective MCL and will comply with OPDES permit limits. Compliance with permit limits will be confirmed by periodic sampling as stipulated in the OPDES permit.

Civil Engineering Controls

If construction or demobilization activity results in a ground disturbance greater than one acre, a SWPPP will be prepared and implemented in accordance with DEQ requirements. The SWPPP may include requirements for:

- Erosion and sedimentation control
- Stabilization
- Pollution prevention

Accidents

A fire is a possible source of an uncontrolled release of toxic materials. Combustible materials such as gasoline or diesel fuel will be properly stored in accordance with applicable ordinances. A Fire Protection Plan will be developed and implemented in accordance with OSHA standards.

5.8 SUMMARY OF ENVIRONMENTAL IMPACTS

The decommissioning work to be completed to achieve release of the Site for unrestricted release and license termination will comply with the decommissioning criteria in 10 CFR 20, Subpart E.

Implementation of this Plan will have essentially no impact on transportation in the vicinity of the Site, air quality, noise levels, historical and cultural resources, visual/scenic resources, members of the public or workers at the Site.

Implementation of this Plan will have a positive impact on the geology and soils, water resources, and the socioeconomic environment, and will result in the beneficial use of a site that has not been beneficially used since the early 1970s.

* * * * *

6.0 REVISIONS TO THE LICENSE

6.1 INTRODUCTION AND BACKGROUND

License SNM-928 was transferred, along with the Cimarron Site, from Cimarron Corporation to the Cimarron Environmental Response Trust (the Trust) on February 14, 2011. As received, several license conditions reference documents which are no longer relevant to the decommissioning of the Site. Buildings, equipment, and soils have been decommissioned to comply with unrestricted release criteria stipulated in the license, and tie-downs which govern those aspects of decommissioning are no longer needed. License conditions should continue to list those documents that pertain to the completion of decommissioning activities. This Section proposes revisions to license conditions to more closely address current conditions and plans for the site.

6.2 LICENSE CONDITION 8 – POSSESSION LIMIT

License Condition 8(A) authorizes the licensee to possess up to 1,200 grams of “Uranium enriched to ≤ 5.0 wt. % in U-235.” License Condition 8(B) authorizes the licensee to possess up to 100 grams of “Uranium enriched to > 5.0 wt. % in U-235”. An asterisk in License Condition 8(B) refers to a note stating, “If during the decontamination of the facilities and equipment at the Cimarron Plant, uranium solutions or compounds are generated that have a U-235 isotopic content greater than 5.0 wt. %, prompt action shall be taken to degrade these materials to below 5.0 wt. % U-235.”

License Condition 8(D) authorizes the possession of up to 6,000 kgs of thorium. This license condition was added to SNM-928 to enable the licensee to possess thorium contaminated material that had been buried in BA1, and which was sent from a Cushing, OK site to package and ship for disposal. The last thorium contaminated material was shipped for disposal in 2004. There is no longer a need for a thorium possession limit.

EPM requests that License Condition 8 be amended to read:

- | | | |
|--|---|---|
| A. <i>Uranium enriched to ≤ 5.0 wt. % in U-235</i> | A. <i>Any compound</i> | A. <i>1,200 grams of contained U-235 (Note 1)</i> |
| B. <i>Uranium enriched to > 5.0 wt. % in U-235</i> | B. <i>Any compound</i> | B. <i>100 grams of contained U-235 (Note 2)</i> |
| C. <i>Natural and depleted uranium source material</i> | C. <i>Any compound</i> | C. <i>2,000 kilograms of uranium</i> |
| D. <i>Uranium enriched to ≤ 5.0 wt. % in U-235</i> | D. <i>Any compound as packaged waste in</i> | D. <i>(Notes 1 and 3)</i> |

*containers that meet
the transportation
requirements in 10
CFR 71.15*

Note 1: The total mass of U-235 possessed under Conditions 8A and 8D shall be limited to less than 0.5 effective kilogram of special nuclear material of low strategic significance. The requirements of 10 CFR Part 74.31 for the Nuclear Material Control and Accounting are therefore not applicable.

Note 2: If during the decontamination of the facilities and equipment at the Cimarron Plant, uranium solutions or compounds are generated that have a U-235 isotopic content greater than 5.0 wt. %, prompt action shall be taken to degrade these materials to below 5.0 wt. % U-235.

Note 3: Special Nuclear Material packaged for transportation that meets the fissile exempt definition in 10 CFR 71.15(c) or (d) may be handled, stored, and transported for disposal without nuclear criticality safety controls, nuclear criticality monitoring systems, or mass-based limits, and is exempt from SNM security (physical protection) requirements of 10 CFR Part 73.

Special Nuclear Material packaged for transportation meets the fissile exempt definition in 10 CFR 71.15 if it meets any one of the criteria listed in 10 CFR 71.15(a)-(f). Appendix I provides justification for the issuance of a new possession limit to License SNM-928 that applies to packaged waste that meets the requirements for transportation as “fissile exempt” material in 10 CFR 71.15.

6.3 LICENSE CONDITION 9 – DEFINITION OF THE LICENSED SITE

NRC has released significant portions of the property owned by the Trust. The Site has been divided into sixteen Subareas, labeled Subareas A through O (two Subareas, both of which contained uranium waste ponds, were designated Subarea O). Figure 1-2 shows the locations of these Subareas.

The release of portions of the Site has been documented in License Conditions 25, 28, 29, and 30; each one states that these areas are “... no longer licensed by NRC”. This release has been granted to Subareas A, B, C, D, E, H, I, J, K, L, M, and O. Two portions of the property have been demonstrated to comply with the decommissioning criteria for unrestricted use (Subareas G and N), but NRC declined to release them until a decommissioning plan providing for the remediation of groundwater was submitted. The licensee has continued to exercise license controls over all property owned by the Trust, although NRC has stated that most of the property is no longer under license.

After most of the Site was released from the license, groundwater exceeding the release criteria for groundwater was identified in some of the Subareas that had been released for unrestricted use.

Portions of Subareas C, E, F, H, and M are underlain by groundwater exceeding the release criteria for uranium. Except for Subarea F, all these Subareas have been released from license.

The Subarea designations were created to address the decommissioning of buildings, soils, and waste management or disposal facilities (impoundments, lagoons, pipelines, and burial areas). Recent reports addressing the remaining aspects of site decommissioning have abandoned reference to these Subareas, since groundwater migration from historic sources extends across these artificial boundaries. There is little relationship between those areas which license SNM-928 identifies as “licensed” and “released from license” (as shown in Figure 5-2), and those areas which contain or will contain uranium exceeding decommissioning criteria.

NRC and EPM have agreed that the license must be amended so that property which contains or will contain licensed material exceeding NRC Criteria is subject to License SNM-928. The licensee will then implement license controls in those areas for which such controls are justified in accordance with ALARA principles. This part of the license amendment request identifies those areas within which:

- Groundwater exceeds license criteria for unrestricted release
- Groundwater exceeding license criteria will be stored and treated during the groundwater remediation effort,
- Contaminated media, such as treatment resins containing concentrated uranium, will be stored and/or packaged for shipment for disposal

The proposed licensed area in the western portion of the Site is shown in Figure 6-1. The proposed licensed area in the eastern portion of the Site is shown in Figure 6-2. EPM requests that License Conditions 25, 28, 29, and 30 be deleted, and that Item #9, “Authorized Place of Use” be amended to read, “That portion of the property owned by the Cimarron Environmental Response Trust depicted on Figures 6-1 and 6-2, in *Cimarron Facility Decommissioning Plan – Rev. 1*, dated October 31, 2018.”

6.4 LICENSE CONDITION 10 – FINAL SURVEY AND ON-SITE DISPOSAL

License Condition 10 lists 39 documents (there are 40 citations, but one date is listed twice). These documents primarily address final status surveys and the burial of soil in the on-site disposal cell. Other documents referenced in License Condition 10 include license amendment requests related to the authorization to possess specific quantities of radioactive material (since incorporated into Item 6 of the license), the site radiation safety officer, and responses to NRC comments related to

groundwater assessment and remediation. This section briefly describes each document listed in License Condition 10 and provides justification to:

- Retain the document citation in License Condition 10, or
- Move the document citation to another License Condition, or
- Delete the document citation from the license.

November 19, 1985 – This letter from Kerr-McGee Corporation requested an amendment to the license to authorize possession of up to 6,000 kgs of thorium, which would allow the excavation, packaging, and shipment of thorium from the Cushing site (which has been buried at the Cimarron site) for disposal at a licensed facility. License amendment No. 3, issued in April 1986, revised Item 6(D) to authorize possession of 6,000 kg of thorium. This authorization is still present in Item 6(D) of the current license. EPM requests that License Condition 10 be amended to delete the reference to this document.

March 3, 1986 – This letter from Sequoyah Fuels Corporation (predecessor to Cimarron Corporation) requested an amendment to the license to increase the authorized quantity of < 5 wt. % U-235 from 1,200 grams to 6,000 grams, to provide latitude for the licensee to accumulate sufficient material on site to load several trucks with contaminated material for transportation to a licensed disposal facility. License amendment No. 4, issued in April 1986, revised Item 6(A) to authorize possession of 6,000 grams of < 5 wt. % U-235. However, this authorization is again limited to 1,200 grams of < 5 wt. % in Item 6(A) of the current license. License amendments No. 5 through 9 only addressed changes to later license conditions, and the authorized amount is not listed in those amendments. It appears that when license amendment No. 10 was issued on November 4, 1994, NRC reverted the authorized quantity of < 5 wt. % U-235 back to the previous 1,200 grams. EPM requests that License Condition 10 be amended to delete this document, and that Item 6(A) maintain the authorized possession limit of up to 1,200 grams of <5 wt. % U-235.

September 4, 1987 – This letter from Sequoyah Fuels Corporation requested an amendment to the license to authorize the stockpiling of material designated as “Option 2 material” in the 1981 SECY 81-576, *Disposal or Onsite Storage of Residual Thorium or Uranium (Either as Natural Ores or Without Daughters Present) From Past Operations* (hereafter referred to as “Option 2 material”) on site so that other areas could be decommissioned for release while on-site burial of this material was under consideration. License amendment No. 10, issued in November 1994, added this letter as a tie-down to Condition 10 to authorize the stockpiling of Option 2 material. Disposal of Option 2

material is complete, and authorization to create soil stockpiles is no longer needed. EPM requests that License Condition 10 be amended to delete the reference to this document.

November 2, 1989 – This submittal from Cimarron Corporation included results of the final release surveys of the MOFF facility. Subarea I, in which the MOFF plant is located, was released for unrestricted use in License Amendment No. 17, issued April 9, 2001. EPM requests that License Condition 10 be amended to delete the reference to this document.

August 22, 1990 and September 14, 1990 – The August 1990 letter from Cimarron Corporation stated that the MOFF facility had been decommissioned, that decommissioning of the uranium plant was nearly complete, and that all major exhaust systems had been removed. Consequently, there were no longer effluents to monitor, and Cimarron planned to discontinue filing effluent monitoring reports as had been required per 10 CFR 70.59. In the September 14, 1990 letter, NRC stated, “Since the reports are required for licensees authorized possession or use of SNM for processing and fuel fabrication and your license authorizes possession or use of SNM subsequent to decontamination and decommissioning only, we have no objection to your discontinuation of the effluent release reports.” Effluent release reports have not been submitted for over twenty years, and these tie-downs are no longer needed. EPM requests that License Condition 10 be amended to delete the references to these documents.

June 24, 1992 – This letter from Cimarron Corporation requested information from NRC, maintaining that NRC was causing “unnecessary delay and additional expense in decommissioning the Cimarron facilities because of indecision and non-responsiveness of the Commission.” It is not clear why this letter is referenced in Condition 10. EPM requests that License Condition 10 be amended to delete the reference to this document.

February 25, 1993 – This letter from Kerr-McGee Corporation responded to an NRC request for additional information dated January 8, 1993. This letter addressed subsidence, wind and water erosion, deed notice and location markers, all associated with the proposed on-site burial cell. It also contained a commitment to submit a radiological characterization report and complete the decommissioning of the site. On-site disposal of Option 2 material was approved by NRC in license amendment No. 10, issued November 4, 1994. Decommissioning of soil and burial in the on-site disposal cell is complete. The deed notice was filed and the corner markers (cairns) were installed. The post-closure monitoring of the cell for subsidence and/or erosion associated with the on-site disposal cell is complete. The radiological characterization report was submitted in 1994. Subarea N,

which contains the on-site disposal cell, is releasable for unrestricted use. The required 5-year monitoring period expired several years ago. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

April 19, 1994 – This letter from Kerr-McGee Corporation requested NRC approval of a procedure entitled, “Onsite Disposal Plan”. This procedure defined the responsibilities of various personnel, the characterization, transportation, and disposal of Option 2 material in the cell, the determination of total activity in the filled cell, the construction of run-on and run-off controls and the final cover, and the record of disposal. On-site disposal of Option 2 material was approved by NRC in license amendment No. 10, issued November 4, 1994. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

May 31, 1994 – This letter from Kerr-McGee Corporation responded to an NRC request for additional information dated April 19, 1994. The response addressed the final survey of Option 2 material in the on-site disposal cell, determination of the average concentration of material in the cell, Regulatory Guide 1.86 criteria, acceptance of a 100 pCi/g Option 2 limit for soil to be placed in the on-site disposal cell, hot spot averaging, the final survey of excavations, and the final survey of the disposal cell cap using the 1992 NUREG/CR-5849, *Manual for Conducting Radiological Surveys in Support of License Determination*. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

July 20, 1994 – This letter from Kerr-McGee Corporation responded to an NRC request for additional information dated July 18, 1994. It addressed how to collect soil samples and determine the distribution coefficient (K_d) value for soil in the on-site disposal cell. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

September 21, 1994 – This letter from Cimarron Corporation responded to an NRC request for additional information dated August 12, 1994. It addressed hot spot averaging of soil in the on-site

disposal cell, the analysis of quality control samples, NUREG/CR-5849 calculations, and calibration of the on-site soil counter, all associated with the placement of Option 2 material in the on-site disposal cell. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

November 3, 1994 – This letter from Cimarron Corporation responded to an NRC question raised during a teleconference conducted November 1, 1994. It addressed exposure to workers placing soil in the on-site disposal cell. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. There is no reason to maintain this tie-down in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

November 15, 1994 – This letter from Cimarron Corporation requested a license amendment to eliminate tie-downs related to Appendix A of a 1976 license renewal request, and Annex A of a 1982 license renewal request. Both Appendix A and Annex A were previous versions of the site Radiation Protection Plan. None of the referenced documents are relevant to the current license, decommissioning plan, or Radiation Protection Plan. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

December 16, 1994 – This letter from Cimarron Corporation requested a license amendment to designate Karen Morgan as radiation safety officer (RSO). Ms. Morgan has not been RSO for the Cimarron site since 2007. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

April 12, 1995 – This letter from Cimarron Corporation responded to an NRC request for additional information dated March 29, 1995. It addressed the analysis of samples from and hot-spot averaging used in the South Uranium Yard. Decommissioning and disposal of soils in the South Uranium Yard, which is part of Subarea K, is complete. Subarea K was released for unrestricted use in license amendment No. 18, issued May 28, 2002. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

June 5, 1995 – This letter from Cimarron Corporation provided a resume for Karen Morgan to justify her designation as RSO. Ms. Morgan has not been RSO for the Cimarron site since 2007. License

Condition 27(e)(3) of the current license (Amendment No. 21) states, “The Radiation Safety Officer shall be named in the licensee’s Radiation Protection Plan”, hence, neither the June 5, 1995 tie-down, nor a more up-to-date equivalent, needed be referenced in the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

July 5, 1995 – This letter from Cimarron Corporation provided a response to an NRC telephone inquiry on hot spot averaging in the South Uranium Yard. Decommissioning and disposal of soils in the South Uranium Yard, which is part of Subarea K, is complete. Subarea K was released for unrestricted use in license amendment No. 18, issued May 28, 2002. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

July 25, 1995 – This document is the *Final Status Survey Plan for Phase II Areas* (Chase Environmental Group, 1995). Subarea F is a Phase II area and is the only area in which NRC has not yet agreed that soils are releasable for unrestricted use. In August 2005, Cimarron Corporation submitted a final status survey plan in accordance with this final status survey plan and supplemented it with subsurface soil data in November 2007. In March 2013, ORAU published the analytical results for confirmatory subsurface samples selected by NRC. All results were less than one-third the license criteria for unrestricted release. However, because this Phase II area remains under license, this tie-down should be retained in the license.

August 9, 1995 and November 13, 1995 – The August 9 document is the *Final Status Survey Report, Phase I Areas* (Cimarron Corporation, 1995). The November 13 letter responds to September 5, 1995 NRC comments on the final status survey report. All five of the Phase I areas (Subareas A through E) were released for unrestricted use in license amendment No. 13, issued April 23, 1996. Groundwater containing uranium exceeding NRC criteria for unrestricted release, as well as uranium and nitrate exceeding State Criteria, is present in portions of Subareas C, D, and E. The remediation of groundwater in these areas is addressed in the decommissioning plan submitted as part of this license amendment request. Portions of Subareas C, D, and E will be drawn back under the license; those areas that should be licensed will be defined in Section 6.3 of this license amendment request. However, the final status survey of soils described in Phase I areas is not relevant to the groundwater remediation plan proposed herein. Consequently, these submittals are no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the references to these documents.

January 23, 1996 – This letter from Cimarron Corporation requested a license amendment to recognize an organization change. The organizational change reported in this submittal is no longer relevant, and the license was transferred to a new licensee in February 2011. License amendment No. 21 sets forth the organizational requirements for the Trust, which are presented in the Radiation Protection Program. This tie-down does not reflect the current licensee’s organization and is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

April 25, 1996 (Listed twice) and June 10, 1996 – The April 25 letter from Cimarron Corporation proposed an Option 2 material disposal procedure change from stockpiling to direct transportation to the on-site disposal cell. The June 10 letter from NRC approved this procedural change. Decommissioning of soil and closure of the on-site disposal cell is complete. NRC has agreed that Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. These tie-downs established requirements for work that has already been completed and are not relevant to current site conditions. EPM requests that License Condition 10 be amended to delete the references to these documents.

August 28, 1996 – This letter from Cimarron Corporation described hot-spot averaging procedures which were being used in the evaluation of material in stockpiles and the on-site disposal cell and clarified that hot-spot averaging was not performed in the five waste water pond areas. Decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. This tie-down was established to control work that has already been completed and is no longer relevant to current site conditions. EPM requests that License Condition 10 be amended to delete the reference to this document.

September 20, 1996 – This letter from Cimarron Corporation responded to an August 1996 NRC request for additional information and revised the November 15, 1994 license amendment request. Cimarron Corporation was seeking to eliminate tie-downs related to Appendix A of a 1976 license renewal request, and Annex A of a 1982 license renewal request. During the ensuing two years, additional sections of the license were determined to need revision. A new Radiation Protection Plan (RPP) was submitted in this license amendment request, which was to represent a new “Annex A” to the *Decommissioning Plan for Cimarron Corporation’s Former Nuclear Fuel Fabrication Facility* (Chase Environmental Group, 1995). That RPP has been superseded several times, and other documents referenced in this submittal are no longer relevant to the license. This submittal is no

longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

November 20, 1996 – This letter from Cimarron Corporation proposed to perform a lung fluid solubility test to determine the biological solubility of uranium in site soils. The intent of this proposal was to determine if the Option 2 limit for soil for on-site disposal should be between the 100 pCi/g and the 250 pCi/g limits for totally soluble uranium and totally insoluble uranium, respectively. The issue is now moot, since decommissioning of soil and closure of the on-site disposal cell is complete. Subarea N, which contains the on-site disposal cell, is releasable for unrestricted use. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

January 2, 1997 – This letter from Cimarron Corporation responded to NRC's December 2, 1996 comments on Annex A, the RPP submitted in the September 20, 1996 license amendment request. The RPP has been superseded numerous times since this submittal, and the 1996 RPP is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

January 28, 1997 – This letter from Cimarron Corporation responded to NRC's October 31, 1996 comments on *Final Status Survey Plan for Phase II Areas* (Chase Environmental Group, Inc., 1995). Subarea F, which is the only area in which NRC has not yet agreed that soils are releasable for unrestricted use, is a Phase II area. Cimarron Corporation submitted a final status survey plan in accordance with this final status survey plan, in August 2005, and supplemented it with subsurface soil data in November 2007. Because this Phase II area is still under license, this tie-down should be retained in the license.

May 6, 1997 – This letter from Cimarron Corporation responded to NRC's February 25, 1997 comments on the site decommissioning plan. This response addressed volumetric averaging at Uranium Ponds 1 and 2, volumetric characterization of concrete in drainage and spillways, and the State's classification of groundwater. The first two issues were addressed in subsequent decommissioning efforts. The two areas containing Uranium Ponds 1 and 2, the two Subarea O parcels, were released for unrestricted use in Amendment No. 16, issued April 17, 2000. Both NRC and DEQ approved criteria for groundwater under an unrestricted use scenario in 1999. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

May 16, 1997 – This letter from Cimarron Corporation responded to NRC’s March 5, 1997 comments on the RPP. The RPP has been superseded numerous times since this submittal, and the 1996 RPP is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

December 5, 1997 – This letter from Cimarron Corporation responded to NRC’s October 3, 1997 Comments on the *Final Status Survey Plan for Phase III Areas* (Chase Environmental Group, Inc., 1997). Final Status Survey Reports (FSSRs) for all Phase III areas have been submitted and approved by NRC. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

February 10, 1998 – This letter from Cimarron Corporation served as a letter of submittal for the June 24, 1997 *Final Status Survey Plan for Phase III Areas* (Chase Environmental Group, Inc., 1997). FSSRs for all Phase III areas have been submitted and approved by NRC. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

June 26, 1998 – This letter from Cimarron Corporation responded to NRC’s February 9, 1998 comments on the June 24, 1997 *Final Status Survey Plan for Phase III Areas* (Chase Environmental Group, Inc., 1997). FSSRs for all Phase III areas have been submitted and approved by NRC. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

July 2, 1998 – This letter from Cimarron Corporation responded to NRC’s July 1, 1998 conference call comments regarding the soil counter used to prepare the *Final Status Survey Report, Phase II Subarea J* (Nextep, 1997). With the exception of Subarea F, the NRC has agreed that all Phase II soils are releasable for unrestricted use. A July 1, 1998 letter also addressed a similar soil counter comment on the Phase III Final Status Survey Plan. FSSRs for all Phase III areas have since been submitted and approved by NRC. This tie-down regarding the traceability of the soil counter is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

February 15, 2000 – This document was the *Final Status Survey Report, Subarea K* (Cimarron Corporation, 2000). Subarea K was released for unrestricted use in license amendment No. 18, issued May 28, 2002 – This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

February 20, 2001 – This letter from Cimarron Corporation responded to NRC’s January 9, 2001 comments on the *Final Status Survey Report, Subarea K* (Nextep, 2000). Subarea K was released for unrestricted use in license amendment No. 18, issued May 28, 2002. This submittal is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

April 17, 2002 – This letter from Cimarron Corporation proposed a decommissioning schedule based on information available at that time. That schedule is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

May 10, 2002 – This letter from Cimarron Corporation revised the decommissioning schedule, revising the assumptions behind the April 17, 2002 schedule. That schedule is no longer relevant to the license. EPM requests that License Condition 10 be amended to delete the reference to this document.

In summary, only two of the 39 documents listed in License Condition 10 are still relevant to the licensing and decommissioning of the Cimarron site. Those documents are the July 25, 1995 *Final Status Survey Plan for Phase II Areas* (Chase Environmental Group, Inc., 1995) and the January 28, 1997 response to NRC comments on that final status survey plan. License Condition 27(a) references those documents that address all other aspects of site decommissioning. EPM requests that License Condition 10 be deleted and the references to the July 25, 1995 and January 28, 1997 submittals be added to License Condition 27(a).

6.5 LICENSE CONDITION 23 – ON-SITE DISPOSAL

License Condition 23 authorized the licensee to bury up to 500,000 ft³ of soil contaminated with low-enriched uranium in the location described in an October 9, 1989, submittal to the NRC. The licensee was required to monitor the disposal area for subsidence, erosion, and status of the vegetative cover for at least 5 years, and promptly repair any problems noted.

In accordance with License Condition 23, the disposal cell area was inspected and maintained. On September 19, 2002, notification was placed on the land title to declare that uranium-contaminated soil was buried on the site. The deed notice recorded the volume of soil, total uranium activity, and exact location of the buried soil. Cairns (permanent markers) consisting of concrete cylinders with brass markers were placed at the corners of the disposal cell. According to License Condition 23, the deed notice is not to be considered a restriction on the sale or future use of the site.

Although License Condition 23 required that the disposal cell be maintained for five years, it has now been maintained for over ten years, with no observable evidence of subsidence or erosion. A dense vegetative cover remains on the cell, which was sufficiently vigorous to withstand the severe drought conditions of 2011 – 2012. EPM requests that this license condition be amended to read, “The licensee was authorized to bury up to 14,000 m³ (500,000 ft³) of soil contaminated with low-enriched uranium, in the 1981 BTP Option 2 concentration range, in the location identified as Burial Area #4, in the October 31, 2018 *Facility Decommissioning Plan – Rev 1*. Notice has been placed on the land title declaring that uranium-contaminated soil has been buried on the site, and recording the volume, average uranium concentration, and location of Burial Area #4. This disposal of BTP Option 2 soils is not considered a restriction on the sale or future use of the site.”

6.6 LICENSE CONDITION 26 – RADIATION PROTECTION PROGRAM

License Condition 26 requires the licensee to implement a version of the Radiation Protection Plan (RPP) that was submitted as Annex A to the 1996 site decommissioning plan. This license condition also lists a specific set of clarifications and revisions dated September 20, 1996, January 2, 1997, May 16, 1997, June 30, 1997, January 23, 1998, June 29, 1998, October 26, 1998, and December 11, 1998. The RPP has been revised on an annual basis, resulting in 15 subsequent revisions since the last submittal referenced in this license condition.

In addition, license amendment No. 15, issued August 20, 1999, added License Condition 27(e), which provides for licensee revision of the Site Decommissioning Plan and RPP without NRC approval, provided certain conditions are met. Periodic changes have been made to the RPP each year, and annual reports of all changes made under License Condition 27(e) have been submitted to NRC, usually with complete copies of the current RPP.

License SNM-928 was transferred to the Trust on February 14, 2011. The RPP was revised significantly to reflect changes in the licensee and the licensee’s organization. The RPP has since been revised to reflect changing conditions and programs at the site; all revisions have been in accordance with License Condition 27(e).

EPM requests that License Condition 26 be amended to read, “The Licensee shall conduct a radiation protection program in accordance with the Radiation Protection Plan (RPP) submitted as Appendix N to the October 31, 2018 *Facility Decommissioning Plan – Rev 1*, as amended in accordance with License Condition 27(e).”

6.7 LICENSE CONDITION 27 – SITE DECOMMISSIONING

6.7.1 License Condition 27(a)

This license condition authorizes the licensee to remediate the Site in accordance with the April 1995 site decommissioning plan, as supplemented by eight subsequent documents. Numerous additional submittals address subsequent commitments and work to decommission the Site, particularly addressing the characterization and remediation of Site groundwater. EPM believes this license condition needs to be amended incorporate the site characterization work that justifies the re-definition of the licensed area. The amended license condition should also incorporate the groundwater remediation plan submitted in this license amendment request to provide for the completion of decommissioning activities needed to achieve unrestricted release of the Site and termination of the license. This section addresses each of the documents referenced in License Condition 27(a) and explains why each should be deleted or retained from the license. It also discusses several other submittals which EPM believes should be included in this license condition.

April 19, 1995 – This submittal was the *Decommissioning Plan for Cimarron Corporation's Former Nuclear Fuel Fabrication Facility* (Chase Environmental Group, Inc., 1995). This document provided for the decommissioning of buildings, materials, and soil Site-wide. It also assumed that active groundwater remediation would not be required. Because active groundwater remediation is required, this decommissioning plan is no longer relevant. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

September 10, 1996 – This letter from Cimarron Corporation responded to NRC's July 11, 1996 comments on the April 1995 *Final Status Survey Plan for Phase II Areas* (Chase Environmental Group, Inc., 1995). NRC's comments primarily addressed the decommissioning and final status survey of areas which were subsequently released for unrestricted use. Except for groundwater, which has received substantial characterization since that time, and for which a remediation plan is submitted herein, all the work addressed in this submittal has been completed. This submittal is no longer relevant to the license. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

May 6, 1997 – This letter from Cimarron Corporation responded to NRC's February 25, 1997 comments on Cimarron's September 10, 1996 response letter. NRC's comments addressed volumetric averaging, final survey of paved areas, groundwater classification, and the

characterization of concrete. Except for groundwater, which has received substantial characterization since that time, and for which a remediation plan is submitted herein, all the work addressed in this submittal has been completed. This submittal is no longer relevant to the license. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

August 26, 1997 – This letter from Cimarron Corporation responded to NRC’s July 1, 1997 comments on open issues related to Cimarron’s September 10, 1996 response letter. NRC’s comments addressed volumetric averaging in Uranium Ponds #1 and #2 and the characterization of concrete. All the work addressed in this submittal has been completed. This submittal is no longer relevant to the license. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

March 10, 1998 – This submittal was *Final Status Survey Report for Concrete Rubble in Sub-Area F* (Chase Environmental Group, 1998). This report presented the results of surveys of concrete rubble (primarily floor slabs and footers) which came from demolished buildings in Subarea K. NRC performed a confirmatory survey of the concrete rubble in Subarea F in June 2012, and in a letter dated September 7, 2012, NRC released the rubble for unrestricted use. EPM requests that NRC amend License Condition 27(a) to delete the reference to this document.

March 12, 1998 – This submittal was *Final Status Survey Report for Phase III Subarea O, Uranium Waste Ponds #1 and #2 (Subsurface)* (Nextep, 1998). The two Subareas identified as Subarea O were released for unrestricted use in license amendment No. 16, issued April 17, 2000. This submittal is no longer relevant to the license. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

June 15, 1998 – This letter from Cimarron Corporation responded to NRC’s May 20, 1998 comments on *Final Status Survey Report for Concrete Rubble in Sub-Area F* (Chase Environmental Group, 1998). For the same reasons described in the above paragraph on the March 10, 1998 report, EPM requests that License Condition 27(a) be amended to delete the reference to this document.

October 6, 1998 – This letter from Cimarron Corporation responded to NRC’s September 10, 1998 comments on residential inhalation dose from concrete rubble in Subarea F. For the same reasons described in the above paragraph on the March 10, 1998 report, EPM requests that License Condition 27(a) be amended to delete the reference to this document.

March 4, 1999 – This letter from Cimarron Corporation responded to NRC’s January 19, 1999 comments on *Decommissioning Plan Groundwater Evaluation Report* (Chase Environmental Group, 1998), in which Cimarron stated that groundwater in Well 1315 (in Subarea F) exceeded the criteria for uranium. At that time, Cimarron personnel did not believe that groundwater exceeding release criteria extended beyond Well 1315, much less beyond the boundary of Subarea F. NRC required additional characterization of groundwater in Subareas F and C. Since that time, substantial characterization of groundwater, not only in Subareas F and C, but site-wide, has been performed, culminating in the submittal of *Conceptual Site Model (Revision – 01)* (ENSR, 2006). Consequently, Cimarron’s response to NRC comments on the 1998 groundwater evaluation report are no longer relevant to the continued decommissioning of the site. EPM requests that License Condition 27(a) be amended to delete the reference to this document.

License Condition 27(a) Summary – EPM requests that License Condition 27(a) be amended to read, “The licensee is authorized to remediate the Licensee facility in accordance with the “Facility Decommissioning Plan – Rev 1”, dated October 31, 2018.

6.7.2 License Condition 27(b)

License Condition 27(b) establishes the radiological release criterion for uranium in groundwater, establishes a monitoring requirement to demonstrate that groundwater complies with the criterion, requires that the licensee retain control of the property until groundwater release criteria are met, and acknowledges that DEQ may require monitoring of non-radiological components of groundwater.

At the time this license condition was incorporated into the license, it was believed that uranium exceeding the license release criterion was present in groundwater in only a very limited area. It was also believed that natural attenuation would reduce the concentration of uranium in groundwater to less than the release criterion within a few years. Consequently, License Condition 27(b) required that ALL wells yield less than the groundwater release criteria for eight consecutive quarters.

Subsequent groundwater assessment has shown that groundwater exceeds license release criteria in several areas of the Site, and that natural attenuation processes alone will not reduce groundwater concentrations to less than release criteria for decades. The substantial groundwater assessment performed at the site has resulted in the installation of over 230 monitor wells at the site, many of which do not yield groundwater exceeding the release criterion for uranium.

The decommissioning plan submitted as part of this license amendment request includes a comprehensive groundwater remediation plan designed to reduce the concentration of both radiological and non-radiological COCs to less than their respective release criteria. The groundwater remediation plan includes a post-remediation groundwater monitoring plan to demonstrate that portions of the site comply with groundwater release criteria as remediation is completed in various areas. The requirement to collect and analyze groundwater samples from ALL wells for eight quarters is no longer appropriate. Incorporation of this groundwater remediation plan into License Condition 27(a) will eliminate the need to specify groundwater monitoring requirements in License Condition 27(b).

License Condition 27(b) states that DEQ may require continued groundwater monitoring. Approval of the groundwater remediation plan by both NRC and DEQ is required before groundwater remediation can be initiated. The groundwater remediation plan contains post-remediation monitoring requirements for both radiological and non-radiological COCs. Consequently, there is no longer any need to state in the license condition that DEQ may require monitoring.

EPM requests that License Condition 27(b) be amended to read, “The release criteria for groundwater at the Cimarron site is 6.7 becquerel per liter (Bq/l) (180 pCi/L) total uranium. Compliance with release criteria must be demonstrated over a period of 12 calendar quarters as described in the post-remediation monitoring plan described in “Facility Decommissioning Plan – Rev 1” dated October 31, 2018.

6.7.3 License Condition 27(c)

License Condition 27(c) includes one paragraph specifying survey methods for Waste Ponds 1 and 2 in Subarea O, and concrete rubble located in Phase II and Phase III subareas. The two areas containing Waste Ponds 1 and 2 (the two Subarea O parcels) were released for unrestricted use in Amendment No. 16, issued April 17, 2000.

Concrete rubble is present in Subareas E, G, and F. Subarea E was released for unrestricted use in Amendment No. 13, issued April 13, 1996. In a letter dated March 1, 1999, NRC stated it had no further comments regarding the survey of the concrete rubble in Subarea F. In a letter dated March 12, 2002, NRC did not comment on the rubble in Subarea G but stated that Subarea G would not be released until the licensee characterized Tc-99 contamination in groundwater in Subarea G, Waste Pond 1, Waste Pond 2, and BA1. The concrete rubble in Subareas E and F

have been released for unrestricted use, and it is the Trustee's understanding that NRC has accepted the surveys conducted for the concrete rubble in Subarea G.

In a letter dated March 12, 2012, EPM submitted information regarding the characterization of Tc-99 site-wide, including Tc-99 in and downgradient from Subarea G. In a letter dated April 22, 2013, NRC stated, "... *the NRC staff has concluded that Tc-99 will not have to be addressed in the groundwater remediation plan. However, the NRC staff requested that the post-remediation monitoring plan leading to license termination includes four calendar quarters of monitoring for Tc-99 to be collected ... to confirm that previous concentrations have remained below NRC's DCL.*" Consequently, there is no need for further characterization of Tc-99 in groundwater in Subarea G, Waste Pond 1, Waste Pond 2, and BA1.

EPM requests that the license be amended to remove this paragraph from License Condition 27(c).

6.7.4 License Condition 27(d)

License Condition 27(d) states, "Access gates to the Cimarron facility shall be locked and secured when no personnel are onsite and fences and locks will be maintained." This control of access was appropriate when the licensee maintained a crew of employees on site during normal working hours, and before all but a few dozen acres of the property had been released for unrestricted use. To effectively protect individuals from unauthorized access to radiological hazards at the site, EPM is requesting a change to this License Condition.

NRC defines a Controlled Area as "an area, outside of a restricted area but inside the site boundary, access to which can be limited by the licensee for any reason." NRC defines a Restricted Area as, "an area, access to which is limited by the licensee for the purpose of protecting individuals against undue risks from exposure to radiation and radioactive materials." Restricted Areas are always located within Controlled Areas, and Controlled Areas may occupy only a portion of the licensed site.

Figures 6-1 and 6-2 depict the licensed and Controlled Areas in the Western Areas and in BA1, respectively. The Cimarron Site presents a unique situation, in which licensed material exceeding the NRC Criterion is inaccessible because it is only present in the groundwater. Grass is harvested for cattle feed in portions of the areas within which licensed material exceeds NRC Criteria in the groundwater. EPM only permits harvesting this grass by authorized individuals.

These individuals are not exposed to radiation or radioactive material during harvesting operations. EPM may authorize access to these areas on a case-by-case basis.

This license condition is no longer necessary, because NRC regulations require that access to restricted areas be limited to individuals who have received the appropriate training. As Figures 6-1 and 6-2 show, EPM will implement access control to all areas within which operations, offices, and radioactive material storage areas are located. Additional controls will be implemented for those small portions of controlled areas that will be designated restricted areas. EPM requests that License Condition 27(d) be deleted from the license.

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7.0 ALARA ANALYSIS

7.1 DECOMMISSIONING GOAL

Section 1, “Facility Operating History”, describes how the Cimarron Site was divided into subareas for decommissioning and final status survey. Based solely on final status surveys and confirmatory surveys performed for equipment and building surfaces and surface and subsurface soil, all but three of the sixteen subareas (Subareas F, G, and N) have been released for unrestricted use. Even for Subareas F, G, and N, final status surveys and confirmatory surveys have shown that both surface and subsurface soil complies with the criteria for unrestricted release. The only environmental medium that remains to be decommissioned is groundwater.

License Condition 23(b) provides the unrestricted release criterion of 6.7 Bq/L (180 pCi/L) for uranium in groundwater. However, DEQ requires that shallow groundwater undergoing remediation must be treated to comply with lower State Criteria to obtain unrestricted release from DEQ. For uranium, this is 30 µg/L, which will vary from 30 – 40 pCi/L as the enrichment of the uranium in groundwater varies.

No unrestricted release criterion for Tc-99 is stipulated in License SNM-928. EPA has promulgated a primary drinking water standard of 4 mrem/yr for beta photon emitters. As discussed in Section 4.3.2, NRC developed a derived concentration level of 3,790 pCi/L for Tc-99, based on the 4 mrem/yr dose limit.

7.2 COST BENEFIT ANALYSIS

To terminate the site’s license, EPM must demonstrate that the criteria stipulated in License Conditions 27(b) and 27(c) have been met. As part of the decommissioning evaluation process specified in 10 CFR 20.1402, an ALARA analysis of the decommissioning effort must show that anticipated residual radioactivity levels are ALARA. 10 CFR 20.1402 states:

“A site will be considered acceptable for unrestricted use if the residual radioactivity that is distinguishable from background radiation results in a TEDE to an average member of the critical group that does not exceed 25 mrem (0.25 mSv) per year, including that from groundwater sources of drinking water, and the residual radioactivity has been reduced to levels that are as low as reasonably achievable (ALARA). Determination of the levels which are ALARA must take into account consideration of any detriments, such as deaths from transportation accidents, expected to potentially result from decontamination and waste disposal.”

Demonstration of whether it is feasible to further reduce the levels of residual radioactivity to levels below those necessary to meet the dose criteria (i.e., to levels that are ALARA) is discussed in NUREG-1757. Per NUREG 1757 Volume 2, Appendix L, the following definition applies:

"Reasonably achievable' is judged by considering the state of technology and the economics of improvements in relation to all the benefits from these improvements. (However, a comprehensive consideration of risks and benefits will include risks from nonradiological hazards. An action taken to reduce radiation risks should not result in a significantly larger risk from other hazards.) NRC Regulatory Guide 8.8, Revision 3 (1978)."

10 CFR 20.1402, 20.1403(a), 20.1403(e), and 20.1404(a)(3) contains specific requirements to demonstrate that residual radioactivity has been reduced to a level that is ALARA. NUREG 1757 Volume 2 Appendix N provides specific examples of an ALARA demonstration. ALARA for site closure for the Site can be demonstrated using the equation shown below.

$$\frac{Conc}{DCGL_w} = \frac{Cost_T}{\$2000 \times P_D \times Dose_A \times F \times A} \times \frac{r + \lambda}{1 - e^{-(r+\lambda)N}}$$

The residual radioactivity level that requires initiation of an ALARA assessment is the point when the concentration, Conc reaches the DCGL_w value (180 pCi/L). Thus, this ALARA assessment is applied after the concentration is reduced to the DCGL_w value, i.e., site remediation standards have been met. Factors in this equation are defined below along the specific values used for this ALARA evaluation.

P_D = Population density for the critical group scenario in people/m². For the Cimarron facility, the total plant area is approximately 500 acres. The sale of 24-acres of the site containing the TiO₂ and MOFF buildings may lead an estimated 24 workers assigned to the site. This scenario provides a site population density of 2.78 x 10⁻⁴ people/m². Logan County estimates the population in 2017 to be 46,800. Logan County is approximately 749 square miles (1,940 square kilometers). This scenario provides a population density value of 2.41 x 10⁻⁵ people/m². As a conservative selection, the higher value of 2.78 x 10⁻⁴ people/m² was selected.

A = Area being evaluated in square meters (m²). The total site area is approximately 500 acres, or 2.861 x 10⁶ m². The combined area of the western alluvial and BA1 is approximately 108 acres, or 4.37 x 10⁵ m². For the purposes of the ALARA calculation, the area being evaluated is 4.37 x 10⁵ m².

- $Dose_A$ = Annual dose to an average member of the critical group from residual radioactivity at the Derived Concentration Guideline Level ($DCGL_W$) results in 25 mrem/yr.
- F = Effectiveness, or fraction of the residual radioactivity removed by the remediation action. The effectiveness was assumed to be 1 (complete removal).
- $Conc$ = Average concentration of residual radioactivity in the area being evaluated in units of activity per unit area for buildings or activity per unit volume for soils. For the purposes of the ALARA calculation, the concentration of that will remain after decommissioning was assumed to be 180 pCi/L of total uranium in the groundwater.
- $DCGL_W$ = Derived concentration guideline equivalent to the average concentration of residual radioactivity that would give a dose of 0.25 mSv/y (25 mrem/yr) to the average member of the critical group, in the same units as "Conc". For the purposes of the ALARA calculation $DCGL_W$ is 180 pCi/L.
- r = Monetary discount rate in units per year. For durations exceeding 100 years, the NRC approved value is 0.03.
- λ = Radiological decay constant for the radionuclide in units per year. The radiological decay constant for uranium-234 is 2.77×10^{-6} . For the purpose of the ALARA calculation, the radiological decay constant for U-234 was selected as the most conservative value.
- N = Number of years over which the collective dose will be calculated, or 1,000 years.

For the ALARA analysis, $Cost_T$ can include all of the costs shown in the equation below.

$$Cost_T = Cost_R + Cost_{WD} + Cost_{Acc} + Cost_{TF} + Cost_{WDose} + Cost_{PDose} + Cost_{other}$$

Where:

- $Cost_R$ = Monetary cost of the remediation action (may include "mobilization" costs)
- $Cost_{WD}$ = Monetary cost for transport and disposal of the waste generated by the action

- $Cost_{Acc}$ = Monetary cost of worker accidents during the remediation action
- $Cost_{TF}$ = Monetary cost of traffic fatalities during transporting of the waste
- $Cost_{WDose}$ = Monetary cost of dose received by workers performing the remediation action and transporting waste to the disposal facility
- $Cost_{PDose}$ = Monetary cost of the dose to the public from excavation, transport, and disposal of the waste
- $Cost_{other}$ = Other costs as appropriate for the particular situation

The process steps for the ALARA calculation are as follows:

1. Assume that the concentration ($Conc$) is equal to the $DCGL_W$.

Solve the ALARA equation to calculate the total monetary value of remediation at which $Conc$ equals $DCGL_W$ (i.e., ratio of 1).

Compare the cost in the ALARA calculation to the NRC-adopted value of \$2,000 per person-rem of averted dose.

Using the values and process steps described above, the ALARA equation gives:

$$\frac{180 \text{ pCi/L}}{180 \text{ pCi/L}} = \frac{Cost_T}{\$2000 \times 0.000278 \times 0.025 \times 1 \times (4.37 \times 10^5)} \times \frac{(0.03 + 2.77 \times 10^{-06})}{1 - e^{-(0.03+2.77 \times 10^{-06}) \times 1000}}$$

The computed value of $Cost_T$ from the above equation is \$202,250. This cost represents the net present worth of future remediation to be considered when the dose exposure has been reduced to 25 millirem per year by achieving 180 pCi/L. The decommissioning cost estimate is far in excess of the NRC approved limit of \$2,000 per person-rem averted, thus no further remediation to achieve additional averted dose is justified when the concentration is reduced to 180 pCi/L.

The calculation of cost per man-rem avoided will be significantly greater than is presented in this analysis because of the following:

- A relatively high population density was assumed
- Assumed area used only the footprint of the impacted area rather than the entire site

- Removal efficiency was assumed to be 1
- The collective dose is assumed at the highest future potential dose rate over 1,000 years

Overall, the ALARA analysis shows that the site will meet the regulatory ALARA criteria upon achieving 180 pCi/L.

7.3 RESIDUAL DOSE IS ALARA

This ALARA analysis addresses only the cost to reduce the activity concentration of uranium in groundwater to less than the decommissioning criteria stipulated in License Conditions 27(b) and 27(c). It is not realistic to project that EPM can staff and operate the groundwater remediation system to achieve a lower activity of uranium in the groundwater for a cost of \$202,250 or less. It would be further unjustifiable to perform additional decommissioning of soil to achieve further reduction of the activity concentration of uranium in soil. The cost associated with reducing surface contamination levels to less than the limits stipulated in License Condition 27(c) would further impact the ALARA analysis. It is concluded that achieving 180 pCi/L is ALARA and continued spending to achieve lower groundwater uranium levels is not justified by ALARA.

The cost estimate provided in Section 16 complies with the applicable regulatory requirements of 10 CFR 70.38(g)(4)(v).

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