



UNITED STATES
NUCLEAR REGULATORY COMMISSION
WASHINGTON, D.C. 20555-0001

March 6, 2017

Mr. Todd Parfitt
Director, Department of Environmental Quality
4W Herschler Bldg
122 W 25th St
Cheyenne, WY 82002

Dear Mr. Parfitt:

I appreciate the State of Wyoming sending staff members of the Wyoming Department of Environmental Quality to the U.S. Nuclear Regulatory Commission (NRC) on December 14 and 15, 2016, to have discussions with the NRC team tasked to review Wyoming's draft Atomic Energy Act, Section 274b Agreement application. The discussions were fruitful and the review team was given ample opportunity to get clarifications to their questions related to the elements contained in the draft application.

One of the items discussed in December was Wyoming's proposal to have the NRC retain regulatory authority for six Uranium Mill Tailings Radiation Control Act (UMTRCA) Title II sites. To support our ongoing discussions on the status of these six sites, the NRC is providing site descriptions for each site (see enclosed). These descriptions include the current status of decommissioning activities, surface reclamation, ground water restoration, and the long-term surveillance plan. The NRC staff continues to review the state of Wyoming's draft application, including the request that the NRC retain authority for six UMTRCA Title II sites. We will keep you informed about the status of our review.

If you or your staff have any questions or wish to obtain additional information, please feel free to contact Paul Michalak at 301-415-5804 or Mr. Stephen Poy at 301-415-7135. You may also contact Mr. Poy via e-mail at: stephen.poy@nrc.gov.

Sincerely,

/RA/

Daniel S. Collins, Director
Division of Material Safety, State, Tribal
and Rulemaking Programs
Office of Nuclear Material Safety and
Safeguards

Enclosure:
Site Descriptions

cc: Kyle Wendtland, WY
Ryan Schierman, WY

SUBJECT: LETTER TO WYOMING DEQ RE: DESCRIPTIONS OF SIX WYOMING
DECOMMISSIONING UMRCA TITLE II SITES (March 6, 2017)

DISTRIBUTION:

MSTR r/f

MShaffer

PMichalak

ML17040A501

***by e-mail**

OFFICE	NMSS/MSTR	NMSS/MSTR	NMSS/DUWP	OGC	NMSS/MSTR
NAME	SPoy	PMichalak	TSmith	MMarsh*	DCollins
DATE	2/10/17	2/10/17	2/21/17	2/23/17	3/6/17

OFFICIAL RECORD COPY

Anadarko Bear Creek

Background

The Bear Creek UMTRCA Title II site is located in rural Converse County, Wyoming approximately 45 miles northeast of Casper and about 37 miles north-northwest of Douglas, Wyoming. The nearest sizeable town is Glenrock, about 29 miles south-southwest of the site. The Bear Creek Mill was owned and operated by Bear Creek Uranium Company (BCUC). BCUC was a joint venture of Southern California Edison and Rocky Mountain Energy. Rocky Mountain Energy was the operating partner. Company reorganization made Rocky Mountain Energy part of Union Pacific Resources. In 2000 Anadarko Petroleum Corporation acquired Union Pacific Resources.

Decommissioning

Uranium milling commenced in the summer of 1977 and continued until January 20, 1986. The ore processed in the Bear Creek mill came from several open pit mining operations in the immediate vicinity of the mill site. The milling process consisted of sulfuric acid leach, sodium chlorate oxidant, and liquid ion exchange extraction and concentration. As a result of these operations, approximately 4.7 million tons of uranium mill tailings were produced and discharged into the tailings basin as a slurry. After 1986, an interim cover and three evaporation ponds were constructed on top of the mill tailings area. The evaporation ponds were part of a ground water corrective action program which was in place from 1986 to 1996.

Reclamation at the site consisted of demolishing site structures and consolidating contaminated materials in the mill tailings impoundment (i.e., disposal cell) according to an NRC-accepted reclamation plan. This reclamation included a 10-year ground water corrective action program in which ground water that had seeped past the retaining dam was pumped back to the disposal cell for evaporation. This program ceased when it was no longer practical because of lowered ground water levels within the cell and the area below the embankment, and a lack of water in the recovery wells. The mill and solvent extraction buildings were decommissioned in 1988.

Surface Reclamation

The NRC staff concurred that site reclamation was complete in 2001 (Agencywide Documents Access and Management System (ADAMS) Accession Number ML011910515). As described in the draft Long-Term Surveillance Plan (LTSP), the land was transferred from BCUC to the U.S. Department of Energy (DOE) on November 4, 2009 (ADAMS Accession Number ML16097A617).

Ground Water Reclamation

In 2010, in preparation for license termination and transfer to the DOE, the NRC staff reviewed the ground water data from 1997 through 2010 and found that uranium concentrations had exceeded the predicted concentration at one of the Point of Exposure (POE) wells, showing that the 1997 model was incorrect. Consequently, in November 2010, the NRC staff requested that new Alternate Concentration Limits (ACLs) be proposed even though the 1997 ACLs at the Point of Compliance (POC) wells had not been exceeded (ADAMS Accession Number ML103280165). Anadarko submitted a revised ACL monitoring program in November 2011 (ADAMS Accession Numbers ML12046A858 & ML12046A854). The proposed ACLs were the same as the 1997 ACLs, however, the ground water model supporting the ACLs was revised. Specifically, the POE concentration predictions were changed due to this revised model and due to the POE wells being moved further from the tailings disposal cell. The revised ground water model predicted, as did the 1997 model, that the concentration of hazardous constituents will not exceed the ACLs at the POC wells. Based on the NRC staff's evaluation, in February 2013 Anadarko's request was approved, and the NRC staff amended the license to eliminate ground water monitoring requirements (ADAMS Accession Number ML12145A201). In October 2014, the State of Wyoming classified the ground water at the site as industrial use only, due to elevated mercury levels (ADAMS Accession Number ML14310A124).

Long-Term Surveillance Plan

In August 2009, the DOE submitted a draft LTSP for the site (ADAMS Accession Number ML092260745). However, as discussed above, issues associated with the ground water model resulted in the need to revise the LTSP. In April 2016 the DOE submitted a revised LTSP and Long-Term Care Fee (LTCF) estimate for the site (ADAMS Accession Number ML16097A617). In June 2016, the NRC staff informed the DOE that the draft LTSP and LTCF estimate did not include sufficient information for the NRC staff to complete its review (ADAMS Accession Number ML16134A192).

Current Issues

NRC is currently working with the DOE to resolve issues with the LTCF estimate.

American Nuclear Corporation – Gas Hills West

Background

The American Nuclear Corporation (ANC) UMTRCA Title II site is located in the Gas Hills in eastern Fremont County, Wyoming approximately 45 miles east of Riverton, Wyoming. The site occupies approximately 550 acres that were used for uranium mining and milling activities between 1959 and 1981. ANC suspended milling activities in 1981 due to poor uranium market conditions and began the decommissioning and reclamation process. Two tailings impoundments, totaling approximately 160 acres are located on the site. Approximately 130 acres of the site contains soil in excess of the cleanup limits that will need to be collected and emplaced in the tailings impoundments. On May 9, 1994, ANC notified the NRC staff that they were ceasing operations and going out of business (ADAMS Accession Number ML071580050). Consequently, ANC forfeited its \$3.2 million surety reclamation performance bond to the Wyoming Department of Environmental Quality (WDEQ).

Decommissioning

Since 1995, WDEQ has performed reclamation work including placement of an interim cover on Tailings Pond No.1, removal of certain windblown tailings, reclamation and capping of Tailings Pond No. 2, and ongoing ground water monitoring and seasonal ground water remediation. WDEQ has been conducting limited decommissioning and reclamation pursuant to an October 1996 Confirmatory Order (ADAMS Accession Number ML071520354) with the NRC. The Confirmatory Order has been modified several times since 1996. It was modified in August 2009 to revise some monitoring requirements (ADAMS Accession Number ML091330303); in July 2012 to temporarily suspend parts of the order until financial issues were resolved (ADAMS Accession Numbers ML120670346 & ML14122A199); and, in July 2014 to reduce the burden on WDEQ by discontinuing the ground water corrective action program and ground water sampling and to make clear that WDEQ will not have to pay for the long-term surveillance and control fund when the site is transferred to the DOE (ADAMS Accession Numbers ML14106A328 & ML14206A590). The July 2014 modification also directed that WDEQ determine the extent of the ground water plume moving off-site and, if feasible, to purchase land to extend the site boundary beyond the plume. The Confirmatory Order was last modified in January 2017 to focus the remaining decommissioning funds on stabilizing those areas of the site that have deteriorated and improving the tailings pile cover in order to prevent additional recharge of contaminants to ground water and to prevent erosion (ADAMS Accession Number ML16354B554).

Surface Reclamation

Some reclamation and stabilization of the impoundments has been completed, but neither impoundment has been reclaimed to acceptable standards.

Ground Water Reclamation

There is a plume of ground water contaminated with uranium, sulfate and chloride leaving the boundary of the site. Uranium in the ground water has migrated approximately one mile downgradient of current site boundary, while the extent of radium has been limited to within 1500 ft. of the site boundary. Chlorides and sulfates have migrated greater than one mile off-site, and sulfates may be entering the ground water from an adjacent facility. However, the current off-site ground water contamination does not appear to pose an immediate health risk because the ground water is not a source of drinking water.

Current Issues

ANC is insolvent and adequate funds are not available to complete the decommissioning of the site. The NRC staff is currently evaluating various options for funding the reclamation of the site.

Umetco Minerals Corporation – Gas Hills East

Background

The Umetco Gas Hills UMTRCA Title II site is located in Fremont and Natrona counties, approximately 60 miles east of Riverton, Wyoming. The restricted area of the site consists of approximately 542 acres, of which Umetco owns 280 acres. The remainder of the site is under the jurisdiction of the U.S. Bureau of Land Management. The uranium mill was constructed in 1959 and was shut down in 1984.

Decommissioning

Mill building decommissioning was completed in 1993. Site reclamation was completed in 2006 and approved by the NRC in September 2008 (ADAMS Accession Numbers ML081780142, ML081780626 & ML081770073).

Surface Reclamation

During field inspections of the tailings impoundment in 2009, Umetco identified incisions and rills on the tailings impoundment cover. Umetco determined that the incisions and rills were due to a deficiency in the design of the erosion protection system for the cover. In December 2010, Umetco proposed a solution to the deficiency (ADAMS Accession Number ML103640265) and the NRC staff approved Umetco's proposed Erosion Protection Enhancement in August 2011 (ADAMS Accession Number ML112060380). The Erosion Protection Enhancement work was completed in 2011 and approved as complete by the NRC staff in May 2012 (ADAMS Accession Numbers ML120790259 & ML120790266).

Ground Water Reclamation

Ground water, for the purposes of compliance by Umetco, occurs in two flow regimes of the aquifer underlying the site (the Wind River Formation). The shallowest ground water beneath one portion of the site (the A-9 Repository) is defined as the Southwest Flow Regime (SWFR) and includes the upper portion of the Wind River Formation. This regime is characterized by more oxidizing conditions. The Western Flow Regime (WFR) is characterized by deeper, more reducing conditions. A mudstone unit separates the two flow regimes. In May 2001, Umetco submitted a license amendment request for ACLs to address ground water constituents-of-concern derived from historical milling operations at the site (ADAMS Accession Number ML011440258). The ACL application was supported by ground water flow, solute transport, and geochemical models. To help validate these models, and provide ACL constituent attenuation information, Umetco prepared and implemented a ground water monitoring plan that required the comparison of ground water constituent sampling results to corresponding model-predicted concentrations. The ACLs were approved in March 2002 (ADAMS Accession Number ML021070805). However, as discussed below, some ground water issues still need to be addressed at the site.

Long-Term Surveillance Plan

The DOE submitted a draft LTSP for the site in August 2009 (ML092250176). In 2014, NRC and DOE staffs agreed to suspend the review due to tailings impoundment cover incisions and rills (discussed above) and ground water issues. (ADAMS Accession Number ML16218A144). The issues associated with the tailings impoundment cover have been resolved through the Erosion Protection Enhancement work discussed above. However, as discussed below, issues associated with the ground water at the site will need to be addressed before the DOE will resubmit the LTSP to the NRC staff for review.

Current Issues

Between 2010 and 2012, measured concentrations of chloride and sulfate exceeded model predictions in a monitoring well, located along the ground water flow path between the WFR POC and POE. In addition, sampling results raised concerns that radium-226 and radium-228 were not attenuating as predicted in the model. In January 2015, Umetco agreed to perform a ground water evaluation of the WFR and requested a license amendment implementing the evaluation (ADAMS Accession Number ML15027A095). In January 2017, the NRC staff approved Umetco's proposed ground water evaluation ADAMS Accession Number ML15211A329, ML15211A325 & ML15211A327). Umetco will install additional ground water monitoring wells in the spring of 2017. NRC staff anticipates at least one year or more of monitoring may be necessary to complete the evaluation. However, as discussed below, some ground water issues still need to be addressed at the site.

Western Nuclear Incorporated – Split Rock

Background

The Western Nuclear Incorporated (WNI), Split Rock UMTRCA Title II site is located approximately 2 miles west of Jeffrey City, in Fremont County, Wyoming. The site consists of three reclaimed tailings impoundments occupying approximately 180 acres and other reclaimed disposal areas. The Split Rock facility began operations in 1957 under Atomic Energy Commission license R-205, which became Source Material License No. SUA-56. The uranium mill operations commenced in 1958 and continued until 1981. The facility was licensed by the NRC when Title II of the UMTRCA became effective. In 1981, the facility was placed on standby status, and in 1986, the license was converted to possession only and amended to allow WNI to complete the disposal of the tailings at the site.

Decommissioning

The decommissioning of the tailings impoundments and other disposal areas began in 1988. Final surface decommissioning was conducted from 1995 through 1998. In November 2007, reclamation of the Split Rock site was considered complete when the NRC staff approved the reclamation of the final evaporation pond that had been used for ground water corrective action (ADAMS Accession Number ML072840542).

Surface Reclamation

The NRC staff approved the Construction Completion Report (CCR) and amended the license to remove the license conditions regarding surface reclamation (LC 27 and 75) in September 2000 (ADAMS accession Number ML010160187).

Ground Water Reclamation

Ground water corrective action at the site began in 1990 with the extraction of contaminated ground water in the area directly down gradient of the tailings impoundments. Recovered ground water was piped to an evaporation pond and then to an evaporation misting system. The primary purpose of the system was to accelerate dewatering of the tailings impoundments, with an ultimate goal of achieving background concentrations in the ground water. In October 1999, this goal was determined to be unachievable, and the licensee applied for ACLs (ADAMS Accession Number ML003672392). The ACLs were subsequently approved in September 2006 (ADAMS Accession Number ML062910216). Upon approval of the ACLs, the ground water corrective action program was terminated in 2006 after removing a total of 375.3 million gallons of ground water.

Long-Term Surveillance Plan

The DOE submitted an LTSP for the site in April 2012 in which the DOE identified issues associated with the ground water (ADAMS Accession Number ML12109A081). The NRC staff suspended its review of the LTSP until the ground water issues (see below) can be resolved.

Current Issues

WNI is proposing to transfer 94 percent of the land encompassing the Long-Term Care Boundary (LTCB), in fee, to the DOE. For the remainder, WNI is proposing institutional controls on privately owned lands under which WNI's analysis indicates a plume of contaminated ground water will migrate within the next 100 to 200 years. WNI's proposal would allow contaminated ground water migrating from the tailings impoundments to naturally degrade as it migrates under private property to the Sweetwater River. In January 2015, the NRC staff informed WNI that the Commission did not approve the use of specific institutional controls in its instructions to the NRC staff, but did conceptually approve the use of institutional controls and directed the NRC staff to require that WNI establish institutional controls for property it could not purchase that were both durable and enforceable (ADAMS Accession Number ML14338A463). In addition, the NRC staff determined that ground water monitoring results indicated that the contaminants in the aquifer beneath the site were not performing as predicted in the model used by WNI to support their alternative approach. Specifically, nitrate in the ground water at one down gradient monitoring well has resulted in a violation of 10 CFR 40 Appendix A, Criterion 5(B)(1) (i.e., conforming to secondary ground water standards). The NRC staff has been working with WNI to address these issues, and in October 2016, WNI submitted an alternate ground water modeling approach (ADAMS Accession Number ML16328A402). NRC staff is currently evaluating WNI's ground water modeling approach.

Pathfinder Lucky Mc – Gas Hills North

Background

The Pathfinder Lucky Mc UMTRCA Title II site is located approximately 45 miles south-southeast of Riverton, Wyoming in eastern Fremont County. Pathfinder Mines Corporation (PMC) operated the Lucky Mc uranium mill from 1958 until 1988.

Decommissioning

PMC submitted a decommissioning plan for the site in 1992 (ADAMS Accession Number ML062900208) and modified this plan by supplements from 1993 to 2002. Uranium milling facilities were decommissioned from 1993 through 1994, and windblown tailings and contaminated soils were reclaimed in 1996. An interim cover was placed on the tailings impoundment before milling operations ceased and was completed in 1993. By 2004, PMC had installed the final grading and tailings cover.

Surface Reclamation

PMC submitted the CCR to the NRC staff in April 2005 (ADAMS Accession Number ML051720392) and supplemented the CCR in October 2005 (ADAMS Accession Number ML053260284). The NRC staff performed the construction completion inspection in September 2005. Based on the NRC staff's review of the CCR and the NRC staff's site inspection results, the NRC staff determined that PMC properly implemented the reclamation plan, as amended, and approved the final construction in September 2006 (ADAMS Accession Number ML062680391). The land was transferred to the DOE in June 2010, but the license held by PMC has not yet been terminated.

Ground Water Reclamation

Ground water pumping operations at the facility began in 1980. The corrective action consisted of ground water pumping to evaporation ponds and the injection of fresh water to remove contamination and impede the flow of contaminated ground water in the aquifer. A total of 197 million gallons of contaminated water was collected from the Wind River Channel. 193 million gallons of fresh water was injected as part of the remedial effort and approximately 217 million gallons of water were pumped from the tailings by the end of 2001. In December 2000, PMC submitted a license amendment application requesting ACLs for six licensed ground water constituents at the site (ADAMS Accession Number ML010250146). In December 2002, the NRC staff approved the license amendment application. The NRC staff determined that PMC adequately demonstrated that the proposed ACLs will not pose a substantial present or potential hazard to human health or the environment, based on the WDEQ class of use of the aquifer downstream of the site and as long as the ACLs are not exceeded (ADAMS Accession Number ML023570130).

Long-Term Surveillance Plan

The DOE submitted an LTSP for the site in January 2009 (ADAMS Accession Number ML090400197). In December 2011, the DOE submitted a revised LTSP that modified the ground water monitoring at the site. In this submittal, DOE expressed concerns that exceedances of ground water ACLs in 2009 would be regarded as the DOE being out of compliance with the LTSP (ADAMS Accession Number ML12006A115). In addition, the DOE requested that acceptance of the LTSP by the NRC staff be delayed pending resolution of DOE's concern about elevated concentrations exceeding ACLs.

Current Issues

In February 2012, the DOE noted that uranium concentrations down gradient of the site POC wells exceeded the ACLs in 2011 and requested that the NRC staff resolve regulatory concerns regarding increasing concentrations with PMC before the site transitioned to the DOE¹, that the NRC staff require additional ground water monitoring of concentrations to ensure that the ground water system is behaving consistent with the approved ACLs, and that the NRC staff provide an NRC interpretation of the law and regulations governing UMTRCA Title II sites to confirm that an exceedance of State of Wyoming ground water protection standards at the POE well will not constitute an out-of-compliance situation that DOE will need to address (ADAMS Accession Number ML12065A005). In September 2012 the NRC staff requested that PMC provide a path forward for resolving the ground water issues (ADAMS Accession Number ML12248A198). In May 2013, PMC responded and proposed that they continue the ground water monitoring program at the site (ADAMS Accession Number ML13135A143).

The NRC staff is reviewing the ground water monitoring data for the site to determine if the ACLs exceedances discussed above indicate a deterioration of cell performance, legacy contamination at the site, or if the exceedances were an isolated or transient occurrence.

¹Note that while the land has transferred to the DOE, the general license under 10 CFR 40.28 is not yet in effect and as such is not yet under long-term care and maintenance by the DOE.

ExxonMobile Highland

Background

The ExxonMobile Highland UMTRCA Title II site is located approximately 35 miles north of Douglas, in Converse County, Wyoming. The facility included a conventional surface uranium mine with an associated uranium mill. The site also included ore storage pads, four mine pits, several waste rock piles, one tailings impoundment and an environmental laboratory. Surface mining, solution mining and underground mining were used to recover the uranium ore. The first uranium ore was processed at the facility in October 1972. Approximately 11.3 million tons of ore were processed at the site between 1972 and the end of operations in mid-1984.

Decommissioning

The reclamation plan for the site was approved by NRC staff in 1988. Tailings reclamation activities were completed in 1991 (ADAMS Accession Numbers are not available).

Surface Reclamation

ExxonMobile submitted the CCR for the uranium tailings impoundment in June 2002 (ADAMS Accession Numbers ML021750614 & ML021750636). Tailings impoundment reclamation consisted of evaporation of residual ponded water, placement of random fill and interim cover to facilitate residual water management, and construction of a reclamation soil cover over the tailings surface. The NRC staff approved the CCR in September 2002 (ADAMS Accession Numbers ML030640524 & ML022490336), except for the radon barrier on one portion of the site, which was later approved in February 2004 (ADAMS Accession Number ML040580375) by deleting License Condition 40 from the license.

Ground Water Reclamation

ExxonMobile submitted a ground water corrective action plan (GCAP) to the NRC staff in August 1989, and the NRC staff approved the GCAP later that month (ADAMS Accession Numbers are not available). In December 1998, ExxonMobile submitted an amendment request for ACLs for nickel, radium, and uranium (ADAMS Accession Number ML103370298). In May 1999, the NRC staff approved the ACL amendment request (ADAMS Accession Number ML092400290). In January and May 2006, ExxonMobile submitted requests to modify the ground water protection standards for chromium, uranium, selenium, and nickel at the designated POC wells in the license to reflect the current (at the time) Maximum Contaminant Levels (MCLs) for chromium, selenium and uranium and to retain the former MCL for nickel in the U.S. Environmental Protection Agency's National Primary Drinking Water Standards and incorporated in the NRC's regulations at 10 CFR 40 Appendix A, Criterion 5 (ADAMS Accession Numbers ML060260421 & ML061500019). In July 2006, the NRC staff approved ExxonMobile's request to modify the ground water protection standards (ADAMS Accession Numbers ML062060027 & ML062120252).

Long-Term Surveillance Plan

To date, the DOE has not submitted an LTSP for the site.

Current Issues

In May 2011, ExxonMobile submitted a license amendment request to the NRC staff to expand the long-term surveillance boundary to include the pit lake and establish new and revised ACLs, with associated POC and POE locations, at the site (ADAMS Accession Number ML11136A199). In May and June 2012, the NRC staff requested additional information (RAI) to support the NRC staff's review of ExxonMobile's request ADAMS Accession Numbers ML12136A176, ML12136A151, ML12172A126 & ML12172A097). In February 2013, ExxonMobile requested that the NRC staff make a "final legal determination" that the pit lake at the site facility contained 11e.(2) byproduct material, as defined under Section 11(e) of the Atomic Energy Act of 1954, as amended (ADAMS Accession Number ML13105A059). In April 2013, ExxonMobile prepared a partial response to the RAIs, along with a work plan that outlined proposed well locations, target geologic units and depths, and data collection activities for new monitoring wells (ADAMS Accession Numbers ML13109A558 & ML13109A557). In February 2014, the NRC staff concluded that the 2013 work plan was acceptable with several conditions (ADAMS Accession Number ML14029A1522). In February 2016, ExxonMobile provided NRC a monitoring well installation and regolith sampling completion report. (ADAMS Accession Number ML16067A198). Ground water monitoring data from these wells will be used to develop supplemental hydrological and geochemical characterization reports to fully address the NRC staff's request for additional information. The NRC is currently awaiting the ground water monitoring results and related supplemental hydrological and geochemical characterization reports.