UNC-ChurchRockEISCEm Resource

From: Paul Robinson <sricpaul@gmail.com>
Sent: Friday, April 19, 2019 11:48 PM
To: UNC-ChurchRockEIS Resource; UNC-ChurchRockEIS Resource; Waldron, Ashley
Cc: Susan Gordon - MASE; Chris Shuey; Eric Jantz
Subject: [External_Sender] MASE Comments without Poster
Attachments: MASE comments consolidated draft_V5_041919.pdf

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Ashley and Colleagues;

Please find comments on behalf of the Multicultural Alliance for a Safe Environment (MASE) on the Scope of the Environmental Impact Statement being prepared to evaluate the Church Rock Uranium Mill License Amendment Application Churchrock. Please consider these comments in addition to the oral comments provided by MASE and its members at the March 2019 Scoping Meetings on the Churchrock License Amendment Application in Gallup, New Mexico.

As the first several attempted to email the comments were rejected by the NRC email addressed due to full inboxes, I'm resending the Comments without the large file of the Poster mentioned below attached. a link for the Poster is provided.

MASE is a coalition of community-based groups within the Grants Mineral District (GMD) of northwestern New Mexico. MASE was founded on principles of environmental justice and its member groups seek to protect the air, land, water, and health of present and future generations. MASE includes five core groups:

Bluewater Valley Downstream Alliance (BVDA),
Eastern Navajo Diné Against Uranium Mining (ENDAUM),
Laguna-Acoma Coalition for a Safe Environment (LACSE),
Post-71 Uranium Workers Committee and
Red Water Pond Road Community Association (RWPRCA)

MASE can be reached through its coordinator, Susan Gordon at sgordon@swuraniumimpacts.or

The MASE Scoping Comments are supplemented by a Technical Poster directly related to the public health impacts of the uranium facilities being addressed in the EIS. Compiled by residents of the Red Water Pond Road Community, the Poster explores "Living with Uranium Wastes for 50 Years and Four Generations - A Navajo Community's Perspective." It was prepared and presented by Peterson Bell, Bertha Nez, Edith Hood with Teracita Keyanna, Jacquelyn Bell-Jefferson, Grace Henio and Anna Benally — Red Water Pond Road Community Association, Coyote Canyon Chapter, Navajo Nation. at *10th Conference on Metals Toxicity and Carcinogenesis* and *Center for Native Environmental Health Equity Research 2018 Annual Meeting* Poster Presentation 10/29/18. The email with the Poster attached was too larrge for the NRC EIS addresses. The poster can be found at http://www.sric.org/uranium/docs/Bell_Nez_Hood_RWPRCA_poster_v6_102418.pdf.

MASE's staff and Members, the Red Water Pond Road Community members and the Comment author look forward to opportunities to address the concerns in the attached comments, concerns raised at the Scoping Meetings and Poster and other questions that may arise as NRC and its contractors prepare the Churchrock Uranium Mill License Amendment Application EIS.

For MASE,

Paul Robinson
Research Director
Southwest Research and Information Center
PO Box 4524
Albuquerque, NM 87196-4524
phone 505-262-1862 fax 505-262-1864

On Thu, Apr 11, 2019 at 3:00 PM UNC-ChurchRockEIS Resource <UNC-ChurchRockEIS.Resource@nrc.gov> wrote:

> Greetings,
>
> Thank you for your interest in the Church Rock Uranium Mill License Amendment Request. The Nuclear Regulatory Commission (NRC) intends to use this email address to update you throughout the environmental review process.
>
> The NRC's project webpage found here: https://www.nrc.gov/info-finder/decommissioning/uranium/united-nuclear-corporation-unc-.html. The webpage includes United Nuclear Corporation's (UNC) application, the NRC's review schedule, transcripts for the March 19 and 21 scoping meetings held in Gallup, NM, and other additional information related to this project.
>
> The scoping period for the Environmental Impact Statement will close next Friday, **April 19, 2019**. Please submit any comments by this date to ensure consideration. You can use this email address (UNC-ChurchRockEIS@nrc.gov) to submit comments. Other ways to submit comments are described in the Federal Register notice (FRN) that was published on February 8, 2019 found here: https://www.federalregister.gov/documents/2019/02/08/2019-01642/united-nuclear-corporation-unc-church-rock-project
>
> Thank you,
> Ashley Waldron
>
> Environmental Project Manager
>
> U.S. NRC

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NRC Docket No. 40-8907
NRC-ID-2019-0026

MULTICULTURAL ALLIANCE FOR A SAFE ENVIRONMENT (MASE)
SCOPING COMMENTS FOR THE NRC CHURCHROCK MINE WASTE DISPOSAL EIS

Prepared by
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April 19, 2019

Introduction

Pursuant to the notice published Feb. 8, 2019 (84 *Federal Register* 2935), the Multicultural Alliance for a Safe Environment (MASE) submits the following comments on the National Environmental Policy Act (NEPA) scoping process for the application of United Nuclear Corporation (UNC) to amend NRC Source Material License SUA-1475 to authorize the disposal of 1 million cubic yards or more of uranium mine waste on UNC'S mill tailings impoundment, an NRC 11e(2) byproduct material disposal facility located in Township 16 North, Range 16 West, Section 2, McKinley County, New Mexico.

These comments supplement oral testimony given by the preparers and MASE members at the Nuclear Regulatory Commission (NRC) Scoping Meeting on March 19, 2019 in Gallup, New Mexico. They address issues that should be given a "hard look" in the Environmental Impact Statement (EIS) that NRC intends to prepare to assess the impacts of the proposed action. These comments have filed by email *UNC-ChurchRockEIS.resource@nrc.gov* as recommended in the April 11, 2019 email from Ashley Waldron, NRC Environmental Project Manager.

These comments are based on a limited review of portions of the 27-volume license amendment application ("Application"), including the Supplemental Environmental Report (SER), which comprises Volumes 25-27 of the Application. We also reference oral statements contained in the transcript of the March 19 Scoping Meeting ("Transcript"), and data and results of recent research into the mobility and toxicity of uranium mine wastes.

About MASE

MASE is a coalition of community-based groups within the Grants Mineral District (GMD) of northwestern New Mexico. MASE was founded on principles of environmental justice and

its member groups seek to protect the air, land, water, and health of present and future generations. MASE includes five core groups:

- Bluewater Valley Downstream Alliance (BVDA)
- Eastern Navajo Diné Against Uranium Mining (ENDAUM)
- Laguna-Acoma Coalition for a Safe Environment (LACSE)
- Post-71 Uranium Workers Committee
- Red Water Pond Road Community Association (RWPRCA)

RWPRCA is a grassroots organization of Diné families who have experienced and lived with the impacts of uranium mining and milling in the Church Rock mining area since the late-1960s. The Red Water Pond Road Community is located 1 mile northwest of the UNC tailings facility and is sandwiched between the Northeast Church Rock (NECR) Mine to the south and the former Kerr-McGee/Quivira Mining Church Rock I Mine to the north. Families living there trace their continuous occupancy of the area to at least the 1920s. RWPRCA's mission is to restore the land and water contaminated by uranium mining, improve the health of community members, and protect and preserve the natural and cultural environment.

For more information about MASE, its Core Groups and its work, contact its Coordinator Susan Gordon at P.O. Box 4524 Albuquerque, NM 87196; phone 505-577-8438/e-mail: sgordon@swuraniumimpacts.org.

Comments on License Application

Stantec, the firm that prepared the Application for UNC/GE, introduces Volume 1 of the document with a Disclaimer that states in part, "Stantec did not verify information supplied to it by others" (Application, Volume 1, page 3 of 92). This disclosure creates doubt about the completeness and accuracy of the entire Application. Accordingly, the NRC should independently verify information provided in the Application and disclose in the EIS any substantive changes that result from its ongoing review of the Application.

A. History of the UNC Tailings Impoundment and Longevity of Control

The EIS must fully and accurately describe the *history and existing condition* of the mill tailings impoundment's starter dam and containment cells to provide a basis upon which to determine if placement of 1 million cubic yards of mine wastes *on top of the existing mill tailings* will safely contain the underlying tailings (and the mine wastes that will rise 25 to 30 feet above the tailings impoundment) for up to 1,000 years, and in no case less than 200 years – NRC's long-established longevity of control standard promulgated in 10 CFR 40 Appendix A, Criterion 6. Transcript at 80 (Shuey Statement).

This history includes the July 16, 1979 tailings dam failure that released 94 million gallons of acidic mill effluent and 1,100 tons of tailings to the Pipeline Arroyo and thence to the North Fork of the Puerco River, a tributary to the Little Colorado River in Arizona. The spill remains the largest release of radioactive wastes, by volume, in U.S. history. This

catastrophic release traveled at least 80 miles downstream (McQuillan, Shuey and Robinson, 2017). Its radiological impacts were surpassed only by nearly 30 years of mine dewatering that turned the Puerco River into a perennial stream and released five times more radioactivity than the tailings spill (Wirt 1994; Brugge et al., 2007).

The tailings impoundment was constructed between 1974 and 1977, and became operational in May 1977 prior to the effective date of the New Mexico Water Quality Control Commission regulations. Transcript at 81 (Shuey Statement). As a result, the site on which the impoundment was built was not vetted for long-term tailings management nor required to be lined. The impoundment – unlined, located in a floodplain and sitting partially on unconsolidated alluvium and partially on bedrock – would not meet NRC's current siting and design standards for uranium mill tailings management. Transcript at 87-88 (Robinson Statement).

Furthermore, as we noted at the March 19 scoping meeting, the existing tailings impoundment may not be adequate as a long-term disposal cell for both mill tailings and mine waste. The Center for Nuclear Waste Regulatory Analysis addressed net infiltration at the Church Rock site along with several other sites (CNWRA 2015). The Center's conclusion was that firm conclusions about the integrity of the impoundment could not be drawn because of water balance errors, uncertainty in the water balance components, discrepancy between the apparent water balance, and changes in volumetric contents. The EIS should address these findings in light of the fact that more than 1 million cubic yards (about 1.2 million tons) will be placed on top of the existing tailings cells.

None of this history is reviewed in the "Licensing Background" section of the Application (at 1-1). These are relevant and critical matters that should be disclosed in the EIS because they go to the central question of whether the existing tailings impoundment is suitable for containment of mill tailings and mine waste for hundreds of years.

B. Erosion Protection in and around the Proposed Mine Waste Repository

The EIS should contain a clear and comprehensive summary of the erosional effects of flash floods in the Pipeline Arroyo both northwest and north of the UNC tailings impoundment, and inside the licensed restricted area. This critical issue of containment was mentioned several times in portions of the license application that we were able to review in the time given by NRC. Relevant excerpts from Volume 1 of the Application that underscore the importance of erosion control include:

> The NRC issued a letter dated January 7, 2003 regarding erosion protection design concerns at the UNC mill tailings site. During a site visit on June 13, 2002, the NRC identified "several areas of concern in relation to erosion protection" and issued the letter to document these concerns. The identified concerns included I) Sediment in Branch Swales, II) Sediment in North Upstream Diversion Channel and Poor Condition of the Road, III) Damage to Jetty IV) Erosion at Southwest End of Embankment, and V) Differential Settlement on Top of the Tailings Impoundment (eastern part of the Central Cell)." (Application at 1-1)

> "The existing Pipeline Arroyo will also be stabilized with a reconstructed rock jetty with a riprap chute. Stability of the Pipeline Arroyo is important for long-term viability of the Repository and the TDA [Tailings Disposal Area], to address the potential for lateral southeastward migration of the arroyo that could lead to embankment erosion." (Application Volume 1 at 1-5 to 1-6.)
>
> "Progressive scour and undermining of the jetty has led to ongoing concerns that loss of the jetty will result in uncontrolled lateral scour in the arroyo toward the tailings embankment. Other than the erosional pathway, the Pipeline Arroyo downstream of the jetty appears stable (based on aerial imagery), with some historical deepening and widening, but with no lateral movement. Although historical images show no lateral movement in the last decade, further down-cutting in the pathway and undercutting of the banks could cause episodic bank failures and pathway shifting toward the TDA. That the pathway would shift far enough to the east to threaten the TDA embankment is unlikely; however, the available bedrock information indicates that migration will not be limited by a bedrock control. Besides the erosional pathway, the engineered arroyo channel between the jetty and the southern end of the TDA has been stable with no meandering since at least 1981; although, similar to the erosion pathway, lateral migration will not be limited by bedrock. A large meander bend in the Pipeline Arroyo exists downstream of the TDA." (Application, Volume 1, at 2-4.)

The Application (Volume 1 at 2-4, page 35 of 92) refers to aerial photos that document changes in the drainage patterns around the tailings impoundment. The aerial imagery is found in the License Amendment Application (LAA) Appendix I, Northeast Church Rock 95% Design Report: Mill Site Stormwater Controls (ML18267A240).

App. I – p.28-38/299 – Fig I.7.1-7.10 – The chronological series of aerial photos does not show the Northeast Churchrock Mine site or the whole Pipeline Arroyo drainage. As a result, the aerials are not sufficient to identify land-use conditions on and around the mine site and in the Pipeline Arroyo watershed. Analyses of land-use changes in the mine area and the rest of Pipeline Arroyo watershed are needed to evaluate the effectiveness of the proposed repository in perpetuity. The EIS should include aerial photography and analyses of those images from the NECR Mine site and the whole Pipeline Arroyo watershed, not just of the mill and tailings areas.

App. I 39/299 – Fig I.7.1-12 – This image shows "existing ground" – 6875 famsl [feet above mean sea level]– in jetty area, at an elevation that is *below* the depth where "groundwater was encountered during drilling in two of the boreholes within the repository footprint (TI-B10 and TI-B11). The groundwater elevation in these boreholes was approximately 6,885 famsl."

Observations of aerial imagery not identified in the LAA include:

7.1 – 1954 – The earliest image in the series appears to show areas of field crop cultivation by pre-mining residents in the area now under north tailings cell. The LAA does not indicate whether this is the earliest available image of the area of interest.

7.2 – 1962 – This image appears to show extensive use of cross-channel berms to manage flows in area under north tailings cell before mine water discharges reported.

7.3 – 1978 – Pipeline Arroyo appears to be flowing with mine water discharges.

7.4 – 1981 – Mine water flows continue in Pipeline Arroyo.

Additional comments on Appendix I of the LAA include:

> "[S]tormwater controls for temporary support facilities, including temporary haul roads, were designed for the 10-year flood. These design elements include roadside ditches, culverts, and stormwater ponds shown in Attachment D" (App. I at 48.)

Design for a 10-year flood may not be adequate for protection of the temporary transportation system. As shown in the photos on page 6 below, riprap installed in the bottom of the Pipeline Arroyo under the new "Kerr-McGee Mine Bridge" (the rebuilt bridge on Red Water Pond Road that crosses the Pipeline Arroyo at the southwest corner of the Quivira Mine site) in late June 2018 ("A") was dislodged and washed away by a flood event on July 16, 2018 ("B"). As of March 2019 (Photo "C"), this riprap was still missing.

As no meteorological data are gathered at the mill or mine site or elsewhere in the Pipeline Arroyo watershed, no information is available as to whether the July 16 evident was greater than or lesser than a 10-year flood event. Localized high intensity thunderstorms over the Pipeline Arroyo will not be observed at the Gallup Airport weather station more than 15 miles away.

App. I at 64 – Flow flood calculations should consider sheet flow and potential for prevalence of low infiltration, soils at surface.

App. I at 92 – The LAA appears to have monitored "Flow into Pipeline Arroyo West Fork" above the location of the reconstructed arroyo channel near the Nez residence – we call this the "Mine Water Arroyo" –that connects to the "West Fork of the Pipeline Arroyo." This location fails to monitor flow in the "West Fork of the Pipeline Arroyo" that collects water from a larger area than the "Mine Water Arroyo," which emanated from the southern reach of the NECR Mine in Section 35 next to the mine-water treatment ponds.

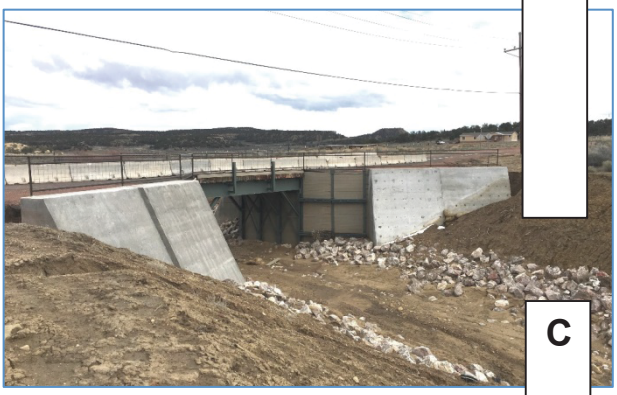


Photo A (top left): Riprap installed in bottom [illegible]eline Arroyo as seen on June 26, 2018. Photo B (top right): Riprap is missing following a flash floo[illegible] July 16, 2018. Photo C (above left) shows same location in March 2019.

The "West Fork of the Pipeline Arroyo'[illegible]erated enough flood flow to move riprap that appears to be greater than 12 inches d[illegible]ter and eroded soil that was installed following completion of bridge reconstruction. The erosion experienced along this stretch of the Pipeline Arroyo next to the southwest corner of the Quivira Mine site should be evaluated in the EIS to determine how to prevent such severe and rapid deterioration of the armor designed to protect remediation structures and the proposed repository.

NRC should discuss in the EIS whether the bottom and sides of the Pipeline Arroyo should be armored with gabions, which are riprap enclosed in wire mesh and anchored to the bottom of the wash. Gabions should be considered at all locations where riprap is being proposed to strengthen the erosion resistance of the proposed project.

App. I – 243/299 – Fig. 1.a - The 2D existing terrain model illustrated does not include all of mine site and Pipeline Arroyo watershed. The EIS should include existing terrain models that include the mine site and the rest of the Pipeline Arroyo watershed, especially upstream (to the west) of the Quivira Mine.

App. I at 252 – Fig. 6b – Major floods are identified as generating flows with a maximum depth in the range of 9 to 12 feet for the North Cell Channel and Alluvial area, Pipeline Arroyo.

App. I at 253 – Fig. 7 - Cross-section views of project flood flows during Probable Maximum Flood (PMF) events show depth of 7 to 8 feet of water.

App. I at 254 – Fig 8 – This figure shows that flood waters will approach the edges of the tailings repository, including areas inside the north berm during all of the possible floods considered — 5-year, 100-year and PMF.

The figures indicate there is not an adequate buffer between the anticipated floods and the reclaimed mounds of mill and mine waste. The EIS should analyze the close proximity of the flows to the disposal area and compare it to the proximity of flood flows predicted at other reclaimed uranium mill tailing piles currently under the jurisdiction of USDOE. The EIS should evaluate whether the proposed design that allows for flood flows at the margin of the proposed disposal area meets NRC disposal criteria.

App. I at 275 – Here, the application makes a startling admission that the rock jetty located in the Pipeline Arroyo between the mill site to the west of Route 566 and the evaporation ponds at the tailings site may not be adequate to prevent overtopping of runoff:

> "The buried rock 'jetty' was designed as part of the current reclamation design (Canonie, 1991) previously approved by [NRC]. The jetty is a buried rock slope located in the vicinity of the nickpoint within the flow path of the Pipeline Arroyo. The nickpoint is an area of outcropping sandstone that narrows the flow channel of the arroyo and forces flow eastward toward the tailings area. The existing jetty consists of basalt riprap with a median rock size (D50) of 6 inches. The design of the jetty currently in-place is intended to prevent headcutting and erosion of the existing flow channel, *but the design is not robust enough to manage large overtopping flows in the vicinity of the jetty*" [emphasis added].

Residents of the mine site area, and members of the public, have not been provided opportunities to tour the Pipeline Arroyo within the tailings repository, despite many years of requests. NRC and the Applicant should conduct tours of the Pipeline Arroyo so neighbors and members of the public can observe conditions at this critically important location directly, rather than only through selected photos.

App. I at 264 – That groundwater was encountered below the disposal site suggests that the subsurface below the repository is not "dry". The EIS should independently verify the extent, flow path and chemistry of groundwater under the tailings repository and along the Pipeline Arroyo in what is called the Southwest Alluvium.

App. I at 289 – The proposed Pipeline Arroyo excavation depth – West side 6890 – will reach the approximate depth of groundwater that "was encountered during drilling in two of the boreholes within the repository footprint (TI-B10 and TI-B11). The groundwater

elevation in these boreholes was approximately 6,885 feet amsl." The EIS should identify the current and potential future distribution of groundwater along the Pipeline Arroyo and under the tailings disposal sites and consider the potential impacts of that water on the durability of proposed arroyo armor and the stability of the tailings impoundment.

App. I at 291 – "[For] satisfactory compaction of the subgrade and fill materials, it may be necessary to adjust the water content of the materials at the time of construction. This may require either water to be added to soil that is too dry, or the scarification and aeration of soils that are too wet." Based on the documented damage to the riprap and stream bottom at the "Kerr-McGee Mine Bridge" on the "West Fork of the Pipeline Arroyo" in July 2018 (photos above), the EIS should reevaluate the adequacy of the stream bottom and stream side installation proposed by the Applicant for long-term stability and durability.

App. I at 291 – "Any soft soils or unsuitable bearing materials should be compacted or removed and replaced with controlled fill similar in composition to the surrounding soils. If wet and/or soft soils are encountered which cannot be replaced with dry soils or scarified, they can typically be stabilized with materials such as recycled, crushed concrete or crushed stone that is clean, angular, and greater than 3 inches in size." Bare soil, whether compacted well or not, is not likely to be stable during erosive, high-intensity rains such as that which damage the erosion control structures under the bridge on the West Fork of the Pipeline Arroyo in July 2018. The EIS should evaluate alternative technologies to strengthen the diversion of the Pipeline Arroyo and determine if the Arroyo can be prevented from degrading the tailings repository during the next millennium, and beyond. The rock layer installed on the base of the "West Fork of the Pipeline Arroyo" did not survive the first storm its was subjected to in July 2018.

Merely patching the stream bed with rock and crushed concrete is not likely to provide successful, full scale erosion resistance. The EIS should evaluate long-term monitoring, maintenance and repair costs of attempting to construct a permanent waste repository next to an actively eroding arroyo. The ephemeral nature of flows in the Pipeline Arroyo does not reduce or eliminate the likelihood of highly erosive runoff events.

C. <u>Lack of Site-specific Meteorological Data Inhibits Accurate Assessment of Impacts of Flash Floods</u>

The Application (at 33; SER at Figure 3.6-1) uses climate data from the Gallup Municipal Airport (GMA), located more than 15 miles away from the UNC mining complex, to estimate effects of precipitation events. The Gallup data are from a site that is open and flat and far removed from the NECR Mine-Red Water Pond Road area. Weather in Gallup is much different than weather in the area near the tailings impoundment and NECR Mine. Storm events, especially in the summer, are often volatile, fueled by dramatic elevation changes from the three main canyons that feed the Pipeline Arroyo drainage system. Transcript I at 45-46 (Thompson Bell statement).

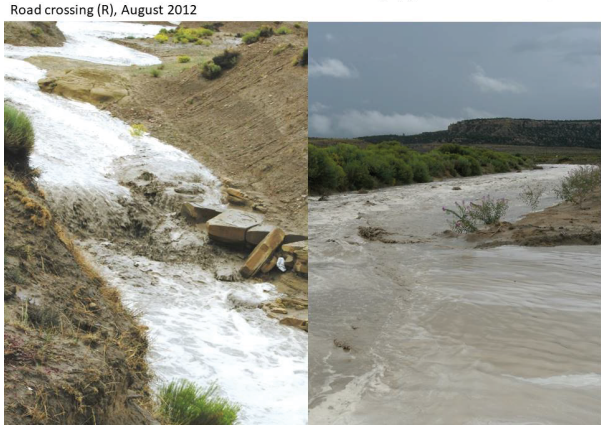
The SER (at 61) reports that a single meteorological station was operated at the mill from 1977 to 1978, and that the resulting met data were summarized in a 1981 report by the

consulting firm D'Appolonia. It opines, based on the conclusions in the 38-year-old report, that "the Gallup ASOS site will provide a reasonable representation of the meteorological conditions observed at the Mill site." A "reasonable representation" is not a rigorous test for high-elevation canyon country prone to intense, short-term precipitation events.

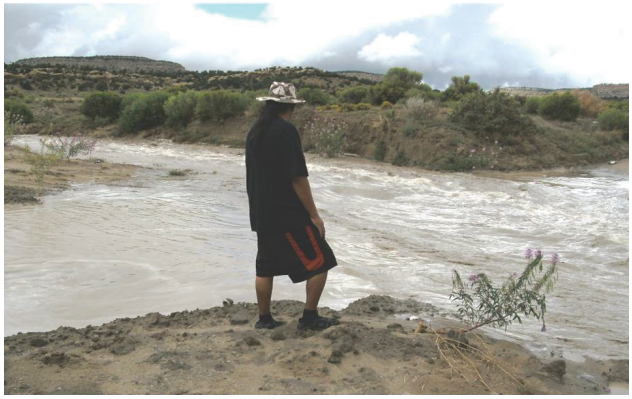
Recent site-specific climate data is needed to support the application. Passive met stations can be placed in and around the site and in the canyons northwest of the site. Weather monitoring can and should be done as the application process moves forward so that new, local meteorological can be made available to the public and summarized in the EIS.

As we showed at the March 19 scoping meeting, flash floods have been commonplace in the Pipeline Arroyo and in and around the UNC restricted area over the past 20 years. Transcript I at 81-83 (Shuey Statement). Photos by RWPRCA members and SRIC staff from 2006 and 2012 illustrate the intensity of flood waters surging through the Pipeline Arroyo just north of the tailings impoundment, and water ponding in the same area outside of the stream channel. These are just a sampling of the many photos we have that reflect recent flood events, rather than the 40-year-old data offered by the Applicant.

Flood waters in Pipeline Arroyo at Red Water Pond Road bridge (L), downstream at the Pipeline Road crossing (R), August 2012



Flooding in Pipeline Arroyo at the Pipeline Road crossing, August 2012.



Flash flood at Old Church Rock Mine, August 2006.

Ponding of flood waters in area north of UNC tailings North Cell, September 2006.

D. Regulatory Requirements

> p. 15-3. "The 11e.(2) licensee must provide documentation showing necessary approvals of other affected regulators (e.g., the U.S. Environmental Protection Agency or State) for material containing listed hazardous wastes or any other material regulated by another Federal agency or State because of environmental or safety considerations."

Even though the State of New Mexico has not had regulatory authority over the NECR Mine site since 2003 and the mill and tailings impoundment since 1986, the state Environment Department and Mining and Minerals Division should be invited to review the Application and comment on issues that should be addressed in the EIS.

> p. 16-6 - "The 11e.(2) licensee must provide documentation showing approval by the Regional Low-Level Waste Compact in whose jurisdiction the waste originates as well as approval by the Compact in whose jurisdiction the disposal site is located, for material which otherwise would fall under Compact jurisdiction."

As the mine waste is in fact waste from mining of materials other than radium, the NRC EIS should include a reevaluation of whether the project should be subject to approval under the Regional Low-Level Waste Compact.

> p. 16-8 - "UNC requests an exemption from NRC to 10 CFR Part 61, under 10 CFR Part 61.6 as part of this LAR, since the placement of the material will provide added protections for public safety and the environment, to the existing licensed 11e.(2) byproduct disposal facility, as demonstrated by this design."

The test of whether an exemption from the requirements of 10 CFR Part 61 governing land disposal of radioactive waste is a Commission finding that the activity "will not endanger life or property or the common defense and security, and is otherwise in the public interest" (10 CFR 61.6). The EIS should evaluate whether placing mine wastes on top of the tailings in a manner that would allow flood water to reach the edge of the repository for all floods greater than the 5-year event is in the "public interest".

E. Waste Volumes May Be Underestimated

The volume of mine wastes that will be moved from the NECR Mine site to the UNC tailings impoundment is likely to be underestimated (Shuey 2009). EPA's Engineering Evaluation/Cost Analysis (EE/CA) (USEPA 2009) stated "there is insufficient data to confidently define the depth of contamination" beneath mine-water ponds at the NECR site (USEPA 2009 at 13). An inspection of plan-view and cross-section diagrams of the mine-water ponds contained in the EE/CA revealed that the existing profiles of the ponds range from about 20 feet to more than 60 feet deep. Furthermore, MWH, UNC's and GE's technical consultant, collected soil samples from borings up to 45 feet deep in Ponds 1, 2 and 3. This information suggested at the time that waste depths may be much greater than the 10 feet depth used to calculate the waste volume in Table 3.1 of the EE/CA. We find no

new information or analysis in the Application that would change our previous analysis. Indeed, the SER (at 17 and 22) also appears to accept the current mine waste volume estimate without reference to subsurface studies.

Furthermore, former UNC worker Scotty Begay, who participated in demolition of the mill and removal of mill equipment and debris to the NECR Mine site, has stated in separate comments that numerous waste streams – cables, tanks, vehicles, paperwork – are buried on the mine site. We cannot determine if the Application discloses the existence of these buried wastes, or estimates the volume of materials they contain.

The EIS should address how an increase in the estimated mine waste volume would affect the design of the repository – its height and areal extent – and the length of time required to move the wastes.

F. Waste Characteristics and Final Disposition of Wastes at Remote Sites

The Application at 1-5 states:

> "The mine waste cleanup level for radium 226 (Ra-226) is 2.24 pCi/g and the cleanup level for natural uranium is 230 mg/kg. Mine waste that contains 200 pCi/g or more of Ra-226 and/or 500 mg/kg or more of total uranium will be segregated from lower activity mine waste and transported to an off-site, licensed and controlled disposal or reprocessing facility." (Application at 1-5.)

The Application is not clear about where the 200 pCi/g (230 mg/kg) uranium clean-up level will be applied and what it will be applied to. If it's applied on the mine site and in adjacent off-site areas, that concentration would represent a substantial increase over local uranium-in-soil background levels, which ranged from 0.7 to 2.6 mg/kg in soil sampling conducted in 2004-2007. The uranium clean-up level also is 85 times higher than the crustal average (2.7 mg/kg). This is an unsafe level for residential areas near the site. The EIS should assess the impacts of this unacceptably high uranium clean-up goal or explain whether residual uranium-soil concentrations will be reduced indirectly through compliance with the Radium-226 clean-up standard of 2.24 pCi/g.

With respect to waste characteristics, the Application is also not clear about the disposition of Principal Threat Waste (PTW) or whether the mine site, after waste removal is completed, will be protective of public health.

We note that the Application identifies the White Mesa Uranium Mill near Blanding, Utah as the destination for PTW (SER at 1). (Another licensed disposal facility near Clive, UT is also identified as a possible destination.) However, no information is provided on the adequacy the White Mesa Mill site to provide long-term isolation of the waste already at the site or the additional waste from the UNC NECR mine. No information is provided as to the environmental risk associated with the White Mesa site would be shared by GE/UNC, EPA and the NRC were the UNC waste added to the wastes already in place at the White Mesa site.

The SER does not fully describe the procedure for approval of alternate feed materials at the White Mesa Uranium Mill. The mill operator has ceased the processing of uranium ore for the past several years and has been limiting its processing activities to the alternate feedstocks and ore processed primarily for its vanadium content. Each batch of alternative feed stock processed at the White Mesa facility has been subject to a license amendment application and review process. Such a process should be anticipated before acceptance of the PTW from the NECR mine for disposal at the White Mesa site.

Energy Fuels representatives have offered the White Mesa site as a facility to receive mine waste requiring offsite disposal from the clean up of abandoned uranium mines on the Navajo Nation at meetings of the Navajo Nation's Diné Uranium Remediation Advisory Commission (DURAC). At the DURAC meetings, Commission members expressed concern about the potential long-term liability for the costs of full cleanup and decommissioning of the White Mesa mill and tailings facility if Navajo uranium mine waste were to be disposed there.

The preferred alternative identified in the SER should be reassessed to consider the need for a White Mesa Mill license amendment and risk of long-term liability, and the impact of such a licensing amendment process on the timing of the NECR remediation project.

The SER also does not address whether the White Mesa Mill has capacity for the unidentified volume of PTW anticipated from the NECR mine site. White Mesa Mill owners submitted an application to construct new tailings ponds to replace aging facilities in 2018. The EIS should address whether the proposed recipient of the PTW has license authority and sufficient disposal capacity for permanent disposal and isolation of the principal threat wastes. Licensing activities for the White Mesa facility are available on the Utah Department of Environmental Quality web site at https://deq.utah.gov/legacy/businesses/e/energy-fuels-resources-usa/white-mesa-uranium-mill.htm.

The Application's identification of potential off-site disposal sites does not include USDOE's Crescent Junction, UT disposal site for Title II Moab mill tailings (see, https://www.gjem.energy.gov/moab/project_docs/crescentjunction.htm). This site meets current NRC siting and design requirements and could be a destination for Navajo uranium mine wastes if current statutory restrictions were lifted. Transcript at 89 (Robinson Statement). The EIS should add the Crescent Junction site to its evaluation of potential off-site disposal facilities.

Maps in the Application show that the NECR Mine site contains two shafts and several mine vent holes among other facilities. Some Churchrock-area residents, citing comments of Diné medicine persons, have recommended the EIS include an alternative of placing as much mine waste as possible underground because that is where the material came from originally. Such an alternative would reduce the amount of mine waste requiring movement off the mine site. Disposal in shafts or in underground stopes could affect

recovering water levels and water quality. Impacts of a subsurface disposal option would need to be considered in the EIS.

G. Cover Design Objectives

The SER (at 19) lists the remedial objectives for the proposed project as "[p]revent[ing] exposure to current and future human and ecological receptors from internal/external radiation, ingestion, dermal contact, and inhalation (i.e., inhalation of associated gas or dust) of soil, mine waste, and tailings contained within the TDA containing concentrations of radionuclides and their daughter products that exceed remediation goals."

The cover over the mine wastes will be the principal feature to achieve these objectives. However, no published literature regarding the repository cover design provided by Dwyer and Associates is cited by the SER and Application. Neither does the Application discuss field experience for the proposed cover design or cover performance at other reclaimed uranium mill tailings sites under the control of the USDOE Office of Legacy Management (USDOE-LM). Comparison of field experience regarding the multi-decade performance of mill tailings covers with the proposed design should be incorporated in to the scope of the EIS. Of particular interest should be the Stoller Corporation evaluations of cover performance at four Title I mill tailings facilities managed by USDOE-LM (Waugh 2009).

The Dwyer design evolved from an Alternative Landfill Cover Demonstration (ALCD) (see, https://www.sandia.gov/caps/ALCD.htm and https://prod-ng.sandia.gov/techlib-noauth/access-control.cgi/1998/982021.pdf) constructed on a landfill at Sandia National Laboratory in Albuquerque more than 20 years ago. The EIS should include a thorough evaluation of the ALCD sites to assess their performance during the 20+ years since their construction to determine if real-world experience verifies the representations in the SER and Application about the protectiveness of the proposed cover. As the landfill covers at the ALCD site are not reported to have had any monitoring or maintenance in more than 10 years, the performance of the covers installed at the site should be valuable in the consideration of an analogous design in the SER and License Application. A Google Earth image of the ALCD site in February 2018 follows:

This Google Earth image appears to show wide variation in the density of vegetation on top of and on the margins the six experimental land fill covers constructed for the ALCD project. The EIS should include an investigation of the ALCD experimental facility to evaluate the effectiveness of the ALCD covers more than 20 years after cover construction and more than 15 years after any active monitoring or maintenance.

Field experience associated with reclaimed uranium mill tailings sites in the USA or other countries should inform the design of the cover for the mine waste repository. USDOE-LM has monitored, inspected, conducted research at and modified reclaimed uranium mill tailings based on the accumulated experience. The scope of the EIS should include review of the DOE experience as owner, inspector and investigator of reclaimed uranium mill tailings. Legacy Management's programs can be accessed at https://www.energy.gov/lm/office-legacy-management, which includes archives for all uranium mill tailings site,, among other sites, under DOE control.

H. Existing Environment: Population Characteristics

The Application (Volume 1 at 23) identifies homesites but not population or population dynamics. There is no discussion of the local population at the time mining and milling was started, and no discussion of local land uses by residents, historically, currently or anticipated. Figure 3.11-1 of the SER shows structures within a two-mile radius of the repository, but does not indicate how many people live in these quarters. Ground-truthing is needed to ascertain the affected population within two miles (or more) of the mine and mill tailings complex. The EIS should accurately reflect the local population in the Red Water Pond Road, Pipeline Road and State Route 566 communities.

RWPRCA members have described their occupancy of the valley between the NECR Mine and the Quivira Church Rock I Mine and of a traditional use area, called Standing Black Tree Mesa, for much of the past century. As we discussed at the March 19 meeting (Transcript at 79 {Shuey Statement)), they have documented multigenerational exposures from living next to, first, active mining operations, and more recently abandoned mines. They have discussed the historic trauma to their families of as a result of these exposures and various health problems they have experienced. These observations were summarized in a scientific poster that RWPRCA members prepared and discussed at the 10th International Conference on Metals Toxicity and Carcinogenesis in Albuquerque in October 2018. A copy of the poster is appended to these comments. We urge NRC staff to value the community's collective knowledge from living with uranium wastes for 50 years.

I. Community Health Risks

Residents of the Red Water Pond Road and Pipeline Road communities affected by airborne and waterborne releases from the NECR Mine site and the UNC tailings operation have long sought to have the wastes removed from their community. The EIS should address the benefit of off-site disposal from the perspective of eliminating the risk of another catastrophic release of radioactive and metal-laden wastes from the repository. The EIS should also discuss health and safety risks to local residents from cumulative exposures to

airborne and waterborne releases of hazardous substances since the beginning of mine operations and in the long period of abandonment since 1983.

While the SER (at 31) notes that the Navajo Nation and local residents do not support disposal of the NECR Mine waste *on site*, it does not disclose that the local residents also do not support disposal of NECR mine wastes at the UNC mill tailing site and have not since the idea was first suggested a decade ago. (NRC staff is encouraged to review the transcripts of public hearings held by USEPA Region IX on the EE/CA in June and August of 2009, and to place those transcripts in ADAMS.) The residents have sought removal of the mine waste from their community, not simply moving the waste from one side of the community to another. Alternative B is the only alternative that would remove the mine waste from the Red Water Pond Road Community and other adjacent residential areas northeast and south-southwest of the tailings site.

The SER also does not indicate if USEPA or GE/UNC collected cumulative airborne contaminant data for the residences near the NECR mine, either on a continuous basis or during removal actions. No data regarding exposure to particulate matter, including fine particles (less than 2.5 microns in diameter) laden with heavy metals and radionuclides, are reflected in the SER. Recent research at the University of New Mexico has demonstrated that uranium mine waste has been shown to generate fine dust particles containing uranium, vanadium, arsenic and other metals (Blake et al., 2015; Zychowski et al., 2018). Exposure to the nanoparticles in this fine dust has been shown to cause lung damage in laboratory mice (Zychowski et al., 2018). The EIS should acknowledge and address these recent studies on the heavy metal content of and risk from exposure to fine dust particles released during past mining and in the upcoming removal operations.

While those studies focused on an abandoned mine site in northeastern Arizona, the NECR mine wastes are likely to have similar characteristics because of decades of weathering prior to the period in 2009-2010 when the NECR wastes were consolidated and moved southward on the existing Section 35 site, away from residences to the north, and a thin cover of dirt was applied to lessen releases. NECR mine wastes are replete with heavy metals in concentrations many orders of magnitude above crustal averages, as shown in the table that follows (MWH, 2007a; MWH 2007b).

Concentrations of Radium and Metals in NECR Mine Wastes, 2007

	Ra-226	As	Mo	Se	U	V
Units	pCi/g	mg/kg				
Crustal Ave.	1.0	1.8	1.2	0.05	2.7	120
Screen	2.24	3.7	5,100	5,100	200	1,000
# samples	263	229	229	229	229	229
Mean	30.6	4.2	3.8	9.5	79.7	40.2
Max	875	14.9	214	159	3,970	502

Sources: MWH, 2007a and 2007b.

J. Withdraw the Notice to Petition for Leave to Intervene

MASE concurs with RWPRCA's recommendation in its written comments that NRC should withdraw its recent notice announcing an opportunity to request a hearing and petition for leave to intervene in the proposed license amendment. See 84 *Federal Register* 9148 (March 13, 2019). The notice is premature because the EIS scoping process has just started and a Draft EIS is yet a year or more away. The issuance of the notice at this time was not appropriate or respectful of the affected community (Transcript at 85-86). It can be issued at a later date when the EIS process has been completed.

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