U. S. Nuclear Regulatory Commission

Draft Environmental Impact Statement for the Disposal of Mine Waste at the United Nuclear Corporation Mill Site

Radio Broadcast – NRC Staff's Safety Evaluation

Introduction

Good Evening, my name is Jim Smith and I work for the United States Nuclear Regulatory Commission, or (the NRC). This is the second of three broadcasts this week about a proposal by the United Nuclear Corporation or (UNC) to excavate mine wastes from the site of the former Northeast Church Rock Mine and place those wastes for permanent disposal in a repository on top of an existing uranium mill tailings impoundment at the nearby Mill Site that is owned by UNC.

Through these broadcasts we hope listeners are learning more about the proposal, and we encourage you to review our Environmental Impact Statement (or EIS) that describes the potential environmental impacts of this proposal. We are seeking your comments on our EIS now through May 27 of this year. At the end of this evening's broadcast, I'll talk more about how you can access our EIS or contact us with any questions.

During the last night's broadcast, we talked about the Environmental Protection Agency's (or the EPA's) role in the Northeast Church Rock mine cleanup over the last 15 years. We also described the NRC's process to review the proposal to place mine waste on the Mill Site and develop the EIS that we are now seeking public comments on. As we described in the previous broadcast, the EIS evaluates the potential environmental impacts to inform the public about the proposal and to make sure we have considered the relevant information in assessing the impacts.

Tonight, I will describe the NRC staff's technical review to determine whether UNC's proposal can be done safely. This safety review is different from our environmental review in that it focuses on the details of the proposal to determine whether it would meet NRC requirements for the protection of public health and safety and the environment. The results of the NRC's safety review are described in a report called the safety evaluation report. The NRC will use both the safety evaluation report and the environmental report to decide whether to allow UNC to place the mine waste on the Mill Site. This final licensing decision is expected to be made in January of 2022.

Background: United Nuclear Mill Site

First, some background about the Mill Site. The Mill operated under a license from the State of New Mexico from 1977 until 1982 for the purpose of extracting uranium from mined ore, using crushing, grinding, and acid-leach solvent extraction methods. The uranium ore came from the nearby Northeast Church Rock and Old Church Rock Mines. In 1979, the tailings impoundment dam at the Mill Site collapsed, and 94 million gallons of mill tailings liquids were released into nearby waterways and the underlying soils. The embankment was repaired, the spill was cleaned up and corrective actions were taken at the site, and the mill tailings impoundment continued to be used. In 1986, the NRC became the regulatory authority for the Mill Site, and

the tailings impoundment there is managed by UNC under an NRC license. The license has conditions that UNC needs to meet to make sure it is complying with NRC requirements.

To clean up the mine site in the manner that EPA required in a decision of 2011, UNC needs approval from the NRC to allow that mine waste to be placed on top of the Mill Site impoundment. The NRC does not have any say over what happens on the mine site, and by law the NRC does not regulate the mine waste. We only have authority over the Mill Site and changes to the Mill Site.

Areas of Review in NRC Safety Evaluation

I will now describe what we assessed in detail during our safety review of this proposal. The safety report is organized into chapters that address several topics, which I'll list in a few minutes. For each topic, the safety report identifies the NRC requirements that need to be met and explains what information we looked for to determine whether UNC's proposal would meet those requirements. Next, the report describes the analysis that we conducted and explains the conclusions or findings for each topic. In tonight's presentation, I won't get into the details of the NRC's requirements, but I will describe the topics we reviewed and the conclusions for each topic.

The main topics we reviewed are contained in several different chapters of the safety report:

- Chapter 2 of the safety report addresses the geology of the site and how the underlying rock formations and soils could affect the integrity of the tailings impoundment.
- Chapter 3 of the safety report addressed the stability of the impoundment and geotechnical details of the proposal.
- Chapter 4 addressed how surface water flows on and around the Mill Site, and how water could cause flooding or erosion of soils;
- Chapter 5 addresses how the proposal might affect groundwater, and ensuring the groundwater is adequately monitored;
- And finally, Chapter 6 of the Safety Report addressed protection from radiation, including an assessment of radiation levels from the impoundment and ways to control and monitor radiation levels.

Geology and Seismology

The first topic I listed is the geology of the site and how the underlying rock and soils could affect the stability of tailings impoundment with the addition of the mine waste. We reviewed UNC's proposal in detail to determine if enough information was included about the geology of the region and specifically the Mill Site, and if enough information was included about how faults (cracks in very large rock formations) and ground movement (such as earthquakes) affect the region and might affect the Mill Site.

We reviewed the detailed information provided by UNC about rock formations underneath the site and in the surrounding area. We also reviewed information about faults and the potential for mild or severe earthquakes to occur and how those earthquakes might affect the impoundment; and about processes involving water and ground movement that could change the shape of the land and surrounding waterways and how these processes might affect the impoundment.

After assessing all the information and comparing it to NRC requirements, we concluded that the subsurface conditions at the Mill Site would provide enough stability to protect the impoundment from damage by these processes. We also determined that the impoundment is not located near a fault that could cause an earthquake larger than the impoundment could withstand. Overall, we determined that the aspects of UNC's proposal related to geology meets NRC requirements and that the tailings impoundment with the added mine waste would be protective.

Geotechnical Stability

The next topic is the NRC staff's detailed assessment of how UNC's proposal to construct a mine waste repository on top of the existing impoundment might affect the impoundment's stability and integrity. We evaluated how the existing impoundment would handle placement of 1,000,000 cubic yards of mine waste, plus another 430,000 cubic yards of soil and 60,000 cubic yards of rock that would be needed for an earthen cover.

The specific areas we reviewed include the following site characteristics; the stability of the impoundment and mine waste repository slopes; settlement of soils resulting from placement of the mine waste; and liquefaction of the tailings within the impoundment -- liquefaction is when soils behave like a liquid under certain conditions. Other general areas we reviewed are the design of the cover that would be placed over the mine waste and the movement of water through the mine waste repository impoundment.

In reviewing the engineering and technical details of the site, we also considered the characteristics of the mine waste, existing mill tailings, areas from which soil would be taken to be used in the repository, and soil stockpiles. We determined that UNC's characterization of these geotechnical aspects of the site was adequate for the NRC staff to verify that these aspects do not present an obstacle to safe disposal and long-term safety. We also determined, as I mentioned earlier, that the site is not near an earthquake fault that could produce an earthquake larger than the impoundment could withstand.

We also assessed whether the proposed slopes of the mine waste repository and the underlying impoundment would meet NRC requirements. We assessed several areas in detail. These are: whether the slopes would remain stable, would be protected from wind and water by vegetation or a rock covering, would minimize the pooling of rainwater, would not be damaged by an earthquake, and would be protected against a slope failure. We determined that UNC's proposed repository design would meet NRC requirements for slope angle (or how steep the slopes would be).

We also assessed the amount of settlement that would occur after the mine waste is placed on top of the impoundment. We evaluated how settlement could change the overall shape of the impoundment, and whether this would affect groundwater or cause pooling of water on the surface of the mine waste repository. The staff also assessed whether the existing mill tailings could behave like a liquid if an earthquake were to occur (this is the process of liquefaction I mentioned earlier). We determined that the proposal would adequately address settlement, and ponding of water is not expected. We also concluded that liquefaction is not a risk to the tailings impoundment.

We also assessed the proposed design of the earthen cover that would be placed on top of the mine wastes. In this review, we looked at the proposed soil and rock types, and freezing and

thawing effects on the cover soils, and possible ways the cover could be penetrated or could crack, and as a result would not be as effective. Most of the mine waste repository would be covered by a soil and rock mixture. The soil and rock mixture are designed to function as an evapotranspirative cover, meaning the soil and rock mixture absorbs rainwater and stores it, until it is released back into the air either by evaporation, or through vegetation by a process called transpiration. Evapotranspirative covers reduce the amount of rainwater that could infiltrate into the impoundment. The complete cover would be 4 and ½ feet thick. We concluded, based on our detailed review, that the cover would meet NRC requirements and that the cover would be protective and keep the material isolated.

We also conducted a review of how water could move through the mine waste repository and tailings impoundment. For this review, we focused on the properties of the cover, specifically how it would remove rainwater from the soils, using appropriate vegetation that would be self-sustaining. This would greatly reduce the amount of rainwater that could pass through the cover, mine wastes, and underlying radon barrier and mill tailings. We also considered in detail whether heavy rains could cause water entering the cover system to move through the mine waste and reach the mill tailings and result in seepage from the tailings into the groundwater. We concluded that the vegetative cover would be self-sustaining and that the proposed cover design meets NRC's requirements. We also concluded there are uncertainties in the computer model developed to predict long-term movement of water in the cover system. We concluded that although it is unlikely that groundwater would be impacted, the computer model had uncertainty in its forecasting. To address this uncertainty, we concluded that a robust groundwater monitoring program would provide early detection of any changes in the groundwater that should be addressed. The staff is proposing to require additional groundwater monitoring as a condition in UNC's license.

Surface Water Hydrology and Erosion Protection

The next major topic is the NRC staff's review of surface water hydrology and erosion protection for maintaining the long-term stability of the tailings impoundment and proposed mine waste repository.

In this review, we evaluated the information UNC provided to describe the site hydrology, the severity of potential floods, the flow of surface water through channels at the site (such as the Pipeline Arroyo), and UNC's proposed designs to prevent erosion of site soils. UNC has proposed changes to the existing drainage system on and around the current tailings disposal area. The proposed changes are intended to manage surface water runoff from the mine waste repository and improve protection from flooding and erosion. UNC's proposed changes include replacing the buried rock protection area, known as the jetty, in the Pipeline Arroyo with an improved design. The new design would have a rip-rap chute to carry water through the arroyo and away from the tailings impoundment and mine waste repository. In addition, UNC would also construct an earthen cover to be placed over the mine waste. This cover would capture rainwater and allow it to either evaporate or to be absorbed by vegetation and released back into the air through the plants.

We focused our detailed review of flooding on water flow in and around the Pipeline Arroyo, including the proposed improvements to the Pipeline Arroyo, and new features UNC is proposing to control and direct surface water off the mine waste repository. In our review, we evaluated information about the frequency, duration, and intensity of rains and the resulting water flow over and around the tailings impoundment and mine waste repository. UNC's design

is based on the probable maximum precipitation, which is the greatest depth of rain that could fall in a particular area during a storm. The probable maximum precipitation that we evaluated is based on climate and weather records and statistical analysis. Our review focused on the probable maximum precipitation event as well as the surface water runoff after such an event. This included a detailed look at the potential for erosion and UNC's proposed erosion control measures.

We reviewed factors such as whether proposed slopes and embankments could resist the anticipated flow of water; details of the proposed riprap chute; the use of appropriate rock sizes, shapes, and durability; the potential for sediments to build up; the role of vegetation; and the potential for wind erosion. After conducting this review, which is described in detail in the safety report, we determined that the mill tailings and mine waste would be protected from flooding and erosion by the cover system, a series of channels around the perimeter of the repository, and other proposed erosion protections. We determined that a minimum 5-year period of observation should be required after the mine waste is in place. This observation period is needed to verify that the Pipeline arroyo improvements (the riprap chute) and drainages at the site would perform as designed during storms. This condition would also require that UNC repair any damage, determine if changes need to be made to improve flood and erosion protection, and determine what actions should be taken and determine the costs of those actions to ensure long-term stability before the site is transferred from UNC to the Department of Energy for long-term care. The staff is proposing other license conditions that would help ensure protection from flooding and erosion, and these are described in Chapter 4 of the safety report.

Protecting Groundwater Resources

The next major topic is protecting groundwater resources. We reviewed UNC's proposal to evaluate how the groundwater could be affected by placing the mine waste on the tailings impoundment. The added weight of the mine waste could cause mill tailings liquids to move downward and possibly reach groundwater. This might happen when the mill tailings become squeezed by the weight of the added mine waste, or it might happen if the proposed cover for the repository does not function as it should and allows rainwater to pass through to the mill tailings and then into groundwater. We conducted a detailed review to determine how much water could be released when the mill tailings are compressed by the mine waste. We concluded that the amount of water that would be drained from the tailings would be limited and that it is unlikely this water would affect groundwater. However, because it is not certain whether the tailings water would affect the groundwater, the NRC would require additional monitoring of the impoundment wells to detect chemicals from the mill tailings that might have reached groundwater.

We also reviewed the details of the groundwater monitoring network that is currently in place to make sure it would be sufficient for monitoring after the mine waste is added. This network has wells to monitor for seepage from the mill tailings impoundment, and these wells are also used to gather information for the groundwater cleanup at the Mill Site that is ongoing. Samples from the wells are taken every three months. We determined that additional wells that are in place on the site should be added to this monitoring network and that the resulting number of wells in the network and their locations would be adequate for future monitoring. As I just mentioned, we concluded that monitoring of those wells needs to increase after the mine waste repository is placed on the impoundment. If the new monitoring and sampling data show that the mill tailings water is adversely affecting the quality of the groundwater, UNC would need to address the

situation. Chapter 5 of the safety report lists the wells that need to be sampled and the chemicals that need to be checked for in the samples.

Separate from the NRC staff's safety review of this proposed mine waste action, I should note that UNC is still cleaning up groundwater under the Mill Site that was contaminated by past activities. This cleanup action is overseen by both the EPA and the NRC. The contaminated groundwater is pumped to the surface and stored in two large ponds that are lined to prevent seepage back into the ground. The purpose of these ponds is to allow the water to evaporate, leaving the uranium and other chemicals in the lined bottom of the ponds to be disposed of later. This separate groundwater cleanup program will continue until the NRC and EPA have determined that UNC has met the applicable requirements. More information about this program is provided in Chapters 2, 3, and 5 of our draft EIS.

Radiation Protection

Another major topic is protection from radiation. We looked at how the cover to be placed over the mine waste repository would protect people and the environment from radiation; how soil with low levels of radioactivity would be cleaned up and disposed of; and what controls would be needed for workers during the construction of the mine waste repository.

First, the cover – as I discussed earlier, the proposed mine waste repository would entail preparing the surface of the impoundment to receive the mine waste. UNC has stated that it would place the mine waste on top of the radon barrier that is already in place for the mill tailings. After placing the mine waste, UNC would add a cover of soils that protects the impoundment from rainwater and protects people and the environment from radiation. The cover would be 4 and ½ feet thick and would be evapotranspirative – as I mentioned earlier, this means that UNC would plant vegetation that is good at absorbing rainwater from the soil and releasing that moisture back into the air. This would help prevent rainwater from moving downward into the tailings impoundment. The vegetation would also help prevent soils from being washed away during rains. Just beneath the vegetation, the very top layer of the cover would be soil mixed with rock to further prevent the underlying soils from washing away.

We conducted a detailed technical review to determine whether the added mine waste and the new cover would meet NRC requirements for protection against radiation. We concluded that the proposal would meet NRC requirements for the placement of an earthen cover over mill tailings to ensure protection against radiation for at least 200 years and up to 1,000 years.

The NRC staff also reviewed UNC's plan to conduct radiation surveys at the mill site after the mine waste and cover are in place. These surveys must show that the radiation levels from the mill site are within NRC limits. We determined that UNC's survey plans would meet NRC requirements for radiation surveys. I should clarify here that this is approval only of the survey design. If the NRC approves UNC's request, and after the mine waste is in place and UNC has conducted surveys, we would at that time review the survey results to determine if the mill site complies with NRC requirements for protection against radiation.

We also reviewed UNC's plan to protect workers and the environment from radiation at the Mill Site, including limiting airborne dust at the mill site. Note that the NRC does not have authority over UNC's mine waste activities that are outside the Mill Site boundary. Those activities fall under EPA authority for the mine waste cleanup. The methods UNC would use to reduce exposures from the mine waste would likely include applying water to areas to be excavated,

spraying water during excavation and handling of the mine wastes and other soils, modifying or stopping work during windy conditions, and controlling work locations depending on wind direction. Also, UNC plans to set up control points to check for contamination and would use loading methods and coverings to minimize airborne dust during loading, unloading and hauling of mine waste. We determined that these measures are adequate for controlling dust from mine wastes as they are unloaded and added to the repository. The safety report also describes several plans UNC has developed to control and monitor for radiation and to promptly notify the NRC of incidents and keep records of worker and public exposures.

We determined that UNC has provided an adequate plan for controlling radiation, monitoring for exposures, and protecting the environment while mine waste is being placed on the mill site in accordance with the NRC's radiation protection requirements and Environmental Protection Agency standards.

Closing and Contact Information

That is the end of my description of the safety report. As a reminder, we are providing this information about the safety report to assist the public in understanding the proposal before the NRC. We are seeking public comments on our draft EIS, which assesses the potential environmental impacts of the proposal. Our public comment period for the draft EIS closes on May 27, 2021.

The NRC's overall review is expected to be complete in January 2022. If the NRC approves UNC's request to place mine waste on the mill site, UNC would start the project in 2023 and it would take about 4 years. The Mill Site would eventually be transferred from UNC ownership to the Department of Energy (or DOE), who would become the long-term steward of the site. The NRC, EPA, and DOE are working together to make sure that the site is safe before the site is transferred to DOE and that enough money will be available to pay for long-term surveillance and maintenance.

You can find the draft EIS and the safety report on our website. The quickest way to get there is to go to the main page at www.nrc.gov and then type United Nuclear Corporation into the main search bar. Soon we will also post the audio recordings and written scripts of these broadcasts on our website. If you have any questions, you may send an email to Ashley Waldron at Ashley.waldron@nrc.gov.

Be sure to tune in tomorrow at 6 pm for our last broadcast, when we will answer many of the questions we have heard during our public comment period.

Thank you and have a good night.