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CMD 21-H6.7

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Oral Presentation

Written submission from the English River First Nation

In the Matter of the

Orano Canada Inc.,
McClean Lake Operation

Application for licence amendment for the expansion of the JEB Tailings Management Facility (TMF) at the McClean Lake Operation

Commission Public Hearing

October 4, 2021

Exposé oral

Mémoire de la Première Nation d'English River

À l'égard de

Orano Canada Inc.,
Établissement minier de McClean Lake

Demande de modification de permis pour l'agrandissement de l'installation de gestion des résidus (IGR) JEB à l'établissement de McClean Lake

Audience publique de la Commission

4 octobre 2021

Canada

English River
First Nation

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August 16, 2021

Canadian Nuclear Safety Commission
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"VIA EMAIL cnsc.interventions.ccsn@canada.ca"

RE: ERFN Intervention- McClean Lake Operation Tailings Management Facility Expansion Project

This submission is made on behalf of the English River First Nation (ERFN).

English River First Nation is made up of 19 reserves, most of which are located around Cree Lake in Northern Saskatchewan. ERFN has a population of approximately 1650 people. The on reserve members of the First Nation reside at two small remote Northern Saskatchewan reserves called Patuanak and La Plonge. These reserves are located approximately 600 km north of Saskatoon. Approximately half of ERFN's population resides off reserve.

Orano Canada Inc (Orano) has submitted an application to the Canadian Nuclear Safety Commission (CNSC) to amend its uranium operating license to encompass the JEB Tailing Management Facility (JEB TMF) Expansion Project at the McClean Lake Operations (MLO) located in the Athabasca Basin of Northern Saskatchewan.

This topic is of great importance to the people of the ERFN, as the McClean Lake Operation is located within English River First Nation Ancestral Territory. The people of ERFN have subsisted on this land for generations- fishing, hunting, gathering, and living.

ERFN has retained Robin Kusch to help ERFN review and understand the technical information contained within Orano's submission documents. Mrs. Kusch has outlined six questions that have arisen as a result of her review. These questions have been posed to Orano, and we look forward to receiving their response in due course.

After a review of all relevant documentation and in consultation with Mrs. Kusch, ERFN supports Orano's MLO Licence Amendment.

Sincerely,

Cheyenna Campbell B.A., LL.B.
English River First Nation
Lands & Resources Manager

Technical Memorandum

Review of CMD 21-H6: Review of License Amendment Application for JEB Tailing Management Facility Expansion Project at McClean Lake Operation

July 29, 2021

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Background Information

Orano Canada Inc (Orano) submitted an application to the Canadian Nuclear Safety Commission (CNSC) to amend its uranium operating license to encompass the JEB Tailing Management Facility (JEB TMF) Expansion Project at the McClean Lake Operations (MLO) located in the Athabasca Basin of northern Saskatchewan.

I have reviewed the License UMOL-MINEMILL-McCLEAN.01/2027 Amendment Commission Member Document (CMD21_H6) that presents the CNSC staff's assessment, conclusion and recommendations in respects to Orano's license amendment application. I have reviewed the document following community input on activities that have occurred at uranium mine and mill operations in northern Saskatchewan over the past 4-years, this process was executed to facilitate a review of these documents in a culturally aware manner.

This technical memorandum has been prepared for the English River First Nation (ERFN), and provides a summary and review of CMD 21-H6 document with the intent to inform the ERFN's Intervener Submission. Overall, although the application was 137 pages and the Commission Member Document (CMD) was 220 pages very little quantitative data was provided. As such, the bulk of the review entailed summarizing the relevant information from the documents for presentation to ERFN members.

English River First Nation

ERFN is a Dene and Cree First Nation located in Northern Saskatchewan. ERFN's two largest reserves are La Plonge Reserve and Wapachewunak, located approximately 600 km north of Saskatoon, Saskatchewan. The ERFN is a signatory to Treaty 10 and is comprised of nineteen different reserves:

- La Plonge 192,
- Elak Dase 192A,
- Knee Lake 192B,
- Dipper Rapids 192C,
- Wapachewunak 192D,
- Ile a la Crosse 192 E,
- Primeau Lake 192F,
- Cree Lake 192G,
- Grasswoods 192J,
- Leaf Rapids 192P,
- English River (Porter Lake) 192H,
- English River FN Barkwell Bay No. 192I,
- English River FN Haultain Lake No. 192K,
- English River FN Flatstone Lake No. 192L,
- English River FN Cable Bay Cree Lake No. 192M,
- English River First Nation Cable Bay Cree Lake192N,
- English River FN Beauval Forks No. 192O,
- Slush Lake Reserve No. 192Q, and
- Mawdsley Lake Reserve No.192R.

The ERFN is rising to the challenge of ensuring sustainable development in the vicinity of their communities and within ERFN Ancestral Territory, and recognizes the unique and important role they have to play in Northern Saskatchewan. While remaining true to traditional values as “keepers of the land,” members also pursue opportunities to participate in the development of ERFN’s resources (e.g., forestry, industry and workforce).

ERFN established Des Nedhe Development LP in 1991 to create sustainable employment and business opportunities for English River members. Since its inception, Des Nedhe Development has invested in established companies that are leaders in Saskatchewan’s mining and construction industry and expanded its portfolio into the areas of retail and real estate development and management. The company takes pride in its strong focus on growth through investment, experienced management team and history of delivering solid financial results. Looking forward, Des Nedhe is exploring new opportunities across the Country, in multiple sectors, and is positioned to play an important role in Canada’s economic future.

Saskatchewan Uranium Industry

The Athabasca Basin of northern Saskatchewan has been the site of several major uranium discoveries and Saskatchewan is recognized as a world leader in uranium production. The uranium is exclusively used for electricity generation at nuclear power plants, which is a non-carbon emitting energy source and provides about 15% of Canada’s electricity needs. The uranium industry is a significant economic driver in northern Saskatchewan.

Collaboration Agreement

All of the uranium mines and mills in northern Saskatchewan are considered of interest to the communities of ERFN, including the McClean Lake Operation, which is within ERFN’s Ancestral Territory. In northern Saskatchewan, the industry leaders Orano and Cameco Corporation have entered into formal agreements with Indigenous communities, including ERFN (referred to as collaboration agreement (CAs) or impact benefit agreements (IBAs). These agreements provide Indigenous communities with workforce and business development programs, dedicated community engagement programs, community investment monies and mechanisms to collaborate around environmental stewardship. These industry leaders have also entered into several trapper compensation agreements with individual land users who are affected by their activities.

These agreements are part of the effort undertaken in recent history to engage and respect local communities, First Nations, Metis Nations and local land users during the planning and execution of industrial developments. Execution of these agreements ensures that engagement occurs with the intent to minimize the potential and perceived negative impacts from a development, as well as optimize potential positive impacts. Signing of these agreements conveys a general trust in the industry’s performance and is recognition of a positive working relationship with the industry leaders.

Leadership Role

In 2018, members of ERFN gained a heightened awareness of the external factors that can affect the mining industry and that life-of-mine estimates based on resource delineation are just projections. As

such, the communities have started to shift their engagement focus from operational performance and economic benefits to the long-term environmental effects of closure and associated reclamation uncertainties. Key concerns of the ERFN communities, as reported in 2017, remain to be the:

- operation and ultimate closure of the Key Lake Operations, due to the long-term (1000s of year) management of tailings and linkages to Wheeler River system that is an area of heightened value; and
- operation and ultimate closure of McArthur River Operation and Key Lake Operations, due to potential for cumulative effects on the Wheeler River system.

The Wheeler River region is recognized as an important cultural, ecological, and sustainability resources (i.e., drinking water, food and air) area for the communities of ERFN. The prevalence of the importance of the resources (clean air, water, soil, and country foods) in this area is likely to only increase in value to local land users following closure of local operations.

However, in general, ERFN is dedicated to stewardship of the land for future generations and doesn't take this responsibility lightly. Often in relation to First Nation consultation and engagement the focus is on the spatial extent of their traditional and current land use, and it is conveyed that their concerns should be limited to these areas. However, it is recognized that the climate and environments around the world are changing, and there is no way to know in the future where the traditional resources that could be necessary to support future generations will be located within northern Saskatchewan or even Canada. As such, ERFN has interest in the MLO license amendment from two perspectives: (1) protection of all lands in northern Saskatchewan and (2) gaining an increased understanding of operational and long-term tailings management methods / technologies.

Findings from License Amendment Documentation Review

Summation of Information Provided

CMD12-H6 Summary

The JEB TMF has been the subject of several environmental assessment and is continuously studied under the Tailings Optimization and Validation Program (TOVP), which is updated and submitted for review every 5-years. The TOVP validates the predicted performance of the JEB TMF. Further, as part of a five-year cycle requirement, Orano submitted a revised preliminary decommissioning plan (PDP) and cost estimate. The CNSC staff has concluded that the facility including the proposed JEB TMF Expansion Project will continue to achieve the operational and post-closure (long-term) objectives ensuring the safety and protection of the environment.

CNSC staff determined that the predicted environmental risks for the JEB TMF Expansion Project are within those already considered through prior assessments of the MLO and will not result in significant changes to the way the JEB TMF will be operated. However, some changes to the existing monitoring programs will be required. These changes are related to groundwater monitoring and the TOVP.

CNSC Staff recommend that the License be amended as requested, with the condition that Orano complete additional monitoring and modelling as stipulated in relation to contaminants of potential

concern (COPCs). As well, CNSC Staff recommend the revised financial guarantee for the MLO decommissioning also be accepted.

JEB Tailing Management Facility Expansion Project Summary

Relevant Description of the Facility and Project

Milling (i.e., extraction of uranium from the ore) includes leaching, decanting and clarifying uranium solution, which is then followed by precipitation to form yellowcake (i.e., concentrated uranium). Milling results in waste material and water that needs to be managed as, in addition to rock material, sand, and clay, the waste may include chemical residues from the milling process, residual radionuclides, metals and minerals that were present in the ore with the uranium, and waste water plant sludge.

From the mill the tailings are directed to the Tailings Preparation Circuit, where the tailings are prepared for deposition in the JEB TMF, this includes the neutralization of acid waste solutions and precipitation of contaminants out of solution. Sulphuric acid, hydrogen peroxide, barium chloride, ferric sulphate, and slaked lime are added to promote the precipitation of contaminates from solution. The neutralized tailings are then thickened, flocculent is added to settle the solids from solution, and the overflow liquid is directed by an overflow tank to the surface of the JEB TMF. Ultimately the overflow liquid will be treated in the JEB WTP and released to the receiving environment. The solids slurry is pumped from the thickener underflow to the JEB TMF for disposal beneath the water cover.

From the mill neutralized and thickened tailings are pumped to the pit; a dual containment system is used from the mill to the pit and a single pipe is used from the pit to the placement barge. The tailings are deposited from the barge via vertical deposition pipes that penetrate the pit water cover and approximately the top 2 m of tailings. During operations, placing the tailings under water achieves the following: (1) tailings containment, (2) protection of workers in the area from radiation exposure, and (3) preventing the tailings from freezing.

JEB TMF is an in-pit tailing disposal facility designed to provide long-term hydraulic containment of tailings. This means that flows (surface water and/or groundwater) are controlled to provide containment of contaminated water (i.e., contact water). During operation, this means isolating the flow from the receiving environment prior to treatment. During operation the water in the JEB TMF is in part contained by the use of a bentonite-amended liner system (i.e., layer of sandstone waste rock and till with 5% bentonite added). The Liner is designed to have low hydraulic conductivity (1.0 x 10-9 m/s or less) resulting in a material with limited permeability that doesn't easily allow water to pass through it. A 6-m wide liner made with 5% bentonite is used on the upstream slope of the JEB TMF embankment for pond containment. During operations the hydraulic containment is accomplished through a drift and raise system that consists of: sand and gravel filters, a drain rock under the tailings, and three raised wells (Figure 1). The continually pumping of water from the bottom of the JEB TMF creates an inward and downward movement of flow into the TMF (i.e., groundwater cone of depression).

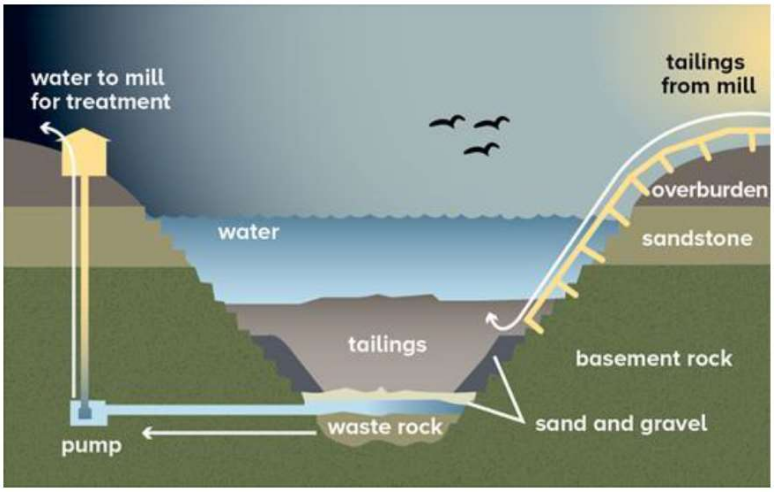

Figure 1: Schematic Diagram of an In-pit TMF; Figure 1.43 provided in CMD12.26

The system pulls tailings pore water from the tailings and the surrounding groundwater inward and the raise wells directs this flow to the leaching circuit for use in the mill or directs it to the JEB Water Treatment Plant (WTP). In the JEB WTP the water is treated before being released to the Sink Reservoir / Vulture Lake Treated Effluent Management System (S/V TEMS), which discharges to the downstream receiving environment of McClean Lake East Basin and Collin's Creek (Figure 2).

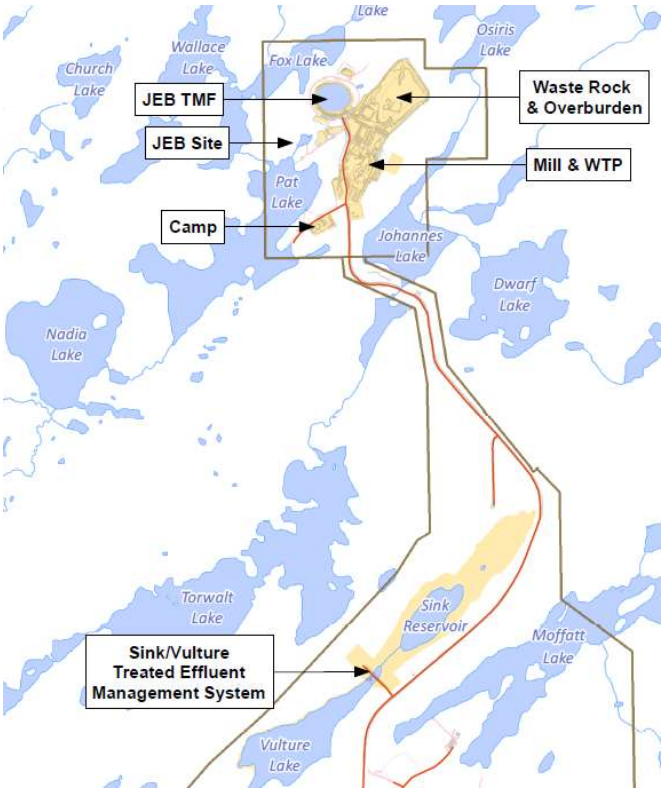

Figure 2: McClean Lake Operation – Site Layout; excerpt of Figure 1-3 provided in Orano's Application

The proposed JEB TMF Expansion Project requires:

- Construction of a permanent embankment to vertically expand the JEB TMF to 468 mASL.
- Relocation and reconstruction of some of the JEB TMF infrastructure (e.g., construction of new Mill Site Runoff Pond, modification to the Storm Water Storage Pond and Waste Rock Runoff Pond, and establishment of new groundwater monitoring wells).

It has been determined that the JEP WTP has the capacity to treat the reclaimed water from the proposed JEB TMF expansion. The treated effluent from the JEB WTP is not expected to change as a result of the expansion. Monitoring of the WTP effluent is completed to ensure the licensed released limits are met prior to discharge.

Based on current mineral reserves, MLO could continue until 2050 and it is estimated that decommissioning would occur over a period of 19-years following operation. Post-closure, the hydraulic containment of the tailings will be achieved via passive controls (i.e., human action is not required for operation and/or maintenance) that will operate over a very long time scale (20,000 years) to protect the environment. At closure the JEB TMF will be capped with a low hydraulic conductivity soil cover system, which will be re-vegetated. The consolidated tailings will not easily allow water to pass through it, while the surrounding material will, and the water will take the path of least resistance limiting the interaction of the tailings with the groundwater (Figure 3).

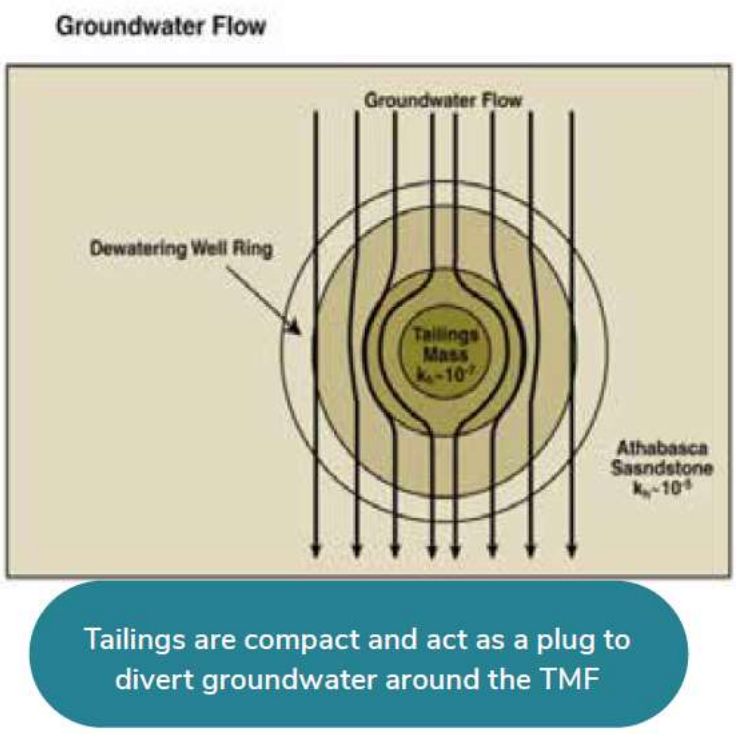

Figure 3: Schematic Diagram of Decommissioning Passive Hydraulic Conductivity; Figure from Fact Sheet Pages

Project-Environment Interactions and Assessment

Although limited, after decommissioning (i.e., active hydraulic containment ceases), precipitation will migrate through the tailings and into the surround sandstones and base drain, resulting in a slow discharge of contaminants into groundwater and ultimately surfacing in Fox Lake and Pat Lake. An environmental impact assessment was completed for the predicted long-term contaminant loading to the surface water from this pathway. The assessment predicts movement of arsenic, nickel, uranium, and radioum-226 to Fox Lake via groundwater over time (30% of groundwater flows directly to Pat Lake; 70% of groundwater flows to Fox Lake which will ultimately drain into Pat Lake). The slow movement of contaminants in groundwater to surface water was simulated and evaluated in the assessment. Predicted surface water concentrations were considered to meet decommissioning criteria for the currently approved JEB TMF, and will occur in a similar way over a similar time frame following implementation of the JEB TMF Expansion Project. For example:

- Unattenuated COPCs, such as chloride and sulphate, are predicted to reach the lakes in about 200 years. These parameters remain in the water column as they travel subsurface.
- Moderately attenuated COPCs, such as arsenic and nickel, are predicted to reach the lakes in about 200 to 300 years. These parameters decrease in concentration in the water column as they travel subsurface (e.g., metals that get sequestered in precipitates).
- Radium-226 is predicted to be at a maximum concentration in the lakes after 10,000 years.

Concentrations of COPCs, including uranium and molybdenum, that will be elevated above baseline / background levels in Fox Lake and Pat Lake are all predicted to remain below the Saskatchewan Surface Water Quality Objectives or Canadian Council of Ministries of Environment (CCME) Water Quality Guidelines. As such, the impacts to the aquatic environment are expected to be negligible. The predicted environmental risks for the JEB TMF Expansion Project are within those already predicted under the previous environmental assessments completed for MLO.

Post-closure radiation exposure conditions for the JEB TMF Expansion Project were evaluated considering potential exposure of traditional land users to gamma radiation, radon, and long-lived radioactive dusts. The post-decommissioning radiation will be indistinguishable from the natural background radiation in the area and that environmental risk to the health of the general public is predicted to be negligible.

Disruptive Event Assessment

A screening level evaluation of the potential environmental effects to Fox Lake and/or Pat Lake and subsequently the Collins Creek watershed from (1) a release of pond water to the environment when the JEB TMF is at maximum capacity and (2) a release of pond water and tailings solids to the environment when the JEB TMF is at maximum capacity were assessed. There would be effects to the surface water in Fox Lake, recovery could take months or decades, however, no negative impact to the aquatic life over the short- or long-term would be expected downstream of Fox Lake. In Fox Lake, short-term (up to 16 months) impacts to the aquatic environment would be predicted (i.e., significant exceedances of Saskatchewan Water Quality Objectives and/or CCME Water Quality Guidelines). For example, the concentration of uranium in Fox Lake immediately following a failure could be predicted to 500 ug/L (guideline is 15 ug/L). Concentrations would be predicted to decline rapidly as a result of remediation

activities. Following decommissioning, there would no longer be the potential for the release of untreated water and the tailing would be consolidated (i.e., not free flowing), as such the risks would be significantly reduced.

A conceptual PDP has been provided as part of the approval process for the JEB TMF Expansion Project, including the evaluation of a potential disruptive event over the life cycle of the closed pit that could impact the proposed passive controls. The possibility that a portion of the cover could eroding following closure resulting in increased infiltration of water into the tailing was assessed. The assessment results illustrate that even under these conditions additional risks to aquatic receptors would not be predicted.

Follow-up License Conditions Requirements

In addition to the surface water assessment completed for closure, Orano has committed to conducting a long-term assessment of predicted contaminant concentrations in sediments in Fox Lake and Pat Lake, which was not provided as part of the license amendment application. The migration of contaminants into Fox Lake and Pat Lake will continue for 1000s of years, as such it is expected that there will be an accumulation of contaminants in sediment over time. If the future assessment predicts an unreasonable risk to aquatic receptors over the long-term, additional mitigation measures to prevent predicted adverse effect from occurring will be required. This assessment will be integrated into the TOVP in the future, as such it will be reviewed / revised every 5-years.

Groundwater monitoring wells affected by the construction of the JEB TMF Expansion Project will be replaced with new wells. Given the long timeframe associated with the post-decommissioning prediction, the CNSC staff requested that groundwater quality be monitored after decommissioning to provide an early indication of the accuracy of the prediction. The groundwater monitoring plan developed to demonstrate maintenance of the hydraulic containment will be incorporated into the existing groundwater monitoring program. This program will provide early performance indicators of the post-decommissioning rate of movement and long-term concentrations of groundwater COPC (i.e., will be used to verify the predicted concentrations in Fox Lake and Pat Lake). If the revised predicted COPCs in Fox Lake and Pat Lake are above the current long-term assessment prediction, additional mitigation measures to prevent this from occurring will be required.

A revised cover erosion scenario will be submitted during the detailed decommissioning planning and/or detailed design stages, and that the best science and engineering measures available at the time of decommissioning be incorporated into the design to ensure the integrity of the cover over the long-term. This would include result of the proposed test cover plots. Further, the probable maximum flood event would be used to design the drainage channels and the cover to ensure erosion potential is minimized. The disruptive event scenario, a 6 m wide and 3 m deep gully selected as the bounding case, will be revised / justified, as well as confirmation that erosion beyond the barrier layer and exposure of the tailings is unlikely (i.e., doesn’t need to be assessed).

Safety Control Areas Summary

To allow for an easier review of the content of the amendment documents, the discussion and conclusions in relation to each of the relevant safety and control areas (SCAs) in relation to the requested license amendment has been summarized below in Tables 1 and 2. Table 1 presents the information provided in the application and Table 2 presents the CNSC Staff’s conclusions. The MLO is currently in

good standing with “Satisfactory” rating in all SCAs. The December 2020 Regulatory Oversight Report (ROR) presented and evaluated MLO performance over the 3-year time period from 2017 to 2019.

Table 1: Summation of Amendment Application Information Relevant to Safety and Control Areas

Safety and Control Area	Ongoing / Proposed Improvements Commitments Outside License Amendment	Required Change in Relation to License Amendment
Management System	Continual improvement guided by updates to regulatory framework standards and REGDOC's, as well as findings from internal and external audits and regulatory inspections.	The Integrated Management System (IMS) will be updated to encompass the JEB TMF Expansion Project. Existing IMS sufficient for the safe operation of the McClean Lake Operations (MLO) and supports the License amendment request.
Human Performance Management[(a)]	-	The JEB TMF Expansion Project requires no change to operational management of human performance. Existing management sufficient for the safe operation of the MLO and supports the License amendment request.
Operating Performance	Continual improvement through corrective action that will be guided by ongoing initiatives and resolution of non-compliances identified by CNSC inspections and reviews.	The program that ensures the safe operation of the facility will be updated to encompass the JEB TMF Expansion Project.
Safety Analysis[(b)]	Continual improvement guided by recommendation by CNSC and updates to applicable standards and regulatory documents, including the Global Industry Standard on Tailing Management (published by International Council on Mining & Metals August 2020).	Safe work plans, design plans and the IMS will be reviewed and updated throughout construction, operation and decommissioning. During decommissioning a performance monitoring program will be implemented to confirm physical and environmental stability of the JEB TMF Expansion, which will continue into post-decommissioning.
Physical Design	The physical design of the JEB TMF is described / documented in the Facility Description Manual (FDM; AREVA 2016). This includes (a) site characterization, (b) embankment and liner design, (c) landform design, and (d) cover design. Change control and design control processes are used to ensure physical changes are reviewed and approved by site management prior to implementation.	Prior to construction, to provide increased confidence in the foundation competency and to ensure the JEB TMF Expansion is constructed safely and as designed, a number of undertaking will be completed: (1) verification of embankment soil conditions, (2) embankment fill test pad, and (3) cover test plot program, all of which will inform detailed design and construction management.

Safety and Control Area	Ongoing / Proposed Improvements Commitments Outside License Amendment	Required Change in Relation to License Amendment
Fitness for Service[(a)]	-	Existing management sufficient for the safe operation of the MLO and supports the License amendment request.
Radiation Protection	Continual improvement through Job Task Observations[(c)], worker awareness, radiation protection training and application of lessons learned.	The JEB TMF Expansion Project requires no change to operational protective measures. Existing management sufficient for the safe operation of the MLO and supports the License amendment request.
Conventional Health & Safety	Continual improvement through implementation of new safety standards, and the maintenance and where possible enhancement of existing safety program.	Appropriate measures are in place for safe operation and supports the License amendment request.
Environmental Protection	Continual improvement through site inspections, environmental training, reviews of environmental monitoring data and systematic audits of the Environmental Management System[(d)] (EMS).	Appropriate measures are in place for safe operation and supports the License amendment request.
Emergency Management & Fire Protection	Continued compliance with REGDOC 2.10.1 Nuclear Emergency Preparedness and Response, and continual improvement through compliance with Global Industry Standard on Tailing Management (published by International Council on Mining & Metals August 2020).	The Emergency Preparedness and Response will be updated to encompass the JEB TMF Expansion Project. Existing management sufficient for the safe operation of the MLO and supports the License amendment request.
Waste Management	Revision of the MLO Preliminary Decommissioning Plan (PDP) and Financial Assurance (FA) every 5-years[(e)].	The PDP and FA will be updated to encompass the JEB TMF Expansion Project.
Security[(a)]	-	Appropriate measures are in place for safe operation and supports the License amendment request.
Safeguards & Non-proliferation[(a)]	-	Appropriate measures are in place for safe operation and supports the License amendment request.

Safety and Control Area	Ongoing / Proposed Improvements Commitments Outside License Amendment	Required Change in Relation to License Amendment
Packaging and Transport[(a)]	-	Appropriate measures are in place for safe operation and supports the License amendment request.

(a) SCA is not directly relevant to the licensing request.

(b) Primary concerns in relation to the JEB Tailings Expansion Project are: (1) long-term transport of contaminants from the facility to the receiving environment and (2) the geotechnical stability of the facility during operating period and post-closure.

(c) No additional context is provided in the submission document as to what Job Task Observations entails; assuming this encompasses the matrix referred to on page 45 (pg 47/137, written submission from Oran) of sampling location and frequencies that is informed by worker occupancy in areas and potential hazards in those areas.

(d) Two integral components of the EMS are the Environmental Monitoring Program (EMP) and the Environmental Code of Practice (ECOP); the EMP = effluent and environmental monitoring and the ECOP describes the administrative and action levels (action response “triggers”) for environmental protection. The Environmental Performance (EP) Technical Information Document (EP TID) is updated every 5-years, which presents EP data and compares performance to: (1) predictions made in environmental impact assessments, (2) reference values, (3) federal and provincial guidelines, and (4) previous monitoring results.

(e) PDP is intended to provide sufficient planning and FA the sufficient funds for decommissioning in the unlikely event that Orano is unable to fulfill its obligations and should a government agency need to assume responsibility for decommissioning the site.

Table 2: Summation of CMD12-H6 Conclusions Relevant to Safety and Control Areas

Safety and Control Area	Conclusion	Recommendation
Management System	The licensee's program in respect of this SCA remains satisfactory.	
Human Performance Management	The licensee's program in respect of this SCA remains satisfactory.	
Operating Performance	Tailings preparation process and the expanded JEB TMF will continue to perform as expected and meet CNSC's expectations with respect to the protection of the receiving environment.	Retain three licence conditions without change: the licensee shall implement and maintain (1) an operation program, which includes a set of operating limits; (2) a program for reporting to the Commission or a person authorized by the Commission; and (3) a program for nuclear substance and radiation devices.
Safety Analysis	Taking into account environmental design features and mitigation measures, the 10.5 m JEB TMF vertical expansion can be constructed, operated and decommissioned safety. CNSC staff concluded that Orano is meeting the regulatory requirements of the safety analysis SCA and CNSC staff's expectations to protect workers and the environment at the MLO as it relates to the development and maintenance of the safety analysis for the facility.	Retain one licence condition without change: the licensing shall implement and maintain a safety analysis program.
Physical Design	CNSC staff conclude that Orano continues to implement and maintain effective design programs at the MLO in accordance with regulatory requirements. The site characterization has provided appropriate foundation soil conditions and material properties for embankment and liner designs, and for preliminary cover and landform designs.	Retain one licence condition without change: the licensing shall implement and maintain a design program.

Safety and Control Area	Conclusion	Recommendation
	The embankment and liner design are appropriate to provide expected embankment stability, and safe containment of tailings and pond water during operation. A detailed design of final cover and landform at the time of decommissioning is required to ensure the long-term safety and environmental performance of the JEB TMF.	
Fitness for Service	The licensee's program in respect of this SCA remains satisfactory.	
Radiation Protection	The licensee's program in respect of this SCA remains satisfactory.	
Conventional Health & Safety	The licensee's program in respect of this SCA remains satisfactory.	
Environmental Protection	Orano's MLO has implemented and maintained an environmental protection program that adequately protects the environment and the people in accordance with regulatory requirements. CNSC staff concluded that the potential risks to human health and the environment from radiological and hazardous released to the atmosphere, terrestrial, hydrogeological and aquatic environments from the proposed JEB TMF Expansion Project are low to negligible.	Retain two licence conditions without change: the licensee shall (1) implement and maintain (1) an environmental protection program, which includes a set of action levels. When the licensee becomes aware that an action level has been reached, the licensee shall notify the Commission within 24 hours; and (2) when the effluent concentrations reach or exceeds the discharge limits specified in the Metal and Diamond Mining Effluent Regulation, as amended from time to time, immediately investigate and take corrective action to ensure that the effluent concentration is maintained below the discharge limits.
Emergency Management & Fire Protection	The licensee's program in respect of this SCA remains satisfactory.	

Safety and Control Area	Conclusion	Recommendation
Waste Management	Based on desktop reviews and inspection, CNSC staff conclude that Orano's overall performance for this SCA is satisfactory. The revised PDP, cost estimate and FA meet CNSC regulatory requirements.	Retain two licence conditions without change: the licensee shall implement and maintain (1) a waste management program; and (2) a decommissioning strategy.
Security	The licensee's program in respect of this SCA remains satisfactory.	
Safeguards & Non-proliferation	The licensee's program in respect of this SCA remains satisfactory.	
Packaging and Transport	The licensee's program in respect of this SCA remains satisfactory.	

Other Areas of Regulatory Interest

In addition to the SCAs, the MLO is currently in good standing with “Satisfactory” rating in all other areas of regulatory interest. Table 3 presents the CNSC Staff’s conclusions regarding other areas of regulatory interest outside of the SCAs.

Table 3: Summation of CMD12-H6 Conclusions Relevant to Other Areas of Regulatory Interest

Other Areas of Interest	Conclusion	Recommendation
Indigenous Engagement	Since the proposed JEB TMF Expansion Project will be carried out within the existing footprint of the MLO, CNSC staff are confident that the risk of potential impacts on the environment are unlikely to cause new impacts to Indigenous an/or treaty rights in relation to this license amendment.	-
Other Consultation	The public continue to be informed of regulatory activities through regular website updates, publicly webcast Commissioning proceedings, social media, and regular fact-to-face discussion with key audiences in Northern Saskatchewan.	-
Cost Recovery	CNSC staff conclude that Orano is in good standing with respect to MLO meeting CNSC Cost Recovery Fees Regulations.	-
Financial Guarantees	CNSC staff concludes the cost estimate and financial guarantees proposed meet regulatory requirements.	Retain one licence condition without change: maintain a financial guarantee for decommissioning that is acceptable to the Commission.
Public Information and Disclosure	Orano is encouraged to complete more frequent reviews and updates of their Public Information and Disclosure Program to adapt communications to suit the needs of their multiple audiences. CNSC staff expect the licensee to conduct a yearly review of the disclosure protocol with impacted communities to ensure the commitment maintains relevance and importance to those communities.	Retain one licence condition without change: implement and maintain a public information and disclosure program.

Other Areas of Interest	Conclusion	Recommendation
	CNSC staff concludes that Orano's PIDP for the MLO meets regulatory requirements.	

Questions

As was indicated earlier in this report, there is very little quantitative data provided to review. As such, there are some general overarching concerns raised that I cannot establish a full context for. These concerns are provided in this section and are summarized as questions that could be posed to Orano for clarification.

Firstly, I imagine for anyone it is hard to believe that during operation, let alone closure, that increasing the tailings from 4.6 Mm^3 to 6.9 Mm^3 (2.3 Mm^3 increase; 50% increase) would not result in a significant increase in terms of risk to the environment both during operation (Sink Reservoir and Vulture Lake) and closure (Fox Lake and Pat Lake). This may be true perhaps as one or all of the following are true:

> As stated on pg 17 (pg 19/137 of written submission form Orano) of the application during processing of the ore from Phase 1 of the Cigar Lake Mine, it became apparent that due to the geochemical and physical characteristics of Cigar Lake ore, the tailings generated were utilizing more of the JEB TMF capacity than anticipated.
>
> (1) That although the volume of the tailings will significantly increase perhaps the associated loadings of contaminants are not predicted to increase proportionally (i.e., the ore per until volume contains less contaminants than previously predicted).
>
> (2) The environmental impact assessment previously completed was very conservative and based on new information / assessment methods this conservatism has been reduced and the predicted effect are the same although the volume to be disposed of has significantly increased.
>
> (3) The concentrations in the receiving environment are actually predicted to significantly increase, but as the levels of those contaminants that will be elevated above baseline / background are predicted to remain below the relevant guidelines the conclusions of the previous and the new environmental impact assessment work are considered to be the same.
>
> (4) New mitigations methods are proposed and/or mitigation previously proposed have been shown to be more effective than originally predicted.

Question #1: What is the overall rationale behind the significant increase in tailings volume not significantly increasing risk to the downstream environment during closure?

Stated in the Environmental Protection Review Report on page 14 (EPR; Appendix E of the CMD document pg 114/220), with the JEB TMF Expansion Project there will be no new releases of waterborne effluent expected and the effluent quality to be discharged from the JEB WTP will not be altered.

I would agree that no new sources of waterborne effluent will be created, but I would seek confirmation that annually and/or over the life cycle of the facility that the volume of effluent to be discharged from the JEB TMF, in addition to the quality of the effluent, are not predicted to change (i.e., loadings to the receiving environment are not increased). As it is states on pg 10 of the EPR (pg 110 / 220 of the CMD document), Orano has determined the JEB WTP has the capacity to treat the reclaim water from the proposed JEB TMF expansion. The statement regarding the WTP's capacity would indicate the volumes to be treated are expected to change. However, no information is provided to reassure the reader that either (1) the volume of water to be discharged over time is not expected to change or (2) that the volumes to be discharged will increase but have been previously assessed.

Question #2: Will the volume of water to be released from the JEB WTP annually and over the life cycle of the plant be altered by the JEB TMF Expansion Project?

This would include predicted COPCs in Sink Reservoir, Vulture Lake, McClean Lake East Basin sediments and risk to aquatic and terrestrial receptors (semi-aquatic receptors can be sensitive to selenium exposure). I'm unaware of the decommissioning plan for Sink Reservoir and Vulture Lake, as such, I'm not sure if they will be accessible to wildlife and/or humans in the future.

The assessment work specific to the JEB TMF Expansion Project concludes that the COPCs will move from the facility to the receiving environment in a similar way over a similar time frame as was predicted before the expansion. This same context would be valuable in terms of the operation of the Sink/Vulture Treated Effluent Management System / JEB WTP. As we know from our previous review of the ROR (October 2019), short-term predicted sediment selenium concentrations in East Basin of McClean Lake have been predicted to be above those previously predicted.

Question #3: If the answer to Question #2 is "yes", has the potential environmental risks posed been previously assessed, including risks from sediment COPCs to aquatic and terrestrial receptors?

Further, in relation to the assessment condition stipulated by CNSC (pg 125 / 220 of the CMD document) that the risk posed to aquatic receptors from predicted sediment COPC concentrations in Fox Lake and Pat Lake following closure be assessed, I would also seek clarification that risks to terrestrial receptors have also been considered or there is some rationale as to why this is not necessary.

Question #4: As aquatic-dependent terrestrial receptors are known to be sensitive to selenium exposure, has this been encompassed in the environmental risk assessment work completed to-date or ongoing for both the JEB TMF and JEB WTP?

On page 42 of the CMD document (pg 48 / 220), a disruptive event is described as a beyond design failure of environmental controls during the closure state, and the potential environmental risks from this event are evaluated. This event seems very limited considering the timeframe over which the environmental controls / mitigation are anticipated to be necessary (>10,000 years).

Question #5: Was stakeholder engagement sought to inform the disruptive event assessed? If not, would stakeholder engagement be sought to develop the disruptive event assessed as part of the final decommissioning and closure environmental risk assessment?

On pg 42 of the CMD document (pg 48 / 220) it is described that in the event that the sediment assessment completed for Fox Lake and Pat Lake predict concentrations that pose a risk to aquatic receptors additional mitigation measures to prevent this from occurring must be considered. Perhaps this would be more reassuring if the types of available additional mitigation measures were discussed briefly.

Question #6: What additional mitigation measures would be available to prevent predicted elevated sediment COPC levels in Fox Lake and Pat Lake if the additional environmental risk work shows there could be a potential risk to downstream receptors?

Recommendations

From my review of the information provided there is no reason to object to the CNSC's conclusions that the MLO Licence Amendment should be granted.

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