Comments on the Impact Statement and Summary for the Crawford Nickel Project

IAA Reference # 83857

Submitted by Northwatch

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On December 9, 2024 the Impact Assessment Agency of Canada (IAAC) announced a 60 day comment period for Indigenous Peoples and the public to review and provide feedback on the summary of the Canada Nickel Company's Impact Statement prepared for the Crawford Nickel Project. The deadline for comments was announced to be 11:59 p.m. on February 7, 2025. This is the third of four opportunities for Indigenous Peoples and the public to comment as part of the impact assessment process for the project. The final comment opportunity will be on a draft Impact Assessment Report to be prepared by the IAAC.

Crawford Nickel Project

According to the Agency's registry posting, the Canada Nickel Company is proposing the Crawford Nickel Project located 43 kilometres north of Timmins, Ontario. Canada Nickel Company is proposing the construction, operation, decommissioning and abandonment of an open-pit nickel-cobalt mine and on-site metal mill, located 43 kilometres north of Timmins, Ontario. As proposed, the Crawford Nickel Project would have a mine ore production capacity of 290,000 tonnes per day and a mill ore input capacity of 120,000 tonnes per day. The project would operate for about 41 years.

The Project will be a massive undertaking, consisting of the construction, operation, and decommissioning and closure of a new open pit nickel mine and on-site processing facility, covering an area of approximately 11,785 hectares (ha), extracting approximately 1,715 million tonnes of ore at a rate of up to 240,000 tonnes per day. Aspects include:

- An open pit about 10 km2 (992 ha) in size, measuring 4,400 meters (m) by 3,100 m,and up to 690 m deep.
- An Impoundment Facility about 3,150 ha, with a height ranging from 34 m to 115 m.
- A tailings management area approximately 2,300 ha which will store up to 495 million cubic meters (m 3) of tailings; the final dam height will vary from 9 m to 23 m.
- A Water Management System to separate contact and non-contact water which includes a number of ditches and ponds[1]
- Site preparation and clearing will result in a direct loss of approximately 11,504 ha of naturally vegetated communities, including plant species of importance to Indigenous Nations, riparian habitat (178 ha) and wetlands (8,667 ha), which includes a potential rare vegetation community (Hardwood Swamp) (3 ha).[2]
- The Project will result in the loss of 147 ha of fish habitat in the North Driftwood River, West Buskegau River, and Jocko Creek watersheds, including headwater streams, ponds, and approximately 8 km of the main channel of the North Driftwood River within the Project Area[3]

[1] Impact Statement Summary, Page 3
[2] Impact Statement Summary, Page 56
[3] Impact Statement Summary, Page 59-60

The Project is located 42 kilometres north of the City of Timmins, within the unorganized geographic townships of Nesbitt, Crawford, Carnegie, Kidd, Beck, Lucas, Prosser, and Wark in Ontario, including portions of these townships that are considered part of the City of Timmins. First Nations with communities in the vicinity of the project include Apitipi Anicinapek Nation, Flying Post First Nation, Matachewan First Nation, Mattagami First Nation and Taykwa Tagamou.

One of Canada Nickel Company's central claims about the project is that through the use of the Company's "patent-pending In-Process Tailings Carbonation process, a groundbreaking method, that could permanently store (sequester) up to 1.3 million tonnes of CO2 annually, transforming the Project into a large-scale carbon sink capable of producing net-zero metals. Once fully realized, this could make the Project Ontario's first permanent carbon storage sink and one of Canada's largest permanent carbon storage sinks."[4] Northwatch's comments are found later in this submission.

Northwatch

Northwatch is a public interest organization concerned with environmental protection and social development in northeastern Ontario. Founded in 1988 to provide a representative regional voice in environmental decision-making and to address regional concerns with respect to energy, waste, mining and forestry related activities and initiatives, we have a long term and consistent interest in the mining sequence and its social and environmental costs and benefits, including mineral exploration, mine development, operation and closure, and metals processing.

Northwatch's objective in participating in this and other mining related assessment processes is to provide an independent review of mines as proposed, and to contribute to mine reviews in such a manner as to reduce environmental impacts and increase social benefits.

The questions Northwatch poses as a basis for mine reviews in which we engage include the following:

- Will the mine project, if in an area with past or active mines, result in or contribute to the remediation of past mining impacts?
- Will the mine project maximize economic / social benefits to local communities, especially communities who have previously been mine-dependent or mining-impacted?
- Will the mine assessment be carried out in a way that adequately identifies the ecological values in the project area and adequately assesses the degree to and the manner in which the proposed mining-related activities imperils these values?
- Will the mining activities be carried out in a manner that avoids environmental harm?
- Will the mine project avoid adversely impacting recreational opportunities and pastimes in the mine's vicinity?

[4] Impact Statement Summary, Page 2

- Will the mine project be carried out in a manner that respects and preserves the rights, land uses and interests of Indigenous peoples?

Northwatch has provided comments in response to two previous invitations to participate. On 6 February 2023 the Impact Assessment Agency of Canada (the Agency) announced that the Crawford Nickel Project would be subject to an impact assessment and that a 30-day comment period had commenced on draft Tailored Impact Statement Guidelines (draft Guidelines) and a draft Public Participation Plan (draft Plan). At the same time, the Agency also posted a Draft Cooperation Plan and a Draft Permitting Plan but did not invite comments on these plans. Northwatch provided comments in response.

Previously, on 8 August 2022, the Impact Assessment Agency announced a public comment period on the Summary of the Initial Project Description for the Crawford Nickel Project, and Northwatch subsequently submitted comments to the Agency on that document. Those comments identified many subjects which Northwatch identified as necessary topics for inclusion in an eventual Impact Statement, and so in the Tailored Impact Statement Guidelines. In the Impact Statement Summary Canada Nickel Company writes that "recognizing the importance of consultation and engagement, Canada Nickel engaged with various stakeholders with a potential interest in the Project, including federal and provincial government agencies, local municipalities, public interest groups, and other interested parties and members of the public" and that engagement activities included emails, calls, and meetings and ad-hoc meetings on specific topics.[5]

Northwatch notes that despite being an easily identified regional environmental non-governmental organization – and certainly recognizable on the basis of having commented on both the initial project description and the Tailored Impact Statement Guidelines and draft Public Participation Plan as part of the Impact Assessment process – we have no record of having been contacted by Canada Nickel Company or approached by the Company or its agents to discuss the project or Northwatch's interests or concerns.

Comments on the Impact Statement and Impact Statement Summary

While Northwatch has an interest and concern with the full range of issues presented by this mine project, our review has concentrated in three key areas: mine closure and closure planning, the potential for acid mine drainage and associated metal leaching, and the project's climate impacts and the associated claims by Canada Nickel with respect to carbon sequestration. However, our comments are not narrowly limited to those topics.

[5] Impact Statement Summary, Page 12

Northwatch was supported in this review by Dr. Dave Chambers with the Centre for Science in Public Participation who reviewed those sections of the CNC documents related to closure planning, including the *Crawford Nickel Project: Conceptual Closure Plan* (Stantec, September 30, 2024). Several of the following sections relies heavily on the review carried out by Dr. Chambers. As set out below, several key concerns span operational, closure and post-closure periods.

Closure Planning

The first half of the Closure Plan is spent describing the operational aspects of the mine, and while it is important to understand the mine operation that will be reclaimed and closed, much of operational detail provided reads as if it was cut and pasted from another document. It would have been helpful to tie the operational/site layout details more closely to how this impacts reclamation and closure considerations.

Unfortunately, the plan for the Crawford Nickel Project leaves some important issues – including and particularly water treatment and the financial surety - to be decided at a future point in time.

Several issues related to closure, closure planning and the post-closure period are discussed below.

Water Treatment

Canada Nickel has recognized that water treatment will most probably be required for any discharges of water from the plant site, waste rock piles, and mine pits/tailings disposal facilities.

> "*Based on the geochemical characterization, certain primary constituents of concern exceed Provincial Water Quality Objectives (PWQO), need further treatment before being discharged to the receiving environment*." (Canada Nickel 2023)

However, neither the water treatment methodology, nor the criteria to which the water must be treated, have been analyzed in the project documents.

> "*Details of the treatment technologies and sampling methodologies to be used to test and treat contact water will be determined during detailed Project design.*" (Stantec 2024a).

Water treatment, while initially an operational consideration from both a regulatory and financial standpoint, is also very important from a mine closure standpoint because of financial implications for the financial assurance required for post-closure activities. Canada Nickel has suggested that it will use,

> "*… mobile water treatment units to treat site seepage and runoff from impoundment facilities, stockpiles, plant site, and the TMF ...*" (Canada Nickel 2023).

There are several undisclosed issues that could significantly affect the need for, and cost of, cost-closure water treatment. First, what are the contaminants that will need to be treated? Second,

what the discharge standards/criteria that will be imposed by the regulatory agency for discharges from the mine?

Contaminant Predictions

A number of exceedances of Provincial and CCME criteria were noted in the testing of the ore, waste rock, and synthetic tailings supernatant, but arsenic seems to be the primary constituent of concern. However, testing conducted to this point is limited, and is too limited to base an analyses for a Project Impact Statement. More thorough geochemical testing is required, especially for seepage from the waste piles and the pit wall rock, to produce results with ample reliability to determine whether post-closure water treatment will be required.

The existing contamination predictions were based primarily on the results of shake flask extractions tests. Shake flask extraction testing is not widely used for predicting contaminant leaching from mine waste. Synthetic leaching testing is the preferred method for producing predictions of contaminant leaching.

Shake flask extraction testing has several weaknesses when it comes to predicting water quality:

Limited Reaction Time: shake flask extraction tests typically involve short-term reactions, which may not accurately reflect long-term leaching behaviors and the gradual release of contaminants over time.

Lack of Environmental Conditions: The test conditions in a shake flask do not fully replicate the complex environmental conditions found in natural settings, such as variations in temperature, pH, and microbial activity.

Inconsistent Results: The results can be inconsistent due to variations in sample preparation, agitation speed, and extraction duration, leading to difficulties in standardization and reproducibility.

These limitations highlight the need for complementary testing methods and more comprehensive approaches to accurately predict water quality.

Synthetic leaching tests are generally considered more reliable than shake flask extraction tests for predicting water quality.

Recommendation: A thorough geochemical characterization program must be undertaken to supplement/replace the preliminary geochemical results from the current shake flask extraction tests.

Recommendation: A geochemical model to predict water quality needs to be run using the results from the updated geochemical testing. These models are standard procedure for mine-permitting analysis, and the information from these models is needed at this stage in the permitting process.

Groundwater Impacts

There is no discussion in the Project documents of the potential contamination to groundwater. Groundwater discussions are related almost entirely to water quantity, the dewatering requirements for the pits, and time it will take for the pits to reestablish stable groundwater levels after mine closure. With regard to the potential for ARD/ML, it is noted;

> "*Based on preliminary characterization data, waste rock is anticipated to be NPAG and acid rock drainage is not anticipated to occur during the LOM. No waste segregation will be conducted. Confirmatory samples will be collected during the construction phase and the first three years of the operations phase and results will be reviewed by a qualified professional to evaluate potential for ML/ARD*." (Stantec 2024b)

Lack of waste segregation, coupled with the preliminary geochemical characterization, means that further testing, and/or operational monitoring results, will be required. This also means that the conceptual feasibility of a groundwater/seepage collection system must be investigated as a part of the Closure Plan, since this will be necessary to collect metals leaching contamination from the tailings, waste rock, and pit walls, if it should occur. The present level of geochemical characterization is not sufficient to determine whether metals leaching will be a problem.

In addition, there is little to no discussion or analysis of any potential effects to groundwater off the mine site. Even if no effects are anticipated, that assumption must be discussed and substantiated.

Recommendation: Groundwater modeling and offsite groundwater quality must be included in the Project analysis.

Discharge Standards

It is mentioned in several Appendices that discharges of project contact water will meet Metal and Diamond Mining Effluent Regulations (MDMER) water quality standards. MDMER water quality standards significantly exceed most chronic and acute water quality criteria that are protective of aquatic life. The commitment to meet MDMER Standards will not ensure the safety of fish and other aquatic life. It is important to know what water quality discharge standards Provincial regulators will impose on the Project. The discharge standards will drive the requirements for water treatment.

For post-closure, only settling of suspended sediment, potentially coupled with passive treatment, is mentioned for water treatment. Passive treatment is generally limited to relatively low flows, and is only effective during warm weather. If protection for aquatic organisms is necessary, active water treatment may be required. Active treatment is much more expensive than settling and/or passive treatment. If active treatment is required, a much larger post-closure financial assurance will be needed.

Recommendation: A draft discharge permit should be issued by the regulatory agency so that both the company and the public will know what criteria will be applied to the mine discharges, and what water treatment technologies will be needed to meet these criteria.

Financial Assurance

Even though a draft reclamation and closure plan is necessarily vague, one of the concrete parts of a draft reclamation and closure plan is the calculation of the financial assurance required for post-closure activities. No effort has been made to estimate the post-closure financial assurance for the Crawford Nickel Project.

There are probably several reasons for this. Regulatory agencies are almost universally reluctant to release post-closure financial assurance calculations, usually based on the justification that they want to wait until they have an approved final project before making these calculations. This reasoning has several significant flaws. First, because mining companies need to have a good handle on their potential and projected costs, they always know how the potential variations on project design will affect operational and capital costs. Because of this, the information required to make post-closure financial assurance calculations is readily available at the permitting stage.

In addition, a critical part of the post-closure financial assurance calculations are the assumptions used in financial assurance model, for example the assumption of the real rate of return that will be applied to the investment of the financial assurance, and the assumed percentages for the indirect costs associated with post-closure plan. These factors are extremely important, and are independent of the final choice of approved closure plan. These assumptions can and should be disclosed as a part of the Closure Plan.

Second, the magnitude of the financial assurance for post-closure reclamation and closure is huge, and is a significant liability to the public if it is not estimated conservatively. The public deserves to review and comment on the assumptions made for the post-closure costs before the project is approved.

From the statements in the Project documents, it appears that Canada Nickel is assuming only *de minimus* water treatment will be required for post-closure.

> "*Initially, a water treatment plant will treat seepage prior to discharging to the North Driftwood River and/or West Buskegau River. As the TMF is reclaimed and vegetated, elevated TSS will begin to stabilize. At this stage, a 5-year reclamation timeline has been assumed at which time water quality will be suitable for direct discharge*." (Stantec 2024a)

There is no data supporting the assumption of a "5-year reclamation timeline" at which water from the TMF, or the mine site itself, will be suitable for direct discharge into North Driftwood River and/or West Buskegau River.

A water quality prediction model for the post-closure residual pit lake, or the waste rock seepage, has not been done. This modeling is an essential component of post-closure planning. Operational monitoring of actual water quality is also essential, but if there is an assumption of no water treatment, as is the case, is not correct, and the mining company were to go bankrupt, the public would be left with the costs of long-term water treatment.

> "*If seepage treatment is required, a passive treatment system will be implemented*." (Ausenco 2024).

Since neither contaminant concentrations, nor water flows, have yet been estimated, we do not know whether a passive treatment system is capable of adequately treating post-closure seepage.

Recommendation: An estimate of the financial assurance for closure and post-closure should be disclosed so that the public has an opportunity to review the plan and comment on the assumptions made in the financial assurance calculations, and the size of the financial assurance required.

Climate Impacts and Carbon Sequestration

As outlined in the Impact Statement Summary, Canada Nickel is promoting the notion that it will use its patent-pending In-Process Tailings Carbonation process to enhance the Project's permanent carbon storage, or 'sequestration' potential, whereby carbon dioxide will be added into the tailings to permanently fix carbon dioxide in solid mineral form. Canada Nickel aims to develop the Project into an operation with carbon sequestration exceeding its greenhouse gas emissions, making the Project Ontario's first and largest (and one of Canada's largest) carbon storage facilities, storing up to 1.3 million tonnes of carbon annually during its peak period.[6]

Also reported in the Summary are key concerns expressed by federal and provincial agencies in earlier stages of the review process with respect to the proposed carbon storage, including comments on the need to increase the validity of Canada Nickel's Carbon Storage Plan and produce a "credible plan to achieve net-zero by 2050 that uses and builds off the Best Available Technologies / Best Environmental Practices".[7]

Despite those caution flags waved by the government agencies, Canada Nickel Company has still not produced sufficient information about their carbon storage plan or made a convincing case.

Canada Nickel places a great deal of emphasis on the potential for carbon sequestration of the tailings in the impact statement and summary and supporting documents.

They describe "Active carbonation" as something they expect through Canada Nickel's novel In-Process Tailings Carbonation process to harness the natural mineral sequestration capabilities of host rock to actively capture concentrated CO 2."

[6] Impact Statement Summary, Page 4
[7] Impact Statement Summary, Page 22

Purportedly, in this process, tailings generated by the milling process are conditioned with concentrated CO 2 after thickening and before discharge to the Tailings Management Facility. While still providing very little information about the actual process, the Impact Statement claims that while the Project is expected to release a net total of 11,135 kilotonnes of carbon dioxide equivalent in greenhouse gas emissions over the Project's lifetime, the Project will also increase carbon sinks, leading to an estimated sequestration of 46,678 kilotonnes carbon dioxide equivalent, with the final claim that "overall, the Project will sequester more carbon dioxide equivalent than it emits[8].

In addition to the material in the project description, Canada Nickel has also provided the following information in its Crawford Nickel NI 43-101 (2023) report:

> *"The company commissioned a study by a leading strategy house that confirms that the project could reasonably expect in excess of C$25 per tonne of CO2 in capture and storage fees from its IPT carbonation process based on publicly known storage fees and communicated carbon price and policy status. The study also confirmed the potential requirement for more than 20 Mt of annual storage capacity of CO2, given the communicated carbon price and Carbon Capture, Utilization, and Storage (CCUS) ITC status, from a population of approximately 150 potential emitters, with approximately 50 emitters concentrated in four distinct clusters in Sudbury, Sault Ste. Marie, Toronto, and Sarnia."*

While chemically possible, and a laudable goal, the practicalities are missing from the Canadian Nickel Company descriptions.

In a carbon sequestration project, at the point of capture the carbon dioxide (CO2) is typically compressed into a liquid statement for transport and then delivered to the storage site via pipelines, although it can be transported by other methods (trucks, trains, etc.). The CO2 is – typically – then injected deep underground into geological formations such as depleted oil and gas reservoirs. While research into carbon sequestration in mine tailing is underway by a University of British Columbia spin-off company and by Newmont Gold, in our review Northwatch was unable to identify any actual experience with carbon sequestration in mine tailings.

Canada Nickel Company's commissioned study – noted above – identified a potential customer base for their carbon sequestration service of approximately 150 potential emitters, with approximately 50 emitters concentrated in four distinct clusters in Sudbury, Sault Ste. Marie, Toronto, and Sarnia.

[8] Impact Statement Summary, Page 69-70

To bring CO2 to the Crawford mine site would potentially involve building a pipeline, a major capital investment of hundreds of millions of dollars that would need to be borne all, or in large part, by the producer of the CO2.

The most practical (potential) way of sequestering the CO2 would be to mix it with the tailings before or as they are placed in the impoundment/pit (which the Impact Statement confirms is the intention). The planned mine life is only 41 years, so if the infrastructure to move CO2 to the Crawford mine site is not in place when the mine opens, the cost per unit of CO2 stored would increase rapidly, making sequestering CO2 there less and less economic as mine counts down toward closure.

Potentially, Canada Nickel Company is considering that a likely source of carbon for sequestration would be from the nickel smelter Canada Nickel is proposing for Timmins. However, it does not appear the likelihood is high that a smelter would open in Timmins anytime soon, with the minimal investment estimated to be in the billion dollar range.[9]

An additional concern is with "leaks" or releases from the tailing, over time, after the carbon has been sequestered. This is a well-known issue with carbon sequestration in underground settings. Given that the CNC patent-pending In-Process Tailings Carbonation process is novel and without operating experience or observation, this risk area is significant.

In general, we do not support the substitution of aggressive efforts to reduce carbon output from the project under review with a theoretical plan to sequester carbon produced by other players at other operations, none of which has been clearly identified.

Canada has made a commitment to reduce our carbon emissions.

On its face, with the Canada Nickel Company proposal does it allows the Crawford Mine to release carbon to the atmosphere unfettered and without restraint on the basis of a theoretical plan to absorb carbon from other operations; in turn, those other operations may have also continued to release carbon with the expectation that they could simply pay to make their problem go away. The net result is significantly larger releases of carbon. This is unacceptable from myriad perspectives.

Recommendation: CMC should provide a detailed and technically supported description of the carbon sequestration project, including the sources of the CO2 to be sequestered and the transportation methods to be utilized as part of this assessment process

***Recommendation: CMC should undertake a full-cost accounting analysis of the CO2 releases and other impacts associated with the capture, concentrating and transporting of* the CO2 as**

[9] *Plans to build mineral processing plants in Timmins by 2027 'a bit of a stretch,' says expert*
Canada Nickel announced plans Thursday to build 'biggest nickel processing facility in America'
Aya Dufour · CBC News · Posted: Feb 09, 2024 6:30 AM EST | Last Updated: February 9, 2024
https://www.cbc.ca/news/canada/sudbury/canada-nickel-profits-mine-northern-ontario-1.7110089

part of their carbon sequestration process; this should be included in this impact assessment process

Recommendation: CMC should develop a detailed accounting of the 11,135 kilotonnes of carbon dioxide equivalent in greenhouse gas emissions that is currently projected to be released over the Project's lifetime and prepare an aggressive strategy to reduce those emissions as part of this assessment process

Recommendation: CMC should develop contingency plans for their carbon sequestration project with defined performance thresholds and corresponding contingency measures which will be employed if and when performance thresholds are not met.

Recommendation: CMC should produce a study specific to the potential for releases of carbon to the environment after carbon sequestration in the tailings. This study would include discussion of mechanisms for release paying particular attention to the potential effect acid mine drainage and setting out scenarios on various time frames.

Recommendation: CMC should set out the basis for their calculations based on current and estimated pricing for carbon storage, and various scenarios based on changes in those price estimates.

Acid Mine Drainage

As noted above, CMC's *Crawford Nickel Project Conceptual Metal Leaching and Acid Rock Drainage Management Plan* appears to have carried out only preliminary characterization of the geology to assess acid mine drainage potential, with an intention to collect additional samples and carry out tests during the construction phase and the first three years of the operations. [10]

Summarizing responses to Indigenous concerns, Table 3 in the summary of the Impact Statement indicates that this "A Conceptual Metal Leaching and Acid Rock Drainage Management Plan has also been prepared for the Project." Developing and implementing a Site-Wide Water Management Plan and a Metal Leaching and Acid Rock Drainage Management Plan is identified as an important mitigation measure[11] it is unclear and seemingly unlikely that this plan – an actual plan vs a conceptual plan - has actually been developed.

Prevention must be prioritized over mitigation. Without a detailed and defensible assessment of the acid mine drainage potential with this project.

[10] Stantec 2024b. Crawford Nickel Project Conceptual Metal Leaching and Acid Rock Drainage Management Plan, Stantec Consulting Ltd., September 30, 2024

[11] Impact Statement Summary, Section 6.5.2 and 6.6.2

The statement "Based on preliminary characterization data, waste rock is anticipated to be NPAG and acid rock drainage is not anticipated to occur during the LOM" [12] is of concern for multiple reasons:

- The characterization work to date has only been preliminary work
- The determination that waste rock is anticipated to be NPAG is weak, relative to the strength the threat posed by acid mine drainage
- The "life of the mine" is a relatively short time frame relative to the potential occurrence of acid mine drainage and metal leaching; many mines have operated without acid mine drainage, only to have the phenomena commence post operations

Recommendation: A detailed analysis of acid mine drainage and metal leaching potential should be carried out as part of the impact assessment process, and disclosed so that the government agencies and the public has and opportunity to review the analysis.

Recommendation: The Metal Leaching and Acid Rock Drainage Management Plan identified by CMC's consultant as an important mitigation measure should be prepared and submitted for review as part of the Impact Assessment Process.

Conclusion

The Impact Statement is incomplete and as noted above there are several areas of significant concern where the proponent has not adequately described their project or the methods of carrying out the project, or sufficiently explored and explained areas of risk and potential adverse impacts.

As a next step, the Agency should provide the proponent with a detailed deficiency statement and establish a timeline for their response and an additional review period during with government agencies, Indigenous people and the public are again provided an opportunity for comment and critique.

This should be undertaken prior to the Agency preparing preparation of the draft Impact Assessment Report.

[12] Stantec 2024b. Crawford Nickel Project Conceptual Metal Leaching and Acid Rock Drainage Management Plan, Stantec Consulting Ltd., September 30, 2024

References

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