

Comments on:
SML-173 EIA Public Meeting held on November 16, 2021
AND
Environmental Impact Assessment for proposed MINING OPERATIONS in the
SPECIAL MINING LEASE 173 (SML 173) AREA
located in the Parishes of St. Ann and Trelawny, Jamaica
by Noranda Jamaica Bauxite Partners II (NJBP II), VOLUME 1, FINAL
and the CORRIGENDA
Prepared by Conrad Douglas & Associates Limited, August 3, 2021

Comments submitted by:

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SUMMARIES & CONCLUSIONS:

In denoting this EIA as “FINAL”, Noranda Jamaica Bauxite Partners II (NJBP II) and the EIA consultants, Conrad Douglas & Associates, Ltd (CD&A) continue to demonstrate that ensuring a functional cockpit karst ecosystem, with its myriad ecosystem services, is not a concern to the Partners, and that the EIA process (including public consultation) is merely something to “check off from a list” rather than being a valid, science-based process to guide environmentally- and socially-responsible land use practices and governance. CD&A’s explanation for the delineation of the Clawed-Back Area is but one example which demonstrates both their arbitrary usage of the EIA process and their presenting of information to mislead the public. Confirming what is written in the EIA, during the November 16, 2021 Public Meeting, Dr. Douglas explained that, because bauxite mining would impact the farmers of Sawyers and Level Bottom, lands within the Clawed-Back Area are to be excluded from mining. To cite the EIA:

Therefore, these communities will no longer be potential impact receptors. This is beneficial to the communities as livelihoods will be maintained and export agricultural produce for the domestic and export markets will continue to be supported. (Page 7-14).

Question: Why are the Sawyers and Level Bottom farmers given this special consideration, to not be impacted by mining, but all of the other farming communities located within the proposed SML-173 are not afforded this protection from impacts? On the face of it, the identification of Sawyers and Level Bottom appears capricious.

Question: If as the EIA states on page 10-6 that the Clawed-Back Area is “based on natural biological resource conservation”, why does it not include all of the Richmond Pen Forest Reserve blocks along with the Llandaff and Belmont Forest Reserves? Once these Reserves are surrounded by mining pits and haul roads, they are consigned to death-by-fragmentation because of irreversible changes to the topography. (As a reminder, dynamiting gaps through limestone corridors in *cockpit karst* is irreversible because it obliterates one of the definitional components of *cockpit karst*.) Also, if the functional integrity of the Forest Reserves (i.e., natural biological resources) was an objective, why did the Clawed-Back Area not extend to maintain terrestrial connectivity to the Litchfield Mountain-Matheson’s Run Forest Reserve to the south?

Continuing with the example of the Clawed-Back Area, during the November 16, 2021 Public Meeting, Dr. Douglas re-iterated countless times that the area encompasses a total of 2,109 hectares. I submit that this is disingenuous as presented to the public: NJBP II are not relinquishing 2,109 hectares from mining because, in truth, 1,111 hectares in the Clawed-Back Area are Forest Reserves, which were already ear-marked to be excluded from mining. (NB, I’m assuming Richmond Pen Blocks A & B are included in the Clawed-Back Area because they straddle the boundary.) Thus, only 998 hectares of non-Reserve lands will be excluded from the SML-173 area.

But what opportunities did I have to present the above issues and questions to the wider public during the November 16, 2021 meeting? As NEPA will be aware, CD&A did not undertake adequate safe-guards and the Zoom connection was bombed with pornography. Consequently, I switched to watching the meeting on television, which precluded being able to submit any questions through the Zoom Chat function. I do not have WhatsApp and no phone callers were presented during the televised programme. Thus, I had no valid means of submitting questions for the public to hear or read. Further, with this virtual format, it was obvious that members of the public were not given adequate opportunities to follow-up if they did not believe their questions were answered sufficiently. Added to the fact that substantially more time was allocated to CD&A and to Noranda employees, to give what essentially were public relations briefings, than to members of the public. And that the moderator made statements which demonstrated a lack of neutrality (e.g. during a discussion about Air Quality sampling, she stated that “the science was done” to collect baseline conditions. The moderator was clearly unaware that temporal sampling of Air Quality conditions was not robust for establishing seasonal baselines; otherwise she would not have made that (unsupported) statement . . . but that’s what the public heard from her . . .). I conclude that:

The November 16, 2021 public meeting did not meet national or internationally-recognized standards for a legitimate Public Consultation in the EIA Process.

While I reject the legitimacy of that meeting, I must continue to make comparisons for my review of the August 3, 2021 EIA. As with the previous version of the EIA dated November 6, 2020, this revised version continues to be inadequate, data-deficient, has incorrect descriptions of the karstscape, and makes myriad unsupported assertions that no-to-minimal impact will be

experienced when deep pockets of moisture-holding bauxitic soils are eliminated and limestone corridors are irreversibly obliterated from the landscape, creating gaps which can never be re-constructed.

The EIA continues to be notable for gross omissions of important information. With regards to answering technical questions from reviews submitted in December 2020, it is notable for: (a) ignoring questions; (b) answering questions with assertions instead of data-based evidence or with examples from the peer-reviewed literature; and (c) answering questions with false information. If, as CD&A claim, that the EIA is grounded in scientific investigations, then they cannot be allowed to ignore all of the principles of science, and instead merely repeat their unsupported assertions over and over.

Of the 53 topics and questions I raised in my review of December 28, 2020, CD&A only correctly addressed one, the misspelled surname of the agro-chemist Reginald Innes. This correction can only be described as exceptionally minor compared to the major issues I raised in my review.

A few examples of the **MAJOR** issues and / or outstanding questions which still need to be addressed with data-based evidence include:

- Why is there still no accurate, professional description using technical terminology for the area's geomorphology and topography, namely that it encompasses a form of polygonal karst called *cockpit karst*? As demonstrated in another EIA prepared for SEPL-524, CD&A are fully aware of the technical aspects of *cockpit karst*. Equally, why is NEPA not requiring this accurate and technical description so that the Terms of Reference (ToR) will be fulfilled? As revealed by Figure 5-2, CD&A have the data file to conduct an objective, quantitative assessment of e.g., the numbers and spatial configuration of enclosed polygonal depressions, the numbers and spatial configuration of circular hilltops, the numbers and spatial configuration of limestone saddle- and ridgeline corridors to quantitatively define the topography. These parameters were, after all, relevant for Noranda to create its first 5-year plan of haul roads (ref Figure 4-2), to determine the configurations and costings for obliterating what may be at least 38 limestone corridors to gain access to ore bodies.
- CD&A continue to assert that the creation of haul roads is a Minor and Reversible change to the karstscape. But a first simple question: why are limestone saddle-corridors, which connect circular-shaped hilltops, obliterated to create haul roads? It is to create GAPS through which trucks can pass. And when gaps are created between once-solid features, physical features such as air flow patterns are changed – that's a fundamental principle of aerodynamics. Can CD&A or NJBP II demonstrate a single instance where the physical gap was rehabilitated so as to return a reclaimed pit to a pre-mined topography of a polygon **fully-enclosed** by peripheral limestone hillsides. If not, haul road construction cannot be classified as Minor and Reversible.

- Instead of adding the third proven underground flow line from Cave River Sink to Dornoch (Dornock) Head Rising (which I highlighted as missing in my Dec 2020 review), the EIA replaced the map of WRA's Dye Trace Study with a map of fault lines while retaining the title " **Figure 5-15: WRA Dye Trace Study (Source: WRA)**". Given the profound importance of this area as part of a functioning aquifer, why did NEPA not highlight this major switch of the maps?
- CD&A's contradictory information about risks to aquifers and aquifer discharge flow rates for the 50+ year history of mining in St. Ann; e.g. the EIA describes the flow of the Rio Bueno as:

" The trend line indicates a slight increase in flow despite the diversion of the Cave River and the mining of bauxite within the Rio Bueno Sub Basin by Kaiser Bauxite, and successive companies over the past 50 years:"

But Mr. Basil Fernandez stated during the November 16, 2021 meeting that there has been no destruction of water since mining began in St Ann; he didn't think there would be any impacts; , but he then further stated that there has not been a formal study on discharge rates.

- Invalid comparisons of hydrology and hydrodynamics to bauxite mining and post-mining rehabilitation in Australia (ref Mr. Fernandez during the November 16, 2021 meeting); direct comparisons or extrapolations are not valid owing to the fact that Australia's shallow, blanket-type lateritic bauxites overlay a granitic bedrock while the deep, pocket-type bauxites in SML-173 overlay limestone.
- Invalid comparisons and extrapolations of hydrology and hydrodynamics to the area under SML-165. I refer here to published research conducted by now-Professor Emeritus Michael J. Day in the Tobolski area when he was a graduate student under Marjorie Sweeting in the early 1970s.
- NEPA's failure to reject Napier (Elephant) Grass (*Cenchrus purpureus*) for post-mining rehabilitation, not only because the agency, itself, classifies this grass as a Category 2 Invasive Alien Species, but also because CD&A asserts, without providing any supporting data, that it represents climate change mitigation *inter alia* for CO₂ absorption and carbon sequestration. Critically, CD&A did not provide a robust comparison of Napier Grass to trees with regards to CO₂ absorption and carbon sequestration potentials.
- NEPA's failure to reject CD&A's demonstrably-false assertion that trees do not grow in bauxitic soils. Given that CD&A are aware of hydrology studies from Western Australia, they cannot pretend they do not know that trees and forests do, indeed, grow in bauxitic soils. Instead, they merely repeat a falsehood which stems from the local industry's observational bias of sampling for bauxite in areas already converted to agrarian land uses (e.g., see pg 82 in CD&A's "Responses to Additional Comments . . .")

document, dated March 10 , 2021 for confirmation of this bias). I will repeat my request for data-based evidence for percentage- aluminum concentrations: *What mineralogical and chemical evidence is there to support the assertion that soils of forest-covered cockpits are not bauxitic in their physical properties?* If they want me to be more specific with examples for sampling data, what are the percentage aluminum concentrations for the soils in enclosed depressions with centroids at:

- 18^o 21' 55.6" N and 77^o 38' 16.5" W (confirmed ore body in Windsor, Trelawny)
 - Any other forest-covered enclosed polygonal bottomland depression (including from the Lluidas Vale area) for which they have quantitative evidence that aluminum concentrations in the soils are less than 19%
- Why is NEPA continuing to accept the false assertion that the natural state of enclosed bottomland depressions with bauxitic soils is the currently-observed grassland cover? it is well-documented in the literature that the observed grasses were imported by humans to create and improve livestock-rearing conditions. They categorically are not the natural state. What was the natural state? CD&A can read the historic accounts from the 17th and 18th centuries as well as assess horizontal and vertical spatial deposits of sub-fossil snail shells, which serve as bio-indicators of forest → deforestation → reforestation histories.
 - CD&A assert that members of the public or ecological receptors such as tank bromeliads are not being exposed to heavy metals in fugitive dust generated on-site in mining pits or during haulage along roadways. How many samples have they collected within 500 meters of active mining pits and where are the laboratory results to support this assertion? Data on heavy metal concentrations are not included in NJBP II's monthly emission reports to NEPA for their Green Hill, Clydesdale, or Calderwood stations in St. Ann (all of which are > 7.5 km away from SML-173 and from SML-172 where active mining is occurring). I repeat my question from December 28, 2020: *Has NJBP I or II ever measured any air-borne concentrations of heavy metals in fugitive dust?*

I reject this version of the EIA for its inadequate, data-deficient, and incorrect descriptions of the karstscape and for its myriad unsupported conclusions that no-to-minimal impact will be experienced to key functional components when bauxitic soils are removed and limestone corridors are eliminated from the landscape. Repeating assertions, as CD&A did in response to technical questions from December 2020, does not make the assertions true.

A few more, but by no means complete listing of, examples where CD&A answered with assertions or false statements.

	CD&A Response	Koenig Response
1	<p>With regards to questions about sustainable agriculture and farming livelihoods:</p> <p>“CD&A’s review has shown that seventy years of bauxite mining has significantly improved food security in Jamaica with the implementation of agricultural projects such as dairy farming, the rearing of beef cattle and greenhouse developments, among others.”</p> <p>Dr. Douglas repeated this commentary about improved food security during the November 16, 2021 meeting.</p>	<p>While CD&A’s overview of the cattle-breeding efforts in Jamaica should be of interest to young livestock owners, examples of productivity metrics e.g., such as those used by Dr. Wellington, the Bodles Agricultural Research Station, or the Jamaica Dairy Development Board need to be presented in a comparison of: (a) pre-mining livestock productivity per hectare (e.g, stocking density, age at first lactation milk yield, calving intervals, weight at slaughter, etc.); (b) post-mining productivity for rehabilitated pits returned to private land owners; and (c) post-mining productivity for rehabilitated pits that were specifically retained by the companies, for company herds. These should be presented in a table format, with statistical analyses of the quantitative productivity metrics. Otherwise, all CD&A presents are assertions.</p> <p>The EIA must present documented, quantitative measures of livestock productivity for reclaimed pits rehabilitated with Napier (aka Elephant) Grass and for which Mines and Geology Division issues Certificates classifying it as “pasture”.</p> <p>Because CD&A refer to the 70-year history of mining, questions which must now be answered in relation to their assertion that mining has improved food security over its full history, include:</p> <ul style="list-style-type: none"> • How many mined-out ore bodies and of what hectareage have not yet been reclaimed or rehabilitated? (This is not just for Noranda, but for the ENTIRE history of mining.) • What is the current agricultural productivity of these unreclaimed pits which can be quantified? <p>And additional questions with regards to greenhouses and</p>

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		<p>whether they represent sustainable agriculture:</p> <ul style="list-style-type: none"> • What is the surface area currently covered by Noranda-built greenhouses? And how does this compare to the total surface areas which have been impacted by mining of ore bodies? • What happens when a greenhouse blows down in windy conditions (e.g., see meeting minutes of the National Restoration Committee for March 15, 2016)? • When “Noranda” is no longer mining in Jamaica, who will be responsible for the maintenance of greenhouses? Without greenhouses, what crops (incl. but not restricted to root crops aka ground provisions) and fruit trees can be produced in the spatial footprint of the currently-existing greenhouses?
2	<p>With regards to questions about impacts on soil fertility:</p> <p>“With specific reference to the topsoil, the 18” – 24” of topsoil contains the highest level of soil biodiversity and is removed and stored for use in the rehabilitation process as the final cover. The rehabilitation is done at the end of the phased mining process and in accordance with the standards stipulated by the Commissioner of Mines (Mines & Geology Division) for rehabilitation of mined lands.”</p>	<p>Unless there are more recent guidelines, GUIDELINES FOR THE REHABILITATION OF LANDS DISTURBED FOR MINING BAUXITE, adopted by the NRC on December 6, 2012 include no referencing that soil biodiversity must be rehabilitated to pre-mining conditions for certificates to be issued by the Commissioner of Mines.</p> <p>CD&A’s implied assertion, that soil biodiversity remains viable during stock-piling, is comparable when returned during rehabilitation or, indeed, returns to its pre-mined status in at least 20 years, is not supported by the peer-reviewed literature, notably the results published for JAMALCO’S analyses of soil functional diversity over a 20-year rehabilitation chronosquence.</p> <p>What data-based evidence can CD&A or NJBP II provide to demonstrate the mining and post-mining soil reconstruction does</p>

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		<p>not impact soil biodiversity? In the absence of data for SML-165, we must accept JAMALCO's results as a valid proxy and reject the assertion that mining SML-173 will not impact soil fertility.</p>
3	<p>CD&A were asked to present:</p> <p>A more detailed assessment of the impact on agricultural communities and national food security of replacing deep agricultural soils that can retain moisture (suitable for tree crops and timber and a wide variety of other crops) with shallow soils on running rock.</p> <p>CD&A responded: "Prior to any mining activity, all sensitive species of flora is removed and relocated to nearby hillocks or for temporary storage in a greenhouse. Upon completion of rehabilitation, the floral species which are stored in greenhouses are relocated to the area. "</p> <p>"The bauxite ore bodies in SML 173 do not support the growth of forest cover or large timber trees as asserted in the comment. "</p>	<p>CD&A attempted to deflect the request for more information about the functional role of moisture-holding soils by re-asserting the falsehood that bauxitic soils do not support tree growth.</p> <p>Until CD&A provide mineralogical and chemical evidence that the soils in forest-covered enclosed polygonal depressions in Jamaican karst (including those for which Asprey & Robbins (1953) presented physiognomy descriptions) have a percentage-aluminum concentration < 19%, we must accept the 19,000+ articles in the peer-reviewed literature which refute their assertion (<google scholar: bauxite tree forest;; not to mention the extensive literature for rehabilitation of eucalyptus (jarrah) forest in Western Australia, of which CD&A are aware from their review of hydrology).</p> <p>Other than CD&A's description that "The moisture content of naturally occurring bauxite ranges from about 20% to 25%" and on a slide during the public meeting on November 16, 2021 that the bauxite in SML-173 "contains a fair degree of moisture", I found nothing in their comments-to-reviewers or in the revised EIA to address what will be a major and irreversible change to the entire water cycle in SML-173.</p> <p>The EIA notes that "The rate of dry bauxite production may be as high as 6 million dry metric tonnes of bauxite per annum." Thus, for a 23-year, 2-month lease, an estimated 138 million dry metric tonnes of bauxite could be removed from the landscape under SML-173. This will result in a loss in the natural water-holding</p>

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		<p>capacity of more than 33 billion liters (> 8.7 billion US gallons). Among other things, the EIA still needs to address all risks associated with rainfall once all of this soil buffering and storage capacity is eliminated with regards to the speed at which rain will reach the underlying limestone and the force of discharge events at lower elevations. The EIA must also still address how this loss of moisture-holding soils impacts non-greenhouse agriculture.</p> <p>During the public meeting, Mr. Delroy Dell noted that Noranda plans to build a 15 million gallon water storage facility, which is needed to support their dust suppression efforts. Of course, should they leave the moist bauxitic soils in the ground, holding their > 8.7 billion gallons of water, there is no need for dust suppression or artificial storage facilities.</p> <p>Mr. Dell also noted that the storage facility would be erected near Water Valley (St. Ann). Water Valley, located within SML-165, is less than 2 km from Alexandria and more than 7 km (linear distance) from the ore bodies delineated for the first 5-yr plan of mining. How will this storage facility help farmers in SML-172 or SML-173 when mining is finished? The currently receive free rainfall and rely on the moisture-holding soils for their farming success. Without moisture-holding soils, will they need to pay to have water trucked-in from Water Valley?</p>

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4	<p>With regards to bird surveys and eBird:</p> <p>“With the Forest Reserves excluded from mining by law and not required to be studied by the agreed TOR, it was not required to do the detail surveys in these areas. Ms. Wendy Lee has indicated that the black billed parrot was observed in the Forest Reserves around Stewart Town. These Forest Reserves were not a part of the detailed studies carried out by the consultant.”</p>	<p>Is CD&A attempting to suggest that Black-billed Parrots (<i>Amazona agilis</i>) restrict their activities to a non-visible Forest Reserve boundary?</p> <p>The fact that CD&A failed to detect Black-billed Parrots, as well as failed to detect a further 39 species which have been reported for this area, demonstrates the inadequacy of their surveying efforts.</p> <p>I must advise NEPA to ask Mr. Ricardo Miller to explain to CD&A how BirdLife Jamaica members (incl. Mr. Miller) assist with the verification of records submitted to eBird.</p> <p>If they haven't already done so, I also advise NEPA to ask Mr. Miller to review the bird species list presented by CD&A, to independently assess whether it presents a valid description of the bird community compared to his first-hand experience.</p> <p>Given my 10+ years of experience driving the unpaved road from Stewart Town to Endeavour via Belmont, it's unimaginable that CD&A didn't detect Crested Quail-Doves (<i>Geotrygon versicolor</i>; IUCN NT) and Black-billed Parrots (IUCN VU).</p>
5	<p>With regards to bat surveys and the ToR requirements which required detailed descriptions of the flora and fauna (terrestrial) of the area.</p> <p>“The execution of the bat identification study was carried out to provide information for consideration of nocturnal species.”</p> <p>“The execution of the bat identification study was carried</p>	<p>As CD&A only deployed ultrasonic bat detectors inside caves, they did not fulfill the ToR. A “detailed description” (akin to niche specificity) for bats requires not only defining roosting requirements and feeding guild, but it also requires defining each species' acoustic soundscape – their preferences and abilities to utilize open-, edge- or cluttered spaces – which is associated with echolocation limitations and flexibilities. Unlike birds which use sound to advertise, the functional necessity of using echolocation to travel to feeding areas cannot be ignored, as it was by CD&A.</p>

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<p>out to provide information for consideration of nocturnal species.”</p>	<p>Because CD& didn't conduct nocturnal terrestrial surveys and classify bats by acoustic soundscape they failed to conduct risk assessments for the most forest-restricted species.</p> <p>EIA consultants have a professional responsibility to demonstrate that they can use correctly any equipment and software they deploy. For bats, this means demonstrating an understanding for the factors which affect our abilities to actually detect them with an given ultrasonic detector, the documented-in-the-literature issues associated with multiple auto-detection classifiers and the documented-in-the-literature reliability issues associated with auto-identification software</p> <p>Until CD&A provide a written explanation of why the acoustic signature of Fish-eating Bat (<i>Noctilio leporinus</i>) and of all the Molossidae species the software auto-identified show functional convergence when the bats are enclosed species, I will continue to reject the reliability of their species inventory to serve as a baseline of the bat community in SML-173.</p> <p>The assessment and conclusions by Dr. Brock Fenton, for the previous version of this EIA dated November 6, 2020 remain, in my opinion, fully valid. Dr. Fenton has been involved with bat research and conservation for more than five decades, is the lead author or co-author of 264 articles published in peer-reviewed journals, has authored 15 books and authored 51 book chapters on bats.</p>