Rio Algom Mining LLC

September 18, 2007

ADDRESSEE ONLY
Mr. Tom McLaughlin, Project Manager
U.S. Nuclear Regulatory Commission
Mail Stop T-8F5
Washington, DC 20555

Subject: Rio Algom Mining, LLC; Docket 40-8905
Rock Production Protocols – Tinaja Quarry
Ambrosia Lake – Grants, NM

Dear Mr. McLaughlin,

Please find attached to this letter Rio Algom Mining LLC's (RAM) submittal detailing the rock production protocols for the rock to be crushed and placed as erosion protection for Pond 2 and the Arroyo del Puerto.

This protocol was developed to address the concerns raised by the NRC staff during visits to the quarry and the project site.

Please contact me at (505) 287-8851, extension 11 if you have questions or wish to discuss this matter.

Regards,

Terry J Fletcher

Terry Fletcher
President

Attachment: As Stated

xc: T. Johnson (NRC)
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File

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Rock Production Protocols
Tinaja Quarry
Rio Algom Ambrosia Lake Site
Grants, New Mexico

I. Introduction,

The rock production protocols presented here will be part of the overall Quality Control/Quality Assurance procedures for production of the erosion protection rock for reclamation activities at the Rio Algom Mining LLC's (RAML) Ambrosia Lake facility. The rock for the reclamation projects at the site is being produced at the Tinaja Quarry Milan, New Mexico, data for which has previously been submitted to the Nuclear Regulatory Commission (NRC). Following of these protocols will ensure that the rock used is generally homogeneous and absent of characteristics that would adversely affect the durability of the overall cover system or channels.

A. Summary of Rock Characteristics

The rock for the rip-rap cover (Pond 2 Expansion) and all channels for surface water discharge at the site will be dolomitic limestone (calcic dolomite) from the Tinaja Quarry located approximately 35 miles southeast of Grants/Milan, New Mexico on State Highway 53 and is being produced by C&E Concrete (Milan, NM). Acceptable erosion protection rock from the quarry is from the San Andres Formation (Permian age), specifically it is the unit comprised of a massive, grayish white to pinkish, dolomitic limestone. The unit being used for rock production for Rio Algom is approximately 70 feet thick. At the quarry, this massive limestone/dolomite is overlain by a tan, argillaceous limestone unit with interbedded shales that is approximately 10 feet thick along the north face of pit that is being mined. Locally thin layers of shell fossils may occur near the base of this unit and indicate some shaley or silty partings by be present. Underlying the massive limestone is a reddish brown, sandstone/siltstone (Glorieta Sandstone). This rock unit is not used for any economic purposes by the quarry and forms the floor of the quarry operation.

Rock quality test results and petrographic analyses for the rock from the Tinaja Quarry are found in Appendix B-1 (Rock Quality Testing) of the *Reclamation Plan for Disposal of Pond Sediments and Ancillary Materials, Tailings Cell 2 Expansion, Revision 1 May 2007.* In 2001 physical and mechanical tests were also performed to evaluate the quality of the rock in accordance with NUREG-1623 criteria. The dolomite was found to have a rock quality rating of 76.7 percent. Based on these evaluations, Rio Algom incorporated a four percent over design factor on rock diameter sizing calculations to meet the NRC rock quality rating of 80.

In response to NRC requests, the rock from the Tinaja Quarry was reevaluated in 2003. The test results from this reevaluation are also included in Appendix B-1 of the Reclamation Plan for the Pond 2 Cell Expansion. At this time the dolomite scored an 83.1, in accordance with NRC-1623 rock scoring criteria.

The following observations from quarry visits and discussions with NRC personnel (Robert Johnson and Ted Johnson), Rio Algom Mining project personnel and quarry operation personnel were considered in developing the rock production protocols:

- Potential adverse heterogeneities in the dolomitic limestone would include joints, fractures, zones of higher porosity (vugs), or stylolites (irregular partings). However, these features comprise only a small fraction of the overall rock mass and are easily recognizable. These protocols were developed so when followed these types of heterogeneities if found in locally significant during mining would be identified prior to production of rock for Rio Algom and would be avoided. Therefore, these features will not be detrimental to the overall rock durability of the erosion protection rock as currently encountered during production. Inspection of the work quarry face and produced rock indicates that there is a small potential for the voids (vugs) to result in unsound rock.

- The San Andres Limestone has been subject to diagenetic changes that consist of being replaced by dolomite and hematite. Stylolitic structures on bedding planes are the result of local dissolution and recrystalization under pressure and replacement by hematite. This red iron oxide forms a thin irregular layer on stylolitic partings and is a concern if the layer is thick enough to cause a weak seam in the recrystalized dolomitic limestone. Preliminary inspection indicates limited stylolitic partings in quarry exposures. Furthermore, stylolitic partings in the rock rip rap for RAML would likely be rare due to the breakage along stylolitic partings after blasting and crushing

operations.

Other than in the overburden layer (topmost bench), nearly all joints and fractures in the limestone mined for rock riprap appear to be un-weathered. It did not appear that continuous joints remained in individual pieces of rock after being processed. The dolomitic limestone has essentially no primary porosity and a very low secondary porosity due to widely spaced joints and fractures and generally lacks bedding planes.

There appears to be little variability in the degree of fracturing in the limestone. Therefore, weathering of the limestone is not considered to be a significant concern relative to durability. For the most part, the size of rock fragments produced from a blast is representative of the drill spacing and planes of weakness in the original rock mass. Only a small percentage of rocks displayed evidence of unexpressed joints. Following further processing, nearly all the incipient planes of weakness are made evident and, therefore, will not impact the performance of the rip-rap cover.

B. General Quarrying Operations

The dolomitic limestone at the Tinaja quarry being used for rock production for Rio Algom consists of a massive layer approximately 70 feet thick that dips approximately 10° to the southwest. The quarry is elongated along the approximate strike of the formation and operates in three benches: the first bench is the "overburden" which is approximately 10-feet thick and consists of argillaceous limestone and interbedded shales which are not acceptable for production of the RAML rip rap. The underlying second and third benches are for production of high quality limestone for the RAML rip rap. The second bench is approximately 25 feet thick and the third bench is 45 feet thick. As stated previously, a reddish brown fine-grained sandstone/siltstone forms the floor of the quarry and is unacceptable for the RAML rip rap.

The overburden rock will be removed before the first phase of rock production. Vegetation and cover soils are stripped to uncover the "overburden" layer to approximately 200 – 300 feet from the operating pit face. To remove the overburden layer, the blasting crew will drill blast holes through the overburden layer and approximately one-foot into the underlying limestone produced for RAML. This will be

confirmed visually since the rock changes color dramatically from brown or tan (overburden) to a white to pinkish limestone (production rock) and becomes harder to drill. After blasting, the overburden layer will be removed to approximately 50 – 75 feet back from the operating rock face and stockpiled away from any potential rock to be processed for Rio Algom.

The lead time required to start production of the larger size erosion protection rock (greater than 7.8 inch D_{50}) is from 3 to 4 weeks for rock to be produced specifically for Rio Algom Mining. Based on notification from RAML, the necessary procedures for riprap production will be initiated. The drill pattern for production is increased from the usual 8' – 9' by 10' spacing to approximately 12' by 15' spacing. This wider spacing for blasting is needed to minimize unwanted fracturing of the rock. The "grizzlies" will be adjusted for each size rock specification.

After each blast, if necessary, a large impact hammer mounted on an excavator is used to break the oversized boulders such that the material can be loaded into trucks. The rock being produced for riprap 7.8 inch and larger is transported to the Rip Rap Plant, which is a vibratory screening plant with appropriately sized "grizzlies" to meet the gradation requirements for each riprap size specification.

The rock produced for the nominal 1 inch and 3.2 inch D_{50} erosion protection rock for RAML is produced from the same dolomitic limestone unit as the larger riprap sizes but in a separate blast face on the usual 8' by 10' drill spacing. After blasting, the rock is transported to the Crusher Plant by trucks. This plant uses dynamic impact hammers to crush the rock which then passes through a screening operation to be properly sized according to specifications and placed in stockpiles in via conveyors.

II. Personnel Involved in Rock Selection and Testing

Testing of the rock (gradation and laboratory for rock quality) will be performed by a geotechnical engineering firm contracted by C &E Concrete per the Reclamation Plan design specifications and frequencies. Applicable ASTM testing protocols for laboratory and gradation testing (weight of rock for each rock size specified) will be followed. Independent of this C&E Concrete Quality Control (QC) testing another

engineering/testing firm will be contracted by RAML for Quality Assurance to periodically inspect the rock production activities at the quarry during production and at stockpiled at the RAML facility as appropriate. Key to this independent QA team will be a geologist knowledgeable of the rock being produced, its durability requirements, and potential heterogeneities in the rock that would lead to production of unsuitable erosion protection rock for placement. The geologist will work with both QA and QC firm testing personnel and quarry operation personnel (including the Superintendent) to identify unacceptable heterogeneities in the rock for selection and/or processing of the rock that should be excluded. After transportation to the RAML site at Ambrosia Lake, the rock will be inspected for acceptability for placement at the project site by RAML personnel. RAML's Reclamation Engineer has overall responsibility for the rock selection and placement operations.

III. Rock Selection Procedure

The protocols for rock production incorporate both the quarry operation procedures described previously in accordance with the size of the erosion protection rock being produced. The overall goal of the rock production is to minimize the potential that the limestone for the project would contain deleterious material, primarily the overburden or "floor" rock, or significant heterogeneities in the RAML rock unit which would adversely affect long-term performance of the rock for erosion protection purposes.

Prior to drilling of the blast holes to produce the rock for RAML, the Quarry Superintendent will inspect the existing face to identify the presence of heterogeneities as described above and, if necessary, avoid concentrations of unacceptable heterogeneities. The Superintendent will also confirm that the production unit (dolomitic limestone) for RAML will be separated from the overburden unit and the "floor" rock such that rock from these units are excluded. After each production blast, the Superintendent will also inspect the rock prior to loading on trucks for transport to the respective production plant and avoid unacceptable heterogeneities. Quarry personnel during all production operations, as well as the QC and QA testing personnel (when on site), will identify and remove of unacceptable rock during quarrying operations or in the stockpiles of material prior to loading for transport to the project site.

Because quarry operational protocols have been prepared to keep separate the overburden and "floor" rock from the rock being produced for RAML, and avoid significant heterogeneities in the rock prior to processing, the likelihood of there being significant unacceptable rock in the produced for RAML is low.

The numerous crushing and sorting processes used ensures that the rock produced will be fairly homogenous and the visual portions will be representative of the entire pile. The processing (vibratory and dynamic hammers) and screening also ensures that rocks will break along planes of weakness, thus unexpressed planes of weakness will be rare or absent in this material.