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March 6, 2015

Mr. Scott E. Sheeley
NYS DEC
Environmental Permits, Region 8
6274 East Avon-Lima Road
Avon, NY 14414-9516

RE: Frontier Stone, LLC, Proposed Shelby Quarry
Town of Shelby, Orleans County
DEC Application NO. 8-3436-00033/00001

Dear Mr. Sheeley:

Frontier Stone LLC ("Frontier") fully supports the Genesee County Economic Development Corporation ("GCEDC") effort to attract semiconductor and nanotechnology-based research, development and/or manufacturing to the Western New York Science, Technology and Advanced Manufacturing Park ("STAMP"). Frontier worked with GCEDC and its consultant, Colin Gordon Associates, Inc. ("Colin Gordon") to evaluate potential ground vibration impacts to the STAMP site from production blasting at the proposed Frontier quarry. To this end, Frontier retained Vibra-Tech a leading national engineering firm specializing in quarry blasting seismology.

Vibra-Tech conducted a single hole signature test blast to measure seismic attenuation characteristics of the geologic formations between the proposed quarry and the STAMP site. The study consisted of a linear array of 41 seismographs and two (2) spectrum analyzers with seismic acceleremeters to measure ground vibration between the quarry and the STAMP site resulting from detonation of a 382 kg charge in a confined single hole blast. A statistical analysis was performed on the measured ground vibration to develop a site-specific equation to predict ground vibration amplitude at the STAMP site based on distance attenuation and the weight of explosives used.

Vibra-Tech then prepared an analysis of the collected data and used the distance from closest quarry mining area to the STAMP property boundary 7,606 meters (4.7 miles) to develop a production blast design to limit ground vibrations at the closest STAMP site property boundary to meet very restrictive semiconductor (VC-E) and nanotechnology (NIST-A) vibration criteria. The analysis demonstrates Frontier will be able to conduct quarry operations at the Shelby quarry site without adversely impacting ground vibration conditions at the STAMP site.

Frontier appreciates the economic development potential of the STAMP project and will work with GCEDC and its consultant, Colin Gordon to develop and implement protocols to fully mitigate any potential ground vibration impacts to the STAMP site. Presently, however, there are no existing buildings on the STAMP parcel. To date, we are not aware of any publicly announced commitments by prospective tenants to establish semiconductor and nanotechnology-based research, development and/or manufacturing facilities at the site.

The 1,250 acre STAMP site is 4.7 miles south of the proposed Frontier quarry in the Town of Shelby. A Colin Gordon study concluded that ambient vibration conditions at the STAMP site are very low and ideal for semiconductor and nanotechnology based research and development and manufacturing. While such conditions may be prevalent at the STAMP site, Colin Gordon's measurements consisted of a single day of measurements and failed to account for production blasting at two existing quarries one located 5,899 meters (3.7 miles) south of the STAMP site and the other located 10,106 meters (6.28 miles) north of the STAMP site. Quarry production blasting is usually limited to one or two very short duration events per week, nevertheless, Colin Gordon's conclusions concerning ambient ground vibration conditions at the STAMP site should take into account production blasting at nearby existing quarries.

According to research conducted by Colin Gordon and others, the ideal vibration characteristics for the design of semiconductor and nanotechnology facilities is based on the sensitivity of the equipment manufactured for use at such facilities. See, Hal Amick *et al. Evolving criteria for research facilities: I – Vibration*, Proceedings of SPIE Conference 5933: Buildings for Nanoscale Research and Beyond San Diego, CA, 31 Jul 2005 to 1 Aug 2005 ("*Evolving Criteria*"). *Evolving Criteria* evaluated conditions at existing and planned semiconductor and nanotechnology facilities and the vibration sensitivity of equipment used at such facilities. The study reports: 1) the criteria for semiconductor and nanotechnology differ, with the design criteria for nanotechnology being more restrictive, 2) many existing nanotechnology research and development sites do not meet the stringent NIST-A criteria. A copy of *Evolving Crit*eria is enclosed.

Frontier questions the need to mitigate induced ground vibration from production blasts to meet design criteria for buildings that have not been designed or built. Today, semiconductor and nanotechnology facilities at the STAMP site are not part of the existing environment. Assuming GCEDC is successful in attracting such a tenant, there will be a period of design and construction. The STAMP site itself will generate vibration during construction well beyond the vibration criteria of semiconductor and nanotechnology equipment. Indeed, if such facilities are ever built, larger production blasts at the proposed Frontier Stone quarry would provide more competitive pricing for material needed during the construction phase of facilities at the STAMP site without impairing their subsequent use.

GCEDC has requested that the Department should impose permit conditions to restrict production blasting at the proposed Frontier quarry to a single blast design, in order to limit blast induced ground vibration from production blasting to the most stringent vobration criteria for nanotechnology, NIST-A, at the STAMP property line. Frontier supports GEDC's efforts to establish STAMP. Frontier Stone is willing to work with GEDC to develop protocols, including blast designs, to address GCEDC's concerns that quarry blasting may impact ambient vibration conditions at the STAMP site. It is premature, however, to base a permit condition on the assumption that nanotechnology equipment will be located on the 1,250 acre parcel at the property line nearest to the Frontier Stone quarry property line and without any information on the actual buildings to be built. Moreover, the Vibra-Tech study determined that other blast designs could also result in ground vibration meeting the strictest vibration design criteria of NIST-A at the STAMP property line.

Frontier Stone questions the imposition of a permit condition based on a hypothetical of equipment that may be located on part of the STAMP parcel at some point in the future and without any consideration of the specific location of the facility within the 1,250 acre site or the design of the building, which may incorporate preventative measures to address potential for ground vibration.

To the extent a permit condition is imposed, it should be tailored to mitigate the induced ground vibration from production blasts so as to eliminate the issue of potential adverse vibration impacts to actual faclities located on the STAMP site. Accordingly, the permit condition should not be effective until such time as vibration-sensitive facilities are established, *i.e.* after construction. Second, it should be tied to the vibration design criteria and location of the facilities actually established on the STAMP parcel, not to the most stringent NIST-A standard for nanotechnology at the property line.

STAMP is attempting to attract semiconductor and nanotechnology facilities, which have different design criteria. If STAMP only secures semiconductor facilities there is no point in mitigating potential Frontier production blasting induced ground vibration to nanotechnology criteria. The vibration sensitivity of the facilities, the equipment, and location at STAMP determines the extent to which mitigation is required and provides the information required for production blast design. *See Evolving Criteria* (criteria are based on equipment inside facilities). Vibra-Tech has established that production blasting under the most conservative assumptions, *i.e.* confined and at the nearest location to the STAMP parcel, can be done without exceeding NIST-A criteria. To design production blasts in practice, the nature, design, and location of the vibration-sensitive facilities must be established in fact.

Frontier proposes the permit conditions set forth below to fully mitigate any potential production blast vibration impact to the ideal design criteria for the STAMP site. When GCEDC promotion of the STAMP parcel results in concrete proposals for specific facilities and buildings, Frontier Stone will analyze the production blast design limits required to fully mitigate ground vibration impacts, which would then result in enforceable permit conditions. In the alternative, given the limited number and short duration of production blasting requirements, a simple protocol for notification and coordination with potentially affected facilities might serve to fully mitigate potential ground vibration impacts. This addresses GCEDC concern by conditioning the permit to ensure the mitigation requirements of any facilities established at the STAMP parcel will be met.

Proposed Blasting Conditions

1. **Licensed Blaster Required** All blasting shall be undertaken, monitored and recorded by a blaster licensed by the New York State Department of Labor. The permittee shall maintain copies of all blasting records. Such records shall be made available to the Department (NYSDEC) upon request.

2. **Blasting Hours** Blasting shall be conducted between the hours of 9:00 a.m. to 5:00 p.m. Exceptions from these hours will require prior Department approval. No blasting will occur on Sundays or legal holidays.

3. **Storage of Explosives** Storage of explosives on site shall conform to State of New York, Department of Labor Industrial Code Rule 39, found at 12 NYCRR 39:

Part 39.6 General Provisions for the Storage and Handling of Explosives

Part 39.8 Construction and Maintenance of Magazines

Part 39.9 Location of Magazines

4. **No Flyrock Beyond the Property Line** There shall be no flyrock beyond the property line including flyrock that travels in the air or along the ground. In the event of flyrock beyond the property line, all blasting shall cease immediately and the flyrock incident shall be reported within 24 hours to the Regional Mined Land Reclamation Specialist. Blasting shall not resume until approval to resume blasting is obtained from the Regional Mined Land Reclamation Specialist.

5. **Seismograph Monitoring** All blasts shall be monitored with a properly calibrated seismograph. Seismographs shall be installed at the nearest residential receptor and any locations identified within the approved Mined Land Use Plan or locations determined by the Department. Seismograph records shall be provided to the Department upon request.

6. **Prevent Injury** Blasting shall be conducted in a manner to prevent injury to persons and damage to public or private property outside the permit area.

7. **Air Blast Limits** Air blast shall not exceed the maximum limits listed below at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area.

0.1 Hz high-pass system	134 dB
2 Hz high-pass system	133 dB
5 or 6 Hz high-pass system	129 dB
c-slow (events not exceeding 2-sec. duration)	105 dB

8. **Ground Vibration Limits**

(a) Ground vibration shall not exceed the limits as per the attached ground vibration limits graph from the U. S. Bureau of Mines Report of Investigation 8507 (Figure B-1, Safe levels of blasting vibration for houses using a combination of velocity and displacement). Maximum peak particle velocity shall not exceed these limits at the location of any dwelling, public building, school, church, or community or institutional building outside the permit area.

(b) In the event that building permit(s) application(s) are filed to establish either semiconductor or nanotechnology based research, development and/or manufacturing institutional buildings at the 1,250 acre Western, NY Science, Technology, and Advance Manufacturing Park in the Town of Alabama, NY, the permittee must submit an approvable production blast analysis (PBA) and proposed production blast condition (PBC) within 6 months of permittee obtaining actual notice of such application(s). The PBA must at a minimum include:

1. If the application(s) is for semiconductor based research, development and/or manufacturing institutional building(s), the PBA shall establish a PBC to limit ground vibration from the production blast so as not to exceed VC-E vibration criteria, defined as 3.1 mm/s (125 min/s) between 1 and 80 Hz, in the interior of such building(s), or otherwise achieve equivalent mitigation of production blast ground vibration by an agreement for notification and coordination with potentially affected facilities.

2. If the application(s) is for nanotechnology based research, development and/or manufacturing institutional building(s), the PBA shall establish a PBC to limit ground vibration from the production blast so as not to exceed NIST-A vibration criteria, defined as 0.025 mm or 25 nm (1 min) between 1 and 20 Hz; 3.1 mm/s (125 min/s) between 20 and 100 Hz, in the interior of such building(s),

or otherwise achieve equivalent mitigation of production blast ground vibration by an agreement for notification and coordination with potentially affected facilities.

3. The PBA must include analysis of procedures to be included in the PBC to confirm compliance with the PBC.

4. The approved PBC will become an enforceable condition of this MLRL permit.

Sincerely,

BROWN SHARLOW DUKE & FOGEL, P.C.

By: Kevin J. Brown

cc: Frontier Stone, LLC

Ecc: Dudley Loew, DEC Region 8
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