United States Department of the Interior

FISH AND WILDLIFE SERVICE

Iroquois National Wildlife Refuge
1101 Casey Road
Basom, NY 14013

August 12, 2008

David L. Bimber
Deputy Regional Permit Administrator
NYSDEC – Region 8
6274 East Avon-Lima Road
Avon, New York 14414 - 9519

RE: Draft Environmental Impact Statement
Frontier Stone, LLC, Shelby Quarry
DEC 8-3436-00033/00001 MLR 80823

Dear Mr. Bimber;

Attached please find informal comments from U.S. Geological Survey after reviewing the hydrology section of the dEIS for Frontier Stone, LLC, Shelby Quarry.

If you need anything further I can be reached at 585.948.5445 ext 202.

Sincerely,

Thomas P. Roster
Refuge Manager

Attachment
USGS Informal Comments

Informal review of the Proposed Frontier Stone - Lockport Dolomite Quarry near the Iroquois National Wildlife Refuge (*Notes in italics are question/comments that came to mind during this review.*)

by

Bill Kappel

June 16, 2008

1. Page 16 - 1.5.2.1 Surface Water drainage – they indicate that surface water drainage will remain the same (pattern), but no indication of what those directions are– toward the Refuge or away from it?. What is the drainage pattern and what is the current flow and water quality of these flows?
2. Page 16 - 1.5.2.2. Ground water influences – The EIS indicates no wells south of the proposed quarry will be affected. Where are wells located around the quarry, and what are their distances from the quarry (nearest quarry wall to each well)? *The figure supplied later in the text is in black and white and the wells cannot be discerned from the B&W copy.*
3. Page 17 – Well replacement paragraph - Possible impacts to water levels and quality need to be added. The mitigation plan appears to be reasonable but there is also some boilerplate language that needs to be clarified – Terms like "half-mile distance" (could be further); "potable water of quantity and quality at time of their well survey"; etc., need to be modified to the actual hydrogeology of the area around the quarry. *Are they focusing on drilling new wells and(or) hooking-up homeowners to public water as the alternative(s)?*
4. Page 36 – 3.1.2.1 - Surface water – does the drainage that moves to the south reach the Refuge? *If so, to where, and does the Refuge have any idea of the current quantity and quality of this 'source' of water and to what pool(s) it drains to?*
5. Well log – no indication of any bedding planes or any influx of water at the 75-foot zone. What is the basis for the importance of this bedding plane in the text, as without backup data/information, it's hard to understand.
6. Page 42 – 3.1.2.2 – *Are they continuing to collect water-level information from the monitoring wells – having at least one year or more of water-level data is critical to understanding the flow system at the proposed mining area.*
7. Table 4, page 42 – The fact that well 5-05 "flows" at certain times of the year may play an important role in helping decipher the ground-water-flow system in the area and needs further clarification. The casing appears to have been lengthened between 2005 and 2007.
8. Page 42 – At certain times of the year the water table appears to flow westward and the chevron appearance is unusual and needs to be clarified; a quick scan of water levels at other times of the year indicates changes in the ground-water flow pattern.
9. Page 43 – While information on other quarries is useful, each quarry will have its own flow characteristics, which means that the proposed quarry may or may not act similarly to others and will need to determined and quantified in the future. The concept that water movement in Lockport Dolomite quarries is much less than that seen in Onondaga Limestone quarries is generally true.
10. Page 43 – The presence of poor-quality water in the Lockport Dolomite is well known, since poor quality water was discharged from pumping well during the aquifer (pump) test. What might be the long-term impact on the quality of the receiving water bodies from quarry water being discharged to surface water bodies during the life of the mine?
11. Page 88 – 4.1.1.2 – Soils - What will happen to all the 'excess' soils -- over 8.4 million cubic yards of it?
12. Page 89 – 4.1.2.2 Groundwater – Characterization of the ground-water resource is contradictory between the descriptions cited on pages 92, 94-95 (Johnston) and what is written in the text.

Johnston indicates that there are vertical connections between the weathered bedrock surface and deeper bedding planes – the text in the EIS indicates limited connection.

13. Drawdown at the "barn well", (about 50 ft deep) was reported at about 3 feet in the text, but according to the drawdown curve numbers it was more like 5.5 feet. It appears that the barn well was being used during the test which somewhat confuses the results. General trends indicate the 3 foot drawdown, but it still remains unclear what the drawdown actually was at this well. The fact that the well reacted when the pumping well was discharging indicates a hydraulic connection between the shallow bedrock and what the EIS terms as the "deeper (75ft) zone".
14. *When the quarry is being developed, the drawdown will be dependant on how deep the quarry is being mined and how much water they have to remove to mine the bed rock, until the quarry is abandoned (~75 years) and allowed to fill with water to the current water-table (about10-15 feet below land surface). This semi-permanent drawdown may adversely affect wells, but to determine how far out and to what degree is difficult with the limited scope of data that has been collected. The limitation of a half-mile from the mine for 'restoring well water' should be dropped, and allow the data to guide where and when home-owner wells are affected.*
15. Page 97 – Not clear where did the characterization that the only water-bearing zone was found at ~ 75 feet? It is not indicated on the geologic log or elsewhere in the report – no bedding planes are located. As the pumping took place in an open hole – the source of water could come from multiple zones (as USGS has seen in the Lockport Dolomite bedrock unit in western NY). Characterization of the permeability of the entire bedrock section (for instance by using borehole geophysics) would be needed to strengthen the contention that the majority of water came from that one bedding-plane structure. *Also, if the water is not coming from a local, shallow source, this increases the possibility that the water that will be pumped from the mine will be of the" black-water" type (large concentrations of sulfur and manganese) compounds and will probably require some treatment prior to surface-water discharge as to not reduce the existing water quality of the surface water receiving bodies.*
16. Figure 11 - The recorded drawdown cone-of-depression collected during the aquifer test is elliptical (solid lines) yet the estimated cone of depression (dotted line) appears circular as if the bedrock were a homogenous material. The circular dashed lines are misleading as shown, since if the data indicted an elliptical drawdown cone, the estimated contours should be too (unless there was evidence that they wouldn't be elliptical.....*and difficult to determine without further study. The elliptical nature of the measured drawdown indicates hat there is a preferential pathway (regional vertical fracture zone similar to what Johnston described in his report p. 31 in the appendix) for water to flow in this fashion within the bedrock.*
17. Figure 12 is black and white (*version we have*), and it is unclear where the drinking-water wells are located within the proposed 4,000 ft radius of the quarry. *Because of the likely fracturing and interconnection of the bedding planes with vertical fractures, once bedrock dewatering begins, it will affect the shallow wells first as the upper, fractured and weathered bedrock will drain prior to hitting the 75-foot zone they reference.*
18. Pages 97-98 – The large database of Lockport quarries and nearby private wells only offers off-hand comments with no factual data to back up the statement of "no or minor effect" from quarrying. The statements offered for the nearby Shelby mine are backed-up with some data, but from our past experience in working in the Lockport Dolomite – fracture permeability varies and depends on the fracture framework of the local area. Limited effects might be true at Shelby but if dewatering would occur along a regional structure (see Johnston's explanation of zones of high-yield wells p. 31 of his report), the influence of that zone could be large but limited to the area near to the structure. Also see (Miller and Kappel, 1987, Effect of Niagara Power Project

on ground-water flow in the upper part of the Lockport Dolomite, Niagara Falls area, New York, WRI 86-4130).

19. Figure 13 shows no pre-mining water levels. While the wells are several hundred feet from the quarry face there is no indication of where regional bedding-plane structures are in relation to the wells and the quarry itself, nor potential zones of seepage along these structures that would flow into the quarry. There is also no indication of the regional ground-water table in and around the mine. *Usually seepage can be found along many quarry faces on its upgradient (groundwater) side, but if a regional joint structure is intercepted, it can lead to a larger quantity of water entering the quarry.*
20. Page 100 – The characterization at the bottom of the second paragraph is misleading – while the Lockport is much more competent and less karstic than the Onondaga, solutioning of the dolomite has been reported in the past, and numerous bedding-plane structures are strongly documented in the Lockport, one of which might be the 75-ft zone mentioned here.
21. Page 102 – 4.1.2.2.3 Dewatering Impacts on wetlands - Dewatering from below (from the bedrock) might be minimal, if it is established that Glacial Lake Tonawanda sediments underlie the entire Refuge, but surface water that feeds Refuge pools comes from several directions including the north. *(Are there documented springs on the Refuge, and are the source(s) of these springs known? (See comment #22)* If surface water runoff is reduced (or increased) from the north, both the quantity and quality of this water should be characterized to determine possible impacts to the Refuge.
22. *Page 103 – Last paragraph – the road name "Sour Springs Road" appears to indicate that water from springs in this area are discharging from the Lockport Dolomite, (directly or indirectly). There should be a spring inventory made to determine whether there are some 'windows' of permeability between the bedrock and land surface through the Lake Tonawanda clays. This information could be critical in determining if lowering the head in the Lockport Dolomite might affect the natural water supply to the Refuge ponds.*
23. Appendix 4 – Groundwater Assessment
    a. Table 4-2 – information on these wells show some inconsistencies (numbers transposed) but more importantly well 5-05 appears to have a 7-ft stickup pipe to limit overflow from the well. (May and November, 2005 indicate flowing conditions and most of the time the water levels are above land surface – apparently the height of the casing was changed between 2005 and 2007).*While this is due to the wells position in the landscape, it also indicates that the quarry will be pumping water at elevations close to 620 feet, and therefore will be doing considerable pumping as soon as the quarry opens, or as soon as the overburden is removed or thinned to this elevation. How might this effect the development of the quarry and the resultant effect on the water resources of the Refuge?*
    b. Where will the water be pumped to from the dewatering wells – which way will it flow, will ditches be expanded to carry this water and what will be the receiving water body?
    c. What is the expected quality of this water – it was noted in the text that "*with depth, the quality of water diminishes*" – what is the fate of this "water" If 'black water' (highly mineralized water with abundant sulfur content) from the Lockport is encountered, will treatment be required for discharge no matter what the receiving water body is? How will both the basic water quality and degassing of this sulfur water affect the local environment?
24. *The recharge boundary found during the aquifer test is significant as it limits the drawdown to about 12 to 13 feet below land surface. This would appear to indicate that large volumes of water (much greater than the 125 gallons per minute during the aquifer test) will have to be*

removed to allow mining, and if so, the effect on water levels in wells surrounding the mine would be much greater than what is currently stipulated in the assessment.