

October 2, 2020

*Via Electronic Mail*

Ms. Sandra Olearcek  
47 Long Hill Drive  
Somers, CT 06071

Dear Ms. Olearcek:

At your request, I am providing this letter in response to the well water quality concerns raised by you and your neighbors in light of a rock quarrying operation in the neighborhood. Allegedly, blasting has been previously used to remove solid rock at 40 Hallie Drive without appropriate town approval. It is understood that the applicant is presently seeking a special use permit from the Somers's Zoning Commission to remove 9,500 cubic yards of rock material by mechanical/hydraulic fracturing means at the site and to move it onto a adjoining parcel (42 Hallie Drive).

As I mentioned to you during our phone conversation, I was employed as a hydrogeologist by the Department of Energy & Environmental Protection (DEEP) for more than 36 years, retiring in October of 2019. For almost 25 years, I was employed as a supervising environmental analyst mainly responsible for enforcing Connecticut's groundwater pollution laws and overseeing the state's potable water program.

Because of my working experience, thorough knowledge and expertise in Connecticut's geology and geochemical/hydrogeologic principles, I was DEEP's primary staff person handling and responding to complaints lodged by well owners related to the adverse impacts of blasting on drinking water wells, i.e., water quality and yield, etc., in particular acid rock drainage. As a result of that experience, I was requested to and did author a DEEP guidance document for municipal officials on potential adverse impacts of blasting and rock removal operations. As good land in Connecticut became more scarce in the 80s and 90s, land developers subsequently resorted to blasting rock to make the land suitable for building without fully understanding the full environmental consequences of the activity. Additionally, as part of my job, I was required to assess the impacts of the handling, storage, and disposal of blasted/crushed rock material and its potential to cause acid rock drainage and adversely impact surface and ground water. There have been many documented cases statewide where

that type of land use activity has resulted in the pollution of potable wells. It was my job to enforce state regulations and to seek a resolution with the responsible party or parties.

As I mentioned, I will share below with you and your neighbors the experience I have gained from evaluating these types of problems in context of the proposed project. I also have reviewed the O'Reilly, Talbot & Okum letter report that was prepared for the applicant, but have not reviewed any other information such as a site or engineering plans or other technical documents related to the proposed activity, which may have been submitted as part of the application. Feel free to share this letter with Zoning Commission members and town officials as it may provide insight on the matter as part of the Commission's decision making process on the application.

- 1) Uncontrolled and even controlled blasting can adversely impact the structural integrity of a well as well as drinking water quality as far away as 1,500 feet. For that reason, it is prudent to develop a well designed and well conducted blasting program and to conduct a pre-blast survey before any blasting is done. The pre-blast survey, among other things, should include an inspection of all drinking water wells including well drilling reports within a radius depending on the extent of blasting levels and the structure of the underlying rock, well water testing for selected parameters, yield tests, and, in some cases, using a down hole camera to inspect the well casing and the uncased portion of the well. That baseline information is essential for evaluating what the potential post-blasting effects may be on ground and drinking water quality. It is also warranted for general rock removal operations including mechanical/hydraulic fracturing.
- 2) The applicant's consultant inaccurately states in its letter that since the neighboring wells are 200 feet deep, there will be no adverse effects due to mechanical/hydraulic fracturing, apparently due to the vertical separation distance. Typically a residential bedrock well is cased with steel pipe for the first 20 feet; below that, the well is an open borehole that intersects cracks and fractures in the bedrock. Ground water recharging those openings provide water to the well. Consequently, the impacts of blasting, mechanical/hydraulic fracturing and the handling/storage/disposal of rock material has significant potential to affect well water quality at the point where the well is not cased with steel pipe, which is far shallower than 200 feet. Ground and surface water recharging those upper fractures will definitely have the potential to impact well water in the deepest part of the well.
- 3) While blasting can create more fractures in rock making it more productive from a yield standpoint, blasting can also close existing fractures thereby reducing the well's yield.

Having a good understanding of the underlying bedrock structure and conducting pre-blast yield tests can help assess the potential problem. That is why it is also imperative to thoroughly review in detail well drilling and well water quality reports for the neighboring wells. Equally concerning is the potential for the uncased portion of the well to "cave-in" due to the effects of uncontrolled, seismic blasts, airblasts and vibration due to mechanical/hydraulic fracturing. Cave-ins can damage the well pump and cause temporary sedimentation in well water resulting in discolored or cloudy, turbid water, which may require the need to drill a new well or install water treatment both of which can be very costly.

- 4) The applicant's consultant states in its letter that the maximum contaminant level (MCL) for the radioactive minerals apply only to public wells. The private well water regulations identified in the state public health code defer to the same MCLs as public wells. Regardless, the local director of health could request the department of public health's toxicologist for a health risk determination on the specific constituents and levels identified in wells if there is no MCL. Going forward, regardless if blasting is not going to be done, all potentially affected wells should be tested, as part of an overall detailed hydrogeologic investigation, in order to establish baseline drinking water quality conditions. Test parameters should include the following: total coliform bacteria, pH, iron, manganese, nitrate, radon, uranium, color, turbidity, and total hardness. If perchlorate was an ingredient in the explosives, based on the prior blasting, it should be included as a test parameter.
- 5) The applicant's consultant mentions the concern relating to inhalation. Any increase in the level of radioactive materials in neighboring well water due to the historical blasting, mechanical/hydraulic fracturing or handling/storage/disposal of the rock material may lead to increased levels of radon in indoor air exacerbating the problem and health risk. This underscores the need for a more detailed investigation of the proposed rock quarrying proposal. While radioactive materials may not be "unusual" in Somers, exacerbating the problem, due to rock removal and handling/storage/disposal practices, especially where it does not presently represent a health risk, should be prevented.
- 6) The rock being quarried is the Glastonbury Gneiss. It is not a "soft rock," as alluded to by the applicant's consultant. It is competent rock that makes it valuable from a construction material or monumental stone standpoint. Wells tapping the Glastonbury Gneiss are notorious for yielding elevated levels of radioactive minerals. It would have been good if the applicant's consultant provided photos of the quarry site in its report identifying the degree of fracturing in the rock and its geologic structure. In addition, it would have been beneficial if the consultant reviewed well completion reports to identify well yields, which directly relate to the interconnectiveness and degree of fractures in the

rock as well as the static water level and possibly the location of water bearing fractures identified during the initial drilling. All of this information is necessary in order to fully and accurately assess the proposal and potential damaging effects. A site plan and photo identifying the orientation of the current rock removal work would also assist to determine what extent the energy from blasting would be dissipated.

- 7) Regardless, if the plan changes to remove the rock by mechanical/hydraulic fracturing, a major issue not discussed at all by the applicant's consultant is the effect of freshly exposed bedrock surface and crushed rock on ground water quality resulting from the rock quarrying operation. That activity perhaps more than anything has the potential to adversely impact ground water, surface water and drinking water. Stockpiling the freshly blasted rock, especially crushed rock, which increases the surface area and exposing the bedrock surface to infiltrating rainfall (in CT is very acidic) poses a water quality threat to neighboring wells. The handling, storage and disposal of the rock material at the site and 42 Hallie Drive must be fully evaluated from a hydrogeologic and petrologic standpoint including rock analyses to determine the potential for the leaching of minerals present in the rock when exposed to weathering and its acid generation potential. The increased levels of constituents identified in your well water are a likely consequence of the latter condition.
- 8) Protecting the freshly exposed bedrock and quarried/blasted rock at both sites, especially crushed rock where the surface area is increased significantly, from infiltrating precipitation and the weather is another very important consideration. A well defined restoration plan for the disturbed area is critical. Such a plan should include the chemical nature of the soil cover material that may help to buffer against acid drainage should it be a potential problem. This underscores the need to sample the quarried rock for its chemical makeup and potential to cause acid rock drainage or to create a leaching problem of other constituents or minerals in the rock and whether the makeup of the cover material needs special composition to buffer infiltrating precipitation.
- 9) Given the scope of the application, it would be prudent to have the applicant provide a very detailed assessment from a geologic/hydrologic/petrologic standpoint of the proposed project prior to the Commission taking any action. The report, provided by the applicant's consultant, is insufficient to definitively determine whether there would be any adverse risk to drinking water quality or the integrity of well construction of neighboring wells from the proposed project. It may be necessary to install bedrock floored sentry wells to monitor ground water quality leaving the site. Perhaps the Town can hire its own consultant to conduct an impartial investigation. It should be done by a consultant specializing in hydrogeology and with first hand experience dealing with rock analyses,

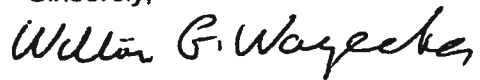
the impacts of blasting and mechanical hydraulic fracturing on ground water quality where there are drinking water wells in proximity to the activity and acid rock drainage.

10) In addition, given the size of the project area, there may be a need for the applicant to secure a storm water permit from DEEP. Site restoration and erosion/sedimentation issues as well as drainage would be addressed by such a plan. Keeping the disturbed land area small and promptly restoring it will help to minimize adverse ground water impacts.

I hope the information in this letter is helpful. Over the years, I have seen first hand the costly, long-term damage rock removal operations can have on ground water and personal property, if not properly evaluated and designed. Consequently, it is imperative that a much more robust hydrogeological investigation be undertaken of the proposed activity.

As I mentioned, I will be out of state early next week. Should you, your neighbors, or town officials have any questions regarding this letter, do not hesitate to call me by cell phone at 860-912-8329. I will be available to meet as necessary after October 8th.

Sincerely,



William G. Warzecha

**RESUME OF  
WILLIAM G. WARZECHA**

**Professional Objective** To effectively manage an environmental/public health compliance program.

**EMPLOYMENT**

September 2000

to

Present

*rehired 10/2019*

**CT DEPARTMENT OF ENERGY & ENVIRONMENTAL PROTECTION**

79 Elm Street, Hartford, CT 06106-5127 (860) 424-3776

*Supervising Environmental Analyst*

Responsible for supervising the staff of the DEEP's Bureau of Water Protection and Land-Reuse's Remediation Section-Eastern District. Oversee remedial activities relating to property transfers of commercial/industrial sites, state and federal Superfund sites, polluted drinking water wells, Brownfields/urban redevelopment projects, site discovery and assessment projects and the hydrogeologic review of diversion applications. Review staff's work for technical content and consistency with State statutes, regulations, and laws including DEP policy guidelines. Prepare administrative orders, consent orders, and referrals to the State Attorney General for the commissioner's action and signature. Recommend and negotiate enforcement and corrective actions. Expert and fact witness on technical environmental and hydrogeologic issues at adjudicatory and court proceedings. Analyze, review and approve/disapprove complex environmental investigation reports and remedial plans for consistency with technical standards and conformance with applicable laws. Oversee the implementation of environmental investigations and remedial actions and the reporting of significant environmental hazard conditions.

December 1997

to

September 2000

*Supervising Environmental Analyst*

Responsible for supervising the staff of the DEEP's Permitting, Enforcement and Remediation Division's Potable Water Program, which was created to ensure that safe drinking water is available to residents whose well water is polluted as a result of human activities. Oversaw and enforced environmental investigations relating to well pollution problems arising from leaking underground fuel oil or gasoline tanks, improper handling or disposal of industrial and commercial chemicals, over/mis-application of fertilizers and pesticides and road salting activities. Arranges for the provision of bottled water to affected residents, evaluates short- and long-term water supply alternatives, and oversees the clean-up of the pollution that has affected drinking water supplies.

January 1991

to

November 1997

*Environmental Analyst 3*

Responsible for protecting and managing groundwater resources in the state and implementing the enforcement of state laws and regulations pertaining to groundwater resource protection. Responsible for conducting and overseeing groundwater investigations of remedial activities, including water and soil sampling, making site assessments and issuing administrative orders. Responsible for meeting with stakeholders in regard to resolutions for drinking water pollution problems and remedial measures, negotiate consent orders/environmental disputes and coordinate permit applications.

## continued RESUME of WILLIAM G. WARZECHA

- January 1983  
to  
January 1991
- Senior Environmental Analyst*  
Responsible for making detailed hydrogeologic assessments for the Eastern Connecticut and King's Mark Environmental Review Teams regarding major development proposals statewide. Prepared technical and interpretive reports regarding geologic and hydrogeologic conditions and site suitability for development. Assessed suitability for on-site water supply and sewage disposal, drainage conditions, the potential for flooding and wetland impacts due to development. Reviewed detailed engineering plans for completeness, accuracy and regulatory compliance and participated in local regulatory hearings to report findings and address environmental concerns raised by town officials and other stakeholders. Conducted similar reviews for special state, local and regional projects including low-level radioactive waste disposal facility siting, correctional facilities, schools and controversial residential subdivisions.
- August 1981  
to  
January 1983
- DEPARTMENT OF HEALTH**  
*Chief of Environmental Health-Northeast District Department of Health*  
Administered and supervised (four professional staff and one clerical) the environmental health program for a ten town health district in northeast Connecticut. Also, developed, evaluated and coordinated programs in the area of water supplies, swimming pools, restaurants, housing, bathing areas, sewage disposal and surface/groundwater contamination; conferred with and advised area officials concerning environmental and public health matters. Performed additional assignments from the Director of Health that involved a team effort in the resolution of environmental health problems.
- EDUCATION**
- M.S. (Spring 1997) *Rensselaer Polytechnic Institute*  
Major: Environmental Management and Policy
- B.A. (Spring 1976) *Eastern Connecticut State College*  
Major: Environmental Earth Science
- Post-Graduate Courses  
Public Health Engineering; Hydrogeology; Soil Taxonomy and Classification;  
Land-use and Soils; Administration for Local Health Officials;  
Personnel Management and Environmental Response Training.
- Awards
- DEP Employee GreenCircle Award, 2002  
DEP Distinguished Service Award, 1993  
King's Mark Environmental Review Team Meritorious Award, 1987  
Eastern Connecticut Review Team Meritorious Award, 1986  
Connecticut Environmental Health Association Award for Meritorious Service, 1979
- Activities
- Chairman, Uncas Health District Board of Directors, Norwich, CT; Board member, since 1988  
Board of Trustee & Corporator, Norwich Free Academy-November 2015
- Certifications
- OSHA 29 CFR 1910.120 40-Hour Safety Training Registered  
Registered Sanitarian - State of Connecticut No. 302