O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

J3207-01-01
October 15, 2020

Mr. Dan Eastman
40 Hallie Lane
Somers, Connecticut 06071

Re: Supplemental Discussion of Impacts from Rock Removal Operations
40 Hallie Lane Residence
Somers, Connecticut

Dear Mr. Eastman:

Per your request, O'Reilly, Talbot & Okun Associates, Inc. (OTO) provides this additional information to address comments from Mr. William Warzecha regarding potential impacts to the nearby potable supply wells during the excavation of bedrock at your residence.

Work Performed

We understand that bedrock behind your residence was blasted by Baystate Blasting during 2018 and 2019. In preparing this letter we have reviewed blasting records provided by Baystate Blasting. Blasting was performed during two periods of time. Blasting logs completed by Baystate for each blast event are attached. Between February 1 and 16, 2018, Baystate blasted approximately 5,425 cubic yards of rock (total) during six blast events. On May 14 and 15, 2019, Baystate blasted approximately 957 cubic yards during two events. Furthermore, we have reviewed a recent Google Earth Image of the site. Based on this review the total area disturbed is approximately 0.89 acres.

According to the blasting logs, the amount of blasting powder used during these events varied between approximately 600 and 1,500 pounds. We note that these quantities represent small blasts, and must be distinguished from quantities used in a commercial quarry operation (typically between 10,000 and 30,000 pounds of blasting powder, in our experience).

Discussion of Vibrations and Published information

Rock blasting generates vibration waves that propagate through the soil and rock away from the blast location. The blasting generates force waves that break the rock and open joints, so that it can be excavated using standard construction equipment. The amount and propagation of blast vibrations are related to the amount of explosive used, the amount of rock blasted, the type and condition of rock being blasted, and the shape of the ground surface. Typically, only 20-30% of the energy released by the blast is used to break the rock or open rock fractures. The remaining portion of the blast energy is dissipated as ground vibrations, air blast, noise or fly-rock. Where blasting occurs along an open rock face (which was the case at the 40 Hallie Lane project) much of the excess energy is typically dissipated in the form of either air blast or fly-rock. The contractor used blasting mats to control fly-rock and that there were no complaints of damage associated with this issue.

Ground vibrations appear to be the significant concern to neighboring properties. Typically, vibration waves attenuate (decrease) with distance from the source. Ground vibrations can be represented by two parameters, peak particle velocity (PPV) and frequency. PPV is defined as the maximum instantaneous positive or negative peak in the vibration signal and is thus a measure of the magnitude (or strength) of the vibration. PPV is measured in inches per second. Frequency is the time between each adjacent peak and is measured in hertz. A high frequency vibration would characterize a rapidly shaking vibration event.

Possible impacts to the water quality and production capacity of ground water supply wells by blasting is commonly raised as a concern at large-scale, commercial rock blasting operations. The potential concerns include increased turbidity; discolored water; and perchlorate, nitrate, and/or coliform contamination. Another potential concern at this site is that ground vibrations may be sufficient to cause loose materials to slough off the uncased portion of the supply well bore hole to (temporarily) cause the well water to become more turbid, or in an extreme cases to clog the well and potentially bury the well pump. Other potential effects include: changes in well water production capacity such as loss of quantity production due to the closure of water bearing rock fractures, air in water and/or water lines, damage to pump, and damage to well screen or borehole. We are not aware of any indications that these issues have occurred in wells near the 40 Hallie Lane property.

We have reviewed several studies evaluating impacts to domestic water supply wells from blasting operations[1,2,3,4]. For the most part, these studies were of large mining operations in other areas of the country where geologic and hydrogeologic conditions differ from those in the Somers area. It is essential to understand that the studies were based upon impacts from large blasting operations at commercial mining operations, where the size and scope of the blasting was likely much larger than that which occurred at the Hallie Lane property. Therefore, the use of these studies is highly "conservative" in that they assume large, commercial operations with blasting using 20 times the amount of explosives in each blast than was used at 40 Hallie Lane. The scenarios are obviously not comparable.

The review of these sources indicate that blasting in the large-scale operations resulted in significant long-term decreases in water quality or damage to water supply wells. The reports indicated that in most, if not all, cases where large amounts of explosives were used water quality issues were most likely related to either environmental factors, poor well construction, or wells whose elements required repair or replacement prior to blasting.

Most importantly, Baystate Blasting performed vibration monitoring during each day when blasting occurred. These data are presented on the monitoring reports. The results are

[1] U. S. Department of the Interior, Philip Berger & Associates, Inc., "Survey of Blasting Effects on Ground Water Supplies in Appalachia", November 1980.
[2] Jay Hawkins, "Impacts of Blasting on Domestic Water Wells", May 2000.
[3] D. A. Robertson, "Survey of Blasting Effects on Ground Water Supplies in Appalachia", 1988.
[4] Matheson, "Blast Vibration Damage to Water Supply Wells –Water Quality and Quantity", 1997.

compared with the U. S. Bureau of Mines vibration guidance.[5] The USBM provides a plot of peak particle velocity (PPV) vs. frequency above which damage to structures would not be expected (which is the stepped horizontal line on the Velocity vs. Frequency plot presented on the Event Reports). Although these standards are applicable to structures and may not be directly applicable to water supply wells, they provide a useful representation as to the significance of a measured vibrations.

From these plots it is apparent that no damage occurs in even the most sensitive structure when the peak particle velocity is below 1.0 in/sec. The maximum peak particle velocity measured at an off-site location during blasting at 40 Hallie Lane was less than 0.3 in/sec, well below the USBM standards, just one-third of the "no damage" standard of 1.0 in/sec. (We note that higher values were measured at the 40 Hallie Lane residence, although the values were still below the USBM standard. Since the 40 Hallie Lane residence is much closer to the blasting, this is expected.)

Response to Warzecha Comments

We provide the following responses to each of the Warzecha comments. In general, his comments appear to be related to off-site effects from large quarry operations and/or blast events, and may not be directly applicable to small scale blasting operations, such as that at Hallie Lane.

Comment 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."

Response: We have never seen any instances where impacts to drinking water quality has occurred in a well 1,500 feet from a blasting location, with the exception of perchlorate contamination. As was documented in our November 16, 2019 letter (attached), according to Baystate Blasting only de minimus amounts of perchlorates were present in the blasting formulation used at the Hallie Lane site. While a pre-blast baseline survey was not conducted prior to the start of the subject blasting, this is to be expected because such surveys are not warranted for properties located greater than 250 feet from a blast site, particularly when the blast sizes are small. Baystate Blasting concurs that this is also their experience. There is nothing in the data we have reviewed indicating that a baseline survey should be conducted prior to future rock removal operations, even if blasting with low levels of explosives were used as before. The present application is for drilling with

[5] United States Bureau of Mines, "Structure Response and Damage Produced by Ground Vibrations from Surface Mine Blasting, RI 8507", by Siskind, Stagg, Kopp and Dowding, 1980.

hydraulic fracturing, which by its very nature will result in minimal vibrations and should not impact any off-site wells or structures.

Comment 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."

Response: We concur with the comment that a typical private supply well consists of a 20-foot casing sealed into bedrock with an open borehole in the bedrock below. The potential issue would be that near surface material would slough into the well and cause sediment to enter the well. However, the casing is securely sealed into bedrock in a properly constructed well. Since the nearby residences are all relatively new, we assume that their wells were properly constructed with a well-designed and constructed seal. We have no evidence indicating these wells were improperly constructed.

The studies we cited above indicate that sloughing has been documented to occur only in older, poorly constructed and poorly maintained supply wells. Furthermore, they note that sloughing is most common in wells constructed in poorly consolidated claystone and shale. That is not the case at Hallie Lane where, as Mr. Warzecha correctly states, the rock at the site is Glastonbury Gneiss, for the most part a relatively hard rock.

Comment 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."

Response: We know of no local cases where blasting has resulted in the closing of fractures, which then reduced well yield, and there is no evidence in the record of reduced well yield in the area of the subject site. The studies we cited above discuss some cases where well yields have diminished near commercial mining operations where blasting with high amounts of explosives occurred. However, those studies indicate that reduced yield is likely not from the blasting, but the result of fractures closing due to the increased overburden pressure associated with the filling of a closed mine.

There is nothing in the record, to our knowledge, indicating that there are currently any problems or that conditions have changed since blasting occurred. As noted above, vibration measurements taken during blasting indicate that off-site vibrations were low and were well below applicable standards or published guidance. The past experience is irrelevant regardless since the pending applications are forward-looking.

Comment 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, arid total hardness. If perchlorate was an ingredient in the explosives, based on the prior blasting, it should be included as a test parameter."

Response: Baystate Blasting indicates that only de minimus amounts of perchlorates were present in the blasting formulation used. Therefore, it is our opinion that it is not necessary to analyze water samples for perchlorates. More importantly, there is nothing in the history of the activity on the site or in the plans for future operations that indicate the need for well testing. In our opinion, if Baystate monitors vibration at the perimeter of the site closest to the work area, and if those vibrations do not exceed 1 inch per second, there should be no adverse impact on any well (the closest of which is just under 500 feet away). As such, we do not recommend water quality testing at this time. In our opinion it is an unnecessary effort, and expense.

Comment 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."

Response: We note that radon gas was present at elevated concentrations in the water supply well at the 40 Hallie Lane residence before any blasting and thus is also likely almost certainly present in the water at nearby residences, and was likely present prior to any blasting. Radon is naturally occurring and the levels vary over time. As we discussed above, the blasting operations and resulting vibrations at the 40 Hallie Lane property were small and thus unlikely to impact the water bearing fractures in nearby wells.

Regardless, radon is an extremely volatile compound and any excess radon gas generated as a result of past blasting operations is likely to have dissipated since blasting

was last performed in May 2019. With respect to the proposed hydraulic splitting operation being considered, any vibrations generated would be extremely small and unlikely it impact any of the neighboring wells. The Commission can be assured that there will be no impact on any wells by imposing a condition on the approval, as suggested above, that the peak particle velocity at the site perimeter closest to the work area not exceed 1 in per second. Provided this condition is met, we do not recommend water quality testing.

Comment 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."

Response: We concur that the Glastonbury Gneiss would be considered a competent and not a soft rock. We note that there are also layers of softer Biotite Schist within the bedrock formation present at the site. Photographs of the exposed rock are attached.

Comment 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 arid 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."

Response: The past operation did not involve the crushing of the blasted rock. As a result the vast majority of the rock fragments generated are greater than six-inches in diameter. The proposed work also does not involve rock crushing. The leaching of metals is a direct function of the relative surface area of the rock fragments generated, and the large pieces generated have a relatively small surface area relative to the amount of rock generated. Therefore, it is our opinion that leaching is not a significant concern. It is our understanding, that the consultant hired by the town will address the leaching issue more completely.

Comment 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."

Response: The 40 Hallie Lane homeowner intends to grade the final ground surface to shed water and cover the area with topsoil and grass. We note that lime is typically added to lawn areas on an annual basis to neutralize the naturally acidic rainwater which falls in New England. These actions should adequately address this comment.

Comment 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 firsthand 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."

Response: Such studies are typically only required for large commercial operations and are not indicated for the proposed limited activity at the 40 Hallie Lane residence to complete the project. We note that only about 6,500 cubic yards of rock have been blasted to date (another 3,000 cubic yards have been jackhammered and hydraulically fractured) and the applicant is proposing to remove up to an additional 9,650 cubic yards.

Comment 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."

Response: We note that the applicant has disturbed approximately 0.89 acres of land to date (based upon measurements taken from a Google Earth image). It is our understanding that the Connecticut Stormwater Regulations only require a permit if greater than 1.00 acre is disturbed. We also note that there are no wetlands, surface water bodies or otherwise sensitive environmental areas bordering the properties. Regardless, it is reasonable to the town to require that the disturbed area (outside of rock lined slopes) be vegetated at the completion of the project.

We appreciate the opportunity to provide services for this project. If you have any questions, please do not hesitate to contact us.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

Michael J. Talbot, P.E.
Principal

Ashley Sullivan. P.E.
Reviewer

Attachments: Blasting Records, October 2019 OTO Letter, Photographs

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O'Reilly, Talbot & Okun
ENGINEERING ASSOCIATES

J3207-01-01
October 16, 2019

Mr. Dan Eastman
40 Hallie Lane
Somers, Connecticut 06071

Re: Discussion of Blasting Issues
40 Hallie Lane Residence
Somers, Connecticut

Dear Mr. Eastman:

Per your request, O'Reilly, Talbot & Okun Associates, Inc. (OTO) presents this discussion of potential impacts that might occur if the bedrock at the rear of your residence was removed by blasting.

The subject bedrock is located on the north side of your residence. It is approximately 200 feet long and 20 feet high. You wish to remove the rock outcrop in order to form a level yard at the rear of your residence. We understand that you have hired Baystate Blasting of Ludlow, Massachusetts to complete the work once the appropriate permits have been obtained.

You have requested that we evaluate three issues associated with the blasting project, namely:

- Potential contamination issues associated with arsenic within the bedrock;
- Potential groundwater contamination associated with perchlorates in blasting formulations; and
- Potential vibrations from the blasting operations and the impacts on neighboring structures.

Our evaluation of each issue is provided below.

Arsenic Releases to Groundwater and Air during Blasting

Arsenic is a naturally occurring metal in bedrock, and the potential exists for releases to groundwater and air due to the dusts created during blasting. Elevated concentrations of arsenic are present in bedrock and soil in a north to south trending band across a portion of central New England. However, we are not aware of any data indicating that arsenic is present at high concentrations in either bedrock or natural soils in the Somers, Connecticut area. Regardless, Site samples were collected to support this reference.

Representative samples were obtained to evaluate the potential presence of arsenic in bedrock at the 40 Hallie Lane property. The three sample consisted of rock collected from the subject outcrop. Each sample was visibly different in color, grain size and structure, and appeared to be representative of the rock present at the Site. Photographs of the samples are attached.

The samples were analyzed by Contest Laboratories of East Longmeadow, Massachusetts for arsenic. No arsenic was detected, indicating that arsenic is not present at significant levels. Therefore, it is our opinion that little or no potential exists for arsenic to be release at elevated concentrations to either groundwater or air as a result of the proposed blasting operations.

Releases of Perchlorates in Blasting Formulations to Groundwater

We understand that some of your neighbors have expressed a concern that the blasting operations may result in groundwater contamination, which could impact water supply wells in the Site area. We understand that your blasting contractor (Baystate Blasting) has indicated that the blasting formulation to be used for this project would contain only de minimus amounts of perchlorates. Although perchlorates contamination from explosives has occurred in the past at some locations, information collected regarding the proposed blast indicate that there this is not a concern.

The information provided by Baystate Blasting is supported by published information. Perchlorate salts (such as sodium perchlorate, ammonium perchlorate or potassium perchlorate) are used as sensitizing agents or propellants in blasting formulations where high pressure/high energy blasts are required. These properties make perchlorate explosives most suitable for use in wet/hard/dense rock applications. We understand that the use of perchlorate formulations is relatively rare. We found published information indicating that less than 0.5% of the commercial blasting powders used, contain significant amounts of perchlorates. Furthermore, we understand that the cost of perchlorates is relatively high, which limits their use in applications.

We note that the conditions at this Site do not dictate the use of high cost/high pressure/high energy explosives. First, the rock is relatively soft (i.e. we were able to break some rock particles relatively easily using a small hammer). Secondly, the rock appears to be highly jointed, which allows the rock to be broken into smaller particles with relatively light blasts. Lastly, there is a large open face, which allows the rock to separate along joints at relatively low blast pressures. Therefore, these conditions support the information provided by Baystate Blasting that indicates the formulation planned for this event would not result in an additional release of perchlorates.

Vibrations

We understand that there is a concern regarding vibrations caused by the blast event and their impact to nearby structures. The vibrations resulting from blasting operations at a specific location depend on the distance from the blast, the configuration of the ground surface at the blast location, rock and soil type, the frequency of the blast wave, and the pressure/energy of the blast. In general, the vibrations are proportional to blast pressure and energy, and attenuate (decrease) with distance from the event. Therefore, a structure will experience lower vibrations the further it is from the blast location and the lower the pressure and energy of the blast. In addition, ground vibrations will be lower if the blast location has an open face, which allows energy to be transmitted outward and not into the ground.

Published information indicates that a residential structure should only experience significant damage if the peak particle velocity at that location exceeds 2 inches per second. With the exception of the Eastman residence, the nearest structure to the blast location is approximately 500 feet from the blast area. Published data (which is supported by our experience at other blast locations) indicate that vibrations at a distance of 500 feet should be well below the recommended maximum vibration intensities for typical structures. Therefore, it is our opinion that the proposed blast should not impact any of the neighboring structures.

We appreciate the opportunity to provide services for this project. If you have any questions, please do not hesitate to contact us.

Sincerely yours,
O'Reilly, Talbot & Okun Associates, Inc.

Michael J. Talbot, P.E.
Principal

Attachments: Limitations, Laboratory Data Sheets

LIMITATIONS

1. The observations presented in this report were made under the conditions described herein. The conclusions presented in this report were based solely upon the services described in the report and not on scientific tasks or procedures beyond the scope of the project or the time and budgetary constraints imposed by the client. The work described in this report was carried out in accordance with the Statement of Terms and Conditions attached to our proposal.

2. The analysis and recommendations submitted in this report are based in part upon the data obtained from widely spaced subsurface explorations. The nature and extent of variations between these explorations may not become evident until construction. If variations then appear evident, it may be necessary to reevaluate the recommendations of this report.

3. The generalized soil profile described in the text is intended to convey trends in subsurface conditions. The boundaries between strata are approximate and idealized and have been developed by interpretations of widely spaced explorations and samples; actual soil transitions are probably more erratic. For specific information, refer to the boring logs.

4. In the event that any changes in the nature, design or location of the proposed structures are planned, the conclusions and recommendations contained in this report shall not be considered valid unless the changes are reviewed and conclusions of this report modified or verified in writing by O'Reilly, Talbot & Okun Associates Inc. It is recommended that we be retained to provide a general review of final plans and specifications.

5. Our report was prepared for the exclusive benefit of our client. Reliance upon the report and its conclusions is not made to third parties or future property owners.

con-test®
ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

October 1, 2019

Michael Talbot
OTO Associates
293 Bridge St. Suite 500
Springfield, MA 01103

Project Location: Somers, CT
Client Job Number:
Project Number: 3207-01-01
Laboratory Work Order Number: 19I1371

Enclosed are results of analyses for samples received by the laboratory on September 26, 2019. If you have any questions concerning this report, please feel free to contact me.

Sincerely,

Jessica Hoffman

Jessica L. Hoffman
Project Manager

Table of Contents

con-test® ANALYTICAL LABORATORY

39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

OTO Associates
293 Bridge St. Suite 500
Springfield, MA 01103
ATTN: Michael Talbot

REPORT DATE: 10/1/2019

PURCHASE ORDER NUMBER:

PROJECT NUMBER: 3207-01-01

ANALYTICAL SUMMARY

WORK ORDER NUMBER: 19I1371

The results of analyses performed on the following samples submitted to the CON-TEST Analytical Laboratory are found in this report.

PROJECT LOCATION: Somers, CT

FIELD SAMPLE #	LAB ID:	MATRIX	SAMPLE DESCRIPTION	TEST	SUB LAB
Rock-1	19I1371-01	Product/Solid		SW-846 6010D	
Rock-2	19I1371-02	Product/Solid		SW-846 6010D	
Rock-3	19I1371-03	Product/Solid		SW-846 6010D	

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

CASE NARRATIVE SUMMARY

All reported results are within defined laboratory quality control objectives unless listed below or otherwise qualified in this report.

The results of analyses reported only relate to samples submitted to the Con-Test Analytical Laboratory for testing.
I certify that the analyses listed above, unless specifically listed as subcontracted, if any, were performed under my direction according to the approved methodologies listed in this document, and that based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete.

Tod E. Kopyscinski
Laboratory Director

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Somers, CT
Sample Description:
Work Order: 19I1371

Date Received: 9/26/2019

Field Sample #: Rock-1
Sampled: 9/26/2019 00:00

Sample ID: 19I1371-01

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	1.7	mg/Kg	1		SW-846 6010D	9/27/19	9/30/19 21:26	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Somers, CT
Sample Description:
Work Order: 19I1371

Date Received: 9/26/2019

Field Sample #: Rock-2
Sampled: 9/26/2019 00:00

Sample ID: 19I1371-02

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	1.6	mg/Kg	1		SW-846 6010D	9/27/19	9/30/19 21:32	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Project Location: Somers, CT
Sample Description:
Work Order: 19I1371

Date Received: 9/26/2019

Field Sample #: Rock-3
Sampled: 9/26/2019 00:00

Sample ID: 19I1371-03

Sample Matrix: Product/Solid

Metals Analyses (Total)

Analyte	Results	RL	Units	Dilution	Flag/Qual	Method	Date Prepared	Date/Time Analyzed	Analyst
Arsenic	ND	1.7	mg/Kg	1		SW-846 6010D	9/27/19	9/30/19 21:38	MJH

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

Sample Extraction Data

Prep Method: SW-846 3050B-SW-846 6010D

Lab Number [Field ID]	Batch	Initial [g]	Final [mL]	Date
19I1371-01 [Rock-1]	B241678	1.46	50.0	09/27/19
19I1371-02 [Rock-2]	B241678	1.56	50.0	09/27/19
19I1371-03 [Rock-3]	B241678	1.46	50.0	09/27/19

con-test® ANALYTICAL LABORATORY
39 Spruce Street * East Longmeadow, MA 01028 * FAX 413/525-6405 * TEL. 413/525-2332

QUALITY CONTROL

Metals Analyses (Total) - Quality Control

Analyte	Result	Reporting Limit	Units	Spike Level	Source Result	%REC	%REC Limits	RPD	RPD Limit	Notes
Batch B241678 - SW-846 3050B										
Blank (B241678-BLK1)				Prepared: 09/27/19 Analyzed: 09/30/19						
Arsenic	ND	1.7	mg/Kg							
LCS (B241678-BS1)				Prepared: 09/27/19 Analyzed: 09/30/19						
Arsenic	70.6	5.0	mg/Kg	69.4		102	82.4-117.4			
LCS Dup (B241678-BSD1)				Prepared: 09/27/19 Analyzed: 09/30/19						
Arsenic	67.6	4.9	mg/Kg	69.4		97.5	82.4-117.4	4.27	30	

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FLAG/QUALIFIER SUMMARY

*	QC result is outside of established limits.
†	Wide recovery limits established for difficult compound.
‡	Wide RPD limits established for difficult compound.
#	Data exceeded client recommended or regulatory level
ND	Not Detected
RL	Reporting Limit is at the level of quantitation (LOQ)
DL	Detection Limit is the lower limit of detection determined by the MDL study
MCL	Maximum Contaminant Level

Percent recoveries and relative percent differences (RPDs) are determined by the software using values in the calculation which have not been rounded.

No results have been blank subtracted unless specified in the case narrative section.

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CERTIFICATIONS

Certified Analyses included in this Report

Analyte	Certifications
SW-846 6010D in Product/Solid	
Arsenic	CT,NH,NY,ME,VA,NC

The CON-TEST Environmental Laboratory operates under the following certifications and accreditations:

Code	Description	Number	Expires
AIHA	AIHA-LAP, LLC - ISO17025:2017	100033	03/1/2020
MA	Massachusetts DEP	M-MA100	06/30/2020
CT	Connecticut Department of Publilc Health	PH-0567	09/30/2021
NY	New York State Department of Health	10899 NELAP	04/1/2020
NH-S	New Hampshire Environmental Lab	2516 NELAP	02/5/2020
RI	Rhode Island Department of Health	LAO00112	12/30/2019
NC	North Carolina Div. of Water Quality	652	12/31/2019
NJ	New Jersey DEP	MA007 NELAP	06/30/2020
FL	Florida Department of Health	E871027 NELAP	06/30/2020
VT	Vermont Department of Health Lead Laboratory	LL015036	07/30/2020
ME	State of Maine	2011028	06/9/2021
VA	Commonwealth of Virginia	460217	12/14/2019
NH-P	New Hampshire Environmental Lab	2557 NELAP	09/6/2020
VT-DW	Vermont Department of Health Drinking Water	VT-255716	06/12/2020
NC-DW	North Carolina Department of Health	25703	07/31/2020
PA	Commonwealth of Pennsylvania DEP	68-05812	06/30/2020

con-test ANALYTICAL LABORATORY

JLH

Phone: 413-525-2332 19I1371
Fax: 413-525-6405
Email: info@contestlabs.com

http://www.contestlabs.com

CHAIN OF CUSTODY RECORD

39 Spruce Street
East Longmeadow, MA 01028

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Page 1 of 1

Company: OTO
Address: 293 Bridge St.
Phone:
Site Location: 40 Hallie Ln
Project Location: Somers, CT
Project Number: 3207-01 -01
Project Manager: Mike Talbot
Con-Test Quote Name/Number:
Invoice Recipient:
Sampled By: MT

Turnaround Time Requested (TAT)
7-Day ☐ 10-Day ☐
PFAS 10-Day (std) ☐ Due Date: 5 day

Rush TAT (Surcharges Apply)
1-Day ☐ 3-Day ☐
2-Day ☐ 4-Day ☐

Deliverables
Format: PDF ☒ EXCEL ☒
Other:
CLP Like Data Pkg Required: ☐
Email To: Talbot@oto-env.com
Fax To #:

Data Reporting Options
○ Field Filtered
○ Lab to Filter

Data Reporting Options
○ Field Filtered
○ Lab to Filter

ANALYSIS REQUESTED

Con-Test Work Order#	Client Sample ID / Description	Beginning Date/Time	Ending Date/Time	COMP/GRAB	Matrix Code	Conc Code	VIALS	GLASS	PLASTIC	BACTERIA	ENCORE	Total Arsenic
1	rock - 1	9/26/19	AM	G	SOL	O						5
2	rock - 2	↓	↓	↓								5
3	rock - 3											5

[2] Preservation Code

Container Type
Total Number Of:
VIALS
GLASS
PLASTIC
BACTERIA
ENCORE

Glassware in the fridge? Y / N
Glassware in freezer? Y / N
Prepackaged Cooler? Y / N
*Contest is not responsible for missing samples from prepacked coolers

[1] Matrix Codes:
GW = Ground Water
WW = Waste Water
DW = Drinking Water
A = Air
S = Soil
SL = Sludge
SOL = Solid
O = Other (please define)

[2] Preservation Codes:
I = Iced
H = HCL
M = Methanol
N = Nitric Acid
S = Sulfuric Acid
B = Sodium Bisulfate
X = Sodium Hydroxide
T = Sodium Thiosulfate
O = Other (please define)

	Date/Time:
Relinquished by: (signature)	9/26/19 1746
Received by: (signature) 23.8 C	Date/Time: 1746 9-26-19
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:
Relinquished by: (signature)	Date/Time:
Received by: (signature)	Date/Time:

Client Comments: Grind before testing

Regulatory Requirements/Report Limits
State / Fed Program
Criteria

Special Requirements
☐ MA MCP Required
MCP Certification Form Required
☐ CT RCP Required
RCP Certification Form Required
☐ MA State DW Required
PWSID #

Please use the following codes to indicate possible sample concentration within the Conc Code column above:
H - High; M - Medium; L - Low; C - Clean; U - Unknown

NELAC and AIHA-LAP, LLC Accredited

Project Entity
Government ☐ Municipality ☐ MWRA ☐ WRTA ☐
Federal ☐ 21 J ☐ School ☐
City ☐ Brownfield ☐ MBTA ☐

Other
☐ Chromatogram
☐ AIHA-LAP,LLC

PCB ONLY
☐ Soxhlet
☐ Non Soxhlet

Lab Comments:

Disclaimer: Con-Test Labs is not responsible for any omitted information on the Chain of Custody. T
Chain of Custody is a legal document that must be complete and accurate and is used to determine w
analyses the laboratory will perform. Any missing information is not the laboratory's responsibility. (
Test values your partnership on each project and will try to assist with missing information, but will no
held accountable.

Table of Contents

I Have Not Confirmed Sample Container Numbers With Lab Staff Before Relinquishing Over Samples_____

con-test® ANALYTICAL LABORATORY

Doc# 277 Rev 5 2017

Login Sample Receipt Checklist - (Rejection Criteria Listing - Using Acceptance Policy) Any False Statement will be brought to the attention of the Client - State True or False

Client OTO

Received By MP Date 9/26/19 Time 17:46

How were the samples received? In Cooler ____ No Cooler T On Ice ____ No Ice T
Direct from Sampling ____ Ambient ____ Melted Ice ____

Were samples within Temperature? 2-6°C F By Gun # 5 Actual Temp - 23.8
By Blank # ____ Actual Temp - ____

Was Custody Seal Intact? N/A Were Samples Tampered with? N/A
Was COC Relinquished ? T Does Chain Agree With Samples? T
Are there broken/leaking/loose caps on any samples? F
Is COC in ink/ Legible? T Were samples received within holding time? T
Did COC include all pertinent Information? Client T Analysis T Sampler Name T
Project T ID's T Collection Dates/Times T*
Are Sample labels filled out and legible? T
Are there Lab to Filters? F Who was notified? ____
Are there Rushes? F Who was notified? ____
Are there Short Holds? F Who was notified? ____
Is there enough Volume? T
Is there Headspace where applicable? N/A MS/MSD? F
Proper Media/Containers Used? T Is splitting samples required? F
Were trip blanks received? F On COC? F
Do all samples have the proper pH? N/A Acid ____ Base ____

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Flashpoint		Col./Bacteria		2oz Amb/Clear	
DI-		Other Glass		Other Plastic		Encore	
Thiosulfate-		SOC Kit		Plastic Bag	3	Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Unused Media

Vials	#	Containers:	#		#		#
Unp-		1 Liter Amb.		1 Liter Plastic		16 oz Amb.	
HCL-		500 mL Amb.		500 mL Plastic		8oz Amb/Clear	
Meoh-		250 mL Amb.		250 mL Plastic		4oz Amb/Clear	
Bisulfate-		Col./Bacteria		Flashpoint		2oz Amb/Clear	
DI-		Other Plastic		Other Glass		Encore	
Thiosulfate-		SOC Kit		Plastic Bag		Frozen:	
Sulfuric-		Perchlorate		Ziplock			

Comments:

no sample times on COC or containers