

**COMMONWEALTH OF PENNSYLVANIA
BEFORE THE ENVIRONMENTAL HEARING BOARD**

SIRI LAWSON, Appellant :
:
: **EHB Docket No. 2017-051-B**
:
COMMONWEALTH OF :
PENNSYLVANIA, DEPARTMENT :
OF ENVIRONMENTAL :
PROTECTION, Appellee :
:
and :
:
HYDRO TRANSPORT, LLC, :
Permittee, :
:
and :
:
FARMINGTON TOWNSHIP, :
Intervenor :
:
and :
PENNSYLVANIA STATE :
ASSOCIATION OF TOWNSHIP :
SUPERVISORS :
Intervenor :

**AFFIDAVIT OF BARBARA ARRINDELL
DIRECTOR OF DAMASCUS CITIZENS FOR SUSTAINABILITY, INC.**

I, Barbara Arrindell, do hereby affirm and state:

1. I am the Director of Damascus Citizens for Sustainability, Inc. (“Damascus Citizens”) and Chair of Damascus Citizens’ Board of Directors. I have held both these positions since co-founding Damascus Citizens in 2008.

2. Damascus Citizens is a nonprofit, grassroots organization dedicated to protecting clean air, land, and water from pollution caused by the fossil fuel extraction industry, primarily looking at oil and gas. We work to provide individuals and communities directly threatened by their processes with the tools necessary to defend themselves. To this end, we routinely provide individuals in Pennsylvania and across the country (and internationally) with information about the way fossil fuels are extracted, processed, etc., the risks those processes pose to human health and the environment, and the federal, state, and local laws, regulations, and policies that govern fossil fuel extraction and related processes.

3. Currently, 4,334 people are signed up as members of Damascus Citizens. We don’t require our subscribers to provide their home address; of those that do, more than 500 subscribers list a primary address in Pennsylvania. Many other subscribers have a secondary address in Pennsylvania, own property or have relational or business interests in the Commonwealth, or visit regularly to see family or to enjoy Pennsylvania’s amenities. Individual supporters contribute close to one-half of Damascus Citizens’ operating budget.

4. DCS's mission is to protect public health and safety from impacts of the oil and gas industry. While its *raison d'etre* is to respond to hydraulic fracturing, since its inception it has been highly involved in the impacts of, and the regulation and oversight of natural gas production in Pennsylvania, from production to end user with attention to the wastes produced at each stage and their subsequent disposal. The spread of brine is a disposal method, which impacts DCS members and impacts DCS's ability to fulfill its mission - i.e., protection public health. The substantial, direct and immediate impact from the outcome of the appeal if we lose, our members will have more brine health problems; regulatory oversight would be less even than it has been and water and air impacts would increase.

5. Based on my understanding of the scientific and industry literature and my personal observations in Pennsylvania and elsewhere, I believe oil and gas extraction poses an unacceptable threat to individuals, communities, and irreplaceable natural resources.

6. In the areas where the industry has already taken hold, including places within Pennsylvania, our supporters rely on Damascus Citizens to advocate for strong government regulations and conscientious enforcement. or other changes with the goal of reducing health and community impacts of fossil fuel practices.

7. My interest is of long standing in the practice of what I will call dumping or disposal of drilling production wastes, but is referred to as 'brine spreading' by the

those in favor of the practice. The industry has known for decades about both the inability to prevent damages from the drilling and from the wastes and their need to avoid liability for the damages they knew would ensue moving into more populated places than they had been working. Over a number of years, the oil & gas industry lobbied to create exemptions to eliminate liabilities under the basic environmental protection laws that were put in place in the 1970's. One of industry's first victories in 1980, was to make oil & gas wastes "special" so that these wastes would not be subject to the rigorous "cradle to grave" regulatory programs of the nation's hazardous waste law known as the Resource Conservation and Recovery Act (RCRA). The effect of the Bentsen Amendment was to exclude oil & gas wastes from the waste characterization, manifesting, tracking, and disposal restrictions in RCRA. Then the big win for the industry came 25 years later in the 2005 Energy Policy Act when the industry got exemptions from major provisions of seven national environmental laws. See <http://www.damascuscitizensforsustainability.org/2009/05/natural-gas-politics/> and https://www.earthworksaction.org/files/publications/FS_LoopolesForPollutersNEW.pdf

8. On top of that I have observed a 'dump and forget about it' culture in Pennsylvania that encourages practices like this waste dumping or 'brine spreading'. The more I learned about the contents of and the potential impacts from these wastes the more alarmed I have become. See <http://>

www.damascuscitizensforsustainability.org/2014/10/chemicals-used-hydraulic-fracturing/ and <https://endocrinedisruption.org/audio-and-video/oil-and-gas-basics>

9. Source of the liquid wastes being spread as brine in north western PA: the wells the wastes are from are considered 'conventional' and as such have reduced regulatory oversight on them and their wastes in PA. They are most all of them in reality but perhaps not in name, unconventional gas and oil fracked wells.

According to DEP and local sources the gas wells in the Warren County and surrounding area are vertical wells into the Medina layer and are all fracked, the oil wells are into Bradford, Devonian and other layers. They are shallow wells (1,800 ft or less), are mostly vertical (some horizontal or directional) and most are fracked.

over 2/3 of all existing gas wells were fracked.- federal Energy Information Agency (EIA) and federal Department of Energy (DOE)<https://www.eia.gov/todayinenergy/detail.php?id=26112>

over 1/2 of all existing oil wells were fracked <https://www.eia.gov/todayinenergy/detail.php?id=25372>

"up to 95% of all new wells" since 2013 are fracked - US Dept. of Energy, [How is shale gas produced?](https://energy.gov/sites/prod/files/2013/04/f0/how_is_shale_gas_produced.pdf), Apr. 2013 https://energy.gov/sites/prod/files/2013/04/f0/how_is_shale_gas_produced.pdf

So according to the EIA and the DOE the majority of existing and almost all new gas and oil wells today are fracked therefore we can use what we know of the substances contained in fracking fluids and then released from fracked wells (both

what is introduced and what is released from formation layers) and toxicity data from fracked wells and wastes when talking about gas oil well ‘brine’.

10. Over the years DCS has publicized the contents of oil & gas wastes (for example, 'Toxicological Analysis Ohio Brines' now on our website: <http://www.damascuscitizensforsustainability.org/2012/02/toxicological-analysis-of-ohio-brines/>) being spread as “brine”, commented on attempts to extend the practice statewide (2011 DCS' Hydroquest comments for example [http://hydroquest.com/Hydrofracking/HydroQuest%20Brine%20Disperal%20Letter%202011-15-11\(W\).pdf](http://hydroquest.com/Hydrofracking/HydroQuest%20Brine%20Disperal%20Letter%202011-15-11(W).pdf)) and worked to have 'ordinary' citizens, scientists, policymakers, journalist and the medical community be more cognizant of the dangers of oil & gas wastes. DCS was a major contributor to start the compilation of materials that became Concerned Health Professionals of New York's, Compendium, <http://concernedhealthny.org> in 2011.

11. This work led us to develop the Health and Community Impacts Survey, <http://www.damascuscitizensatsdr.org> that looks at oil and gas exploration and production practices' impact on the health of people near the activities and the impact on nearby communities.

12. DCS is conducting health effects surveys of its members and other interested individuals under a protocol developed with the Agency for Toxic Substances and Disease Registry to collect and evaluate adverse health effects from exposure to

contaminants from the oil and gas industry. Attached to this affidavit is the symptoms page reporting form (question #) that is part of the DCS/ATSDR Survey Form.

13. In approximately half of the 45 PA surveys completed and filed with ATSDR to date, responding households report brine spreading on roads as one of the industry activities that have adversely affected their quality of life. In their Surveys they list a number of adverse effects such as chronic headaches, nose bleeds and other sinus conditions, respiratory issues, skin irritation, nausea, and significant joint and back pain that have occurred since drilling activities began around them. These families live in areas mostly served by gravel or unpaved roads.

14. Our Survey takers report brine spreading where there were no permits filed at least in the years 2014, 2015 and 2016 the only years for which we have DEP brine permit and reporting data. Looking at that data 16 of the 20 households reported brine spreading in their townships/counties who had no permits. DCS has under way a further review of areas where brine spreading has been approved and where these health impacts have been found. Approximately 34 counties in Pennsylvania have current or recent oil gas drilling and development activity to date.

Respondents participating in our Health Effects Survey so far are from 13 of these counties. Due to confidentiality concerns we have promised our survey respondents that we will only release personal information with their approval. If

the Board would like to have their personal information we will contact them to obtain their approval to share their information with the Board.

15. Also attached (as paragraph 21) to this affidavit is the one very rare, fairly detailed analysis that was prepared for a commercial site whose owners required of the spreader specifics about what was to be used there as a de-icer. Most of the PA DEP required, once a year, 'typical' (DEP wording) analysis are very incomplete, old, or missing entirely as far as we have been able to find out via FOILs and RTK requests filed by others. The quantities of heavy metals, TDS, BETX chemicals and others listed are orders of magnitude over what are considered safe levels.

16. This situation would only be worse if there were even less regulation. Road spreading of brine is not that different from illegal dumping. The material spread is supposed to be from conventional wells, but today almost all are fracked (according to the DOE 95% pf all new wells are fracked) and there is research on the chemicals and radioactivity in stream sediment where wastes from conventional wells were dumped that has measured 600 times the EPA drinking water standard for radioactivity; see abstract here: <http://pubs.acs.org/doi/abs/10.1021/acs.est.7b04952>

17. DCS and Siri Lawson: DCS met Siri Lawson in 2008 when she mailed us the first of many single spaced, multi-page typed letters describing her experiences, and that of the communities she has lived in, with gas and oil drilling - in western

NY and north western PA. She found us on the internet and has been a colleague, source of key information and contributor ever since. Though mostly she has not had email, we have written, faxed and talked on the phone many times over the 10 years. I introduced her to Michelle Bamberger who featured Siri as one of seven households with human and animal impacts from drilling in her peer reviewed article published Jan, 2012 (and later online in 2016 - <http://journals.sagepub.com/doi/abs/10.2190/NS.22.1.e>) followed in 2015 by an expanded version in her book, *The Real Cost of Fracking*:<https://www.penguinrandomhouse.com/books/229020/the-real-cost-of-fracking-by-michelle-bamberger-and-robert-oswald/9780807081419/>.

18. If there is more or continued brining, health impacts will increase of the sort Siri and her husband, Wayne, those in her and other communities have experienced near brined roads.

18. The following is an abridged summary of DCS' involvement with gas oil production waste issues and contents.

In 2008: DCS held two major presentations in the upper Delaware region attended by overflow crowds

-May 1, 2008 - Hickory, PA is the source of some of the first stories about gas drilling in the Eastern part of the US. DCS videotaped important interviews with Hickory residents, and on May 1, 2008, DCS held a public

meeting attended by over 400 people. The audience watched in stunned silence as a slideshow of impacts and those interviews were shown for the first time. DCS has also provided these videos for public viewing via YouTube, the DCS website and the distribution of thousands of DVDs. One of the slides that day showed concerns about both what is introduced in the drilling processes and what is released from the formation layers where the gas comes from.

The late Dr. Theo Colborn of Paonia, Colorado was an award-winning environmental health expert and co-author of *Our Stolen Future*. She had become one of the nation's leading authorities on the hazards of gas and oil drilling. On **May 30, 2008**, DCS held another overflow attendance meeting where DCS arranged for Dr. Colborn to conduct a live-remote Power Point presentation. In her talk, Dr. Colborn discussed the long list of chemicals used in hydraulic fracturing and released from formation layers, 91% of which, she said, are hazardous to human health and many are found in the wastes, liquid and solid.

Additionally in 2008, DCS started its website and has had a continuous web presence since - called, "the deep-dish of fracking information"- we have kept the science based analysis of impacts of drilling including impacts from waste disposal in the public eye. We have answered questions from community groups, individuals, policy-makers and

journalists of all sorts. See PA DEP chemicals list and analysis of same attached to this affidavit. DCS distributed thousands of copies of these papers and others.

2009 - Obtained and began publicizing 'Toxicological Analysis Ohio Brines' now on our website: <http://www.damascuscitizensforsustainability.org/2012/02/toxicological-analysis-of-ohio-brines/>

2010 - published award winning [What's in the Water](#) poster that describes in text and illustrations the processes and impacts involved in drilling that is fracked including about wastewater and wastewater disposal.

- release of the movie *Gasland* - Josh Fox's *Gasland* is a film about the devastating health impacts of gas drilling in Colorado, Wyoming, Texas, and Pennsylvania. Milanville, Pennsylvania resident Josh Fox is a filmmaker and Artistic Director of the International WOW Company. DCS provided both initial funding and critical background information for the production of this provocative film, which set Josh on an 8,000 mile odyssey. Released in January 2010 *Gasland* was nominated for an Academy Award in 2011 and is dedicated to DCS. The film goes into the health consequences of the wastes. among other issues.

2011 - publicized Conrad Volz' work <http://www.damascuscitizensforsustainability.org/2011/03/contaminant->

[characterization-of-effluent-from-pennsylvania-brine-treatment-inc-josephine-facility/](#)

- Had technical comments prepared by Paul Rubin, Hydroquest when PA was pushing to allow spreading, actually dumping, of drilling waste anywhere in the state via a general permit: [http://hydroquest.com/Hydrofracking/HydroQuest%20Brine%20Disperal%20Letter%202011-15-11\(W\).pdf](http://hydroquest.com/Hydrofracking/HydroQuest%20Brine%20Disperal%20Letter%202011-15-11(W).pdf) DCS did not want that general permit for 'brine' spreading. It was defeated.

2012 - DCS collaborated with a number of NY groups to produce a tri-fold brochure on road spreading of 'brine' now on our website: <http://www.damascuscitizensforsustainability.org/wp-content/uploads/2016/01/Brine-Spreading.pdf>

2013 - started developing our Oil and Gas Exploration and Production **Health and Community Impacts Survey** - now ongoing. One question about industry activities that have affected their quality of life includes about brine spreading.

- repeatedly filed comments in the EPA fracking water cycle study. Many comments dealt with wastes, liquid waste disposal including material on road and land spreading, dumping of these materials. Even since even

before the official inception of the EPA fracking water study in 2010, we had been involved with the study. Our involvement continued until the end in late 2016.

2014 - Since 2008 and through 2014 DCS had worked on the various drafts of New York's State Environmental Quality Review Act process of evaluating the potential impacts of fracking on NY and if it should be allowed. At the close of 2014, NY placed a firm regulatory hold on high volume hydraulic Fracturing because of potential public health impacts. Many communities also banned frack waste within their borders also for health reasons after learning about the constituents of the waste..

2015 - Campaigned about the radioactivity in natural gas and in the wastes. The Marcellus layer. for instance, is located by its radioactivity, but radioactivity is not tracked in the gas and very incompletely in the wastes.

2016 - participated in research and publicity leading to the October Don Hokey Post-Gazette article: <http://www.damascuscitizensforsustainability.org/2016/11/amish-oppose-use-drilling-brine-wastewater-roads/>

- DCS led the charge to ban liquid drilling waste ('brine') use and disposal in NYC <http://www.damascuscitizensforsustainability.org/2016/08/nyc-set-ban-use-fracking-waste-water/>

2017 - compilation of information about gas and oil well production waste...known as 'brine' posted on our website: <http://www.damascuscitizensforsustainability.org/toxicfracbrine/>

19. From our Survey - Question 28 Community Concerns:

28) Community Concerns - Quality of Life

ATSDR wants input about how NGE&P activities have affected a community's quality of life. This includes impacts to public health, community cohesion and the ability to engage in recreational and commercial enterprises. **Check all items on the list that have affected your community's quality of life since NGE&P activities began in your area.**

- | | |
|---|---|
| <input type="checkbox"/> Lack of available housing | <input type="checkbox"/> Impacts on Parks and Recreational Areas (including lakes, streams and public waterfront areas) |
| <input type="checkbox"/> Increased Rents | <input type="checkbox"/> Impacts to Historical/Archeological Sites |
| <input type="checkbox"/> Increased Crime | <input type="checkbox"/> Community dissension and division |
| <input type="checkbox"/> Water Pollution | <input type="checkbox"/> Change of area's distinctive nature or character |
| <input type="checkbox"/> Air Pollution | <input type="checkbox"/> Catastrophic Accidents (including blowouts, explosions or vehicle accidents) |
| <input type="checkbox"/> Noise Pollution | <input type="checkbox"/> Spills of Hazardous Materials |
| <input type="checkbox"/> Light Pollution (such as bright lights at night) | <input type="checkbox"/> Stress on Volunteer First Responders (fire department, ambulance services and others) |
| <input type="checkbox"/> Traffic Congestion | <input type="checkbox"/> Increased Taxes |
| <input type="checkbox"/> Deterioration of Roads | <input type="checkbox"/> Decreased Taxes |
| <input type="checkbox"/> Brine-Spreading on Roads (for dust or ice) | <input type="checkbox"/> Other (provide details below) |
| <input type="checkbox"/> Diminished Tourism | |
| <input type="checkbox"/> Loss of Green Space or Open Space | |

Use the comment space at the top of the next page to provide details for Question #28. Use an additional sheet for extended answers and details.

20. And also from our Survey - Question 13 Signs and Symptoms:

Symptoms and Medical Information

13) Signs and Symptoms

Since NGE&P activities began in your area, has a Household member (or members) experienced any of the signs and symptoms listed below? Check all that apply. Household members includes those who have moved out since the start of NGE&P. If you have test results, be sure you've checked them off at Question #3.

- | | |
|--|---|
| <input type="checkbox"/> Rashes, Blisters, Other Skin Changes | <input type="checkbox"/> Restlessness |
| <input type="checkbox"/> Headaches | <input type="checkbox"/> Nausea |
| <input type="checkbox"/> Palpitations | <input type="checkbox"/> Vomiting |
| <input type="checkbox"/> Loss of Appetite | <input type="checkbox"/> Diarrhea |
| <input type="checkbox"/> Difficulty Breathing | <input type="checkbox"/> Weight Loss |
| <input type="checkbox"/> Eye, Nose & Throat Irritations | <input type="checkbox"/> Weight Gain |
| <input type="checkbox"/> Burning Sensation in Chest | <input type="checkbox"/> Sleep Disturbances |
| <input type="checkbox"/> Shortness of Breath | <input type="checkbox"/> Hair Loss |
| <input type="checkbox"/> Chronic Cough | <input type="checkbox"/> Behavioral Changes |
| <input type="checkbox"/> Irregular Heartbeat | <input type="checkbox"/> Mood Changes (depression, anger, anxiety etc.) |
| <input type="checkbox"/> Dizziness, Fainting, etc. | <input type="checkbox"/> Sensory Impairment (hearing/sight/taste/touch/
smell) |
| <input type="checkbox"/> Lethargy (listlessness) | <input type="checkbox"/> Pain |
| <input type="checkbox"/> Muscle Weakness | <input type="checkbox"/> Not Sure |
| <input type="checkbox"/> Involuntary movements (e.g. tics, etc.) | |
| | Other: _____ |

Use this comment space to provide details for Question #13. Use an additional sheet for extended answers and details.

21. Below are the two pages of the Hansen Services permit and the five pages of their detailed analysis - see paragraph 15 above.



OG/Brinespreading/Hansen Services

April 6, 2016

Justin Hansen DBA Hansen Svcs.
7 Mead Blvd.
Clarendon, PA 16313

One of 3
Licensed to Spread in
Farming ton

Re: 2016 Brine Spreading Plan Review
Approval No. NW5916
Whirley Drink Works, City of Warren,
Sam Harvey Property, Sugargrove Township, Warren County

Dear Operator:

The Department of Environmental Protection (DEP) has reviewed your plan for spreading brine for dust control on the above subject roads/lots. This plan for applying oil and gas well production brine to roads for dust control is approved subject to operating requirements listed below.

This Plan Approval is granted on a calendar year basis and expires on December 31, 2016.

Operating Requirements

1. The application of brine to unpaved roads must be performed in accordance with the approved plan.
2. The brine may only be applied at a rate and frequency necessary to suppress dust and stabilize the road. The rate and frequency of application must be controlled to prevent the brine from flowing or running off into roadside ditches, streams, creeks, lakes and other bodies of water or infiltrating to groundwater.
3. Recommended spreading rates: The road should initially be spread at a rate of up to one-half gallon per square yard (typically after the road has been graded in the spring). The road should subsequently be spread at a rate of up to one-third gallon per square yard no more than once per month unless based on weather conditions, traffic volume or brine characteristics—a greater frequency is needed to control dust and stabilize the road. The application rate for race tracks and mining haul roads should be determined for each site and should not exceed one gallon per square yard.
4. Only production or treated brines may be used. The use of brine from Marcellus and other non-conventional shale formations is not applicable for roadspraying. The use of drilling, fracturing, or plugging fluids or production brines mixed with well servicing or treatment fluids, except surfactants, is prohibited. Free oil must be separated from the brine before spreading.
5. Brine must not be applied within 150 feet of a stream, creek, lake or other body of water.
6. Brine must be spread by use of a spreader bar with shut-off controls in the cab of the truck.
7. Brine must not be placed on sections of road having a grade exceeding 10 percent.
8. Brine must not be spread on wet roads, during rain, or when rain is imminent.
9. Each vehicle used to spread brine shall have a clearly legible sign identifying the applicator on both sides of the vehicle.

10. The company spreading the brine shall notify the appropriate regional Oil & Gas program, brine spreading coordinator the business day before spreading brine.
11. The producing oil and gas wells must be in compliance with the bonding requirements of the Oil and Gas Act.
12. The person who received approval for the roadspreading plan must submit a monthly report (5500-FM-OG0046) to DEP indicating the location and amount of brine spread during the month. This monthly report must be submitted by the 15th day following the month in which the brine was spread. This report must be submitted even if no spreading took place during that month. The monthly report shall be submitted to:

PA DEP NWRO
District Oil & Gas Operations
230 Chestnut St.
Meadville PA 16335
13. Any revisions to the plan must be submitted to DEP for approval. Approval must be obtained prior to implementation of the revisions.
14. Failure to comply with all these conditions may result in DEP rescinding the plan approval.

Reporting Requirements

Transporters of residual waste must follow the requirements of 25 Pa. Code §299 Subchapter B (Standards for Collecting and Transporting of Residual Waste). Transporters must keep a daily operations record and file an annual operational report with DEP by March of the following year.

Oil and gas operators who generate brine must report the amount in their Annual Production Report.

This plan approval letter and its conditions should be reviewed by all parties involved in the brine spreading activity. A copy should be maintained in the cab of each vehicle used for spreading and its conditions made known to each driver.

If you have any questions, please contact me at 814.332.6173.

Sincerely,



Curtis LeSuer
Environmental Protection Specialist
Oil and Gas Management

cc: Rick Mader, WQS
Marshall Wurst, OGI
File

Analytical Services, Inc.

P.O. Box 237
Brockway, PA 15824-0237

Laboratory (814) 265-8749
FAX (814) 265-8749

GENERAL CHEMICAL ANALYSIS REPORT

CUSTOMER: Hansen Services
7 Mead Boulevard
Clarendon, PA 16313
Attn: Justin Hansen

Page 1 of 5

SAMPLE DATE: 01/07/16 at 12:50 pm
RECEIPT DATE: 01/07/16 at 8:40 pm

REPORT DATE: 02/10/16
ASI ID#: 140687

DESCRIPTION OF SAMPLE: Hansen Services

TOTAL ANALYSIS RESULTS:

PARAMETER	RESULT	UNIT	QUANTITATION LIMIT	METHOD	BY	DATE & TIME	DATA QUALIFIER
TPH-HEM Oil & Grease	8	mg/L	8	SM 8920B	WB	01/21/16 @ 11:00 am	R3
TPH-DRO	2,480	µg/L	-	EPA 8015D	FL	02/04/16 @ 3:22 pm	3a
TPH-GRO	9,720	µg/L	-	EPA 8015D	FL	02/03/16 @ 9:12 am	3a
Nitrate-N	< 50.0	mg/L	50.0	EPA 300.0	BB	01/18/16 @ 7:47 pm	
Nitrite-N	< 50.0	mg/L	50.0	EPA 300.0	BB	01/18/16 @ 7:47 pm	
Sulfate	791	mg/L	8	EPA 300.0	BB	01/18/16 @ 7:47 pm	E1
Fluoride	< 0.8	mg/L	.15	SM 4500 F-C	CC	02/03/16 @ 11:16 am	
Bromide	855	mg/L	0.1	EPA 300.0	BO	01/10/16 @ 7:47 pm	
Dissolved Phosphorus	< .15	mg/L	.15	SM 4500 P-B, S-E	WD	02/10/16 @ 10:30 am	
Dissolved Vanadium	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Zinc	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Titanium	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Strontium	88.1	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Tin	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Selenium	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Antimony	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Lead	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Nickel	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Sodium	24,700	mg/L	800	EPA 200.8	CH	02/04/16 @ 1:26 pm	
Dissolved Molybdenum	< 0.500	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Manganese	8.40	mg/L	0.500	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Magnesium	1,230	mg/L	800	EPA 200.8	CH	02/04/16 @ 1:26 pm	
Dissolved Lithium	4.1	mg/L	-	SM 3111B	CC	02/08/16 @ 4:00 pm	
Dissolved Potassium	89.5	mg/L	10.0	EPA 200.8	CH	02/04/16 @ 12:09 pm	
Dissolved Iron	69.6	mg/L	10.0	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Copper	0.705	mg/L	0.8	EPA 200.8	CH	02/03/16 @ 4:46 pm	
Dissolved Chromium	< 0.500	mg/L	0.5	EPA 200.8	CH	02/03/16 @ 4:46 pm	

R3: No duplicate due to insufficient sample volume.
E1: Diluted sample result exceeded the calibrated range and high CV, but is within the Linear Calibration Range. Concentration is considered an estimate.
3a: this sample was received outside the EPA recommended holding time.

Analytical Services, Inc.

P.O. Box 237
Brockway, PA 15824-0237

Laboratory (814) 265-8749
FAX (814) 265-8749

GENERAL CHEMICAL ANALYSIS REPORT

CUSTOMER: Hansen Services
7 Mead Boulevard
Clarendon, PA 16313
Attn: Justin Hansen

Page 2 of 8

SAMPLE DATE: 01/07/16 at 12:50 pm
RECEIPT DATE: 01/07/16 at 5:40 pm

REPORT DATE: 02/10/16
ABI ID#: 140607

DESCRIPTION OF SAMPLE: Hansen Services

TOTAL ANALYSIS RESULTS:

PARAMETER	RESULT	UNIT	QUANTITATION LIMIT	METHOD	BY	DATE & TIME	DATA QUALIFIER
Dissolved Cobalt	<0.500	mg/L	5	SM 6520B	CH	02/03/16 @ 4:46 pm	
Dissolved Cadmium	<0.100	mg/L	50.0	EPA 300.0	CH	02/03/16 @ 4:46 pm	
Dissolved Beryllium	<0.100	mg/L	50.0	EPA 300.0	CH	02/03/16 @ 4:46 pm	
Dissolved Barium	1.47	mg/L	5	EPA 300.0	CH	02/03/16 @ 4:46 pm	
Dissolved Boron	2.97	mg/L	.15	SM 4500 F-C	CH	02/04/16 @ 12:09 pm	
Dissolved Arsenic	0.048	mg/L	0.1	EPA 500.0	CH	02/03/16 @ 4:46 pm	
Dissolved Aluminum	0.925	mg/L	0.500	EPA 200.0	CH	02/03/16 @ 4:46 pm	
Total Inorganic Carbon	27.8	mg/L	0.5	SM 8210B	WB	02/09/16	
TOC	211.5	mg/L	0.5	SM 8210B	WB	02/09/16	
Hardness	22,000	mg/L	3310	SM 2840B	CH	01/04/16 @ 1:06 pm	
Alkalinity to pH 4.5 as CaCO ₃	58	mg/L	1	SM 2320B	PW	01/12/16 @ 12:00 pm	
Barium	1.31	mg/L	0.500	EPA 200.0	CH	02/03/16 @ 4:10 pm	
TDS	81,880	mg/L	10	SM 2840C	PW	01/11/16 @ 9:48 am	
Manganese	0.50	mg/L	.300	EPA 200.0	CH	02/04/16 @ 1:06 pm	
Chloride	62,167	mg/L	5	EPA 300.0	BB	01/18/16 @ 7:47 pm	
Magnesium	1,370	mg/L	500	EPA 200.0	CH	02/04/16 @ 1:06 pm	
Iron	118	mg/L	10.0	EPA 200.0	CH	02/03/16 @ 4:10 pm	
Sodium	23,100	mg/L	500	EPA 200.0	CH	02/04/16 @ 1:06 pm	
Conductivity	110,700	mg/L	0.1	SM 2810B	WB	01/20/16 @ 1:00 pm	
Specific Gravity	1.090	mg/L	--	--	WB	02/09/16	
Sulfide	2.6	mg/L	0.05	SM 4500 S-D	WB	02/10/16 @ 10:00 am	
Temperature	2.4	°C	--	SM 2500B	MC	01/07/16 @ 5:40 pm	
Dissolved Oxygen	1.70	mg/L	--	SM 4500 O-G	MC	01/07/16 @ 5:40 pm	
Density	1.080	g/g	--	--	MC	01/07/16 @ 5:40 pm	
pH (Meq)	6.83	--	--	SM 4500 H+ B	MC	01/07/16 @ 5:40 pm	

Analytical Services, Inc.

P.O. Box 237
Brockway, PA 15824-0237

Laboratory (814) 265-8749
FAX (814) 265-8749

GENERAL CHEMICAL ANALYSIS REPORT

CUSTOMER: Hansen Services
7 Mead Boulevard
Clarendon, PA 16313
Attn: Justin Hansen

Page 3 of 8

SAMPLE DATE: 01/07/16 at 12:50 pm
RECEIPT DATE: 01/07/16 at 5:40 pm

REPORT DATE: 02/10/16
ASI ID#: 140887

DESCRIPTION OF SAMPLE: Hansen Services

TOTAL ANALYSIS RESULTS:

PARAMETER	RESULT	UNIT	QUANTITATION LIMIT	METHOD	BY	DATE RANGE
Iron Bacteria	YES	--	-	Hal	WS	01/07/16 , Ended 01/10/16

We certify that the above reported values were obtained by use of procedures appropriate for the sample as submitted.

By: William J. Sabatose

Date: 02/10/16

For: William J. Sabatose, Chief Chemical Analyst

PADEP LAB ID#: 33-00411

Analytical Services, Inc.

P.O. Box 237
Brockway, PA 15824-0237

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CHEMICAL ANALYSIS REPORT

CUSTOMER: Hansen Services
7 Mead Blvd.
Clarendon, PA 16313

ASI ID#: 140687
SAMPLE DATE: 01/07/16 @ 12:50
RECEIVED: 01/07/16 @ 17:40
REPORTED: 02/09/16

ATTN: Justin Hansen

SAMPLE DESCRIPTION:

TOTAL ANALYSIS RESULTS:

Parameter	Results	Units	Reporting Limit	Method	Date Analyzed	Time	Qualifier
1,3,5-trimethylbenzene	59.3	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
1,2,4-trimethylbenzene	138	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
Benzene	2090	µg/L	25.0	SW 846-8280B	02/03/16	17:50	3a
Toluene	1870	µg/L	25.0	SW 846-8280B	02/03/16	17:50	3a
Ethylbenzene	90.2	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
Xylenes (total)	957	µg/L	20.0	SW 846-8280B	02/02/16	23:27	3a
Isopropylbenzene	< 10.0	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
Naphthalene	10.2	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
sec-butylbenzene	< 10.0	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a
tert-butylbenzene	< 10.0	µg/L	10.0	SW 846-8280B	02/02/16	23:27	3a

Sample analyzed by Fairway Laboratories, PA Lab # 07-062

Qualifier 3a: This sample was received outside the EPA recommended holding time.

We certify that the above reported values were obtained by use of procedures appropriate for the sample as submitted.

Reviewed and Approved By: William Sabatose
For: William Sabatose, Chief Chemical Analyst

PADEP LAB ID#: 33-00411

Analytical Services, Inc.

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Brockway, PA 15824-0237

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CHEMICAL ANALYSIS REPORT

CUSTOMER: Hansen Services
7 Mead Blvd.
Clarendon, PA 16313

ASI ID#: 140687
SAMPLE DATE: 01/07/16 @ 12:50
RECEIVED: 01/07/16 @ 17:40
REPORTED: 02/09/16

ATTN: Justin Hansen

SAMPLE DESCRIPTION:

TOTAL ANALYSIS RESULTS:

Parameter	Results	Units	Reporting Limit	Method	Date Analyzed	Time	Qualifier
Pyridine	< 40.0	µg/L	40.0	SW 846-8270D	02/03/16	14:53	3a, 2d
Acetophenone	< 20.0	µg/L	20.0	SW 846-8270D	02/03/16	14:53	3a, 2d
3 & 4-methylphenol	124	µg/L	20.0	SW 846-8270D	02/03/16	14:53	3a, 2d
2-methylphenol	101	µg/L	20.0	SW 846-8270D	02/03/16	14:53	3a, 2d

Sample analyzed by Fairway Laboratories, PA Lab # 07-062

Qualifier 3a: This sample was received outside the EPA recommended holding time.
Qualifier 2d: The LCS spike recovery was outside acceptance limits for the noted analyte. Data accepted based on additional batch QC.

We certify that the above reported values were obtained by use of procedures appropriate for the sample as submitted.

Reviewed and Approved By: William Sabatosa
For: William Sabatosa, Chief Chemical Analyst

PADEP LAB ID#: 33-00411

I declare subject to the penalties of 18 Pa. C.S. § 4904 regarding unsworn falsification to authorities that the foregoing is true and correct to the best of my personal knowledge.

Barbara Arrindell

Date