

Testimony of Walter L. T. Hang
Before the State Senate Democratic Conference Forum
Regarding Natural Gas and Oil Extraction
Wastewater Concerns In New York
Albany, NY
May 13, 2014

Greetings. My name is Walter L. T. Hang. I am the President of Toxics Targeting, Inc., an environmental database firm in Ithaca, NY. My firm's state-of-the-art Geographic Information System (GIS) maps and profiles more than 700,000 known and potential toxic sites in New York using local, state and federal government data. We provide services to many of New York's most respected engineering and environmental consulting firms, government agencies, public drinking water supply systems, attorneys and homebuyers.

Thank you for the opportunity to comment on natural gas and oil extraction wastewaters generated or disposed of in New York, notably "flow-back" and "produced" wastewater aka "brine" documented to be contaminated with toxic metals, petroleum hydrocarbons, radionuclides and dissolved solids.

My firm has been compiling government data about these hazards since 2009. I commend your efforts because I believe that this issue warrants New York's utmost attention.

The Department of Environmental Conservation's (DEC) *de facto* shale gas extraction moratorium remains in effect pending adoption of comprehensive public health and environmental safeguards pursuant to a Supplemental Generic Environmental Impact Statement (SGEIS) permit guideline proceeding that has yet to be completed.

Moreover, that SGEIS cannot be adopted until the Department of Health completes a "review" of DEC's shale gas "health impact analysis." That proceeding began in September 2012 and has a dubious future because Health Commissioner, Dr. Nirav R. Shah, recently resigned before he could complete it.

Both the SGEIS and DOH "review" have received intense criticism due to their major shortcomings, notably a failure to resolve gas extraction wastewater problems. That is why your forum could not be more timely.

DEC's Inadequate Regulation of Gas Extraction Wastewaters

DEC states on its Marcellus Shale homepage: "As a result of New York's rigorous regulatory process, the types of problems reported to have occurred in states without such strong environmental laws and rigorous regulations haven't happened here."

That key assertion is the rationale for only "supplementing" DEC's 1992 GEIS instead of requiring an entirely new GEIS to be adopted before permitting Marcellus Shale gas fracking to begin.

With all respect, DEC's own data document that its assertion is factually incorrect and deliberately misleading. I believe that this self-serving myth must be rejected along with DEC's fatally flawed Revised Draft SGEIS.

For example, the irrefutable truth of the matter is that for decades DEC's gas and oil extraction wastewater regulatory program has:

- a) permitted publicly owned treatment works (POTWs) to accept tens of millions of gallons of extraction wastewater even though those facilities are neither designed, constructed nor maintained to remove toxic pollutants documented to be present in that wastewater;
- b) failed to halt gas extraction wastewater dumping into "brine pits" even though that practice was required to be halted more than 25 years ago;
- c) failed to investigate and clean up thousands of reported extraction wastewater spills even though they do not meet applicable clean up standards; and
- d) authorized tens of millions of gallons of highly contaminated extraction wastewater to be spread on roads for dust control, de-icing and roadbed stabilization.

These problems are clearly documented by extensive, detailed information that Toxics Targeting compiled from DEC's wastewater regulatory program, local municipal authorities, DEC's hazardous substances spills database and the agency's Beneficial Use Determination (BUD) landspreading authorization program.

Management of gas extraction by-products is critically important because in the autumn of 2008 inadequately treated gas extraction wastewater "passed through" multiple municipal treatment plants into the Monongahela River near Pittsburgh. As a result, more than 850,000 local residents were unable to drink public water drawn from that river during the biggest drinking water contamination crisis in our nation's history.

Conventional Gas and Oil Extraction Versus Marcellus Shale Gas Fracking

"Conventional" production wells drilled into pockets of gas and oil have been common in western and central New York for nearly two centuries. Natural gas has been extracted since 1821. The first commercial oil production well was constructed in 1865.

In July 2008, DEC withheld authorization for proposed extraction of gas from Marcellus Shale, a huge geologic formation that stretches from Marcellus, NY, southwest of Syracuse, south to the Pennsylvania border and from the Catskills to the western terminus of our state. On average, this shale formation is approximately one mile underground.

Natural gas in Marcellus Shale is present in tiny pores. In order to extract that gas, horizontal drilling combined with hydraulic fracturing is required. First, a well is drilled down and horizontally through Marcellus Shale. Then fracturing fluid is pumped into the well under enormous pressure through perforations in the well casing. This process cracks the rock and releases gas.

Fracturing fluid is usually water laced with chemical additives that reduce the coefficient of friction of the fracturing fluid and sand that props open the tiny fractures caused by fracturing.

Gas Extraction "Flowback" and "Produced Water" or "Brine"

Virtually all gas production wells are currently "fracked." The key difference is that fracking a conventional vertical gas well requires tens or hundreds of thousands of gallons of fracking fluid while fracking a horizontal shale gas well requires approximately three to five million gallons of fracking fluid.

Gas extraction generates two types of wastewater: "flowback" and "produced water," also known as "brine."

After the fracking process is complete, the pressure on the pumping system is relieved. According to the DEC, approximately five percent to 35 percent of the fracking fluid reportedly flows back out of a horizontally hydrofractured Marcellus Shale well in northern Pennsylvania. This wastewater is called "flowback." Rates of flowback vary by geologic formation and other factors.

As gas flows out of a well, it is accompanied by "produced water" or "brine." This material is collected in tanks or dumped into "brine pits" at the well pad during the lifetime of the well. A conventional gas well typically generates one to three barrels, or between 42 and 126 gallons, of brine per day. Brine production increases over time.

In recent years, approximately 7,000 gas production wells in New York have generated flowback and/or produced wastewater. A comparable number of oil production wells in the state have generated produced water. There is currently no regulatory system to track those wastewaters from "cradle to grave." As a result, the volume and fate of those wastewaters is unknown to environmental authorities.

Toxic Constituents of Gas Drilling Wastewater

Both flowback and produced water/brine are documented to be contaminated with three main categories of toxic pollutants:

- a) Total Dissolved Solids (TDS) have been reported in gas extraction wastewater generated in Pennsylvania up to 413,000 parts per million. These TDS constituents include sodium, chloride, bromide and a wide spectrum of toxic metals, including lead, barium, mercury and chromium. Many TDS constituents are elements that never break down when released into the environment. As a result, they can cause permanent pollution hazards.
- b) petroleum hydrocarbons, notably in the diesel range, have been reported up to 72,600 parts per billion in gas drilling wastewater generated in West Virginia. Benzene, a known human cancer-causing agent was reported in gas extraction wastewater generated in Pennsylvania up to 660 parts per billion. Many of these constituents resist biodegradation and are toxic even at exceedingly low levels of exposure. For example, the Maximum Contaminant Level for benzene in New York State drinking water is five parts per billion.
- c) a wide range of Naturally Occurring Radioactive Materials (NORM) have been documented in gas extraction wastewater, including: radium 226, 228 and 224, thorium 228, radon 222 and lead 210. Radionuclides can cause severe health effects and can have long half-lives. Radium 226, for example has a half-life of 1,600 years.

While a great deal of attention has been focused on flowback, contaminant concentrations in produced water or brine are typically higher for all three contaminant categories.

Both flowback and produced water/brine are complex mixtures of hundreds, if not thousands, of inorganic as well as organic compounds. To date, those wastewaters have yet to be fully characterized by analytical studies.

Gas Extraction Wastewater Discharges into POTWs in New York

It is now documented that DEC failed to prevent tens of millions of gallons of gas extraction wastewater from being discharged into publicly owned treatment works (POTWs) that are neither designed, constructed nor maintained to be able to break down or remove pollutants in that wastewater. This is an extremely urgent policy matter that must be fully resolved prior to permitting horizontal hydrofracking in New York's tight shale.

Gas extraction wastewater is fundamentally incompatible with the "secondary" biological treatment systems employed by virtually all municipal treatment systems in New York to break down human sewage. These "activated sludge" and "trickling filter" or "biotower" systems promote the growth of bacteria that degrade human wastewater components.

Many of the constituents of gas extraction wastewater inhibit treatment processes, resist biological degradation, "pass through" into receiving bodies of water, concentrate in residual biosolids, or sludge and pose hazards to treatment plant workers.

Auburn

The POTW in New York that reportedly accepted the largest volume of gas drilling wastewater was in Auburn. The City of Auburn Water Pollution Control Facility reportedly received a total of more than 16 million gallons of "gas well drilling process wastewater" from 7/1/09 to 6/30/10.

The facility reportedly accepted gas drilling wastewater from a number of firms, including Fortuna Energy, Inc., Range Resources, Inc., Lenape Resources, Inc., Epsilon Energy USA, Inc., Southwest Energy Company, Strategic Environmental, LLC, Norse Energy Corp. USA and Chesapeake Appalachia, LLC.

The attached documents reveal gas drilling wastewater accepted by the facility was not characterized on a comprehensive basis. Dozens of pollutant parameters were "Not Sampled," including Total Dissolved Solids subject to pretreatment restrictions. See:

http://toxicstargeting.com/sites/default/files/pdfs/AubDEC_Jan09letter-N...

On 3/31/11, the City of Auburn reportedly cited six natural gas firms for "Significant Non-Compliance With City of Auburn Sewer Use Law." I am providing for your review a section of the public notice in the Auburn Citizen on that day as an attachment. See Appendix A.

After *The New York Times* reported this practice, public concerns persuaded the Auburn City Council to pass a ban on accepting gas drilling wastewater at its POTW in July 2011.

In the spring of 2012, a change in the Democratic leadership of the City Council led to the rescinding of that ban. When the City sought to gain DEC and EPA approval for accepting gas drilling wastewater, it was required to conduct a "headworks analysis" to assure that the plant could manage the pollution load.

March 2014 Auburn Headworks Analysis Report

I invite you to review Auburn's final Headworks Analysis report by GHD Consulting Services Inc. As you will see, it concludes that no gas drilling wastewater should be accepted at the plant:

"The headworks analyses performed herein indicate that the Auburn WPCP [Water Pollution Control Plant, not in the original] does not have the additional capacity for the acceptance of hauled VGWW [Vertical Natural Gas Well Wastewater, not in the original] due to excess chloride loading to the plant (emphasis added). The results of the evaluation were made based on available data and literature inhibition values for nitrification, a biological treatment process used at the Auburn WPCP."

Regarding future regulation of gas drilling wastewater at POTWs, the report concludes that:

"Acceptance of hauled VGWW will constitute a major change to the Auburn WPCP's existing IWPP [Industrial Wastewater Pretreatment Program, not in the original], and as such, this change will likely be

subject to intense scrutiny from the NYSDEC and USEPA during the approval process. The USEPA is unlikely to approve a major modification of the existing IWPP without significant additional efforts by the Auburn WPCP to verify its ability to accept VGWW, through inhibition studies and additional demonstration of process compatibility."

The report references possible stringent new requirements for accepting gas drilling wastewater:

"Recalculation of allowable headworks loads and an update of the headworks analysis for each new well from which VGWW is to be accepted. This analysis will require actual monitoring data from each well applying for acceptance of its hauled VGWW at the Auburn WPCP."

See: <http://toxicstargeting.com/MarcellusShale/documents/2014/4/22/gnd-headworks-analysis>

Appendix A, Section I of the Auburn Headworks Analysis Report documents that DEC authorized acceptance of gas drilling wastewater dumping at Auburn on 10/17/2008 by reportedly leaving a phone message for local officials. DEC required no additional wastewater characterization investigation or regulatory changes to the plant's effluent discharge permit.

Given these findings, it is beyond dispute that DEC failed to safeguard New York's environment from gas extraction wastewater dumped into the Auburn POTW. The municipality's own "headworks analysis" concludes the plant could not treat that pollution properly.

This incident calls into question DEC's fundamental ability to regulate gas and oil extraction activities in New York. This matter warrants full investigation as well as a public report about how it possibly could have happened.

Cayuga Heights

The Cayuga Heights Wastewater Treatment Facility reportedly accepted approximately three million gallons of natural gas drilling wastewater without an approved pretreatment program, a requisite "headworks analysis" or strict enforcement of local pretreatment requirements. That practice was reportedly halted circa 4/09 after I brought the matter to public attention.

This facility discharges into Southern Cayuga Lake upgradient of the drinking water intake for the Bolton Point system that supplies approximately 30,000 local residents. That receiving body of water is listed on the national 303(d) registry of impaired waterbodies and required a Total Maximum Daily Load (TMDL) comprehensive clean up plan by 3/31/06 due to its status as "High Priority Waters." To date, no TMDL has been adopted.

Canandaigua

Without necessarily knowing it, the Canandaigua POTW reportedly received 177,000 gallons of gas drilling wastewater generated in Pennsylvania by EOG Resources, Inc.. See below, Appendix B and: <http://toxicstargeting.com/sites/default/files/pdfs/EOG-26R-part-1-1-2-3...>

The facility reportedly stopped accepting all gas extraction wastewater in September 2009. Prior to that time, it had reportedly accepted that wastewater for up to nine years.



COMMONWEALTH OF PENNSYLVANIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
BUREAU OF WASTE MANAGEMENT

915
2010

FORM 26R
CHEMICAL ANALYSIS OF RESIDUAL WASTE
ANNUAL REPORT BY THE GENERATOR

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 26R, reference the item number and identify the date prepared. The date on attached sheets needs to match the date noted below.

General Reference 267.54

Date Prepared/Revised: 03/01/2010

Date Received & General Note: APR 14 2010

Company Name: EDG Resources, Inc. EPA Generator ID#

If a Subsidiary, Name of Parent Company

Company Mailing Address Line 1: 400 Southpointe Blvd. Company Mailing Address Line 2: Plaza 1, Suite 300

Company Address Last Line - City: Canonsburg State: PA Zip-4: 15317 Phone: 724-745-1102 Ext:

Company Contact Last Name: Gary First Name: Smith MI: L Suffix:

Municipality: Canonsburg County: Washington

Contact Phone: 724-745-1102 Ext: Contact Email Address: gary.smith@edgresources.com

Is the waste generated at the Company Mailing Address (noted above)? Yes No

If 'No', describe location of waste generation and storage. Natural Gas Well Locations

Municipality: County: Clearfield, Elk, Jefferson, Bradford State: PA

Residual Waste Code	Residual Waste Code Description	Amount	Unit of Measure		Time Frame
801	Drilling Residuals	200	<input type="checkbox"/> cu yd	<input type="checkbox"/> gal	<input type="checkbox"/> One Time
			<input type="checkbox"/> lb	<input checked="" type="checkbox"/> ton	

a. pH Range: 6 to 9 (based on analyses or knowledge)

b. Physical State: Liquid Wastes (EPA Method 9095) Solid (EPA Method 9095) Gas (ambient temperature & pressure)

c. Physical Appearance: Color: Black to Brown Odor: None
Number of Solid or Liquid Phases of Separation: One
Describe each phase of separation: Solid

a. The results of a detailed chemical characterization of the waste, as described in the instructions, is attached. Yes No

b. A detailed description of the waste sampling method is attached. Yes No

c. The quality assurance/quality control procedures employed by the laboratory(ies) is attached. Yes No

d. The results of the hazardous waste determination is attached. Yes No

e. If applicable, a detailed explanation supporting use of generator knowledge in lieu of actual chemical analysis is attached. Yes No N/A

a.	Solid waste permit number(s) for processing or disposal facility being utilized NY 0025968	
b.	Facility Name	Canadaigua WWTP
	Address Line 1	
	Address Line 2	
	Address City State ZIP	
	Municipality	County
c.	Facility Contact Name	
	Title	
	Phone	Email Address
d.	Volumes of waste shipped to processing or disposal facility in the previous year. 177,000 <input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)	

a.	Solid waste permit number(s) for processing or disposal facility being utilized PA0101508	
b.	Facility Name	Pennsylvania Brine Treatment - Franklin
	Address Line 1	5148 Route 322
	Address Line 2	
	Address City State ZIP	Franklin PA 16323
	Municipality	Franklin County Venango
c.	Facility Contact Name	Elton DeLong, Jr.
	Title	Operations Manager
	Phone	814-437-3593 Email Address
d.	Volumes of waste shipped to processing or disposal facility in the previous year. 4,838,644 <input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)	

a.	Solid waste permit number(s) for processing or disposal facility being utilized PA0095273	
b.	Facility Name	Pennsylvania Brine Treatment - Josephine
	Address Line 1	P.O. Box 296 Belts Mills Road
	Address Line 2	
	Address City State ZIP	Josephine PA 15750
	Municipality	Josephine County Indiana
c.	Facility Contact Name	Elton DeLong, Jr.
	Title	Operations Manager
	Phone	724-248-1000 Email Address
d.	Volumes of waste shipped to processing or disposal facility in the previous year. 606,012 <input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)	

Gas Extraction Wastewater Dumping into Brine Pits

Vast quantities of contaminated gas extraction wastewater have been discharged into brine pits even though this practice was required to be halted more than 25 years ago. Numerous examples of brine pit dumping hazards have been reported, but these pictures speak louder than words.



Gas Extraction Wastewater Spills

Massive gas extraction wastewater releases are documented to have been caused by hundreds and perhaps thousands of spills, accidents and other uncontrolled discharges in New York. Gas extraction wastewater spills up to 100,000 gallons have been reported to DEC in a single incident. Many spills are never cleaned up in strict compliance with remediation requirements.

There is no specific regulatory requirement to report gas extraction wastewater spills in New York. As a result, the full scope of this problem is unknown. In contrast, petroleum releases are required to be reported to a DEC hotline within two hours or fines up to \$25,000.00 can be levied per day of non-compliance.

Toxics Targeting has posted for public review hundreds of major spills involving polluted water supply wells, an incident involving oil from a nearby production well that shot out of a showerhead and doused someone bathing, explosions, fires and impacts to surface waters, groundwaters and wetlands. These gas drilling wastewater spills refute DEC's assertion that its existing regulatory efforts are sufficient.

See: http://www.toxicstargeting.com/MarcellusShale/drilling_spills_profiles and

http://www.toxicstargeting.com/sites/default/files/pdfs/jamestown/group1_reorder2-HL.pdf

Land-Spreading of Gas Drilling Wastewater

DEC has long approved land-spreading of gas drilling wastewater for dust control, winter de-icing and roadbed stabilization.

DEC's Beneficial Use Determination (BUD) program has approved natural gas wastewater to be spread on roadways at farms, residential and business properties, a summer camp for children, a water treatment plant, County fairgrounds, State lands as well as areas adjoining critical drinking water supply sources, including a major reservoir and "sole-source" and primary aquifers.

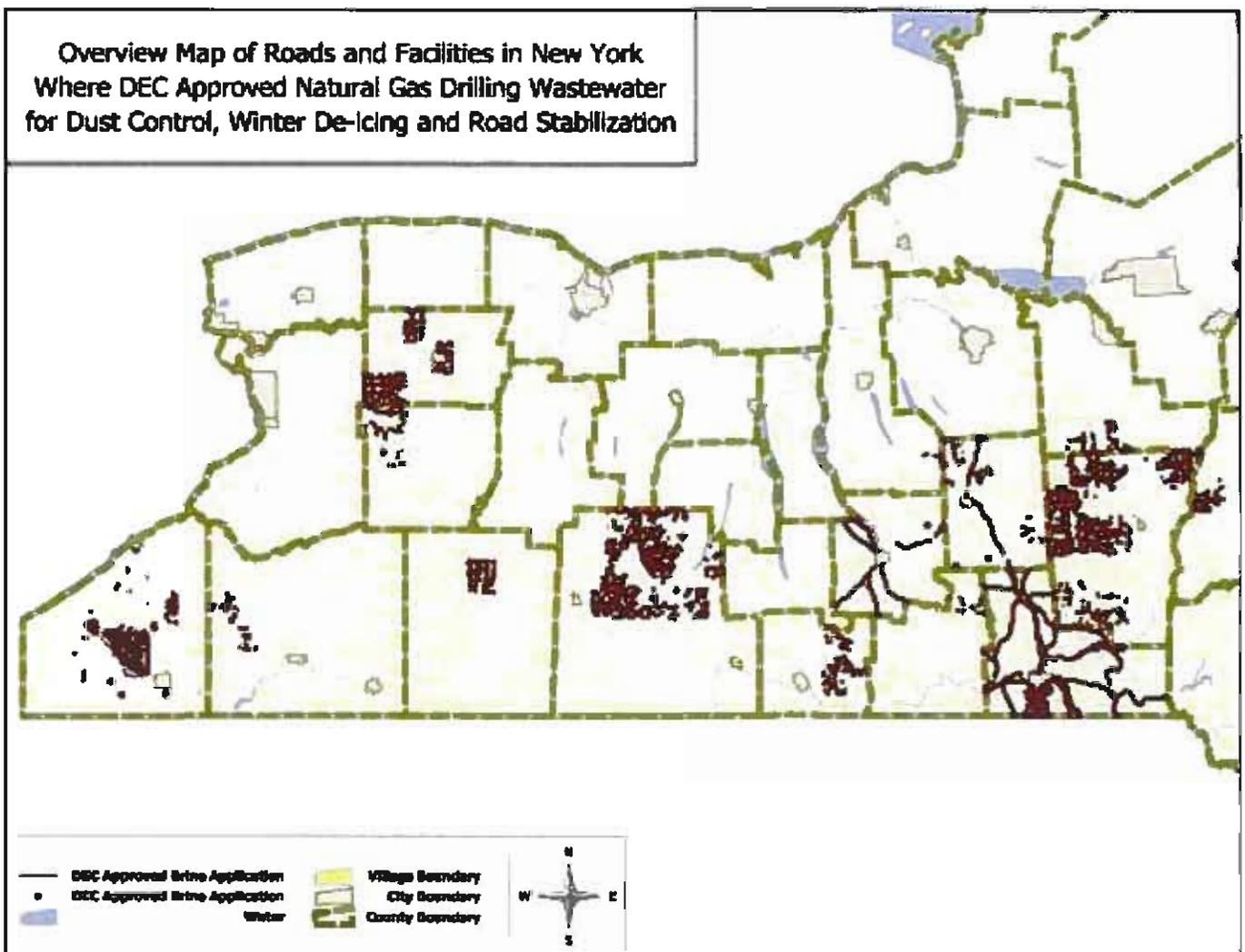
DEC has reportedly approved gas extraction wastewater spreading in Chemung, Broome, Tompkins, Tioga, Chenango, Steuben, Cayuga, Cortland, Madison, Genesee, Chautauqua, Cattaraugus, Allegany, Wyoming and Otsego Counties.

I have posted extensive documents related to this practice at:

<http://toxicstargeting.com/sites/default/files/pdfs/foil-hi-110718.pdf>

See below an Overview Map illustrating where the gas wastewater has been approved for land-spreading. The map is also posted at:

http://toxicstargeting.com/sites/default/files/pdfs/Overview_110720_1500...



Conclusion

I am pleased to note that not one horizontal Marcellus Shale gas production well has ever been fracked in New York. That is how our state has avoided the widespread problems experienced in Pennsylvania and other states.

Until a Final SGEIS is adopted, our state's *de facto* moratorium will remain in effect. It is absolutely imperative that the gas extraction wastewater concerns I have summarized today be fully resolved prior to the permitting of horizontal hydrofracking in New York's tight shales.

After DEC issued its draft SGEIS on 9/30/09, it received withering criticism from government authorities, EPA and concerned citizens. A coalition letter which requested that Governor Paterson withdraw the draft SGEIS due to its fundamental shortcomings eventually gained more than 10,000 signatories.

On December 10, 2010, Governor Paterson signed Executive Order No. 41 requiring DEC to: *"make such revisions to the Draft SGEIS that are necessary to analyze comprehensively the environmental impacts associated with high-volume hydraulic fracturing combined with horizontal drilling, ensure that such impacts are appropriately avoided or mitigated ..."* As one of his first official acts, Governor Cuomo signed a continuation of that Executive Order.

The Revised Draft SGEIS released by DEC in September 2011 received even more scathing criticism than the original Draft SGEIS. It is factually incorrect, deliberately misleading and inadequate to safeguard public health and the environment.

A coalition letter sent to Governor Cuomo requests that he immediately withdraw the proposal in order to resolve its fundamental shortcomings. That letter now has more than 22,000 signatories, including elected officials, government authorities, environmental and civic organizations and citizens from all over New York.

See: http://www.toxicstargeting.com/MarcellusShale/cuomo/coalition_letter/2011

With regard to today's forum, that coalition letter specifically requests that Governor Cuomo:

Ban gas extraction wastewaters from being discharged into POTWs designed for sanitary waste and adopt strict pretreatment standards.

Ban gas extraction wastewaters from being discharged into brine pits.

Ban land-spreading of toxic gas drilling wastewaters.

Ban toxic gas drilling wastewater from being recycled as hydrofracking or drilling fluid. Gas drilling wastewaters, including flowback as well as produced water or brine, are currently exempted from "GA" effluent limitations designed to safeguard drinking water drawn from the ground in New York. The Revised Draft SGEIS fails to eliminate this exemption even though gas extraction wastewater is documented to contain pollutant concentrations that vastly exceed applicable GA effluent limitations. For example, benzene reported in gas extraction wastewater up to 660 parts per billion is only allowed at one part per billion in permitted groundwater discharges.

In conclusion, while I commend your efforts to pass legislation that would address a wide range of gas extraction wastewater hazards, the reality is that it will be extremely difficult, if not impossible, to enact any bills into law in the near term due to Republican opposition in the joint leadership which controls your House.

That is why I urge you to pursue two critical goals that are entirely within the realm of your possibilities. First, please work to persuade Governor Cuomo to halt his DOH "review" due to its numerous technical shortcomings as well as its lack of public notice, public review and comment or even a single public hearing.

Instead, the Governor must require a comprehensive shale fracking "Public Health Impact Study" to be undertaken openly and transparently with formal public participation to resolve all documented health hazard concerns once and for all.

Second, please use your authority and influence to persuade Governor Cuomo to withdraw the inadequate Final Revised Draft SGEIS. It is imperative that this profoundly criticized proposal not be adopted.

Thank you for the opportunity to speak to you today. I would be pleased to try to answer any questions that my testimony might have raised.

Appendix A

PUBLIC NOTICE OF SIGNIFICANT NON-COMPLIANCE WITH CITY OF AUBURN SEWER USE LAW P.Y. 2010 The following permitted industries are listed as having been in violation of Title 40 and Section 403.8(f)(v)(A,B&F) of the Code of Federal Regulations (CFR) during the City of Auburn Industrial Pretreatment Year 2010. This notice is published in accordance with 40 CFR Part 25 and covers the period from October 1, 2009 to December 31, 2010: Pretreatment Year Periods: First Evaluation Period - October 2009 through March 2010 Second Evaluation Period - January 2010 through June 2010 Third Evaluation Period - April 2010 through September 2010 Fourth Evaluation Period - July 2010 through December 2010

Violation 40 CFR 403.8(f)(2)(vii)(A): Type "A" violations are defined by the CFR as "Chronic violations" of wastewater discharge limits..." in which sixty-six percent or more of all of the measurements taken during a six-month period equal or exceed (by any magnitude) the daily maximum limit or the average limit for the same pollutant parameter.

Violation 40 CFR 403.8(f)(2)(vii)(B): Type "B" violations are defined by the CFR as "Technical Review Criteria" (TRC) violations, those in which thirty-three percent or more of all of the measurements for each pollutant parameter taken during a six-month period equal or exceed the product of the daily maximum limit or the average limit multiplied by the applicable TRC (TRC=1.4 for BOD, TSS, fats, oil, and grease, and 1.2 for all other pollutants except pH).

Violation 40 CFR 403.8(f)(2)(vii)(F): Type "F" violations are defined by the CFR as "Failure to provide, within 30 days after the due date, required reports such as baseline monitoring reports, 90-day compliance reports, periodic self-monitoring reports, and reports on compliance with compliance schedules;"

3. Industry Name: **Anschutz Exploration** (emphasis added) Address: 555 Seventeenth Street Suite 2400 Denver, Colorado Type "F" Violations: 90-Day self-monitoring reports were not submitted for the second, third or fourth quarters of 2010. Actions Taken: Anschutz Exploration was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Waste water was sampled in February 2011 by the City in accordance with EPA-approved pretreatment program protocol. Compliance Anschutz is scheduled to submit samples in the second quarter 2011 in accordance with their discharge permit requirements. Anschutz submitted first quarter sample results in lieu of the fourth quarter 2010 results, and required certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010. Penalties: No penalties were assessed.

4. Industry Name: **Chesapeak Energy** (emphasis added) Address: Chesapeak Appalachia, LLC Eastern Division 6100 N. Western Avenue Oklahoma City, Ok. 73118 Type "F" Violations: 90-Day self-monitoring report was not submitted for the fourth quarter of 2010. Actions Taken: Chesapeak Energy was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Compliance Chesapeak is scheduled to submit samples in the

second quarter 2011 in accordance with their discharge permit requirements. Chesapeake submitted required certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010. Chesapeake has elected not to make deliveries until further notice. Penalties: No penalties were assessed.

5. Industry Name: **Empire Energy** (emphasis added) Address: PO Box 100 Mayville, N.Y. 14757 Type "F" Violations: 90-Day self-monitoring reports were not submitted for the second, third or fourth quarters of 2010. Actions Taken: Empire Energy was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Waste water was sampled by the City in February 2011 in accordance with EPA-approved pretreatment program protocol. Compliance Empire is scheduled to submit samples in the second quarter 2011 in accordance with their discharge permit requirements. Empire submitted required certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010. Penalties: No penalties were assessed.

6. Industry Name: **Epsilon Energy USA, Inc.** (emphasis added) Address: 3343 PA State Route 3004 Meshoppen, Pa. 18630 Type F Violations: 90-Day self-monitoring report was not submitted for the second quarter of 2010. Epsilon only discharged waste water on June 14 and 15, 2010. Actions Taken: Epsilon was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Compliance Epsilon submitted required certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010. No additional deliveries were made in 2010 and none are planned for 2011. Penalties: No penalties were assessed.

7. Industry Name: **Norse Energy** (emphasis added) Address: 3556 Lakeshore Road Suite 700 Buffalo, N.Y. 14219 Type F Violations: Norse delivered waste water to the City treatment plant only in the fourth quarter of 2010. The 90-Day self-monitoring report was not submitted for the fourth quarters of 2010. Actions Taken: Norse was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Waste water sampling is planned in the first quarter 2011 by the City in accordance with EPA-approved pretreatment program protocol. Compliance Norse is scheduled to submit samples in the second quarter 2011 in accordance with their discharge permit requirements. Norse submitted required certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010. Penalties: No penalties were assessed.

8. Industry Name: **Talisman Energy** (emphasis added) Address: 337 Daniel Zenker Drive Horseheads, N.Y. 14845 Type F Violations: Talisman delivered waste water to the City treatment plant in all four quarters of 2010. 90-Day self-monitoring reports were not submitted for the second, third or fourth quarters of 2010. Actions Taken: Talisman was notified of reporting requirements on January 26, 2011 that the City of Auburn would no longer accept water without quarterly reports. Waste water was sampled by the City in February 2011 in accordance with EPA-approved pretreatment program protocol. Compliance Talisman is scheduled to submit samples in the second quarter 2011 in accordance with their discharge permit requirements. Talisman submitted required

certification verifying that no water from horizontal Marcellus Shale formation was discharged to the Auburn Wastewater Facility in 2010.

Penalties: No penalties were assessed. _____ Vicky L. Murphy
 Director of Municipal Utilities Mar 31, 2011

Appendix B

2540-PM-BWM0347 6/2006



COMMONWEALTH OF PENNSYLVANIA
 DEPARTMENT OF ENVIRONMENTAL PROTECTION
 BUREAU OF WASTE MANAGEMENT

FORM 26R
 CHEMICAL ANALYSIS OF RESIDUAL WASTE
 ANNUAL REPORT BY THE GENERATOR

This form must be fully and accurately completed. All required information must be typed or legibly printed in the spaces provided. If additional space is necessary, identify each attached sheet as Form 26R, reference the item number and identify the date prepared. The data on attached sheets needs to match the date noted below.

RECEIVED
 Date Received & General Notes
 APR 14 2010

General Reference 287.54
 Date Prepared/Revised 03/01/2010

CLIENT (GENERATOR OF THE WASTE) INFORMATION

Company Name
 EOG Resources, Inc.
 If a Subsidiary, Name of Parent Company EPA Generator ID#

Company Mailing Address Line 1
 400 Southpoints Blvd.
 Company Mailing Address Line 2
 Plaza 1, Suite 300

Company Address Last Line - City State Zip+4 Phone Ext
 Canonsburg PA 15317 724-745-1102

Company Contact Last Name First Name MI Suffix
 Gary Smith L

Municipality County
 Canonsburg Washington

Contact Phone Ext Contact Email Address
 724-745-1102 gary.smith@eogresources.com

In the waste generated at the Company Mailing Address (noted above)? Yes No
 If 'No', describe location of waste generation and storage. Natural Gas Well Locations

Municipality County Clearfield/Ek-McKeen, Bradford State PA

Residual Waste Code	Residual Waste Code Description	Amount	Unit of Measure		Time Frame
801	Drilling Residuals	200	<input type="checkbox"/> cu yd	<input checked="" type="checkbox"/> gal	<input type="checkbox"/> One Time

a. pH Range 6 to 9 (based on analyses or knowledge)

b. Physical State Liquid Waste (EPA Method 8096) Solid (EPA Method 9006) Gas (ambient temperature & pressure)

c. Physical Appearance Color Black to Brown Odor None
 Number of Solid or Liquid Phases of Separation One
 Describe each phase of separation. Solid

a. The results of a detailed chemical characterization of the waste, as described in the instructions, is attached. Yes No

b. A detailed description of the waste sampling method is attached. Yes No

c. The quality assurance/quality control procedures employed by the laboratory(ies) is attached. Yes No

d. The results of the hazardous waste determination is attached. Yes No

e. If applicable, a detailed explanation supporting use of generator knowledge in lieu of actual chemical analysis is attached. Yes No N/A

3. PROCESS DESCRIPTION & SCHEMATIC ATTACHMENTS	
a.	A detailed description of the manufacturing and/or pollution control processes producing the waste, as specified in the instructions, is attached. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No
b.	A schematic of the manufacturing and/or pollution control processes producing the waste, as specified in the instructions, is attached. <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No
c.	If portions of the information submitted are confidential, the substantiation for a confidentiality claim, as described in the instructions, is attached. <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No <input type="checkbox"/> N/A
4. IDENTIFICATION OF RESIDUAL WASTE	
1. PROCESSING OR DISPOSAL FACILITY(IES)	
The area below (a.-d.) will accommodate the identification of two facilities. Attach additional sheets if necessary.	
a.	Solid waste permit number(s) for processing or disposal facility being utilized. PA0101243
b.	Facility Name Northern Tier Solid Waste Authority Address Line 1 P.O. Box 10 Address Line 1 Address City State ZIP Burlington PA 18814-0010 Municipality Burlington County Bradford
c.	Facility Contact Name Ronald Slingerland Title Foreman Phone 570-297-4177 Email Address ntswa@epx.net
d.	Volume of waste shipped to processing or disposal facility in the previous year. 225.94 <input type="checkbox"/> cu yd <input type="checkbox"/> gal <input type="checkbox"/> lb <input checked="" type="checkbox"/> ton (check one)
a.	Solid waste permit number(s) for processing or disposal facility being utilized. PA0103446
b.	Facility Name Veolia ES Greentree Landfill, LLC Address Line 1 635 Toby Road Address Line 1 Address City State ZIP Kersey PA 16846 Municipality Kersey County Elk
c.	Facility Contact Name Title Phone 814-265-1744 Email Address
d.	Volume of waste shipped to processing or disposal facility in the previous year. 11,107.89 <input type="checkbox"/> cu yd <input type="checkbox"/> gal <input type="checkbox"/> lb <input checked="" type="checkbox"/> ton (check one)
a.	Has the waste been approved for beneficial use? <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No If "Yes", list the general permit number or approval number.
b.	Volumes of waste beneficially used in the previous year. 0 <input type="checkbox"/> cu yd <input type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)

SECTION D. CERTIFICATION

I certify, under penalty of law, that I have personally examined and am familiar with the information submitted in this Annual Report and all attached documents and that based upon my inquiry of those individuals immediately responsible for obtaining the information, I verify that the submitted information is true, accurate and complete to the best of my knowledge. I understand that the submission of false information herein is made subject to the penalties of 18 Pa. C.S. §4904, relating to unsworn falsification to authorities, which include fine and imprisonment.

Check the following, if applicable.

I certify the information required in Section B-A, General Properties was supplied to the Department for the year _____ and has not changed.

Form Submitted: Form 26R
 Other (specify) _____

Date Submitted: _____

I certify the information required in Section B-B, Chemical Analysis was supplied to the Department for the year _____ and has not changed.

Form Submitted: Form 26R
 Other (specify) _____

Date Submitted: _____

I certify the information required in Section B-C, Process Description and Schematic, was supplied to the Department for the year _____ and has not changed.

Form Submitted: Form 26R
 Other (specify) _____

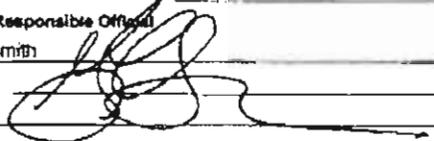
Date Submitted: _____

Name of Responsible Official

Gary L. Smith

Title Vice-President and General Manager

Signature



Date March 25, 2010

a. Solid waste permit number(s) for processing or disposal facility being utilized	
NY 0025968	
b. Facility Name	Canadaiquis WWTP
Address Line 1	
Address Line 2	
Address City State ZIP	
Municipality	County
c. Facility Contact Name	
Title	
Phone	Email Address
d. Volumes of waste shipped to processing or disposal facility in the previous year.	
177,000	<input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)

a. Solid waste permit number(s) for processing or disposal facility being utilized	
PA0101508	
b. Facility Name	Pennsylvania Brine Treatment - Franklin
Address Line 1	5148 Route 322
Address Line 2	
Address City State ZIP	Franklin PA 16323
Municipality	County Venango
c. Facility Contact Name	
Eton DeLong, Jr	
Title	
Operations Manager	
Phone	814-437-3593 Email Address
d. Volumes of waste shipped to processing or disposal facility in the previous year.	
4,838,644	<input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)

a. Solid waste permit number(s) for processing or disposal facility being utilized	
PA0095273	
b. Facility Name	Pennsylvania Brine Treatment - Josephine
Address Line 1	P.O. Box 296 Bells Mills Road
Address Line 2	
Address City State ZIP	Josephine PA 15750
Municipality	County Indiana
c. Facility Contact Name	
Eton DeLong, Jr	
Title	
Operations Manager	
Phone	724-248-1000 Email Address
d. Volumes of waste shipped to processing or disposal facility in the previous year.	
606,012	<input type="checkbox"/> cu yd <input checked="" type="checkbox"/> gal <input type="checkbox"/> lb <input type="checkbox"/> ton (check one)