

Name: Paul Mendelsohn
Email Address: paulm@cherryvalley.com
Title: Mr
Organization: Sustainable Otsego, Action Otsego
County: Otsego

You may be aware that the EPA has finally begun to test the drinking water aquifers of residents living alongside high volume, high pressure horizontal hydrofracking for gas, after reports of fouled water and health problems in several states. A couple of weeks ago, 11 out of 39 water wells tested in Pavilion, WY revealed dangerous levels of chemicals consistent with gas drilling. I'd like to talk for a moment about how the costs in health problems, real estate values and other business prospects are about to be externalized to all New Yorkers. Residents have routinely been told that no evidence of water contamination from drilling has ever been detected. No, no one can prove that our aquifers are contaminated. because chemicals we might test for remain classified information, as they're injected beneath the homes of those signing leases. and those neighbors forced to sign under compulsory integration. and everyone else living over an aquifer which is unmapped and undefined. (Please see additional notes for updated info from DEC FOIL request) Earlier estimates showing @ 70% of fluids to be reclaimed are now, according to an IOGA presentation last week in Oneonta, as low as 9%- the rest remaining below our aquifers, separated only by casings of concrete & steel- which will last for a few decades... but not indefinitely. We do not have facilities for the disposal of the millions of gallons of toxic fluids to be withdrawn. How can an industry that has promised such enormous sums of money to the state coffers be unable to limit their fracking additives to non-toxic, biodegradable formulas? Could they not make a profit if they revealed to local residents exactly what was pumped, at up to 8000 psi under our homes, with the defined goal creating many new passageways? Federal regulations, as of 2005 have exempted this industry alone- which is ironic, given the great fear trumpeted by Washington that some foreigner might try to slip a few gallons of some dangerous substance into our reservoirs. Today, we are required to accept chemicals in below our aquifers associated with cancer, endocrine disruptors, nerve agents and birth defects. (again, much more detail in DEC FOIL request) So we've been asked to put our faith in the regulations of the DEC, an agency already grossly understaffed and underfunded, clearly unable to provide, with 18 inspectors, enforcement of the regulations they're already got on the far simpler vertical wells. Industry lobbyists, again crying poverty successfully killed a severance tax on gas, which might have provided the necessary funds for this. Drillers do pay local taxes- based on figures self-reported by the industry. We've been assured that the kind of incidents we've seen in Pavilion, or Dimock PA, or Shreveport LA are only 2-3 % of frac jobs- and depend on the skill and the scruples of the individual driller. But even an accident rate of 2%... on the tens of thousands of wells proposed would still result in hundreds of problems for thousands of homeowners. Water, we are told, will be the "oil" of the 21st century. New York and the northeast are unique in our supply

Paul Mendelsohn
paul.m@cherryvalley.com

You may be aware that the EPA has finally begun to test the drinking water aquifers of residents living alongside high volume, high pressure horizontal hydrofracking for gas, after ^{many} reports of fouled water and health problems in several states. A couple of weeks ago, 11 out of 39 water wells tested in Pavilion, WY revealed dangerous levels of chemicals consistent with gas drilling. I'd like to talk for a moment about how the costs in health problems, real estate values and other business prospects are ~~about to be~~ ^{being} externalized to all New Yorkers.

Residents have routinely been told that no evidence of water contamination from drilling has ever been detected. No, no one can prove that our aquifers are contaminated... because chemicals we might test for remain classified information, as they're injected beneath the homes of those signing leases... and those neighbors forced to sign under compulsory integration... and everyone else living over an aquifer which is unmapped and undefined.

Earlier estimates showing @ 70% of fluids to be reclaimed are now as low as 9% - the rest remaining below our aquifers, separated only by casings of concrete & steel- which will last for a few decades... but not indefinitely. We do not have ^{adequate} facilities for the disposal of the millions of gallons of toxic fluids ~~to be~~ ^{that will} withdrawn.

How can an industry that has promised such enormous sums of money to the state coffers be unable to limit their fracking additives to non-toxic, biodegradable formulas? Could they not make a profit if they revealed to local residents exactly what was pumped, at up to 8000 psi under our homes, with the defined goal creating many new passageways?

Federal regulations, as of 2005 have exempted this industry alone- which is ironic, given the great fear trumpeted by Washington that some foreigner might try to slip a few gallons of some dangerous substance into our reservoirs. Today, we are required to accept chemicals ~~in~~ below our aquifers associated with cancer, endocrine disruptors, nerve agents and birth defects.

So we've been asked to put our faith in the regulations of the DEC, an agency already grossly understaffed and underfunded, clearly unable to provide, with 18 inspectors, enforcement of the regulations they're already got on the far simpler vertical wells. Industry lobbyists, again crying poverty successfully killed a severance tax on gas, which might have provided the necessary funds for this. Drillers do pay local taxes- based on figures self-reported by the industry. ^{Local gov't has been allowed no role.}

We've been assured that the kind of incidents we've seen in Pavilion, or Dimock PA, or Shreveport LA are only 2-3 % of frac jobs- and depend on the skill and the scruples of the individual driller. But even an accident rate of 2%... on the tens of thousands of wells proposed would still result in hundreds of problems for thousands of homeowners.

Water, we are told, will be the "oil" of the 21st century. New York and the northeast are unique in our supply of abundant, fresh water as this resource is steadily diminished by other man-made activities. We know that we will be depending on more localized food and tourists are steadily discovering the natural beauty of upstate NY. NYC has successfully fought drilling within a perimeter of their reservoirs. Will the rest of us, particularly those with private wells, be abandoned by our lawmakers?

Your scope includes health impacts, environmental justice, environmental impact and regulation of energy systems. In closing, I ask that you include the public costs to New Yorkers before tallying up the private profits which would temporarily swell the coffers of NYS.

W/o adequate accountability & required best practices, the banking industry made great deal of \$, but eventually cost all NYers dearly. We'll recover from that - but we will never recover from contaminated aquifers

W/o adequate accountability & required best practices, the banking industry made great deal of \$, but eventually cost all NYers dearly. We'll recover from that - but we will never recover from contaminated aquifers

Source: The Center

of abundant, fresh water as this resource is steadily diminished by other man-made activities. We know that we will be depending on more localized food and tourists are steadily discovering the natural beauty of upstate NY. NYC has successfully fought drilling within a perimeter of their reservoirs. Will the rest of us, particularly those with private wells, be abandoned by our lawmakers? Your scope includes health impacts, environmental justice, environmental impact and regulation of energy systems. In closing, I ask that you include the public costs to New Yorkers before tallying up the private profits which would temporarily swell the coffers of NYS. Without adequate accountability and required best practices, out banking industry made a great deal of money, then passed the costs off to the rest of us. but we will recover. If NY fails to demand accountability and best practices, thus allowing quick profits by contaminating our water, we will never recover.

I've recently found some of the non-proprietary fluids that will likely be pumped below my aquifer by way of compulsory integration. Wonder if you'd feel safe or would buy a home with such activity going on.

Paul Mendelsohn 238 Mill RD Cherry Valley, NY 13320

also available from:

<http://newyork.sierraclub.org/fingerlakes/gasinfo.html>

The Safety of Fracturing Fluids – A Quantitative Assessment

by Steve Coffman, member of the Committee to Preserve the Finger Lakes --
August 4, 2009

In response to a FOIL request to New York State's Department of Environmental Conservation, the Committee to Preserve the Finger Lakes received a list of 48 toxic substances (as defined by the DEC or EPA) permitted for use in hydraulic fracture drilling of gas wells in the Marcellus Shale formation in Yates, Schuyler, Steuben, Broome and Cortland Counties. The received materials came in the form of documents submitted by the drilling companies themselves: Material Safety Data Sheets (MSDS) and Company Drilling Data Sheets.

The Hazardous Materials Identification System was developed to help employers comply with OSHA standards. The MSDS documents have the Hazardous Materials Identification System (HMIS) ratings for most of the 48 products. Additionally, extensive data is presented for each product about its chemical composition.

Some of the products listed in the documents are antimicrobials, microbiocides, corrosion inhibitors, surfactants, hydrochloric acid, and liquid nitrogen. Very low doses of some of them can cause cancer, damage kidney and immune systems and affect reproductive development. Some of them are very harmful to plant and marine life. Many are highly flammable.

Gas drilling companies say they use such tiny amounts of chemicals in the drilling---of the million or so gallons of liquid pumped into a well, only one percent or so are chemicals, and that they are diluted beyond harmful levels. But on some fracturing sites that tiny percentage of one percent translates to 5,000 or more gallons of chemicals highly concentrated in a few acres.

Method

While all 48 products received from DEC are toxic to some degree, this analysis limits its scope to 34 materials that are highly toxic in one or more ways, or that have specific relevance to the drilling operations in Part II.

Part I describes these products in terms the toxic chemicals they contain, their use, precautions, decomposition dangers, and methods of disposal. [Numbered "NOTES" provide additional information on toxicity of certain chemicals within these described products.]

Part II describes the use of toxic chemicals, also information about water use and disposal, as reported from the 12 gas drilling operations that, according to DEC, have taken place in the Marcellus Shale formation in Yates, Schuyler, Steuben, Broome and Cortland Counties.

Part III provides a brief summary and poses some of the obvious questions prompted by this information.

Disclaimer: While several members of the Committee to Preserve the Finger Lakes have strong industrial engineering backgrounds, none of the members is a chemist, geologist or a gas drilling expert. The purpose here is not to present ultimate answers, but rather to pose important and necessary questions about the safety of these products; not only to the humans directly exposed to these materials, but also in the air and water of our region's environment. All of the information presented herein comes from the companies themselves, either from the DEC or from other Material Safety Data Sheets.

Note: The "Composition" of products refers only to listed toxic ingredients as supplied in company MSDS.

PART I -- HIGHLY HAZARDOUS PRODUCTS LISTED BY DEC FOR USE IN FRACKING FLUIDS IN YATES, SCHUYLER, STEUBEN, BROOME AND CORTLAND COUNTIES

1. **BIO CLEAR 200**

Composition: 2,2Dibromo-3-Nitrilopropionamide; Polyethelene Glycol Mixture.

Precautions: Corrosive. Will cause eye burns and permanent tissue damage. **Ingestion may be fatal.**

Decomposition: May include hazardous carbon dioxide, bromine, **cyanogen bromide**.

Highly toxic to aquatic organisms. Disposal in streams or sewers may be prohibited by Federal, State and Local laws.

Disposal: Consult local, state, federal agencies for acceptable procedures and locations.

<http://www.epa.gov/enviro/html/emci/chemref/10222012.html>

NOTE 1. Cyanogen bromide

May be fatal if swallowed, inhaled or absorbed through skin. Corrosive. Vapors cause severe irritation to eyes and respiratory tract. Causes burns to any area of contact. contact with acids liberates poisonous gas. Affects blood, cardiovascular system, central nervous system and thyroid. **Impure material may explode.**

Health Rating: 4 - Extreme (Poison); Reactivity Rating: 3 - Severe (Explosive); Contact Rating: 4 - Extreme (Corrosive) -- MSDS Number: C6600

2. **CL-14**

Composition: **Methanol, Propargyl alcohol**

Precautions: **Highly Flammable.** Toxic: may be absorbed through skin in harmful amounts. Inhalation of high levels of vapors may affect central nervous system or cause unconsciousness. Ingestion may be harmful. Chronic Overexposure can adversely affect liver, eyes, lungs brain and nervous system. **Probable human carcinogen.**

Decomposition: **Highly toxic gases may be generated by thermal decomposition or combustion.** Vapors may form explosive mixture with air. Decomposition may create hazardous amounts of carbon dioxide and carbon monoxide.

Disposal: According to RCRA Hazardous Waste Code D001 (ignitable waste).

NOTE 2. Methanol

Methanol is released to the environment during industrial uses and naturally from volcanic gases, vegetation, and microbes. Exposure may occur from ambient air and during the use of solvents. Acute (short-term) or chronic (long-term) exposure of humans to methanol by inhalation or ingestion may result in blurred vision, headache, dizziness, and nausea. No information is available on the reproductive, developmental, or carcinogenic effects of methanol in humans. **Birth defects have been observed in the offspring of rats and mice exposed to methanol by inhalation.** EPA has not classified methanol with respect to carcinogenicity.

<http://www.epa.gov/ttn/atw/hlthef/methanol.html>

NOTE 3. Propargyl alcohol

Flammable, potentially explosive. The substance may be toxic to blood, kidneys, liver, brain, cardiovascular system, upper respiratory tract, skin, central nervous system.

Repeated or prolonged exposure to the substance can produce target organs damage. Prolonged contact with spray mist may produce chronic eye irritation and severe skin irritation, respiratory tract irritation leading to frequent attacks of bronchial infection, general deterioration of health by an accumulation in one or many organs.

http://www.sciencelab.com/xMSDS-Propargyl_Alcohol-9924728

3. **CORROSION INHIBITOR A261**

Composition: **Aromatic keytones, Aliphatic alcohol polyglycol ether, Methanol, Aliphatic acid, Prop-2-yn-1-ol, Aromatic hydrocarbon, Formaldehyde, Propan-2-ol**

Precautions: **Highly Flammable. Corrosive.** Eye contact may cause permanent damage or blindness, Skin contact may cause tissue damage and cause illness. Inhalation may cause illness. Ingestion causes severe pain, burns, swelling, may cause illness. Probable human carcinogen. **Toxic to aquatic organisms.**

Decomposition: When heated or burned creates oxides of carbon and sulfur, harmful organic chemical fumes.

Disposal: By injection or other acceptable method in accordance with local regulations.

NOTE 4. Aromatic ketones

Several ketones and aldehydes have been classified as known or likely carcinogens. Aldehydes and ketones are widely used industrial chemicals both as solvents and as chemical intermediates (ingredients for other chemicals). Most can be classified as volatile organic compounds meaning that their vapors may be easily inhaled or ignited. <http://www.ilpi.com/msds/ref/ketone.html>

NOTE 5. Prop-2-yn-1-ol

Because dermal lethality data in rabbits indicate that prop-2-yn-1-ol is readily absorbed through the skin, a skin notation is recommended. <http://toxnet.nlm.nih.gov/cgi-bin/sis/search/r?dbs+hsdb:@term+@rn+@rel+107-19-7>

NOTE 6. Formaldehyde

Studies have shown that even low levels of formaldehyde can have health effects. Low levels of exposure can irritate the eyes, nose and throat, cause skin problems, serious breathing problems and can increase risk of certain kinds of cancer. **OSHA regulates formaldehyde as a cancer-causing substance.** (NYCOSH) http://www.nycosh.org/workplace_hazards/formal.html

NOTE 7. Propan-2-ol

Causes respiratory tract, eye and skin irritation. contains material which causes damage to the following organs: respiratory tract, skin, central nervous system, eye, lens or cornea. Flammable liquid and vapor. **Vapor may cause flash fire.** (MSDS) http://nanosafeguard.com/images/msds/Marine_Sealing_Component2_msds.pdf

NOTE 8. Aromatic hydrocarbons

U.S. Public Health Service statement "How can polycyclic aromatic hydrocarbons [PAHs] affect my health?"-- PAHs can be harmful to your health under some circumstances. Several of the **PAHs . . . have caused tumors in laboratory animals when they breathed these substances in the air, when they ate them, or when they had long periods of skin contact with them.** Studies of people show that individuals exposed by breathing or skin contact for long periods to mixtures that contain PAHs and other compounds can also develop cancer. **Mice fed high levels of benzo[a]pyrene during pregnancy had difficulty reproducing and so did their offspring.** <http://www.atsdr.cdc.gov/toxprofiles/tp69.pdf>

4. FAW-5

Composition: **2-butoxyethanol, Methanol, Ethyl alcohol, Aqueous ammonia**

Precautions: **Combustible hazard.** May be absorbed through skin in toxic amounts. **Inhalation may cause collapse, unconsciousness, even death.** Ingestion may cause blindness, mental confusion, stupor. Chronic overexposure may damage liver, kidneys, eyes, lungs and central nervous system. **May be teratogenic and fetotoxic.**

Thermal decomposition or combustion may produce carbon monoxide, carbon dioxide.

Disposal: **According to RCRA* Hazardous Waste Code D001 (ignitable waste).** [*RCRA -- Resource Conservation Recovery Act]

NOTE 9. 2-butoxyethanol

(CCOHS) Emergency overview: **Combustible liquid and vapor. Very toxic. Fatal if inhaled.** Harmful if absorbed through the skin. Central nervous system depressant. Causes severe eye and skin irritation. <http://www.atsdr.cdc.gov/toxprofiles/phs118.html>

NOTE 10. Aqueous ammonia

Corrosive alkaline solution. Causes burns to any area of contact. Harmful if swallowed, inhaled or absorbed through skin. **Inhalation may be fatal** as a result of spasm inflammation and edema of the larynx and bronchi, chemical pneumonitis and pulmonary edema. **May be absorbed through the skin with possible systemic effects. Eye Contact can cause temporary or permanent blindness.** Prolonged or repeated skin exposure may cause dermatitis. Prolonged or repeated exposure may cause eye, liver, kidney, or lung damage. **Health Rating: 4 - extreme (poison) Contact Rating: 3 - severe (corrosive)** <http://www.jtbaker.com/msds/englishhtml/A5472.htm>

[Methanol -- See Note 2.]

5. **FDP-S819-05**

Composition: **Sodium perborate tetrahydrate**

Precautions: Skin disorders, lung disorders, eye ailments; prolonged exposure may cause gastrointestinal effects and muscular dysfunction.

Accidental release: **Prevent from entering sewers or, waterways or low areas.**

Disposal: In accordance with local, state, federal regulations.

NOTE 11. Sodium perborate tetrahydrate

(MSDS English) Harmful if swallowed, inhaled or absorbed through skin. causes irritation to skin, eyes and respiratory tract. Health Rating: 3 - Severe Contact Rating: 3 - Severe MSDS #S4634
<http://www.jtbaker.com/msds/englishhtml/S4634.htm>

Inhalation: May be caustic to nasal and lung tissues. Ingestion: **May cause convulsions, collapse, coma, and death.** Skin Contact: Absorption of large amounts may cause symptoms similar to those of ingestion. Eye Contact may cause corrosion.

6. **FE-1A**

Composition: Acetic Acid; Acetic anhydride

Precautions: Contact with skin or eyes causes severe burns. **Inhalation causes severe respiratory irritation.** Ingestion causes burns to mouth, throat and stomach. **Prolonged exposure may cause erosion of the teeth.**

Decomposition products: **Toxic gases and vapors** (such as carbon dioxide, carbon monoxide, various hydrocarbons, and acid aerosols) may be released when acetic anhydride is heated or decomposes.

Accidental spills: **Prevent from entering sewers, waterways, or low areas.**

Disposal: In accordance with federal, state and local regulations.

<http://www.osha.gov/SLTC/healthguidelines/aceticanhydride/recognition.html>

7. **FLOMAX 50 MSDS**

Composition: Secondary alcohol, proprietary, proprietary.

Precautions: **Extremely flammable & Explosion hazard**
Can cause permanent eye damage if not removed promptly. Ingestion harmful.

Disposal Method: Recycle if possible, otherwise use licensed disposal contractor.

8. **FLOMAX 50 UWS** -- Same as #7.

9. **GAS PERM 1000**

Composition: **Isopropanol**

Precautions: **Highly flammable.** Inhalation or ingestion may cause central nervous system depression, unconsciousness. May be absorbed through the skin. May cause severe eye ailments. Overexposure may affect liver and kidneys.

Decomposition: **In fire may produce toxic gases.**

Disposal: In accordance with federal, state, and local regulations.

<http://www.techni-tool.com/content/resources/MSDS/754CH122.pdf>

NOTE 12. Isopropanol: Inhalation can cause ulceration of the respiratory tract with bronchitis, pneumonia, palpitations, dental erosion, cyanosis, asphyxiation, gastric hemorrhage, and death. **Absorption through skin can cause similar effects to inhalation.** Ingestion can cause stomach and esophageal perforation, circulatory collapse leading to renal, liver, or heart failure. **Ecological Information:** No information found. **Vapors hazardous in drains, sewers, low level enclosures or wells.** MSDS Feb. 21, 1998 <http://www.labchem.net/msds/75222.pdf>

Decomposition Products: Carbon Monoxide, Carbon dioxide, possibly HF, other organic compounds. **Spill Procedures: Avoid inhalation, touching, ignition sources. Contain spill from entering waterways.** Disposal: according to RCRA Hazardous Waste Code D001 (ignitable waste).

10. HAI-OS ACID INHIBITOR

Composition: **Methanol, Propargyl alcohol**

Precautions: **Highly flammable.** May be absorbed through skin. May cause eye damage. Inhalation may cause chemical pneumonia, depress central nervous system, cause unconsciousness. **Ingestion may cause blindness or death.** Prolonged exposure may damage eyes, blood, liver, kidneys, nervous system, spleen. **Acute fish toxicity, may cause long-term adverse effects in aquatic environment.**

Accidental Release: Prevent for entering sewers, waterways, low areas.

Disposal: In accordance with federal, state, and local regulations.

[Methanol, Propargyl alcohol, see Notes 2 and 3.]

11. HC-2

Composition: Sodium chloride, Inner salt of alkyl amines

Precautions: May cause severe eye irritation, corneal damage

Accidental Release: **Prevent for entering sewers, waterways, low areas.**

Disposal: In accordance with federal, state, and local regulations.

12. HYDROCHLORIC ACID 15% DTC-Canada

Precautions: May burn skin, eyes, respiratory system.

Disposal Method: Injection or other acceptable method according to local regulations.

13. HYDROCHLORIC ACID 15% H15 STC-USA -- Same as #12

14. HYDROCHLORIC ACID [30 - 60%]

Precautions: May burn skin, eyes, respiratory system.

Accidental Release: **Prevent from entering sewers, waterways, low areas.**

Disposal Method: In accordance with federal, state, and local regulations.

15. INFLO-102

Composition: **Methanol, 2-butoxyethanol, Isopropanol**

Precautions: **Highly Flammable. Skin absorption may cause systemic poisoning;** vapors irritate eyes. Inhalation may cause respiratory irritation, unconsciousness. Prolonged concentrated exposure can cause unconsciousness and death; **ingestion of 100-200 mls can be fatal.**

Decomposition Products: Carbon Monoxide, Carbon dioxide, possibly HF, other organic compounds.

Spill Procedures: **Avoid inhalation, touching, ignition sources. Contain spill from entering waterways.**

Disposal: According to RCRA Hazardous Waste Code D001 (ignitable waste).

[Methanol, 2-butoxyethanol, Isopropanol, see notes 2, 9 and 12.]

16. MULTIFUNCTIONAL SURFACTANT F105

Composition: Polyethoxylated alkanol, **2butoxyethanol, Butan-1-ol**

Precautions: **Highly combustible.** Hazardous to skin, eyes; inhalation can cause CNS-depression, narcosis. Ingestion may cause defects to central nervous system.

Accidental release: **Keep out of sewage and waterways. Toxic to aquatic organisms.**

Disposal Method: Injection or other acceptable method in accordance with local regulations.

NOTE 13. Butan-1-ol (CAS# 71-36-3)

Flammable liquid and vapor. May cause adverse reproductive effects based upon animal studies. May be harmful if absorbed through the skin. Ecological Information: Data not yet available.

Decomposition products: toxic fumes of carbon monoxide, carbon dioxide. **Butanol should not bind strongly to soil and so is expected to leach into groundwater.**

Disposal: **RCRA U-Series::** waste number U031 (Ignitable waste).

<http://avogadro.chem.iastate.edu/MSDS/1-butanol.htm>

[2butoxyethanol -- see Note 9.]

17. NITROGEN REFRIGERATED LIQUID

Composition: Formula N₂ -- CAS: 7727-37-9 (Nitrogen (acetaldehyde))

Precautions: May cause tissue freezing. Inhalation may affect mental and physical capacities. **Prolonged inhalation may lead to convulsions, coma and death.**

Accidental Release: Evacuate all personnel from affected area.

Disposal: Do not attempt to dispose of residual waste. Return in shipping container.

18. SANDWEDGE WF

Composition: **Methanol, Isopropanol**

Precautions: **Highly Flammable.** May be absorbed through skin. May damage eye tissue. Inhalation may cause respiratory irritation, unconsciousness. **Ingestion may cause convulsions, blindness, death.** Prolonged exposure may damage eyes, liver, kidneys, blood, heart, nervous system, spleen.

Accidental Release: **Prevent from entering sewers, waterways, low areas.**

Disposal: In accordance with federal, state, and local regulations.

[Methanol and Isopropanol -- see Notes 2 and 12.]

19. TEMPORARY CLAY STABILIZER L64

Composition: **Tetramethylammonium chloride**

Precautions: Contact harmful to skin and eyes. Avoid inhaling. **Ingestion may cause death.**

Decomposition: **Heating or burning will release harmful carbon/nitrogen oxides, ammonia and organic chemical fumes.**

Disposal: Injection or other acceptable method in accordance with local regulations.

http://www.sciencelab.com/xMSDS-Tetramethylammonium_chloride-9925214

20: MAGNACIDE 575

Composition: phosphonium, tetrakis(hydroxymethyl)-,sulfate

Precautions: **Toxic to aquatic organisms, may cause adverse effects in the aquatic environment.** (MSDS Japan) http://www.nippon-chem.com/msds/msds_thps.pdf]

21. SCALHEHIB 100

Composition: **Ethylene Glycol**

Precautions: **Flammable and combustible.** Absorbed through skin. **Mutagenic for mammalian somatic cells.** May cause damage to the following organs: kidneys, liver, central nervous system.

Decomposition: Explosive decomposition may occur if combined with strong acids or strong bases and subjected to elevated temperatures. This product may release **Formaldehyde**

Disposal: **Prevent entry into sewers, basements or confined areas.** Waste must be disposed of in accordance with federal, state and local environmental control regulations. http://www.sciencelab.com/xMSDS-Ethylene_glycol-9927167

22. ACTIVATOR 78-ACTW

Composition: **C12-14 Secondary alcohol, Ethoxylated; Methanol**

Precautions: **Liquid or vapor may cause a flash fire or ignite explosively. Ingestion may cause blindness.** Inhalation can irritate lungs, cause central nervous system depression. May be absorbed through skin. Ecological information not determined.

Disposal: Recover free liquid. Absorb residue and dispose according to local, state and federal requirements. Empty container. Since empty containers retain waste residue, follow warnings even after container is empty. **DO NOT drill, grind, puncture or weld on or nearby.**

Decomposition: **Hazardous oxides of carbon.** This produce may release **Formaldehyde.**

NOTE 14. C12-14 Secondary alcohol, Ethoxylated

May cause severe burns.

Spills: **Avoid uncontrolled releases of this material.** Where spills are possible a comprehensive spill response plan should be developed and implemented.

Disposal: All recovered material should be packaged, labeled, transported, and disposed or reclaimed in conformance with applicable laws and regulations and in conformance with good engineering practices. **Avoid landfilling of liquids.**
<http://www.anatrace.com/msds/APO138.pdf>

[Methanol, Formaldehyde, Ethoxylated alcohol -- see Notes 2 and 6, 14.]

23. BORATE CROSSLINKER J532 (CAS: 1303-96-4)

Composition: **Aliphatic alcohol; Sodium tetraborate decahydrate.**

Precautions: **MSDS: "Caution! The toxicological properties of this material have not been fully investigated." Mutagenic effect observed in insect studies. Reproductive toxicity on laboratory animals.**

Disposal: By injection or other acceptable method in accordance with local regulations.

NOTE 15: Sodium tetraborate decahydrate. May impair fertility. May cause harm to the unborn child. Ingestion: Human fatalities reported from acute poisoning. Chronic exposure may cause reproductive disorders and teratogenic effects.

Decomposition: **Hazardous oxides of boron.**

http://research.amnh.org/molecular/histology_lab_msds/histology_msds/sodium_tetraborate_decahydrate.pdf

NOTE 16: ALIPHATIC ALCOHOL

Precautions: **Flammable. May cause flash fire.** Harmful if inhaled or swallowed. May be absorbed through the skin.

Disposal: **Avoid dispersal of spilled material and runoff and contact with soil, waterways, drains and sewers.**

http://vpracingfuels.com/PDF/MSDS_LC6_Sep08.pdf

24. FERROTROL 300L

Composition: Citric Acid

Precautions: Irritant to eyes, skin, mucous membranes and respiratory system. Acute fish toxicity; pH will decrease in water close to the discharge and can have local effects on water living organisms.

(English MSDS, manufactured by BP Drilling Chemicals)

<http://logichem.netpower.no/datasheet.aspx?id=31628&iDepId=5523>

Spills: Prevent from entering sewers or waterways.

Disposal: In accordance with federal and local regulations.

25. BC-140

Composition: Monoethanolamine, Ethylene glycol, Boric acid

Precautions: Corrosive. May cause eye ailments; skin, liver and kidney disorders. Ingestion may be harmful to heart, kidney, brain. Prolonged or repeated exposure may cause embryo or fetus toxicity. Ecological information not determined.

Decomposition: Toxic fumes. Carbon monoxide and carbon dioxide.

Disposal: In accordance with federal, state and local regulations.

26. ALDACIDE G

Composition: Glutaraldehyde

Precautions: Harmful if inhaled. May be absorbed through skin. May cause permanent eye damage. Aspiration into lungs may cause chemical pneumonia, which can be fatal. May be highly toxic to aquatic life. (MSDS Sheet, July 5, 2006).

Decomposition: Carbon monoxide and carbon dioxide.

Disposal: In accordance with federal and local regulations.

27. FE-5A

Composition: Thioglycolic acid

Precautions: May cause severe skin and respiratory burns. May be absorbed through skin. Ingestion may cause severe burns, dyspnea and coma.

Spills: Prevent from entering sewers, waterways or low areas.

Decomposition: May produce Hydrogen sulfide. Oxides or sulfur. Carbon monoxide and carbon dioxide.

Disposal: In accordance with federal and local regulations.

28. LP-65

Composition: Ammonium chloride

Precautions: Causes irritation to skin, eyes and respiratory tract. Harmful if swallowed or inhaled. Ecological information not determined.

Spills: Prevent from entering sewers, waterways or low areas.

Decomposition: Hydrogen chloride. Oxides of nitrogen. Ammonia. Carbon monoxide and carbon dioxide.

Disposal: In accordance with federal, state and local regulations.

29. LGC-35 CBM

Composition: Paraffinic solvent; Polysaccharide

Precautions: Combustible. Inhalation may cause respiratory irritation or chemical pneumonia, which can be fatal. Ingestion may be fatal. Chronic exposure may be carcinogenic. Ecological information not determined.

Decomposition: Carbon monoxide and carbon dioxide.

Disposal: In accordance with federal and local regulations.

30. FR-46

Composition: Ammonium bisulfate

Precautions: Corrosive. Chronic effect may cause damage to lungs, mucous membranes. Extremely hazardous in case of skin contact or ingestion.

Hazardous in case of eye contact or inhalation. Ecological information not determined.

http://www.sciencelab.com/xMSDS-Ammonium_bisulfate-9922913

Spills: Prevent from entering sewers, waterways or low areas.

Decomposition: Carbon monoxide and carbon dioxide, Oxides of nitrogen

Disposal: In accordance with federal and local regulations.

31. BE-3S

Composition: 2-Monobromo-3-nitrilopropionamide; 2,2Dibromo-3-nitrilopropionamide

Precautions: Flammable. Causes severe respiratory irritation Vapors cyanogen bromide (see Note 1) and dibromoacetylnitrile may form ion the drum head space. Causes severe skin and eye irritation. May be toxic to aquatic life.

Spills: Prevent from entering sewers, waterways or low areas.

Decomposition: Oxides of nitrogen, Bromide; Hydrogen bromide; Methyl and ethyl bromide; Cyanogen bromide; Hydrogen cyanide; Carbon monoxide and c