



**Public Service
of New Hampshire**

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The Northeast Utilities System

Linda T. Landis
Senior Counsel

December 8, 2010

BY OVERNIGHT MAIL

Mr. Stephen Perkins
Office of Ecosystem Protection
U.S. Environmental Protection Agency
5 Post Office Square
Boston, MA 02109-3912

**Re: Public Service Company of New Hampshire
Merrimack Station, Bow, New Hampshire, NPDES Permit No. NH000465
Response to Information Request, CONFIDENTIAL BUSINESS INFORMATION**

Dear Mr. Perkins:

Public Service Company of New Hampshire (“PSNH”), in response to the United States Environmental Protection Agency’s (“EPA”) Supplemental Section 308 Request for Information, is providing certain information (see attached Responses 5 and 9) that requires treatment as Confidential Business Information (“CBI”). The CBI herewith provided to EPA is exempt from disclosure under Exemption 4 of the Freedom of Information Act (“FOIA”) (5 U.S.C. 552(b)(4)). In addition, PSNH is required by contract to seek confidential treatment for the vendor-proprietary information that comprises Responses 5 and 9. As a result, PSNH is submitting these documents under separate cover and appropriately labeled as required by EPA regulations (40 C.F.R. §§2.201-2.301) and other federal law.

FOIA Exemption 4 covers two broad categories of information: (1) trade secrets; and (2) information that is (a) commercial or financial, and (b) obtained from a person, and (c) privileged and confidential. 5 U.S.C. §552(b)(4). The information at issue, Responses 5 and 9, falls within the second category of Exemption 4 pertaining to confidential commercial and technical information.

FOIA Exemption 4 is specifically designed for situations like this where entities that are required to furnish commercial¹ or financial information to the government are protected against the

¹ As described further herein, courts have routinely interpreted “commercial” information to include technical information.

competitive disadvantages that could result from disclosure.² As a general matter, courts interpret “commercial or financial” information broadly and find that information falls in this category if it relates to business or trade.³ Proprietary technical designs and specifications, including engineering plans (such as Response 5), are commercial information within the meaning of FOIA Exemption 4.⁴ Proprietary technical data (such as Response 9) or designs are also exempt from disclosure where the release of such information could “seriously undermine a company’s competitive advantage by allowing competitors to have access to ideas and design details that they would not have had or would have had to spend considerable funds to develop on their own.”⁵ In relevant FOIA decisions adjudicated by the Department of Energy, the agency has held that technical information is exempt from mandatory FOIA disclosure.⁶ FOIA Exemption 4 has been applied where the requested documents contained “technical information” regarding a project.⁷ Such information is contained in both Responses 5 and 9 (a detailed process diagram in Response 5 and vendor-proprietary information in Response 9).

² *National Parks & Conservation Ass’n v. Morton*, 498 F.2d 765, 768 (D.C. Cir. 1974); *see also*, Attorney General’s Memorandum to All Federal Departments and Agencies Regarding the Freedom of Information Act (Oct. 12, 2001) (recognizing fundamental societal value of protecting sensitive business information). The exemption encourages submitters to furnish useful commercial or financial information to the government and provides the government with an assurance that required submissions will be reliable. *Critical Mass Energy Project v. NRC*, 975 F.2d 871, 878 (D.C. Cir. 1992).

³ *Dow Jones Co. v. FERC*, 219 F.R.D 167, 176 (C.D. Cal. 2002) (finding commercial or financial information relating to “business decisions and practices regarding the sale of power, and the operation and maintenance” of generators); *Merit Energy Co. v. U.S. Dep’t of Interior*, 180 F. Supp. 2d 1184, 1188 (D. Colo. 2001) (finding commercial or financial information relating to “information regarding oil and gas leases, prices, quantities and reserves”); *RMS Indus. v. DOD*, No. C-92-1545, slip op. at 3, 6 (N.D. Cal. 1992) (finding commercial or financial information relating to “interim pricing, type and quality of machines owned and names and background of key employees and suppliers”); *Pub. Citizen Health Research Group v. FDA*, 704 F.2d 1280, 1290 (D.C. Cir. 1983) (“[R]ecords are commercial so long as the submitter has a ‘commercial interest’ in them”).

⁴ *Landfair*, 645 F.Supp. at 327 (D.D.C. 1986) (citing *Washington Post Co. v. HHS*, 690 F.2d 252, 266 (D.C.Cir.1982)). In *Landfair*, the plaintiff sought documents which contained technical information regarding the design and performance of a hydraulic turbine in use at the Chief Joseph Dam in Washington State. *Id.* at 326-27. The court found that the information included “business sales statistics, research data, technical designs, overhead and operating costs, and information on financial condition” and held that the documents containing this information are exempt from disclosure under FOIA. *Id.*

⁵ *SMS Data Products Group, Inc. v. U.S. Dept. of Air Force*, 1989 WL 201031, 3 (D.D.C., 1989).

⁶ *See* DOE, TFA-0205, pg 5 (2007); DOE, TFA-0120, pg 4-5 (2006); DOE, TFA-0077, pg 2 (2005).

⁷ *See* DOE, TFA-0205, pg 5 (2007); *see also* DOE, TFA-0120, pg 4-5 (2006); DOE, TFA-0077, pg 2 (2005). In TFA-0205, the DOE held that the documents in question satisfied the elements of Exemption 4, including the competitive harm prong, because “[t]he technical information is of a confidential nature,” and is “unique to the submitter.” *Id.*

As a general matter we note that one significant factor in assessing whether information is considered confidential is whether its release would result in substantial competitive injury.⁸ To meet this test, a competitive injury need not be “certain” to result from disclosure, rather it is sufficient if such harm is “likely.”⁹ A “competitive injury” is one “flowing from the affirmative use of proprietary information by competitors.”¹⁰ If technical designs and schematics unique to PSNH’s proposed wastewater treatment facility were publicly available, competitor energy suppliers or vendors would be able to access such information without expending any money on research and development and equipment testing.

The scope of Exemption 4 is also sufficiently broad to encompass financial and commercial information concerning a third party and protection is therefore available regardless of whether information pertains directly to the commercial interests of the party that provided it, as is typically the case, or pertains to the commercial interests of another.¹¹

The term “confidential” protects governmental and private interests in accordance with the following two-part test:

To summarize, commercial or financial matter is “confidential” for purposes of the exemption if disclosure of the information is likely to have either of the following effects: (1) to impair the Government’s ability to obtain necessary information in the future; or (2) to cause substantial harm to the competitive position of the person from whom the information was obtained.¹²

Release of the information at issue here would both chill government efforts to secure such information in the future and would certainly cause substantial harm to PSNH’s competitive position, and the positions of our vendors, as well as negatively impact PSNH customer costs.

Additionally, PSNH is contractually bound to ensure the confidentiality of certain vendor-specific information as in Responses 5 and 9. If that information were released, it would likely cause significant harm to PSNH and adversely impact customer costs. The release of the data could potentially result in breach of contract claims which PSNH would have to defend and for which PSNH would face damages. In addition, it would be extremely difficult going forward to attract quality vendors to bid on necessary maintenance and construction activities if such information were to become public and available to competitors.

⁸ *Customs & Intern. Trade Newsletter v. U.S. Customs and Border Protection*, 588 F.Supp.2d 51, 55 (D.D.C. 2008) (citing *CNA Fin. Corp. v. Donovan*, 830 F.2d 1132, 1152 (D.C.Cir. 1987); *Lion Raisins v. U.S. Dept. of Agriculture*, 354 F.3d 1072, 1079 (9th Cir. 2004).

⁹ *Boeing Co. v. U.S. Dept. of Air Force*, 616 F.Supp.2d 40, 45 (D.D.C. 2009).

¹⁰ *Customs*, 588 F.Supp.2d at 55.

¹¹ *Bd. of Trade v. Commodity Futures Trading Comm’n*, 627 F.2d 392, 405 (D.C. Cir. 1980) (holding that the “plain language” of Exemption 4 does not in any way suggest that the requested information must relate to the affairs of the provider).

¹² *National Parks*, 498 F.2d at 770.

PSNH has not disclosed the information we claim as confidential to any other party. As a company, we have taken every conceivable measure to protect the information at issue. In accordance with company policy, confidential business information is segregated, distribution and access is limited, and the information may not be copied. PSNH has and will continue to maintain the information in Responses 5 and 9 as confidential. In the event that any of this information is disclosed to the public, PSNH and/or parties with whom PSNH has contractual and other relationships will suffer substantial harm, including harm to their competitive positions.

We appreciate EPA's consideration of our request to treat the enclosed information as confidential. Please call me if you would like to discuss further or require additional substantiation of our confidentiality claim.

Yours truly,



Linda T. Landis
Senior Counsel

cc: David Webster, EPA
Mark Stein, Esq., EPA
William H. Smagula, PSNH
Elizabeth Tillotson, PSNH
Allan Palmer, PSNH
Elizabeth F. Mason, Esq.

SCU MEDIA MATERIAL SAFETY DATA SHEET (MSDS)

Material Safety Data Sheet

SECTION 1 – CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Type: Water Treatment Media

Product Names: SCU

Chemical Family: Proprietary

Manufacturer's Name: Siemens Water Technologies Corp.

Address: 2430 Rose Place, Roseville, MN 55113

Product/Technical Information Phone Number: (651) 638-1300

Medical/Handling Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day every day

Transportation Emergency Phone Number: Call CHEMTREC at (800) 424-9300
24 hours a day every day

Issue Date/Revision Number: December 2009 / Original

SECTION 2 – COMPOSITION INFORMATION

<u>Chemical Name</u>	<u>Percent by Weight</u>	<u>CAS#</u>
Proprietary	100	Proprietary

SECTION 3 – HAZARDS IDENTIFICATION

Appearance & Odor: Granular or powdered black solid

Emergency Overview:

- ♦ May cause eye irritation due to mechanical abrasion
- ♦ Spills make the floor slippery

Fire & Explosion Hazards: This material will smolder if ignited or heated to red heat. May form explosive dust concentrations in air.

Primary Route(s) of Exposure: Eye or skin contact

Inhalation – Acute Effects: Large quantities of dusts may irritate the respiratory tract.

Skin Contact – Acute Effects: No adverse effects are expected from brief skin contact.

Eye Contact – Acute Effects: The dusts may cause eye irritation, redness, and moderate corneal injury due to mechanical abrasion. The effects are likely to heal.

Ingestion – Acute Effects: Single dose oral toxicity is considered to be low. No hazards anticipated from swallowing small amounts incidental to normal handling operation. Swallowing large amounts may cause irritation to the gastrointestinal tract.

CONFIDENTIAL

Material Safety Data Sheet

SECTION 4 – FIRST AID MEASURES

Inhalation First Aid: Remove affected person from area to fresh air. Give artificial respiration ONLY if breathing has stopped and give CPR ONLY if there is no breathing and no pulse. Obtain medical attention.

Skin Contact First Aid: Immediately remove clothing from affected and wash skin vigorously with flowing water. Clothing should be washed before reuse. Seek medical attention if irritation develops.

Eye Contact First Aid: Immediately irrigate eyes with flowing water continuously for 15 minutes while holding eyes open. Contacts should be removed before or during flushing. Obtain medical attention.

Ingestion First Aid: No adverse effects anticipated by this route of exposure incidental to proper industrial handling. If ingestion does occur, if victim is alert and not convulsing rinse mouth with water and give plenty of water to drink. If spontaneous vomiting occurs, have affected person lean forward with head down to avoid breathing in of vomitus. Rinse mouth again and give more water to drink. Obtain medical attention.

Medical Conditions Aggravated: Breathing large quantities of this material may aggravate chronic asthma and other pulmonary diseases.

Note to Physician: No specific antidote. Supportive care. Treatment based on judgment of the physician in response to reactions of the patient.

SECTION 5 – FIRE FIGHTING MEASURES

Flash Point/Method: Not applicable.

Extinguishing Media: Water, carbon dioxide, dry chemical

Fire Fighting Procedures: Keep people away. Isolate fire area and deny unnecessary entry. Cool surrounding area with water to localize fire zone. Soak thoroughly with water to cool and prevent reignition.

Use NIOSH approved positive-pressure self-contained breathing apparatus (SCBA) and protective fire fighting clothing (includes fire fighting helmet, coat, pants, boots and gloves). If protective equipment is not available or not used, fight fire from a protected location or a safe distance.

Fire & Explosion Hazards: This material will smolder if ignited or heated to red heat. Carbon monoxide gas may be formed if this material is ignited under low oxygen conditions. Dusts at sufficient concentrations may form explosive mixtures in air.

Hazardous Products of Decomposition and/or Combustion: May include carbon monoxide and carbon dioxide.

NFPA Ratings:

HEALTH - 1 FLAMMABILITY - 1 REACTIVITY - 0

Material Safety Data Sheet

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

Cleanup: Clean up floor area. Sweep up.

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations.

Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

SECTION 7 – HANDLING AND STORAGE

Handling: Practice reasonable care and caution. Avoid dust cloud formation and control ignition sources.

Storage: Keep containers tightly closed when not in use. Store between 35° - 100°F.

General Comments: Containers of this material may be hazardous when empty since they retain product residues (dust, solids); observe all warnings and precautions listed for the product.

SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROL

Respiratory Protection: Wear a NIOSH-approved half-face respirator equipped with dust cartridges if use conditions generate dusts.

Skin Protection: Wear gloves impervious to this material to prevent skin contact.

Eye Protection: Wear safety glasses. Wear chemical goggles if product contact is likely. Do not wear contact lenses while working with this product.

Ventilation Protection: Provide local exhaust ventilation if use conditions generate dusts.

Other Protection: Never eat, drink, or smoke in work areas. Practice good personal hygiene after using this material, especially before eating, drinking, smoking, using the toilet, or applying cosmetics.

Safety showers, with quick opening valves which stay open, and eye wash fountains, or other means of washing the eyes with a gentle flow of cool to tepid tap water, should be readily available in all areas where this material is handled or stored. Water should be supplied through insulated and heat-traced lines to prevent freeze-ups in cold weather.

Material Safety Data Sheet

Exposure Limits:

Exposure limits have not been developed for this product.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Granular or powdered black solid.

Density: 35 – 45 lb / ft³ **Solubility in Water:** Insoluble

pH: 8.5 – 12 (aqueous solution)

SECTION 10 – STABILITY AND REACTIVITY

Stability: Stable under normal handling and storage conditions.

Incompatibilities: Avoid contact with strong mineral acids.

Polymerization: Hazardous polymerization cannot occur.

Decomposition: May liberate carbon monoxide and hydrogen sulfide gasses upon contact with strong mineral acids.

Conditions to Avoid: None known.

SECTION 11 – TOXICOLOGICAL INFORMATION

No information found relating to normal routes of occupational exposure.

SECTION 12 – ECOLOGICAL INFORMATION

The environmental fate and ecological toxicity are not known.

SECTION 13 – DISPOSAL CONSIDERATIONS

Spill/Leak Procedures: Isolate spill area to prevent falls as material can be a slipping hazard. Avoid contact with eyes and skin. Material is heavier than water and has limited water solubility. It will collect on the lowest surface.

Cleanup: Clean up floor area. Sweep up.

Regulatory Requirements: Follow all applicable Federal, State, Local, or Provincial regulations.

Disposal: DO NOT DUMP INTO ANY SEWERS, ON THE GROUND, OR INTO ANY BODY OF WATER. All disposal methods must be in compliance with all Federal, State Local and

Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

Material Safety Data Sheet

SECTION 14 – TRANSPORTATION INFORMATION

Domestic Transportation: This material is not regulated as a hazardous material for domestic transportation purposes.

International Transportation: This material is not regulated as a dangerous good for international transportation purposes.

SECTION 15 – REGULATORY INFORMATION

US Regulations:

SARA HAZARD CATEGORY:

Acute: yes

Chronic: no

Fire: no

Pressure Release: no

Reactivity: no

SECTION 16 – OTHER INFORMATION

Disclaimer: The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the user thereof. It is the buyer's responsibility to ensure that its activities comply with federal, state, provincial and local laws.

ARSENIC REMOVAL SYSTEM REFERENCES

ARSENIC REMOVAL SYSTEM REFERENCES

	#1
Location	California
Process	Potable Well Water
Type	48 gpm 2-vessel parallel system
pH	7.4
Conductivity	220 μ S/cm
Total Arsenic	21 ppb
Sample Point	System effluent
Other Notes	In operation for 2 years
Effluent Result	<10 ppb
Media	GFH, 5.0 minute EBCT

Project	#2
Location	Ohio
Process	Potable Well Water
Type	17 gpm 2-vessel parallel system
pH	7.4
Conductivity	1,300 μ S/cm
Total Arsenic	14 ppb
Sample Point	System effluent
Other Notes	In operation for 3 years
Effluent Result	<10 ppb
Media	GFH, 5.0 minute EBCT

Project	#3
Location	Northwestern United States
Process	Gallium Arsenide semiconductor manufacturing
Type	69 gpm, 4-vessels - 2 parallel systems in lead/lag configuration
pH	8.5
Conductivity	904 μ S/cm
Total Arsenic	84 - 3,500 ppb
Sample Point	System effluent
Other Notes	In operation for 2 years
Effluent Result	<1 - 5 ppb, required treatment level is 500 ppb
Media	GFH, 5.0 minute EBCT

Project	#4
Location	Wisconsin
Process	Drinking water bottler, well water source
Type	250 gpm, multiple vessels in train system
pH	7.7
Conductivity	550 μ S/cm
Total Arsenic	4 ppb
Sample Point	After treatment, end of train
Other Notes	In operation for 2 years
Effluent Result	<1 ppb
Media	GFH, 5.0 minute EBCT

Project	#5
Location	Michigan, elementary school
Process	Potable water from well
Type	1 gpm pilot for state acceptance, 50 gpm installation
pH	7.6
Conductivity	800 μ S/cm
Total Arsenic	28 ppb
Sample Point	After treatment
Other Notes	In operation for 2 years
Effluent Result	<1 ppb, required treatment level is < 5 ppb
Media	GFH, 5.0 minute EBCT

Project	#6
Location	Arizona – Site P
Process	Potable water from well
Type	1.5 MGD, two 14 ft diameter X 8 ft side shell tanks in parallel
pH	
Conductivity	
Total Arsenic	
Sample Point	
Other Notes	In operation since 2002
Effluent Result	<10 ppb treatment requirement
Media	GFH

Project	#7
Location	Arizona – Site S
Process	Potable water from well
Type	1.5 MGD, two 14 ft diameter X 8 ft side shell tanks in parallel
pH	
Conductivity	
Total Arsenic	
Sample Point	
Other Notes	In operation since 2004
Effluent Result	<10 ppb treatment requirement
Media	GFH

GFH MEDIA MATERIAL SAFETY DATA SHEET (MSDS)

Material Safety Data Sheet

SECTION 1 – CHEMICAL PRODUCT AND COMPANY INFORMATION

Product Name: GFH Media

Chemical Family: Iron Hydroxide Oxide

Manufacturer's Name: Siemens Water Technologies Corp.

Address: 14250 Gannet St. La Mirada CA 90638

Product/Technical Information Phone Number: (714) 228-8835

Medical/Handling Emergency Phone Number: CHEMTREC 1-800-424-9300

24 hr / day everyday

Transportation Emergency Phone Number: CHEMTREC 1-800-424-9300

24 hr / day everyday

Issue Date: February 2004

Revision Date / Revision Number: January 2010 / Rev 1

SECTION 2 – COMPOSITION INFORMATION

<u>Chemical Name</u>	<u>Percent by Weight</u>	<u>CAS#</u>
Iron hydroxide oxide	50-60	7732-18-5

SECTION 3 – HAZARDS IDENTIFICATION

Appearance & Odor: Black granules, odorless

Emergency Overview: None known

Fire & Explosion Hazards: None known

Primary Route(s) of Exposure: None known

Inhalation – Acute Effects: None known

Skin Contact – Acute Effects: None known

Eye Contact – Acute Effects: None known

Ingestion – Acute Effects: None known

SECTION 4 – FIRST AID MEASURES

Inhalation First Aid: Not applicable

Skin Contact First Aid: In case of contact with skin wash off with warm water.

Eye Contact First Aid: In case of contact with eyes rinse thoroughly with plenty of water and seek medical advice.

Ingestion First Aid: Not applicable

Medical Conditions Aggravated: None known

Note to Physician: Treat patient symptomatically.

Material Safety Data Sheet

SECTION 5 – FIRE FIGHTING MEASURES

Flash Point/Method: Non-flammable

Auto Ignition Temperature: Not applicable

Upper/Lower Explosion Limits: Not applicable

Extinguishing Media: This material does not burn. Use extinguishing media appropriate for surrounding fire.

Fire Fighting Procedures: Fire extinguishing method of surrounding areas must be considered.

Fire & Explosion Hazards: None

Hazardous Products of Decomposition and/or Combustion: None

NFPA Ratings:

HEALTH - 1 FLAMMABILITY - 0 REACTIVITY - 0

SECTION 6 – ACCIDENTAL RELEASE MEASURES

Spills/Leak Procedures: Take up mechanically. Clean up spills in a manner that does not disperse dust into the air. Handle in accordance with good industrial hygiene and safety practices. These practices include avoiding unnecessary exposure, and removal of material from eyes, skin, and clothing. All disposal methods must be in compliance with all Federal, State, Local and Provincial laws and regulations. Regulations may vary in different locations. Waste characterizations and compliance with applicable laws are the responsibility solely of the waste generator.

SECTION 7 – HANDLING AND STORAGE

Handling: Avoid the formation and deposition of dust. No special measures necessary for protection against fire and explosion.

Storage: Keep in original containers. Do not store together with acids.

General Comments: None.

SECTION 8 – PERSONAL PROTECTION/ EXPOSURE CONTROL

Respiratory Protection: Dust mask (N95 Particulate Respirator).

Skin Protection: Leather gloves.

Eye Protection: Protective goggles.

Ventilation Protection: Mechanical ventilation should be adequate.

Material Safety Data Sheet

Other Protection: Avoid contact with eyes and skin. Do not inhale dust. Wash hands before breaks and after work. Use barrier skin cream..

Exposure Limits: Exposure limits have not been established for this material.

SECTION 9 – PHYSICAL AND CHEMICAL PROPERTIES

Appearance & Odor: Black granules, odorless

Vapor Pressure: ND*

Vapor Density (Air=1): ND

Boiling Point: ND

Melting Point: > 1000 °C

Specific Gravity: ND

Solubility in Water: Insoluble

Volatile Percentage: ND

pH: NA

Flash Point/method: NA**

Auto Ignition Temperature: NA

Upper/Lower Explosion Limits: NA

Other: NA

*ND=Not determined

**NA=Not applicable

SECTION 10 – STABILITY AND REACTIVITY

Stability: This product is considered stable under the specified conditions of storage, shipment and use.

Incompatibilities: Do not use with acids.

Polymerization: Will not occur.

Hazardous Products of Decomposition: None

Conditions to Avoid: Acids

SECTION 11 – TOXICOLOGICAL INFORMATION

Inhalation – Acute: No toxicological data are available. The product has not been tested.

Inhalation – Chronic: No toxicological data are available. The product has not been tested.

Skin Contact – Acute: No toxicological data are available. The product has not been tested.

Skin Contact – Chronic: No toxicological data are available. The product has not been tested.

Eye Contact – Acute: No toxicological data are available. The product has not been tested.

Ingestion – Acute: No toxicological data are available. The product has not been tested.

Ingestion – Chronic: No toxicological data are available. The product has not been tested.

Material Safety Data Sheet

Carcinogenicity/Mutagenicity: No toxicological data are available. The product has not been tested.

Reproductive Effects: No toxicological data are available. The product has not been tested.

Neurotoxicity: No toxicological data are available. The product has not been tested.

Other Effects: No toxicological data are available. The product has not been tested.

Target Organs: No toxicological data are available. The product has not been tested.

SECTION 12 – ECOLOGICAL INFORMATION

Fish Toxicity: Not determined.

Behavior in sewage plant: Iron hydroxide oxide will adsorb nutrients, especially phosphate.

General Information: Ecological data are not available.

SECTION 13 – DISPOSAL CONSIDERATIONS

Material that cannot be used or chemically reprocessed and empty containers should be disposed of in accordance with all applicable regulations. Product containers should be thoroughly emptied before disposal. Uncontaminated packaging may be taken for recycling. Packaging that cannot be cleaned should be disposed of as for product. For recycling of product, consult manufacturer. Generators of waste material are required to evaluate all waste for compliance with RCRA and any local disposal procedures and regulations. NOTE: State and local regulations may be more stringent than federal regulations.

SECTION 14 – TRANSPORTATION INFORMATION

Domestic Transportation: This material is not regulated as a hazardous material for transportation purposes.

International Transportation: This material is not regulated as a dangerous good for transportation purposes.

SECTION 15 – REGULATORY INFORMATION

CERCLA SECTION 103 (40CFR302.4): No RQ: one

SARA SECTION 302 (40CFR355.30): No

SARA SECTION 304 (40CFR355.40): No

SARA SECTION 313 (40CFR372.65): No

SARA HAZARD CATEGORIES, SARA SECTIONS 311/312 (40CFR370.21):

ACUTE: No CHRONIC: No FIRE: No REACTIVE: No SUDDEN RELEASE: No

OSHA PROCESS SAFETY (29CFR1910.119): No

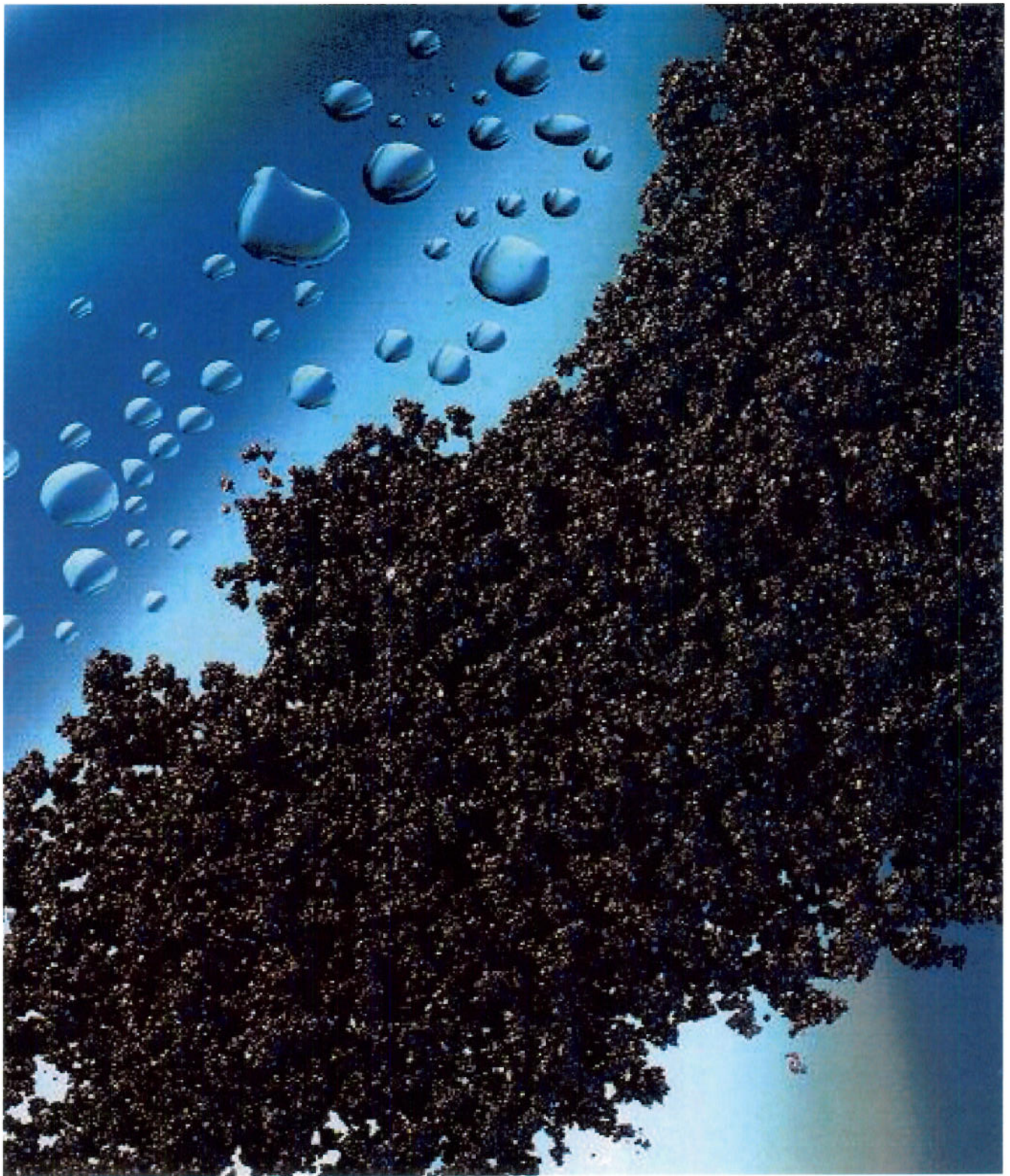
CALIFORNIA PROPOSITION 65: No

Material Safety Data Sheet

SECTION 16 – OTHER INFORMATION

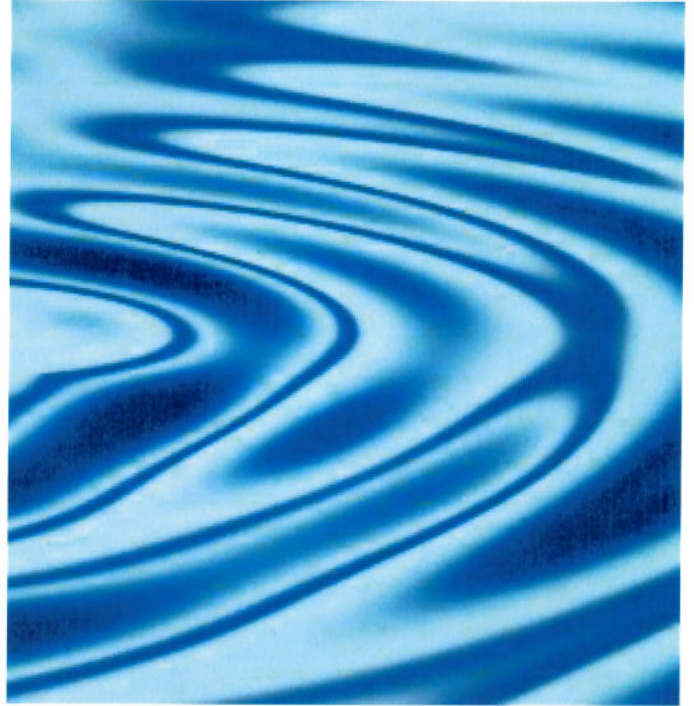
Disclaimer: The information contained herein is based on data considered accurate. However, no warranty is expressed or implied regarding the accuracy of these data or the results to be obtained from the user thereof. It is the buyer's responsibility to ensure that its activities comply with federal, state, provincial and local laws.

Revision Indicator: Jan 2010: Converted to Siemens format.



GFH[®] Media for Arsenic Removal

7



Simple, Safe Arsenic Removal

Municipalities concerned with arsenic in the drinking water can employ Granular Ferric Hydroxide (GFH) to comply with Environmental Protection Agency (EPA) Arsenic Rule. The GFH® system is an adsorption process capable of removing arsenic and other heavy metals from raw water supplies. Arsenic is common in groundwater sources and the health effects associated with high concentrations in drinking water include skin lesions, skin cancer, and several internal organ cancers. Siemens Water Technologies realizes the importance of arsenic removal and the GFH® system is one of our solutions to meet the standards of today, as well as tomorrow.

The arsenic standard implemented by the EPA of 10 parts per billion (ppb) in drinking water has prompted municipalities to comply with strict and increased guidelines when considering arsenic removal options. The GFH® system can meet the standards set by the EPA with a simple design process that requires minimal operator attention and produces a low liquid waste volume.

The GFH® system utilizes a ferric-based, non-regenerative media to adsorb arsenic, selenium, phosphate, chromium and other heavy metals from drinking water. Like other adsorption processes, the water is simply passed through the media to remove the contaminants. Once the media has depleted its adsorption capacity, it is removed from the vessel and replacement media is installed. In many cases, the exhausted media can be discarded in landfills and classified as non-hazardous waste after passing a TCLP test. On-site storage of regeneration chemicals and concentrated waste disposal issues are eliminated with the single use media.

The adsorption life of the media relies on raw water pH, arsenic concentration levels, and operating cycles per day. GFH® media does not require preconditioning or pre-oxidation procedures in most cases, and the use of non-regenerative media are design features that are ideal for small and wellhead applications, particularly where no treatment currently exists.



GFH® Pilot unit

Typical raw water quality:

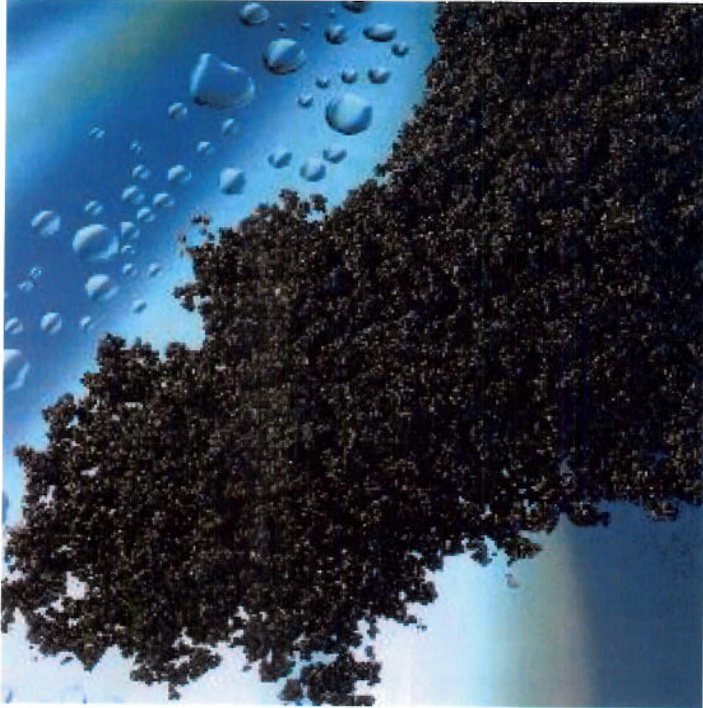
pH	5.5 – 9.0
Oxygen	> 0.5 ppm
Ferrous Iron	< 0.2 ppm
Manganese	< 0.05 ppm
Aluminum	< 0.2 ppm
Silica	< 20 ppm
Phosphate	< 0.05 ppm

While these are the general requirements, we recommend providing a complete analysis for specific system performance and evaluation. The water supply should be free of suspended material and precipitated iron and manganese as these may affect the adsorption process.

Typical contaminants removed:

- Arsenic (III & V)
- Phosphate
- Chromium
- Selenium
- Antimony
- Copper

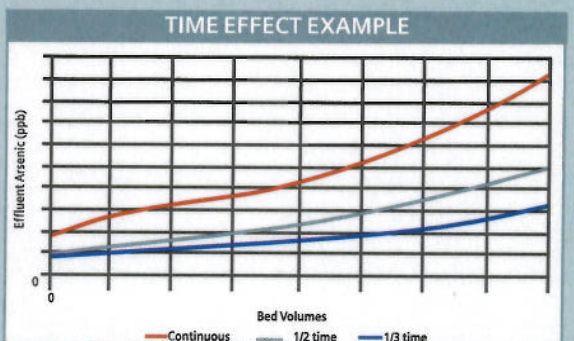
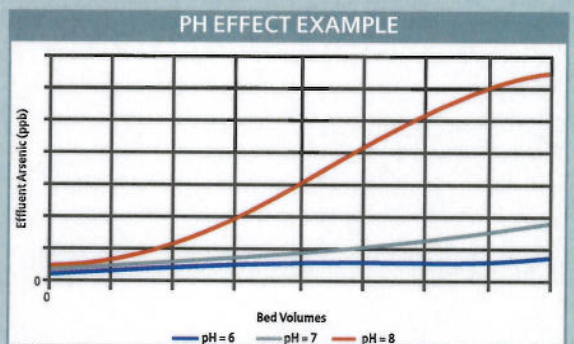
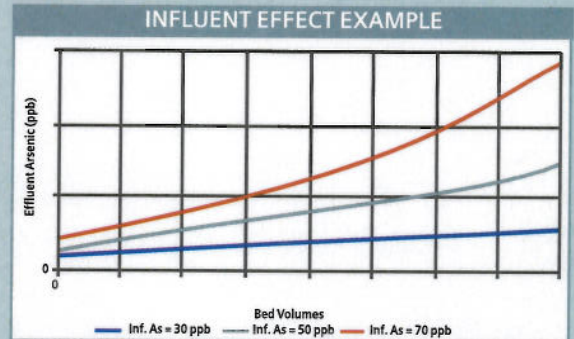
The standard GFH® system consists of three vertical pressure vessels with factory installed internals for distribution and collection of influent and backwash flows. The vessels include fully finished, painted interiors for superior corrosion protection. GFH® media is field placed on a 9" heavy media bed. All face piping and valves are included in the standard system to streamline installation. A backwash process flow rate of 10-12 gpm/sq. ft. (24-29 m/hr) is typically required once every 2-6 weeks to prevent compaction of the bed and remove captured particulate. GFH® systems are ideal for plants that have limited waste handling facilities since the unit produces unusually low volumes of liquid waste and on an infrequent basis.

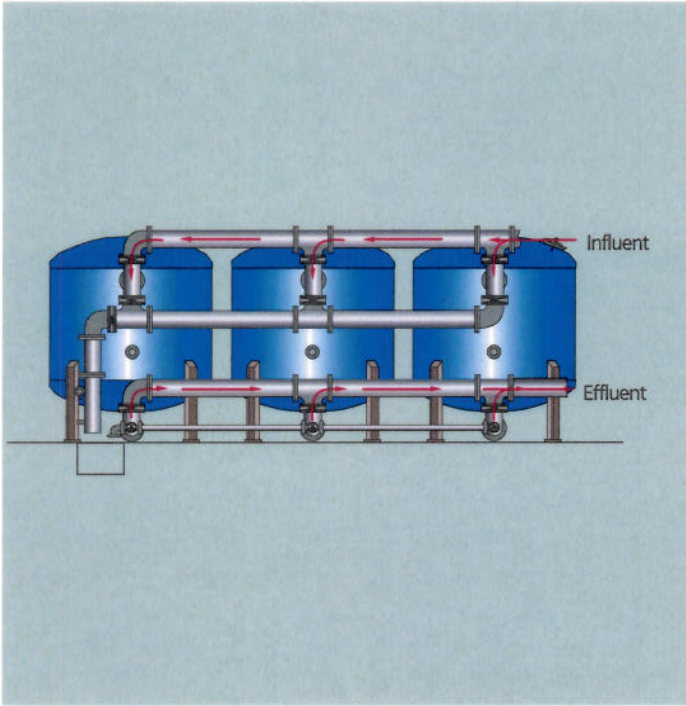


Influent, pH and Time Effect

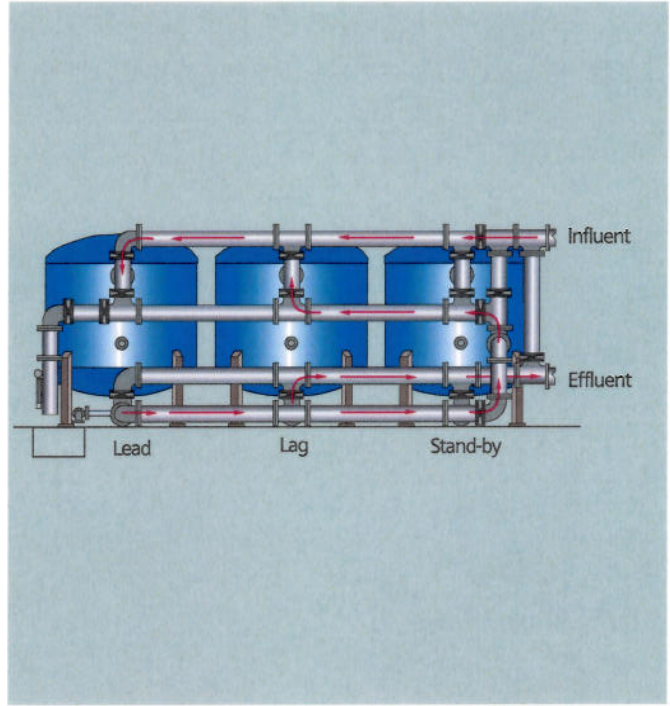
The graphs show the effect of influent arsenic concentration, pH and duty cycle on GFH® systems. As expected, lower influent concentrations lead to a longer media life. Lower raw water pH also has a positive impact on media life. In many cases, pH may not require adjustment. For higher influent pH, a correction step can be included to extend media life. The most interesting operating parameter is the duty cycle. As shown in the graph, systems that allow the media a “rest” period will see an increase in effective media life in terms of bed volumes treated. The rest period allows for an inter-particulate diffusion of arsenic to expose fresh adsorption sites, thus extending the media’s useful life.

The GFH® media can be placed into parallel or series pressure vessel systems depending on your required removal concentrations. If a consistent 90% reduction is needed across the system, the series design is used. However, if the percentage is less than 90%, then the parallel design is typically applied. Consult Siemens Water Technologies for special conditions that may define the use of the series design, particularly if higher removal rates are required.





Parallel Flow – service mode, all vessels in-service



Series flow – service mode, two vessels in series – one in stand-by

Parallel Systems, Series Systems

The three, in-service vertical pressure vessels in a parallel system are each designed to treat 1/3 of the incoming flow at a hydraulic loading rate of 5 gpm/sq. ft. (12 m/hr). A five minute Empty Bed Contact Time (EBCT) is provided through the parallel system, plus backwash water is supplied solely from the in-service vessels where they are backwashed during the same event. During the initial start-up of the plant, one vessel is placed on-line where it begins the exhaustion curve. Subsequently, the second vessel is started and later the third one is activated. This process causes all the vessels to operate at varying degrees of exhaustion, and the blended effluent concentration is below the desired level. The blended effluent concentration eventually approaches the acceptable limit, however, and when the media in the longest running vessel is replaced, the overall blended effluent is reduced. Overall media life is extended when operated in this fashion.

In a series system two vessels are operated in a lead/lag mode with a third vessel in stand-by. The hydraulic loading rate is 8 gpm/sq. ft. (19 m/hr) and, similar to the parallel system, provides an EBCT of five minutes total or 2.5-minute EBCT per vessel.

Backwash water is supplied from the raw water source, or returned from the system. Again, as in the parallel system in-service vessels are backwashed during the same event. When the lead vessel media is exhausted, it is isolated and the lag vessel shifts to the lead vessel. At that time, the stand-by vessel progresses to the lag sequence. Following this process, the exhausted media is replaced in this vessel and it becomes the stand-by vessel. The series flow systems include a by-pass line in order to blend raw water with the treated water until the desired effluent is achieved. In a series design, the lag unit receives a lower concentration of contaminants, which creates a more consistent removal throughout the system. The series system, however, treats a lower flow rate than the same size vessels in a parallel unit.

For specific applications, contact Siemens for an estimate of water produced between media replacement. We also offer on-site verification pilot units to confirm process design and equipment selection. The pilot units are provided with the tank, controller and media for an efficient study.

GFH is a trademark of Siemens, its subsidiaries or affiliates.

The information provided in this brochure contains merely general descriptions or characteristics of performance which in actual case of use do not always apply as described or which may change as a result of further development of the products. An obligation to provide the respective characteristics shall only exist if expressly agreed in the terms of contract.

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