Orr&Reno

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Admitted in NH, MD and select Federal Courts

July 15, 2015

Via Electronic Mail and Hand Delivery
Martin P. Honigberg, Chairman
New Hampshire Site Evaluation Committee
ATTN: Jane Murray
New Hampshire Department of Environmental Services
29 Hazen Drive
Concord, NH 03301-2429

Re: Granite Ridge Energy, LLC – Informational Filing
NHSEC Docket 98-02

Dear Chairman Honigberg:

On behalf of Granite Ridge Energy, LLC ("GRE"), we are providing the Committee with information regarding a request submitted to the Department of Environmental Services Air Resources Division for a Research and Development (R&D) exception to Title V permitting requirements. The request relates to a temporary pilot program for demonstrating new disinfection technology in treating cooling water used at the facility. We attach GRE's written request to the Department for informational purposes only so that the request may be placed on file in the above-referenced docket. *See* Exhibit 1 and accompanying Attachments 1-6.

No further Committee action is requested at this time, as the Committee has already delegated to the Department ample authority to approve the temporary R&D exception request. The Committee will be kept informed of the Department's action on GRE's request and, in the meantime, we would be happy to address any questions on GRE's proposal. We provide further explanation below.

By way of background, the Committee's May 25, 1999 Order and Certificate of Site and Facility in the above-referenced docket incorporated conditions relating to water used in the cooling towers, among other things. The Order is available at http://www.nhsec.nh.gov/projects/1998-02/index.htm. GRE's cooling water is drawn from the Manchester Wastewater Treatment Facility and discharged to the Town of Londonderry's sewer system. The Order requires GRE to "treat discharges … as necessary to ensure that the local Sewer Use Ordinance, local discharge limitations, local industrial discharge permit conditions, and state pretreatment statutes (RSA 485-A) and regulations (Env-Ws 904), and the federal Clean Water Act and federal pretreatment regulations (40

CFR 403) are met." *See* Order, Attachment "E," Water Quality, Wastewater and Wetlands Condition No 5.

The Committee also addressed air emissions from the cooling tower by conditioning the Certificate upon maintenance of "high water quality within the cooling tower [to assure] that there will be no adverse impact to air quality from cooling tower emissions as provided in the NH DES air permit. Nothing in this section is intended to impose any requirements beyond the NH DES air permit." *See* Order, Attachment G, p. 11 (Cooling Water Supply).

At the same time, the Committee adopted specific cooling water treatment system methodology, as proposed by the applicant, as "the Town of Londonderry did not undertake an expert analysis regarding the imposition of special conditions for the cooling water system" and "relies on the expertise of the Department of Environmental Services to mandate appropriate treatment practices." *See* Order, Attachment G, pp. 2-3 (Conditions Agreed with the Town of Londonderry). The specified treatment methodology, which relies primarily upon chlorine bleach, was ultimately incorporated into GRE's Title V Operating Permit ("Permit") regulating air emissions. The Permit is currently under review by the Department and U.S.E.P.A. due to a scheduled renewal of the original Permit.

GRE is interested in moving away from bleach towards a safer, greener chlorine dioxide approach to water purification with lower toxicity, as described in Exhibit 1, and has proposed a pilot project to demonstrate use of the new system at the plant. The Town of Londonderry has already approved use of the new chemicals during the proposed pilot period and, on June 26, 2015, issued a revised Industrial Discharge Permit to allow for discharge of the chemicals into the Town's sewer system. *See* Exhibit 1, Attachments 3-6. GRE anticipates improvement in both water and air quality from the new chlorine dioxide treatment process and will report the pilot's results to the Town and Department upon completion, which is expected to occur within approximately three months after initiation of the new process.

If GRE's proposed chlorine dioxide treatment process is approved under the Department's R&D exception authority, the Committee need not conduct further review because the Order contains an express delegation of authority: "The Committee delegates authority to the [Department] to specify the use of any appropriate technique, methodology, practice or procedure associated with air emissions of the facility, including authority to approve minor modifications to the facility's emission sources and control equipment, so long as such modifications do not substantially modify the design of the facility, as determined by the Air Resources Division." *See* Order, p. 2. The delegation is consistent with other conditions relating to cooling water supply, which rely upon the air permitting process to maintain high water quality within the cooling towers. *See, e.g.*, Order, Attachment G, p. 11.

As you know, the Department's Air Resources Division has already exercised the Committee's delegation of authority with regard to cooling water. In particular, the Department determined in 2013 that revising the cooling water treatment methods relating to pH and turbidity monitoring location were minor modifications to the facility's emission sources and control equipment that did not substantially modify the design of the facility. *See* August 20,

2013 correspondence from Craig A. Wright, Air Resources Division to Thomas S. Burack, Committee Chairman. The Committee acknowledged that, under the delegation provisions, the Department's approval of the modifications was sufficient. *See* September 25, 2013 correspondence from Thomas S. Burack, Committee Chairman, to Maureen D. Smith, Orr & Reno, P.A.

GRE's current proposal falls squarely within the Department's delegated authority to "specify the use of any appropriate technique, methodology, practice or procedure associated with air emissions of the facility" with no substantial design modification to the facility. *See* Order, p. 2. Here, GRE would retain the cooling water treatment system design and merely add more robust but less toxic/lower volumes of chemical additives for better biological control in the cooling water.

If GRE's proposed R&D pilot program is approved by the Department and successfully demonstrates the new method for disinfecting cooling water, GRE may seek to modify the facility's Permit. We will update the Committee at the appropriate time regarding any further requests for Permit modification.

Thank you for your attention.

Sincerely,

Maureen D. Smith

MDS/eac

Enclosures (Exhibit 1 and Attachments 1-6)

cc (email): Michael Iacopino, Esq.
Kevin Smith, Town Manager, Town of Londonderry
Jim Carlton, GRE
Craig Wright, DES/ARD

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Exhibit 1
(4 pages)

Orr&Reno

Maureen D. Smith
msmith@orr-reno.com
Direct Dial 603.223.9166
Direct Fax 603.223.9066
Admitted in NH, MD and select Federal Courts

July 15, 2015

Via Electronic Mail and Hand Delivery
Craig Wright, Director
Air Resources Division
NH Department of Environmental Services
29 Hazen Drive; P.O. Box 95
Concord, NH 03302-0095

RE: *Granite Ridge Energy, LLC*
R&D Permitting Exception and Waiver Request for Cooling Water Treatment Method

Dear Mr. Wright:

We respectfully request, on behalf of Granite Ridge Energy, LLC ("GRE"), that the Department issue a determination under Chapter Env-A 617.02 to allow for a proposed research and development (R&D) pilot program to demonstrate a more advanced method of disinfecting cooling water, as required under GRE's Title V Operating Permit TV-OP-056 ("Permit").

The purpose of the R&D exception would be to allow GRE to temporarily add chlorine dioxide as a disinfection method for treating cooling water within the cooling tower. GRE plans to initiate staging of the R&D method during July 2015 and to start up in August 2015, coinciding with the ongoing Permit renewal process. The R&D method would be used for approximately three months after initiation, subject to all conditions set forth in Chapter Env-A 617.02.

All facility emission limitations contained in the Permit would continue to be applicable during the R&D period. Information generated during the three-month pilot would inform GRE on successful application of the R&D method and any necessary adjustments to the existing Permit conditions relating to cooling water treatment. GRE would also retain existing chlorine bleach/bromine treatment methods specified in the Permit as a potential "back-up" to the R&D method during and after completion of the pilot program. If the R&D pilot program is successful, GRE may follow up with the Department on recommended disinfection-related revisions to the Permit.

The proposed R&D pilot would consist of an on-site Chlorine Dioxide Generation System to demonstrate recent advances in technology for effectively treating and disinfecting the City of Manchester wastewater used in the cooling towers. Applying new technology provided by Nalco, chlorine dioxide would be manufactured on-site in a small "reactor" (a unit approximately 3'x5') by reacting sulfuric acid with Purate, which would then be injected into the cooling tower basin. The method is described by NALCO in Attachments 1 and 2. The new technology reflects advances made since issuance of GRE's original Permit by providing better biological control with a lower chemical dosage than the existing plant technology using bleach, bromine and biocides. There would be no change to four disinfection steps applied upstream of the cooling tower and a small amount of bleach and bromine would still remain in the cooling tower basin as carryover from the upstream disinfection applications.

It is important to note that the proposed R&D disinfection method would not change either the design or function of the cooling water treatment system, as it would simply add superior performance chemicals at lower volumes to achieve better disinfection results. The existing chlorine monitor can continue to be used to monitor both chlorine dioxide and free chlorine, as appropriate, so that an additional monitoring system is not necessary. GRE will ensure adequate disinfection by continuously monitoring total free halogen residual in the cooling tower basin, as required in the Permit, although lower levels of total free halogen residual than specified in the Permit will be maintained during chlorine dioxide application (chlorine dioxide achieves comparable disinfection with lower levels). *See* Permit, Section J.1.e.

To ensure adequate disinfection of cooling water during the entire R&D demonstration, GRE will conduct a full range of microbiological testing, including twice monthly testing for the following parameters: total viable count, mucoid and pigmented aerobic bacteria, pseudomonas, sulfate reducing bacteria, fungi, total coliform and E. coli. GRE will also continue its standard quarterly analysis for Legionella. This performance-based testing conducted during the R&D pilot may well provide a basis for establishing performance-based parameters for disinfection of the cooling water going forward. If so, GRE may request appropriate modifications to the Permit after completion of the R&D pilot program.

GRE has coordinated with the Town of Londonderry and has demonstrated to the Town's satisfaction that the proposed technology and accompanying testing would protect against microbial activity in the cooling water discharge, resulting in Town approval for GRE's proposed Chlorine Dioxide Generation System and associated discharge of additional raw materials. On June 26, 2015, the Town re-issued GRE's Industrial Wastewater Discharge Permit ("IDP") to include discharges associated with the proposed system. *See* Attachment 3 ("the Town has approved the proposed Chlorine Dioxide Generation System and associated new raw materials") and Attachment 4 (IDP cover sheet). The IDP includes a fact sheet further describing the Cooling Tower Blowdown and proposed disinfection system, s*ee* Attachment 5, as well as a list of approved raw material discharges that includes the chlorine dioxide and Purate discharges associated with the proposed R&D disinfection method, *see* Attachment 6, pp. 2, 4. As a result of the Town's approval, GRE is authorized to continue cooling water discharges after the R&D

pilot program commences, while retaining the ability to use the existing chlorination system as a back-up method of disinfection.

The R&D pilot program, if approved, would not increase regulated emissions from the cooling tower. As set forth in the Permit, cooling tower-related emissions would continue to be included in total facility emissions calculations. For Total Suspended Particulate (TSP), which is the primary pollutant of concern for cooling tower emissions, total emissions would continue to be calculated based upon cooling tower drift efficiency. GRE does not anticipate any increase in TSP, PM 2.5 or PM 10, as no coagulants with a potential to remove particles out of suspension would be added, nor does GRE anticipate any change to existing compliance demonstrations or actual emissions. Total emissions of VOCs, HAPs and toxic air pollutants would not exceed regulatory thresholds set forth in Env-A 617.02(f), (g) and (h). The proposed method would not trigger NESHAP permitting under 40 CFR 61, MACT standards for source categories contained in 40 CFR 63 or NSPS under 40 CFR 60. Moreover, the method would not be subject to PSD or Non-Attainment New Source Review, as the change in disinfection method would not constitute a regulated modification to GRE's facility.

GRE has also determined that use of the new disinfection method would be exempt from state air toxics rules. Although chlorine dioxide is listed on the Department's Air Toxics list (Chapter Env-A 1400,) it is exempt from regulation under Env-A 1402.01(b) because the chemical is a registered pesticide under FIFRA and regulated pursuant to RSA 430:31, NH Code Admin R. Part Pes 101.21. Also, while chlorine dioxide is included on EPA's list of chemicals regulated under the Clean Air Act's Section 112(r) Risk Management Plan Rule, GRE would consistently store less than the threshold quantity of 1000 lbs. and, therefore, would not be subject to the rule. Other federal notification and chemical reporting requirements would also not apply because the threshold quantities would not be triggered.

GRE's plant manager, William Vogel, would be directly responsible for supervising each R&D operation and, as required under Env-A 617.02(e), would ensure continued maintenance of a written operating log that would include: (i) a brief narrative of the R&D operation; (ii) the date of commencement; (iii) the total number of days that the method was used; (iv) the date on which the R&D operation ended; (v) the amount of actual emissions of each regulated and toxic air pollutant; and (vi) Mr. Vogel's or his designee's name and title.

Cooling water treatment is included as an insignificant activity in GRE's Permit renewal application, which is currently pending before the Department. *See* Permit Application No. 13-0078. The proposed method is not subject to any applicable requirement, as defined under Env-A 101.26, except to the extent that GRE's Permit already imposes such requirements. GRE is currently operating under the Title V Permit Application Shield available under Env-A 609.08 as the timely and complete application is currently under review by the Department.

In sum, GRE believes that the new technology will prove to be more effective and protective of public health than the old technology, both from a water discharge and air emissions perspective, and respectfully requests prompt action on this request.

While GRE believes that the Department has been delegated full authority to grant GRE's request without further action by the New Hampshire Site Evaluation Committee, GRE intends to alert the Committee of this request through an informational filing.

We would be happy to provide any additional information that may be necessary for the Department to make a prompt determination on this request.

Thank you for your attention.

Sincerely,

Maureen D. Smith

Attachments (6)

cc via email: Jim Carlton, GRE
William Vogel, GRE
Susan Prior, GRE
Todd Moore, DES/ARD
Gary Milbury, DES/ARD
Padmaja Baru, DES/ARD
Robert Kerry, PWED, Town of Londonderry

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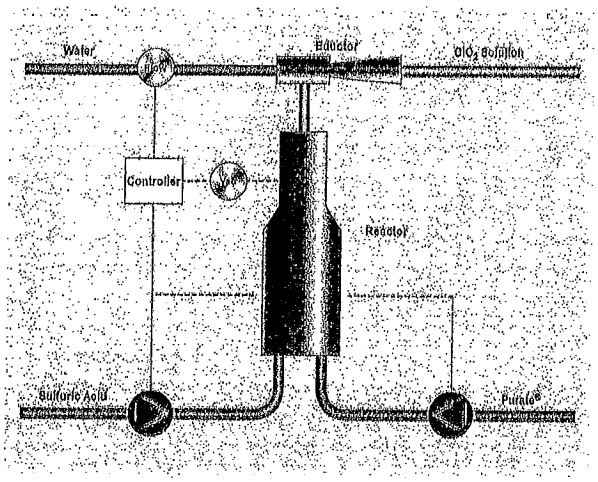
Attachment 1

SVP-Pure™ ClO_2 Generator Model AD-M16

NALCO
An Ecolab Company
Specification SPEC-640

Description

The SVP-Pure Chlorine Dioxide Generator uses Purate™ and sulfuric acid to efficiently and cost effectively produce chlorine dioxide on site for a wide variety of water treatment applications.



Application Requirements

1. A booster pump is often needed to supply the 110 - 140 psig water to the generator. See Technical Bulletin "Booster Pump Selection" for more information, or contact Nalco Company.
2. The motive supply water must be free of suspended solids so as to not plug the eductor nozzle.
3. Sulfuric acid must meet the quality requirements established by Nalco. See Technical Bulletin "Sulfuric Acid" for details.
4. Various options are available for the generator, including an Optek ClO_2 analyzer, ClO_2 gas detector alarms, all-plastic cabinet, operator interface terminal (OIT), and more. Contact Nalco for details.

Support

If you have any questions, please contact your Nalco representative. In North America, you can contact the Nalco Global Equipment Solutions Help Desk at 1-800-323-8483.

Specifications

Specifications	Details
General Model	AD-M16
Capacity	2 – 35 lb/hr, 840 lb/day max. (1 – 16 kg/hr, 384 kg/day max
Dimensions (H x W x D)	90" x 78" x 36" (2285 mm x 1980 mm x 915 mm)
Weight	1,300 lbs (approx) 600 kg (approx)
Chemicals	Purate (78% sulfuric acid)
Motive water	34 – 39 gpm, 110 – 140 psig, 7.7 – 9 m^3/hr
Electrical	460 VAC - Three phase, 30 Amp circuit
Controls	Siemens S7/226 LC (1200 PLC 2013)
Chemical Pumps	Grundfos DME 60
Eductor	1-1/2" Model 485 (smaller available with reduced capacity)

Process Connections	
Purate inlet	1" flange
Sulfuric acid inlet	1" flange
Motive water in	2" flange
ClO_2 solution out	2" flange
Purate calibration vent	1/2" FNPT
Acid calibration vent	1/2" FNPT
Purate line vent	1/2" FSW
Purate drip pan drain	3/4" MNPT
Acid drip pan drain	3/4" MNPT
Reactor drain	1/2" FNPT

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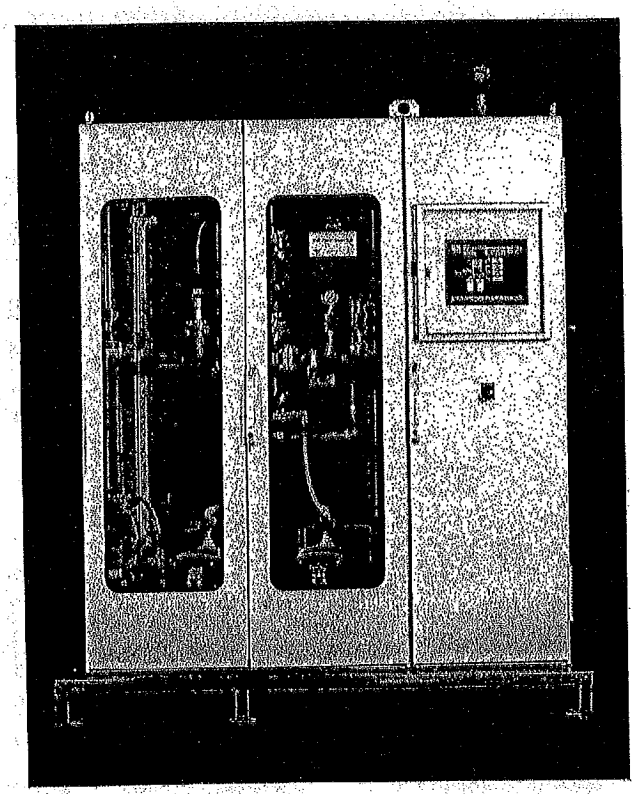

Nalco, an Ecolab Company

North America: ***Headquarters*** – 1601 West Diehl Road • Naperville, Illinois 60563 • USA
Nalco Champion – 7705 Highway 90-A • Sugar Land, Texas 77478 • USA
Europe: Richtistrasse 7 • 8304 Wallisellen • Switzerland
Asia Pacific: 2 International Business Park • #02-20 The Strategy Tower 2 • Singapore 609930
Latin America: Av. das Nações Unidas 17.891 • 6° andar • São Paulo • SP • Brazil • CEP 04795-100

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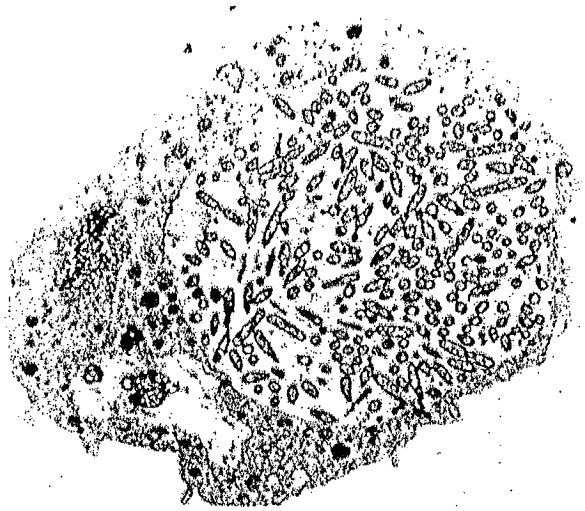
Attachment 2

Biocidal Efficacy of Chlorine Dioxide

NALCO
An Ecolab Company



Chlorine dioxide (ClO_2) is a highly effective, environmentally friendly microbicide. It is a selective oxidant that eliminates both planktonic and sessile bacteria, disinfects surfaces, and destroys biofilms very rapidly. ClO_2 is a stable, dissolved gas that is a strong bactericide and virucide at concentrations as low as 0.1 ppm. With minimal contact time, it is highly effective against many pathogenic organisms such as *Legionella*, amoebal cysts, Giardia cysts, E. Coli, and Cryptosporidium. ClO_2 destroys biofilms so bacterial regrowth is significantly impeded.

Importance to Human Health

Microbial infection is responsible for hundreds of thousands of illnesses and thousands of deaths each year in the United States. Frequent outbreaks of disease, as reported in the media, have been linked to food handling and processing (Salmonella, Shigella, and E. Coli), drinking water (Giardia, Cryptosporidium) and hotels, cruise ships, hospitals and office buildings (*Legionella*). The incidence of Legionellosis is frequently misdiagnosed as common pneumonia. This under-reporting has recently come to light as more and more health organizations recognize the need for control plans against this deadly disease.

Significance of Biofilm

Another major problem is biofilm. Biofilm is similar to a spider web in design and function. When certain microbes reach a surface, they attach themselves by producing polysaccharides (the web). This material is sticky and very difficult to remove. Channels are formed in this film, through which water flows. The sticky web catches nutrients and other microbes that pass by, providing food and a quick growth mechanism. Once a biofilm is established it is very difficult to remove, often requiring manual cleaning. Problems associated with biofilm growth include: 1) fouled heat exchange equipment in cooling systems, 2) increased corrosion rates on equipment, and 3) formation of a habitat for pathogenic organisms. Even if all waterborne microorganisms are eliminated, regrowth quickly occurs due to bacterial communities and nutrients in the biofilm. The microorganism in biofilm are often vastly in excess of the quantities of those in the planktonic phase.

Disinfectant Power of ClO_2

ClO_2 is shown to be an effective disinfectant at residual concentrations between 0.2 and 0.8 ppm. For example, 0.3 to 0.4 ppm ClO_2 is completely deactivates tough Cryptosporidium oocysts in less than 20 minutes. ClO_2 penetrates the cell wall of the micro-organism and disrupts metabolic functions.This is more efficient than other oxidizers that "burn" whatever they come in contact with. This allows lower concentration to be effectively used.

ClO_2, like ozone, is a dissolved gas that penetrates biofilm by molecular diffusion. However, unlike ozone, ClO_2 is stable and soluble, allowing it to travel to the base of the film where it attacks microorganisms and destroys the biofilm at its point of attachment. Other oxidizers react mostly on the surface of the biofilm to form an oxidized layer, like charring on wood.This precludes further penetration. No biocide has proved to control biofilm better than ClO_2.

The criteria for disinfection, as defined by the USEPA, are:

1. a 99.9% reduction in Giardia lamblia (3 log reduction)
2. zero lactose fermenting coliform
3. less than 10 cfu/mL non-lactose fermenting coliforms and 4. 99.99% reduction in enteric virus (4 log) concentrations.

ClO_2 meets all of these criteria and is already in widespread use in The United Kingdom and continental Europe. In the UK, the Building Services Research and Information Association (BSRIA) has recommended ClO_2 as the best available technology for control of *Legionella* in hot and cold water systems.

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ClO_2 Is Effective Over a Wide pH Range

Because chlorine dioxide is a dissolved gas, it does not ionize to form weak acids (as chlorine and bromine do) in aqueous solutions. This allows ClO_2 to be effective over a wide pH range. For example, the pH dependent speciation of chlorine produces hypochlorite ion and hypochlorous acid (HOCl). Hypochlorite is only 1/30 to 1/200 as effective as HOCl. ClO_2 being a neutral species with rapid disinfection kinetics, is 100% available for disinfection in hard or soft water.

Chlorine Dioxide from the Envirox® system

ClO_2 is generated on site with patented electrolytic process. It efficiently generates a very pure ClO_2 solution from a single precursor, sodium chlorite. Immediately after generation, the ClO_2 solution is fed directly to the water or material being treated. This self-contained system is safe to use and simple to operate. The Envirox system requires NO acid, chlorine gas, or bleach. Because of its unique controlled oxidation, the Envirox system generates a very pure product at a surprising low cost. The Envirox system, which is completely enclosed, is safe and simple to operate.

Applications

Cooling Towers and Loops: ClO_2 controls algae, planktonic bacteria, biofilm and scale for maximum efficiency of heat exchangers and ancillary equipment. ClO_2 is more stable than other oxidizing biocides and compatible with most water treatment chemistry. This "selective oxidation" makes ClO_2 ideal for systems with corrosion problems.

Potable Water: ClO_2 is EPA-approved for both pretreatment and final disinfection of drinking water. In pretreatment, it effectively removes iron and manganese and promotes flocculation. It also removes taste and odor components as well as halogenated disinfectant byproduct precursors e.g. trihalomethanes (THM's). In post-treatment, it provides a lasting residual throughout the distribution system. ClO_2 is also ideal for small water supplies, cisterns, and hospital water systems. ClO_2 does not form THM's or haloacetic acids (HAA's).

Food and Beverage: ClO_2 provides excellent microbiological control in flume waters, packaging operations and process disinfection. Thus, it is ideal for the washing of fruits and vegetables (FDA approved) as well as bottling and brewery applications. ClO_2 does not react with most "organics" in flume water, which makes it a very effective disinfectant. It also neutralizes foul smelling secondary and tertiary amines formed in the meat packing industry.

Waste Treatment and Odor Control: ClO_2 safely oxidizes phenols, cyanides, aldehydes, amines, and mercaptains, reduced sulfur compounds and some pesticides. It is useful in both waste treatment and scrubber systems.

Summary

Chlorine dioxide is a very safe and potent biocide. It is effective over a wide pH range in both hard and soft water and does not react with most other water treatment chemicals. Many of its uses are government approved and highly recommended by top researchers. The Envirox system is the safest and most simple method to produce this versatile disinfectant.

Addresses Problems

- *Legionella* Control
- Giardia Cysts
- Coliforms
- Biofilms
- Cryptosporidium
- Salmonella
- Shigella
- Algae
- Amoebae
- Cost-Effective Microbiocide
- Iron and Manganese
- Taste And Odor
- THM/HAA Formation
- Planktonic and Sessile Organisms

Applications

- Healthcare Facilities
- Food/Beverage
- Cruise Ships
- Cooling Towers
- Water Hygiene
- Potable Water
- Waste Water
- Hotels and Motels
- Apartments and Colleges
- Marinas/ Water Wells
- Commercial/Industrial Facilities

Features/Benefits

- Safe Production of ClO_2
- Chlorine-Free ClO_2
- On-Demand ClO_2
- Alternative To Bleach, Ozone, Bromine
- Point-Of-Use Generation
- No ClO_2 Storage
- No Bleach Or Acid; No Chlorine Gas
- Single Precursor
- Not pH Dependent
- No Pipe Corrosion
- Environmentally Friendly
- Ease Of Operation

Nalco, an Ecolab Company
North America: *Headquarters* – 1601 West Diehl Road • Naperville, Illinois 60563 • USA
Nalco Champion – 7705 Highway 90-A • Sugar Land, Texas 77478 • USA
Europe: Richtistrasse 7 • 8304 Wallisellen • Switzerland
Asia Pacific: 2 International Business Park • #02-20 The Strategy Tower 2 • Singapore 609930
Latin America: Av. das Nações Unidas 17.891 • 6° andar • São Paulo • SP • Brazil • CEP 04795-100

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Attachment 3

TOWN OF LONDONDERRY, NH
Public Works & Engineering Department
Environmental Services Division
268B Mammoth Road
Londonderry, NH 03053-3416
Tel: (603) 432-1100 x 137
Fax: (603) 432-1128

June 26, 2015

Ms. Susan Prior
EH&S Manager
Granite Ridge Energy, LLC
21 North Wentworth Avenue
Londonderry, New Hampshire 03053

Re: Class 1 Industrial Wastewater Discharge Permit (IDP) Reissuance
Granite Ridge Energy, LLC (GRE)

Dear Sue:

In accordance with the requirements of the Town of Londonderry's (Town's) Industrial Pretreatment Program (IPP) and based on information provided by GRE in the March 24, 2015 IDP reapplication and subsequent communications, the Town has renewed the Class 1 IDP for the GRE facility located in Londonderry. Please find enclosed the reissued IDP, a Fact Sheet, a *Flow Summary Report* and Periodic (6-Month) Compliance Report worksheets (to be emailed). Also included is a copy of the *Raw Material Report*, providing a more detailed summary of the Town's record of raw materials at GRE.

In response to GRE's June 3, 2015 request for approval of new raw materials, the Town has approved the proposed Chlorine Dioxide Generation System and associated new raw materials (Chlorine Dioxide and Purate). These approved materials are included in this IDP reissuance.

Subsequent to your careful review of the IDP and all attachments, please provide the signature of an authorized representative of GRE to both copies of Page 2, "Acknowledgement of Permit Limitations". Retain one copy for your records and return one copy within seven (7) days to:

Bob Kerry
Environmental Engineer
Town of Londonderry
268 B Mammoth Road
Londonderry, New Hampshire 03053

If you have any questions regarding this IDP or the Town's IPP, please do not hesitate to call TeTon Environmental at 587-0039 or me at 432-1100 ext. 137.

Sincerely,
TOWN OF LONDONDERRY

Robert Kerry
Environmental Engineer

Attachments

RECEIVED
JUN 27 2015
BY:

Attachment 4

TOWN OF LONDONDERRY, NH
Public Works & Engineering Department
Environmental Services Division
268B Mammoth Road
Londonderry, NH 03053-3416
Tel: (603) 432-1100 x137
Fax: (603) 432-1128

Permit No. IDP# 14-44-37 **Expiration Date:** May 31, 2018

INDUSTRIAL WASTEWATER DISCHARGE PERMIT (IDP) ☒CLASS 1 ☐CLASS 2

In accordance with the provisions of the Town of Londonderry Sewer Use Ordinance and Sewer Use and Permitting Regulations

Granite Ridge Energy, LLC
21 North Wentworth Avenue
Londonderry, New Hampshire 03053

is authorized to discharge industrial wastewater from the above identified facility and through the outfall or final effluent discharge location at the Granite Ridge Energy, LLC facility site identified within this permit into the Town's Publicly Owned Treatment Works (POTW) in accordance with the conditions set forth in this permit. Compliance with this permit does not relieve the permittee of its obligation to comply with any applicable pretreatment requirements under local, State or Federal laws, including any such requirements that may become effective during the term of this permit.

Non-compliance with any terms or condition of this permit shall constitute a violation of the Town of Londonderry Sewer Use Ordinance and shall be subject to the penalty provisions of Sections 6, 7 and 8.

This permit shall become effective on July 1, 2015.

Permit issued by — June 26, 2015 Date

Town of Londonderry Authorization Signature — June 26, 2015 Date

THIS PERMIT CONTAINS:

ATTACHMENTS

Compliance Reporting Worksheets
Flow Summary Report
Fact Sheet

Cooling Tower Blowdown

GRE has a dual 6-cell (12 cells total) evaporative cooling tower system (cooling water is used for condensing steam in the steam generator and for cooling the closed-loop component cooling water system), where up to 75 percent (approximately 2 to 3 MGD) of the water evaporates and is emitted as pure water vapor. The cooling tower evaporation rate is estimated to vary seasonally from 2,000 to 2,900 gpm. In accordance with the facility's air permit, the pH of the water in the cooling tower basin must be maintained within the range of 6.5 to 8.5 (note: lower pH limit was reduced from 6.8 to 6.5 in early 2014).

The remaining 25 percent (approximately 0.5 to 1 MGD) is discharged as cooling tower blowdown at a rate of approximately 500 gpm. Cooling tower blowdown is discharged to the general waste sump on a continuous basis to prevent solids buildup resulting from evaporative losses within the cooling tower system. GRE's objective is to maintain cooling tower quality in the range of 5 – 8 "cycles." Cycles are monitored by comparing cooling tower loop water hardness to the hardness of the feed water supply. This check occurs approximately every 4 – 12 hours, and the blowdown rate is manually adjusted by controlling the opening of a bleed-off valve on the cooling tower recirculating lines. Chemicals are added to the cooling tower loop to control biological activity (*e.g.*, algal, bacterial slimes) that could accumulate and cause blockages within the system's components. A dispersant is also added to minimize deposition of solids. Sodium hypochlorite and dispersant dosages are continuously monitored and are automatically controlled. A biocide is added to the system every other week as an intermittent treatment process at a dosage rate of 60 ppm (to 1.4 MG within the cooling tower system). The use of a bromine-based disinfectant was initiated in early 2008 as a supplement / stabilizer to hypochlorite. The ability to maintain a more stable chlorine residual allowed a reduction in the controller residual chlorine setpoint and a significant reduction in hypochlorite use. Reduced hypochlorite usage also lowered cooling tower pH, and reduced the amount of H_2SO_4 needed to control pH. The reduced H_2SO_4 usage, and implementation of HCl as a secondary pH control chemical (starting in late 2007) have reduced the effluent SO_4 levels, which had been a periodic compliance concern.

This permit includes approval of GRE's June 3, 2015 request for installation and use of an on-site Chlorine Dioxide Generation System. GRE proposes a pilot test to generate chlorine dioxide through a technology provided by Nalco reacting sulfuric acid with Purate (a mixture of hydrogen peroxide, sodium chlorate, and water). This material would be added directly to the cooling tower basin water. Use of chlorine dioxide will result in an anticipated reduction in overall chemistry (sulfuric acid, sodium hypochlorite, sodium bromide and non-oxidizing biocide) addition to the cooling tower by half. As of June 2015, GRE is proposing a 3-month trial period starting in mid to late July 2015 to ascertain the effectiveness of this system. The pilot test also requires approval of the NHDES ARD. If the pilot test is successful, the new system would be retained.

The discharge from this cooling tower system represents a portion of the facility's wastewater discharge that is federally regulated (the federally-regulated chemical cleaning activities are addressed in text below). With the exception of specific numerical limits for chromium and zinc,

Attachment 6
(5 pages)

Raw Material Usage: Granite Ridge Energy, LLC

Town of Londonderry - Public Works & Engineering Department
268B Mammoth Road
Londonderry, NH 03053-3416
IMA with City of Manchester Wastewater Treatment Facility
Environmental Engineer: Bob Kerry Telephone: 603-432-1100 x137 Fax: 603-432-1128

Purpose Raw Material Name / Manufacturer	Main Ingredients / Notes	Annual Usage	% to Sewer	MSDS on File?	Date Added
Actifloc system					
ACTI-BROM 1318 / Nalco	Active ingredient is sodium bromide. Constant rate dosage feed @ 34 gpd. This disinfectant stabilizes chlorine residual and reduces the setpoint requirement. Usage included under "Cooling Tower System" (used in both locations).		100.0%	☑	6/20/2012
ActiSand / Manley Bros. of Indiana		34 Tons	0.0%	☑	6/20/2012
CAT-FLOC 8103 PLUS (APPROVED 5/18/09) / Nalco	Filtration Aid coagulant / No hazardous ingredients/ Certified by NALCO no priority pollutants present	6,137 Pounds	100.0%	☑	5/12/2009
NALCLEAR® 7768 / Nalco	FLOCCULANT - new chemical with undetermined usage rates. Aluminum-free Cupric sulphate may be present as a contaminant	4,684 Pounds	20.0%	☑	8/29/2011
Nalco 8158 / Nalco	WATER CLARIFICATION AIDCOAGULANT, FLOCCULANT - new chemical with undetermined usage rates Aluminum Chloride Hydroxide Sulphate 30.0 - 60.0%	81 Tons	20.0%	☑	8/29/2011
Nalcolyte 8105 (APPROVED 8/18/10) / Nalco	Organic coagulant (no aluminum). Alternative filter aid - may help improve filter runs, lower turbidity and improve organic removal. / No hazardous substances included in MSDS.	500 Gallons	20.0%	☑	8/19/2010
Chlorination of influent from Manchester POTW, TWST Tank, Cooling Tower Basin					
Sodium hypochlorite (12% solution) / JCL Jones		1,457 Tons	100.0%	☑	5/23/2006

Purpose Raw Material Name / Manufacturer	Main Ingredients / Notes	Annual Usage	% to Sewer	MSDS on File?	Date Added
Component Cooling Water System					
77352NA Non-Ox Biocide / Nalco	Magnesium salt 1 - 5%, biocides. Non-Oxidizing Biocide. Certified by NALCO no priority pollutants present. August 2013: Nalco 2838 to mostly replace use of this chemical (77352NA may be used as shock treatment if necessary). Usage reduced from 1000 lb to < 5 gallons (45 lb).	1,000 Pounds	100.0%	☑	3/27/2008
NALCO® 2838 (APPROVED 8/23/13) / Nalco	Glutaraldehyde (15%w/w) / This material is recommended for primary non-oxidizing biocide (rather than 77352NA) due to employee handling concerns. Will not entirely replace 77352NA (which may still be used as shock treatment). Certified by NALCO no priority pollutants present (Air permitting evaluation pending for glutaraldehyde emissions)	1,000 Pounds	100.0%	☑	8/23/2013
TRASAR TRAC 101 (APPROVED 5/18/09) / Nalco	Liquid corrosion and deposit inhibitor / To replace Nalco 8325 / Sodium nitrite (10 - 30%); Sodium molybdate (1 - 5%; 160 ppm in cooling water system) / Certified by NALCO no priority pollutants present	2,000 Pounds	100.0%	☑	5/12/2009
Cooling tower system					
3D Trasar 3DT195 Dispersant / Nalco	Organic phosphate inhibitor / Certified by NALCO no priority pollutants present (per 7/31/07 letter from NALCO)	74,000 Pounds	100.0%	☑	8/1/2007
ACTI-BROM 1318 / Nalco	Active ingredient is sodium bromide. Started using in JAN 2008. Constant rate dosage feed @ 34 gpd. This disinfectant stabilizes chlorine residual and reduces the setpoint requirement. 250-gallon totes. Usage includes amount used in Actifloc System.	100 Tons	100.0%	☑	3/27/2008
Carbon Dioxide, Gas (APPROVED 5/18/09) / BOC Gases	Supplemental cooling tower pH control (to help reduce sulfuric acid use) / Trial operation expected within 6 months (May and Nov 2009) March 2012 - Trial not completed but GRE would like to maintain approval for future trials. June 2015 - Trial may be conducted after trial of the Purate System in 2015.		0.0%	☑	5/12/2009
Chlorine Dioxide / Nalco	Proposed in June 2015 to be manufactured on-site through technology provided by Nalco reacting Sulfuric Acid and Purate.		100.0%	☑	6/4/2015

Purpose Raw Material Name / Manufacturer	Main Ingredients / Notes	Annual Usage	% to Sewer	MSDS on File?	Date Added
Cooling tower system					
Hydrochloric Acid (32%) / Univar USA Inc.	NOT ACTIVELY IN USE OR ON SITE as of DEC 2014 (RO system has resolved sulfate compliance issues) Is used to offset elevated pH caused by hypochlorite. Its usage is secondary to sulfuric acid use, and is presently used to minimize sulfate concentrations - primarily when cooling tower cycles are high in summer. MSDS submitted with 10/10/07 letter. Started using in May 2015 due to elevated sulfate.	16,000 Pounds	100.0%	☑	3/27/2008
Nalco H-130 Microbiocide / Nalco	Antimicrobial biocide. Alternative to 90005, less dosage required. Certified by Nalco - no priority pollutants / Didecyl-Dimethyl-Ammonium chloride (30 - 60%), Ethanol (10-30%)	6,000 Pounds	100.0%	☑	6/20/2012
Nalco PP01-3911 (APPROVED 2/12/14) / Nalco	Anti-foam. Primary. Alternate to 71D5 PLUS depending on tower conditions.	30,000 Pounds	50.0%	☑	2/12/2014
Nalco(R) 73550 (APPROVED 5/18/09) / Nalco	Biodetergent used to aid in removing and dispersing microbiological-based slime and silt deposits / Nonionic surfactants (10 - 30%); Nonionic alkyl polyglycoside (10 - 30%) / Certified by NALCO no priority pollutants present	4,000 Pounds	100.0%	☑	5/12/2009
NALCO(R) 90005 (APPROVED 5/18/09) / Nalco	To replace 77352NA in CT system / non-oxidizing biocide / Dimethyl-dioctyl-ammonium chloride (30 - 60%); Alkyl alcohol (5 - 10%) / Certified by NALCO no priority pollutants present	18,000 Pounds	100.0%	☑	5/12/2009
NALCO® 71D5 PLUS / Nalco	Antifoam - Secondary. Alternative to PP01-3911 (depending on tower conditions) Paraffin Wax 1.0% Hydrotreated Light Distillate 10.0 - 20.0 Straight Run Middle Distillate 30.0 - 60.0 Polypropylene Glycol 5.0 - 10.0 Aliphatic alcohol Proprietary 1.0 - 5.0 Aliphatic alcohol Proprietary 1.0 - 5.0	5,000 Pounds	50.0%	☑	8/29/2011

Purpose Raw Material Name / Manufacturer	Main Ingredients / Notes	Annual Usage	% to Sewer	MSDS on File?	Date Added
Cooling tower system					
Purate (for generation of Chlorine Dioxide) / Nalco	PROPOSED JUNE 2015. 50 GPD - 3-month trial planned. Chlorine dioxide biocide precursor. Sodium Chlorate (40%); Hydrogen Peroxide (5-10%). Not all sodium chlorate is reacted and a residual of 5% (11.4 lb/day, 3.4 mg/L) is expected in the cooling tower. Certified by 2/12/2014 NALCO letter that no priority pollutants are present	18,250 Gallons	100.0%	☑	6/4/2015
Sulfuric acid (93% solution) / Univar USA Inc.	300-gallon totes Is used to offset elevated pH caused by hypochlorite. Cooling tower system levels need to be approximately 7.0 to minimize phosphate precipitation. It's usage rate may be offset or replaced by HCl use, dependent on time of year and availability. Usage combined with Demin usage.		100.0%	☑	3/27/2008
Sulfuric acid (93% solution) / Univar USA Inc.	30 GPD - Used in Purate system	10,950 Gallons	100.0%	☑	6/15/2015
Demineralizer regeneration and Wastewater neutralization					
PermaTreat PC-1611/T / Nalco	Antiscalant used to prevent scaling in RO membranes. Contains Maleic acid.	700 Pounds	100.0%	☑	7/14/2014
Sodium hydroxide (25-50% solution) / Harcross	50% solution stored in the bulk tank. 25% solution used in totes during very cold months due to lower freezing temp	220 Tons	100.0%	☑	5/23/2006
Sulfuric acid (93% solution) / Univar USA Inc.	Usage amount is total for this purpose and Cooling Tower System.	275 Tons	100.0%	☑	5/23/2006
HRSG water system					
Ammonium hydroxide (pH control) / Boremco	Usage is also included with the SCR NH3-OH - same tank system. 19% solution. May be supplemented with Nalco 5711 per 12/12/12 request. 2/27/13 update: this material may still be used for pH control (either or both this material and 5711 will be used).	Gallons	100.0%	☑	2/28/2007
HRSG Water Testing (Silica Standards)					
Amino Acid F Dilution Solvent / Hach	Aminomethlpropanol (5-10%,) balance water	<2 Pounds	100.0%	☑	6/21/2012

Purpose Raw Material Name / Manufacturer	Main Ingredients / Notes	Annual Usage	% to Sewer	MSDS on File?	Date Added
HRSG Water Testing (Silica Standards)					
Citric Acid / Surfactant Solution / Hach	Citric Acid (10-20%,) balance water	<2 Pounds	100.0%	☑	6/21/2012
Molybdate 3 Reagent / Hach	Molybdic Acid (5 - 15%,) Sodium Bisulfate (10 - 20%,) Sulfuric Acid (5 -15%,) balance water	<2 Pounds	100.0%	☑	6/21/2012
Silica Standard Sol. 500 / Hach	Sodium Silicofluoride (< 0.01%,) balance water	<2 Pounds	100.0%	☑	6/21/2012
Manitenance parts washer					
Safety-Kleen Premium Solvent / Safety-Kleen Systems, Inc.	Petroleum distillates; Tetrachlorothylene (0.2%); Parts washer volume is 26 gallons. July 2014: Changed from recycled 105 Solvent to Premium Solvent. Used solvent sent for reclaimation approx. every 2 years.	26 Gallons	0.0%	☑	6/29/2009
SCR Emission control					
Ammonium hydroxide (19% solution) / Boremco	Single Catalyst Reduction - NOX reduction (air pollution control). Usage combined with HRSG Water System.	4,500 Tons	0.0%	☑	5/23/2006
Service water system					
3D Trasar 3DT195 Dispersant / Nalco	Dual function phosphonate inhibitor - active material is proprietary chemical called Phosphinosuccinic Oligomer (PSO). Replaced 3DT181 in OCT 2007. For usage, see Cooling Tower System usage	Gallons	100.0%	☑	8/1/2007
Turbine Wash					
Fyrewash F3 (added 3/14/2012 inspection) / Rochem	Detergent based cleaner with non ionic surfactants (2.5 - 10%) and 2-(2-butoxyethoxy). Mixed with water and used to wash turbine blades. Batch discharge 0-2 times per year from an 800-gallon tank after testing.	155 Pounds	100.0%	☑	3/14/2012