



August 11, 2016

Mr. Michael Wood
Town Manager
Town of Burrillville
100 Main Street
Harrisville, RI 02830

Re: Clear River Energy Center Invenergy Response to DOH Advisory Opinion

Dear Mr. Wood:

At your request, CDR Maguire and Alares LLC (Alares) has provided a review of the Invenergy Response to the Department of Health's (DOH) Draft Advisory Opinion. We have reviewed the document and offer the following comments and recommendations:

Issue 3 – Drinking Water Quality

RIDOH's Opinion: The RIDOH recommended that efforts be made to protect source water for nearby wells, including private wells and Wallum Lake, from contamination through each phase of the project, including construction and operation.

The RIDOH also stated that the MTBE-contaminated wells cannot be used to provide water to the plant's offices. Should the power plant use well water on-premises for human use and consumption, and its offices serve more than 25 persons more than 60 days out of the year, then the plant will have to obtain a public water system license through RIDOH's Center for Drinking Water Quality.

Invenergy's Response: Invenergy will be required to implement numerous controls and best management practices both during construction and operation through the stormwater and water quality permitting processes to ensure the protection of source water from contamination. Invenergy will obtain a RIPDES Construction General Permit, which will require the development and implementation of a Soil Erosion and Sediment Control Plan which will include extensive pollution prevention practices throughout all construction activities.

The Stormwater Management Plan for the Project will include stormwater control systems and best management practices to fully comply with the Rhode Island Stormwater Design and Installation Standards Manual during operation. An Operation and Maintenance Plan will also be developed for post-construction monitoring and maintenance of stormwater control systems.

Invenergy will obtain a RIPDES Multi-Sector General Permit for Industrial Activities, which will require the development of a Stormwater Pollution Prevention Plan.

All chemicals will be stored on-site in sealed containers in designated areas equipped with secondary containment systems as required. All plant employees responsible for chemical storage and handling will be trained to handle chemicals responsibly and in accordance with applicable regulations. A routine inspection and maintenance program will be established to ensure that all containment and spill control equipment at the facility is in proper working order at all times. A Spill Prevention, Control, and Countermeasures Plan will also be developed for the storage of fuel oil at the facility.

Invenergy is proposing an on-site well to provide potable water for plant personnel during operation (post-construction). The well will not service more than 25 people more than 60 days out of the year so a public water system license will not be required. Invenergy will submit an Application for Source Approval to the RIDOH for approval of the potable well as a non-community, non-transient water system.

Review Team Comments and Recommendations: Acknowledged from a drinking water perspective as it pertains to the authority of RIDOH to regulate drinking water. In the RIDOH evaluation, RIDOH did clearly state that they are principally concerned with the “protection of sourcewater for nearby wells, including private wells and Wallum Lake, the source serving Zambarano Hospital.” The information presented by the CREC design team adequately addresses how operations at the proposed CREC facility would limit the possibility of a release of oil or hazardous materials to the environment.

The CREC response does not appear to address the reactivation of Well 3A which was also part of the RIDOH analysis. As stated in the RIDOH analysis, the reactivation of Well 3A is not subject to the RIDOH regulations since the use of the water will be for process water at the proposed CREC facility. However, with the stated RIDOH principal concern of protecting the “sourcewater for nearby wells, including private wells and Wallum Lake, the source serving Zambarano Hospital,” the reactivation of Well 3A does have potential implications for these sensitive receptors. Please advise how the reactivation of Well 3A would not impact the “sourcewater for nearby wells, including private wells and Wallum Lake, the source serving Zambarano Hospital.”

Additionally, to restate the previous Review Team summaries from the recent planning board meetings:

- It should be demonstrated that the reactivation of Well #3A should have no hydraulic impact on the operation of the Eccleston Well Field for Harrisville Water District. Harrisville Water District has recently undertaken this modeling initiative with an independent engineer and available information indicates that information may be ready as soon as August 10, 1026.
- The groundwater conditions should be modeled to establish if the reactivation of Well #3A would potentially introduce air impacts to the residential properties in the vicinity of Well #3A. Due to the time necessary to reach equilibrium conditions in the aquifer, in the vadose zone soil gas, and potentially indoor air; it may be likely infeasible to conduct a pump test of sufficient duration to assess these conditions. In the event that an impact is identified post Well #3A

activation, contingency arrangements should be in place by CREC for assessment and mitigation of indoor air intrusion, as necessary to protect human health.

- It should be demonstrated that the reactivation of Well #3A will have no impact on the low flow stream conditions of the Clear River.
- A groundwater treatment process and instrumentation diagram (P&ID) should be presented by the CREC Design Team. It should detail the proposed flow rates, the design criteria, the system components, and the proposed building size. The treatment system should be capable of removing petroleum constituents in groundwater to non-detect laboratory limits consistent with EPA Method 8260 analysis. Treatment and mechanical redundancy should be factored into the design.
- Supplemental sources for process water should be proposed by the CREC Design Team in addition to the reactivation of Well #3A. These may include additional groundwater sources, surface water sources, or interconnections with other municipalities.
- Consideration should be given to discharging a portion or the majority of the spent process water from the proposed CREC plant to an upgradient location on the Clear River. Treatment will likely be required as the proposed CREC plant to facilitate this sustainable water reuse option.

Issue 6 – Emergency Response and Prevention

RIDOH's Opinion: The RIDOH recommended that Invenergy establish written procedures to maintain the integrity of the ammonia storage tank containment area as well as written emergency procedures. The RIDOH also recommended that the ALOHA model be run assuming a failure of the passive controls to be used to reduce the evaporation rate, and if the distance to the toxic end-point extends off-site, appropriate planning should be implemented. The RIDOH also recommended that Invenergy coordinate with local emergency responders.

The RIDOH recommended that Invenergy put in place written procedures for the inspection, testing, and maintenance of all equipment related to the storage of hydrogen at the facility. All staff involved with the storage, transfer and use of hydrogen should have the appropriate training. Coordination with local emergency responders is essential.

The RIDOH recommended that all potential hazards be evaluated in a facility-wide RMP-like hazard analysis.

Invenergy's Response: Aqueous ammonia for the gas turbine selective catalytic reduction ("SCR") systems will be stored at 19% concentration in a 40,000 gallon aboveground storage tank. The EPA requires facilities that store 10,000 pounds or more of aqueous ammonia which is stored at a concentration of 20% or greater to conduct an off-site consequence analysis and prepare a Risk Management Plan (RMP) to prevent and mitigate the consequences of accidental releases. The RMP does not apply to aqueous ammonia stored at a concentration of less than 20% in any amount.

The Facility will not be subject to the RMP requirements, but will be subject to the EPA's General Duty Clause, which requires facilities to assess hazards, prevent accidental releases, and minimize the consequences of any releases which occur. Consistent with the General Duty Clause, Invenergy is proposing the following to ensure the safe storage of aqueous ammonia on-site, and to minimize the consequences in the unlikely event that an accidental ammonia release were to occur:

- The ammonia storage tank and its associated transfer pumps and piping will be enclosed within a concrete containment area designed to contain up to 110% of the capacity of the storage tank.
- The containment area will be filled with a passive evaporative control system designed to reduce the exposed surface area of any ammonia within the containment system by at least 90%.
- The containment area will be equipped with ammonia sensors to alert Facility operators of any system leaks.
- Procedures will be established and documented for the periodic maintenance, inspection and testing of the containment area, the leak detection system, and the evaporative control system.
- Emergency procedures will be established and documented, including the training of staff in the procedures and the proper use of the personal protective equipment which would be required during a release.
- Invenergy will coordinate with local emergency responders and the nearest hazardous materials response team to establish emergency procedures in the unlikely event of a release of ammonia from the Facility.

Acute Exposure Guideline Levels ("AEGs") are used by emergency planners and responders as guidance in dealing with accidental releases of chemicals into the air. AEGs are expressed as concentrations of airborne chemicals at which health effects may occur and are designed to protect the elderly and children, as well as other individuals who may be susceptible.

AEG levels are dictated by the severity of the toxic effects caused by the exposure, as follows:

- AEG-1 (Level 1): Notable discomfort, irritation, or certain asymptomatic non-sensory effects. Any effects are not disabling and are transient and reversible upon cessation of exposure.
- AEG-2 (Level 2): Irreversible or other serious, long-lasting adverse health effects or an impaired ability to escape.
- AEG-3 (Level 3): Life-threatening health effects or death.

Airborne concentrations below the AEGL-1 are exposure levels which could produce mild, transient, odor, taste, and sensory irritation. These effects are non-disabling, allowing for safe evacuation from any impacted areas.

For ammonia, the 1-hour AEGL concentrations have been defined as follows:

- AEGL-1: 30 parts per million (ppm)
- AEGL-2: 160 ppm
- AEGL-3: 1,100 ppm

Although the CREC is not subject the Risk Management Program, a worst-case accidental release scenario has been evaluated to assess the potential consequences in the extremely unlikely event of a release of the full 40,000 gallons of 19% aqueous ammonia into the containment area. This assessment was performed using the Area Locations of Hazardous Atmospheres (“ALOHA”) Model developed by the EPA and the National Oceanic and Atmospheric Administration and included as a prescribed technique under the Risk Management Program. It was completed in accordance with the procedures contained in the EPA’s “Risk Management Program Guidance for Offsite Consequence Analysis”.

The analysis was first conducted without and then with the proposed passive evaporative control system. The results of the worst-case accidental release scenario assessment completed for the CREC aqueous ammonia storage tank are shown in both tabular and graphical form in **Exhibit 1 (Not included in this response)**.

Based on the ALOHA modeling results, the furthest downwind distances from the ammonia storage tank at which the in-air ammonia concentrations would exceed each of the ammonia AEGL levels during a worst-case accidental release are as follows:

AEGL Level	w/o Evaporative Controls	w/ Evaporative Controls
AEGL-1	389 yards	121 yards
AEGL-2	174 yards	53 yards
AEGL-3	64 yards	20 yards

As shown on the figures in **Exhibit 1**, all of the areas in which the inair ammonia concentration would exceed the AEGL-1 level are within the Project and/or Spectra site, which is private property not accessible to the general public. Emergency procedures will be established to evacuate Algonquin (Spectra) and CREC personnel from these areas in the event of a release and to require emergency

personnel to utilize the proper personal protective equipment before entering these areas until the released ammonia has been properly recovered.

The in-air ammonia concentrations in all areas beyond the Spectra site during a worst-case accidental release would be below the AEGL-1 level, thus resulting in no adverse health effects upon exposure. Although there would be no public health risk, Invenergy will work with local emergency responders to establish emergency procedures in the unlikely event that there is an accidental release of ammonia from the facility.

Invenergy will put in place written procedures for the periodic inspection, testing, and maintenance of all equipment, controls, and sensors related to the storage and use of hydrogen at the facility. All staff involved with the storage, transfer and use of hydrogen will be provided with the appropriate training in procedures necessary to ensure the safe maintenance and operation of the hydrogen system, including emergency procedures. Periodic refresher training of this training will be provided to the relevant staff. Invenergy will coordinate with local emergency responders, including the nearest hazardous materials response team. Invenergy will provide them with all relevant information regarding the quantity of hydrogen stored on site and its location, transport routes and procedures.

Although not subject to the RMP requirements, Invenergy will conduct a facility-wide RMP-like hazard analysis to ensure full compliance with the General Duty Clause. This assessment will include the ammonia, hydrogen, and fuel oil storage and delivery systems, the storage and transportation of hazardous waste generated at the facility, and the transport and use of natural gas at the facility or in the pipeline or related infrastructure.

Review Team Comments and Recommendations: As presented, the proposed CREC facility is not subject to the RMP requirements and the proposed CREC facility is required to be in full compliance with the General Duty Clause. The proposed “facility-wide RMP-like hazard analysis” that is proposed to be conducted by the CREC design team is intended to provide a higher level of safety for the employees working at the proposed CREC facility as well as the residents in the vicinity of the proposed CREC facility. It should be noted that the proposed “facility-wide RMP-like hazard analysis” constitutes an act of good faith by the CREC design team and exceeds the Standard of Care required by the proposed facility configuration.

Mr. Michael Wood
August 11, 2016
Page 7 of 7

We appreciate the opportunity to assist the Town of Burrillville with these issues. If you have questions please contact me at your convenience

Very truly yours,

CDR MAGUIRE INC.

A handwritten signature in blue ink, appearing to read "James A. Jackson". The signature is fluid and cursive, with the first name "James" and last name "Jackson" clearly distinguishable.

James A Jackson, P.E.
Project Manager