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January 27, 2016

Mr. Doug McVay
Rhode Island Department of Environmental Management
Office of Air Resources
235 Promenade Street
Providence, Rhode Island 02908

***Re: Health Risk Assessment Report - Clear River Energy Center– Burrillville, Rhode Island***

Dear Mr. McVay:

Enclosed for your review is a Health Risk Assessment Report for the Clear River Energy Center, a combined-cycle electric generating facility being proposed by Invenergy Thermal Development, LLC (Invenergy) at the Spectra Energy Algonquin Compressor Station site on Wallum Lake Road (State Route 100) in Burrillville, Rhode Island (the Project or the Facility).

An Air Dispersion Modeling Protocol was submitted to RIDEM on April 20, 2015, which described the procedures to be used for the air quality impact analysis to be completed for the Project. A Major Source Permit Application was submitted for the Project on June 26, 2015. RIDEM conditionally approved the Modeling Protocol in a letter dated July 27, 2015. An Air Dispersion Modeling Report, submitted to RIDEM on October 30, 2015, detailed the air quality impact analysis completed for the Project in accordance with the approved Modeling Protocol.

A Health Risk Assessment Protocol for the Project was submitted to RIDEM on June 26, 2015. RIDEM provided comments on the Protocol in a letter dated August 11, 2015. The RIDEM letter stated that the comments were based on the specifications in the proposed revision to the RIDEM Guideline and that RIDEM's comments on the submitted protocol would be reevaluated and updated as necessary to be consistent with the final Guideline document, which was finalized on October 21, 2015. You confirmed by telephone on January 5, 2016 that the submitted Protocol was approved based on the revised Guideline.

This Health Risk Assessment Report details the assessment completed for the Project in accordance with the approved Protocol and the revised RIDEM Guideline. As detailed in the Report, compliance with each of the acceptability criteria listed in the RIDEM Guideline has been demonstrated.

Please contact me at (781) 419-7749 or at mfeinblatt@essgroup.com with any questions you may have about the enclosed Health Risk Assessment Report.

Sincerely,

**ESS GROUP, INC.**

Michael E. Feinblatt
Vice President, Energy & Industrial Services

Enclosures

C: John Niland, Invenergy

# Health Risk Assessment Report
# Combined-Cycle Electric Generating Facility

## CLEAR RIVER ENERGY CENTER
## BURRILLVILLE, RHODE ISLAND

**PREPARED FOR:**
Invenergy Thermal Development LLC
One South Wacker Drive
Suite 1900
Chicago, IL 60606

**FOR SUBMITTAL TO:**
Office of Air Resources
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908

**PREPARED BY:**
ESS Group, Inc.
10 Hemingway Drive, 2nd Floor
East Providence, Rhode Island 02915

ESS Project No. I108-011

January 27, 2016

# HEALTH RISK ASSESSMENT REPORT
# COMBINED-CYCLE ELECTRIC GENERATING FACILITY

**Clear River Energy Center**
**Burrillville, Rhode Island**

*Prepared For:*

**Invenergy Thermal Development LLC**
One South Wacker Drive
Suite 1900
Chicago, Illinois 60606

*For Submittal To:*

**Office of Air Resources**
Rhode Island Department of Environmental Management
235 Promenade Street
Providence, Rhode Island 02908

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**ESS Project No. I108-011**

**January 27, 2016**

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# 1.0 INTRODUCTION

## 1.1 Background

ESS Group, Inc. (ESS) was contracted by Invenergy Thermal Development LLC (Invenergy) to conduct an air quality impact analysis for the Clear River Energy Center, a combined-cycle electric generating facility being proposed by Invenergy at the Spectra Energy Algonquin Compressor Station site on Wallum Lake Road (State Route 100) in Burrillville, Rhode Island (the Facility).

The Facility will be a new major stationary source, as it will have the potential to emit 100 tons per year or more of a regulated new source review (NSR) pollutant. In accordance with Rhode Island Department of Environmental Management (RIDEM) Air Pollution Control Regulation No. 9, Section 9.5.2, major stationary sources proposed in areas designated as attainment or unclassifiable for any pollutant for which there is a significant net emissions increase at the source must obtain a Major Source Permit. The conditions which must be met for the issuance of a Major Source Permit include a demonstration, by means of air quality modeling, that the allowable emission increases from the proposed source would not cause or contribute to air pollution in violation of any National Ambient Air Quality Standard (NAAQS) or any increase in ambient concentrations exceeding the remaining available Prevention of Significant Deterioration (PSD) Increment for the specified air contaminant. The additional impact analyses required by RIDEM's PSD and Air Toxics regulations must also be completed prior to the issuance of a Major Source Permit.

The RIDEM "Rhode Island Air Dispersion Modeling Guidelines for Stationary Sources (March 2013 Revision)" (RIDEM, 2013) outlines the accepted procedures for performing modeling analyses in conformance with the EPA Guideline on Air Quality Models (40 CFR 51, Appendix W). To ensure that all modeling analyses subject to the approval of RIDEM are performed in accordance with applicable state and federal guidance, an applicant must submit a modeling protocol prior to conducting the analysis. The protocol describes the input parameters, models, and assumptions that will be used in the analysis.

An Air Dispersion Modeling Protocol was submitted to RIDEM on April 20, 2015, which described the procedures to be used for the air quality impact analysis to be completed for the Project. A Major Source Permit Application was submitted for the Project on June 26, 2015. RIDEM conditionally approved the Modeling Protocol in a letter dated July 27, 2015. An Air Dispersion Modeling Report, submitted to RIDEM on October 30, 2015, detailed the air quality impact analysis completed for the Project in accordance with the approved Modeling Protocol.

Section 9.5.2(f) of RIDEM APCR No. 9 requires an applicant for a major source permit in an attainment area to conduct any studies required by the Guidelines for Assessing Health Risks from Proposed Air Pollution Sources (the RIDEM Guideline), and meet the criteria therein. The RIDEM Guideline, which was revised on October 21, 2015, requires that preconstruction permit applications for all proposed major stationary sources must include a multi-pathway human health risk assessment. It also requires the applicant to submit a risk assessment protocol to RIDEM for approval prior to preparation of the assessment. The protocol must include the information detailed in the RIDEM Guideline.

A Health Risk Assessment Protocol for the Project was submitted to RIDEM on June 26, 2015. RIDEM provided comments on the Protocol in a letter dated August 11, 2015. The RIDEM letter stated that the comments were based on the specifications in the proposed revision to the RIDEM Guideline and that RIDEM's comments on the submitted protocol would be reevaluated and updated as necessary to be consistent with the final Guideline document. Mr. Doug McVay of RIDEM confirmed by telephone on January 5, 2016 that the submitted Protocol was approved based on the revised Guideline.

This Health Risk Assessment Report details the assessment completed for the Project in accordance with the approved Protocol and the revised RIDEM Guideline. Section 2.0 of this report describes the Project emission sources and emission points. The scope of the assessment is outlined in Section 3.0. Section

4.0 provides an overview of the assessment methodology. The risk characterization procedures used are detailed in Section 5.0. Section 6.0 summarizes the results of the Project health risk assessment.

## 1.2 Facility Description

The Clear River Energy Center is a combined-cycle electric generating facility being proposed by Invenergy at the Spectra Energy Algonquin Compressor Station site located along Wallum Lake Road in Burrillville, Rhode Island. A site locus map is shown in Figure 1. The preliminary Facility site layout plan is shown in Figure 2. Figure 3 shows the general arrangement of the Facility equipment. A topographic map of the area within 3 km of the proposed Facility location is shown in Figure 4.

The Facility will consist of two General Electric Model 7HA.02 gas turbines operated in a combined-cycle configuration, each equipped with a heat recovery steam generator (HRSG) with natural fired duct burners, a steam turbine, and an air cooled condenser (ACC). Each gas turbine will fire natural gas as a primary fuel and ultra-low sulfur diesel (ULSD) fuel as a backup fuel from on-site storage tanks for limited periods when natural gas is unavailable. The Facility will have a nominal power output at base load of approximately 800-1,080 megawatts (MW) while firing natural gas (with supplementary HRSG duct firing) and 600-930 MW while firing ULSD.

## 1.3 Applicable Regulations

The following RIDEM Air Pollution Control Regulations apply to the proposed Project:

- No. 1 – Visible Emissions
- No. 5 – Fugitive Dust
- No. 6 – Opacity Monitors
- No. 7 – Emission of Air Contaminants Detrimental to Person or Property
- No. 8 – Sulfur Content of Fuels
- No. 9 – Air Pollution Control Permits
- No. 10 – Air Pollution Episodes
- No. 11 – Petroleum Liquids Marketing and Storage
- No. 13 – Particulate Emissions from Fossil Fuel Fired Steam or Hot Water Generating Units
- No. 14 – Record Keeping and Reporting
- No. 16 – Operation of Air Pollution Control Systems
- No. 17 – Odors
- No. 22 – Air Toxics
- No. 27 – Control of Nitrogen Oxide Emissions
- No. 28 – Operating Permit Fees
- No. 29 – Operating Permits
- No. 45 – Rhode Island Diesel Anti-Idling Program
- No. 46 – $CO_2$ Budget Trading Program

The following federal Air Pollution Control Regulations apply to the proposed Project:

- 40 CFR 50 – National Primary and Secondary Ambient Air Quality Standards
- 40 CFR 52.21 – Prevention of Significant Deterioration of Air Quality
- 40 CFR 60 – Standards of Performance for New Stationary Sources
    - Subpart A – General Provisions
    - Subpart Db – Standards of Performance for Industrial-Commercial-Institutional Steam Generating Units
    - Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines
    - Subpart KKKK – Standards of Performance for Stationary Combustion Turbines
    - Appendix B – Performance Specifications
    - Appendix F – Quality Assurance Procedures
- 40 CFR 63 – National Emission Standards for Hazardous Air Pollutants for Source Categories
    - Subpart A – General Provisions
    - Subpart ZZZZ – National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines
- 40 CFR 70 & 71 – Operating Permits Program
- 40 CFR 72 – Permits Regulation
- 40 CFR 73 – Acid Rain Program Sulfur Dioxide Allowance System
- 40 CFR 75 – Continuous Emissions Monitoring
- 40 CFR 80 – Regulation of Fuels and Fuel Additives
- 40 CFR 89 – Control of Emissions from New and In-Use Nonroad Compression-Ignition Engines
- 40 CFR 98 – Mandatory Greenhouse Gas Reporting

## 2.0 EMISSION SOURCES & EMISSION POINTS

The Facility's potential emissions of criteria pollutants are summarized on Table 1. The specifications of each of the Facility emission sources and each emission point are summarized on Table 2. The Facility's potential emissions of non-criteria pollutants are summarized on Table 3. Appendix A contains Facility emissions data summaries.

For the gas turbines/HRSGs, the annual criteria pollutant potential emissions during steady-state operation firing natural gas are based on base load operation with duct firing at 59°F, which will be base operating load on natural gas. The potential emissions during steady-state operation on ULSD are based on base load operation at 10°F for 720 hours per year per unit, as it is expected that ULSD firing will predominately be during the winter months, when natural gas may be diverted for commercial and residential heating uses.

The potential emissions during gas turbine startups and shutdowns are based on startup/shutdown emissions and event duration information provided by GE and the number of each startup and shutdown events Invenergy expects could occur each year. Appendix A contains a summary of expected startup shutdown events on each fuel per year, including their number, duration, and potential emissions of criteria pollutants.

The potential emissions for the other emission sources are based on their maximum emission rates at full load and their proposed maximum permitted hours of operation per year.

As shown on Table 1, the Facility will be a major source for $NO_X$, CO, VOC, $CO_2$, $PM_{10}$, and $PM_{2.5}$. The Facility will not be a major source of hazardous air pollutants (HAPs), as shown on Table 2.

The Facility stationary emission sources are detailed below. The equipment specifications and emissions information provided in Tables 1, 2 and 3, and in Appendix A, are based on the current Facility design, preliminary equipment and emissions information provided to date by GE, and the available emission factors. The actual Facility design and layout, the equipment specifications, and the emission rates of each pollutant from each emission source are all subject to change as the Project design advances.

### 2.1 Gas Turbines/HRSGs

The Facility will utilize two gas turbines operated in a combined cycle configuration, each with a duct fired HRSG to generate electricity and to generate steam for a dedicated steam turbine. Based on the preliminary information provided by GE, each gas turbine will have a maximum heat input rate of approximately 3,393 MMBtu/hr while firing natural gas and approximately 3,507 MMBtu/hr while firing ULSD fuel. Each HRSG will be equipped with a natural gas fired HRSG duct burner with a maximum heat input capacity of approximately 721 MMBtu/hr to provide additional energy for the steam turbine during natural gas firing.

Each GT/HRSG will be equipped with a selective catalytic reduction (SCR) system for $NO_X$ emissions control. Water injection will also be used during ULSD firing for $NO_X$ emissions control. Each HRSG stack will have a maximum stack $NO_X$ concentration of 2.0 parts per million dry by volume at 15 percent oxygen (ppmvd@15%$O_2$) during natural gas firing, and 5.0 ppmvd@15%$O_2$ during ULSD firing during steady-state operation (down to a minimum of 30%-50% load on natural gas and 50% load on ULSD).

Each SCR will utilize $NH_3$ injection for $NO_X$ emissions control. The Facility will include a 40,000 gallon aboveground storage tank of 19% aqueous $NH_3$ for this purpose. The SCR will be designed to achieve a maximum $NH_3$ stack concentration ($NH_3$ slip concentration) of 2.0 pmvd@15%$O_2$ both while firing natural gas and while firing ULSD.

Each GT/HRSG will be equipped with an oxidation catalyst (OC) for the control of CO, VOCs, and organic hazardous air pollutants (HAPs). Each OC will be designed to achieve a maximum stack CO concentration of 2.0 ppmvd@15%$O_2$ while firing natural gas and 5.0 ppmvd@15%$O_2$ while firing ULSD. The maximum VOC stack concentration will be 1.0 ppmvd@15%$O_2$ while firing natural gas without duct firing, 1.7 ppmvd@15%$O_2$ while firing natural gas during duct firing, and 5.0 ppmvd@15%$O_2$ during ULSD firing. Each OC will also reduce organic HAP by at least 90%. The potential emissions of organic HAP emissions from the GT/HRSGs have been estimated using information provided by GE and using emission factors from AP-42.

The emissions of $CO_2$, $SO_2$, $H_2SO_4$, and $PM_{10}/PM_{2.5}$ from the GT/HRSGs will be minimized by the use of clean burning, low sulfur, low ash fuels, and by the use of the most efficient gas turbine combustion technology commercially available at this time. The emission rates of $CO_2$, $SO_2$, $H_2SO_4$, and $PM_{10}/PM_{2.5}$ from the gas turbines at each operating condition are detailed in Appendix A. The average $CO_2$ emission rates from the GT/HRSGs at base load will be 814 lb/MW-hr (net) while firing natural gas and 1,227 lb/MW-hr (net) while firing ULSD.

The exit height of each GT/HRSG stack will be 200 feet above grade. The GT/HRSG stacks will have an inside diameter of 22 feet. The GT/HRSG stack exhaust flow rates and exit temperatures, and criteria pollutant emission rates over the full range of expected operating conditions, based on preliminary information provided by GE, are provided in Appendix A. Each HRSG stack will be equipped with a certified continuous emissions monitoring system (CEMS) to monitor compliance with permit emission limits.

The gas turbines will be permitted for unlimited operation on natural gas. Invenergy is proposing to permit the gas turbines to operate for the equivalent total ULSD fuel usage of up to 60 days per year at base load when natural gas is unavailable only. It is expected that the gas turbines will only fire ULSD fuel during the winter months when commercial and residential natural gas usage for heating purposes is at its peak.

### 2.2 Auxiliary Boiler

The Facility will utilize a natural gas fired auxiliary boiler to supply gland sealing steam to the steam turbine, sparging steam to the HRSG steam drums, sparging steam to the ACC condensate tank, and motive steam to establish initial vacuum in the ACC and the steam turbine. The auxiliary boiler is currently designed to provide up to 107,910 lb/hr of steam at 215 psia and 390°F, at a boiler efficiency of approximately 82 percent. Based on the current design, the maximum heat input rate to the natural gas fired auxiliary boiler will be 140.6 MMBtu/hr.

The auxiliary boiler will be equipped with ultra-low $NO_X$ burners and flue gas recirculation (FGR) for emissions control. The exhaust gases from the auxiliary boiler will be vented through a 48-inch diameter exhaust stack at an exit height of 50 feet above grade. The auxiliary boiler will exhaust at 38,067 acfm at 344°F at full load. The criteria pollutant emission rates from the auxiliary boiler at its maximum natural gas firing rate are summarized on Table 1.

The auxiliary boiler will only operate prior to and during gas turbine startup periods and will not operate during normal, steady-state gas turbine operating periods. Invenergy is proposing to permit the auxiliary boiler to operate up to 4,576 hours per year, the equivalent of up to 8 hours per day during weekdays (at night) and through each weekend.

### 2.3 Dew Point Heater

The Facility will utilize a natural gas fired dew point heater to maintain the temperature of the natural gas delivered to the gas turbines at a nominal 50°F above the hydrocarbon dew point of the natural gas. Based on the current design, the dew point heater will have a maximum heat input rate of 15 MMBtu/hr.

The dew point heater will be equipped with an ultra-low $NO_X$ burner and FGR for emissions control. The exhaust gases from the dew point heater will be vented through a 20-inch diameter exhaust stack at an exit height of 35 feet above grade. The dew point heater will exhaust at 7,252 acfm at 1,000°F at full load. The criteria pollutant emission rates from the dew point heater at its maximum natural gas firing rate are summarized on Table 1.

Invenergy is proposing to permit the dew point heater for unlimited operation firing natural gas.

**2.4 Emergency Diesel Generator**

The Facility will utilize a 2 MW emergency diesel generator equipped with a 2,682 horsepower (Hp) engine to manage the combined cycle critical shutdown and maintenance loads during a loss of site power from the grid. Based on the current design, the emergency diesel generator will have a maximum heat input rate of 19.5 MMBtu/hr firing ULSD fuel.

The exhaust gases from the emergency diesel generator will be vented through an 8-inch diameter exhaust stack at an exit height of 35 feet above grade. The emergency diesel generator will exhaust at 15,295 acfm at 752°F at full load. The criteria pollutant emission rates from the emergency diesel generator at its maximum ULSD fuel firing rate are summarized on Table 1.

Invenergy is proposing to only operate the emergency diesel generator when grid power is unavailable and for maintenance and readiness testing for up to 1 hour per week and up to 300 hours per year.

**2.5 Diesel Fire Pump**

The Facility will utilize a 315 BHP diesel engine fire pump. Based on the current design, the diesel fire pump engine will have a maximum heat input rate of 2.1 MMBtu/hr firing ULSD fuel.

The exhaust gases from the diesel fire pump will be vented through a 6-inch diameter exhaust stack at an exit height of 35 feet above grade. The diesel fire pump will exhaust at 1,673 acfm at 865°F at full load. The criteria pollutant emission rates from the diesel fire pump at its maximum ULSD fuel firing rate are summarized on Table 1.

Invenergy is proposing to only operate the fire pump during emergency situations and for maintenance and readiness testing for up to 1 hour per week and up to 300 hours per year.

**2.6 Fuel Oil Tanks**

The Facility will include two (2) 2,000,000 gallon aboveground ULSD storage tanks equipped with secondary containment, as required. The potential fugitive VOC emissions (working losses and breathing losses) associated with the ULSD storage tanks at the Facility have been estimated using the EPA's TANKS program.

## 3.0 HEALTH RISK ASSESSMENT SCOPE

A multi-pathway human health risk assessment was conducted for the proposed Clear River Energy Center in Burrillville in accordance with the RIDEM Guideline. The assessment is focused on the impact to the theoretical "most exposed individual" (MEI). The MEI is defined in the RIDEM Guideline as a person who lives for thirty years, including childhood, at the location the facility's maximally impacted residential receptor and whose diet includes homegrown produce and food and water from impacted sources, if applicable (e.g. local farms that produce milk, meat or produce; drinking water sources; and fishing areas). According to the RIDEM Guideline, impacts at nearby non-residential sensitive receptors and maximally impacted workplaces should also be evaluated.

### 3.1 Sensitive Receptor Locations

The RIDEM Guideline requires that receptor locations should be sufficient to identify ground level pollutant impacts at the off-site point of maximum impact and at the point of maximum impact for which residential use is not precluded by zoning or other land use restrictions. Receptors should also be located at nearby non-residential sensitive receptors.

The health risks associated with the ambient air impacts from the Facility at sensitive receptors within the project impact area were assessed. Figure 5 shows all residential neighborhoods, schools, day care centers, hospitals, senior citizen facilities, farms, drinking water sources and bodies of water used for fishing and other recreational activities within 5 miles of the proposed Facility site (centered around the GT/HRSG-1 stack). Table 4 provides a summary of all of the sensitive receptors which are within 5 miles of the Facility.

Consistent with the RIDEM Guideline, the health assessment results were applied at receptors located at the point of maximum potential impact based on the modeling results, at the maximum residential impact location, and at the maximum non-residential impact locations of each type located within the impact area. Table 5 lists the maximally impacted receptors included in the assessment.

### 3.2 Pollutant Selection

The RIDEM Guideline specifies that the assessment include all pollutants that will be emitted by the proposed new source for which air emissions estimates are available. Table 3 lists the quantity of each RI listed toxic air contaminant which will be emitted from each emission source at the Facility. The ammonia and sulfuric acid emissions from the gas turbines have been estimated based on preliminary information provided by the manufacturers. The metals emissions from gas turbine ULSD usage have been estimated using Siemens Westinghouse's Survey of Ultra-Trace Metals in Gas Turbine Fuels (2004).

All of the other non-criteria pollutant emission rates from each emission source have been estimated using emission factors from the EPA's AP-42 Compilation of Emission Factors. Because the emission factors in AP-42 are primarily based on the results of stack tests conducted 20 or more years ago, and in many cases are based on non-detect stack test results, the use of AP-42 emission factors to estimate the emissions of non-criteria pollutants from the Facility is conservative. Based on the advances in combustion technology and fuel processing since AP-42 was last updated, it is expected that the actual emissions of non-criteria pollutants from the Facility emission sources will be much lower than the values presented in Table 3.

Consistent with the RIDEM Guideline, the assessment included all of the pollutants that will be emitted by the Facility for which air emissions estimates were available.

## 4.0 HEALTH RISK ASSESSMENT METHODOLOGY

The following sections describe the methodologies used to complete the health risk assessment for the Project.

### 4.1 Air Dispersion Modeling

The health risk assessment utilized the results of the air dispersion modeling analysis, which was conducted in accordance with the Air Dispersion Modeling Protocol previously submitted for the Project. The following is a summary of the modelling procedures used, which are further detailed in the Modeling Protocol and the Modeling Report submitted for the Project:

- The air dispersion modeling was completed using the EPA's AERMOD refined model.
- AERMOD was applied using the five most recent years (currently 2010-2014) of hourly meteorological surface data available from T. F. Green Airport in Providence, with concurrent upper air observations from Chatham, MA.
- Land use near the Facility site is predominately rural. At RIDEM's request, a comparison between modeling the turbines as rural and urban sources was conducted in the initial AERSCREEN modeling for the GE modeling scenarios. Each modeling scenario resulted in higher concentrations when the gas turbines were modeled as rural sources. Consistent with the surrounding land uses and to be conservative, all Facility sources were modeled as rural sources.
- The AERMOD results were applied to all pollutants which will be emitted by the Facility for which air emissions estimates were available.
- A polar receptor grid was centered on the GT/HRSG-1 stack. Receptor coverage extends out to 50 km. Receptors are located at:
    - 25-meter increments out to 1 km
    - 100-meter increments out to 2 km
    - 200-meter increments out to 5 km
    - 500-meter increments out to 10 km
    - 1,000-meter increments out to 50 km
- Receptors were also placed along the property fenceline at 10-meter increments and at each of the sensitive receptors within the Project's SIA identified on Table 4. On-site locations will not be accessible by the public and therefore were not included in the analysis.
- The maximum terrain elevation and hill height were determined for each receptor through the application of AERMAP. National Elevation Data (NED) data were input to AERMAP (Version 11103). The data was downloaded from the USGS website (http://seamless.usgs.gov/index.php).
- AERMOD was run with each emission source operating simultaneously, for five years of hourly meteorological data. The annual impacts from the gas turbines are based on the worst-case 59°F operating cases for each fuel, pollutant, and averaging period. The auxiliary boiler will not operate while the gas turbines are in steady-state operation, so its short term impacts were determined based on startup periods only.
- Per RIDEM guidance, the emergency generator and fire pump were not included in the 1-hour impact analyses. For the annual impact modeling, the emission rates from the emergency generator and the fire pump were pro-rated for the number of hours each will be permitted to operate each year.

- The AERMOD results were applied to all pollutants which will be emitted by the Facility for which air emissions estimates were available.
- The AERMOD results were applied at receptors located at the point of maximum potential impact, at the maximum residential impact location, and at the maximum non-residential impact locations of each type located within the impact area.
- Ground-level concentrations corresponding to the maximum (one-hour average) and average (annual average) were generated for each pollutant evaluated for the assessment.

### 4.2 Deposition Modeling

The deposition modeling is described in detail in Section 5.0.

### 4.3 Environmental Transport

The following residential receptor exposure pathways were screened for potential significance for this assessment:

- Inhalation
- Soil ingestion
- Dermal exposure
- Ingestion of mother's milk
- Ingestion of homegrown produce
- Ingestion of drinking water from the maximally impacted drinking water source
- Ingestion of fish from the maximally impacted fishing area
- Ingestion of produce, beef and dairy, and pigs, chicken and eggs from the maximally impacted farm

The exposure pathways for the non-residential receptors were tailored to match the receptor type and site-specific details.

## 5.0 RISK CHARACTERIZATION PROCEDURES

As required by the RIDEM Guideline, the California Air Resources Board's Health Risk Assessment Standalone Tool (RAST, Version 2.0) was used to characterize the health risks associated with the Facility's emissions. The following sections describe the specific procedures and options used within the RAST program for the Project health risk assessment.

### 5.1 Pollutant Concentration Data Entry

The AERMOD results at the maximally impacted residential receptor and at the maximally impacted receptor for each sensitive receptor category were imported into RAST in the required format. For each pollutant and receptor location, the average and maximum hourly modeled concentrations were entered into a spreadsheet, which were then imported to RAST as a CSV file.

### 5.2 Risk Scenario Selection

#### 5.2.1 Analysis Type

The RAST program was used to assess the following three types of health risks:

- Cancer Risk – residential receptors
- Chronic Non-Cancer Risk – residential receptors
- Acute Non-Cancer Risk – residential & non-residential receptors
- 8-Hour Non-Cancer Risk – non-residential receptors

#### 5.2.2 Receptor Types

The following receptor types were used within RAST:

- For receptors located within residential areas, the "Individual Resident" receptor type were used.
- For receptors located at other off-site sensitive areas, the "Worker" receptor type was used.

#### 5.2.3 Exposure Duration

The Exposure Duration is the number of years the receptor is exposed to facility pollutants. The following Exposure Durations were used within RAST:

- For receptors located within residential areas, a 30-year exposure, which is used to estimate Tier 1 cancer risk at a residential location, was used.
- For receptors located at other off-site areas, a 25-year exposure, which is used to estimate cancer risk for off-site workers, was used.

#### 5.2.4 Exposure Pathways

The exposure pathways listed in Section 4.3 were evaluated using RAST for this assessment for all residential receptors. The non-residential receptors were evaluated for the inhalation, soil ingestion and dermal exposure pathways. Exposure at recreational water areas was not evaluated as a separate scenario, as the pollutant concentrations at those locations impact fish ingestion pollutant intakes calculated for the MEI and other residential exposure scenarios.

#### 5.2.5 Deposition Rates

The default Uncontrolled Source deposition rate of 0.05 m/s was used for this assessment. The oxidation catalyst installed on each gas turbine/HRSG will provide control of PAHs. However, the

emissions of metals from the gas turbine/HRSGs and the emissions of all metals and PAHs from the other project emission sources will be emitted uncontrolled.

#### 5.2.6 Exposure Frequency Adjustments

The following exposure frequency adjustments were made for this assessment. The default values in RAST were used, except for the following adjustments.

- For residential receptors, no adjustment was made for time at residence, since it is assumed that most of the nearby residents go to local schools or work locally, and are thus still exposed when not at home.
- For non-residential receptors, 8-hour breathing rates were used to reflect worker exposures that are recurring but only for a portion of the day. The breathing rate was based on moderate intensity to cover a broad range of daily activity levels.
- The default exposure frequency for workers of 250 days per year was used to account for time spent away from the exposure site.
- A cold climate setting was used for dermal exposures. This setting is for northern coastal communities, which have cool temperatures (daily highs of less than 65 degrees) for the majority of the year and can receive a considerable amount of fog and rainfall.

### 5.3 Risk Calculation

Once the pollutant concentration data were input and the risk scenario selected for each sensitive receptor, RAST was run to calculate the associated risks. The risk results were output by each risk type assessed: Cancer, Chronic Non-Cancer, Acute Non-Cancer, and 8-hour Non-Cancer.

#### 5.3.1 Cancer Risk

The RAST cancer risk output was the pollutant-specific estimated probability of developing cancer associated with each applicable exposure pathway and the total risk for all pathways for each carcinogenic substance evaluated.

#### 5.3.2 Chronic Non-Cancer Risk

The chronic non-cancer hazard quotient (HQ) is the calculated pollutant-specific indicator for the risk of developing an adverse health outcome for different target organ systems. It is based on the pollutant concentration and risk scenario selected, and is calculated using the predefined reference exposure level (REL) of a pollutant, ground level concentration and the exposure duration. If the maximum concentration is below the REL, there is assumed to be no observable adverse health impact to the target organ system. The one hour maximum concentration is divided by the acute REL to determine an acute HQ for each pollutant.

The following target organ systems were evaluated for chronic non-cancer adverse health impacts for this assessment:

- Cardiovascular System
- Central Nervous System
- Immune System
- Kidneys
- Gastrointestinal Tract & Liver or Alimentary Tract
- Reproductive System & Developmental
- Respiratory System
- Skin

- Eyes
- Bones & Teeth
- Endocrine System
- Hematological System
- Response to Odors
- General Toxicity

### 5.3.3 Acute Non-Cancer Risk

The acute non-cancer HQ was also determined for each substance and each target health effect. It was calculated as the exposure dose divided by the California acute health benchmark. RAST includes only inhalation exposures in the acute dose calculations.

### 5.3.4 8-Hour Non-Cancer Risk

The 8-hour non-cancer risk was determined for each substance and each target health effect. It was calculated as the 8-hour exposure dose divided by the California 8-hour health benchmark. RAST includes only inhalation exposures in the 8-hour dose calculations.

## 6.0 HEALTH RISK ASSESSMENT RESULTS

The results of the health risk assessment completed for the Clear River Energy Center Project met all of the applicable acceptability criteria contained in the RIDEM Guideline, as detailed below. Tables 5 through 10 (and the accompanying charts) summarize the results of the assessment. The RAST output files are included in Appendix B. Included in the results are the following required information:

- Table 5 shows the cancer risk associated with each carcinogenic substance and the total of those risks, including a stacked column chart that shows the contribution of each carcinogen to the total cancer risk calculated for the MEI.
- Table 6 shows the cancer risk associated with each exposure route and the total of those risks, including a stacked column chart that shows the contribution of each route to the total cancer risk calculated for the MEI.
- Table 7 shows the contribution of each exposure route to the cancer risk calculated for each carcinogen, including a stacked column chart that shows the contribution of each carcinogen and the contribution of each exposure route to the total cancer risk calculated for the project;
- Table 8 shows the total and pollutant-specific chronic hazard quotients for each target health effect (including general toxicity and odor), and a stacked column chart that shows the contribution of each substance to the total chronic hazard quotient for each target health effect.
- Table 9 shows the total and pollutant-specific acute hazard quotients for each target health effect (including general toxicity and odor), and a stacked column chart that shows the contribution of each substance to the total acute hazard quotient for each target health effect.
- Table 10 shows the total and pollutant-specific 8-hour chronic hazard quotients for each target health effect (including general toxicity and odor), and a stacked column chart that shows the contribution of each substance to the total 8-hour chronic hazard quotient for each target health effect.

### 6.1 Air Toxics Compliance

As shown on Table 3, the maximum off-site ground level ambient air impacts predicted by the modeling for each of the pollutants included in the assessment was less than their corresponding Reg. 22 AALs and any CAALs developed by RIDEM.

### 6.2 Cancer Risk Results

The total cancer risks associated with the modeled Facility impacts for the MEI and other residential receptors, non-residential receptors, and the maximally impacted workplace, evaluated for all applicable exposure routes, did not exceed the RIDEM Guideline limit of 1/10,000 ($10^{-4}$).

### 6.3 Non-Cancer Risk Results

The total chronic HQ, total acute HQ and total 8-hour HQ for each target health effect associated with the modeled Facility impacts at residential receptors, non-residential receptors, and the maximally impacted workplace, evaluated for all applicable exposure routes, did not exceed the RIDEM Guideline limit of 1.

## Tables

# Tables

**Table 1**
**Clear River Energy Center - Burrillville, Rhode Island**
**Facility Criteria Pollutant Potential Emissions Summary[1]**

| Emission Source | Units | Gas Turbines/HRSGs/Duct Burners Steady State Operation | | Gas Turbines/HRSGs Startup/Shutdown | | Auxiliary Boiler | Dewpoint Heater | Emergency Generator | Fire Pump | ULSD Tank | Total | Major Source Threshold | Major Source? | Attainment Status | Offsets/Allowances Required |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Fuel Type | | Natural Gas | ULSD | Natural Gas | ULSD | Natural Gas | Natural Gas | ULSD | ULSD | | | | | | |
| Emission Controls | | SCR/OC | SCR/OC | SCR/OC | SCR/OC | Ultra-Low NOx/FGR | Ultra-Low NOx/FGR | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Annual Operation (per unit) | hrs/yr | 7,865 | 720 | 155 | 20 | 4,576 | 8,760 | 300 | 300 | | | | | | |
| | | | | | | | | | | | | | | | |
| Maximum Heat Input Per Unit (per Gas Turbine) | MMBtu/hr | 3,393 | 3,507 | | | 140.6 | 15.0 | 19.5 | 2.1 | | | | | | |
| Maximum Heat Input Per Unit (per HRSG) | MMBtu/hr | 721 | 0 | | | | | | | | | | | | |
| Maximum Power Output (total) | MW net | 1,080 | 940 | | | | | | | | | | | | |
| Maximum Engine Output | Hp | | | | | | | 2,682 | 315 | | | | | | |
| | | | | | | | | | | | | | | | |
| Proposed Emissions | per unit | | | | | | | | | | | | | | |
| NOx | ppmvd@15%O2 | 2.0 | 5.0 | | | | | | | | | | | | |
| CO | ppmvd@15%O2 | 2.0 | 5.0 | | | | | | | | | | | | |
| VOC | ppmvd@15%O2 | 1.7 | 5.0 | | | | | | | | | | | | |
| CO2 | lb/MW-hr | 781 | 1,227 | | | | | | | | | | | | |
| SO2 | lb/MMBtu | 0.0017 | 0.0019 | | | | | | | | | | | | |
| PM/PM10/PM2.5 | lb/MMBtu | 0.0053 | 0.020 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | |
| Full Load Average Emission Rates | per unit | | | | | | | | | | | | | | |
| NOx | lb/hr | 24.90 | 68.60 | | | 1.55 | 0.16 | 32.23 | 1.88 | | | | | | |
| CO | lb/hr | 15.10 | 41.75 | | | 10.55 | 1.65 | 1.77 | 0.47 | | | | | | |
| VOC | lb/hr | 7.36 | 23.85 | | | 1.12 | 0.12 | 0.65 | 0.07 | | | | | | |
| CO2 | lb/hr | 399,000 | 577,000 | | | 16,591 | 1,770 | 3,206 | 349 | | | | | | |
| SO2 | lb/hr | 5.75 | 6.49 | | | 0.21 | 0.02 | 0.03 | 0.00 | | | | | | |
| PM/PM10/PM2.5 | lb/hr | 18.00 | 69.10 | | | 0.98 | 0.11 | 0.15 | 0.05 | | | | | | |
| | | | | | | | | | | | | | | | |
| Potential Emissions | | | | | | | | | | | | | | | |
| NOx | ton/yr | 195.85 | 49.39 | 27.92 | 4.03 | 3.55 | 0.70 | 4.83 | 0.28 | 0.00 | 286.55 | 50 | Yes | Ozone Nonattainment | 344 |
| CO | ton/yr | 118.77 | 30.06 | 50.05 | 8.90 | 24.14 | 7.23 | 0.27 | 0.07 | 0.00 | 239.48 | 100 | Yes | Attainment | NA |
| VOC | ton/yr | 57.89 | 17.17 | 7.03 | 2.60 | 2.56 | 0.53 | 0.10 | 0.01 | 0.44 | 88.32 | 50 | Yes | Ozone Nonattainment | 106 |
| CO2 | ton/yr | 3,138,251 | 415,440 | 13,062 | 3,592 | 37,960 | 7,753 | 481 | 52 | 0 | 3,616,592 | 100,000 | Yes | No NAAQS | 3,570,346 |
| SO2 | ton/yr | 45.23 | 4.67 | 0.19 | 0.04 | 0.48 | 0.09 | 0.00 | 0.00 | 0.00 | 50.70 | 100 | No | Attainment | NA |
| PM/PM10/PM2.5 | ton/yr | 141.58 | 49.75 | 1.64 | 1.09 | 2.24 | 0.48 | 0.02 | 0.01 | 0.00 | 196.81 | 100 | Yes | Attainment | NA |

[1] Based on preliminary project equipment specifications and emissions estimates. Equipment vendor selection, equipment specifications, and emission rates are subject to change as the project design advances.

**Table 2**
**Clear River Energy Center - Burrillville, Rhode Island**
**Modeling Input Summary[1]**

| Emission Source | Units | Gas Turbines/HRSGs/Duct Burners | | | | Auxiliary Boiler | Dewpoint Heater | Emergency Generator | Fire Pump |
|---|---|---|---|---|---|---|---|---|---|
| | | GT/HRSG-1 | | GT/HRSG-2 | | | | | |
| Fuel Type | | Natural Gas | ULSD | Natural Gas | ULSD | Natural Gas | Natural Gas | ULSD | ULSD |
| | | | | | | | | | |
| Annual Operation (per unit) | hrs/yr | 8,040 | 720 | 8,040 | 720 | 4,576 | 8,760 | 300 | 300 |
| | | | | | | | | | |
| Stack Parameters | | | | | | | | | |
| Stack Location | UTM N (Z 19T) | 4649568.7 | | 4649527.1 | | 4649470.9 | 4649670.7 | 4649460.6 | 4649420.0 |
| Stack Location | UTM E (Z 19T) | 271841.7 | | 271869.9 | | 271874.6 | 271699.0 | 271848.3 | 271946.6 |
| Stack Base Elevation | ft AMSL | 570 | | 570 | | 570 | 570 | 570 | 570 |
| Stack Height | feet | 200.0 | | 200.0 | | 50 | 35 | 35 | 35 |
| Stack Diameter | inches | 264.0 | | 264.0 | | 48 | 20 | 8 | 6 |
| Stack Flow | acfm | see App. A | see App. A | see App. A | see App. A | 38,067 | 7,252 | 15,295 | 1,673 |
| Stack Exit Temperature | deg. F | see App. A | see App. A | see App. A | see App. A | 344 | 1,000 | 752 | 855 |
| | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | |
| NOx | lb/hr | see App. A | see App. A | see App. A | see App. A | 1.55 | 0.16 | 32.23 | 1.88 |
| CO | lb/hr | see App. A | see App. A | see App. A | see App. A | 10.55 | 1.65 | 1.77 | 0.47 |
| SO2 | lb/hr | see App. A | see App. A | see App. A | see App. A | 0.21 | 0.020 | 0.031 | 0.0033 |
| PM/PM10/PM2.5 | lb/hr | see App. A | see App. A | see App. A | see App. A | 0.98 | 0.11 | 0.15 | 0.054 |
| | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | |
| NOx | g/sec | see App. A | see App. A | see App. A | see App. A | 0.20 | 0.020 | 4.06 | 0.24 |
| CO | g/sec | see App. A | see App. A | see App. A | see App. A | 1.33 | 0.21 | 0.22 | 0.059 |
| SO2 | g/sec | see App. A | see App. A | see App. A | see App. A | 0.026 | 0.0025 | 0.0039 | 0.00042 |
| PM/PM10/PM2.5 | g/sec | see App. A | see App. A | see App. A | see App. A | 0.12 | 0.014 | 0.019 | 0.0068 |

[1] Based on preliminary project equipment specifications and emissions estimates. Equipment vendor selection, equipment specifications, and emission rates are subject to change as the project design advances.

**Table 3**
**Clear River Energy Center - Burrillville, Rhode Island**
**Air Toxics Potential Emissions and Modeling Results Summary**

| Emission Source(s): | Gas Turbines | Gas Turbines | HRSG Duct Burners | Auxiliary Boiler | Dewpoint Heater | Diesel Generator | Fire Pump | Facility Total Potential Emissions | RIDEM APCR No. 22 Acceptable Ambient Levels | | |
|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Sources: | 2 | 2 | 2 | 1 | 1 | 1 | 1 | | | | |
| Fuel Fired: | Natural Gas | ULSD | Natural Gas | Natural Gas | Natural Gas | ULSD | ULSD | | | | |
| Maximum Unit Heat Input (MMBtu/hr): | 3,393 | 3,507 | 721 | 140.6 | 15.0 | 19.5 | 2.1 | | | | |
| Annual Operation (hrs/yr): | 8,040 | 720 | 8,040 | 4,576 | 8,760 | 300 | 300 | | 1-hour | 24-hour | Annual |
| Emission Rate: | lb/hr | lb/hr | lb/hr | lb/hr | lb/hr | lb/hr | lb/hr | lb/yr | µg/m$^3$ | µg/m$^3$ | µg/m$^3$ |
| 1,3-Butadiene | 2.92E-04 | 1.12E-02 | | | | | 8.21E-05 | 10.4 | | | 0.03 |
| Acetaldehyde | 2.71E-02 | | | | | 4.91E-04 | 1.61E-03 | 219 | | | 0.5 |
| Acrolein | 4.34E-03 | | | | | 1.54E-04 | 1.94E-04 | 35.0 | 0.2 | | 0.02 |
| Ammonia | 9.20E+00 | 1.01E+01 | | | | | | 81,240 | 1,000 | 100 | 70 |
| Arsenic | | 3.24E-04 | 2.83E-04 | 2.76E-05 | 2.94E-06 | | | 2.7 | 0.2 | | 0.0002 |
| Benzene | 8.14E-03 | 8.42E-03 | 2.97E-04 | 2.89E-04 | 3.09E-05 | 1.51E-02 | 1.96E-03 | 80.6 | 30 | 20 | 0.1 |
| Beryllium | | 2.17E-03 | 1.70E-05 | 1.65E-06 | 1.76E-07 | | | 1.7 | | 0.02 | 0.0004 |
| Cadmium | | 3.60E-05 | 1.56E-03 | 1.52E-04 | 1.62E-05 | | | 13.4 | | 0.1 | 0.0006 |
| Cobalt | | | 1.19E-04 | 1.16E-05 | 1.24E-06 | | | 1.02 | | | 0.001 |
| Formaldehyde | 1.48E-01 | 1.62E-01 | 1.06E-02 | 1.03E-02 | 1.10E-03 | 1.54E-03 | 2.48E-03 | 1,450 | 50 | 40 | 0.08 |
| Lead | | 5.39E-03 | 7.07E-04 | 6.89E-05 | 7.35E-06 | | | 9.9 | | | 0.008 |
| Manganese | | 1.98E-03 | 5.37E-04 | 5.24E-05 | 5.59E-06 | | | 6.0 | | 0.05 | 0.04 |
| Mercury | | 7.22E-05 | 3.68E-04 | 3.58E-05 | 3.82E-06 | | | 3.2 | 2 | 0.3 | 0.009 |
| Naphthalene | 8.82E-04 | 2.45E-02 | 8.62E-05 | 8.41E-05 | 8.97E-06 | 2.54E-03 | 1.78E-04 | 26.7 | | 3 | 0.03 |
| Nickel | | 1.04E-02 | 2.97E-03 | 2.89E-04 | 3.09E-05 | | | 33.0 | 6 | 0.2 | 0.004 |
| Propylene Oxide | 1.97E-02 | | | | | | | 158.4 | 3,000 | | 0.3 |
| Sulfuric Acid | 3.69E+00 | 4.17E+00 | | | | | | 32,670 | 100 | | 1 |
| Vanadium | | | 3.25E-03 | 3.17E-04 | 3.38E-05 | | | 27.9 | 0.2 | | |

| Maximum Modeled Impacts (µg/m$^3$/g/sec) | 1-hour | 24-hour | Annual |
|---|---|---|---|
| GT/HRSG-1 & 2 (Natural Gas) | 3.21 | 2.09 | 0.16 |
| GT/HRSG-1 & 2 (ULSD) | 3.08 | 2.00 | 0.15 |
| Auxiliary Boiler | 146.25 | 49.85 | 4.15 |
| Dewpoint Heater | 209.52 | 62.85 | 7.66 |
| Diesel Generator | 195.64 | 47.04 | 6.34 |
| Fire Pump | 440.05 | 214.51 | 17.32 |

| GT.HRSG firing Natural Gas | | | | AAL Compliant? (Yes/No) | | |
|---|---|---|---|---|---|---|
| Maximum Modeled Impacts (µg/m$^3$) | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual |
| 1,3-Butadiene | 4.67E-03 | 2.30E-03 | 2.84E-05 | | | Yes |
| Acetaldehyde | 1.12E-01 | 5.36E-02 | 6.25E-04 | | | Yes |
| Acrolein | 1.63E-02 | 7.30E-03 | 9.74E-05 | Yes | | Yes |
| Ammonia | 3.72E+00 | 2.43E+00 | 1.82E-01 | Yes | Yes | Yes |
| Arsenic | 7.01E-04 | 2.71E-04 | 1.60E-05 | Yes | | Yes |
| Benzene | 4.90E-01 | 1.47E-01 | 8.34E-04 | Yes | Yes | Yes |
| Beryllium | 4.19E-05 | 1.62E-05 | 4.23E-06 | | Yes | Yes |
| Cadmium | 3.86E-03 | 1.49E-03 | 8.54E-05 | | Yes | Yes |
| Cobalt | 2.95E-04 | 1.14E-04 | 6.52E-06 | | | Yes |
| Formaldehyde | 4.58E-01 | 1.91E-01 | 7.22E-03 | Yes | Yes | Yes |
| Lead | 1.75E-03 | 6.77E-04 | 4.69E-05 | | | Yes |
| Manganese | 1.33E-03 | 5.15E-04 | 3.24E-05 | | Yes | Yes |
| Mercury | 9.09E-04 | 3.52E-04 | 2.02E-05 | Yes | Yes | Yes |
| Naphthalene | 7.47E-02 | 2.07E-02 | 1.69E-04 | | Yes | Yes |
| Nickel | 7.34E-03 | 2.84E-03 | 1.78E-04 | Yes | Yes | Yes |
| Propylene Oxide | 7.97E-03 | 5.19E-03 | 3.57E-04 | Yes | | Yes |
| Sulfuric Acid | 1.49E+00 | 9.73E-01 | 7.32E-02 | Yes | | Yes |
| Vanadium | 8.05E-03 | 3.12E-03 | 1.78E-04 | Yes | | |

| GT/HRSG firing ULSD | | | | AAL Compliant? (Yes/No) | | |
|---|---|---|---|---|---|---|
| Maximum Modeled Impacts (µg/m$^3$) | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual |
| 1,3-Butadiene | 8.91E-03 | 5.04E-03 | 2.84E-05 | | | Yes |
| Acetaldehyde | 1.01E-01 | 4.64E-02 | 6.25E-04 | | | Yes |
| Acrolein | 1.46E-02 | 6.16E-03 | 9.74E-05 | Yes | | Yes |
| Ammonia | 3.93E+00 | 2.54E+00 | 1.82E-01 | Yes | Yes | Yes |
| Arsenic | 7.12E-04 | 2.78E-04 | 1.60E-05 | Yes | | Yes |
| Benzene | 4.90E-01 | 1.47E-01 | 8.34E-04 | Yes | Yes | Yes |
| Beryllium | 8.79E-04 | 5.58E-04 | 4.23E-06 | | Yes | Yes |
| Cadmium | 3.24E-03 | 1.09E-03 | 8.54E-05 | | Yes | Yes |
| Cobalt | 2.46E-04 | 8.27E-05 | 6.52E-06 | | | Yes |
| Formaldehyde | 4.57E-01 | 1.90E-01 | 7.22E-03 | Yes | Yes | Yes |
| Lead | 3.56E-03 | 1.85E-03 | 4.69E-05 | | | Yes |
| Manganese | 1.88E-03 | 8.72E-04 | 3.24E-05 | | Yes | Yes |
| Mercury | 7.89E-04 | 2.73E-04 | 2.02E-05 | Yes | Yes | Yes |
| Naphthalene | 8.38E-02 | 2.66E-02 | 1.69E-04 | | Yes | Yes |
| Nickel | 1.02E-02 | 4.68E-03 | 1.78E-04 | Yes | Yes | Yes |
| Propylene Oxide | 0.00E+00 | 0.00E+00 | 3.57E-04 | Yes | | Yes |
| Sulfuric Acid | 1.62E+00 | 1.05E+00 | 7.32E-02 | Yes | | Yes |
| Vanadium | 6.73E-03 | 2.26E-03 | 1.78E-04 | Yes | | |

**Table 4**
**Clear River Energy Center - Burrillville, Rhode Island**
**Sensitive Receptor List**

| X_RISP | Y_RISP | ID | Category | NAME | Dist_Ft | Dist_Mi |
|---|---|---|---|---|---|---|
| 260408.63 | 323441.83 | 1 | Neighborhood | Wallum Lake Road | 1,928 | 0.37 |
| 262211.18 | 320528.85 | 2 | Neighborhood | Jackson Schoolhouse Road | 2,228 | 0.42 |
| 254499.87 | 321780.92 | 3 | Neighborhood | Wilson Trail | 2,996 | 0.57 |
| 262492.85 | 322623.86 | 4 | Neighborhood | Wallum Lake Road | 3,147 | 0.60 |
| 263559.49 | 323157.02 | 5 | Neighborhood | Manley Drive | 4,329 | 0.82 |
| 264435.30 | 321755.00 | 6 | Neighborhood | Wallum Lake Road | 4,567 | 0.86 |
| 262384.23 | 314746.00 | 7 | Neighborhood | Jackson Schoolhouse Road | 6,217 | 1.18 |
| 263972.41 | 326000.01 | 8 | Neighborhood | E Wallum Lake Road | 6,289 | 1.19 |
| 257636.76 | 329074.91 | 9 | Neighborhood | Wallum Lake Road | 7,189 | 1.36 |
| 251762.08 | 325901.62 | 10 | Park and Recreation Area | Buck Hill State Management Area | 7,425 | 1.41 |
| 267358.51 | 323163.99 | 11 | Boat Ramp | Wilson Reservoir | 7,767 | 1.47 |
| 249615.59 | 321835.78 | 12 | Boat Ramp | Wakefield Pond | 7,834 | 1.48 |
| 249625.00 | 323250.16 | 13 | Neighborhood | Lee Circle | 8,084 | 1.53 |
| 269674.61 | 321336.19 | 14 | Shore Fishing Access | White Mill Park | 9,705 | 1.84 |
| 267201.98 | 328337.99 | 15 | Neighborhood | Town Farm Road | 10,272 | 1.95 |
| 257679.51 | 333138.93 | 16 | Fire Station | Wallum Lake Fire Department | 11,194 | 2.12 |
| 257086.78 | 333148.09 | 17 | Hospital | Eleanor Slater Hospital Zambarano Unit | 11,293 | 2.14 |
| 271325.22 | 319544.92 | 18 | Place of Worship | Pascoag Community Baptist Church | 11,395 | 2.16 |
| 265418.70 | 331541.61 | 19 | Neighborhood | Town Farm Road | 11,420 | 2.16 |
| 255460.47 | 308973.48 | 20 | Park and Recreation Area | Casimir Pulaski Memorial Recreation Area | 11,628 | 2.20 |
| 262593.92 | 333091.80 | 21 | Neighborhood | East Wallum Lake Road | 11,599 | 2.20 |
| 269637.39 | 314272.60 | 22 | Neighborhood | James Street | 11,596 | 2.20 |
| 271049.52 | 315838.66 | 23 | Neighborhood | Highland Drive | 12,083 | 2.29 |
| 271926.73 | 318328.78 | 24 | Library | Pascoag Public Library | 12,171 | 2.31 |
| 271926.25 | 318126.31 | 25 | Place of Worship | Calvary Episcopal Church | 12,212 | 2.31 |
| 272306.21 | 319036.43 | 26 | School | Community Christian School | 12,429 | 2.35 |
| 272382.74 | 319441.14 | 27 | School | Father Holland Catholic Regional Elementary School | 12,457 | 2.36 |
| 256924.41 | 334417.04 | 28 | Small Boat Launch | Wallum Lake | 12,571 | 2.38 |
| 262124.98 | 307960.43 | 29 | Neighborhood | Olney Keach Road | 12,612 | 2.39 |
| 247321.67 | 328716.26 | 30 | Neighborhood | Buck Hill Road | 12,652 | 2.40 |
| 272592.61 | 316528.51 | 31 | Boat Ramp | Union Pond | 13,277 | 2.51 |
| 272906.62 | 317314.18 | 32 | Place of Worship | New Hope Baptist Church | 13,355 | 2.53 |
| 273247.45 | 318192.62 | 33 | Fire Station | Pascoag Fire Department | 13,494 | 2.56 |
| 244502.61 | 325583.44 | 34 | Neighborhood | Quaddick Town Farm Road | 13,672 | 2.59 |
| 273299.19 | 324059.98 | 35 | Neighborhood | Grove Lane | 13,725 | 2.60 |
| 257885.52 | 306290.41 | 36 | Boat Ramp | Bowdish Reservoir | 14,063 | 2.66 |
| 271697.09 | 328487.90 | 37 | Neighborhood | Hill Road | 14,057 | 2.66 |
| 243177.67 | 317879.93 | 38 | Park and Recreation Area | Quaddick State Park | 14,593 | 2.76 |
| 258457.16 | 336889.26 | 39 | School | Pine Harbor School | 14,869 | 2.82 |
| 258457.16 | 336889.26 | 40 | School | Pine Harbor School | 14,869 | 2.82 |
| 247432.06 | 309694.22 | 41 | Shore Fishing Access | Peck Pond | 14,905 | 2.82 |
| 241156.76 | 315225.40 | 42 | Neighborhood | Quaddick Town Farm Road | 14,978 | 2.84 |
| 252143.93 | 306270.88 | 43 | Neighborhood | South Atlantic Avenue | 15,195 | 2.88 |
| 245082.68 | 330060.99 | 44 | Neighborhood | Quaddick Town Farm Road | 15,251 | 2.89 |
| 255276.18 | 337137.49 | 45 | Reservoir | Wallum Lake Reservoir | 15,578 | 2.95 |
| 268806.19 | 307620.68 | 46 | Boat Ramp | Pascoag Reservoir Fishing Access | 15,665 | 2.97 |
| 249761.66 | 306643.05 | 47 | Boat Ramp | Clarkville Pond | 15,918 | 3.01 |
| 268974.42 | 307004.44 | 48 | Neighborhood | Jackson Schoolhouse Road | 16,264 | 3.08 |
| 257766.41 | 303986.54 | 49 | Boat Ramp | Lake Washington | 16,367 | 3.10 |
| 244947.00 | 332931.00 | 50 | Neighborhood | Quaddick Town Farm Road | 17,196 | 3.26 |
| 266913.78 | 304746.67 | 51 | Neighborhood | Sprague Hill Road | 17,192 | 3.26 |
| 240916.55 | 315347.52 | 52 | Neighborhood | Brandy Hill Road | 17,467 | 3.31 |
| 262070.42 | 302946.04 | 53 | Shore Fishing Access | Burlingame Reservoir | 17,548 | 3.32 |
| 256636.35 | 339479.09 | 54 | Neighborhood | Shore Road | 17,617 | 3.34 |
| 277442.17 | 316668.97 | 55 | Neighborhood | Mowry Street | 17,913 | 3.39 |
| 245515.42 | 334586.52 | 56 | Neighborhood | Starr Road | 17,995 | 3.41 |
| 278316.52 | 322772.82 | 57 | School | William L Callahan School | 18,443 | 3.49 |
| 278358.50 | 322666.83 | 58 | School | Burrillville High School | 18,473 | 3.50 |
| 240903.44 | 311841.31 | 59 | Neighborhood | Quaddick Town Farm Road | 18,923 | 3.58 |
| 252414.15 | 302143.99 | 60 | School | West Glocester Elementary School | 19,004 | 3.60 |
| 273441.55 | 334790.26 | 61 | Shore Fishing Access | Big Round Top | 19,200 | 3.64 |
| 246750.43 | 337100.70 | 62 | Survey Point | MA/CT/RI Tri-state Marker | 19,239 | 3.64 |
| 239381.14 | 328379.88 | 63 | Golf Course | Raceway Golf Club | 19,452 | 3.68 |
| 279376.90 | 322661.25 | 64 | Fire Station | Harrisville Fire Department | 19,485 | 3.69 |
| 279565.74 | 321955.73 | 65 | Place of Worship | Berean Baptist Church | 19,615 | 3.72 |
| 279566.37 | 322259.39 | 66 | School | Austin T Levy School | 19,638 | 3.72 |
| 279461.83 | 323446.34 | 67 | Small Boat Launch | Harrisville | 19,664 | 3.72 |
| 279647.18 | 321858.99 | 68 | School | Harrisville Preschool | 19,691 | 3.73 |
| 279641.92 | 322259.23 | 69 | Place of Worship | First Universalist Church of Burrillville | 19,713 | 3.73 |
| 269201.79 | 338912.26 | 70 | Neighborhood | South Street | 19,675 | 3.73 |
| 274623.88 | 334806.59 | 71 | Shore Fishing Access | Little Round Top | 20,109 | 3.81 |
| 280108.77 | 321493.62 | 72 | Library | Jesse M Smith Memorial Library | 20,134 | 3.81 |
| 278371.43 | 311512.21 | 73 | Neighborhood | South Main Street | 20,553 | 3.89 |
| 280605.78 | 321633.39 | 74 | Small Boat Launch | Mill Pond | 20,637 | 3.91 |
| 278276.86 | 330425.22 | 75 | Neighborhood | Sherman Farm Road | 20,709 | 3.92 |
| 243893.99 | 337158.87 | 76 | Neighborhood | East Thompson Road | 21,002 | 3.98 |
| 241819.51 | 335307.41 | 77 | Fire Station | East Thompson Volunteer Fire Department | 21,105 | 4.00 |
| 269338.09 | 340503.35 | 78 | Cemetery | South Douglas Cemetery | 21,121 | 4.00 |
| 236434.80 | 323603.64 | 79 | Cemetery | Dike Cemetery | 21,130 | 4.00 |
| 239777.40 | 308609.40 | 80 | Cemetery | Munyan Cemetery | 21,553 | 4.08 |
| 280523.84 | 311653.72 | 81 | School | Steere Farm Elementary School | 22,441 | 4.25 |
| 276083.55 | 304868.49 | 82 | Neighborhood | Putnam Pike | 22,566 | 4.27 |
| 282130.68 | 327896.98 | 83 | Beach | YWCA Beach | 23,279 | 4.41 |
| 283186.99 | 326403.94 | 84 | Boat Ramp | Spring Lake | 23,886 | 4.52 |
| 246568.00 | 299250.00 | 85 | Neighborhood | Blood Road | 23,930 | 4.53 |
| 264093.18 | 345491.90 | 86 | Neighborhood | Walnut Street | 23,985 | 4.54 |
| 239692.27 | 304294.47 | 87 | Fire Station | East Putnam Fire Department | 24,240 | 4.59 |
| 284159.64 | 314404.21 | 88 | Golf Course | Crystal Lake Golf Club | 24,978 | 4.73 |
| 284375.71 | 327183.15 | 89 | Beach | Flynns Beach | 25,231 | 4.78 |
| 248752.41 | 296565.55 | 90 | Shore Fishing Access | Mowry Pond | 25,468 | 4.82 |
| 245390.98 | 343556.73 | 91 | Neighborhood | High Street | 25,478 | 4.83 |
| 238912.59 | 339385.27 | 92 | Cemetery | Carpenter Cemetery | 26,022 | 4.93 |
| 284750.73 | 329709.64 | 93 | Beach | Spring Lake Beach | 26,347 | 4.99 |

**Table 5**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to Total Cancer Risk- All Pathways**

| Pollutant | Cancer Risk |
|---|---|
| 1,3-Butadiene | 6.37E-09 |
| Acetaldehyde | 4.16E-09 |
| Acrolein | 0.00E+00 |
| NH3 | 0.00E+00 |
| Arsenic | 8.38E-07 |
| Barium | 0.00E+00 |
| Benzene | 2.28E-07 |
| Beryllium | 2.26E-09 |
| Cadmium | 2.85E-07 |
| Chromium | 0.00E+00 |
| Cobalt | 0.00E+00 |
| Copper | 0.00E+00 |
| Ethyl Benzene | 9.09E-10 |
| Formaldehyde | 8.74E-08 |
| Hexane | 0.00E+00 |
| Lead | 8.49E-09 |
| Manganese | 0.00E+00 |
| Mercury | 0.00E+00 |
| Naphthalene | 4.34E-08 |
| Nickel | 3.31E-08 |
| Propylene | 0.00E+00 |
| Propylene Oxide | 1.23E-09 |
| Selenium | 0.00E+00 |
| Sulfuric Acid | 0.00E+00 |
| Toluene | 0.00E+00 |
| Vanadium | 0.00E+00 |
| Xylenes | 0.00E+00 |
| Zinc | 0.00E+00 |
| **Total** | **1.54E-06** |

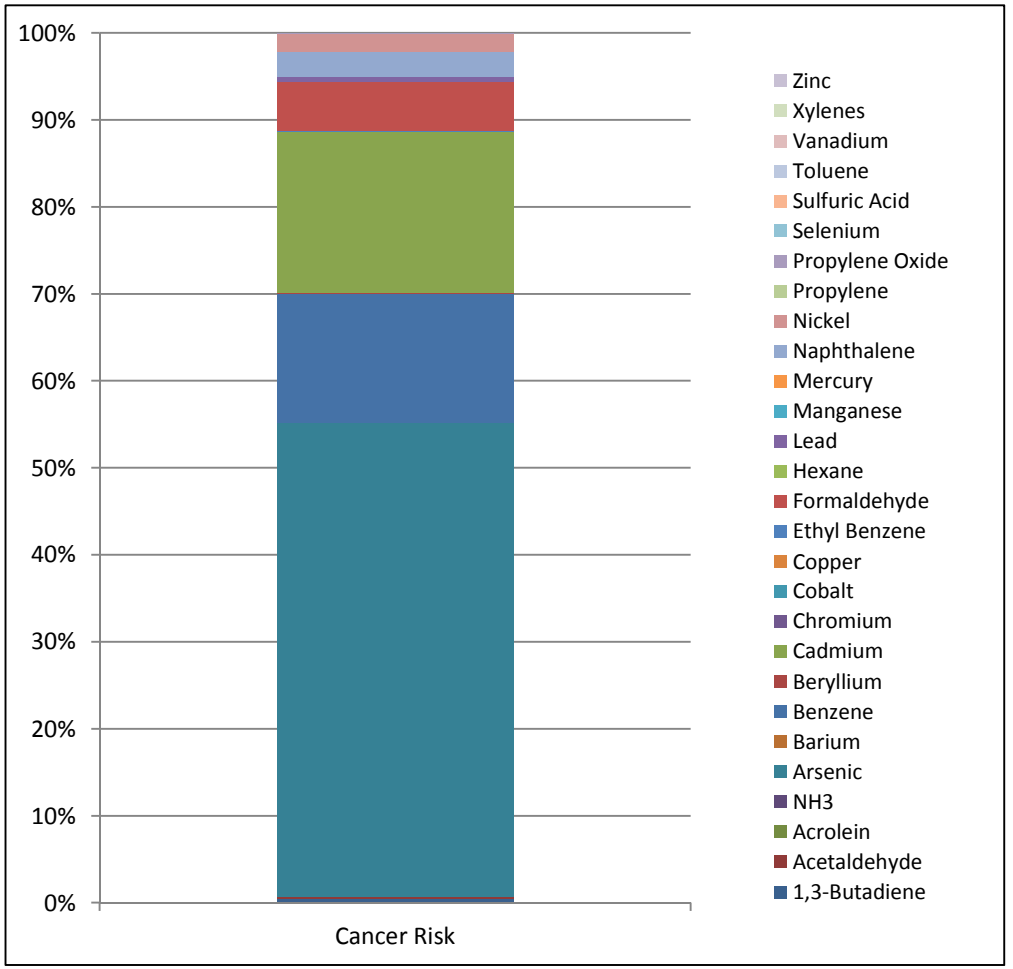


**Table 6**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pathway Contribution to Total Cancer Risk- All Pollutants**

| Pathway | Cancer Risk |
|---|---|
| Inhalation | 7.18E-07 |
| Soil Ingestion | 4.88E-07 |
| Dermal Exposure | 1.97E-08 |
| Mother's Milk | 1.19E-10 |
| Drinking Water | 3.57E-13 |
| Fish Ingestion | 2.79E-13 |
| Crop Ingestion | 3.12E-07 |
| Beef Ingestion | 2.57E-10 |
| Dairy Ingestion | 4.64E-11 |
| Pig Ingestion | 9.45E-11 |
| Chicken Ingestion | 3.00E-12 |
| Egg Ingestion | 1.11E-11 |
| **Total** | **1.54E-06** |

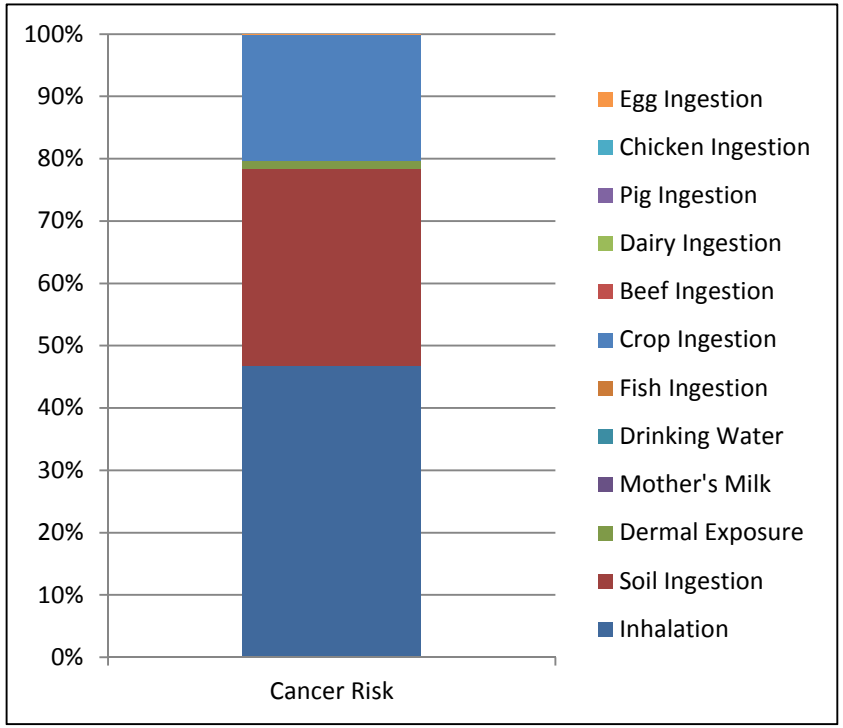


**Table 7**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant and Pathway Contributions to Cancer Risk**

| Pollutant | Inhalation | Soil Ingestion | Dermal Exposure | Mother's Milk Ingestion | Drinking Water | Fish Ingestion | Crop Ingestion | Beef Ingestion | Dairy Ingestion | Pig Ingestion | Chicken Ingestion | Egg Ingestion | Combined Risk |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 6.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.37E-09 |
| Acetaldehyde | 4.16E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.16E-09 |
| Acrolein | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NH3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 2.61E-08 | 4.82E-07 | 1.96E-08 | 0.00E+00 | 3.52E-13 | 2.75E-13 | 3.10E-07 | 2.56E-10 | 4.57E-11 | 9.45E-11 | 2.81E-12 | 1.11E-11 | 8.38E-07 |
| Barium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Benzene | 2.28E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-07 |
| Beryllium | 2.26E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.26E-09 |
| Cadmium | 2.85E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.85E-07 |
| Chromium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cobalt | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 9.09E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.09E-10 |
| Formaldehyde | 8.74E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.74E-08 |
| Hexane | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Lead | 2.24E-10 | 6.67E-09 | 1.36E-10 | 1.19E-10 | 4.80E-15 | 3.81E-15 | 1.34E-09 | 5.22E-13 | 7.44E-13 | 4.54E-14 | 1.82E-13 | 3.06E-14 | 8.49E-09 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 4.34E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.34E-08 |
| Nickel | 3.31E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.31E-08 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene Oxide | 1.23E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-09 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sulfuric Acid | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Vanadium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | **7.18E-07** | **4.88E-07** | **1.97E-08** | **1.19E-10** | **3.57E-13** | **2.79E-13** | **3.12E-07** | **2.57E-10** | **4.64E-11** | **9.45E-11** | **3.00E-12** | **1.11E-11** | **1.54E-06** |

# Table 7 Chart - Individual Pathway Contribution to Cancer Risk, by Pollutant

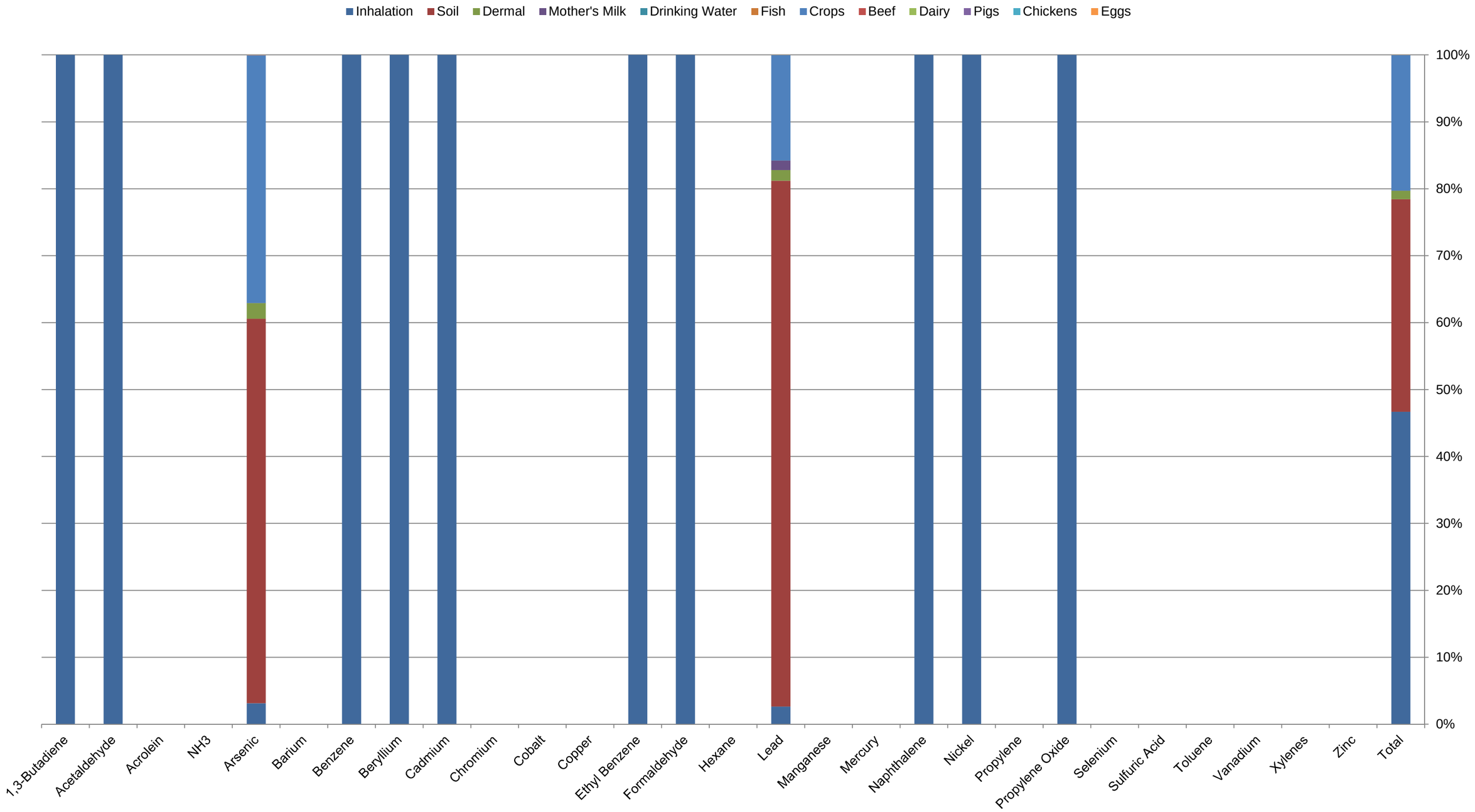


**Table 8**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to Chronic Hazard Quotient, by Target Health Effect**

| Pollutant | Cardiovascular System | Central Nervous System | Immune System | Kidneys | Gastrointestinal Tract & Liver or Alimentary Tract | Reproductive System & Developmental | Respiratory System | Skin | Eyes | Bones & Teeth | Endocrine System | Hematological System | Odor | General Toxicity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.60E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acrolein | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.49E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NH3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.99E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 6.48E-02 | 6.48E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-02 | 6.48E-02 | 6.48E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Barium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.47E-04 | 0.00E+00 | 0.00E+00 |
| Beryllium | 0.00E+00 | 0.00E+00 | 4.79E-05 | 0.00E+00 | 5.06E-06 | 0.00E+00 | 4.79E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cadmium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.06E-03 | 0.00E+00 | 0.00E+00 | 1.18E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Chromium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cobalt | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.50E-08 | 6.50E-08 | 6.50E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.50E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Formaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hexane | 0.00E+00 | 5.56E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Lead | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Manganese | 0.00E+00 | 9.13E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 1.48E-03 | 0.00E+00 | 1.48E-03 | 0.00E+00 | 1.48E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Nickel | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.50E-04 | 3.23E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.23E-03 | 0.00E+00 | 0.00E+00 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.19E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene Oxide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 1.67E-05 | 1.67E-05 | 0.00E+00 | 0.00E+00 | 1.67E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sulfuric Acid | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.39E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 5.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.40E-06 | 5.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Vanadium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.38E-06 | 0.00E+00 | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | **6.48E-02** | **6.64E-02** | **4.79E-05** | **5.54E-03** | **2.18E-05** | **6.65E-02** | **7.60E-02** | **6.48E-02** | **1.38E-06** | **0.00E+00** | **6.50E-08** | **4.18E-03** | **0.00E+00** | **0.00E+00** |

# Table 8 Chart - Individual Pollutant Contribution to Chronic Hazard Quotient, by Target Health Effect

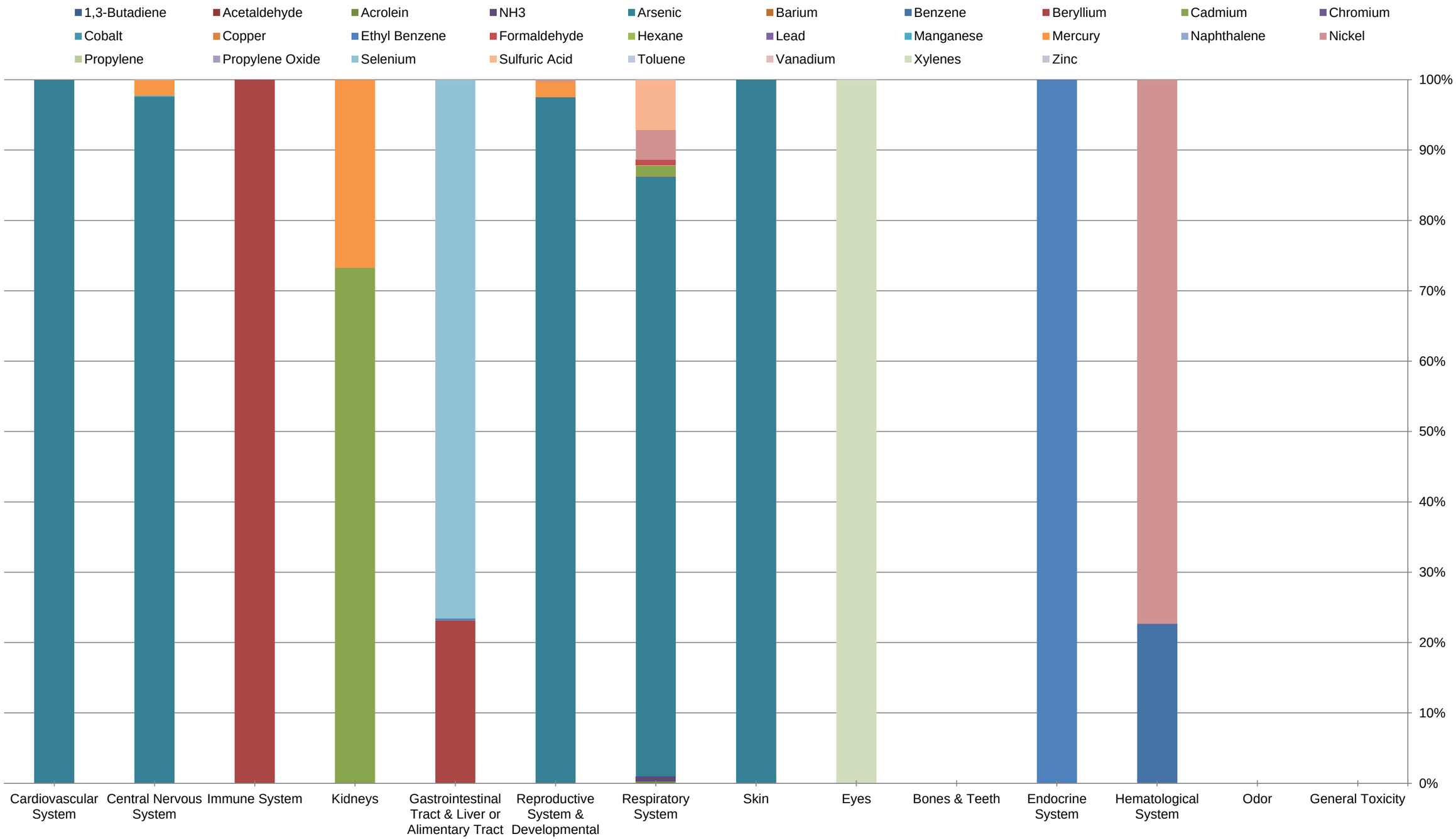


**Table 9**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to Acute Hazard Quotient, by Target Health Effect**

| Pollutant | Cardiovascular System | Central Nervous System | Immune System | Kidneys | Gastrointestinal Tract & Liver or Alimentary Tract | Reproductive System & Developmental | Respiratory System | Skin | Eyes | Bones & Teeth | Endocrine System | Hematological System | Odor | General Toxicity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.97E-05 | 0.00E+00 | 6.97E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acrolein | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-03 | 0.00E+00 | 2.28E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NH3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.21E-03 | 0.00E+00 | 2.21E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 1.16E-03 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Barium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Benzene | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 |
| Beryllium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cadmium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Chromium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cobalt | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.54E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Formaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.01E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hexane | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Lead | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Manganese | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 4.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Nickel | 0.00E+00 | 0.00E+00 | 1.17E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene Oxide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.71E-06 | 2.71E-06 | 0.00E+00 | 2.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sulfuric Acid | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.19E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 3.06E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.06E-06 | 3.06E-06 | 0.00E+00 | 3.06E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Vanadium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.55E-05 | 0.00E+00 | 8.55E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 3.10E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.10E-06 | 0.00E+00 | 3.10E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | **1.16E-03** | **1.63E-03** | **1.91E-02** | **0.00E+00** | **0.00E+00** | **9.06E-03** | **7.86E-03** | **0.00E+00** | **1.07E-02** | **0.00E+00** | **0.00E+00** | **7.43E-03** | **0.00E+00** | **0.00E+00** |

# Table 9 Chart - Individual Pollutant Contribution to Acute Hazard Quotient, by Target Health Effect

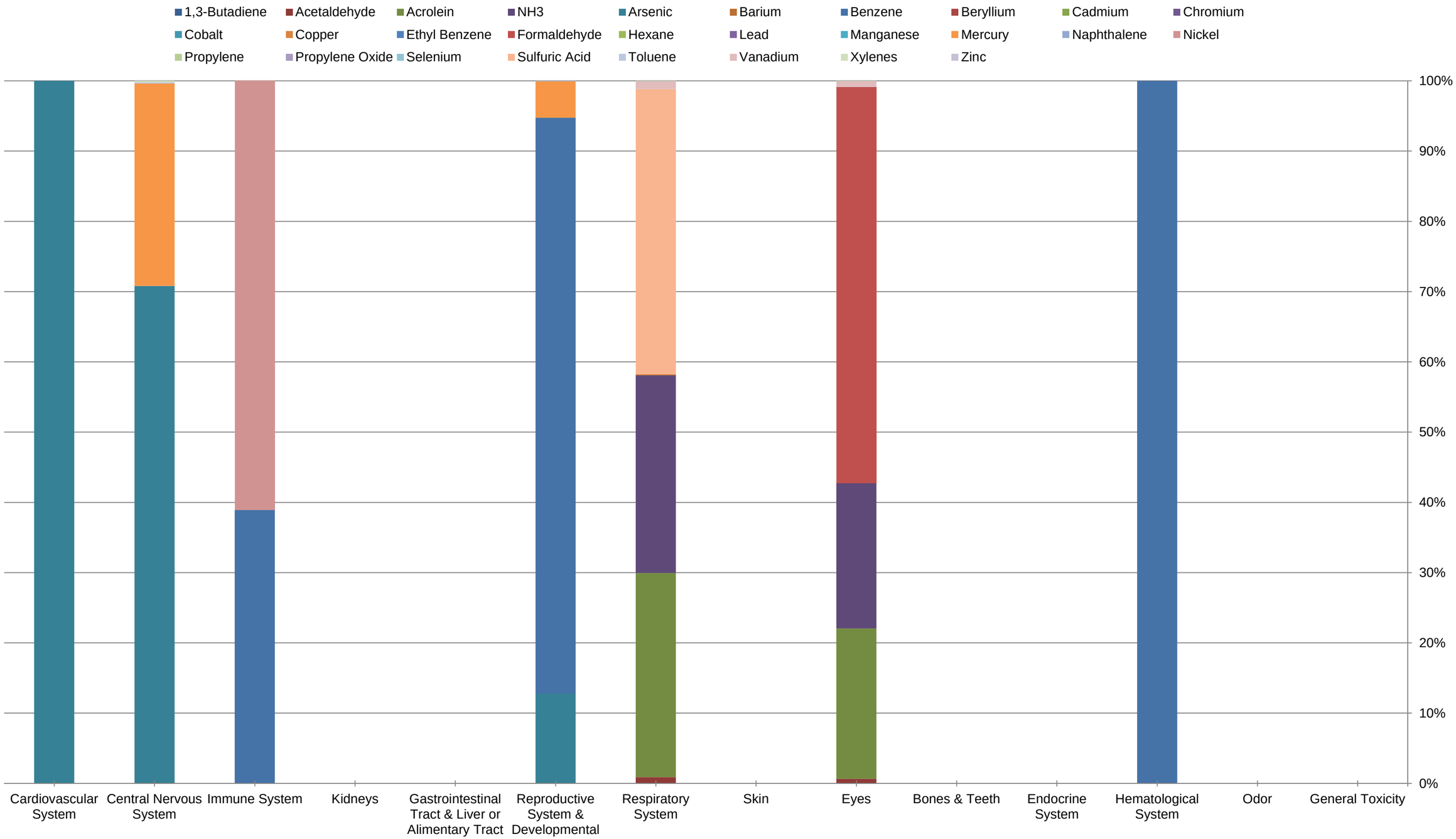
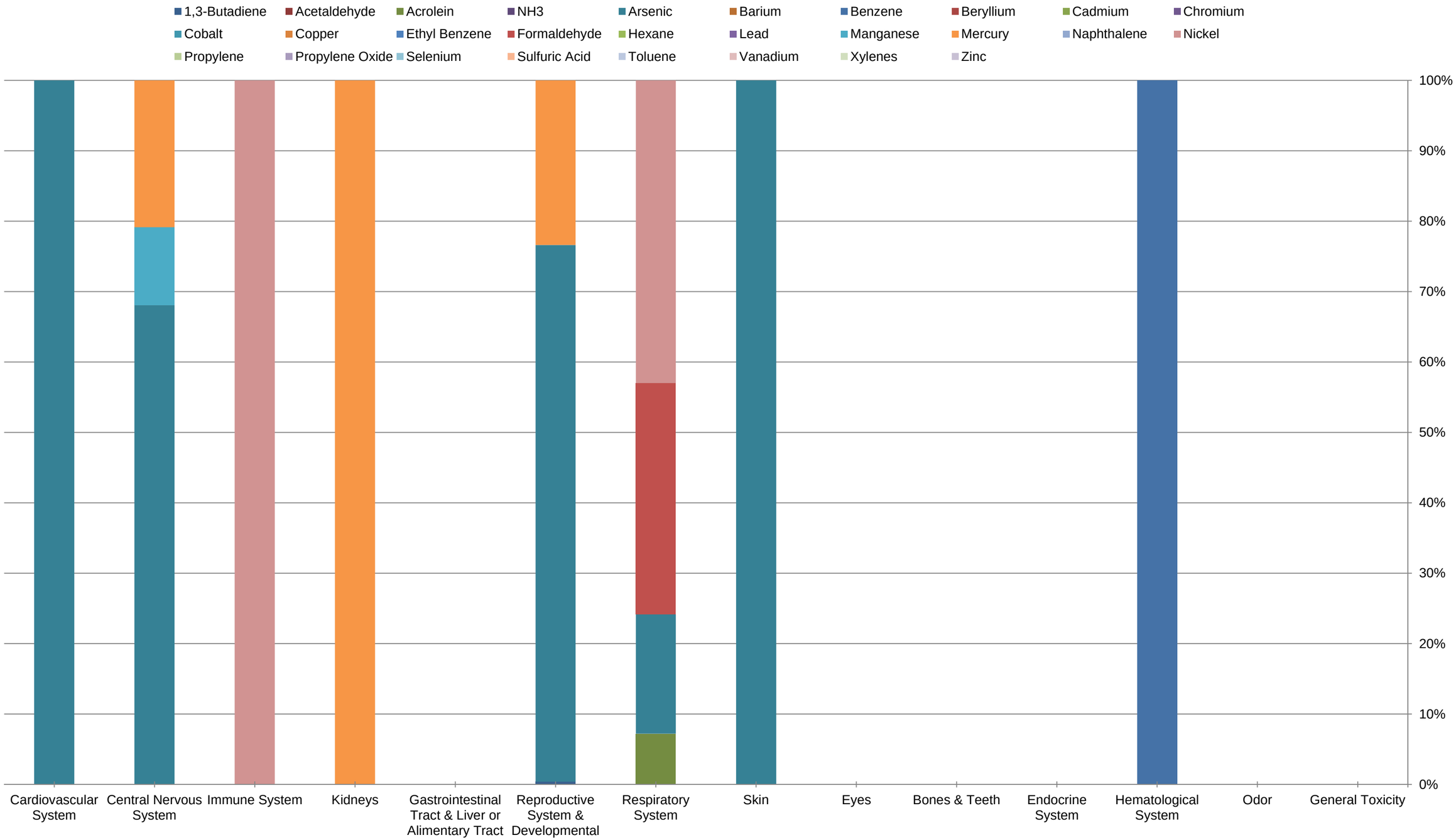


**Table 10**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to 8-Hour Chronic Hazard Quotient, by Target Health Effect**

| Pollutant | Cardiovascular System | Central Nervous System | Immune System | Kidneys | Gastrointestinal Tract & Liver or Alimentary Tract | Reproductive System & Developmental | Respiratory System | Skin | Eyes | Bones & Teeth | Endocrine System | Hematological System | Odor | General Toxicity |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1,3-Butadiene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.73E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Acrolein | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| NH3 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 2.97E-04 | 2.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.97E-04 | 2.97E-04 | 2.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Barium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.47E-04 | 0.00E+00 | 0.00E+00 |
| Beryllium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cadmium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Chromium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Cobalt | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Copper | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Ethyl Benzene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Formaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Hexane | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Lead | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Manganese | 0.00E+00 | 4.84E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Mercury | 0.00E+00 | 9.12E-05 | 0.00E+00 | 9.12E-05 | 0.00E+00 | 9.12E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Naphthalene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Nickel | 0.00E+00 | 0.00E+00 | 7.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Propylene Oxide | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Selenium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Sulfuric Acid | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Toluene | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Vanadium | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Zinc | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| **Total** | **2.97E-04** | **4.37E-04** | **7.53E-04** | **9.12E-05** | **0.00E+00** | **3.90E-04** | **1.75E-03** | **2.97E-04** | **0.00E+00** | **0.00E+00** | **0.00E+00** | **9.47E-04** | **0.00E+00** | **0.00E+00** |

# Table 10 Chart - Individual Pollutant Contribution to 8-Hour Chronic Hazard Quotient, by Target Health Effect



# Figures


Path: K:\l108-000 Invenergy\00-mxd\EFSB - Clear River Energy Center\108 Figure 1 - Aerial Photo.mxd

Drawing Date: 2016/01/15



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**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 1,667 feet

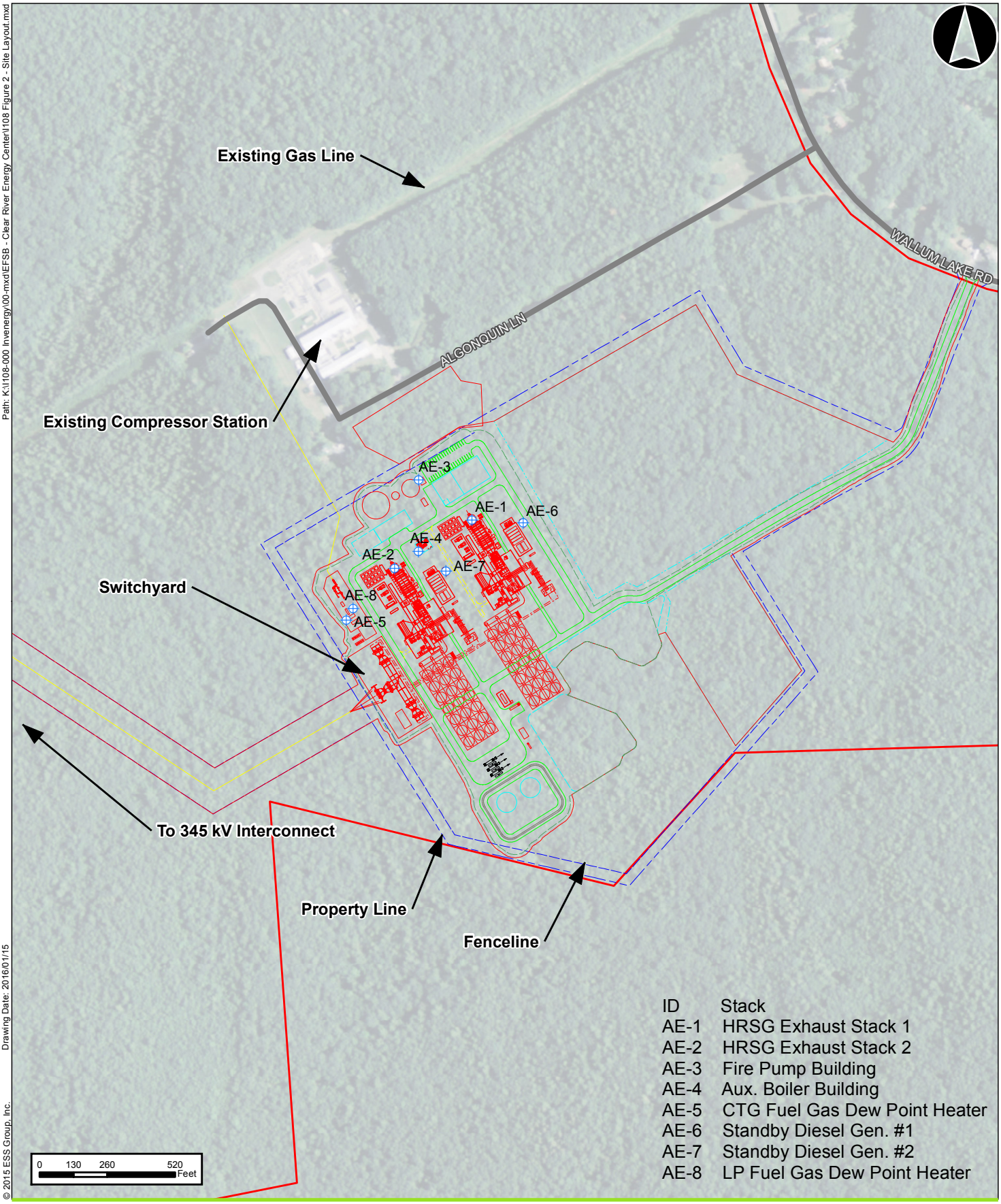
Source: 1) ESRI, Imagery, 2014
2) ESS, Site Location, 2014
3) RIGIS, Roads, 2013

**Legend**

Facility Property Line

**Aerial Photo**

**Figure 1**




| ID | Stack |
|---|---|
| AE-1 | HRSG Exhaust Stack 1 |
| AE-2 | HRSG Exhaust Stack 2 |
| AE-3 | Fire Pump Building |
| AE-4 | Aux. Boiler Building |
| AE-5 | CTG Fuel Gas Dew Point Heater |
| AE-6 | Standby Diesel Gen. #1 |
| AE-7 | Standby Diesel Gen. #2 |
| AE-8 | LP Fuel Gas Dew Point Heater |



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environmental consulting & engineering services

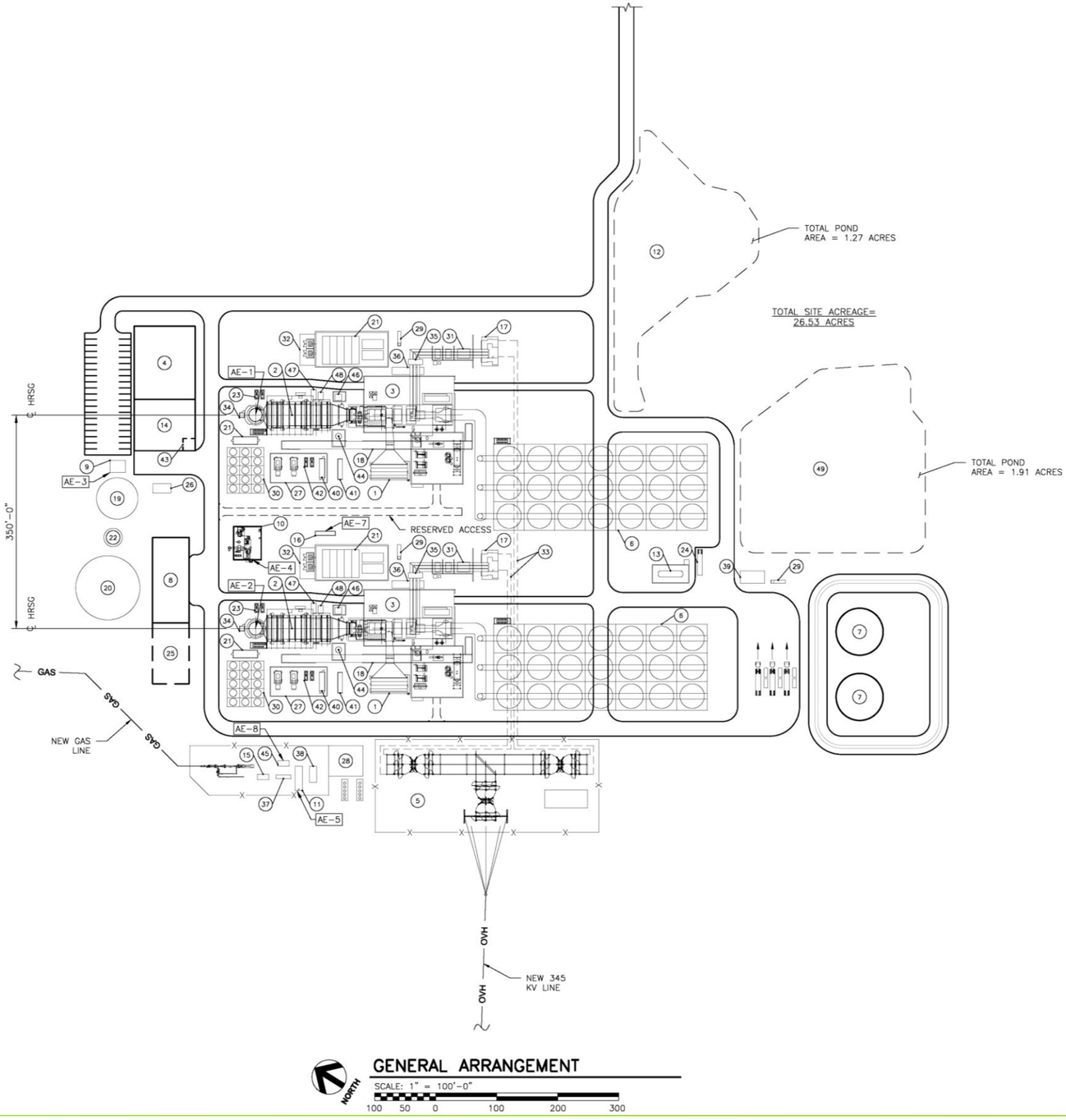
**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 501 feet

Source: 1) HDR, Site Layout 2/09/15
2) ESS, Site Location, 2014
3) RIGIS, Roads, 2013

**Site Layout**

**Figure 2**




## GENERAL ARRANGEMENT

SCALE: 1" = 100'-0"

NORTH

100 50 0 100 200 300

| BUILDING AND EQUIPMENT LIST | | | | |
|---|---|---|---|---|
| NO | NAME | SIZE (DIMENSIONS IN FEET) | | |
| | | LENGTH | WIDTH | HEIGHT |
| 1 | COMBUSTION TURBINE INLET FILTER | 60 | 27 | 80 |
| 2 | HEAT RECOVERY STEAM GENERATOR | 103 | 44 | 115 |
| 3 | TURBINE BUILDING | 150 | 94 | 80 |
| 4 | ADMINISTRATION/CONTROL BUILDING | 140 | 100 | 25 |
| 5 | SWITCHYARD | 367 | 153 | 25 |
| 6 | AIR-COOLED CONDENSER | 350 | 150 | 120 |
| 7 | FUEL OIL STORAGE TANK | 77ø | – | 30 |
| 8 | WATER TREATMENT BUILDING | 140 | 60 | 30 |
| 9 | FIRE PUMP BUILDING | 25 | 20 | 15 |
| 10 | AUXILIARY BOILER BUILDING | 54 | 45 | 35 |
| 11 | CTG FUEL GAS DEW POINT HEATER | 40 | 12 | 15 |
| 12 | STORM WATER DETENTION POND #1 | – | – | – |
| 13 | AMMONIA STORAGE TANK | 60 | 30.5 | 15 |
| 14 | WAREHOUSE | 100 | 84 | 25 |
| 15 | FUEL GAS FILTER/SEPARATOR | 18 | 9 | 15 |
| 16 | STAND-BY DIESEL GENERATOR | 33 | 8 | 15 |
| 17 | GSU TRANSFORMER | 48 | 27 | 15 |
| 18 | PIPE RACK | 313 | 15 | 30 |
| 19 | FIRE/SERVICE WATER TANK | 68ø | – | 30 |
| 20 | DEMINERALIZED WATER STORAGE TANK | 105ø | – | 30 |
| 21 | BOP ELECTRICAL | 46 | 12 | 25 |
| 22 | WASTE WATER TANK | 30ø | – | 30 |
| 23 | HRSG LTE RECIRCULATION PUMPS | 16 | 16 | 6 |
| 24 | HYDROGEN TUBE TRAILER | – | – | 15 |
| 25 | ZLD WATER TREATMENT | 100 | 60 | 30 |
| 26 | OIL STORAGE SHELTER | 30 | 15 | 12 |
| 27 | FEEDWATER PUMP BUILDING | 94 | 48.5 | 25 |
| 28 | GAS COMPRESSOR BUILDING | 56 | 51 | 30 |
| 29 | OIL WATER SEPARATOR | 24 | 5 | – |
| 30 | CCCW HEAT EXCHANGER | 75 | 60 | 32 |
| 31 | AUX. TRANSFORMERS | 20 | 16 | 15 |
| 32 | SUS TRANSFORMERS | 51 | 25 | 12 |
| 33 | 345 KV UNDERGROUND DUCT BANK | – | 5 | – |
| 34 | CEMS SHELTER | 9 | 8 | 12 |
| 35 | GENERATOR CIRCUIT BREAKER | 23.5 | 8 | 20 |
| 36 | LCI EXCITATION CONTAINER | 52 | 12 | 12 |
| 37 | FUEL GAS FLOW METER | 24 | 6 | 6 |
| 38 | FUEL GAS PRESSURE REGULATION | 27 | 11 | 6 |
| 39 | FUEL OIL EQUIPMENT BUILDING | 40 | 20 | 20 |
| 40 | SAMPLE PANEL ENCLOSURE | 31 | 9 | 12 |
| 41 | FUEL GAS PERFORMANCE HEATER | 34 | 8.5 | 10 |
| 42 | CCCW PUMPS | 16 | 16 | 6 |
| 43 | WORKSHOP | 20 | 20 | 25 |
| 44 | BLOWDOWN TANK | 10ø | – | 10 |
| 45 | LP FUEL GAS DEW POINT HEATER | 18 | 9 | 8 |
| 46 | WATER WASH DRAIN TANK | 11 | 11 | – |
| 47 | DUCT BURNER FUEL SKID | 16 | 8.5 | 8 |
| 48 | DUCT BURNER COOLING AIR BLOWER | 12 | 8.5 | 6 |
| 49 | STORM WATER DETENTION POND #2 | – | – | – |

| AIR EMISSION SOURCES (COMBUSTION SOURCES) | | | |
|---|---|---|---|
| NO | NAME | UTM COORDINATES | |
| | | N | E |
| AE-1 | HRSG EXHAUST STACK 1 | N4,649,656 | E271,822 |
| AE-2 | HRSG EXHAUST STACK 2 | N4,649,602 | E271,730 |
| AE-3 | FIRE PUMP BUILDING | N4,649,702 | E271,765 |
| AE-4 | AUX. BOILER BUILDING | N4,649,627 | E271,764 |
| AE-5 | CTG FUEL GAS DEW POINT HEATER | N4,649,545 | E271,676 |
| AE-6 | NOT USED | – | – |
| AE-7 | STAND-BY DIESEL GENERATOR 2 | N4,649,596 | E271,788 |
| AE-8 | LP FUEL GAS DEW POINT HEATER | N4,649,556 | E271,678 |

* UTM COORDINATES ARE FOR ZONE 19 T

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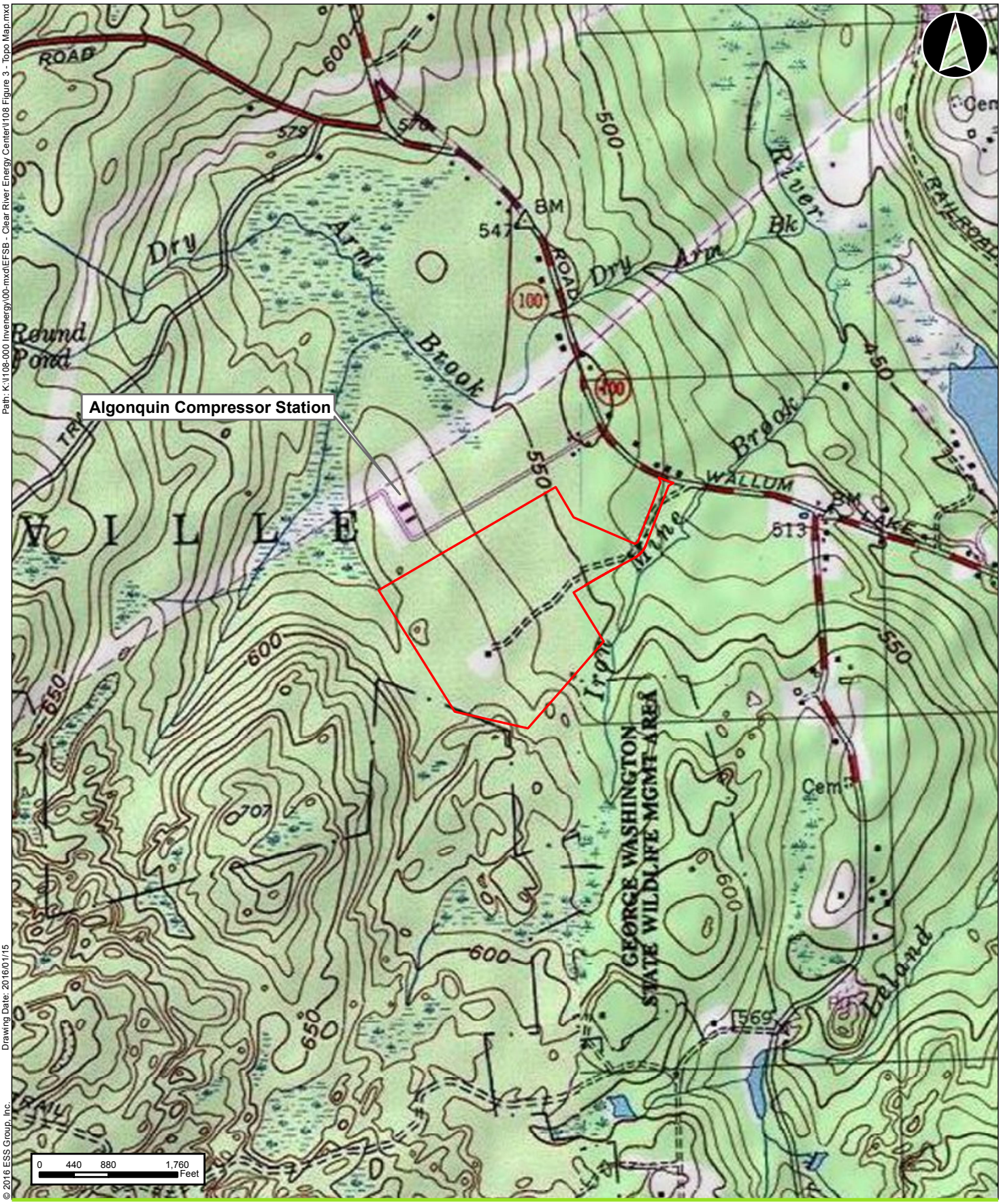
**Clear River Energy Center**
Burrillville, Rhode Island

Source: HDR
Scale: As Shown



**General Arrangement**

**Figure**
**3**




Path: K:\l108-000 Invenergy\00-mxd\EFSB - Clear River Energy Center\108 Figure 3 - Topo Map.mxd

Drawing Date: 2016/01/15



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**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 1,667 feet

Source: 1) USGS, Topo Map, 2013
2) ESS, Site Location, 2014

**Legend**

Property Line

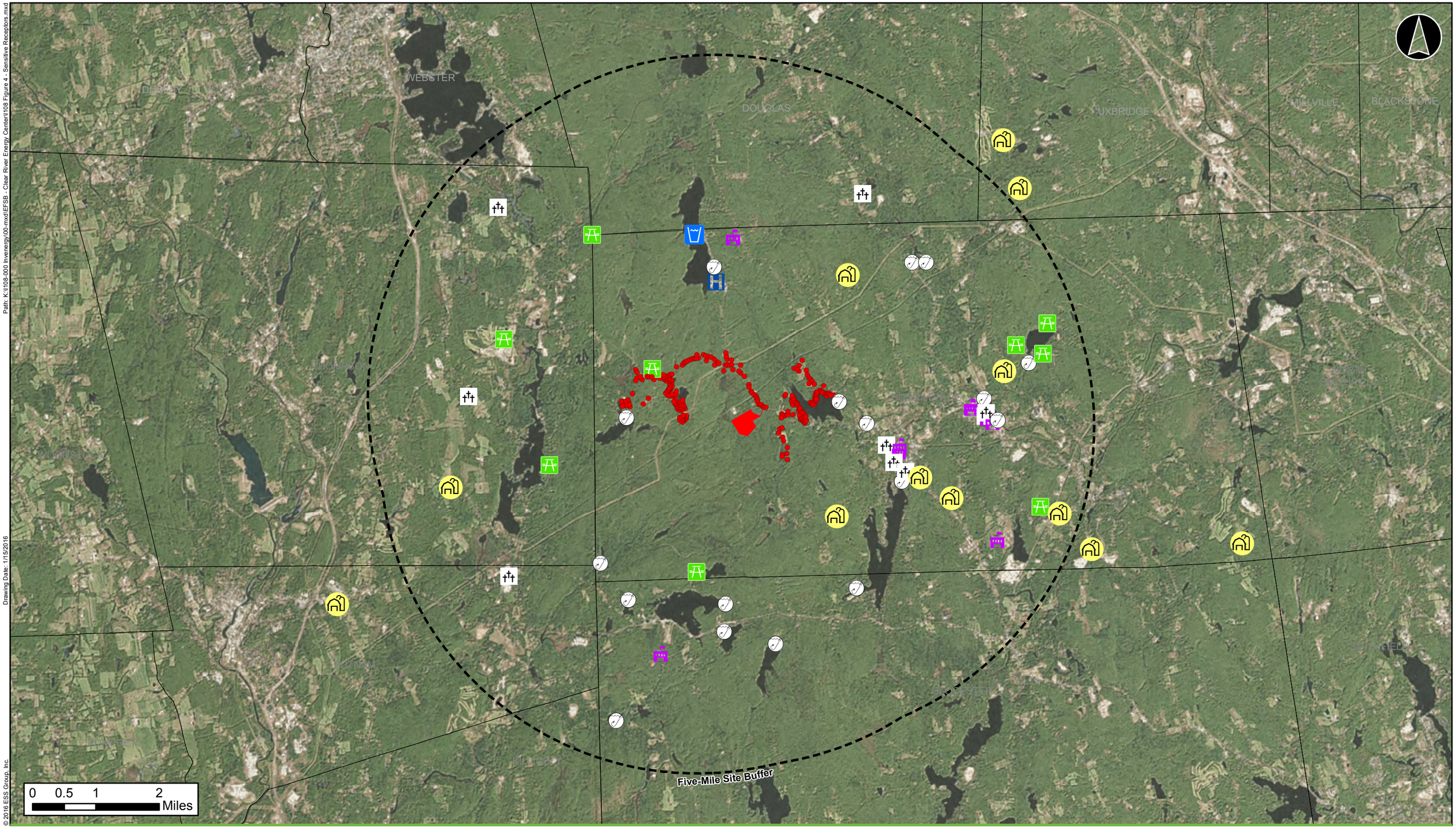
**Topographic Map**

**Figure 4**

Path: K:\1108-000 Invenergy\00-mxd\EFSB - Clear River Energy Center\1108 Figure 4 - Sensitive Receptors.mxd

Drawing Date: 1/15/2016






**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 7,500 feet

Source: 1) ESS, Site Location and Receptors, 2016; 2) ESRI, Imagery, 2016;

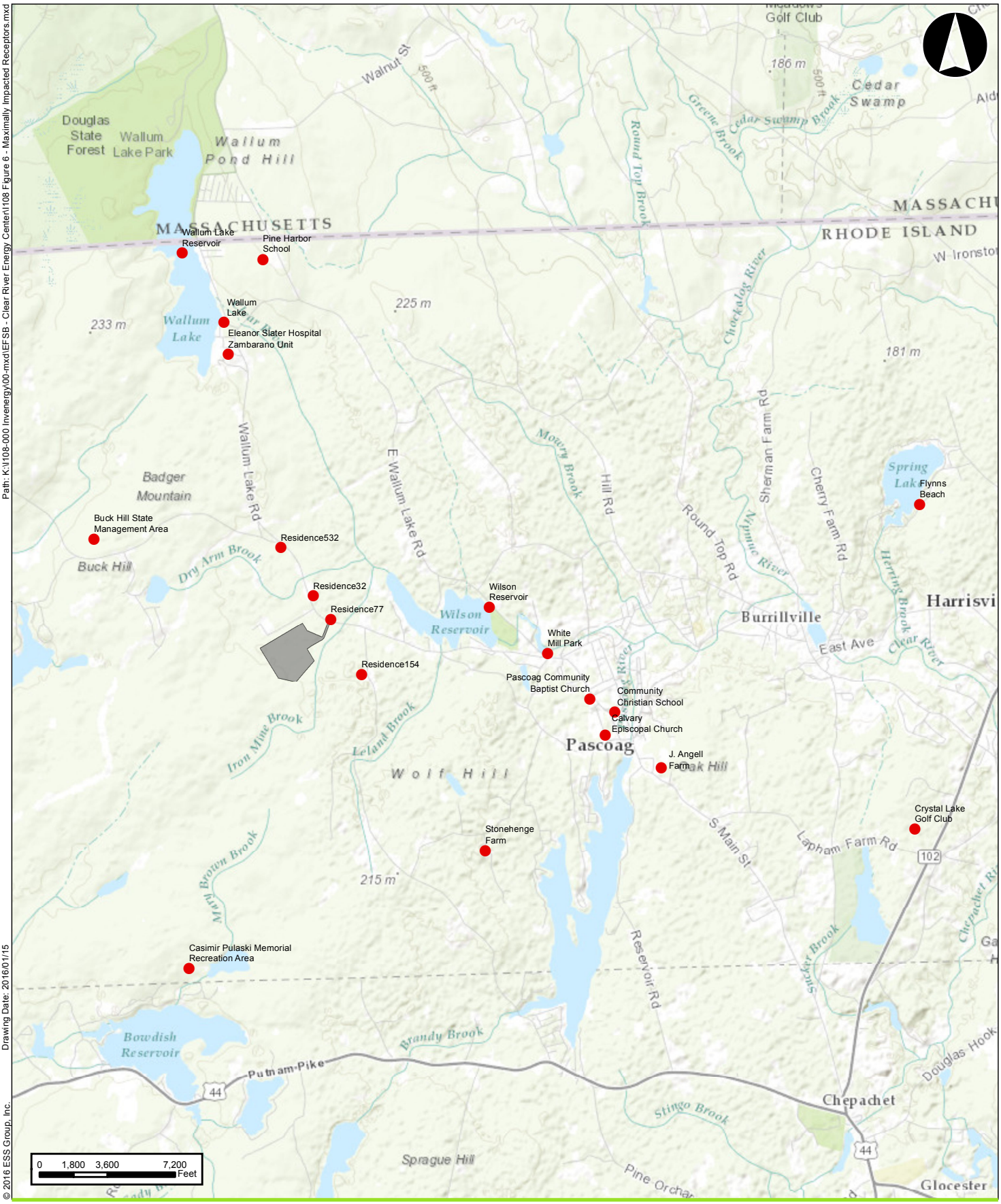
**Legend**

**Receptor Category**

- Church/Cemetery
- Drinking Water
- Farm
- Fishing
- Hospital
- Outdoor Recreation
- Residential
- School/Library

**Sensitive Receptors**

**Figure 5**






**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 6,932 feet

Source: 1) USGS, Topo Map, 2015
2) ESS, Receptor Locations, 2015

**Legend**

- Maximally Impacted Receptor
- Proposed Project Site

**Maximally Impacted Receptors**

**Figure 6**

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# Appendix A

## Emissions Data Summaries

**Table A-1**
**Clear River Energy Center - Burrillville, Rhode Island**
**CT/HRSG Emission Summaries[1]**

| Modeling Case No. | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GE Case No. | | 1 | 4 | 5 | 6 | 7 | 15 | 17 | 18 | 19 | 25 | 27 | 28 | 29 |
| | | | | | | | | | | | | | | |
| Fuel Fired | | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas | Natural Gas |
| Gas Turbine Load | % of Base | 100 | 100 | 100 | 75 | 38 | 100 | 100 | 75 | 30 | 100 | 100 | 75 | 35 |
| | | | | | | | | | | | | | | |
| Ambient Temperature | deg. F | 90 | 90 | 90 | 90 | 90 | 59 | 59 | 59 | 59 | 10 | 10 | 10 | 10 |
| Ambient Pressure | psia | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 |
| Ambient Relative Humidity | % | 50 | 50 | 50 | 50 | 50 | 60 | 60 | 60 | 60 | 61 | 61 | 61 | 61 |
| | | | | | | | | | | | | | | |
| Duct Burner Firing | % of capacity | 31 | 0 | 0 | 0 | 0 | 34 | 0 | 0 | 0 | 37 | 0 | 0 | 0 |
| Evaporative Cooler Status | On/Off | On | On | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| | | | | | | | | | | | | | | |
| Stack Gas Molecular Weight | lb/lb-mole | 28.11 | 28.14 | 28.20 | 28.22 | 28.27 | 28.29 | 28.33 | 28.35 | 28.42 | 28.38 | 28.42 | 28.43 | 28.49 |
| Stack Flow | lb/hr | 5,757,500 | 5,747,700 | 5,565,000 | 4,645,200 | 3,340,100 | 5,692,300 | 5,681,600 | 4,704,000 | 3,124,800 | 6,066,200 | 6,054,300 | 4,855,200 | 3,444,000 |
| Stack Flow | acfm | 1,638,360 | 1,623,680 | 1,568,723 | 1,308,512 | 939,213 | 1,599,503 | 1,594,243 | 1,318,999 | 874,034 | 1,699,161 | 1,693,441 | 1,359,686 | 960,950 |
| Stack Exit Temperature | deg. F | 184 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 180 | 181 | 180 |
| | | | | | | | | | | | | | | |
| Emission Rate | | | | | | | | | | | | | | |
| NOx | lb/hr | 24.8 | 23.1 | 22.1 | 17.5 | 11.4 | 24.9 | 23.0 | 18.2 | 10.5 | 26.6 | 24.5 | 19.5 | 12.3 |
| CO | lb/hr | 15.1 | 14.1 | 13.4 | 10.6 | 6.95 | 15.1 | 14.0 | 11.1 | 6.40 | 16.2 | 14.9 | 11.9 | 7.46 |
| SO2 | lb/hr | 5.74 | 5.35 | 5.10 | 4.04 | 2.64 | 5.75 | 5.33 | 4.21 | 2.44 | 6.14 | 5.68 | 4.50 | 2.83 |
| PM/PM10/PM2.5 | lb/hr | 17.9 | 12.0 | 11.9 | 11.3 | 10.6 | 18.0 | 12.0 | 11.4 | 10.5 | 18.1 | 12.1 | 11.5 | 10.7 |
| | | | | | | | | | | | | | | |
| Emission Rate | | | | | | | | | | | | | | |
| NOx | g/sec | 3.12 | 2.91 | 2.78 | 2.21 | 1.44 | 3.14 | 2.90 | 2.29 | 1.32 | 3.35 | 3.09 | 2.46 | 1.55 |
| CO | g/sec | 1.90 | 1.78 | 1.69 | 1.34 | 0.88 | 1.90 | 1.76 | 1.40 | 0.81 | 2.04 | 1.88 | 1.50 | 0.94 |
| SO2 | g/sec | 0.72 | 0.67 | 0.64 | 0.51 | 0.33 | 0.72 | 0.67 | 0.53 | 0.31 | 0.77 | 0.72 | 0.57 | 0.36 |
| PM/PM10/PM2.5 | g/sec | 2.26 | 1.51 | 1.50 | 1.42 | 1.34 | 2.27 | 1.51 | 1.44 | 1.32 | 2.28 | 1.52 | 1.45 | 1.35 |

| Modeling Case No. | Units | 14 | 15 | 16 | 17 | 18 | 19 | 20 | 21 |
|---|---|---|---|---|---|---|---|---|---|
| GE Case No. | | 36 | 37 | 42 | 43 | 48 | 49 | 51 | 52 |
| | | | | | | | | | |
| Fuel Fired | | ULSD | ULSD | ULSD | ULSD | ULSD | ULSD | ULSD | ULSD |
| Gas Turbine Load | % of Base | 100 | 50 | 100 | 50 | 100 | 50 | 100 | 50 |
| | | | | | | | | | |
| Ambient Temperature | deg. F | 90 | 90 | 59 | 59 | 10 | 10 | 0 | 0 |
| Ambient Pressure | psia | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 | 14.4 |
| Ambient Relative Humidity | % | 50 | 50 | 60 | 60 | 61 | 61 | 52 | 52 |
| | | | | | | | | | |
| Duct Burner Firing | % of capacity | 0 | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Evaporative Cooler Status | On/Off | Off | Off | Off | Off | Off | Off | Off | Off |
| | | | | | | | | | |
| Stack Gas Molecular Weight | lb/lb-mole | 27.99 | 28.14 | 28.11 | 28.23 | 28.20 | 28.32 | 28.21 | 28.38 |
| Stack Flow | lb/hr | 5,865,300 | 3,587,900 | 6,002,900 | 3,684,500 | 6,181,400 | 3,921,800 | 6,188,700 | 4,037,300 |
| Stack Flow | acfm | 1,978,114 | 1,149,749 | 2,015,878 | 1,155,866 | 2,028,357 | 1,228,120 | 2,051,831 | 1,380,003 |
| Stack Exit Temperature | deg. F | 300 | 266 | 300 | 253 | 285 | 254 | 293 | 321 |
| | | | | | | | | | |
| Emission Rate | | | | | | | | | |
| NOx | lb/hr | 63.3 | 38.3 | 65.6 | 40.2 | 68.6 | 42.5 | 68.8 | 42.1 |
| CO | lb/hr | 38.5 | 23.3 | 40.0 | 24.5 | 41.8 | 25.8 | 41.8 | 25.8 |
| SO2 | lb/hr | 5.99 | 3.62 | 6.22 | 3.80 | 6.49 | 4.02 | 6.50 | 3.98 |
| PM/PM10/PM2.5 | lb/hr | 68.8 | 67.6 | 68.9 | 67.7 | 69.0 | 67.8 | 69.1 | 67.8 |
| | | | | | | | | | |
| Emission Rate | | | | | | | | | |
| NOx | g/sec | 7.98 | 4.83 | 8.27 | 5.07 | 8.64 | 5.36 | 8.67 | 5.30 |
| CO | g/sec | 4.85 | 2.94 | 5.04 | 3.08 | 5.26 | 3.24 | 5.26 | 3.24 |
| SO2 | g/sec | 0.75 | 0.46 | 0.78 | 0.48 | 0.82 | 0.51 | 0.82 | 0.50 |
| PM/PM10/PM2.5 | g/sec | 8.67 | 8.52 | 8.68 | 8.53 | 8.69 | 8.54 | 8.71 | 8.54 |

[1] Based on preliminary project equipment specifications and emissions estimates provided by GE. Equipment vendor selection, equipment specifications, and emission rates are subject to change as the project design advances.

**Table A-2**
**Clear River Energy Center - Burrillville, Rhode Island**
**Non-Criteria Pollutant Emissions Summaries[1]**

| Emission Source(s): | Gas Turbines | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Number of Sources: | 2 | | | | | | | |
| Fuel Fired: | Natural Gas | | | | | | | |
| Maximum Unit Heat Input: | 3,393 | MMbtu/hr | | | | | | |
| Annual Operation: | 8,040 | hrs/yr | | | | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | lb/yr |
| Ammonia | 0.0027 | lb/MMBtu | 9.2 | 73,968.00 | 0.00% | 9.20E+00 | 73,968 | 300 |
| Sulfuric Acid | 1.1E-03 | lb/MMBtu | 3.69 | 29,667.60 | 0.00% | 3.69E+00 | 29,668 | 40 |
| 1,3-Butadiene | 4.3E-07 | lb/MMBtu | 0.0029 | 23.46 | 90.00% | 2.92E-04 | 2.3 | 3 |
| Acetaldehyde | 4.0E-05 | lb/MMBtu | 0.27 | 2,182.38 | 90.00% | 2.71E-02 | 218 | 50 |
| Acrolein | 6.4E-06 | lb/MMBtu | 0.043 | 349.18 | 90.00% | 4.34E-03 | 35 | 0.07 |
| Benzene | 1.2E-05 | lb/MMBtu | 0.081 | 654.71 | 90.00% | 8.14E-03 | 65 | 10 |
| Ethylbenzene | 3.2E-05 | lb/MMBtu | 0.22 | 1,745.90 | 90.00% | 2.17E-02 | 175 | 9,000 |
| Formaldehyde | 2.2E-04 | lb/MMBtu | 1.48 | 11,914.98 | 90.00% | 1.48E-01 | 1,191 | 9 |
| Naphthalene | 1.3E-06 | lb/MMBtu | 0.009 | 70.93 | 90.00% | 8.82E-04 | 7.1 | 3 |
| PAH | 2.2E-06 | lb/MMBtu | 0.015 | 120.03 | 90.00% | 1.49E-03 | 12 | NA |
| Propylene Oxide | 2.9E-05 | lb/MMBtu | 0.20 | 1,582.22 | 90.00% | 1.97E-02 | 158 | 30 |
| Toluene | 1.3E-04 | lb/MMBtu | 0.88 | 7,092.73 | 90.00% | 8.82E-02 | 709 | 1,000 |
| Xylenes | 6.4E-05 | lb/MMBtu | 0.43 | 3,491.80 | 90.00% | 4.34E-02 | 349 | 3,000 |

| Emission Source(s): | Gas Turbines | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Number of Sources: | 2 | | | | | | | |
| Fuel Fired: | ULSD | | | | | | | |
| Maximum Unit Heat Input: | 3,507 | MMbtu/hr | | | | | | |
| Annual Operation: | 720 | hrs/yr | | | | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | lb/yr |
| Ammonia | 0.0029 | lb/MMBtu | 10.1 | 7,272.00 | 0.00% | 1.01E+01 | 7,272 | 300 |
| Sulfuric Acid | 1.2E-03 | lb/MMBtu | 4.17 | 3,002.40 | 0.00% | 4.17E+00 | 3,002 | 40 |
| 1,3-Butadiene | 1.6E-05 | lb/MMBtu | 0.11 | 80.80 | 90.00% | 1.12E-02 | 8.1 | 3 |
| Benzene | 1.2E-05 | lb/MMBtu | 0.084 | 60.60 | 90.00% | 8.42E-03 | 6.1 | 10 |
| Formaldehyde | 2.3E-04 | lb/MMBtu | 1.62 | 1,163.64 | 90.00% | 1.62E-01 | 116 | 9 |
| Naphthalene | 3.5E-05 | lb/MMBtu | 0.25 | 176.75 | 90.00% | 2.45E-02 | 18 | 3 |
| PAH | 4.0E-05 | lb/MMBtu | 0.28 | 202.00 | 90.00% | 2.81E-02 | 20 | NA |
| Arsenic | 4.6E-08 | lb/MMBtu | 0.00 | 0.23 | 0.00% | 3.24E-04 | 0.23 | 0.02 |
| Beryllium | 3.1E-07 | lb/MMBtu | 0.00 | 1.57 | 0.00% | 2.17E-03 | 1.6 | 0.04 |
| Cadmium | 5.1E-09 | lb/MMBtu | 0.00 | 0.03 | 0.00% | 3.60E-05 | 0.026 | 0.07 |
| Chromium | 2.2E-06 | lb/MMBtu | 0.02 | 11.31 | 0.00% | 1.57E-02 | 11 | 20,000 |
| Lead | 7.7E-07 | lb/MMBtu | 0.01 | 3.88 | 0.00% | 5.39E-03 | 3.9 | 0.9 |
| Manganese | 2.8E-07 | lb/MMBtu | 0.00 | 1.42 | 0.00% | 1.98E-03 | 1.4 | 0.2 |
| Mercury | 1.0E-08 | lb/MMBtu | 0.00 | 0.05 | 0.00% | 7.22E-05 | 0.052 | 0.7 |
| Nickel | 1.5E-06 | lb/MMBtu | 0.01 | 7.47 | 0.00% | 1.04E-02 | 7.5 | 0.4 |
| Selenium | 2.6E-07 | lb/MMBtu | 0.00 | 1.29 | 0.00% | 1.80E-03 | 1.3 | 2,000 |

| Emission Source(s): | HRSG Duct Burners | | | | | | | |
|---|---|---|---|---|---|---|---|---|
| Number of Sources: | 2 | | | | | | | |
| Fuel Fired: | Natural Gas | | | | | | | |
| Maximum Unit Heat Input: | 721.0 | MMbtu/hr | | | | | | |
| Annual Operation: | 8,040 | hrs/yr | | | | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | lb/yr |
| Lead | 4.9E-07 | lb/MMBtu | 7.1E-04 | 5.68 | 0.00% | 7.07E-04 | 5.7 | 0.9 |
| Benzene | 2.1E-06 | lb/MMBtu | 3.0E-03 | 23.87 | 90.00% | 2.97E-04 | 2.4 | 10 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 1.1E-01 | 852.48 | 90.00% | 1.06E-02 | 85 | 9 |
| Hexane | 1.8E-03 | lb/MMBtu | 2.5E+00 | 20,459.44 | 90.00% | 2.54E-01 | 2,046 | 20,000 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 8.6E-04 | 6.93 | 90.00% | 8.62E-05 | 0.69 | 3 |
| Toluene | 3.3E-06 | lb/MMBtu | 4.8E-03 | 38.65 | 90.00% | 4.81E-04 | 3.9 | 1,000 |
| Arsenic | 2.0E-07 | lb/MMBtu | 2.8E-04 | 2.27 | 0.00% | 2.83E-04 | 2.3 | 0.02 |
| Barium | 4.3E-06 | lb/MMBtu | 6.2E-03 | 50.01 | 0.00% | 6.22E-03 | 50 | 2,000 |
| Beryllium | 1.2E-08 | lb/MMBtu | 1.7E-05 | 0.14 | 0.00% | 1.70E-05 | 0.14 | 0.04 |
| Cadmium | 1.1E-06 | lb/MMBtu | 1.6E-03 | 12.50 | 0.00% | 1.56E-03 | 13 | 0.07 |
| Chromium | 1.4E-06 | lb/MMBtu | 2.0E-03 | 15.91 | 0.00% | 1.98E-03 | 16 | 20,000 |
| Cobalt | 8.2E-08 | lb/MMBtu | 1.2E-04 | 0.95 | 0.00% | 1.19E-04 | 1.0 | 0.1 |
| Copper | 8.3E-07 | lb/MMBtu | 1.2E-03 | 9.66 | 0.00% | 1.20E-03 | 10 | 40 |
| Manganese | 3.7E-07 | lb/MMBtu | 5.4E-04 | 4.32 | 0.00% | 5.37E-04 | 4.3 | 0.2 |
| Mercury | 2.5E-07 | lb/MMBtu | 3.7E-04 | 2.96 | 0.00% | 3.68E-04 | 3.0 | 0.7 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 1.6E-03 | 12.50 | 0.00% | 1.56E-03 | 13 | 60 |
| Nickel | 2.1E-06 | lb/MMBtu | 3.0E-03 | 23.87 | 0.00% | 2.97E-03 | 24 | 0.4 |
| Selenium | 2.4E-08 | lb/MMBtu | 3.4E-05 | 0.27 | 0.00% | 3.39E-05 | 0.27 | 2,000 |
| Vanadium | 2.3E-06 | lb/MMBtu | 3.3E-03 | 26.14 | 0.00% | 3.25E-03 | 26 | 0.07 |
| Zinc | 2.8E-05 | lb/MMBtu | 4.1E-02 | 329.62 | 0.00% | 4.10E-02 | 330 | 3,000 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 3.4E-05 | 0.27 | 90.00% | 3.39E-06 | 0.0273 | NA |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 2.3E-05 | 0.18 | 90.00% | 2.26E-06 | 0.0182 | NA |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Anthracene | 2.4E-09 | lb/MMBtu | 3.4E-06 | 0.03 | 90.00% | 3.39E-07 | 0.0027 | NA |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 1.7E-06 | 0.01 | 90.00% | 1.70E-07 | 0.0014 | NA |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 1.7E-06 | 0.01 | 90.00% | 1.70E-07 | 0.0014 | NA |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Butane | 2.1E-03 | lb/MMBtu | 3.0E+00 | 23,869.34 | 90.00% | 2.97E-01 | 2,387 | NA |
| Chrysene | 1.8E-09 | lb/MMBtu | 2.5E-06 | 0.02 | 90.00% | 2.54E-07 | 0.0020 | NA |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 1.7E-06 | 0.01 | 90.00% | 1.70E-07 | 0.0014 | NA |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 1.7E-03 | 13.64 | 90.00% | 1.70E-04 | 1.4 | NA |
| Ethane | 3.0E-03 | lb/MMBtu | 4.4E+00 | 35,235.69 | 90.00% | 4.38E-01 | 3,524 | NA |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 4.2E-06 | 0.03 | 90.00% | 4.24E-07 | 0.0034 | NA |
| Fluorene | 2.8E-06 | lb/MMBtu | 4.0E-03 | 32.46 | 90.00% | 4.04E-04 | 3.2 | NA |
| Indeno(1,2,3-cd)pyrene | 1.8E-06 | lb/MMBtu | 2.6E-03 | 20.87 | 90.00% | 2.60E-04 | 2.1 | NA |
| Pentane | 2.5E-03 | lb/MMBtu | 3.7E+00 | 29,552.52 | 90.00% | 3.68E-01 | 2,955 | NA |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 2.4E-05 | 0.19 | 90.00% | 2.40E-06 | 0.019 | NA |
| Propane | 1.6E-03 | lb/MMBtu | 2.3E+00 | 18,186.16 | 90.00% | 2.26E-01 | 1,819 | NA |
| Pyrene | 4.9E-09 | lb/MMBtu | 7.1E-06 | 0.06 | 90.00% | 7.07E-07 | 0.0057 | NA |

| Emission Source(s): | Auxiliary Boiler | | | | |
|---|---|---|---|---|---|
| Number of Sources: | 1 | | | | |
| Fuel Fired: | Natural Gas | | | | |
| Maximum Unit Heat Input: | 140.6 | MMbtu/hr | | | |
| Annual Operation: | 4,576 | hrs/yr | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Potential Emissions | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | lb/yr |
| Lead | 4.9E-07 | lb/MMBtu | 6.9E-05 | 3.15E-01 | 0.9 |
| Benzene | 2.1E-06 | lb/MMBtu | 2.9E-04 | 1.32E+00 | 10 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 1.0E-02 | 4.73E+01 | 9 |
| Hexane | 1.8E-03 | lb/MMBtu | 2.5E-01 | 1.14E+03 | 20,000 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 8.4E-05 | 3.85E-01 | 3 |
| Toluene | 3.3E-06 | lb/MMBtu | 4.7E-04 | 2.14E+00 | 1,000 |
| Arsenic | 2.0E-07 | lb/MMBtu | 2.8E-05 | 1.26E-01 | 0.02 |
| Barium | 4.3E-06 | lb/MMBtu | 6.1E-04 | 2.78E+00 | 2,000 |
| Beryllium | 1.2E-08 | lb/MMBtu | 1.7E-06 | 7.57E-03 | 0.04 |
| Cadmium | 1.1E-06 | lb/MMBtu | 1.5E-04 | 6.94E-01 | 0.07 |
| Chromium | 1.4E-06 | lb/MMBtu | 1.9E-04 | 8.83E-01 | 20,000 |
| Cobalt | 8.2E-08 | lb/MMBtu | 1.2E-05 | 5.30E-02 | 0.1 |
| Copper | 8.3E-07 | lb/MMBtu | 1.2E-04 | 5.36E-01 | 40 |
| Manganese | 3.7E-07 | lb/MMBtu | 5.2E-05 | 2.40E-01 | 0.2 |
| Mercury | 2.5E-07 | lb/MMBtu | 3.6E-05 | 1.64E-01 | 0.7 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 1.5E-04 | 6.94E-01 | 60 |
| Nickel | 2.1E-06 | lb/MMBtu | 2.9E-04 | 1.32E+00 | 0.4 |
| Selenium | 2.4E-08 | lb/MMBtu | 3.3E-06 | 1.51E-02 | 2,000 |
| Vanadium | 2.3E-06 | lb/MMBtu | 3.2E-04 | 1.45E+00 | 0.07 |
| Zinc | 2.8E-05 | lb/MMBtu | 4.0E-03 | 1.83E+01 | 3,000 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 3.3E-06 | 1.51E-02 | NA |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 2.2E-06 | 1.01E-02 | NA |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Anthracene | 2.4E-09 | lb/MMBtu | 3.3E-07 | 1.51E-03 | NA |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 1.7E-07 | 7.57E-04 | NA |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 1.7E-07 | 7.57E-04 | NA |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Butane | 2.1E-03 | lb/MMBtu | 2.9E-01 | 1.32E+03 | NA |
| Chrysene | 1.8E-09 | lb/MMBtu | 2.5E-07 | 1.14E-03 | NA |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 1.7E-07 | 7.57E-04 | NA |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 1.7E-04 | 7.57E-01 | NA |
| Ethane | 3.0E-03 | lb/MMBtu | 4.3E-01 | 1.96E+03 | NA |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 4.1E-07 | 1.89E-03 | NA |
| Fluorene | 2.8E-06 | lb/MMBtu | 3.9E-04 | 1.80E+00 | NA |
| Indeno(1,2,3-cd)pyrene | 1.8E-06 | lb/MMBtu | 2.5E-04 | 1.16E+00 | NA |
| Pentane | 2.5E-03 | lb/MMBtu | 3.6E-01 | 1.64E+03 | NA |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 2.3E-06 | 1.07E-02 | NA |
| Propane | 1.6E-03 | lb/MMBtu | 2.2E-01 | 1.01E+03 | NA |
| Pyrene | 4.9E-09 | lb/MMBtu | 6.9E-07 | 3.15E-03 | NA |

| Emission Source(s): | Fire Pump | | | | |
|---|---|---|---|---|---|
| Number of Sources: | 1 | | | | |
| Fuel Fired: | ULSD | | | | |
| Maximum Unit Heat Input: | 2.1 | MMbtu/hr | | | |
| Annual Operation: | 300 | hrs/yr | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Potential Emissions | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | lb/yr |
| Benzene | 9.33E-04 | lb/MMBtu | 2.0E-03 | 5.88E-01 | 10 |
| Toluene | 4.09E-04 | lb/MMBtu | 8.6E-04 | 2.58E-01 | 1,000 |
| Xylenes | 2.85E-04 | lb/MMBtu | 6.0E-04 | 1.80E-01 | 3,000 |
| Propylene | 2.58E-03 | lb/MMBtu | 5.4E-03 | 1.63E+00 | 36,500 |
| Formaldehyde | 1.18E-03 | lb/MMBtu | 2.5E-03 | 7.43E-01 | 9 |
| Acetaldehyde | 7.67E-04 | lb/MMBtu | 1.6E-03 | 4.83E-01 | 50 |
| Acrolein | 9.25E-05 | lb/MMBtu | 1.9E-04 | 5.83E-02 | 0.07 |
| Naphthalene | 8.48E-05 | lb/MMBtu | 1.8E-04 | 5.34E-02 | 3 |
| 1,3-Butadiene | 3.91E-05 | lb/MMBtu | 8.2E-05 | 2.46E-02 | 3 |
| Acenaphthylene | 5.06E-06 | lb/MMBtu | 1.1E-05 | 3.19E-03 | NA |
| Acenaphthene | 1.42E-06 | lb/MMBtu | 3.0E-06 | 8.95E-04 | NA |
| Fluorene | 2.92E-05 | lb/MMBtu | 6.1E-05 | 1.84E-02 | NA |
| Phenanthrene | 2.94E-05 | lb/MMBtu | 6.2E-05 | 1.85E-02 | NA |
| Anthracene | 1.87E-06 | lb/MMBtu | 3.9E-06 | 1.18E-03 | NA |
| Fluoranthene | 7.61E-06 | lb/MMBtu | 1.6E-05 | 4.79E-03 | NA |
| Pyrene | 4.78E-06 | lb/MMBtu | 1.0E-05 | 3.01E-03 | NA |
| Benz(a)anthracene | 1.68E-06 | lb/MMBtu | 3.5E-06 | 1.06E-03 | NA |
| Chrysene | 3.53E-07 | lb/MMBtu | 7.4E-07 | 2.22E-04 | NA |
| Benzo(b)fluoranthene | 9.91E-08 | lb/MMBtu | 2.1E-07 | 6.24E-05 | NA |
| Benzo(k)fluoranthene | 1.55E-07 | lb/MMBtu | 3.3E-07 | 9.77E-05 | NA |
| Benzo(a)pyrene | 1.88E-07 | lb/MMBtu | 3.9E-07 | 1.18E-04 | NA |
| Indeno(1,2,3-cd)pyrene | 3.75E-07 | lb/MMBtu | 7.9E-07 | 2.36E-04 | NA |
| Dibenz(a,h)anthracene | 5.83E-07 | lb/MMBtu | 1.2E-06 | 3.67E-04 | NA |
| Benzo(g,h,I)perylene | 4.89E-07 | lb/MMBtu | 1.0E-06 | 3.08E-04 | NA |
| PAH | 1.68E-04 | lb/MMBtu | 3.5E-04 | 1.06E-01 | NA |

| Emission Source(s): | Dewpoint Heater | | | | |
|---|---|---|---|---|---|
| Number of Sources: | 1 | | | | |
| Fuel Fired: | Natural Gas | | | | |
| Maximum Unit Heat Input: | 15.0 | MMbtu/hr | | | |
| Annual Operation: | 8,760 | hrs/yr | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Potential Emissions | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | lb/yr |
| Lead | 4.9E-07 | lb/MMBtu | 7.4E-06 | 6.44E-02 | 0.9 |
| Benzene | 2.1E-06 | lb/MMBtu | 3.1E-05 | 2.71E-01 | 10 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 1.1E-03 | 9.66E+00 | 9 |
| Hexane | 1.8E-03 | lb/MMBtu | 2.6E-02 | 2.32E+02 | 20,000 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 9.0E-06 | 7.86E-02 | 3 |
| Toluene | 3.3E-06 | lb/MMBtu | 5.0E-05 | 4.38E-01 | 1,000 |
| Arsenic | 2.0E-07 | lb/MMBtu | 2.9E-06 | 2.58E-02 | 0.02 |
| Barium | 4.3E-06 | lb/MMBtu | 6.5E-05 | 5.67E-01 | 2,000 |
| Beryllium | 1.2E-08 | lb/MMBtu | 1.8E-07 | 1.55E-03 | 0.04 |
| Cadmium | 1.1E-06 | lb/MMBtu | 1.6E-05 | 1.42E-01 | 0.07 |
| Chromium | 1.4E-06 | lb/MMBtu | 2.1E-05 | 1.80E-01 | 20,000 |
| Cobalt | 8.2E-08 | lb/MMBtu | 1.2E-06 | 1.08E-02 | 0.1 |
| Copper | 8.3E-07 | lb/MMBtu | 1.3E-05 | 1.10E-01 | 40 |
| Manganese | 3.7E-07 | lb/MMBtu | 5.6E-06 | 4.90E-02 | 0.2 |
| Mercury | 2.5E-07 | lb/MMBtu | 3.8E-06 | 3.35E-02 | 0.7 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 1.6E-05 | 1.42E-01 | 60 |
| Nickel | 2.1E-06 | lb/MMBtu | 3.1E-05 | 2.71E-01 | 0.4 |
| Selenium | 2.4E-08 | lb/MMBtu | 3.5E-07 | 3.09E-03 | 2,000 |
| Vanadium | 2.3E-06 | lb/MMBtu | 3.4E-05 | 2.96E-01 | 0.07 |
| Zinc | 2.8E-05 | lb/MMBtu | 4.3E-04 | 3.74E+00 | 3,000 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 3.5E-07 | 3.09E-03 | NA |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 2.4E-07 | 2.06E-03 | NA |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Anthracene | 2.4E-09 | lb/MMBtu | 3.5E-08 | 3.09E-04 | NA |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 1.8E-08 | 1.55E-04 | NA |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 1.8E-08 | 1.55E-04 | NA |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Butane | 2.1E-03 | lb/MMBtu | 3.1E-02 | 2.71E+02 | NA |
| Chrysene | 1.8E-09 | lb/MMBtu | 2.6E-08 | 2.32E-04 | NA |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 1.8E-08 | 1.55E-04 | NA |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 1.8E-05 | 1.55E-01 | NA |
| Ethane | 3.0E-03 | lb/MMBtu | 4.6E-02 | 3.99E+02 | NA |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 4.4E-08 | 3.86E-04 | NA |
| Fluorene | 2.8E-06 | lb/MMBtu | 4.2E-05 | 3.68E-01 | NA |
| Indeno(1,2,3-cd)pyrene | 1.8E-06 | lb/MMBtu | 2.7E-05 | 2.37E-01 | NA |
| Pentane | 2.5E-03 | lb/MMBtu | 3.8E-02 | 3.35E+02 | NA |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 2.5E-07 | 2.19E-03 | NA |
| Propane | 1.6E-03 | lb/MMBtu | 2.4E-02 | 2.06E+02 | NA |
| Pyrene | 4.9E-09 | lb/MMBtu | 7.4E-08 | 6.44E-04 | NA |

| Emission Source(s): | Emergency Diesel Generator | | | | |
|---|---|---|---|---|---|
| Number of Sources: | 1 | | | | |
| Fuel Fired: | ULSD | | | | |
| Maximum Unit Heat Input: | 19.5 | MMbtu/hr | | | |
| Annual Operation: | 300 | hrs/yr | | | |
| RIDEM APCR No. 22 | Emission | Measurement | Potential Emissions | | Reg. 22 MQ |
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | lb/yr |
| Benzene | 7.76E-04 | lb/MMBtu | 1.5E-02 | 4.54E+00 | 10 |
| Toluene | 2.81E-04 | lb/MMBtu | 5.5E-03 | 1.64E+00 | 1,000 |
| Xylenes | 1.93E-04 | lb/MMBtu | 3.8E-03 | 1.13E+00 | 3,000 |
| Propylene | 2.79E-03 | lb/MMBtu | 5.4E-02 | 1.63E+01 | 36,500 |
| Formaldehyde | 7.89E-05 | lb/MMBtu | 1.5E-03 | 4.62E-01 | 9 |
| Acetaldehyde | 2.52E-05 | lb/MMBtu | 4.9E-04 | 1.47E-01 | 50 |
| Acrolein | 7.88E-06 | lb/MMBtu | 1.5E-04 | 4.61E-02 | 0.07 |
| Naphthalene | 1.30E-04 | lb/MMBtu | 2.5E-03 | 7.61E-01 | 3 |
| Acenaphthylene | 9.23E-06 | lb/MMBtu | 1.8E-04 | 5.40E-02 | NA |
| Acenaphthene | 4.68E-06 | lb/MMBtu | 9.1E-05 | 2.74E-02 | NA |
| Fluorene | 1.28E-05 | lb/MMBtu | 2.5E-04 | 7.49E-02 | NA |
| Phenanthrene | 4.08E-05 | lb/MMBtu | 8.0E-04 | 2.39E-01 | NA |
| Anthracene | 1.23E-06 | lb/MMBtu | 2.4E-05 | 7.20E-03 | NA |
| Fluoranthene | 4.03E-06 | lb/MMBtu | 7.9E-05 | 2.36E-02 | NA |
| Pyrene | 3.71E-06 | lb/MMBtu | 7.2E-05 | 2.17E-02 | NA |
| Benz(a)anthracene | 6.22E-07 | lb/MMBtu | 1.2E-05 | 3.64E-03 | NA |
| Chrysene | 1.53E-06 | lb/MMBtu | 3.0E-05 | 8.95E-03 | NA |
| Benzo(b)fluoranthene | 1.11E-06 | lb/MMBtu | 2.2E-05 | 6.49E-03 | NA |
| Benzo(k)fluoranthene | 2.18E-07 | lb/MMBtu | 4.3E-06 | 1.28E-03 | NA |
| Benzo(a)pyrene | 2.57E-07 | lb/MMBtu | 5.0E-06 | 1.50E-03 | NA |
| Indeno(1,2,3-cd)pyrene | 4.14E-07 | lb/MMBtu | 8.1E-06 | 2.42E-03 | NA |
| Dibenz(a,h)anthracene | 3.46E-07 | lb/MMBtu | 6.7E-06 | 2.02E-03 | NA |
| Benzo(g,h,I)perylene | 5.56E-07 | lb/MMBtu | 1.1E-05 | 3.25E-03 | NA |
| PAH | 2.12E-04 | lb/MMBtu | 4.1E-03 | 1.24E+00 | NA |

[1] Based on preliminary project equipment specifications and emissions estimates. Equipment vendor selection, equipment specifications, and emission rates are subject to change as the project design advances.
GT ammonia, formaldehyde and sulfuric acid emission factors are from equipment specifications. Gas turbine distillate oil metals emission factors are from "Survey of Ultra-Trace Metals in Gas Turbine Fuels". All other emission factors are from AP-42.

**Table A-3**
**Clear River Energy Center - Burrillville, Rhode Island**
**CT/HRSG Startup & Shutdown Emission Summaries[1]**

| Parameter | Measurement Units | Cold Start | Warm Start | Hot Start | Shut Down | Cold Start | Warm Start | Hot Start | Shut Down |
|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | |
| Fuel Fired | | Natural Gas | Natural Gas | Natural Gas | Natural Gas | ULSD | ULSD | ULSD | ULSD |
| | | | | | | | | | |
| Event Duration | min/event | 45 | 40 | 30 | 12 | 45 | 7 | 21 | 7 |
| Events per Year | events/yr | 50 | 100 | 250 | 400 | 15 | 45 | 10 | 30 |
| Hours per Year | hrs/yr | 37.5 | 66.7 | 125.0 | 80.0 | 11.3 | 5.3 | 3.5 | 3.5 |
| | | | | | | | | | |
| Stack Gas Molecular Weight | lb/lb-mole | 28.60 | 28.60 | 28.60 | 28.60 | 28.60 | 28.60 | 28.60 | 28.60 |
| Stack Flow | lb/hr | 4,320,000 | 4,320,000 | 4,320,000 | 2,880,000 | 4,680,000 | 4,680,000 | 4,680,000 | 3,420,000 |
| Stack Flow | acfm | 1,163,214 | 1,163,214 | 1,163,214 | 775,476 | 1,260,149 | 1,260,149 | 1,260,149 | 920,878 |
| Stack Exit Temperature | deg. F | 160 | 160 | 160 | 160 | 160 | 160 | 160 | 160 |
| | | | | | | | | | |
| Emissions | | | | | | | | | |
| NOx | lb/event | 196.0 | 159.0 | 110.0 | 6.6 | 198.0 | 178.0 | 100.0 | 25.0 |
| CO | lb/event | 133.0 | 131.0 | 123.0 | 124.0 | 304.0 | 301.0 | 287.0 | 99.0 |
| PM/PM10/PM2.5 | lb/event | 9.1 | 8.1 | 4.2 | 2.4 | 53.0 | 47.0 | 25.0 | 8.3 |
| | | | | | | | | | |
| Emission Rate | | | | | | | | | |
| NOx | lb/hr | 261.3 | 238.5 | 220.0 | 33.0 | 264.0 | 1525.7 | 285.7 | 214.3 |
| CO | lb/hr | 177.3 | 196.5 | 246.0 | 620.0 | 405.3 | 2580.0 | 820.0 | 848.6 |
| PM/PM10/PM2.5 | lb/hr | 12.1 | 12.2 | 8.4 | 12.0 | 70.7 | 402.9 | 71.4 | 71.1 |
| | | | | | | | | | |
| Emission Rate | | | | | | | | | |
| NOx | g/sec | 32.93 | 30.05 | 27.72 | 4.16 | 33.26 | 192.24 | 36.00 | 27.00 |
| CO | g/sec | 22.34 | 24.76 | 31.00 | 78.12 | 51.07 | 325.08 | 103.32 | 106.92 |
| PM/PM10/PM2.5 | g/sec | 1.53 | 1.53 | 1.06 | 1.51 | 8.90 | 50.76 | 9.00 | 8.96 |

[1] Based on preliminary project equipment specifications and emissions estimates. Equipment vendor selection, equipment specifications, and emission rates are subject to change as the project design advances.

# Appendix B

# RAST Modeling Output Tables

*HARP - HRACalc v15197 1/26/2016 4:25:20 PM - Cancer Risk

| INDEX | GRP1 | GRP2 | POLID | POLABBREV | CONC | RISK_SUM | SCENARIO | DETAILS | INH_RISK | SOIL_RISK | DERMAL_RISK | MMILK_RISK | WATER_RISK | FISH_RISK | CROP_RISK | BEEF_RISK | DAIRY_RISK | PIG_RISK | CHICKEN_RISK | EGG_RISK | 1ST_DRIVER | 2ND_DRIVER | PASTURE_CONC | FISH_CONC | WATER_CONC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Residential | Residence154 | 106990 | 1,3-Butadiene | 1.32E-05 | 6.37E-09 | 30YrCancerDerived | * | 6.37E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 2.30E-06 | 2.98E-06 | 1.06E-06 |
| 2 | Residential | Residence154 | 75070 | Acetaldehyde | 5.18E-04 | 4.16E-09 | 30YrCancerDerived | * | 4.16E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 1.06E-04 | 1.19E-04 | 6.39E-05 |
| 3 | Residential | Residence154 | 107028 | Acrolein | 8.70E-05 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.73E-05 | 2.05E-05 | 1.03E-05 |
| 4 | Residential | Residence154 | 7664417 | NH3 | 9.98E-02 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 3.36E-02 | 2.22E-02 | 2.92E-02 |
| 5 | Residential | Residence154 | 7440382 | Arsenic | 4.46E-06 | 8.38E-07 | 30YrCancerDerived | * | 2.61E-08 | 4.82E-07 | 1.96E-08 | 0.00E+00 | 3.52E-13 | 2.75E-13 | 3.10E-07 | 2.56E-10 | 4.57E-11 | 9.45E-11 | 2.81E-12 | 1.11E-11 | SOIL | CROP | 4.27E-07 | 8.75E-07 | 1.57E-07 |
| 6 | Residential | Residence154 | 7440393 | Barium | 9.52E-05 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 9.07E-06 | 1.87E-05 | 3.32E-06 |
| 7 | Residential | Residence154 | 71432 | Benzene | 2.84E-03 | 2.28E-07 | 30YrCancerDerived | * | 2.28E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 3.77E-04 | 7.22E-04 | 1.28E-04 |
| 8 | Residential | Residence154 | 7440417 | Beryllium | 3.35E-07 | 2.26E-09 | 30YrCancerDerived | * | 2.26E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 3.11E-08 | 6.56E-08 | 1.06E-08 |
| 9 | Residential | Residence154 | 7440439 | Cadmium | 2.36E-05 | 2.85E-07 | 30YrCancerDerived | * | 2.85E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 2.25E-06 | 4.63E-06 | 8.22E-07 |
| 10 | Residential | Residence154 | 7440473 | Chromium | 3.01E-05 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 2.87E-06 | 5.91E-06 | 1.05E-06 |
| 11 | Residential | Residence154 | 7440484 | Cobalt | 1.71E-06 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.63E-07 | 3.35E-07 | 5.95E-08 |
| 12 | Residential | Residence154 | 7440508 | Copper | 1.85E-05 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.76E-06 | 3.62E-06 | 6.44E-07 |
| 13 | Residential | Residence154 | 100414 | Ethyl Benzene | 1.30E-04 | 9.09E-10 | 30YrCancerDerived | * | 9.09E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 4.39E-05 | 2.90E-05 | 3.82E-05 |
| 14 | Residential | Residence154 | 50000 | Formaldehyde | 5.18E-03 | 8.74E-08 | 30YrCancerDerived | * | 8.74E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 1.22E-03 | 1.12E-03 | 9.34E-04 |
| 15 | Residential | Residence154 | 110543 | Hexane | 3.89E-02 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 3.70E-03 | 7.62E-03 | 1.35E-03 |
| 16 | Residential | Residence154 | 7439921 | Lead | 1.09E-05 | 8.49E-09 | 30YrCancerDerived | * | 2.24E-10 | 6.67E-09 | 1.36E-10 | 1.19E-10 | 4.80E-15 | 3.81E-15 | 1.34E-09 | 5.22E-13 | 7.44E-13 | 4.54E-14 | 1.82E-13 | 3.06E-14 | SOIL | CROP | 1.04E-06 | 2.14E-06 | 3.78E-07 |
| 17 | Residential | Residence154 | 7439965 | Manganese | 8.22E-06 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 7.84E-07 | 1.61E-06 | 2.87E-07 |
| 18 | Residential | Residence154 | 7439976 | Mercury | 5.47E-06 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 5.20E-07 | 1.07E-06 | 1.89E-07 |
| 19 | Residential | Residence154 | 91203 | Naphthalene | 4.50E-04 | 4.34E-08 | 30YrCancerDerived | * | 4.34E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 5.86E-05 | 1.15E-04 | 1.94E-05 |
| 20 | Residential | Residence154 | 7440020 | Nickel | 4.52E-05 | 3.31E-08 | 30YrCancerDerived | * | 3.31E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 4.31E-06 | 8.86E-06 | 1.57E-06 |
| 21 | Residential | Residence154 | 115071 | Propylene | 9.58E-03 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.24E-03 | 2.46E-03 | 3.89E-04 |
| 22 | Residential | Residence154 | 75569 | Propylene Oxide | 1.18E-04 | 1.23E-09 | 30YrCancerDerived | * | 1.23E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | | 3.98E-05 | 2.63E-05 | 3.46E-05 |
| 23 | Residential | Residence154 | 7782492 | Selenium | 6.70E-07 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 6.21E-08 | 1.31E-07 | 2.13E-08 |
| 24 | Residential | Residence154 | 7664939 | Sulfuric Acid | 5.39E-03 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.81E-03 | 1.20E-03 | 1.58E-03 |
| 25 | Residential | Residence154 | 108883 | Toluene | 1.62E-03 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 3.18E-04 | 3.92E-04 | 1.99E-04 |
| 26 | Residential | Residence154 | 7440622 | Vanadium | 4.97E-05 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 4.73E-06 | 9.74E-06 | 1.73E-06 |
| 27 | Residential | Residence154 | 1330207 | Xylenes | 9.63E-04 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 1.79E-04 | 2.37E-04 | 1.05E-04 |
| 28 | Residential | Residence154 | 7440666 | Zinc | 6.26E-04 | 0.00E+00 | 30YrCancerDerived | * | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | | 5.97E-05 | 1.23E-04 | 2.18E-05 |

*HARP - HRACalc v15197 1/26/2016 4:25:20 PM - Chronic Risk

| INDEX | GRP1 | GRP2 | POLID | POLABBREV | CONC | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DEVEL | RESP | SKIN | EYE | BONE/TEETH | ENDO | BLOOD | ODOR | GENERAL | DETAILS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Residential | Residence154 | 106990 | 1,3-Butadiene | 1.32E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.60E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 2 | Residential | Residence154 | 75070 | Acetaldehyde | 0.000518 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.70E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 3 | Residential | Residence154 | 107028 | Acrolein | 8.70E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.49E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 4 | Residential | Residence154 | 7664417 | NH3 | 0.0998 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.99E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 5 | Residential | Residence154 | 7440382 | Arsenic | 4.46E-06 | NonCancerChronicDerived | 6.48E-02 | 6.48E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-02 | 6.48E-02 | 6.48E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 6 | Residential | Residence154 | 7440393 | Barium | 9.52E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 7 | Residential | Residence154 | 71432 | Benzene | 0.00284 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.47E-04 | 0.00E+00 | 0.00E+00 | * |
| 8 | Residential | Residence154 | 7440417 | Beryllium | 3.35E-07 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 4.79E-05 | 0.00E+00 | 5.06E-06 | 0.00E+00 | 4.79E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 9 | Residential | Residence154 | 7440439 | Cadmium | 2.36E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.06E-03 | 0.00E+00 | 0.00E+00 | 1.18E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 10 | Residential | Residence154 | 7440473 | Chromium | 3.01E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 11 | Residential | Residence154 | 7440484 | Cobalt | 1.71E-06 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 12 | Residential | Residence154 | 7440508 | Copper | 1.85E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 13 | Residential | Residence154 | 100414 | Ethyl Benzene | 0.00013 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.50E-08 | 6.50E-08 | 6.50E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.50E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 14 | Residential | Residence154 | 50000 | Formaldehyde | 0.00518 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 15 | Residential | Residence154 | 110543 | Hexane | 0.0389 | NonCancerChronicDerived | 0.00E+00 | 5.56E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 16 | Residential | Residence154 | 7439921 | Lead | 1.09E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 17 | Residential | Residence154 | 7439965 | Manganese | 8.22E-06 | NonCancerChronicDerived | 0.00E+00 | 9.13E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 18 | Residential | Residence154 | 7439976 | Mercury | 5.47E-06 | NonCancerChronicDerived | 0.00E+00 | 1.48E-03 | 0.00E+00 | 1.48E-03 | 0.00E+00 | 1.48E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 19 | Residential | Residence154 | 91203 | Naphthalene | 0.00045 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.00E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 20 | Residential | Residence154 | 7440020 | Nickel | 4.52E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.50E-04 | 3.23E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.23E-03 | 0.00E+00 | 0.00E+00 | * |
| 21 | Residential | Residence154 | 115071 | Propylene | 0.00958191 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.19E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 22 | Residential | Residence154 | 75569 | Propylene Oxide | 0.000118 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.93E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 23 | Residential | Residence154 | 7782492 | Selenium | 6.70E-07 | NonCancerChronicDerived | 1.67E-05 | 1.67E-05 | 0.00E+00 | 0.00E+00 | 1.67E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 24 | Residential | Residence154 | 7664939 | Sulfuric Acid | 0.00539 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.39E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 25 | Residential | Residence154 | 108883 | Toluene | 0.00162 | NonCancerChronicDerived | 0.00E+00 | 5.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.40E-06 | 5.40E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 26 | Residential | Residence154 | 7440622 | Vanadium | 4.97E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 27 | Residential | Residence154 | 1330207 | Xylenes | 0.000963 | NonCancerChronicDerived | 0.00E+00 | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.38E-06 | 0.00E+00 | 1.38E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 28 | Residential | Residence154 | 7440666 | Zinc | 0.000626 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |

| continued> | INDEX | INH_CONC | SOIL_DOS | DERMAL_DOSE | MMILK_DOSE | WATER_DOSE | FISH_DOS | CROP_DO | BEEF_DOS | DAIRY_DO | PIG_DOSE | CHICKEN_DOSE | EGG_DOS | 1ST_DRIV | 2ND_DRIV | 3RD_DRIVER | PASTURE_ | FISH_CON | WATER_CONC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 1.32E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.70E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 2.30E-06 | 2.98E-06 | 1.06E-06 |
| | 2 | 5.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.03E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.06E-04 | 1.19E-04 | 6.39E-05 |
| | 3 | 8.70E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.65E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.73E-05 | 2.05E-05 | 1.03E-05 |
| | 4 | 9.98E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 4.69E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 3.36E-02 | 2.22E-02 | 2.92E-02 |
| | 5 | 4.46E-06 | 1.01E-07 | 6.49E-09 | 0.00E+00 | | 1.05E-13 | 1.90E-13 | 1.18E-07 | 1.17E-10 | 9.75E-12 | 3.87E-11 | 1.18E-12 | 1.11E-11 | INHALATI( | CROP | SOIL | 4.27E-07 | 8.75E-07 | 1.57E-07 |
| | 6 | 9.52E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 5.33E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 9.07E-06 | 1.87E-05 | 3.32E-06 |
| | 7 | 2.84E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 2.06E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 3.77E-04 | 7.22E-04 | 1.28E-04 |
| | 8 | 3.35E-07 | 7.57E-09 | 2.44E-10 | 0.00E+00 | | 7.11E-15 | 2.85E-14 | 2.30E-09 | 1.17E-12 | 1.18E-14 | 8.22E-14 | 1.69E-13 | 0.00E+00 | INHALATI( | SOIL | CROP | 3.11E-08 | 6.56E-08 | 1.06E-08 |
| | 9 | 2.36E-05 | 5.33E-07 | 1.15E-09 | 0.00E+00 | | 5.51E-13 | 2.01E-12 | 9.05E-07 | 1.06E-10 | 8.86E-12 | 1.82E-10 | 1.85E-10 | 0.00E+00 | INHALATI( | CROP | SOIL | 2.25E-06 | 4.63E-06 | 8.22E-07 |
| | 10 | 3.01E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.69E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 2.87E-06 | 5.91E-06 | 1.05E-06 |
| | 11 | 1.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 9.56E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.63E-07 | 3.35E-07 | 5.95E-08 |
| | 12 | 1.85E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.03E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.76E-06 | 3.62E-06 | 6.44E-07 |
| | 13 | 1.30E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 6.14E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 4.39E-05 | 2.90E-05 | 3.82E-05 |
| | 14 | 5.18E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.50E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.22E-03 | 1.12E-03 | 9.34E-04 |
| | 15 | 3.89E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 2.17E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 3.70E-03 | 7.62E-03 | 1.35E-03 |
| | 16 | 1.09E-05 | 2.46E-07 | 7.93E-09 | 1.42E-07 | | 2.53E-13 | 4.65E-13 | 2.87E-08 | 4.19E-11 | 2.80E-11 | 3.29E-12 | 1.35E-11 | 3.06E-14 | INHALATI( | SOIL | MMILK | 1.04E-06 | 2.14E-06 | 3.78E-07 |
| | 17 | 8.22E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 4.61E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 7.84E-07 | 1.61E-06 | 2.87E-07 |
| | 18 | 5.47E-06 | 1.24E-07 | 5.31E-09 | 0.00E+00 | | 1.27E-13 | 9.29E-13 | 7.91E-08 | 3.07E-11 | 1.80E-11 | 5.97E-12 | 3.05E-12 | 0.00E+00 | INHALATI( | SOIL | CROP | 5.20E-07 | 1.07E-06 | 1.89E-07 |
| | 19 | 4.50E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 3.12E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 5.86E-05 | 1.15E-04 | 1.94E-05 |
| | 20 | 4.52E-05 | 1.02E-06 | 2.19E-08 | 0.00E+00 | | 1.05E-12 | 1.92E-12 | 6.11E-07 | 1.76E-10 | 5.91E-11 | 2.17E-11 | 4.43E-12 | 0.00E+00 | INHALATI( | SOIL | CROP | 4.31E-06 | 8.86E-06 | 1.57E-06 |
| | 21 | 9.58E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 6.25E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.24E-03 | 2.46E-03 | 3.89E-04 |
| | 22 | 1.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 5.56E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 3.98E-05 | 2.63E-05 | 3.46E-05 |
| | 23 | 6.70E-07 | 1.51E-08 | 4.88E-10 | 0.00E+00 | | 1.43E-14 | 1.42E-12 | 6.58E-08 | 4.75E-10 | 3.58E-10 | 1.09E-09 | 2.00E-11 | 0.00E+00 | INHALATI( | CROP | SOIL | 6.21E-08 | 1.31E-07 | 2.13E-08 |
| | 24 | 5.39E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 2.54E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.81E-03 | 1.20E-03 | 1.58E-03 |
| | 25 | 1.62E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 3.20E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 3.18E-04 | 3.92E-04 | 1.99E-04 |
| | 26 | 4.97E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 2.78E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 4.73E-06 | 9.74E-06 | 1.73E-06 |
| | 27 | 9.63E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 1.69E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 1.79E-04 | 2.37E-04 | 1.05E-04 |
| | 28 | 6.26E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | | 3.50E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATI( | WATER | | 5.97E-05 | 1.23E-04 | 2.18E-05 |

*HARP - HRACalc v15197 1/26/2016 4:25:20 PM - Acute Risk

| INDEX | GRP1 | GRP2 | POLID | POLABBREV | CONC | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DEVEL | RESP | SKIN | EYE | BONE/TEETH | ENDO | BLOOD | ODOR | GENERAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Residential | Residence154 | 106990 | 1,3-Butadiene | 0.000764 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 2 | Residential | Residence154 | 75070 | Acetaldehyde | 0.032748048 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.97E-05 | 0.00E+00 | 6.97E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | Residential | Residence154 | 107028 | Acrolein | 0.005709633 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-03 | 0.00E+00 | 2.28E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | Residential | Residence154 | 7664417 | NH3 | 7.08 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.21E-03 | 0.00E+00 | 2.21E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 5 | Residential | Residence154 | 7440382 | Arsenic | 0.000231 | NonCancerAcute | 1.16E-03 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 6 | Residential | Residence154 | 7440393 | Barium | 0.004913577 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 7 | Residential | Residence154 | 71432 | Benzene | 0.200610885 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.43E-03 | 0.00E+00 | 0.00E+00 |
| 8 | Residential | Residence154 | 7440417 | Beryllium | 1.71E-05 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 9 | Residential | Residence154 | 7440439 | Cadmium | 0.001219157 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 10 | Residential | Residence154 | 7440473 | Chromium | 0.00155526 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 11 | Residential | Residence154 | 7440484 | Cobalt | 8.83E-05 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 12 | Residential | Residence154 | 7440508 | Copper | 0.000954241 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.54E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 13 | Residential | Residence154 | 100414 | Ethyl Benzene | 0.009261802 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 14 | Residential | Residence154 | 50000 | Formaldehyde | 0.330610718 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.01E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | Residential | Residence154 | 110543 | Hexane | 2.006523748 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 16 | Residential | Residence154 | 7439921 | Lead | 0.00056407 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 17 | Residential | Residence154 | 7439965 | Manganese | 0.000424408 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 18 | Residential | Residence154 | 7439976 | Mercury | 0.000282035 | NonCancerAcute | 0.00E+00 | 4.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.70E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 19 | Residential | Residence154 | 91203 | Naphthalene | 0.0321 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 20 | Residential | Residence154 | 7440020 | Nickel | 0.00233289 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 1.17E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 21 | Residential | Residence154 | 115071 | Propylene | 0.684561866 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 22 | Residential | Residence154 | 75569 | Propylene Oxide | 0.008393906 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.71E-06 | 2.71E-06 | 0.00E+00 | 2.71E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 23 | Residential | Residence154 | 7782492 | Selenium | 3.42E-05 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 24 | Residential | Residence154 | 7664939 | Sulfuric Acid | 0.382326297 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.19E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 25 | Residential | Residence154 | 108883 | Toluene | 0.113279127 | NonCancerAcute | 0.00E+00 | 3.06E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.06E-06 | 3.06E-06 | 0.00E+00 | 3.06E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 26 | Residential | Residence154 | 7440622 | Vanadium | 0.002563569 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.55E-05 | 0.00E+00 | 8.55E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 27 | Residential | Residence154 | 1330207 | Xylenes | 0.0681 | NonCancerAcute | 0.00E+00 | 3.10E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.10E-06 | 0.00E+00 | 3.10E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 28 | Residential | Residence154 | 7440666 | Zinc | 0.032324355 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |

*HARP - HRACalc v15197 1/26/2016 5:23:04 PM - 8-Hour Chronic Risk

| INDEX | GRP1 | GRP2 | POLID | POLABBREV | CONC | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DEVEL | RESP | SKIN | EYE | BONE/TEETH | ENDO | BLOOD | ODOR | GENERAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | Residential | Residence154 | 106990 | 1,3-Butadiene | 1.32E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.47E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 2 | Residential | Residence154 | 75070 | Acetaldehyde | 0.000518 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.73E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | Residential | Residence154 | 107028 | Acrolein | 8.70E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | Residential | Residence154 | 7664417 | NH3 | 0.0998 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 5 | Residential | Residence154 | 7440382 | Arsenic | 4.46E-06 | NonCancer8HrChronic | 2.97E-04 | 2.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.97E-04 | 2.97E-04 | 2.97E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 6 | Residential | Residence154 | 7440393 | Barium | 9.52E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 7 | Residential | Residence154 | 71432 | Benzene | 0.00284 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.47E-04 | 0.00E+00 | 0.00E+00 |
| 8 | Residential | Residence154 | 7440417 | Beryllium | 3.35E-07 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 9 | Residential | Residence154 | 7440439 | Cadmium | 2.36E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 10 | Residential | Residence154 | 7440473 | Chromium | 3.01E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 11 | Residential | Residence154 | 7440484 | Cobalt | 1.71E-06 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 12 | Residential | Residence154 | 7440508 | Copper | 1.85E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 13 | Residential | Residence154 | 100414 | Ethyl Benzene | 0.00013 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 14 | Residential | Residence154 | 50000 | Formaldehyde | 0.00518 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.76E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | Residential | Residence154 | 110543 | Hexane | 0.0389 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 16 | Residential | Residence154 | 7439921 | Lead | 1.09E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 17 | Residential | Residence154 | 7439965 | Manganese | 8.22E-06 | NonCancer8HrChronic | 0.00E+00 | 4.84E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 18 | Residential | Residence154 | 7439976 | Mercury | 5.47E-06 | NonCancer8HrChronic | 0.00E+00 | 9.12E-05 | 0.00E+00 | 9.12E-05 | 0.00E+00 | 9.12E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 19 | Residential | Residence154 | 91203 | Naphthalene | 0.00045 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 20 | Residential | Residence154 | 7440020 | Nickel | 4.52E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 7.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.53E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 21 | Residential | Residence154 | 115071 | Propylene | 0.00958191 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 22 | Residential | Residence154 | 75569 | Propylene Oxide | 0.000118 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 23 | Residential | Residence154 | 7782492 | Selenium | 6.70E-07 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 24 | Residential | Residence154 | 7664939 | Sulfuric Acid | 0.00539 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 25 | Residential | Residence154 | 108883 | Toluene | 0.00162 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 26 | Residential | Residence154 | 7440622 | Vanadium | 4.97E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 27 | Residential | Residence154 | 1330207 | Xylenes | 0.000963 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 28 | Residential | Residence154 | 7440666 | Zinc | 0.000626 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |