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September 15, 2016

Ms. Ruth A. Gold
Supervising Air Quality Specialist
Rhode Island Department of Environmental Management
Office of Air Resources
235 Promenade Street
Providence, Rhode Island 02908

***Re: Major Source Permit Application Addendum***
***Clear River Energy Center– Burrillville, Rhode Island***

Dear Ms. Gold:

The following is an Addendum to the Major Source Permit Application submitted by ESS Group, Inc. (ESS) for the Clear River Energy Center (CREC), a combined-cycle electric generating facility being proposed by Clear River Energy LLC at the Spectra Energy Algonquin Compressor Station site on Wallum Lake Road (State Route 100) in Burrillville, Rhode Island (the Project or the Facility).

**INTRODUCTION**

The CREC Major Source Permit Application was submitted to RIDEM on June 26, 2015. An Air Dispersion Modeling Report was 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 Report for the Project was submitted to RIDEM on January 27, 2016.

On April 15, 2016, RIDEM issued a Completeness Determination letter stating that the Application was deemed to be administratively complete on March 29, 2016. The letter requested that CREC revise and resubmit the modeling analysis to model the Algonquin site consistent with the current site configuration and equipment including the equipment recently permitted under Approval No. 2289-2291 issued on June 3, 2015.

Spectra has recently informed Clear River Energy LLC that it intends to submit an application to RIDEM shortly for the modification of the Algonquin Compressor Station which will include a firm commitment to the retirement of at least two of the three reciprocating compressor engines currently operated at the facility, prior to the date that Clear River Energy would be on line. Because Spectra intends to commit to such a modification, the results of any modeling conducted which includes the current Algonquin site configuration would not be representative of the conditions which will exist at the time that the CREC commences operation. Therefore, this Addendum does not include any multi-source modeling for the CREC. The revised results of the CREC multi-source modeling analysis, based on the future Algonquin site configuration which Spectra will commit to implementing before CREC commences operation, will be submitted to RIDEM under separate cover.

The purpose of this Addendum is to provide RIDEM with the results of the revised CREC only air dispersion modeling analysis conducted based on changes to the Project, and to provide additional updates and clarifications to the Application based on Project changes which have occurred subsequent to the previous submittals.

## FACILITY DESCRIPTION

The Clear River Energy Center is a combined-cycle electric generating facility being proposed by Clear River Energy LLC at the Spectra Energy Algonquin Compressor Station site located along Wallum Lake Road in Burrillville, Rhode Island. An aerial photo of the area surrounding the proposed Facility is shown in Figure 1. The revised Site Arrangement showing the proposed Facility property line and fenceline is shown on Figure 2. The revised General Arrangement showing the location and dimensions of all Facility building and structures is presented on Figure 3. A topographic map of the area within 3 km of the proposed Facility is shown on Figure 4.

The Facility will consist of two General Electric Model 7H.02 gas turbines operated in a single-shaft, combined-cycle configuration. Each gas turbine will be equipped with a heat recovery steam generator (HRSG) with natural gas 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. The Facility will have a maximum net power output of 1,080 megawatts (MW) while firing natural gas (with supplementary HRSG duct firing) and 966 MW while firing ULSD.

## PROJECT EMISSIONS

The Facility's potential emissions of criteria pollutants are summarized on Table 1. The Facility's potential emissions of non-criteria pollutants are summarized on Table 2. Table A-1 summarizes the revised gas turbine operational and emissions information provided by GE over the full range of operating conditions. Table A-2 summarizes the maximum emission rates of each non-criteria pollutant from each emission source and the source of the emission factor used for each pollutant and source. Table A-3 summarizes the gas turbine startup and shutdown information provided by GE.

Clear River Energy LLC is proposing unlimited operation of the gas turbines while firing natural gas. HRSG duct burner usage will be limited to the total natural gas usage equivalent to 6,100 hours per year per turbine at the duct burner's maximum firing rate. The auxiliary boiler will only operate prior to and during gas turbine startups and will not operate during normal, steady-state gas turbine operating periods. Auxiliary boiler usage will be limited to the natural gas usage equivalent to 2,400 hours per year at its maximum firing rate. Clear River Energy LLC is proposing unlimited operation of the dewpoint heater firing natural gas.

Emergency generator operation will be limited to periods when grid power is unavailable and for maintenance and readiness testing for up to one hour per week and up to 300 hours per year. Diesel fire pump operation will be limited to emergency situations and for maintenance and readiness testing for up to one hour per week and up to 300 hours per year.

Total gas turbine ULSD usage will be limited to the equivalent usage of 30 days per year at base load (15 days per turbine) and only for oil system readiness testing or when natural gas is unavailable. Natural gas will be deemed to be unavailable when the natural gas supplier informs Clear River Energy LLC that the natural gas supply is being curtailed or if there is a Force Majeure event. The availability of natural gas is monitored by ISO-NE, who may declare a "Cold Weather Event", a "Cold Weather Watch", or a "Cold Weather Warning" according to its market rules.

The total annual emissions from the Facility during startup and shutdown periods will be limited to the potential emissions presented in Table 1 for such periods.

## EMISSIONS CONTROL TECHNOLOGY EVALUATION

Clear River Energy LLC is proposing to utilize the same control technologies and short term emission limits previously proposed so there are no substantive changes being proposed to the emissions control technology evaluation provided in the CREC Major Source Permit Application.

## AIR QUALITY IMPACT ANALYSIS

A revised air quality impact analysis has been completed for the Project based on the latest Site Arrangement (Figure 2) and General Arrangement (Figure 3), and the updated emissions estimates provided by GE (Table A-1). The revised modeling input parameters for each of the six CREC emission sources are summarized on Table 3.

The analysis was completed in accordance with the approved Test Protocol and the methodology detailed in the Air Dispersion Modeling Report previously submitted. The results of the revised air quality impact analysis are detailed in the attached tables and figures as follows. All modeling files associated with the revised CREC air quality impact analysis have been provided electronically on the enclosed CD-ROM. Attachment 2 contains isopleths of the revised modeling results.

Figure 5 presents the percentage breakdown of the various land use categories within 3 km of the Facility. As shown on Figure 5, nearly 90% of the land use within 3 km is forested area and nearly 96% is associated with rural land uses.

A revised Good Engineering Practice (GEP) stack height analysis was performed based on the new General Arrangement. The structures that resulted in the highest GEP formula height are presented on Table 4. Based on the results presented on Table 4, building downwash was assessed for all stacks.

A revised cavity analysis was completed based on the new General Arrangement. The results of the revised cavity analysis are presented on Table 5. The AERMOD analysis conducted evaluated the impacts of plumes potentially entrapped within the cavity regions of the structures for which there is a potential for the cavity to extend off-site.

AERSCREEN was used to determine the gas turbine operating conditions which result in the highest predicted ambient air concentrations for each fuel, pollutant and averaging period. Screen modeling was performed for each of the operating scenarios presented in Table A-1 for the GE turbine for this purpose. For each operating scenario, the actual 1-hour average impacts predicted for each pollutant was determined by scaling the unit emission rate (i.e. one gram per second) normalized 1-hour concentrations by the maximum actual emission rate. To evaluate annual impacts, the 52°F cases were considered, as these cases represent an average meteorological condition over the course of the year. For ULSD, the 20°F cases were also considered, as it is expected that the gas turbines would primarily fire ULSD during the winter months.

Each operating scenario was also run using both urban and rural dispersion coefficients, with the higher result used in the analysis. The modeling results from nearly all of the operating scenarios were higher using rural coefficients. To be conservative and to be consistent with the rural nature of the area surrounding the proposed Facility, all emission sources included in the analysis were subsequently modeled in AERMOD as rural sources.

Table 6 presents the results of the AERSCREEN analysis conducted for the GE turbine. Note that Tables 7, 8, and 9 from the modeling report have not been included in this Addendum, as the Siemens and MHI gas turbine models are no longer being considered for the Project. As shown on Table 6, the following gas turbine operating conditions resulted in the highest predicted pollutant concentrations:

- Short-term $NO_2$ and CO: Modeling Case 19 (Base Load @ 20°F on ULSD)
- Short-term $SO_2$: Modeling Case 8 (Base Load @ 52°F on Natural Gas)
- Short-term $PM_{10}/PM_{2.5}$: Modeling Case 18 (Min Load @ 52°F on ULSD)
- Annual $NO_2$ (NG): Modeling Case 8 (Base Load @ 52°F on Natural Gas)
- Annual $NO_2$ (ULSD): Modeling Case 19 (Base Load @ 20°F on ULSD)
- Annual $SO_2$ (NG): Modeling Case 8 (Base Load @ 52°F on Natural Gas)
- Annual $SO_2$ (ULSD): Modeling Case 19 (Base Load @ 20°F on ULSD)
- Annual $PM_{2.5}$ (NG): Modeling Case 8 (Base Load @ 52°F on Natural Gas)
- Annual $PM_{2.5}$ (ULSD): Modeling Case 20 (Min Load @ 20°F on ULSD)

The meteorological data and receptor grid spacing detailed in the protocol were used for this analysis. Figures 6 and 7 display the receptor grid which was used. Receptors were placed along the fenceline at 10-meter increments.

AERMOD was used to determine the maximum ambient air impact concentrations resulting from the operation of the CREC emission sources for each pollutant and averaging period, as described in the Modeling Protocol and Modeling Report. The highest total modeled concentration for each pollutant and averaging period was then compared to the corresponding Significant Impact Levels (SILs).

The results of the CREC Class II area significant impact determinations are summarized on Table 10. The maximum predicted impacts of 1-hour $NO_2$, annual $NO_2$, and 24-hour $PM_{10}$ exceeded their respective Class II SILs, which required that an interactive source model be done. The maximum impacts of the other pollutants and averaging periods were predicted by the model to be below their respective Class II SILs, and will thus be insignificant, as defined by the EPA.

The furthest distances at which significant impacts were predicted to occur (Significant Impact Areas (SIA)) were determined to be as follows:

- 1-hour $NO_2$: 0.875 kilometers
- Annual $NO_2$: 0.375 kilometers
- 24-hour $PM_{10}$: 1.8 kilometers

Figure 8 shows isopleths of the actual areas where the modeling predicted exceedances of the Class II SILs.

Figure 9 shows the location of the proposed Facility in relation to the nearest Class I areas in the region. The closest Class I area is the Lye Brook Wilderness Area in Vermont, whose boundary is located approximately 160 kilometers northwest of the Facility location.

As shown on Table 10, the maximum distances from the Facility at which the modeled Facility impact concentrations were greater than the Class I SILs were as follows:

- 3-hour $SO_2$: 5 kilometers

- 24-hour $SO_2$: 5 kilometers
- 24-hour $PM_{10}$: 48 kilometers
- Annual $NO_2$: 3 kilometers
- Annual $SO_2$: 0.875 kilometers
- Annual $PM_{10}$: 1.2 kilometers

As shown above, the Facility will not produce any ambient air impacts which exceed a Class I SIL in any Class I area.

RIDEM requested that multi-source modeling be conducted for the CREC including the emissions from the Algonquin Compressor Station, Ocean State Power, and the Tennessee Gas Compressor Station. No other significant emission sources are within the SIA, so the multi-source modeling analysis previously conducted only included these three sources.

Tables 11a, 11b, and 11c of the Air Dispersion Modeling Report presented the modeling input parameters used for the multi-source modeling sources. A revised version of Table 11a will be provided once Spectra finalizes the future site configuration planned for the Algonquin Compressor Station. Tables 11b and 11c are unchanged from the versions previously submitted.

The maximum modeled CREC ambient air impact concentrations are compared to the Significant Monitoring Concentrations in Table 12. As described in the application there is ample background concentration data available that has been used in our analysis.

The background concentrations used for this analysis were the monitoring concentrations recommended for use by RIDEM, as summarized on Table 13.

The PSD increment analysis was summarized on Table 14 and a revised version of Table 14 will be provided once Spectra finalizes the future site configuration planned for the Algonquin Compressor Station and the revised CREC multi-source modeling analysis has been completed.

The NAAQS compliance determination was summarized on Table 15 in the Air Dispersion Modeling Report. The impact concentrations presented in Table 15 represented the combined modeled impacts from the CREC and the other three multi-modeling sources. A revised version of Table 15 will be provided once Spectra finalizes the future site configuration planned for the Algonquin Compressor Station and the revised CREC multi-source modeling analysis has been completed.

Table 16 presents the results of the revised air toxics modeling analysis. The AERMOD results were applied to each listed air toxic for which the CREC has the potential to emit an amount greater than its respective Minimum Quantity from RIDEM APCR No. 22. AERMOD was applied using a 1 gram per second emission rate for each source, which is greater than the expected emission rate. The maximum source impacts for each air toxic were then computed by multiplying the 1 gram per second modeled concentration by the maximum source emission rate. The source concentrations were then summed to determine the total Facility impact for each air toxic for each averaging period. The results presented in Table 16 are conservative in that they are based on the assumption that the maximum modeled impact from each source occurs at the same location and at the same time.

As requested by RIDEM, air toxics modeling was also conducted for polycyclic organic matter (POM), also known as polycyclic aromatic compounds (PAH), which is a listed air toxic in RIDEM APCR No. 22. RIDEM requires that POM values be expressed as benzo(a)pyrene equivalents, calculated as specified in

Table F of the Rhode Island Air Toxics Guideline. Table A-4 presents the POM emission calculations for each emission source, using the weighting factors from Table F of the guideline. Note that the AP-42 emission factors for PAH from gas turbines are not speciated, so no equivalency factors were applied to the PAH emission rates from the gas turbines.

The only AAL for POM is for annual impacts. A separate AERMOD modeling run was conducted for the combined annual POM impacts from the CREC emission sources using the POM equivalent emission rates listed on Table A-4 and their proposed maximum hours of annual operation.

As shown on Table 16, the results of the revised air toxics modeling analysis have demonstrated that the predicted ambient air impacts from the Facility will not cause an exceedance of a RIDEM AAL at or beyond the CREC property line.

Table 17 presents the results of the revised soils and vegetation impact assessment. As shown on Table 17, the maximum predicted impacts from the Facility, when combined with representative background concentrations, will not exceed any of the EPA screening levels.

Table 18 of the Air Dispersion Modeling Report presented the results of the CREC startup/shutdown modeling analysis. The modeled impacts during startup/shutdown periods included the impacts from the multi-source modeling sources. The attached version of Table 18 shows the results of the revised CREC startup/shutdown modeling without the multi-source modeling sources. As shown on Table 18, the CREC will not cause or contribute to an NAAQS exceedance during startup/shutdown events. A revised version of Table 18 will be provided once Spectra finalizes the future site configuration planned for the Algonquin Compressor Station and the revised CREC startup/shutdown modeling analysis has been completed.

**HEALTH RISK ASSESSMENT**

A revised health risk assessment has been completed for the Project based on the latest Site Arrangement (Figure 2) and General Arrangement (Figure 3) and the updated non-criteria pollutant emissions estimates (Table A-2). This analysis has been completed in accordance with the approved Test Protocol and the methodology detailed in the Health Risk Assessment Report previously submitted. The results of the revised health risk assessment are detailed in the tables and figures included in Attachment 3. All modeling files associated with the revised CREC health risk assessment have been provided electronically on the enclosed CD-ROM.

The results of the revised health risk assessment completed for the Project met all of the applicable acceptance criteria contained in RIDEM's Guidelines for Assessing Health Risks from Proposed Air Pollution Sources (October 21, 2015 Revision).

## TABLES, FIGURES & ATTACHMENTS

The table and figure numbers referenced above correspond to the tables and figures which were included in the CREC Air Dispersion Modeling Report. As detailed above, several of the tables, figures, and appendix materials from the CREC Air Dispersion Modeling Report have been revised to reflect the selected equipment, (as requested by RIDEM) for this Addendum. Some of the tables are no longer applicable because the turbine manufacturer and model for the Project have been selected. The following list indicates where revisions have been made to the tables, figures, and appendix materials.

Some of the tables which have not been revised will be revised once the future Algonquin Compressor Station site configuration has been determined and the revised CREC multi-source modeling analysis has been completed.

| | |
|---|---|
| Table 1 | Potential Emissions Criteria Pollutants (revised/included) |
| Table 2 | Potential Emissions Non-criteria Pollutants (revised/included) |
| Table 3 | Modeling Input Parameter Summary (revised/included) |
| Table 4 | GEP Stack Height Analysis Summary (revised/included) |
| Table 5 | Cavity Analysis (revised/included) |
| Table 6 | Screening Modeling Results – GE Gas Turbines (revised/included) |
| Table 7 | Screening Modeling Results – MHI Gas Turbines (not applicable/not included) |
| Table 8 | Screening Modeling Results – Siemens Gas Turbines (not applicable/not included) |
| Table 9 | Screening Modeling Results Summary (now Table 6/not included) |
| Table 10 | AERMOD Modeling Results Summary – Significance Determinations (revised/included) |
| Table 11a | Modeling Input Parameters – Algonquin Compressor Station (to be revised/not included) |
| Table 11b | Modeling Input Parameters – Ocean State Power (not revised/included) |
| Table 11c | Modeling Input Parameters – RISE Compressor Station (not revised/included) |
| Table 12 | Comparison of Modeled Impacts to the Significant Monitoring Concentrations (revised/included) |
| Table 13 | Background Concentrations (not revised/included) |
| Table 14 | PSD Increment Analysis (to be revised/not included) |
| Table 15 | NAAQS Compliance Determination (to be revised/not included) |
| Table 16 | Air Toxics Modeling Results Summary (revised/included) |
| Table 17 | Soils and Vegetation Impact Summary (revised/included) |
| Table 18 | Startup/Shutdown NAAQS Compliance Summary (to be revised/included) |

| | |
|---|---|
| Table A-1 | GE GT/HRSG Emissions Estimates (revised/included) |
| Table A-2 | Non-Criteria Pollutant Emissions Summaries (revised/included) |
| Table A-3 | GE GT/HRSG Startup & Shutdown Emission Summaries (revised/included) |
| Table A-4 | Polycyclic Organic Matter Emission Rate Calculations (new/included) |

| | |
|---|---|
| Figure 1 | Site Location (not revised/included) |
| Figure 2 | Site Layout (revised/included) |
| Figure 3 | General Arrangement (revised/included) |
| Figure 4 | Topographic Map (not revised/included) |
| Figure 5 | Surrounding Land Use (not revised/included) |
| Figure 6 | Receptor Grid (revised/included) |
| Figure 7 | Receptor Grid Overview (revised/included) |
| Figure 8 | Significant Impact Area (revised/included) |
| Figure 9 | Mandatory Class I Federal Areas (not revised/included) |

| | |
|---|---|
| Attachment 1 | Isopleths of Modeling Results (revised/included) |
| Attachment 2 | Health Risk Assessment Tables (revised/included) |

**CONCLUSION**

Please contact me at (781) 419-7749 or at mfeinblatt@essgroup.com with any questions you may have about this Major Source Permit Application Addendum.

Sincerely,

**ESS GROUP, INC.**

Michael E. Feinblatt
Vice President, Energy & Industrial Services

Enclosures

C: John Niland, Clear River Energy LLC
Terrence Gray, RIDEM
Ron Gagnon, RIDEM

# Tables

Note: Tables 7-9 have been omitted from this set (see note below Table 6)

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

| 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 | | N.Gas | N.Gas w/DB | ULSD | Natural Gas | ULSD | Natural Gas | Natural Gas | ULSD | ULSD | | | | | | |
| Emission Controls | | SCR/OC | SCR/OC | SCR/OC | SCR/OC | SCR/OC | Ultra-Low NOx/FGR | Ultra-Low NOx/FGR | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Annual Operation (per unit) | hrs/yr | 2,150 | 6,100 | 360 | 134 | 16 | 2,400 | 8,760 | 300 | 300 | | | | | | |
| | | | | | | | | | | | | | | | | |
| Maximum Heat Input Per Unit (per Gas Turbine) | MMBtu/hr | 3,435 | 3,435 | 3,669 | | | 140.6 | 15.0 | 19.5 | 2.1 | | | | | | |
| Maximum Heat Input Per Unit (per HRSG) | MMBtu/hr | 0 | 403 | 0 | | | | | | | | | | | | |
| Maximum Power Output (per GT/HRSG) | MW gross | 526 | 575 | 494 | | | | | | | | | | | | |
| Maximum Power Output (per GT/HRSG) | MW net | 513 | 562 | 483 | | | | | | | | | | | | |
| Maximum Engine Output | Hp | | | | | | | | 2,682 | 315 | | | | | | |
| | | | | | | | | | | | | | | | | |
| Proposed Emissions | per unit | | | | | | | | | | | | | | | |
| NOx | ppmvd@15%O2 | 2.0 | 2.0 | 5.0 | | | | | | | | | | | | |
| CO | ppmvd@15%O2 | 2.0 | 2.0 | 5.0 | | | | | | | | | | | | |
| VOC | ppmvd@15%O2 | 1.0 | 1.7 | 5.0 | | | | | | | | | | | | |
| CO2 | lb/MW-hr (net) | 750 | 769 | 1,206 | | | | | | | | | | | | |
| SO2 | lb/MMBtu | 0.0017 | 0.0017 | 0.0015 | | | | | | | | | | | | |
| PM/PM10/PM2.5 | lb/MMBtu | 0.0037 | 0.0045 | 0.019 | | | | | | | | | | | | |
| | | | | | | | | | | | | | | | | |
| Full Load Average Emission Rates | per unit | | | | | | | | | | | | | | | |
| NOx | lb/hr | 23.9 | 26.9 | 69.3 | | | 1.55 | 0.16 | 32.23 | 1.88 | | | | | | |
| CO | lb/hr | 14.5 | 16.4 | 42.2 | | | 10.55 | 1.65 | 1.77 | 0.47 | | | | | | |
| VOC | lb/hr | 4.15 | 7.95 | 24.1 | | | 1.12 | 0.12 | 0.65 | 0.07 | | | | | | |
| CO2 | lb/hr | 371,900 | 418,500 | 582,600 | | | 16,591 | 1,770 | 3,206 | 349 | | | | | | |
| SO2 | lb/hr | 5.5 | 6.2 | 5.6 | | | 0.21 | 0.02 | 0.03 | 0.00 | | | | | | |
| PM/PM10/PM2.5 | lb/hr | 12.1 | 16.4 | 69.0 | | | 0.98 | 0.11 | 0.15 | 0.05 | | | | | | |
| | | | | | | | | | | | | | | | | |
| Potential Emissions | total | | | | | | | | | | | | | | | |
| NOx | ton/yr | 51.39 | 164.09 | 24.95 | 20.70 | 3.77 | 1.86 | 0.70 | 4.83 | 0.28 | 0.00 | 273 | 50 | Yes | Ozone Transport Region | 327 |
| CO | ton/yr | 31.18 | 100.04 | 15.19 | 49.33 | 7.19 | 12.66 | 7.23 | 0.27 | 0.07 | 0.00 | 223 | 100 | Yes | Attainment | NA |
| VOC | ton/yr | 8.92 | 48.50 | 8.68 | 7.03 | 2.60 | 1.34 | 0.53 | 0.10 | 0.01 | 0.44 | 78 | 50 | Yes | Ozone Transport Region | 94 |
| CO2 | ton/yr | 799,585 | 2,552,850 | 209,736 | 11,235 | 2,755 | 19,909 | 7,753 | 481 | 52 | 0 | 3,604,356 | 100,000 | Yes | No NAAQS | 3,576,161 |
| SO2 | ton/yr | 11.83 | 37.82 | 2.02 | 0.17 | 0.03 | 0.25 | 0.09 | 0.00 | 0.00 | 0.00 | 52 | 100 | No | Attainment | NA |
| PM/PM10/PM2.5 | ton/yr | 26.02 | 100.04 | 24.84 | 1.64 | 1.09 | 1.18 | 0.48 | 0.02 | 0.01 | 0.00 | 155 | 100 | Yes | Attainment | NA |

**Table 2**
**Clear River Energy Center - Burrillville, Rhode Island**
**Non-Criteria Pollutants Potential Emission Summary**

| Emission Source(s): | | Gas Turbines | Gas Turbines | HRSG Duct Burners | Auxiliary Boiler | Dewpoint Heater | Diesel Generator | Fire Pump | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Number of Sources: | Hazardous Air Pollutant (Yes/No) | 2 | 2 | 2 | 1 | 1 | 1 | 1 | Total Facility Potential Emissions | RIDEM APCR No. 22 Minimum Quantity | RIDEM APCR No. 22 Applicability Determination | Total Potential HAP Emissions | Major HAP Source Threshold |
| Fuel Fired: | | Natural Gas | ULSD | Natural Gas | Natural Gas | Natural Gas | ULSD | ULSD | | | | | |
| Maximum Unit Heat Input (MMBtu/hr): | | 3,435 | 3,669 | 403 | 140.6 | 15.0 | 19.5 | 2.1 | | | | | |
| Annual Operation (hrs/yr): | | 8,400 | 360 | 6,100 | 2,400 | 8,760 | 300 | 300 | | | | | |
| | | lb/yr | lb/yr | lb/yr | lb/yr | lb/yr | lb/yr | lb/yr | lb/yr | lb/yr | Yes/No | ton/yr | |
| 1,3-Butadiene | Yes | 2.48E+00 | 4.23E+00 | | | | | 2.46E-02 | 6.73E+00 | 3 | Yes | 0.00 | 10 |
| 2-Methylmaphthalene | No | | | 1.16E-02 | 7.94E-03 | 3.09E-03 | | | 2.26E-02 | NA | NA | | |
| 3-Methylchloranthrene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | | | 1.70E-03 | NA | NA | | |
| 7,12-Dimethylbenz(a)anthracene | No | | | 7.71E-03 | 5.29E-03 | 2.06E-03 | | | 1.51E-02 | NA | NA | | |
| Acenaphthene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 2.74E-02 | 8.95E-04 | 3.00E-02 | NA | NA | | |
| Acenaphthylene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 5.40E-02 | 3.19E-03 | 5.89E-02 | NA | NA | | |
| Acetaldehyde | Yes | 2.31E+02 | | | | | 1.47E-01 | 4.83E-01 | 2.32E+02 | 50 | Yes | 0.12 | 10 |
| Acrolein | Yes | 3.69E+01 | | | | | 4.61E-02 | 5.83E-02 | 3.70E+01 | 0.07 | Yes | 0.02 | 10 |
| Ammonia | No | 1.73E+05 | 7.34E+03 | | | | | | 1.80E+05 | 300 | Yes | | |
| Anthracene | No | | | 1.16E-03 | 7.94E-04 | 3.09E-04 | 7.20E-03 | 1.18E-03 | 1.06E-02 | NA | NA | | |
| Arsenic | Yes | | 1.22E-01 | 9.64E-01 | 6.62E-02 | 2.58E-02 | | | 1.18E+00 | 0.02 | Yes | 0.00 | 10 |
| Barium | No | | | 2.12E+01 | 1.46E+00 | 5.67E-01 | | | 2.32E+01 | 2,000 | No | | |
| Benz(a)anthracene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 3.64E-03 | 1.06E-03 | 6.40E-03 | NA | NA | | |
| Benzene | Yes | 6.92E+01 | 1.45E+01 | 1.01E+00 | 6.95E-01 | 2.71E-01 | 4.54E+00 | 5.88E-01 | 9.08E+01 | 10 | Yes | 0.05 | 10 |
| Benzo(a)pyrene | No | | | 5.78E-04 | 3.97E-04 | 1.55E-04 | 1.50E-03 | 1.18E-04 | 2.75E-03 | NA | NA | | |
| Benzo(b)fluoranthene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 6.49E-03 | 6.24E-05 | 8.25E-03 | NA | NA | | |
| Benzo(g,h,i)perylene | No | | | 5.78E-04 | 3.97E-04 | 1.55E-04 | 3.25E-03 | 3.08E-04 | 4.69E-03 | NA | NA | | |
| Benzo(k)fluoranthene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 1.28E-03 | 9.77E-05 | 3.07E-03 | NA | NA | | |
| Beryllium | Yes | | 8.19E-01 | 5.78E-02 | 3.97E-03 | 1.55E-03 | | | 8.82E-01 | 0.04 | Yes | 0.00 | 10 |
| Butane | No | | | 1.01E+03 | 6.95E+02 | 2.71E+02 | | | 1.98E+03 | NA | NA | | |
| Cadmium | Yes | | 1.36E-02 | 5.30E+00 | 3.64E-01 | 1.42E-01 | | | 5.82E+00 | 0.07 | Yes | 0.00 | 10 |
| Chromium | Yes | | 5.92E+00 | 6.75E+00 | 4.63E-01 | 1.80E-01 | | | 1.33E+01 | 20,000 | No | 0.01 | 10 |
| Chrysene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 8.95E-03 | 2.22E-04 | 1.09E-02 | NA | NA | | |
| Cobalt | Yes | | | 4.05E-01 | 2.78E-02 | 1.08E-02 | | | 4.44E-01 | 0.1 | Yes | 0.00 | 10 |
| Copper | No | | | 4.10E+00 | 2.81E-01 | 1.10E-01 | | | 4.49E+00 | 40 | No | | |
| Dibenzo(a,h)anthracene | No | | | 5.78E-04 | 3.97E-04 | 1.55E-04 | 2.02E-03 | 3.67E-04 | 3.52E-03 | NA | NA | | |
| Dichlorobenzene | No | | | 5.78E-01 | 3.97E-01 | 1.55E-01 | | | 1.13E+00 | NA | NA | | |
| Ethane | No | | | 1.49E+03 | 1.03E+03 | 3.99E+02 | | | 2.92E+03 | NA | NA | | |
| Ethylbenzene | Yes | 1.85E+02 | | | | | | | 1.85E+02 | 9,000 | No | 0.09 | 10 |
| Fluoranthene | No | | | 1.45E-03 | 9.92E-04 | 3.86E-04 | 2.36E-02 | 4.79E-03 | 3.12E-02 | NA | NA | | |
| Fluorene | No | | | 1.35E-03 | 9.26E-04 | 3.61E-04 | 7.49E-02 | 1.84E-02 | 9.59E-02 | NA | NA | | |
| Formaldehyde | Yes | 1.26E+04 | 7.40E+02 | 3.62E+02 | 2.48E+01 | 9.66E+00 | 4.62E-01 | 7.43E-01 | 1.37E+04 | 9 | Yes | 6.87 | 10 |
| Hexane | Yes | | | 8.68E+02 | 5.95E+02 | 2.32E+02 | | | 1.70E+03 | 20,000 | No | 0.85 | 10 |
| Indeno(1,2,3-cd)pyrene | No | | | 8.68E-04 | 5.95E-04 | 2.32E-04 | 2.42E-03 | 2.36E-04 | 4.35E-03 | NA | NA | | |
| Lead | Yes | | 2.03E+00 | 2.41E+00 | 1.65E-01 | 6.44E-02 | | | 4.67E+00 | 0.9 | Yes | 0.00 | 10 |
| Manganese | Yes | | 7.44E-01 | 1.83E+00 | 1.26E-01 | 4.90E-02 | | | 2.75E+00 | 0.2 | Yes | 0.00 | 10 |
| Mercury | Yes | | 2.72E-02 | 1.25E+00 | 8.60E-02 | 3.35E-02 | | | 1.40E+00 | 0.7 | Yes | 0.00 | 10 |
| Molybdenum | No | | | 5.30E+00 | 3.64E-01 | 1.42E-01 | | | 5.81E+00 | 60 | No | | |
| Naphthalene | Yes | 7.50E+00 | 9.25E+00 | 2.94E-01 | 2.02E-01 | 7.86E-02 | 7.61E-01 | 5.34E-02 | 1.81E+01 | 3 | Yes | 0.01 | 10 |
| Nickel | Yes | | 3.91E+00 | 1.01E+01 | 6.95E-01 | 2.71E-01 | | | 1.50E+01 | 0.4 | Yes | 0.01 | 10 |
| Polycyclic Organic Matter (POM or PAH) | No | 1.27E+01 | 1.06E+01 | 4.96E-01 | 3.40E-01 | 1.32E-01 | 9.72E-03 | 1.50E-03 | 2.43E+01 | 0.01 | Yes | | |
| Pentane | No | | | 1.25E+03 | 8.60E+02 | 3.35E+02 | | | 2.45E+03 | NA | NA | | |
| Phenanthrene | No | | | 8.19E-03 | 5.62E-03 | 2.19E-03 | 2.39E-01 | 1.85E-02 | 2.74E-01 | NA | NA | | |
| Propane | No | | | 7.71E+02 | 5.29E+02 | 2.06E+02 | | | 1.51E+03 | NA | NA | | |
| Propylene | No | | | | | | 1.63E+01 | 1.63E+00 | 1.79E+01 | 36,500 | No | | |
| Propylene Oxide | Yes | 1.67E+02 | | | | | | | 1.67E+02 | 30 | Yes | 0.08 | 10 |
| Pyrene | No | | | 2.41E-03 | 1.65E-03 | 6.44E-04 | 2.17E-02 | 3.01E-03 | 2.94E-02 | NA | NA | | |
| Selenium | Yes | | 6.76E-01 | 1.16E-01 | 7.94E-03 | 3.09E-03 | | | 8.03E-01 | 2,000 | No | 0.00 | 10 |
| Sulfuric Acid | No | 6.97E+04 | 2.58E+03 | | | | | | 7.23E+04 | 40 | Yes | | |
| Toluene | Yes | 7.50E+02 | | 1.64E+00 | 1.12E+00 | 4.38E-01 | 1.64E+00 | 2.58E-01 | 7.55E+02 | 1,000 | No | 0.38 | 10 |
| Vanadium | No | | | 1.11E+01 | 7.61E-01 | 2.96E-01 | | | 1.22E+01 | 0.07 | Yes | | |
| Xylenes | Yes | 3.69E+02 | | | | | 1.13E+00 | 1.80E-01 | 3.70E+02 | 3,000 | No | 0.19 | 10 |
| Zinc | No | | | 1.40E+02 | 9.59E+00 | 3.74E+00 | | | 1.53E+02 | 3,000 | No | | |
| | | | | | | | | | | | Total: | 8.67 | 25 |

**Table 3**
**Clear River Energy Center - Burrillville, Rhode Island**
**Modeling Input Summary**

| 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 | 8,400 | 360 | 8,400 | 360 | 2,400 | 8,760 | 300 | 300 |
| | | | | | | | | | |
| Stack Parameters | | | | | | | | | |
| Stack Location | UTM N (Zone 19N) | 4,649,602 | | 4,649,648 | | 4,649,606 | 4,649,546 | 4,649,562 | 4,649,684 |
| Stack Location | UTM E (Zone 19N) | 271,730 | | 271,808 | | 271,759 | 271,680 | 271,789 | 271,800 |
| Stack Base Elevation | ft AMSL | 570 | | 570 | | 570 | 570 | 570 | 570 |
| Stack Height | ft above grade | 200 | | 200 | | 50 | 26 | 16 | 12 |
| Stack Height | ft AMSL | 770 | | 770 | | 620 | 596 | 586 | 582 |
| Stack Diameter | inches | 264 | | 264 | | 48 | 20 | 8 | 6 |
| Stack Flow | acfm | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 38,067 | 7,252 | 15,295 | 1,673 |
| Stack Exit Temperature | deg. F | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 344 | 1,000 | 752 | 855 |
| | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | |
| NOx | lb/hr | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 1.55 | 0.16 | 32.23 | 1.88 |
| CO | lb/hr | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 10.55 | 1.65 | 1.77 | 0.47 |
| SO2 | lb/hr | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 0.21 | 0.020 | 0.031 | 0.0033 |
| PM/PM10/PM2.5 | lb/hr | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 0.98 | 0.11 | 0.15 | 0.054 |
| | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | |
| NOx | g/sec | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 0.20 | 0.020 | 4.06 | 0.24 |
| CO | g/sec | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 1.33 | 0.21 | 0.22 | 0.059 |
| SO2 | g/sec | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 0.026 | 0.0025 | 0.0039 | 0.00042 |
| PM/PM10/PM2.5 | g/sec | Table A-1 | Table A-1 | Table A-1 | Table A-1 | 0.12 | 0.014 | 0.019 | 0.0068 |

**Table 4. GEP Stack Height Analysis Summary**

| Structure | Height (ft) | Length (ft) | Width (ft) | Projected Width (ft) | Formula GEP Height (ft) | Stacks > GEP Height | Building Distance from Stack (ft) | | | | | | '5L' Distance (ft) | Stacks within 5L? |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | ES-1 | ES-2 | FP | Aux Boiler | DP Heater | EG | | |
| Air Cooled Condenser 1 | 110 | 305 | 130 | 331.5 | 275 | None | 400 | 495 | 615 | 370 | 350 | 200 | 550 | All but FP |
| Air Cooled Condenser 2 | 110 | 305 | 130 | 331.5 | 275 | None | 420 | 410 | 525 | 375 | 480 | 190 | 550 | All stacks |
| Heat Recovery Steam Generator 1 | 135 | 103 | 44 | 112.0 | 303 | None | 10 | 285 | 340 | 70 | 210 | 115 | 560 | All stacks |
| Heat Recovery Steam Generator 2 | 135 | 103 | 44 | 112.0 | 303 | None | 275 | 15 | 125 | 185 | 510 | 200 | 560 | All stacks |
| Steam Turbine Building 1 | 80 | 202 | 136 | 243.5 | 200 | None | 145 | 270 | 375 | 100 | 215 | 25 | 400 | All stacks |
| Steam Turbine Building 2 | 80 | 202 | 136 | 243.5 | 200 | None | 300 | 150 | 260 | 210 | 500 | 135 | 400 | All but DP Heater |
| CT Inlet Filter 1 | 50 | 60 | 27 | 65.8 | 150 | ES-1, ES-2 | 200 | 395 | 490 | 210 | 165 | 140 | 250 | ES-1, Aux Boiler, DP Heater, EG |
| CT Inlet Filter 2 | 50 | 60 | 27 | 65.8 | 150 | ES-1, ES-2 | 275 | 200 | 310 | 180 | 440 | 90 | 250 | ES-1, ES-2, Aux Boiler, EG |

**Table 5. Cavity Analysis**

| Structure | Height (ft) | Projected Width (ft) | Cavity Height (1.5L) (ft) | Stacks > Cavity Height | Cavity Region Distance (3L) (ft) | Stacks within Cavity Region | Distance from Property Line (ft) | Cavity Extends Offsite? |
|---|---|---|---|---|---|---|---|---|
| Air Cooled Condenser 1 | 110 | 331.5 | 165 | ES-1, ES-2 | 330 | EG | 75 | Yes |
| Air Cooled Condenser 2 | 110 | 331.5 | 165 | ES-1, ES-2 | 330 | EG | 240 | Yes |
| Heat Recovery Steam Generator 1 | 135 | 112.0 | 192 | ES-1, ES-2 | 336 | All but FP | 250 | Yes |
| Heat Recovery Steam Generator 2 | 135 | 112.0 | 192 | ES-1, ES-2 | 336 | All but DP Heater | 230 | Yes |
| Steam Turbine Building 1 | 80 | 243.5 | 120 | ES-1, ES-2 | 240 | All but FP | 220 | Yes |
| Steam Turbine Building 2 | 80 | 243.5 | 120 | ES-1, ES-2 | 240 | ES-2, Aux Boiler, EG | 135 | Yes |
| CT Inlet Filter 1 | 50 | 65.8 | 75 | ES-1, ES-2 | 150 | EG | 165 | No |
| CT Inlet Filter 2 | 50 | 65.8 | 75 | ES-1, ES-2 | 150 | EG | 270 | No |

Table 6. Screening Modeling Results - GE Gas Turbines

| Fuel Type | | Natural Gas | | | | | | | | | | | | | ULSD | | | | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Modeling Case | | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
| Amb. Temp (F) | | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 52 | 52 | 52 | 20 | 20 | 20 | 90 | 90 | 90 | 51 | 52 | 20 | 20 |
| | | Emission Rate (lb/hr) | | | | | | | | | | | | | Emission Rate (lb/hr) | | | | | | |
| $NO_X$ | | 25.6 | 23.6 | 25.6 | 22.5 | 18.4 | 14.5 | 11.3 | 26.9 | 23.9 | 10.7 | 28.0 | 24.9 | 11.2 | 66.3 | 63.9 | 38.4 | 67.5 | 40.9 | 69.3 | 42.7 |
| CO | | 15.6 | 14.4 | 15.6 | 13.7 | 11.2 | 8.82 | 6.90 | 16.4 | 14.5 | 6.53 | 17.0 | 15.1 | 6.84 | 40.4 | 38.9 | 23.4 | 41.1 | 24.9 | 42.2 | 26.0 |
| $SO_2$ | | 5.9 | 5.5 | 5.9 | 5.2 | 4.2 | 3.3 | 2.6 | 6.2 | 5.5 | 2.5 | 6.5 | 5.8 | 2.6 | 5.3 | 5.1 | 3.1 | 5.4 | 3.3 | 5.6 | 3.4 |
| $PM/PM_{10}/PM_{2.5}$ | | 15.3 | 12.0 | 16.3 | 11.9 | 11.3 | 10.8 | 10.4 | 16.4 | 12.1 | 10.3 | 16.7 | 12.2 | 10.4 | 68.9 | 68.8 | 67.6 | 68.9 | 67.7 | 69.0 | 67.8 |
| | | Emission Rate (g/sec) | | | | | | | | | | | | | Emission Rate (g/sec) | | | | | | |
| $NO_X$ | | 3.23 | 2.97 | 3.23 | 2.84 | 2.32 | 1.83 | 1.42 | 3.39 | 3.01 | 1.35 | 3.53 | 3.14 | 1.41 | 8.35 | 8.05 | 4.84 | 8.51 | 5.15 | 8.73 | 5.38 |
| CO | | 1.97 | 1.81 | 1.97 | 1.73 | 1.41 | 1.11 | 0.87 | 2.07 | 1.83 | 0.82 | 2.14 | 1.90 | 0.86 | 5.09 | 4.90 | 2.95 | 5.18 | 3.14 | 5.32 | 3.28 |
| $SO_2$ | | 0.74 | 0.69 | 0.74 | 0.66 | 0.53 | 0.42 | 0.33 | 0.78 | 0.69 | 0.32 | 0.82 | 0.73 | 0.33 | 0.67 | 0.64 | 0.39 | 0.68 | 0.42 | 0.71 | 0.43 |
| $PM/PM_{10}/PM_{2.5}$ | | 1.93 | 1.51 | 2.05 | 1.50 | 1.42 | 1.36 | 1.31 | 2.07 | 1.52 | 1.30 | 2.10 | 1.54 | 1.31 | 8.68 | 8.67 | 8.52 | 8.68 | 8.53 | 8.69 | 8.54 |
| Urban | | 1.195 | 1.139 | 1.252 | 1.171 | 1.307 | 1.460 | 1.600 | 1.450 | 1.227 | 1.747 | 1.300 | 1.175 | 1.716 | 0.889 | 0.911 | 1.292 | 0.904 | 1.297 | 0.892 | 1.269 |
| Rural | | 1.238 | 1.178 | 1.296 | 1.213 | 1.352 | 1.509 | 1.679 | 1.371 | 1.271 | 1.878 | 1.303 | 1.218 | 1.846 | 0.891 | 0.920 | 1.335 | 0.914 | 1.340 | 0.902 | 1.312 |
| Averaging Period | | Concentration (µg/m3) Modeled @ 1 g/s | | | | | | | | | | | | | Concentration (µg/m3) Modeled @ 1 g/s | | | | | | |
| 1-hr | | 1.238 | 1.178 | 1.296 | 1.213 | 1.352 | 1.509 | 1.679 | 1.450 | 1.271 | 1.878 | 1.303 | 1.218 | 1.846 | 0.891 | 0.920 | 1.335 | 0.914 | 1.340 | 0.902 | 1.312 |
| 3-hr | | 1.238 | 1.178 | 1.296 | 1.213 | 1.352 | 1.509 | 1.679 | 1.450 | 1.271 | 1.878 | 1.303 | 1.218 | 1.846 | 0.891 | 0.920 | 1.335 | 0.914 | 1.340 | 0.902 | 1.312 |
| 8-hr | | 1.114 | 1.060 | 1.166 | 1.092 | 1.217 | 1.358 | 1.511 | 1.305 | 1.144 | 1.690 | 1.173 | 1.096 | 1.661 | 0.801 | 0.828 | 1.202 | 0.822 | 1.206 | 0.812 | 1.181 |
| 24-hr | | 0.743 | 0.707 | 0.778 | 0.728 | 0.811 | 0.905 | 1.007 | 0.870 | 0.763 | 1.127 | 0.782 | 0.731 | 1.108 | 0.534 | 0.552 | 0.801 | 0.548 | 0.804 | 0.541 | 0.787 |
| Annual | | 0.124 | 0.118 | 0.130 | 0.121 | 0.135 | 0.151 | 0.168 | 0.145 | 0.127 | 0.188 | 0.130 | 0.122 | 0.185 | 0.089 | 0.092 | 0.134 | 0.091 | 0.134 | 0.090 | 0.131 |
| | | Concentration (µg/m3) | | | | | | | | | | | | | Concentration (µg/m3) | | | | | | |
| $NO_X$ | 1-hr | 3.99 | 3.50 | 4.18 | 3.44 | 3.13 | 2.76 | 2.39 | 4.91 | 3.83 | 2.53 | 4.60 | 3.82 | 2.61 | 7.44 | 7.41 | 6.46 | 7.77 | 6.91 | **7.88** | 7.06 |
| | Annual | | | | | | | | **0.49** | 0.38 | 0.25 | | | | | | | | | **0.79** | 0.71 |
| | | | | | | | | | | | | | | | | | | | | | |
| CO | 1-hr | 2.43 | 2.14 | 2.55 | 2.09 | 1.91 | 1.68 | 1.46 | 3.00 | 2.32 | 1.55 | 2.79 | 2.32 | 1.59 | 4.53 | 4.51 | 3.94 | 4.73 | 4.20 | **4.80** | 4.30 |
| | 8-hr | 2.19 | 1.92 | 2.29 | 1.88 | 1.72 | 1.51 | 1.31 | 2.70 | 2.09 | 1.39 | 2.51 | 2.09 | 1.43 | 4.08 | 4.06 | 3.54 | 4.26 | 3.78 | **4.32** | 3.87 |
| | | | | | | | | | | | | | | | | | | | | | |
| $SO_2$ | 1-hr | 0.92 | 0.82 | 0.96 | 0.79 | 0.72 | 0.63 | 0.55 | **1.13** | 0.88 | 0.59 | 1.07 | 0.89 | 0.60 | 0.59 | 0.59 | 0.52 | 0.62 | 0.56 | 0.64 | 0.56 |
| | 3-hr | 0.92 | 0.82 | 0.96 | 0.79 | 0.72 | 0.63 | 0.55 | **1.13** | 0.88 | 0.59 | 1.07 | 0.89 | 0.60 | 0.59 | 0.59 | 0.52 | 0.62 | 0.56 | 0.64 | 0.56 |
| | 24-hr | 0.55 | 0.49 | 0.58 | 0.48 | 0.43 | 0.38 | 0.33 | **0.68** | 0.53 | 0.35 | 0.64 | 0.53 | 0.36 | 0.36 | 0.35 | 0.31 | 0.37 | 0.33 | 0.38 | 0.34 |
| | Annual | | | | | | | | **0.11** | 0.09 | 0.06 | | | | | | | | | **0.064** | 0.056 |
| | | | | | | | | | | | | | | | | | | | | | |
| $PM_{2.5}$ | 24-hr | 1.43 | 1.07 | 1.60 | 1.09 | 1.15 | 1.23 | 1.32 | 1.80 | 1.16 | 1.46 | 1.65 | 1.12 | 1.45 | 4.64 | 4.79 | 6.82 | 4.76 | **6.86** | 4.70 | 6.72 |
| | Annual | | | | | | | | **0.30** | 0.19 | 0.24 | | | | | | | | | 0.78 | **1.12** |
| | | | | | | | | | | | | | | | | | | | | | |
| $PM_{10}$ | 24-hr | 1.43 | 1.07 | 1.60 | 1.09 | 1.15 | 1.23 | 1.32 | 1.80 | 1.16 | 1.46 | 1.65 | 1.12 | 1.45 | 4.64 | 4.79 | 6.82 | 4.76 | **6.86** | 4.70 | 6.72 |

*Note: Tables 7, 8, and 9 are omitted in this Addendum. Due to the selection of GE as the proposed gas turbine manufacturer, no screening modeling was done using Siemens or MHI gas turbine specifications.

**Table 10. AERMOD Modeling Results Summary - Significance Determination**

| Pollutant | Averaging Period | Rank | 2010 | 2011 | 2012 | 2013 | 2014 | 5-yr Avg/Max | Max | Class II SIL | SIA (km) | Class I SIL | SIA (km) |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| **Steady State Operation (turbines, dewpoint heater)** | | | | | | | | | | | | | |
| **CO** | 1-hr | Max | 94.2 | 81.8 | 82.1 | 79.2 | 77.8 | | 94.2 | 2000 | < SIL | n/a | |
| | 8-hr | Max | 59.6 | 57.9 | 59.8 | 54.7 | 58.0 | | 59.8 | 500 | < SIL | n/a | |
| **NO2** | 1-hr | Max | | | | | | 8.9 | 8.9 | 7.8 | 0.875 | n/a | |
| **SO2** | 1-hr | Max | | | | | | 1.6 | 1.6 | 7.5 | < SIL | n/a | |
| | 3-hr | Max | 1.49 | 1.69 | 1.70 | 1.60 | 1.59 | | 1.7 | 25 | < SIL | 1 | 5 |
| | 24-hr | Max | 1.06 | 0.78 | 0.82 | 1.09 | 0.90 | | 1.09 | 5 | < SIL | 0.2 | 5 |
| **PM10** | 24-hr | Max | 11.9 | 8.3 | 9 | 12.4 | 9.9 | | 12.4 | 5 | 1.8 | 0.3 | 48 |
| **PM2.5** | 24-hr | Max | | | | | | 8.0 | 8.0 | n/a | n/a | n/a | n/a |
| **Long-Term Operation (all sources)** | | | | | | | | | | | | | |
| **NO2** | Annual | Max | 1.67 | 1.82 | 1.74 | 1.87 | 1.74 | | 1.87 | 1 | 0.375 | 0.1 | 3 |
| **SO2** | Annual | Max | 0.085 | 0.088 | 0.091 | 0.084 | 0.101 | | 0.101 | 1 | < SIL | 0.08 | 0.875 |
| **PM2.5** | Annual | Max | 0.45 | 0.46 | 0.49 | 0.44 | 0.54 | | 0.54 | n/a | n/a | n/a | n/a |
| **PM10** | Annual | Max | 0.45 | 0.46 | 0.49 | 0.44 | 0.54 | | 0.54 | 1 | < SIL | 0.2 | 1.2 |

**Table 11b. Modeling Input Summary - Ocean State Power**

| Emission Source | Units | Gas Turbines | | | | | | | | Diesel Gen 1 | Diesel Gen 2 |
|---|---|---|---|---|---|---|---|---|---|---|---|
| | | G001 | | G002 | | G003 | | G004 | | G005 | G006 |
| Fuel Type | | Natural Gas | Oil | Natural Gas | Oil | Natural Gas | Oil | Natural Gas | Oil | | |
| | | | | | | | | | | | |
| Annual Operation | hrs/yr | 7,560 | 1,200 | 7,560 | 1,200 | 7,560 | 1,200 | 7,560 | 1,200 | 500 | 500 |
| | | | | | | | | | | | |
| Stack Parameters | | | | | | | | | | | |
| Stack Location | UTM N (Z 19T) | 4654369.3 | | 4654369.3 | | 4654369.3 | | 4654369.3 | | 4654406.3 | 4654299.1 |
| Stack Location | UTM E (Z 19T) | 278949.0 | | 278949.0 | | 278949.0 | | 278949.0 | | 279022.3 | 279094.0 |
| Stack Base Elevation | ft AMSL | 526 | | 526 | | 526 | | 526 | | 529 | 529 |
| Stack Height | feet | 150.0 | | 150.0 | | 150.0 | | 150.0 | | 13.1 | 13.1 |
| Stack Diameter | inches | 189.0 | | 189.0 | | 189.0 | | 189.0 | | 8 | 8 |
| Stack Flow | acfm | 872,600.0 | 766,958.2 | 872,600.0 | 766,958.2 | 872,600.0 | 766,958.2 | 872,600.0 | 766,958.2 | 4,549 | 4,549 |
| Stack Exit Temperature | deg. F | 207.0 | 284.0 | 207.0 | 284.0 | 207.0 | 284.0 | 207.0 | 284.0 | 1,187 | 1,187 |
| | | | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | | | |
| NOx | lb/hr | 37.40 | 81.60 | 37.40 | 81.60 | 37.40 | 81.60 | 37.40 | 81.60 | 12.04 | 12.04 |
| CO | lb/hr | 46.80 | 81.70 | 46.80 | 81.70 | 46.80 | 81.70 | 46.80 | 81.70 | 0.30 | 0.30 |
| SO2 | lb/hr | 3.10 | 61.54 | 3.10 | 61.54 | 3.10 | 61.54 | 3.10 | 61.54 | 1.14 | 1.14 |
| PM/PM10/PM2.5 | lb/hr | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 11.50 | 0.35 | 0.35 |
| | | | | | | | | | | | |
| Maximum Emission Rate | | | | | | | | | | | |
| NOx | g/sec | 4.71 | 10.28 | 4.71 | 10.28 | 4.71 | 10.28 | 4.71 | 10.28 | 1.52 | 1.52 |
| CO | g/sec | 5.90 | 10.29 | 5.90 | 10.29 | 5.90 | 10.29 | 5.90 | 10.29 | 0.04 | 0.04 |
| SO2 | g/sec | 0.39 | 7.75 | 0.39 | 7.75 | 0.39 | 7.75 | 0.39 | 7.75 | 0.14 | 0.14 |
| PM/PM10/PM2.5 | g/sec | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 1.45 | 0.04 | 0.04 |

**Table 11c. Modeling Input Summary - RISE Compressor Station**

| Emission Source | Units | Combustion Turbine | Emergency Generator | Hot Water Boiler |
|---|---|---|---|---|
| Fuel Type | | Natural Gas | Natural Gas | Natural Gas |
| | | | | |
| Annual Operation | hrs/yr | 8,760 | 8,760 | 8,760 |
| | | | | |
| Stack Parameters | | | | |
| Stack Location | UTM N (Z 19T) | 4654376.9 | 4654383.1 | 4654383.1 |
| Stack Location | UTM E (Z 19T) | 279179.4 | 279167.9 | 279167.9 |
| Stack Base Elevation | ft AMSL | 506 | 506 | 506 |
| Stack Height | feet | 52.0 | 22.0 | 26.0 |
| Stack Diameter | inches | 74.5 | 7.9 | 14.4 |
| Stack Flow | acfm | 101,640.0 | 15,295 | 38,067 |
| Stack Exit Temperature | deg. F | 859.0 | 752 | 344 |
| | | | | |
| Maximum Emission Rate | | | | |
| $NO_X$ | lb/hr | 6.04 | 2.27 | 0.26 |
| CO | lb/hr | 7.37 | 1.70 | 0.16 |
| $SO_2$ | lb/hr | 0.04 | 0.003 | 0.001 |
| $PM_{10}$ | lb/hr | 0.70 | 0.05 | 0.01 |
| | | | | |
| Maximum Emission Rate | | | | |
| $NO_X$ | g/sec | 0.76 | 0.29 | 0.03 |
| CO | g/sec | 0.93 | 0.21 | 0.02 |
| $SO_2$ | g/sec | 0.01 | 0.00 | 0.00 |
| PM/PM10/PM2.5 | g/sec | 0.09 | 0.01 | 0.00 |

**Table 12. Comparison of Modeled Impacts to the Significant Monitoring Concentrations**

| Pollutant | Averaging Time | SMC ($\mu g/m^3$) | Max. modeled Concentration ($\mu g/m^3$) |
|---|---|---|---|
| Carbon Monoxide | 8-hr | 575 | 59.8 |
| Nitrogen Dioxide | Annual | 14 | 1.9 |
| $PM_{10}$ | 24-hr | 10 | 12.4 |
| Sulfur Dioxide | 24-hr | 13 | 1.1 |
| Lead | 3-month | 0.1 | 7.80E-04 |
| Mercury | 24-hr | 0.25 | 4.10E-04 |
| Beryllium | 24-hr | 0.001 | 2.20E-04 |
| Fluorides | 24-hr | 0.25 | Not emitted |
| Vinyl Chloride | 24-hr | 15 | Not emitted |
| Total Reduced Sulfur | 1-hr | 10 | Not emitted |
| Hydrogen Sulfide | 1-hr | 0.2 | Not emitted |
| Reduced Sulfur Compounds | 1-hr | 10 | Not emitted |

*SMCs are from Section 9.5.2(d)(i) of Rhode Island APCR Reg. 9

**Table 13. Background Concentrations**

| Criteria Pollutant | Averaging Period | Monitoring Location | Background Value (µg/m$^3$) | 2012-2014 Monitoring Value |
|---|---|---|---|---|
| $NO_2$ | 1-hour | Rockefeller Library, Brown University (Providence) | 80 | 3-year average of 98$^{th}$ percentile of 1-hour daily maxima |
| $NO_2$ | Annual | Rockefeller Library, Brown University (Providence) | 19.7 | highest annual mean |
| CO | 1-hour | Francis School (East Providence) | 2,346 | highest 2nd annual daily high value |
| CO | 8-hour | Francis School (East Providence) | 1,495 | highest 2nd annual daily high value |
| $SO_2$ | 1-hour | Francis School (East Providence) | 36 | 3-year average of 99$^{th}$ percentile of 1-hour daily maxima |
| $SO_2$ | 3-hour | Francis School (East Providence) | 45 | highest 2nd annual daily high value |
| $SO_2$ | 24-hour | Rockefeller Library, Brown University (Providence) | 21 | highest 2nd annual daily average value |
| $SO_2$ | Annual | Rockefeller Library, Brown University (Providence) | 3.69 | highest annual mean |
| $PM_{10}$ | 24-hour | URI W.Alton Jones Campus (W.Greenwich) | 17 | average 2nd annual daily average |
| $PM_{2.5}$ | 24-hour | URI W.Alton Jones Campus (W.Greenwich) | 13.1 | 3-year average of 98$^{th}$ percentile |
| $PM_{2.5}$ | Annual | URI W.Alton Jones Campus (W.Greenwich) | 5.17 | 3-year average of annual mean |

* From RIDEM's "Background Criteria Pollutant Air Monitoring Data for Modeling Rhode Island Sources" http://www.dem.ri.gov/programs/benviron/air/pdf/dispdata.pdf

**Table 16: Air Toxics Modeling Results Summary**

| Emission Source(s): | Gas Turbines | Gas Turbines | HRSG Duct Burners | Auxiliary Boiler | Dewpoint Heater | Diesel Generator | Fire Pump | 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): | 3,435 | 3,669 | 403 | 140.6 | 15.0 | 19.5 | 2.1 | | | |
| Annual Operation (hrs/yr): | 8,400 | 360 | 6,100 | 2,400 | 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 | µg/m$^3$ | µg/m$^3$ | µg/m$^3$ |
| 1,3-Butadiene | 2.95E-04 | 1.17E-02 | | | | | 8.21E-05 | | | 0.03 |
| Acetaldehyde | 2.75E-02 | | | | | 4.91E-04 | 1.61E-03 | | | 0.5 |
| Acrolein | 4.40E-03 | | | | | 1.54E-04 | 1.94E-04 | 0.2 | | 0.02 |
| Ammonia | 2.06E+01 | 2.04E+01 | | | | | | 1,000 | 100 | 70 |
| Arsenic | | 3.39E-04 | 1.58E-04 | 2.76E-05 | 2.94E-06 | | | 0.2 | | 0.0002 |
| Benzene | 8.24E-03 | 4.04E-02 | 1.66E-04 | 2.89E-04 | 3.09E-05 | 1.51E-02 | 1.96E-03 | 30 | 20 | 0.1 |
| Beryllium | | 2.27E-03 | 9.48E-06 | 1.65E-06 | 1.76E-07 | | | | 0.02 | 0.0004 |
| Cadmium | | 3.76E-05 | 8.69E-04 | 1.52E-04 | 1.62E-05 | | | | 0.1 | 0.0006 |
| Cobalt | | | 6.64E-05 | 1.16E-05 | 1.24E-06 | | | | | 0.001 |
| Formaldehyde | 1.50E+00 | 2.05E+00 | 5.93E-02 | 1.03E-02 | 1.10E-03 | 1.54E-03 | 2.48E-03 | 50 | 40 | 0.08 |
| Lead | | | 3.95E-04 | 6.89E-05 | 7.35E-06 | | | | | 0.008 |
| Manganese | | | 3.00E-04 | 5.24E-05 | 5.59E-06 | | | | 0.05 | 0.04 |
| Mercury | | | 2.05E-04 | 3.58E-05 | 3.82E-06 | | | 2 | 0.3 | 0.009 |
| Naphthalene | 8.93E-04 | 2.57E-02 | 4.82E-05 | 8.41E-05 | 8.97E-06 | 2.54E-03 | 1.78E-04 | | 3 | 0.03 |
| Nickel | | | 1.66E-03 | 2.89E-04 | 3.09E-05 | | | 6 | 0.2 | 0.004 |
| Polycyclic Organic Matter | 1.51E-03 | 2.94E-02 | 8.13E-05 | 1.42E-04 | 1.51E-05 | 3.24E-05 | 5.01E-06 | | | 0.00009 |
| Propylene Oxide | 1.99E-02 | | | | | | | 3,000 | | 0.3 |
| Sulfuric Acid | 8.30E+00 | 7.18E+00 | | | | | | 100 | | 1 |
| Vanadium | | | 1.82E-03 | 3.17E-04 | 3.38E-05 | | | 0.2 | | |

| Maximum Modeled Impacts (µg/m$^3$/g/sec) | 1-hour | 24-hour | Annual |
|---|---|---|---|
| GT/HRSG-1 & 2 (Natural Gas) | 1.59 | 1.08 | 0.07 |
| GT/HRSG-1 & 2 (ULSD) | 1.12 | 0.70 | 0.04 |
| Auxiliary Boiler | 253.35 | 57.13 | 7.89 |
| Dewpoint Heater | 456.00 | 248.73 | 24.12 |
| Diesel Generator | 375.79 | 81.17 | 12.92 |
| Fire Pump | 1190.66 | 698.69 | 109.84 |

| Annual POM |
|---|
| ug/m3, all sources, highest receptor |
| 7.18E-05 |

| | GT.HRSG firing Natural Gas | | | AAL Compliant? (Yes/No) | | | % of AAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Maximum Modeled Impacts (µg/m$^3$) | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual |
| 1,3-Butadiene | 1.24E-02 | 7.27E-03 | 4.39E-05 | | | Yes | | | 0% |
| Acetaldehyde | 2.70E-01 | 1.51E-01 | 1.04E-03 | | | Yes | | | 0% |
| Acrolein | 3.73E-02 | 1.93E-02 | 1.40E-04 | Yes | | Yes | 19% | | 1% |
| Ammonia | 4.13E+00 | 2.81E+00 | 1.89E-01 | Yes | Yes | Yes | 0% | 3% | 0% |
| Arsenic | 1.08E-03 | 3.12E-04 | 1.76E-05 | Yes | | Yes | 1% | | 9% |
| Benzene | 1.02E+00 | 3.31E-01 | 2.03E-03 | Yes | Yes | Yes | 3% | 2% | 2% |
| Beryllium | 6.47E-05 | 1.87E-05 | 1.50E-06 | | Yes | Yes | | 0% | 0% |
| Cadmium | 5.96E-03 | 1.72E-03 | 9.63E-05 | | Yes | Yes | | 2% | 16% |
| Cobalt | 4.55E-04 | 1.31E-04 | 7.36E-06 | | | Yes | | | 1% |
| Formaldehyde | 1.15E+00 | 5.56E-01 | 2.17E-02 | Yes | Yes | Yes | 2% | 1% | 27% |
| Lead | 2.70E-03 | 7.80E-04 | 4.37E-05 | | | Yes | | | 1% |
| Manganese | 2.05E-03 | 5.93E-04 | 3.32E-05 | | Yes | Yes | | 1% | 0% |
| Mercury | 1.40E-03 | 4.05E-04 | 2.27E-05 | Yes | Yes | Yes | 0% | 0% | 0% |
| Naphthalene | 1.50E-01 | 4.27E-02 | 2.90E-04 | | Yes | Yes | | 1% | 1% |
| Nickel | 1.13E-02 | 3.28E-03 | 1.83E-04 | Yes | Yes | Yes | 0% | 2% | 5% |
| Polycyclic Organic Matter | 8.01E-03 | 2.49E-03 | 7.18E-05 | | | Yes | | | 80% |
| Propylene Oxide | 3.99E-03 | 2.72E-03 | 1.78E-04 | Yes | | Yes | 0% | | 0% |
| Sulfuric Acid | 1.66E+00 | 1.13E+00 | 7.59E-02 | Yes | | Yes | 2% | | 8% |
| Vanadium | 1.24E-02 | 3.59E-03 | 2.01E-04 | Yes | | | 6% | | |

| | GT/HRSG firing ULSD | | | AAL Compliant? (Yes/No) | | | % of AAL | | |
|---|---|---|---|---|---|---|---|---|---|
| Maximum Modeled Impacts (µg/m$^3$) | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual | 1-hour | 24-hour | Annual |
| 1,3-Butadiene | 1.40E-02 | 8.26E-03 | 4.39E-05 | | | Yes | | | 0% |
| Acetaldehyde | 2.65E-01 | 1.47E-01 | 1.04E-03 | | | Yes | | | 0% |
| Acrolein | 3.64E-02 | 1.87E-02 | 1.40E-04 | Yes | | Yes | 18% | | 1% |
| Ammonia | 2.87E+00 | 1.79E+00 | 1.89E-01 | Yes | Yes | Yes | 0% | 2% | 0% |
| Arsenic | 1.10E-03 | 3.21E-04 | 1.76E-05 | Yes | | Yes | 1% | | 9% |
| Benzene | 1.03E+00 | 3.34E-01 | 2.03E-03 | Yes | Yes | Yes | 3% | 2% | 2% |
| Beryllium | 3.82E-04 | 2.17E-04 | 1.50E-06 | | Yes | Yes | | 1% | 0% |
| Cadmium | 5.79E-03 | 1.61E-03 | 9.63E-05 | | Yes | Yes | | 2% | 16% |
| Cobalt | 4.42E-04 | 1.22E-04 | 7.36E-06 | | | Yes | | | 1% |
| Formaldehyde | 1.13E+00 | 5.23E-01 | 2.17E-02 | Yes | Yes | Yes | 2% | 1% | 27% |
| Lead | 2.62E-03 | 7.26E-04 | 4.37E-05 | | | Yes | | | 1% |
| Manganese | 1.99E-03 | 5.52E-04 | 3.32E-05 | | Yes | Yes | | 1% | 0% |
| Mercury | 1.36E-03 | 3.77E-04 | 2.27E-05 | Yes | Yes | Yes | 0% | 0% | 0% |
| Naphthalene | 1.54E-01 | 4.48E-02 | 2.90E-04 | | Yes | Yes | | 1% | 1% |
| Nickel | 1.10E-02 | 3.05E-03 | 1.83E-04 | Yes | Yes | Yes | 0% | 2% | 5% |
| Polycyclic Organic Matter | 1.18E-02 | 4.85E-03 | 7.18E-05 | | | Yes | | | 80% |
| Propylene Oxide | 0.00E+00 | 0.00E+00 | 1.78E-04 | Yes | | Yes | 0% | | 0% |
| Sulfuric Acid | 1.01E+00 | 6.31E-01 | 7.59E-02 | Yes | | Yes | 1% | | 8% |
| Vanadium | 1.21E-02 | 3.34E-03 | 2.01E-04 | Yes | | | 6% | | |

**Table 17. Soils and Vegetation Impact Summary**

| Pollutant | | Averaging Time | Maximum Modeling Results (µg/m³) | | | | | | Background (µg/m³) | Total Impact (µg/m³) | Sensitivity Screening Levels (µg/m³)[1] | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | 2010 | 2011 | 2012 | 2013 | 2014 | Maximum | | | Sensitive | Intermediate | Resistant |
| $SO_2$ | | 1 hr | 2.0 | 1.7 | 1.7 | 1.7 | 1.7 | 2.0 | 36 | 38 | 917 | NA | NA |
| | | 3 hrs | 1.5 | 1.7 | 1.7 | 1.6 | 1.6 | 1.7 | 45 | 47 | 786 | 2,096 | 13,100 |
| | | 1 year | 0.08 | 0.09 | 0.09 | 0.08 | 0.1 | 0.1 | 3.69 | 4 | 18 | 18 | 18 |
| $NO_2$ | Steady State | 4 hrs | 8.8 | 6.9 | 10 | 9.7 | 9.4 | 10.0 | 80 | 90 | 3,760 | 9,400 | 16,920 |
| | | 8 hrs | 6 | 6.3 | 9.1 | 8.1 | 8.2 | 9.1 | 80 | 89 | 3,760 | 7,520 | 15,040 |
| | | 1 month | 0.8 | 0.5 | 1 | 0.7 | 1.1 | 1.1 | 80 | 81 | 564 | 564 | 564 |
| | | 1 year | 1.7 | 1.8 | 1.7 | 1.9 | 1.7 | 1.9 | 19.7 | 22 | 94 | 94 | 94 |
| | Emergency | 4 hrs | 758.3 | 806.7 | 671.1 | 720.7 | 642.6 | 806.7 | 80 | 886.7 | 3,760 | 9,400 | 16,920 |
| | | 8 hrs | 465.1 | 578.6 | 441.3 | 522.5 | 497.9 | 578.6 | 80 | 658.6 | 3,760 | 7,520 | 15,040 |
| | | 1 month | 63.8 | 75.7 | 71.3 | 77.4 | 87.8 | 87.8 | 80 | 167.8 | 564 | 564 | 564 |
| CO | | 1 hour | 95.8 | 96.1 | 100 | 101.3 | 94.7 | 101.3 | 2,346 | 2,447 | NA | NA | NA |
| | | 8 hrs | 59.6 | 57.9 | 59.8 | 54.7 | 58 | | 1,495 | | | | |
| | | 24 hrs | 51.1 | 44.5 | 38.2 | 45.5 | 53 | 53.0 | | | | | |
| | | 1 week | | | | | | 53.0 | 1,495 | 1,548 | 1,800,000 | NA | 18,000,000 |

[1] The Sensitivity Screening Levels are from Table 3.1 of the EPA's "A Screening Procedure for the Impacts of Air Pollution on Plants, Soils and Animals" (EPA, 1980)

**Table 18. Startup/Shutdown NAAQS Compliance Summary**

| Pollutant | Averaging Period | Rank | 2010 | 2011 | 2012 | 2013 | 2014 | 5-year Average | Max | Background | Total | NAAQS | % NAAQS |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| CO | 1-hr | Max | 358.7 | 348.4 | 459.5 | 418.6 | 424.7 | | 459.5 | | | | |
| | | H2H | 332.9 | 335.2 | 380.8 | 400.1 | 403.8 | | 403.8 | 2,346 | 2,750 | 40,000 | 6.9 |
| | 8-hr | Max | 131.8 | 162.8 | 134 | 164.5 | 137.4 | | 164.5 | | | | |
| | | H2H | 120 | 147 | 123 | 145.1 | 132.1 | | 147 | 1,495 | 1,642 | 10,000 | 16.4 |
| $NO_2$ | 1-hr | Max | | | | | | 45.3 | 45.3 | | | | |
| | | 98th Percentile | | | | | | 36.2 | 36.2 | 80 | 116 | 188 | 61.8 |
| $PM_{10}$ | 24-hr | Max | | | | | | 12.8 | 12.8 | | | | |
| | | 6th high | | | | | | 7.8 | 7.8 | 17 | 25 | 150 | 16.5 |
| $PM_{2.5}$ | 24-hr | Max | | | | | | 8.6 | 8.6 | | | | |
| | | 98th Percentile | | | | | | 4.7 | 4.7 | 13 | 18 | 35 | 50.9 |

Modeled impacts do not include Algonquin Compressor Station, Ocean State Power and RISE

**Table A-1**
**Clear River Energy Center - Burrillville, Rhode Island**
**GE CT/HRSG Emissions Estimates**

| Modeling Case No. | Units | 1 | 2 | 3 | 4 | 5 | 6 | 7 | 8 | 9 | 10 | 11 | 12 | 13 |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| GE Operating Point | | 2 | 13 | 18 | 7 | 8 | 9 | 26 | 17 | 6 | 25 | 16 | 5 | 24 |
| 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 | | Base | Base | Base | Base | Part | Part | MECL | Base | Base | MECL | Base | Base | MECL |
| Ambient Temperature | deg. F | 90 | 90 | 90 | 90 | 90 | 90 | 90 | 52 | 52 | 52 | 20 | 20 | 20 |
| Ambient Pressure | psia | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 |
| Ambient Relative Humidity | % | 45 | 45 | 45 | 45 | 45 | 45 | 45 | 74 | 74 | 74 | 60 | 60 | 60 |
| GT Heat Consumption | MMBtu/hr | 3,258 | 3,259 | 3,112 | 3,109 | 2,537 | 1,999 | 1,565 | 3,293 | 3,289 | 1,482 | 3,435 | 3,435 | 1,551 |
| Duct Burner Heat Consumption | MMBtu/hr | 262 | 0 | 401 | 0 | 0 | 0 | 0 | 392 | 0 | 0 | 403 | 0 | 0 |
| Total Heat Consumption | MMBtu/hr | 3,520 | 3,259 | 3,513 | 3,109 | 2,537 | 1,999 | 1,565 | 3,685 | 3,289 | 1,482 | 3,838 | 3,435 | 1,551 |
| Evaporative Cooler Status | On/Off | On | On | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off | Off |
| Gross Power Output | MW | 524 | 493 | 518 | 471 | 377 | 283 | 208 | 557 | 508 | 193 | 575 | 526 | 200 |
| Plant Net Power Output | MW | 512 | 482 | 506 | 460 | 368 | 277 | 203 | 544 | 496 | 188 | 562 | 513 | 196 |
| Stack Flow | acfh | 97,445,000 | 99,663,000 | 93,214,000 | 95,950,000 | 81,542,000 | 67,953,000 | 56,850,000 | 92,461,000 | 95,478,000 | 51,297,000 | 97,474,000 | 100,280,000 | 52,531,000 |
| Stack Flow | acfm | 1,624,083 | 1,661,050 | 1,553,567 | 1,599,167 | 1,359,033 | 1,132,550 | 947,500 | 1,541,017 | 1,591,300 | 854,950 | 1,624,567 | 1,671,333 | 875,517 |
| Stack Exit Temperature | deg. F | 177 | 194 | 169 | 192 | 188 | 182 | 179 | 148 | 171 | 163 | 155 | 176 | 164 |
| HRSG Exit Exhaust Emissions | | | | | | | | | | | | | | |
| NOx | ppmvd@15%O2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| NOx | lb/hr as NO2 | 25.6 | 23.6 | 25.6 | 22.5 | 18.4 | 14.5 | 11.3 | 26.9 | 23.9 | 10.7 | 28.0 | 24.9 | 11.2 |
| CO | ppmvd@15%O2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| CO | lb/hr | 15.6 | 14.4 | 15.6 | 13.7 | 11.2 | 8.82 | 6.90 | 16.4 | 14.5 | 6.53 | 17.0 | 15.2 | 6.84 |
| VOC | ppmvd@15%O2 | 1.7 | 1.0 | 1.7 | 1.0 | 1.0 | 1.0 | 1.0 | 1.7 | 1.0 | 1.0 | 1.7 | 1.0 | 1.0 |
| VOC | lb/hr as CH4 | 7.58 | 4.11 | 7.58 | 3.92 | 3.20 | 2.52 | 1.97 | 7.95 | 4.15 | 1.87 | 8.28 | 4.33 | 1.95 |
| CO2 | lb/hr | 399,100 | 368,000 | 399,100 | 351,500 | 286,500 | 226,300 | 176,700 | 418,500 | 371,900 | 168,000 | 436,000 | 388,400 | 175,800 |
| NH3 | ppmvd@15%O2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| NH3 | lb/hr | 9.48 | 8.73 | 9.48 | 8.33 | 6.80 | 5.35 | 4.19 | 9.94 | 8.82 | 3.97 | 10.30 | 9.21 | 4.15 |
| SOx | lb/hr as SO2 | 5.9 | 5.5 | 5.9 | 5.2 | 4.2 | 3.3 | 2.6 | 6.2 | 5.5 | 2.5 | 6.5 | 5.8 | 2.6 |
| PM/PM10/PM2.5 | lb/hr | 15.3 | 12.0 | 16.3 | 11.9 | 11.3 | 10.8 | 10.4 | 16.4 | 12.1 | 10.3 | 16.7 | 12.2 | 10.4 |
| H2SO4 | lb/hr | 3.80 | 3.51 | 3.80 | 3.35 | 2.73 | 2.15 | 1.68 | 3.99 | 3.54 | 1.60 | 4.15 | 3.70 | 1.67 |

| Modeling Case No. | Units | 14 | 15 | 16 | 17 | 18 | 19 | 20 |
|---|---|---|---|---|---|---|---|---|
| GE Operating Point | | 34 | 31 | 39 | 30 | 38 | 29 | 37 |
| Fuel Fired | | ULSD | ULSD | ULSD | ULSD | ULSD | ULSD | ULSD |
| Gas Turbine Load | % of Base | Base | Base | MECL | Base | MECL | Base | MECL |
| Ambient Temperature | deg. F | 90 | 90 | 90 | 51 | 52 | 20 | 20 |
| Ambient Pressure | psia | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 | 14.403 |
| Ambient Relative Humidity | % | 45 | 45 | 45 | 73 | 74 | 60 | 60 |
| GT Heat Consumption | MMBtu/hr | 3,513 | 3,385 | 2,033 | 3,573 | 2,164 | 3,669 | 2,260 |
| Duct Burner Heat Consumption | MMBtu/hr | 0 | 0 | 0 | 0 | 0 | 0 | 0 |
| Total Heat Consumption | MMBtu/hr | 3,513 | 3,385 | 2,033 | 3,573 | 2,164 | 3,669 | 2,260 |
| Evaporative Cooler Status | On/Off | On | Off | Off | Off | Off | Off | Off |
| Gross Power Output | MW | 469 | 452 | 259 | 483 | 279 | 494 | 288 |
| Plant Net Power Output | MW | 458 | 442 | 253 | 472 | 273 | 483 | 281 |
| Stack Flow | acfh | 122,960,000 | 118,000,000 | 69,254,000 | 120,780,000 | 70,153,000 | 123,180,000 | 72,551,000 |
| Stack Flow | acfm | 2,049,333 | 1,966,667 | 1,154,233 | 2,013,000 | 1,169,217 | 2,053,000 | 1,209,183 |
| Stack Exit Temperature | deg. F | 307 | 303 | 265 | 295 | 255 | 299 | 257 |
| HRSG Exit Exhaust Emissions | | | | | | | | |
| NOx | ppmvd@15%O2 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| NOx | lb/hr as NO2 | 66.3 | 63.9 | 38.4 | 67.5 | 40.9 | 69.3 | 42.7 |
| CO | ppmvd@15%O2 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| CO | lb/hr | 40.4 | 38.9 | 23.4 | 41.1 | 24.9 | 42.2 | 26.0 |
| VOC | ppmvd@15%O2 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 | 5.0 |
| VOC | lb/hr as CH4 | 23.1 | 22.2 | 13.4 | 23.5 | 14.2 | 24.1 | 14.8 |
| CO2 | lb/hr | 557,300 | 537,900 | 323,400 | 567,000 | 343,700 | 582,600 | 359,300 |
| NH3 | ppmvd@15%O2 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 | 2.0 |
| NH3 | lb/hr | 9.81 | 9.45 | 5.68 | 9.98 | 6.04 | 10.20 | 6.31 |
| SOx | lb/hr as SO2 | 5.3 | 5.1 | 3.1 | 5.4 | 3.3 | 5.6 | 3.4 |
| PM/PM10/PM2.5 | lb/hr | 68.9 | 68.8 | 67.6 | 68.9 | 67.7 | 69.0 | 67.8 |
| H2SO4 | lb/hr | 3.43 | 3.31 | 1.99 | 3.49 | 2.12 | 3.59 | 2.21 |

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

| | | |
|---|---|---|
| Emission Source(s): | Gas Turbines | |
| Number of Sources: | 2 | |
| Fuel Fired: | Natural Gas | |
| Maximum Unit Heat Input: | 3,435 | MMbtu/hr |
| Annual Operation: | 8,400 | hrs/yr |

| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Emission Factor |
|---|---|---|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | Source |
| Ammonia | 3.0E-03 | lb/MMBtu | 2.06E+01 | 1.73E+05 | 0.00% | 2.06E+01 | 1.73E+05 | GE Emissions Estimates |
| Sulfuric Acid | 1.2E-03 | lb/MMBtu | 8.30E+00 | 6.97E+04 | 0.00% | 8.30E+00 | 6.97E+04 | GE Emissions Estimates |
| 1,3-Butadiene | 4.3E-07 | lb/MMBtu | 2.95E-03 | 2.48E+01 | 90.00% | 2.95E-04 | 2.48E+00 | AP-42 Table 3.1-3 |
| Acetaldehyde | 4.0E-05 | lb/MMBtu | 2.75E-01 | 2.31E+03 | 90.00% | 2.75E-02 | 2.31E+02 | AP-42 Table 3.1-3 |
| Acrolein | 6.4E-06 | lb/MMBtu | 4.40E-02 | 3.69E+02 | 90.00% | 4.40E-03 | 3.69E+01 | AP-42 Table 3.1-3 |
| Benzene | 1.2E-05 | lb/MMBtu | 8.24E-02 | 6.92E+02 | 90.00% | 8.24E-03 | 6.92E+01 | AP-42 Table 3.1-3 |
| Ethylbenzene | 3.2E-05 | lb/MMBtu | 2.20E-01 | 1.85E+03 | 90.00% | 2.20E-02 | 1.85E+02 | AP-42 Table 3.1-3 |
| Formaldehyde | 2.2E-04 | lb/MMBtu | 1.50E+00 | 1.26E+04 | 0.00% | 1.50E+00 | 1.26E+04 | GE Emissions Estimates |
| Naphthalene | 1.3E-06 | lb/MMBtu | 8.93E-03 | 7.50E+01 | 90.00% | 8.93E-04 | 7.50E+00 | AP-42 Table 3.1-3 |
| PAH | 2.2E-06 | lb/MMBtu | 1.51E-02 | 1.27E+02 | 90.00% | 1.51E-03 | 1.27E+01 | AP-42 Table 3.1-3 |
| Propylene Oxide | 2.9E-05 | lb/MMBtu | 1.99E-01 | 1.67E+03 | 90.00% | 1.99E-02 | 1.67E+02 | AP-42 Table 3.1-3 |
| Toluene | 1.3E-04 | lb/MMBtu | 8.93E-01 | 7.50E+03 | 90.00% | 8.93E-02 | 7.50E+02 | AP-42 Table 3.1-3 |
| Xylenes | 6.4E-05 | lb/MMBtu | 4.40E-01 | 3.69E+03 | 90.00% | 4.40E-02 | 3.69E+02 | AP-42 Table 3.1-3 |

| | | |
|---|---|---|
| Emission Source(s): | Gas Turbines | |
| Number of Sources: | 2 | |
| Fuel Fired: | ULSD | |
| Maximum Unit Heat Input: | 3,669 | MMbtu/hr |
| Annual Operation: | 360 | hrs/yr |

| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Emission Factor |
|---|---|---|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | Source |
| Ammonia | 2.8E-03 | lb/MMBtu | 2.04E+01 | 7.34E+03 | 0.00% | 2.04E+01 | 7.34E+03 | GE Emissions Estimates |
| Sulfuric Acid | 9.8E-04 | lb/MMBtu | 7.18E+00 | 2.58E+03 | 0.00% | 7.18E+00 | 2.58E+03 | GE Emissions Estimates |
| 1,3-Butadiene | 1.6E-05 | lb/MMBtu | 1.17E-01 | 4.23E+01 | 90.00% | 1.17E-02 | 4.23E+00 | AP-42 Table 3.1-4 |
| Benzene | 5.5E-05 | lb/MMBtu | 4.04E-01 | 1.45E+02 | 90.00% | 4.04E-02 | 1.45E+01 | AP-42 Table 3.1-4 |
| Formaldehyde | 2.8E-04 | lb/MMBtu | 2.05E+00 | 7.40E+02 | 0.00% | 2.05E+00 | 7.40E+02 | AP-42 Table 3.1-4 |
| Naphthalene | 3.5E-05 | lb/MMBtu | 2.57E-01 | 9.25E+01 | 90.00% | 2.57E-02 | 9.25E+00 | AP-42 Table 3.1-4 |
| PAH | 4.0E-05 | lb/MMBtu | 2.94E-01 | 1.06E+02 | 90.00% | 2.94E-02 | 1.06E+01 | AP-42 Table 3.1-4 |
| Arsenic | 4.6E-08 | lb/MMBtu | 3.39E-04 | 1.22E-01 | 0.00% | 3.39E-04 | 1.22E-01 | Ultra-Trace Metal Survey |
| Beryllium | 3.1E-07 | lb/MMBtu | 2.27E-03 | 8.19E-01 | 0.00% | 2.27E-03 | 8.19E-01 | Ultra-Trace Metal Survey |
| Cadmium | 5.1E-09 | lb/MMBtu | 3.76E-05 | 1.36E-02 | 0.00% | 3.76E-05 | 1.36E-02 | Ultra-Trace Metal Survey |
| Chromium | 2.2E-06 | lb/MMBtu | 1.64E-02 | 5.92E+00 | 0.00% | 1.64E-02 | 5.92E+00 | Ultra-Trace Metal Survey |
| Lead | 7.7E-07 | lb/MMBtu | 5.64E-03 | 2.03E+00 | 0.00% | 5.64E-03 | 2.03E+00 | Ultra-Trace Metal Survey |
| Manganese | 2.8E-07 | lb/MMBtu | 2.07E-03 | 7.44E-01 | 0.00% | 2.07E-03 | 7.44E-01 | Ultra-Trace Metal Survey |
| Mercury | 1.0E-08 | lb/MMBtu | 7.56E-05 | 2.72E-02 | 0.00% | 7.56E-05 | 2.72E-02 | Ultra-Trace Metal Survey |
| Nickel | 1.5E-06 | lb/MMBtu | 1.09E-02 | 3.91E+00 | 0.00% | 1.09E-02 | 3.91E+00 | Ultra-Trace Metal Survey |
| Selenium | 2.6E-07 | lb/MMBtu | 1.88E-03 | 6.76E-01 | 0.00% | 1.88E-03 | 6.76E-01 | Ultra-Trace Metal Survey |

| | | |
|---|---|---|
| Emission Source(s): | HRSG Duct Burners | |
| Number of Sources: | 2 | |
| Fuel Fired: | Natural Gas | |
| Maximum Unit Heat Input: | 403.0 | MMbtu/hr |
| Annual Operation: | 6,100 | hrs/yr |

| RIDEM APCR No. 22 | Emission | Measurement | Uncontrolled PTE | | Control | Controlled PTE | | Emission Factor |
|---|---|---|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | % | lb/hr | lb/yr | Source |
| Lead | 4.9E-07 | lb/MMBtu | 3.95E-04 | 2.41E+00 | 0.00% | 3.95E-04 | 2.41E+00 | AP-42 Table 1.4-2 |
| Benzene | 2.1E-06 | lb/MMBtu | 1.66E-03 | 1.01E+01 | 90.00% | 1.66E-04 | 1.01E+00 | AP-42 Table 1.4-3 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 5.93E-02 | 3.62E+02 | 0.00% | 5.93E-02 | 3.62E+02 | AP-42 Table 1.4-3 |
| Hexane | 1.8E-03 | lb/MMBtu | 1.42E+00 | 8.68E+03 | 90.00% | 1.42E-01 | 8.68E+02 | AP-42 Table 1.4-3 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 4.82E-04 | 2.94E+00 | 90.00% | 4.82E-05 | 2.94E-01 | AP-42 Table 1.4-3 |
| Toluene | 3.3E-06 | lb/MMBtu | 2.69E-03 | 1.64E+01 | 90.00% | 2.69E-04 | 1.64E+00 | AP-42 Table 1.4-3 |
| Arsenic | 2.0E-07 | lb/MMBtu | 1.58E-04 | 9.64E-01 | 0.00% | 1.58E-04 | 9.64E-01 | AP-42 Table 1.4-4 |
| Barium | 4.3E-06 | lb/MMBtu | 3.48E-03 | 2.12E+01 | 0.00% | 3.48E-03 | 2.12E+01 | AP-42 Table 1.4-4 |
| Beryllium | 1.2E-08 | lb/MMBtu | 9.48E-06 | 5.78E-02 | 0.00% | 9.48E-06 | 5.78E-02 | AP-42 Table 1.4-4 |
| Cadmium | 1.1E-06 | lb/MMBtu | 8.69E-04 | 5.30E+00 | 0.00% | 8.69E-04 | 5.30E+00 | AP-42 Table 1.4-4 |
| Chromium | 1.4E-06 | lb/MMBtu | 1.11E-03 | 6.75E+00 | 0.00% | 1.11E-03 | 6.75E+00 | AP-42 Table 1.4-4 |
| Cobalt | 8.2E-08 | lb/MMBtu | 6.64E-05 | 4.05E-01 | 0.00% | 6.64E-05 | 4.05E-01 | AP-42 Table 1.4-4 |
| Copper | 8.3E-07 | lb/MMBtu | 6.72E-04 | 4.10E+00 | 0.00% | 6.72E-04 | 4.10E+00 | AP-42 Table 1.4-4 |
| Manganese | 3.7E-07 | lb/MMBtu | 3.00E-04 | 1.83E+00 | 0.00% | 3.00E-04 | 1.83E+00 | AP-42 Table 1.4-4 |
| Mercury | 2.5E-07 | lb/MMBtu | 2.05E-04 | 1.25E+00 | 0.00% | 2.05E-04 | 1.25E+00 | AP-42 Table 1.4-4 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 8.69E-04 | 5.30E+00 | 0.00% | 8.69E-04 | 5.30E+00 | AP-42 Table 1.4-4 |
| Nickel | 2.1E-06 | lb/MMBtu | 1.66E-03 | 1.01E+01 | 0.00% | 1.66E-03 | 1.01E+01 | AP-42 Table 1.4-4 |
| Selenium | 2.4E-08 | lb/MMBtu | 1.90E-05 | 1.16E-01 | 0.00% | 1.90E-05 | 1.16E-01 | AP-42 Table 1.4-4 |
| Vanadium | 2.3E-06 | lb/MMBtu | 1.82E-03 | 1.11E+01 | 0.00% | 1.82E-03 | 1.11E+01 | AP-42 Table 1.4-4 |
| Zinc | 2.8E-05 | lb/MMBtu | 2.29E-02 | 1.40E+02 | 0.00% | 2.29E-02 | 1.40E+02 | AP-42 Table 1.4-4 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 1.90E-05 | 1.16E-01 | 90.00% | 1.90E-06 | 1.16E-02 | AP-42 Table 1.4-3 |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 1.26E-05 | 7.71E-02 | 90.00% | 1.26E-06 | 7.71E-03 | AP-42 Table 1.4-3 |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Anthracene | 2.4E-09 | lb/MMBtu | 1.90E-06 | 1.16E-02 | 90.00% | 1.90E-07 | 1.16E-03 | AP-42 Table 1.4-3 |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 9.48E-07 | 5.78E-03 | 90.00% | 9.48E-08 | 5.78E-04 | AP-42 Table 1.4-3 |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 9.48E-07 | 5.78E-03 | 90.00% | 9.48E-08 | 5.78E-04 | AP-42 Table 1.4-3 |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Butane | 2.1E-03 | lb/MMBtu | 1.66E+00 | 1.01E+04 | 90.00% | 1.66E-01 | 1.01E+03 | AP-42 Table 1.4-3 |
| Chrysene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 9.48E-07 | 5.78E-03 | 90.00% | 9.48E-08 | 5.78E-04 | AP-42 Table 1.4-3 |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 9.48E-04 | 5.78E+00 | 90.00% | 9.48E-05 | 5.78E-01 | AP-42 Table 1.4-3 |
| Ethane | 3.0E-03 | lb/MMBtu | 2.45E+00 | 1.49E+04 | 90.00% | 2.45E-01 | 1.49E+03 | AP-42 Table 1.4-3 |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 2.37E-06 | 1.45E-02 | 90.00% | 2.37E-07 | 1.45E-03 | AP-42 Table 1.4-3 |
| Fluorene | 2.7E-09 | lb/MMBtu | 2.21E-06 | 1.35E-02 | 90.00% | 2.21E-07 | 1.35E-03 | AP-42 Table 1.4-3 |
| Indeno(1,2,3-cd)pyrene | 1.8E-09 | lb/MMBtu | 1.42E-06 | 8.68E-03 | 90.00% | 1.42E-07 | 8.68E-04 | AP-42 Table 1.4-3 |
| Pentane | 2.5E-03 | lb/MMBtu | 2.05E+00 | 1.25E+04 | 90.00% | 2.05E-01 | 1.25E+03 | AP-42 Table 1.4-3 |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 1.34E-05 | 8.19E-02 | 90.00% | 1.34E-06 | 8.19E-03 | AP-42 Table 1.4-3 |
| Propane | 1.6E-03 | lb/MMBtu | 1.26E+00 | 7.71E+03 | 90.00% | 1.26E-01 | 7.71E+02 | AP-42 Table 1.4-3 |
| Pyrene | 4.9E-09 | lb/MMBtu | 3.95E-06 | 2.41E-02 | 90.00% | 3.95E-07 | 2.41E-03 | AP-42 Table 1.4-3 |

| | | |
|---|---|---|
| Emission Source(s): | Auxiliary Boiler | |
| Number of Sources: | 1 | |
| Fuel Fired: | Natural Gas | |
| Maximum Unit Heat Input: | 140.6 | MMbtu/hr |
| Annual Operation: | 2,400 | hrs/yr |

| RIDEM APCR No. 22 | Emission | Measurement | Potential Emissions | | Emission Factor |
|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | Source |
| Lead | 4.9E-07 | lb/MMBtu | 6.89E-05 | 1.65E-01 | AP-42 Table 1.4-2 |
| Benzene | 2.1E-06 | lb/MMBtu | 2.89E-04 | 6.95E-01 | AP-42 Table 1.4-3 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 1.03E-02 | 2.48E+01 | AP-42 Table 1.4-3 |
| Hexane | 1.8E-03 | lb/MMBtu | 2.48E-01 | 5.95E+02 | AP-42 Table 1.4-3 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 8.41E-05 | 2.02E-01 | AP-42 Table 1.4-3 |
| Toluene | 3.3E-06 | lb/MMBtu | 4.69E-04 | 1.12E+00 | AP-42 Table 1.4-3 |
| Arsenic | 2.0E-07 | lb/MMBtu | 2.76E-05 | 6.62E-02 | AP-42 Table 1.4-4 |
| Barium | 4.3E-06 | lb/MMBtu | 6.07E-04 | 1.46E+00 | AP-42 Table 1.4-4 |
| Beryllium | 1.2E-08 | lb/MMBtu | 1.65E-06 | 3.97E-03 | AP-42 Table 1.4-4 |
| Cadmium | 1.1E-06 | lb/MMBtu | 1.52E-04 | 3.64E-01 | AP-42 Table 1.4-4 |
| Chromium | 1.4E-06 | lb/MMBtu | 1.93E-04 | 4.63E-01 | AP-42 Table 1.4-4 |
| Cobalt | 8.2E-08 | lb/MMBtu | 1.16E-05 | 2.78E-02 | AP-42 Table 1.4-4 |
| Copper | 8.3E-07 | lb/MMBtu | 1.17E-04 | 2.81E-01 | AP-42 Table 1.4-4 |
| Manganese | 3.7E-07 | lb/MMBtu | 5.24E-05 | 1.26E-01 | AP-42 Table 1.4-4 |
| Mercury | 2.5E-07 | lb/MMBtu | 3.58E-05 | 8.60E-02 | AP-42 Table 1.4-4 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 1.52E-04 | 3.64E-01 | AP-42 Table 1.4-4 |
| Nickel | 2.1E-06 | lb/MMBtu | 2.89E-04 | 6.95E-01 | AP-42 Table 1.4-4 |
| Selenium | 2.4E-08 | lb/MMBtu | 3.31E-06 | 7.94E-03 | AP-42 Table 1.4-4 |
| Vanadium | 2.3E-06 | lb/MMBtu | 3.17E-04 | 7.61E-01 | AP-42 Table 1.4-4 |
| Zinc | 2.8E-05 | lb/MMBtu | 4.00E-03 | 9.59E+00 | AP-42 Table 1.4-4 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 3.31E-06 | 7.94E-03 | AP-42 Table 1.4-3 |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 2.21E-06 | 5.29E-03 | AP-42 Table 1.4-3 |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Anthracene | 2.4E-09 | lb/MMBtu | 3.31E-07 | 7.94E-04 | AP-42 Table 1.4-3 |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 1.65E-07 | 3.97E-04 | AP-42 Table 1.4-3 |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 1.65E-07 | 3.97E-04 | AP-42 Table 1.4-3 |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Butane | 2.1E-03 | lb/MMBtu | 2.89E-01 | 6.95E+02 | AP-42 Table 1.4-3 |
| Chrysene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 1.65E-07 | 3.97E-04 | AP-42 Table 1.4-3 |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 1.65E-04 | 3.97E-01 | AP-42 Table 1.4-3 |
| Ethane | 3.0E-03 | lb/MMBtu | 4.27E-01 | 1.03E+03 | AP-42 Table 1.4-3 |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 4.14E-07 | 9.92E-04 | AP-42 Table 1.4-3 |
| Fluorene | 2.7E-09 | lb/MMBtu | 3.86E-07 | 9.26E-04 | AP-42 Table 1.4-3 |
| Indeno(1,2,3-cd)pyrene | 1.8E-09 | lb/MMBtu | 2.48E-07 | 5.95E-04 | AP-42 Table 1.4-3 |
| Pentane | 2.5E-03 | lb/MMBtu | 3.58E-01 | 8.60E+02 | AP-42 Table 1.4-3 |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 2.34E-06 | 5.62E-03 | AP-42 Table 1.4-3 |
| Propane | 1.6E-03 | lb/MMBtu | 2.21E-01 | 5.29E+02 | AP-42 Table 1.4-3 |
| Pyrene | 4.9E-09 | lb/MMBtu | 6.89E-07 | 1.65E-03 | AP-42 Table 1.4-3 |

| | | |
|---|---|---|
| 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 | | Emission Factor |
|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | Source |
| Benzene | 9.33E-04 | lb/MMBtu | 1.96E-03 | 5.88E-01 | AP-42 Table 3.3-2 |
| Toluene | 4.09E-04 | lb/MMBtu | 8.59E-04 | 2.58E-01 | AP-42 Table 3.3-2 |
| Xylenes | 2.85E-04 | lb/MMBtu | 5.99E-04 | 1.80E-01 | AP-42 Table 3.3-2 |
| Propylene | 2.58E-03 | lb/MMBtu | 5.42E-03 | 1.63E+00 | AP-42 Table 3.3-2 |
| Formaldehyde | 1.18E-03 | lb/MMBtu | 2.48E-03 | 7.43E-01 | AP-42 Table 3.3-2 |
| Acetaldehyde | 7.67E-04 | lb/MMBtu | 1.61E-03 | 4.83E-01 | AP-42 Table 3.3-2 |
| Acrolein | 9.25E-05 | lb/MMBtu | 1.94E-04 | 5.83E-02 | AP-42 Table 3.3-2 |
| Naphthalene | 8.48E-05 | lb/MMBtu | 1.78E-04 | 5.34E-02 | AP-42 Table 3.3-2 |
| 1,3-Butadiene | 3.91E-05 | lb/MMBtu | 8.21E-05 | 2.46E-02 | AP-42 Table 3.3-2 |
| Acenaphthylene | 5.06E-06 | lb/MMBtu | 1.06E-05 | 3.19E-03 | AP-42 Table 3.3-2 |
| Acenaphthene | 1.42E-06 | lb/MMBtu | 2.98E-06 | 8.95E-04 | AP-42 Table 3.3-2 |
| Fluorene | 2.92E-05 | lb/MMBtu | 6.13E-05 | 1.84E-02 | AP-42 Table 3.3-2 |
| Phenanthrene | 2.94E-05 | lb/MMBtu | 6.17E-05 | 1.85E-02 | AP-42 Table 3.3-2 |
| Anthracene | 1.87E-06 | lb/MMBtu | 3.93E-06 | 1.18E-03 | AP-42 Table 3.3-2 |
| Fluoranthene | 7.61E-06 | lb/MMBtu | 1.60E-05 | 4.79E-03 | AP-42 Table 3.3-2 |
| Pyrene | 4.78E-06 | lb/MMBtu | 1.00E-05 | 3.01E-03 | AP-42 Table 3.3-2 |
| Benz(a)anthracene | 1.68E-06 | lb/MMBtu | 3.53E-06 | 1.06E-03 | AP-42 Table 3.3-2 |
| Chrysene | 3.53E-07 | lb/MMBtu | 7.41E-07 | 2.22E-04 | AP-42 Table 3.3-2 |
| Benzo(b)fluoranthene | 9.91E-08 | lb/MMBtu | 2.08E-07 | 6.24E-05 | AP-42 Table 3.3-2 |
| Benzo(k)fluoranthene | 1.55E-07 | lb/MMBtu | 3.26E-07 | 9.77E-05 | AP-42 Table 3.3-2 |
| Benzo(a)pyrene | 1.88E-07 | lb/MMBtu | 3.95E-07 | 1.18E-04 | AP-42 Table 3.3-2 |
| Indeno(1,2,3-cd)pyrene | 3.75E-07 | lb/MMBtu | 7.88E-07 | 2.36E-04 | AP-42 Table 3.3-2 |
| Dibenz(a,h)anthracene | 5.83E-07 | lb/MMBtu | 1.22E-06 | 3.67E-04 | AP-42 Table 3.3-2 |
| Benzo(g,h,l)perylene | 4.89E-07 | lb/MMBtu | 1.03E-06 | 3.08E-04 | AP-42 Table 3.3-2 |
| PAH | 1.68E-04 | lb/MMBtu | 3.53E-04 | 1.06E-01 | AP-42 Table 3.3-2 |

| | | |
|---|---|---|
| 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 | | Emission Factor |
|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | Source |
| Lead | 4.9E-07 | lb/MMBtu | 7.35E-06 | 6.44E-02 | AP-42 Table 1.4-2 |
| Benzene | 2.1E-06 | lb/MMBtu | 3.09E-05 | 2.71E-01 | AP-42 Table 1.4-3 |
| Formaldehyde | 7.4E-05 | lb/MMBtu | 1.10E-03 | 9.66E+00 | AP-42 Table 1.4-3 |
| Hexane | 1.8E-03 | lb/MMBtu | 2.65E-02 | 2.32E+02 | AP-42 Table 1.4-3 |
| Naphthalene | 6.0E-07 | lb/MMBtu | 8.97E-06 | 7.86E-02 | AP-42 Table 1.4-3 |
| Toluene | 3.3E-06 | lb/MMBtu | 5.00E-05 | 4.38E-01 | AP-42 Table 1.4-3 |
| Arsenic | 2.0E-07 | lb/MMBtu | 2.94E-06 | 2.58E-02 | AP-42 Table 1.4-4 |
| Barium | 4.3E-06 | lb/MMBtu | 6.47E-05 | 5.67E-01 | AP-42 Table 1.4-4 |
| Beryllium | 1.2E-08 | lb/MMBtu | 1.76E-07 | 1.55E-03 | AP-42 Table 1.4-4 |
| Cadmium | 1.1E-06 | lb/MMBtu | 1.62E-05 | 1.42E-01 | AP-42 Table 1.4-4 |
| Chromium | 1.4E-06 | lb/MMBtu | 2.06E-05 | 1.80E-01 | AP-42 Table 1.4-4 |
| Cobalt | 8.2E-08 | lb/MMBtu | 1.24E-06 | 1.08E-02 | AP-42 Table 1.4-4 |
| Copper | 8.3E-07 | lb/MMBtu | 1.25E-05 | 1.10E-01 | AP-42 Table 1.4-4 |
| Manganese | 3.7E-07 | lb/MMBtu | 5.59E-06 | 4.90E-02 | AP-42 Table 1.4-4 |
| Mercury | 2.5E-07 | lb/MMBtu | 3.82E-06 | 3.35E-02 | AP-42 Table 1.4-4 |
| Molybdenum | 1.1E-06 | lb/MMBtu | 1.62E-05 | 1.42E-01 | AP-42 Table 1.4-4 |
| Nickel | 2.1E-06 | lb/MMBtu | 3.09E-05 | 2.71E-01 | AP-42 Table 1.4-4 |
| Selenium | 2.4E-08 | lb/MMBtu | 3.53E-07 | 3.09E-03 | AP-42 Table 1.4-4 |
| Vanadium | 2.3E-06 | lb/MMBtu | 3.38E-05 | 2.96E-01 | AP-42 Table 1.4-4 |
| Zinc | 2.8E-05 | lb/MMBtu | 4.26E-04 | 3.74E+00 | AP-42 Table 1.4-4 |
| 2-Methylmaphthalene | 2.4E-08 | lb/MMBtu | 3.53E-07 | 3.09E-03 | AP-42 Table 1.4-3 |
| 3-Methylchloranthrene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| 7,12-Dimethylbenz(a)anthracene | 1.6E-08 | lb/MMBtu | 2.35E-07 | 2.06E-03 | AP-42 Table 1.4-3 |
| Acenaphthene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Acenaphthylene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Anthracene | 2.4E-09 | lb/MMBtu | 3.53E-08 | 3.09E-04 | AP-42 Table 1.4-3 |
| Benz(a)anthracene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Benzo(a)pyrene | 1.2E-09 | lb/MMBtu | 1.76E-08 | 1.55E-04 | AP-42 Table 1.4-3 |
| Benzo(b)fluoranthene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Benzo(g,h,i)perylene | 1.2E-09 | lb/MMBtu | 1.76E-08 | 1.55E-04 | AP-42 Table 1.4-3 |
| Benzo(k)fluoranthene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Butane | 2.1E-03 | lb/MMBtu | 3.09E-02 | 2.71E+02 | AP-42 Table 1.4-3 |
| Chrysene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Dibenzo(a,h)anthracene | 1.2E-09 | lb/MMBtu | 1.76E-08 | 1.55E-04 | AP-42 Table 1.4-3 |
| Dichlorobenzene | 1.2E-06 | lb/MMBtu | 1.76E-05 | 1.55E-01 | AP-42 Table 1.4-3 |
| Ethane | 3.0E-03 | lb/MMBtu | 4.56E-02 | 3.99E+02 | AP-42 Table 1.4-3 |
| Fluoranthene | 2.9E-09 | lb/MMBtu | 4.41E-08 | 3.86E-04 | AP-42 Table 1.4-3 |
| Fluorene | 2.7E-09 | lb/MMBtu | 4.12E-08 | 3.61E-04 | AP-42 Table 1.4-3 |
| Indeno(1,2,3-cd)pyrene | 1.8E-09 | lb/MMBtu | 2.65E-08 | 2.32E-04 | AP-42 Table 1.4-3 |
| Pentane | 2.5E-03 | lb/MMBtu | 3.82E-02 | 3.35E+02 | AP-42 Table 1.4-3 |
| Phenanthrene | 1.7E-08 | lb/MMBtu | 2.50E-07 | 2.19E-03 | AP-42 Table 1.4-3 |
| Propane | 1.6E-03 | lb/MMBtu | 2.35E-02 | 2.06E+02 | AP-42 Table 1.4-3 |
| Pyrene | 4.9E-09 | lb/MMBtu | 7.35E-08 | 6.44E-04 | AP-42 Table 1.4-3 |

| | | |
|---|---|---|
| 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 | | Emission Factor |
|---|---|---|---|---|---|
| Air Toxic Chemical | Factor | Units | lb/hr | lb/yr | Source |
| Benzene | 7.76E-04 | lb/MMBtu | 1.51E-02 | 4.54E+00 | AP-42 Table 3.4-3 |
| Toluene | 2.81E-04 | lb/MMBtu | 5.48E-03 | 1.64E+00 | AP-42 Table 3.4-3 |
| Xylenes | 1.93E-04 | lb/MMBtu | 3.76E-03 | 1.13E+00 | AP-42 Table 3.4-3 |
| Propylene | 2.79E-03 | lb/MMBtu | 5.44E-02 | 1.63E+01 | AP-42 Table 3.4-3 |
| Formaldehyde | 7.89E-05 | lb/MMBtu | 1.54E-03 | 4.62E-01 | AP-42 Table 3.4-3 |
| Acetaldehyde | 2.52E-05 | lb/MMBtu | 4.91E-04 | 1.47E-01 | AP-42 Table 3.4-3 |
| Acrolein | 7.88E-06 | lb/MMBtu | 1.54E-04 | 4.61E-02 | AP-42 Table 3.4-3 |
| Naphthalene | 1.30E-04 | lb/MMBtu | 2.54E-03 | 7.61E-01 | AP-42 Table 3.4-4 |
| Acenaphthylene | 9.23E-06 | lb/MMBtu | 1.80E-04 | 5.40E-02 | AP-42 Table 3.4-4 |
| Acenaphthene | 4.68E-06 | lb/MMBtu | 9.13E-05 | 2.74E-02 | AP-42 Table 3.4-4 |
| Fluorene | 1.28E-05 | lb/MMBtu | 2.50E-04 | 7.49E-02 | AP-42 Table 3.4-4 |
| Phenanthrene | 4.08E-05 | lb/MMBtu | 7.96E-04 | 2.39E-01 | AP-42 Table 3.4-4 |
| Anthracene | 1.23E-06 | lb/MMBtu | 2.40E-05 | 7.20E-03 | AP-42 Table 3.4-4 |
| Fluoranthene | 4.03E-06 | lb/MMBtu | 7.86E-05 | 2.36E-02 | AP-42 Table 3.4-4 |
| Pyrene | 3.71E-06 | lb/MMBtu | 7.23E-05 | 2.17E-02 | AP-42 Table 3.4-4 |
| Benz(a)anthracene | 6.22E-07 | lb/MMBtu | 1.21E-05 | 3.64E-03 | AP-42 Table 3.4-4 |
| Chrysene | 1.53E-06 | lb/MMBtu | 2.98E-05 | 8.95E-03 | AP-42 Table 3.4-4 |
| Benzo(b)fluoranthene | 1.11E-06 | lb/MMBtu | 2.16E-05 | 6.49E-03 | AP-42 Table 3.4-4 |
| Benzo(k)fluoranthene | 2.18E-07 | lb/MMBtu | 4.25E-06 | 1.28E-03 | AP-42 Table 3.4-4 |
| Benzo(a)pyrene | 2.57E-07 | lb/MMBtu | 5.01E-06 | 1.50E-03 | AP-42 Table 3.4-4 |
| Indeno(1,2,3-cd)pyrene | 4.14E-07 | lb/MMBtu | 8.07E-06 | 2.42E-03 | AP-42 Table 3.4-4 |
| Dibenz(a,h)anthracene | 3.46E-07 | lb/MMBtu | 6.75E-06 | 2.02E-03 | AP-42 Table 3.4-4 |
| Benzo(g,h,l)perylene | 5.56E-07 | lb/MMBtu | 1.08E-05 | 3.25E-03 | AP-42 Table 3.4-4 |
| PAH | 2.12E-04 | lb/MMBtu | 4.13E-03 | 1.24E+00 | AP-42 Table 3.4-4 |

GT ammonia, formaldehyde (NG only) and sulfuric acid emission rates were provided by GE. 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**
**GE CT/HRSG Startup & Shutdown Emission Summaries**

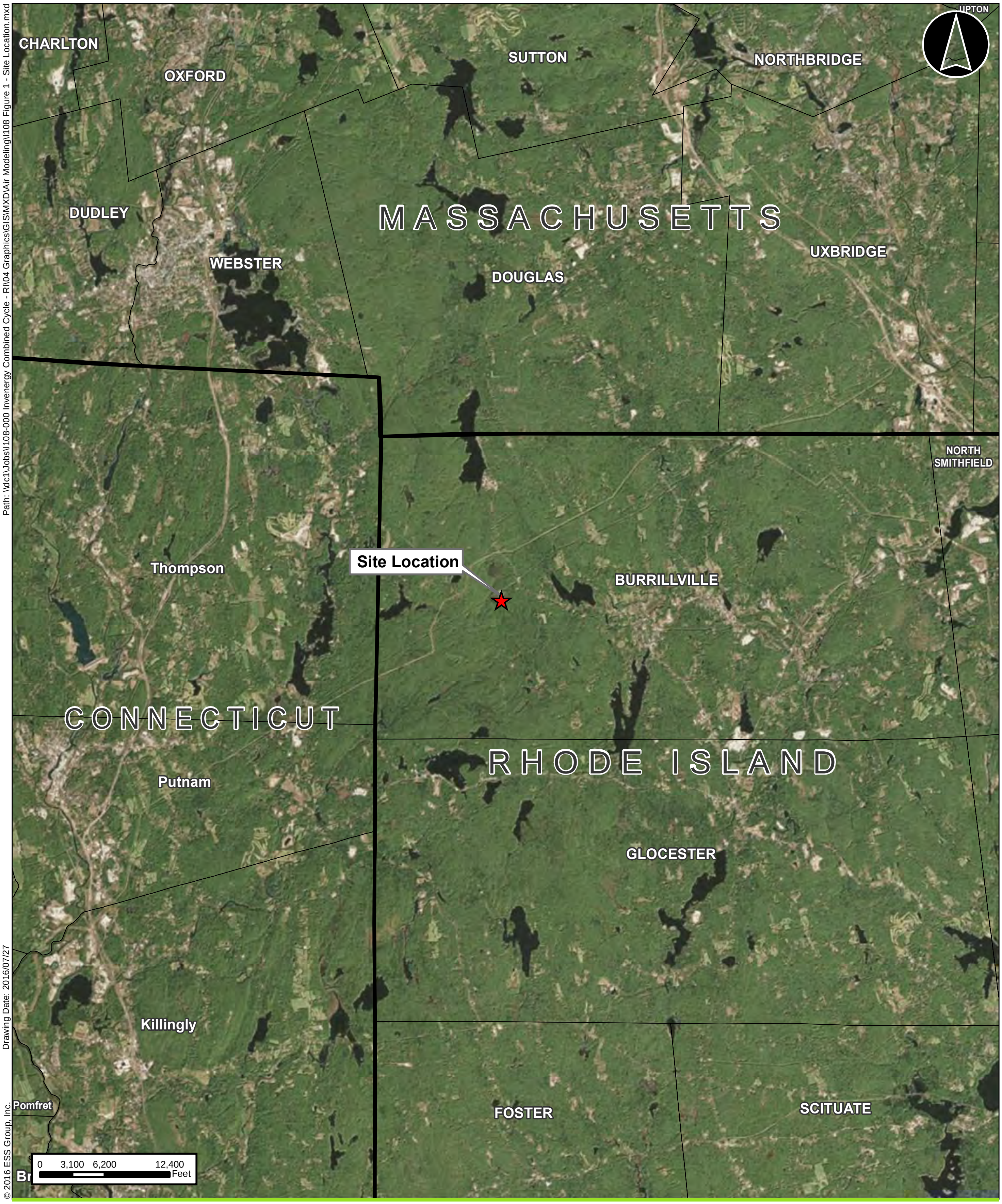
| Parameter | Measurement Units | Cold Start | Warm Start | Hot Start | Shut Down | Cold Start | Warm Start | Hot Start | Shut Down | Total | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | | | | | | | | | Natural Gas | ULSD | Total |
| | | | | | | | | | | | | |
| Fuel Fired | | Natural Gas | Natural Gas | Natural Gas | Natural Gas | ULSD | ULSD | ULSD | ULSD | | | |
| | | | | | | | | | | | | |
| Event Duration | min/event | 45 | 40 | 20 | 12 | 45 | 40 | 20 | 7 | | | |
| Events per Year | events/yr | 50 | 100 | 250 | 400 | 5 | 25 | 15 | 45 | 400 | 45 | 445 |
| Hours per Year | hrs/yr | 38 | 67 | 83 | 80 | 4 | 17 | 5 | 5 | 268 | 31 | 298 |
| | | | | | | | | | | | | |
| Stack Flow | acfm | 427,475 | 427,475 | 427,475 | 427,475 | 604,592 | 604,592 | 604,592 | 604,592 | | | |
| Stack Exit Temperature | deg. F | 108 | 108 | 108 | 108 | 139 | 139 | 139 | 139 | | | |
| | | | | | | | | | | | | |
| Emissions Per Event | | | | | | | | | | | | |
| NOx | lb/event | 188.0 | 126.0 | 67.0 | 6.6 | 180.0 | 165.0 | 105.0 | 21.0 | | | |
| CO | lb/event | 129.0 | 126.0 | 120.0 | 124.0 | 284.0 | 279.0 | 261.0 | 46.0 | | | |
| VOC | lb/event | 10.3 | 9.9 | 8.6 | 26.0 | 89.0 | 88.0 | 86.0 | 28.0 | | | |
| CO2 | lb/event | 63,000 | 56,000 | 28,000 | 16,800 | 134,738 | 119,767 | 59,883 | 20,959 | | | |
| SO2 | lb/event | 0.94 | 0.83 | 0.42 | 0.25 | 1.28 | 1.13 | 0.57 | 0.20 | | | |
| PM/PM10/PM2.5 | lb/event | 9.1 | 8.1 | 4.2 | 2.4 | 53.0 | 47.0 | 25.0 | 8.3 | | | |
| | | | | | | | | | | | | |
| Average Emission Rate | | | | | | | | | | | | |
| NOx | lb/hr | 250.7 | 189.0 | 201.0 | 33.0 | 240.0 | 247.5 | 315.0 | 180.0 | | | |
| CO | lb/hr | 172.0 | 189.0 | 360.0 | 620.0 | 378.7 | 418.5 | 783.0 | 394.3 | | | |
| VOC | lb/hr | 13.7 | 14.9 | 25.8 | 130.0 | 118.7 | 132.0 | 258.0 | 240.0 | | | |
| CO2 | lb/hr | 84,000 | 84,000 | 84,000 | 84,000 | 179,650 | 179,650 | 179,650 | 179,650 | | | |
| SO2 | lb/hr | 1.3 | 1.3 | 1.3 | 1.3 | 1.7 | 1.7 | 1.7 | 1.7 | | | |
| PM/PM10/PM2.5 | lb/hr | 12.1 | 12.2 | 12.6 | 12.0 | 70.7 | 70.5 | 75.0 | 71.1 | | | |
| | | | | | | | | | | | | |
| Potential Emissions | | | | | | | | | | | | |
| NOx | ton/yr | 4.70 | 6.30 | 8.38 | 1.32 | 0.45 | 2.06 | 0.79 | 0.47 | 20.70 | 3.77 | 24.47 |
| CO | ton/yr | 3.23 | 6.30 | 15.00 | 24.80 | 0.71 | 3.49 | 1.96 | 1.04 | 49.33 | 7.19 | 56.52 |
| VOC | ton/yr | 0.26 | 0.50 | 1.08 | 5.20 | 0.22 | 1.10 | 0.65 | 0.63 | 7.03 | 2.60 | 9.63 |
| CO2 | ton/yr | 1,575 | 2,800 | 3,500 | 3,360 | 337 | 1,497 | 449 | 472 | 11,235 | 2,755 | 13,990 |
| SO2 | ton/yr | 0.02 | 0.04 | 0.05 | 0.05 | 0.00 | 0.01 | 0.00 | 0.00 | 0.17 | 0.03 | 0.19 |
| PM/PM10/PM2.5 | ton/yr | 0.23 | 0.41 | 0.53 | 0.48 | 0.13 | 0.59 | 0.19 | 0.19 | 1.64 | 1.09 | 2.73 |

**Table A-4**
**Clear River Energy Center - Burrillville, Rhode Island**
**Polycyclic Organic Matter Emission Rate Calculations**

| POM Constituent | POM Weighting Factor* | Gas Turbines (Natural Gas) Potential Emission Rates | | Gas Turbines (ULSD) Potential Emission Rates | | HRSG Duct Burners Potential Emission Rates | | Auxiliary Boiler Potential Emission Rates | | Dewpoint Heater Potential Emission Rates | | Emergency Generator Potential Emission Rates | | Fire Pump Potential Emission Rates | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) | (lb/hr) | (lb/yr) |
| Anthracene | 0.3 | | | | | 1.90E-07 | 1.16E-03 | 3.31E-07 | 7.94E-04 | 3.53E-08 | 3.09E-04 | 2.40E-05 | 7.20E-03 | 3.93E-06 | 1.18E-03 |
| Benz(a)anthracene | 0.1 | | | | | 1.42E-07 | 8.68E-04 | 2.48E-07 | 5.95E-04 | 2.65E-08 | 2.32E-04 | 1.21E-05 | 3.64E-03 | 3.53E-06 | 1.06E-03 |
| Benzo(b)fluoranthene | 0.1 | | | | | 1.42E-07 | 8.68E-04 | 2.48E-07 | 5.95E-04 | 2.65E-08 | 2.32E-04 | 2.16E-05 | 6.49E-03 | 2.08E-07 | 6.24E-05 |
| Benzo(j)fluoranthene | 0.1 | | | | | | | | | | | | | | |
| Benzo(k)fluoranthene | 0.1 | | | | | 1.42E-07 | 8.68E-04 | 2.48E-07 | 5.95E-04 | 2.65E-08 | 2.32E-04 | 4.25E-06 | 1.28E-03 | 3.26E-07 | 9.77E-05 |
| Benzo(a)pyrene | 1 | | | | | 9.48E-08 | 5.78E-04 | 1.65E-07 | 3.97E-04 | 1.76E-08 | 1.55E-04 | 5.01E-06 | 1.50E-03 | 3.95E-07 | 1.18E-04 |
| Chrysene | 0.01 | | | | | 1.42E-07 | 8.68E-04 | 2.48E-07 | 5.95E-04 | 2.65E-08 | 2.32E-04 | 2.98E-05 | 8.95E-03 | 7.41E-07 | 2.22E-04 |
| Cyclopenta(cd)pyrene | 0.1 | | | | | | | | | | | | | | |
| Dibenz(a,h)acridine | 0.1 | | | | | | | | | | | | | | |
| Dibenz(a,c)anthracene | 0.1 | | | | | | | | | | | | | | |
| Dibenz(a,h)anthracene | 1.1 | | | | | 9.48E-08 | 5.78E-04 | 1.65E-07 | 3.97E-04 | 1.76E-08 | 1.55E-04 | 6.75E-06 | 2.02E-03 | 1.22E-06 | 3.67E-04 |
| Dibenz(a,j)acridine | 0.1 | | | | | | | | | | | | | | |
| Dibenzo(a,e)fluoranthene | 1 | | | | | | | | | | | | | | |
| Dibenzo(a,e)pyrene | 1 | | | | | | | | | | | | | | |
| Dibenzo(a,h)pyrene | 10 | | | | | | | | | | | | | | |
| Dibenzo(a,i)pyrene | 10 | | | | | | | | | | | | | | |
| Dibenzo(a,l)pyrene | 10 | | | | | | | | | | | | | | |
| 7H-dibenzo(c,g)carbazole | 1 | | | | | | | | | | | | | | |
| 7,12-dimethylbenz(a)anthracene | 64 | | | | | 1.26E-06 | 7.71E-03 | 2.21E-06 | 5.29E-03 | 2.35E-07 | 2.06E-03 | | | | |
| 1,6-dinitropyrene | 10 | | | | | | | | | | | | | | |
| 1,8-dinitropyrene | 1 | | | | | | | | | | | | | | |
| Fluoranthene | 0.1 | | | | | 2.37E-07 | 1.45E-03 | 4.14E-07 | 9.92E-04 | 4.41E-08 | 3.86E-04 | 7.86E-05 | 2.36E-02 | 1.60E-05 | 4.79E-03 |
| Indeno(1,2,3-cd)pyrene | 0.1 | | | | | 1.42E-07 | 8.68E-04 | 2.48E-07 | 5.95E-04 | 2.65E-08 | 2.32E-04 | 8.07E-06 | 2.42E-03 | 7.88E-07 | 2.36E-04 |
| 3-methylcholanthrene | 5.7 | | | | | | | | | | | | | | |
| 5-methylchrysene | 1 | | | | | | | | | | | | | | |
| 5-nitroacenaphthene | 0.03 | | | | | | | | | | | | | | |
| 6-nitrochrysene | 10 | | | | | | | | | | | | | | |
| 2-nitrofluorene | 0.01 | | | | | | | | | | | | | | |
| 1-nitropyrene | 0.1 | | | | | | | | | | | | | | |
| 4-nitropyrene | 0.1 | | | | | | | | | | | | | | |
| PAH (Total, when non-speciated) | 1 | 1.51E-03 | 1.27E+01 | 2.94E-02 | 1.06E+01 | | | | | | | | | | |
| POM Emission Rates | | 1.51E-03 | 1.27E+01 | 2.94E-02 | 1.06E+01 | 8.13E-05 | 4.96E-01 | 1.42E-04 | 3.40E-01 | 1.51E-05 | 1.32E-01 | 3.24E-05 | 9.72E-03 | 5.01E-06 | 1.50E-03 |

* Rhode Island Air Toxics Guideline, Table F

# Figures




Path: \\dc1\Jobs\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 1 - Site Location.mxd

Drawing Date: 2016/07/27



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environmental consulting & engineering services

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

1 inch = 12,500 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016

**Site Location**

**Figure 1**


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

Source: HDR, inc
Scale: As Shown



**Site Layout**

**Figure 2**

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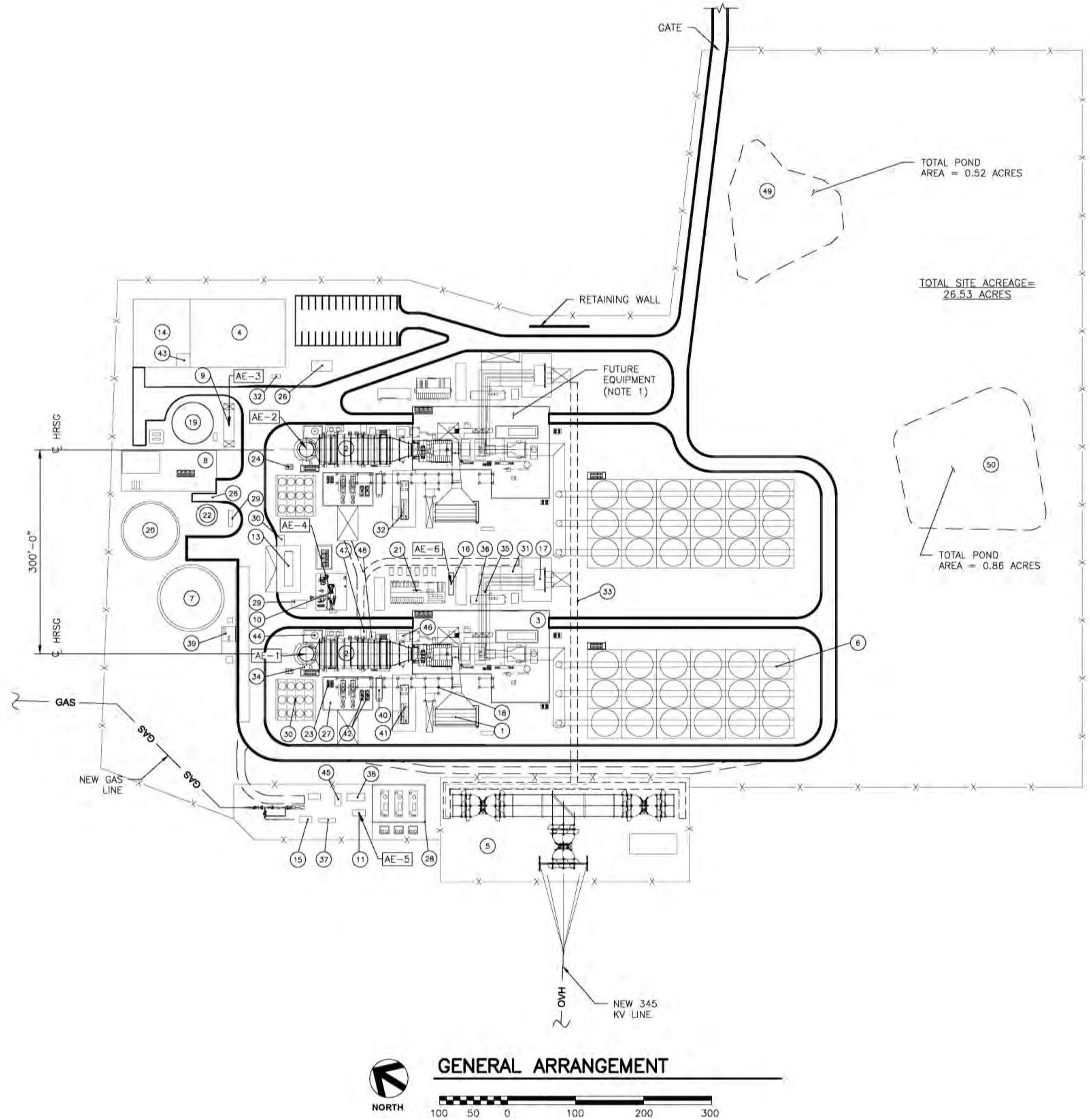


GENERAL ARRANGEMENT

NOTES:

1. THE TWO UNITS AT THIS FACILITY WILL BE INSTALLED IN PHASES. THE FIRST UNIT (UNIT 1) SHALL BE INSTALLED IN PHASE 1 AND THE SECOND UNIT SHALL BE INSTALLED IN PHASE 2. THE COMMON BOP SYSTEMS SHALL BE DESIGNED FOR BOTH UNITS AND INSTALLED IN PHASE 1.

BUILDING AND EQUIPMENT LIST

| NO | NAME | SIZE (DIMENSIONS IN FEET) | | |
|---|---|---|---|---|
| | | LENGTH | WIDTH | HEIGHT |
| 1 | COMBUSTION TURBINE INLET FILTER | 60 | 27 | 50 |
| 2 | HEAT RECOVERY STEAM GENERATOR | 103 | 44 | 135 |
| 3 | TURBINE BUILDING | 202 | 136 | 80 |
| 4 | ADMINISTRATION/CONTROL BUILDING | 140 | 100 | 25 |
| 5 | SWITCHYARD | 367 | 153 | 25 |
| 6 | AIR-COOLED CONDENSER | 305 | 130 | 110 |
| 7 | FUEL OIL STORAGE TANK | 90ø | – | 48 |
| 8 | WATER TREATMENT BUILDING | 140 | 60 | 30 |
| 9 | FIRE PUMP BUILDING | 50 | 16 | 15 |
| 10 | AUXILIARY BOILER BUILDING | 54 | 45 | 35 |
| 11 | CTG FUEL GAS DEW POINT HEATER | 18 | 9 | 15 |
| 12 | STORM WATER DETENTION POND #1 | – | – | – |
| 13 | AMMONIA STORAGE TANK | 50 | 12 | 15 |
| 14 | WAREHOUSE | 100 | 84 | 25 |
| 15 | FUEL GAS FILTER/SEPARATOR | 24 | 6 | 15 |
| 16 | EMERGENCY DIESEL GENERATOR | 33 | 8 | 15 |
| 17 | GSU TRANSFORMER | 48 | 27 | 15 |
| 18 | PIPE RACK | 313 | 15 | 55 |
| 19 | FIRE/SERVICE WATER TANK | 62ø | – | 30 |
| 20 | DEMINERALIZED WATER STORAGE TANK | 86ø | – | 55 |
| 21 | BOP ELECTRICAL | 80 | 30 | 25 |
| 22 | WASTE WATER TANK | 32.5ø | – | 30 |
| 23 | HRSG LTE RECIRCULATION PUMPS | 10 | 4 | 6 |
| 24 | HYDROGEN TUBE TRAILER | – | – | 15 |
| 25 | NOT USED | – | – | – |
| 26 | OIL STORAGE SHELTER | 30 | 15 | 12 |
| 27 | FEEDWATER PUMP BUILDING | 74 | 49 | 25 |
| 28 | GAS COMPRESSOR BUILDING | 78.5 | 56 | 30 |
| 29 | OIL WATER SEPARATOR | 24 | 5 | – |
| 30 | CCCW HEAT EXCHANGER | 60 | 58 | 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 | 18 | 9 | 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 | 57 | 13 | 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 | – | – | – |
| 50 | STORM WATER DETENTION POND #3 | – | – | – |

AIR EMISSION SOURCES (COMBUSTION SOURCES)

| NO | NAME | UTM COORDINATES | | ELEVATION |
|---|---|---|---|---|
| | | N | E | |
| AE–1 | HRSG EXHAUST STACK 1 | N4,649,602 | E271,730 | 770.00' |
| AE–2 | HRSG EXHAUST STACK 2 (FUTURE) | N4,649,648 | E271,808 | 770.00' |
| AE–3 | DIESEL FIRE WATER PUMP SKID VENT | N4,649,684 | E271,800 | 582.00' |
| AE–4 | AUXILIARY BOILER STACK | N4,649,606 | E271,759 | 620.00' |
| AE–5 | CTG FUEL GAS DEW POINT HEATER STACK | N4,649,546 | E271,680 | 596.00' |
| AE–6 | EMERGENCY DIESEL GENERATOR STACK | N4,649,562 | E271,789 | 586.00' |

1. UTM COORDINATES ARE FOR UTM GRID ZONE 19T. COORDINATES REMAIN UNCHANGED FOR ZONE 19 NORTHERN HEMISPHERE, UTM ZONE 19N DESIGNATION.
2. BASE ELEVATION IS 570 FEET AMSL

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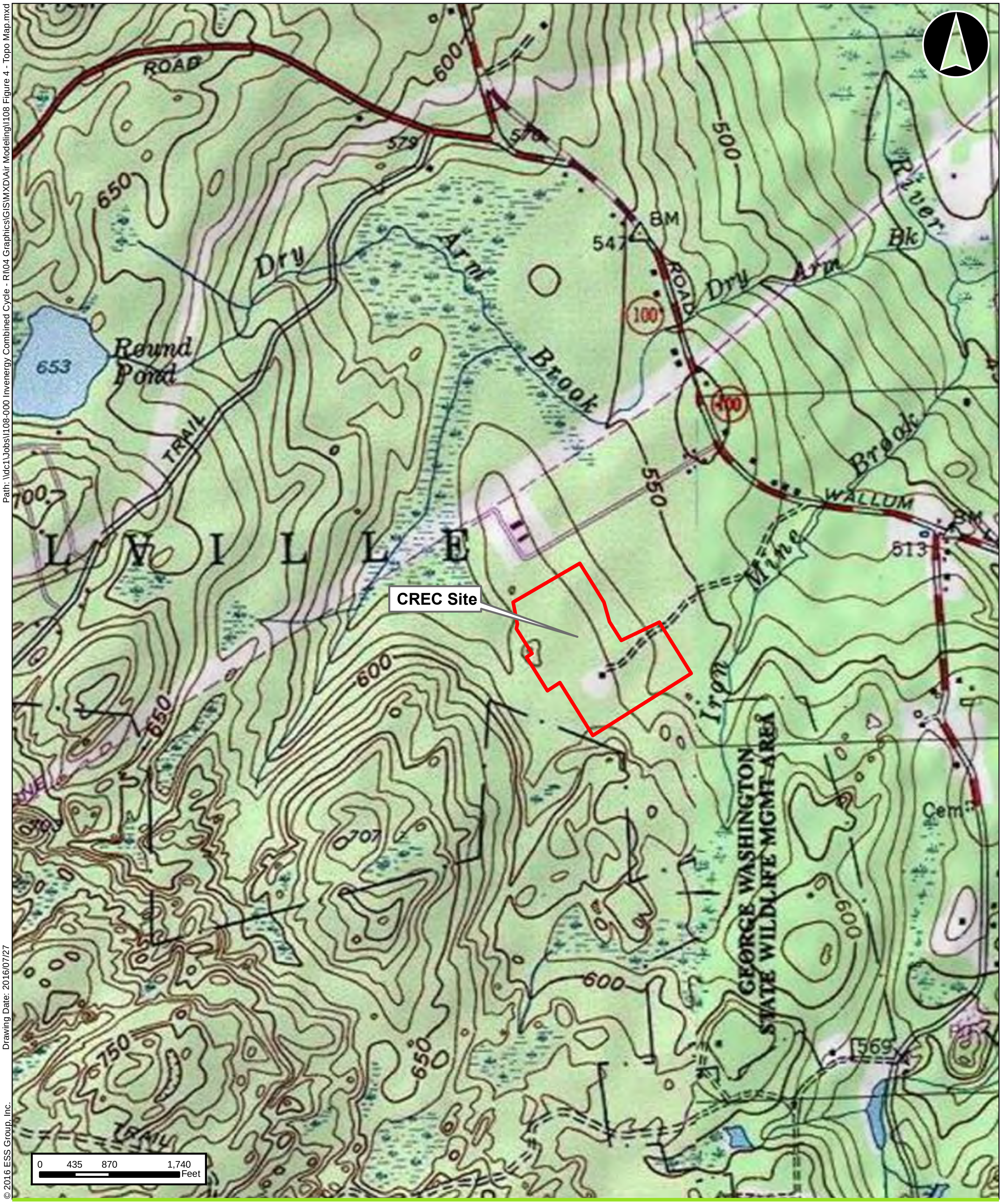
**Clear River Energy Center**
Burrillville, Rhode Island

Source: HDR, inc
Scale: As Shown



**General Arrangement**

**Figure 3**




Path: \\dc1\Jobs\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 4 - Topo Map.mxd

Drawing Date: 2016/07/27



**Invenergy Air Dispersion Modeling Protocol**

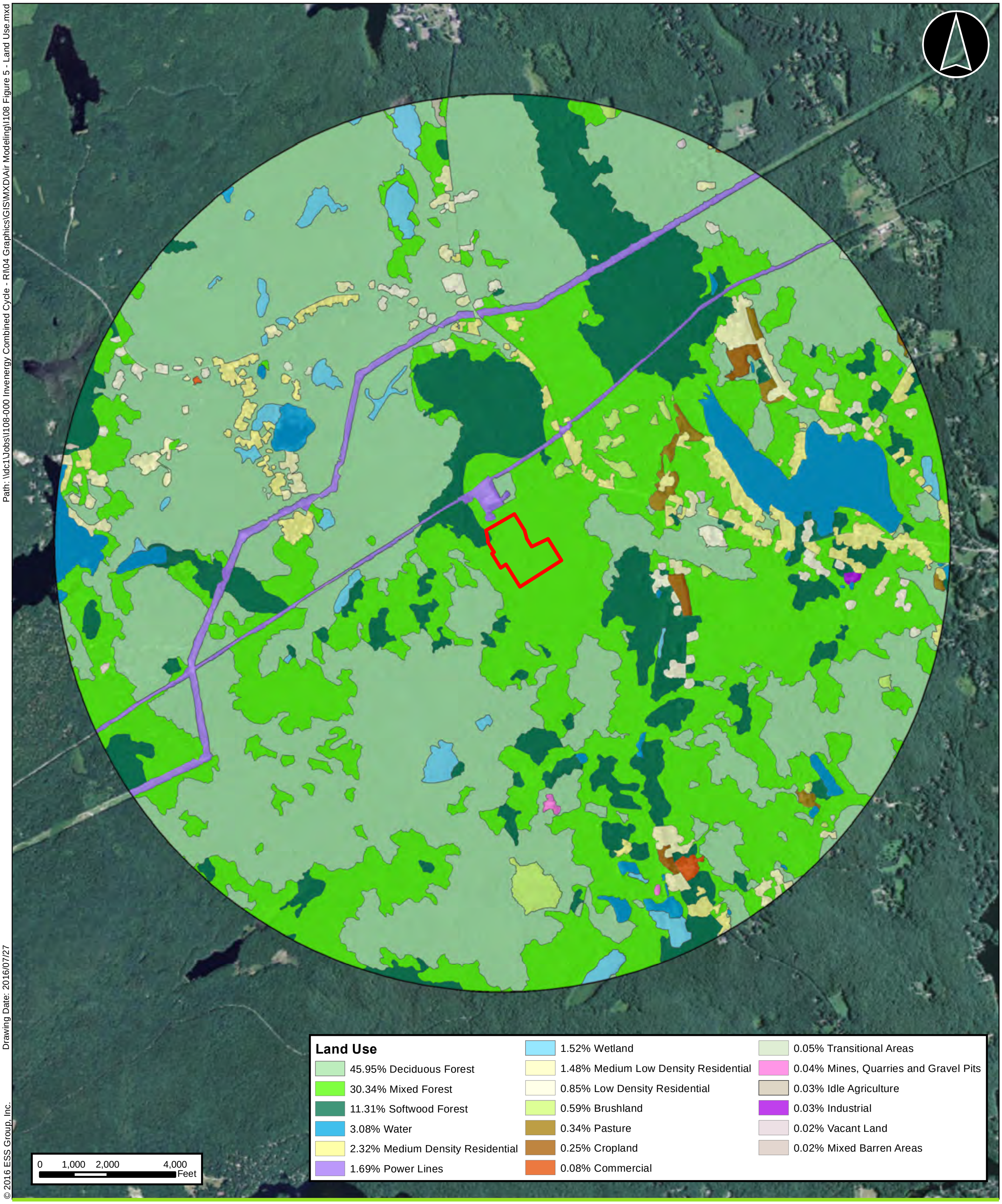
Burrillville, Rhode Island

1 inch = 1,634 feet

Source: 1) USGS, Topo Map, 2016
2) HDR, Site Layout, 2016

**Topographic Map**

**Figure 4**




Path: \\dc1\Jobs\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 5 - Land Use.mxd

Drawing Date: 2016/07/27



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

1 inch = 3,863 feet

Source: 1) RIGIS, Imagery, 2016
2) ESS, Site Location, 2016
3) RIGIS, Land Use, 2011

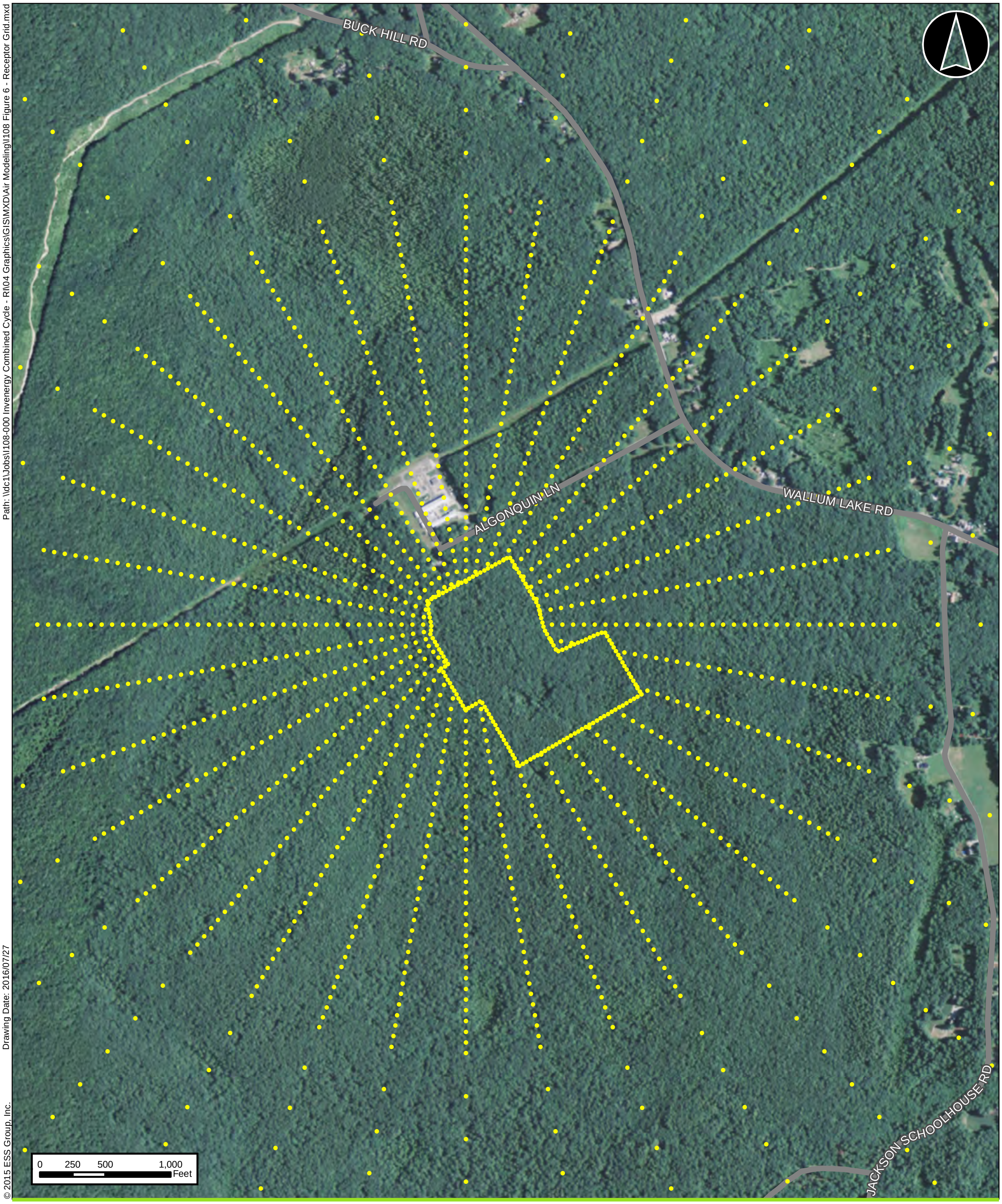
**Surrounding Land Use (3 km)**

**Figure 5**

Path: \\dc1\Jobs\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 6 - Receptor Grid.mxd

Drawing Date: 2016/07/27



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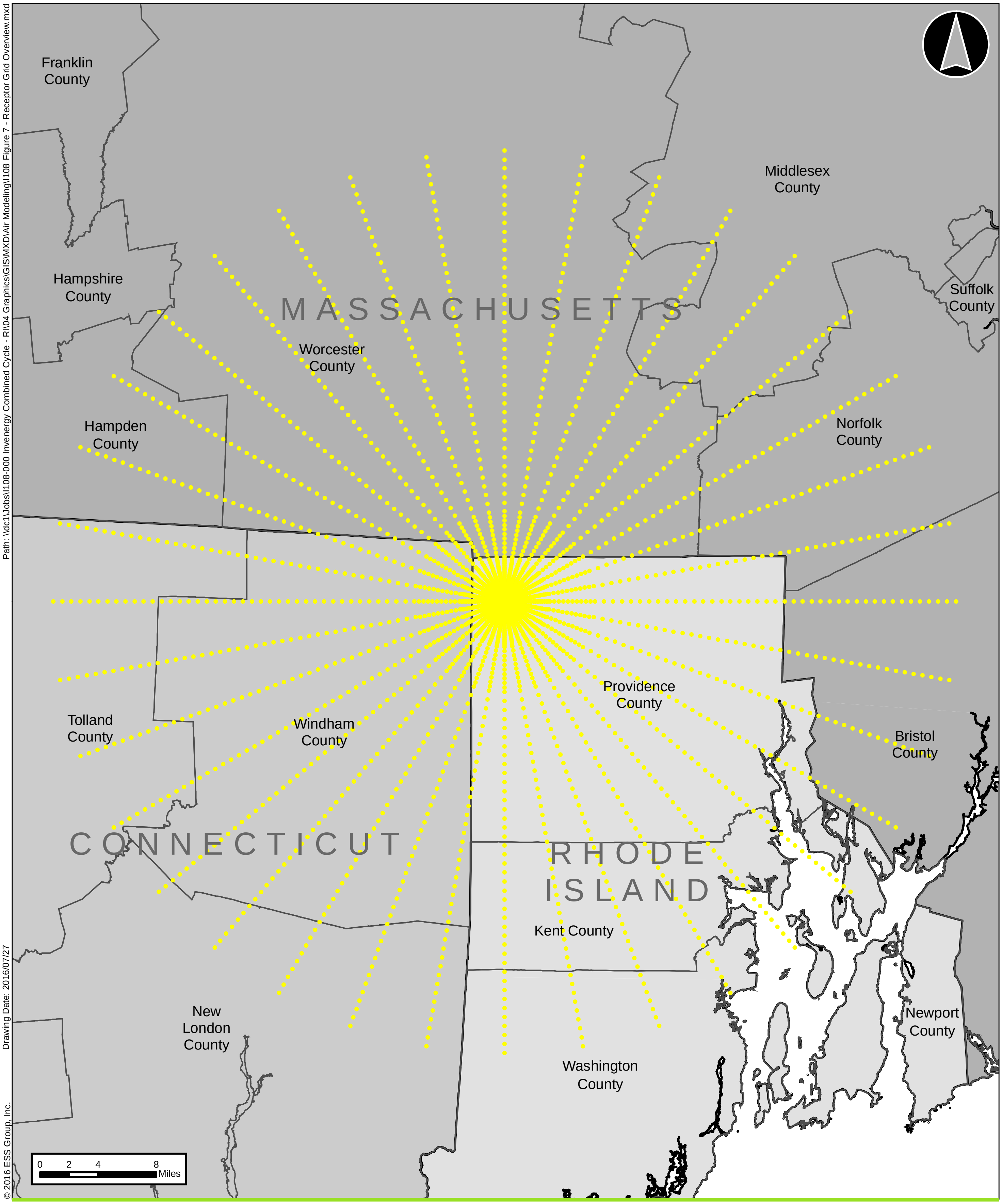
**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 1,000 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) RIGIS, Roads, 2013

**Receptor Grid**

**Figure 6**





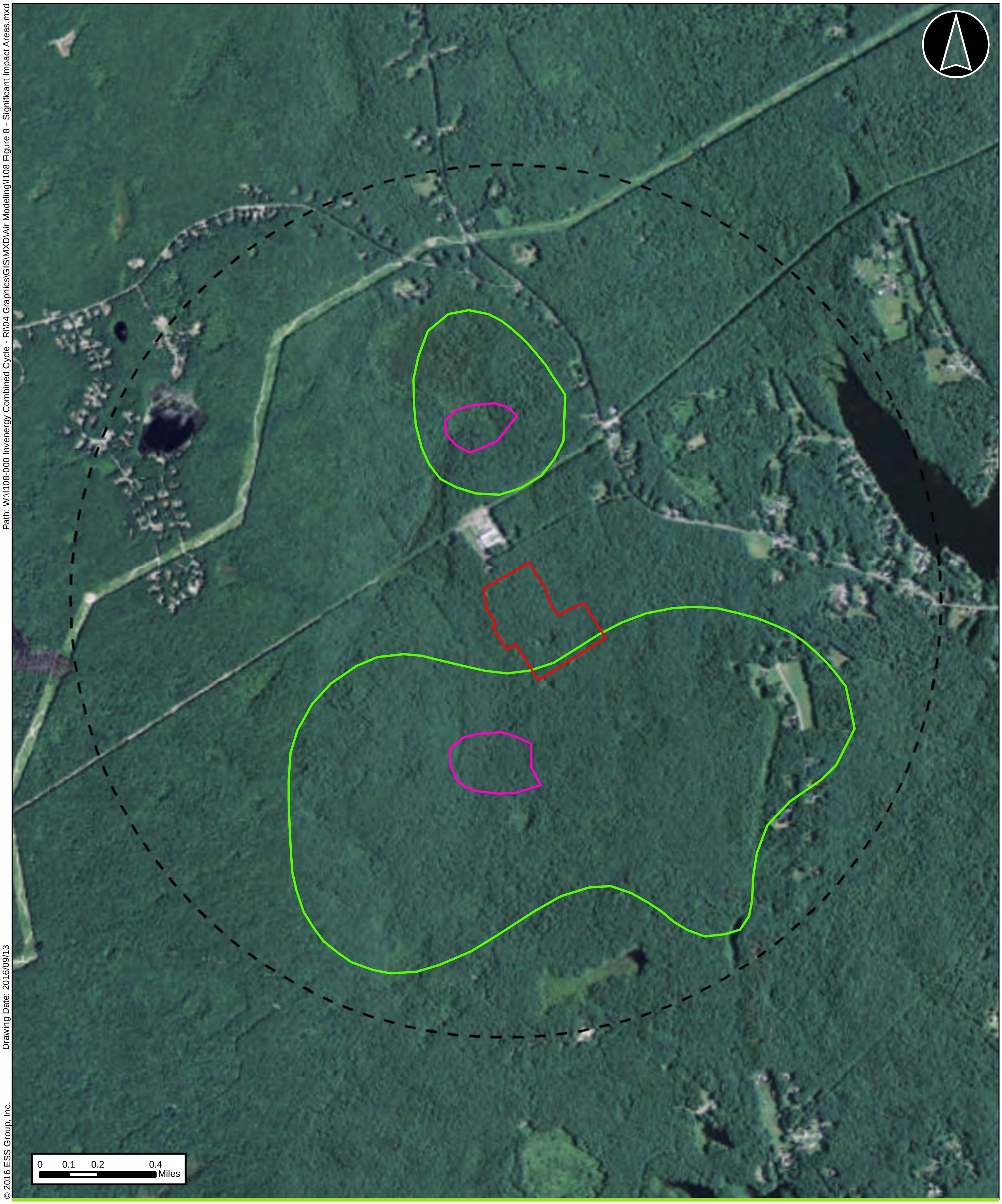

**Clear River Energy Center**
Burrillville, Rhode Island

1 inch = 47,500 feet

Source: 1) ESRI, Boundaries, 2016
2) HDR, Site Layout, 2016
3) RIGIS, Roads, 2013

**Receptor Grid Overview**

**Figure 7**




Path: W:\108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\108 Figure 8 - Significant Impact Areas.mxd

Drawing Date: 2016/09/13



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

1 inch = 2,383 feet

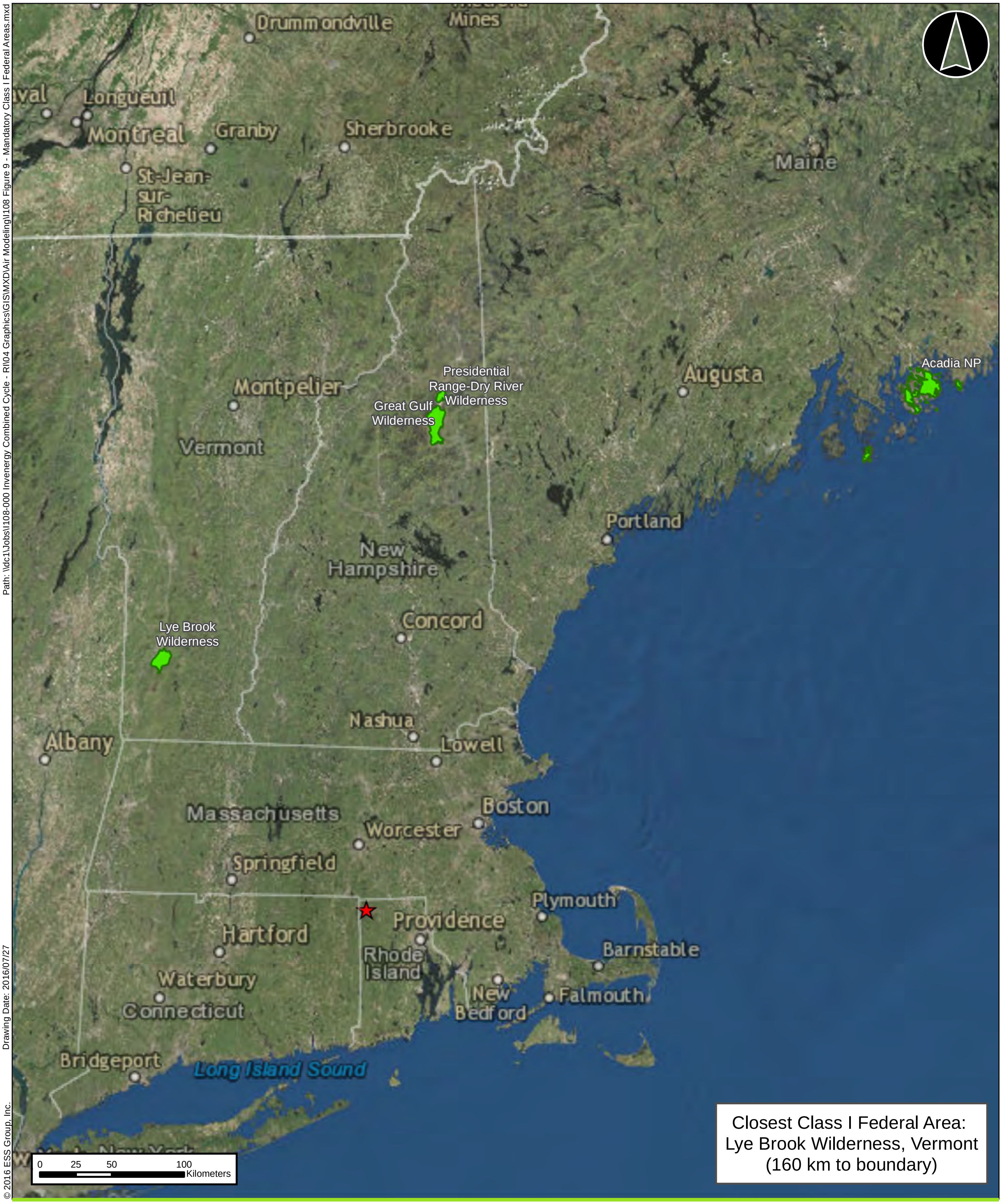
Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Significant Impact Areas, 2016

**Legend**

CREC Fenceline
24-hr PM10 - 5 ugm3
1-hr NO2 - 7.8 ugm3
Significant Impact Area (1.8km)

**Significant Impact Area**

**Figure 8**




Path: \\dc1\Jobs\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 9 - Mandatory Class I Federal Areas.mxd

Drawing Date: 2016/07/27



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**Invenergy Air Dispersion Modeling Protocol**
Burrillville, Rhode Island

**Mandatory Class I Federal Areas**

1 centimeter = 36 kilometers

Source: 1) ESRI, Imagery, 2016
2) ESS, Site Location, 2016
3) National Park Service, Class I Areas, 2016

**Legend**

Site Location
Class I Federal Areas

**Figure 9**

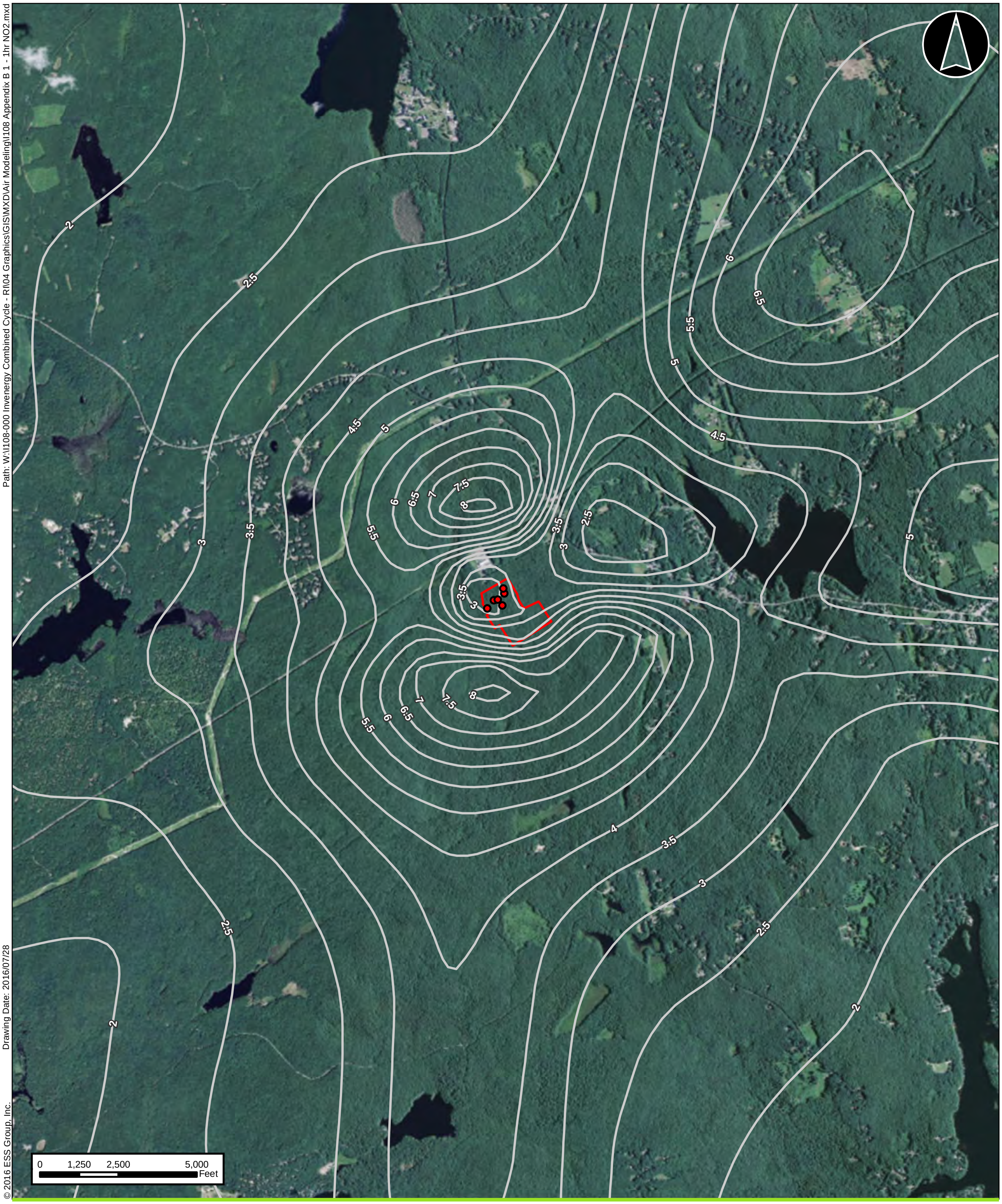
## Attachment 1

## Air Modeling Isopleth Figures

Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Appendix B 1 - 1hr NO2.mxd

Drawing Date: 2016/07/28



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

1 inch = 4,167 feet

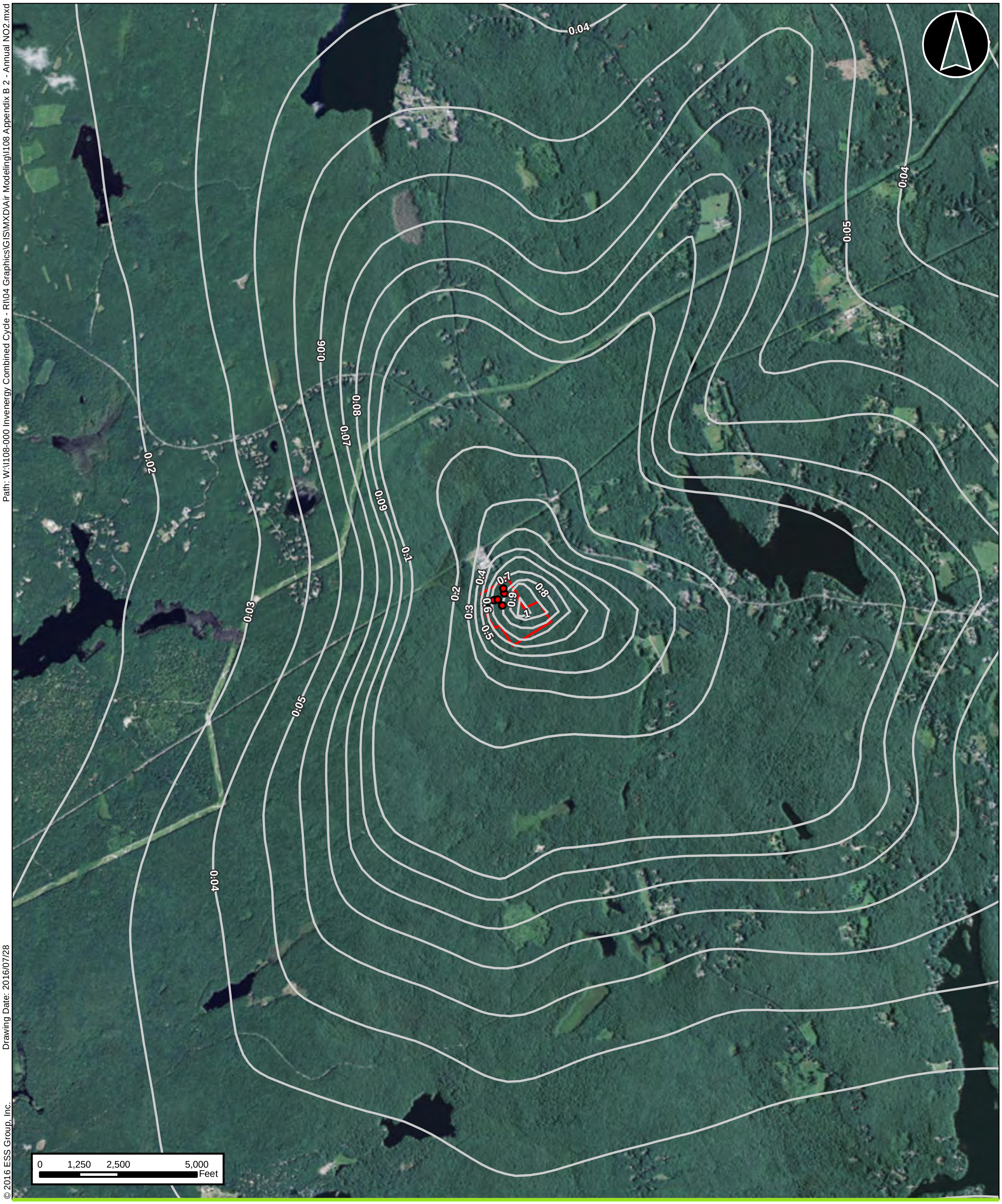
Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**

- Stack Locations
- 1-hour NO2 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**1-Hour NO2**

**Appendix B**
Sheet 1 of 6




Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Appendix B 2 - Annual NO2.mxd

Drawing Date: 2016/07/28



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

1 inch = 4,167 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**

- Stack Locations
- Annual NO2 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**Annual NO2**

**Appendix B**


Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Appendix B 3 - 3hr SO2.mxd

Drawing Date: 2016/07/28



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

1 inch = 4,167 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**
- Stack Locations
- 3-Hour SO2 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**3-Hour SO2**

**Appendix B**
Sheet 3 of 6


Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Appendix B 4 - 24hr PM10.mxd

Drawing Date: 2016/07/28



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

1 inch = 4,167 feet

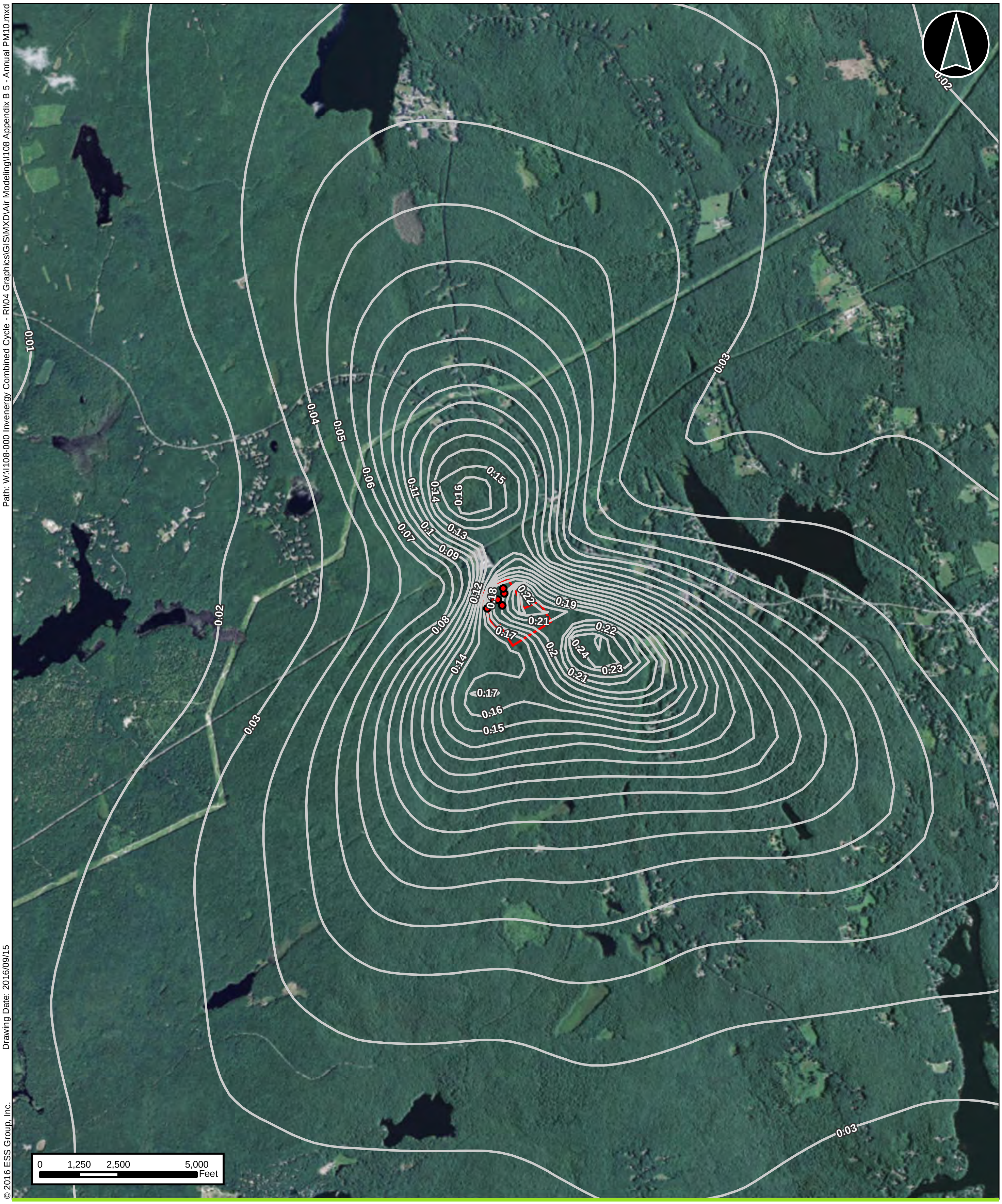
Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**

- Stack Locations
- 24-Hour PM10 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**24-Hour PM10**

**Appendix B**
Sheet 4 of 6

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

1 inch = 4,167 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**
- Stack Locations
- Annual PM10 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**Annual PM10**

**Appendix B**
Sheet 5 of 6


Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Appendix B 6 - 24hr PM25.mxd

Drawing Date: 2016/07/28



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

1 inch = 4,167 feet

Source: 1) ESRI, Imagery, 2016
2) HDR, Site Layout, 2016
3) ESS, Criteria Pollutant Concentrations, 2016

**Legend**

- Stack Locations
- 24-Hour PM2.5 Isopleths
- CREC Fenceline

**Modeling Result Isopleths (ug/m3)**
**24-Hour PM2.5**

**Appendix B**
Sheet 6 of 6

## Attachment 2

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## Revised Health Risk Assessment Tables

Note: Tables 1-3 of the HRA are included above as Tables 1, 3, and 16, respectively

**Table 4**
**Clear River Energy Center - Burrillville, Rhode Island**
**Sensitive Receptors and Most Exposed Individual**

| Name | Category | UTM19M_X | UTM19M_Y | Zone | Town | State | MEI Category |
|---|---|---|---|---|---|---|---|
| Austin T Levy School | School | 278060.1 | 4649649.0 | R12 | Burrillville | RI | - |
| Berean Baptist Church | Place of Worship | 278057.2 | 4649556.5 | R12 | Burrillville | RI | - |
| Big Round Top | Shore Fishing Access | 276305.2 | 4653522.1 | F5 | Burrillville | RI | - |
| Blood Road | Neighborhood | 267799.5 | 4642930.5 | AG-2 | Putnam | CT | - |
| Bowdish Reservoir | Boat Ramp | 271311.0 | 4644975.4 | A-4 | Glocester | RI | - |
| Brandy Hill Road | Neighborhood | 266220.3 | 4647886.5 | R-40 | Thompson | CT | - |
| Buck Hill Road | Neighborhood | 268291.2 | 4651903.6 | F5 | Burrillville | RI | - |
| Buck Hill State Management Area | Park and Recreation Area | 269619.4 | 4651006.4 | OS | Burrillville | RI | - |
| Burlingame Reservoir | Shore Fishing Access | 272556.6 | 4643919.1 | A-4 | Glocester | RI | - |
| Burrillville High School | School | 277695.6 | 4649783.9 | R12 | Burrillville | RI | - |
| Calvary Episcopal Church | Place of Worship | 275695.1 | 4648457.5 | R12 | Burrillville | RI | - |
| Carpenter Cemetery | Cemetery | 265823.6 | 4655229.9 | R-20 | Thompson | CT | - |
| Casimir Pulaski Memorial Recreation Area | Park and Recreation Area | 270595.9 | 4645814.7 | OS | Burrillville | RI | - |
| Chocolog Farm | Farm | 278723.0 | 4656558.2 | AGR | Uxbridge | MA | - |
| Clarkville Pond | Boat Ramp | 268838.4 | 4645155.1 | A-4 | Glocester | RI | - |
| Community Christian School | School | 275819.0 | 4648731.4 | R12 | Burrillville | RI | - |
| Country Smith Farm | Farm | 278580.6 | 4650682.8 | F2 | Burrillville | RI | - |
| Country View Farm | Farm | 284501.2 | 4646128.9 | F5 | Burrillville | RI | - |
| Crystal Lake Golf Club | Golf Course | 279389.9 | 4647214.4 | GI | Burrillville | RI | - |
| Dike Cemetery | Cemetery | 264927.9 | 4650442.5 | R-40 | Thompson | CT | - |
| E Wallum Lake Road | Neighborhood | 273341.3 | 4650927.7 | F5 | Burrillville | RI | - |
| East Thompson Road | Neighborhood | 267321.8 | 4654507.1 | RA-80 | Thompson | CT | - |
| East Wallum Lake Road | Neighborhood | 272984.3 | 4653101.1 | F5 | Burrillville | RI | - |
| Eleanor Slater Hospital Zambarano Unit | Hospital | 271306.6 | 4653167.3 | F5 | Burrillville | RI | - |
| Father Holland Catholic Regional Elementary School | School | 275845.9 | 4648854.1 | R12 | Burrillville | RI | - |
| First Universalist Church of Burrillville | Place of Worship | 278083.1 | 4649648.3 | R12 | Burrillville | RI | - |
| Flynns Beach | Beach | 279569.5 | 4651106.6 | R20 | Burrillville | RI | - |
| Fort Hill Farm | Farm | 264405.4 | 4648136.3 | R-40 | Thompson | CT | - |
| Grove Lane | Neighborhood | 276166.3 | 4650253.5 | R12 | Burrillville | RI | - |
| Harrisville | Small Boat Launch | 278038.8 | 4650011.6 | F2 | Burrillville | RI | - |
| Harrisville Preschool | School | 278081.2 | 4649526.3 | R12 | Burrillville | RI | - |
| Hickory Hill Farm | Farm | 274666.2 | 4653243.2 | F5 | Burrillville | RI | - |
| High Street | Neighborhood | 267835.0 | 4656443.5 | RA | Douglas | MA | - |
| Highland Drive | Neighborhood | 275407.6 | 4647768.1 | R20 | Burrillville | RI | - |
| Hill Road | Neighborhood | 275717.5 | 4651617.1 | F5 | Burrillville | RI | - |
| Indian Inn Road | Neighborhood | 265440.3 | 4656275.6 | R-20 | Thompson | CT | - |
| J. Angell Farm | Farm | 276360.8 | 4648040.3 | F2 | Burrillville | RI | Meat and Dairy Ingestion |
| Jackson Schoolhouse Road | Neighborhood | 272755.9 | 4649276.0 | F5 | Burrillville | RI | Inhalation, Dermal, Mother's Milk |
| Jackson Schoolhouse Road | Neighborhood | 272757.2 | 4647512.2 | F5 | Burrillville | RI | - |
| Jackson Schoolhouse Road | Neighborhood | 274696.6 | 4645094.4 | A-4 | Glocester | RI | - |
| James Street | Neighborhood | 274963.3 | 4647303.4 | R20 | Burrillville | RI | - |
| Jesse M Smith Memorial Library | Library | 278218.6 | 4649410.8 | R12 | Burrillville | RI | - |
| Lake Washington | Boat Ramp | 271254.2 | 4644274.4 | A-4 | Glocester | RI | - |
| Lee Circle | Neighborhood | 268944.5 | 4650217.4 | F5 | Burrillville | RI | - |
| Little Barn Farm | Farm | 280668.6 | 4646093.8 | F5 | Burrillville | RI | - |
| Little Round Top | Shore Fishing Access | 276665.6 | 4653516.6 | F5 | Burrillville | RI | - |
| MA/CT/RI Tri-state Marker | Survey Point | 268191.8 | 4654463.9 | RA-80 | Thompson | CT | - |
| Manley Drive | Neighborhood | 273190.2 | 4650065.0 | F5 | Burrillville | RI | - |
| Mapleville Farm | Farm | 279880.3 | 4647021.3 | GC | Burrillville | RI | - |
| Mill Pond | Small Boat Launch | 278371.3 | 4649449.0 | R12 | Burrillville | RI | - |
| Morning Beckons Farm | Farm | 279109.7 | 4655321.1 | AGR | Uxbridge | MA | - |
| Mowry Pond | Shore Fishing Access | 268441.3 | 4642093.0 | A-4 | Glocester | RI | - |
| Mowry Street | Neighborhood | 277363.0 | 4647964.3 | F2 | Burrillville | RI | - |
| Munyan Cemetery | Cemetery | 265813.2 | 4645843.2 | AG-2 | Putnam | RI | - |
| My Blue Heaven Farm | Farm | 277140.9 | 4647491.7 | F2 | Burrillville | RI | - |
| New Hope Baptist Church | Place of Worship | 275986.6 | 4648201.3 | R20 | Burrillville | RI | - |
| Olney Keach Road | Neighborhood | 272617.8 | 4645446.7 | A-4 | Glocester | RI | - |
| Pascoag Community Baptist Church | Place of Worship | 275524.6 | 4648895.1 | R12 | Burrillville | RI | - |
| Pascoag Public Library | Library | 275697.0 | 4648519.2 | R12 | Burrillville | RI | - |
| Pascoag Reservoir Fishing Access | Boat Ramp | 274650.9 | 4645283.7 | A-4 | Glocester | RI | - |
| Peck Pond | Shore Fishing Access | 268155.6 | 4646105.7 | OS | Burrillville | RI | - |
| Pine Harbor School | School | 271757.5 | 4654295.2 | F5 | Burrillville | RI | - |
| Pine Harbor School | School | 271757.5 | 4654295.2 | F5 | Burrillville | RI | - |
| Putnam Pike | Neighborhood | 276844.1 | 4644380.3 | A-4 | Glocester | RI | - |
| Quaddick State Park | Park and Recreation Area | 266931.9 | 4648638.1 | R-40 | Thompson | CT | - |
| Quaddick Town Farm Road | Neighborhood | 267404.2 | 4650974.0 | RA-80 | Thompson | CT | - |
| Quaddick Town Farm Road | Neighborhood | 267620.9 | 4652333.4 | RA-80 | Thompson | CT | - |
| Quaddick Town Farm Road | Neighborhood | 267605.1 | 4653209.2 | RA-80 | Thompson | CT | - |
| Quaddick Town Farm Road | Neighborhood | 266292.4 | 4647847.1 | R-40 | Thompson | CT | - |
| Quaddick Town Farm Road | Neighborhood | 266185.1 | 4646818.1 | R-40 | Thompson | CT | - |
| Raceway Golf Club | Golf Course | 265868.4 | 4651871.8 | R-40 | Thompson | CT | - |
| Regina Ave | Neighborhood | 266496.1 | 4656491.9 | SFR | Webster | MA | - |
| Sherman Farm Road | Neighborhood | 277739.8 | 4652148.9 | F5 | Burrillville | RI | - |
| Shore Road | Neighborhood | 271225.7 | 4655100.6 | RA | Douglas | MA | - |
| South Atlantic Avenue | Neighborhood | 269561.1 | 4645020.5 | A-4 | Glocester | RI | - |
| South Douglas Cemetery | Cemetery | 275105.6 | 4655299.7 | RA | Douglas | RI | - |
| South Main Street | Neighborhood | 277600.3 | 4646384.6 | GI | Burrillville | RI | - |
| South Street | Neighborhood | 275049.9 | 4654816.0 | RA | Douglas | MA | - |
| Sprague Hill Road | Neighborhood | 274048.6 | 4644424.7 | A-4 | Glocester | RI | - |
| Spring Lake | Boat Ramp | 279200.3 | 4650879.8 | R20 | Burrillville | RI | - |
| Spring Lake Beach | Beach | 279706.2 | 4651873.2 | R20 | Burrillville | RI | - |
| Starr Road | Neighborhood | 267793.0 | 4653708.7 | RA-80 | Thompson | CT | - |
| Steere Farm Elementary School | School | 278257.5 | 4646408.6 | R40 | Burrillville | RI | - |
| Stonehenge Farm | Farm | 274207.9 | 4647116.6 | F5 | Burrillville | RI | Crop Ingestion |
| Thompson Road | Neighborhood | 262815.1 | 4649276.9 | TC-80 | Thompson | CT | - |
| Town Farm Road | Neighborhood | 274346.3 | 4651611.4 | F5 | Burrillville | RI | - |
| Town Farm Road | Neighborhood | 273831.4 | 4652603.6 | F5 | Burrillville | RI | - |
| Twin Brook Farm | Farm | 261427.2 | 4645250.3 | R-40 | Thompson | CT | - |
| Union Pond | Boat Ramp | 275883.9 | 4647964.6 | R20 | Burrillville | RI | - |
| Wakefield Pond | Boat Ramp | 268929.1 | 4649786.4 | F5 | Burrillville | RI | - |
| Wallum Lake | Small Boat Launch | 271268.4 | 4653555.4 | F5 | Burrillville | RI | - |
| Wallum Lake Reservoir | Reservoir | 270790.3 | 4654399.2 | Water | Burrillville | RI | Drinking Water |
| Wallum Lake Road | Neighborhood | 272860.4 | 4649912.0 | F5 | Burrillville | RI | - |
| Wallum Lake Road | Neighborhood | 271437.9 | 4651921.1 | F5 | Burrillville | RI | - |
| Wallum Lake Road | Neighborhood | 273444.6 | 4649629.9 | R20 | Burrillville | RI | - |
| Wallum Lake Road | Neighborhood | 272232.5 | 4650179.8 | F5 | Burrillville | RI | - |
| Walnut Street | Neighborhood | 273551.7 | 4656866.6 | RA | Douglas | MA | - |
| West Glocester Elementary School | School | 269606.8 | 4643760.5 | A-4 | Glocester | RI | - |
| White Mill Park | Shore Fishing Access | 275037.5 | 4649455.7 | R20 | Burrillville | RI | Fish Ingestion |
| William L Callahan School | School | 277683.8 | 4649816.6 | R12 | Burrillville | RI | - |
| Wilson Reservoir | Boat Ramp | 274347.9 | 4650033.3 | R20 | Burrillville | RI | - |
| Wilson Trail | Neighborhood | 270417.1 | 4649726.2 | F5 | Burrillville | RI | - |
| YWCA Beach | Beach | 278891.7 | 4651344.1 | OS | Burrillville | RI | - |

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

| Pollutant | Cancer Risk |
|---|---|
| 1,3-Butadiene | 9.29E-10 |
| Acetaldehyde | 1.35E-09 |
| Acrolein | 0.00E+00 |
| NH3 | 0.00E+00 |
| Arsenic | 1.25E-07 |
| Barium | 0.00E+00 |
| Benzene | 1.09E-08 |
| Beryllium | 2.69E-10 |
| Cadmium | 4.40E-08 |
| Chromium | 0.00E+00 |
| Cobalt | 0.00E+00 |
| Copper | 0.00E+00 |
| Ethyl Benzene | 9.06E-10 |
| Formaldehyde | 1.54E-07 |
| Hexane | 0.00E+00 |
| Lead | 1.29E-09 |
| Manganese | 0.00E+00 |
| Mercury | 0.00E+00 |
| Naphthalene | 1.98E-09 |
| Nickel | 5.10E-09 |
| 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** | **3.46E-07** |

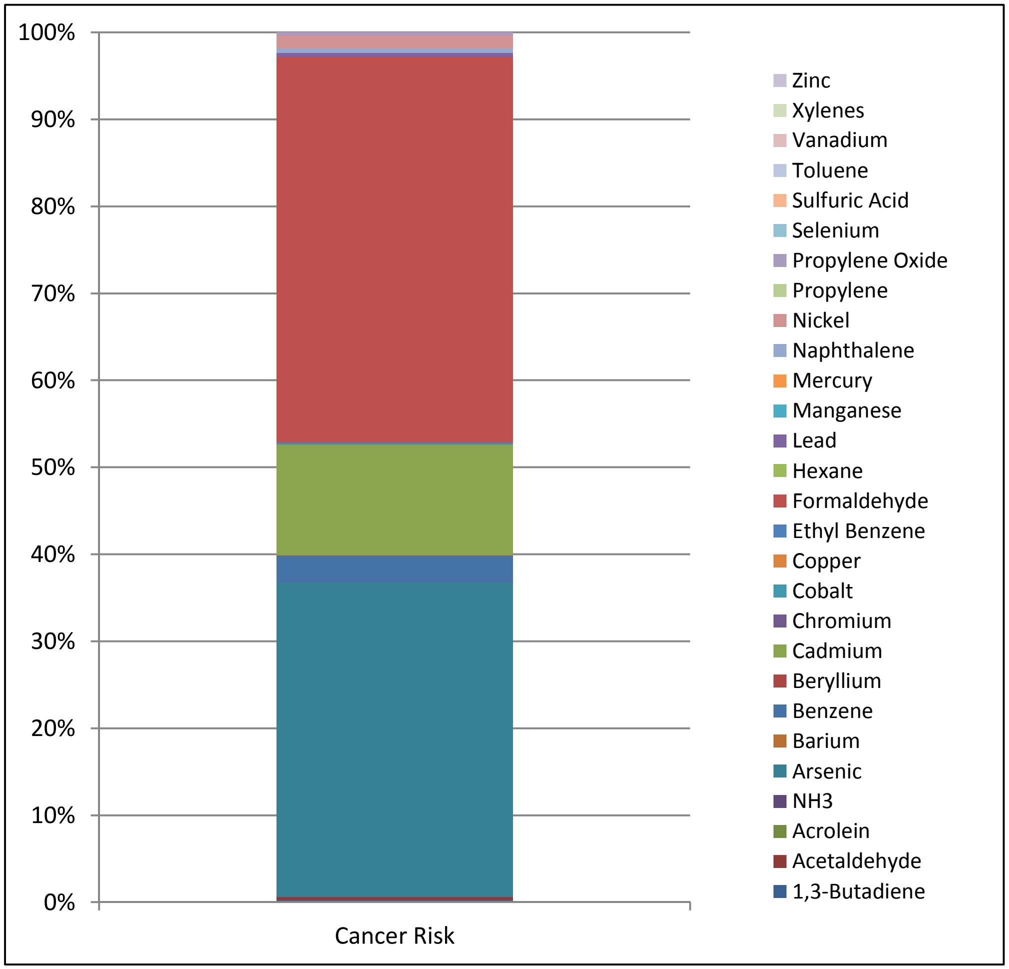


**Table 6**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pathway Contribution to Total Cancer Risk- All Pollutants**

| Pathway | Cancer Risk |
|---|---|
| Inhalation | 2.24E-07 |
| Soil Ingestion | 7.27E-08 |
| Dermal Exposure | 2.94E-09 |
| Mother's Milk | 1.81E-11 |
| Drinking Water | 6.27E-15 |
| Fish Ingestion | 5.79E-16 |
| Crop Ingestion | 4.64E-08 |
| Beef Ingestion | 5.58E-11 |
| Dairy Ingestion | 1.01E-11 |
| Pig Ingestion | 1.41E-11 |
| Chicken Ingestion | 4.46E-13 |
| Egg Ingestion | 1.65E-12 |
| **Total** | **3.46E-07** |

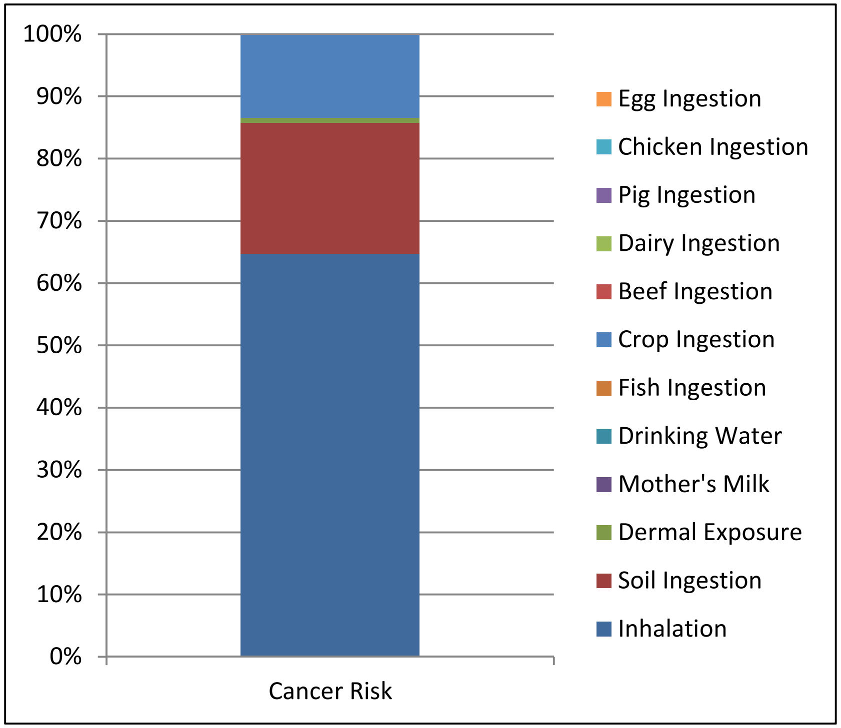


**Table 7**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant and Pathway Contributions to Cancer Risk**

| 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 | 9.29E-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 | 9.29E-10 |
| Acetaldehyde | 1.35E-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 | 1.35E-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 | 3.89E-09 | 7.17E-08 | 2.92E-09 | 0.00E+00 | 6.19E-15 | 5.71E-16 | 4.62E-08 | 5.57E-11 | 9.94E-12 | 1.41E-11 | 4.19E-13 | 1.65E-12 | 1.25E-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 | 1.09E-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 | 1.09E-08 |
| Beryllium | 2.69E-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 | 2.69E-10 |
| Cadmium | 4.40E-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 | 4.40E-08 |
| 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 | 9.06E-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 | 9.06E-10 |
| Formaldehyde | 1.54E-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 | 1.54E-07 |
| 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 | 3.40E-11 | 1.01E-09 | 2.07E-11 | 1.81E-11 | 8.76E-17 | 8.08E-18 | 2.04E-10 | 1.16E-13 | 1.66E-13 | 6.91E-15 | 2.76E-14 | 4.66E-15 | 1.29E-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 | 1.98E-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 | 1.98E-09 |
| Nickel | 5.10E-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 | 5.10E-09 |
| 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** | **2.24E-07** | **7.27E-08** | **2.94E-09** | **1.81E-11** | **6.27E-15** | **5.79E-16** | **4.64E-08** | **5.58E-11** | **1.01E-11** | **1.41E-11** | **4.46E-13** | **1.65E-12** | **3.46E-07** |

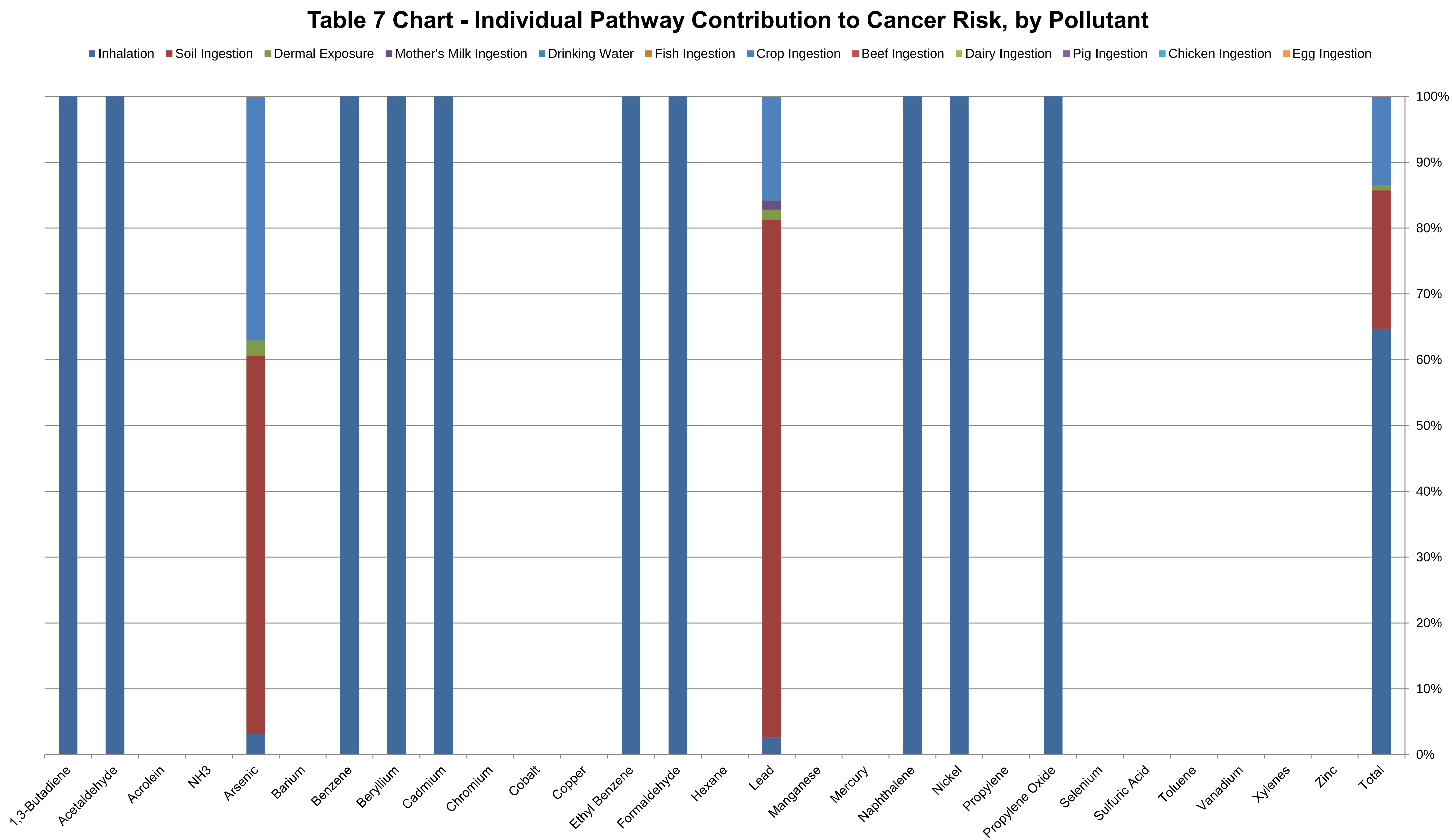


Table 7 Chart - Individual Pathway Contribution to Cancer Risk, by Pollutant
Inhalation
Soil Ingestion
Dermal Exposure
Mother's Milk Ingestion
Drinking Water
Fish Ingestion
Crop Ingestion
Beef Ingestion
Dairy Ingestion
Pig Ingestion
Chicken Ingestion
Egg Ingestion
100%
90%
80%
70%
60%
50%
40%
30%
20%
10%
0%
1,3-Butadiene
Acetaldehyde
Acrolein
NH3
Arsenic
Barium
Benzene
Beryllium
Cadmium
Chromium
Cobalt
Copper
Ethyl Benzene
Formaldehyde
Hexane
Lead
Manganese
Mercury
Naphthalene
Nickel
Propylene
Propylene Oxide
Selenium
Sulfuric Acid
Toluene
Vanadium
Xylenes
Zinc
Total

**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 | 9.63E-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 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.20E-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 | 7.77E-05 | 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 | 6.11E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 9.65E-03 | 9.65E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.65E-03 | 9.65E-03 | 9.65E-03 | 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 | 4.50E-05 | 0.00E+00 | 0.00E+00 |
| Beryllium | 0.00E+00 | 0.00E+00 | 5.70E-06 | 0.00E+00 | 6.02E-07 | 0.00E+00 | 5.70E-06 | 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 | 6.28E-04 | 0.00E+00 | 0.00E+00 | 1.83E-04 | 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 | 6.48E-08 | 6.48E-08 | 6.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-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 | 1.01E-03 | 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 | 7.67E-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 | 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 | 1.40E-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 | 2.34E-04 | 0.00E+00 | 2.34E-04 | 0.00E+00 | 2.34E-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 | 2.28E-06 | 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 | 2.32E-05 | 4.98E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.98E-04 | 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 | 1.35E-07 | 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 | 1.99E-06 | 1.99E-06 | 0.00E+00 | 0.00E+00 | 1.99E-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 |
| Sulfuric Acid | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.91E-02 | 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 | 1.88E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.88E-06 | 1.88E-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 | 4.01E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.01E-07 | 0.00E+00 | 4.01E-07 | 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** | **9.65E-03** | **9.90E-03** | **5.70E-06** | **8.62E-04** | **2.66E-06** | **9.91E-03** | **6.11E-02** | **9.65E-03** | **4.01E-07** | **0.00E+00** | **6.48E-08** | **5.43E-04** | **0.00E+00** | **0.00E+00** |

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

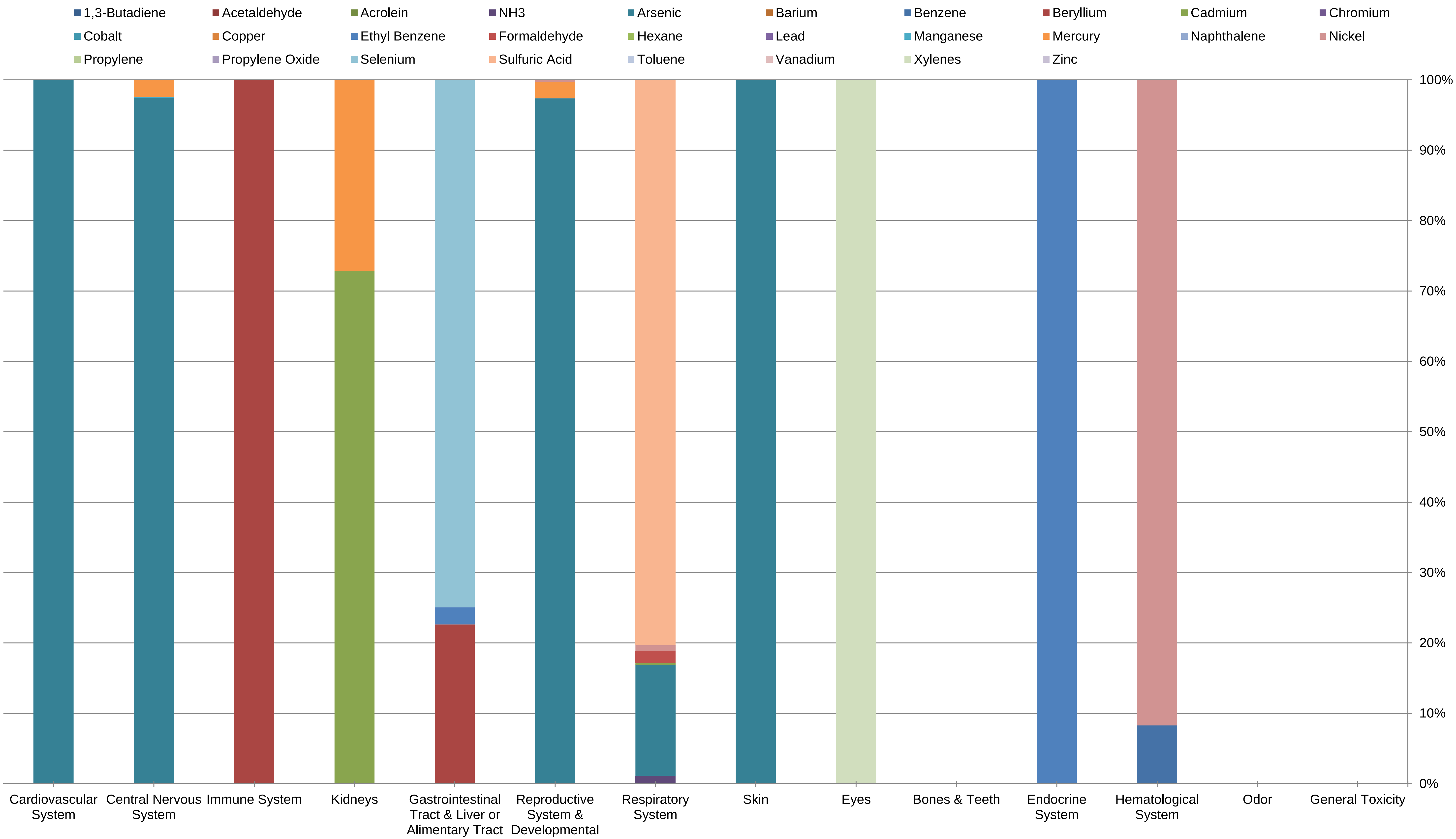


**Table 9**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to Acute Hazard Quotient, by Target Health Effect**

| 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 | 8.02E-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 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-05 | 0.00E+00 | 1.04E-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 | 3.15E-04 | 0.00E+00 | 3.15E-04 | 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 | 1.16E-03 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Arsenic | 2.84E-03 | 2.84E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.84E-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 | 2.57E-04 | 0.00E+00 | 0.00E+00 | 2.57E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.57E-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 | 2.41E-05 | 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 | 7.80E-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 | 1.23E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-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 | 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 | 2.98E-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 | 1.15E-06 | 1.15E-06 | 0.00E+00 | 1.15E-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 | 1.24E-02 | 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 | 6.00E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.00E-07 | 6.00E-07 | 0.00E+00 | 6.00E-07 | 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 | 2.17E-04 | 0.00E+00 | 2.17E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| Xylenes | 0.00E+00 | 3.58E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.58E-07 | 0.00E+00 | 3.58E-07 | 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** | **2.84E-03** | **4.07E-03** | **3.01E-02** | **0.00E+00** | **0.00E+00** | **4.33E-03** | **1.41E-02** | **0.00E+00** | **9.50E-03** | **0.00E+00** | **0.00E+00** | **2.57E-04** | **0.00E+00** | **0.00E+00** |

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

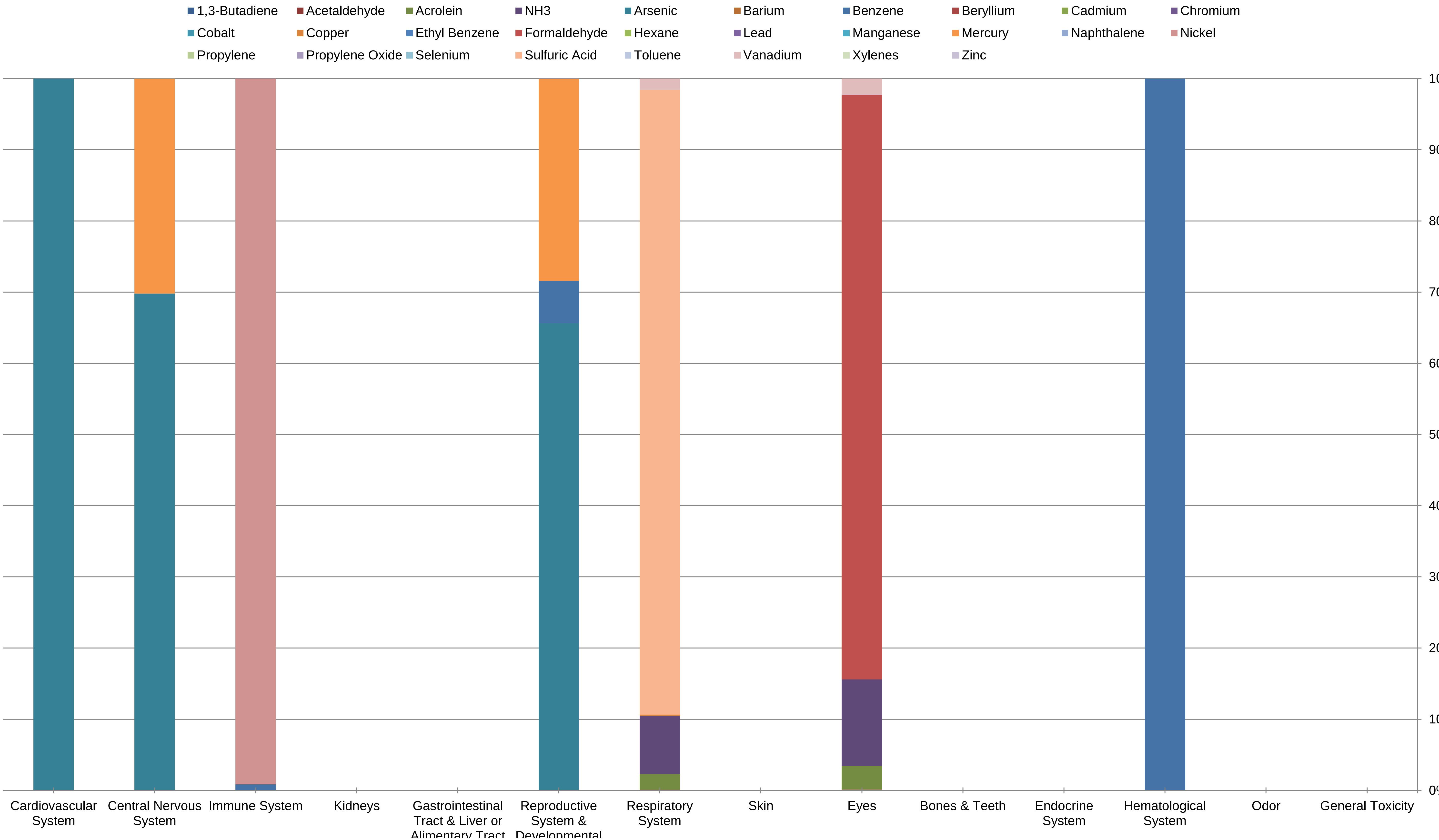
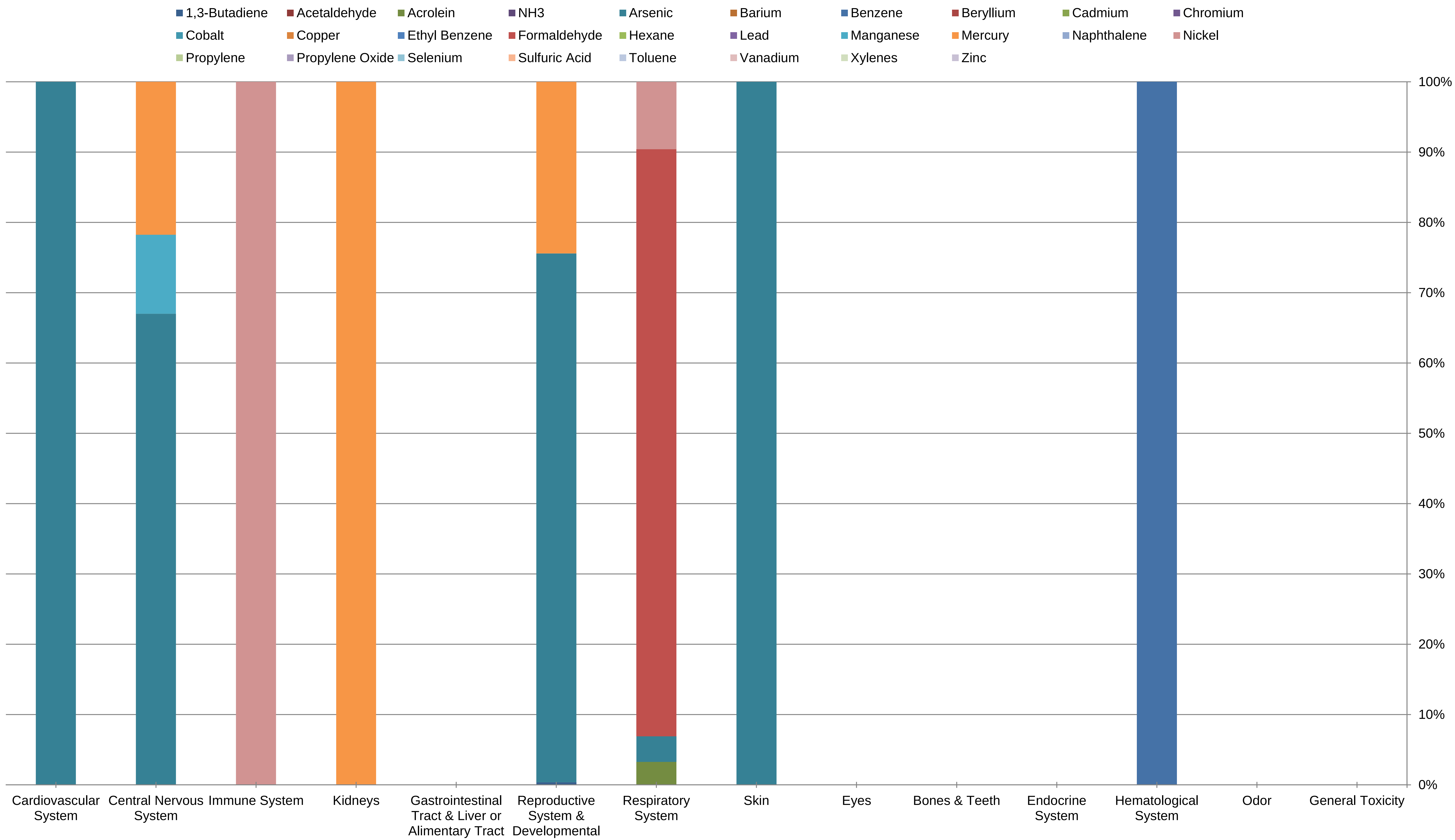


**Table 10**
**Clear River Energy Center - Burrillville, Rhode Island**
**Individual Pollutant Contribution to 8-Hour Chronic Hazard Quotient, by Target Health Effect**

| 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 | 2.14E-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 |
| Acetaldehyde | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.60E-07 | 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 | 3.89E-05 | 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 | 4.43E-05 | 4.43E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.43E-05 | 4.43E-05 | 4.43E-05 | 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 | 4.50E-05 | 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 | 1.01E-03 | 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 | 7.42E-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 |
| Mercury | 0.00E+00 | 1.44E-05 | 0.00E+00 | 1.44E-05 | 0.00E+00 | 1.44E-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 | 1.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-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** | **4.43E-05** | **6.61E-05** | **1.16E-04** | **1.44E-05** | **0.00E+00** | **5.89E-05** | **1.21E-03** | **4.43E-05** | **0.00E+00** | **0.00E+00** | **0.00E+00** | **4.50E-05** | **0.00E+00** | **0.00E+00** |

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



*HARP - HRACalc v16088 9/8/2016 12:58:47 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 | 37 | 28 | 106990 | 1,3-Butadiene | 1.93E-06 | 9.29E-10 | 30YrCancerDerived | * | 9.29E-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 | | 4.06E-07 | 3.98E-07 | 2.55E-07 |
| 2 | 37 | 28 | 75070 | Acetaldehyde | 0.00016801 | 1.35E-09 | 30YrCancerDerived | * | 1.35E-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 | | 3.62E-05 | 2.55E-05 | 2.15E-05 |
| 3 | 37 | 28 | 107028 | Acrolein | 2.72E-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 | | | 5.81E-06 | 4.10E-06 | 3.44E-06 |
| 4 | 37 | 28 | 7664417 | NH3 | 0.1222 | 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 | | | 2.69E-02 | 1.61E-02 | 1.57E-02 |
| 5 | 37 | 95 | 7440382 | Arsenic | 6.64E-07 | 1.25E-07 | 30YrCancerDerived | * | 3.89E-09 | 7.17E-08 | 2.92E-09 | 0.00E+00 | 6.19E-15 | 5.71E-16 | 4.62E-08 | 5.57E-11 | 9.94E-12 | 1.41E-11 | 4.19E-13 | 1.65E-12 | SOIL | CROP | 9.29E-08 | 1.82E-07 | 5.52E-08 |
| 6 | 37 | 95 | 7440393 | Barium | 1.46E-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 | | | 2.04E-06 | 4.00E-06 | 1.22E-06 |
| 7 | 37 | 95 | 71432 | Benzene | 0.00013501 | 1.09E-08 | 30YrCancerDerived | * | 1.09E-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 | | 1.70E-05 | 3.98E-05 | 1.04E-05 |
| 8 | 37 | 95 | 7440417 | Beryllium | 3.99E-08 | 2.69E-10 | 30YrCancerDerived | * | 2.69E-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 | | 5.58E-09 | 1.09E-08 | 3.32E-09 |
| 9 | 37 | 95 | 7440439 | Cadmium | 3.65E-06 | 4.40E-08 | 30YrCancerDerived | * | 4.40E-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 | | 5.11E-07 | 1.00E-06 | 3.04E-07 |
| 10 | 37 | 95 | 7440473 | Chromium | 4.64E-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 | | | 6.49E-07 | 1.27E-06 | 3.86E-07 |
| 11 | 37 | 95 | 7440484 | Cobalt | 2.79E-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 | | | 3.89E-08 | 7.62E-08 | 2.32E-08 |
| 12 | 37 | 95 | 7440508 | Copper | 2.83E-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 | | | 3.96E-07 | 7.75E-07 | 2.35E-07 |
| 13 | 37 | 28 | 100414 | Ethyl Benzene | 0.00012956 | 9.06E-10 | 30YrCancerDerived | * | 9.06E-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 | | 2.85E-05 | 1.70E-05 | 1.66E-05 |
| 14 | 37 | 95 | 50000 | Formaldehyde | 0.0090956 | 1.54E-07 | 30YrCancerDerived | * | 1.54E-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 | | 1.98E-03 | 1.24E-03 | 1.15E-03 |
| 15 | 95 | 95 | 110543 | Hexane | 0.0053655 | 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 | | | 6.49E-04 | 1.35E-03 | 2.17E-04 |
| 16 | 37 | 95 | 7439921 | Lead | 1.66E-06 | 1.29E-09 | 30YrCancerDerived | * | 3.40E-11 | 1.01E-09 | 2.07E-11 | 1.81E-11 | 8.76E-17 | 8.08E-18 | 2.04E-10 | 1.16E-13 | 1.66E-13 | 6.91E-15 | 2.76E-14 | 4.66E-15 | SOIL | CROP | 2.32E-07 | 4.54E-07 | 1.38E-07 |
| 17 | 37 | 95 | 7439965 | Manganese | 1.26E-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 | | | 1.76E-07 | 3.46E-07 | 1.05E-07 |
| 18 | 37 | 95 | 7439976 | Mercury | 8.63E-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 | | | 1.21E-07 | 2.36E-07 | 7.18E-08 |
| 19 | 95 | 95 | 91203 | Naphthalene | 2.05E-05 | 1.98E-09 | 30YrCancerDerived | * | 1.98E-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 | | 2.53E-06 | 6.18E-06 | 1.34E-06 |
| 20 | 37 | 95 | 7440020 | Nickel | 6.98E-06 | 5.10E-09 | 30YrCancerDerived | * | 5.10E-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 | | 9.76E-07 | 1.91E-06 | 5.81E-07 |
| 21 | 95 | 0 | 115071 | Propylene | 0.00040446 | 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 | | | 4.17E-05 | 1.11E-04 | 1.33E-05 |
| 22 | 37 | 28 | 75569 | Propylene Oxide | 0.00011778 | 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 | | 2.59E-05 | 1.55E-05 | 1.51E-05 |
| 23 | 37 | 95 | 7782492 | Selenium | 7.96E-08 | 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 | | | 1.11E-08 | 2.18E-08 | 6.62E-09 |
| 24 | 37 | 28 | 7664939 | Sulfuric Acid | 0.0491 | 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 | | | 1.08E-02 | 6.46E-03 | 6.29E-03 |
| 25 | 37 | 95 | 108883 | Toluene | 0.00056416 | 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 | | | 1.18E-04 | 8.37E-05 | 6.94E-05 |
| 26 | 37 | 95 | 7440622 | Vanadium | 7.63E-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 | | | 1.07E-06 | 2.09E-06 | 6.35E-07 |
| 27 | 37 | 28 | 1330207 | Xylenes | 0.0002805 | 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 | | | 5.83E-05 | 4.23E-05 | 3.43E-05 |
| 28 | 37 | 95 | 7440666 | Zinc | 9.63E-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 | | | 1.35E-05 | 2.64E-05 | 8.01E-06 |

*HARP - HRACalc v16088 9/8/2016 12:58:47 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 | 37 | 28 | 106990 | 1,3-Butadiene | 1.93E-06 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.63E-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 | * |
| 2 | 37 | 28 | 75070 | Acetaldehyde | 0.00016801 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.20E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 3 | 37 | 28 | 107028 | Acrolein | 2.72E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 7.77E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 4 | 37 | 28 | 7664417 | NH3 | 0.1222 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.11E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 5 | 37 | 95 | 7440382 | Arsenic | 6.64E-07 | NonCancerChronicDerived | 9.65E-03 | 9.65E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.65E-03 | 9.65E-03 | 9.65E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 6 | 37 | 95 | 7440393 | Barium | 1.46E-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 | 37 | 95 | 71432 | Benzene | 0.00013501 | 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 | 4.50E-05 | 0.00E+00 | 0.00E+00 | * |
| 8 | 37 | 95 | 7440417 | Beryllium | 3.99E-08 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 5.70E-06 | 0.00E+00 | 6.02E-07 | 0.00E+00 | 5.70E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 9 | 37 | 95 | 7440439 | Cadmium | 3.65E-06 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.28E-04 | 0.00E+00 | 0.00E+00 | 1.83E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 10 | 37 | 95 | 7440473 | Chromium | 4.64E-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 | * |
| 11 | 37 | 95 | 7440484 | Cobalt | 2.79E-07 | 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 | 37 | 95 | 7440508 | Copper | 2.83E-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 | * |
| 13 | 37 | 28 | 100414 | Ethyl Benzene | 0.00012956 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-08 | 6.48E-08 | 6.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.48E-08 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 14 | 37 | 95 | 50000 | Formaldehyde | 0.0090956 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.01E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 15 | 95 | 95 | 110543 | Hexane | 0.0053655 | NonCancerChronicDerived | 0.00E+00 | 7.67E-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 | 0.00E+00 | * |
| 16 | 37 | 95 | 7439921 | Lead | 1.66E-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 | * |
| 17 | 37 | 95 | 7439965 | Manganese | 1.26E-06 | NonCancerChronicDerived | 0.00E+00 | 1.40E-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 | 37 | 95 | 7439976 | Mercury | 8.63E-07 | NonCancerChronicDerived | 0.00E+00 | 2.34E-04 | 0.00E+00 | 2.34E-04 | 0.00E+00 | 2.34E-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 | 95 | 95 | 91203 | Naphthalene | 2.05E-05 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.28E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 20 | 37 | 95 | 7440020 | Nickel | 6.98E-06 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.32E-05 | 4.98E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.98E-04 | 0.00E+00 | 0.00E+00 | * |
| 21 | 95 | 0 | 115071 | Propylene | 0.00040446 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.35E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 22 | 37 | 28 | 75569 | Propylene Oxide | 0.00011778 | 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 | 37 | 95 | 7782492 | Selenium | 7.96E-08 | NonCancerChronicDerived | 1.99E-06 | 1.99E-06 | 0.00E+00 | 0.00E+00 | 1.99E-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 | * |
| 24 | 37 | 28 | 7664939 | Sulfuric Acid | 0.0491 | NonCancerChronicDerived | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.91E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 25 | 37 | 95 | 108883 | Toluene | 0.00056416 | NonCancerChronicDerived | 0.00E+00 | 1.88E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.88E-06 | 1.88E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 26 | 37 | 95 | 7440622 | Vanadium | 7.63E-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 | * |
| 27 | 37 | 28 | 1330207 | Xylenes | 0.0002805 | NonCancerChronicDerived | 0.00E+00 | 4.01E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.01E-07 | 0.00E+00 | 4.01E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | * |
| 28 | 37 | 95 | 7440666 | Zinc | 9.63E-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 | * |

| continued> | INDEX | INH_CONC | SOIL_DOSE | DERMAL_DOSE | MMILK_DOSE | WATER_DOSE | FISH_DOSE | CROP_DOSE | BEEF_DOSE | DAIRY_DOSE | PIG_DOSE | CHICKEN_DOSE | EGG_DOSE | 1ST_DRIVER | 2ND_DRIVER | 3RD_DRIVER | PASTURE_CONC | FISH_CONC | WATER_CONC |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| | 1 | 1.93E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.05E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 4.06E-07 | 3.98E-07 | 2.55E-07 |
| | 2 | 1.68E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.73E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 3.62E-05 | 2.55E-05 | 2.15E-05 |
| | 3 | 2.72E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.76E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 5.81E-06 | 4.10E-06 | 3.44E-06 |
| | 4 | 1.22E-01 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.26E-09 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 2.69E-02 | 1.61E-02 | 1.57E-02 |
| | 5 | 6.64E-07 | 1.50E-08 | 9.67E-10 | 0.00E+00 | 1.85E-15 | 3.95E-16 | 1.76E-08 | 2.53E-11 | 2.12E-12 | 5.77E-12 | 1.76E-13 | 1.65E-12 | INHALATION | CROP | SOIL | 9.29E-08 | 1.82E-07 | 5.52E-08 |
| | 6 | 1.46E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.76E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 2.04E-06 | 4.00E-06 | 1.22E-06 |
| | 7 | 1.35E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.33E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.70E-05 | 3.98E-05 | 1.04E-05 |
| | 8 | 3.99E-08 | 9.01E-10 | 2.90E-11 | 0.00E+00 | 1.11E-16 | 4.74E-17 | 2.74E-10 | 2.10E-13 | 2.11E-15 | 9.79E-15 | 2.01E-14 | 0.00E+00 | INHALATION | SOIL | CROP | 5.58E-09 | 1.09E-08 | 3.32E-09 |
| | 9 | 3.65E-06 | 8.25E-08 | 1.77E-10 | 0.00E+00 | 1.02E-14 | 4.34E-15 | 1.40E-07 | 2.40E-11 | 2.01E-12 | 2.81E-11 | 2.86E-11 | 0.00E+00 | INHALATION | CROP | SOIL | 5.11E-07 | 1.00E-06 | 3.04E-07 |
| | 10 | 4.64E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.10E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 6.49E-07 | 1.27E-06 | 3.86E-07 |
| | 11 | 2.79E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.86E-15 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 3.89E-08 | 7.62E-08 | 2.32E-08 |
| | 12 | 2.83E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.89E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 3.96E-07 | 7.75E-07 | 2.35E-07 |
| | 13 | 1.30E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.33E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 2.85E-05 | 1.70E-05 | 1.66E-05 |
| | 14 | 9.10E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 9.27E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.98E-03 | 1.24E-03 | 1.15E-03 |
| | 15 | 5.37E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.74E-11 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 6.49E-04 | 1.35E-03 | 2.17E-04 |
| | 16 | 1.66E-06 | 3.75E-08 | 1.21E-09 | 2.15E-08 | 4.62E-15 | 9.86E-16 | 4.37E-09 | 9.34E-12 | 6.25E-12 | 5.00E-13 | 2.05E-12 | 4.66E-15 | INHALATION | SOIL | MMILK | 2.32E-07 | 4.54E-07 | 1.38E-07 |
| | 17 | 1.26E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.43E-15 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.76E-07 | 3.46E-07 | 1.05E-07 |
| | 18 | 8.63E-07 | 1.95E-08 | 8.37E-10 | 0.00E+00 | 2.41E-15 | 2.05E-15 | 1.25E-08 | 7.11E-12 | 4.17E-12 | 9.41E-13 | 4.81E-13 | 0.00E+00 | INHALATION | SOIL | CROP | 1.21E-07 | 2.36E-07 | 7.18E-08 |
| | 19 | 2.05E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.08E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 2.53E-06 | 6.18E-06 | 1.34E-06 |
| | 20 | 6.98E-06 | 1.58E-07 | 3.39E-09 | 0.00E+00 | 1.95E-14 | 4.15E-15 | 9.43E-08 | 3.99E-11 | 1.34E-11 | 3.35E-12 | 6.84E-13 | 0.00E+00 | INHALATION | SOIL | CROP | 9.76E-07 | 1.91E-06 | 5.81E-07 |
| | 21 | 4.04E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.07E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 4.17E-05 | 1.11E-04 | 1.33E-05 |
| | 22 | 1.18E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.21E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 2.59E-05 | 1.55E-05 | 1.51E-05 |
| | 23 | 7.96E-08 | 1.80E-09 | 5.79E-11 | 0.00E+00 | 2.22E-16 | 2.37E-15 | 7.81E-09 | 8.52E-11 | 6.42E-11 | 1.30E-10 | 2.37E-12 | 0.00E+00 | INHALATION | CROP | SOIL | 1.11E-08 | 2.18E-08 | 6.62E-09 |
| | 24 | 4.91E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.05E-10 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.08E-02 | 6.46E-03 | 6.29E-03 |
| | 25 | 5.64E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.58E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.18E-04 | 8.37E-05 | 6.94E-05 |
| | 26 | 7.63E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.10E-14 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.07E-06 | 2.09E-06 | 6.35E-07 |
| | 27 | 2.81E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.76E-12 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 5.83E-05 | 4.23E-05 | 3.43E-05 |
| | 28 | 9.63E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 6.43E-13 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | INHALATION | WATER | | 1.35E-05 | 2.64E-05 | 8.01E-06 |

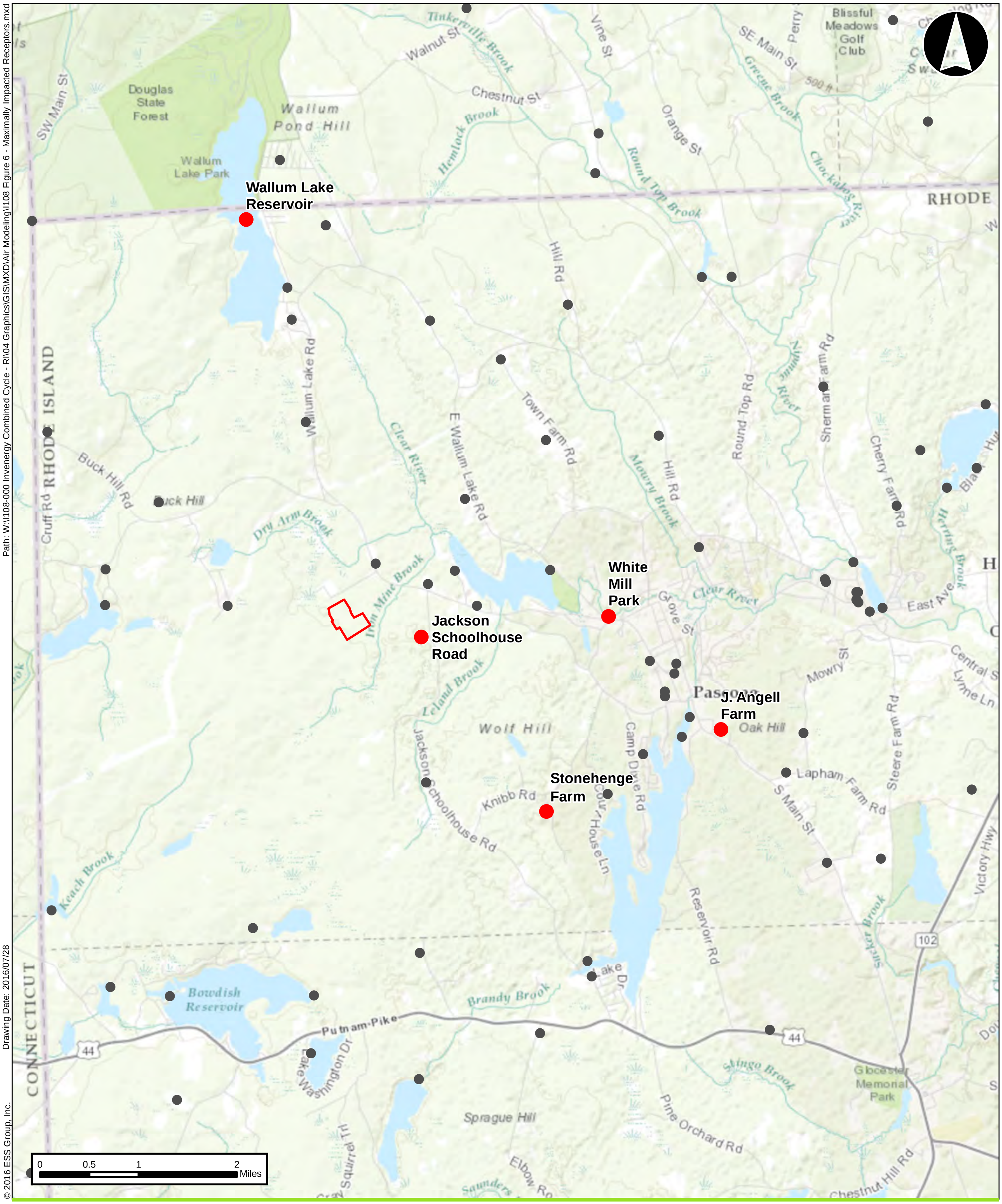
*HARP - HRACalc v16088 9/8/2016 12:58:47 PM - Acute Risk

| INDEX | GRP1 | GRP2 | POLID | POLABBREV | CONC | SCENARIO | CV | CNS | IMMUN | KIDNEY | GILV | REPRO/DEVEL | RESP | SKIN | EYE | BONE/TEETH | ENDO | BLOOD | ODOR | GENERAL |
|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|---|
| 1 | 37 | 28 | 106990 | 1,3-Butadiene | 5.29E-05 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 8.01E-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 |
| 2 | 37 | 28 | 75070 | Acetaldehyde | 0.004907 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.04E-05 | 0.00E+00 | 1.04E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | 37 | 28 | 107028 | Acrolein | 0.00078735 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.15E-04 | 0.00E+00 | 3.15E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | 37 | 28 | 7664417 | NH3 | 3.7026 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 1.16E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 5 | 37 | 95 | 7440382 | Arsenic | 0.00056752 | NonCancerAcute | 2.84E-03 | 2.84E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.84E-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 | 37 | 95 | 7440393 | Barium | 0.012511 | 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 | 37 | 95 | 71432 | Benzene | 0.006932 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 2.57E-04 | 0.00E+00 | 0.00E+00 | 2.57E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.57E-04 | 0.00E+00 | 0.00E+00 |
| 8 | 37 | 95 | 7440417 | Beryllium | 3.40E-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 | 37 | 95 | 7440439 | Cadmium | 0.0031206 | 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 | 37 | 95 | 7440473 | Chromium | 0.0039682 | 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 | 37 | 95 | 7440484 | Cobalt | 0.00023826 | 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 | 37 | 95 | 7440508 | Copper | 0.0024104 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.41E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 13 | 37 | 28 | 100414 | Ethyl Benzene | 0.0039256 | 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 | 37 | 95 | 50000 | Formaldehyde | 0.42889 | 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 | 7.80E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | 95 | 95 | 110543 | Hexane | 4.9145 | 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 | 37 | 95 | 7439921 | Lead | 0.0014149 | 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 | 37 | 95 | 7439965 | Manganese | 0.0010799 | 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 | 37 | 95 | 7439976 | Mercury | 0.00073725 | NonCancerAcute | 0.00E+00 | 1.23E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.23E-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 | 95 | 95 | 91203 | Naphthalene | 0.0017972 | 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 | 37 | 95 | 7440020 | Nickel | 0.0059588 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 2.98E-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 | 95 | 0 | 115071 | Propylene | 0 | 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 | 37 | 28 | 75569 | Propylene Oxide | 0.0035687 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.15E-06 | 1.15E-06 | 0.00E+00 | 1.15E-06 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 23 | 37 | 95 | 7782492 | Selenium | 6.81E-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 | 37 | 28 | 7664939 | Sulfuric Acid | 1.4877 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.24E-02 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 25 | 37 | 95 | 108883 | Toluene | 0.02216 | NonCancerAcute | 0.00E+00 | 5.99E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.99E-07 | 5.99E-07 | 0.00E+00 | 5.99E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 26 | 37 | 95 | 7440622 | Vanadium | 0.0065227 | NonCancerAcute | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.17E-04 | 0.00E+00 | 2.17E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 27 | 37 | 28 | 1330207 | Xylenes | 0.0078735 | NonCancerAcute | 0.00E+00 | 3.58E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.58E-07 | 0.00E+00 | 3.58E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 28 | 37 | 95 | 7440666 | Zinc | 0.082223 | 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 v16088 9/8/2016 2:17:07 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 | 37 | 28 | 106990 | 1,3-Butadiene | 1.93E-06 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 2.14E-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 |
| 2 | 37 | 28 | 75070 | Acetaldehyde | 0.00016801 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 5.60E-07 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 3 | 37 | 28 | 107028 | Acrolein | 2.72E-05 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 3.89E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 4 | 37 | 28 | 7664417 | NH3 | 0.1222 | 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 | 37 | 95 | 7440382 | Arsenic | 6.64E-07 | NonCancer8HrChronic | 4.43E-05 | 4.43E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 4.43E-05 | 4.43E-05 | 4.43E-05 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 6 | 37 | 95 | 7440393 | Barium | 1.46E-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 | 37 | 95 | 71432 | Benzene | 0.00013501 | 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 | 4.50E-05 | 0.00E+00 | 0.00E+00 |
| 8 | 37 | 95 | 7440417 | Beryllium | 3.99E-08 | 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 | 37 | 95 | 7440439 | Cadmium | 3.65E-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 |
| 10 | 37 | 95 | 7440473 | Chromium | 4.64E-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 |
| 11 | 37 | 95 | 7440484 | Cobalt | 2.79E-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 |
| 12 | 37 | 95 | 7440508 | Copper | 2.83E-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 |
| 13 | 37 | 28 | 100414 | Ethyl Benzene | 0.00012956 | 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 | 37 | 95 | 50000 | Formaldehyde | 0.0090956 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.01E-03 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 15 | 95 | 95 | 110543 | Hexane | 0.0053655 | 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 | 37 | 95 | 7439921 | Lead | 1.66E-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 |
| 17 | 37 | 95 | 7439965 | Manganese | 1.26E-06 | NonCancer8HrChronic | 0.00E+00 | 7.42E-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 |
| 18 | 37 | 95 | 7439976 | Mercury | 8.63E-07 | NonCancer8HrChronic | 0.00E+00 | 1.44E-05 | 0.00E+00 | 1.44E-05 | 0.00E+00 | 1.44E-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 | 95 | 95 | 91203 | Naphthalene | 2.05E-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 |
| 20 | 37 | 95 | 7440020 | Nickel | 6.98E-06 | NonCancer8HrChronic | 0.00E+00 | 0.00E+00 | 1.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 1.16E-04 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 | 0.00E+00 |
| 21 | 95 | 0 | 115071 | Propylene | 0.00040446 | 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 | 37 | 28 | 75569 | Propylene Oxide | 0.00011778 | 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 | 37 | 95 | 7782492 | Selenium | 7.96E-08 | 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 | 37 | 28 | 7664939 | Sulfuric Acid | 0.0491 | 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 | 37 | 95 | 108883 | Toluene | 0.00056416 | 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 | 37 | 95 | 7440622 | Vanadium | 7.63E-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 |
| 27 | 37 | 28 | 1330207 | Xylenes | 0.0002805 | 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 | 37 | 95 | 7440666 | Zinc | 9.63E-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 |

Drawing Date: 2016/07/28
Path: W:\I108-000 Invenergy Combined Cycle - RI\04 Graphics\GIS\MXD\Air Modeling\I108 Figure 6 - Maximally Impacted Receptors.mxd




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

1 inch = 7,000 feet

Source: 1) USGS, Topo Map, 2016
2) ESS, Receptor Locations, 2016

**Maximally Impacted Receptors**

**Legend**

- Maximally Impacted Receptor
- Sensitive Receptor
- CREC Fenceline

**Figure 6**