

**ENGINEERING EVALUATION**  
**Chiron Corporation**  
**PLANT NO. 8025**  
**APPLICATION NO. 5753**

**BACKGROUND**

The Chiron Corporation is applying for an Authority to Construct and/or Permit to Operate the following equipment:

**S-44 2000kW Emergency Standby Diesel Generator: Caterpillar 3516B, 2847.5 HP**

The 2847.5 HP diesel generator is CARB/EPA approved. The original engine control setting ("low emissions" strategy) maximized fuel usage and minimized NOx emissions, but the diesel particulate emissions failed the toxic risk screen. In order to pass the risk screen, the engine was modified to meet TBACT for diesel particulates. The engine manufacturer reprogrammed the engine controller ("certified" strategy) such that fuel usage and NOx emissions are compromised in order to minimize diesel particulate emissions. The engine was able to pass the risk screen at the TBACT level of 0.10 g/hp-hr of PM10. The Chiron Corporation will be conditionally permitted not to exceed this particulate emission. Because emissions of the NOx, CO, POC, and SO2 exceed 10 lb/day, Chiron will be conditioned to meet BACT for these pollutants.

|      | <u>Permitted 'certified strategy'</u> | <u>'low emission' strategy</u> |
|------|---------------------------------------|--------------------------------|
| NOx  | 6.17 g/hp-hr                          | 5.70 g/hp-hr                   |
| CO   | 0.44 g/hp-hr                          | 0.49 g/hp-hr                   |
| POC  | 0.15 g/hp-hr                          | 0.24 g/hp-hr                   |
| PM10 | 0.09 g/hp-hr                          | 0.159 g/hp-hr                  |

**EMISSIONS SUMMARY**

**Annual Emissions:**

The Chiron Corporation is allowed to operate the engine for maintenance and reliability-related activities for 100 hr/yr. Chiron will be conditionally permitted to meet BACT and TBACT.

The emission factor for SO2 is from Chapter 3, Table 3.4-1 of the EPA Document AP-42, Compilation of Air Pollutant Emission Factors.

$$\text{SO}_2 \quad 8.09\text{E-}3 \text{ (\% S in fuel oil) lb/hp-hr} = 8.09\text{E-}3 \text{ (0.05\% S) (454 g/lb)} = 0.184 \text{ g/hp-hr}$$

$$\begin{aligned} \text{NOx} &= (6.90 \text{ g/hp-hr})(2847.5 \text{ hp})(100 \text{ hrs/yr})(\text{lb}/454\text{g}) = 4,327.70 \text{ lb/yr} = 2.16 \text{ TPY} \\ \text{CO} &= (2.75 \text{ g/hp-hr})(2847.5 \text{ hp})(100 \text{ hrs/yr})(\text{lb}/454\text{g}) = 1,724.81 \text{ lb/yr} = 0.86 \text{ TPY} \\ \text{POC} &= (1.50 \text{ g/hp-hr})(2847.5 \text{ hp})(100 \text{ hrs/yr})(\text{lb}/454\text{g}) = 940.80 \text{ lb/yr} = 0.47 \text{ TPY} \\ \text{PM10} &= (0.10 \text{ g/hp-hr})(2847.5 \text{ hp})(100 \text{ hrs/yr})(\text{lb}/454\text{g}) = 62.72 \text{ lb/yr} = 0.03 \text{ TPY} \\ \text{SO}_2 &= (0.184 \text{ g/hp-hr})(2847.5 \text{ hp})(100 \text{ hrs/yr})(\text{lb}/454\text{g}) = 115.40 \text{ lb/yr} = 0.06 \text{ TPY} \end{aligned}$$

**Maximum Daily Emissions:**

A full 24-hour day will be assumed since no daily limits are imposed on intermittent and unexpected operations.

$$\begin{aligned} \text{NOx} &= (6.90 \text{ g/hp-hr})(2847.5 \text{ hp})(24 \text{ hrs/day})(\text{lb}/454\text{g}) = 1,038.65 \text{ lb/yr} \\ \text{CO} &= (2.75 \text{ g/hp-hr})(2847.5 \text{ hp})(24 \text{ hrs/day})(\text{lb}/454\text{g}) = 413.95 \text{ lb/yr} \end{aligned}$$

POC = (1.50 g/hp-hr)(2847.5 hp)(24 hrs/day)(lb/454g) = 225.79 lb/yr  
 PM10 = (0.10 g/hp-hr)(2847.5 hp)(24 hrs/day)(lb/454g) = 15.05 lb/yr  
 SO2 = (0.184 g/hp-hr)(2847.5 hp)(24 hrs/day)(lb/454g) = 27.70 lb/yr

**Plant Cumulative Increase: (tons/year)**

| Pollutant | Existing | New  | Total  |
|-----------|----------|------|--------|
| NOx       | 6.100    | 2.16 | 8.260  |
| POC       | 12.040   | 0.47 | 12.510 |
| CO        | 5.480    | 0.86 | 6.340  |
| SO2       | 0.100    | 0.06 | 0.160  |
| PM10      | 0.707    | 0.03 | 0.737  |
| NPOC      | 0        | 0    | 0      |

**Toxic Risk Screening:**

The toxic emission of diesel particulate exceeds the District Risk Screening Trigger and a Risk Screening Analysis has been performed. For 100 hours of operation per year, excluding periods when operation is required due to emergency conditions, the maximum cancer risk is 9.7 in a million for commercial and industrial occupants. The level of risk for students at schools within a quarter of a mile is 1.7 in a million. The level of risk has been determined as acceptable under the risk management policy for diesel-fueled reciprocating engines that meet the TBACT requirement (PM10 emissions less than 0.15 g/hp-hr). For engines that meet TBACT requirements, the maximum acceptable cancer risk for the project is 10 in a million. To pass the risk screen, the particulate emission of 0.10 g/hp-hr was used to calculate the risk at 9.7 in a million. Chiron will be conditionally permitted not to exceed this particulate emission. (See memo from Toxics Group, August 8, 2002.)

| <u>Toxic Pollutant</u>                          | <u>Emission Rate (lb/yr)</u> | <u>Risk Screening Trigger (lb/yr)</u> |
|---|------------------------------|---------------------------------------|
| <b>Diesel Exhaust Particulate Matter (PM10)</b> | <b>62.72</b>                 | <b>0.64</b>                           |

**STATEMENT OF COMPLIANCE**

The owner/operator of S-44 shall comply with Reg. 6 (Particulate Matter and Visible Emissions Standards) and Reg. 9-1-301 (Inorganic Gaseous Pollutants: Sulfur Dioxide for Limitations on Ground Level Concentrations). Low sulfur diesel (0.05wt%) will be used to meet the sulfur limitation of 0.5wt% in Reg. 9-1-304. Because S-44 is an emergency standby generator, Reg. 9-8-110 (Inorganic Gaseous Pollutants: Nitrogen Oxides from Stationary Gas Turbines) exempts the requirements for emission limits of Sections 9-8-301, 302, and 502. Allowable operating hours and the corresponding record keeping in Reg. 9-8-330 and 530 will be included in the Permit Conditions below. To pass the risk screen, the owner/operator will be conditionally permitted to meet TBACT. Emissions of NOx, POC, CO, and SOx exceed 10 lb/day and Chiron will also be conditionally permitted to meet BACT.

The project is considered to be ministerial under the District's CEQA regulation 2-1-311 and therefore is not subject to CEQA review. The engineering review for this project requires only the application of standard permit conditions and standard emissions factors and therefore is not discretionary as defined by CEQA. (Permit Handbook Chapter 2.3)

The project is within 1000 feet from the nearest school and therefore the owner/operator is subject to the public notification requirements of Reg. 2-1-412. A public notice was prepared and sent on **October XX, 2002** to:

- All addresses within 1000 feet of the diesel generator
- Parents and guardians of students at Pacific Rim International School
- Parents and guardians of students at Emeryville High School

*[insert comments and replies here.....No comments were received over the 30-day comment period, which ended on November XX, 2002.]*

A Toxic Risk Screening Analysis is required due to the emission of diesel particulate (PM10); see “Toxic Risk Screening” above. The engine meets TBACT requirements since PM10 emissions are less than 0.15 g/hp-hr and the maximum cancer risk is less than 10 in a million.

**Best Available Control Technology:** In accordance with Regulation 2, Rule 2, Section 301, BACT is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, NOx, CO, SO<sub>2</sub> or PM<sub>10</sub>. Based on engine date, the emissions exceed 10 lb/day for all pollutants (POC, NOx, CO, SO<sub>2</sub> and PM<sub>10</sub>) and Chiron will be conditionally permitted to meet BACT. BACT 1 levels do not apply for ‘engines used exclusively for emergency use during involuntary loss of power’ as per Reference b, Document 96.1.2 of the BAAQMD BACT Guidelines for IC Engines.

The owner/operator satisfies BACT 2 for NOx, CO, and POC since the engine satisfies the emission factor standards. The owner/operator meets BACT 2 standards for PM10 and SO2 since California Diesel Fuel of <0.05% by weight sulfur will be used.

|     | <u>Manufacturer’s Data</u> | <u>BACT 2</u> |
|-----|----------------------------|---------------|
| NOx | 6.17 g/hp-hr               | 6.90 g/hp-hr  |
| CO  | 0.44 g/hp-hr               | 2.75 g/hp-hr  |
| POC | 0.15 g/hp-hr               | 1.50 g/hp-hr  |

**Offsets:** Offsets must be provided for any new or modified source at a facility that emits more than 15 tons/yr of POC or NOx. The District may provide offsets from the Small Facility Banking Account for a facility with emissions between 15 and 50 tons/yr of POC or NOx, provided that facility has no available offsets, and all existing sources of POC and/or NOx are equipped with Best Available Retrofit Control Technology (BARCT). Based on the emission calculations above, offsets are not required for this application.

PSD, NSPS, and NESHAPS do not apply.

### **PERMIT CONDITIONS**

Conditions for S-44

1. The owner/operator shall fire S-44 exclusively with diesel fuel with sulfur content no greater than 0.05wt%.  
(basis: Cumulative Increase)
2. The owner/operator shall operate S-44 only under the following circumstances:
  - a) For emergency use for an unlimited number of hours.
  - b) For reliability-related activities so long as total hours of operation for this purpose do not exceed 100 hours in a calendar year.(basis: Reg. 9-8-330, Cumulative Increase, Toxic Risk Screen)

3. The owner/operator of S-44 shall not exceed the following emission rates:
  - a) NOx 6.90 g/hp-hr
  - b) CO 2.75 g/hp-hr
  - c) POC 1.50 g/hp-hr
  - d) PM10 0.10 g/hp-hr(basis: Reg. 9-8-330, Cumulative Increase, Toxic Risk Screen, BACT/TBACT)
  
4. Emergency use is defined by the following circumstances:
  - a) In the event of loss of regular natural gas supply;
  - b) In the event of failure of regular electric power supply;
  - c) Flood mitigation;
  - d) Sewage overflow mitigation;
  - e) Fire;
  - f) Failure of a primary motor, but only for such time as needed to repair or replace the primary motor.(basis: Reg. 9-8-231)
  
5. Reliability-related activities are defined as either:
  - a) Operation of an emergency standby engine to test its ability to perform for an emergency use; or
  - b) Operation of an emergency standby engine during maintenance of a primary motor.(basis: Reg. 9-8-232)
  
6. S-44 shall be equipped with a non-resettable totalizing meter that measures hours of operation or fuel usage.  
(basis: Reg. 9-8-530: Record keeping)
  
7. To determine compliance with the above conditions, the owner/operator shall maintain the following records and provide all of the data necessary to evaluate compliance with the above conditions. A monthly log of usage shall indicate the following:
  - a) Hours of operation (total)
  - b) Hours of operation (emergency)
  - c) For each emergency, the nature of the emergency conditionThe owner/operator shall record all records in a District-approved log. The owner/operator shall retain the records on-site for two years, from the date of entry, and make them available for inspection by District staff upon request. These record-keeping requirements shall not replace the record-keeping requirements contained in any applicable District Regulations.  
(basis: Cumulative Increase, Regulation 1-441, Reg. 9-8-530: Record keeping)

#### **RECOMMENDATION**

Waive Authority to Construct and issue a Permit to Operate the Chiron Corporation for the following source:

**S-44 2000kW Emergency Standby Diesel Generator: Caterpillar 3516B, 2847.5 HP**

#### **EXEMPTIONS**

None.

By: \_\_\_\_\_

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Air Quality Engineer  
October 3, 2002