**Facility Name:**  Crestwood Behavioral Health, Inc. (San Diego)

**Equipment Type:**  91A – Miscellaneous, Linear Generator

**Application #:**  APCD2025-APP-008678

**ID#:**  APCD2025-SITE-04776

**Equipment/Facility Address:** 5550 University Avenue

San Diego, CA 92105

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**Permit Engineer:**



**Senior Engineer:**



1.0 Background

**1.1 Type of Application:** This is a new application for a prime-use, natural gas linear generators.

**1.2 Permit History:** The equipment is not previously permitted.

**1.3 Facility Description:** Crestwood Behavioral Health is a health and wellness facility. There are no other permits at this site.

**1.4 Other Background Info:** No current Hearing Board actions; no permit denials, no legal settlements; not a Title V facility. This application has trade secret information related to the equipment.

2.0 Process Description

**2.1 Equipment Description.**

Prime Natural Gas Linear Generator

Manufacturer: Mainspring

Model: MSE-250

S/N: TBD,

Rated: 2.15 MMBtu/hr,

Electrical output: 250kWe,

Equipped with a system that measures Air-to-fuel Ratio and an Oxidation Catalyst

Horizontal exhaust, venting through two rectangular 4.75’ by 1.33’ vent, 9.5 feet above ground

**2.2 Process Description.**

Linear generators convert an external heat source into linear motion through sealed pistons, which oscillate magnets through coils to generate electricity. In this project, heat is generated by a low-temperature reaction between pipeline natural gas and ambient air. This low reaction temperature leads to minimal nitrogen oxide emissions, while the continuous reaction zone residence time helps reduce emissions of particulate matter and volatile organic compounds.

**2.3 Emissions Controls.**

The linear generator operates on natural gas as a fuel source, leveraging its lower combustion emissions profile compared to most liquid fuels. Natural gas combustion results in reduced levels of nitrogen oxides (NOx) and particulate matter (PM). The system is designed with a low-flame, high-reactant-temperature configuration, optimizing combustion conditions to minimize NOx formation. Additionally, the unit is equipped with an air-to-fuel ratio monitoring system and an oxidation catalyst to further mitigate emissions. Operational hours are continuously logged and monitored at the Mainspring Network Operating Center, with data available upon request for verification purposes.

**2.4 Attachments.**

Linear generator specification sheet with projected emissions.

3.0 Emissions

**3.1 Emissions estimate summary.** Estimated emissions from the process are shown below.

Table 1: Estimated PTE for criteria pollutants

|  |  |  |  |
| --- | --- | --- | --- |
| **Compound** | **Hourly Emissions** | **Daily Emissions** | **Annual Emissions** |
| **lbs/hr** | **lbs/day** | **tons/year** |
| NOx | 0.02 | 0.48 | 0.09 |
| CO | 0.06 | 1.39 | 0.25 |
| VOC | 0.03 | 0.66 | 0.12 |
| PM | 0.01 | 0.13 | 0.57 |
| SOx | 0.00 | 0.03 | 0.01 |

**3.2 Estimated Emissions Assumptions.**

* Table 1 calculations assume full load operation of one linear generator; 24 hours per day, 8760 hours per year.
* NOx, CO, and VOC specifications given by applicant which are the linear generator limits from SCAQMD Rule 1110.3. Pollutants SOx, and PM10 are from the District’s standard emission factors.
* Emission factors are T11- Turbine, Natural Gas Fired, All Sizes, with lean-premix. Fuel heating value of 1020 Btu/scf.
* Expected actual emissions same as PTE.

**3.3 Emissions Calculations.**

Calculations were performed using the attached spreadsheets using standard calculation methods.

**3.4 Attachments.**

Emission Calculations.

4.0 Applicable Rules

**4.1 District Prohibitory Rules**

Rule 50: Visible emissions

This Rule prohibits any person from discharging from any sources of emissions for a period of more than three minutes any air contaminant which is darker in shade than that designated as Number 1 on the Ringlemann Chart, or of such opacity as to obscure an observer’s view to a degree greater than does smoke of a shade designated as number 1 on the Ringlemann chart.

*The proposed equipment operates on pipeline natural gas. Operation is not expected to result in visible emissions, therefore compliance with this rule is expected.*

Rule 51: Nuisance

This Rule prohibits a person from discharging from any source whatsoever such quantities of air contaminants or other materials which causes injury, nuisance or annoyance to the public or which causes damage to business or property.

*Operation is not expected to result in visible emissions which would cause injury, detriment, nuisance, or annoyance to the public. Therefore, compliance with the rule is expected.*

Rule 52: Particulate Matter

This Rule prohibits discharge into the atmosphere from any source particulate matter in excess of 0.10 grain per dry standard cubic foot (0.23 grams per dry standard cubic meter) of gas.

*The proposed equipment operates on natural gas which has low particulate emissions. The particulate discharge calculated for this linear generator is 0.00004 grains PM/dscf exhaust.*

*Therefore, compliance with this rule is expected.*

Rule 53: Specific Air Contaminants:

This Rule limits emissions of sulfur compounds (calculated as SO2) to less than or equal to 0.05% (500 ppm) by volume, on a dry basis. The rule also limits particulate matter emissions from gaseous fuel combustion to less than or equal 0.1 grains per dry standard cubic foot of exhaust calculated at 12% CO2.

*The proposed equipment will operate with pipeline natral gas.*

*(d)(1) Permit conditions will require use of natural gas with a maximum sulfur content of 10 grains per 100 dsf, which will ensure compliance with this requirement.*

*(d)(2)Particulate matter is addressed in Rule 52.*

Rule 54: Dust and Fumes:

This Rule prohibits a person from discharging, in any one hour, into the atmosphere from any source dust or fumes, including lead and lead compounds, shall not exceed 40 lbs/hour.

*At 1 hour, the proposed equipment is estimated to produce 0.02 lbs/hr of particulate. This is well under the maximum allowable threshold of 40 lbs/hour. Compliance with this rule is expected.*

Rule 62: Sulfur Content of Fuels:

This rule is applicable to all stationary fuel burning equipment. The rule prohibits the operatation of any stationary fuel-burning equipment subject to this rule unless:

(1) Any gaseous fuel used contains no more than 10 grains of sulfur compounds, calculated as hydrogen sulfide, per 100 cubic feet of dry gaseous fuel (0.23 grams of sulfur compounds, calculated as hydrogen sulfide, per cubic meter of dry gaseous fuel), at standard conditions. (2) Any liquid or solid fuel used contains no more than 0.5 percent sulfur by weight, or

(3) The equipment can be so operated as to achieve equivalent results, documented by the person by stack test to the satisfaction of the Air Pollution Control Officer.

*The criteria to meet Rule 62 is the same criteria listed in Rules 52 and 53. Therefore, compliance with this rule is expected.*

Rule 68: Oxides of Nitrogen from Fuel Burning Equipment:

This rule is applicable to any non-vehicular, fuel burning equipment which has a maximum heat input rating of 50 million British Thermal Units (Btu) (12.6 x 106 kcal) per hour (gross) or more. This rule limits NOx emissions from any fuel burning equipment to less than 125 ppmv calculated at 3% oxygen on a dry basis.

*This equipment operates at a maximum heat input of 2.15 million British Thermal Units. Therefore, this rule does not apply to these units.*

Rule 69.4.1: Stationary Reciprocating Internal Combustion Engines:

Applicability. This rule shall apply to stationary internal combustion engines with a brake horsepower (bhp) rating of 50 or greater.

*These units are not considered to be reciprocating internal combustion engines, as there is no ignition used in the mechanical process of electrical generation. Therefore this rule is not applicable.*

**4.2 New Source Review (NSR) Rule 20.1-20.4**

Rule 20.1 – Definitions:

Federal Major Stationary Source: Rule 20.1(c)(30) defines Major Stationary Source as any emission unit, project or stationary source which has, or will have after issuance of an Authority to Construct or modified Permit to Operate, an aggregate potential to emit one or more air contaminants in amounts equal to or greater than any of the emission rates listed below:

Text

Description automatically generated with medium confidence

*The potential emissions of all criteria pollutant at this site are below the Federal Major Stationary source emission limits.*

Major Stationary Source: Rule 20.1(c)(41) defines major stationary source as any emission unit, project or stationary source which has, or will have after issuance of an Authority to Construct or modified Permit to Operate an aggregate potential to emit one or more air contaminants, including fugitive emissions, in amounts equal to or greater than any of the emission rates listed below:

Text, letter

Description automatically generated

*The potential emissions of all criteria pollutant at this site are below the Major Stationary source emission limits.*

Rule 20.2: New Source Review - Non Major Stationary Sources

1. Best Available Control Technology:

Rule 20.2(d)(1)(i) requires any new or modified unit which has any increase in its potential to emit and which has a post-project potential to emit of 10 lbs per day or more of particulate matter (PM), NOx, VOC, or SOx to be equipped with Best Available Control Technology (BACT) for each such air contaminant.

*Emissions from this equipment do not exceed 10 lbs/day for any of these pollutants, therefore BACT does not apply.*

2. Air Quality Impact Analysis

Rule 20.2 (d)(2)(i) requires any new, modified, replacement or relocated unit which results in emissions increase equal to or greater than the amounts listed below to perform an Air Quality Impact Analysis:

Particulate Matter (PM): 100 lbs/day, 15 tpy

NOx: 25 lbs/hour, 250 lbs/day, 40 tpy

SOx: 25 lbs/hour, 250 lbs/day, 40 tpy

CO: 100 lbs/hour, 550 lbs/day, 100 tpy

Lead and lead compounds: 3.2 lbs/day, 0.6 tpy

*Emissions from this project do not exceed any of the AQIA limits, therefore an AQIA is not needed.*

3. Prevention of Significant Deterioration (PSD)

Rule 20.2(d)(3) requires the Air Pollution Control Officer to not issue an Authority to Construct or modified Permit to Operate for any emission unit or project which is expected to have a significant impact on any Class I area, as determined by an AQIA, without satisfying the requirements for Federal Land Manager and Federal EPA notification as well as ARB, SCAQMD and Imperial County APCD Notification .

*The linear generator emissions do not trigger AQIA, therefore, it is not subject to PSD requirement.*

4. Public Notice and Comment

Rule 20.2 (d)(2) requires any emission unit or project subject to the AQIA or notification requirements or for any emission unit or project which results in an emissions increase of VOCs equal to or greater than 250 pounds per day or 40 tons per year to: (A) provide the public with notice of the proposed action in the manner prescribed by Subsection (d)(4)(iii), and (B) provide a copy of the public notice to the federal EPA Administrator, through its Region 9 office, to the California ARB and to any tribal air pollution control agencies having jurisdiction in the San Diego Air Basin, and (C) make available for public inspection all information relevant to the proposed action as specified in Subsection (d)(4)(iv), and

(D) provide at least a 30-day period within which comments may be submitted.to go through a 30-day public notice and comment period for any applications which require an AQIA under Sections d(2) or d(3).

*With no AQIA required, public notification and comment period are not required for this application.*

**4.3 Toxic New Source Review – Rule 1200**

District Rule 1200 applies to any application that is part of a project which results in an emission increase of toxic air contaminants. The rule limits the increase in acute and chronic health hazard index (HHI) to no more than one from the project and limits the increase in cancer risk from the project to no more than one in one million if the engine is not equipped with Toxics BACT (T-BACT) or no more than ten in one million if the project meets T-BACT requirements. These two applications are for two new linear generators which result in an emissions increase. Further detail about the assement can be found below and on the attached HRA.

Table 4: Rule 1200 Applicable Requirements and Discussion

|  |  |  |
| --- | --- | --- |
| **Question** | **Answer** | **Discussion** |
| **Does the application result in an increase in toxic emissions?** | Yes | The application results in an increase in toxic emissions of specific trace heavy metals and organics (as shown in emission calculations section). |
| **Do any special exemptions apply to this equipment?** | No | No exemptions apply to this equipment |
| **Are there any other applications that are part of the project?** | No | There is only one linear generator unit in this project. |
| **What type of HRA was used?** | De Minimis |  |

*Table

AI-generated content may be incorrect.A* ***de minimis health risk screening*** *was conducted to evaluate the potential toxic air contaminant impacts associated with the proposed linear generator equipment. The linear generator is equipped with an oxidation catalyst which is considered T-BACT. This increases the threshold for cancer risk from one in one million to ten in one million.*

*In the absence of an established emission profile for this specific equipment category within the District’s database,* ***natural gas-fired turbines usinging lean-premix combustion*** *were selected as a conservative surrogate for screening purposes. Emission factors from this source category were used to represent expected toxic emissions. Additionally,* ***source test data provided by the manufacturer (Mainspring)*** *were incorporated to refine the analysis and better reflect unit-specific performance.*

*Permit conditions will list limits based on the applicant’s operational data. Based on this analysis, the proposed linear generators should comply with District Rule 1200.*

**4.4 AB3205**

Requirements in the California Health and Safety Code in sections 42301.6 through 42301.9 (a.k.a. "AB3205 requirements") specify that prior to issuing an authority to construct for sources located within 1000 feet of a K-12 school, a 30-day public notification process must be conducted.

*This project is located within 1000 feet of Will C.Crawford Senior High School and Waldorf School of San Diego High school, so a public notice is required. This section shall remain open for any comments received by the public.*

**4.5 State and Federal Regulations.**

California Airborne Toxic Control Measures

This regulation does not apply to the linear generators.

National Emission Standards for Hazardous Air Pollutants

These regulations do not apply to the linear generators.

New Source Performance Standards

These regulations do not apply to the linear generators.

**4.6 Title V.**

*This is not a Title V facility therefore this requirement does not apply.*

**4.7 CEQA**

*The project being permitted does not exceed any BACT thresholds and is exempt from the requirements of the California Environmental Quality Act (CEQA) due to its designation as a ministerial action. Pursuant to CEQA Guidelines Section 15268, ministerial projects are not subject to environmental review because they involve decisions that are guided by fixed standards or regulations, with no allowance for discretionary judgment. The scope of this project falls within routine procedures that are strictly governed by established regulation, thereby precluding any need for subjective evaluation or interpretation. Consequently, the project is exempt from CEQA review.*

5.0 Recommendations

Although this equipment type does not have a specific regulation to detail record keeping, maintenance and testing, and reporting emissions, permits for similar equipment like diesel and natural gas engines were used as guidance. SCAQMD Rule 1110.3 – Emissions for Linear Generators, was also used for guidance in setting the permit conditions for maintenance and testing, and record keeping for these units. This equipment is expected to comply with all rules and regulations, and therefore it is recommended, that an authority to construct be issued with the following conditions.

6.0 Recommended Conditions

|  |  |  |
| --- | --- | --- |
| Condition # | Long Comment | Rule |
| 1. New-1 | Operation of this equipment shall be conducted in accordance with all data and specifications submitted with the application under which this permit is issued, unless otherwise noted below. |  |
| 2. New-2 | All equipment shall be kept in good operating conditions and shall be properly maintained in accordance with the manual of recommended maintenance provided by the engine manufacturer. A copy of the manufacturer’s operating and maintenance manual shall be kept on site and made available to the Air Pollution Control District within 48 hours upon request. | Rule 21 |
| 3. C28302 | There shall be no visible emissions from the exhaust stack of the air pollution control systems.  [Rule 50 and 1200] | Rule 50  Rule 1200 |
| 4. C43902 | Particulate matter emissions shall not exceed 0.10 grain per dry standard cubic foot (0.23 grams per dry standard cubic meter) of gas. Compliance with this requirement shall be demonstrated by adherence to the filter system operation and maintenance requirements of this permit. [Rule 52] | Rule 52 |
| 5. C41156 | This equipment shall only be fired on Public Utility Commission (PUC) quality natural gas. | Rule 50  Rule 52-54  Rule 62 |
| 6. C28414 | The equipment described above shall not cause or contribute to a public nuisance. | Rule 51 |
| 7. New | This equipment shall comply with the following emission concentration limits, corrected to 15% oxygen:  NOx: 2.5 ppmvd  CO: 12 ppmvd  VOC: 10 ppmvd  [Rule 20.2, Rule 1200] | Rule 20  Rule 1200 |
| 8. New | This equipment shall not be operated unless its exhaust is vented to the oxidation catalyst which is in full operation, and which is in good operating condition at all times. |  |
| 9. New | After every 12,000 hours of operation, the operator shall inspect the oxidation catalyst, as recommended by the equipment manufacturer or as specified by the equipment servicing company's maintenance procedures, and determine if it needs to be cleaned or washed. |  |
| 10. New | The owner or operator of this equipment shall install, configure, operate, and maintain this equipment and control device, if any, according to the manufacturer's emission-related written instructions. The owner or operator may change only those emission-related settings that are permitted by the manufacturer. The periodic maintenance shall be conducted at least once each calendar year.  (Rule 20.2) | Rule 20.2 |
| 11. New | The owner or operator of this equipment shall conduct periodic maintenance as recommended by the equipment manufacturer or as specified by the equipment servicing company's maintenance procedures. Maintenance shall be conducted at least once each calendar year. Any maintenance conducted on this equipment shall be recorded and maintained on site.  (Rule 20.2) | Rule 20.2 |
| 12. New | The owner or operator of this equipment shall maintain monthly operating logs that include:  a) Total hours of operation;  b) Fuel consumption in cubic feet of gas and gallons of liquid;  c) Air to Fuel system faults, alarms, or any related emission control failures;  d) Cumulative days of operation since the oxidation catalyst was last cleaned or washed. |  |
| 13. New | The owner or operator shall maintain all records required by this permit for a minimum of three calendar years. These records shall be maintained on the premises and made available to the District upon request. |  |
| 14. New | Within 60 days of first operation of this equipment under this permit, the owner or operator shall demonstrate compliance with permit limits of NOx, VOC, and CO.  A source test shall be conducted by an independent ARB approved tester or the District, at the applicant's expense, to verify emissions of NOx, VOC, and CO. Any testing not performed by the District shall be witnessed by District personnel. This testing shall be scheduled with the District no later than 30 days prior to the proposed test date, and any information requested by the District including a test protocol or information demonstrating appropriately designed facilities for source testing shall also be provided. If complying with this option, a final test report shall be provided to the District no later than 60 days after the test date.  Source test records must be maintained on site and accessible upon request to District personnel.  [Rule 1200] | Rule 1200 |
| 15. New | This equipment shall be source tested once every five years from the date of the previous source test, no later than the last day of the calendar month that the test is due, to demonstrate compliance with the emission standards contained in this permit. For the purposes of this permit, a permit year is the 12-month period ending on the last day of the permit expiration month. It is the responsibility of the permittee to schedule the source test with the District. The source test shall be performed or witnessed by the District. | Rule 21 |
| 16. New | A source test protocol shall be submitted to the District for review and approval at least 30 days prior to any source test. Each test performed shall comply with the following requirements unless an alternative is approved in writing by the District:  a. Measurement of NOx, CO and oxygen content of the exhaust gas shall be determined in accordance with San Diego APCD Test Method 100.  b. Measurement of VOC emissions shall be determined in accordance with EPA Test Methods 25A and/or 18. (if VOC testing is required).  c. NOx, VOC (if applicable) and CO emission concentrations shall be calculated as an average of three subtests. The averaging period to calculate emission concentrations and to determine compliance from the results of source testing shall be at least 15 minutes and not more than 60 minutes unless otherwise specified in writing by the Air Pollution Control Officer.  d. Source testing shall be performed under normal operating conditions. Prior to source testing, the permittee shall provide data substantiating the normal operating load for District review and approval | Rule 21 |
| 17. CHW001 | Access, facilities, utilities and any necessary safety equipment for source testing and inspection shall be provided upon request of the Air Pollution Control District. | District Standard |
| 18. CHW002 | This Air Pollution Control District Permit does not relieve the holder from obtaining permits or authorizations required by other governmental agencies. | District Standard |
| 19. CHW003 | The permittee shall, upon determination of applicability and written notification by the District, comply with all applicable requirements of the Air Toxics "Hot Spots" Information and Assessment Act (California Health and Safety Code Section 44300 et seq.) | District Standard |

All relevant attachments are uploaded to BCMS under the corresponding application number.