MINOR PERMIT REVISION APPLICATION

TUCSON ELECTRIC POWER
IRVINGTON GENERATING STATION
AIR QUALITY PERMIT NUMBER 1052

Submitted to:
Pima County Department of Environmental Quality
33 N. Stone Ave., Suite 700
Tucson, AZ 85701

Prepared by:
Tucson Electric Power
P.O. Box 711, Mail Stop HQW705
Tucson, Arizona 85702

March 2020
# Table of Contents

**Executive Summary** .......................................................................................................................... i

**Section 1.0**  
Permit Application Forms ................................................................................................................. 1-1

**Section 2.0**  
Permit Revision Description ............................................................................................................. 2-1

**Section 3.0**  
Regulatory Applicability Analysis ................................................................................................. 3-1  
3.1 Applicable Air Quality Requirements .................................................................................. 3-1  
3.2 Exemptions and Insignificant Activities............................................................................. 3-2  
3.3 Compliance Status ................................................................................................................. 3-2

**Section 4.0**  
Emission Related Information ............................................................................................................. 4-1

**List of Appendices**

- Appendix A - Draft Redline Permit
Executive Summary

Tucson Electric Power ("TEP") currently operates under Air Quality Permit No. 1052 issued by Pima County Department of Environmental Quality ("PDEQ"), the Irvington Generating Station ("IGS") located in Tucson at 3950 East Irvington Road, Tucson, Arizona 85714. The station is permitted for operation of two steam turbine units designated as Units I3 and I4, three simple cycle internal combustion turbine (ICT) units designated as Units IGT1, IGT2 and IGT3, and three emergency backup generator sets designated as Units EGEN1, EGEN2, and EGEN3. Unit I3 has a net capacity of 104 MW, Unit I4 has 156 MW, and each of Units IGT1-IGT2 has 24 MW. Units EGEN1, EGEN2, and EGEN3 have nameplate capacities of 349 hp, 636 hp, and 900 hp, respectively. IGS supplies electric power for sale to customers primarily in the Tucson area. The generating station produces electricity by combusting natural gas and converting heat to electricity through turbines. The IGS facility can operate 24 hours per day, 7 days per week, and 52 weeks per year.

On August 8, 2018, PDEQ issued a final permit decision, authorizing TEP to install and operate up to ten natural gas fired reciprocating internal combustion engines (RICE), each with a nominal net generating capacity of 19 MW. The final permit also required that TEP cease operation of Units I1 and I2 permanently prior to the initial startup of any one of the RICE units.

TEP is submitting this minor permit revision application under Pima County Code 17.12.110 to add a fourth emergency standby diesel generator (EGEN4) to be located next to our Operations Center. Rated at 2000 kW at full load, the proposed generator is to be used in the event of a power failure to provide emergency power to critical equipment at our Operations Center.
Section 1.0  Permit Application Forms

This section includes:

- Standard Permit Application Form
- Compliance Certification & Certification of Truth, Accuracy, and Completeness
- Emission Sources Form
1. Permit to be issued to (Business License Name of Organization): Tucson Electric Power Company

2. Mailing Address: P.O. Box 711, Mail Stop HQW705
   City: Tucson State: Arizona ZIP: 85702

3. Plant Name (if different than item #1): Irvington Generating Station

4. Name (or names) of Owner or Operator: Tucson Electric Power Company
   FAX #: Phone:
   Email:

5. Name of Owner's Agent: Zigang Fang
   FAX #: (520) 918-8380 Phone: (520) 918-8316

6. Plant/Site Manager/Contact Person: Dylan Bearce, Director, Tucson Power Production
   FAX #: Phone: (520) 745-3338
   Email: dbearce@tep.com

7. Proposed Equipment/Plant Location Address: 4350 East Irvington Road
   City: Tucson State: Arizona ZIP: 85714
   Indian Reservation (if applicable): T/R/S, Lat/Long, Elev: Township – 15S, Range – 14E
   Latitude - 32° 9' 50", Longitude - 110° 54' 16", Elev. – 2610’ above MSL

8. General Nature of Business: Electric Power Generation
   Standard Industrial Classification Code: 4911 Permit Class: Class I

9. Type of Organization: Corporation Individual Owner Partnership Government Entity Other

10. Permit Application Basis (Check all that apply): New Source General Permit Portable Source
    Administrative Minor Significant Renewal Existing Permit # 1052
    Date of Commencement of Construction or Modification: Upon filing of the application
    Is any of the equipment to be leased to another individual or entity? Yes No

11. Signature of Responsible Official of Organization:
    Official Title of Signer: Director, Tucson Power Production

12. Typed or Printed Name of Signer: Dylan Bearce
    Date: March 29, 2021 Telephone Number: (520) 745-3338

Last Revised: August 2018
Certification of Compliance with all Applicable Requirements

Permit Number (If existing source) 1052

This certification must be signed by a Responsible Official. Applications without a signed certification will be deemed incomplete.

The responsible official is defined as a person who is in charge of principal business functions or who performs policy or decision making functions for the business. This may also include an authorized representative for such persons. For a complete definition, see Pima County Air Quality Control, Title 17, Section 17.04.340(A)(186).

I certify that I have knowledge of the facts herein set forth, that the same are true, accurate and complete to the best of my knowledge and belief, and that all information not identified by me as confidential in nature shall be treated by the Pima County Department of Environmental Quality (PDEQ) as public record. I also attest that I am in compliance with the applicable requirements and will continue to comply with such requirements and any future requirements that become effective during the life of my permit. I will present a certification of compliance to PDEQ no less than annually and more frequently if specified by PDEQ. I further state that I will assume responsibility for the construction, modification, or operation of the source in accordance with the requirements of Title 17 of the Pima County Code and any permit issued thereof.

Name (Print/Type): Dylan Bearce Title: Director, Tucson Power Production
(Signature): ____________________________ Date: March 29, 2021

Certification of Truth, Accuracy, and Completeness

17.12.160(H) - Certification of Truth, Accuracy, and Completeness. Any application form, report, or compliance certification submitted pursuant to this Chapter shall contain certification by a responsible official of truth, accuracy, and completeness. This certification shall state that, based on information and belief formed after reasonable inquiry, the statements and information in the documents are true, accurate, and complete.

By my signature I, (Name) Dylan Bearce, hereby certify that based on information and belief formed after reasonable inquiry, the statements and information in this document are true, accurate, and complete.

Signature of Responsible Official of Organization: ____________________________

Title: Director, Tucson Power Production Date: March 29, 2021
**COMPANY NAME: TUCSON ELECTRIC POWER COMPANY – IRVINGTON GENERATING STATION (IGS)**

**EMISSION SOURCES**

"Potential to emit" is estimated per PCC 17-04-340. Review of applications and issuance of permits will be expedited by supplying all necessary information on this table.

<table>
<thead>
<tr>
<th>REGULATED AIR POLLUTANT DATA</th>
<th>EMITTANCE POINT DISCHARGE PARAMETERS</th>
</tr>
</thead>
<tbody>
<tr>
<td>NUMBER</td>
<td>NAME</td>
</tr>
<tr>
<td>EGEN4</td>
<td>Emergency Standby Diesel Generator</td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
<tr>
<td></td>
<td></td>
</tr>
</tbody>
</table>

GROUND ELEVATION OF FACILITY ABOVE MEAN SEA LEVEL: 2307 FEET
PDEQ STANDARD CONDITIONS ARE 293K AND 101.3 KILOPASCALS (A.A.C. R18-2-101)

General Instructions:

1. Identify each emission point with a unique number for this plant site, consistent with emission point identification used on plot plan, previous permits, and Emissions Inventory Questionnaire. Include fugitive emissions. Limit emission point number to eight (8) character spaces. For each emission point use as many lines as necessary to list regulated air pollutant data. Typical emission point names are: heater, vent, boiler, tank, reactor, separator, baghouse, fugitive, etc. Abbreviations are O.K.
2. Components to be listed include regulated air pollutants as defined in R18-2-101. Examples of typical components names are: Carbon Monoxide (CO), Nitrogen Oxides (NOx), Sulfur Dioxide (SO2), Volatile Organic Compounds (VOC), Particulate Matter (PM), particulate less than 10 microns (PM10), etc. Abbreviations are O.K.
3. Pounds per hour (#/HR) is maximum potential emission rate expected by applicant.
4. Tons per year is annual maximum potential emission expected by applicant, which takes into account process operating schedule.
5. As a minimum applicant shall furnish a facility plot plan as described in the filing instructions, UTM coordinates are required only if the source is a major source or is required to perform refined modeling for the purposes of demonstrating compliance with ambient air quality guidelines.
6. Supply additional information as follows if appropriate:
   a. Stack exit configuration other than a round vertical stack.
   b. Stack’s height above supporting or adjacent structures if structure is within 3” (stack height above the ground)” of stack.
7. Dimensions of non point sources as defined in R18-2-101.
Section 2.0  Permit Revision Description

TEP is submitting this minor permit revision application under Pima County Code 17.12.110 for addition of an emergency standby diesel generator (EGEN4) to the Irvington Generating Station (IGS) to be located next to the Operation Center. The proposed generator is intended to be used when the main power is interrupted, to provide emergency power to loads needed for all critical activities. This generator will be powered by a diesel fired reciprocating internal combustion engine (Caterpillar 3516C) which has a displacement of 4.31 liter/cylinder and a maximum engine power of 2937 brake horsepower. This engine is manufacturer certified to conform to EPA’s Tier 2 exhaust emission standards prescribed under 40 CFR 89.112 and 113 for non-road compression ignition engines.

<table>
<thead>
<tr>
<th>Type of Equipment</th>
<th>Maximum Rated Capacity</th>
<th>Make</th>
<th>Model</th>
<th>Serial Number</th>
<th>Date of Manufacture</th>
<th>Equipment ID Number</th>
</tr>
</thead>
<tbody>
<tr>
<td>Emergency Standby Diesel Generator</td>
<td>2000 ekW</td>
<td>Caterpillar</td>
<td>3516C</td>
<td>LY500415</td>
<td>2020</td>
<td>EGEN4</td>
</tr>
</tbody>
</table>
Section 3.0  Regulatory Applicability Analysis

The following provides discussion of federal and local air quality regulations applicable to the proposed emergency standby generator EGEN4 to be located at IGS.

3.1 Applicable Air Quality Requirements

- The New Source Performance Standards (NSPS) are contained within the Code of Federal Regulations (CFR) at 40 CFR Part 60. Specific subparts to the NSPS address a variety of sources. As an engine of 2020 vintage, EGEN4 will be a new source subject to 40 CFR 60, Subpart IIII (“Standards of Performance for Stationary Compression Ignition Internal Combustion Engines”). This rule provides emission limitations for NOx, CO and PM, and describes requirements for monitoring and recordkeeping that are applicable to the proposed generator set.

- The National Emission Standards for Hazardous Air Pollutants (NESHAPS) are contained within 40 CFR Parts 61 and 63. Specific subparts to the NESHAPS address a variety of sources. The subpart that is pertinent to internal combustion engines is 40 CFR Part 63, Subpart ZZZZ (“National Emission Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines”). No provisions of Subpart ZZZZ are applicable to the EGEN4 engine, except for the initial notification requirement set forth in §63.6645(f) of the subpart. Provision §60.4214(b) of NSPS Subpart IIII, however, exempts such notification.

Table 3-1 in the next page summarizes relevant 40 CFR 60 Subpart IIII requirements that are applicable to EGEN4.

<table>
<thead>
<tr>
<th>Rule Citation</th>
<th>Requirements Summary</th>
<th>Source Affected</th>
</tr>
</thead>
<tbody>
<tr>
<td>40 CFR §60.4205(b) &amp; 4211(c)</td>
<td>Comply with emission standards for new nonroad CI engines set forth in 40 CFR §89.112: 6.4 g/kW-hr for NMHC+NOx, 3.5 g/kW-hr for CO, and 0.20 g/kW-hr for PM. This is done by purchasing an engine certified to the emission standards by the manufacturer.</td>
<td>EGEN4</td>
</tr>
<tr>
<td>40 CFR §60.4207(b)</td>
<td>Only burn diesel fuel that meets the 15ppm ultra-low sulfur standard set forth in 40 CFR §80.510(b)</td>
<td>EGEN4</td>
</tr>
<tr>
<td>40 CFR §60.4209(a)</td>
<td>Install a non-resettable hour meter prior to startup of the emergency stationary RICE.</td>
<td>EGEN4</td>
</tr>
<tr>
<td>40 CFR §60.4211(f)</td>
<td>Can only operate the emergency generator in emergency situations, or maintenance checks and readiness testing. While there is no time limit on the use of emergency generator in emergency situations, maintenance checks and readiness testing is limited to 100 hours per year.</td>
<td>EGEN4</td>
</tr>
<tr>
<td>40 CFR §60.4214(b)</td>
<td>Record the time of generator operation and the reason the generator was in operation during that time.</td>
<td>EGEN4</td>
</tr>
</tbody>
</table>
3.2 *Exemptions and Insignificant Activities*

TEP is not proposing any additional exemptions or insignificant activities with this permit application.

3.3 *Compliance Status*

TEP is currently in compliance with its air quality permit and will meet any additional applicable requirements that become effective during the permit term in a timely manner.
Section 4.0 Emission Related Information

As an engine of 2020 vintage, EGEN4 is subject to regulations prescribed under 40 CFR 60 Subpart IIII – Standards of Performance for Stationary Compression Ignition Internal Combustion Engines. As such, EGEN4 is to be certified to EPA’s non-road compression-ignition engine Tier 2 emission standards prescribed under 40 CFR 89.112, that is, 3.5 g/kW-hr for CO, 6.4 g/kW-hr for NMHC+NOx and 0.20 g/kW-hr for PM. The exhaust emission limits are to be met over entire life of the EGEN4 engine. Subpart IIII also requires the use of ultra-low sulfur diesel, which sets maximal fuel sulfur content at 15 ppm. The emissions standards are used in calculation of PTE for CO, NOx, SO2 and PM. AP-42 emission factors are also used to estimate PTE of HAPs, VOCs and PM10/PM2.5.

In addition, Subpart IIII limits operation of maintenance checks and readiness testing to no more than 100 hours/year. The rule does not limit emergency run hours of EGEN4 in true emergency situations.

The emission estimates are summarized in Tables 4-1 and 4-2. As demonstrated, the addition of the emergency generator EGEN4 will cause only a minor increase of emissions and qualifies for minor permit revision specified under Pima County Code 17.12.110.

Table 4-1: EGEN4 Potential to Emit of Criteria Pollutants

<table>
<thead>
<tr>
<th>Pollutant</th>
<th>Emission Factor</th>
<th>Unit of Measure</th>
<th>Emission Factor Source</th>
<th>Potential Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>NOx</td>
<td>6.4</td>
<td>g/kW-hr</td>
<td>40 CFR 89.112 Table 1</td>
<td>28.22</td>
</tr>
<tr>
<td>CO</td>
<td>3.5</td>
<td>g/kW-hr</td>
<td>40 CFR 89.112 Table 1</td>
<td>15.43</td>
</tr>
<tr>
<td>VOC</td>
<td>7.05E-04</td>
<td>lb/hp-hr</td>
<td>AP-42, Table 3.4-1</td>
<td>2.07</td>
</tr>
<tr>
<td>PM</td>
<td>0.0697</td>
<td>lb/mmBtu</td>
<td>AP-42, Table 3.4-2</td>
<td>1.34</td>
</tr>
<tr>
<td>PM10</td>
<td>0.0573</td>
<td>lb/mmBtu</td>
<td>AP-42, Table 3.4-2</td>
<td>1.10</td>
</tr>
<tr>
<td>PM2.5</td>
<td>0.0556</td>
<td>lb/mmBtu</td>
<td>AP-42, Table 3.4-2</td>
<td>1.07</td>
</tr>
<tr>
<td>SO2</td>
<td>1.21E-05</td>
<td>lb/hp-hr</td>
<td>AP-42, Table 3.4-1</td>
<td>0.04</td>
</tr>
</tbody>
</table>

¹ Information based on Caterpillar 3516C. 2020 model year or later. Note that EGEN4 is limited to 100 hours per year for maintenance checks and readiness testing.

² SO2 (lb/hp-hr) = 8.09E-03 * %S, where %S = 0.0015. This equation is derived using sulfur mass balance and vendor provided engine performance data.
### Table 4-2: EGEN4 Potential to Emit of Hazardous Air Pollutants

**HAZARDOUS AIR POLLUTANTS - Emergency Diesel Generator (EGEN4)**

EGEN4 Maximum Firing Rate (MMBtu/hr)\(^1\) = \[
\begin{array}{c}
19.182
\end{array}\]

Emissions = (Max Turbine Firing Rate) \(\times\) (Emission Factor)

<table>
<thead>
<tr>
<th>Listed HAP Pollutants</th>
<th>Emission Factor</th>
<th>Unit of Measure</th>
<th>Emission Factor Source</th>
<th>Potential Emissions</th>
</tr>
</thead>
<tbody>
<tr>
<td>Polynuclear Aromatic Hydrocarbons (PAH)</td>
<td>2.12E-04</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-4</td>
<td>4.07E-03 1.02E-05</td>
</tr>
<tr>
<td>Benzene</td>
<td>7.76E-04</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>1.49E-02 3.72E-03</td>
</tr>
<tr>
<td>Toluene</td>
<td>2.81E-04</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>5.39E-03 1.35E-03</td>
</tr>
<tr>
<td>Xylenes</td>
<td>1.93E-04</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>3.70E-03 9.26E-04</td>
</tr>
<tr>
<td>Propylene</td>
<td>2.79E-03</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>5.35E-02 1.34E-02</td>
</tr>
<tr>
<td>Formaldehyde</td>
<td>7.89E-05</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>1.51E-03 3.78E-04</td>
</tr>
<tr>
<td>Acetaldehyde</td>
<td>2.52E-05</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>4.83E-04 1.21E-04</td>
</tr>
<tr>
<td>Acrolein</td>
<td>7.88E-06</td>
<td>lb/MMBtu</td>
<td>AP-42 Table 3.4-3</td>
<td>1.51E-04 3.78E-05</td>
</tr>
</tbody>
</table>

\[\text{Total HAPs} = 0.08 \quad 0.02\]

\(^1\) Heat Input (mmBtu/hour) = fuel consumption at full load (138 gal/hr) \(\times\) fuel heating value (139,000 Btu/gal) \(\times\) 10\(^{-6}\)
Air Quality Permit No. 1052, Part B, Section XII is hereby amended by revising the section introductory text to read as follows:

**XII. NSPS SUBPART IIII EMERGENCY GENERATOR REQUIREMENTS**

This section applies to the NSPS emergency generators identified as EGEN2, EGEN3, and EGEN4 in the equipment list. All standards are federally enforceable unless indicated otherwise.

*********

Air Quality Permit No. 1052, Attachment 2 - Equipment List, Section V is hereby amended by revising the table to read as follows:

**V. Gas Turbine Starter ICE and Emergency Generators**

<table>
<thead>
<tr>
<th>Equipment ID</th>
<th>Description</th>
<th>Capacity</th>
<th>Serial Number</th>
<th>Make/ Model</th>
<th>Fuels</th>
<th>Date of Manufacture</th>
<th>Rule Applicability</th>
</tr>
</thead>
<tbody>
<tr>
<td>EGEN1</td>
<td>NESHAP Emergency Generator</td>
<td>349 HP (260 kW)</td>
<td>9NR03701</td>
<td>Caterpillar/3306</td>
<td>Diesel</td>
<td>1999</td>
<td>NESHAP Subpart ZZZZ</td>
</tr>
<tr>
<td>EGEN2</td>
<td>NSPS Emergency Generator</td>
<td>636 HP (474 kW)</td>
<td>8CMAF6003ID</td>
<td>Kohler/400REOZDD</td>
<td>Diesel</td>
<td>2008</td>
<td>NSPS Subpart III</td>
</tr>
<tr>
<td>EGEN3</td>
<td>NSPS Emergency Generator</td>
<td>900 HP (600 kW)</td>
<td>T3400446</td>
<td>Caterpillar/C18</td>
<td>Diesel</td>
<td>2018</td>
<td>NSPS Subpart III</td>
</tr>
<tr>
<td>EGEN 4</td>
<td>NSPS Emergency Generator</td>
<td>2937HP (2000 kW)</td>
<td>LY500415</td>
<td>Caterpillar 3516C</td>
<td>Diesel</td>
<td>2020</td>
<td>NSPS Subpart III</td>
</tr>
<tr>
<td>IGT1A</td>
<td>NESHAP Gas turbine starter engine</td>
<td>635 hp</td>
<td>772267-3</td>
<td>Cummings</td>
<td>Diesel</td>
<td>1972</td>
<td>NESHAP Subpart ZZZZ</td>
</tr>
<tr>
<td>IGT2A</td>
<td>NESHAP Gas turbine starter engine</td>
<td>635 hp</td>
<td>769853-3</td>
<td>Cummings</td>
<td>Diesel</td>
<td>1972</td>
<td>NESHAP Subpart ZZZZ</td>
</tr>
</tbody>
</table>