

PM₁₀ SIP/Maintenance Plan Evaluation Report:
Payson City Power Plant

Utah County Nonattainment Area

Utah Division of Air Quality

Major New Source Review Section

October 1, 2015

PM₁₀ SIP/MAINTENANCE PLAN EVALUATION REPORT

Payson City Power Plant

1.0 Introduction

The following is part of the Technical Support Documentation for Section IX, Part H.1 and Section IX, Part H.2 of the Utah SIP; to address the Utah County PM₁₀ Nonattainment Area. This document specifically serves as an evaluation of the Payson City Power Plant.

Note on document identification: The intention of the Utah Division of Air Quality is to develop a Maintenance Plan to address PM₁₀. As part of this effort, SIP Subsections IX.H.1 Emission Limits and Operating Practices – General Requirements, IX.H.2 Source-Specific Particulate Emission Limitations in Salt Lake and Davis Counties and IX.H.3 Source-Specific Particulate Emission Limitations for Utah County will be repealed and replaced. Subsection IX.H.4 will be repealed without replacement, as this section is no longer needed.

This evaluation report references the SIP version originally dated June 28, 1991 (updated November 4, 1992 and made effective by EPA on August 8, 1994). This SIP version is often referred to as the “original SIP.” The Utah County portion of the SIP was further updated on June 5, 2002 and made effective by EPA on January 22, 2003. Additional SIP revisions were adopted by the Air Quality Board on July 6, 2005 and became state law on August 1, 2005. However, this version of the SIP was not adopted by EPA and therefore never became federal law.

In order to distinguish between the various documents in this report, the following coding scheme will be used:

- Since Section IX.H of the 2005 State-only SIP will be repealed entirely and will not be referred to in this report.
- When referencing the original SIP with an effective date of August 8, 1994 the qualifier ^{OS} will follow any citation from that document.
- In reference to the updated Utah County SIP with an effective date of January 22, 2003 the qualifier ^{UC} will follow any citation from that document.
- When referencing any new SIP condition or requirement, the citation will be left blank.

Therefore, a particular sentence of this document might read as follows:

SIP Subsection IX.H.1.c – Stack Testing supersedes 2.a.A^{OS} from the original SIP.

2.0 Facility Identification

Name: Payson City Power Plant

Address: 1100 North 100 East, Payson, Utah, Utah County

Owner/Operator: Payson City Corporation

UTM coordinates: 4,432,650 m Northing, 437,060 m Easting, Zone 12

3.0 Facility Process Summary

Payson City Corporation operates the Payson City Power Plant (PCPP) a peaking power plant consisting of four dual-fuel internal combustion (IC) engines. Engines #1 and #2 are rated at 2,650 kW each. Engine #3 is rated at 2,093 kW, while engine #4 is rated at 1,800 kW. The site also consists of a small emergency generator (186 hp), a small natural gas-fired boiler (0.812 MMBtu/hr), and several above-ground storage tanks. A grandfathered emergency flare acts as a safety device during tank filling operations. Two cooling towers cool the exhaust from the IC engines.

The power plant is operated as a peaking and supplemental power plant to provide electrical power to municipal power customers in and around the City of Payson. The plant is defined as a Title V major source located in Utah County, and within the Provo, Utah PM_{2.5} nonattainment area.

Operation of the plant is dependent on local demand and cost of utility power. The IC engines operate primarily on natural gas, with ultra-low sulfur diesel fuel used for start-up.

4.0 Facility Criteria Air Pollutant Emissions Sources

The facility consists of the following emission sources

- 2,650 kW dual-fuel fired IC engine (IC #1)
- 2,650 kW dual-fuel fired IC engine (IC #2)
- 2,093 kW dual-fuel fired IC engine (IC #3)
- 1,800 kW dual-fuel fired IC engine (IC #4)
- 0.812 MMBtu/hr natural gas-fired boiler (boiler #1)
- Diesel and glycol storage tanks (tanks)
- Emergency flare (flare)
- 186 hp emergency generator (Em Gen)
- Cooling towers (cooling towers #1, #2)

5.0 Facility 2011 Baseline Actual Emissions and Current PTE

PCPP operates sporadically as a peaking plant and as a part of the general municipal power generator network resulting in low actual emissions compared to its potential to emit for all pollutants.

Table 1: Comparison of Actual and Potential Emissions

Pollutant	Actual Emissions (Tons/Year)¹	Potential to Emit (Tons/Year)²
PM ₁₀	0.09	25.00
SO ₂	0.08	3.30
NO _x	3.85	200.00

¹ PCPP's 2011 actual emissions

² PTE's for PCPP's AO issued DAQE-AN108230006-14, dated July 7, 2014

6.0 Projected Emissions for 2019

A modified version of the PTE values was used in the modeled attainment demonstration. The projected emission values for 2019 were calculated from limits given in PCPP's current AO and the PM_{2.5} SIP. PCPP was limited to 200 and 44.8 tons per year of NO_x and CO, respectively, for IC #1-4. Based on the emissions from the IC engines, the CO emission limit compared to the actual emissions limited the engine operation compared to the NO_x emission limit compared to the actual emissions. A scaling factor was determined from the actual IC 1-4 CO emissions and the emission limit, which was then used to scale the other pollutants of interest.

Table 3: 2019 Projected Emission Values or Modeled Emission Values

Pollutant	Potential to Emit (Tons/Year)
PM ₁₀	1.10
SO ₂	1.96
NO _x	99.20

7.0 Maintenance Plan

PCPP was not a previously listed SIP source in the 1994 Original SIP^{OS} or the 2003 Utah County SIP^{UC}. However, PCPP is not a new source. Potential emissions from PCPP were less than the threshold that required inclusion in either the Original or Utah County SIPs. PCPPs emissions were included in the modeling efforts associated with these SIPs.

8.0 New Maintenance Plan – General Requirements

The updated general requirements for all listed sources are found in SIP Subsection IX.H.1. This serves as a means of consolidating all commonly used and often repeated requirements into a central location for consistency and ease of reference.

Conditions 1.a, 1.b and 1.d are declaratory statements and define the framework of the other SIP

conditions. They have little in the way of compliance provisions. Condition 1.c is the primary recordkeeping requirement and is further discussed in section 4.2. Conditions 1.e and 1.f serve as the mechanism through which sources conduct monitoring for the verification of compliance with a particular emission limitation.

- IX.H.1.a. Except as otherwise outlined in individual conditions of this Subsection IX.H.1 listed below, the terms and conditions of this Subsection IX.H.1 shall apply to all sources subsequently addressed in Subsection IX.H.2 and 3. Should any inconsistencies exist between these two subsections, the

Limit Discussion

This paragraph states that the terms and conditions of Subsection IX.H.1 apply to all sources subsequently addressed in the following subsections IX.H.2 and IX.H.3. It also clarifies that should any inconsistency exist between the general requirements and the source specific requirements, then the source specific requirements take precedence.

- IX.H.1.b Part The definitions contained in R307-101-2, Definitions, apply to Section IX, H.

Limit Discussion

This requirement states that the definitions found in State Rule 307-101-2, Definitions, apply to SIP Section IX.H. Since this is stated for the Section (IX.H), it applies equally to IX.H.1, IX.H.2 and IX.H.3.

- IX.H.1.c Any information used to determine compliance shall be recorded for all periods when the source is in operation, and such records shall be kept for a minimum of five years. Any or all of these records shall be made available to the Director upon request.

Limit Discussion

This is a recordkeeping provision. Information used to determine compliance shall be recorded for all periods the source is in operation, maintained for a minimum period of five (5) years, and made available to the Director upon request. As the general recordkeeping requirement of Section IX.H, it will often be referred to and/or discussed as part of the compliance demonstration provisions for other general or source specific conditions.

- IX.H.1.d All emission limitations listed in Subsections IX.H.2 and IX.H.3 apply at all times, unless otherwise specified in the source specific conditions listed in IX.H.2 and 3.

Limit Discussion

This requirement states that emission limitations apply at all times that the source or emitting unit is in operation, unless otherwise specified in the source specific conditions listed in IX.H.2 or IX.H.3.

This is the definitive statement that emission limits apply at all times – including periods of startup or shutdown. It may be that specific sources have separate defined limits that apply during alternate operating periods (such as during startup or shutdown), and these limits will be defined in the source specific conditions of either IX.H.2 or IX.H.3.

- IX.H.1.e Stack Testing:
- i. As applicable, stack testing to show compliance with the emission limitations for the sources in Subsection IX.H.2 and 3 shall be performed in accordance with the following:
 - A. Sample Location: The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, or other EPA-approved methods acceptable to the Director.
 - B. Volumetric Flow Rate: 40 CFR 60, Appendix A, Method 2 or other EPA-approved testing methods acceptable to the Director.
 - C. PM₁₀: 40 CFR 51, Appendix M, Methods 201a and 202, or other EPA approved testing methods acceptable to the Director. If a method other than 201a is used, the portion of the front half of the catch considered PM₁₀ shall be based on information in Appendix B of the fifth edition of the EPA document, AP-42, or other data acceptable to the Director.
 - D. SO₂: 40 CFR 60 Appendix A, Method 6C or other EPA-approved testing methods acceptable to the Director.
 - E. NO_x: 40 CFR 60 Appendix A, Method 7E or other EPA-approved testing methods acceptable to the Director.
 - F. Calculations: To determine mass emission rates (lb/hr, etc.) the pollutant concentration as determined by the appropriate methods above shall be multiplied by the volumetric flow rate and any necessary conversion factors to give the results in the specified units of the emission limitation.
 - G. A stack test protocol shall be provided at least 30 days prior to the test. A pretest conference shall be held if directed by the Director. The emission point shall be designed to conform to the requirements of 40 CFR 60, Appendix A, Method 1, and Occupational Safety and Health

Administration (OSHA) approvable access shall be provided to the test location.

- H. The production rate during all compliance testing shall be no less than 90% of the maximum production rate achieved in the previous three (3) years. If the desired production rate is not achieved at the time of the test, the maximum production rate shall be 110% of the tested achieved rate, but not more than the maximum allowable production rate. This new allowable maximum production rate shall remain in effect until successfully tested at a higher rate. The owner/operator shall request a higher production rate when necessary. Testing at no less than 90% of the higher rate shall be conducted. A new maximum production rate (110% of the new rate) will then be allowed if the test is successful. This process may be repeated until the maximum allowable production rate is achieved.

Limit Discussion

This is the main stack testing condition, and outlines the specific requirements for demonstrating compliance through stack testing. Several subsections detailing Sample Location, Volumetric Flow Rate, Calculation Methodologies and Stack Test Protocols are all included – as well as those which list the specific accepted test methods for each emitted pollutant species (PM₁₀, NO_x, or SO₂). Finally, this subsection also discusses the need to test at an acceptable production rate, and that production is limited to a set ratio of the tested rate.

These stack testing requirements supersede those found in IX.H.1.a.A^{OS} and IX.H.2.a.A^{OS} of the original SIP.

IX.H.1.f Continuous Emission and Opacity Monitoring.

- i. For all continuous monitoring devices, the following shall apply:
 - A. Except for system breakdown, repairs, calibration checks, and zero and span adjustments required under paragraph (d) 40 CFR 60.13, the owner/operator of an affected source shall continuously operate all required continuous monitoring systems and shall meet minimum frequency of operation requirements as outlined in R307-170 and 40 CFR 60.13.
 - B. The monitoring system shall comply with all applicable sections of R307-170; 40 CFR 13; and 40 CFR 60, Appendix B – Performance Specifications.
- ii. Opacity observations of emissions from stationary sources shall be conducted in accordance with 40 CFR 60, Appendix A, Method 9.

Limit Discussion

This condition covers the use of CEMs and opacity monitoring. While it specifically details the rules governing the use of continuous monitors (both emission monitors and opacity monitors), it also covers visible opacity observations through the use of EPA reference method 9.

These requirements specifically supersede those found in IX.H.1.a.C^{OS} and IX.H.2.a.C^{OS} of the original SIP. The original SIP requirements of IX.H.1.a.B^{OS} and IX.H.2.a.B^{OS}, both of which addressed individual equipment opacity, will be superseded as necessary by the particular source specific limitations found in IX.H.2 or IX.H.3.

9.0 SCC Specific Requirements

The PCPP specific conditions in Section IX.H.2 address those limitations and requirements that apply only to PCPP.

IX.H.3.e Payson City Corporation: Payson City Power

- i. Emissions of NO_x shall be no greater than 1.54 ton per day for all engines combined.
- ii. Compliance with the emission limitation shall be determined by summing the emissions from all the engines. Emission from each engine shall be calculated from the following equation:

$$\text{Emissions (tons/day)} = (\text{Power production in kW-hrs/day}) \times (\text{Emission factor in grams/kW-hr}) \times (1 \text{ lb}/453.59 \text{ g}) \times (1 \text{ ton}/2000 \text{ lbs})$$

- A. The NO_x emission factor for each engine shall be derived from the most recent stack test. Stack tests shall be performed in accordance with IX.H.1.e. Each engine shall be tested at least every three years from the previous test.
- B. NO_x emissions shall be calculated on a daily basis.
- C. A day is equivalent to the time period from midnight to the following midnight.
- D. The number of kilowatt hours generated by each engine shall be recorded on a daily basis with an electrical meter.

Limit Discussion

PCPP is limited to a combined 1.54 tons per day of NO_x. The condition also includes the definition of a day as being from midnight until the following midnight. Compliance shall be determined daily with the use of emission factors determined from stack tests and generator output. The equations to be used for the emission calculations are also included. Stack testing has already been completed and emission factors determined from this sampling will be used in place of an initial stack test.

PCPP was not previously included in the Original or Utah County SIP; therefore, limits from previous SIPs have not been altered.

10.0 Monitoring, Recordkeeping and Reporting

Monitoring requirements are found in the general requirement IX.H.1.e and all common recordkeeping and reporting provisions have been consolidated in the general requirements under IX.H.1.c.

Monitoring of the NO_x emission limit, IX.H.3.g.i, is determined by maintaining daily records of emissions. The emissions are determined from data gathered from the engine's stack test and the power generated by that engine.

11.0 Discussion of Attainment Demonstration

The emission threshold to include a source in the PM₁₀ SIP was lowered compared to those for 2003 Utah County^{UC} or the 1994 original SIPs^{OS}. Backsliding by this source has been prevented, as it was previously not included in the SIP.

12.0 Emission Limits

Annual and daily emissions are given below.

Table 4: Yearly Emissions and Daily Emissions Limits

All values in tons	NO _x
Annual	200
Daily (24-hr)	1.54

8.0 Reference

Evaluation Report –
UTAH PM₁₀ SIP/MAINTENANCE PLAN
Utah County Nonattainment Area
Supporting Information