TECHNICAL REVIEW DOCUMENT
for
OPERATING PERMIT 95OPFR076

to be issued to:

WestPlains Energy (Division of UtiliCorp United)
W N Clark Power Plant
Fremont County
Source ID 0430003

Michael E. Jensen
February 9, 1998

I. PURPOSE:

This document will establish the basis for decisions made regarding the applicable requirements, emissions factors, monitoring plan and compliance status of emission units covered by the operating permit proposed for this site. It is designed for reference during the review of the proposed permit by the EPA, the public, and other interested parties. The conclusions made in this report are based on information provided in the original application submittal of November 14, 1995; supplemental technical submittals for June 20, July 24 and August 22, 1996; previous inspection reports as well as numerous telephone conversations with the applicant.

II. SOURCE DESCRIPTION:

This facility is located in Cañon City. Cañon City is classified as a non-attainment area for PM_{10}. A request for re-classification of the area to attainment has been initiated and is currently under consideration by EPA. There are no affected states within 50 miles of the facility. The Great Sand Dunes National Monument is a designated Federal Class I area within 100 kilometers of the facility. Florissant Fossil Beds is a Federal land area within 100 kilometers of the facility. Florissant Fossil Beds has been designated by the State to have the same sulfur dioxide increment as Federal Class I areas.

The facility is categorized as a major source for Prevention of Significant Deterioration/New Source Review (PSD/NSR) considerations. The facility is not subject to the provisions of the Accidental Release Plan of Section 112(r) of the Clean Air Act. The boilers are not subject to the provisions of Title IV, the Acid Rain Program, because they are existing boilers, each with an electrical generating capability of less than 25 Megawatts.

The primary features of the facility are two steam driven electrical generating units. Unit 55 was placed in service in 1955. The boiler has a design capacity of 226 MMBtu/Hr which produces 165,000 pounds per hour of steam to drive a turbine/generator set with a 16.5 megawatts nameplate rating. As a note, the Title V application reports the design feed rate for the coal is 12.44 ton per hour. This feed rate for coal with an average heat value exceeds

the design heat rate for the boiler. Unit 59 was placed in service in 1959. The boiler has a design capacity of 346 MMBtu/Hr which produces 210,000 pounds per hour of steam to drive a turbine/generator set with a 22 megawatts nameplate rating. The boilers are equipped to burn only coal for fuel. No backup fuels are utilized. Each boiler was designed with abrupt directional changes in the gas flow to the stack. The directional changes are intended to separate the larger particulate material from the gas stream. The separated material is returned to the combustion area of the boiler. In addition, each boiler is provided with a Mikro-Pul Model SR fabric filter dust collector. The Unit 55 baghouse has 10 compartments, and the Unit 59 baghouse has 12 compartments. Each compartment has 325 bags. The design information for the baghouses guarantees 99.9 % removal of particulates 0.5 microns and greater, and that the gas stream discharge will not exceed 0.015 grains of particulate matter per actual cubic feet of discharge at any time.

At one time there were provisions for the use of auxiliary or backup fuels for the boilers. These ancillary fuel systems have been removed and the boilers operate only on coal. A cold boiler is started by charging the grates with wood. The wood is burned to heat the refractory and to provide the combustion temperature needed to start the combustion of the coal.

No cooling towers are used. The heated water is discharged to Mill Ditch which flows a short distance before discharge to the Arkansas River. This discharge has a National Pollution Discharge Elimination System (NPDES) permit. There is a cooling tower at the facility for use if there are problems meeting the NPDES temperature requirements. The Division accepts that the limited use of the tower, the low mineral concentration of the water, and the lack of chemical use in the water intuitively results in low cooling tower emissions. However, when evaluating the cooling tower as an insignificant source, the permittee needs to be mindful that cooling towers may have significant particulate emissions.

In May of 1976 the plant was issued a Cease and Desist Order for opacity violations. The owner decided, at that time, to convert the facility to 100% coal use and install baghouses to control emissions. The modifications required construction permits to be issued. The Division denied the permit request because air quality analyses found the potential for SO_2 violations of the allowable 2-hour and 24-hour averages. The Air Quality Commission over-ruled the denial and ordered the permits issued with the requirements for SO_2 monitoring and an SO_2 limit not to exceed 1.2 pounds per million BTU, averaged over two (2) hours. In addition, Unit 59 was also required to provide opacity monitoring. It is worth noting that a June 1977 stack test found the boilers could not comply with the SO_2 limit. Construction Permits C-11,325 and C-11,326 were issued incorporating the Commission decisions. The permits were re-issued as 11FR325 for Unit 55 and 11FR326 for Unit 59 during a subsequent change of ownership. At the time of this re-issuance, several of the permit conditions were changed. One of the changes increased the SO_2 averaging period to a three (3) hour period to incorporate a regulation change.

Regulation No. 1 §III.A.1.b uses the following formula to set the particulate emissions rate: $PE = 0.5(FI)^{-0.26}$. For Unit 59, the equation is: $PE = 0.5(346)^{-0.26} = 0.1093$ pounds per MMBtu. Permit C-11,326 incorrectly set the limit at 0.113 pound per MMBtu. The file review found that the permit error was apparently a result of a transcription error, and never detected. This error is corrected in the Title V permit.

Regulation No. 1§VI.B.4.a.i sets the limit for SO_2 at 1.2 lbs/MMBtu which is the standard set in the construction permits. Inspection of the table in Regulation No. 1 §X finds that for coal with a heating value of 10,500 Btu/pound, the value provided in the Title V application, the sulfur content needs to be less than 0.66% to avoid SO_2 violations. Further, a 1981 EPA memorandum reporting on a plant inspection notes that a 95% conversion of the coal sulfur being burned at that time would result in SO_2 emissions close to the standard. The Exceedance Reports reviewed for the facility note a number of exceedances attributed to the sulfur content of the coal, yet provide no evidence of the coal sulfur values at the time of the exceedance. The Title V application reports the coal is sampled at the time of shipment by the supplier. The application is silent on whether this is a general contract provision for all suppliers, and provides no information on the testing performed. The Title V permit will require closer monitoring and documentation of the coal sulfur content.

The SO_2 standard is related to the coal sulfur and heat content and not the rate of fuel consumption. The SO_2 CEMs should adequately identify the values needed for a calculation to demonstrate compliance with the standard. The apparent variability of the coal sulfur content was discussed above. The variability of the heat content has not been identified in the file information. Engineering judgement would indicate the compliance determination will need to be determined for each shipment of coal.

Regulation No. 1 §IV.B requires fossil fuel-fired steam generators with a rated capacity greater than 250 MMBtu/Hr to be equipped with opacity, SO_2 and CO_2 or O_2 monitors. Unit 55 was rated at 249 MMBtu/Hr when the initial construction permits were issued and avoided the requirement for an opacity monitor. The file review found the difference in the monitoring requirements (set by the Commission) for the two units has been an issue of contention from time to time. No evidence was found in the files to support the 249 MMBtu/Hr rating for Unit 55 which allowed the avoidance of providing the opacity monitor. The permittee was requested to validate the capacity rating to ensure that continuous opacity monitoring was not required. The response provided evidence that the correct rating for Unit 55 should be 226 MMBtu/Hr. This correction is made in the Title V permit. The change in capacity results in a very minor adjustment of the particulate emission standard set by the equation.

The re-issuance of the two construction permits for a change in ownership resulted in other changes in addition to the change in the SO_2 monitoring period previously discussed. Construction Permit C-11,325 was re-issued as 11FR325 for Unit 55. The emission rates for

NOx and CO were dropped. The emission limits had been set by Regulation No. 8, but that portion of Regulation No. 8 had been canceled during the time interval between the two permit issuances; therefore, there were no applicable requirements for retaining these standards. Construction Permit C-11,326 was re-issued as 11FR326 for Unit 59. An apparently inadvertent error resulted in the old NOx and CO emission rate limits being carried forward into the new permit for Unit 59.

To evaluate the significance of the error, Potential-To-Emit (PTE) calculations for Unit 59, the largest boiler, were made using AP-42 (1/95) emission factors. The NOx emission factor of 13.7 lbs/ton of coal resulted in a PTE of 209.88 lbs/hr. The CO emission factor of 5.0 lbs/ton of coal resulted in a PTE of 76.60 lbs/hr. These values were compared to the permit limits. The portion of Regulation No. 8 which has been canceled established the permit limits based on industrial hygiene Threshold Value Limits for CO and NOx. Since the emission factors are average values, a worst case situation could be approximated by doubling the values. Even after the doubling, the values are so far below the previous permit limits that the permit limits serve no purpose. The NOx and CO limits will, therefore, not be included in the Title V permit because of the lack of any practical value for air pollution emissions control.

Regulation No. 3 identifies lead as a criteria pollutant and lead and lead compounds as hazardous air pollutants. The 200 pound criteria pollutant permit threshold for lead was set by a change in Regulation No. 3 in 1993. The permittee needs to be mindful of the dual classification and reporting thresholds for lead when considering the need for the APEN revisions

The Potential-to-Emit in the following tabulation of emissions was calculated from the coal use provided in the Title V application and the emission factors from AP-42 (1/95). The actual emissions are from the Air Pollution Emission Notices (APENs) submitted for reporting the hazardous air pollutant emissions from coal combustion for data year 1995. The actual lead emissions were taken from the Title V application.

POLLUTANT	POTENTIAL-TO-EMIT, TONS PER YEAR						FACILITY ACTUAL EMISSIONS TPY 1995
	UNIT 55	UNIT 59	COAL PILE	COAL HANDLING	ASH HANDLING	TOTALS	
PM	3.60	4.43	34.8	27.8	100.0	170.7	4.31
PM_{10}	0.72	0.89	12.54	13.9	60.0	88.1	0.86
SO_X	1139	1402				2541	1398.72
NO_X	746.5	919.3				1666	1004.21
VOC	2.72	3.36				6.08	5.02
CO	272.4	335.5				607.9	358.65
Pb Compounds	0.59	0.74				1.33	0.86**
HAPS							22.96

** Value taken from Title V application

The compliance status of each source at the facility is based on the information provided in the application and a review of the office files available. No current non-compliance issues were identified in the file review. The Division accepts the facility was in compliance at the time the Title V application was submitted. Since no compliance plan or schedule was included for start-up, shut-down or malfunction opacity exceedances, it is accepted that the facility has adequate and appropriate control programs in place.

III. EMISSION SOURCES

The following sources are specifically regulated under terms and conditions of the Operating Permit for this site:

Unit B001 - 226 MMBtu/Hr Babcock and Wilcox Boiler
Unit B002 - 346 MMBtu/Hr Babcock and Wilcox Boiler

1. Applicable Requirements - B001 (Unit 55) went into service in 1955. The Final Approval construction permit was last issued on July 20, 1992. The construction permit set emissions rate limits for particulate matter and sulfur dioxide, required the use of a continuous emission monitor (CEM) for sulfur dioxide and submission of quarterly excess emissions reports. As reported above, the particulate emission rate included in the construction permit was incorrect, and the correct value will be incorporated into the Title V permit.

B002 (Unit 59) went into service in 1959. A modified The Final Approval construction permit was issued on May 21, 1992. The construction permit sets emissions rate limits for particulate matter and sulfur dioxide, required the use of a continuous emission monitor for sulfur dioxide; required a continuous opacity monitor; and required submission of quarterly excess emissions reports. The permit also sets emission standards for NOX and CO. As noted above, the NOX and CO standards will not be carried into the Title V permit.

Both construction permits specified a 3-hour average for the sulfur dioxide emission rate. Regulation No. 1§IV.B.3 states that the requirement for an SO_2 CEM, also requires the provision of a CO_2 or O_2 CEM. A CO_2 CEM is provided for both stacks.

2. Emission Factors - The boilers are not equipped to burn gaseous or liquid fossil fuels, and are permitted to burn only coal. The primary criteria pollutants of concern are particulates and sulfur dioxide. Standard AP-42 emission factors for particulates and sulfur dioxide include variables based on the ash and sulfur content of the coal. These values for this variables will be obtained from a coal sampling program. The particulate emission factor will have to be adjusted to recognize the removal efficiency of the baghouse.

3. Monitoring Plan - The sulfur dioxide CEMs are to be used to demonstrate continuous compliance with the standard and estimate the actual annual emissions. A coal sampling plan will be required to identify when coal being delivered has a sulfur content high enough to contribute to exceedances of the standard.

For the sulfur dioxide compliance determination, 40 CFR Part 60, Appendix A, Method 19 Section 2.5 provides the following equation for computing the sulfur dioxide emissions when the carbon dioxide and sulfur dioxide are measured on a wet basis.

$$E = C_w F_c \frac{100}{\% CO_{2w}}$$ C_w and CO_{2w} are wet weight measurement values

Method 19, Section 1.0 provides the following conversion factor to be used in the equation:

$$\text{ppm } SO_2 \text{ X } 1.660\text{X}10^{-7} = \frac{\text{lb}}{\text{scf}}$$

Method 19 Table 19-2 provides an F_c value for bituminous coal of 1800 scf/MMBtu

Combing the terms:

$$E, \frac{lb}{MMBtu} = (SO_2 ppm \text{ X } 1.660 \text{ X } 10^{-7}) \frac{lb}{scf} X \frac{1800 scf}{MMBtu} X \frac{100}{\%CO_2}$$

$$E, \frac{lb}{MMBtu} = \frac{0.0858 \quad X \quad SO_{2} \quad ppm}{\%\ CO_{2}}$$

The reduced form of the equation is provided in the operating permit.

As discussed previously, only Unit 59 is equipped with a continuous opacity monitor (COM). The data from the monitor will be used to determine compliance with the Regulation No. 1 opacity standards. Note that it would seem reasonable for both units to report similar amounts of opacity exceedances, presuming equal conditions. The inability to perform Method 9 observations at night immediately creates the possibility for a significant number of Unit 55 opacity exceedances to go unreported, or to exist for a significant period of time before a corrective action is taken. It would be expected that there is adequate operating experience with the Unit 55 baghouse to provide indicators that can serve as surrogates to signal a malfunction of a magnitude to create an opacity exceedance.

The permittee provided the observation that it often takes some time to re-calibrate and stabilize the emission monitoring systems when a boiler is started after being out of service for an extended time. Further, the downtime could result in the boiler operating for just a short period during a calendar quarter. The combination of the short boiler operating time and any problems with the re-start of the emission monitoring systems, could distort the quality assured data availability percentage calculation for the quarter. To recognize this potential problem, the monitoring plan requires the permittee to notify the Division of extended boiler outages and request a case-by-case determination of how to determine the compliance with the quality assured data availability for the quarter.

4. Compliance Status - The Division accepts the unit was in compliance at the time the Title V application was submitted.

S003 Coal Stock Pile
FE001 Coal Processing

1. Applicable Requirements - The coal processing operations had not been previously reported. The coal processing consists of off-loading, stockpiling, and transfer of the coal from the storage pile to the boiler hoppers. The coal is crushed inside the plant just prior to burning. All of these processes had grandfathered regulatory status for the requirement for construction permits. The file information reports that the storage of coal reserves are kept to about 1 day's use to avoid stockpile aging problems. The emission estimates did identify that the current stock pile and coal processing have emissions above the APEN reporting

threshold. Space is available to stockpile up to about 30 days of coal reserves if needed. The permittee needs to be mindful that the fugitive emissions from such a stockpile may result in the need for a fugitive particulate control plan.

The pertinent applicable requirements for these sources of fugitive particulate emissions are to minimize the emissions (Regulation No. 1, Section III.D.1.a), and APEN reporting (Regulation No. 3, Part A, Section II). The 20% opacity, no off-property transport and nuisance emission limitations identified in Regulation 1, Section III.D.1.c are guidelines, not enforceable standards. However, failure to comply with the guidelines may trigger the Division to require a fugitive particulate control plan be submitted. The file information indicates a fugitive particulate emissions control plan has not been required to avoid a problem with the off-site transport of fugitive particulate matter.

While PM and PM_{10} fugitive particulate emissions are subject to the APEN reporting requirements, they but are not subject to annual emission fees.

2. Emission Factors: Fugitive emissions are emissions that are not discharged to the atmosphere in a confined flow stream. The combination of wind, exposed surface area and compaction of the coal create fugitive particulate emissions from the piles. The fugitive emissions are categorized as particulate matter (PM), which is typically particulates with a relatively coarse size range, and particulate matter less than 10 microns in diameter (PM_{10}).

The following emission factors provided in the Title V application and used by the Division in evaluating the emissions from the coal processes and the stockpile:

FUGITIVE MATERIAL EMISSION FACTORS				
	COAL PROCESS			
Pollutant	Off-loading	Stockpile	Transfer	Crushing
PM	0.02 pound per ton of coal	47,400 pounds per acre of exposed material	0.2 pound per ton of coal	0.02 pound per ton of coal
PM10	0.01 pound per ton of coal	17,060 pounds per acre of exposed material	0.1 pound per ton of coal	0.01 pound per ton of coal

3. Monitoring Plan: As noted above, once the emission factors have been determined the emissions can be estimated by monitoring the amount of exposed surface area of the storage pile and the number of tons of coal processed. Fugitive particulate emissions are usually controlled by the application of water or chemicals to the road surface. Visual observations provide sufficient information to identify when a problem is developing and the need for corrective action.

4. Compliance Status: The Division accepts that this source was in compliance at the time

the application was prepared based on the information provided in the application.

S004 Ash Silo

1. Applicable Requirements - The bottom ash and the fly ash from the two baghouses are pneumatically transferred to the storage silo. The ash is taken off the property for disposal. The ash silo had not been previously reported. The ash silo does, however, have grandfathered regulatory status for the requirement for a construction permit. The applicable requirements are to submit Revised APENs as required and to pay annual fees based on the emissions.

2. Emission Factors - AP-42 does not provide emission factors for this situation. The Division has commonly adapted emission factors from the AP-42 section on clay and fly ash sintering. These adapted emission factors were used for the estimates. The silo vent is equipped with a baghouse. While the actual uncontrolled emissions could be quite large, the baghouse limits the actual emissions to a fraction of a ton per year.

3. Monitoring Plan - The amount of total ash (flyash and bottom ash) processed through the silo is to be recorded, and the annual emissions estimated. A visual observation for emissions is to be made weekly. If emissions are noted, the cause of the emissions is to be investigated. If the visible emissions persist, Method 9 opacity observations must be made. This procedure should be adequate to ensure the proper maintenance and operation of the baghouse.

4. Compliance Status - The Division accepts the unit was in compliance at the time the Title V application was submitted.

Alternate Operating Scenarios

No alternate operating scenarios were identified

Permit Shield

No permit shield was requested.

HAZARDOUS AIR POLLUTANTS

At the time the Title V application was submitted, the reporting of estimated actual hazardous air pollutants (HAPs) emissions from combustion at utility steam boilers used for electrical power generation had been deferred until the findings of an EPA scientific study were released, or September 30, 1996, whichever came earliest. In an effort to provide an estimate of the potential-to-emit for the combustion HAPs, the Title V application used emission factors available from AP-42 for calculation of the best available approximation of the emissions. The permittee has reported the estimated HAPs to the Division in accordance with the September 30, 1996, deadline. A computer software program was utilized to calculate the combustion HAPs. The estimated actual HAPs emissions shown in the Table above includes a small amount (approximately 0.05 TPY) of HAP emissions from incidental use of paints, solvents, and cleaning materials.

MISCELLANEOUS

A number of the forms were not provided with the application. The information that would have been provided by the missing forms was available on other forms, or elsewhere in the application. The judgement was made that no beneficial purpose would result from requiring the submission of the missing forms.

From time to time published emission factors are changed based on new or improved data. A logical concern is what happens if the use of the new emission factor in a calculation results in a source being out of compliance with a permit limit. For this operating permit, the emission factors or emission factor equations included in the permit are considered to be fixed until changed by the permit. Obvious factors dependent of the fuel sulfur content or heat content can not be fixed and will vary with the test results. The formula for determining the emission factors is, however, fixed. It is the responsibility of the permittee to be aware of changes in the factors, and to notify the Division in writing of impacts on the permit requirements when there is a change in factors. Upon notification, the Division will work with the permittee to address the situation.