TECHNICAL REVIEW DOCUMENT
For
OPERATING PERMIT 02OPLI253
to be issued to:

Tri-State Generation and Transmission Association, Inc. – Limon Generating Station
Lincoln County
Source ID 0730036

Prepared by Jacqueline Joyce
May 2003
Revised June, October and November 2003

I. Purpose:

This document establishes the basis for decisions made regarding the Applicable Requirements, Emission Factors, Monitoring Plan and Compliance Status of Emission Units covered within the Operating Permit proposed for this site. It is designed for reference during review of the proposed permit by the EPA, the Public and other interested parties. Conclusions made in this report are based on information provided by the applicant in the Title V application submitted November 27, 2002, additional information received on May 14, June 10, September 17 and October 14 2003, comments on the draft operating permit and technical review document received July 31, 2003, various telephone conversations and e-mail correspondence with the source and review of Division files. This narrative is intended only as an adjunct for the reviewer and has no legal standing.

Any revisions made to the underlying construction permits associated with this facility made in conjunction with the processing of this operating permit application have been reviewed in accordance with the requirements of Regulation No. 3, Part B, Construction Permits, and have been found to meet all applicable substantive and procedural requirements. This operating permit incorporates and shall be considered to be a combined construction/operating permit for any such revision, and the permittee shall be allowed to operate under the revised conditions upon issuance of this operating permit without applying for a revision to this permit or for an additional or revised Construction Permit.

II. Source Description

The Limon Generating Station consists of two simple cycle combustions turbines used to generate electric power under Standard Industrial Classification 4911. The combustion turbines are primarily fueled by natural gas and are designed to burn distillate fuel oil as a back-up fuel source. Each combustion turbine generates approximately 82 MW of power.

The facility is located at 48303 State Highway 71(approximately 7 kilometers south, southwest of Limon on the west side of State Highway 71). The area in which the plant operates is designated as attainment for all criteria pollutants.

This facility is considered to be a major stationary source (Potential to Emit > 250 tons/yr) in an attainment area and has a PSD permit. Future modifications to this facility which are in excess of significance levels as defined Colorado Regulation No. 3, Part A, Section I.B.58, would result in a major modification and the application of PSD requirements. Facility wide emissions are as follows:

Pollutant	Potential to Emit (tons/yr)	Actual Emissions (tons/yr)
PM	115.6	2.1
PM_{10}	115.6	2.1
NO_X	370.4	14.7
SO_2	49.2	1.1
CO	396.4	8.3
VOC	13.4	0
HAPS	6	Negl.

Potential to emit (PTE) is based on permitted emission limits. HAP potential to emit is based on both turbines burning natural gas only, AP-42 (Section 3.1, Table 3.1-3, dated April 2000) emission factors for formaldehyde, xylene and acetaldehyde (3 highest HAP emission factors) and the permitted heat input rate. Actual emissions are based on APENS submitted on April 29, 2003, based on 2002 operating levels.

There are no Federal Class I designated areas within 100 kilometers and no affected states within 50 miles of this facility.

The facility indicated in the Title V permit application that the facility contains no listed substances above the threshold level and therefore is not subject to the risk management plan provisions in section 112(r) of the Act.

CAM applies to any emission unit that is subject to an emission limitation, uses a control device to achieve compliance with that emission limitation and has potential pre-control emissions greater than major source levels. NO_X emissions from the turbines, when burning natural gas are controlled by DLN combustion systems. DLN combustion systems are not considered control devices as defined in 40 CFR Part 64 §64.1, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV, since DLN combustion systems are considered inherent process equipment. However, when burning distillate fuel, the turbines utilize water injection to reduce NO_X emissions. Water injection is considered a control device as defined in 40 CFR Part 64 §64.1, as adopted by reference in Colorado Regulation No. 3, Part C, Section XIV. Therefore, the CAM requirements apply to the turbines, when distillate oil is used as fuel.

III. Emission Sources:

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

<u>Units L001 and L002</u> – Two (2) General Electric, Model No. 7EA (PG 7121), Combustion Turbines, Serial Nos. 297656 and 297657. Natural Gas is the primary fuel for these turbines, with distillate oil used as a back-up fuel. Each turbine is rated at 840.3 mmBtu/hr when burning natural gas and 905.8 mmBtu/hr when burning distillate oil. Each turbine drives a generator rated at 82 MW. Each turbine is equipped with dry Low NO_X combustion systems and water injection (when firing distillate oil) to reduce NO_X emissions.

Discussion:

1. Applicable Requirements - These units were issued Colorado Construction Permit 00LI0455 as an initial approval on January 17, 2001. Both units commenced operation in December 2001. A final approval construction permit was issued for the turbines on October 30, 2002.

The turbines are subject to the following applicable requirements from Colorado Construction Permit 00LI0455 (final approval, issued October 30, 2002):

- Visible emissions shall not exceed twenty percent (20%) opacity during normal operation of the source. During periods of startup, process modification, or adjustment of control equipment visible emissions shall not exceed 30% opacity for more than six minutes in any sixty consecutive minutes (condition 2 and Colorado Regulation No. 1, Sections II.a.1 & 4).

  Note that Colorado Regulation No. 1 does not identify the 20% opacity requirement as a condition that only applies during normal operation and EPA has objected, in comments on another operating permit, to the term “normal operations” applied to the 20% opacity standard. The specific operational activities subject to the 30% opacity requirement are also conditions that can be considered “normal operation”. Therefore, the language in the permit will not specify “normal operation”. The 30% opacity requirement will be written to include all the specific operational activities identified in Reg 1.

- This source shall be limited to a maximum raw material process rate or fuel use rate as listed below and all other activities, operational rates and number of equipment as stated in the application. Monthly records of the actual consumption rate shall be maintained by the applicant and made available to the Division for inspection upon request. Total heat inputs into the two turbines, together, shall not exceed the following limitations (condition 4):

  - 3,680,514 mmBtu per quarter and 14,722,056 mmBtu per year, when burning exclusively natural gas, or

- 3,713,264 mmBtu per quarter and 14,853,056 mmBtu per year when operating a maximum of 1,000 hours per year (for each turbine) on distillate fuel oil.

The language in the construction permit indicates that the quarterly emission limits shall apply for the first year of operation, only. Since these units have been operating for one year, the quarterly fuel consumption limits will not be included in the operating permit.

In addition, the language in the construction permit indicates that there is a wide range of possible combinations of heat input between running solely on natural gas, and burning natural gas and distillate fuel oil (up to 1,000 hours per year per turbine) and the construction permit includes a table showing possible combinations. In the original construction permit application, the source submitted an APEN requesting a natural gas heat input limit based on the design heat rate (840.3 mmBtu/hr) and 8760 hrs/yr of operation for each turbine and a distillate fuel oil heat input limit based on the design heat rate (905.8 mmBtu/hr) and 1000 hrs/yr of operation for each turbine. However, in the permit, the Division did not include the heat input limits requested by the source. Clearly, the turbines could not operate at the source's requested heat input limits since in order to do so, each turbine would have to operate 9760 hrs/yr. Since operating each turbine at the requested heat input limits is not possible the Division included a heat input limit that appears to be a "sliding" limit based on how many hours the unit operates on distillate fuel. At this time, the Division believes that including this "sliding" limit makes the compliance monitoring more difficult for both the source and the Division. Therefore, the Division will include the heat input limits requested on the APENS submitted with the initial construction permit application, which are 14,722,058 mmBtu per year from natural gas and 1,811,600 mmBtu/yr from distillate fuel oil. In addition, an hours of operation limit of 1,000 hours per year per turbine shall be imposed for burning distillate fuel oil. As indicated previously, it is physically not possible to run the turbines at the requested heat input limits. Therefore, this revision in the permit does not allow for increased operation of the turbines, but simplifies the monitoring for both the Division and the source.

In addition, in their July 31, 2003 comments on the draft permit and technical review document, the source indicated that they wished to revise the hours of operation limit to allow for 2,000 hrs/yr of operation for both turbines combined and the Division has agreed to revise that limit as requested. Since the turbines are identical and have the same stack characteristics, the Division considers that this revision can be made without conducting any additional modeling analysis.

- Unit #2 (Serial No. 297567) shall not combust distillate fuel oil, unless the combustion of distillate fuel oil is used to conduct distillate fuel oil performance testing, until written approval is received from the Division.

Written approval from the Division will be received when compliance with condition 9 of this construction permit has been demonstrated and approved by the Division (condition 5).

The Division provided the source with written approval to burn distillate fuel oil in a letter dated July 13, 2003 (see attached). Note that the source conducted a performance test on June 6 and 7, 2003 on Unit 2 and the Division has approved this test. Therefore, this requirement will not be include in the operating permit.

- For each combustion turbine, a continuous emission monitoring system (CEMS) shall be installed calibrated, certified, maintained and operated to measure and record:

  - Hourly concentration of NO_X, ppmvd;
  - Hourly concentration of O_2, percent;
  - Emissions of NO_X, tons/mo, tons per rolling twelve month period;
  - Emissions of CO, tons/mo and tons/rolling 12 month permits;
  - Fuel flow rate, SCF/hr for gas and gallons per hour for distillate fuel oil

  QA/QC shall conform to 40 CFR Part 60, Appendix F and Subpart A.

  Because the hourly ppm data are converted to lbs/hr to calculate mass emissions, the Division will include lbs/hr as a parameter to be recorded. In addition, the Division will also require that the data acquisition and handling system of the CEMS record operating mode (i.e. startup, shutdown or standard operation) and load (MW).

  The hourly fuel flow rate required by the construction permit will be identified as a separate requirement and not included as a CEMS requirement.

  In addition, the source has a CEMS plan (dated December 7, 2001) that was approved by the Division on July 15, 2002. Much of the information in the CEMS plan will be included in the operating permit as permit conditions. Therefore, the operating permit will supercede the CEMS plan. Any information contained in the CEMS plan that is not addressed in the operating permit will be included in Appendix G of the operating permit. However, it should be noted that there are some provisions in the CEMS plan that upon incorporation in the operating permit will be revised, as discussed below:

  The CEMS plan includes provisions for both the Knutson and Limon facilities. The Knutson facility did not go through PSD review and the Knutson facility has short term RACT limits as opposed to short term BACT limits. Both the short term BACT and RACT limits are concentration (i.e. ppmvd) limits. In a letter dated August 21, 2001, the Division indicated to Tri-State, that although the construction permit issued for the Limon facility exempted the turbines

from the short-term BACT limits during startup and shutdown, it was not appropriate for the Division to allow such an exemption. However, for the RACT limits (Knutson), the exemption from the RACT limits during startup and shutdown was acceptable and no revisions were necessary. In this letter, the Division indicated that Tri-State could either request a modification to the construction permit or if not, the Division would remove the exemption from the BACT limits during startup and shutdown in the Title V operating permit. However, the CEMS plan (items 3.3, 3.4 and 5.01) specifically indicates that the BACT exemption during startup and shutdown for Limon still applies and indicates that certain startup and shutdown CEMS data is excluded. The CEMS plan does indicate that the mass emissions during startup and shutdown would be included in monitoring compliance with the annual mass emission limits. Since, as discussed later in this document, it was not appropriate for the Division to exempt the Limon turbines from the BACT limits during periods of startup and shutdown, the CEMS must include all valid CEMS data to monitor compliance with the BACT limits.

Condition 5.01 of the CEMS plan indicates how the short-term emission rates will be calculated and specifies that all ppm data is reduced to clock hourly averages and that these averages will be compared to the BACT limits. This procedure is correct, except that calculation of the short-term emission rates during startup, shutdown and combustion tuning and testing and those partial hours of "normal" operation before and after startup, shutdown and combustion tuning and testing will not be calculated in this manner. Compliance with the alternative BACT limits for startup, shutdown, combustion tuning and testing and any partial "normal" hours that occur before and/or after the activity will be monitored as follows:

<u>Startup and Shutdown</u>: All concentration (ppm) data points recorded during a startup and shutdown will be averaged together and compared to the alternative startup and shutdown BACT limits. Note that while this method allows for an averaging time that exceeds 1 hour, the source has indicated that it is highly unlikely for a startup or shutdown to exceed 1 hour in duration. If the startup ends or the shutdown begins within a "clock" hour, all non-startup and non-shutdown concentration (ppm) data points within that "clock" hour will be averaged together and compared to the standard BACT limit. The source has agreed to revise their CEMS to perform these calculations.

<u>Combustion Tuning and Testing:</u> All concentration (ppm) data points recorded during combustion tuning and/or testing will be reduced to "actual" hourly averages and compared to the alternative combustion tuning and testing BACT limit. If combustion tuning and/or testing begins or ends in the middle of a "clock" hour, all non-combustion tuning and/or testing concentration (ppm) data points within that "clock" hour will be averaged together and compared to the standard BACT limit. It should be noted that

the CEMS is not capable of performing these calculations; therefore, the source will perform these calculations manually.

- Emissions of pollutants shall not exceed the following (condition 7):

  - PM 115.6 tons/yr
  - PM_{10} 115.6 tons.yr (includes condensibles)
  - SO_2 49.2 tons/yr
  - NO_X 370.4 tons/yr
  - VOC 13.4 tons/yr
  - CO 396.4 tons/yr
  - Single HAP 9 tons/yr
  - Combined HAPs 20 tons/y

  Based on the Division's review during the processing of this permit, it is not clear why Tri-State requested a limit on HAP emissions. Formaldehyde is the primary HAP emitted from the turbines; although other HAPS are emitted although in much lower quantities. The information in the construction permit application indicated that formaldehyde emissions are well below 9 tons/yr. Based on an emission factor from source testing on a similar unit for natural gas and AP-42 emissions factor for distillate fuel oil, formaldehyde emissions are below 2 tons/yr. Based on AP-42 emission factors for both natural gas and distillate fuel oil, formaldehyde emissions are below 6 tons/yr. In addition, based on the emission factors identified in the proposed MACT for combustion turbines, HAP emissions are below 7 tons/yr. Therefore, in their comments on the draft permit received July 31, 2003, the source requested that the HAP limits be removed from the permit.

  It should be noted that the final rule for combustion turbines was signed on August 29, 2003. The final rule exempts existing combustion turbines (commenced construction on or before January 14, 2003) from the MACT standards.

- Source compliance tests shall be conducted to measure the emission rates for SO_2, CO, NO_X, VOC (non-methane and ethane, speciated for HAPS (formaldehyde and acetaldehyde)), and PM_{10} in order to (condition 8):

  - Show compliance with the emission limits for SO_2, NO_X, VOC and PM_{10};
  - Calibrate and certify the continuous emission monitoring systems; and
  - Develop a correlation between emissions of VOC and NO_X and/or CO. This correlation shall be used for calculating the emissions of VOC.

  A performance test was conducted on Unit 2 on June 6 and 7, 2003 and the Division has approved the test, therefore the performance test requirements will not be included in the operating permit.

- Best Available Control Technology (BACT) shall be applied for control of PM, PM_{10}, CO, SO_2 and NO_X. The following have been determined as BACT, and shall be complied with (condition 9):

  - <u>Particulate Matter and Particulate Matter less than 10 micrometers (PM_{10}):</u> use of pipeline quality natural gas and application of good combustion control practices. Operating on distillate fuel shall not exceed 1,000 hours/yr per turbine. Emissions of PM_{10} shall not be in excess of an annual average of 0.034 lbs/mmBtu when burning 100% distillate fuel oil.

    In their July 31, 2003 comments on the draft permit the source requested that the 1,000 hrs/yr per turbine limit be revised to allow for 2,000 hrs/yr for both turbines combined. As discussed previously, the Division has agreed to revise the hours of operation limit as requested.

    Based on a review of the file, it is not clear where the BACT emission limit for PM_{10} came from, since the 0.034 lbs/mmBtu emission rate is less than the emission rates used to set the annual emission limits for PM_{10}. The modeling analysis was conducted at the emission rate used to set the permit limits (38 lbs/hr per turbine, ranging from 0.041 to - 0.053 lbs/mmBtu).

    The source was able to provide further information on the BACT limit. The manufacturer's information on the Limon turbines (based on an October 30, 2000 revision of the application), when burning distillate oil, provides a manufacturer's guarantee of 38 lbs/hr for PM_{10}. The manufacturer's data sheet indicates that the PM_{10} emissions are based on a PM emission rate of 10 lbs/hr, which is based on filterable catch and therefore was doubled and a sulfur mist emission rate estimate of 18 lbs/hr, which was provided for the Knutson application. However, the sulfur mist emissions are based on a distillate fuel with a sulfur content of 0.218 % by weight. Therefore, to estimate the BACT limit, the sulfur mist emissions were reduced to take into account the lower sulfur content of the fuel oil (0.05 vs. 0.218 weight percent). In addition, the BACT limit was based on the estimated performance at 75% load, which is based on the 10 lbs/hr for filterable PM and 17 lbs/hr for sulfur mist. The BACT limit was determined as follows:

    PM_{10} = PM front half x 2 + sulfur mist

    PM_{10} = (10 lbs/hr) x 2 + 17 lbs/hr x (0.05/0.218) = 23.9 lbs/hr

    $$PM_{10} = \frac{23.9 \text{ lbs/hr}}{712.6 \text{ mmBtu/hr}} = 0.034 \text{ lbs/mmBtu}$$

    In addition, the construction permit indicates that the BACT limit for PM_{10} is on an annual average. Since the PM_{10} NAAQS are 24-hr and annual, an annual averaging time is not appropriate to protect the 24-hr NAAQS. In addition, the annual averaging time is not practically enforceable. Therefore, the Division has revised the PM_{10} averaging time to be the

average of three (3) 1-hour tests, which is based on the compliance demonstration method (i.e. the performance test).

- Sulfur Dioxide: Use of pipeline quality natural gas. Use of low sulfur distillate fuel oil with an annual average sulfur content of less than 0.05 weight percent. Operation of the turbine on distillate fuel oil shall not exceed 1,000 hrs/yr per turbine.

  As discussed previously, as requested by the source the hours of operation limit has been revised to 2,000 hrs/yr for both turbines combined.

- Carbon Monoxide: Application of good combustion practices. Concentration of CO shall not be in excess of 25 ppmvd, at 15% O_2. CO emissions shall not be in excess of an annual average of 0.0534 lbs/mmBtu. Periods of startup (a maximum of 30 minutes) and shutdown (maximum of 15 minutes) are exempt from concentration standards.

  Although not specifically indicated the averaging time for the concentration limit is presumed to be hourly. In addition, the annual lbs/mmBtu limit is apparently based on the annual emission limits divided by the heat input limit of 14,853,056 mmBtu/hr, which is based on burning natural gas for 7760 hrs/yr and then distillate oil for 1000 hrs/yr. Therefore, if each turbine burned only natural gas and operated at their heat input and annual emission limits, the source would be out of compliance with the lbs/mmBtu limit (396.4 tons/yr/14,722,056 mmBtu/yr = 0.0538 lbs/mmBtu). At this point, the Division considers that with an hourly concentration limit and an annual mass limit, there is no further need for a lbs/mmBtu limit for CO. Therefore, the lbs/mmBtu CO limit will not be included in the operating permit.

- Nitrogen Oxides: Advanced Dry Low NO_X combustion system capable of limiting the concentration of NO_X to 9 ppmvd at 15% O_2, hourly average when burning natural gas. When burning fuel oil, water shall be injected to reduce NO_X and the concentration shall be limited to 42 ppmvd at 15% O_2, hourly average. Periods of startup (a maximum of 30 minutes) and shutdown (maximum of 15 minutes) are exempt from concentration standards.

  The construction permit exempted both the NO_X and CO emissions from BACT concentration limits during startup and shutdown. It was not appropriate for the Division to exempt the source from BACT limits during periods of startup and shutdown. EPA guidance (John B. Rasnic to Linda M. Murphy, dated January 28, 1993, “Automatic or Blanket Exemptions for Excess Emissions during Startup and Shutdowns Under PSD”) states that “... PSD permits cannot contain automatic exemptions which allow excess emissions during startup and shutdown....the exemptions granted under some New Source Performance Standards (NSPS) are not applicable to this issue under PSD. The NSPS are

technology based standards that are not directly required for meeting ambient standards." Furthermore EPA guidance (Kathleen M. Bennett to Regional Administrators, dated February 15, 1983, "Policy on Excess Emissions During Startups, Shutdowns, Maintenance and Malfunction") indicates that "...startup and shutdown of process equipment are part of the normal operation of a source and should be accounted for in the design and implementation of the operating procedure for the process and control equipment. Accordingly, it is reasonable to expect that careful planning will eliminate violations of emission limitations during such periods."

The January 28, 1993 EPA memo addresses using alternate limitations during startup and shutdown and although they do not necessarily approve this method, they point out that these types of standards need to have clear definitions and limits and that the standard should demonstrate compliance with the short term PSD increments and ambient air standards, as well as the long term ambient air standards. The Division has opted to take the approach to provide an alternate BACT limit during periods of startup and shutdown. In order to provide an alternate BACT limit during startup and shutdown, the source must demonstrate that with this alternate BACT limit, compliance with the short and long term NAAQS and PSD increments can be maintained. Since the NO_X NAAQS is an annual value, modeling is only required for the CO startup and shutdown limits. The Division reviewed the alternative BACT limits for CO and has determined that with the source's requested alternative BACT limits for startup and shutdown that there are no significant impacts to the NAAQS or PSD increments. The alternative BACT limits are as follows:

Fuel	Startup*		Shutdown*	
	NO_X	CO	NO_X	CO
Natural Gas	100 ppmvd	1,000 ppmvd	100 ppmvd	1,000 ppmvd
Distillate Fuel Oil	175 ppmvd	1,000 ppmvd	175 ppmvd	1,000 ppmvd

*concentration limits (ppmvd) at 15% O_2

All data points collected during any startup and shutdown period shall be averaged together to monitor compliance with the startup and shutdown BACT limits, as discussed on page 6 of this document.

Note that based on the additional information provided by the source on September 17, 2003, startup and shutdown are defined as follows:

<u>Natural Gas:</u>

"Startup" means the setting in operation of any air pollution source for any purpose. Setting in operation for these turbines begins when fuel is

injected into the gas turbine and ends 20 minutes after the turbine reaches “pre-mix steady state” mode.

“Shutdown” means the cessation of operation of any air pollution source for any purpose. The cessation of operation for these turbines begins when the order to shutdown is sent and ends when emissions cease.

Distillate Fuel Oil:

“Startup” means the setting in operation of any air pollution source for any purpose. Setting in operation for these turbines begins when fuel is injected into the gas turbine and ends 20 minutes after the turbine reaches “extended liquid lean-lean” mode.

“Shutdown” means the cessation of operation of any air pollution source for any purpose. The cessation of operation for these turbines begins when the order to shutdown is sent and ends when emissions cease.

In addition, in their additional information received on September 17, 2003, the source requested that the alternative BACT startup and shutdown limits be applicable during “combustion tuning.” The additional information request indicated that the low NO_X turbines are complex machines and need to be tuned from time to time and that combustion tuning is necessary when components begin to wear, deposits build up and/or the controls drift from their original setting. They indicated that combustion tuning activities would be limited to 30 hrs in any calendar year per turbine. Upon further review, the source requested that combustion tuning be limited to 60 hrs in any calendar year for both turbines combined and that the alternative BACT limit apply also to testing operations recommended by the manufacturer in order to properly maintain the turbines. Such testing includes mechanical and electrical over-speed tests and valve tightness testing. Combustion tuning and testing is defined as follows:

“Combustion tuning and testing” means the operation of the unit for purpose of performing combustion tuning and testing operations after a unit overhaul or as part of routine maintenance operations. Combustion tuning and testing can occur from initial fuel firing to maximum load conditions.

The Division has agreed to revise the permit to allow the alternative BACT startup and shutdown limits to apply to combustion tuning and testing operations. The alternative BACT limits for combustion tuning and testing will be based on an “actual” hour average, as discussed on page 6 of this document. Use of the alternative BACT limits for

combustion tuning and testing shall be limited to 60 hrs in any calendar year for both turbines combined.

- The combustion turbines are subject to Regulation No. 6, New Source Performance Standards, as follows (condition 10):

  - Part A, Federal Register Regulations Adopted by Reference, Subpart GG, specifically:

    - NO_X emissions shall not exceed 100 ppmvd at 15% O_2
    - $SO_2 \leq 150$ ppmvd at 15% oxygen **OR** sulfur content in the fuel shall not exceed 0.8 percent by weight

    Although not specifically identified in the construction permit, the source is subject to monitoring requirements on the nitrogen and sulfur content of the fuel and for water injection the source is required to install and operate a monitoring system to monitor the fuel consumption and ratio of water to fuel, continuously. The source submitted a request to EPA (letter dated August 21, 2001) to approve alternative monitoring methods. Specifically, the source requested to use the NO_X CEMS in lieu of the continuous monitoring system for fuel and ratio of water to fuel and the required nitrogen content fuel sampling and to use the provisions in 40 CFR Part 75 Appendix D for determining the sulfur content of the fuels. It is not clear whether EPA approved these alternatives, however, proposed revisions to NSPS GG allow the alternative monitoring methods consistent with the methods requested by the source in their August 21, 2001 letter to EPA.

    The NSPS GG revisions (published in the Federal Register April 14, 2003) were proposed as a direct final rule and if no adverse comments were received by May 14, 2003, the revisions would take effect on May 29, 2003. In these revisions, EPA included the alternative monitoring methods requested by the source in their August 21, 2001 letter. Adverse comments were received and the direct final rule was withdrawn in the Federal Register on May 28, 2003. EPA did however indicate that they would take action on the proposed rule and any final rule would be issued without further public comment.

    Although the proposed revisions to NSPS GG have been withdrawn, EPA has previously indicated in an August 14, 1987 memo that the fuel sampling requirements to determine the nitrogen content for pipeline quality natural gas can be waived. In addition, for other turbines burning pipeline quality natural gas (in accordance with the definition in 40 CFR Part 72) and distillate fuel oil, EPA has approved the use of the "Optional Sulfur Dioxide Emissions Data Protocol for Gas-Fired and Oil-Fired Units" of Appendix D of 40 CFR Part 75 as a custom fuel monitoring schedule for SO_2 (March 13, 2000 letter from John Hepola to Daniel Ewan, Control Number 0000015, from EPA Region 6). It should be

noted that EPA had included test methods from 40 CFR Part 75 Appendix D in their proposed revisions. For other turbines, EPA has also approved the use of a NO_X continuous emission monitoring systems (CEMS) in lieu of sampling fuel for the nitrogen content (March 27, 2000 letter from R. Douglas Neeley to Diana Zakrzwski, Control Number 0000090, from EPA Region 4) and in lieu of the continuous monitoring system for continuously monitoring the fuel consumption and the water to fuel ratio (August 19, 1999 letter from Douglas Neeley to Jeryl Stewart, Control Number 0000064, from EPA Region 4). Therefore, the Division considers that the alternative monitoring methods requested by the source in their August 21, 2001 letter are acceptable and will be included in the permit.

- Part B – Specific Facilities and Sources, **State-only** NSPS, specifically:
  - SO_2 emissions shall not exceed 0.35 lbs/mmBtu.

  Although not specifically identified in the construction permit, the turbines are also subject to the 20% opacity requirement in Section II.C.3.
- Part A, Subpart A
  - Good practices (§ 60.11(d))
  - Circumvention (§ 60.12)

  Note that a more extensive list of requirements from 40 CFR Part 60 Subpart A was included in the construction permit. However, these requirements, if still applicable, will be included in the permit as periodic monitoring or under the continuous emission monitoring requirements and will not be specifically identified as requirements under the NSPS general provisions.

- APEN reporting requirements (condition 11).

Although not specifically identified in Colorado Construction Permit 00LI0455, the turbines are subject to the following applicable requirements:

- Particulate matter emissions, from each turbine, shall not exceed 0.1 lbs/mmBtu (Reg 1, Section III.A.1.c)

- Sulfur dioxide emissions, from each turbine, shall not exceed 0.35 lbs/mmBtu, on a 3-hour rolling average (Reg 1, Section VI.B.4.c.(ii) and VI.B.2)

- Each turbine is subject to the Acid Rain requirements as follows:

  - Allocated SO_2 allowances are listed in 40 CFR Part 73.10(b), however, since these are new units, no allowances were allocated. SO_2 allowances must be obtained per 40 CFR Part 73 to cover SO_2 emissions for the particular calendar year.

- There are no NO_X emission limitations since these units are not coal-fired boilers.
- Acid rain permitting requirements per 40 CFR Part 72.
- Continuous emission monitoring requirements per 40 CFR Part 75.
- This source is also subject to the sulfur dioxide allowance system (40 CFR Part 73) and excess emissions (40 CFR Part 77).

Streamlining of Applicable Requirements

Opacity

The turbines are subject to the Reg 1 20% opacity requirement and the Reg 1 30% opacity requirement for certain specific operational activities. The Reg 1 20% opacity requirement applies at all times, except for certain specific operating conditions under which the Reg 1 30% opacity requirement applies. The turbines are also subject to the state-only Reg 6, Part B 20% opacity requirement. Reg 6, Part B, Section I.A, adopts, by reference, the 40 CFR Part 60 Subpart A general provisions. 40 CFR Part 60 Subpart A § 60.11(c) specifies that the opacity requirements are not applicable during periods of startup, shutdown and malfunction. The Reg 1 20%/30% requirements are more stringent than the Reg 6 Part B opacity requirements during periods of startup, shutdown and malfunction. While the Reg 6, Part B 20% opacity requirement is more stringent during fire building, cleaning of fire boxes, soot blowing, process modifications and adjustment or occasional cleaning of control equipment. Therefore, since no one opacity requirement is more stringent than the other at all times, all three opacity requirements are included in the operating permit. See the attached grid for a clarified view on the opacity requirements and their relative stringency.

SO_2

The turbines are subject to the Regulation No. 1 and Regulation No. 6, Part B SO_2 requirements. The Regulation No. 1 and No. 6, Part B SO_2 standards are the same, 0.35 lbs/mmBtu. The Regulation No. 6, Part B requirement is a state-only requirement. Reg 6, Part B, Section I.A, adopts, by reference, the 40 CFR Part 60 Subpart A general provisions. Although not specifically stated in the general provisions, the Division has concluded after reviewing EPA determinations that the NSPS standards are not applicable during startup, shutdown and malfunction, although any excess emissions during these periods must be reported in the excess emission reports. Specifically, EPA has indicated (4/18/75, determination control no. A007) that when 40 CFR Part 60 Subpart A § 60.11(d) was developed "…it was recognized that sources which ordinarily comply with the standards may during periods of startup, shutdown and malfunction unavoidably release pollutants in excess of the standards." In addition, EPA has also indicated (5/15/74, determination control number D034) that "[s]ection 60.11(a) makes it clear that the data obtained from these reports are not used in determining violations of the emission standards. Our purpose in requiring the submittal of excess emissions is to determine whether affected facilities are being operated and maintained 'in a manner consistent with good air pollution control practices for minimizing emissions' as required

by 60.11(d)." Therefore, the Division considers that the Reg 6, Part B SO_2 requirements do not apply during periods of startup, shutdown and malfunction. Therefore, the Regulation No. 1 SO_2 requirement is more stringent than the Regulation No. 6, Part B requirement and the Regulation No. 6, Part B requirements will be streamlined out of the permit.

The turbines are also subject to the Acid Rain SO_2 requirements. Sources subject to Acid Rain must hold adequate SO_2 allowances to cover annual emissions of SO_2 (1 allowance = 1 ton per year of SO_2) for a given unit in a given year. The number of allowances can increase or decrease for a unit depending on allowance availability. Allowances are obtained through EPA, other units operated by the utility or the allowance trading market and compliance information is submitted (electronically) to EPA. Pursuant to Regulation No. 3, Part C, Section V.C.1.b, if a federal requirement is more stringent than an Acid Rain requirement, both the Reg 1 and the Acid Rain SO_2 requirements shall be incorporated into the permit and shall be federally enforceable. For these reasons, the Acid Rain SO_2 requirements have not been streamlined out of the permit. The source will have to demonstrate compliance with both the Acid Rain SO_2 requirements and the Reg 1 SO_2 standard. Note that the Acid Rain SO_2 allowances appear only in Section III (Acid Rain Requirements) of the permit.

<u>NO_X</u>

Since the NSPS Subpart GG and BACT concentration limits are in the same units, they can be compared for purposes of streamlining. The BACT concentration limits are applicable at all times. The Division considers that the NSPS Subpart GG requirements are not applicable during periods of startup, shutdown and malfunction (as discussed in the SO_2 streamlining section above). Therefore, since the NSPS Subpart GG limits are less stringent than the BACT concentration limits, the NSPS Subpart GG limits will be streamlined out of the operating permit.

<u>Monitoring Requirements</u>

These units are subject to several types of monitoring requirements. The construction permit requires that the stacks be equipped with continuous emission monitoring systems (CEMS) to monitor and record NO_X and CO emissions and the construction permit requires that these monitors be installed, maintained, calibrated and operated according to 40 CFR Part 60, Appendix F and Subpart A. This unit is also subject to the Acid Rain requirements and as such is required to monitor emissions in accordance with the requirements in 40 CFR Part 75. In addition, under the proposed revisions to NSPS Subpart GG, the source may install a NO_X CEMS that meets the requirements of 40 CFR Part 75.

Since the source has installed Part 75 NO_X (and diluent) CEMS, the permit will specify that the NO_X (and diluent) CEMS must meet the requirements in 40 CFR Part 75. The construction permit requirement to install NO_X and diluent CEMS that meet Part 60 requirements will be streamlined out of the permit in favor of the Part 75 requirements. This is consistent with the CEMS plan approved by the Division. In addition, the

continuous monitoring system (monitor fuel and water to fuel ratio, for units with water injection) and nitrogen fuel sampling requirements from 40 CFR Part 60 Subpart GG, will also be streamlined out in favor of the Part 75 NO_X CEMS requirements.

It should also be noted that the 40 CFR Part 60 excess emission reporting requirements for NO_X will remain in the permit as 40 CFR Part 75 does not contain any NO_X excess emission reporting requirements.

It should be noted that for the NO_X CEMS general provisions (Condition 2.2.2), the Division included the primary equipment hourly operating requirements from 40 CFR Part 75 § 75.10(d). Since the turbines are not required to have continuous opacity monitoring systems under 40 CFR Part 75, the Division removed the language from § 75.10(d) regarding the continuous opacity monitoring system since it does not apply to these turbines.

Similarly for the CO CEMS general provisions (Condition 2.2.1), the Division included the continuous emission monitoring requirement from 40 CFR Part 60 § 60.13(e) and since the turbines are not required by the NSPS to have continuous opacity monitoring systems, the Division removed language in § 60.13(e) regarding the continuous opacity monitoring systems, since it does not apply to these turbines.

Under the Acid Rain provisions, sources that demonstrate that the gas burned meets the definition of pipeline quality natural gas may use an emission factor to calculate hourly SO_2 emissions, as allowed by 40 CFR Part 75 Appendix D. Since the Limon turbines burn pipeline quality natural gas, the sampling requirements for NSPS GG will be streamlined in favor of the Part 75 pipeline quality natural gas requirement. As discussed previously, use of the sampling requirements from 40 CFR Part 75 Appendix D have been approved as an alternative monitoring method for the NSPS GG fuel sampling requirements.

Similarly under the Acid Rain provisions, units that burn fuel oil may use the provisions in 40 CFR Part 75 Appendix D for monitoring SO_2 emissions. Appendix D provides sampling requirements (i.e. frequency and method) for units burning fuel and as discussed previously, used of the fuel oil sampling requirements from 40 CFR Part 75 Appendix D have been approved as an alternative monitoring method for the NSPS GG fuel sampling requirements. Therefore, the sampling requirements for NSPS GG will be streamlined in favor of the Part 75 Appendix D sampling requirements.

2. Emission Factors - Emissions from these turbines are produced during the combustion process, and are dependent upon operating conditions and specific properties of the natural gas being burned. The pollutants of concern are Nitrogen Oxides (NO_X), Carbon Monoxide (CO), Volatile Organic Compounds (VOC) and Particulate Matter (PM and PM_{10}). Small quantities of Hazardous Air Pollutants (HAPs) are also emitted dependent upon the makeup of the fuel and combustion efficiency.

NO_X and CO emissions shall be determined using the continuous emission monitoring system required by the construction permit. SO_2 emissions shall be determined using monitoring methods required by 40 CFR Part 75, Appendix D.

The emission factors that will be used to monitor compliance with the emission limits are as follows:

Pollutant	Natural Gas		Distillate Fuel Oil	
	Emission Factor (lbs/mmBtu)	Source	Emission Factor (lbs/mmBtu)	Source
PM	0.0047	From performance tests conducted February 18 - 20, 2002.	0.021	From performance tests conducted June 6 and 7, 2003.
PM_{10}	0.0047		0.021	
VOC	0.0002		3.9×10^{-4}	

3. Monitoring Plan - The source shall be required to monitor compliance with the PM, PM_{10} and VOC emission limits by monitoring fuel consumption and calculating emissions monthly. Compliance with the heat input limits will be monitored using the data acquisition and handling system for the continuous emission monitoring systems.

The continuous emission monitoring systems shall be used to monitor compliance with the BACT and annual NO_X and CO emission limitations. The monitoring methods required by 40 CFR Part 75, Appendix D shall be used to monitor compliance with the SO_2 emission limitations.

Performance tests were conducted on Unit 2, when burning distillate fuel oil on June 6 and 7, 2003. The results of this performance test were 0.021 lbs/mmBtu, approximately 60% of the BACT limit for PM_{10}. The Division considers that no further performance test will be required to demonstrate compliance with the PM_{10} BACT limit unless fuel oil is burned for 3,500 hours in any consecutive 2 year period.

In the absence of credible evidence to the contrary, compliance with the Reg 1 opacity, particulate matter and SO_2 limits shall be presumed provided natural gas is used as fuel. In the absence of credible evidence to the contrary, compliance with the Reg 1 particulate matter and SO_2 limits shall be presumed provided distillate fuel oil is used as fuel. Compliance with the Reg 1 opacity limits, when burning distillate fuel oil, shall be monitored by conducting Method 9 visible emission observations.

The sulfur content of the distillate fuel oil shall be monitored by sampling in accordance with the provisions of 40 CFR Part 75, Appendix D.

4. Compliance Status – The source indicated in the Title V permit application that the turbines were out of compliance with the requirement to demonstrate compliance with the emission limitations when burning distillate fuel oil. The Title V permit application indicates that the source has committed to conducting the performance test for distillate fuel oil by December 2003. However, based on the letter from Tri-State to the Division (dated April 26, 2002), the source committed to conducting the test within 15 months.

The Division assumes the 15 months begins with the date of the letter and therefore, the source committed to conducting the test by July 26, 2003. Tri-State conducted a performance test, when burning distillate fuel oil, on June 6 and 7, 2003.

Unit LT001 – 1,500,000 Gallon Distillate Fuel Oil Storage Tank (Above Ground)

The distillate fuel oil storage tank was first placed in service in December 2001. At that time, the storage tank was subject to recordkeeping requirements in 40 CFR Part 60 Subpart Kb. Although emissions from this tank were below APEN de minimis levels, an APEN needed to be filed under the "catch-all" provisions, since the tank was subject to federal NSPS requirements. The source submitted an APEN on May 15, 2002 and the Division issued a construction permit (Colorado Construction Permit 02LI0450, initial approval, dated September 4, 2002) for the tank. Effective October 15, 2003, revisions were made to NSPS Subpart Kb and under these revisions tanks that that have a capacity of 39,889 gallons or greater and storing liquids with a maximum true vapor pressure less than 3.5 kPa (approx. 0.5 psia) are exempt from the provisions of 40 CFR Part 60 Subpart Kb. Since the emissions from the tank are below APEN de minimis levels and since the tank is no longer subject to any federal NSPS requirements, neither a construction permit or APEN is required for this tank and the tank can be considered an insignificant activity. The Division has presumed that the source will request that the construction permit for this tank be canceled. Therefore, the tank is included in the Appendix A of the permit as an insignificant activity.

IV. Insignificant Activities

General categories of insignificant activities at this site include: disturbance of surface areas for land development < 25 acres and 6 months, fuel (gaseous) burning equipment < 5 mmBtu/hr, chemical storage tanks/containers < 500 gal or storage areas < 5,000 gal, landscaping and site housekeeping equipment (< 10 hp), lube oil storage tanks (< 40,000 gal), fuel (gaseous) burning equipment < 10 mmBtu/hr (for heating), and sources with emissions below APEN de minimis levels. The following list of insignificant activities was provided by the source in their Title V operating permit application:

Two (2) fuel heaters (natural gas fired), 3.5 mmBtu/hr each
Two (2) fuel gas heater tanks (water bath) – main, 4,000 gal, each
Two (2) fuel gas heater tanks (water bath) – expansion, 361 gal, each
Distillate fuel oil storage tank (1,500,000 gallons, above ground) previously identified in construction permit 02LI0450
Chemical storage tanks < 5,000 gal
- Sulfuric acid – 2,000 gal
- Potassium hydroxide – 300 gal
- Sodium hydroxide – 330 gal
- Sodium bisulfite – 300 gal

Lube oil tank - 3,300 gal
Transformers (480 volt/590 gal, 4160 volt/3200 gal, 13800 volt/12460 gal)
Wash water storage tank (underground) - 2,000 gal
Water Treatment (deareator/degassifier) – 1,250 gal

Treated water storage
    Demineralized water – 250,000 gal
    Potable water – 250,000 gal
Pressurized CO_2 tank for fire protection – 8,000 lbs
Landscaping equipment < 10 hp
Ventilated Enclosures (height)
    Distillate forwarding pumps (9 ft)
    Generator Cooling (18 ft)
    Load tunnel cooling (18 ft)
    Exhaust wrapper cooling (18 ft)
    Exhaust frame cooling (18 ft)
    Gas distribution valving (8 ft)
Building Ventilation – including fuel burning equipment using natural gas < 10 mmBtu/hr and used solely for comfort heating
Water treatment building
EEE building – including battery charging station
Control room/maintenance shop – includes welding and other maintenance activities\
Distillate transfer station – includes equipment storage

V. Alternative Operating Scenarios

No alternative operating scenarios were requested for this facility.

VI. Permit Shield

The source identified and justified a short list of non-applicable requirements that they wish to be specifically shielded from. The non-applicable requirements that the source will be shielded from are as follows:

- Colorado Regulation No. 7 (except for Section V, Paragraphs VI.B.1 and 2, and Subsection VII.C), Volatile Organic Compounds - The permit application states that these regulations are not applicable because the source is not located in an ozone non-attainment area. Regulation No. 7 only applies to sources located in ozone non-attainment areas or in the Denver Metro Attainment Maintenance Area with the exception of Section V, Paragraphs VI.B.1 and 2, and Subsection VII.C which are applicable statewide. The permit shield was granted based on the source's justification.

- Colorado Regulation No. 7, Section V.B – The permit application states that these requirements are not applicable since the facility is not a bulk gasoline terminal, bulk gasoline plant or gas dispensing facility. The permit shield was granted based on the source's justification.

- Colorado Regulation No. 7, Sections VI.B.1 and 2 – The permit application states that these requirements are not applicable as the liquids stored in tanks greater than 40,000 gallons is No. 2 distillate fuel oil. The permit shield was granted based on the source's justification.

- Colorado Regulation No. 7, Section VII.C – The permit application states that these requirements are not applicable since crude oil is not stored in tanks exceeding 40,000 gallons. The permit shield was granted based on the source's justification.

In addition, the source requested the permit shield from several monitoring requirements in 40 CFR Part 60 Subpart GG pertaining to monitoring for water injection and nitrogen content of the fuel. The permit application indicates that these requirements are not applicable, since the turbines are equipped with continuous emission monitoring systems to measure NO_X emissions. Specifically, the shield was requested for the following requirements:

- Continuously monitor fuel consumption and water to fuel ratio (40 CFR Part 60 Subpart GG § 60.334(a))

- Monitoring the nitrogen content of the fuel (40 CFR Part 60 Subpart GG § 60.334(b))

- Test methods and procedures related to water injection and monitoring the nitrogen content of the fuel. The relevant sections were not specifically identified by the source but presumably these requirements are §§ 60.335(a), (c)(2), (d) and (e).

These requirements are applicable to the turbines at the Limon facility; however, alternative monitoring methods have been approved and included in the permit. As discussed previously in this document, under streamlining of monitoring requirements, the Division has included the above requirements, as appropriate in the permit shield for streamlined/subsumed conditions.

The following applicable requirements were streamlined out of the permit and have been included in the permit shield.

- **State-only –** 0.35 lbs/mmBtu SO_2 requirement (Reg 6, Part B, Section II.D.3.b), streamlined out since Reg 1 SO_2 requirement is more stringent.

- 100 ppmvd NO_X (natural gas) and 96 ppmvd NO_X (distillate fuel oil) at 15% O_2 requirement for the turbines (40 CFR Part 60 Subpart GG § 60.332(b), as adopted by reference in Colorado Regulation No. 6, Part A), streamlined out since the NO_X BACT limit (9 (natural gas) and 42 (distillate fuel oil) ppmvd at 15% O_2) is more stringent. Note this also includes the exemptions from the standard in 40 CFR Part 60 Subpart GG §§ 60.332(f) & (i).

- Monitor sulfur and nitrogen content of fuel (40 CFR Part 60 Subpart GG § 60.334(b)) and test methods and procedures for fuel sampling (40 CFR Part 60 Subpart GG §§ 60.335(d) & (e)), streamlined out in favor of the continuous emission monitor (nitrogen sampling) and the Acid Rain requirements in 40 CFR Part 75 Appendix D for gas or oil-fired units (sulfur sampling).

- Excess emission reporting for any one-hour period during which the average water-to fuel ratio is less that the ratio determined by the performance test and/or any period nitrogen content is greater than that used in the performance test (40 CFR Part 60 Subpart GG § 60.334(c)(1)), streamlined out in favor of reporting excess NO_X emissions determined by the continuous emission monitoring system.

- Excess emission reporting for any daily period during which the sulfur content of the fuel being fired in the gas turbine exceeds 0.8 % (40 CFR Part 60 Subpart GG § 60.334(c)(2)), streamlined out in favor of the Acid Rain requirement for pipeline quality natural gas.

- QA/QC requirements for the NO_X and diluent monitors (Colorado Construction permit 00LI0455, condition 6) streamlined out, since the NO_X and diluent monitors shall meet the requirements in 40 CFR Part 75.

V. Acid Rain Requirements

Both turbines are affected units under the Acid Rain Program which is governed by 40 CFR Parts 72, 73, 75, 76, 77 and 78 and as such the source is required to have provisions for the Acid Rain requirements in its Title V permit. Units subject to the Acid Rain requirements are required to hold adequate SO_2 allowances and have NO_X limitations. This facility is not listed under 40 CFR 73.10(b)(2) and therefore must obtain SO_2 allowances as needed. Since these units are not coal-fired boilers, they do not have any NO_X limitations under the Acid Rain Program.

Typically, units subject to the Acid Rain requirements are required to continuously measure and record emissions of SO_2, NO_X (with diluent monitor either CO_2 or O_2) and CO_2 as well as opacity and volumetric flow in accordance with the requirements in 40 CFR Part 75. Since these units meet the definition of gas-fired units in 40 CFR Part 72 §72.2, these units are not required to have a continuous opacity monitoring system and can use an alternate monitoring method (Appendix D), in lieu of installing and operating a continuous emission monitoring system for SO_2.