OKLAHOMA DEPARTMENT OF ENVIRONMENTAL QUALITY
AIR QUALITY DIVISION

MEMORANDUM **August 7, 2001**

TO: Dawson Lasseter, P.E., Chief Engineer, Air Quality Division

THROUGH: Phillip Fielder, P.E., New Source Permits Unit
Eric L. Milligan, P.E., New Source Permits Unit

THROUGH: Peer Review

FROM: Ing Yang, P.E., New Source Permits Unit

SUBJECT: Evaluation of Permit Application No. **2000-090-C (PSD)**
Redbud Energy LP (formerly Energetix)
Redbud Power Plant (formerly Arcadia Power Plant)
Section 17, T14N, R1EIM, Oklahoma County. The northeast corner of the intersection of Covell and Triple X Roads.

SECTION I. INTRODUCTION

Redbud Energy LP proposes to construct and operate an electrical generation facility with a peak electrical generating capacity of approximately 1,100 MW, located in Oklahoma County, Oklahoma. The facility is referred to as the Redbud Power Plant. The Redbud Power Plant will generate electricity for sale to wholesale electric market to meet customer demands. The site and surrounding area is currently pasture land used for grazing livestock. Terrain in the area around the facility has elevation changes of less than 50 feet. Grade elevation of the main structures and supporting structures will be approximately 1,000 feet above mean sea level (msl).

Since the facility will have emissions in excess of the Prevention of Significant Deterioration (PSD) threshold level (100 TPY), the application has been determined to be a Tier III application and subject to public review.

SECTION II. FACILITY DESCRIPTION

Upon completion, the facility will consist of four (4) combustion turbine generators (CTG) with four (4) heat recovery steam generators (HRSG) each equipped with duct burner, one (1) auxiliary boiler, three (3) diesel emergency generators, one (1) diesel fire pump, and cooling towers. In addition to the combustion turbines and engines, the Redbud Power Plant will include a balance of plant equipment and systems such as natural gas metering systems; handling systems; instrumentation and control systems; water treatment, storage and handling; transformers and administration and warehouse/maintenance buildings.

Water treatment equipment will be required to support the boiler feed water and coolant for the required cooling towers. The combustion turbines and auxiliary boiler will be fired exclusively with pipeline-quality natural gas.

SECTION III. EMISSIONS

Emission factors for the turbines are based on manufacturer's guarantees. NO_x and CO values for the turbines are based on parts per million by volume, dry basis, corrected to 15% oxygen. Combustion emissions are generated in each turbine and associated duct burners. The facility exceeds the significance threshold for PM_{10}, NO_x, CO, SO_2, and VOC, so the project is subject to full PSD review for these pollutants. Tier III public review, best available control technology (BACT), and ambient impacts analyses are also required. Redbud Energy LP requests that each combustion turbine with associated HRSG and duct burner and cooling tower be authorized to operate up to 8,760 hours per year. The auxiliary boiler will be limited to 3,000 hours per year. The emergency diesel generator and fire pump will be limited to 500 hours per year.

Calculated Emissions

Pollutant	Single CT w/ Duct Burner		Auxiliary Boiler		Emergency(1) Diesel Generator		Diesel(1) Fire Pump		Cooling(2) Tower		Total Maximum(3) Annual Emissions	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
NO_X	94.0	411.72	1.00	1.50	41.90	10.45	4.69	1.17	--	--	423.59	1,660.00
CO	68.1	298.28	1.64	2.46	9.03	2.26	1.01	0.25	--	--	366.48	1,558.97
VOC	9.7	42.50	0.11	0.16	3.42	0.86	0.38	0.10	--	--	42.71	171.12
SO_2	9.79	42.89	0.01	0.02	2.76	0.69	0.31	0.08	--	--	42.24	172.35
PM_{10}	22.0	96.38	0.15	0.30	2.95	0.74	0.33	0.08	1.79	7.84	93.22	402.24
Lead	0.0002	0.0009	--	--	--	--	--	--	--	--	0.0008	0.0036
H_2SO_4	0.29	1.29	--	--	--	--	--	--	--	--	1.16	5.16

Note:

(1) Emergency Diesel Generator and Diesel Fire Pump are insignificant sources by definition in Appendix I of OAC 252:100.

(2) Cooling Towers are a trivial source as per Appendix J of OAC 252:100.

(3) Total Emissions includes the total emissions for four turbines, four duct burners, one auxiliary boiler, one emergency diesel generator, and one diesel fire pump.

EMISSIONS INCREASES COMPARED TO PSD LEVELS OF SIGNIFICANCE

Pollutant	Emissions, TPY	PSD Levels of Significance, TPY	PSD Review Required?
NOx	1,660.00	250	Yes
CO	1,558.97	100	Yes
VOC	171.12	40	Yes
SO_2	172.35	40	Yes
PM/PM_{10}	402.24	25/15	Yes
Lead	0.0036	0.6	No
Sulfuric Acid Mist	5.16	7	No

SECTION IV. PSD REVIEW

As shown above, the proposed facility will have potential emissions above the PSD significance levels for NO_x, CO, SO_2, VOC, and PM_{10} and are reviewed below. Full PSD review of emissions consists of the following.

A. Determination of best available control technology (BACT)
B. Evaluation of existing air quality
C. Evaluation of PSD increment consumption
D. Analysis of compliance with National Ambient Air Quality Standards (NAAQS)
E. Pre- and post-construction ambient monitoring
F. Evaluation of source-related impacts on growth, soils, vegetation, visibility
G. Evaluation of Class I area impact

A Best Available Control Technology (BACT)

The pollutants subject to review under the PSD regulations, and for which a BACT analysis is required, include nitrogen oxides (NO_X), sulfur dioxide (SO_2), carbon monoxide (CO), particulates less than or equal to 10 microns in diameter (PM_{10}), and volatile organic compounds (VOC). The BACT review follows the "top-down" approach recommended by the EPA.

The emission units for which a BACT analysis is required include the combustion turbines, duct burners, emergency diesel generators, diesel fire pump and cooling towers which will be discussed in this order. Economic as well as energy and environmental impacts are considered in a BACT analysis. The EPA-required top down BACT approach must look not only at the most stringent emission control technology previously approved, but it also must evaluate all demonstrated and potentially applicable technologies, including innovative controls, lower polluting processes, etc. REDBUD ENERGY LP identified these technologies and emissions data through a review of EPA's RACT/BACT/LAER Clearinghouse (RBLC), as well as EPA's NSR and CTC websites, recent DEQ BACT determinations for similar facilities, and vendor-supplied information.

NO_x BACT Review

The Redbud Power Plant proposes a NO_X emission limit of 9 ppmvd at 15% oxygen for the combustion turbines alone (without duct burners), utilizing Dry Low NO_X (DLN) combustion. There are not adverse environmental impacts associated with this control technology. Redbud Energy LP believes that DLN with 9 ppmvd corrected to 15% O_2 for the turbines and 15 ppmvd with the duct burners firing represents BACT, with consideration given to the technical practicability and economic reasonableness of minimizing emissions. This level of control is similar to many listed in the RACT/BACT/LAER Clearinghouse.

The BACT proposal was reviewed using the EPA RACT/BACT/LAER Clearinghouse on the EPA web site. The search was restricted to turbines with an output of 100 MW or more permitted after 1994 and located at electric utilities to narrow the field to a manageable number

of sources similar to that being evaluated in this analysis. Eighteen sources fit the criteria and had NO_X emissions ranging from 2.5 to 25 ppmvd. Some of these evaluations showed oil as a secondary fuel and many had HRSGs but not all of those had duct burners, making comparisons difficult. Units using only DLN as BACT showed emissions ranging between 9 and 25 ppmvd. Units using combinations of DLN and SCR showed emissions ranging between 2.5 and 9 ppmvd. Three of these five units also noted that the DLN/SCR combination was necessary as LAER. Thus, for turbines of the size proposed for this project, the BACT limitation of 9 ppmvd is within the range of requirements for other facilities nation-wide. If those facilities using only DLN are considered, this facility is at the bottom end of the range of values cited.

The following is a list of control technologies, which were identified for controlling NOx emissions from the gas turbines with duct burner firing and their effective emission levels.

Technology	**Emissions**
Thermal DeNOx	N/A
SCONOX™	3.5 ppm
Selective Catalytic Reduction w/Dry Low NOx Burners	5 -12 ppm
Dry Low NOx Burners (DLN)	9 -15 ppm
NOxOUT Process	22 ppm (65% rdxn)
Water/steam Injection	25 ppm

The Redbud Power Plant proposes the use of Dry Low NO_X (DLN) combustion, which Redbud Energy LP believes represents BACT when considering the technical practicability, environmental benefit and economics associated with other commercially available NO_X control technology.

Thermal DeNOx is a high temperature selective non-catalytic reduction (SNCR) of NOx using ammonia as the reducing agent. Thermal DeNOx requires the exhaust temperature to be above 1,800^{o}F, and that would require additional firing in the exhaust stream. The only known commercial applications of Thermal DeNOx are on heavy industrial boilers, large furnaces, and incinerators that consistently produce exhaust gas temperatures above 1,800^{o}F. There are no known applications on or experience with combustion turbines. Temperatures of 1,800^{o}F require alloy materials constructed with very large piping and components since the exhaust gas volume would be increased. This option has not been demonstrated on CTs. Additionally, this option is not feasible due to high capital, operating and maintenance costs, and the need for an additional duct burner system. Therefore, this control technology will be precluded from further consideration in this BACT analysis.

SCONOX™, is an emerging catalytic and absorption technology that has shown some promise for turbine applications. Unlike SCR, which requires ammonia injection, this system does not require ammonia as a reagent, and involves parallel catalyst beds that are alternately taken off line through means of mechanical dampers for regeneration.

SCONOX™ works by simultaneously oxidizing CO to CO_2, NO to NO_2 and then absorbing NO_2. The NO_2 is absorbed into a potassium carbonate catalyst coating as KNO_2 and KNO_3. When a catalyst module begins to become loaded with potassium nitrites and nitrates, it is taken off line and isolated from the flue gas stream with mechanical dampers for regeneration. Once

the module has been isolated from the turbine exhaust, four percent hydrogen in an inert gas of nitrogen or steam is introduced. An absence of oxygen is necessary to retain the reducing properties necessary for regeneration. Hydrogen reacts with potassium nitrites and nitrates during regeneration to form H_2O and N_2 that is emitted from the stack.

SCONOX™ is a very new technology and has yet to be demonstrated for long term commercial operation on large scale combined cycle plants. The catalyst is subject to the same fouling or masking degradation that is experienced by any catalyst operating in a turbine exhaust stream. This has led to reported outages in some cases due to catalyst fouling in the early stages of operations. Long term performance is even more questionable, since adequate data is unavailable to determine the 'aging effect', or degradation, in emission control performance over the long term. While this effect is also experienced with conventional SCR catalysts, operating experience with SCRs exists to better predict catalyst life and catalyst replacement cost is far less. Additionally, there are many operational unknowns since available technology would require a significant scale up to accommodate a facility of this size. Due to the extremely high cost per emission reduction of this control technology (over $26,000 per ton), it is ruled out as a control option and will be precluded from further consideration in this BACT analysis.

SCR is the most widely applied post combustion control technology in turbine applications, and is currently accepted as LAER for new facilities located in ozone non-attainment regions. It can reduce NO_X emissions to as low as 9 ppmvd for standard combustion turbines without duct burner firing, and as low as 4-5 ppmvd when combined with DLN combustion (again without duct burner firing). NO_X emissions from combustion turbines equipped with DLN combustion and duct burners can be controlled to around 5-12 ppmvd using SCR technology.

An SCR system introduces environmental and health risks to the local area due to the emissions, and potential accidental release, of ammonia. Ammonia gas is an irritant and corrosive to skin, eyes, respiratory tract and mucous membranes. Typical ammonia slip levels for SCR systems are 5–10 ppm in the exhaust stack. An ammonia slip of only 5 ppm could result in as much as 200 tons per year of ammonia emissions from the facility. Fugitive ammonia emissions are also expected from equipment relating to ammonia loading, storage, and injection into the turbine exhaust gas stream. Additional particulate emissions due to the formation of ammonium sulfate and ammonium bisulfate could increase PM emissions by 50%. Application of an SCR system would also result in the generation of spent vanadium pentoxide catalyst, which is classified as hazardous waste. Spent catalyst will require special handling and disposal, which adds an additional burden to human health and the environment.

An SCR system results in loss of energy due to the pressure drop across the SCR catalyst. Performance loss due to backpressure would result in an energy loss of approximately 5,400 MWh per year. Installation of this complex system could reasonably be expected to cause 50-100 hours of unforced outages, or as much as 100,000 MWh, annually. Although there are several technical considerations, SCR is a feasible control technology for this application.

Redbud Energy LP conducted an economic analysis to determine the cost effectiveness of adding an SCR system to each turbine. The baseline is expected to achieve emissions of NO_X at 9 ppmvd @ 15% O_2 for the turbine only (without duct burner firing). When the duct burners are firing, this number is expected to be somewhat higher, as much as 12-15 ppmvd. Addition of SCR could be expected to reduce this larger number to 5-12 ppmvd. Based on the cost calculations, the cost of adding SCR to reduce the emissions from the combined exhaust from the 12-15 ppmvd range to 9 ppmvd when burning natural gas is $11,800 per ton of NO_X removed. This cost is not economically justifiable.

NOxOUT is a process in which aqueous urea is injected into the flue gas stream ideally within a temperature range of 1600 to 1900°F. In addition, there are catalyst available which can expand the range in which the reaction can occur.

The advantages of the system are low capital and operating costs and catalyst which are not toxic or hazardous. Disadvantages include the formation of ammonia from excess urea treatment and/or improper use of reagent catalyst and plugging of the cold end downstream equipment from the possible reaction of sulfur trioxide and ammonia.

The NOxOUT process is limited by the high temperature requirements and has not been demonstrated on any simple cycle or combined cycle combustion turbine. Therefore this control option is not considered technically feasible and will be precluded from further consideration in this BACT review.

Water or steam injection is a control technology that utilizes water or steam for flame quenching to reduce peak flame temperatures and thereby reduce NOx formation. The injection of steam or water into a gas turbine can also increase the power output by increasing the mass throughput, however, it also reduces the efficiency of the turbine. Typically, where applied to combustion turbines with diffusion combustors, water injection can achieve emission levels of 25 ppm while firing natural gas.

Water or Steam injection provides NOx reductions comparable to that of Dry Low NOx combustion, however, Siemens has reported combustor instability with the introduction of even minute amounts of water. With the resulting incomplete combustion, CO emissions increase dramatically, along with the potential for flame-out and unit trip. For these reasons, the vendor recommends against using water injection for continuous NOx control. In addition, ultra-pure water would be required. Even small quantities of impurities, such as alkali, can damage a gas turbine. Also, large quantities of water are required, typically 1 to 2 pounds of water for each pound of fuel. Cost of treated water can range from 2 to 5 cents per gallon. Based on the concerns described above, this control technology is not considered technically feasible and will be precluded from further BACT analysis.

Dry low NOx (DLN) combustors utilize a lean fuel pre-mix and staged combustion to create a diffuse flame. The diffuse flame results in reduced combustion zone temperatures thereby lowering the reaction rate that produces thermal NOx. This combustion strategy focuses on

flame temperature for NOx control, and does not result in increased emission rates of other criteria pollutants due to incomplete combustion. It has the additional benefit that no secondary emissions (such as ammonia slip) are associated with this control strategy. Finally, there are no solid or liquid wastes generated due to the operation of DLN burners.

The various Dry Low NOx burner designs are relatively new with commercial development occurring in the last 2 to 5 years. However, because their cost-effectiveness in terms of annualized cost per ton NOx reduced is so favorable, the technology has been rapidly incorporated into new equipment designs. DLN technology is incorporated into the design of the combustion turbines and can achieve NOx emissions as low as 9 ppmvd for the turbines alone. The combined cycle turbine system with DLN combustion and duct burners firing can achieve NOx emissions levels of 15 ppmvd corrected to 15% oxygen.

Since DLN combustors are a passive control, they require no ancillary equipment and make no contribution to a facility's parasitic power requirements. Additionally, DLN combustors do not create or contribute to a pressure drop and heat loss within the combustion turbine.

Alternatives Analyzed	Control Costs ($/ton)	Technological Feasibility	Selection/Rejection
Thermal DeNOx	--	not feasible	not demonstrated on combustion turbines
SCONOX™	--	feasible	not economically justifiable
SCR w/Dry Low NOx Burners	$11,800	possible	not economically justifiable, ammonia slip, energy loss due to pressure drop, increased PM emissions
Dry Low NOx Combustion	**NA**	**incorporated into turbine design**	**selected**
NOxOUT Process	--	potentially possible	not demonstrated on combustion turbines, ammonia emissions
Water/steam Injection	--	possible	same NOx emissions as selected option but CO increases, fuel penalty, water costs

The boiler design will incorporate Low NOx burners for NOx control, which is common for auxiliary boilers. Due to the intermittent use of this boiler, the use of Low NOx burners is proposed as BACT for NOx control of the auxiliary boiler. The estimated NOx emissions rate is 0.049 lb/MMBTU. No adverse environmental or economic impacts are associated with this NOx control technology.

A review of the RACT/BACT/LAER Clearinghouse indicates that emergency diesel generators and diesel-powered fire pumps have not been required to install additional NOx controls because of intermittent operation. An uncontrolled NOx emission of 4.41 lbs/MMBTU for the emergency diesel generator is based on engine design and is proposed as BACT. The proposed BACT will not have any adverse environmental or energy impacts.

CO BACT Review

The CO emission rate under maximum load conditions will be limited to 9 ppmvd for the combustion turbine when firing natural gas (15.4 ppmvd with duct burner). A review of EPA's RBLC database (Appendix B) indicates that other combustion turbines that utilize natural gas have been issued permits with BACT-based CO emissions in the range of 3 to 60 ppm (based on full load operation). Given the regional air quality conditions and the fact that the predicted maximum impact of CO emissions on the surrounding environment will not be significant, the proposed emission limits are believed to be representative of a top level of emission control. There are no adverse economic, environmental or energy impacts associated with the proposed control alternative. Thus good combustion practices/design are proposed as BACT for CO emissions from the combustion turbines.

The control technologies evaluated for use on the natural gas-fired auxiliary boiler include catalytic oxidation and proper boiler design/good operating practices. The cost of add-on controls on intermittently operated facilities is prohibitive. However, controlling boiler-operating conditions can minimize carbon monoxide emissions. This includes proper burner settings, maintenance of burner parts, and sufficient air, residence time, and mixing, for complete combustion. The maximum estimated CO emission rate is 0.082 lb/MMBTU. Thus, boiler design and good operating practices are proposed as BACT for controlling the CO emissions from the auxiliary boiler.

The control technologies for CO emissions evaluated for use on the emergency diesel generators and the diesel-powered fire pump are catalytic oxidation and proper design to minimize emissions. Because of the intermittent operation and low emissions, add-on controls would be prohibitively expensive. Thus, engine design is proposed as BACT for controlling the CO emissions from the emergency diesel generators and the diesel-powered fire pump. An estimated CO emission of 0.95 lbs/MMBTU is proposed as BACT

An uncontrolled CO emission limit of 1.07 lbs/MMBTU is proposed as BACT. The proposed BACT will not have any adverse environmental or energy impacts.

SO_2 BACT Review

Control techniques available to reduce SO_2 emissions include flue gas desulfurization (FGD) systems and the use of low sulfur fuels. A review of the RLBC indicates that while FGD systems are common on boiler applications, there are no known FGD systems on combustion turbines. Thus, the use of an FGD system is not warranted and an FGD system is rejected as a BACT control alternative.

The proposed Redbud Power Plant will utilize pipeline-quality natural gas in the turbines and duct burners. The maximum estimated SO_2 emissions would be 0.005 lb/MMBTU for the turbines with duct burners. The use of very low sulfur fuel has an established record of compliance with applicable regulations. The NSPS establish maximum allowable SO_2 emissions associated with combustion turbines and require either an SO_2 emission limitation of 150 ppm or a maximum fuel content of 0.8 percent by weight (40 CFR Part 60, Subpart GG). The estimated

emissions for these units are significantly less than the NSPS limit. Therefore, the very low SO_2 emission rate that results from the use of natural gas is proposed as BACT for the turbines and duct burners. There are no adverse environmental or energy impacts associated with the proposed control alternative.

Control techniques available to reduce SO_2 emissions include flue gas desulfurization (FGD) systems and the use of low sulfur fuels. A review of the RLBC indicates that while FGD systems are common on boiler applications, they are not common with boilers firing very low sulfur fuels, such as natural gas. FGD systems are not cost effective because the SO_2 emissions are already minimal. The estimated SO_2 emission rate is 0.0006 lbs/MMBTU. Thus, the use of an FGD system is not warranted and is rejected as a BACT control alternative.

Therefore, the use of natural gas is proposed as BACT for the auxiliary boiler. There are no adverse environmental or energy impacts associated with the proposed control alternative.

VOC BACT Review

The most stringent VOC control level for gas turbines has been achieved through advanced low NO_X combustors or catalytic oxidation for CO control. According to the list of turbines in the RACT/BACT/LAER Clearinghouse with limits on VOC (see Appendix B), oxidation catalyst systems represent BACT for VOC control in only 2 of the 21 facilities listed. An oxidation catalyst designed to control CO would provide a side benefit of controlling in the range of 10 to 44 percent of VOC emissions. The next level of control is combustion controls where VOC emissions are minimized by optimizing fuel mixing, excess air, and combustion temperature to assure complete combustion of the fuel.

The same technical factors which apply to the use of oxidation catalyst technology for control of CO emissions (narrow operating temperature range, loss of catalyst activity over time, and system pressure losses) apply to the use of this technology for collateral control of VOC. Since the Redbud Power Plant will not employ a CO catalyst, such collateral reductions in VOC are not available.

Since an oxidation catalyst was shown to not be cost effective for control of 238 tons/yr of CO, it could not be cost effective for control of at most 44 percent (BACT level of control) of 12 TPY, or 5.4 TPY of VOC per turbine (cost effectiveness would be over $337,000 per ton). An oxidation catalyst cannot, therefore, be considered to represent BACT for VOC emissions from the Redbud Power Plant. The proposed 7 ppm emission rate, based on operational controls only, is in the same range as facilities which also employ oxidation catalyst. Therefore, this level of operational control is concluded to represent BACT for VOC controls for the Redbud Power Plant gas turbines.

The control technologies evaluated for use on the natural gas-fired auxiliary boiler include catalytic oxidation and proper boiler design and good combustion practices. The cost of add-on controls on intermittently operated facilities is prohibitive. However, optimizing boiler-operating

conditions will minimize VOC emissions. The maximum estimated VOC emission rate is 0.005 lbs/MMBTU. Thus, boiler design and good operating practices are proposed as BACT for controlling VOC emissions from the auxiliary boilers. The proposed BACT will not have any adverse environmental or energy impacts.

PM_{10} BACT Review

Total suspended particulates (TSP) and particulate matter less than 10 micrometers will occur from the combustion of natural gas. The EPA's AP-42, Fifth Edition, Supplement D, Section 1, considers that particulate matter to be less than 1 micron, so all emissions are considered as PM_{10}. The PM_{10} emissions from the combustion of natural gas will result primarily from inert solids contained in the unburned fuel hydrocarbons, which agglomerate to form particles. PM_{10} emission rates from natural gas combustion are inherently low because of very high combustion efficiencies and the clean burning nature of natural gas. Therefore, their use is in and of itself a highly efficient method of controlling emissions. The maximum estimated PM_{10} emission rate is 0.01 lbs/MMBTU. Based on the EPA's RACT/BACT/LAER Clearinghouse (RBLC) database, there are no BACT precedents that have included an add-on TSP/PM_{10} control requirement for natural gas-fired combustion turbines. Therefore, BACT for PM_{10} emissions from the combustion turbines is proposed to be the use of a low ash fuel and efficient combustion. This BACT choice will be protective of any reasonable opacity standard. Typically, plume visibility is not an issue for this type of facility as the exhaust plumes are nearly invisible except for the condensation of moisture during periods of low ambient temperature. There are no adverse environmental or energy impacts associated with the proposed control alternative.

Since the auxiliary boiler will fire natural gas, the same properties that applied to the combustion turbines will also apply to this application. The maximum estimated TSP/PM_{10} emission rate is 0.0074 lbs/MMBTU. The EPA's RACT/BACT/LAER Clearinghouse (RBLC) database research indicates that there are no BACT precedents for TSP/ PM_{10} requiring add-on controls. Therefore, BACT for TSP/ PM_{10} is proposed to be the use of a low ash fuel and efficient combustion. Opacity is also not an issue with this type of application, except for the condensation of moisture during periods of low ambient temperature. There are no adverse environmental or energy impacts associated with the proposed control alternative.

There are no technically feasible alternatives that can be installed on the cooling towers, which specifically reduce particulate emissions; however, cooling towers, are typically designed with drift elimination features. The drift eliminators are specifically designed baffles that collect and remove condensed water droplets in the air stream. These drift eliminators, according to a review of the EPA's RBLC, can reduce drift to 0.001 percent to 0.004 percent of cooling water flow, which reduces particulate emissions. Therefore, the use of drift eliminators to attain air emission rate of 1.79 lb/hr is proposed as BACT for cooling tower particulate emissions. The proposed BACT will not have any adverse environmental or energy impacts.

B AIR QUALITY IMPACTS

The air quality impact analyses were conducted to determine if ambient impacts would result in a radius of impact being defined for the facility for each pollutant. If a radius of impact occurs for a pollutant then a full impact analysis is required for that pollutant. If the air quality analysis does not indicate a radius of impact, no further air quality analyses are required.

C NAAQS Modeling

The air quality modeling analyses employed USEPA's Industrial Source Complex (ISC3) model (USEPA, 1995a). The ISC3 model is recommended as a guideline model for assessing the impact of aerodynamic downwash (40 CFR 40465-40474).

The ISC3 model (Version 99155) consists of two programs: a short-term model (ISCST3) and a long-term model (ISCLT3). The difference in these programs is that the ISCST3 program utilizes an hourly meteorological data base, while ISCLT3 is a sector-averaged program using a frequency of occurrence based on categories of wind speed, wind direction, and atmospheric stability. The ISCST3 model was used for all pollutants. The regulatory default option was selected such that USEPA guideline requirements were met.

VOC is not limited directly by NAAQS. Rather, it is regulated as an ozone precursor. EPA developed a method for predicting ozone concentrations based on VOC and NOx concentrations in an area. The ambient impacts analysis utilized these tables from "VOC/NOx Point Source Screening Tables" (Richard Scheffe, OAQPS, September, 1988). The Scheffe tables utilize increases in NOx and VOC emissions to predict increases in ozone concentrations.

The stack height regulations promulgated by USEPA on July 8, 1985 (50 CFR 27892), established a stack height limitation to assure that stack height increases and other plume dispersion techniques would not be used in lieu of constant emission controls. The regulations specify that Good Engineering Practice (GEP) stack height is the maximum creditable stack height which a source may use in establishing its applicable State Implementation Plan (SIP) emission limitation. For stacks uninfluenced by terrain features, the determination of a GEP stack height for a source is based on the following empirical equation:

$$H_g = H + 1.5L_b$$

where:
H_g = GEP stack height;
H = Height of the controlling structure on which the source is located, or nearby structure; and
L_b = Lesser dimension (height or width) of the controlling structure on which the source is located, or nearby structure.

Both the height and width of the structure are determined from the frontal area of the structure projected onto a plane perpendicular to the direction of the wind. The area in which a nearby

structure can have a significant influence on a source is limited to five times the lesser dimension (height or width) of that structure, or within 0.5 mile (0.8 km) of the source, whichever is less. The methods for determining GEP stack height for various building configurations have been described in USEPA's technical support document (USEPA, 1985).

Since the heights of exhaust stacks at the proposed power plant are less than respective GEP stack heights, a dispersion model to account for aerodynamic plume downwash was necessary in performing the air quality impact analyses.

Since downwash is a function of projected building width and height, it is necessary to account for the changes in building projection as they relate to changes in wind direction. Once these projected dimensions are determined, they can be used as input to the ISC3 model.

In October 1993, USEPA released the Building Profile Input Program (BPIP) to determine wind direction-dependent building dimensions. The BPIP algorithms as described in the User's Guide (USEPA, 1993), have been incorporated into the commercially-available BREEZEWAKE program. The BREEZEWAKE program was used to determine the wind direction-dependent building dimensions for input to the ISC3 model.

The BPIP program builds a mathematical representation of each building to determine projected building dimensions and its potential zone of influence. These calculations are performed for 36 different wind directions (at 10 degree intervals). If the BPIP program determines that a source is under the influence of several potential building wakes, the structure or combination of structures which has the greatest influence ($h_b + 1.5\, l_b$) is selected for input to the ISCST3 model. Conversely, if no building wake effects are predicted to occur for a source for a particular wind direction, or if the worst-case building dimensions for that direction yield a wake region height less than the source's physical stack height, building parameters are set equal to zero for that wind direction. For this case, wake effect algorithms are not exercised when the model is run. The building wake criteria influence zone is 5 l_b downwind, 2 l_b upwind, and 0.5 l_b crosswind. These criteria are based on recommendations by USEPA. The input to the BREEZEWAKE preprocessing program consisted of proposed power plant exhaust stacks (four CTs, and an auxiliary boiler) and building dimensions.

Due to the relatively high stack heights and the relatively small size of the dominant structures, the building cavity effects that were considered in the modeling analysis were minimal. For this analysis, the first step was to determine the building cavity height based on the formula:

$$h_c = H + 0.5L_b$$

where:
h_c = GEP stack height;
H = Height of the controlling structure on which the source is located, or nearby structure; and
L_b = Lesser dimension (height or width) of the controlling structure on which the source is located, or nearby structure.

If the stack height was greater than or equal to the cavity height, the cavity effect would not affect the downwind maximum impacts. However, if a cavity effect was possible, the length of the cavity was compared to the distance to the nearest receptor.

Due to the size of the property, the location of the sources on the property, the height of the stacks, and the distance of the sources from the fence line, no cavity effects were encountered at any receptors. Therefore, the concentrations at all receptors were estimated using the normal procedures in the ISCST3 model.

The meteorological data used in the dispersion modeling analyses consisted of five years (1986-1988, 1990, 1991) of hourly surface observations from the Oklahoma City, Oklahoma, National Weather Service Station (Will Rogers World Airport) and coincident mixing heights from Oklahoma City (1986-1988) and Norman, Oklahoma (1990 and 1991). Surface observations consist of hourly measurements of wind direction, wind speed, temperature, and estimates of ceiling height and cloud cover. The upper air station provides a daily morning and afternoon mixing height value as determined from the twice-daily radiosonde measurements. Based on NWS records, the anemometer height at the Oklahoma City and Norman NWS station during this period was 6.2 meters. Prior to use in the modeling analysis, the meteorological data sets were scanned for missing data. The procedures outlined in the USEPA document, "Procedures for Substituting Values for Missing NWS Meteorological Data for Use in Regulatory Air Quality Models", wre used to fill gaps of information for single missing days. For larger periods of two or more missing days, seasonal averages were used to fill in the missing periods. The USEPA developed rural and urban interpolation methods to account for the effects of the surrounding area on development of the mixing layer boundary. The rural scheme was used to determine hourly mixing heights representative of the area in the vicinity of the proposed power plant.

The urban/rural classification is used to determine which dispersion parameter to use in the model. Determination of the applicability of urban or rural dispersion is based upon land use or population density. For the land use method the source is circumscribed by a three kilometer radius circle, and uses within that radius analyzed to determine whether heavy and light industrial, commercial, and common and compact residential, comprise greater than 50 percent of the defined area. If so, then urban dispersion coefficients should be used. The land use in the area of the proposed facility is not comprised of greater than 50 percent of the above land use types.

For the population density method, the area is reviewed to determine the average population density in people per square kilometer. If the resulting value is greater than 750 people/km^2 or 21,200 people, the area is considered urban. The population density per the 1990 census for the location of the proposed permit does not meet this criterion.

The receptor grid for the ISC3 dispersion model was designed to identify the maximum air quality impact due to the proposed power plant. Several different rectangular grids made up of discrete receptors were used in the ISCST3 modeling analysis. The receptor grids are made up of 100 meter spaced fine receptors, 500 meter spaced medium receptors and 1,000 meter spaced

coarse receptors. Medium grid receptors were used to locate the maximum impact areas. The scenarios were then reevaluated placing fine grid receptors in maximum impact areas to arrive at a final maximum impact. All receptors were originally modeled with flat terrain. However, in response to comments from the public the applicant has submitted revised modeling, which includes terrain data.

In the final revised modeling, all receptors were modeled with actual terrain based on the proposed plant location. The terrain data was taken from United States Geologic Society (USGS) and Digital Elevation Model (DEM) data. This data was obtained in the USGS Spatial Data Transfer Standard (SDTS) and converted to the normal DEM format using a translation program. The DEM files were then used to derive the terrain elevation data with the BREEZE software terrain import function. All building, source location, and terrain data were based on the NAD27 datum.

The stack emission rates and parameters needed for the proposed power plant included each of the four exhaust stacks of the four CTs and the exhaust stack of the auxiliary boiler. The modeling was revised in response to public comments to include the emissions from the four proposed cooling water towers. The cooling water towers contribute a minimal amount of particulate matter and toxic emissions. The proposed CTs can operate at various loads. The emission rates used for the analysis were the maximum estimated emission rates for each pollutant at maximum load. The cooling water toxic emission rates were based upon the toxic concentrations in the circulating water. These concentrations were derived from the concentrations in the raw feed water.

Stack Parameters							
Source	Easting	Northing	Elevation	Stack Ht.	Stack Temp.	Stack Vel.	Stack Dia.
	M	M	M	Ft	°F	Ft/sec	Ft
Turbine No.1	660691	3950288	315	190	200	70.2	17
Turbine No.2	660711	3950341	315	190	200	70.2	17
Turbine No.3	660731	3950394	315	190	200	70.2	17
Turbine No.4	660752	3950449	315	190	200	70.2	17
Auxiliary Boiler	660733	3950363	315	83	309	31.3	2
CW tower cell 1a	660656	3950138	315	45	103	54.65	10
CW tower cell 1b	660651	3950150	315	45	103	54.65	10
CW tower cell 1c	660646	3950164	315	45	103	54.65	10
CW tower cell 1d	660641	3950178	315	45	103	54.65	10
CW tower cell 1e	660635	3950190	315	45	103	54.65	10
CW tower cell 2a	660747	3950180	315	45	103	54.65	10
CW tower cell 2b	660741	3950193	315	45	103	54.65	10
CW tower cell 2c	660736	3950207	315	45	103	54.65	10
CW tower cell 2d	660732	3950221	315	45	103	54.65	10
CW tower cell 2e	660727	3950234	315	45	103	54.65	10
CW tower cell 3a	660779	3950264	315	45	103	54.65	10
CW tower cell 3b	660773	3950274	315	45	103	54.65	10
CW tower cell 3c	660770	3950288	315	45	103	54.65	10
CW tower cell 3d	660765	3950302	315	45	103	54.65	10
CW tower cell 3e	660757	3950320	315	45	103	54.65	10
CW tower cell 4a	660811	3950353	315	45	103	54.65	10
CW tower cell 4b	660806	3950367	315	45	103	54.65	10
CW tower cell 4c	660801	3950380	315	45	103	54.65	10
CW tower cell 4d	660796	3950394	315	45	103	54.65	10
CW tower cell 4e	660791	3950408	315	45	103	54.65	10

Emission Rates				
Source	CO	SO_2	PM_{10}	NO_X
	lb/hr	lb/hr	lb/hr	lb/hr
Turbine No.1[(1)]	88.7	9.8	22.0	94.0
Turbine No.2[(1)]	88.7	9.8	22.0	94.0
Turbine No.3[(1)]	88.7	9.8	22.0	94.0
Turbine No.4[(1)]	88.7	9.8	22.0	94.0
Auxiliary Boiler	1.64	0.01	0.15	1.0[2]
CW Tower Cells[(3)]	--	--	1.79	--

(1) Includes the CTG and the duct burner.

(2) Auxiliary Boiler emissions are limited to 3,000 hours per year. Therefore, the emissions were not included in modeling for NO_X.

(3) Emissions are evenly spread across 20 cells (emissions points).

The modeling results are shown below. The applicant has demonstrated compliance through the application of the NO_2/NO_X ratio of 0.75 as is allowed in the "Guideline on Air Quality Models". The highest first high concentrations over the five year period were used to demonstrate compliance with the modeling significance levels for each pollutant.

Significance Level Comparisons				
Pollutant	Averaging Period	Year	Max. Concentrations ($\mu g/m^3$)	Significance Level ($\mu g/m^3$)
NO_2	Annual	1986	0.923	1
CO	8-hour	1986	16.067	500
	1-hour	1986	41.686	2000
PM_{10}	Annual	1990	0.367	1
	24-hour	1986	2.809	5
SO_2	Annual	1990	0.129	1
	24-hour	1986	1.163	5
	3-hour	1990	2.843	25

The modeling indicates facility emissions will result in ambient concentrations below the significance levels in which an area of impact is defined. Therefore, no additional modeling for PSD increment or NAAQS compliance is required.

An ozone analysis was carried out based on the method in "VOC/NO_X Point Source Screening Tables" created by Robert Scheffe from the results of reactive plume modeling of the emissions of volatile organic compounds (VOC) and NO_X. The impact of all proposed VOC and NO_X emissions associated with the project is estimated at 0.0166 ppm. Based on a fourth high (design) monitored concentration for the years 1997, 1998 and 1999 of 0.1 ppm, the projected emissions will not exceed the ozone NAAQS of 0.12 ppm.

Further the applicant participated in the ozone impact study conducted by Environ (March 20, 2000). The study was done to assess the ozone impacts in Oklahoma due to proposed new electrical generating units (EUGs) in the region. CAMx was run for a 1995 Base Case emissions scenario and the model-estimated ozone concentrations were compared with the observed values of a June 1995 ozone episode. EPA has developed a set of model performance goals for ozone to aid in the determination that the model is working adequately. The CAMx model performance statistics for all days of the June 1995 episode meet EPA's model performance goals by a wide margin (usually by over a factor of 2). Additional analysis of the spatial distribution of the predicted and observed 1-hour and 8-hour ozone concentrations revealed that the model exhibited a fairly good job of estimating the spatial patterns of the observed ozone concentrations. CAMx was then applied using the Oklahoma 32, 16, and 4 kilometer grids and the June 18-22, 1995 episode for two future year emission scenarios:

2007 CAA Base Case: Emission in 2007 assuming growth and all Clean Air Act Amendment (CAA) mandated controls.

2007 New OK Sources: 2007 CAA Base Case including emissions from the proposed New Oklahoma Sources added.

The year 2007 was selected for the future-year assessment because growth and control factors were readily available from the Ozone Transport Assessment Group (OTAG) and Dallas-Fort Worth ozone control plan development modeling domain. Emissions from the New Oklahoma City Sources were estimated to not increase ozone in the Tulsa-Oklahoma City area to above the

1-hour ozone standard. Therefore, emissions from the proposed New Sources are estimated not to cause or contribute to any violations of the 1-hour ozone standard in Oklahoma. As the New Oklahoma Sources are estimated to produce changes in peak 8-hour ozone concentrations that are much less than 1 ppb, then they are estimated to have no measurable effect on peak 8-hour ozone concentrations in the Tulsa and Oklahoma City areas.

D Ambient Monitoring

The predicted maximum ground-level concentrations of pollutants by air dispersion models have demonstrated that the ambient impacts of the facility are below the monitoring exemption levels for NO_2, CO, SO_2 and PM_{10}. Neither pre-construction nor post-construction ambient monitoring will be required for these pollutants. However, VOC emissions are greater than the 100 TPY monitoring significance level. Therefore ozone pre-construction monitoring is required. The existing National Air Monitoring System (NAMS) monitoring site (No. 401091037-1) located 8.4 km south and 22.2 km west of the facility will provide conservative monitoring data in lieu of pre-construction monitoring.

Comparison of Modeled Impacts to Monitoring Exemption Levels			
Pollutant	**Monitoring Exemption Levels**		**Ambient Impacts**
	Averaging Time	**μg/m³**	**μg/m³**
NO_2	Annual	14	0.923
CO	8-hour	575	41.686
PM_{10}	24-hour	10	2.809
SO_2	24-hour	13	1.163
VOC	100 TPY of VOC		273.76 TPY VOC

1999 Monitoring Data Summary	
Monitor 401091037-1	
Ranking	Concentration (ppm)
First High	0.091
Second High	0.082
Third High	0.081
Fourth High	0.081

E Additional Impacts Analyses

Mobile Sources

Current EPA policy is to require an emissions analysis to include mobile sources. In this case, mobile source emissions are expected to be negligible. Few employees will be needed. The fuel for the plant will arrive by pipeline rather than by vehicle.

Growth Impacts

Since a small permanent staff of approximately 25 employees will be required by the plant, no significant housing growth is expected. Construction of the plant would not result in an increase

in the number of permanent residents. No significant industrial or commercial secondary growth will occur as a result of the project since the number of permanent employees needed is small. Most labor, material, and service requirements are already in place.

Soils and Vegetation

The following discussion will review the projects potential to impact its agricultural surroundings based on the facilities allowable emission rates and resulting ground level concentrations of SO_2 and NO_X. SO_2 and NO_X were selected for review since they have been shown to be capable of causing damage to vegetation at elevated ambient concentrations.

The effects of gaseous air pollutants on vegetation may be classified into three rather broad categories: acute, chronic, and long-term. Acute effects are those that result from relatively short (less than 1 month) exposures to high concentrations of pollutants. Chronic effects occur when organisms are exposed for months or even years to certain threshold levels of pollutants. Long-term effects include abnormal changes in ecosystems and subtle physiological alterations in organisms. Acute and chronic effects are caused by the gaseous pollutant acting directly on the organism, whereas long-term effects may be indirectly caused by secondary agents such as changes in soil pH.

SO_2 enters the plant primarily through the leaf stomata and passes into the intercellular spaces of the mesophyll, where it is absorbed on the moist cell walls and combined with water to form sulfurous acid and sulfite salts. Plant species show a considerable range of sensitivity to SO_2. This range is the result of complex interactions among microclimatic (temperature, humidity, light, etc.), edaphic, phenological, morphological, and genetic factors that influence plant response (USEPA, 1973).

NO_2 may affect vegetation either by direct contact of NO_2 with the leaf surface or by solution in water drops, becoming nitric acid. Acute and chronic threshold injury levels for NO_2 are much higher than those for SO_2 (USEPA, 1971).

The secondary NAAQS are intended to protect the public welfare from adverse effects of airborne effluents. This protection extends to agricultural soil. The modeling conducted, which demonstrated compliance with the Primary NAAQS simultaneously demonstrated compliance with the Secondary NAAQS because the Secondary NAAQS are higher or equal to the Primary NAAQS. Since the secondary NAAQS protect impact on human welfare, no significant adverse impact on soil and vegetation is anticipated due to the proposed power plant.

Visibility Impairment

The project is not expected to produce any perceptible visibility impacts in the vicinity of the plant. EPA computer software for visibility impacts analyses, intended to predict distant impacts, terminates prematurely when attempts are made to determine close-in impacts. It is concluded that there will be minimal impairment of visibility resulting from the facility's emissions. Given the limitation of 20% opacity of emissions, and a reasonable expectation that normal operation will result in 0% opacity, no local visibility impairment is anticipated.

F Class I Area Impact Analysis

A further requirement of PSD includes the special protection of air quality and air quality related values (AQRV) at potentially affected nearby Class I areas. Assessment of the potential impact to visibility (regional haze analysis) is required if the source is located within 100 km of a Class I area. An evaluation may be requested if the source is within 200 km of a Class I area. The facility is approximately 171 km northeast of the Wichita Mountains National Wildlife Refuge (Wichita Mountains NWR). The facility is substantially downwind of the Class I area and is not expected to have an impact. No additional evaluations were conducted.

SECTION V. OKLAHOMA AIR POLLUTION CONTROL RULES

OAC 252:100-1 (General Provisions) [Applicable]
Subchapter 1 includes definitions but there are no regulatory requirements.

OAC 252:100-3 (Air Quality Standards and Increments) [Applicable]
Primary Standards are in Appendix E and Secondary Standards are in Appendix F of the Air Pollution Control Rules. At this time, all of Oklahoma is in attainment of these standards.

OAC 252:100-4 (New Source Performance Standards) [Applicable]
Federal regulations in 40 CFR Part 60 are incorporated by reference as they exist on July 1, 1999, except for the following: Subpart A (Sections 60.4, 60.9, 60.10, and 60.16), Subpart B, Subpart C, Subpart Ca, Subpart Cb, Subpart Cc, Subpart Cd, Subpart Ce, Subpart AAA, and Appendix G. These regulations are addressed in the Federal Regulations Section.

OAC 252:100-5 (Registration, Emission Inventory, And Annual Fees) [Applicable]
The owner or operator of any facility that is a source of air emissions shall submit a complete emission inventory annually on forms obtained from the Air Quality Division. Since this is construction for a new facility, no emission inventories or fees have previously been paid.

OAC 252:100-6 (Permitting) [Applicable]
This subchapter contains definitions, types of permits, and processing requirements pertaining to Permitting and the Uniform Permitting Rules, OAC 252:2.

OAC 252:100-7 (Permits for Minor Facilities) [Not Applicable]
Subchapter 7 sets forth the permit application fees and the basic substantive requirements for permits for minor facilities. The current project will be a major source that is subject to Subchapter 8 permitting.

OAC 252:100-8 (Major Source/Part 70 Permits) [Applicable]
Part 5 includes the general administrative requirements for Part 70 permits. Any planned changes in the operation of the facility which result in emissions not authorized in the permit and which exceed the "Insignificant Activities" or "Trivial Activities" thresholds require prior notification to AQD and may require a permit modification. Insignificant activities mean individual emission units that either are on the list in Appendix I (OAC 252:100) or whose actual calendar year emissions do not exceed the following limits:

5 TPY of any one criteria pollutant
2 TPY of any one hazardous air pollutant (HAP) or 5 TPY of multiple HAPs or 20% of any threshold less than 10 TPY for single HAP that the EPA may establish by rule
0.6 TPY of any one Category A toxic substance
1.2 TPY of any one Category B toxic substance
6.0 TPY of any one Category C toxic substance

Emissions limitations have been established for each emission unit based on information from the permit application.

OAC 252:100-9 (Excess Emissions & Malfunction Reporting Requirements) [Applicable]
In the event of any release which results in excess emissions, the owner or operator of such facility shall notify the Air Quality Division as soon as practical during normal office hours and no later than the next working day following the malfunction or release. Within ten (10) business days further notice shall be tendered in writing containing specific details of the incident. Part 70 sources must report any exceedance that poses an imminent and substantial danger to public health, safety, or the environment as soon as is practicable; but under no circumstances shall notification be more than 24 hours after the exceedance.

OAC 252:100-13 (Open Burning) [Applicable]
Open burning of refuse and other combustible material is prohibited except as authorized in the specific examples and under the conditions listed in this subchapter.

OAC 252:100-19 (Particulate Matter) [Applicable]
Subchapter 19 regulates emissions of particulate matter from fuel-burning equipment. Particulate emission limits are based on maximum design heat input rating. Fuel-burning equipment is defined in OAC 252:100-1 as "combustion devices used to convert fuel or wastes to usable heat or power". Thus, the turbines, auxiliary boiler, diesel fire pump, and emergency diesel generator are subject to the requirements of this subchapter.

Equipment	Maximum Heat Input (HHV) (MMBTUH) (per unit)	Allowable Particulate Emission Rate (lb/MMBTU)	Potential Particulate Emissions (lb/MMBTU)
Turbines (4)	1,698	0.18	0.0106
Duct Burners (3)	427	0.25	0.0031
Auxiliary Boiler	20	0.51	0.0074
Emergency	0.85	0.6	0.31
Diesel Fire	0.28	0.6	0.31

OAC 252:100-25 (Visible Emissions, and Particulates) [Applicable]
No discharge of greater than 20% opacity is allowed except for short-term occurrences which consist of not more than one six-minute period in any consecutive 60 minutes, not to exceed three such periods in any consecutive 24 hours. In no case shall the average of any six-minute period exceed 60% opacity. The facility will remain compliant with this regulation by ensuring "complete combustion" and utilizing pipeline-quality natural gas as fuel in the proposed turbines.

OAC 252:100-29 (Fugitive Dust) [Applicable]
No person shall cause or permit the discharge of any visible fugitive dust emissions beyond the property line on which the emissions originated in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or to interfere with the maintenance of air quality standards. No activities are expected that would produce fugitive dust beyond the facility property line.

OAC 252:100-31 (Sulfur Compounds) [Applicable]
Part 5 limits sulfur dioxide emissions from new equipment (constructed after July 1, 1972). For gaseous fuels the limit is 0.2 lb/MMBTU heat input, three-hour average. The permit will require the turbines to be fired with pipeline-grade natural gas with SO_2 emissions of 9.79 lb/hr, based on AP-42 (5/98), Section 3.1, Table 3.1-2, which is equivalent to 0.005 lb/MMBTU. The emergency diesel generators and diesel fire pump will fire diesel fuel and have maximum sulfur compound emissions of 0.29 lbs/MMBTU which is well below the allowable emission limitation of 0.8 lb/MMBTU for liquid fuels.
Part 5 also requires an opacity monitor and sulfur dioxide monitor for equipment rated above 250 MMBTU. Since the turbines are limited to natural gas only, they are exempt from the opacity monitor requirement. Based on the pipeline-grade natural gas requirement, the natural gas burned at the site will have less than 0.1 percent sulfur and is, therefore, also exempt from the sulfur dioxide monitor requirement.

OAC 252:100-33 (Nitrogen Oxides) [Applicable]
The 2-hr average emission limit of 94.0 lb/hr for NO_x emissions from each combustion turbine with full duct burner firing, represents an equivalent emission rate of 0.047 lb/MMBTU which is far below the standard of 0.2 lb/MMBTU, therefore the combustion turbines will be in compliance. The auxiliary boiler, emergency diesel generators, and the diesel fire pump are below 50 MMBTUH heat input and are, therefore, not subject to this regulation.

OAC 252:100-35 (Carbon Monoxide) [Not Applicable]
None of the following affected processes are located at this facility: gray iron cupola, blast furnace, basic oxygen furnace, petroleum catalytic cracking unit, or petroleum catalytic reforming unit.

OAC 252:100-37 (Volatile Organic Compounds) [Applicable]
Part 3 requires storage tanks constructed after December 28, 1974, with a capacity of 400 gallons or more and storing a VOC with a vapor pressure greater than 1.5 psia to be equipped with a permanent submerged fill pipe or with an organic vapor recovery system. These diesel tanks are below this threshold.
Part 5 limits the VOC content of coatings used in coatings lines or operations. This facility will not normally conduct coating or painting operations except for routine maintenance of the facility and equipment, which is exempt.
Part 7 requires fuel-burning equipment to be operated and maintained so as to minimize emissions. Temperature and available air must be sufficient to provide essentially complete combustion. The turbines are designed to provide essentially complete combustion of organic materials.

OAC 252:100-41 (Hazardous and Toxic Air Contaminants) [Applicable]
Part 3 addresses hazardous air contaminants. NESHAP, as found in 40 CFR Part 61, are adopted by reference as they exist on July 1, 1999, with the exception of Subparts B, H, I, K, Q, R, T, W and Appendices D and E, all of which address radionuclides. These standards shall apply to both existing and new sources of hazardous air contaminants. In addition, General Provisions as found in 40 CFR Part 63, Subpart A, and the Maximum Achievable Control Technology (MACT) standards as found in 40 CFR Part 63, Subparts F, G, H, I, L, M, N, O, Q, R, S, T, U, W, X, Y, CC, DD, EE, GG, HH, II, JJ, LL, KK, OO, PP, QQ, RR, SS, TT, UU, VV, WW, YY, CCC, DDD, EEE, GGG, HHH, III, JJJ, LLL, MMM, NNN, PPP, TTT, and XXX are hereby adopted by reference as they exist on July 1, 1999. These standards shall apply to both existing and new sources of HAPs. These requirements are covered in the Federal Regulations Section.
Part 5 is a state-only requirement governing toxic air contaminants. New sources (constructed after March 9, 1987) emitting any category "A" pollutant above de minimis levels must perform a BACT analysis and, if necessary, install BACT. All sources are required to demonstrate that emissions of any toxic air contaminant which exceeds the de minimis level do not cause or contribute to a violation of the MAAC.

Toxic emissions from the turbines are based on AP-42 Table 3.1-3, April 2000, except formaldehyde emissions. Formaldehyde emissions are derived from EPA database used to establish emission factors for Section 3.1. Toxic emissions from the duct burners and auxiliary boiler were calculated using Table 1.4-3 and 1.4-4, July 1998.

Hazardous Air Pollutants (HAPS) From Combustion Turbines, Duct Burners and Auxiliary Boiler

		Toxic	De Minimis Levels		Emissions	
Pollutant	**CAS #**	**Category**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
1,3-Butadiene	106990	A	0.57	0.60	0.003	0.013
Acetaldehyde	75070	B	1.1	1.2	0.270	1.190
Acrolein	107028	A	0.57	0.60	0.043	0.19
Arsenic	7440382	A	0.57	0.60	0.000	0.000
Benzene	71432	A	0.57	0.60	0.085	0.373
Butane	25167673	NS	--	--	3.601	15.773
Ethane	74840	NS	--	--	0.062	0.093
Formaldehyde	50000	A	0.57	0.60	1.054	4.609
Hexane	110543	C	5.6	6.0	3.110	13.52
Naphthalene	91203	B	1.1	1.2	0.009	0.039
PAHs*	**	A	0.57	0.60	0.019	0.085
Pentane	109660	C	5.6	6.0	4.493	19.529
Propane	74986	NS	--	--	2.765	12.018
Propylene Oxide	75569	A	0.57	0.60	0.197	0.863
Xylene	1330207	C	5.6	6.0	0.435	1.904
Toluene	108883	C	5.6	6.0	0.890	3.892

* polycyclic aromatic hydrocarbons
** total group
The cooling water toxic emission rates were based upon the toxic concentrations in the circulating water. These concentrations were derived from the concentrations in the raw feed water.

Hazardous Air Pollutants (HAPS) From Cooling Water Towers					
	Toxic	**De Minimis Levels**		**Emissions**	
Pollutant	**Category**	**lb/hr**	**TPY**	**lb/hr**	**TPY**
Antimony	B	1.1	1.2	0.0012	0.0053
Arsenic	A	0.57	0.6	0.0002	0.0009
Beryllium	A	0.57	0.6	0.0001	0.0004
Cadmium	A	0.57	0.6	1.63×10^{-5}	0.00007
Chromium(1)	A	0.57	0.6	0.0002	0.0009
Copper	B	1.1	1.2	0.0002	0.0009
Lead(2)	(2)	N/A	N/A	0.0001	0.0004
Mercury	A	0.57	0.6	4.08×10^{-6}	0.00002
Nickel	A	0.57	0.6	0.0002	0.0009
Selenium	C	5.6	6.0	5.10×10^{-5}	0.0002
Silver	B	1.1	1.2	4.08×10^{-5}	0.00018
Thallium	A	0.57	0.6	0.0002	0.0009
Zinc	C	5.6	6.0	0.002	0.009

(1) All chromium is assumed to be hexavalent.
(2) Lead is regulated by NAAQS.

For emissions of each pollutant which exceeded a respective de minimis level, modeling was required to demonstrate compliance with the respective Maximum Ambient Air Concentration (MAAC). ISCST3 modeling was conducted for each toxic based on 1991 meteorological data and indicated the facility would be in compliance with each MAAC. Since the resulting maximum predicted concentrations were below 50% of the MAAC, no more modeling is required. Based on the level of formaldehyde, hexane, pentane, and propylene oxide emissions, the demonstration of MAAC compliance, and the low off-site modeled impact, BACT is accepted as no add-on controls.

In response to comments modeling was conducted for all of the toxic pollutants emitted from the cooling water towers. ISCST3 modeling was conducted for each toxic based on five years of meteorological data and indicated the facility would be in compliance with each MAAC.

Hazardous Air Pollutants (HAPS) From Combustion Turbines, Duct Burners and Auxiliary Boiler				
Pollutant	CAS #	MAAC ($\mu g/m^3$)	Emissions (lb/hr)	Estimated Impact ($\mu g/m^3$)
Formaldehyde	50000	12	1.054	0.01752
Hexane	110543	17,628	3.110	0.16743
Pentane	109660	35,000	4.493	0.24184
Propylene Oxide	75569	500	0.197	0.00326

Hazardous Air Pollutants (HAPS) From Cooling Water Towers			
Pollutants	MAAC ($\mu g/m^3$)	Emissions (lb/hr)	Estimated Impact ($\mu g/m^3$)
Antimony	10	0.0012	0.0018
Arsenic	0.02	0.0002	0.0003
Beryllium	0.02	0.0001	0.00015
Cadmium	0.5	1.63×10^{-5}	0.00002
Chromium	0.01	0.0002	0.0003
Copper	4	0.0002	0.0003
Mercury	0.5	4.08×10^{-6}	0.00001
Nickel	0.15	0.0002	0.0003
Selenium	20	5.10×10^{-5}	0.00007
Silver	0.2	4.08×10^{-5}	0.00006
Thallium	1	0.0002	0.0003
Zinc	500	0.002	0.003

OAC 252:100-43 (Sampling and Testing Methods) [Applicable]
All required testing must be conducted by methods approved by the Executive Director under the direction of qualified personnel. All required tests shall be made and the results calculated in accordance with test procedures described or referenced in the permit and approved by Air Quality.

OAC 252:100-45 (Monitoring of Emissions) [Applicable]
Records and reports as Air Quality shall prescribe on air contaminants or fuel shall be recorded, compiled, and submitted as specified in the permit.

SECTION VI. FEDERAL REGULATIONS

PSD, 40 CFR Part 52 [Applicable]
The facility is a listed source as a fossil fuel-fired electric plant of more than 250 MMBTU heat input with emissions greater than 100 TPY. PSD review has been completed in Section IV.

NSPS, 40 CFR Part 60 [Applicable]
Subpart GG affects combustion turbines which commenced construction, reconstruction, or modification after October 3, 1977, and which have a heat input rating of 10 MMBTUH or more. Each of the proposed turbines has a rated heat input of 1,698 MMBTU/hr and are subject to this Subpart. Standards specified in Subpart GG limit NOx emissions to 87 ppmvd or less. Performance testing by Reference Method 20 is required. Monitoring fuel for nitrogen content was addressed in a letter dated May 17, 1996 from EPA Region 6. Monitoring of fuel nitrogen content shall not be required when pipeline-quality natural gas is the only fuel fired in the turbine.
Subpart Db affects industrial-commercial-institutional steam generating units which have a heat input capacity from fuels greater than 100 MMBtuh which commence construction after June 19, 1984. The emissions resulting from the combustion of fuels in the turbines and duct burners are subject to Subpart Db. As such, these units will be subject to the provision of 40 CFR 60.44b for nitrogen oxides, compliance provisions of 40 CFR 60.46b, emission monitoring requirements of 40 CFR 60.48b, and the reporting requirements of 40 CFR 60.49b.

Subpart Dc affects industrial-commercial-institutional steam generating units with a design capacity between 10 and 100 MMBTUH heat input and which commenced construction or modification after June 9, 1989. For gaseous-fueled units, the only applicable standard of Subpart Dc is a requirement to keep records of the fuels used. The 20 MMBTUH gas-fired auxiliary boiler is an affected unit as defined as in the subpart since the heating capacity is above the deminimis level. Recordkeeping will be specified in the permit.

NESHAP, 40 CFR Part 61 [Not Applicable]
There are no emissions of any of the regulated pollutants: arsenic, asbestos, benzene, beryllium, coke oven emissions, mercury, radionuclides, or vinyl chloride except for trace amounts of benzene. Subpart J, Equipment Leaks of Benzene, concerns only process streams which contain more than 10% benzene by weight. Analysis of Oklahoma natural gas indicates a maximum benzene content of less than 1%.

NESHAP, 40 CFR Part 63 [Not Applicable At This Time]
There is no current standard that applies to this facility. A MACT standard may be applicable under the source category "Combustion Turbines" which is scheduled for promulgation by November 15, 2000. Air Quality reserves the right to reopen this permit if any standard becomes applicable.

The combustion turbines are a listed MACT source category and could potentially be subject to case-by-case MACT requirements. Duct burners associated with HRSGs are exempt from consideration for case-by-case MACT as explained in EPA's May 25, 2000 Interpretive Ruling on this issue.

Chemical Accident Prevention Provisions, 40 CFR Part 68 [Not Applicable]
There will be no regulated substance added to the facility as a result of this project.

Stratospheric Ozone Protection, 40 CFR Part 82 [Applicable]
This facility does not produce, consume, recycle, import, or export any controlled substances or controlled products as defined in this part, nor does this facility perform service on motor (fleet) vehicles which involves ozone-depleting substances. Therefore, as currently operated, this facility is not subject to these requirements. To the extent that the facility has air-conditioning units that apply, the permit requires compliance with Part 82.

SECTION VII. COMPLIANCE

Tier Classification And Public Review

This application has been determined to be Tier III based on the request for a construction permit for a new major stationary source which emits 250 TPY or more of pollutants subject to regulation. The permittee has submitted an affidavit that they are not seeking a permit for land use or for any operation upon land owned by others without their knowledge. The affidavit certifies that the applicant has option to purchase the land.

The applicant published the "Notice of Filing a Tier III Application" in *The Edmond Sun* and *The Daily Oklahoman,* in Oklahoma County, on March 26 and March 27, 2000, respectively. The notice stated that the application was available for public review at the DEQ Office at 707 North Robinson, Oklahoma City, Oklahoma; City of Edmond, Engineering Department, 10 S. Littler, Edmond; and Luther City Hall, 119 S. Main, Luther, Oklahoma. The applicant also published the "Notice of Draft Permit and Public Meeting" in *The Daily Oklahoman* on September 18, 2000. The public meeting on the draft permit was held at the Luther High School, in Luther, Oklahoma, on October 17, 2000. Comments were received on the draft permit by the public. A response to those comments is provided below.

A "Notice of Proposed Permit" was published in *The Daily Oklahoma* on December 29, 2000. It was available for public review at Luther City Hall, 119 S. Main, Luther, Oklahoma, the DEQ Office at 707 North Robinson, Oklahoma City, Oklahoma; and on the Air Quality section of the DEQ Web Page: http://www.deq.state.ok.us/ for a period of 20 days. There were no comments received from the public, nor have there been any comments from EPA. This site is not within 50 miles of another states border.

Response to Comments on the Draft Permit

The following comments dated October, 25, 2000, were received from Dr. **Richard Dawson** and incorporate comments from an unnamed person based in the State of Washington. Page references indicated below correspond to the page of the draft permit referenced by the comment.

Page 1 of the Memorandum

1. **Comment:** *"This is a HUGE plant – larger than any in Wash. State. Could well be biggest in Oklahoma."*

   Response: The proposed plant is not larger than many in the State of Washington, nor will it be the largest power plant in Oklahoma. The Centralia – Pacificorp – West/PCA plant in Lewis, Washington has a generating capacity of 1460 MW; the Chief Joseph – Idaho Power Co. plant in Douglas, Washington has a generating capacity of 2457.3 MW; the Grand Coulee–Bonneyville Power plant in Grant, Washington has a generating capacity of 6809 MW; the Rocky Reach – PUD No. 1 of Chelan plant in Chelan, Washington has a generating capacity of 1279.7 MW; and the WNP- Bonneyville Power plant in Benton, Washington has a generating capacity of 1200 MW.
   The Oklahoma Gas and Electric Co. (OG&E)/PCA in Muskogee, Oklahoma has a generating capacity of 1,889 MW; The Central and Southwest/Public Service Co. of Oklahoma Northeastern Plant in Rogers County, Oklahoma has a generating capacity of 1,498.7 MW; and the OG&E Sooner plant in Noble County, Oklahoma has a generating capacity of 1,136 MW.

Page 2 of the Memorandum

2. **Comment:** *"Not reasonable – This is 365 days/yr. Need to have time for maintenance and repair."*

Response: As used here, the reference to 365 days per year has no bearing on actual times planned for maintenance and repair. The permit and computer model must be based on 365 days per year to identify the maximum potential emissions. Any downtime for repair and maintenance will result in fewer emissions for the year.

3. **Comment:** *"These (table of emissions) are huge exceedances of the PSD levels. By definition, this is a significant adverse environmental impact."*

Response: The proposed emissions as set forth on the emissions table do not constitute a significant adverse environmental impact. Prevention of Significant Deterioration (PSD) is a construction air pollution permitting program designed to ensure air quality does not degrade beyond the National Ambient Air Quality Standards (NAAQS) or beyond specified increments above a prescribed baseline level. The PSD rules set forth a review procedure to determine whether a source will cause or contribute to a violation of the NAAQS or maximum increment consumption levels. The "PSD Significance Levels" serve as a screening device. If a source has the potential to emit a pollutant above the PSD significance levels then the PSD review process is triggered. The PSD review process involves the use of computer modeling to determine whether a source will cause or contribute to a violation of the NAAQS or consume increment. Modeling conducted by the applicant and reviewed by the DEQ demonstrated that emissions from the facility will not exceed the PSD modeling significance levels and therefore, will not cause nor contribute to a violation of the NAAQS nor consume increment.

Page 3 of Memorandum

4. **Comment:** *"This [9ppmvd] is the high end of a performance (lowest NOx conc.) for this technology. See table on next page. Assumes everything works right – no margin for less than perfect perf. Of the system."*

Response: The referenced Table is found at page 4 of the draft Evaluation of Permit Application ("permit memorandum"). The table sets forth what EPA has identified to be realistic performance limits for various types of pollution control equipment based on actual electric utility experience. The specific conditions of the proposed permit require that the facility not exceed the permit (performance) limits. The permit does not require a perfect system but does require compliance with the permit limits. Continuous emission monitoring is required in the permit to insure compliance with these limits.

Page 4 of Memorandum

5. **Comment:** *"NOx is an important pollutant & they are just blowing it off here. In addition to smog issues, NOx adds to nitrates in the atmosphere, & contributes to particle loading. Significant issues re. health impacts, as these tiny particles are inhaled deep into the lungs, and create nitric acid."*

Response: This comment is located in a section of the permit memorandum that describes the Best Available Control Technology (BACT) analysis for the proposed turbines. The subject of the discussion is the category of NO_X emissions and the variety of control techniques available to reduce NO_X. Further discussion concerning the potential impact of NO_X emissions from this facility are addressed in Section IV C NAAQS Modeling and Section IV E Additional Impacts. The NAAQS are intended to protect the public welfare from adverse effects of airborne emissions. This protection extends to agricultural soil and nitrate deposition. Because the modeling conducted demonstrated that the emissions from the facility will not exceed the modeling significance levels, the facility is not considered to cause nor contribute to a violation of the NAAQS. Since the NAAQS protect from impact on human welfare, no significant adverse impact on soil and vegetation is anticipated due to the proposed power plant.

Page 5 of Memorandum

6. **Comment:** *"They overstate these [ammonia] risks. It is an agricultural area, you have ammonia there anyway."*

   Response: Ammonia is a toxic that is regulated by Oklahoma State rules and regulations under OAC 252:100-41. Any facility that emits ammonia is subject to the provisions of this regulation. The Oklahoma Air Quality Department will not ignore the effects of potential ammonia emissions in an agricultural area.

7. **Comment:** "*SCR is an accepted practice, used efficiently in many plants. Can achieve NOx emissions in the range of 3 ppm. In WA, we would not be able to build a gas fired power plant without SCR. Real issue they are trying to fuzzy over is the cost."*

   Response: Rules for BACT require consideration and comparison of all emissions increases and decreases associated with each possible control technology, as well as the cost required to achieve the reduction. Here, SCR achieved only an approximate 5.5 ppm reduction, with an increase of 5-10 ppm ammonia. Without even reaching the cost issue, the trade off of pollutants raises additional control considerations. Even so, staff recognized that SCR is considered a feasible control technology for this application. Cost is an integral part of the BACT analysis, and at a cost of $11,800 per ton of NO_X removed, cost was determined not to be economically justifiable as the source will not be located in an area that is in Non-attainment or near non-attainment for NO_X.

8. Comment: *"Natural Energy Systems Co., (NESCO) currently operates the Sumas Energy Plant #1 in Sumas, WA. Uses SCR, & has no problems. Proposing to use SCR on new plant – 670 MW, which is considered to be a very large plant. They project NO_X emissions of 236 TPY, which includes some periods of using oil as fuel. Scale this up to 1100 MW and it is way below the 1660 TPY for Arcadia."*

Response: The Sumas Plant is a cogeneration unit that also uses hydro and renewable (such as wind etc.) sources to generate the 125.5 MW capacity. The comparison of NO_X emissions between this plant and the proposed facility in Oklahoma can not be made, as it would require considerable additional detail regarding the mix of fuels and equipment required to meet the two very different capacities (125.5 MW versus 1100 MW).

Page 6 of Memorandum

9. Comment: *"Seems inflated [SCR technology at $11,800 per ton of NO_X removed] to justify rejecting."*

Response: Staff respectfully disagrees with this observation. BACT is a case-by-case determination that is clearly defined by PSD rules that require conclusions based on facts. The details of the BACT analysis are contained in the permit application, the draft permit memorandum sets forth the analysis and conclusions. Both the application and permit memorandum are available for public review.

Page 8 of Memorandum

10. Comment: *"Basis ?"*

Response: The above comment references the conclusion that the predicted maximum impact of CO emissions on the surrounding environment will not be significant and therefore proposed emission limits are believed to be representative of a top level of emission control. The predicted maximum impact of CO emissions on the surrounding environment will not be significant because the modeling, as reported on page 15 of the memorandum, showed maximum concentrations of CO in $\mu g/m^3$ from the proposed plant to be significantly below the PSD modeling significance levels for the 1 hr. and 8 hr. periods.

11. Comment: *"If they could minimize, you wouldn't have almost 16X the PSD level for emissions. No reason <u>not</u> to use CO catalyst. Pretty standard & well used technology."*

Response: This portion of the memorandum addresses the emissions from the proposed boiler and the control technology available for boilers. The proposed boiler will emit 2.46 TPY of CO (see table on page 2 of permit memorandum), well below the PSD significance level for CO of 100 TPY. Catalytic oxidation would not be BACT for a 2.46 TPY CO source.

Higher CO emissions are associated with the duct burners. For turbines with duct burners, recent permits have required limits as low as 2.0 ppmvd, with a typical range of about 9 to 25 ppmvd. In some cases, facilities with the lower limits were located in non-attainment areas, and an oxidation catalyst was proposed for the additional purpose of limiting VOC emissions to below the non-attainment area major source threshold level. Oklahoma and specifically the Oklahoma City Metropolitan area are in attainment for both CO and ozone. As is stated in response to comment 10, the modeling conducted for this permit application predicted concentrations significantly below the modeling significance thresholds (i.e., the source is not

considered to cause nor contribute to an exceedance of the NAAQS). The proposed emission limits are considered a top level of emission control for systems with predicted concentrations significantly below the modeling significance thresholds.. Thus good combustion practices and design are proposed as BACT for CO emissions from the combustion turbines.

Page 17 of Memorandum

12. Comment: *"Have to track the conclusion from data presented. Need to see more info. re. modeling results."*

Response: This question references the "Soils and Vegetation" part of the Additional Impacts Section E. The conclusions drawn in this section reference modeling conducted in the Air Quality Impacts Section B. All required data for analysis has been submitted and is available in the Air Quality office in Oklahoma City for public review.

13. Comment: *"Plume will have a definite aesthetic impact locally, cooling towers completely ignored here (see back page [comment number 15])."*

Response: As stated on the same page in the memorandum as this comment is written, the facility is required to comply with OAC 252:100-25, Visible Emission and Particulates, which restricts opacity from any stack or source to less than 20%. Also, please refer to page 20 of the Permit Memorandum for further information.

Page 18 of Memorandum

14. Comment: *"Probably still need to do the evaluation."*

Response: This comment appears to be directed toward the memorandum discussion of Class I areas. The closest Class I area is southwest of the proposed location and 171 km away. Oklahoma City is between the Class I area and the proposed location. Based on the fact that prevailing winds are from the south, no further evaluation beyond what was summarized in the memorandum is required to be performed. However, it may be of interest that a similar facility also located downwind of the Class I area but some fifty kilometers closer than this proposed facility conducted a conservative Calpuff screening analysis. This facility was determined to have no adverse impact on the Class I area.

Back Page of Draft Document

15. Comment: *"Cooling Towers"*

"This analysis completely ignores the impacts resulting from the use of mechanical, wet cooling towers!"

"1) Source and quality of water (not an air issue, but very important consideration for this project)."

"2) Cooling Towers will create huge plumes

a) These will be significant fogging and icing problems downwind (creates road hazards, etc.)

b) major visibility and aesthetic impact

c) Water deposition – significantly increase precipitation on downwind properties

d) Drift – small particles entrained in the vapor plume will be deposited downwind. May contain chromium (used as an algaecide), salts and other contaminants.

Response: In response to comment 1, this is not an issue within the jurisdiction or purview of the air permit. The facility will be required to secure an NPDES permit, issued by the Water Quality Division (WQD) of the Department of Environmental Quality (ODEQ).

In response to comment 2, no basis for the comment is presented.

2 a)-d) There is no evidence of significant fogging and icing of roads due to other cooling towers from any facilities in Oklahoma. Significant downwind precipitation caused by the cooling towers is not likely. Central Oklahoma has a very different climate from Washington State where this concern may or may not be a legitimate possibility.

The facility is required to comply with OAC 252:100-25, Visible Emission and Particulates, which restricts opacity from any stack or source to less than 20%.

The drift of small particles entrained in the vapor plume from the cooling tower is discussed on page 11 of the memorandum. Drift eliminators are identified as BACT to reduce potential cooling tower particles to 1.79 lb/hr and 7.81 tons per year. Total particulate matter (PM_{10}) emissions from the facility were modeled and it was shown that the ambient concentrations were below the PSD significance levels. Please refer to the Air Quality Impacts section of the Permit Memorandum.

The following comments were taken from the transcript of the **public meeting** held on **October 17, 2000**, at 7:00 pm in the **Luther High School Auditorium**.

Dr. Richard Dawson

16. Comment: *"The 11 million gallons of water for four massive turbines is going to come - - - the water comes and what it does is it cools these millions of BTU's from these turbines in cooling towers. Now, this water evaporates up into the air and, guess what, all kinds of things go up in the air with it, whatever is in that water. So if it's heavy metals and it's lead. It goes up there. All right. When that particulate matter comes down, and it has to come down somewhere, if any heavy metals hook up with those particles, it might represent a danger to your health."*

Response: Evaporation is a gradual change of state from liquid to gas that occurs at a liquid's surface. The process of evaporation is used to separate and purify substances. Emissions are not generated from the cooling water towers through evaporation. Because wet cooling towers provide direct contact between the cooling water and the air passing through the tower, some of

the liquid water may be entrained in the air stream and be carried out of the tower as "drift" droplets. Therefore, the particulate matter constituent of the drift droplets may be classified as an emission. The proposed cooling water towers are fan-assisted induced draft. In this type of tower the air enters from the sides and exits out the top. Therefore, emissions are constrained to the air exiting at the top of the tower.

Revised modeling, which was conducted to address concerns raised in the public comment period, included both PM_{10} and toxic emissions from the cooling water tower. It was demonstrated that the ambient concentrations were below the PSD modeling significance levels and respective Maximum Allowable Ambient Concentrations (MAAC) for each of the toxic pollutants. Please refer to the Permit Memorandum Section IV C. The aggregation of specific heavy metals with other particulate matter was not addressed in the modeling. The affect of this aggregation would best be evaluated through deposition and depletion calculations within the ISC3 modeling evaluation. These calculations require particle size distributions, which are unavailable for the hypothetical aggregation. Therefore, the modeling was conducted without deposition and depletion calculations. However, as is discussed in response to comment 81, because in deposition and depletion calculations the mass of the pollutant is removed from the plume, the exclusion of deposition and depletion calculations represents the most conservative estimate of the ambient concentrations of these pollutants. Please refer to response to comment 25 for further discussion on MAAC levels. Please also refer to the response to comment 15 for further discussion of the cooling water towers.

17. Comment: *"I am concerned about the patients that live in this area that have asthma. There's no question that it's starting at a trigger level of four part per million in the air of NOx, ozone, carbon monoxide, volatile organic hydrocarbons and all kinds of other things this plant is going to produce will cause a problem."*

Response: A few common air pollutants are found all over the United States. These pollutants can injure health, harm the environment and cause property damage.

Per the Office of Air Quality Planning and Standards (OAQPS), the Clean Air Act, which was last amended in 1990, requires EPA to set National Ambient Air Quality Standards for pollutants considered harmful to public health and the environment. The Clean Air Act established two types of national air quality standards. Primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Secondary standards set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

The EPA Office of Air Quality Planning and Standards (OAQPS) has set National Ambient Air Quality Standards for six principal pollutants, which are called "criteria" pollutants. Units of measure for the standards are parts per million (ppm) by volume, milligrams per cubic meter of air (mg/m^3), and micrograms per cubic meter of air ($\mu g/m^3$).

Modeling results show the maximum concentrations of the criteria and toxic pollutants will be below the significance levels required by the state and federal regulations to protect the public and the environment.

18. Comment: *"And with 13 ozone alerts that we've had in the last summer, I think that the citizens have a duty to check into the modeling."*

Response: The purpose of the modeling and the PSD guidelines are to address this issue. Please refer to the draft permit memorandum for the discussion on modeling and the modeling results. The citizens are always encouraged to review the draft permit, which is available for public review.

19. Comment: *"There are a lot of obvious mistakes in this permit and, if any of you are interested afterwards, I'll be happy to show them to you."*

Response: Following the public meeting comments were received through the end of the comment period plus an additional two weeks. This memo contains the responses to all comments received. The draft permit has been through four levels of review in the Air Quality Permit Unit and two levels of review in the Air Quality Compliance and Enforcement Units prior to it's public review process. The public is encouraged to comment on specific areas where there may be error.

20. Comment: *"People with chronic obstructive pulmonary disease, there are a lot of people that smoke around Luther, so this will add to the total burden on their lungs."*

Response: As is stated in response to comment 17, the Primary NAAQS are protective of public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. Modeling results show the maximum concentrations of the criteria and toxic pollutants will be below the significance levels required by the state and federal regulations to protect the public and the environment.

21. Comment: *"No pre-monitoring studies of the air have been done in the location of the power plant. Energetix should be required to these studies before any permit is issued."*

Response: Monitoring the air is the method used to determine the concentration of pollutants in the air. There are no "pre-monitoring" techniques that can be performed besides modeling.

In the PSD review process, an initial modeling analysis is conducted evaluating only the proposed emissions. The results of this analysis are then compared to two different significance levels. The first is a modeling significance level. If the predicted impacts exceed the modeling significance level then the source is required to do further analyses to insure that the source will not cause or contribute to significant deterioration in the area, as measured by the National Ambient Air Quality Standards and increment consumption levels.

The second significance level is the monitoring significance level. If the predicted impacts exceed the monitoring significance levels then preconstruction monitoring will be required. For ozone, the monitoring significance level is an emission rate of volatile organic compounds (VOC) rather than a modeled ozone concentration. While the proposed facility does not exceed the monitoring significance levels for PM_{10}, SO_2, NO_2, or CO it does exceed

the monitoring significance level for ozone. The monitor selected for the preconstruction analysis is both conservative and representative of the area. This monitor is used directly with the Scheffe analysis to arrive at a conservative post construction estimate.

Because NO_2 emissions are also precursors to ozone formation, the DEQ required that all of the proposed utilities be modeled with all existing point and area sources as well as road, non-road, and biogenic emissions sources. This modeling coupled with data from all of the ozone monitors in the state and modeled boundary conditions from Texas, determined that the proposed facilities would not cause an exceedance of the 1-hour standard nor have a measurable effect on the 8-hour standard. The requirement to do this modeling was above and beyond existing state and federal requirements.

22. Comment: *"And so if we don't have any monitoring studies before the plant is built, there will be no real evidence for what the air quality really is here so that we can compare it later on and put a stop to it if we need to."*

Response: As is stated in response to comment number 21, none of the criteria pollutants emitted triggered the pre-construction monitoring requirements except ozone. The ozone modeling study described in the draft permit memorandum uses ozone monitoring data in conjunction with modeling to predict the effects of this facility.

23. Comment: *"The monitoring stations that the DEQ uses for their data are far away, as far as 22 kilometers is the nearest one, and then there are others in Norman and in Oklahoma City, I believe at Christian College."*

Response: There are two types of monitors at issue in this comment. The first is a background pollutant monitor located at Oklahoma Christian College (OCC) and 22 kilometers west of the proposed facility. This monitor was used to obtain pre-construction data for use with the Scheffe analysis (described in the permit memorandum, Section IV C). The Scheffe analysis provides a conservative estimate of potential ozone formation due to the proposed facility. The resulting concentration is added to the background monitored values to arrive at a post-construction estimate. The OCC monitor was chosen because of both its location near to the proposed facility and the fact that it is more directly impacted by pollution from Oklahoma City. It was determined that the OCC site would yield a conservative and representative background concentration. As is addressed in response to comment number 21, the facility was further evaluated with ozone modeling that incorporated all the ozone monitors in the state.

The second type of monitor is meteorological data monitor. Only two monitors in the state have all the necessary information to be included in the modeling analyses. The closest of these monitors is in Norman, Oklahoma. This monitor provides temperature, wind speed and wind direction, and cloud cover. If five years of meteorological data are used it is acceptable to use an off-site and yet representative monitor such as the one located in Norman, Oklahoma.

24. Comment: *"And so if you use these monitoring stations in the - - - with the monitoring to make for the computer model - - - I know this is kind of difficult. But they do this in 15 kilometer squares. And so what I'm saying is and what I'm questioning is and what we need to look into is the assumption of the modeling and that the modeling be checked by the DEQ. So I'm making a formal request for the DEQ to actually check the modeling of the consultant company hired by Energetix."*

Response: Air Quality has reviewed the modeling and affirmed the results that are reported in the draft and proposed permit. This review is conducted by both analyzing the submitted input and output parameters, and independently conducting the modeling analysis. The independent modeling analysis is not required by state or federal rules and therefore is not included in the public files unless relied upon in the final permit. This analysis serves only as a further check that the submitted analysis was complete. However, the DEQ will provide the files to any member of the public upon request.

25. Comment: *"Number two: No multiple pathway health and environmental risk assessment has been performed."*

Response: The studies performed are those that are required by the state and federal rules and regulations for the determination of approval or denial by the DEQ for a proposed facility of this type and size. As was stated previously in response to comment number 17, the primary standards set limits to protect public health, including the health of "sensitive" populations such as asthmatics, children, and the elderly. The applicant has adequately established that the proposed facility will not cause nor contribute to an exceedance of the NAAQS.

OAC 252:100-41 establishes Maximum Allowable Ambient Concentrations (MAAC) for toxic pollutants. The 24-hour MAACs are based upon occupational exposure limits and the level of toxicity. Level of toxicity as defined in OAC 252:100-41 is based on the most restrictive eight hour time weighted average concentration specified for workroom air selected from either the 1986-1987 Threshold Limit Values and Biological Exposure Indices as adopted by the American Conference of Government Industrial Hygienists; the Recommended Standards for Occupational Exposure set forth in the July, 1985 summary of National Institute for Occupational Safety and Health Recommendations for Occupational Health Standards; or the 1986 Workplace Environmental Exposure Levels set forth by the American Industrial Hygiene Association. Depending upon toxicity level, the MAAC may be one-tenth, one-fiftieth, or one-hundredth of the occupation exposure limit. All toxics from the fuel burning sources and the cooling water towers were evaluated with respect to the MAACs. None of the toxic pollutants exceeded their respective MAACs, therefore a health risk assessment was not required.

26. Comment: *"Most major power plants and other things, it's my understanding, have done more studies than have been performed here, at this plant. Human health is in danger here, in my opinion, and we need to take into account the water problems that I've already mentioned."*

Response: The Department of Environmental Quality adheres to EPA guidance to ensure the protection of air quality in Oklahoma as exemplified in the requirement of the proposed utility to conduct photochemical modeling. The results of the modeling of emissions from the proposed facility are estimated not to cause or contribute to any violations of the 1-hour ozone standard in Oklahoma. As the New Oklahoma Sources are estimated to produce changes in peak 8-hour ozone concentrations that are much less than 1 ppb, then they are estimated to have no measurable effect on peak 8-hour ozone concentrations in the Tulsa-Oklahoma City areas.

Modeling conducted for all other criteria and toxic pollutants emitted does not exceed the modeling significance levels. Please refer to the responses to comments 17 and 25.

As is stated in response to comment 15, the applicant will be required to obtain an NPDES permit to address all water quality issues.

27. Comment: *"Number three: If you read the draft permit, that even the first air quality permit had differences in elevation…And I'd like to say that it's a mistake, but I really don't think so."*

Response: The original modeling did not include terrain. In response to comments DEQ required the applicant to submit modeling, which included terrain. All elevations used in the evaluations were verified with respect to Digital Elevation Model (DEM) data and 7.5 minute quadrangle USGS maps of the area. There were no discrepancies between elevations submitted and elevations verified.

28. Comment: *"Now this is important because it gets into the details of calculating the stack height and so on that's necessary."*

Response: Stack height is not generally calculated based on the terrain. The elevation of the stack was included in the revised modeling analysis.

29. Comment: *"And there's no reason why they need four turbines, two turbines would be adequate."*

Response: The draft permit addresses the proposed facility. Air Quality does not make decisions pertaining to whether a proposed facility should be some size other than the size proposed by the applicant.

30. Comment: *"Number five: …One of the things that the EPA and the DEQ does not take into account is photosynthetic reactions in the air. These highly hazardous noxious elements can combine in the air to form other compounds the DEQ really doesn't take into consideration."*

Response: The DEQ toxics that are subject to OAC 252:100-41 include the photo-chemically reactive toxics. Each has a Maximum Acceptable Ambient Concentration (MAAC) which is a maximum allowable twenty-four hour average concentration, in ambient air, for that air contaminant. Level of toxicity as defined in OAC 252:100-41 is based on the most restrictive eight hour time weighted average concentration specified for workroom air selected from either the 1986-1987 Threshold Limit Values and Biological Exposure Indices as adopted by the American Conference of Government Industrial Hygienists; the Recommended Standards for Occupational Exposure set forth in the July, 1985 summary of National Institute for Occupational Safety and Health Recommendations for Occupational Health Standards; or the 1986 Workplace Environmental Exposure Levels set forth by the American Industrial Hygiene Association. Depending upon toxicity level, the MAAC may be one-tenth, one-fiftieth, or one-hundredth of the occupation exposure limit. All toxics from the fuel burning sources and the cooling water towers were evaluated with respect to the MAACs. None of the toxic pollutants exceeded their respective MAACs, therefore a health risk assessment was not required. Please refer to pages 21 and 22 of the Permit Memorandum.

31. Comment: *"That elevation point that we made previously is crucial, because many of you live in little valleys, here. And if they stay sort of flat, like there's only 50 feet, then I believe you get more turbines because ozone kind of tends to layer. So if you live in a little valley EPA is not going to protect you."*

Response: Ozone modeling was required of the applicant to ensure that the attainment status of Oklahoma was not adversely affected by the new power plant. The ozone modeling study demonstrated that the proposed source would not have a significant impact on the ozone NAAQS. While concentrations of ozone may be higher in some areas due to the issues addressed above, the impact of this specific source is not significant.

Four-kilometer grids were the smallest used in the study. These grids do not resolve the small terrain features present at the proposed site. If the atmosphere is sufficiently unstable on the lee side of hills transient cavities can form at specific distances downwind due to the sinusoidal motion created by the obstruction. Ambient pollution levels will be higher in the cavities. But, it is necessary to realize that the flow patterns around terrain, characteristic of the area in question are too small for models to predict effectively. In the future, researchers may develop numerical models that can be useful on the smallest levels.

However, it should be noted that in the area of the proposed source, it is quite likely that NO_X scavenging will occur and result in lower ozone concentrations rather than higher. NO_X scavenging is the chemical removal of ozone through the participation in photochemical reactions.

32. Comment: *"Okay. Number six, SCR technology. They have a whole section on that in the draft permit, which you can read at the Luther City Hall. They don't want to do it because they say it will be very costly for them."*

Response: The permit review process involves a Best Available Control Technology (BACT) analysis. The BACT analysis considers energy, environmental and economic impacts and other costs in determining the maximum degree of pollutant reduction achievable for the proposed source. In no event can the determination of BACT result in an emission limitation, which would not meet any applicable standard of performance under federal laws and regulations. The BACT analysis performed for this facility was done strictly by the guidelines and in accordance with the rules. Please see the analysis in the draft permit memorandum for further detailed explanation.

33. Comment: *"I have a little map, which I think some of you have received which shows that this is fully a third greater than any other source of pollution in Oklahoma County."*

Response: The emission limits in the draft permit are maximum allowable emissions that are based on potential to emit rather than actual emissions. Several Oklahoma County facilities have much larger maximum allowable emissions than the emission limits in the draft permit. It is not unusual for actual emission to be significantly lower than the maximum allowable emissions. Even if the facility operates at maximum permit levels, the draft permit assures that the permittee will apply the best available control technology so that emissions of pollutants will not exceed any applicable federal or state standard.

34. Comment: *"And also, for our growth in Oklahoma County, if we give this much pollution, then other industries and more cars can't really come to the fore without the EPA saying we're not in compliance. …So why should we have four turbines? At least, if you want a power plant, you know, cut it in half."*

Response: Please read page 15 of the memorandum to the draft permit. It explains that this facility was part of an extensive extra ozone impact study that was done to assess impacts in Oklahoma due to the proposed new electrical generating units in the State. The study considered the impact of current facilities and also considered the possibility of additional growth in the region. The results of the modeling of emissions from the proposed New Sources are estimated not to cause or contribute to any violations of the 1-hour ozone standard or have any measurable effect on peak 8-hour ozone concentrations in Oklahoma.

35. Comment: *"It's very interesting that, in their draft permit, that they use the years that they picked and also the site that they picked to use for the modeling to get what they wanted, which is basically so they could have all four of their turbines."*

Response: It is assumed that the comment is addressed to meteorological data, because that is the only modeling data which covers a number of years. The meteorological data used are wind speed, temperature, cloud cover, etc. The impacts from the pollutants were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed. The number of turbines is based solely on the applicant's request and is not impacted by the meteorological data used. The meteorological data used in the dispersion modeling analyses consisted of five years (1986-1988, 1990, and 1991) of hourly surface observations from the Oklahoma City, Oklahoma, National Weather Service Station (Will Rogers World Airport) and coincident mixing heights from Oklahoma City (1986-1988) and Norman, Oklahoma (1990 and 1991). The National Weather Service moved the upper air-monitoring site from Oklahoma City to Norman in 1989, causing a three-week gap in meteorological data. Therefore, data from 1989 is excluded in all analyses where Oklahoma City upper air data is appropriate. Meteorological data (usable in the model) are not readily available after 1995. The gaps in the data available from the years 1992 through 1995 are significant. Therefore, the Oklahoma Department of Environmental Quality accepts and will continue to accept modeling conducted with the earlier data (1986-88, 1990, and 1991). Again, the use of five years (43,800 hours) is intended to capture the most relevant meteorological conditions.

36. Comment: *"And we didn't mention fugitive dust on the roads. That's a big issue. I would suggest that the DEQ put provisions in the draft permit for fugitive dust."*

Response: Fugitive dust emissions are addressed in the Standard Conditions of the draft permit. Section XIX condition A paragraph (5) states, "No visible fugitive dust emissions shall be discharged beyond the property line on which the emissions originate in such a manner as to damage or to interfere with the use of adjacent properties, or cause air quality standards to be exceeded, or to interfere with the maintenance of air quality standards."

Mr. Gary Martin

37. Comment: *"How did you arrive at the mega pollution of 2958 tons per year?"*

Response: The draft permit does not contain any pollutant that would be permitted at 2958 tons per year. It is not clear where this number comes from.

38. Comment: *"If EPA has a level of 462 tons per year, how, then, did they approve a permit for this power plant?"*

Response: 462 tons per year does not represent any EPA or Oklahoma level. It is not clear where this number comes from.

39. Comment: *"And this plant, it's my understanding --- but it will be 100 percent natural gas fed. Is that not correct?"*

Response: Correct except for the diesel fired emergency generator and the diesel fire pump.

40. Comment: *"Now, it's my understanding that there's four stacks of 17 feet in diameter, 160 feet or 150 feet tall and what is the dissipation into the atmosphere from the release of those fumes?"*

Response: The dispersion is shown in the table on page 15 of the memorandum. Maximum concentrations that are listed are below the listed PSD significance levels in micrograms per cubic meter.

41. Comment: *"Also I would like an explanation on the fumes and the matter of a velocity of 70 feet per second."*

Response: Stack velocity refers to the speed at which the emissions exit the stack. It is one factor in the equation used to determine the distance that emissions will travel and the final ground level concentration. Specifically, the stack velocity is used when the calculations are made that result in the maximum concentrations listed on page 15 of the memorandum.

Mr. Tom Menasco, Jr.

42. Comment: *"... And according to the PSD, which is the --- stated as prevention of significant deterioration levels, threshold levels, that these are --- these numbers are in extreme excess of what's stated as being --- I read that as safe levels. And this, to me, shows that NOx, states this plant will put out 1660 tons per year of NOx and the PSD level is 250. And I just would like to know, when the answers come out, why this could even be considered safe."*

Response: The PSD levels spoken of here are the levels above which additional modeling is required. They are not maximum allowed amounts. The additional modeling is done to determine if construction and operation of the facility will result in a deterioration of air quality. This is the study that was done as explained in the memorandum of the draft permit at pages 16-17, and summarized at page 24. Ambient air quality standards are not threatened by the proposed facility.

43. Comment: *"And carbon monoxide as 1558 tons per year, and the PSD level states that it's 100, and I would just like each one of these, on page two of the draft, issues, I'd like all of those questions as how this can be considered safe if these PSD levels are so much less than the actual levels that the plant is going to put out."*

Response: See response to comment 42.

Mr. Charles DeFuria

44. Comment: *"Now, I haven't read the report, but my question is: Would the report specify if there was say, no wind, absolutely no wind for a period of time, what would be the effect on my family? What would be the levels of pollution?"*

Response: The ISC3 model accepts hourly meteorological data records to define the conditions for plume rise, transport, and diffusion. The model estimates the concentration value for each source and receptor combination for each hour of input meteorology, and calculates user-selected short-term averages. Meteorological data used in these studies consider all conditions, including calm, to predict maximum concentrations and the locations of those maximum conditions. Actual meteorological conditions for central Oklahoma were evaluated in the modeling. Because the dispersion parameters cannot handle zero flow, a wind speed of 1 meter per second is used within the model for stagnant conditions.
Different pollutants are required to be evaluated over different averaging periods by both state and federal regulations. Toxic pollutants regulated under OAC 252:100-41 are required to meet a 24-hour standard. The following criteria pollutants are regulated through the PSD program with respect to the NAAQS (please refer to the response to comment 17). Ten-micron particulate matter is required to meet both a 24-hour and an annual standard. Sulfur dioxide is required to meet 3-hour, 24-hour, and annual standards. Nitrogen dioxide is required to meet an annual standard. Ozone is presently required to meet a 1-hour standard; however, a remanded 8-hour standard exists. Carbon monoxide is required to meet 1-hour and 8-hour standards. No air quality standards are threatened by the proposed facility. Short-term calm conditions may lead to higher concentrations, but the standards and the averaging periods over which they are measured are intended to be protective of human health. Please also refer to the response to comment 46.

45. Comment: *"So I'd like to know what the effect is going to be living three quarters of a mile away in any type of condition."*

Response: The study shows that the maximum concentrations due to this facility are below PSD impact significance levels for all locations and under all modeled conditions.

46. Comment: *"But anyway, also, does the report address any kind of industrial accidents, like what kind of fire protection is there if something blows up or, what-if's like that?"*

Response: Section 112(r) of the Clean Air Act requires that all facilities implement programs to prevent an accidental release and to minimize the consequences of any release of a hazardous substance. EPA, not DEQ, enforces this program. However, the draft permit does include the emissions from an Emergency Diesel Fire Pump which is planned to be installed on site.

Mrs. Vicki DeFuria

47. Comment: *"I would see big power plant out my front window and I can't imagine who'd ever want to buy our place now if we decided to sell and be overlooking the same thing."*

Response: The Air Quality Department permitting authority deals exclusively with air quality issues. The agency is not involved in decisions regarding the use of property, such as zoning or land use planning.

Mr. Tom Rueb

48. Comment: *"And my question, one, would be: [With respect to the cooling water source and emissions from the cooling water towers] How much would that go up into the air and if that could not be incorporated into the model for the air quality, because there would be a significant amount, possibly a significant amount, that would go into the air with other things that are already applied for in the permit. So that's --- that was my question."*

Response: The use of the wastewater to cool the turbines through the cooling towers has been included in the modeling and the effect is insignificant.

Letter from **David and Wanda Fox** dated **September 14, 2000** and received September 19, 2000.

49. Comment; *"We need to help the earth heal itself not give it more cause for sickness. Our environment is making us sick. Lets do without so much greed for money and go back to the basics of living as spiritual being created by God and keep our air as clean as possible."*

Response: EPA has delegated to the Oklahoma Department of Environmental Quality, Air Quality Division the responsibility to enforce the Clean Air Act within the State of Oklahoma. The Division is required by law to issue a permit to an applicant who meets all legal requirements.

E-mail to Monty Elder from **Janet Wood** (TANEMA@aol.com) of Luther, Oklahoma, dated **October 12, 2000** and forwarded to Ing Yang on 10/16/00

50. Comment: *"Energetix never notified me of the proposed plans, it was only from word of mouth that I learned of this plant."*

Response: As required by law, Energetix has published the "Notice of Filing a Tier III Application" in *The Edmond Sun* and *The Daily Oklahoman,* in Oklahoma County, on March 26 and March 27, 2000, respectively. The notice stated that the application was available for public review at the DEQ Office at 707 North Robinson, Oklahoma City, Oklahoma; City of

Edmond, Engineering Department, 10 S. Littler, Edmond; and Luther City Hall, 119 S. Main, Luther, Oklahoma.

51. Comment: *"In the quest for answers and information, conversations with Cindy Mize, Energetix Manager, have gotten me evasive answers. This was during the last town meeting and before."*

Response: DEQ cannot respond for the permit applicant. Throughout the permit application review process there are opportunities for the public to gather information about the proposed facility and air quality permit, including through the submission of comments for response by DEQ.

52. Comment: *"In the quest for answers and information, conversations with a Planning Commission member, Curtis Roberts, got me more evasive answers. His answers consisted of more "I don't knows" than anything. (I live on a hill, I can see all the way to Wellston. I don't want to see the 4 turbines pumping pollution into the country air that I breathe. I have an outstanding view)."*

Response: DEQ cannot respond for the Planning Commission. See response to comment 53.

53. Comment: *"The pipelines carrying the water to and from will tear up peoples yards, roads and destroy large 50 year old and older trees in the path. The ground out here shifts and moves different times of the year and what about leakage from pipes into underground well sources."*

Response: The DEQ AQD's authority is confined to the issuance of air quality permits.

54. Comment: *"Recently, in the paper, there was an article about the government considering lowering air quality standards where we will have even more pollution in the air. It is easier to stop this now than to let it get established and then try to stop it."*

Response: The purpose of the Clean Air Act (CAA) is "to protect and enhance the quality of the Nation's air resources so as to promote the public health and welfare and the productive capacity of its population." Almost without exception, since the Clean Air Act was passed, amendments have tightened rather than relaxed air quality standards. The ODEQ enforces the Clean Air Act, and ODEQ has worked very closely with Oklahoma communities to maintain attainment status.

55. Comment: *"I'm not alone, all of my immediate neighbors do not want Energetix."*

Response: DEQ will confine its responses to air quality issues.

56. Comment: *"Three families that I know of want this plant only because they stand to profit by leasing the farm land around Energetix in their pocketbooks. One family in these 3 just hasn't done any research and are ignorant to the facts of pollution."*

Response: See response to comment 49.

57. Comment: *"Our county roads are not well kept and will be further damaged."*

Response: See response to comment 52.

58. Comment: *"If Energetix gets in, then more will follow and Luther will no longer be a small country town. Please do not issue the air permit to Energetix."*

Response: See response to comments 49 and 52.

Letter from **Richard Dawson**, M.D. dated **October 16, 2000** and received October 16, 2000.

59. Comment: "*The emissions [from the cooling water tower] will contain a much higher amount of heavy metals which has not been taken into account in the applicant's modeling."*

Response: See response to comment 48. The State requested that the applicant revise the modeling to include emissions from the cooling water tower and terrain data throughout the modeling domain. The results of the revised modeling are presented in Section IV C of the permit memorandum of the proposed permit.

Letter from **Bill and Norena Walker** dated **October 16, 2000** and received October 17, 2000.

60. Comment: *"I do not want a power plant in our area. It is not in the best interest of the people. The small amount of jobs is not worth the risk to the communities health. Pollution will hurt the health of the people & animals and crops. It will have a negative effect on the value of our home and land to have a power plant in our vicinity. Please say NO, to the power plant."*

Response: See response to comment 49 and 52.

Letter from Mr & Mrs. **Neil Young** dated **October 17, 2000** and received October 18, 2000.

61. Comment: *"My husband and I just purchased a home in Luther. We moved to the country so we could raise our family in a pollution free environment. We are both extremely upset about this plan! We would like to help stop this, we are concerned about our future!"*

Response: See response to comments 49 and 52.

Letter from **John L. Davis, M.D.** dated **October 17, 2000** and received October 18, 2000.

62. Comment: *"I hope that you will reconsider this plant and perhaps place it in another state that wants the electricity."*

Response: See response to comments 49 and 52.

Letter from **Leif Johnsson** dated **October 17, 2000** and received October 20, 2000.

63. Comment: *"Would you please verify and refine the following perspective of the automotive equivalence of NOx pollution expected to be emitted from the plant.*

Total automobile driven in Oklahoma each days (mpd) is approximately equal to 100 million miles – from Leon Ashford of DEQ.

Total NOx emissions from all automobile in Oklahoma is approximately 170,000 tons per year (tpy) – from Energetix pamphlet (copy attached).

This means that automobile create 1 tpy of NOx from driving approximately 588 mpd (100 mill. mpd / 170 K tpy).

The plant would produce 1,660 tpy of NOx – from DEQ draft permit.

This means that, with regard to NOx, the plant would produce pollution equivalent to automobile driving of 976,000 mpd (588 mpd x 1,660 tpy)."

Response: That is correct.

64. Comment: *"Would you outline the expected impact that the additional NO_X emissions would have on the probability that Oklahoma County will be able to remain within federal guidelines for NO_X emissions and associated ozone creation."*

Response: Please refer to response to comments 33 and 87. The Department of Environmental Quality adheres to EPA guidance to ensure the protection of air quality in Oklahoma as exemplified in the requirement of the proposed utility to conduct photochemical modeling. The results of the modeling of emissions from the proposed facility are estimated not to cause or contribute to any violations of the 1-hour ozone standard in Oklahoma. As the New Oklahoma Sources are estimated to produce changes in peak 8-hour ozone concentrations that are much less than 1 ppb, they are estimated to have no measurable effect on peak 8-hour ozone concentrations in the Tulsa-Oklahoma City areas.

Letter from **Jim Woolbright and Tony Jones** dated **October 17, 2000** and received October 20, 2000.

65. Comment: *"No pre-monitoring studies of the air have been done in the location of the power plant. Energetix should be required to do these studies before any permit is issued."*

Response: It is unclear what is meant by "pre-monitoring studies". Monitoring the air is the method used to determine the concentration of pollutants in the air. Monitoring is performed before construction so that a comparison can be made of air quality pre and post construction. There are no "pre-monitoring" techniques that can be performed besides modeling. Please refer to response to comment 21.

66. Comment: *"No multiple pathway health and environmental risk assesment has been performed. The D.E.Q. has not taken to account the discharge in the air of heated waste (sewage) water and its release of heavy metals from the cooling towers which will combine with the particulate matter and be inhaled and lodge in people's lungs. The effect of this should be measured from human health and safety. The D.E.Q. has assumed clean pure water, which has not been concentrated. In this case Energetix should be required to build a purification plant that will remove heavy metals from the water. The emission from the cooling towers of lead and other metals are too high at the power plant site."*

Response: See response to comments 16 and 25. Emissions from the cooling towers have been incorporated into the revised modeling and their effect is insignificant.

67. Comment: *"Ozone and other toxics will settle down in deeper valleys of the area when the wind is not blowing. This may cause a toxic effect not accounted for by the D.E.Q. planners. It would seem reasonable, therefore, to cut the number of turbines and use S.C.R. technology to reduce the hazard to humans and vegetation."*

Response: Modeling conducted, the results of which are presented in the evaluation memorandum of the permit, does not support the above conclusion. See response to comment 82.

Letter from **Tony Jones** dated **October 17, 2000**

68. Comment: *"No pre-monitoring studies of the air have been done in the location of the power plant. Energetix should be required to do these studies before any permit is issued."*

Response: See response to comments 21.

69. Comment: "*No multiple pathway health and environmental risk assessment has been performed. The D.E.Q. has not taken to account the discharge in the air of heated waste (sewage) water and its release of heavy metals form the cooling towers which will combine with the particulate matter and be inhaled and lodge in people's lungs. The effect of this should be measured for human health and safety."*

Response: See response to comments 16 and 25.

70. Comment: *"Elevation differences at the power plant site are 140 ft., not the 50 ft stated in the Energetix air application and in their draft permit. Ozone and other toxics will settle down in deeper valleys of the area when the wind is not blowing. This may cause a toxic effect not accounted for by the D.E.Q. planners."*

Response: Only elevation differences above stack base are relevant in determining maximum ground level concentrations. The base elevations for the proposed sources ranged from 1000 feet to 1019 feet. Assuming that the area will be brought to a level grade the maximum elevation change is 70 feet.
Actual meteorological conditions for central Oklahoma were evaluated in the modeling. Because the dispersion parameters can not handle zero flow, a wind speed of 1 meter per second is used within the model for stagnant conditions. This wind speed adequately evaluates the impacts from the sources in stagnant conditions. However, if an area has truly stagnant conditions, there is no pollution entering the area. Please refer to response to comment ~~44~~.

71. Comment: *"Appropriate studies should be done because of photosynthetic reactions in the air with the hazardous waste (heavy metals) coming from waste (sewage) water and other dangerous chemicals like volatile organic hydrocarbons as well as the other listed permit chemicals coming from the 160 ft. stacks. These, when mixed with particulate matter create a level of hazard which is too great."*

Response: See response to comment 30.

72. Comment: *"With the thirteen plus ozone alerts this summer in the Oklahoma City area, how will the modeling assumptions protect us when there is no wind?"*

Response: See the memorandum to the draft permit at page 15. It explains that this facility was part of an extensive extra ozone impact study that was done to assess impacts in Oklahoma due to the proposed new electrical generating units. The results of the modeling of emissions from the proposed New Sources are estimated not to cause or contribute to any violations of the 1-hour ozone standard or have any measurable effect on peak 8-hour ozone concentrations in Oklahoma. Also, see response to comment 44.

73. Comment: *"Why are the years used in the modeling not the years of maximum pollution (worst case scenario)?"*

Response: See response to comment 35.

74. Comment: *"Was the stack height correctly calculated based on 140 ft. difference in terrain? Was aerodynamic plume downwash (cavity effect) calculated with all the buildings involved? To our knowledge, the public has not yet seen a sight plan with all the buildings required to run a power plant shown."*

Response: Stack height is not generally calculated based on the terrain. Elevation of the stack and all buildings were included in the modeling.

75. Comment: *"We question the use of the five years between 1986 and 1991. Other parts of their submission have much later years. We believe that the Department of Environmental Quality should pick the very worst case scenario from any previous year for the dispersion modeling analysis and coincident mixing heights. You can't take Norman numbers and mix them with Oklahoma City numbers in our opinion."*

Response: See response to comment 35.

76. Comment: *"We request a Class I area impact analysis because the source is within 200 km. Of the Wichita Mountain National Wildlife Refuge."*

Response: See response to comment 14.

Letter from **Richard Dawson** dated **October 20, 2000** and received October 30, 2000.

77. Comment Page 1: *"Elevations at their site are not the stated 50 feet. Rather on the land that they have optioned to lease, there is a difference of 910 feet at Coon Creek and 1,070 feet at the Northeast corner of their site."*

Response: See response to comment 70.

78. Comment Page 1: *"As the valley land merges into the hills, a complex and constricted terrain is encountered. This rough terrain requires a different computer model than the one used. According to Industrial Source Complex Long-Short Term (ISCST) this model has limited terrain adjustment."*

Response: Complex terrain is defined relative to the plume centerline height. It is not defined by comparing one terrain feature to another. The stack height may be used as a conservative replacement for plume centerline. There are no terrain features out to and substantially beyond the maximum impact of the four stacks that are higher than the four stacks. Therefore, complex terrain is not encountered relative to the four stacks. Complex terrain is possibly encountered relative to the cooling water tower. The Industrial Source Complex (ISC3) model used also incorporates the COMPLEX1 screening model dispersion algorithms for receptors in complex terrain, i.e., where the receptor elevation is above the release height of the source. The COMPLEX1 screening model is designed to provide conservative results and is appropriate for the evaluation. Because the source has demonstrated with a conservative model that all impacts are below the respective modeling significance levels, there is no need for a more refined model which has the potential of providing, while more accurate, less conservative results.

79. Comment Page 1: *"This model [ISC3] also only calculates the average seasonal and/or annual ground level concentration or total disposition."*

Response: The ISC3 model will evaluate concentrations for several averaging periods, including one, three, eight, and twenty-four hour averaging periods.

80. Comment Page 1: *"Citizens for Health" who live in the multiple valleys around could be injured by short periods of ozone and other toxic materials."*

Response: Modeling conducted, the results of which are presented in the permit memorandum , does not support the above conclusion.

81. Comment Page 1: *"Because of terrain downwash, exponential decay, gravitational settling, horizontal temperature gradient, particle size and the interaction of dry and wet plumes, a complete analysis has not been carried out."*

Response: Terrain has been included in the revised modeling analysis. Please refer to the proposed permit memorandum Section IV C. The revised modeling demonstrates that the proposed facility will not exceed any of the modeling significance levels.

The use of exponential decay is not conservative for the pollutants modeled, nor is it relevant. Exponential decay is a simple method of accounting for pollutant removal by physical or chemical processes. The use of an exponential decay factor depletes the pollutant from the plume and results in lower downwind concentrations. It is not a regulatory default option unless sulfur dioxide is modeled in an urban setting. While the facility does have SO_2 emissions it is not located in an urban area as defined for modeling.

Wet deposition is not a guideline feature of ISC3. Therefore it is not evaluated for Air Quality Permitting. However, as is the case with dry deposition and depletion, wet deposition and depletion reduce the mass of the plume and result in lower ground-level concentrations.

As per EPA guidance, gravitational settling is discounted with particle sizes 10 microns and smaller. Particles of this size have negligible settling velocities. Settling velocities are an important aspect of deposition calculations. However, deposition calculations evaluate what is deposited out of the plume not the concentration of the air at ground level. In principle, the bias in the air concentration estimates is directionally opposite that of the deposition. If the deposition were underestimated then the air concentration would be overestimated. Therefore, it is more conservative to evaluate air concentrations for small particles without including deposition calculations.

Horizontal temperature gradients are not a PSD modeling issue. They may be relevant for large domain modeling (4 kilometer grid cells and higher) but they are not relevant for the modeling domain evaluated (maximum impacts within 10 kilometers).

82. Comment Page 1 and 2: *"Since where the steam comes off is lower than the nearby terrain height, the plume interaction in complex terrain added to the combined effects of emissions from four (4) 160' stacks will create turbulent diffusion in many directions including horizontal and vertical. There will be therefore multiple mixing heights. With near stagnant conditions which occurs at the site, ozone and all the other pollutants may settle in the valleys and be a significant hazard to the health of the individuals and plants in these locations."*

Response: The impact of particulate matter from the cooling water towers and the four stacks on the terrain has been modeled with ISC3. This model conservatively evaluated the impact on complex terrain. See response to comment 78.

Mixing heights are generally the heights in atmosphere measured from the ground to the bottom of the inversion layer. The inversion layer is the layer in which temperature no longer decreases with height. Mixing heights are determined by the upper air data. It is unlikely that a single source (or four) will create an inversion in simple terrain. The terrain is not complex with respect to the four stacks. The momentum flux (velocity dependent), the buoyancy flux (temperature dependent), and the stack heights combine to ensure a maximum height for the final plume rise. The plumes from the four stacks will not create a temperature inversion, which would create a new mixing height.
The emissions from the cooling water tower will never be hot and therefore will never create an inversion layer (increase in temperature with height). Whether or not the cooling towers are situated in complex terrain has no bearing on the creation of a new mixing height.
For more information on stagnant conditions please refer to response to comments 44 and 70.

83. Comment Page 2: *"With near stagnant conditions which occurs at the site, ozone and all the other pollutants may settle in the valleys and be a significant hazard to the health of the individuals and plants in these locations."*

Response: Five years of actual meteorological data were used for the modeling and the results do not demonstrate that emissions from the facility will pose a health hazard. The commentator should be cautioned not to extrapolate a short-term occurrence (acute exposure) to the health and environmental effects found with long term exposures. While the model does have the ability to evaluate a short term concentration, the NAAQS and MAAC standards are evaluated over very specific averaging periods. For more detail on the NAAQS and MAAC standards please refer to response to comments 17 and 25. Further, in the near field (zero to ten miles) of a NO_X source the existing background ozone may be scavenged (consumed in photochemical reactions) and actually be lower than the surrounding area.

84. Comment Page 2: *"Photochemical interactions and heavy metals on particles may also represent a significant factor that will be helped by a study of spatial pollutant patterns."*

Response: A consortium of new utilities conducted photochemical modeling. See response to comments 34 and 87. The study was conducted with the Comprehensive Air-quality Model with extensions (CAMx) a photochemical model. It was determined that the utilities did not represent a threat to air quality in Oklahoma. The use of receptor grids (with terrain) in both the CAMx and ISC3 modeling provided spatial pollutant patterns.

85. **Comment Page 2:** ***Pollutant transport and disposition in complex terrain is important and needs to be studied in this project.***

Response: Ozone transport within the state and from surrounding states was evaluated using the CAMx model. Results meet all EPA performance goals.

The remaining criteria and toxic pollutants were modeled again in response to comments with the inclusion of terrain in the ISC3 modeling program. Deposition was not considered using the ISC3 model. In applying the ISC3 model some factors are screened out, so that the model uses, instead, a very conservative assumption. Small particles, such as those emitted from utilities, result in negligible settling. For this reason, deposition and depletion calculations were eliminated from the model, in favor of the conservative assumption. The law of conservation of mass dictates the conclusion that deposition and depletion calculations would provide less conservative results than were reported.

86. Comment Page 2: *"Citizens for Health" has asked the Dallas Environmental Protection Agency and the Oklahoma City Department of Environmental Quality to run the modeling on their computers to check the work of Energetix's consultant firm."*

Response: The Air Quality Division of the Oklahoma Department of Environmental Quality performed modeling (including terrain and emissions from the cooling water tower) to confirm the results submitted by Energetix. EPA Region VI in Dallas was provided full copies of the application and draft permit. Staff at Region VI review all PSD permits for Oklahoma.

87. Comment Page 2: *"We believe the years picked between 1986 and 1991 do not represent the worst case scenarios in the Oklahoma City area. As you know, the Oklahoma City area is almost in non-attainment. This is a very important fact and would cost the governments surrounding the area a huge amount of money to come into compliance if this power plant when its massive pollution sends us into noncompliance. The numbers between 1986 and 1991 do not fairly reflect the increase in the ozone due to numerous sources and the ozone we have had in the past. The change in weather and meteorological conditions which have occurred since 1991 are not reflected in this data. The consultant firm that Energetix uses should be made to assemble the data and model it correctly if the Environmental Protection Agency and the Department of Environmental Quality does not have this data."*

Response: See response to comment 35, which explains why the years between 1986 and 91 were used for meterological data. Oklahoma City is not in danger of exceeding the National Ambient Air Quality Standards (NAAQS) for nitrogen dioxide (NO_2), sulfur dioxide (SO_2), 10 micron particulate matter (PM_{10}), or carbon monoxide (CO). The impacts from these

pollutants were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed.

Photochemical modeling conducted at the request of the Oklahoma Department of Environmental Quality, i.e., not specifically required in PSD permitting, did not use the meteorological data mentioned above. CAMx was run for a 1995 Base Case emissions scenario and the model-estimated ozone concentrations were compared with the observed values of a June 1995 ozone episode. EPA has developed a set of model performance goals for ozone to aid in the determination that the model is working adequately. The CAMx model performance statistics for all days of the June 1995 episode meet EPA's model performance goals by a wide margin (usually by over a factor of 2). Additional analysis of the spatial distribution of the predicted and observed 1-hour and 8-hour ozone concentrations revealed that the model exhibited a fairly good job of estimating the spatial patterns of the observed ozone concentrations. CAMx was then applied using the Oklahoma 32, 16, and 4 kilometer grids and the June 18-22, 1995 episode for two future year emission scenarios:

2007 CAA Base Case: Emission in 2007 assuming growth and all Clean Air Act Amendment (CAA) mandated controls.

2007 New OK Sources: 2007 CAA Base Case including emissions from the proposed New Oklahoma Sources added.

The year 2007 was selected for the future-year assessment because growth and control factors were readily available from the Ozone Transport Assessment Group (OTAG) and Dallas-Fort Worth ozone control plan development modeling domain. Emissions from the New Oklahoma City Sources were estimated to not increase ozone in the Tulsa-Oklahoma City area to above the 1-hour ozone standard. Therefore, emissions from the proposed New Sources are estimated not to cause or contribute to any violations of the 1-hour ozone standard in Oklahoma. As the New Oklahoma Sources are estimated to produce changes in peak 8-hour ozone concentrations that are much less than 1 ppb, then they are estimated to have no measurable effect on peak 8-hour ozone concentrations in the Tulsa-Oklahoma City areas.

88. Comment Page 2: *"Citizens for Health" look forward to seeing in person the Department of Environmental Quality's check on the modeling."*

Response: Any modeling conducted by the State of Oklahoma is available to the public.

89. Comment Page 2: *"We would also like to see the appropriate years the modeling sites and assumptions that would better protect our air quality in view of the approximately thirteen (13) ozone alerts that have occurred in Oklahoma City this year alone."*

Response: See response to comment 35, which explains why the years between 1986 and 1991 were used for meterological data for all criteria pollutants except ozone. See response to comment 87, which explains the use of 1995 data for photochemical (ozone) modeling. The Department of Environmental Quality has gone above and beyond EPA guidance to ensure the protection of air quality in Oklahoma as exemplified in the requirement of the proposed utility to conduct photochemical modeling.

Letter from **Richard Dawson** dated **October 23, 2000** and received October 30, 2000.

90. Comment: *"The 1,100 MW plant is a HUGE plant. This is larger than any plant in the State of Washington. Therefore, "Citizens for Health" feel that the amount of pollution is excessive."*

Response: See response to comment 1.

91. Comment: *"The surrounding area is currently pastureland and used for livestock. To this should be added "fertile farmland whose use the DEQ should protect from excessive ozone." According to the OAQPS Staff Paper of June, 1996 EPA-452/R-96/007, the Staff concluded on page 280 that the secondary standard which only limits one-hour peak concentrations to less than 0.12 ppm is not adequately protective of vegetation. It also says on page 280 at the bottom and 281 at the top that factors such as conductive meteorology either from emission sources within an area or from long-range transport distance are important. Survival of plants is also affected by mid-range O_3 concentrations (from 0.05 to 0.09 ppm). This illustrates the fact that all aspects of modeling are extremely important which we do not find in the current modeling."*

Response: The ozone impact evaluation for the utilities was compared to both the 8-hour and 1-hour standards. All modeling indicates that the facility will not adversely impact the area. This issue is adequately addressed in the Permit Memorandum.

92. Comment: *"The statement was made the terrain in the area around the facility has elevation changes of less than 50 feet. In the site that the power plant has leased consisting of two (2) 160 acre parcels which are next to each other, the change in elevation is 910' at the Coon Creek to 1,070' at the Northeast Corner of the property. Depending upon the actual grading of this site, it is estimated that the terrain on the site will be at least 50' above the emissions from the bottom of the cooling towers. This clearly indicates that this is complex terrain especially when you look at the differences of elevation in the surrounding nearby valleys where ozone can layer. 1,070' minus 910' gives us a difference of 160'. The company should be required to run Complex Terrain Modeling and also modeling done for height of hills in the Luther Quadrangle where the greatest impact of the pollution will hit."*

Response: Complex terrain is evaluated from the emission point, not from the bottom of the emission source, nor by elevation differences at the site. The emission point for the cooling water tower is at the top. There are no terrain elevations greater than stack height prior to the maximum-modeled concentration. However, terrain data for the entire modeling domain has been evaluated.

93. Comment: *"In the Facility Description found on page 1, Section II, there is no mention of how the power plant will remove the heavy metals in the water from the wastewater facility on the North Canadian River. "Citizens for Health" would like to see Energetix put in a cleaning plant which will make the water absolutely pure of any heavy metals that might go into the atmosphere with the wet steam from the cooling towers and combine with the particulate matter from the four 160' stacks. "Citizens for Health" also believe this would also benefit the power plant protecting the baffles on the cooling towers from scale and the boilers from excess oxidation."*

Response: Energetix will chlorinate its intake water. The mean concentrations assume that pollutants are concentrated five times during the course of the operation. Estimated PM_{10} and toxic emissions from the facility were modeled and it was shown that the projected ambient concentrations were in compliance with the MAACs.

94. Comment: *"It is suggested that the plant not be allowed to operate up to 8,760 hours per year. This is an unreasonable amount of extra pollution. The turbines need to be taken down for maintenance, repairs and in general will not operate 8,760 hours per year. The EPA can adjust the number of hours that turbines are allowed to operate. Because of the huge exceedance of the PSD levels found in the Table at the bottom of page 2, there is by definition a significant adverse environmental impact and therefore, the total number of operating hours should be limited. The auxiliary boiler should not have an extra 3,000 hours per year added to the figure of 8,760. This is a totally unnecessary amount of time when viewed in terms of the huge excesses of PSD levels."*

Response: This proposed facility went through the technical review and demonstrated that it will not provide a significantly adverse environmental impact operating up to 8,760 hours per year. Therefore, no changes will be made.

95. Comment: *"From the BACT survey results taken from Appendix 3 in the PSD Air Permit Application of March 16, 2000, it is clear that there are multiple power plants fired from natural gas combustion turbines that have this technology working well to protect the environment. Thus we feel unless catalytic reduction is applied that Energetix has not met BACT. It has also not met BACT for a number of other reasons. As stated on page 8, paragraph 4, line 3 and 4, boiler-operating conditions can minimize carbon monoxide emissions. There is no reason not to use a carbon monoxide catalyst. This is a well-used and standardized technology within the industry."*

Response: See responses to comments 10 and 11. Good combustion practices/design are proposed as BACT for CO emissions from the combustion turbines at this facility.

96. Comment: *"We believe that evaluation of existing air quality has not been properly carried out. Energetix has supplied the Department of Environmental Quality with data on their computerized disk which is difficult for any citizen to open, understand and see. The encryptation files on this computerized program are industry-specific software without easy to read legends. We have even had computer experts try and open this file so we could see and understand it. No instructions Response: zip files and programs were given. As the results of the formula depend upon the quality of the input data, the citizens have no ability to determine the quality of the input data."*

Response: The files were zipped to conserve space. The division uses proprietary software to zip and unzip files, therefore we are unable to provide this technology to the public. However, software is common and freely available to unzip files. Further the files themselves are ASCII text files. They may be viewed (once unzipped) with any text editor. The files were in the format produced by the EPA program for which there are several guidance documents. The public has access to the guidance documents through the EPA website. These documents explain in detail the more cryptic entries of the file.

97. Comment: *"Their model includes no dry depletion, no wet depletion, not wet scavenging data and no dry gas deposition."*

Response: See responses to comment 81. Depletion and scavenging are not conservative assumptions. Dry gas deposition is not relevant for PM_{10} evaluations because of negligible settling velocities.

98. Comment: *"The model does not use gridded terain data for depletion calculations."*

Response: Terrain data has been included in the modeling. Depletion calculations are not conservative.

99. Comment: *"It is mandatory for the DEQ to correct the modeling to take into account the stagnant air in the small valleys that cover the area."*

Response: See response to comment 44. Actual meteorological conditions for central Oklahoma were evaluated in the modeling. Because the dispersion parameters can not handle zero flow, a wind speed of 1 meter per second is used within the model for stagnant conditions. This wind speed adequately evaluates the impacts from the sources in stagnant conditions. However, if an area has truly stagnant conditions, there is no pollution entering the area.

100. Comment: *"We have not seen and evaluation of PSD increment consumption."*

Response: In the PSD review process, an initial modeling analysis is conducted evaluating only the proposed emissions. The results of this analysis are then compared to the modeling significance levels. If the predicted impacts exceed the modeling significance level then the source is required to do further analyses to insure that the source will not cause or contribute to significant deterioration in the area, as measured by the National Ambient Air Quality Standards and increment consumption levels.
All impacts from the facility were below the PSD modeling significance levels and therefore by definition do not consume increment. See the permit memorandum at page 15.

101. Comment: *"Oklahoma City is now in near non-attainment and we believe it is in the public's interest to have a sufficient amount of buffering capability to absorb not only contaminated air from Texas, but also must adjust for increased industry in the Oklahoma City area as well as increased automobile, truck and other traffic which will greatly increase hazardous omissions. This has not been taken into account in this Draft Permit."*

Response: See response to comment 34. Oklahoma City is close to non-attainment for ozone only. DEQ required photochemical modeling be done by all the proposed utilities. The results of the modeling of emissions from the proposed New Sources are estimated not to cause or contribute to any violations of the 1-hour ozone standard in Oklahoma. As the New Oklahoma Sources are estimated to produce changes in peak 8-hour ozone concentrations that are much less than 1 ppb, then they are estimated to have no measurable effect on peak 8-hour ozone concentrations in the Tulsa-Oklahoma City areas.

None of the other criteria pollutants were considered to have a significant impact on the area, thus further modeling was not required.

102. Comment: *"We believe there will be a change in concentrations of pollutants in the air with the change in modeling that is more appropriate for this site, we have to at this point say the DEQ must check for analysis of compliance with National Ambient Air Quality Standards when proper modeling is done."*

Response: DEQ has verified all modeling.

103. Comment: *"To our knowledge, none have been completed and there is no provision in the Draft Permit that we understand about pre- and post-construction ambient monitoring at the site."*

Response: See response to comment 21. The monitoring significance thresholds, like the modeling significance thresholds, were not crossed for any of the criteria pollutants other than ozone. Predicted impacts were not triggered for any of the criteria pollutants except ozone. Pre-construction monitoring was, however, required for ozone. Because of the network of monitors already in existence in and around the Oklahoma City Area, it was determined that pre-existing data from these monitors were adequate to meet the pre-construction monitoring requirement. Because no standards are threatened by the new source, post construction monitoring will not be required. This issue is adequately addressed in the Permit Memorandum.

104. Comment: *"We believe that the present levels of pollutants will have a deleterious impact on growth, soils, vegetation and visibility."*

Response: See response to comment 17. The ozone impact evaluation for the utilities was compared to both the 8-hour and 1-hour standards. All modeling indicates that the facility will not adversely impact the area. This issue is adequately addressed in the Permit Memorandum.

105. Comment: *"We have requested an evaluation of Class I Area Impact. The Wichita Mountains National Wildlife Refuge is within 200 kilometers of the plant site."*

Response: See response to comment 14. The closest Class I area is southwest of the proposed location and 171 km away. Oklahoma City is between the Class I area and the proposed location. Prevailing winds are from the south. No further evaluation beyond what was present in the memorandum is necessary.

106. Comment: *"The mechanical wet cooling towers will create huge plumes and there will be significant icing and fogging problems downwind creating road hazards and major aesthetic impact. We believe this should be studied before it is allowed to be built considering the huge size of this plant."*

Response: Please refer to response to comment 15. As stated in the memorandum, the facility is required to comply with OAC 252:100-25, Visible Emission and Particulates, which restricts opacity from any stack or source to less than 20%.

107. Comment: *"Since correcting the turbines to 15% oxygen is the lowest and ideal when you add the duct burners, we believe the concentrations will be more than 15 ppmvd. We also believe that therefore because of the excessive pollution this does not represent BACT and proves the need for selective catalytic reduction technology."*

Response: DEQ staff respectfully disagree with this comment. The BACT analysis conducted in connection with this permit application yielded the prediction that concentrations will not exceed 15 ppmvd. BACT is a case-by-case determination that is clearly defined by PSD rules that require conclusions based on facts

108. Comment: *"There is a huge amount of particles compared with PSD and this should have a significant health effect as these tiny particles are inhaled deep into the lungs and create nitric acid. When pollutants are added together, sometimes the health effects are additive. Not knowing exactly what heavy metals would be in the air and on the particles as well is extremely dangerous without study."*

Response: See response to comment 23. Estimated PM_{10} emissions from the facility were modeled and it was shown that the ambient concentrations were below PSD modeling significance levels. These levels are protective of public health.

109. Comment: *"We feel that the power plant is merely trying to save money and puts that goal higher in this case than human health and the environment. SCR is an accepted practice used effectively in many plants as seen in their BACT Review. It can achieve NOx emissions in the range of 3 ppm. In Washington State, a power plant would not be able to build a gas-fired power plant without SCR."*

Response: See response to comment 7, which explains the BACT process and the inclusion of cost as a factor. In the August 17, 2000 Federal Register/Vol 65, No. 160, EPA published Notice of Availability for Draft Guidance on BACT for NOx Control on Combined Cycle Turbines. On page 4 the guidance states, "Thus, a permitting authority could appropriately conclude that BACT in a specific case was DLN turbines without additional controls for a combined cycle gas turbine if a case-by-case assessment of the environmental, energy, and economic impacts demonstrates that the collateral impacts associated with a control technology such as SCR outweighed the benefits of additional NOx reduction." Comparisons of control technology used at other plants in other states can not be made without reviewing all the facts considered in the BACT.

110. Comment: *"We would like to point out the National Energy System Company (NESCO) currently operates the Sumas Energy Plant No. 1 in Sumas, Washington. This plant uses SCR technology and has no problems. Proposing to use SCR on a new plant - 670 MW (which is considered to be a very large plant) - they project the NOx emissions of 336 tons per year which includes some periods of using oil as fuel. Scale this up to 1,100 NIW and it is way below our 660 tons per year for Arcadia. This is certainly an excellent argument for SCR."*

Response: The Sumas Plant is a cogeneration unit that also uses hydro and renewable (such as wind etc.) sources to generate the 125.5 MW capacity. The comparison of NOx emissions between this plant and the proposed facility in Oklahoma is not appropriate. See response to comment 8.

111. Comment: *"A previous letter has addressed the issue that the $11,800 of NOx removed is inflated and not correct. We believe when the duct burners are firing (and it is our understanding they will be firing all the time) the number of NOx emissions may even be higher than the 15 ppmvd that are noted in this paragraph. At the table on the bottom of page 7, we believe under control costs/ton the correct number should be $4,060/ton of NOx and the applicant shows it is technologically feasible in its own BACT table. Under the Selection portion of the table, it is economically justifiable."*

Response: The cost analysis provided in the permit application for Arcadia was developed using techniques described in the OAQPS Cost Control Manual where an estimated Purchased Equipment Cost (PEC) is obtained and then calculations based on a percentage of PEC are used to determine total capital costs. Energetix utilized the equipment purchase cost data provide by Nooter/Eriksen, Inc. for a similar project (Kiamichi Energy Facility, Kiowa, Oklahoma) to demonstrate that cost data used in the Arcadia PSD permit application represents typical control cost estimates for the installation of SCR. Nooter/Eriksen has confirmed that the budgetary costs associated with the Kiamichi Energy Facility are appropriate for Arcadia as well since they will have identical combustion turbines. Based on the information provided, the Division has concluded that the estimated costs for the addition of SCR are excessive and justify the BACT determination contained in the draft permit.

112. Comment: *"The DEQ must put limitations on this and must calculate it and therefore lower the emissions asked for. In paragraph 2, it just says intermittent operation. This is not necessarily so and we wish the DEQ to impose limitations because of the huge amount of NOx compared with the PSD."*

Response: If a pollutant is emitted above the PSD significance levels, the applicant is required to evaluate the Best Available Control Technology and the impact of the facility on the NAAQS and increment levels. The applicant has evaluated and agreed to implement BACT. The applicant has performed an air quality impact analysis and has established that they will not cause nor contribute to an exceedance of the NAAQS, nor consume increment. EPA has delegated to the Oklahoma Department of Environmental Quality, Air Quality Division the responsibility to enforce the Clean Air Act within the State of Oklahoma. The Division is required by law to issue a permit to an applicant who meets all legal requirements. The applicant has demonstrated the ability to meet the requirements. Limits in the permit are established to ensure that the facility will meet the requirements. The limits cannot and should not be established arbitrarily.

Limits for NO_X and CO concentrations are listed in Specific Condition No.1, and are not to be exceeded except during periods of start-up, shutdown or maintenance operations. Such periods may not exceed four hours per occurrence. When monitoring shows concentrations in excess of the ppm and lb/hr limits of Specific Condition No. 1, the owner or operator must comply with the provisions of OAC 252:100-9 for excess emissions during start-up, shut-down, and malfunction of air pollution control equipment. Requirements include prompt notification to Air Quality and prompt commencement of repairs to correct the condition of excess emissions other than periods of start-up, shutdown or maintenance operations.

113. Comment: *"Controlling boiler height and operating conditions can minimize CO emissions according to the statement on this page[5 of comment]. But if you could minimize, you would not have almost 16 times the PSD level for emissions."*

Response: This comment refers to the BACT review for carbon monoxide. Please refer to page 8 of the permit memorandum. Good combustion practices and design were determined to be BACT for the project. Please refer to the response to comment 112.

114. Comment: *"We believe that with this high pollutant level, the DEQ should certainly consider more highly the use of flue gas desulfurization (FGD)."*

Response: Control techniques available to reduce SO_2 emissions include flue gas desulfurization (FGD) systems and the use of low sulfur fuels. Staff reviewed the RACT/BACT/LAER Clearinghouse (RLBC) to identify established technology for comparable boilers. This review of the RLBC indicates that while FGD systems are common on boiler applications, there are no known FGD systems on combustion turbines. Thus, the use of an FGD system is not warranted and an FGD system was rejected as a BACT control alternative.

115. Comment: *"In the winter, cooling towers will create huge plumes with significant icing and fogging problems downwind. Major visibility and aesthetic impact will also be affected. This Draft report does not include any information regarding this whatsoever. They refer here in this paragraph I believe to exhaust plumes from the four stacks. We are concerned with the mixing of heavy metals from the wastewater on the particles from the four stacks."*

Response: See response to comment 106. There is no evidence of significant fogging and icing of roads due to any of the cooling towers from any facilities in Oklahoma. Significant downwind precipitation caused by the cooling towers is not likely. Estimated PM_{10} and toxic emissions from the facility were modeled and it was shown that the ambient concentrations were demonstrated compliance with the MAACs.

116. Comment: *"We believe that if a different modeling was done for complex terrain that the radius of impact being defined for the facility for each pollutant may be different and that in fact there may be a radius of impact"*

Response: See response to comment 78, which explains that complex terrain is defined relative to the plume centerline height. The stack height may be used as a conservative replacement for plume centerline. The modeling has been revised to include terrain data. Please refer to the permit memorandum for a summary of results.

117. Comment: *"We are certainly in an urban area. This correction should also be made in the modeling."*

Response: An urban or rural classification is used to determine the dispersion parameter to be used in the model. Determination of the applicability of urban or rural dispersion is based upon land use or population density. For the land use method the source is circumscribed by a three kilometer radius circle, and uses within that radius analyzed to determine whether heavy and light industrial, commercial, and common and compact residential, comprise greater than 50 percent of the defined area. If so, then urban dispersion coefficients should be used. The land use in the area of the proposed facility is not comprised of greater than 50 percent of the above land use types.

For the population density method, the area is reviewed to determine the average population density in people per square kilometer. If the resulting value is greater than 750 people/km^2 or 21,200 people, the area is considered urban. The population density for the location of the proposed permit does not meet this criterion.

118. Comment: *"Under Paragraph C – NAAQS Modeling, "Citizens for Health" has asked if this modeling has been checked and we have not received an answer."*

Response: See response to comment 24. The modeling significance levels are used to determine if further modeling for NAAQS or increment consumption is required. The source is not predicted to have a significant impact, therefore, they are not considered to consume increment or cause or contribute to an exceedance of the NAAQS.

119. Comment: *"We feel that US EPA's Industrial Source Complex C3 model is not the recommended guideline because it is recommended for use in flat terrain."*

Response: See response to comment 78.

120. Comment: *"We especially do not know whether concluded in this model are the pumping facilities and the electrical transmission station which should add considerably to the diffusion and dispersion of the downwash for the aerodynamic plume. You will notice in paragraph 5 that it says once these projected dimensions are determined they can be used as input into the ISC3 model."*

Response: All potential downwash structures were evaluated. The reference in paragraph 5 is to the ultimate location of these structures at the facility. Regardless of location the pumping facilities and the electrical transmission station will have no effect on the plumes from the stacks.

121. Comment: *"It does not say which model this is – long or short – nor does it say if these figures were inserted."*

Response: The ISC no longer goes by the ISCLT and ISCST nomenclature. It is referred to as ISC3 or more recently ISC-Prime, and the single model covers all relevant time periods.

122. Comment: *"On page 13, again we do not know which ISC3 model we are talking about here."*

Response: The Julian date for the model, as reported in the Draft permit, identifies it. All modeling except for ozone modeling was conducted with the ISCST3 algorithms.

123. Comment: *"It does not state specifically at the end of paragraph 1 on page 13 if the cooling towers were added or if other necessary plant buildings, which will be part of more final plans, were added. "Citizens for Health" would like to know more about the cavity effect and the surrounding hillsides being that 1,070' in the Northeast corner."*

Response: The cooling water towers were added in the revised modeling. Cavity concentrations occur near buildings and large structures. Due to the size of the property, the location of the sources on the property, the height of the stacks, and the distance of the sources from the fence line, no cavity effects were encountered at any receptors.

124. Comment: *"We also feel that since the cooling towers represent an emission into the air that this whole subject should be looked into for the health reasons previously mentioned."*

Response: Toxic pollutants from the cooling water tower were evaluated in the revised modeling. Maximum impacts are below all standards. See responses to comments 15 and 16.

125. Comment: *"In the last paragraph on page 13, we believe that if different modeling were done, such as the complex terrain model using urban diffusion, that the results may very well be different."*

Response: See responses to comments 78 and 117. Urban dispersion is not applicable. Terrain was included in the revised modeling.

126. Comment: "We would also like to question the concentrations at the receptors since they were estimated."

Response: Concentrations at receptors were evaluated through the modeling exercise. Modeling is an estimate. ISC3 is the current generation of the Gaussian dispersion models developed in the 1970s. The model was developed based upon both the physics of air dispersion and actual source specific monitoring data. EPA has provided the model with specific regulatory default options to ensure a conservative result. The model tends to over predict concentrations. These over predictions can be significant. Any modeling conducted is a best guess. However, please be assured that it is a conservative best guess.

127. Comment: *"On page 14 paragraph 1, "Citizens for Health" has found that in other states it has been required of a person applying for a Permit to use years, which accurately reflect worst-case scenarios, as well as the most recent years possible. Just because the five years of 1986 - 1991 had easily accessible data is no reason to take these years and use them in the modeling analysis. It is our belief that there is complete analysis for later years, although the form of the analysis may not make it extremely easy for the power plant to get this data, it is extremely necessary to calculate an accurate modeling picture that current and worst-pollutant modeling data be used."*

Response: See response to comment 35 and 131. The impacts from these pollutants were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed. Meteorological data (usable in the model) are not readily available after 1995. The gaps in the data available from the years 1992 through 1995 are significant. Therefore, the Oklahoma Department of Environmental Quality accepts and will continue to accept modeling conducted with the earlier data. Again, the use of five years (43,800 hours) is intended to capture the most relevant meteorological conditions. The meteorological data used are wind speed, temperature, cloud cover, etc. Meteorological data does not contain pollutant concentrations. Changes in these variables from the time period selected are not significant for modeling An analysis for later years would not differ in any significant way from the analysis presented in the permit application.

128. Comment: *"On page 15, second line under the first table, we feel the emissions should be included in the modeling for NOx because auxiliary boiler emissions are stated and therefore they really have to be included."*

Response: Emissions for the auxiliary boiler were included in all appropriate modeling analyses.

129. Comment: *"In the paragraph above the second chart, we feel that if the years used were different than 1986 - 1991 that the applicant may not have been in compliance with the highest fourth-high-24-hour model concentration. This certainly should be checked."*

Response: The impacts from the pollutants were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed. Meteorological data (usable in the model) are not readily available after 1995. The gaps in the data available from the years 1992 through 1995 are significant. Therefore, the Oklahoma Department of Environmental Quality accepts and will continue to accept modeling conducted with the earlier data. Again, the use of five years (43,800 hours) is intended to capture the most relevant meteorological conditions. The meteorological data used are wind speed, temperature, cloud cover, etc. Existing pollutant concentrations are not a part of the meteorological data. However, it should be noted that the Permit Memorandum has been changed to reflect that the source was modeled for the highest rather than the fourth-highest 24-hour concentration.

130. Comment: *"Please note in the second chart that for NOx the maximum concentrations in micrograms/m^3 are almost exactly the same as the significant level. This is another reason why selective catalytic reduction is absolutely necessary."*

Response: See response to comment 3. The significance level does not impact the BACT decision. If a source is modeled above the significance level, then further modeling (including background concentrations and sources) must be conducted.

131. Comment: *"Please note also that way back in 1986, the SO_2 level was half of the significance level. We believe if different years had been used that this figure would be higher, therefore the technology to limit this pollutant is necessary and reasonable."*

Response: There seems to be some confusion on what is meant by meteorological data. The meteorological data used are wind speed, temperature, cloud cover, etc. There are two stations in Oklahoma that provide all of the necessary meteorological data. The monitoring sites maintained by ODEQ are monitoring pollutant concentrations, which are not directly used in the modeling. The impacts from the pollutants were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed. Meteorological data (usable in the model) are not readily available after 1995. The gaps in the data available from the years 1992 through 1995 are significant. Therefore, the Oklahoma Department of Environmental Quality accepts and will continue to accept modeling conducted with the earlier data. Again, the use of five years (43,800 hours) is intended to capture the most relevant meteorological conditions.

Had the modeled impacts exceeded the modeling significance levels, the applicant would have been required to conduct more refined modeling that includes background sources. These results would then be added to the existing monitored background concentrations. The most current monitored pollutant concentrations must be used in this refined analysis. The meteorological data, which does not include pollutant concentrations, need only contain representative data. The date of collection is important only to the extent that it confirms that representative data was selected.

132. Comment: *"On page 16 under D - Ambient Monitoring, we feel that if different air dispersion models as mentioned previously had been picked that it could very well be that pre- and post-construction ambient monitoring would be necessary."*

Response: The commentator has consistently recommended more refined modeling. The modeling that was conducted is considered to be conservative. What this means is that the modeled concentrations would be lower with the suggested models.

133. Comment: *"It is noted in this paragraph that ozone pre-construction monitoring is required. We believe that the NAMS monitoring site located 8.4 km south and 22.2 km west of the facility is too far away to accurately reflect pre-construction monitoring. "Citizens for Health" request pre-construction monitoring at a reasonable distance from the site."*

Response: The use of this monitor will be much more conservative than if a monitor were placed closer to the site.

134. **Comment:** *"On page 17 of the Draft under Soils and Vegetation these comments will refer to the paragraphs listed in this section. They give a description of impacts but it is hard to track the conclusion from the data presented. The information regarding modeling will provide better information to see if the allegations are true."*

Response: An impact evaluation of visibility, soils and vegetation has been addressed in the application and permit memorandum. No significant adverse impact on soil and vegetation is anticipated due to the proposed power plant. Please refer to response to comment 17. The modeling conducted, which demonstrated compliance with the Primary NAAQS, simultaneously demonstrates compliance with the Secondary NAAQS because the Secondary NAAQS are higher or equal to the Primary NAAQS. The Secondary NAAQS set limits to protect public welfare, including protection against decreased visibility, damage to animals, crops, vegetation, and buildings.

135. Comment: *"Citizens for Health" are concerned that without complex terrain monitoring ozone and other noxious pollutants will lower in the small valleys and differences in terrain elevations and cause a significant problem. We believe that in these small valleys the NAAQS guidelines may be in fact breached. We would like to see a competent analysis presented as it should have been in a form that any citizen can understand.*

Response: DEQ has reevaluated the modeling to include terrain. Please refer to the Permit Memorandum. Also, see response to comment 78.

136. Comment: *"Because the model has been incorrect for the terrain, the conclusion of no significant impact on soils, vegetation and human beings cannot be made."*

Response: The modeling has been revised to include terrain. Please refer to the Permit Memorandum.

137. Comment: *"Under Visibility Impairment on the last paragraph same page, first line, the visibility impacts will have definite aesthetic impact locally because the cooling tower was completely ignored here. There is no basis for their conclusion because plants of similar size create opacity and trapping in valleys under the terrain conditions which are present in the area."*

Response: DEQ does not consider aesthetic issues, such as steam from cooling towers, in its review. Steam is not considered an air quality issue, and DEQ confines its review to air quality issues. Particulate matter from the cooling towers was included in the analysis with respect to visibility impacts. The model indicated that the project is not expected to produce any perceptible visibility impacts in the vicinity of the plant. Further, cooling water towers are a common technology in Oklahoma and absent a reference to a specific plant of similar size and in similar terrain with demonstrable visibility impairment, we find no basis for the commenter's conclusion.

138. Comment: *"On page 18, our consultant felt that the Class I Area Impact Analysis still needed to be done and we have requested the same."*

Response: See response to comment 14. This comment appears to be directed toward the memorandum discussion of Class I areas. The closest Class I area is southwest of the proposed location and 171 km away. Oklahoma City is between the Class I area and the proposed location. Prevailing winds are from the south. No further evaluation beyond what was present in the memorandum is necessary.

139. Comment: *"Continuing on page 18 under Section V, Oklahoma is in near non-attainment of air quality standards. We feel because of the anticipated growth in Oklahoma County which is continuing at a rapid pace and based on the approximately 13 ozone alerts we have had this summer that stricter standards and cutting back the hours of turbine operations should certainly apply."*

Response: As was stated in response to an earlier comment, the new utilities are not expected to adversely impact the 1 or 8-hour standards. Therefore, there is no basis for the request to restrict the turbine operations.

140. Comment: *"We would certainly have you note in the third line that the permit will require the turbines to be fired with pipeline-grade natural gas with SO_2 emissions of 9.79 lb/hr. We would like to see control measures instituted."*

Response: The proposed Arcadia Power Plant will utilize pipeline-quality natural gas in the turbines and duct burners. The maximum estimated SO_2 emissions would be 0.005 lb/MMBTU for the turbines with duct burners. The use of very low sulfur fuel has an established record of compliance with applicable regulations. The NSPS establish maximum allowable SO_2 emissions associated with combustion turbines and require either an SO_2 emission limitation of 150 ppm or a maximum fuel content of 0.8 percent by weight (40 CFR Part 60, Subpart GG). The estimated emissions for these units are significantly less than the NSPS limit. Therefore, the very low SO_2 emission rate that results from the use of natural gas is proposed as BACT for the turbines and duct burners. There are no adverse environmental or energy impacts associated with the proposed control alternative.
The specific conditions of the proposed permit require that the facility not exceed the permit (performance) limits. The permit does not require a perfect system but does require compliance with the permit limits. The specific conditions of the permit require the applicant to maintain the results of a quarterly "stain-tube" analysis on the natural gas. This requirement helps to ensure compliance with the emission limits of the permit and identify potential violations.

141. Comment: *"On page 21 paragraph 2 approximately 24 lines from the top where it says "new sources (constructed after March 9, 1987) emitting any category "A" pollutant above de minimis levels must perform a BACT analysis." We would look to the DEQ to do the new modeling and make sure that there is no violation."*

Response: This section of the permit memorandum identifies various state and federal requirements that are applicable to the facility now and in the future. The modeling which has been conducted for this construction permit covers all pollutants which are anticipated to be emitted following construction of the facility.

142. Comment: *"From the Table at the top of page 22, it is obvious that there are some serious emissions of formaldehyde, hexane, pentane, propylene oxide as well as acetaldehyde which was just below the de minimis level. It does not state whether the OSDST3 modeling was the long model or the short model and also we believe that if the years were changed and rough terrain used these values might be different. These chemicals are highly toxic and if they layer in small valleys, they might represent a significant hazard to human health as well as to plant life. Modeling should be done for all these chemicals not just formaldehyde and hexane."*

Response: The ISCST, which is a short term model, was used to model for every pollutant listed at page 22. The model established that the maximum predicted concentrations for all pollutants were below 50% of the MAAC. For pollutants which are below 50% of the MAAC, no further modeling is required.

143. Comment: *"On page 23 paragraph 3, it states there are no emissions of any of the regulated pollutants, we wonder if mercury, for example, as the cooling water is concentrated may represent a problem and we have asked the DEQ to look into this and other elements that are in the wastewater."*

Response: Toxic pollutants from the cooling water tower were evaluated in the revised modeling. Maximum impacts are below all standards. Please refer to the Permit Memorandum page 22. Mercury emissions from the cooling water towers were estimated based upon a concentration of 0.001 mg/L in the circulating water. Emissions are expected to be less than 0.000001 lb/hr with a resulting ambient concentration of 0.00001 $\mu g/m^3$. The MAAC for mercury is 0.5 $\mu g/m^3$.

144. Comment: *"On page 24, "Citizens for Health" wonder if the DEQ has a survey showing that the electrical power lines owned by OG&E with their potential connection to Energetix Power Plant might violate the affidavit that they are not seeking a permit for land use or for any operation upon land owned by others. We are concerned that part of this construction might encroach on their north boundary."*

Response: DEQ does not have a survey to make this kind of determination. The permittee has submitted an affidavit that they are not seeking a permit for land use or for any operation upon land owned by others without their knowledge. The affidavit certifies that the applicant has an option to purchase the land.

145. Comment: *"Their statement under Section III Summary that ambient air quality standards are not threatened at this site requires further modeling analysis for the huge exceedances of the PSD levels. By definition, this is a significant adverse environmental impact and we need more studies to show that in the small valleys surrounding the power plant this will not harm individuals, plants and animals in these areas."*

Response: See response to comment 3. Prevention of Significant Deterioration (PSD) significance levels do not define a significant impact. Instead they require that an applicant evaluate the impact to ensure that significant deterioration does not occur. Modeling conducted has established that the source is not projected to have a significant impact, therefore significant deterioration will not occur. Further evaluations are not required.

146. Comment: *"We come to the Permit to Construct Air Pollution Control Facility - Specific Conditions. Concerning the Table under item 1, we feel that for the pollutants listed that proper control technology is necessary for both NOx and SO_2 as mentioned in the body of this letter. In the first line underneath this Table for some reason it mentions "without duct burner firing." Since the duct burners will fire all the time and since the 15% O_2 is an ideal, we feel that the ppmvd will be exceeded and therefore limitations in hours of use and control technology are necessary."*

Response: This issue is addressed in response to earlier comments.

147. Comment: *"On page 2 of the Permit to Construct, we note that 3,000 hours per year must be included in the total is too much and must be reduced. Calculations clearly need to be made with this included."*

Response: The auxiliary boiler will be limited to 3,000 hours per year while the combustion turbines and cooling towers will be operated continuously.

148. **Comment:** *"In summary, "Citizens for Health" would ask that the DEQ limit the pollution that is asked for in this permit because of the huge exceedances of the PSD levels. By definition, this is a significant adverse environmental impact. We suggest that the DEQ re-calculate the modeling so as to better understand the increased concentrations that may be present in the small valleys in the location."*

Response: See response to comment 3, which explains why the proposed emissions do not constitute a significant adverse environmental impact. DEQ has reevaluated the modeling to include terrain. Please refer to the Permit Memorandum.

149. Comment: *"We would ask for SCR technology as well as catalytic oxidation for CO which will also reduce volatile organic hydrocarbons. Flue gas desulfurization should also be considered for SO_2 because of the acid rain and the concentrations involved. Because of hours not added from the auxiliary boilers, we suggest not only that the total number of hours that the turbines are running be reduced also because of the down time, but we would ask that reduction measures previously described be employed."*

Response: Other comments and responses address each of these issues. The applicant has demonstrated the ability to comply with the requirements of the applicable Air Quality rules and regulations. Ambient air quality standards are not threatened at this site. Thus, no change was made to the permit in response to this comment.

150. Comment: *"Most importantly, the modeling does not address significant issues and it was not possible because of the industry-specific software for the public to have any input or to see this model."*

Response: The output files are available for public review. These files are ASCII text files and may be read by any text editor. The guidance documents which aid the review of these files are publicly available on the EPA website. Industry-specific software would only aid in the review. It is not necessary for a thorough review.

151. Comment: *"We would ask that the DEQ re-open the period to look at the modeling as well as looking at the modeling itself before any sort of administrative review or final decision is made. We would therefore ask that the DEQ go back in the application process to Technical Review where all these could be corrected and then again have a Draft Permit with public notice and public comment."*

Response: Air Quality has reviewed the modeling and confirmed the results that are reported in both the draft permit and proposed permit. No additional issues have been raised through this review, or through public comments. Therefore, there is no reason to remand the draft permit for further review or correction. This review is required by state and federal rules.

152. Comment: *"It is necessary that we go back in this application process because no one could see what the modeling was really like and, in fact, we have asked that the DEQ check the modeling because we believe that it is incorrect."*

Response: DEQ has verified all modeling.

153. Comment: *"The applicant has not met the burden and responsibility of proof that this extreme amount of pollution will not be harmful. We ask that the Department of Environmental Quality require that the applicant reduce these emissions to a more acceptable level through the application of reasonable operating and design parameters."*

Response: Modeling results show the maximum concentrations of the criteria and toxic pollutants will be below the significance levels required by the state and federal regulations to protect the public and the environment.

Letter from **Richard Dawson** dated **October 24, 2000** and received October 24, 2000.

154. Comment: *"Modeling lacks cooling tower particulate matter inputs. Lower terrain height indicates complex terrain is present for these sources. I request modeling be done for that."*

Response: The modeling has been revised to include cooling water tower emissions. Lower terrain heights do not indicate complex terrain; however, terrain data has been included in the modeling.

155. Comment: *"The air emissions from the cooling towers of 1.79 lb/hr when combined with metals from the waste water and allowed to settle in complex terrain may represent a significant health hazard. Since the water source is a non-typical industrial waste and illegal dumping can occur, modeling is required."*

Response: The 1.79 lb/hr is inclusive of all pollutants emitted from the cooling water tower. As is discussed in later responses, settling is not a factor for particles as small a 10 microns, rather it is more conservative to ignore deposition and depletion of the plume. Modeling has been conducted, the results of which are available in the Evaluation Memorandum. The results demonstrate that a health hazard is not predicted.

Letter from **William L. McNatt** dated **October 29, 2000**.

156. Comment: *"I am concerned that Robert/Schornick and Assoc. elected to use meteorological data that is 9 to 14 years old as input data for their computer model. They maintain in their Modeling analysis that "the data selected represents the most recent five (5) years of data available for the station selected."*

Response: See response to comment 35. The impacts from the proposed source were evaluated over a period of five years to ensure that the most relevant meteorological phenomena were assessed. Meteorological data (usable in the model) are not readily available after 1995. The gaps in the data available from the years 1992 through 1995 are significant. Therefore, the Oklahoma Department of Environmental Quality accepts and will continue to accept modeling conducted with the earlier data. Again, the use of five years (43,800 hours) is intended to capture the most relevant meteorological conditions.

157. Comment: *"I do not understand why they use a station in Norman, Oklahoma for input data when the ODEQ has 8 monitoring stations in Oklahoma City, Edmond, and Moore all of which are closer than Norman. Surely their records of air quality as taken and maintained by the ODEQ are sufficient for their modeling purposes. It would be much more meaningful to use the years 1999, 1998, 1997, 1996, and 1995 as supplied by ODEQ for input data for the modeling."*

Response: There seems to be some confusion on what is meant by meteorological data. The meteorological data used are wind speed, temperature, cloud cover, etc. There are two stations in Oklahoma that provide all of the necessary meteorological data. The Mesonet sites located all over the state do not include cloud cover, which is necessary. The monitoring sites maintained by ODEQ are monitoring pollutant concentrations, which are not directly used in the modeling.

158. Comment: *"The application says the project is not expected to produce any perceptible visibility impacts in the vicinity of the plant. This is not correct. Certainly a huge plume this is visible for miles has an adverse visual impact."*

Response: See response to comment 137. DEQ does not regulate steam nor its aesthetic impact on Class II areas.

159. Comment: *"Also the vapor plume will contain small particles of heavy metals and other pollutants which will be deposited on the surrounding countryside. These hazards need to be addressed in the application and modeling."*

Response: Both toxic and general particulate matter emissions have been evaluated from the cooling tower and are addressed in the Permit Memorandum.

160. Comment: *"In the modeling options selected as shown in tables 8-1 Roberts/Schornik elected not to use terrain heights for receptors, but rather used a flat topography for their model. With elevation changes of approximately 400 feet in their 25 km x 25 km grids, and elevation changes of at least twice that in their 100km x 100km grid one would certainly expect that they would use terrain heights for their receptors. Why have they not done so?"*

Response: The modeling results presented in the proposed permit Section IV C reflect modeling performed by the applicant, with the inclusion of terrain.

161. Comment: *"In their modeling Roberts/Schornick state that the prevailing winds are from the South, Southeast, and North. Does this mean that they did not consider winds out of the North and Northeast which happens numerous times each year in this location. Considering winds from these directions would result in the worst scenario for Edmond and Oklahoma City. These cases need to be included in their model."*

Response: The statement of prevailing winds is merely descriptive. The model incorporates five years (43,800 hours) of actual meteorological data. All probable wind speeds and directions are evaluated.

162. Comment: *In their modeling Roberts/Schornick elected to use the Rural option. In their Rezoning application Energetix requested Urban Industrial zoning (IU). Why the difference? Is the proposed site Urban or Rural?*

Response: Dispersing plumes encounter more turbulence in urban areas than in rural areas, due to the buildings as well as the somewhat warmer temperatures in urban areas. Therefore, a rural or urban classification is based on land use or population density rather than zoning. The site of the proposed facility is considered rural based both on population density and land use.

Letter from **Shari Ripp** dated **October 30, 2000** and received October 31, 2000.

163. Comment: *"Meteorological events producing the highest ground level concentrations in our small constricted valleys are not reflected in Energetix' modeling. Please see to it that they do this."*

Response: Terrain effects on all pollutants are now included in the results presented in the permit.

Letter from **Anna Roy** dated **October 30, 2000** and received October 31, 2000.

164. Comment: "*What is the plume interaction in complex terrain? Please require that this be looked at."*

Response: The plume impact on complex terrain has been evaluated and the results are available in the permit memorandum.

Letter from **Anna M. Beems** dated **October 30, 2000** and received October 31, 2000.

165. Comment: *"The area proposed for the facility is definitely complex terrain. I propose that a Complex Terrain Analysis should be mandatory including 3D interaction of plume and terrain."*

Response: As was stated previously, terrain data was used to determine ground level impacts. The results of the model do not allow for the generation of a 3D graph of the interaction of the plume and the terrain. The results provide a footprint of the plume over the terrain, i.e., the maximum ground level concentrations. A 3D graph of the interaction of the plume and terrain, while interesting, will not provide any needed additional information.

Letter from **Vivian Keely** dated **October 30, 2000** and received October 30, 2000.

166. Comment: *"What is the plume interaction in complex terrain? Please require that this be looked at."*

Response: Terrain data was used in the revised modeling to determine ground level impacts. Please refer to the Permit Memorandum.

Letter from **John A Croom** dated **October 30, 2000** and received October 30, 2000.

167. Comment: *"I wonder if temperature profiles along with gradual (transitional) plume rise has been considered in Energetix modeling. If not, why not?"*

Response: Temperature profiles are evaluated within the model with respect to default (conservative) values. Transitional plume rise is a non-regulatory option. Since there is insufficient information to identify and quantify dispersion during the transitional plume rise period, gradual plume rise is not generally recommended for use in construction permit related modeling. There are two exceptions where the use of gradual plume rise is appropriate: (1) In complex terrain screening procedures to determine close-in impacts; (2) when calculating the effects of building wakes. The building wake algorithm in the ISC model incorporates and automatically (i.e., internally) exercises the gradual plume rise calculations. If the building wake is calculated to affect the plume for any hour, gradual plume rise is also used in downwind dispersion calculations to the distance of final plume rise, after which final plume rise is used. Because complex terrain is defined relative to the source, the stacks are not considered to be in complex terrain, therefore transitional plume rise (exception 1) does not apply. The building wake algorithm automatically addressed exception 2 within the model. Because final plume rise is dependent upon the plumes initial velocity momentum and buoyancy momentum, which are low and nonexistent respectively for the cooling water tower, final plume rise for the cooling water tower is predicted to occur prior to encountering any complex terrain.

Letter from **Ralph L. Crump** dated **October 30, 2000** and received October 30, 2000.

168. Comment: *"Why hasn't a flow and diffusion study in complex terrain (CTMOP) been required of Energetix before any permits are issued."*

Response: All sources have been evaluated with respect to terrain. Because the results demonstrate that the source will not threaten any standards, more refined analyses are not necessary.

Letter from **Tom Sanders** dated **October 30, 2000** and received October 30, 2000.

169. Comment: *"I believe this power plant is located in an urban area- not rural as stated in their Draft Permit. Energetix needs to use a Rough Terrain Diffusion Model under urban circumstances in their modeling of this plant."*

Response: The rural classification is appropriate for this facility. See response to comment 117.

Letter from **Richard Dawson** dated **October 30, 2000** and received October 31, 2000.

170. Comment: *"Was Calpuff Modeling considered (Calmet, Calpuff, Calpost)? If not, why not? I feel that since an Acid Rain permit is required, I would also like to see the modeling for acid rain."*

Response: Calpuff is used for long range transport, acid deposition, and visibility impairment. The strength of Calpuff is the ability to evaluate at distances greater than 50 km and with multiple meteorological stations. It is not the model of choice for rolling terrain and fine grid modeling domains of less than 10 km. An impact evaluation of visibility, soils and vegetation has been addressed in the application and permit memorandum.

Letter from Richard Dawson dated October 30, 2000 and received October 31, 2000.

171. Comment: *"The Department of Environmental Quality needs to consider the use of COMPDEP (Complex Terrain Deposition Model- CTDM) for modeling input parameters."*

Response: Complex terrain was evaluated for the proposed sources. More refined modeling is not required.

Letter from **Richard Dawson** dated **October 30, 2000** and received October 31, 2000.

172. Comment: *"I do not see any notation for stable vs. unstable atmospheric conditions in their modeling."*

Response: The stability of the atmosphere is a factor in several different aspects of the model. It is determined from the meteorological data. The effects of the stability of the atmosphere on complex terrain modeling are appropriately evaluated within the model. Further discussion or notation is not necessary.

173. Comment: *"Especially important is wet vs. dry deposition which we do not see in their modeling concept."*

Response: Please refer to response to comment 81. Wet deposition is not a guideline feature of ISC3. Therefore it is not evaluated for Air Quality Permitting. Dry deposition is not relevant for PM_{10} due to negligible settling velocities.

174. Comment: *"As a matter of fact, they even forgot the visibility analysis in the steam plume. Please have Energetix look at these issues."*

Response: See response to comment 137. DEQ does not regulate steam nor its aesthetic impact on Class II areas.

Letter from **Sharon Stricklin** dated **October 30, 2000** and received October 31, 2000.

175. Comment: *"Atmospheric boundary layer parameters and boundary layer flow cannot be predicted without horizontal modeling. Energetix did not accomplish this in their modeling proposal. I submit that the Department of Environmental Quality should see that this is accomplished."*

Response: Atmospheric boundary layer modeling would be conducted with the Aermod modeling system. This model has only recently been included in the draft revised Appendix W of 40 CFR 51 as an approved model. It is not yet an EPA approved model for general use. The results from the ISC3 model are conservative and the impacts from the modeling do not indicate that air quality is threatened, therefore more refined modeling is not required.

Letter from **Paul Eisert IV** dated **October 30, 2000** and received October 31, 2000.

176. Comment: *"Did Energetix consider downwash, downwash plumes and terrain downwash?"*

Response: Yes. Please refer to the Permit Memorandum.

Letter from **Richard Dawson** dated **October 30, 2000** and received October 31, 2000.

177. Comment: *"Energetix has not considered long-term vs. short-term ground level concentrations in their modeling. Please require that this company consider these factors."*

Response: All pollutant averaging times for which there are corresponding regulations were evaluated. This included long and short-term ground level concentrations. Please refer to the Permit Memorandum.

Letter from **Raul and Bonnie Baca** dated **October 30, 2000** and received October 31, 2000.

178. Comment: *"Complex terrain and acid depositions studies are extremely important to plants, animals and people. Acid modeling should be required to help the public understand this."*

Response: Complex terrain was evaluated in the modeling. Additional impacts on animals and plants were also evaluated within the Permit Memorandum. No further evaluation is necessary. Please refer to the Permit Memorandum.

Letter from **Charles and Vicki DeFuria** dated **October 30, 2000** and received October 31, 2000.

179. Comment: *"The combined effects of emissions from several large stacks have not been estimated in terms of the effect on the modeling. The turbulent effects is a cause of concern as this does not seem to have been taken into account in the original modeling."*

Response: The stacks were modeled together and their maximum impacts were reported in the Permit Memorandum. Generally, greater turbulence means more dispersion of the plume. More dispersion of the plume results in lower ground level impacts.

Letter from **Martha Cochran** dated **October 30, 2000** and received October 31, 2000.

180. Comment: *"Complex terrain and acid deposition are extremely important to plants, animals and people. Acid modeling should be required to help the public understand this."*

Response: Complex terrain was evaluated in the modeling. Additional impacts on animals and plants were also evaluated within the Permit Memorandum. No further evaluation is necessary. Please refer to the Permit Memorandum.

Letter from Mark and Jenni Romo dated October 30, 2000 and received October 31, 2000.

181. Comment: *"There is complex terrain dispersion, near stagnant flows of air and constricted terrain at the proposed facility's location. Please consider the WYND Valley program for modeling."*

Response: See response to comment 78. Complex terrain issues are addressed within the ISC3 model. The need for the WYND Valley model is not indicated either by the terrain or the meteorology.

Other minor changes were made to the memorandum and permit by AQD staff for clarity, or to correct grammar or spelling. However, no substantive changes were made to the permit as a result of these corrections.

Fees Paid

Construction permit application fee of $2,000.

SECTION III. SUMMARY

The applicant has demonstrated the ability to comply with the requirements of the applicable Air Quality rules and regulations. Ambient air quality standards are not threatened at this site. There are no active Air Quality compliance and enforcement issues concerning this facility. Issuance of the permit is recommended.

PERMIT TO CONSTRUCT
AIR POLLUTION CONTROL FACILITY
SPECIFIC CONDITIONS

REDBUD ENERGY LP
Redbud Power Plant **Permit No. 2000-090-C (PSD)**

The permittee is authorized to construct in conformity with the specifications submitted to Air Quality on March 16, 2000, with additional information submitted June 1, 14, and July 27, 2000. The Evaluation Memorandum dated August 7, 2001 explains the derivation of applicable permit requirements and estimates of emissions; however, it does not contain operating permit limitations or permit requirements. Commencing construction or operations under this permit constitutes acceptance of, and consent to, the conditions contained herein:

1. Points of emissions and emissions limitations for each point:

Each of Four Combustion Turbines with duct burner firing			
Pollutant	lb/hr	TPY	ppmvd[1,2]
NO_X	94.00[3]	411.72	15[4]
CO	68.1	298.28	15.4
VOC	9.70	42.50	N/A
SO_2	9.79	42.89	N/A
PM_{10}	22.00	96.38	N/A
Lead	0.0008	0.0036	N/A
H_2SO_4	1.16	5.16	N/A

[1] NO_x concentrations are limited to 9 ppmvd, corrected to 15% O_2, per turbine, without duct burner firing
[2] CO concentrations: ppmvd, corrected to 15% O_2
[3] two hour average
[4] annual rolling average

Pollutant	Auxiliary Boiler		Emergency Diesel Generator		Diesel Fire Pump		Cooling Towers	
	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
NO_X	1.00	1.50	41.90	10.45	4.69	1.17	--	--
CO	1.64	2.46	9.03	2.26	1.01	0.25	--	--
VOC	0.11	0.16	3.42	0.86	0.38	0.10	--	--
SO_2	0.01	0.02	2.76	0.69	0.31	0.08	--	--
PM_{10}	0.15	0.30	2.95	0.74	0.33	0.08	1.79	7.84

2. The fuel-burning equipment shall use only pipeline-quality natural gas, except for the emergency diesel fire-water pump engine and emergency diesel generators, which shall burn diesel fuel with a maximum fuel sulfur content of 0.4 percent by weight.

3. A serial number or another acceptable form of permanent (non-removable) identification shall be on each turbine.

4. Upon issuance of an operating permit, the permittee shall be authorized to operate each combustion turbine with associated HRSG and duct burner and cooling tower continuously (24 hours per day, every day of the year). The auxiliary boiler will be limited to 3,000 hours per year. The emergency diesel generator and fire pump will be limited to 500 hours per year.

5. The permittee shall incorporate the following BACT methods for reduction of emissions. Emission limitations are as stated in Specific Condition No. 1.

a. Emissions from each turbine shall be controlled by properly operated and maintained dry low-NO_X combustors maintaining levels as specified in Specific Condition #1.
b. Emissions from the auxiliary boiler, emergency generator, and emergency diesel fire pump engine shall be controlled by properly operating per manufacturer's specifications, specified fuel types and limits as listed in Specific Condition #1.

6. Each turbine is subject to the Federal New Source Performance Standards (NSPS) for Stationary Gas Turbines, 40 CFR 60, Subpart GG, and shall comply with all applicable requirements.

a. 60.332: Standard for nitrogen oxides
b. 60.333: Standard for sulfur dioxide
c. 60.334: Monitoring of operations
d. 60.335: Test methods and procedures

7. The duct burners are subject to federal New Source Performance Standards, 40 CFR 60, Subpart Db, and shall comply with all applicable requirements.

a. 60.44b: Standard for nitrogen oxides
b. 60.46b: Compliance and performance test methods and procedures for nitrogen oxides
c. 60.48b: Emission monitoring for particulate matter and nitrogen oxides
d. 60.49b: Reporting and recordkeeping requirements

8. The permittee shall maintain a record of the amount of natural gas burned in the auxiliary boiler for compliance with NSPS Subpart Dc.

9. The permittee shall comply with all acid rain control permitting requirements and for SO_2 and NO_X emissions allowances of 40 CFR 72 - 75.

10. The permittee shall follow the 40 CFR Part 75 Appendix E NO_X Emissions Estimation Protocol for peaking units until such time the units are operated above the levels defining peaking load units. At such time, the permittee shall follow the 40 CFR Part 75 monitoring guidelines for non-peaking units and will install NO_X CEMs on combustion turbine/HRSG stacks no later than December 31st of the following calendar year per 40 CFR Part 75.12 (c)(2).

11. Within 60 days of achieving maximum power output from each individual turbine, not to exceed 180 days from initial start-up of each individual turbine, and at other such times as directed by Air Quality, the permittee shall conduct performance testing and furnish a written report to Air Quality documenting compliance with emissions limitations. Performance testing by the permittee shall use the following test methods specified in 40 CFR 60:

Method 1:	Sample and Velocity Traverses for Stationary Sources.
Method 2:	Determination of Stack Gas Velocity and Volumetric Flow Rate.
Method 3:	Gas Analysis for Carbon Dioxide, Excess Air, and Dry Molecular Weight.
Method 4:	Determination of Moisture in Stack Gases.
Method 5:	Determination of Particulate Emissions from stationary sources.
Method 10:	Determination of Carbon Monoxide Emissions From Stationary Sources.
Method 20:	Determination of Nitrogen Oxides and Oxygen Emissions from Stationary Gas Turbines.
Method 25/25A:	Determination of Non-Methane Organic Emissions From Stationary Sources. Performance testing shall be conducted while the new units are operating within 10% of the desired testing rate.

12. NO_X and CO concentrations listed in Specific Condition No.1 shall not be exceeded except during periods of start-up, shutdown or maintenance operations. Such periods shall not exceed four hours per occurrence. When monitoring shows concentrations in excess of the ppm and lb/hr limits of Specific Condition No. 1, the owner or operator shall comply with the provisions of OAC 252:100-9 for excess emissions during start-up, shut-down, and malfunction of air pollution control equipment. Requirements include prompt notification to Air Quality and prompt commencement of repairs to correct the condition of excess emissions other than periods of start-up, shutdown or maintenance operations.

13. The permittee shall maintain records as listed below. These records shall be maintained on-site for at least five years after the date of recording and shall be provided to regulatory personnel upon request.

a. Operating hours for each auxiliary boiler, emergency generator and diesel fire pump (monthly and 12 month rolling total).
b. Total fuel consumption for each turbine (monthly and cumulative annual).
c. Sulfur content of natural gas (supplier statements or quarterly “stain-tube” analysis).
d. Diesel fuel consumption (total annual) and sulfur content of each delivery.

14. The permittee shall apply for a Title V operating permit and an Acid Rain permit within 180 days of operational start up.