

EAST TENNESSEE NATURAL GAS, LLC
5400 Westheimer Court
Houston, TX 77056-5310
713.627.5400 main

Mailing Address:
P.O. Box 1642
Houston, TX 77251-1642



January 31, 2012

FEB 02 2012

Mr. Barry R. Stephens, Director
Division of Air Pollution Control
9th Floor, L&C Annex
401 Church Street
Nashville, TN 37243-1531
Tel: 615-532-0554

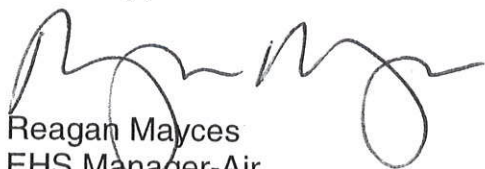
**RE: Operating Permit Application
East Tennessee Natural Gas
Station 3110 (Wartburg)
Permit # 963779P
Emission Source No. 65-0028-01**

Dear Mr. Stephens:

East Tennessee Natural Gas (ETNG) is submitting the enclosed operating permit application for the above reference permit. A permit renewal application was submitted to the department on June 2, 2010. The department issued temporary operating permit #9663779P on February 17, 2011 based on updates of the turbine representation to reflect current information from the turbine manufacturer (Solar). This authorization expired February 9, 2012.

If you have any questions, please feel free to call Diana Phelps at 713-627-4484.

Sincerely,

A handwritten signature in black ink, appearing to read "Reagan Mayces".

Reagan Mayces
EHS Manager-Air
US-Operations

Overnight delivery
Enclosures

Station 3110 – Wartburg

Operating Permit Application

Forms and Supporting Documentation



NOT TO BE USED FOR TITLE V APPLICATIONS

PERMIT APPLICATION

FEB 02 2012

APC 20

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH EMISSION SOURCE. ATTACH APPROPRIATE SOURCE DESCRIPTION FORMS.

1. ORGANIZATION'S LEGAL NAME East Tennessee Natural Gas Company			/// FOR	APC COMPANY--POINT NO. 65-0028-01
2. MAILING ADDRESS (ST/RD/P.O. BOX) P.O. Box 1642			/// APC	APC LOG/PERMIT NO. 065359
CITY Houston	STATE TX	ZIP CODE 77251-1642	PHONE WITH AREA CODE (713) 627-5210	
3. PRINCIPAL TECHNICAL CONTACT Edward L Anderson - Monterey Office			PHONE WITH AREA CODE (931) 839-2268	
4. SITE ADDRESS (ST/RD/HWY) 142 Clayton Howard Road			COUNTY NAME Morgan	
CITY OR DISTANCE TO NEAREST TOWN Wartburg		ZIP CODE 37887	PHONE WITH AREA CODE (931) 346-3579	
5. EMISSION SOURCE NO. (NUMBER WHICH UNIQUELY IDENTIFIES THIS SOURCE) 65-0028-01		PERMIT RENEWAL YES () NO (X)		
6. BRIEF DESCRIPTION OF EMISSION SOURCE Three natural gas-fired Solar Saturn T-1300 turbines (1,360 bhp each at ISO standard conditions). [1466 HP @ 0 °F]				

7. TYPE OF PERMIT REQUESTED				
CONSTRUCTION ()	STARTING DATE	COMPLETION DATE	LAST PERMIT NUMBER	EMISSION SOURCE REFERENCE NUMBER
OPERATING (X)	DATE CONSTRUCTION STARTED 06/10/1996	DATE COMPLETED 09/01/1996	LAST PERMIT NUMBER 053993F	EMISSION SOURCE REFERENCE NUMBER 65-0028-01
LOCATION TRANSFER ()	TRANSFER DATE		LAST PERMIT NUMBER	EMISSION SOURCE REFERENCE NUMBER

ADDRESS OF LAST LOCATION

8. DESCRIBE CHANGES THAT HAVE BEEN MADE TO THIS EQUIPMENT OR OPERATION SINCE THE LAST CONSTRUCTION OR OPERATING PERMIT APPLICATION. No physical changes or changes in the method of operation have occurred or are proposed. Authorization is being requested as a Conditional Major Source based on the nominal emission rates for NOx, CO provided by Solar so that emission representations reflect a basis that can be unequivocally supported..
--

9. SIGNATURE (APPLICATION MUST BE SIGNED BEFORE IT WILL BE PROCESSED) 		DATE 1/31/2012
10. SIGNER'S NAME (TYPE OR PRINT) Thomas V. Wooden	TITLE V.P.-Field Operations	PHONE WITH AREA CODE (713) 627-5400

TABLE OF POLLUTION REDUCTION DEVICE OR METHOD CODES
(ALPHABETICAL LISTING)

NOTE: FOR CYCLONES, SETTLING CHAMBERS, WET SCRUBBERS, AND ELECTROSTATIC PRECIPITATORS. THE EFFICIENCY RANGES CORRESPOND TO THE FOLLOWING PERCENTAGES:

HIGH: 95-99+%. MEDIUM: 80-95%. AND LOW: LESS THAN 80%.

IF THE SYSTEM HAS SEVERAL PIECES OF CONNECTED CONTROL EQUIPMENT, INDICATE THE SEQUENCE, FOR EXAMPLE:

008'010.97%.

IF NONE OF THE BELOW CODES FIT, USE 999 AS A CODE FOR OTHER AND SPECIFY IN THE COMMENTS.

NO EQUIPMENT	000	LIMESTONE INJECTION--DRY	041
ACTIVATED CARBON ADSORPTION	048	LIMESTONE INJECTION--WET	042
AFTERBURNER--DIRECT FLAME	021	LIQUID FILTRATION SYSTEM	049
AFTERBURNER--DIRECT FLAME WITH HEAT EXCHANGER	022	MIST ELIMINATOR--HIGH VELOCITY	014
AFTERBURNER--CATALYTIC	019	MIST ELIMINATOR--LOW VELOCITY	015
AFTERBURNER--CATALYTIC WITH HEAT EXCHANGER	020	PROCESS CHANGE	046
ALKALIZED ALUMINA	040	PROCESS ENCLOSED	054
CATALYTIC OXIDATION--FLUE GAS DESULFURIZATION	039	PROCESS GAS RECOVERY	060
CYCLONE--HIGH EFFICIENCY	007	SETTLING CHAMBER--HIGH EFFICIENCY	004
CYCLONE--MEDIUM EFFICIENCY	008	SETTLING CHAMBER--MEDIUM EFFICIENCY	005
CYCLONE--LOW EFFICIENCY	009	SETTLING CHAMBER--LOW EFFICIENCY	006
DUST SUPPRESSION BY CHEMICAL STABILIZERS		SPRAY TOWER (GASEOUS CONTROL ONLY)	052
OR WETTING AGENTS	062	SULFURIC ACID PLANT--CONTACT PROCESS	043
ELECTROSTATIC PRECIPITATOR--HIGH EFFICIENCY	010	SULFURIC ACID PLANT--DOUBLE CONTACT PROCESS	044
ELECTROSTATIC PRECIPITATOR--MEDIUM EFFICIENCY	011	SULFUR PLANT	045
ELECTROSTATIC PRECIPITATOR--LOW EFFICIENCY	012	VAPOR RECOVERY SYSTEM (INCLUDING CONDENSERS,	
FABRIC FILTER--HIGH TEMPERATURE	016	HOODING AND OTHER ENCLOSURES)	047
FABRIC FILTER--MEDIUM TEMPERATURE	017	VENTURI SCRUBBER (GASEOUS CONTROL ONLY)	053
FABRIC FILTER--LOW TEMPERATURE	018	WET SCRUBBER--HIGH EFFICIENCY	001
FABRIC FILTER--METAL SCREENS (COTTON GINS)	059	WET SCRUBBER--MEDIUM EFFICIENCY	002
FLARING	023	WET SCRUBBER--LOW EFFICIENCY	003
GAS ADSORPTION COLUMN--PACKED	050	WET SUPPRESSION BY WATER SPRAYS	061
GAS ADSORPTION COLUMN--TRAY TYPE	051		
GAS SCRUBBER (GENERAL: NOT CLASSIFIED)	013		

TABLE OF EMISSION ESTIMATION METHOD CODES

NOT APPLICABLE EMISSIONS ARE KNOWN TO BE ZERO	0
EMISSIONS BASED ON SOURCE TESTING	1
EMISSIONS BASED ON MATERIAL BALANCE USING ENGINEERING EXPERTISE AND KNOWLEDGE OF PROCESS	2
EMISSIONS CALCULATED USING EMISSION FACTORS FROM EPA PUBLICATION NO. AP-42 COMPILATION OF	
AIR POLLUTANT EMISSIONS FACTORS	3
JUDGEMENT	4
EMISSIONS CALCULATED USING A SPECIAL EMISSION FACTOR DIFFERING FROM THAT IN AP-42	5
OTHER (SPECIFY IN COMMENTS)	6



FEB 13 2012

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NOT TO BE USED FOR TITLE V APPLICATIONS

**PROCESS OR FUEL BURNING
SOURCE DESCRIPTION**

FEB 02 2012

APC21(& 24)

PLEASE TYPE OR PRINT, SUBMIT IN DUPLICATE AND ATTACH TO THE PERMIT APPLICATION.

1. ORGANIZATION NAME East Tennessee Natural Gas Company		/// FOR	APC COMPANY-POINT NO.	
2. EMISSION SOURCE NO. (AS ON PERMIT APPLICATION) 65-0028-01		SIC CODE 4922	/// APC	APC PERMIT/LOG NO.
3. DESCRIPTION OF PROCESS OR FUEL BURNING UNIT Three natural gas-fired Solar Saturn T-1300 turbines (1,360 bhp each at ISO standard conditions; 1466 hp @ 0 °F).				
4. NORMAL OPERATION: →	HOURS/DAY 24	DAYS/WEEK 7	WEEKS/YEAR 52	DAYS/YEAR 365
5. PERCENT ANNUAL THROUGHPUT: →	DEC.-FEB. 25	MARCH-MAY 25	JUNE-AUG. 25	SEPT.-NOV. 25
6. TYPE OF PERMIT APPLICATION				(CHECK BELOW ONE ONLY)
PROCESS SOURCE: APPLY FOR A SEPARATE PERMIT FOR EACH SOURCE. (CHECK AT RIGHT, AND COMPLETE LINES 7, 8, 13, AND 14).				()
PROCESS SOURCE WITH IN-PROCESS FUEL: PRODUCTS OF COMBUSTION CONTACT MATERIALS HEATED. APPLY FOR A SEPARATE PERMIT FOR EACH SOURCE. (CHECK AT RIGHT, AND COMPLETE LINES 7, 8, AND 10 THROUGH 14)				()
NON-PROCESS FUEL BURNING SOURCE: PRODUCTS OF COMBUSTION DO NOT CONTACT MATERIALS HEATED. COMPLETE THIS FORM FOR EACH BOILER OR FUEL BURNER AND COMPLETE AN EMISSION POINT DESCRIPTION FORM (APC 22) FOR EACH STACK. (CHECK AT RIGHT, AND COMPLETE LINES 9 TO 14)				(X)
7. TYPE OF OPERATION: CONTINUOUS, ()		BATCH ()	NORMAL BATCH TIME	NORMAL BATCHES/DAY
8. PROCESS MATERIAL INPUTS AND IN-PROCESS SOLID FUELS	DIAGRAM* REFERENCE	INPUT RATES (POUNDS/HOUR)		(FOR APC USE ONLY) SCC CODE
		DESIGN	ACTUAL	
A.			/	
B.			/	
C.			/	
D.			/	
E.			/	
F.			/	
G.			/	
TOTALS			/	

* A SIMPLE PROCESS FLOW DIAGRAM MUST BE ATTACHED.

(OVER)

9. BOILER OR BURNER DATA: (COMPLETE LINES 9 TO 14 USING A SEPARATE FORM FOR EACH BOILER)

BOILER NUMBER	STACK NUMBER**	TYPE OF FIRING***	RATED BOILER HORSEPOWER	RATED INPUT CAPACITY (10 ⁶ BTU/HR)	OTHER BOILER RATING (SPECIFY CAPACITY AND UNITS)
T1A	T1A	Single Pipe, High Pressure	1466 at 0°F	18.11 at 0°F (HHV)	
BOILER SERIAL NO. 21139		DATE CONSTRUCTED 06/10/1996	DATE OF LAST MODIFICATION (EXPLAIN IN COMMENTS BELOW).		

** BOILERS WITH A COMMON STACK WILL HAVE THE SAME STACK NUMBER.

*** CYCLONE, SPREADER (WITH OR WITHOUT REINJECTION), PULVERIZED (WET OR DRY BOTTOM, WITH OR WITHOUT REINJECTION), OTHER STOKER (SPECIFY TYPE), HAND FIRED, AUTOMATIC, OR OTHER TYPE (DESCRIBE BELOW IN COMMENTS).

10. FUEL DATA: (COMPLETE FOR A PROCESS SOURCE WITH IN-PROCESS FUEL OR A NON-PROCESS FUEL BURNING SOURCE)

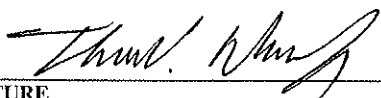
PRIMARY FUEL TYPE (SPECIFY)				STANDBY FUEL TYPE(S) (SPECIFY)			
Natural Gas				None			
FUELS USED	ANNUAL USAGE	HOURLY USAGE		% SULFUR	% ASH	BTU VALUE OF FUEL	(FOR APC ONLY) SCC CODE
		DESIGN	AVERAGE				
NATURAL GAS:	10 ⁶ CUFT 140,995	CUFT 16,095	CUFT 16,095	/// /	///	1,020 BTU/scf (HHV)	
#2 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
#5 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
#6 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
COAL:	TONS	LBS	LBS				
WOOD:	TONS	LBS	LBS	/// /	///		
LIQUID PROPANE:	10 ³ GAL	GAL	GAL	/// /	///	85,000	
OTHER (.SPECIFY TYPE & UNITS.):							

11. IF WOOD IS USED AS A FUEL, SPECIFY TYPES AND ESTIMATE PERCENT BY WEIGHT OF BARK

12. IF WOOD IS USED WITH OTHER FUELS, SPECIFY PERCENT BY WEIGHT OF WOOD CHARGED TO THE BURNER.

13. COMMENTS

14. SIGNATURE



DATE

1/31/2012

Thomas V. Wooden, Vice President

9. BOILER OR BURNER DATA: (COMPLETE LINES 9 TO 14 USING A SEPARATE FORM FOR EACH BOILER)

BOILER NUMBER	STACK NUMBER**	TYPE OF FIRING***	RATED BOILER HORSEPOWER	RATED INPUT CAPACITY (10 ⁶ BTU/HR) (HHV)	OTHER BOILER RATING (SPECIFY CAPACITY AND UNITS)
T-2A	T-2A	Single Pipe, High Pressure	1,466 at 0°F	18.11 at 0°F (HHV)	Please see Table A-1 for site-rated capacities at different ambient temperatures.
BOILER SERIAL NO. 1376S		DATE CONSTRUCTED 06/10/1996	DATE OF LAST MODIFICATION (EXPLAIN IN COMMENTS BELOW).		

** BOILERS WITH A COMMON STACK WILL HAVE THE SAME STACK NUMBER.

*** CYCLONE, SPREADER (WITH OR WITHOUT REINJECTION), PULVERIZED (WET OR DRY BOTTOM, WITH OR WITHOUT REINJECTION), OTHER STOKER (SPECIFY TYPE), HAND FIRED, AUTOMATIC, OR OTHER TYPE (DESCRIBE BELOW IN COMMENTS).

10. FUEL DATA: (COMPLETE FOR A PROCESS SOURCE WITH IN-PROCESS FUEL OR A NON-PROCESS FUEL BURNING SOURCE)

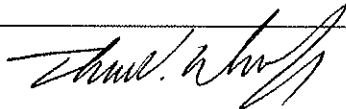
PRIMARY FUEL TYPE (SPECIFY)				STANDBY FUEL TYPE(S) (SPECIFY)			
Natural Gas				None			
FUELS USED	ANNUAL USAGE	HOURLY USAGE		% SULFUR	% ASH	BTU VALUE OF FUEL	(FOR APC ONLY) SCC CODE
		DESIGN	AVERAGE				
NATURAL GAS:	10 ⁶ CUFT 140,995	CUFT 16,095	CUFT 16,095	///	///	1,020 BTU/scf (HHV)	
#2 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
#5 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
#6 FUEL OIL:	10 ³ GAL	GAL	GAL		///		
COAL:	TONS	LBS	LBS				
WOOD:	TONS	LBS	LBS	///	///		
LIQUID PROPANE:	10 ³ GAL	GAL	GAL	///	///	85,000	
OTHER (,SPECIFY TYPE & UNITS.):							

11. IF WOOD IS USED AS A FUEL, SPECIFY TYPES AND ESTIMATE PERCENT BY WEIGHT OF BARK

12. IF WOOD IS USED WITH OTHER FUELS, SPECIFY PERCENT BY WEIGHT OF WOOD CHARGED TO THE BURNER.

13. COMMENTS

14. SIGNATURE



Thomas V. Wooden, Vice President

DATE

1/31/2012

APC 21 (& 24)

9. BOILER OR BURNER DATA: (COMPLETE LINES 9 TO 14 USING A SEPARATE FORM FOR EACH BOILER)					
BOILER NUMBER T-3A	STACK NUMBER** T-3A	TYPE OF FIRING*** Single Pipe, High Pressure	RATED BOILER HORSEPOWER 1,466 at 0°F	RATED INPUT CAPACITY (10 ⁶ BTU/HR) (HHV) 18.11 at 0°F	OTHER BOILER RATING (SPECIFY CAPACITY AND UNITS) Please see Table A-1 for site-rated capacities at different ambient temperatures.
BOILER SERIAL NO. 10897		DATE CONSTRUCTED 06/10/1996	DATE OF LAST MODIFICATION (EXPLAIN IN COMMENTS BELOW).		

** BOILERS WITH A COMMON STACK WILL HAVE THE SAME STACK NUMBER.


*** CYCLONE, SPREADER (WITH OR WITHOUT REINJECTION), PULVERIZED (WET OR DRY BOTTOM, WITH OR WITHOUT REINJECTION), OTHER STOKER (SPECIFY TYPE), HAND FIRED, AUTOMATIC, OR OTHER TYPE (DESCRIBE BELOW IN COMMENTS).

10. FUEL DATA: (COMPLETE FOR A PROCESS SOURCE WITH IN-PROCESS FUEL OR A NON-PROCESS FUEL BURNING SOURCE)							
PRIMARY FUEL TYPE (SPECIFY) Natural Gas				STANDBY FUEL TYPE(S) (SPECIFY) None			
FUELS USED	ANNUAL USAGE	HOURLY USAGE		% SULFUR	% ASH	BTU VALUE OF FUEL	(FOR APC ONLY) SCC CODE
		DESIGN	AVERAGE				
NATURAL GAS:	10 ⁶ CUFT 140.995	CUFT 16,095	CUFT 16,095	/ / / / / / / /	/ / / / / /	1,020 BTU/scf (HHV)	
#2 FUEL OIL:	10 ³ GAL	GAL	GAL		/ / / / / /		
#5 FUEL OIL:	10 ³ GAL	GAL	GAL		/ / / / / /		
#6 FUEL OIL:	10 ³ GAL	GAL	GAL		/ / / / / /		
COAL:	TONS	LBS	LBS				
WOOD:	TONS	LBS	LBS	/ / / / / / / /	/ / / / / /		
LIQUID PROPANE:	10 ³ GAL	GAL	GAL	/ / / / / / / /	/ / / / / /	85,000	
OTHER (SPECIFY TYPE & UNITS.):							

11. IF WOOD IS USED AS A FUEL, SPECIFY TYPES AND ESTIMATE PERCENT BY WEIGHT OF BARK

12. IF WOOD IS USED WITH OTHER FUELS, SPECIFY PERCENT BY WEIGHT OF WOOD CHARGED TO THE BURNER.

13. COMMENTS

14. SIGNATURE	DATE
Thomas V. Wooden, Vice President 	1/31/2012

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL



9th Floor, L. & C Annex
401 Church Street
Nashville, TN 37243-1531
Telephone: (615) 532-0554
FAX: (615) 532-0614

NOT TO BE USED FOR TITLE V APPLICATIONS

EMISSION POINT DESCRIPTION

FEB 02 2012

APC 22

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT.
ATTACH TO THE PERMIT APPLICATION.

1. ORGANIZATION NAME East Tennessee Natural Gas Company				///	APC COMPANY POINT NO.
				FOR	
2. EMISSION SOURCE NO. (FROM APPLICATION) 65-0028-01		FLOW DIAGRAM POINT NUMBER Not Applicable		///	APC SEQUENCE NO.
				APC	
3. LOCATION: →	LATITUDE 36° 04' 15"	LONGITUDE 84° 32' 29"	UTM VERTICAL		UTM HORIZONTAL
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): T-1A: Natural gas-fired Solar Saturn T-1300 turbine (1,360 bhp at ISO standard conditions) exhaust stack.					DISTANCE TO NEAREST PROPERTY LINE (FT) 212

COMPLETE LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC 21)

5. NORMAL OPERATION: →	HOURS/DAY 24	DAYS/WEEK 7	WEEK/YEAR 52	DAYS/YEAR 365			
6. PERCENT ANNUAL THROUGHPUT: →	DEC.-FEB. 25	MARCH-MAY 25	JUNE-AUG. 25	SEPT.-NOV. 25			
7. STACK OR EMISSION POINT DATA: →	HEIGHT ABOVE GRADE (FT) 22.33	DIAMETER (FT) 2.00	TEMPERATURE (°F) 974	% OF TIME OVER 125°F 100	DIRECTION OF EXIT (UP, DOWN OR HORIZONTAL) UP		
DATA AT EXIT CONDITIONS: →	FLOW (ACTUAL FT³/MIN.) 30,493	VELOCITY (FT/SEC) 161.77	MOISTURE (GRAINS/FT³) 187		MOISTURE (PERCENT) 5.93 vol%		
DATA AT STANDARD CONDITIONS: →	FLOW (DRY STD. FT³/MIN) 10,183	VELOCITY (FT/SEC) 54.02 (dry)	MOISTURE (GRAINS/FT³) 0 (dry)		MOISTURE (PERCENT) 0.00 vol% (dry)		
8. AIR CONTAMINANTS	ACTUAL EMISSIONS						
	EMISSIONS (LBS/HR)		CONCENTRATION	AVG. (TONS/YR)	EMISSIONS* EST.	CONTROL DEVICES*	CONTROL EFFICIENCY%
	AVG.	MAXIMUM					
PARTICULATES	0.11	0.12	**	0.47	3	000	0
SULFUR DIOXIDE	0.06	0.06	***	0.24	3	000	0
CARBON MONOXIDE	3.55	11.67	PPMVD at 15% O2	15.53	5	000	0
ORGANIC COMPOUNDS	0.03	0.47	PPMVD at 15% O2	0.14	5	000	0
NITROGEN OXIDES	4.69	4.84	PPMVD at 15% O2	20.54	5	000	0
FLUORIDES							
OTHER(SPECIFY)						000	0
OTHER(SPECIFY) Formaldehyde	0.01	0.16		0.05	3	000	0

(OVER)

APC 22

9. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:OPACITY MONITOR (), SO₂ MONITOR (), NOX MONITOR (), OTHER (SPECIFY IN COMMENTS) (X)**10. COMMENTS**

Section 7: Stack exhaust data is based on manufacturer's data at an average annual ambient temperature of 59.10°F (see Table A-1).

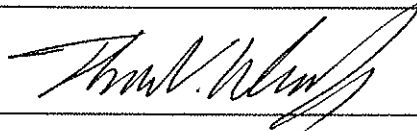
Section 8: Emissions data is based on calculations that are documented in Tables A-2.

Section 9: Monitoring or recordkeeping should be necessary to document compliance with the terms and condition of the permit. Monthly fuel consumption records and 12-month running total fuel consumption records should be sufficient.

The turbine is subject to NSPS, Subpart GG. Performance testing was conducted on November 20, 1996 in accordance with the applicable requirements of NSPS, Subparts A and GG. The turbine complies with the NSPS, Subpart GG nitrogen and sulfur monitoring requirements in accordance with §§60.334(h)(2) and 60.334(h)(3), respectively.

11. SIGNATURE**DATE**

Thomas V. Wooden, Vice President



1/3/2012

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS — GRAINS/DRY STANDARD FT³ (70°F); WOOD FIRED BOILERS — GRAINS/DRY STANDARD FT³ (70°F); ALL OTHER BOILERS — LBS/MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATIONS UNITS: PROCESS — PPM BY VOLUME, DRY BASES; BOILERS — LBS/MILLION BTU HEAT INPUT.

FEB 13 2012

STATE OF TENNESSEE
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EMISSION POINT DESCRIPTION

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APC 22

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT.
ATTACH TO THE PERMIT APPLICATION.

1. ORGANIZATION NAME East Tennessee Natural Gas Company				///	APC COMPANY POINT NO.		
2. EMISSION SOURCE NO. (FROM APPLICATION) 65-0028-01				FOR			
FLOW DIAGRAM POINT NUMBER Not Applicable				///	APC SEQUENCE NO.		
3. LOCATION:				APC			
LATITUDE 36° 04' 15"	LONGITUDE 84° 32' 29"	UTM VERTICAL		UTM HORIZONTAL			
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): T-2A: Natural gas-fired Solar Saturn T-1300 turbine (1,360 bhp at ISO standard conditions) exhaust stack.					DISTANCE TO NEAREST PROPERTY LINE (FT) 205		
COMPLETE LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC 21)							
5. NORMAL OPERATION:	HOURS/DAY 24	DAYS/WEEK 7	WEEK/YEAR 52	DAYS/YEAR 365			
6. PERCENT ANNUAL THROUGHPUT:	DEC.-FEB. 25	MARCH-MAY 25	JUNE-AUG. 25	SEPT.-NOV. 25			
7. STACK OR EMISSION POINT DATA:	HEIGHT ABOVE GRADE (FT)	DIAMETER (FT)	TEMPERATURE (°F)	% OF TIME OVER 125°F	DIRECTION OF EXIT (UP, DOWN OR HORIZONTAL)		
→	22.33	2.00	974	100	UP		
DATA AT EXIT CONDITIONS:	FLOW (ACTUAL FT ³ /MIN.)	VELOCITY (FT/SEC)	MOISTURE (GRAINS/FT ³)	MOISTURE (PERCENT)			
→	30,493	161.77	187	5.93 vol%			
DATA AT STANDARD CONDITIONS:	FLOW (DRY STD. FT ³ /MIN)	VELOCITY (FT/SEC)	MOISTURE (GRAINS/FT ³)	MOISTURE (PERCENT)			
→	10,183	54.02 (dry)	0 (dry)	0.00 vol% (dry)			
8. AIR CONTAMINANTS	ACTUAL EMISSIONS				EMISSIONS* EST.	CONTROL DEVICES*	CONTROL EFFICIENCY%
	EMISSIONS (LBS/HR)		CONCENTRATION	AVG. (TONS/YR)			
	AVG.	MAXIMUM					
PARTICULATES	0.11	0.12	**	0.47	3	000	0
SULFUR DIOXIDE	0.06	0.06	***	0.24	3	000	0
CARBON MONOXIDE	3.55	11.67	PPMVD at 15% O2	15.53	5	000	0
ORGANIC COMPOUNDS	0.03	0.47	PPMVD at 15% O2	0.14	5	000	0
NITROGEN OXIDES	4.69	4.84	PPMVD at 15% O2	20.54	5	000	0
FLUORIDES							
OTHER(SPECIFY)						000	0
OTHER(SPECIFY) Formaldehyde	0.01	0.16		0.05	3	000	0

(OVER)

APC 22

9. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:

OPACITY MONITOR (), SO2 MONITOR (), NOX MONITOR (), OTHER (SPECIFY IN COMMENTS) (X)

10. COMMENTS

Section 7: Stack exhaust data is based on manufacturer's data at an average annual ambient temperature of 59.10°F (see Table A-1).

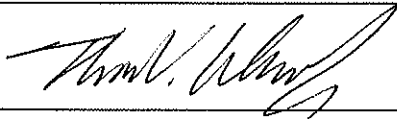
Section 8: Emissions data is based on calculations that are documented in Tables A-2.

Section 9: Monitoring or recordkeeping should be necessary to document compliance with the terms and condition of the permit. Monthly fuel consumption records and 12-month running total fuel consumption records should be sufficient.

The turbine is subject to NSPS, Subpart GG. Performance testing was conducted on November 20, 1996 in accordance with the applicable requirements of NSPS, Subparts A and GG. The turbine complies with the NSPS, Subpart GG nitrogen and sulfur monitoring requirements in accordance with §§60.334(h)(2) and 60.334(h)(3), respectively.

11. SIGNATURE**DATE**

Thomas V. Wooden, Vice President



1/31/2012

* REFER TO THE BACK OF THE PERMIT APPLICATION FORM FOR ESTIMATION METHOD AND CONTROL DEVICE CODES.

** EXIT GAS PARTICULATE CONCENTRATION UNITS: PROCESS — GRAINS/DRY STANDARD FT3 (70°F); WOOD FIRED BOILERS — GRAINS/DRY STANDARD FT3 (70°F); ALL OTHER BOILERS — LBS/MILLION BTU HEAT INPUT.

*** EXIT GAS SULFUR DIOXIDE CONCENTRATIONS UNITS: PROCESS — PPM BY VOLUME, DRY BASES; BOILERS — LBS/MILLION BTU HEAT INPUT.

STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
DIVISION OF AIR POLLUTION CONTROL



9th Floor, L & C Annex
401 Church Street
Nashville, TN 37243-1531
Telephone: (615) 532-0554
FAX: (615) 532-0614

NOT TO BE USED FOR TITLE V APPLICATIONS

EMISSION POINT DESCRIPTION

APC 22

PLEASE TYPE OR PRINT AND SUBMIT IN DUPLICATE FOR EACH STACK OR EMISSION POINT.
ATTACH TO THE PERMIT APPLICATION.

1. ORGANIZATION NAME East Tennessee Natural Gas Company				///	APC COMPANY POINT NO.
2. EMISSION SOURCE NO. (FROM APPLICATION) 65-0028-01				FOR	
FLOW DIAGRAM POINT NUMBER Not Applicable				///	APC SEQUENCE NO.
				APC	
3. LOCATION: →	LATITUDE 36° 04' 15"	LONGITUDE 84° 32' 29"	UTM VERTICAL	UTM HORIZONTAL	
4. BRIEF EMISSION POINT DESCRIPTION (ATTACH A SKETCH IF APPROPRIATE): T-3A: Natural gas-fired Solar Saturn T-1300 turbine (1,360 bhp at ISO standard conditions) exhaust stack.					DISTANCE TO NEAREST PROPERTY LINE (FT) 202

COMPLETE LINES 5 AND 6 IF DIFFERENT FROM THAT ON THE PROCESS OR FUEL BURNING SOURCE DESCRIPTION (APC 21)

5. NORMAL OPERATION: →	HOURS/DAY 24	DAYS/WEEK 7	WEEK/YEAR 52	DAYS/YEAR 365
6. PERCENT ANNUAL THROUGHPUT: →	DEC.-FEB. 25	MARCH-MAY 25	JUNE-AUG. 25	SEPT.-NOV. 25
7. STACK OR EMISSION POINT DATA: →	HEIGHT ABOVE GRADE (FT) 22.33	DIAMETER (FT) 2.00	TEMPERATURE (°F) 974	% OF TIME OVER 125°F 100
DATA AT EXIT CONDITIONS: →	FLOW (ACTUAL FT³/MIN.) 30,493	VELOCITY (FT/SEC) 161.77	MOISTURE (GRAINS/FT³) 187	MOISTURE (PERCENT) 5.93 vol%
DATA AT STANDARD CONDITIONS: →	FLOW (DRY STD. FT³/MIN) 10,183	VELOCITY (FT/SEC) 54.02 (dry)	MOISTURE (GRAINS/FT³) 0 (dry)	MOISTURE (PERCENT) 0.00 vol% (dry)
8. AIR CONTAMINANTS	ACTUAL EMISSIONS			
	EMISSIONS (LBS/HR)		CONCENTRATION	AVG. (TONS/YR)
	AVG.	MAXIMUM		
PARTICULATES	0.11	0.12	**	0.47
SULFUR DIOXIDE	0.06	0.06	***	0.24
CARBON MONOXIDE	3.55	11.67	PPMVD at 15% O2	15.53
ORGANIC COMPOUNDS	0.03	0.47	PPMVD at 15% O2	0.14
NITROGEN OXIDES	4.69	4.84	PPMVD at 15% O2	20.54
FLUORIDES				
OTHER(SPECIFY)				
OTHER(SPECIFY) Formaldehyde	0.01	0.16		0.05

(OVER)

APC 22

9. CHECK TYPES OF MONITORING AND RECORDING INSTRUMENTS THAT ARE ATTACHED:OPACITY MONITOR (), SO₂ MONITOR (), NO_x MONITOR (), OTHER (SPECIFY IN COMMENTS) (X)**10. COMMENTS**

Section 7: Stack exhaust data is based on manufacturer's data at an average annual ambient temperature of 59.10°F (see Table A-1).

Section 8: Emissions data is based on calculations that are documented in Tables A-2.

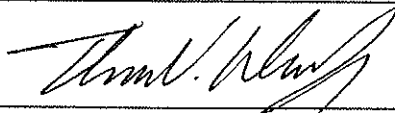
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11. SIGNATURE

DATE

Thomas V. Wooden, Vice President



1/31/2012

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*** EXIT GAS SULFUR DIOXIDE CONCENTRATIONS UNITS: PROCESS — PPM BY VOLUME, DRY BASES; BOILERS — LBS/MILLION BTU HEAT INPUT.

EMISSION CALCULATIONS

**East Tennessee Natural Gas Company
Station 3110 (Wartburg Compressor Station)
Turbine Manufacturer's Operating and Nominal Emissions Data for Saturn T-1360**

Parameters			Values							
Ambient ²	Temperature	°F	0.00	20.00	26.50	40.00	59.10	60.00	80.00	100.00
	Elevation	ft	1,310	1,310	1,310	1,310	1,310	1,310	1,310	1,310
	Pressure	psia	14.02	14.02	14.02	14.02	14.02	14.02	14.02	14.02
	Relative Humidity	%	60	60	60	60	60	60	60	60
	Specific Humidity	lb ₁₂₀ /lb _{Dry Air}	0.0006	0.0015	0.0021	0.0033	0.0068	0.0070	0.0139	0.0266
Fuel ³	Lower Heating Value (LHV)	BTU/scf	939.2	939.2	939.2	939.2	939.2	939.2	939.2	939.2
	Higher Heating Value (HHV)	BTU/scf	1,043.6	1,043.6	1,043.6	1,043.6	1,043.6	1,043.6	1,043.6	1,043.6
Turbine	Elevation Loss	hp	87	77	76	73	69	69	64	58
	Inlet Loss	in ₁₂₀	3	3	3	3	3	3	3	3
		hp	23	22	22	21	20	20	19	18
	Exhaust loss	in ₁₂₀	4	4	4	4	4	4	4	4
		hp	13	13	13	13	13	13	13	12
	Off-Optimum NPT Loss	hp	53	50	48	45	39	39	31	22
	Net Output Power	hp	1,466	1,420	1,403	1,369	1,313	1,310	1,234	1,130
	Heat Input at LHV	MMBTU/hr	16.30	15.82	15.65	15.30	14.78	14.75	14.13	13.36
	Heat Rate at LHV	BTU/hp-hr	11,119	11,135	11,152	11,177	11,256	11,260	11,452	11,822
	Heat Input at HHV	MMBTU/hr	18.11	17.58	17.39	17.00	16.42	16.39	15.70	14.84
	Heat Rate at HHV	BTU/hp-hr	12,354	12,379	12,391	12,419	12,507	12,511	12,724	13,137
	Fuel Consumption	MMscf/hr	0.017	0.017	0.017	0.016	0.016	0.016	0.015	0.014
Exhaust	Temperature	°F	890	907	912	922	938	939	954	968
	Water Fraction	vol%	5.03%	5.15%	5.24%	5.42%	5.93%	5.95%	6.95%	8.71%
	Non-Water Fraction	vol%	94.97%	94.85%	94.76%	94.58%	94.07%	94.05%	93.05%	91.29%
	O ₂ Content	vol% (dry)	16.20%	16.20%	16.20%	16.21%	16.21%	16.21%	16.22%	16.24%
	Molecular Weight	lb/lb-mol	28.65	28.63	28.62	28.60	28.54	28.54	28.43	28.23
	Flow Rate	lb/hr	53,701	52,119	51,586	50,479	48,791	48,711	46,733	44,379
		scfm	11,859	11,515	11,401	11,165	10,813	10,796	10,399	9,944
NO _x Emissions		acfm	32,302	31,751	31,551	31,136	30,493	30,463	29,654	28,639
		lb/lb-mol	46.01	46.01	46.01	46.01	46.01	46.01	46.01	46.01
		ppmvd, 15% O ₂	74.16	77.92	78.67	80.22	79.72	79.70	74.45	62.58
		ppmww	56.11	58.88	59.34	60.31	59.62	59.59	54.95	45.12
		lb/hr	4.84	4.93	4.92	4.90	4.69	4.68	4.16	3.26
		lb/MMBTU at LHV	0.297	0.312	0.314	0.320	0.317	0.317	0.294	0.244
		lb/MMBTU at HHV	0.267	0.281	0.283	0.288	0.286	0.285	0.265	0.220
CO Emissions		lb/lb-mol	28.01	28.01	28.01	28.01	28.01	28.01	28.01	28.01
		ppmvd, 15% O ₂	293.88	226.84	205.08	159.89	99.05	96.17	96.86	98.10
		ppmww	222.33	171.40	154.71	120.21	74.07	71.90	71.49	70.73
		lb/hr	11.67	8.74	7.81	5.94	3.55	3.44	3.29	3.11
		lb/MMBTU at LHV	0.716	0.552	0.499	0.388	0.240	0.233	0.233	0.233
		lb/MMBTU at HHV	0.644	0.497	0.449	0.350	0.216	0.210	0.210	0.210
THC Emissions		lb/lb-mol	16.80	16.80	16.80	16.80	16.80	16.80	16.80	16.80
		ppmvd, 15% O ₂	7.86	7.88	7.91	7.96	7.96	8.03	8.15	8.42
		ppmww	5.95	5.96	5.97	5.98	5.95	6.00	6.01	6.07
		lb/hr	0.19	0.18	0.18	0.18	0.17	0.17	0.17	0.16
		lb/MMBTU at LHV	0.011	0.012	0.012	0.012	0.012	0.012	0.012	0.012
		lb/MMBTU at HHV	0.010	0.010	0.010	0.010	0.010	0.010	0.011	0.011

NOTES

- Operating and emissions data was provided by the turbine manufacturer (Solar Turbines, Inc.) for the following ambient temperatures: 0°F, 20°F, 40°F, 60°F and 80°F. Data for 26.5°F and 59.1°F are interpolated from the manufacturer's data. An ambient temperature of 26.5°F corresponds to the lowest monthly daily minimum ambient temperature and 59.1°F corresponds to average annual ambient temperature as obtained from USEPA's TANKS 4.0 program for Nashville, TN.
- Ambient pressure and humidity are values assumed by the turbine manufacturer to be representative. Emissions are affected by the values used; however, it is believed that the affect is minimal.
- The heating value of the natural gas used to fuel the turbine will vary. However, it is believed that any variation would have a minimal affect.

TABLE A-2
Gas-Fired Turbines
Hourly and Annual Emission Estimates

Source	Wartburg				
Unit	3110-01:3111-03				
Type	turbine				
Make	Solar				
Model	T-1360				
Fuel	Natural Gas				
Fuel Higher Heating Value (HHV)	1,020 BTU/scf			1,020 BTU/scf	
Ambient Temperature	59 °F			0 °F	
Power Output	1,313 bhp (mech.) 979 kW (elec.)			1,466 bhp (mech.) 1,093 kW (elec.)	
Heat Rate at HHV	12,507 BTU/hp-hr			12,354 BTU/hp-hr	
Operating Hours	8,760 hrs/yr				
Fuel Consumption	16,095 scfh 140.995 MMscf/yr			17,756 scfh	
Heat Input at HHV	16.42 MMBTU/hr 143,815 MMBTU/yr			18.11 MMBTU/hr	
		Avg. Hourly	Max. Annual		Max. Hourly
NO _x	291.32 lb/MMscf	4.6889 lb/hr	20.5375 tpy	272.49 lb/MMscf	4.8385 lb/hr
CO	220.35 lb/MMscf	3.5465 lb/hr	15.5338 tpy	657.38 lb/MMscf	11.6727 lb/hr
SO ₂	3.47 lb/MMscf	0.0558 lb/hr	0.2445 tpy	3.47 lb/MMscf	0.0616 lb/hr
PM ₁₀	6.73 lb/MMscf	0.1084 lb/hr	0.4746 tpy	6.73 lb/MMscf	0.1195 lb/hr
TOC (Total)	10.62 lb/MMscf	0.1709 lb/hr	0.7487 tpy	10.55 lb/MMscf	0.1873 lb/hr
Methane	8.30 lb/MMscf	0.1336 lb/hr	0.5854 tpy	8.25 lb/MMscf	0.1464 lb/hr
Ethane	0.29 lb/MMscf	0.0047 lb/hr	0.0204 tpy	0.29 lb/MMscf	0.0051 lb/hr
VOC (Total)	2.03 lb/MMscf	0.0326 lb/hr	0.1429 tpy	2.01 lb/MMscf	0.0358 lb/hr
HAP (Total)	0.99 lb/MMscf	0.0160 lb/hr	0.0699 tpy	0.99 lb/MMscf	0.0175 lb/hr
Acetaldehyde	3.86E-02 lb/MMscf	0.0006 lb/hr	0.0027 tpy	3.84E-02 lb/MMscf	0.0007 lb/hr
Acrolein	6.18E-03 lb/MMscf	0.0001 lb/hr	0.0004 tpy	6.14E-03 lb/MMscf	0.0001 lb/hr
Benzene	1.16E-02 lb/MMscf	0.0002 lb/hr	0.0008 tpy	1.15E-02 lb/MMscf	0.0002 lb/hr
Butadiene (1,3-)	4.15E-04 lb/MMscf	0.0000 lb/hr	0.0000 tpy	4.12E-04 lb/MMscf	0.0000 lb/hr
Ethylbenzene	3.09E-02 lb/MMscf	0.0005 lb/hr	0.0022 tpy	3.07E-02 lb/MMscf	0.0005 lb/hr
Formaldehyde	6.86E-01 lb/MMscf	0.0110 lb/hr	0.0483 tpy	6.81E-01 lb/MMscf	0.0121 lb/hr
Naphthalene	1.26E-03 lb/MMscf	0.0000 lb/hr	0.0001 tpy	1.25E-03 lb/MMscf	0.0000 lb/hr
PAH	2.12E-03 lb/MMscf	0.0000 lb/hr	0.0001 tpy	2.11E-03 lb/MMscf	0.0000 lb/hr
Propylene Oxide	2.80E-02 lb/MMscf	0.0005 lb/hr	0.0020 tpy	2.78E-02 lb/MMscf	0.0005 lb/hr
Toluene	1.26E-01 lb/MMscf	0.0020 lb/hr	0.0088 tpy	1.25E-01 lb/MMscf	0.0022 lb/hr
Xylenes	6.18E-02 lb/MMscf	0.0010 lb/hr	0.0044 tpy	6.14E-02 lb/MMscf	0.0011 lb/hr

NOTES

1. Fuel higher heating value selected to correspond to AP-42 emissions factors, but representative of gas in Tennessee.
2. Manufacturer provided data on: power output, heat rate, along with NO_x, CO, and UHC (or TOC) emissions.
3. The average annual temperature for Nashville, TN (59°F) was extracted from USEPA's TANKS program and 55°F is used as the temperature appropriate for estimating annual emissions. A temperature of 0°F is used to estimate maximum hourly emissions.
4. With the exception of NO_x, CO, TOC, and TAPs, emissions based data provided in Table 3.1-1 of AP-42 (dated 4/00).
5. Speciated TAP emissions based on data provided in Table 3.1-3 of AP-42 (dated 4/00).
6. Methane, Ethane, VOC, HAP, and Speciate TAP AP-42 emission factors were scaled based on manufacturer's data for TOC:

$$EF_{\text{Scaled}} = (EF_{\text{AP42}})(EF_{\text{TOC}}/EF_{\text{TOC-AP42}})$$

FEB 13 2012

TEST DATA REFERENCES



STATE OF TENNESSEE
DEPARTMENT OF ENVIRONMENT AND CONSERVATION
9th Floor, L & C Annex
401 Church Street
Nashville, Tennessee 37243-1531

April 28, 1997

Mr. Ted Wurfel
Environmental Scientist
Tenneco Energy
P. O. 2511
1010 Milam Street
Houston, Texas 77252-2511

Reference Number: 65-0028-01-S4 (Station 3110)

Dear Mr. Wurfel:

The Tennessee Division of Air Pollution Control has received the gaseous source test report submitted by Tenneco Energy for a Solar Saturn T-1360 gas-fired compressor turbine (Unit 3A) operated by East Tennessee Natural Gas and located in Morgan County (Station 3110). This source testing was conducted on November 20, 1996 by personnel of the Tenneco Energy Environmental, Health, Safety, and Technology Services. Pursuant to the United States Environmental Protection Agency (EPA) letter dated September 19, 1996, compliance testing could be waived for two of the three gas turbines that make up this fuel burning installation if one of the turbines was determined to have nitrogen oxides emissions of less than fifty percent of the applicable federal emission standard.

The source test report has been reviewed by the Compliance Validation Program. Based on this review it has been determined that the report is technically correct and thus, is acceptable to the agency. From the review of the source test report it was noted that the sampling methodology utilized followed the procedures outlined in EPA Source Test Method 20 (40 CFR 60, Appendix A) and the Tenneco testing protocol dated October 15, 1996.

In the review of the operational parameters presented in the report it was noted that the turbine operated very close to its designed power rating. Specifics of this are listed on Attachment 1 to this letter. Thus, the operation of this turbine was at an acceptable level for an official compliance demonstration.

Mr. Ted Wurfel
Tenneco Energy
Station 3110 Unit 3A
April 28, 1996
page 2 of 3

During the testing period the measured nitrogen oxides emissions from Unit 3A were 55.6 ppm corrected to 15 percent oxygen and ISO standard conditions and 2.8 pounds per hour. The 55.6 ppm of nitrogen oxides corrected to 15 percent oxygen and ISO standard conditions demonstrates compliance with the regulatory nitrogen oxides emission standard of 150 ppm by volume at 15 percent oxygen and on a dry basis. This standard is set forth in Subparagraph 1200-3-16-.31 (3) (a) 2. of the Tennessee Air Pollution Control Regulations (40 CFR 60.332 (a) (2)). This also demonstrates compliance with the current permit stipulated nitrogen oxides emission limit of 84 ppm of nitrogen oxides corrected to 15 percent oxygen (Permit #741853F, Condition 5). In addition the 3.76 pounds per hour of nitrogen oxides demonstrates compliance with the current permit stipulated nitrogen oxides emission limit of 27.7 pounds per hour the three gas turbines that constitute this fuel burning installation (Permit #741853F, Condition 5).

The measured sulfur concentration value of the fuel being combusted in this turbine, less than one ppm sulfur, demonstrates that this turbine was demonstrating compliance with either the sulfur dioxide emission standard of 150 ppm by volume at 15 percent oxygen and on a dry basis or the maximum fuel sulfur content of 0.8 percent by weight. These standards are set forth in Paragraph 1200-3-16-.31 (4) of the Regulations (40 CFR 60.333). This also demonstrates compliance with the current permit stipulated sulfur dioxide emission limits of four ppm of sulfur dioxide corrected to 15 percent oxygen and on a dry basis and 1.47 pounds per hour (Permit #741853F, Condition 4).

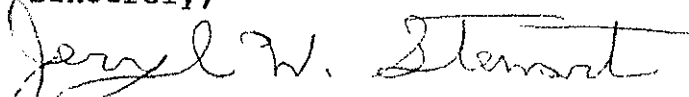
The Division considers that this source test report is acceptable as a demonstration of compliance and from the data presented considers that this turbine has met the stipulated testing requirements and is in compliance with the applicable nitrogen oxides and sulfur dioxide emission standards. In addition, as the nitrogen oxides emission rate was less than fifty percent of the applicable federal emission standard, the testing requirement for the other two turbines located at this fuel burning installation is waived pursuant to the EPA letter dated September 19, 1996.

FEB 13 2012

Mr. Ted Wurfel
Tenneco Energy
Station 3110 Unit 3A
April 28, 1996
page 3 of 3

If you have any questions concerning the matters addressed by this letter, please contact Mr. Jeryl W. Stewart at (615) 532-0605.

Sincerely,



for John W. Walton, P.E.
Technical Secretary
Tennessee Air Pollution Control Board

attachment - 1

cc: Knoxville Field Office

ATTACHMENT 1

Summary of Turbine Operation

Station 3110 Unit 3A

Test Date November 20, 1996

Turbine 3A heat input during test 13.9 MMBtu/hr

Rated heat input capacity for this turbine 14.45 MMBtu/hr
(from April 4, 1994 permit application)

Turbine 3A turbine horsepower during test 1,209 BHP

Rated turbine horsepower for this turbine 1,300 BHP
(from April 4, 1994 permit application)

TENNECO
Energy

COMPLIANCE TEST REPORT
for
THE SOLAR SATURN TURBINES
at
TENNESSEE GAS PIPELINE STATION 3110
Wartburg, TN

November 25, 1996

Prepared for the

STATE OF TENNESSEE
DEPARTMENT OF HEALTH AND ENVIRONMENT

By

Richard C. Schoonover
Research Engineer

TENNECO ENERGY
ENVIRONMENTAL, HEALTH, SAFETY AND
TECHNICAL SERVICES

5510 South Rice Avenue
Houston, TX 77081
(713) 662-5335

**Emissions Test Report for
Compliance Testing at
Station 3110 Wartburg, Tennessee**

INTRODUCTION

The three Solar Saturn turbines at Station 3110 have been uprated from T-1100 units to T-1360 units. The Environmental, Health, Safety and Technology Services Department of Tenneco Energy conducted testing to determine the exhaust emission rates for oxides of nitrogen (NOx). The corrected NOx emissions level fell below the 75 ppm threshold set by the EPA, thereby allowing the data collected during the compliance test will to be used as representative data for the other two Solar Saturn turbines at the station. The test was conducted in basic accordance with approved Environmental Protection Agency (EPA) test methods as described in the Code of Federal Regulations, Title 40, Part 60, Appendix A and Tenneco Energy's test protocol.

TEST SUMMARY

The results of the emissions compliance test performed on November 20, 1996 at East Tennessee Natural Gas compressor station 3110, in Wartburg, Tennessee are summarized below. The two-minute averages, collected during the test, analyzer calibrations, and certification sheets, are included in the appendices of this report.

Table I:

Run #	Completion Time	Ambient Rated Horsepower	Exhaust Oxygen Content	Corrected NOx ppm Level
1	10:30 am	1,215	16.65%	54.9
2	11:58 am	1,209	16.65%	55.5
3	1:25 pm	1,202	16.65%	56.4
Average		1,208.6	16.65%	55.6

Additionally, a fuel gas sample was collected and analyzed for the overall sulfur content of the gas. The sulfur content of the fuel gas was below 0.0001% by weight. The results of the analysis are listed in the appropriate section of the Appendices.

SECTION I

Summary of Test Results

TENNECO ENERGY

EMISSIONS DATA SHEET - TURBINE ROTATING ENGINES

Shaded rows indicate raw data.

PROJECT NUMBER: 3110
COMPANY: East Tennessee Natural Gas
STATION: 3110
UNIT: 3a
ENGINE TYPE: Solar Saturn
DATE: 17-Dec-96

NAME OF PERSONNEL: B. SCHOONOVER
REPORTING TEST: C. NOWAK
FUEL CHARGE (GAL): 0.875 in.
FUEL TUBE (IN): 3.068 in.
AGA (LBS): 1033 bu/dec
AGA (LBS): 933 bu/dec

RUN TIME	1-AVG 10:30 AM	2-AVG 11:58 AM	3-AVG 01:25 PM	AMBIENT BHP	AMBIENT BHP
TURBINE OPERATING CONDITIONS					
HORSEPOWER	1215	1209	1202		
CP SPEED (RPM)	22300	22300	22300		
PT SPEED (RPM)	20550	20550	20550		
TS TEMPERATURE (F)	1051	1052	1054		
AMBIENT TEMP (F)	59.5	52.9	55.7		
BAROMETRIC PRESS (PSI)	28.47	28.43	28.38		
ABS. HUM. (GRAIN/LB)	60	60	60		
% LOAD	91.5	91.5	91.2		
HEAT RATE (BTU/HP-HR)	10586	10574	9967		
EMISSIONS CONCENTRATIONS AND CALCULATED MASS EMISSIONS					
NOx (PPM)	36.58	36.96	40.83		
NOx g/BHP-HR **	1.075	1.085	1.038		
NOx LB/HR **	2.881	2.891	2.753		
CO (PPM)	38.257	33.28	32.18		
CO g/BHP-HR **	0.600	0.550	0.501		
CO LB/HR **	1.607	1.465	1.328		
%O2	16.65	16.66	16.65		
CALCULATED EMISSIONS CONCENTRATIONS					
%CO2(WET) *	2.28	2.28	2.28		
%CO2(DRY) *	2.42	2.42	2.42		
%H2O *	5.81	5.81	5.81		
%O2(WET) *	15.68	15.68	15.68		
CALCULATED FLOWS					
FUEL FLOW (SCFM)	230.40	228.80	214.40		
EX. FLOW (LB/HR) **	38473	38206	35801		
EX. FLOW (WSCFM)	10243	10172	9532		
AIR FLOW (WSCFM)	9731	9684	9056		

** BASED ON FUEL SPECIFIC DRY F-FACTOR CALCULATION
* BASED ON CARBON BALANCE (STOICH. + O2)
- A/F IS TOTAL MASS RATIO