Item Barcode: **50459947**

New Source Permits

AIR RN 077

Air #: 105359665 83070

File Type: Permits

Volume: 001

Date: 1/1/2007 -

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Box Barcode: 577212

TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Protecting Texas by Reducing and Preventing Pollution

November 6, 2007

MR JIM LIND
PRESIDENT
MIDSTREAM ENERGY SERVICES LLC
8801 S YALE AVE STE 350
TULSA OK 74137

Permit by Rule Registration Number:	83070
Location/City/County:	~ 10.5 miles south of Borger on Hwy 207 then west into facility, Borger, Carson County
Project Description/Unit:	Grey Badger Plant
Regulated Entity Number:	RN105359665
Customer Reference Number:	CN603254731
New or Existing Site:	New
Affected Permit (if applicable):	None
Renewal Date (if applicable):	None

Midstream Energy Services LLC has certified sitewide emissions associated with the Grey Badger Plant under Title 30 Texas Administrative Code §§ 106.352, 106.372, 106.373, 106.476, 106.492, and 106.511.

For rule information see www.tceq.state.tx.us/permitting/air/nav/numerical_index.html.

No planned MSS emissions have been represented or reviewed for this registration, and none will be authorized by this PBR.

The company is also reminded that these facilities may be subject to and must comply with other state and federal air quality requirements. This registration is taken under the authority delegated by the Executive Director of the TCEQ. If you have questions, please contact Mr. Dennis Chanmugam at (512) 239-6618.

Sincerely,

Anne M. Inman, P.E., Manager
Rule Registrations Section
Air Permits Division

Represented Sitewide Emissions (tpy):

VOCs	21.50
SO_2	0.06
CO	43.68
NO_x	8.77
PM	0.64

cc: Air Section Manager, Region 1 - Amarillo
Mr. Ron Sober, P.E., RFS Consulting, PO Box 470947, Tulsa, OK 74147

Project Number: 133285

TECHNICAL REVIEW: AIR PERMIT BY RULE

Permit No.:	83070	*Company Name:*	Midstream Energy Services LLC	*APD Reviewer:*	Mr. Dennis Chanmugam
Project No.:	133285	*Unit Name:*	Grey Badger Plant	*PBR No(s).:*	106.352, 106.372, 106.373, 106.476, 106.492, & 106.511

GENERAL INFORMATION			
Regulated Entity No.:	RN105359665	**Project Type:**	Permit by Rule Application
Customer Reference No.:	CN603254731	**Date Received by TCEQ:**	September 26, 2007
Account No.:	Unassigned	**Date Received by Reviewer:**	October 11, 2007
City/County:	Borger, Carson County	**Physical Location:**	~ 10.5 miles south of Borger on Hwy 207 then west into facility

CONTACT INFORMATION					
Responsible Official/ Primary Contact Name and Title:	Mr. Jim Lind President	**Phone No.:** **Fax No.:**	(918) 388-6900 (918) 388-6590	**Email:**	jlind@midstreamenergyllc.com
Technical Contact/ Consultant Name and Title:					

GENERAL RULES CHECK	YES	NO	COMMENTS
Is confidential information included in the application?		x	
Are there affected NSR or Title V permits for the project?		x	No permit action pending
Is each PBR > 25/250 tpy?		x	
Are PBR sitewide emissions > 25/250 tpy?		x	
Are there permit limits on using PBRs at the site?		x	
Is PSD or Nonattainment netting required?		x	Not triggered by site's emission
Do NSPS, NESHAP, or MACT standards apply to this registration?		x	None applies
Does NOx Cap and Trade apply to this registration?		x	Not sited in the HGA
Is the facility in compliance with all other applicable rules and regulations?	x		

DESCRIBE OVERALL PROCESS AT THE SITE

Midstream Energy Services LLC (Midstream) is certifying the emissions from the operations of the Grey Badger Plant (site), an oil and gas production site which will handle gas streams (having trace amounts - 10 ppm or less - of hydrogen sulfide) from raw natural gas received from neighboring wells. The site processes will remove the hydrogen sulfide (H_2S), carbon dioxide (CO_2), oxygen (O_2) and water (H_2O) and produce sales-quality gas while recovering other products such as natural gas liquids (NGL) and helium as well. Processes at the site include various phases of separation and chilling of natural gas and natural gas liquids (NGLs). By-products from the various processes may be routed to a vapor recovery unit (VRU), or, to an emergency flare, or, trucked off-site for disposal, or, vented to the atmosphere. Final products are sent off-site to the market via pipeline. The processes are detailed below:

An inlet separator will remove free water and liquid condensate from the gas stream. Separated liquids will be piped to storage tanks equipped with a vapor recovery unit (VRU). The VRU will also route back into the system, vapors from the truck loading operations. Separated gas will be routed to "Sulfa Treat Towers" where the trace amounts of H_2S will be removed by reacting with the iron-based pellets in the unit. The sweetened gas is then passed through an electric-driven inlet compressor for boosting gas pressure to 1,000 psig. The high-pressure gas passes through a de-oxygenation unit (DeOx) where O_2 is consumed, producing CO_2 and H_2O. The DeOx system is equipped with a direct-fired auxiliary heater which heats the gas stream to assure proper reactor temperature.

From the DeOx, the gas is passed through a hydrocarbon dew point control unit (HCDPT) to begin the removal of NGLs. The unit is designed to chill the gas down to 50^0F and contains a propane refrigeration system and ethylene glycol (EG) hydrate inhibition/dehydration unit. The NGLs are then sent to a de-methanizing tower where methane and lighter compounds are removed and thus, making the NGLs re-salable. The final NGL product is pumped off-site via a pipeline to the market. Heat for the de-methanizing tower is supplied with heat from a hot-oil system which is generated by a direct-fired heater. Part of the hot oil stream is used to regenerate the EG in the EG unit's regenerator whose still column vents minute amounts of VOCs to the atmosphere.

After the HCDPT, the remaining natural gas is routed to the contactor of an amine unit which removes (i.e. vents) all of the CO_2 to the atmosphere. Heat for the amine unit is supplied by a direct-fired steam generator.

From the amine unit, the water-saturated natural gas is subjected to treatment in a molecular sieve dehydration unit (MSDU) which is heated by a direct-fired heater to raise the temperature to 500^0F for bed regeneration. This system is connected to the VRU which captures any flash gases: the produced water is trucked off-site for disposal.

After treatment at the MSDU, the dry natural gas is subjected to treatment in a cryogenic expander where most of the ethane and the all of the heavier hydrocarbons (NGLs) are separated from the methane (C_1), nitrogen (N_2), and helium (He). The chilling in this unit is aided by a propane refrigeration system. The separated and de-methanized NGLs are combined with the NGLs recovered from the HCDPT unit and pumped into the sales pipeline.

After the treatment described above, the three remaining gases, C_1, N_2, & He, (and trace ethane) enter N_2 - rejection unit for where C_1 and the trace ethane are liquefied, leaving just the N_2 and He in the gas phase. The liquid C_1/ethane are vaporized to be piped off-site as a residual sales product. Vapors from the N_2/He-mix are recovered, compressed and stored in pressurized tanks and sent to sales outlets via trucks.

Flash vapors in the amine flash tank and EG flash tank are directed to the VRU system and returned to the suction of the plant's inlet compression. Two natural gas-fired emergency generators will be on standby for emergency use in case of power outage at the site. An emergency flare receives emissions from plant relief valves and from blowdowns. All compression units, apart from the emergency generators, are electric-driven.

The site's emission sources and their respective emissions are reflected in the "ESTIMATED EMISSIONS" table below.

DESCRIBE PROJECT AND INVOLVED PROCESS

Midstream is certifying the emission sources and their respective emissions under PBR 106.4 and the other PBRs note above.

TECHNICAL REVIEW: AIR PERMIT BY RULE

Permit No.:	83070	*Company Name:*	Midstream Energy Services LLC	*APD Reviewer:*	Mr. Dennis Chanmugam
Project No.:	133285	*Unit Name:*	Grey Badger Plant	*PBR No(s).:*	106.352, 106.372, 106.373, 106.476, 106.492, & 106.511

TECHNICAL SUMMARY - DESCRIBE HOW THE PROJECT MEETS THE RULES

Form PI-7-CERT, a detailed process description, PTE calculations (using the appropriate AP-42 emission factors, AMINECalc V1.0, GR-GLYCalc V 4.0), the relevant checklists, & Table 29, were include in the certification packet.

106.4:

* Site emissions (tpy) will not exceed the following: **SO_2** - 0.06; **PM_{10}** - 0.64; **VOC** - 21.10; **NO_x** - 8.8; **CO** - 43.7
* The site will comply with all the other remaining applicable conditions of the PBR.

106.352 - Oil and gas Production Facilities:

* The site is an oil and gas production facility whose emissions < limits of this PBR:
* No sour gas handled at the site:
* The emergency flare at the site is addressed in 106.492 below. [**Note:** The compressors in constant use will be electrically run. Also, two emergency generators (237-hp Generac SG150 and 454-hp Generac SG300) are claimed under PBR 106.511 (addressed below)].
* Total emissions of sulfur compounds, excluding sulfur oxides, are less than 4.0 lbs/hr

106.372 - Industrial Gases:

* Air separation and industrial gas production will include only oxygen, nitrogen and helium.

106.373 - Refrigeration Systems:

* The refrigerant used will be propane, and satisfies 106.373(1).

106.476 - Pressurized Tanks or Tanks Vented to Control:

* Pressurized tanks equipped with a VRU will be used at the site for storage purposes. Relief valves from the tanks will direct all vapors to the emergency flare (addressed in 106.492 below).

106.492 - Flares:

* The flare is equipped with a tip designed to provide good mixing with air, flame stability and a tip velocity less than 60 ft/sec for gases having a lower heating value less than 1,000 BTU/ft^3, or less than 400 ft/sec for gases with an LHV greater than 1,000 BTU/ft^3. Flare Stack Exit Velocity calculations were submitted.
* The flare is equipped with a continuously burning pilot.
* The flare does not emit more than 4 lbs/hr of reduced sulfur compounds.
* The flare does not burn gases containing more than 24 ppmv sulfur, chlorine, or their compounds.
* The flare does not emit more than HCl.
* The flare does not emit SO2.
* The flare will be limited to burning only combustible mixtures of gases containing carbon, hydrogen, nitrogen, oxygen, sulfur, chlorine or their derived compounds.
* The gas mixture will always have net or lower heating value of at least 200 BTU/ft^3 prior to the addition of air.
* Liquids will never be burned in the flare.

106.511 - Portable & Emergency Engines and Turbines:

* Although not required, the company included Table 29 in the application packet for each of the emergency/standby generators, the 237-hp Generac SG150 and the 454-hp Generac SG300.
* The generators will not be used for more than 876 hours per year.
* The generators will only be used in case of an emergency such as a power outage at the site.

Note:

(1) No planned MSS emissions have been represented or reviewed for this registration and none will be authorized by this PBR.

(2) PTE from emergency generators [**EPNs: G-1 & G-2**] are included in site's PTE.

COMMUNICATION LOG

Date	Time	Name/Company	Subject of Communication
10/17/07	1040 hrs	Mr. Ron Sober, Consultant, RFS Consulting	Mr. Sober touched base with reviewer. Reviewer replied that the initial review looked good.
10/30/07	1150 hrs		Mr. Sober called for update on project. Reviewer replied good chance project completed next week.
11/05/07	1050 hrs		Reviewer left voice-mail: (1) RFS address since none of the docs submitted had this? (2) Reviewer completed, but needed to go to two more staff for their reviews and if any questions, reviewer would get back with Mr. Sober.
	1330 hrs	Mr. John Gott, P.E.	Mr. Gott concerned that Amine Unit recorded zero emissions. After reviewing the process and consulting with Ms. Anne Inman, P.E., RR Sec Mgr, both satisfied with this since emissions certified.
11/06/07	1215 hrs	Mr. Howard Uhal, Work Leader, RR Section	Per instructions from Mr. Uhal, reviewer added note on how fugitive emissions calculated.

TECHNICAL REVIEW: AIR PERMIT BY RULE

Permit No.:	83070	*Company Name:*	Midstream Energy Services LLC	*APD Reviewer:*	Mr. Dennis Chanmugam
Project No.:	133285	*Unit Name:*	Grey Badger Plant	*PBR No(s).:*	106.352, 106.372, 106.373, 106.476, 106.492, & 106.511

ESTIMATED EMISSIONS

EPN	Emission Source	NOx		CO		VOC		SO_2		All PM		Other	
		lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy	lbs/hr	tpy
G-1	237-hp Generac SG150 (emergency generator)	3.24	0.810	31.35	7.84	0.94	0.24	< 0.01	0.0003	0	0	0	0
G-2	454-hp Generac SG300 (emergency generator)	2.12	0.53	118.40	29.60	2.90	0.73	< 0.01	0.0006	0	0	0	0
H-1	Amine Regenerator	0.29	1.27	0.24	1.07	0.02	0.07	< 0.01	0.008	0.02	0.10	0	0
H-2	DeOx Heater	0.48	2.10	0.40	1.77	0.03	0.12	< 0.01	0.013	0.037	0.160	0	0
H-3	Mole Sieve Dehydration Heater	0.40	1.752	0.34	1.47	0.02	0.10	< 0.01	0.011	0.34	0.151	0	0
H-4	Hot Oil Heater	0.20	0.86	0.16	0.72	0.01	0.05	< 0.01	0.005	0.019	0.0823	0	0
H-5	Inlet Heater	0.30	1.33	0.26	1.12	0.02	0.09	0.01	0.021	0.032	0.139	0	0
D-1	EG Dehy Unit Still Vent and Flash Tank	0	0	0	0	0.34	1.50	0	0	0	0	0	0
V-1	Acid Gas Vent	0	0	0	0	0.24	1.05	0	0	0	0	0	0
FP-1	Emergency Flare Pilot	0.03	0.114	0.02	0.10	0.001	0.006	< 0.01	0.0007	< 0.01	0.01	0	0
LD-1	Truck Loading (with VRU)	0	0	0	0	0.14	0.63	0	0	0	0	0	0
FUG	Fugitives	0	0	0	0	3.87	16.94	0	0	0	0	0	0
	TOTAL EMISSIONS (TPY):		**8.77**		**43.68**		**21.50**		**0.06**		**0.64**		**0**
	MAXIMUM OPERATING SCHEDULE:	**Hours/Year** - 876 for the emergency generators / 8,760 for the rest											

Note: Although the equipment noted below are part of the various processes at the site, for the reasons given against each, are not included in the table above:
(i) Condensate Tanks (**TK-1, 2, 3 & 4**) are equipped with VRU: thus, zero emissions.
(ii) Amine systems are re-routed to fuel (**A-1 & A-FT**): thus, zero emissions.
(iii) Nitrogen Vent (**V-1**): nitrogen not a pollutant.
(iv) Compressors, **C-1, 2, 3, 4, & 5**, are electric-run: no pollutants.
(v) Fugitive calculations derived from emission factors per EPA-453/R-98-017 - "Protocol for Equipment Leak Emission Estimates" - applied to total of 2,345 components.

SITE REVIEW / DISTANCE LIMIT	Yes	No	Description/Outcome	Date	Reviewed by
Site Review Required?		x	NA for these types of PBRs	November 5, 2007	Dennis Chanmugam
PBR Distance Limits Met?	na		This is a sweet site: Receptor > 1,000 ft		

	TECHNICAL REVIEWER	PEER REVIEWER	FINAL REVIEWER
SIGNATURE:			
PRINTED NAME:	Mr. Dennis Chanmugam	Mr. John C. Gott, P.E.	Mr. Howard Uhal
DATE:	November 5, 2007	November 5, 2007	11/06/2007

BASIS OF PROJECT POINTS		POINTS
Base Points:	* 106.492	1.5
Project Complexity Description and Points:	* 106.352	0.5
	* Four short PBRs @ 0.25 ea.	1.0
	* EPNs (12 - Base 8 = 4 @ 0.25 ea)	1.0
Technical Reviewer Project Points Assessment:		4.0
Final Reviewer Project Points Confirmation:		4.0

11/06/2007 ---------- NSR PERMITS IMS- PROJECT RECORD ----------

PROJECT#: 133285 | PERMIT#: **83070** | STATUS: **P** | DISP CODE: C

RECEIVED: **09/26/2007** | PROJTYPE: **XRVW** | RENEWAL:

FEE DATE: | FEE AMT: $ 100 | PROJ-ISSUE DATE: 11/6/07

STDX,PBR#,STDP: 0352,0511,0492,0372,0373,0476 | CHECK NUMBER: 3852

PROJECT NAME: GREY BADGER PLANT

4.0
John G

GROUP: PAR

PAR1_2 : HICKMAN, SHARON

GROUP: ART

TECHENGR : CHANMUGAM, DENNIS

ADMIN REVIEW

A - PAR RECEIVED :	10/08/2007	A - CN/RN REQ FROM CENTRAL REG :	10/09/2007	A - PAR TRANSFER TO APD :	10/10/2007
A - CN/RN REC FROM CENTRAL REG :	10/10/2007				

ISSUED TO: MIDSTREAM ENERGY SERVICES LLC

COMPANY NAME: MIDSTREAM ENERGY SERVICES LLC

CUSTOMER REGISTRY ID: **CN603254731**

PRIMARY CONTACT INFORMATION

CONTACT TYPE: RESPONSIBLE OFFICIAL

NAME: MR JIM LIND | TITLE: PRESIDENT

EMPLOYER NAME: MIDSTREAM ENERGY SERVICES LLC

PHONE: 918-388-6900 ext 226 | FAX: 918-388-6590 ext

STREET: 8801 S YALE AVE STE 350 | CITY/STATE,ZIP: TULSA, OK , 74137-

PROJECT INFORMATION

UNIT: GREY BADGER PLANT

SIC: 1321 | REGION: 1 | ACCOUNT: | REG ENTITY ID: **RN105359665**

SITE NAME: GREY BADGER PLANT

COUNTY: CARSON | CAPUNITS: | UNITTYPE:

CAPACITY: | CITY: BORGER

LOCATION: ~ 10.5 MILES SOUTH OF BORGER ON HIGHWAY 207 TURN WEST INTO FACILITY

PUBLIC NOTICE

PUBLIC NOTICE REQUIRED?: | PN1 ALT LANGUAGE: NO | PN2 ALT LANGUAGE: NO

EMISSION RATES

TONS/YR REDUCTION	NOX	CO	VOC	PM	SO2	OTHER	TOTAL

PROJECT NOTES

ADMINISTRATIVE: APPLICATION RECVD FROM REVENUE SECTION CAUSING DELAY IN PROCESSING

TECHNICAL ACTIVITY HISTORY

TR - ENGINEER RECEIVE PROJECT :	10/11/2007	TR - INITIAL REVIEW COMPLETE :	10/12/2007
TR - PEER REVIEW :	11/05/2007	11/05/2007	
TR - PROJECT TO ADMIN :	11/06/2007	TR - FINAL PKG TO TEAM LEADER :	11/06/2007

PROJECT ATTRIBUTES

PROJECT LINK

PROJECTS/PERMITS VOIDANCE

10/10/2007 ---------- NSR PERMITS IMS- PROJECT RECORD ----------

PROJECT#: 133285 PERMIT#: **83070** STATUS: **P** DISP CODE: _____

RECEIVED **09/26/2007** PROJTYPE: **XRVW** RENEWAL:

FEE DATE: FEE AMT: $ 100 PROJ-ISSUE DATE: _____

STDX,PBR#,STDP: 0352,0511,0492,0372,0373,0476 CHECK NUMBER: 3852

PROJECT NAME: GREY BADGER PLANT

GROUP: PAR

PAR1_2 : HICKMAN, SHARON

GROUP: ART

TECHENGR : CHANMUGAM, DENNIS

ADMIN REVIEW

A - PAR RECEIVED :	10/08/2007	A - CN/RN REQ FROM CENTRAL REG :	10/09/2007	A - PAR TRANSFER TO APD :	10/10/2007
A - CN/RN REC FROM CENTRAL REG :	10/10/2007				

ISSUED TO: MIDSTREAM ENERGY SERVICES LLC

COMPANY NAME: MIDSTREAM ENERGY SERVICES LLC

CUSTOMER REGISTRY ID: **CN603254731**

PRIMARY CONTACT INFORMATION

CONTACT TYPE: RESPONSIBLE OFFICIAL

NAME: MR JIM LIND TITLE: PRESIDENT

EMPLOYER NAME: MIDSTREAM ENERGY SERVICES LLC

PHONE: 918-388-6900 ext 226 FAX: 918-388-6590 ext

STREET: 8801 S YALE AVE STE 350 CITY/STATE,ZIP: TULSA, OK , 74137-

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PROJECT INFORMATION

UNIT: GREY BADGER PLANT

SIC: 1321 REGION: 1 ACCOUNT: REG ENTITY ID: **RN105359665**

SITE NAME: GREY BADGER PLANT

COUNTY: CARSON CAPUNITS: UNITTYPE:

CAPACITY: CITY: BORGER

LOCATION: ~ 10.5 MILES SOUTH OF BORGER ON HIGHWAY 207 TURN WEST INTO FACILITY

PUBLIC NOTICE

PUBLIC NOTICE REQUIRED?: PN1 ALT LANGUAGE: NO PN2 ALT LANGUAGE: NO

EMISSION RATES

TONS/YR REDUCTION	NOX	CO	VOC	PM	SO2	OTHER	TOTAL

PROJECT NOTES

ADMINISTRATIVE: APPLICATION RECVD FROM REVENUE SECTION CAUSING DELAY IN PROCESSING

TECHNICAL ACTIVITY HISTORY

TR - ENGINEER RECEIVE PROJECT : 10-11

TR - PROJECT TO ADMIN :

TR - FINAL PKG TO TEAM LEADER :

TR - DEFICIENCY CYCLE : 1

TR - INITIAL REVIEW COMPLETE :

TR - PEER REVIEW :

- Due Date — proj. Rec'd 10/11/2007. 15 d/s
  ∴ 9/26 - 10/11 =
  - 9/26 – 9/30 → 5 d/s
  - 10/1 — 10/22 → 22 d/s
  - 27 d/s
- New, minor
  - IR - 10/12/07 Mon.
  - 1 PL – 500'
  - 1 R – 1,000'
  - Attainment
    10/17 @ 10:40 am / MR. RON SOBER → called for status.
    RFS Consulting (918) 6639850 ext: 302
- 10/30 @ 11:50 am → Ron Sober called for update. I send next day or two
- 11/5 @ 10:30 am – left v.m for RS.

PROJECT ATTRIBUTES

PROJECT LINK

PROJECTS/PERMITS VOIDANCE

Sharon Hickman - Midstream Energy Services LLC

From: Elizabeth Granja
To: Sharon Hickman
Date: 10/10/2007 10:50 AM
Subject: Midstream Energy Services LLC

Sharon,

Your request has been completed. If you have any questions let me know.

CN603254731 - Midstream Energy Service LLC
RN105359665 - Grey Badger Plant

Thank you,
Elizabeth Granja
Central Registry Team
CR/PAT Section
512-239-6393

TRANSMISSION VERIFICATION REPORT

TIME : 10/09/2007 09:18
NAME : AIR PERMINTS
FAX : 5122390739
TEL : 5122390731
SER.# : 000A7J360109

DATE,TIME	10/09 09:17
FAX NO./NAME	5181
DURATION	00:00:46
PAGE(S)	03
RESULT	OK
MODE	STANDARD ECM

FAX TRANSMITTAL

DATE: October 9, 2007 NUMBER OF PAGES (*including this cover sheet*): 3

TO:
Name: Central Registry
Organization: ***Attention: Central Registry***
FAX Number: **(512) 239-5181**

FROM: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY
Name: Sharon Hickman
Division/Region: Air Permits Initial Review Team, Air Permits Division
Telephone Number: (512) 239-1544
Fax Number: **(512) 239-4500**

Protecting Texas by Reducing and Preventing Pollution

X 1st Request

2nd Request

Check Box	
New Cust.	✓
New Reg Ent	✓

Check Box	
Update Customer	
Update Regulated Entity	
Update All CN Info	
Update All RN Info	
New Reg/Permit #	✓

New Affiliation	
End Date Current Customer: Y or N	**End Date:**

Portable	

ADIRT has record original

Attached is a CORE Data form or print out of CR Data. Please update Central

TCEQ

Protecting Texas by Reducing and Preventing Pollution

FAX TRANSMITTAL

DATE: October 9, 2007 NUMBER OF PAGES (*including this cover sheet*): 3

TO:

Name	Central Registry
Organization	***Attention: Central Registry***
FAX Number	**(512) 239-5181**

FROM: TEXAS COMMISSION ON ENVIRONMENTAL QUALITY

Name	Sharon Hickman
Division/Region	Air Permits Initial Review Team, Air Permits Division
Telephone Number	(512) 239-1544
Fax Number	**(512) 239-4500**

__X__ 1st Request

___ 2nd Request

	Check Box
New Cust.	✓
New Reg Ent	✓

	Check Box
Update Customer	
Update Regulated Entity	
Update All CN Info	
Update All RN Info	
New Reg/Permit #	✓

New Affiliation	
End Date Current Customer: Y or N	**End Date:**

Portable	

ADIRT was recd original

Attached is a CORE Data form or print out of CR Data. Please update Central Registry with the information on the form provided.

Company Name:	**Midstream Energy Services LLC** **☐ Assumed Name: different than SOS Legal Name. Legal Name for TCEQ.** **☐ Legal Name: Research shows name on CDF is**
Customer Number:	
Regulated Entity No.	
Account Number:	
IMS Project Number:	**133285**
Registration or Permit: (Please underline one)	**83070 - registration**

Please call if you should have any questions. Thank you. **(10/18/06)**

MIDSTREAM ENERGY SERVICES, LLC
OPERATING ACCOUNT
TULSA, OKLAHOMA 74137

VENDOR: TE0006

CHECK DATE: 09/25/07

003852

INVOICE NUMBER	INVOICE DATE		DISCOUNT TAKEN	AMOUNT PAID
92507	09/25/07	12343	$0.00	$100.00
		Total:	$0.00	$100.00

APIKT
OCT 08 2007

PAY TO THE ORDER OF STATE COMPTR. TCEQ

Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

TCEQ 802663 SP 265

I. REGISTRANT INFORMATION			
A. TCEQ Customer Reference Number:	CN- TBD	TCEQ Regulated Entity Number:	RN- TBD
Note: If "NO," CN or RN number was entered above; please fill out the required Core Data Form, which will be available in Step II of the submittal process.			
B. Company or Other Legal Customer Name: Midstream Energy Services, L.L.C.			
Company Official Contact Name: Jim Lind		Title: President	
Mailing Address: 8801 S. Yale, Suite 350			
City: Tulsa		State: OK	Zip Code: 74137
Phone No.: 918-388-6900 ext. 226	Fax No.: 918-388-6590	E-mail Address: jlind@midstreamenergyllc.com	
C. Technical Contact Name: Jim Lind			
Company: Midstream Energy Services, L.L.C.			
Mailing Address: 8801 S. Yale, Suite 350			
City: Tulsa		State: OK	Zip Code: 74137
Phone No. : 918-388-6900 ext. 226	Fax No.: 918-388-6590	E-mail Address: jlind@midstreamenergyllc.com	
D. Facility Location Information - Street Address:			
If "NO," street address, provide written driving directions to the site: (attach description if additional space is needed)			
Approximately 10.5miles south of Borger, TX on HWY 207. Turn west into facility.			
City: Borger	County: Carson		Zip Code: 79007

II. FACILITY AND SITE INFORMATION			
A. Name and Type of Facility: Grey Badger Plant			☒ Permanent ☐ Portable
B. PBR claimed under **30 TAC § 106** *(List all)*:			
§ 106.4 Requirements for PBR	§ 106.372 Industrial Gases		
§ 106.352 Oil and Gas Production	§ 106.373 Refrigeration Systems		
§ 106.511 Emergency Generators	§ 106.476 Tanks Vented to Controls		
§ 106.492 Flares			
Are you claiming a **historical standard exemption or PBR**?			☐ YES ☒ NO
If "YES," enter effective date and Rule Number:			
C. Is there a previous Standard Exemption or PBR for the facility in this registration? (Attach details regarding changes)			☐ YES ☒ NO
If "YES," enter Registration Number and Rule Number:			
D. Are there any **other facilities** at this **site** which are **authorized by an Air Standard Exemption or PBR**?			☐ YES ☒ NO
If "YES," enter Registration Number and Rule Number:			
E. Are there any **other air preconstruction permits** at this site?			☒ YES ☐ NO
If "YES," enter Permit Numbers:	O-00667 (nearby facility)		
F. Is this site required to obtain an **air federal operating permit**?			☒ YES ☐ NO
If "YES," enter Permit Number:	O-00667 (nearby facility)		
G. TCEQ Account Identification Number (*if known*):			

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Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

III. FEE INFORMATION

To determine if a fee is required answer the following question. If "YES," to question III. A., a fee is not required, skip to Section IV. If "NO," to answer II. A., then go to Section III. B. See Section VI. for address to send fee or go to www.2.tceq.state.tx.us/epay to pay online.

A. Is this registration an update to a previously registered facility and accompanied by a Certification Form solely to establish a federally enforceable emission limit?			☐ YES ☒ NO
B. What is the fee amount? *If "YES," to any of the following three questions, a **$100** fee is require. Otherwise, a **$450** fee is required.*			
Does this business have less than 100 employees?			☒ YES ☐ NO
Does this business have less than 6 million dollars in annual gross receipts?			☒ YES ☐ NO
Is this registration submitted by a governmental entity with a population of less than 10,000?			☐ YES ☒ NO
C. Check/Money Order or Transaction Number *(Payable to TCEQ)*:	Check	*Was fee **Paid** online?*	☐ YES ☒ NO
Company name of check: Midstream Energy Services, L.L.C.		Fee amount:	$ 100.00

IV. SELECTED FACILITY REVIEWS ONLY—TECHNICAL INFORMATION

Note: If claiming one of the following PBRs, complete this section, then skip to Section VI., "Submitting your registration" below:

Animal Feeding Operations § 106.161 ***Livestock Auction Facilities § 106.162*** ***Saw Mills § 106.223***

Grain Handling, Storage and Drying § 106.283 ***Auto Body Refinishing Facilities §106.436*** ***Air Curtain Incinerator § 106.496***

A. Is the applicable PBR checklist attached which shows the facility meets all general and specific requirements of the PBR(s) being claimed? *(If submitting electronically, click "YES".)*		☐ YES ☐ NO
B. Distance from this facility's emission release point to the nearest property line:		feet
Distance from this facility's emission release point to the nearest off-property structure:		feet

V. TECHNICAL INFORMATION INCLUDING STATE AND FEDERAL REGULATORY REQUIREMENTS

Registrants must be in compliance with all applicable state and federal regulations and standards to claim a PBR.

A. Is Confidential information submitted and properly marked "CONFIDENTIAL" with this registration?		☐ YES ☒ NO
B. Is a process flow diagram or a process description attached?		☒ YES ☐ NO
C. Are emissions data and calculations for this claim attached?		☒ YES ☐ NO
D. Is information attached showing how the **general** requirements (**30 TAC § 106.4**) of the PBR is met for this Registration? (**PBR checklists** may be used, but are optional)		☒ YES ☐ NO

*Note: Please be reminded that if the facilities listed in this registration are subject to the Mass Emissions Cap & Trade program under **30 TAC Chapter 101, Subchapter H, Division 3**, the owner/operator of these facilities must possess NO_x allowances equivalent to the actual NO_x emissions from these facilities.*

E. Is information attached showing how the **specific PBR** requirements are met for this registration? (***PBR checklist** may be used, but are optional*)		☒ YES ☐ NO
F. Distance from this facility's emission release point to the nearest property line:	500	feet
Distance from this facility's emission release point to the nearest off-property structure:	1,000	feet

Note: In limited cases, a map or drawing of the site and surrounding land use may be requested during the technical review or at the request of the TCEQ Regional Office or local air pollution control program during an investigation.

APIRT
OCT 08 2007

Texas Commission on Environmental Quality
Form PI-7-CERT
Certification and Registration for Permits by Rule

VI. SIGNATURE FOR CERTIFICATION AND REGISTRATION

The signature below indicates that the Responsible Official has knowledge of the facts herein set forth and that the same are true, accurate, and complete to the best of my knowledge and belief. By this signature, the maximum emission rates listed on this certification reflect the maximum anticipated emissions due to the operation of this facility and all representations in this certification of emissions are conditions upon which the facilities and sources will operate. It is understood that it is unlawful to vary from these representations unless the certification is first revised. The signature certifies that to the best of the Responsible Official's knowledge and belief, the project will satisfy the conditions and limitations of the indicated exemption or permit by rule and the facility will operated in compliance with all regulations of the Texas Commission on Environmental Quality and with Federal U.S. Environmental Protection Agency regulations governing air pollution. The signature below certifies that, based on information and belief formed after reasonable inquiry, the statements and information above and contained in the attached document(s) are true, accurate, and complete. **If you questions on how to fill out this form or about air quality permits. Please call 512/239-1250.** *Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, call 512/239-3282.*

SIGNATURE: _____ ***(ORIGINAL SIGNATURE REQUIRED)***	DATE:

VII. SUBMITTING COPIES OF THE CERTIFICATION AND REGISTRATION

Copies must be sent as listed below:
Processing delays may occur if copies are not sent as noted.

Who	*Where*	*What*
Air Permits Initial Review Team (APIRT)	Regular, Certified, Priority Mail MC161, P.O. Box 13087 Austin, Texas 78711-3087 Hand Delivery, Overnight Mail MC 161, 12100 Park 35 Circle, Building C, Third Floor Austin, Texas 78753 Fax No.: (512) 239-2123 *(do not follow fax with paper copies)*	Originals Form PI-7, Core Data Form. and all attachments
Revenue Section, TCEQ	Regular, Certified, Priority Mail MC 214, P.O. Box 13088 Austin, Texas 78711-3088 Hand Delivery, Overnight Mail MC 214, 12100 Park 35 Circle, Building A, Third Floor Austin, Texas 78753	Original Money Order or Check Copy of Form PI-7 and Core Data Form
Appropriate TCEQ Regional Office	To find your Regional Office address, go to the TCEQ Web site at www.tceq.state.tx.us, or call (512) 239-1250.	Copy of Form PI-7, Core Data Form, and all attachments.
Appropriate Local Air Pollution Control Program(s)	To Find your local or Regional Air Pollution Control Programs go to the TCEQ, APD Website at www.tceq.state.tx.us/nav/permits/air_permits.html or call (512) 239-1250	Copy of Form PI-7, Core Data Form, and all attachments.

APIRT
OCT 08 2007

TCEQ Core Data Form

TCEQ Use Only

If you have questions on how to fill out this form or about our Central Registry, please contact us at 512-239-5175.

Individuals are entitled to request and review their personal information that the agency gathers on its forms. They may also have any errors in their information corrected. To review such information, contact us at 512-239-3282.

SECTION I: General Information

1. Reason for Submission *Example: new wastewater permit; IHW registration; change in customer information; etc.*

Registration of new gas plant

2. Attachments				**Describe Any Attachments:** *(ex: Title V Application, Waste Transporter Application, etc.)*
X	**YES**		**NO**	**PI-7CERT, PBR checklists, support information**

3. Customer Reference Number-*if issued*				**4. Regulated Entity Reference Number-*if issued***		
CN	**TBD**	*(9 digits)*		**RN**	**TBD**	*(9 digits)*

SECTION II: Customer Information

5. Customer Role *(Proposed or Actual)* – As It Relates to the Regulated Entity Listed on This Form

Proposed gas plant and pipeline, construction and operation

Please check one of the following:		Owner		Operator	**X**	Owner and Operator
	Occupational Licensee		Volunteer Cleanup Applicant			Other

TCEQ Use Only	**Superfund**		**PST**		**Respondent**

6. General Customer Information

X	New Customer		Change to Customer Information
	Change in Regulated Entity Ownership		No Change *

***If "No Change" and Section I is complete, skip to Section III - Regulated Entity Information.**

7. Type of Customer:		Individual		Sole Proprietorship - D.B.A.
	Partnership		Corporation		Federal Government
	State Government		County Government		City Government
	Other Government		Other: **L.L.C.**		

8. Customer Name *(If an individual, please print last name first)*	*If new name, enter previous name:*
Midstream Energy Services, L.L.C.	

9. Mailing Address:	**8801 S. Yale, Suite 350**			
	City	State	ZIP36	ZIP + 4
	Tulsa	**OK**	**74137**	

10. Country Mailing Information *if outside USA*	**11. E-Mail Address *if applicable***
	jlind@midstreamenergyllc.com

12. Telephone Number	**13. Extension or Code**	**14. Fax Number *if applicable***
918-388-6900	**226**	**918-388-6950**

15. Federal Tax ID *(9 digits)*	**16. State Franchise Tax ID Number** *if applicable*	**17. DUNS Number** *if applicable* *(9 digits)*
201645330	**NA**	**177906927**

18. Number of Employees										**19. Independently Owned and Operated?**			
	0-20	**X**	**21-100**		**101-250**		**251-500**		**501 and higher**		**Yes**		**No**

SECTION III: Regulated Entity Information

20. General Regulated Entity Information

X	New Regulated Entity		Change to Regulated Entity Information		No Change*

*If "No Change" and Section I is complete, skip to Section IV - Preparer Information.

21. Regulated Entity Name *(If an individual, please print last name first)*				
Grey Badger Plant				
22. Street Address (No PO Boxes)	**Approximately 10.5miles south of Borger, TX on HWY 207. Turn west into facility.**			
	City	State	ZIP	ZIP + 4
	Borger	TX	79007	
23. Mailing Address	**8801 S. Yale, Suite 350**			
	City	State	ZIP	ZIP + 4
	Tulsa	OK	**74137**	
24. E-Mail Address:	**jlind@midstreamenergyllc.com**			

25. Telephone Number	26. Extension or Code	27. Fax Number *if applicable*

28. Primary SIC Code (4 digits)	29. Secondary SIC Code (4 digits)	30. Primary NAICS Code (5 or 6 digits)	31. Secondary NAICS Code (5 or 6 digits)
1321	9908	211112	

32. What is the Primary Business of this entity? (Please do not repeat the SIC or NAICS description)

Natural gas gathering and processing

Questions 33 - 37 address geographic location. Please refer to the instructions for applicability.

33. County	Carson

34. Description of Physical Location

Approximately 10.5miles south of Borger, TX on HWY 207. Turn west into facility.

35. Nearest City	State	Nearest Zip
Borger	TX	79007

36. Latitude (N)			*37. Longitude (W)*		
Degrees	*Minutes*	*Seconds*	*Degrees*	*Minutes*	*Seconds*
35	30	56.02	101	24	36.97

38. TCEQ Programs In Which This Regulated Entity Participates *Not all programs have been listed. Please add to this list as needed. If you don't know or are unsure, please mark "Unknown".* If you know a permit or registration # for this entity, please write it below the program."

	Animal Feeding Operation		Petroleum Storage Tank		Water Rights
	Title V - Air		Wastewater Permit		
	Industrial & Hazardous Waste		Water Districts		
	Municipal Solid Waste		Water Utilities		Unknown
	New Source Review - Air		Licensing - TYPE(s)		
		X	Permit By Rule, Registration		

Section IV: Preparer Information

39. Name	40. Title
James E. Lind	President

41. Telephone Number	42. Extension or Code	43. Fax Number *if applicable*
918-388-9826		918-388-6950

44. E-mail Address:	jlind@midstreamenergyllc.com

Texas Commission on Environmental Quality
Permit by Rule Applicability Checklist
Title 30 Texas Administrative Code § 106.4

The following checklist was developed by the Texas Commission on Environmental Quality (TCEQ), **Air Permits Division**, to assist applicants in determining whether or not a facility meets all of the applicable requirements. Before claiming a specific Permit by Rule (PBR), a facility must first meet all of the requirements of **Title 30 Texas Administrative Code § 106.4** (30 TAC § 106.4), "Requirements for Permitting by Rule." Only then can the applicant proceed with addressing requirements of the specific Permit by Rule being claimed.

The use of this checklist is not mandatory; however, it is the responsibility of each applicant to show how a facility being claimed under a PBR meets the general requirements of 30 TAC § 106.4 and also the specific requirements of the PBR being claimed. If all PBR requirements cannot be met, a facility will not be allowed to operate under the PBR and an application for a construction permit may be required under 30 TAC § 116.110(a).

Registration of a facility under a PBR can be performed by completing **Form PI-7** (Registration for Permits by Rule) or **Form PI-7-CERT** (Certification and Registration for Permits by Rule). The appropriate checklist should accompany the registration form. Check the most appropriate answer and include any additional information in the spaces provided. If additional space is needed, please include an extra page and reference the question number. The PBR forms, tables, checklists and guidance documents are available from the TCEQ, Air Permits Division Web site at: **www.tceq.state.tx.us/permitting/air/nav/air_pbr.html**.

1. 30 TAC § 106.4(a)(1) & (4): Emission limits	
List emissions in tpy for **each** facility (add additional pages or table if needed): SO_2 = _____ PM_{10} = _____ VOC = _____ NO_x = _____ CO = _____ Other _____ = _____ SO_2 = _____ PM_{10} = _____ VOC = _____ NO_x = _____ CO = _____ Other _____ = _____ SO_2 = _____ PM_{10} = _____ VOC = _____ NO_x = _____ CO = _____ Other _____ = _____ **Total** 0.06 0.64 21.1 8.8 43.7 _____ **(See Table 1. Potential to Emit for source specific emissions)**	
• Are the SO_2, PM_{10}, VOC, or other air contaminant emissions claimed for **each** facility in this PBR submittal less than 25 tpy? • Are the NO_x and CO emissions claimed for each facility in this PBR submittal less than 250 tpy? *If the answer to both is "Yes," continue to the question below. If the answer to either question is "No," a **PBR cannot be claimed.***	X YES ☐ NO X YES ☐ NO
Has any facility at the property had public notice and opportunity for comment under 30 TAC Section 116 for a regular permit or permit renewal? (This does not include public notice for voluntary emission reduction permits, grandfathered existing facility permits, or federal operating permits.) *If "Yes," skip to Section 2. If "No," continue to the questions below.*	☐ YES X NO
If the site has had no public notice, please answer the following: • Are the SO_2, PM_{10}, VOC, or other emissions claimed for **all** facilities in this PBR submittal less than 25 tpy? • Are the NO_x and CO emissions claimed for all facilities in this PBR submittal less than 250 tpy? *If the answer to both questions is "Yes," continue to Section 2.* *If the answer to either question is "No," **a PBR cannot be claimed.** A permit will be required under Chapter 116.*	X YES ☐ NO X YES ☐ NO
2. 30 TAC § 106.4(a)(2): Nonattainment check	
Are the facilities to be claimed under this PBR located in a designated ozone nonattainment county? *If "Yes," please indicate which county by checking the appropriate box to the right.* (Marginal) - Hardin, Jefferson, and Orange counties *(BPA)* (Moderate) - Brazoria, Chambers, Fort Bend, Galveston, Harris, Liberty, Montgomery, and Waller counties *(HGA)* (Moderate) - Collin, Dallas, Denton, Ellis, Johnson, Kaufman, Parker, Rockwall, and Tarrant counties *(DFW)* *If "Yes," to any of the above, continue to the next question. If "No," continue to Section 3.*	☐ YES X NO ☐ BPA ☐ HGA ☐ DFW

Does this project trigger a nonattainment review? To determine the answer, review the information below: • Is the project's potential to emit (PTE) for emissions of VOC or NO_x increasing by 100 tpy or more? *PTE is the maximum capacity of a stationary source to emit any air pollutant under its worst-case physical and operational design unless limited by a permit, rule, or made federally enforceable by a certification.* • Is the site an existing major nonattainment site and are the emissions of VOC or NO_x increasing by 40 tpy or more? If needed, attach contemporaneous netting calculations per nonattainment guidance. Additional information can be found at: **www.tceq.state.tx.us/permitting/air/forms/newsourcereview/tables/nsr_table8.html** and **www.tceq.state.tx.us/permitting/air/nav/air_docs_newsource.html** If checklist is submitted as a hard copy, attach additional pages as needed. If checklist is submitted electronically, please email attachment to the following address: **apd@tceq.state.tx.us** *If "Yes," to any of the above, the project is a major source or a major modification and* ***a PBR may not be used.*** *A Nonattainment Permit review must be completed to authorize this project. If "No," continue to Section 3.*	❑ YES ❑ NO ❑ YES ❑ NO
3. 30 TAC § 106.4(a)(3): Prevention of Significant Deterioration (PSD) check	
Does this project trigger a review under PSD rules? To determine the answer, review the information below: • Are emissions of any regulated criteria pollutant increasing by 100 tpy of any criteria pollutant at a named source? • Are emissions of any criteria pollutant increasing by 250 tpy of any criteria pollutant at an unnamed source? • Are emissions increasing above significance levels at an existing major site? PSD information can be found at: **www.tceq.state.tx.us/permitting/air/forms/newsourcereview/tables/nsr_table9.html** and **www.tceq.state.tx.us/permitting/air/nav/air_docs_newsource.html** *If "Yes," to any of the above,* ***a PBR may not be used.*** *A PSD Permit review must be completed to authorize the project. If "No," continue to Section 4.*	❑ YES X NO ❑ YES X NO ❑ YES X NO
4. 30 TAC § 106.4(a)(6): Federal Requirements	
• Will all facilities under this PBR meet applicable requirements of Title 40 Code of Federal Regulations (40 CFR) Part 60, New Source Performance Standards (NSPS)? If "Yes," which Subparts are applicable?: 40 CFR PART 60 SUBPARTS KKK AND LLL	X YES ❑ NO ❑ N/A
• Will all facilities under this PBR meet applicable requirements of 40 CFR Part 63, Hazardous Air Pollutants Maximum Achievable Control Technology (MACT) standards? If "Yes," which Subparts are applicable?: _____	❑ YES ❑ NO X N/A
• Will all facilities under this PBR meet applicable requirements of 40 CFR Part 61, National Emissions Standards for Hazardous Air Pollutants (NESHAPs)? If "Yes," which Subparts are applicable?: _____ If checklist is submitted as a hard copy, attach additional pages as needed. If checklist is submitted electronically, please email attachment to the following address: **apd@tceq.state.tx.us** *If "Yes" to any of the above, please attach a discussion of how the facilities will meet any applicable standards.*	❑ YES ❑ NO X N/A

5. 30 TAC § 106.4(a)(7): PBR prohibition check

Are there any air permits at the site containing conditions which prohibit or restrict the use of PBRs? *If "Yes," PBRs may not be used or their use must meet the restrictions of the permit. A new permit or permit amendment may be required.* ***List permit number(s):*** _____ *If "No," continue to Section 6.*	❑ YES X NO

6. 30 TAC § 106.4(a)(8): NO_x Cap and Trade

• Is the facility located in Harris, Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, or Waller County? *If "Yes," answer the question below. If "No," continue to Section 7.*	❑ YES X NO
• Will the proposed facility or group of facilities obtain required allowances for NO_x if they are subject to 30 TAC Chapter 101, Subchapter H, Division 3 (relating to the Mass Emissions Cap and Trade Program)?	❑ YES X NO

7. Highly Reactive Volatile Organic Compounds (HRVOC) check

• Is the facility located in Harris County? *If "Yes," answer the next question. If "No," skip to the box below.*	❑ YES X NO
• Will the project be constructed after June 1, 2006? *If "Yes," answer the next question. If "No," skip to the box below.*	❑ YES ❑ NO
• Will one or more of the following HRVOC be emitted as a part of this project?	❑ YES ❑ NO

If "Yes," complete the information below:

	lb/hr	tpy
▸ 1,3-butadiene	_____	_____
▸ all isomers of butene (e.g., isobutene [2-methylpropene or isobutylene])	_____	_____
▸ alpha-butylene (ethylethylene)	_____	_____
▸ beta-butylene (dimethylethylene, including both cis- and trans-isomers)	_____	_____
▸ ethylene	_____	_____
▸ propylene	_____	_____

• Is the facility located in Brazoria, Chambers, Fort Bend, Galveston, Liberty, Montgomery, or Waller County? *If "Yes," answer the next question. If "No," the checklist is complete.*	❑ YES X NO
• Will the project be constructed after June 1, 2006? *If "Yes," answer the next question. If "No," the checklist is complete.*	❑ YES ❑ NO
• Will one or more of the following HRVOC be emitted as a part of this project?	❑ YES ❑ NO

If "Yes," complete the information below:

	lb/hr	tpy
▸ ethylene	_____	_____
▸ propylene	_____	_____

Table 29
RECIPROCATING ENGINES

ENGINE DATA

Emission Point Number From Table 1(a) G-1

APPLICATION

_____ Gas Compression
__X__ Electric Generation
_____ Refrigeration
_____ Other (Specify) _____

Manufacturer Generac
Model No. SG150
Serial No. _____
Orig. Mfr. Date _____
Rebuild Date(s) _____
No. of Cylinders 6
Compression Ratio 10.5-1

_____ 4 Stroke Cycle __X__ Carburetted _____ Spark Ignited _____ Dual Fuel
_____ 2 Stroke Cycle _____ Fuel Injected _____ Diesel

Naturally Aspirated _____ Blower/Pump Scavenged _____ Turbocharged & I.C. _____
Turbocharged __X__ Intercooled (I.C.) _____ I.C. Water Temperature _____

Ignition/Injection Timing: _____ Fixed _____ Variable

	Mfg. Rating	Proposed Operating Range
Horsepower	237	237
Speed (rpm)	1800	1800

FUEL DATA

_____ Field Gas _____ Landfill Gas _____ LP Gas _____ Other
__X__ Natural Gas _____ Digester Gas _____ Diesel

Engine Fuel Consumption 7806 BTU/bhp-hr
Heat Value (specify units) 1000 (HHV) (LHV)
Fuel Sulfur Content NA (grains/100 scf)(weight percent)

FULL LOAD EMISSIONS DATA

NO_x _____ 6.2 _____ g/bhp-hr CO 60 g/bhp-hr
_____ ppmv _____ ppmv
VOC(C_3^+) 1.8 g/bhp-hr Total HC 1.8 g/bhp-hr
_____ ppmv _____ ppmv

Attach information showing emissions versus engine speed and load.

Method of Emissions Control:

_____ Lean Operation _____ Parameter Adjustment _____ SCR Catalyst
_____ Stratified Charge _____ NSCR Catalyst _____ Other (Specify)

ADDITIONAL INFORMATION

On separate sheets attach the following:

A. A copy of engine manufacturer's site rating or general rating specification for the engine model.
B. Tyical fuel analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
C. Description of air/fuel ratio control system (manufacturers's information acceptable).
D. Details regarding principle of operation of emissions controls. If add-on equipment is used, provide make and model and manufacturer's information.
E. Exhaust parameter information on Table 1(a).

Table 29
RECIPROCATING ENGINES

ENGINE DATA

Emission Point Number From Table 1(a) G-2

APPLICATION

_____ Gas Compression
__X__ Electric Generation
_____ Refrigeration
_____ Other (Specify)
_____

Manufacturer Generac
Model No. SG300
Serial No. _____
Orig. Mfr. Date _____
Rebuild Date(s) _____
No. of Cylinders 6
Compression Ratio 10.5-1

_____ 4 Stroke Cycle __X__ Carburetted _____ Spark Ignited _____ Dual Fuel
_____ 2 Stroke Cycle _____ Fuel Injected _____ Diesel

Naturally Aspirated _____ Blower/Pump Scavenged _____ Turbocharged & I.C. _____
Turbocharged __X__ Intercooled (I.C.) _____ I.C. Water Temperature _____

Ignition/Injection Timing: _____ Fixed _____ Variable

	Mfg. Rating	Proposed Operating Range
Horsepower	454	245
Speed (rpm)	2300	2300

FUEL DATA

_____ Field Gas _____ Landfill Gas _____ LP Gas _____ Other
__X__ Natural Gas _____ Digester Gas _____ Diesel

Engine Fuel Consumption 9031 BTU/bhp-hr
Heat Value (specify units) 1000 (HHV) (LHV)
Fuel Sulfur Content NA (grains/100 scf)(weight percent)

FULL LOAD EMISSIONS DATA

NO_x 2.1 g/bhp-hr CO 118.3 g/bhp-hr
_____ ppmv _____ ppmv
VOC(C_3^+) 2.9 g/bhp-hr Total HC 2.9 g/bhp-hr
_____ ppmv _____ ppmv

Attach information showing emissions versus engine speed and load.

Method of Emissions Control:

_____ Lean Operation _____ Parameter Adjustment _____ SCR Catalyst
_____ Stratified Charge _____ NSCR Catalyst _____ Other (Specify)

ADDITIONAL INFORMATION

On separate sheets attach the following:

A. A copy of engine manufacturer's site rating or general rating specification for the engine model.
B. Tyical fuel analysis, including sulfur content and heating value. For gaseous fuels, provide mole percent of constituents.
C. Description of air/fuel ratio control system (manufacturers's information acceptable).
D. Details regarding principle of operation of emissions controls. If add-on equipment is used, provide make and model and manufacturer's information.
E. Exhaust parameter information on Table 1(a).

Title 30 Texas Administrative Code § 106.352
Permit By Rule (PBR) Checklist
Oil and Gas Production Facilities

The following checklist is designed to help you confirm that you meet Title 30 Texas Administrative Code § 106.352 (30 TAC § 106.352) requirements. If you do not meet all the requirements, you may alter the project design or operation in such a way that all the requirements of the PBR are met or you may obtain a construction permit. The PBR forms, tables, checklists and guidance documents are available from the Texas Commission on Environmental Quality (TCEQ), Air Permits Division Web site at www.tceq.state.tx.us/nav/permits/air_permits.html.

CHECK THE MOST APPROPRIATE ANSWER		
	Check the type of facilities covered by this registration(check all that are applicable): ☐ oil or gas production facility ☐ carbon dioxide separation facility ☐ oil or gas pipeline facility	
	The facilities at the site include (check all that apply): ☑ one or more tanks ☑ separators ☑ dehydration units ☑ free water knockouts ☐ gunbarrels ☐ heater treaters ☑ natural gas liquids recovery units ☑ gas sweetening and other gas conditioning facilities ☑ sulfur recovery units	☑ YES ☐ NO
	Will gas sweetening, sulfur recovery, or other gas conditioning facilities only condition gas that contains less than two (2) long tons per day of sulfur compounds as sulfur?	☑ YES ☐ NO
1	Do all compressors and flares fully meet the requirements of 30 TAC § 106.512 and 30 TAC § 106.492, respectively? Attach data showing how the exemptions are met. Checklists are available.	☑ YES ☐ NO
2	Are total emissions from all facilities, including fugitives and loading emissions, less than 25 tpy SO_2, VOC, or 250 tpy of CO or NO_x?	☑ YES ☐ NO
	Have you attached calculations and other data, such as a gas analysis, showing that the emissions limits of the general rule are met?	☑ YES ☐ NO
3	If the facility handles sour gas, is it located at least 1/4 mile from any recreational area, residence, or other structure not occupied or used solely by the owner or operator of the facility or the owner of the property upon which the facility is located? Attach a scaled map.	☑ YES ☐ NO
4	Are total emissions of sulfur compounds, excluding sulfur oxides, less than 4.0 pounds per hour? Attach calculations.	☑ YES ☐ NO
	Does the height of each vent emitting sulfur compounds meet or exceed the minimum vent height stated in 30 TAC § 106.352? List stack height: NA	☑ YES ☐ NO

PRINT

Exemption §106.492 Checklist
(Previously Standard Exemption 80)

Smokeless Gas Flares

YOU MUST SUBMIT A PI-7 WITH REQUIRED ATTACHMENTS BEFORE CONSTRUCTION OR OPERATION IF THE GAS BURNED IN THE FLARE HAS A SULFUR OR CHLORINE CONCENTRATION GREATER THAN 24 PPMV.

The following checklist is designed to help you confirm that you meet Exemption §106.492, previously standard exemption 80, requirements. **Any "no" answers indicate that the claim of exemption may not meet all requirements for the use of Exemption §106.492, previously standard exemption 80.** If you do not meet all the requirements, you may alter the project design/operation in such a way that all the requirements of the exemption are met, or obtain a construction permit.

YES	NO	NA	DESCRIPTION
X	_	_	Have you included a description of how this exemption claim meets the general rule for the use of exemptions (§106.4 checklist is available)?
X	_	_	Is the flare equipped with a tip designed to provide good mixing with air, flame stability and a tip velocity less than 60 ft/sec for gases having a lower heating value less than 1,000 BTU/ft^3, or less than 400 ft/sec for gases with a LHV greater than 1,000 BTU/ft^3? Attach a description including BTU content and tip velocity (Table 8 is available).
X	_	_	Is the flare equipped with a continuously burning pilot or other automatic ignition system that assures gas ignition whenever vents are directed to the flare? Attach a description of the system.
_	_	X	If the flare emits more than 4 #/hr of reduced sulfur compounds, excluding sulfur oxides, is it equipped with an alarm system that immediately notifies appropriate personnel when the ignition system ceases functioning? Attach a description of the system.
_	_	X	If the flare emits less than 4 #/hr of reduced sulfur compounds and is not equipped with an alarm system, does the stack height meet the requirements of condition (d) of §106.352, previously standard exemption STDX 66? Required height:___. Actual height ___.
_	_	X	If the flare burns gases containing more than 24 ppmv of sulfur, chlorine or compounds containing either element, is it located at least 1/4 mile from any recreational area, residence, or other structure not occupied or used solely by the owner or operator of the flare or owner of the property where the flare is located? Attach a scaled map.
_	_	X	If the flare emits HCl, does the heat release (BTU/hr based on lower heating value) equal or exceed 2.73 x 10E5 x HCl emission rate(lb/hr)? Attach calculations.
_	_	X	If the flare emits SO2, does the heat release (BTU/hr based on lower heating value) equal or exceed 0.53 x 10E5 x SO2 emission rate (lb/hr)? Attach calculations.
X	_	_	Will you limit the flare to burning only combustible mixtures of gases containing only carbon, hydrogen, nitrogen, oxygen, sulfur, chlorine, or compounds derived from these elements?
X	_	_	Will the gas mixture always have a net or lower heating value of at least 200 BTU/ft3 prior to addition of air?
X	_	_	Do you understand and will you ensure that liquids shall never be burned in the flare?

Grey Badger Plant
Midstream Energy Services, L.L.C.

General Process Description (see Block Flow Diagram):

Midstream Energy Services, L.L.C. proposes to install and operate a natural gas processing facility near Borger in Carson County, Texas. The facility is designed to process 25 MMscfd of raw natural gas entering the facility at approximately 120°F and 200 psig. The new facility will receive raw natural gas from an existing Conoco-Phillips gathering compressor station (O-00667) located nearby. The natural gas will be processed to produce a sales-quality residue gas, while recovering an assortment of inclusive products including natural gas liquids (NGL) and helium. Natural contaminants, hydrogen sulfide (H_2S), carbon dioxide (CO_2), oxygen (O_2), and water (H_2O), will be removed from all product streams. The facility will be a synthetic minor emission source.

Natural gas will enter the facility through an inlet separator, which will remove free water and liquid condensate from the gas stream. Removed liquids will be flowed to and stored in atmospheric condensate storage tanks, which will be equipped with a vapor recovery system (VRU). Accumulated condensate is periodically transported off site by truck. Vapors from the truck are routed back to the inlet of the plant via the vapor recovery system.

The remaining natural gas exiting the separator will then pass through Sulfa Treat towers where the trace (10 ppm or less) hydrogen sulfide (H_2S) is removed. The H_2S reacts with the Sulfa Treat iron-based pellet media contained in the towers. This media is periodically replaced (every 6 to 8 months) and removed from site for disposal. The sweetened raw gas stream then passes through an electric-driven inlet compressor, which boosts gas pressure to nearly 1000 psig. The high pressure raw gas then passes through a de-oxygenation (removal) unit (DeOx), where the trace amounts of oxygen (500 ppm) contaminant is consumed producing CO_2 and H_2O, which is contained in the DeOx exit gas. The DeOx system has a direct-fired auxiliary heater, which heats the raw gas stream to assure proper reactor temperature.

From the DeOx, the raw gas passes through a hydrocarbon dew point control unit (HCDPT) to begin removing NGLs. This unit is designed to chill the gas down to 50°F and contains a propane refrigeration system and ethylene glycol (EG) hydrate inhibition/dehydration unit. Saturated water vapors from the gas stream are removed in this unit to prevent hydrate formation and equipment problems. The NGLs produced in the HCDPT due to gas chilling at high pressure flow to de-methanizing tower where methane and lighter components are removed to produce a salable NGLs product, which is pumped to a sales point off site via NGL pipeline. The de-methanizing tower is supplied with heat from a hot oil system, which is heated by a direct-fired heater. Part of the hot oil stream is used to regenerate the EG in the EG unit's regenerator. The EG regenerator's still column is open to the atmospheric without any BTEX recovery system as the volume of BTEX and other volatile organic compounds (VOCs) is very small.

After the HCDPT, the remaining natural gas is routed to the contactor of an amine-treating unit, where carbon dioxide (CO_2), 0.7 mol%, is almost completely removed. The acid gas (CO_2) stream from the amine regenerator, which is over 99% carbon dioxide, is vented to atmosphere, at a release point adjacent to the top of the emergency flare stack. The amine system has a direct-fired steam generator for amine regeneration.

From the amine unit, a molecular sieve dehydration unit again dehydrates water-saturated natural gas. The mol sieve regeneration system has a direct-fired heater to heat gas to near 500°F for bed regeneration. Removed water from the mol sieve's regeneration system is directed to atmospheric water storage, where any flash gases are captured by VRU and produced water is hauled off via truck for disposal.

From the molecular sieve unit, the dry natural gas is chilled in a cryogenic expander plant, where most of the ethane and all of the heavier hydrocarbons (NGLs) are separated from the methane (C_1), nitrogen (N_2), and helium (He). The expander plant's chilling is aided by a propane refrigeration system. The NGLs are demethanized, combined with the HCDPT's NGLs and pumped via pipeline to sales.

The three remaining gases (C_1, N_2, He) enter the nitrogen rejection unit where the methane and trace ethane are liquefied, leaving only N_2 and He in the gas phase. The liquid methane/ethane is vaporized and turned into residue sales gas, which is compressed and piped off site to market. The N_2/He mix is further cooled to liquefy the N_2 and He vapors are recovered, compressed and placed in pressurized tank truck storage for sales. The liquid N_2 is vaporized, a portion is compressed and recycled, and an equivalent volume to that of the inlet raw gas is vented to atmosphere, containing only trace methane and no other hydrocarbons.

The flash vapors in the amine flash tank and the EG flash tank are directed to the VRU system and returned to the suction of the plant's inlet compression. There are two natural gas fired emergency generators onsite for lighting, office equipment, and control systems during power outages. Many of the plant relief valves and blowdowns are directed to emergency flare. All compression in the facility is electric driven except for the emergency generators.

Table 1
Potential to Emit
Grey Badger Plant
Midstream Energy Services, L.L.C.

Unit ID	Description	Emission Reference	NOx		CO		NMHC		SO2		PM	
			lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy	lb/hr	tpy
G-1	SG150	Manufacturer's Data and AP-42	3.239	0.810	31.349	7.837	0.940	0.235	0.001	0.0003	0.000	0.0000
G-2	SG300	Manufacturer's Data and AP-42	2.122	0.530	118.404	29.601	2.903	0.726	0.002	0.0006	0.000	0.0001
H-1	Amine Regenerator Heater	AP-42	0.291	1.273	0.244	1.069	0.016	0.070	0.0017	0.0076	0.0221	0.0967
H-2	DEOX Heater	AP-42	0.480	2.102	0.403	1.766	0.026	0.116	0.0029	0.0126	0.0365	0.1598
H-3	Mole Sieve Dehydration Heater	AP-42	0.400	1.752	0.336	1.472	0.022	0.096	0.0024	0.0105	0.0344	0.1507
H-4	Hot Oil Heater DEC2 System	AP-42	0.196	0.858	0.164	0.720	0.011	0.047	0.0012	0.0051	0.0188	0.0823
H-5	Inlet Heater	AP-42	0.303	1.327	0.255	1.117	0.020	0.085	0.0048	0.0210	0.0318	0.1393
D-1	EG Dehydration Unit Still Vent and Flash Tank	GRI GLYCalc, Ver. 4.0	--	--	--	--	0.342	1.499	--	--	--	--
A-1	Amine Unit	API Amine Calc	--	--	--	--	--	--	--	--	--	--
A-FT	Amine Unit Flash Tank[5]	API Amine Calc	--	--	--	--	--	--	--	--	--	--
V-1	Acid Gas Vent	API Amine Calc	--	--	--	--	0.239	1.045	--	--	--	--
V-2	Nitrogen Vent	Engineering Estimate	--	--	--	--	--	--	--	--	--	--
F-1	Emergency Flare	NA	(for startup, shutdown, and emergency use)									
FP-1	Emergency Flare Pilots (4 total)	AP-42	0.026	0.114	0.022	0.096	0.001	0.006	0.0002	0.0007	0.0020	0.0087
C-1	Inlet Compressor	Electric Comprssor - No emissions	--	--	--	--	--	--	--	--	--	--
C-2	Nitrogen Compressor	Electric Comprssor - No emissions	--	--	--	--	--	--	--	--	--	--
C-3	Residue Compressor	Electric Comprssor - No emissions	--	--	--	--	--	--	--	--	--	--
C-4	Helium Compressor	Electric Comprssor - No emissions	--	--	--	--	--	--	--	--	--	--
C-5	Refrigeration Compressor	Electric Comprssor - No emissions	--	--	--	--	--	--	--	--	--	--
LD-1[2]	Truck Loading	AP-42	--	--	--	--	0.143	0.627	--	--	--	--
TK-1	Condensate Tanks[1]	AP-42	--	--	--	--	--	--	--	--	--	--
TK-2	Condensate Tanks[1]	AP-42	--	--	--	--	--	--	--	--	--	--
TK-3	Condensate Tanks[1]	AP-42	--	--	--	--	--	--	--	--	--	--
TK-4	Condensate Tanks[1]	AP-42	--	--	--	--	--	--	--	--	--	--
FUG[4]	Fugitive Sources	AP-42	--	--	--	--	3.868	16.942	--	--	--	--
		Total Emissions, tpy =		**8.766**		**43.678**		**21.496**		**0.058**		**0.638**

[1] Condensate Tanks equipped with vapor recovery unit, thus no emissions.
[2] Truck loading has vapor recovery unit, thus controlled emission. NGL loading has vapor return, thus no emissions.
[3] Vents assumed not sent to flare header
[4] Facility required LDAR. Estimate is without control benefit of LDAR program.
[5] Flash tank for amine unit to be routed to fuel.

Table 2
Estimated Emissions for Engines
Grey Badger Plant
Midstream Energy Services, L.L.C.

EQUIPMENT PARAMETERS

Equipment			Design Capacity			Fuel Use	Stack		
ID Number	Make	Model	hp	rpm	Design Class	Btu/hp-hr	Temp (F)	Flow (acfm)	Fuel mmscf
G-1	Generac	SG150	237	1800	4SRB	7,806	1,533	833	0.925
G-2	Generac	SG300	454	2300	4SRB	9,031	1,490	4,335	2.050

CRITERIA AIR POLLUTANT EMISSIONS

	NOx			CO			VOC		
ID Number	EF (g/hp-hr)	lb/hr	tpy	EF (g/hp-hr)	lb/hr	tpy	EF (g/hp-hr)	lb/hr	tpy
G-1	6.2	3.239	0.810	60	31.349	7.837	1.8	0.940	0.235
G-2	2.1	2.122	0.530	118.3	118.404	29.601	2.9	2.903	0.726
TOTAL EMISSIONS =			1.340			37.438			0.961

Hours of Operation =	500	G-1	(Emergency generators only. Maximum anticipate runtime = 500hrs/yr)
	500	G-2	(Emergency generators only. Maximum anticipate runtime = 500hrs/yr)
	1000	btu/scf	

	SO2			PM2.5		
ID Number	EF (lb/mmbtu)	lb/hr	tpy	EF (lb/mmbtu)	lb/hr	tpy
G-1	5.88E-04	0.001	0.000	7.70E-05	0.00014	0.000
G-2	5.88E-04	0.002	0.001	7.70E-05	0.00032	0.000
TOTAL EMISSIONS =			0.001			0.000

HAZARDOUS AIR POLLUTANTS (HAPs) EMISSIONS

		Estimated Emissions (tpy)							
ID Number	Design Class	Benzene	Toluene	Ethylbenzene	Xylene	Formaldehyde	Acrolein	Acetaldehyde	Total HAPs
G-1	4SRB	0.01	0.01	0.001	0.003	0.948	0.09	0.15	1.21
G-2	4SRB	0.01	0.01	0.001	0.003	0.948	0.09	0.15	1.21
Annual HAP Emissions =		0.02	0.01	0.00	0.01	1.90	0.18	0.30	2.42
lb/hr HAP Emissions =		0.004	0.003	0.000	0.002	0.433	0.042	0.069	

HAP EMISSION FACTORS**

	Fuel Input (lb/mmBtu)						
Design Class	Benzene	Toluene	Ethylbenzene	Xylene	Formaldehyde	Acrolein	Acetaldehyde
4S-LB	4.40E-04	4.08E-04	3.97E-05	1.84E-04	5.28E-02	5.14E-03	8.36E-03
4S-RB	1.58E-03	5.58E-04	2.48E-05	1.95E-04	2.05E-02	2.63E-03	2.79E-03

** Compressor Engines: AP-42 Table 3.2-1 (7/00)

Table 3
Emissions Estimate - Heaters and Pilots
Grey Badger Plant
Midstream Energy Services, L.L.C.

EQUIPMENT PARAMETERS

Equipment		Design Duty	Fuel Use		Stack				
ID Number	Function	mm btu/hr	scfh	mmscfy	Height (ft)	Diameter (ft)	Temp (F)	Velocity (fps	Flow (acfm)
H-1	Amine Regenerator Heater	2.906	2,906	25.46	81	2.5	700	47.19	13,900.00
H-2	DEOX Heater	4.80	4,800	42.05	20	0.67	500	21.27	450.00
H-3	Hot Oil Heater DEC2 System	4.00	4,000	35.04					
H-4	Mole Sieve Heater	1.96	1,958	17.15					
H-5	Inlet Heater	3.00	3,000	26.28					
FP-1	Emergency Flare Pilots - 4 @ 0.065mmbtu/hr = 0.39mmbtu/hr total	0.26	260	2.28	50	2	1400	NA	NA

CRITERIA AIR POLLUTANT EMISSIONS

	NOx			CO			VOC			SO2			PM2.5		
ID Number	EF lb/mmscf	lb/hr	tpy	EF lb/mmscf	lb/hr	tpy	EF lb/mmscf	lb/hr	tpy	EF lb/mmscf	lb/hr	tpy	EF lb/mmscf	lb/hr	tpy
H-1	100.0	0.291	1.273	84.0	0.244	1.069	5.50	0.016	0.070	0.60	0.002	0.008	7.60	0.022	0.097
H-2	100.0	0.480	2.102	84.0	0.403	1.766	5.50	0.026	0.116	0.60	0.003	0.013	7.60	0.036	0.160
H-3	100.0	0.400	1.752	84.0	0.336	1.472	5.50	0.022	0.096	0.60	0.002	0.011	8.60	0.034	0.151
H-4	100.0	0.196	0.858	84.0	0.164	0.720	5.50	0.011	0.047	0.60	0.001	0.005	9.60	0.019	0.082
H-5	101.0	0.303	1.327	85.0	0.255	1.117	6.50	0.020	0.085	1.60	0.005	0.021	10.60	0.032	0.139
FP-1	100.0	0.026	0.114	84.0	0.022	0.096	5.50	0.001	0.006	0.60	0.000	0.001	7.60	0.002	0.009
TOTAL EMISSIONS =			7.426			6.240			0.421			0.058			0.637

*Emission Factors from AP-42, 1.4-1 and 1.4-2 (7/98).

Hours of Operation =	8760
Btu/scf =	1000

HAZARDOUS AIR POLLUTANTS (HAPs) EMISSIONS

		Estimated Emissions (tpy)							
ID Number	Design Class	Benzene	Formaldehyde	Hexane	Lead	Naphthalene	Dichlorobenzene	Toluene	Total HAPs
H-1	<100 mmbtu/hr	0.000	0.001	0.023	0.000	0.000	0.000	0.000	0.024
H-2	<100 mmbtu/hr	0.000	0.002	0.038	0.000	0.000	0.000	0.000	0.040
H-3	<100 mmbtu/hr	0.000	0.001	0.032	0.000	0.000	0.000	0.000	0.033
H-4	<100 mmbtu/hr	0.000	0.001	0.015	0.000	0.000	0.000	0.000	0.016
H-5	<100 mmbtu/hr	0.000	0.001	0.024	0.000	0.000	0.000	0.000	0.025
FP-1	<100 mmbtu/hr	0.000	0.000	0.002	0.000	0.000	0.000	0.000	0.002
Annual HAP Emissions =		0.000	0.006	0.133	0.000	0.000	0.000	0.000	0.140
lb/hr HAP Emissions =		0.000	0.001	0.030	0.000	0.000	0.000	0.000	0.032

HAP EMISSION FACTORS**

	EF, lb/mmscf						
Design Class	Benzene	Formaldehyde	Hexane	Lead	Toluene	Naphthalene	Dichlorobenzene
<100 mmbtu/hr	2.10E-03	7.50E-02	1.80E+00	5.00E-04	3.40E-03	6.10E-04	1.20E-03

** Select HAP constituent factors form AP-42, Natural gas combustion, Section 1.4-3 (7/98).

Table 4
Inlet Gas Composition
Grey Badger Plant
Midstream Energy Services, L.L.C.

Constituent	MW [1] (lb/mol)	Mole Percent (Mol %)	Wgt. Fraction (lbs)	Avg. VOC Mol Wgt. (lb/mol)	Wgt. Percent of VOC (Wgt %)	Wgt. Percent Total (Wgt %)
Nitrogen	28.013	7.46000	2.08977	-	-	8.141
Oxygen	31.999	0.03640	0.01165	-	-	0.045
Carbon Dioxide	44.010	0.67000	0.29487	-	-	1.149
Carbon Monoxide	28.010		0.00000	-	-	0.000
Hydrogen Sulfide	34.020	0.00090	0.00031	-	-	0.001
Methane	16.043	66.38000	10.64934	-	-	41.485
Ethane	30.070	7.46000	2.24322	-	-	8.739
VOC						
Propane	44.097	7.31000	3.22349	17.865	31.05	12.557
Isobutane	58.123	1.60000	0.92997	5.154	8.96	3.623
n-Butane	58.123	4.45000	2.58647	14.334	24.92	10.076
Isopentane	72.150	1.49000	1.07504	5.958	10.36	4.188
n-Pentane	72.150	1.78000	1.28427	7.118	12.37	5.003
Clycopentane	72.150		0.00000	0.000	0.00	0.000
n-Hexane	86.177		0.00000	0.000	0.00	0.000
Clycohexane	86.177		0.00000	0.000	0.00	0.000
Other Hexanes	86.177	0.97360	0.83902	4.650	8.08	3.268
Heptanes	100.204	0.38340	0.38418	2.129	3.70	1.497
Benzene	78.114	0.01480	0.01156	0.064	0.11	0.045
Toluene	92.141	0.00350	0.00322	0.018	0.03	0.013
Ethylbenzene	106.167	0.00000	0.00000	0.000	0.00	0.000
Xylene	106.167	0.00040	0.00042	0.002	0.00	0.002
Octanes +	114.231	0.03760	0.04295	0.238	0.41	0.167
2,2,4 Trimethylpentane	114.26	0.00000	0.00000	0.000	0.00	0.000
Nonanes	128.258	0.00040	0.00051	0.003	0.00	0.002
C10+ through C12+	142.285		0.00000	0.000	0.00	0.000
Total VOC:		**18.04**	**10.38**	**57.53**	**100.00**	**40.440**
TOTAL:		**100.05**	**25.67**			**100.00**

[1] Molecular Weight from GPSA Handbook.

Table 5
Estimated Emissions for Fugitive Equipment
Grey Badger Plant
Midstream Energy Services, L.L.C.

Source ID	Componet Type	Service	EF ID	Equipment Count	Comments	EF	UOM	TOC	VOC
FUG	Compressor Seals	G	FUG-O-CS-G	8	Compressor Seals	0.019400	lb/hr/source	0.6798	0.2719
FUG	Flanges	G	FUG-F-G	500	Flanges	0.000860	lb/hr/source	1.8834	0.7534
FUG	Connectors	G	FUG-CON-G	300	Connectors	0.000441	lb/hr/source	0.5795	0.2318
FUG	Open Ended Lines	G	FUG-OEL-G	0	Open Ended Lines	0.004409	lb/hr/source	0.0000	0.0000
FUG	Pressure Relief Valves	G	FUG-O-PRV-G	15	Pressure Relief Valves	0.019400	lb/hr/source	1.2746	0.5098
FUG	Pump Seals	G	FUG-PS-G		Pump Seals	0.005291	lb/hr/source	0.0000	0.0000
FUG	Other	G	FUG-PS-O	30	Other	0.019400	lb/hr/source	2.5492	1.0197
FUG	Valves	G	FUG-V-G	300	Valves	0.009921	lb/hr/source	13.0362	5.2145
FUG	Flanges	LL	FUG-F-LL	500	Flanges	0.000243	lb/hr/source	0.5322	0.4257
FUG	Connectors	LL	FUG-CON-LL	300	Connectors	0.000463	lb/hr/source	0.6084	0.4867
FUG	Open Ended Lines	LL	FUG-OEL-LL	0	Open Ended Lines	0.003086	lb/hr/source	0.0000	0.0000
FUG	Other	LL	FUG-PS-O-LL	25	Other	0.016534	lb/hr/source	1.8105	0.7242
FUG	Pump Seals	LL	FUG-PS-LL	15	Pump Seals	0.028660	lb/hr/source	1.8830	1.5064
FUG	Valves	LL	FUG-V-LL	300	Valves	0.005510	lb/hr/source	7.2401	5.7921
FUG	Flanges	HL	FUG-F-HL	100	Flanges	0.000001	lb/hr/source	0.0004	0.0004
FUG	Connectors	HL	FUG-CON-HL		Connectors	0.000017	lb/hr/source	0.0000	0.0000
FUG	Other	HL	FUG-PS-HL	10	Other	0.000071	lb/hr/source	0.0031	0.0031
FUG	Open Ended Lines	HL	FUG-OEL-HL	0	Open Ended Lines	0.000309	lb/hr/source	0.0000	0.0000
FUG	Pump Seals	HL	FUG-PS-HL	2	Pump Seals	NA	lb/hr/source		
FUG	Valves	HL	FUG-V-HL	30	Valves	0.000019	lb/hr/source	0.0025	0.0025
			Total Components =	2435					

Total	Gas Components =	TOC	20.00258	tpy
		VOC	8.00103	tpy
	Liquid Liquid Components =	TOC	12.07413	tpy
		VOC	8.93511	tpy
	Heavy Liquid Components =	TOC	0.00604	tpy
		VOC	0.00604	tpy
	Total Fugitives	**VOC**	16.942	tpy

Note:
Equipment counts estimated.
G = Natural gas service; LL = Light liquid service; HL = Heavy Liquid service
Emission factors from Protocol for Equipment Leak Emission Estimates, EPA-453/R-98-017, 1995.

Gas VOC wt% =	40.00	
L.Liq. VOC wt% =	80.00	
H.Liq. VOC wt% =	100.00	
Assumes	8760	hours on site

Table 6
Estimate Emissions for Loading Losses
Grey Badger Plant
Midstream Energy Services, L.L.C.

Equations:
LL = 12.46*SPM/T (AP-42 Sec.5.2)
VOC = LL * Q/1000

Where:

S =	0.6	Saturation Factor
T =	60.31	Loading Temperature, deg.F
T =	520.31	Loading Temperature, deg.R
P =	19.9	True Vapor Pressure, psia
M =	78	Vapor Molecular Weight, lb/lb-mole
Q =	1,250,000	Quantity Loaded per Year, gallons
		Assumed condensate.

Estimated Emissions:

LL =	**22.30**	**lb/1000 gal.**
VOC =	**27878.205**	**lb/yr**
VOC =	**13.939**	**tpy**
Controlled VOC =	**0.627**	**typ, VRU, 90% capture, 95% control**

* Actual condensate production occurs 6 months of year. Thus, assumed 1250000 gallons produced

Table 7
Inlet Gas Composition
Grey Badger Plant
Midstream Energy Services, L.L.C.

Constituent	MW [1] (lb/mol)	Moles per Hour	Mole %	Mole wt Frac lb/lb-mole	Wgt. Percent of VOC (Wgt %)	Wgt. Percent Total (Wgt %)	Acid Gas[2] lb/hr
Nitrogen	28.013		0.00000	0.000	-	0.013	0.064
Oxygen	31.999	0.00000	0.00000	0.000	-	0.000	0.000
Carbon Dioxide	44.010	11.58762	99.17545	43.647	-	99.640	509.971
Carbon Monoxide	28.010	0.00000	0.00000	0.000	-	0.000	0.000
Hydrogen Sulfide	34.020	0.00000	0.00000	0.000	-	0.000	0.000
Methane	16.043	0.08097	0.69300	0.111	-	0.254	1.299
Ethane	30.070	0.01031	0.08823	0.027	-	0.061	0.31
VOC							
Propane	44.097	0.00472	0.04037	0.018	88.51	0.041	0.208
Isobutane	58.123	0.00000	0.00000	0.000	0.00	0.000	0.000
n-Butane	58.123	0.00000	0.00000	0.000	0.00	0.000	0.000
Isopentane	72.150	0.00000	0.00000	0.000	0.00	0.000	0.000
n-Pentane	72.150	0.00000	0.00000	0.000	0.00	0.000	0.000
Clycopentane	72.150	0.00000	0.00000	0.000	0.00	0.000	0.000
n-Hexane	86.177	0.00001	0.00010	0.000	0.43	0.000	0.001
Clycohexane	86.177	0.00000	0.00000	0.000	0.00	0.000	0.000
Other Hexanes	86.177	0.00000	0.00000	0.000	0.00	0.000	0.000
Heptanes	100.204	0.00000	0.00000	0.000	0.00	0.000	0.000
Benzene	78.114	0.00033	0.00285	0.002	11.06	0.005	0.026
Toluene	92.141	0.00000	0.00000	0.000	0.00	0.000	0.000
Ethylbenzene	106.167	0.00000	0.00000	0.000	0.00	0.000	0.000
Xylene	106.167	0.00000	0.00000	0.000	0.00	0.000	0.000
Octanes +	114.23	0.00000	0.00000	0.000	0.00	0.000	0.000
2,2,4 Trimethylpentane	114.26	0.00000	0.00000	0.000	0.00	0.000	0.000
Nonanes	128.258	0.00000	0.00000	0.000	0.00	0.000	0.000
C10+ through C12+	142.285	0.00000	0.00000	0.000	0.00	0.000	0.000
Total VOC:		**0.01**	**0.04**	**0.02**	**100.00**	**0.046**	**511.815**
TOTAL:		**11.68**	**100.00**	**43.80**		**100.01**	

[1] Molecular Weight from GPSA Handbook.

2 Acid gas stream #5 from Amine Calc simulation

Table 8
Acid Gas Vent
Grey Badger Plant
Midstream Energy Services, L.L.C.

Estimated Gas Vented in mmscf/yr = **39.430**

Vent Stream	MW lb/mole	VOC wt %	VOC Emissions lb/yr	tpy
Hydrocarbon - Natural Gas	43.80	0.046	2,090.294	1.045

VOC annual, tpy = **1.045**

Note:

Mole Volume = 385.13 ft^3
Pressure = 14.7
Temperature = 68 °F
mole = lb-mole
Properties estimated

Vent Estimate

511.88 lb/hr, from Amine Calc
43.8 lb/lb-mole
385.13 ft^3/lb-mole
4,500.92 scf/hr
39.43 mmscf/yr

Example Calculation

VOC, lb/yr = 1.2 mmscfy * 1,000,000 / 379.4 ft^3/mole * 20.01 lb/mole * 17.058 VOC wt% / 100
VOC, lb/yr = 10795.465
VOC, tpy = VOC lb/yr / 2000 lb/ton
VOC, tpy = 5.398

AMINECalc Input Data

Project Name:	Greg Badger Plant Nominal 25 MMscfd Gas Plant, treater is a 50 gpm Ineos CS-2020, MDEA Based amine solvent, Gas has gone through a 50 F HCDPT plant to rem much of the heavier hydrocarbons	
Model:	Gas Model	
Amine:	MDEA	
Lean Amine Pressure:	975.000	[psia]
Lean Amine Temperature:	120.000	[F]
Lean Amine Flowrate:	50.000	[gal/min]
Lean Amine Weight:	50.000	[%]
H2S Loading:	0.000	[mol/mol]
CO2 Loading:	0.005	[mol/mol]
Emission Control Efficiency	100.000	
Operating Hours/Day:	24	[hours/day]
Operating Days/Year:	365	[days/year]
Gas Feed Pressure:	955.000	[psia]
Gas Feed Temperature:	110.000	[F]
Gas Feed Flowrate:	25.000	[MMSCFD]
Number of Trays in Column:	20	
Flash Tank Pressure:	90.000	[psia]
H2S	0.00000	[%]
CO2	0.75010	[%]
MDEA	0.00000	[%]
H2O	0.00000	[%]
N2	8.73940	[%]
O2	0.00000	[%]
C1	74.32000	[%]
C2	7.98100	[%]
C3	5.18100	[%]
i-C4	0.72760	[%]
n-C4	1.67100	[%]
i-C5	0.28490	[%]
n-C5	0.29860	[%]
Hexanes	0.01630	[%]
Heptanes	0.00110	[%]
Octanes	0.00000	[%]
Nonanes	0.00000	[%]
C10+	0.00000	[%]
MeSH	0.00000	[%]
EtSH	0.00000	[%]
Benzene	0.00070	[%]
Toluene	0.00000	[%]
Ethylbenzene	0.00000	[%]
Xylenes	0.00000	[%]
n-C6	0.02830	[%]
224Trimeth	0.00000	[%]

AMINECalc Stream Results

Stream 1 Gas Feed to Absorber

Component	Mol Fraction	[lb/h]	[ton/yr]
H2S	0.000000	0.000	0.000
CO2	0.007500	906.148	3968.859
MDEA	0.000000	0.000	0.000
H2O	0.000000	0.000	0.000
N2	0.087390	6720.102	29433.550
C1	0.743200	32728.020	143346.300
C2	0.079810	6587.478	28852.660
C3	0.051810	6271.206	27467.420
i-C4	0.007280	1160.851	5084.442
n-C4	0.016710	2666.001	11676.890
i-C5	0.002850	564.239	2471.326
n-C5	0.002990	591.372	2590.164
Hexanes	0.000160	38.558	168.880
Heptanes	0.000010	3.026	13.252
Benzene	0.000010	1.501	6.574
n-C6	0.000280	66.944	293.210
Total:	1.000000	58305.440	255373.500

Pressure	955.000	[psia]
Temperature	110.000	[F]

Stream 2 Rich Amine From Absorber

Component	Mol Fraction	[lb/h]	[ton/yr]
H2S	0.000000	0.000	0.000
CO2	0.014370	534.264	2340.039
MDEA	0.130220	13106.030	57403.430
H2O	0.854220	12998.570	56932.750
N2	0.000050	1.263	5.530
C1	0.000950	12.912	56.553
C2	0.000110	2.845	12.461
C3	0.000060	2.255	9.879
i-C4	0.000000	0.020	0.087
n-C4	0.000000	0.046	0.201
i-C5	0.000000	0.014	0.061
n-C5	0.000000	0.015	0.064
Hexanes	0.000000	0.005	0.020
Heptanes	0.000000	0.000	0.000
Benzene	0.000000	0.031	0.136
n-C6	0.000000	0.014	0.063
Total:	1.000000	26658.280	116761.300

Pressure	955.000	[psia]
Temperature	109.626	[F]

AMINECalc Stream Results

Stream 3 Flash Gas Vent Flow from Flash Tank

	----- Controlled -----		----- Uncontrolled -----	
Component	[lb/h]	[ton/yr]	[lb/h]	[ton/yr]
H2S	0.000	0.000	0.000	0.000
CO2	0.092	0.405	0.092	0.405
MDEA	0.000	0.000	0.000	0.001
H2O	0.000	0.000	0.200	0.875
N2	0.000	0.000	1.199	5.250
C1	0.000	0.000	11.613	50.865
C2	0.000	0.000	2.535	11.104
C3	0.000	0.000	2.047	8.966
i-C4	0.000	0.000	0.020	0.087
n-C4	0.000	0.000	0.046	0.200
i-C5	0.000	0.000	0.014	0.061
n-C5	0.000	0.000	0.014	0.063
Hexanes	0.000	0.000	0.004	0.020
Heptanes	0.000	0.000	0.000	0.000
Benzene	0.000	0.000	0.005	0.020
n-C6	0.000	0.000	0.014	0.060
Total:	0.092	0.405	17.803	77.975

Pressure	90.000	[psia]
Temperature	109.626	[F]

Stream 4 Rich Amine Feed to Regenerator

Component	Mol Fraction	[lb/h]	[ton/yr]
H2S	0.000000	0.000	0.000
CO2	0.014390	534.172	2339.634
MDEA	0.130360	13106.030	57403.430
H2O	0.855130	12998.370	56931.880
N2	0.000000	0.064	0.280
C1	0.000100	1.299	5.688
C2	0.000010	0.310	1.357
C3	0.000010	0.208	0.913
i-C4	0.000000	0.000	0.000
n-C4	0.000000	0.000	0.001
i-C5	0.000000	0.000	0.000
n-C5	0.000000	0.000	0.000
Hexanes	0.000000	0.000	0.001
Heptanes	0.000000	0.000	0.000
Benzene	0.000000	0.026	0.116
n-C6	0.000000	0.001	0.003
Total:	1.000000	26640.480	116683.300

Pressure	90.000	[psia]
Temperature	109.626	[F]

AMINECalc Stream Results

Stream 5 Acid Gas Flow from Regenerator

	----- Controlled -----		----- Uncontrolled -----	
Component	[lb/h]	[ton/yr]	[lb/h]	[ton/yr]
H2S	0.000	0.000	0.000	0.000
CO2	509.971	2233.636	509.971	2233.636
MDEA	0.000	0.000	0.000	0.000
H2O	0.000	0.000	0.000	0.000
N2	0.000	0.000	0.064	0.280
C1	0.000	0.000	1.299	5.688
C2	0.000	0.000	0.310	1.357
C3	0.000	0.000	0.208	0.913
i-C4	0.000	0.000	0.000	0.000
n-C4	0.000	0.000	0.000	0.001
i-C5	0.000	0.000	0.000	0.000
n-C5	0.000	0.000	0.000	0.000
Hexanes	0.000	0.000	0.000	0.001
Heptanes	0.000	0.000	0.000	0.000
Benzene	0.000	0.000	0.026	0.116
n-C6	0.000	0.000	0.001	0.003
Total:	509.971	2233.636	511.880	2241.996

Pressure	N/A	[psia]
Temperature	N/A	[F]

Stream 6 Lean Amine from Regenerator

Component	Mol Fraction	[lb/h]	[ton/yr]
H2S	0.000000	0.000	0.000
CO2	0.000660	24.201	105.998
MDEA	0.131250	13106.110	57403.780
H2O	0.868090	13106.110	57403.780
N2	0.000000	0.000	0.000
C1	0.000000	0.000	0.000
C2	0.000000	0.000	0.000
C3	0.000000	0.000	0.000
i-C4	0.000000	0.000	0.000
n-C4	0.000000	0.000	0.000
i-C5	0.000000	0.000	0.000
n-C5	0.000000	0.000	0.000
Hexanes	0.000000	0.000	0.000
Heptanes	0.000000	0.000	0.000
Benzene	0.000000	0.000	0.000
n-C6	0.000000	0.000	0.000
Total:	1.000000	26236.420	114913.600

Pressure	975.000	[psia]
Temperature	120.000	[F]

AMINECalc Stream Results

Stream 7 Sweet Gas Flow from Absorber

Component	Mol Fraction	[lb/h]	[ton/yr]
H2S	0.000000	0.000	0.000
CO2	0.003290	396.084	1734.818
MDEA	0.000000	0.080	0.349
H2O	0.002180	107.543	471.028
N2	0.087590	6718.839	29428.020
C1	0.744700	32715.100	143289.700
C2	0.079970	6584.633	28840.200
C3	0.051920	6268.951	27457.540
i-C4	0.007290	1160.831	5084.355
n-C4	0.016750	2665.956	11676.690
i-C5	0.002860	564.225	2471.265
n-C5	0.002990	591.357	2590.100
Hexanes	0.000160	38.553	168.860
Heptanes	0.000010	3.025	13.252
Benzene	0.000010	1.470	6.438
n-C6	0.000280	66.930	293.146
Total:	1.000000	57883.580	253525.800

Pressure	975.000	[psia]
Temperature	124.258	[F]

STREAM NUMBER	10 TOTAL	10 VAPOR	10 LIQ A	11 TOTAL Treater Feed
	MOLE %	MOLE %	MOLE %	MOLE %
WATER	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
HELIUM	0.3351	0.3874	3.0424E-02	0.3874
NITROGEN	7.341	8.352	1.439	8.352
CARBON DIOXIDE	0.7270	0.7501	0.5924	0.7501
METHANE	67.89	74.32	30.36	74.32
ETHANE	8.570	7.981	12.01	7.981
PROPANE	7.304	5.181	19.70	5.181
I-BUTANE	1.418	0.7276	5.446	0.7276
N-BUTANE	3.750	1.671	15.88	1.671
I-PENTANE	1.043	0.2849	5.465	0.2849
N-PENTANE	1.193	0.2986	6.410	0.2986
N-HEXANE	0.2782	2.8301E-02	1.736	2.8301E-02
HYDROGEN SULFIDE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
BENZENE	6.5447E-03	7.2890E-04	4.0479E-02	7.2890E-04
TOLUENE	6.5211E-04	2.6967E-05	4.2998E-03	2.6968E-05
P-XYLENE	2.5036E-05	4.2331E-07	1.6865E-04	4.2331E-07
ETHYLBENZENE	0.0000E+00	0.0000E+00	0.0000E+00	0.0000E+00
CYCLOPENTANE	7.7471E-02	1.4404E-02	0.4455	1.4404E-02
CYCLOHEXANE	3.9199E-02	3.7961E-03	0.2458	3.7961E-03
METHYLCYCLOHEXANE	6.5072E-03	3.3631E-04	4.2514E-02	3.3631E-04
N-HEPTANE	2.2751E-02	1.0941E-03	0.1491	1.0941E-03
N-OCTANE	7.8711E-04	1.8620E-05	5.2712E-03	1.8620E-05
TEMPERATURE F	50.0	50.0	50.0	50.0
PRESSURE PSIA	955.0	955.0	955.0	955.0
PERCENT LIQUID(A) %	14.6	0.0	100.0	0.0
PERCENT LIQUID(B) %	0.0	0.0	0.0	0.0
FLOW LBMOL/HR	2872.0	2451.8	420.2	2451.8
FLOW LB/HR	69090.9	51845.8	17245.1	51845.8
MOLE WT LB/LBMOLE	24.1	21.1	41.0	21.1
DENSITY LB/FT^3	5.8807	4.6300	31.3070	4.6300
Z FACTOR	0.7144	0.7976	0.2289	0.7976
FLOW ACFH	11748.7	11197.8	550.8	11197.8
FLOW MMSCFD	0.0000	22.3297	0.0000	22.3297
FLOW GPM	0.0000	0.0000	68.6759	0.0000
STD FLOW GPM @60F	0.0000	0.0000	69.4860	0.0000
STD FLOW BBL/D @60F	0.0	0.0	2382.4	0.0
ENTHALPY BTU/HR	8.438E+06	8.523E+06	-8.520E+04	8.523E+06
ENTHALPY BTU/LB	122.1	164.4	-4.9	164.4
CP BTU/F LB	0.0000	0.6536	0.6628	0.6536
IDEAL GAS CP/CV	1.2263	1.2559	1.1351	1.2559
VISCOSITY CP	0.00000	0.01310	0.08964	0.01310
K BTU/FT HR F	0.00000	0.02075	0.07806	0.02075
SURTN DYNES/CM	0.00	0.00	4.37	0.00
GRS V HTVAL BTU/FT^3	0.0	1125.7	0.0	1125.7
NET V HTVAL BTU/FT^3	0.0	1021.1	0.0	1021.1
FROM BLOCK	EXCH8.0	EXCH8.0	EXCH8.0	FLSH9.0
TO BLOCK	FLSH9.0	FLSH9.0	FLSH9.0	OUTLET

SHAMROCK GAS ANALYSIS
1100 South Madden
Shamrock, Texas 79079
(806)256-3249

GAS ANALYSIS REPORT NO: D27648X/A **DATE:** 24-Aug-07

FOR: Thurmond McGlothlin
Attn: Conoco Phillips
P.O. Box 2358
Pampa, Texas
79065

SAMPLE IDENTIFICATION

COMP: Thrumond McGlothlin
FIELD: Not/Rec
LEASE: Burnett Station Discharge
STA. #: Not/Rec

SAMPLE DATA

DATE: 21-Aug-07 **BY:** Not/Rec
PRES: 154 **psig** **TEMP:** 107 **Deg. F.** **FIELD GRAVITY:**
FLOW: **MCF/D** **DIFF:** **IN. Hg** **DEW POINT** **LBS H2O**
REMARKS: Field H2S: 9.0 PPM Oxygen Mol %: 0.0364%
Helium Mol %: 0.346% Hydrogen Mol %: 0.003%

CYL # : 10 **LAB # :** D27648X/A

COMPONENT ANALYSIS

COMPONENTS		MOL PERCENT	GPM @ 14.650 psia
HYDROGEN SULFIDE	(H2S)	0.00	
CARBON DIOXIDE	(CO2)	0.67	
NITROGEN	(N2)	7.46	
METHANE	(C1)	66.38	
ETHANE	(C2)	7.46	1.982
PROPANE	(C3)	7.31	2.003
ISOBUTANE	(IC4)	1.60	0.521
N-BUTANE	(NC4)	4.45	1.397
ISOPENTANE	(IC5)	1.49	0.543
N-PENTANE	(NC5)	1.78	0.641
HEXANES PLUS	(C6+)	1.40	0.548
TOTALS		100.00	

MOLECULAR WEIGHT: 25.584

ETHANE+ GPM: 7.635
PROPANE+ GPM: 5.653
ISO-PENTANE+ GPM: 1.732

Compressibility Factor (Z): 0.9950

Specific Gravity @ 60 Deg. F. (real): 0.883

BTU / CU. FT. @ 60 Deg. F., 14.650 **PSIA (REAL):**
DRY 1383.2
WET 1359.0

SHAMROCK GAS ANALYSIS
1100 South Madden
Shamrock, Texas 79079
(806) 256-2249

HEAVY END BREAKDOWN		
C6	HEXANES:	0.9736
C7	HEPTANES:	0.3834
C8	OCTANES:	0.0376
C9	NONANE:	0.0004
C10	DECANE:	0.0000
C11	UNDECANE:	0.0000
C12	ISODODECANE:	0.0000
		=======
TOTAL C6+		1.3950

BTEX BREAKDOWN		
	MOL %	*WT.%*
BENZENE:	0.0148	0.0453
TOLUENE:	0.0035	0.0126
ETHYLBENZENE:	0.0000	0.0000
XYLENES:	0.0004	0.0017

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Grey Badger, Carson County, TX
File Name: U:\CLIENTS\Midstream Energy Services\Texas Permit\Grey Badger EG System.ddf
Date: August 30, 2007

DESCRIPTION:

Description: 25 MMscfd EG Injection system
50 F HC Dewpoint
1.78 gpm of 80 wt% EG

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0942	2.262	0.4128
Ethane	0.0821	1.970	0.3594
Propane	0.1201	2.882	0.5259
Isobutane	0.0198	0.476	0.0869
n-Butane	0.0726	1.742	0.3178
Isopentane	0.0245	0.587	0.1072
n-Pentane	0.0280	0.673	0.1227
Cyclopentane	0.0155	0.372	0.0680
n-Hexane	0.0049	0.117	0.0213
Cyclohexane	0.0108	0.259	0.0472
Other Hexanes	0.0091	0.218	0.0398
Heptanes	0.0005	0.012	0.0023
Methylcyclohexane	0.0008	0.019	0.0035
Benzene	0.0116	0.278	0.0507
Toluene	0.0015	0.035	0.0064
Xylenes	0.0001	0.002	0.0004
C8+ Heavies	<0.0001	<0.001	<0.0001
Total Emissions	0.4960	11.904	2.1725
Total Hydrocarbon Emissions	0.4960	11.904	2.1725
Total VOC Emissions	0.3197	7.673	1.4003
Total HAP Emissions	0.0180	0.433	0.0789
Total BTEX Emissions	0.0132	0.316	0.0576

FLASH GAS EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0464	1.114	0.2033
Ethane	0.0185	0.443	0.0809
Propane	0.0125	0.301	0.0549

Isobutane	0.0020	0.047	0.0086
n-Butane	0.0052	0.124	0.0227
Isopentane	0.0013	0.030	0.0055
n-Pentane	0.0011	0.027	0.0049
Cyclopentane	0.0001	0.003	0.0005
n-Hexane	0.0001	0.003	0.0005
Cyclohexane	<0.0001	0.001	0.0002
Other Hexanes	0.0003	0.007	0.0013
Heptanes	<0.0001	<0.001	<0.0001
Methylcyclohexane	<0.0001	<0.001	<0.0001
Benzene	<0.0001	<0.001	<0.0001
Toluene	<0.0001	<0.001	<0.0001
Xylenes	<0.0001	<0.001	<0.0001
C8+ Heavies	<0.0001	<0.001	<0.0001
Total Emissions	0.0876	2.102	0.3835
Total Hydrocarbon Emissions	0.0876	2.102	0.3835
Total VOC Emissions	0.0227	0.544	0.0994
Total HAP Emissions	0.0001	0.003	0.0006
Total BTEX Emissions	<0.0001	<0.001	0.0001

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.9281	22.275	4.0652
Ethane	0.3695	8.868	1.6184
Propane	0.2509	6.021	1.0988
Isobutane	0.0393	0.942	0.1720
n-Butane	0.1037	2.488	0.4541
Isopentane	0.0251	0.602	0.1098
n-Pentane	0.0225	0.541	0.0987
Cyclopentane	0.0022	0.054	0.0098
n-Hexane	0.0024	0.058	0.0105
Cyclohexane	0.0010	0.023	0.0042
Other Hexanes	0.0061	0.147	0.0269
Heptanes	0.0002	0.004	0.0007
Methylcyclohexane	0.0001	0.002	0.0003
Benzene	0.0002	0.005	0.0010
Toluene	<0.0001	<0.001	0.0001
Xylenes	<0.0001	<0.001	<0.0001
C8+ Heavies	<0.0001	<0.001	<0.0001
Total Emissions	1.7513	42.031	7.6706
Total Hydrocarbon Emissions	1.7513	42.031	7.6706
Total VOC Emissions	0.4537	10.888	1.9870
Total HAP Emissions	0.0026	0.064	0.0116
Total BTEX Emissions	0.0002	0.006	0.0011

EQUIPMENT REPORTS:

COLD SEPARATOR

Cold Separator Temperature:	30.0 deg. F
Cold Separator Pressure:	975.0 psig
Dry Gas Flow Rate:	25.0000 MMSCF/day
Calculated Dry Gas Dew Point:	3.22 lbs. H2O/MMSCF
Glycol Losses with Dry Gas:	0.5427 lb/hr
Wet Gas Water Content:	Saturated
Calculated Wet Gas Water Content:	80.59 lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	1.33 gal/lb H2O
Produced Liquid:	2.48e+003 bbls/day
Glycol Losses in Produced Liquids:	19.3811 lb/hr

Component	Remaining in Dry Gas	Absorbed or Condensed
Water	3.20%	96.80%
Carbon Dioxide	83.89%	16.11%
Nitrogen	97.63%	2.37%
Methane	91.95%	8.05%
Ethane	82.39%	17.61%
Propane	46.01%	53.99%
Isobutane	29.82%	70.18%
n-Butane	23.03%	76.97%
Isopentane	14.13%	85.87%
n-Pentane	9.00%	91.00%
Cyclopentane	6.09%	93.91%
n-Hexane	4.07%	95.93%
Cyclohexane	3.03%	96.97%
Other Hexanes	6.30%	93.70%
Heptanes	0.85%	99.15%
Methylcyclohexane	1.06%	98.94%
Benzene	3.09%	96.91%
Toluene	1.13%	98.87%
Xylenes	0.44%	99.56%
C8+ Heavies	0.17%	99.83%

FLASH TANK

Flash Control:	Combustion device
Flash Control Efficiency:	95.00 %
Flash Temperature:	80.0 deg. F
Flash Pressure:	75.0 psig

Component	Left in Oil and Glycol	Removed in Flash Gas
Water	100.00%	0.00%
Carbon Dioxide	70.86%	29.14%
Nitrogen	6.88%	93.12%
Methane	9.22%	90.78%
Ethane	18.17%	81.83%
Propane	32.37%	67.63%

Isobutane	33.57%	66.43%
n-Butane	41.17%	58.83%
Isopentane	49.65%	50.35%
n-Pentane	55.65%	44.35%
Cyclopentane	87.43%	12.57%
n-Hexane	67.12%	32.88%
Cyclohexane	92.02%	7.98%
Other Hexanes	60.08%	39.92%
Heptanes	77.13%	22.87%
Methylcyclohexane	91.32%	8.68%
Benzene	98.19%	1.81%
Toluene	98.81%	1.19%
Xylenes	99.43%	0.57%
C8+ Heavies	89.30%	10.70%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	86.27%	13.73%
Carbon Dioxide	0.00%	100.00%
Nitrogen	0.00%	100.00%
Methane	0.00%	100.00%
Ethane	0.00%	100.00%
Propane	0.00%	100.00%
Isobutane	0.00%	100.00%
n-Butane	0.00%	100.00%
Isopentane	1.01%	98.99%
n-Pentane	0.90%	99.10%
Cyclopentane	0.57%	99.43%
n-Hexane	0.74%	99.26%
Cyclohexane	3.48%	96.52%
Other Hexanes	1.66%	98.34%
Heptanes	0.65%	99.35%
Methylcyclohexane	4.38%	95.62%
Benzene	5.09%	94.91%
Toluene	8.00%	92.00%
Xylenes	12.97%	87.03%
C8+ Heavies	13.44%	86.56%

STREAM REPORTS:

WET GAS STREAM

Temperature: 110.00 deg. F
Pressure: 994.70 psia
Flow Rate: 1.30e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.70e-001	1.05e+002
Carbon Dioxide	6.69e-001	1.01e+003
Nitrogen	7.45e+000	7.14e+003
Methane	6.63e+001	3.64e+004
Ethane	7.45e+000	7.67e+003
Propane	7.30e+000	1.10e+004
Isobutane	1.60e+000	3.18e+003
n-Butane	4.44e+000	8.84e+003
Isopentane	1.49e+000	3.67e+003
n-Pentane	1.78e+000	4.39e+003
Cyclopentane	1.31e-001	3.16e+002
n-Hexane	3.57e-001	1.05e+003
Cyclohexane	1.03e-001	2.95e+002
Other Hexanes	6.52e-001	1.92e+003
Heptanes	1.03e-001	3.52e+002
Methylcyclohexane	2.88e-002	9.69e+001
Benzene	1.49e-002	3.98e+001
Toluene	3.49e-003	1.10e+001
Xylenes	4.05e-004	1.47e+000
C8+ Heavies	5.31e-003	3.10e+001
Total Components	100.00	8.75e+004

DRY GAS STREAM

Temperature: 30.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.04e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	6.78e-003	3.35e+000
Carbon Dioxide	7.00e-001	8.45e+002
Nitrogen	9.07e+000	6.97e+003
Methane	7.60e+001	3.35e+004
Ethane	7.65e+000	6.32e+003
Propane	4.19e+000	5.07e+003
Isobutane	5.94e-001	9.47e+002
n-Butane	1.28e+000	2.04e+003
Isopentane	2.62e-001	5.19e+002
n-Pentane	1.99e-001	3.95e+002
Cyclopentane	9.99e-003	1.92e+001
n-Hexane	1.81e-002	4.28e+001
Cyclohexane	3.87e-003	8.94e+000
Other Hexanes	5.12e-002	1.21e+002
Heptanes	1.08e-003	2.98e+000
Methylcyclohexane	3.82e-004	1.03e+000
Benzene	5.72e-004	1.23e+000
Toluene	4.92e-005	1.24e-001
Xylenes	2.21e-006	6.44e-003
C8+ Heavies	1.11e-005	5.20e-002

Total Components	100.00	5.68e+004

LEAN GLYCOL STREAM

Temperature: 110.00 deg. F
Flow Rate: 1.78e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)
EG	8.00e+001	7.75e+002
Water	2.00e+001	1.94e+002
Carbon Dioxide	9.71e-012	9.40e-011
Nitrogen	1.95e-012	1.89e-011
Methane	3.55e-018	3.44e-017
Ethane	2.20e-008	2.13e-007
Propane	1.56e-009	1.51e-008
Isobutane	1.83e-010	1.77e-009
n-Butane	4.51e-010	4.37e-009
Isopentane	2.57e-005	2.49e-004
n-Pentane	2.62e-005	2.54e-004
Cyclopentane	9.21e-006	8.92e-005
n-Hexane	3.77e-006	3.65e-005
Cyclohexane	4.01e-005	3.89e-004
Other Hexanes	1.59e-005	1.54e-004
Heptanes	3.47e-007	3.36e-006
Methylcyclohexane	3.79e-006	3.67e-005
Benzene	6.42e-005	6.21e-004
Toluene	1.32e-005	1.28e-004
Xylenes	1.55e-006	1.50e-005
C8+ Heavies	1.10e-008	1.06e-007
Total Components	100.00	9.68e+002

RICH GLYCOL STREAM

Temperature: 30.00 deg. F
Pressure: 989.70 psia
Flow Rate: 1.81e+000 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
EG	7.68e+001	7.55e+002
Water	2.28e+001	2.25e+002
Carbon Dioxide	9.57e-002	9.40e-001
Nitrogen	1.92e-002	1.89e-001
Methane	1.04e-001	1.02e+000
Ethane	4.59e-002	4.52e-001
Propane	3.77e-002	3.71e-001
Isobutane	6.01e-003	5.91e-002
n-Butane	1.79e-002	1.76e-001
Isopentane	5.07e-003	4.98e-002

n-Pentane	5.17e-003	5.08e-002
Cyclopentane	1.82e-003	1.78e-002
n-Hexane	7.44e-004	7.31e-003
Cyclohexane	1.24e-003	1.21e-002
Other Hexanes	1.56e-003	1.54e-002
Heptanes	6.83e-005	6.71e-004
Methylcyclohexane	9.33e-005	9.17e-004
Benzene	1.26e-003	1.24e-002
Toluene	1.65e-004	1.62e-003
Xylenes	1.18e-005	1.16e-004
C8+ Heavies	9.00e-008	8.84e-007
Total Components	100.00	9.83e+002

COLD SEPARATOR OIL STREAM

Temperature: 30.00 deg. F
Flow Rate: 7.22e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
EG	6.30e-002	1.94e+001
Water	2.29e-001	7.05e+001
Carbon Dioxide	5.25e-001	1.61e+002
Nitrogen	5.51e-001	1.69e+002
Methane	9.52e+000	2.93e+003
Ethane	4.39e+000	1.35e+003
Propane	1.93e+001	5.95e+003
Isobutane	7.25e+000	2.23e+003
n-Butane	2.21e+001	6.80e+003
Isopentane	1.03e+001	3.15e+003
n-Pentane	1.30e+001	3.99e+003
Cyclopentane	9.64e-001	2.96e+002
n-Hexane	3.28e+000	1.01e+003
Cyclohexane	9.32e-001	2.86e+002
Other Hexanes	5.86e+000	1.80e+003
Heptanes	1.13e+000	3.49e+002
Methylcyclohexane	3.12e-001	9.59e+001
Benzene	1.25e-001	3.85e+001
Toluene	3.54e-002	1.09e+001
Xylenes	4.77e-003	1.47e+000
C8+ Heavies	1.01e-001	3.09e+001
Total Components	100.00	3.07e+004

FLASH TANK OFF GAS STREAM

Temperature: 80.00 deg. F
Pressure: 89.70 psia
Flow Rate: 3.49e+001 scfh

Component	Conc.	Loading

	(vol%)	(lb/hr)
Water	3.08e-001	5.10e-003
Carbon Dioxide	6.77e+000	2.74e-001
Nitrogen	6.84e+000	1.76e-001
Methane	6.30e+001	9.28e-001
Ethane	1.34e+001	3.69e-001
Propane	6.19e+000	2.51e-001
Isobutane	7.35e-001	3.93e-002
n-Butane	1.94e+000	1.04e-001
Isopentane	3.78e-001	2.51e-002
n-Pentane	3.40e-001	2.25e-002
Cyclopentane	3.48e-002	2.24e-003
n-Hexane	3.03e-002	2.40e-003
Cyclohexane	1.25e-002	9.69e-004
Other Hexanes	7.75e-002	6.14e-003
Heptanes	1.67e-003	1.54e-004
Methylcyclohexane	8.83e-004	7.96e-005
Benzene	3.14e-003	2.25e-004
Toluene	2.27e-004	1.93e-005
Xylenes	6.75e-006	6.58e-007
C8+ Heavies	6.04e-007	9.46e-008
Total Components	100.00	2.21e+000

FLASH TANK OIL STREAM

Temperature: 80.00 deg. F

The calculated flow rate is less than 0.000001 #mol/hr.
The stream flow rate and composition are not reported.

FLASH TANK GLYCOL STREAM

Temperature: 80.00 deg. F
Flow Rate: 1.81e+000 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
EG	7.70e+001	7.55e+002	769821.
Water	2.29e+001	2.25e+002	228979.
Carbon Dioxide	6.79e-002	6.66e-001	679.
Nitrogen	1.33e-003	1.30e-002	13.
Methane	9.61e-003	9.42e-002	96.
Ethane	8.37e-003	8.21e-002	84.
Propane	1.22e-002	1.20e-001	122.
Isobutane	2.02e-003	1.98e-002	20.
n-Butane	7.40e-003	7.26e-002	74.
Isopentane	2.52e-003	2.47e-002	25.
n-Pentane	2.88e-003	2.83e-002	29.
Cyclopentane	1.59e-003	1.56e-002	16.
n-Hexane	5.00e-004	4.91e-003	5.
Cyclohexane	1.14e-003	1.12e-002	11.
Other Hexanes	9.42e-004	9.24e-003	9.

Heptanes	5.28e-005	5.18e-004	1.
Methylcyclohexane	8.54e-005	8.38e-004	1.
Benzene	1.24e-003	1.22e-002	12.
Toluene	1.63e-004	1.60e-003	2.
Xylenes	1.18e-005	1.16e-004	0.
C8+ Heavies	8.05e-008	7.90e-007	0.
Total Components	100.00	9.81e+002	1000003.

FLASH GAS EMISSIONS

Flow Rate: 1.17e+002 scfh
Control Method: Combustion Device
Control Efficiency: 95.00

Component	Conc. (vol%)	Loading (lb/hr)
Water	5.96e+001	3.30e+000
Carbon Dioxide	3.71e+001	5.02e+000
Nitrogen	2.04e+000	1.76e-001
Methane	9.41e-001	4.64e-002
Ethane	2.00e-001	1.85e-002
Propane	9.25e-002	1.25e-002
Isobutane	1.10e-002	1.96e-003
n-Butane	2.90e-002	5.18e-003
Isopentane	5.65e-003	1.25e-003
n-Pentane	5.08e-003	1.13e-003
Cyclopentane	5.20e-004	1.12e-004
n-Hexane	4.53e-004	1.20e-004
Cyclohexane	1.87e-004	4.85e-005
Other Hexanes	1.16e-003	3.07e-004
Heptanes	2.49e-005	7.68e-006
Methylcyclohexane	1.32e-005	3.98e-006
Benzene	4.69e-005	1.13e-005
Toluene	3.40e-006	9.63e-007
Xylenes	1.01e-007	3.29e-008
C8+ Heavies	9.03e-009	4.73e-009
Total Components	100.00	8.58e+000

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 6.61e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.83e+001	3.08e+001
Carbon Dioxide	8.69e-001	6.66e-001
Nitrogen	2.66e-002	1.30e-002
Methane	3.37e-001	9.42e-002
Ethane	1.57e-001	8.21e-002

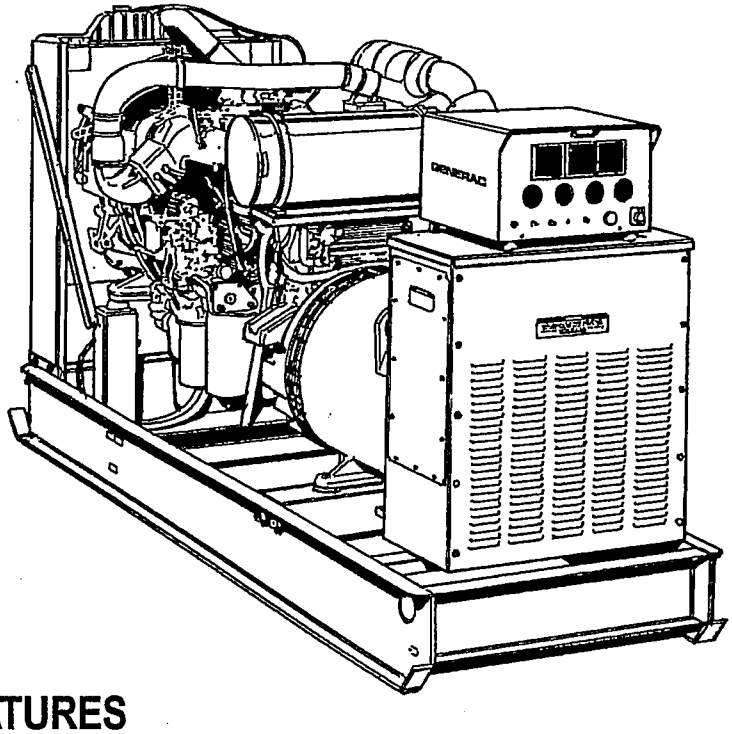
Propane	1.56e-001	1.20e-001
Isobutane	1.96e-002	1.98e-002
n-Butane	7.17e-002	7.26e-002
Isopentane	1.95e-002	2.45e-002
n-Pentane	2.23e-002	2.80e-002
Cyclopentane	1.27e-002	1.55e-002
n-Hexane	3.24e-003	4.87e-003
Cyclohexane	7.36e-003	1.08e-002
Other Hexanes	6.05e-003	9.08e-003
Heptanes	2.95e-004	5.14e-004
Methylcyclohexane	4.68e-004	8.01e-004
Benzene	8.51e-003	1.16e-002
Toluene	9.17e-004	1.47e-003
Xylenes	5.44e-005	1.01e-004
C8+ Heavies	2.30e-007	6.84e-007
Total Components	100.00	3.20e+001

SG150
SG175

Liquid Cooled Gas Engine Generator Sets

Standby Power Rating
150KW 60 Hz / 150KVA 50 Hz
175KW 60 Hz / 175KVA 50 Hz

Prime Power Rating
123KW 60 Hz / 135KVA 50 Hz
144KW 60 Hz / 158KVA 50 Hz



Power Matched
GENERAC 13.3GTA ENGINE
Turbocharged/Aftercooled

FEATURES

- **INNOVATIVE DESIGN & PROTOTYPE TESTING** are key components of GENERAC'S success in "IMPROVING POWER BY DESIGN." But it doesn't stop there. Total commitment to component testing, reliability testing, environmental testing, destruction and life testing, plus testing to applicable CSA, NEMA, EGSA, and other standards, allows you to choose GENERAC POWER SYSTEMS with the confidence that these systems will provide superior performance.

- **TEST CRITERIA:**
  - ✓ PROTOTYPE TESTED
  - ✓ SYSTEM TORSIONAL TESTED
  - ✓ ELECTRO-MAGNETIC INTERFERENCE
  - ✓ NEMA MG1 EVALUATION
  - ✓ MOTOR STARTING ABILITY
  - ✓ SHORT CIRCUIT TESTING
  - ✓ UL2200 COMPLIANCE AVAILABLE

- **SOLID-STATE, FREQUENCY COMPENSATED VOLTAGE REGULATION.** This state-of-the-art power maximizing regulation system is standard on all Generac models. It provides optimized FAST RESPONSE to changing load conditions and MAXIMUM MOTOR STARTING CAPABILITY by electronically torque-matching the surge loads to the engine.

- **SINGLE SOURCE SERVICE RESPONSE** from Generac's dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component. You are never on your own when you own a GENERAC POWER SYSTEM.

- **GENERAC TRANSFER SWITCHES, SWITCHGEAR AND ACCESSORIES.** Long life and reliability is synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is that the GENERAC product line includes its own transfer systems, accessories, switchgear and controls for total system compatibility.

GENERAC®
POWER SYSTEMS, INC.

APPLICATION & ENGINEERING DATA

SG150/SG175

GENERATOR SPECIFICATIONS

TYPE	Four-pole, revolving field
ROTOR INSULATION	Class H
STATOR INSULATION	Class H
TOTAL HARMONIC DISTORTION	<3%
TELEPHONE INTERFERENCE FACTOR (TIF)	<30
SHORT CIRCUIT CURRENT	300%
ALTERNATOR	Self-ventilated and drip-proof
BEARINGS (PRE-LUBED & SEALED)	1
COUPLING	Direct, Flexible Disc
LOAD CAPACITY (STANDBY)	100%
LOAD CAPACITY (PRIME)	110%

NOTE: Emergency loading in compliance with NFPA 99, NFPA 110, paragraph 5-13.2.6. Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046 and DIN6271 standards.

EXCITATION SYSTEM

PERMANENT MAGNET EXCITER	Eighteen pole exciter ✓
	Magnetically coupled DC current ✓
	Mounted outboard of main bearing ✓
REGULATION	Solid-state ✓
	±1% regulation ✓

GENERATOR FEATURES

- Four pole, revolving field generator, directly connected to the engine shaft through a heavy-duty, flexible disc for permanent alignment.
- Generator meets the temperature rise standards for class "F" insulation as defined by NEMA MG1-32.6, while the insulation system meets the requirements for the higher class "H" rating.
- All prototype models have passed a three-phase symmetrical short circuit test to assure system protection and reliability.
- All prototype models are tested for motor starting ability by measuring the instantaneous voltage dip with a waveform data acquisition system.
- All models utilize an advanced wire harness design for reliable interconnection within the circuitry.
- Magnetic circuit, including amortisseur windings, tooth and skewed stator design, provides a minimal level of waveform distortion and an electromagnetic interference level which meets accepted requirements for standard AM radio, TV, and marine radio telephone applications.
- Voltage waveform deviation, total harmonic content of the AC waveform, and T.I.F. (Telephone Influence Factor) have been evaluated to acceptable standards in accordance with NEMA MG1-32.
- Alternator is self-ventilated and drip-proof constructed.
- Fully life-tested protective systems, including "field circuit and thermal overload protection" and optional main-line circuit breakers capable of handling full output capacity.
- System Torsional acceptability confirmed during Prototype Testing.

ENGINE SPECIFICATIONS

MAKE	GENERAC
MODEL	13.3GTA
CYLINDERS	6 in-line
DISPLACEMENT	13.3 Liter (811 cu. in.)
BORE	137 mm (5.39 in.)
STROKE	150 mm (5.91 in.)
COMPRESSION RATIO	10.5:1
INTAKE AIR	Turbocharged/Aftercooled
NUMBER OF MAIN BEARINGS	7
CONNECTING RODS	6-Carbon Steel
CYLINDER HEAD	Cast Iron with Overhead Valve
CYLINDER LINERS	Wet/Replaceable
IGNITION	Altronic CD1
PISTONS	Heat-Resistant Alloy with 4 Rings
CRANKSHAFT	Induction-Hardened, Die-Forged Carbon Steel

VALVE TRAIN

LIFTER TYPE	Solid
INTAKE VALVE MATERIAL	Special Heat Resistant Steel
EXHAUST VALVE MATERIAL	Inconel Alloy High Temp.
HARDENED VALVE SEATS	Hight Temp. Alloy Stellite Faced

ENGINE GOVERNOR

ELECTRONIC	Standard
FREQUENCY REGULATION, NO-LOAD TO FULL LOAD	0.5%
STEADY STATE REGULATION	±0.25%

LUBRICATION SYSTEM

TYPE OF OIL PUMP	Gear Driven
OIL FILTER	Full flow, cartridge
CRANKCASE CAPACITY	27 Liters (7.13 gal.)

COOLING SYSTEM

TYPE OF SYSTEM	Pressurized, closed recovery
WATER PUMP	Pre-lubed, self-sealing
TYPE OF FAN	Pusher
NUMBER OF FAN BLADES	6
DIAMETER OF FAN	30 in.
COOLANT HEATER	2-240V, 1000 W

FUEL SYSTEM

FUEL	
☐ Natural Gas	Standard
CARBURETOR	Down draft
SECONDARY FUEL REGULATOR	Nat. Gas
AUTOMATIC FUEL LOCKOFF SOLENOID	Standard
OPERATING FUEL PRESSURE SYSTEMS	7" to 15" H_2O
☐ OPTIONAL HIGH PRESSURE (2 to 20 PSI)	
LOW PRESSURE INPUT (7" to 15" H_2O)	Standard

ELECTRICAL SYSTEM

BATTERY CHARGE ALTERNATOR	20 Amps at 24 V
STARTER MOTOR	24 V
RECOMMENDED BATTERY	(2) - 12 V, 135 A.H., 40
GROUND POLARITY	Negative

Rating definitions - Standby: Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. (All ratings in accordance with BS5514, ISO3046 and DIN6271). Prime (Unlimited Running Time): Applicable for supplying electric power in lieu of commercially purchased power. Prime power is the maximum power available at variable load. A 10% overload capacity is available for 1 hour in 12 hours. (All ratings in accordance with BS5514, ISO3046, ISO8528 and DIN6271).

GENERAC®
POWER SYSTEMS, INC.

SG150/SG175

OPERATING DATA

	STANDBY				PRIME			
	SG150		SG175		SG150		SG175	
GENERATOR OUTPUT VOLTAGE/KW-60Hz	N.G.	Rated AMP	N.G.	Rated AMP	N.G.	Rated AMP	N.G.	Rated AMP
120/240V, 1-phase, 1.0 pf	100	417	120	500	100	417	120	500
120/208V, 3-phase, 0.8 pf	150	521	175	608	123	427	144	500
120/240V, 3-phase, 0.8 pf	150	452	175	527	123	370	144	434
277/480V, 3-phase, 0.8 pf	150	226	175	263	123	185	144	217
600V, 3-phase, 0.8 pf	150	181	175	211	123	148	144	173
NOTE: Consult your Generac dealer for additional voltages.								
GENERATOR OUTPUT VOLTAGE/KVA-50Hz	N.G.	Rated AMP	N.G.	Rated AMP	N.G.	Rated AMP	N.G.	Rated AMP
110/220V, 1-phase, 1.0 pf	100	455	120	545	100	455	120	545
115/200V, 3-phase, 0.8 pf	150	434	175	506	135	390	158	457
100/200V, 3-phase, 0.8 pf	150	434	175	506	135	390	158	457
231/400V, 3-phase, 0.8 pf	150	217	175	253	135	195	158	228
480V, 3-phase, 0.8 pf	150	181	175	211	135	163	158	190
NOTE: Consult your Generac dealer for additional voltages.								
MOTOR STARTING KVA								
Maximum at 35% instantaneous voltage dip	240V	480V	240V	480V	240V	480V	240V	480V
with standard alternator—50/60 Hz	240/390	353/405	322/370	461/530	240/390	353/405	322/370	461/530
with optional alternator—50/60 Hz	797/960	1112/1340	797/960	1112/1340	797/960	1112/1340	797/960	1112/1340
FUEL	N.G.		N.G.		N.G.		N.G.	
Fuel consumption—60 Hz—100% Load								
$ft.^3$ hr.	1850		2200		1750		1800	
m^3 hr.	52		62		50		51	
Fuel consumption—50 Hz—100% Load								
$ft.^3$ hr.	1400		1675		1350		1400	
m^3 hr.	40		47		38		40	
COOLING								
Coolant capacity — System - lit. (US gal.)	29 (7.7)		29 (7.7)		29 (7.7)		29 (7.7)	
Engine - lit. (US gal.)	21 (5.6)		21 (5.6)		21 (5.6)		21 (5.6)	
Radiator - lit. (US gal.)	8 (2.1)		8 (2.1)		8 (2.1)		8 (2.1)	
Coolant flow/min. — 60 Hz (US gal.)	170 (45)		170 (45)		170 (45)		170 (45)	
50 Hz (US gal.)	142 (37.5)		142 (37.5)		142 (37.5)		142 (37.5)	
Heat rejection to coolant — BTU/hr	440,000		440,000		380,000		400,000	
Inlet air — 60 Hz - m^3/min. (cfm)	493 (17400)		493 (17400)		493 (17400)		493 (17400)	
50 Hz - m^3/min. (cfm)	410 (14500)		410 (14500)		410 (14500)		410 (14500)	
Max air temperature onto radiator °C (°F)	50 (122)		50 (122)		50 (122)		50 (122)	
Max. ambient air temperature °C (°F)	54 (130)		54 (130)		54 (130)		54 (130)	
COMBUSTION AIR REQUIREMENTS								
Flow at rated power 60 Hz - m^3/min. (cfm)	10.1 (358)		11.1 (392)		9.8 (345)		10.1 (358)	
50 Hz - m^3/min. (cfm)	8.8 (312)		9.7 (341)		8.5 (300)		8.8 (312)	
EXHAUST								
Exhaust flow at rated output 60 Hz - m^3/min. (cfm)	23.6 (833)		26.8 (945)		22.1 (778)		22.8 (803)	
50 Hz - m^3/min. (cfm)	20.6 (725)		23.3 (822)		19.2 (677)		19.8 (699)	
Maximum recommended back pressure Kpa(Hg)	5.0 (1.5")		5.0 (1.5")		5.0 (1.5")		5.0 (1.5")	
Exhaust temperature at rated output °F	1533		1542		1410		1507	
Exhaust outlet size I.D. (flange)	4"		4"		4"		4"	
ENGINE								
Rated RPM — 60 Hz / 50 Hz	1800 / 1500		1800 / 1500		1800 / 1500		1800 / 1500	
HP at rated KW — 60 Hz / 50 Hz	237 / 189		276 / 221		216 / 173		230 / 202	
Piston speed — 60 Hz - m/min. (ft./min.)	541 (1773)		541 (1773)		541 (1773)		541 (1773)	
50 Hz	451 (1477)		451 (1477)		451 (1477)		451 (1477)	
BMEP — 60 Hz / 50 Hz - psi	128 / 145		150 / 146		123 / 111		144 / 129	
DERATION FACTORS								
Temperature								
5% for every 10°C above - °C	43		43		43		43	
2.77% for every 10°F above - °F	110		110		110		110	
Altitude								
1.1% for every 100 m above - m	3049		2287		3049		2287	
3.5% for every 1000 ft. above - ft.	10,000		7500		10,000		7500	

STANDARD ENGINE & SAFETY FEATURES

SG150/SG175

- High Coolant Temperature Automatic Shutdown
- Low Coolant Level Automatic Shutdown
- Low Oil Pressure Automatic Shutdown
- Overspeed Automatic Shutdown (Solid-state)
- Crank Limiter (Solid-state)
- Oil Drain Extension
- Radiator Drain Extension
- Factory-Installed Cool Flow Radiator
- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Rubber-Booted Engine Electrical Connections
- Isochronous Governor
- Fuel Lockoff Solenoid
- Secondary Fuel Regulator (N.G. and L.P.)
- Stainless Steel Flexible Exhaust Connection
- Battery Charge Alternator
- Battery Cables
- Battery Tray
- Vibration Isolation of Unit to Mounting Base
- 24 Volt, Solenoid-Activated Starter Motor
- Air Cleaner
- Fan Guard
- Control Console
- Radiator Duct Adaptor

OPTIONS

- **OPTIONAL FUEL ACCESSORIES**
  - O Flexible Fuel Lines
- **OPTIONAL EXHAUST ACCESSORIES**
  - O Critical Exhaust Silencer
- **OPTIONAL ELECTRICAL ACCESSORIES**
  - O Battery, (2) - 12 Volt, 135 A.H., 4DLT
  - O Battery, (2) - 12 Volt, 225 A.H., 8D
  - O Battery Heater
  - O 2A Battery Charger
  - O 10A Dual Rate Battery Charger
- **OPTIONAL ALTERNATOR ACCESSORIES**
  - O Alternator Upsizing
  - O Alternator Strip Heater
  - O Alternator Tropicalization
  - O Voltage Changeover Switch
  - O Main Line Circuit Breaker
- **CONTROL CONSOLE OPTIONS**
  - O Analog Control "C" Panel (Bulletin 0151160SBY)
  - O Analog / Digital Control "E" Panel (Bulletin 0161310SBY)
- **ADDITIONAL OPTIONAL EQUIPMENT**
  - O Automatic Transfer Switch
  - O 3 Light Remote Annunciator
  - O 5 Light Remote Annunciator
  - O 20 Light Remote Annunciator
  - O Remote Relay Panels
  - O Unit Vibration Isolators
  - O Oil Make-Up System
  - O Oil Heater
  - O 5 Year Warranties
  - O Export Boxing
  - O GenLink® Communication Software
- **OPTIONAL ENCLOSURES**
  - O Weather Protective
  - O Sound Attenuated
  - O Aluminum and Stainless Steel
  - O Enclosed Muffler

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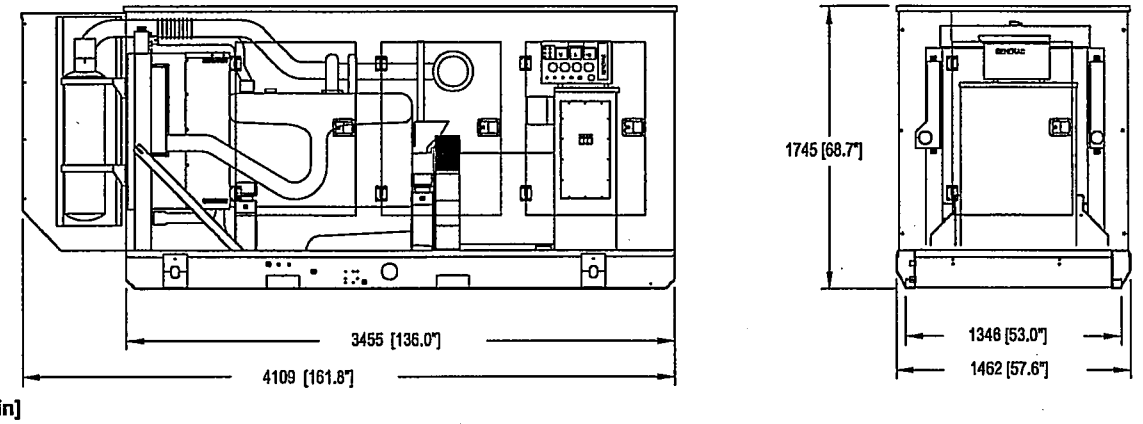
Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.



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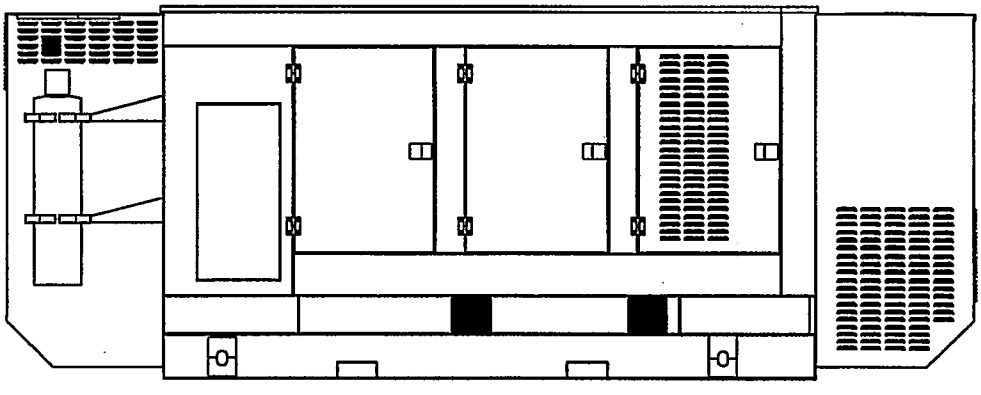
262/544-4811 • FAX 262/544-4851

Bulletin 0151900SBY / Printed in USA 6.97 rev: 11.02

SG275
SG300

Liquid Cooled Gas Engine Generator Sets

Standby Power Rating
275 KW 60 Hz / 275 KVA 50 Hz
300 KW 60 Hz / 300 KVA 50 Hz



Power Matched
GENERAC 13.3GTA ENGINE
Turbocharged/Aftercooled

FEATURES

- **INNOVATIVE DESIGN & PROTOTYPE TESTING** are key components of GENERAC'S success in "IMPROVING POWER BY DESIGN." But it doesn't stop there. Total commitment to component testing, reliability testing, environmental testing, destruction and life testing, plus testing to applicable CSA, NEMA, EGSA, and other standards, allows you to choose GENERAC POWER SYSTEMS with the confidence that these systems will provide superior performance.

- **TEST CRITERIA:**
  - ✓ PROTOTYPE TESTED
  - ✓ SYSTEM TORSIONAL TESTED
  - ✓ ELECTRO-MAGNETIC INTERFERENCE
  - ✓ NEMA MG1 EVALUATION
  - ✓ MOTOR STARTING ABILITY
  - ✓ SHORT CIRCUIT TESTING
  - ✓ UL2200 COMPLIANCE AVAILABLE

- **SOLID-STATE, FREQUENCY COMPENSATED VOLTAGE REGULATION.** This state-of-the-art power maximizing regulation system is standard on all Generac models. It provides optimized FAST RESPONSE to changing load conditions and MAXIMUM MOTOR STARTING CAPABILITY by electronically torque-matching the surge loads to the engine.

- **SINGLE SOURCE SERVICE RESPONSE** from Generac's dealer network provides parts and service know-how for the entire unit, from the engine to the smallest electronic component. You are never on your own when you own a GENERAC POWER SYSTEM.

- **GENERAC TRANSFER SWITCHES, SWITCHGEAR AND ACCESSORIES.** Long life and reliability is synonymous with GENERAC POWER SYSTEMS. One reason for this confidence is that the GENERAC product line includes its own transfer systems, accessories, switchgear and controls for total system compatibility.

GENERAC®
POWER SYSTEMS, INC.

APPLICATION & ENGINEERING DATA

SG275/SG300

GENERATOR SPECIFICATIONS

TYPE	Four-pole, revolving field
ROTOR INSULATION	Class H
STATOR INSULATION	Class H
TOTAL HARMONIC DISTORTION	<3%
TELEPHONE INTERFERENCE FACTOR (TIF)	<50
SHORT CIRCUIT CURRENT	300%
ALTERNATOR	Self-ventilated and drip-proof
BEARINGS (PRE-LUBED & SEALED)	1
COUPLING	Direct, Flexible Disc
LOAD CAPACITY (STANDBY)	100%
LOAD CAPACITY (PRIME)	110%

NOTE: Generator rating and performance in accordance with ISO8528-5, BS5514, SAE J1349, ISO3046 and DIN6271 standards.

EXCITATION SYSTEM

PERMANENT MAGNET EXCITER	Eighteen pole exciter ✓
	Magnetically coupled DC current ✓
	Mounted outboard of main bearing ✓
REGULATION	Solid-state ✓
	±1% regulation ✓

GENERATOR FEATURES

- Four pole, revolving field generator, connected to the engine shaft through a heavy-duty, gear drive.
- Generator meets the temperature rise standards for class "F" insulation as defined by NEMA MG1-32.6, while the insulation system meets the requirements for the higher class "H" rating.
- All prototype models have passed a three-phase symmetrical short circuit test to assure system protection and reliability.
- All prototype models are tested for motor starting ability by measuring the instantaneous voltage dip with a waveform data acquisition system.
- All models utilize an advanced wire harness design for reliable interconnection within the circuitry.
- Magnetic circuit, including amortisseur windings, tooth and skewed stator design, provides a minimal level of waveform distortion and an electromagnetic interference level which meets accepted requirements for standard AM radio, TV, and marine radio telephone applications.
- Voltage waveform deviation, total harmonic content of the AC waveform, and T.I.F. (Telephone Influence Factor) have been evaluated to acceptable standards in accordance with NEMA MG1-32.
- Alternator is self-ventilated and drip-proof constructed.
- Fully life-tested protective systems, including "field circuit and thermal overload protection" and optional main-line circuit breakers capable of handling full output capacity.
- System Torsional acceptability confirmed during Prototype Testing.

ENGINE SPECIFICATIONS

MAKE	GENERAC
MODEL	13.3GTA
CYLINDERS	6 in-line
DISPLACEMENT	13.3 Liter (811 cu. in.)
BORE	137 mm (5.39 in.)
STROKE	150 mm (5.91 in.)
COMPRESSION RATIO	10.5:1
INTAKE AIR	Turbocharged/Aftercooled
NUMBER OF MAIN BEARINGS	7
CONNECTING RODS	6-Carbon Steel
CYLINDER HEAD	Cast Iron with Overhead Valve
CYLINDER LINERS	Wet/Replaceable
IGNITION	Altronic CD1
PISTONS	Heat-Resistant Alloy with 4 Rings
CRANKSHAFT	Induction-Hardened, Die-Forged Carbon Steel

VALVE TRAIN

LIFTER TYPE	Solid
INTAKE VALVE MATERIAL	Special Heat Resistant Steel
EXHAUST VALVE MATERIAL	Inconel Alloy High Temp.
HARDENED VALVE SEATS	Hight Temp. Alloy Stellite Faced

ENGINE GOVERNOR

ELECTRONIC	Standard
FREQUENCY REGULATION, NO-LOAD TO FULL LOAD	Isochronous
STEADY STATE REGULATION	±0.25%

LUBRICATION SYSTEM

TYPE OF OIL PUMP	Gear Driven
OIL FILTER	Full flow, cartridge
CRANKCASE CAPACITY	27 Liters (7.13 gal.)

COOLING SYSTEM

TYPE OF SYSTEM	Pressurized, closed recovery
WATER PUMP	Pre-lubed, self-sealing
TYPE OF FAN	Pusher
NUMBER OF FAN BLADES	8
DIAMETER OF FAN	39 in.
COOLANT HEATER	240V, 2000 W

FUEL SYSTEM

FUEL	
❑ Natural Gas	Standard
CARBURETOR	Down draft
SECONDARY FUEL REGULATOR	Nat. Gas
AUTOMATIC FUEL LOCKOFF SOLENOID	Standard
OPERATING FUEL PRESSURE SYSTEMS	10" to 15" H_2O

ELECTRICAL SYSTEM

BATTERY CHARGE ALTERNATOR	20 Amps at 24 V
STARTER MOTOR	24 V
RECOMMENDED BATTERY	(2) - 12 V, 925 CCA, 31
GROUND POLARITY	Negative

Rating definitions - Standby: Applicable for supplying emergency power for the duration of the utility power outage. No overload capability is available for this rating. (All ratings in accordance with BS5514, ISO3046 and DIN6271). Prime (Unlimited Running Time): Applicable for supplying electric power in lieu of commercially purchased power. Prime power is the maximum power available at variable load. A 10% overload capacity is available for 1 hour in 12 hours. (All ratings in accordance with BS5514, ISO3046, ISO8528 and DIN6271).

GENERAC®
POWER SYSTEMS, INC.

SG275/SG300

OPERATING DATA		SG275		SG300	
GENERATOR OUTPUT VOLTAGE/KW-60Hz		KW	Rated AMP	KW	Rated AMP
120/208V, 3-phase, 0.8 pf	NOTE: Consult your Generac dealer for additional voltages.	275	954	300	1041
120/240V, 3-phase, 0.8 pf		275	827	300	902
277/480V, 3-phase, 0.8 pf		275	413	300	451
600V, 3-phase, 0.8 pf		275	331	300	361
MOTOR STARTING					
Maximum at 35% instantaneous voltage dip		208/240V	480V	208/240V	480V
with standard alternator—60 Hz		800 KVA	1060 KVA	800 KVA	1060 KVA
with optional alternator—60 Hz		1000 KVA	1350 KVA	1000 KVA	1350 KVA
FUEL		N.G.		N.G.	
Fuel consumption—60 Hz—100% Load	ft.³ hr.				
	No Load	906		906	
	25%	1557		1671	
	50%	2253		2376	
	75%	3000		3189	
	100%	3792		4100	
COOLING					
Coolant capacity	System lit. (US gal.)	56.8 (15)		56.8 (15)	
Coolant flow/min.	60 Hz US gal.	138		138)	
Heat rejection to coolant	BTU/hr.	1,046,600		1,048,250	
Inlet air	60 Hz (cfm)	19,200		19,200	
Max. operating air temp. onto radiator*	°C (°F)	60 (140)		60 (140)	
Max. operating ambient temp.*	°C (°F)	50 (122)		50 (122)	
Max. external pressure drop on rad.	in. H_2O	0.5		0.5	
COMBUSTION AIR REQUIREMENTS					
Flow at rated power	60 Hz m³/min. (cfm)	31.1 (1100)		34 (1200)	
EXHAUST					
Exhaust flow at rated output	60 Hz m³/min. (cfm)	112 (3960)		122 (4335)	
Max. recommended back pressure	Kpa (Hg)	5.0 (1.5")		5.0 (1.5")	
Exhaust temp. at rated output	°F	1470		1490	
Exhaust outlet size	(flange)	4" I.D.		4" I.D.	
ENGINE					
Rated RPM	60 Hz	2300		2300	
HP at rated KW	60 Hz	419		454	
Piston speed	60 Hz m/min. (ft./min.)	690 (2265)		690 (2265)	
BMEP	60 Hz	178		193	
DERATION FACTORS					
Temperature					
1.9% for every 10°C above - °C		40		40	
1.1% for every 10°F above - °F		104		104	
Altitude					
0.7% for every 100 m above - m		1220		1067	
2.1% for every 1000 ft. above - ft.		4000		3500	

STANDARD ENGINE & SAFETY FEATURES

SG275/SG300

- High Coolant Temperature Automatic Shutdown
- Low Coolant Level Automatic Shutdown
- Low Oil Pressure Automatic Shutdown
- Overspeed Automatic Shutdown (Solid-state)
- Crank Limiter (Solid-state)
- Oil Drain Extension
- Radiator Drain Extension
- Factory-Installed Cool Flow Radiator
- Closed Coolant Recovery System
- UV/Ozone Resistant Hoses
- Rubber-Booted Engine Electrical Connections
- Isochronous Governor
- Fuel Lockoff Solenoid
- Secondary Fuel Regulator (N.G.)
- Stainless Steel Flexible Exhaust Connection
- Battery Charge Alternator
- Battery Cables
- Battery Tray
- Vibration Isolation of Unit to Mounting Base
- 24 Volt, Solenoid-Activated Starter Motor
- Air Cleaner
- Fan Guard
- Control Console (H100)

OPTIONS

- **OPTIONAL COOLING SYSTEM ACCESSORIES**
  - O Radiator Duct Adapter
- **OPTIONAL FUEL ACCESSORIES**
  - O Flexible Fuel Lines
- **OPTIONAL EXHAUST ACCESSORIES**
  - O Critical Exhaust Silencer
- **OPTIONAL ELECTRICAL ACCESSORIES**
  - O Battery, (2) - 12 Volt, 135 A.H., 4DLT
  - O Battery, (2) - 12 Volt, 225 A.H., 8D
  - O Battery Heater
  - O 2A Battery Charger
  - O 10A Dual Rate Battery Charger
- **OPTIONAL ALTERNATOR ACCESSORIES**
  - O Alternator Strip Heater
  - O Alternator Tropicalization
  - O Main Line Circuit Breaker
- **CONTROL CONSOLE OPTIONS**
  - O Digital Controller H100 *see specification 0172110SBY*
- **ADDITIONAL OPTIONAL EQUIPMENT**
  - O Automatic Transfer Switch (GTS or HTS)
  - O 20 Light Remote Annunciator
  - O Remote Relay Panels
  - O Unit Vibration Isolators
  - O Oil Make-Up System
  - O Oil Heater
  - O 5 Year Warranties
  - O Export Boxing
  - O GenLink® Communications Software
- **OPTIONAL ENCLOSURES**
  - O Weather Protective
  - O Sound Attenuated
  - O Aluminum and Stainless Steel
  - O Enclosed Muffler

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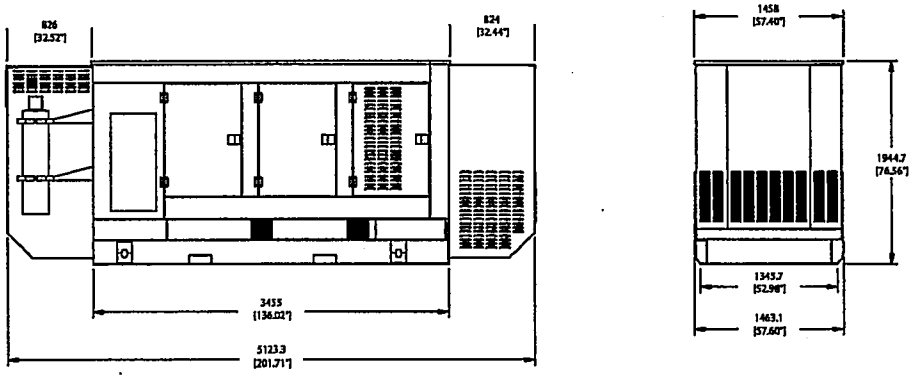
Design and specifications subject to change without notice. Dimensions shown are approximate. Contact your Generac dealer for certified drawings. DO NOT USE THESE DIMENSIONS FOR INSTALLATION PURPOSES.

Sound Attenuated Enclosure

Note: Muffler shown is inside enclosure



Reference Install Drawing:
OF9953STD
OF9954SAE

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Bulletin 0172640SBY / Printed in USA 01.06

GENERAC®
POWER SYSTEMS, INC.

STATEMENT OF EXHAUST EMISSIONS
GASEOUS-FUELED GENERATOR

Generator Type: **SG150** kW_e Rated: **150**

Engine Size: **13.3L** HP at rated kW_e: **237**

Aspiration: **Turbocharged and aftercooled**

Speed (RPM): **1800**

Additional Equipment Description or Comments:

Emissions Test Type: **5 Mode**

Measured Emissions (grams / brake horsepower-hour):

NOx	THC	HC + NOx	CO	PM	PM10
6.20	**1.80**	**8.0**	**60.00**	**N/A**	**N/A**

- The stated values are actual exhaust emission test measurements obtained from a unit representative of the generator type and engine described above.
- Values based on 5-mode testing are official data of record as submitted to regulatory agencies for certification purposes. Testing was conducted in accordance with prevailing EPA & CARB protocols, which are typically accepted by SCAQMD and other regional authorities.
- Values based on full load testing are provided when 3 or 5-mode test data is either unavailable, or not applicable. Data may be based on testing performed by either the engine supplier or Generac Power Systems.
- No emission values provided above are to be construed as guarantees of emission levels for any given Generac generator unit.
- Generac Power Systems reserves the right to revise this information without prior notice.
- Consult state and local regulatory agencies for specific permitting requirements.

0601260SSD 8/03

INDUSTRIAL SALES
P.O. BOX 8 ● WAUKESHA, WI 53187 ● 262/544-4811 ● FAX 262/544-4854

RSober

From: Gregory Esau [gesau@unitedengines.com]
Sent: Thursday, August 23, 2007 10:51 AM
To: Brad Campbell
Cc: Ron Sober
Subject: RE: RE: RE: Engine Information for MES PO 6004-030
Attachments: SG150-Exh Emissions data.pdf

Brad or Ron

I have attached the information for the 150kW. It looks like what you need.

Here's for the exhaust emissions data for the SG 300 w/o catalyst.
NOx: 2.12 g/hp-hr
HC: 2.90 g/hp-hr
CO: 118.3 g/hp-hr

I am working on getting the document for the 300kW just like the 150kW that is attached. I will send it as soon as I get it.

Thanks,

Greg Esau
Sales Engineer
United Engines, LLC - Tulsa
Ph: 918 / 627-8080
Fax: 918 / 828-4547
Cell: 918 / 230-1295

From: Brad Campbell [mailto:onstream_ops@yahoo.com]
Sent: Wednesday, August 22, 2007 7:11 PM
To: Gregory Esau
Cc: Ron Sober
Subject: Fwd: RE: RE: Engine Information for MES PO 6004-030

Greg,
We have review the data for the two engine and request the following information from United Engine- at full load, what is the expected NOx, CO, Formaldehyde, particular matter, opacity,...air emissions based on what range of BTU/scf natural gas? There may be factors for engine BHP; however, most manufacturers already have this engine data from inhouse tests. If questions, please let me know.

Note: forwarded message attached.

Brad Campbell, PE
918-521-6571 (M)
405-395-2314 (H)