Samson Resources

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February 19, 2014

Ms. Claudia Smith
US EPA Region 8 Air Program
1595 Wynkoop Street
Mail Code 8P-AR
Denver, CO 80202

Re: Additional Information Request
Jaques Compressor Station (V-SU-0043-06.02)
South Ignacio Central Delivery Point (V-SU-0031-08.00)
Samson Resources Company

Dear Ms Smith:

The Samson Resources Company (Samson) is herein submitting the additional information requested for the synthetic minor permit applications for the Jaques Compressor Station and South Ignacio Central Delivery Point. The facilities are located in Section 26, Township 33 North, Range 8 West, and Section 32, Township 33 North, Range 7 West in La Plata County, Colorado.

Greenhouse Gas (GHG) Emissions
Greenhouse gas emission estimates and sample calculations were included as the final section of the application for both the Jaques Compressor Station and South Ignacio Central Delivery Point. These sections are attached to this letter.

South Ignacio Emission Limits
Samson would like to maintain the same emission limits for the engines as those in the Part 71 Operating Permit. Samson would like to keep the existing CO emission limits for all of the engines and the NO_X emission limit for E1. The engine emissions presented in the application for the South Ignacio Central Delivery Point matched the permitted values and the potential to emit of each engine was calculated based on the controlled values. The original application contains these calculations and emission limits.

Jaques Dehydration Units
The backup TEG dehydration unit, D3, was not included in the application for the Jaques Compressor Station because this unit is no longer needed or operational. This unit has not

operated at the facility since July of 2009. The unit was disconnected from service in early of 2009. The unit was removed from the facility September 2009.

If you require any additional information please feel free to contact me at (720) 239-4406 or via email at bradr@samson.com.

Sincerely,
SAMSON RESOURCES COMPANY

Brad M. Rogers
Senior Environmental Specialist

Cc: CPI

GREENHOUSE GAS EMISSIONS

Total Greenhouse Gas PTE
Samson Resources Company
Jaques Compressor Station

Source ID	Description	Green House Gases Emissions		
		CO_2	Methane	N_2O
		tpy	tpy	tpy
E1	Waukesha L5794LT	5137.13	112.45	0.01
E2	Waukesha L5794LT	5137.13	112.45	0.01
E3	Waukesha L5794LT	5137.13	112.45	0.01
E4	Waukesha L5794LT	5137.13	112.45	0.01
E5	Waukesha L5794LT	5137.13	112.45	0.01
E6	Waukesha L5794LT	5137.13	112.45	0.01
D1	0.375 MMBtu/hr Reboiler	191.59	0.00	0.00
	Glycol Process Vents	16.78	2.83	0.00
D2	1.25 MMBtu/hr Reboiler	638.63	0.01	0.00
	Glycol Process Vents	27.20	4.60	0.00
FUG	Fugitive Leaks	2.75	18.24	0.00
IEUs	Insignificant Units	1982.04	0.03	0.00
Total		33681.77	700.40	0.06
CO_2e		33681.77	14708.32	19.62

Total GHG PTE **34,382 tpy**
Total CO_2e **48,410 tpy**

Compressor Engine GHG Emission Estimate
Samson Resources Company
Jaques Compressor Station

Basis

Units	Waukesha L5794LT Compressor Engines	
Combustion	4 Stroke Lean Burn	
Rating	1400	hp
Operating Hours	8760	hours/year
Fuel Consuption	7155	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,171	5,128	1.41	6.19	241.14	2.41	3.24	0.08	5,137.13	40 CFR Part 98, Subpart C, Table C-1
Methane	1.250	12.521	54.843	9.37	41.06	1598.55	15.99	21.48	0.56	112.45	AP-42 Table 3.2-2
N_2O	0.0002	0.002	0.010	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Glycol Dehydration Process Vents GHG Emission Estimate
Samson Resources Company
Jaques Compressor Station

Basis

Unit	Dehydration Units D1 & D2	
D1 Annual Throughput	18	MMscfd
D2 Annual Throughput	30	MMscfd
Hours of Operation	8760	hrs

Emissions Based on GLYCalc 3.0 Model

D1 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	3.83	16.78	3.83	16.78
Methane	0.647	2.83	0.647	2.83
N_2O	0.0	0	0.0	0.0

D2 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	6.21	27.20	6.21	27.20
Methane	1.05	4.60	1.05	4.60
N_2O	0.0	0	0.0	0.0

Natural Gas Fired Burner GHG Emission Estimate
Samson Resources Company
Jaques Compressor Station

Basis

Units	Dehydration Unit Reboilers
Hours of Operation	8760 hrs
D1 Rating	0.375 MMBtu/hr
D2 Rating	1.25 MMBtu/hr

D1 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D1 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	43.74	191.59	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

D2 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D2 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	145.81	638.63	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.003	0.01	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

Fugitive GHG Emission Estimate
Samson Resources Company
Jaques Compressor Station

Basis

Units	Fugitive Emissions
CO_2	12.881 wt%
CH_4	85.392 wt%

Emissions Estimate

Component	Count	Emission Factor (kg/component-hr)	CO2		Methane	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)
Flanges	40	3.90E-04	0.00	0.02	0.03	0.13
Valves	258	4.50E-03	0.33	1.44	2.18	9.56
Connectors	86	2.00E-04	0.00	0.02	0.03	0.14
Press Relief	0	2.00E-03	0.00	0.00	0.00	0.00
Pump Seals	0	2.40E-03	0.00	0.00	0.00	0.00
Other	116	8.80E-03	0.29	1.27	1.92	8.41
Total			**0.63**	**2.75**	**4.17**	**18.24**

Emission factors obtained from the 1995 Protocol for Equipment Leak Emission Estimates Document EPA-453/R-95-017 Table 2-4: Oil and Gas Production

IEU GHG Emission Estimate
Samson Resources Company
Jaques Compressor Station

Pollutant	Emission Factor (kg/MMBtu)	Emission Factor Source
CO_2	53.0200	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	40 CFR Part 98, Subpart C, Table C-2

Heaters and Burners <100 MMBtu/hr

Unit ID	Description	Heater Size	CO_2		Methane		N_2O	
		(MMBtu/hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IEU7	Regenerator Heaters	0.60	69.99	306.54	0.00	0.01	0.000	0.00
	Regenerator Heaters	0.60	69.99	306.54	0.00	0.01	0.000	0.00
IEU8	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
IEU13	Slug Catcher Burner	0.125	14.58	63.86	0.00	0.00	0.000	0.00
	Slug Catcher Burner	0.125	14.58	63.86	0.00	0.00	0.000	0.00
IEU15	Production Unit Burner	0.50	58.32	255.45	0.00	0.00	0.000	0.00
Heater/Burner Total				**1731.95**		**0.03**		**0.00**

Pump Engines

Unit ID	Description	Rating	CO_2		Methane		N_2O	
		(hp)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IEU9	Ford 460 Pump Engine	34	35.30	154.60	0.00	0.00	0.00	0.00
IEU12	Ford Pump Engine	21	21.80	95.49	0.00	0.00	0.00	0.00
Pump Engine Total				**250.09**		**0.00**		**0.00**

IEU Total				**1982.04**		**0.03**		**0.00**

Example GHG Emission Calculations
Jaques Compressor Station

Cylinder Rod Packing Vents

$$\frac{60\ scf}{hr * cylinder} * \frac{4\ cylinder}{compressor} * \frac{mole}{385\ scf} * \frac{5.1555\ mole\ CO_2}{100\ mole} * \frac{44\ lb\ CO_2}{mole\ CO_2} = 1.41\ \frac{lb\ CO_2}{hr}$$

$$1.41\ \frac{lb\ CO_2}{hr} * \frac{ton}{2000\ lb} * \frac{8760\ hr}{yr} = 2.41\ tpy\ CO_2$$

$$\frac{60\ scf}{hr * cylinder} * \frac{4\ cylinder}{compressor} * \frac{mole}{385\ scf} * \frac{93.9848\ mole\ CH_4}{100\ mole} * \frac{16\ lb\ CH_4}{mole\ CH_4} = 9.37\ \frac{lb\ CH_4}{hr}$$

$$9.37\ \frac{lb\ CH_4}{hr} * \frac{ton}{2000\ lb} * \frac{8760\ hr}{yr} = 41.06\ tpy\ CH_4$$

Blowdown Emissions

$$\frac{40{,}927\ scf}{event} * \frac{mole}{385\ scf} * \frac{5.1555\ mole\ CO_2}{100\ mole} * \frac{44\ lb\ CO_2}{mole\ CO_2} = 241.14\ \frac{lb\ CO_2}{event}$$

$$241.14\ \frac{lb\ CO_2}{event} * \frac{20\ events}{yr} * \frac{ton}{2000\ lb} = 2.41\ tpy\ CO_2$$

$$\frac{40{,}927\ scf}{event} * \frac{mole}{385\ scf} * \frac{93.9848\ mole\ CH_4}{100\ mole} * \frac{16\ lb\ CH_4}{mole\ CH_4} = 1598.55\ \frac{lb\ CH_4}{event}$$

$$1598.55\ \frac{lb\ CH_4}{event} * \frac{20\ events}{yr} * \frac{ton}{2000\ lb} = 15.99\ tpy\ CH_4$$

Starter Emissions

$$\frac{1100\ scf}{min} * \frac{mole}{385\ scf} * \frac{5.1555\ mole\ CO_2}{100\ mole} * \frac{44\ lb\ CO_2}{mole\ CO_2} * \frac{0.5\ min}{event} = 3.24\ \frac{lb\ CO_2}{event}$$

$$3.24\ \frac{lb\ CO_2}{event} * \frac{52\ events}{yr} * \frac{ton}{2000\ lb} = 0.08\ tpy\ CO_2$$

$$\frac{1100\ scf}{min} * \frac{mole}{385\ scf} * \frac{93.9848\ mole\ CH_4}{100\ mole} * \frac{16\ lb\ CH_4}{mole\ CH_4} * \frac{0.5\ min}{event} = 21.48\ \frac{lb\ CH_4}{event}$$

$$21.48\ \frac{lb\ CH_4}{event} * \frac{52\ events}{yr} * \frac{ton}{2000\ lb} = 0.56\ tpy\ CH_4$$

Reboilers/Heaters/Burners

$$\frac{1.25\ MMBtu}{hr} * \frac{53.02\ kg\ CO_2}{MMBtu} * \frac{2.2\ lb\ CO_2}{kg\ CO_2} = 145.81\ \frac{lb\ CO_2}{hr}$$

$$145.81\ \frac{lb\ CO_2}{hr} * \frac{ton}{2000\ lb} * \frac{8760\ hr}{yr} = 638.63\ tpy\ CO_2$$

Pump Engines

$$21\ hp * \frac{8900\ Btu}{hp - hr} * \frac{MMBtu}{1{,}000{,}000\ Btu} * \frac{53.02\ kg\ CO_2}{MMBtu} * \frac{2.2\ lb\ CO_2}{kg\ CO_2} = 21.80\ \frac{lb\ CO_2}{hr}$$

$$21.80\ \frac{lb\ CO_2}{hr} * \frac{ton}{2000\ lb} * \frac{8760\ hr}{yr} = 95.49\ tpy\ CO_2$$

GREENHOUSE GAS EMISSIONS

Total Greenhouse Gas PTE
Samson Resources Company
South Ignacio Central Delivery Point

Source ID	Description	Green House Gases Emissions		
		CO_2	Methane	N_2O
		tpy	tpy	tpy
E1	Waukesha L7044GSI	6700.59	57.93	0.01
E2	Waukesha L7042GL	4491.21	57.90	0.01
E3	Waukesha L7042GL	4491.21	57.90	0.01
E4	Waukesha L7042GL	4735.31	57.90	0.01
E5	Waukesha L5794LT	5137.33	57.91	0.01
E6	Waukesha L5794LT	5137.33	57.91	0.01
E7	Waukesha L5794LT	5137.33	57.91	0.01
E8	Waukesha L5794LT	5137.33	57.91	0.01
D1	1.25 MMBtu/hr Reboiler	638.63	0.01	0.00
	Glycol Process Vents	85.41	3.99	0.00
D2	0.75 MMBtu/hr Reboiler	383.18	0.01	0.00
	Glycol Process Vents	96.80	4.51	0.00
FUG	Fugitive Leaks	2.83	18.38	0.00
IEUs	Insignificant Units	306.54	0.01	0.00
Total		42481.04	490.17	0.08
CO_2e		42481.04	10293.49	24.67

Total GHG PTE **42,971 tpy**
Total CO_2e **52,799 tpy**

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E1	
	Waukesha L7044GSI Compressor Engine	
Combustion	4 Stroke Rich Burn	
Rating	1680	hp
Operating Hours	8760	hours/year
Fuel Consuption	7780	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,528	6,692	1.45	6.34	246.77	2.47	3.32	0.09	6,700.59	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.026	0.114	9.41	41.21	1604.59	16.05	21.56	0.56	57.93	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.003	0.013	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E2, E3	
	Waukesha L7042GL Compressor Engines	
Combustion	4 Stroke Lean Burn	
Rating	1267	hp
Operating Hours	8760	hours/year
Fuel Consuption	6910	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,023	4,482	1.45	6.34	246.77	2.47	3.32	0.09	4,491.21	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.018	0.077	9.41	41.21	1604.59	16.05	21.56	0.56	57.90	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.008	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E4	
	Waukesha L7042GL Compressor Engine	
Combustion	4 Stroke Lean Burn	
Rating	1336	hp
Operating Hours	8760	hours/year
Fuel Consuption	6910	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,079	4,726	1.45	6.34	246.77	2.47	3.32	0.09	4,735.31	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.018	0.081	9.41	41.21	1604.59	16.05	21.56	0.56	57.90	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.009	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E5, E6, E7, E8	
	Waukesha L5794LT Compressor Engines	
Combustion	4 Stroke Lean Burn	
Rating	1400	hp
Operating Hours	8760	hours/year
Fuel Consuption	7155	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,171	5,128	1.45	6.34	246.77	2.47	3.32	0.09	5,137.33	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.020	0.088	9.41	41.21	1604.59	16.05	21.56	0.56	57.91	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.010	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Natural Gas Fired Burner GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	Dehydration Unit Reboilers
Hours of Operation	8760 hrs
D1 Rating	1.25 MMBtu/hr
D2 Rating	0.75 MMBtu/hr

D1 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D1 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	145.81	638.63	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.00	0.01	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

D2 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D2 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	87.48	383.18	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.002	0.01	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

Glycol Dehydration Process Vents GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Unit	Dehydration Units D1 & D2	
D1 Annual Throughput	30	MMscfd
D2 Annual Throughput	40	MMscfd
Hours of Operation	8760	hrs

Emissions Based on GLYCalc 3.0 Model

D1 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	19.5	85.41	19.5	85.41
Methane	0.911	3.99	0.911	3.99
N_2O	0.0	0	0.0	0.0

D2 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	22.1	96.80	22.1	96.80
Methane	1.03	4.51	1.03	4.51
N_2O	0.0	0	0.0	0.0

Fugitive GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	Fugitive Emissions
CO_2	13.232 wt%
CH_4	86.038 wt%

Emissions Estimate

Component	Count	Emission Factor (kg/component-hr)	CO2		Methane	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)
Flanges	40	3.90E-04	0.00	0.02	0.03	0.13
Valves	258	4.50E-03	0.34	1.48	2.20	9.64
Connectors	86	2.00E-04	0.01	0.02	0.03	0.14
Press Relief	0	2.00E-03	0.00	0.00	0.00	0.00
Pump Seals	0	2.40E-03	0.00	0.00	0.00	0.00
Other	116	8.80E-03	0.30	1.30	1.93	8.47
Total			**0.65**	**2.83**	**4.20**	**18.38**

Emission factors obtained from the 1995 Protocol for Equipment Leak Emission Estimates Document EPA-453/R-95-017 Table 2-4: Oil and Gas Production

IEU GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Pollutant	Emission Factor (kg/MMBtu)	Emission Factor Source
CO_2	53.0200	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	40 CFR Part 98, Subpart C, Table C-2

Heaters and Burners <100 MMBtu/hr

Unit ID	Description	Heater Size (MMBtu/hr)	CO_2		Methane		N_2O	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IEU7	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
Heater/Burner Total				**306.54**		**0.01**		**0.00**

Smith, Claudia

From: Brad Rogers <bradr@samson.com>
Sent: Thursday, February 20, 2014 9:31 AM
To: Smith, Claudia
Cc: Paser, Kathleen; Wortman, Eric; Jarrell, Brenda
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications
Attachments: Response to EPA info Request - Samson Resources Jaques and South Ignacio - Feb 2014.pdf

Hi Claudia,

Please find attached the additional information that your department has requested for Samson's Jaques and S. Ignacio faciliites. IF you need additional information, please do not hesitate to contact me. You should receive the original hardcopy by FEDEX tomorrow. Thank you.

Regards,

Brad M. Rogers
Sr. Environmental Specialist
Samson Resources
370 17th Street, Suite 3000
Denver, CO 80202
(o) 720.239.4406
(c) 303.229.1228
bradr@samson.com

Samson Resources

From: Smith, Claudia [mailto:Smith.Claudia@epa.gov]
Sent: Tuesday, February 04, 2014 2:42 PM
To: Brad Rogers
Cc: Paser, Kathleen; Wortman, Eric; Jarrell, Brenda
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Brad,

Smith, Claudia

From: Smith, Claudia
Sent: Tuesday, February 04, 2014 2:42 PM
To: 'Brad Rogers'
Cc: Paser, Kathleen; Wortman, Eric; 'Jarrell, Brenda'
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Brad,

We have still not received a response from you or anyone else at Samson regarding the questions we had on the Jaques and S. Ignacio SMNSR Part 71 transfer permit applications. If we do not hear from you by **Friday, February 21, 2014**, we are going to assume that you are no longer requesting these permits and will close out the files for these permit actions.

Please note that once the Southern Ute Air Quality Program issues the Part 70 permit, the Part 71 permit automatically expires and you will lose any federal, legal, and practical enforceability for the limits in the current Part 71 permits.

If you have any questions, please contact me.

Thank you,

Claudia

Claudia Young Smith
Environmental Scientist
US EPA Region 8 Air Program
Phone: (303) 312-6520
Fax: (303) 312-6064
http://www2.epa.gov/region8/air-permitting

****
US EPA Region 8
1595 Wynkoop Street
Mail Code 8P-AR
Denver, Colorado 80202
****

From: Smith, Claudia
Sent: Friday, September 27, 2013 10:57 AM
To: Brad Rogers
Cc: Paser, Kathleen; Wortman, Eric
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Hi, Brad,

Just another friendly follow-up on the status of the requested additional information for both the Jaques and S. Ignacio SMNSR Part 71 transfer permit applications. The Southern Ute Air Quality Program has been asking us about the status of the Part 71 transfer permits. As a reminder, once the AQP issues the P70 permit the P71 permit automatically expires and you will lose enforceability on the synthetic limits established in those permits, unless we issue a synthetic minor NSR permit containing all of the enforceable limits you wish to maintain from the Part 71 permit before that time.

I will be going on maternity leave starting on October 7th, potentially sooner, so I am copying Kathleen Paser, who will be covering these permit actions while I am out.

Thanks,

Claudia

From: Smith, Claudia
Sent: Thursday, August 08, 2013 4:24 PM
To: 'Brad Rogers'
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Hi, Brad,

I am just following up on the status of the requested information for both the Jaques and S. Ignacio SMNSR permit applications.

Thanks,

Clauida

From: Brad Rogers [mailto:bradr@samson.com]
Sent: Tuesday, July 02, 2013 2:13 PM
To: Smith, Claudia
Cc: Wortman, Eric; Paser, Kathleen
Subject: RE: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Thanks for the update Claudia. We are currently working on the information you have requested for the Jaques and will do the same for South Ignacio. I'll definitely let you know if we have any questions regarding the applications.

Thanks,

Brad M. Rogers
Sr. Environmental Specialist
Samson Resources
370 17th Street, Suite 3000
Denver, CO 80202
(o) 720.239.4406
(c) 303.229.1228
bradr@samson.com

From: Smith, Claudia [mailto:Smith.Claudia@epa.gov]
Sent: Tuesday, July 02, 2013 1:25 PM
To: Brad Rogers
Cc: Wortman, Eric; Paser, Kathleen
Subject: Questions on Jaques Compressor Station and South Ignacio CDP SMNSR Permit Applications

Brad,

Based on my review of the South Ignacio CDP application, some of the information I previously (recently) asked for regarding the Jaques application also apply to the South Ignacio CDP application, particularly, the need for GHG calculations. I also had some additional questions on the applications

Eric Wortman originally corresponded with Scott Rose in an email dated September 13, 2011, determining the South Ignacio CDP application incomplete, asking several questions, and requesting additional information. Samson submitted a revised application in January 2012, but that application did not address all of Eric's questions/needs. At the time Katie Romero was the permit engineer assigned to the permit action. Katie is no longer employed at EPA, so if any further correspondence was made just with her, I apologize, but we have no accessible record of that and I am not sure that we could get access to her old email account very easily, if at all. I am currently the permit engineer assigned to both permits, but for safe measure in case anything happens to me, Eric Wortman and/or Kathleen Paser (both copied on this email) should be copied on all correspondence.

On to the questions/additional information needed – I am including the questions I already asked in previous correspondence, so that they are conveniently all in one place:

- **Both** the applications for Jaques Compressor Station and South Ignacio CDP will need an addendum that includes GHG calculations. Although the Tribal Minor NSR Rule does not require regulation of GHGs, when issuing synthetic minor NSR permits, we need to verify that we are not issuing a permit to a major source of GHGs.

- **South Ignacio CDP:** The engines at South Ignacio CDP currently have part 71 emission limits for CO (engine E1 also has a limit for NOx) and Samson's original and revised applications did not include requests for synthetic minor limits for those pollutants from the engines, only for total HAP and formaldehyde. I suspect you still want the enforceable CO and NO_X emission limits. If so, I will need an addendum to the application with the emission limits requested and all of the necessary supporting information for the additional limits.
- **Jaques Compressor Station:** Application has no mention of the backup TEG dehydration unit that is identified in the current Part 71 Operating Permit (#V-SU-0043-06.02). Has this unit been removed from the facility and you are no longer requesting the emission restrictions previously established in the Part 71 permit? If that dehy is still at the facility and connected and you still need limits for it, I will need an addendum to the application including the requested limits and an updated equipment list, emissions calculations, and any necessary supporting documentation.

Thanks, and if you have any questions, call me at (303) 312-6520, or email me.

Claudia Young Smith
Environmental Scientist
US EPA Region 8 Air Program
Phone: (303) 312-6520
Fax: (303) 312-6064
http://www2.epa.gov/region8/air-permitting

****
US EPA Region 8
1595 Wynkoop Street
Mail Code 8P-AR
Denver, Colorado 80202
****

From: Smith, Claudia
Sent: Wednesday, June 19, 2013 3:16 PM
To: 'bradr@samson.com'
Cc: Wortman, Eric
Subject: Question on Jaques Compressor Station SMNSR Permit Application

Brad,

I am working on drafting the proposed synthetic minor NSR permit for the Jaques Compressor Station and notice there is no mention in the November 2011 application of the backup TEG dehydration unit that is identified in the current Part 71 Operating Permit (#V-SU-0043-06.02). Has this unit been removed from

the facility and you are no longer requesting the emission restrictions previously established in the Part 71 permit?

Thank you,

Claudia Young Smith

Environmental Scientist
US EPA Region 8 Air Program
Phone: (303) 312-6520
Fax: (303) 312-6064
http://www2.epa.gov/region8/air-permitting

****
US EPA Region 8
1595 Wynkoop Street
Mail Code 8P-AR
Denver, Colorado 80202
****

********** ATTACHMENT NOT DELIVERED **********

This Email message contained an attachment named
image001.jpg
which may be a computer program. This attached computer program could contain a computer virus which could cause harm to EPA's computers, network, and data. The attachment has been deleted.

This was done to limit the distribution of computer viruses introduced into the EPA network. EPA is deleting all computer program attachments sent from the Internet into the agency via Email.

If the message sender is known and the attachment was legitimate, you should contact the sender and request that they rename the file name extension and resend the Email with the renamed attachment. After receiving the revised Email, containing the renamed attachment, you can rename the file extension to its correct name.

For further information, please contact the EPA Call Center at (866) 411-4EPA (4372). The TDD number is (866) 489-4900.

********** ATTACHMENT NOT DELIVERED **********

MEMO TO FILE

DATE: November 2, 2012

SUBJECT: Southern Ute Indian Reservation Natural Gas Production Facilities
National Historic Preservation Act

FROM: Victoria Parker-Christensen, EPA Region 8 Air Program

TO: Source Files:
205c AirTribal SU BP America Treating Site 6B
SMNSR-SU-000024-2011.001
FRED # 99977

205c AirTribal SU BP America Treating Site 7B
SMNSR-SU-000025-2012.001
FRED # 99976

205c AirTribal SU BP America Treating Site 8
SMNSR-SU-000026-2012.001
FRED # 99973

205c AirTribal SU BP America Miera Compressor Facility
SMNSR-SU-000039-2012.001
FRED # 99978

205c AirTribal SU BP America Salvador I/II Compressor Station
SMNSR-SU-000009-2012.001
FRED # 99974

205c AirTribal SU BP America Wolf Point Compressor Facility
SMNSR-SU-000034-2012.001
FRED # 99975

205c AirTribal SU Red Cedar Arkansas Loop & Simpson Treating Plants
SMNSR-SU-000010-2011.001
FRED # 97581

205c AirTribal SU Red Cedar Sambrito Compressor Station
SMNSR-SU-000049-2011.001
FRED # 84665

205c AirTribal SU Samson South Ignacio Central Delivery
SMNSR-SU-000031-2011.001

FRED #84627
205c AirTribal SU Samson Jacques Compressor Station
SMNSR-SU-000043-2011.001
FRED # 96630

Section 106 of the National Historic Preservation Act (NHPA) requires federal agencies to take into account the effects of their undertakings on historic properties and afford the Advisory Council on Historic Preservation (ACHP) a reasonable opportunity to comment with regard to such undertakings. Under the ACHP's implementing regulations at 36 C.F.R. Part 800, Section 106 consultation is generally with state and tribal historic preservation officials in the first instance, with opportunities for the ACHP to become directly involved in certain cases. An "undertaking" is "a project, activity, or program funded in whole or in part under the direct or indirect jurisdiction of a Federal agency, including those carried out by or on behalf of a Federal agency; those carried out with Federal financial assistance; and those requiring a Federal permit, license or approval." 36 C.F.R. § 800.16(y).

If an undertaking is a type of activity that does not have the potential to cause effects on historic properties, assuming such historic properties were present, the federal agency has no further obligations under 36 C.F.R. § 800.3(a)(1). Because this permit will authorize new construction and related activities at an existing site, this undertaking does have the potential to cause effects on historic properties.

Under the NHPA Section 106 implementing regulations, federal agencies consult with relevant historic preservation partners to determine the area of potential effect (APE) of the undertaking, to identify historic properties that may exist in that area, and to assess and address any adverse effects that may be caused on such properties by the undertaking. Specifically, 36 C.F.R. § 800.4(b)(1) of the regulations states that federal agency officials shall make a "reasonable and good faith effort" to identify historic properties.

This memorandum describes EPA's efforts to identify historic properties and assess potential effects in connection with issuing draft synthetic minor New Source Review (NSR) permits for existing oil and gas production facilities located within the exterior boundaries of the Southern Ute Indian Reservation in La Plata County, Colorado.

Region 8, Air Program Determination

The EPA has reviewed the proposed action for potential impacts on historic properties in the APE. These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. Because the EPA has determined that the federal action will have no effect, the agency is making the finding of "*No historic properties affected*" for the APE.

Area of Potential Effects (APE)

The APE for the existing facilities are the locations within the areas currently occupied by each facility.

Regulation 36 C.F.R. 800.16(d) defines "area of potential effects" - as:

> "… the geographic area or areas within which an undertaking may directly or indirectly cause alterations in the character or use of historic properties, if any such properties exist. The area of potential effects is influenced by the scale and nature of an undertaking and may be different for different kinds of effects caused by the undertaking."

Permit Request

The EPA has received CAA permit applications from BP America Production Company (BP), Red Cedar Gathering Company (Red Cedar), and Samson Resources Company (Samson) requesting approval to transfer enforceable emission restrictions previously established in their title V permits to synthetic minor NSR permits for existing natural gas production facilities on the Southern Ute Indian Reservation in La Plata County, Colorado. These permits are intended only to incorporate allowable and requested emission limits and provisions from the following documents:

1. Associated Part 71 Permit to Operate issued by the EPA to the applicant for the specified facility,
2. Associated application from the applicant requesting a synthetic minor NSR permit for the specified facility in accordance the requirements of the "Review of New Sources and Modifications in Indian Country; Final Rule," at 40 CFR Parts 49 and 51.

The net effect of the incorporation of these documents into a single synthetic minor NSR permit is a facility that is an area source with regard to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Categories at 40 CFR Part 63, and a minor source with regard to the PSD permitting program. Approval of these actions will establish each permit as the source of the legally and practically enforceable requirements previously created in the associated Part 71 permit.

The creation of the limits in the Part 71 permits was a temporary, gap-filling measure for those sources operating in Indian country that did not have the ability to obtain these limits through other programs, such as exists in state jurisdictions. Upon promulgation of the minor new source review permitting program in Indian Country, this gap-filling measure is no longer needed. 40 CFR §49.153(a)(3)(iv) provides the EPA with the authority to transfer such limits to a synthetic minor NSR permit, effectively creating legally and practically enforceable requirements without the use of the Part 71 permit. These requirements would be similar to those requirements in New Source Performance Standards at 40 CFR Part 60, NESHAP at 40 CFR Part 63, and limits established in PSD permits. The following table lists the facility, associated Title V permit and location.

Applicant/Facility/Title V Permit	Location
BP America Production Company Treating Site 6B, SMNSR-SU-000024-2011.001	S5, T32N, R9W Lat. 37.0571028, Long. -107.8457361
BP America Production Company Treating Site 7B, SMNSR-SU-000025-2012.001	S3, T32N, R10W Lat. 37.0388778, Long. -107.9223722
BP America Production Company Treating Site 8, SMNSR-SU-000026-2012.001	S28, T33N, R10W Lat. 37.076025. Long. -107.9342472
BP America Production Company Miera Compressor Facility, SMNSR-SU-000039-2012.001	SE 1/4 S8, T34N, R8W Lat. 37.1988, Long. -107.739683
BP America Production Company Salvador I/II Compressor Station, SMNSR-SU-000009-2012.001	S28, T33N, R7W Lat. 37.07905247, Long. -107.6182899
BP America Production Company Wolf Point Compressor Facility, SMNSR-SU-000034-2012.001	NW¼ S16, T33N, R9W Lat. 37.10743378, Long. -107.8353513
Red Cedar Gathering Company Arkansas Loop & Simpson Treating Plants, SMNSR-SU-000010-2011.001	S1, T32N, R9W Lat. 37.052783, Long. -107.784875
Red Cedar Gathering Company Sambrito Compressor Station, SMNSR-SU-000049-2011.001	SW ¼ S3, T32N, R6W Lat. 37.043769, Long. -107.493169
Samson Resources Company Jacques Compressor Station, SMNSR-SU-000043-2011.001	NW¼ S26, T33N, R8W Lat. 37.077944, Long. -107.691
Samson Resources Company South Ignacio Central Delivery, SMNSR-SU-000031-2011.001	SE ¼ S32, T33N, R7W Lat. 37.0539167, Long. -107.6252222

Process and Construction Information

These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. This is an administrative action with no physical changes to the existing facilities or surrounding area.

Registered Historic Places

The National Park Service maintains an internet resource that can be used to determine whether any registered historic places are within the area of potential effect. The resource is:

1. National Register of Historic Places database, http://www.nps.gov/history/nr/research/index.htm

An additional site is available to provide additional information on these historic places. The resource is:

2. National Register of Historic Places, http://www.nationalregisterofhistoricplaces.com/
    a. County information, http://www.nationalregisterofhistoricplaces.com/ut/Uintah/state.html
    b. Historic Districts within a county, http://www.nationalregisterofhistoricplaces.com/ut/Uintah/districts.html

A search of registered historic places or districts was not undertaken because this is an administrative action with no physical changes to the existing facilities or surrounding area.

State and Tribal Consultation

To comply with our obligations under Section 106 of the NHPS, we consulted with the Colorado State Historic Preservation Officer (SHPO) and requested any information the SHPO had regarding any historic properties within the APE. The EPA sent a letter to the Colorado SHPO on November 2, 2012 requesting concurrence with our determination of "*No historic properties affected*". The Colorado SHPO concurred in writing with our determination in a letter dated November 9, 2012 and received on November 14, 2012.

We also consulted with the tribal government by sending a letter to the Tribal Chairman with cc: to the Environmental Programs Division Head and Air Quality Program Manager inviting them to consult with us and provide information concerning historic properties relating to these proposed permits and our determination of "*No historic properties affected*" for the APE. The EPA sent the letter on November 9, 2012 and is waiting for the Tribe's response.

Attachment:

Map of Facilities Located on the Southern Ute Indian Reservation
Letter to Colorado State Historic Preservation Officer dated November 2, 2012
Letter from Colorado State Historic Preservation Officer dated November 9, 2012
Letter to Chairman Newton Southern Ute Indian Tribe dated November 9, 2012

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
Wolf Point Compressor Facility
Treating Site #8
Treating Site #6B
Treating Site #7B
Ute Compressor Station
Jaques Compressor Station
South Ignacio Central Delivery
Sambrito Compressor Station

Durango
Bayfield
Ignacio

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
City Boundary - NAVTEQ (2011);
County Boundary - U.S. Census Bureau (2010);
State Boundary - U.S. Census Bureau (2010);
Base - Microsoft Bing web service (2012).

0 1.5 3 6 9 Miles
0 3.25 6.5 13 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

EPA United States Environmental Protection Agency
REGION 8
serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

N

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EPA United States Environmental Protection Agency — REGION 8 serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Date: November 2, 2012

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Base - Microsoft Bing web service (2012).

0 1 2 4 6 Miles
0 2.25 4.5 9 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

NOV 02 2012

Ref: P-AR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Edward Nichols, President and CEO
History Colorado
1200 Broadway
Denver, CO 80203

RE: Section 106 of the National Historic Preservation Act regarding Proposed Synthetic Minor New Source Review Permits on the Southern Ute Indian Reservation

Dear Mr. Nichols:

The Environmental Protection Agency Region 8 (EPA) has received federal Clean Air Act (CAA) permit applications and is preparing draft synthetic minor New Source Review (NSR) air pollution control permits for several existing oil production facilities within the exterior boundary of the Southern Ute Indian Reservation in La Plata County, Colorado. To comply with our obligations under Section 106 of the National Historic Preservation Act and its implementing regulations at 36 C.F.R. Part 800, we are consulting with you concerning our finding as to the potential effects and we are seeking any information you may have as to whether there are any historic properties within the area of potential effects for these facilities.

The permit applications request approval to transfer previously issued CAA Part 71 permits to synthetic minor NSR permits. The synthetic minor NSR permits are intended only to incorporate allowable and requested emission limits and provisions from the associated Part 71 permit, Federal Compliance Agreement and Final Order (if applicable) and associated permit applications.

The EPA has made the finding "*No historic properties affected*" for the proposed synthetic minor NSR permit actions. The proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. This is an administrative action with no physical changes to the existing facilities or surrounding area. A map showing the locations of the facilities is enclosed with this letter.

The following table lists the companies, facilities and locations affected by the proposed permit actions.

Company and Facility	Section, Township, Range	Latitude / Longitude
BP America Production Company		
Treating Site 6B	S5, T32N, R9W	37.0571028 / -107.8457361
Treating Site 7	S3, T32N, R10W	37.0388778 / -107.9223722
Treating Site 8	S28, T33N, R10W	37.076025 / -107.9342472
Miera Compressor Facility	SE S8, T34N, R8W	37.1988 / -107.739683
Salvador I/II Compressor Station	S28, T33N, R7W	37.07905247 / -107.6182899
Wolf Point Compressor Facility	NW S16, T33N, R9W	37.10743378 / -107.8353513
ConocoPhillips Company		
Sunnyside Compressor Station,	S9, T33N, R9W	37.1194 / -107.8372
Argenta CDP Compressor Facility,	SW, SE S4, T33N, R10W	37.1294 / -107.9372
Ute Compressor Station,	S14-15,T32N, R11W	37.0173 / -108.0201
Red Cedar Gathering Company		
Arkansas Loop & Simpson Treating Plants	S1, T32N, R9W	37.052783 / -107.784875
Sambrito Compressor Station	SW S3, T32N, R6W	37.043769 / -107.493169
Samson Resources Company		
Jacques Compressor Station	NWS26, T33N, R8W	37.077944 / -107.691
South Ignacio Central Delivery	SE S32, T33N, R7W	37.0539167 / -107.6252222

The EPA has made the finding "*No historic properties affected*" for the proposed synthetic minor NSR permit actions. If you have any concerns regarding our determination, please notify me in writing within the 30 day time period described at 36 C.F.R. § 800.3(c)(4). If we haven't heard back from you within 30 days, we will assume you concur with our finding. In addition, please send any comments or information concerning historic properties within the project areas to me within 30 days, so as to ensure that we will have ample time to review them. You can reach me by phone at (303) 312-6441 or email at parker-christensen.victoria@epa.gov. Thank you for your assistance.

Sincerely,

Victoria Parker-Christensen
Environmental Engineer
Air Program

Enclosure

cc: Mark Tobias, Section 106 Compliance Manager

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
Wolf Point Compressor Facility
Treating Site #8
Treating Site #6B
Treating Site #7B
Ute Compressor Station
Jaques Compressor Station
South Ignacio Central Delivery
Sambrito Compressor Station

Durango
Bayfield
Ignacio

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
City Boundary - NAVTEQ (2011);
County Boundary - U.S. Census Bureau (2010);
State Boundary - U.S. Census Bureau (2010);
Base - Microsoft Bing web service (2012).

0 1.5 3 6 9 Miles
0 3.25 6.5 13 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

EPA United States Environmental Protection Agency
REGION 8
serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
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Treating Site #8
Jaques Compressor Station
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South Ignacio Central Delivery
Treating Site #7B
Sambrito Compressor Station
Ute Compressor Station
Archuleta
San Juan

N

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

EPA United States Environmental Protection Agency — REGION 8 serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
City Boundary - NAVTEQ (2011);
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Base - Microsoft Bing web service (2012).

0 1 2 4 6 Miles
0 2.25 4.5 9 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

HISTORY Colorado

November 9, 2012

Victoria Parker-Christensen
Environmental Engineer
Air Program
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, Colorado 80202-1129

Re: Section 106 of the National Historic Preservation Act regarding Proposed Synthetic Minor New Source Review Permits on the Southern Ute Indian Reservation, La Plata County, Colorado (CHS #62996)

Dear Ms. Parker-Christensen:

Thank you for your correspondence dated November 2, 2012 (received by our office on November 6, 2012) regarding the subject project.

Following our review of the documentation provided, we concur that a finding of no historic properties affected is appropriate for the proposed undertaking pursuant to 36 CFR 800.4(d)(1). This finding assumes that "no physical changes to the existing [thirteen] facilities or surrounding areas" will result from the implementation of this program.

Please remember that the consultation process does involve other consulting parties such as local governments and Tribes, which as stipulated in 36 CFR 800.3 are required to be notified of the undertaking. Additional information provided by the local government, Tribes or other consulting parties may cause our office to re-evaluate our comments and recommendations.

Should unidentified archaeological resources be discovered in the course of the projects, work must be interrupted until the resources have been evaluated in terms of the National Register of Historic Places eligibility criteria (36 CFR 60.4) in consultation with our office.

Thank you for the opportunity to comment. If we may be of further assistance please contact Mark Tobias, Section 106 Compliance Manager, at (303) 866-4674 or mark.tobias@state.co.us.

Sincerely,

for Edward C. Nichols
State Historic Preservation Officer
ECN/MAT

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

NOV 0 9 2012

Ref: 8P-AR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Honorable Jimmy Newton Jr., Chairman
Southern Ute Indian Tribe
P.O. Box 737
Ignacio, Colorado 84026

RE: Notice to Consult – Section 106 of the National Historic Preservation Act regarding Proposed Synthetic Minor New Source Review Permits on the Southern Ute Indian Reservation

Dear Chairman Newton:

The U.S. Environmental Protection Agency Region 8 (EPA) is initiating consultation and coordination with the Southern Ute Indian Tribe regarding potential impacts to historic, religious or cultural properties covered by section 106 of the National Historic Preservation Act (NHPA) and its implementing regulations at 36 C.F.R. Part 800.

The EPA has received federal Clean Air Act (CAA) permit applications, as detailed in the enclosure, and is preparing draft synthetic minor New Source Review (NSR) air pollution control permits for 13 existing natural gas production facilities within the exterior boundary of the Southern Ute Indian Reservation in La Plata County, Colorado. As required by the NHPA, we are assessing whether approving the permits would cause any impacts on these properties. The EPA permit issuance process includes public notice of a draft permit, opportunity for public comment, as well as administrative and judicial review provisions. A copy of the draft permit document and technical support document will be available on the internet during the public comment period at www.epa.gov/region8/air/permitting/pubcomment.html.

The permit applications request approval to transfer previously issued CAA Part 71 permits to synthetic minor NSR permits. The synthetic minor NSR permits are intended only to incorporate allowable and requested emission limits and provisions from the associated Part 71 permit, Federal Compliance Agreement and Final Order (if applicable) and associated permit applications.

The EPA is proposing a finding of "*No historic properties affected*" for the proposed synthetic minor NSR permit actions. The proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each

existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. This is an administrative action with no physical changes to the existing facilities or surrounding area. A map showing the locations of the facilities is enclosed with this letter.

We seek consultation with you concerning 1) how the Southern Ute Indian Tribe wishes us to address the NHPA consultation process, 2) the presence of historic properties within the areas of potential effects (APE) and 3) our proposed determination as to the potential effects of these proposed permit actions.

We want to ensure that we fulfill our obligations under the NHPA and that we are working with the appropriate representatives of the Tribe on air permitting matters. If a tribe does not have a federally designated Tribal Historic Preservation Officer (THPO), which is the case for the Southern Ute Indian Tribe, then federal agencies consult directly with the State Historic Preservation Officer (SHPO) concerning undertakings that may affect historic properties on tribal lands. The EPA initiated consultation with the Colorado SHPO on November 2, 2012. The enclosed letter to the Colorado SHPO describes the specific information for the facilities and seeks their concurrence with our proposed determination.

In addition, the NHPA and its implementing regulations require that the agencies consult with federally recognized tribes to ensure that tribes attaching religious or cultural significance to historic properties that may be affected by an undertaking have a reasonable opportunity to participate in the process. Therefore, please advise us as to the Tribe's preference for the process we should follow for the NHPA. Would you prefer that we communicate only with the SHPO, do you have a NHPA designated representative for the Tribe, or would you prefer that we communicate with the Tribal government as well as the SHPO and/or NHPA designated representative concerning any NHPA matters on the Reservation?

Also, to ensure that we are considering all relevant information, we would appreciate your assistance in identifying any historic properties of traditional religious or cultural importance to the Southern Ute Indian Tribe that may be located within the APE that may be directly or indirectly affected by these proposed permit actions. If the Tribe has any information concerning such properties, please contact us.

We understand that the Southern Ute Indian Tribe may not wish to divulge information about historic properties that have religious or cultural significance. The NHPA and its regulations provide a means to consider protecting information about a historic property if public disclosure might cause harm to the property, a significant invasion of privacy or impediments to traditional religious practices. We are open to working with the Tribe to seek to address any concerns that you may have regarding the sensitivity of information. If any properties are determined to be historic properties under the NHPA, the EPA would propose to consult with you on possible measures to avoid or minimize potential adverse effects.

As noted above, based on the administrative nature of the permit actions, we are proposing a finding of *"No historic properties affected"* as a result of issuing these permits. If you have any concerns regarding our determination or additional information about historic properties related to this permit, please notify me in writing within the 30 day time period described at 36 C.F.R. § 800.3(c)(4). If we haven't heard back from you within 30 days, we will assume you concur with our finding.

If you have questions or comments, please contact me directly at (303) 312-6308 or your staff can contact Victoria Parker-Christensen, Air Program, at (303) 312-6441 or parker-christensen.victoria@epa.gov. We are available to meet with you or your representatives to consult further regarding these permit actions.

Sincerely,

Howard M. Cantor, for
Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance

Enclosures

cc: Thomas Johnson, Southern Ute Indian Tribe, Environmental Programs Division Head
Brenda Jarrell, Southern Ute Indian Tribe, Air Quality Program Manager

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
Wolf Point Compressor Facility
Treating Site #8
Treating Site #6B
Treating Site #7B
Ute Compressor Station
Jaques Compressor Station
South Ignacio Central Delivery
Sambrito Compressor Station

Durango
Bayfield
Ignacio

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
City Boundary - NAVTEQ (2011);
County Boundary - U.S. Census Bureau (2010);
State Boundary - U.S. Census Bureau (2010);
Base - Microsoft Bing web service (2012).

0 1.5 3 6 9 Miles
0 3.25 6.5 13 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

EPA United States Environmental Protection Agency
REGION 8
serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

N

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EPA United States Environmental Protection Agency — REGION 8 serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

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0 2.25 4.5 9 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917
http://www.epa.gov/region08

NOV 02 2012

Ref: P-AR

CERTIFIED MAIL
RETURN RECEIPT REQUESTED

Mr. Edward Nichols, President and CEO
History Colorado
1200 Broadway
Denver, CO 80203

RE: Section 106 of the National Historic Preservation Act regarding Proposed Synthetic Minor New Source Review Permits on the Southern Ute Indian Reservation

Dear Mr. Nichols:

The Environmental Protection Agency Region 8 (EPA) has received federal Clean Air Act (CAA) permit applications and is preparing draft synthetic minor New Source Review (NSR) air pollution control permits for several existing oil production facilities within the exterior boundary of the Southern Ute Indian Reservation in La Plata County, Colorado. To comply with our obligations under Section 106 of the National Historic Preservation Act and its implementing regulations at 36 C.F.R. Part 800, we are consulting with you concerning our finding as to the potential effects and we are seeking any information you may have as to whether there are any historic properties within the area of potential effects for these facilities.

The permit applications request approval to transfer previously issued CAA Part 71 permits to synthetic minor NSR permits. The synthetic minor NSR permits are intended only to incorporate allowable and requested emission limits and provisions from the associated Part 71 permit, Federal Compliance Agreement and Final Order (if applicable) and associated permit applications.

The EPA has made the finding "*No historic properties affected*" for the proposed synthetic minor NSR permit actions. The proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. This is an administrative action with no physical changes to the existing facilities or surrounding area. A map showing the locations of the facilities is enclosed with this letter.

The following table lists the companies, facilities and locations affected by the proposed permit actions.

Company and Facility	Section, Township, Range	Latitude / Longitude
BP America Production Company		
Treating Site 6B	S5, T32N, R9W	37.0571028 / -107.8457361
Treating Site 7	S3, T32N, R10W	37.0388778 / -107.9223722
Treating Site 8	S28, T33N, R10W	37.076025 / -107.9342472
Miera Compressor Facility	SE S8, T34N, R8W	37.1988 / -107.739683
Salvador I/II Compressor Station	S28, T33N, R7W	37.07905247 / -107.6182899
Wolf Point Compressor Facility	NW S16, T33N, R9W	37.10743378 / -107.8353513
ConocoPhillips Company		
Sunnyside Compressor Station,	S9, T33N, R9W	37.1194 / -107.8372
Argenta CDP Compressor Facility,	SW, SE S4, T33N, R10W	37.1294 / -107.9372
Ute Compressor Station,	S14-15,T32N, R11W	37.0173 / -108.0201
Red Cedar Gathering Company		
Arkansas Loop & Simpson Treating Plants	S1, T32N, R9W	37.052783 / -107.784875
Sambrito Compressor Station	SW S3, T32N, R6W	37.043769 / -107.493169
Samson Resources Company		
Jacques Compressor Station	NWS26, T33N, R8W	37.077944 / -107.691
South Ignacio Central Delivery	SE S32, T33N, R7W	37.0539167 / -107.6252222

The EPA has made the finding "*No historic properties affected*" for the proposed synthetic minor NSR permit actions. If you have any concerns regarding our determination, please notify me in writing within the 30 day time period described at 36 C.F.R. § 800.3(c)(4). If we haven't heard back from you within 30 days, we will assume you concur with our finding. In addition, please send any comments or information concerning historic properties within the project areas to me within 30 days, so as to ensure that we will have ample time to review them. You can reach me by phone at (303) 312-6441 or email at parker-christensen.victoria@epa.gov. Thank you for your assistance.

Sincerely,

Victoria Parker-Christensen
Environmental Engineer
Air Program

Enclosure

cc: Mark Tobias, Section 106 Compliance Manager

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
Wolf Point Compressor Facility
Treating Site #8
Treating Site #6B
Treating Site #7B
Ute Compressor Station
Jaques Compressor Station
South Ignacio Central Delivery
Sambrito Compressor Station

Durango
Bayfield
Ignacio

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
City Boundary - NAVTEQ (2011);
County Boundary - U.S. Census Bureau (2010);
State Boundary - U.S. Census Bureau (2010);
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Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

EPA United States Environmental Protection Agency
REGION 8
serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Southern Ute Indian Reservation, Clean Air Act New Source Review (NSR) Permit Program

Miera Compressor Facility
Argenta CDP Compressor Facility
Sunnyside Compressor Station
Wolf Point Compressor Facility
Ignacio
Treating Site #8
Jaques Compressor Station
Treating Site #6B
South Ignacio Central Delivery
Treating Site #7B
Sambrito Compressor Station
Ute Compressor Station
Archuleta
San Juan

N

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

EPA United States Environmental Protection Agency — REGION 8 serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

Date: November 2, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

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0 2.25 4.5 9 Kilometers

Synthetic Minor NSR PermitFacility
City Boundary
State Boundary
County Boundary

Area Enlarged

MEMO TO FILE

DATE: November 12, 2013

SUBJECT: Southern Ute Indian Reservation Natural Gas Production Facilities
Endangered Species Act

FROM: Victoria Parker-Christensen, EPA Region 8 Air Program

TO: Source Files:
205c AirTribal SU BP America Treating Site 6B
SMNSR-SU-000024-2011.001
FRED # 99977

205c AirTribal SU BP America Treating Site 7B
SMNSR-SU-000025-2012.001
FRED # 99976

205c AirTribal SU BP America Treating Site 8
SMNSR-SU-000026-2012.001
FRED # 99973

205c AirTribal SU BP America Miera Compressor Facility
SMNSR-SU-000039-2012.001
FRED # 99978

205c AirTribal SU BP America Salvador I/II Compressor Station
SMNSR-SU-000009-2012.001
FRED # 99974

205c AirTribal SU BP America Wolf Point Compressor Facility
SMNSR-SU-000034-2012.001
FRED # 99975

205c AirTribal SU Red Cedar Arkansas Loop & Simpson Treating Plants
SMNSR-SU-000010-2011.001
FRED # 97581

205c AirTribal SU Red Cedar Sambrito Compressor Station
SMNSR-SU-000049-2011.001
FRED # 84665

205c AirTribal SU Samson South Ignacio Central Delivery
SMNSR-SU-000031-2011.001
FRED #84627

205c AirTribal SU Samson Jacques Compressor Station
SMNSR-SU-000043-2011.001
FRED # 96630

Pursuant to Section 7 of the Endangered Species Act (ESA), 16 U.S.C. §1536, and its implementing regulations at 50 CFR, part 402, the EPA is required to ensure that any action authorized, funded, or carried out by the Agency is not likely to jeopardize the continued existence of any Federally-listed endangered or threatened species or result in the destruction or adverse modification of such species' designated critical habitat. Under ESA, those agencies that authorize, fund, or carry out the federal action are commonly known as "action agencies." If an action agency determines that its federal action "may affect" listed species or critical habitat, it must consult with the U.S. Fish and Wildlife Service (FWS). If an action agency determines that the federal action will have no effect on listed species or critical habitat, the agency will make a "no effect" determination. In that case, the action agency does not initiate consultation with the FWS and its obligations under Section 7 are complete.

In complying with its duty under ESA, the EPA, as the action agency, examined the potential effects on listed species and designated critical habitat relating to issuing these Clean Air Act (CAA) synthetic minor New Source Review (NSR) permits.

Region 8 Air Program Determination

The EPA has concluded that the proposed synthetic minor NSR permit actions will have "*No effect"* on listed species or critical habitat. These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. Because the EPA has determined that the federal action will have no effect, the agency made a *"No effect"* determination, did not initiate consultation with the FWS and its obligations under Section 7 are complete.

Permit Request

The EPA has received CAA permit applications from BP America Production Company (BP), Red Cedar Gathering Company (Red Cedar), and Samson Resources Company (Samson) requesting approval to transfer enforceable emission restrictions previously established in their title V permits to synthetic minor NSR permits for existing natural gas production facilities on the Southern Ute Indian Reservation in La Plata County, Colorado. These permits are intended only to incorporate allowable and requested emission limits and provisions from the following documents:

1. Associated Part 71 Permit to Operate issued by the EPA to the applicant for the specified facility,
2. Associated application from the applicant requesting a synthetic minor NSR permit for the specified facility in accordance the requirements of the "Review of New Sources and Modifications in Indian Country; Final Rule," at 40 CFR Parts 49 and 51.

The net effect of the incorporation of these documents into a single synthetic minor NSR permit is a facility that is an area source with regard to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Categories at 40 CFR Part 63, and a minor source with regard to the PSD permitting program. Approval of these actions will establish each permit as the source of the legally and practically enforceable requirements previously created in the associated Part 71 permit.

The creation of the emission limits in the Part 71 permits was a temporary, gap-filling measure for those sources operating in Indian country that did not have the ability to obtain these limits through other programs, such as exists in state jurisdictions. Upon promulgation of the minor new source review permitting program in Indian Country, this gap-filling measure is no longer needed. 40 CFR

§49.153(a)(3)(iv) provides the EPA with the authority to transfer such limits to a synthetic minor NSR permit, effectively creating legally and practically enforceable requirements without the use of the Part 71 permit. These requirements would be similar to those requirements in New Source Performance Standards at 40 CFR Part 60, NESHAP at 40 CFR Part 63, and limits established in PSD permits. The following table lists the facility, associated Title V permit and location.

Applicant/Facility/Title V Permit	**Location**
BP America Production Company Treating Site 6B, SMNSR-SU-000024-2011.001	S5, T32N, R9W Lat. 37.0571028, Long. -107.8457361
BP America Production Company Treating Site 7B, SMNSR-SU-000025-2012.001	S3, T32N, R10W Lat. 37.0388778, Long. -107.9223722
BP America Production Company Treating Site 8, SMNSR-SU-000026-2012.001	S28, T33N, R10W Lat. 37.076025. Long. -107.9342472
BP America Production Company Miera Compressor Facility, SMNSR-SU-000039-2012.001	SE 1/4 S8, T34N, R8W Lat. 37.1988, Long. -107.739683
BP America Production Company Salvador I/II Compressor Station, SMNSR-SU-000009-2012.001	S28, T33N, R7W Lat. 37.07905247, Long. -107.6182899
BP America Production Company Wolf Point Compressor Facility, SMNSR-SU-000034-2012.001	NW¼ S16, T33N, R9W Lat. 37.10743378, Long. -107.8353513
Red Cedar Gathering Company Arkansas Loop & Simpson Treating Plants, SMNSR-SU-000010-2011.001	S1, T32N, R9W Lat. 37.052783, Long. -107.784875
Red Cedar Gathering Company Sambrito Compressor Station, SMNSR-SU-000049-2011.001	SW ¼ S3, T32N, R6W Lat. 37.043769, Long. -107.493169
Samson Resources Company Jacques Compressor Station, SMNSR-SU-000043-2011.001	NW¼ S26, T33N, R8W Lat. 37.077944, Long. -107.691
Samson Resources Company South Ignacio Central Delivery, SMNSR-SU-000031-2011.001	SE ¼ S32, T33N, R7W Lat. 37.0539167, Long. -107.6252222

Process and Construction Information

These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times.

Threatened and Endangered Species

The EPA accessed U.S. Fish and Wildlife Service (FWS) websites for information on threatened and endangered species and designated critical habitat for those species. FWS maintains a website titled *Environmental Conservation Online System* (ECOS, http://ecos.fws.gov/ecos/indexPublic.do) that provides access to databases for threatened and endangered species that may be present within the proposed project area and designated critical habitat for threatened and endangered species.

The EPA accessed the FWS Information, Planning, and Conservation System (IPaC) database (http://ecos.fws.gov/ipac) to identify species listed as threatened and endangered that have been documented as being present in La Plata County, Colorado, and received an official species list from the FWS Western Colorado Ecological Services Field Office on November 12, 2013. Information on critical habitat is available on-line at http://criticalhabitat.fws.gov/crithab/. The following threatened or endangered species may be found in La Plata County:

Birds

Mexican Spotted owl (*Strix occidentalis lucida*)
Threatened
Final designated critical habitat

Southwestern Willow flycatcher (*Empidonax traillii extimus*)
Endangered

Yellow-Billed Cuckoo (Coccyzus americanus)
Proposed Threatened

Butterfly

Uncompahge Fritillary butterfly (*Boloria acronema*)
Endangered

Fishes

Bonytail chub (*Gila elegans*)
Endangered

Humpback chub (*Gila cypha*)
Endangered
Final designated critical habitat

Colorado pikeminnow (*Ptychocheilus lucius*)
Endangered
Final designated critical habitat

Razorback sucker (*Xyrauchen texanus*)
Endangered
Final designated critical habitat

Mammals

Black-Footed ferret (*Mustela nigripes*)
Experimental Population, Non-Essential

Canada Lynx (*Lynx canadensis*)
Threatened

New Mexican meadow jumping mouse (Zapus hudsonius luteus)
Proposed Endangered

North American Wolverine (Gulo gulo luscus)
Proposed Threatened

Plants

Knowlton's cactus (*Pediocactus knowltonii*)
Endangered

Conclusion

The EPA has concluded that the proposed synthetic minor NSR permit actions will have "*No effect"* on listed species or critical habitat. These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times. Because the EPA has determined that the federal action will have no effect, the agency will make a *"No effect"* determination. In that case, the EPA does not initiate consultation with the FWS and its obligations under Section 7 are complete.

Attachments:
Map of Facilities Located on the Southern Ute Indian Reservation and FWS Designated Critical Habitat
FWS Official Species List

United States Department of the Interior

FISH AND WILDLIFE SERVICE
WESTERN COLORADO ECOLOGICAL SERVICES FIELD OFFICE
764 HORIZON DRIVE, BUILDING B
GRAND JUNCTION, CO 81506
PHONE: (970)243-2778 FAX: (970)245-6933
URL: www.fws.gov/mountain-prairie/es/Colorado/;
www.fws.gov/platteriver/

Consultation Tracking Number: 06E24100-2014-SLI-0018 November 12, 2013
Project Name: SUIT Oil and Gas T% to SMNSR Permits

Subject: List of threatened and endangered species that may occur in your proposed project location, and/or may be affected by your proposed project.

To Whom It May Concern:

The enclosed species list identifies threatened, endangered, and proposed species, designated critical habitat, and candidate species that may occur within the boundary of your proposed project and/or may be affected by your proposed project. The species list fulfills the requirements of the U.S. Fish and Wildlife Service (Service) under section 7(c) of the Endangered Species Act (Act) of 1973, as amended (16 U.S.C. 1531 *et seq.*).

New information based on updated surveys, changes in the abundance and distribution of species, changed habitat conditions, or other factors could change this list. Please feel free to contact us if you need more current information or assistance regarding the potential impacts to federally proposed, listed, and candidate species and federally designated and proposed critical habitat. Please note that under 50 CFR 402.12(e) of the regulations implementing section 7 of the Act, the accuracy of this species list should be verified after 90 days. This verification can be completed formally or informally as desired. The Service recommends that verification be completed by visiting the ECOS-IPaC website at regular intervals during project planning and implementation for updates to species lists and information. An updated list may be requested through the ECOS-IPaC system by completing the same process used to receive the enclosed list.

The purpose of the Act is to provide a means whereby threatened and endangered species and the ecosystems upon which they depend may be conserved. Under sections 7(a)(1) and 7(a)(2) of the Act and its implementing regulations (50 CFR 402 *et seq.*), Federal agencies are required to utilize their authorities to carry out programs for the conservation of threatened and endangered species and to determine whether projects may affect threatened and endangered species and/or designated critical habitat.

A Biological Assessment is required for construction projects (or other undertakings having similar physical impacts) that are major Federal actions significantly affecting the quality of the human environment as defined in the National Environmental Policy Act (42 U.S.C. 4332(2)(c)). For projects other than major construction activities, the Service suggests that a biological evaluation similar to a Biological Assessment be prepared to determine whether the project may affect listed or proposed species and/or designated or proposed critical habitat. Recommended contents of a Biological Assessment are described at 50 CFR 402.12.

If a Federal agency determines, based on the Biological Assessment or biological evaluation, that listed species and/or designated critical habitat may be affected by the proposed project, the agency is required to consult with the Service pursuant to 50 CFR 402. In addition, the Service recommends that candidate species, proposed species and proposed critical habitat be addressed within the consultation. More information on the regulations and procedures for section 7 consultation, including the role of permit or license applicants, can be found in the "Endangered Species Consultation Handbook" at:

http://www.fws.gov/endangered/esa-library/pdf/TOC-GLOS.PDF

Please be aware that bald and golden eagles are protected under the Bald and Golden Eagle Protection Act (16 U.S.C. 668 *et seq.*), and projects affecting these species may require development of an eagle conservation plan (http://www.fws.gov/windenergy/eagle_guidance.html). Additionally, wind energy projects should follow the wind energy guidelines (http://www.fws.gov/windenergy/) for minimizing impacts to migratory birds and bats.

Guidance for minimizing impacts to migratory birds for projects including communications towers (e.g., cellular, digital television, radio, and emergency broadcast) can be found at: http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/towers.htm; http://www.towerkill.com; and http://www.fws.gov/migratorybirds/CurrentBirdIssues/Hazards/towers/comtow.html.

We appreciate your concern for threatened and endangered species. The Service encourages Federal agencies to include conservation of threatened and endangered species into their project planning to further the purposes of the Act. Please include the Consultation Tracking Number in the header of this letter with any request for consultation or correspondence about your project that you submit to our office.

Attachment

United States Department of Interior
Fish and Wildlife Service

Project name: SUIT Oil and Gas T% to SMNSR Permits

Official Species List

Provided by:

WESTERN COLORADO ECOLOGICAL SERVICES FIELD OFFICE
764 HORIZON DRIVE, BUILDING B
GRAND JUNCTION, CO 81506
(970) 243-2778
http://www.fws.gov/mountain-prairie/es/Colorado/
http://www.fws.gov/platteriver/

Consultation Tracking Number: 06E24100-2014-SLI-0018
Project Type: Oil Or Gas
Project Description: US EPA syn minor NSR permits for previously T5 permits in La Plata County in the Soutern Ute Indian Reservation

Project Counties: La Plata, CO

Endangered Species Act Species List

Species lists are not entirely based upon the current range of a species but may also take into consideration actions that affect a species that exists in another geographic area. For example, certain fish may appear on the species list because a project could affect downstream species. Please contact the designated FWS office if you have questions.

Black-Footed ferret *(Mustela nigripes)*

Population: entire population, except where EXPN

Listing Status: Endangered

Bonytail chub *(Gila elegans)*

Population: Entire

Listing Status: Endangered

Canada Lynx *(Lynx canadensis)*

Population: (Contiguous U.S. DPS)

Listing Status: Threatened

Colorado pikeminnow *(Ptychocheilus lucius)*

Population: except Salt and Verde R. drainages, AZ

Listing Status: Endangered

Humpback chub *(Gila cypha)*

Population: Entire

Listing Status: Endangered

Knowlton's cactus *(Pediocactus knowltonii)*

Listing Status: Endangered

Mexican Spotted owl *(Strix occidentalis lucida)*

Population: Entire

Listing Status: Threatened

New Mexico meadow jumping mouse *(Zapus hudsonius luteus)*

Listing Status: Proposed Endangered

North American wolverine *(Gulo gulo luscus)*

Listing Status: Proposed Threatened

Razorback sucker *(Xyrauchen texanus)*

Population: Entire

Listing Status: Endangered

Schmoll milk-vetch *(Astragalus schmolliae)*

Listing Status: Candidate

Southwestern Willow flycatcher *(Empidonax traillii extimus)*

Population: Entire

Listing Status: Endangered

Critical Habitat: Final designated

Uncompahgre Fritillary butterfly *(Boloria acrocnema)*

Population: Entire

Listing Status: Endangered

Yellow-Billed Cuckoo *(Coccyzus americanus)*

Population: Western U.S. DPS

Listing Status: Proposed Threatened

Southern Ute Indian Reservation
Clean Air Act, New Source Review Permit Program

N

Disclaimer: EPA makes no claim regarding the accuracy or precision of these data. Questions concerning the data should be referred to the source agency. This map does not necessarily represent EPA's position on any Indian Country boundaries or the jurisdictional status of any specific location.

Date: October 22, 2012

Map Projection: UTM, Meters, Zone 13N,NAD83.

Data Sources:
Reservations - U.S. Census Bureau (2009);
Base - Microsoft Bing web service (2012).

EPA United States Environmental Protection Agency
REGION 8
serving the states & tribes of Colorado, Montana, Wyoming, Utah, North Dakota & South Dakota

0 3.5 7 14 21 Miles
0 5 10 20 Kilometers

- Synthetic Minor NSR Permit Applicants
- City Boundary
- Colorado Pikeminnow - FWS Critical Habitat
- Razorback Sucker- FWS Critical Habitat
- State Boundary
- County Boundary

Area Enlarged

MEMO TO FILE

DATE: October 26, 2012

SUBJECT: Southern Ute Indian Reservation Natural Gas Production Facilities
Environmental Justice

FROM: Victoria Parker-Christensen, EPA Region 8 Air Program

TO: Source Files:
205c AirTribal SU BP America Treating Site 6B
SMNSR-SU-000024-2011.001
FRED # 99977

205c AirTribal SU BP America Treating Site 7B
SMNSR-SU-000025-2012.001
FRED # 99976

205c AirTribal SU BP America Treating Site 8
SMNSR-SU-000026-2012.001
FRED # 99973

205c AirTribal SU BP America Miera Compressor Facility
SMNSR-SU-000039-2012.001
FRED # 99978

205c AirTribal SU BP America Salvador I/II Compressor Station
SMNSR-SU-000009-2012.001
FRED # 99974

205c AirTribal SU BP America Wolf Point Compressor Facility
SMNSR-SU-000034-2012.001
FRED # 99975

205c AirTribal SU Red Cedar Arkansas Loop & Simpson Treating Plants
SMNSR-SU-000010-2011.001
FRED # 97581

205c AirTribal SU Red Cedar Sambrito Compressor Station
SMNSR-SU-000049-2011.001
FRED # 84665

205c AirTribal SU Samson South Ignacio Central Delivery
SMNSR-SU-000031-2011.001
FRED #84627

205c AirTribal SU Samson Jacques Compressor Station
SMNSR-SU-000043-2011.001
FRED # 96630

On February 11, 1994, the President issued Executive Order 12898, entitled "Federal Actions to Address Environmental Justice in Minority Populations and Low-Income Populations." The Executive Order calls on each federal agency to make environmental justice a part of its mission by "identifying and addressing, as appropriate, disproportionately high and adverse human health or environmental effects of its programs, policies and activities on minority populations and low-income populations."

EPA defines "Environmental Justice" to include meaningful involvement of all people regardless of race, color, national origin, or income with respect to the development, implementation, and enforcement of environmental laws, regulations, and polices.

On June 10, 2011, the EPA promulgated a final Clean Air Act (CAA) Federal Implementation Plan (FIP) that implements New Source Review (NSR) preconstruction air pollution control requirements in Indian country. The FIP includes two NSR rules for the protection of air quality in Indian country. One of those rules, known as the minor NSR Rule, applies to new industrial facilities or modifications at existing industrial facilities with the potential to emit (PTE) certain pollutants equal to or more than the minor NSR thresholds but less than the major NSR thresholds, generally 100 to 250 tons per year. The EPA permit issuance process includes public notice of a draft permit, opportunity for public comment, as well as administrative and judicial review provisions.

This memorandum describes EPA's efforts to identify environmental justice communities and assess potential effects in connection with issuing CAA synthetic minor NSR permits in La Plata County within the exterior boundaries of the Southern Ute Indian Reservation (SUIR).

Permit Request

The EPA has received CAA permit applications from BP America Production Company (BP), Red Cedar Gathering Company (Red Cedar), and Samson Resources Company (Samson) requesting approval to transfer enforceable emission restrictions previously established in their title V permits to synthetic minor NSR permits for existing natural gas production facilities on the Southern Ute Indian Reservation in La Plata County, Colorado. These permits are intended only to incorporate allowable and requested emission limits and provisions from the following documents:

1. Associated Part 71 Permit to Operate issued by the EPA to the applicant for the specified facility,
2. Associated application from the applicant requesting a synthetic minor NSR permit for the specified facility in accordance the requirements of the "Review of New Sources and Modifications in Indian Country; Final Rule," at 40 CFR Parts 49 and 51.

The net effect of the incorporation of these documents into a single synthetic minor NSR permit is a facility that is an area source with regard to the National Emission Standard for Hazardous Air Pollutants (NESHAP) for Source Categories at 40 CFR Part 63, and a minor source with regard to the

PSD permitting program. Approval of these actions will establish each permit as the source of the legally and practically enforceable requirements previously created in the associated Part 71 permit.

The creation of the emission limits in the Part 71 permits was a temporary, gap-filling measure for those sources operating in Indian country that did not have the ability to obtain these limits through other programs, such as exists in state jurisdictions. Upon promulgation of the minor new source review permitting program in Indian Country, this gap-filling measure is no longer needed. 40 CFR §49.153(a)(3)(iv) provides the EPA with the authority to transfer such limits to a synthetic minor NSR permit, effectively creating legally and practically enforceable requirements without the use of the Part 71 permit. These requirements would be similar to those requirements in New Source Performance Standards at 40 CFR Part 60, NESHAP at 40 CFR Part 63, and limits established in PSD permits. The following table lists the facility, associated Title V permit and location.

Applicant/Facility/Title V Permit	**Location**
BP America Production Company Treating Site 6B, SMNSR-SU-000024-2011.001	S5, T32N, R9W Lat. 37.0571028, Long. -107.8457361
BP America Production Company Treating Site 7B, SMNSR-SU-000025-2012.001	S3, T32N, R10W Lat. 37.0388778, Long. -107.9223722
BP America Production Company Treating Site 8, SMNSR-SU-000026-2012.001	S28, T33N, R10W Lat. 37.076025. Long. -107.9342472
BP America Production Company Miera Compressor Facility, SMNSR-SU-000039-2012.001	SE 1/4 S8, T34N, R8W Lat. 37.1988, Long. -107.739683
BP America Production Company Salvador I/II Compressor Station, SMNSR-SU-000009-2012.001	S28, T33N, R7W Lat. 37.07905247, Long. -107.6182899
BP America Production Company Wolf Point Compressor Facility, SMNSR-SU-000034-2012.001	NW¼ S16, T33N, R9W Lat. 37.10743378, Long. -107.8353513
Red Cedar Gathering Company Arkansas Loop & Simpson Treating Plants, SMNSR-SU-000010-2011.001	S1, T32N, R9W Lat. 37.052783, Long. -107.784875
Red Cedar Gathering Company Sambrito Compressor Station, SMNSR-SU-000049-2011.001	SW ¼ S3, T32N, R6W Lat. 37.043769, Long. -107.493169
Samson Resources Company Jacques Compressor Station, SMNSR-SU-000043-2011.001	NW¼ S26, T33N, R8W Lat. 37.077944, Long. -107.691
Samson Resources Company South Ignacio Central Delivery, SMNSR-SU-000031-2011.001	SE ¼ S32, T33N, R7W Lat. 37.0539167, Long. -107.6252222

Environmental Impacts to Potential Environmental Justice Communities

Air Emissions

These proposed permit actions do not authorize the construction of any new emission sources, or emission increases from existing units, nor do they otherwise authorize any other physical modifications to the associated facility or its operations. The emissions, approved at present, from each existing facility will not increase due to the associated permit action and the emissions will continue to be well controlled at all times.

Air Quality Review

The Federal Minor New Source Review Regulations at 40 CFR 49.154(d) require that an Air Quality Impact Assessment (AQIA) modeling analysis be performed if there is reason to be concerned that new construction would cause or contribute to a National Ambient Air Quality Standard (NAAQS) or PSD increment violation. If an AQIA reveals that the proposed construction could cause or contribute to a NAAQS or PSD increment violation, such impacts must be addressed before a pre-construction permit can be issued.

The emissions, approved at present, from these existing facilities will not be increasing due to these permit actions and the emissions will continue to be well controlled at all times. These permit actions will have no air quality impacts; therefore, the EPA has determined that an AQIA modeling analysis is not required for any of the proposed permits.

Furthermore, each permit contains a provision stating, "*The permitted source shall not cause or contribute to a NAAQS violation or, in an attainment area, shall not cause or contribute to a PSD increment violation.*" Noncompliance with this permit provision is a violation of the permit and is grounds for enforcement action and for permit termination or revocation. As a result, the EPA concludes that issuance of the aforementioned synthetic minor NSR permits will not have disproportionately high and adverse human health effects on communities in the vicinity of the SUIR.

Tribal Consultation and Public Participation

The EPA offers the Tribal Government Leaders an opportunity to consult on each proposed permit action. The Tribal Government Leaders are asked to respond to the EPA's offer to consult within 30 days and if no response is received within that time, the EPA notifies the Tribal Government Leaders that the consultation period has closed. The Chairman of the Southern Ute Tribe has been offered an opportunity to consult on this permit action via letter dated September 25, 2012. To date, the EPA has not received a response to our offer to consult on this permit action and the Chairman will be notified when the consultation period has closed.

All minor source applications (synthetic minor, modification to an existing facility, new true minor or general permit) are submitted to both the EPA and the Tribal Environmental Director per the application instructions (see http://epa.gov/region8/air/permitting/tmnsr.html). The Tribal Environmental Office has 10 business days to respond to the EPA with questions and comments on the application. In the event an

Air Quality Impact Assessment (AQIA) is triggered, a copy of that document is emailed to the tribe within 5 business days of receipt by the EPA.

Given the presence of potential environmental justice communities in the vicinity of the facilities, the EPA is providing an enhanced public participation process for this permit. Interested parties can subscribe to an EPA listserve that notifies them of public comment opportunities on the Southern Ute Indian Reservation for draft air pollution control permits via email at http://epa.gov/region8/air/permitting/pubcomment.html.

Additionally, the Tribe's Environmental Director is notified of the public comment period for the proposed permit and provided copies of the notice of public comment opportunity to post in various locations on the Reservation that they deem fit. The Tribe is also notified of the issuance of the final permit.

http://www.epa.gov/region08
UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 8
1595 Wynkoop Street
DENVER, CO 80202-1129
Phone 800-227-8917

SEP 2 5 2012

Ref: 8P-AR

The Honorable Jimmy Newton, Jr.
Chairman, Southern Ute Indian Tribe
P.O. Box 737
Ignacio, CO 81137-0737

Re: Notification of Consultation and Coordination on Issuance of Synthetic Minor New Source Review Permits for Existing Natural Gas Compression Facilities on the Southern Ute Indian Reservation

Dear Chairman Newton,

The U.S. Environmental Protection Agency Region 8 (EPA Region 8) is initiating consultation and coordination with the Southern Ute Indian Tribe regarding issuance of permits to approve federally and practically enforceable emission limit requirements for twelve (12) existing natural gas compression facilities on the Southern Ute Indian Reservation. These emission limit requirements were established in a Federal Title V (Part 71) Permit to Operate.

Upon promulgation of the Federal New Source Review Pre-Construction Permit program at 40 CFR Part 49.151 (Part 49) for sources constructing and operating in Indian country, the use of the Federal Part 71 permit to create these limits is no longer practiced. In addition, these emission limits will not automatically transfer to the Southern Ute's new Title V (Part 70) Permits to Operate that will be issued by the Tribe.

Upon the transfer of these limits to the Federal Part 49 preconstruction permit, the limits will become applicable requirements, similar to applicable requirements originating from New Source Performance Standards at 40 CFR Part 60 (NSPS) and National Emission Standards for Hazardous Air Pollutants at 40 CFR Part 63 (NESHAP) that can then be incorporated into the Southern Ute's new Part 70 permits.

The following facilities are requesting a transfer of enforceable synthetic minor air pollutant emission limits established in their Part 71 permits to a Part 49 permit:

ConocoPhillips Company Sunnyside Compressor Station
ConocoPhillips Company Argenta Compressor Station
ConocoPhillips Company Ute Compressor Station
Samson Resources Company Jaques Compressor Station
Samson Resources Company South Ignacio Compressor Station
Red Cedar Gathering Company ALP-Simpson Treating Plants
Red Cedar Gathering Company Sambrito Compressor Station
BP America Production Company Miera Compressor Facility
BP America Production Company Salvador Compressor Facility

BP America Production Company Treating Site 6B Compressor Facility
BP America Production Company Treating Site 7B Compressor Facility
BP America Production Company Treating Site 8 Compressor Facility
BP America Production Company Wolf Point Compressor Facility

This consultation and coordination process is being conducted based on the *EPA Policy on Consultation and Coordination with Indian Tribes* (www.epa.gov/tribal/consultation/consult-policy.htm). The EPA Region 8 invites you and your designated consultation representative(s) to participate in this process. The EPA Region 8's anticipated timeline for the consultation and coordination period is expected to extend to 30 days after you receive this letter.

Whether or not you decide to accept this offer for government-to-government consultation, the EPA Region 8 plans to regularly coordinate and communicate with the Southern Ute Tribe's Environmental Program Division Head Thomas Johnson and the Environmental Program Director, Brenda Jarrell, for facilities located within the exterior boundaries of the Southern Ute Indian Reservation. If you would prefer to designate an alternative representative for communication on air pollution control permitting matters, please notify us of that person's name and contact information. We will keep the tribal government informed and will seek your input on these permits.

The EPA Region 8 welcomes the opportunity to consult and coordinate with the Southern Ute Tribe. If you choose to consult about these permitting actions, we will work with your tribal government to develop a consultation plan including a description of the process we would follow, opportunity for your input, and timeline for us to provide feedback and to complete the consultation. We will send a draft consultation plan for your review as soon as practical after we receive your reply to this letter. The Agency's goal will be to ensure that you have an opportunity to provide tribal input into these permit actions.

We request that you reply in writing to this letter within the next 30 days if the Southern Ute Tribe desires to consult on these permit actions. The official EPA Region 8 contact person for this consultation and coordination process is Kathleen Paser, a permit engineer on my staff.

Thank you very much for your attention to this matter. Please contact me at (303) 312-6308 or your staff can contact Kathleen Paser at (303) 312-6526 or paser.kathleen@epa.gov should you have any questions on this action. We look forward to hearing from you on this important matter.

Sincerely,

Howard M. Cantor, for
Assistant Regional Administrator
Office of Partnerships and Regulatory Assistance

cc: Thomas Johnson, Division Head, Environmental Program, Southern Ute Indian Tribe
Brenda Jarrell, Air Program Director, Southern Ute Indian Tribe

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103-3103
USA
918/591-1791
Fax 918/591-1796

August 3, 2012

Ms. Kathleen Paser
Air and Radiation Program, 8P-AR
U.S. Environmental Protection Agency
Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Like-Kind Engine Replacement
South Ignacio Central Delivery Point (V-SU-0031-08.00)
Samson Resources Company

Dear Ms. Paser:

The Samson Resources Company is herein submitting notification of a like-kind engine replacement for Units E7 at the South Ignacio Central Delivery Point. The facility is located in the SE/4 of Section 32, Township 33 North, Range 7 West, in La Plata County, Colorado.

Unit E7, a 1400 hp Waukesha 5794LT lean burn reciprocating engine equipped with an oxidation catalyst with Serial Number C-15838/1 was taken out of service on May 28, 2012. The replacement engine is labeled with Serial Number C-15836/1 was originally manufactured August 31, 2005. The replacement engine was installed and put into service on May 30, 2012.

The facility is not a major source of HAP and will therefore be subject to the area source rules under 40 CFR part 63 subpart ZZZZ (RICE MACT). The engine is not subject to 40 CFR Part 60 subpart JJJJ because the engine was manufactured prior to July 1, 2007.

If you have any questions regarding this replacement please feel free to contact me at (918) 591-1370 or via email at srose@samson.com.

Sincerely,
SAMSON RESOURCES COMPANY

Scott Rose
Environmental Specialist

Cc: South Ignacio File

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103-3103
USA
918/591-1791

January 9, 2012

Ms. Kathleen Paser
Federal Minor NSR Permit Coordinator
1595 Wynkoop Street (8P-AR)
Denver, CO 80202-1129

Re: Synthetic Minor Limit Request
South Ignacio Central Delivery Point
Samson Resources

Dear Ms. Paser:

Samson Resources Company (Samson) is herein submitting a synthetic minor limit request for its South Ignacio Central Delivery Point facility. This facility is currently permitted under permit V-SU-0031-08.00 under Title V Part 71. This permit has several emissions limitations that Samson would like to operate under and will therefore need to establish under the Minor NSR program.

Enclosed you will find the attachments documenting the limits requested as well as the methods for demonstrating compliance with those limits. Since Samson currently operates with these limits there will be no pre and post emission changes and Samson has enclosed a copy of the 2010 Emission Inventory for the facility. This facility is an existing facility operated by Samson since 2006.

Please feel free to contact me at (918) 591-1370 or srose@samson.com if you have any questions regarding this application.

Sincerely,
SAMSON RESOURCES COMPANY

Scott Rose
Air Quality Specialist

Cc: File
Brenda Jarrell
Kyle Hunderman

SYNTHETIC MINOR PERMIT APPLICATION

SOUTH IGNACIO CENTRAL DELIVERY POINT

PART 71 OPERATING PERMIT: V-SU-0031-08.00

Prepared for:

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103

Prepared by:

Compliance Partners Inc.

4038 Timberline Road, Suite 100
Fort Collins, CO 80525

DECEMBER 2011

SYNTHETIC MINOR PERMIT APPLICATION
SOUTH IGNACIO CENTRAL DELIVERY POINT

CONTENTS

SYNTHETIC MINOR PERMIT APPLICATION
SOUTH IGNACIO CENTRAL DELIVERY POINT

CONTENTS CONTINUED

ADMINISTRATIVE AND PLANT-WIDE INFORMATION

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8 Air Program
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY

Check List – Application for New Construction

(Form NEW)

Please check all that apply to show how you are using this form

- ○ **Proposed Construction of a New Facility**
- ○ **Proposed Construction of New Equipment at an Existing Facility**
- ○ **Proposed Modification of an Existing Facility**
- ✓ **Other – Please Explain** Synthetic Minor Permit Application

Use of this information request form is voluntary and not yet approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your proposed project. While submittal of this form is not required, it does offer details on the information we will use to complete your requested approval and providing the information requested may help expedite the process. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

Please submit information to following two entities:

Minor NSR Permitting Coordinator
U.S. EPA, Region 8
1595 Wynkoop Avenue, 8P-AR
Denver, CO 80202-1129

The Tribal Environmental Contact for the specific reservation:

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact the EPA Region 8 Tribal Air Coordinator:

Alexis North, EPA Region 8 Tribal Air Coordinator
303-312-7005
north.alexis@epa.gov

A. GENERAL FACILITY INFORMATION

1. (a) **Company Name** Samson Resources Company (b) **Operator Name** Samson Resources Company		2. **Facility Name** South Ignacio Central Delivery Point	
3. Type of Operation Natural Gas Production		4. Portable Source? Yes (No) 5. Temporary Source? Yes (No)	
6. NAICS Code 211111		7. SIC Code 1311	
8. Physical Address (home base for portable sources) South Ignacio Road about nine miles southeast of Durango, CO			
9. Reservation* Southern Ute	10. County* La Plata	11a. Latitude* 37° 3' 14.1" N 37.053917	11b. Longitude* -107° 37' 30.8" W -107.625222
12a. Quarter Quarter Section* SE 1/4	12b. Section* 32	12c. Township* 33 North	12d. Range* 7 West

*Provide all proposed locations of operation for portable sources

B. PREVIOUS PERMIT ACTIONS (Provide information in this format for each permit that has been issued to this facility. Provide as an attachment if additional space is necessary)

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-01.00
Date of the Permit Action April 2004

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-01.01
Date of the Permit Action October 2005

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-01.02
Date of the Permit Action January 2006

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-01.03
Date of the Permit Action January 2008

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-01.04
Date of the Permit Action July 2008

B. PREVIOUS PERMIT ACTIONS (Provide information in this format for each permit that has been issued to this facility. Provide as an attachment if additional space is necessary)

Facility Name on the Permit South Ignacio Central Delivery Point
Permit Number (xx-xxx-xxxxx-xxxx.xx) V-SU-0031-08.00
Date of the Permit Action August 2009

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

Facility Name on the Permit
Permit Number (xx-xxx-xxxxx-xxxx.xx)
Date of the Permit Action

C. CONTACT INFORMATION

Company Contact Scott Rose		Title Air Quality Specialist
Mailing Address Two West Second Street	Tulsa, Oklahoma 74103-3103	
Email Address srose@samson.com		
Telephone Number (918) 591-1370	Facsimile Number (918) 591-7370	
Operator Contact (if different from company contact)		Title
Mailing Address		
Email Address		
Telephone Number	Facsimile Number	
Facility Contact Lynn Davis		Title Superintendent
Mailing Address PO Box 9	Bayfield, Colorado 81122	
Email Address ldavis@samson.com		
Telephone Number (970) 884-5085	Facsimile Number	
Compliance Contact Scott Rose	Title Air Quality Specialist	
Mailing Address Two West Second Street	Tulsa, Oklahoma 74103-3103	
Email Address srose@samson.com		
Telephone Number (918) 591-1370	Facsimile Number (918) 591-7370	

D. ATTACHMENTS

Include all of the following information (see the attached instructions)

- ✓ **FORM SYNMIN** - New Source Review Synthetic Minor Limit Request Form, if synthetic minor limits are being requested.
- ✓ Narrative description of the proposed production processes. This description should follow the flow of the process flow diagram to be submitted with this application.
- ✓ Process flow chart identifying all proposed processing, combustion, handling, storage, and emission control equipment.
- ✓ A list and descriptions of all proposed emission units and air pollution-generating activities.
- ✓ Type and quantity of fuels, including sulfur content of fuels, proposed to be used on a daily, annual and maximum hourly basis.
- ✓ Type and quantity of raw materials used or final product produced proposed to be used on a daily, annual and maximum hourly basis.
- ✓ Proposed operating schedule, including number of hours per day, number of days per week and number of weeks per year.
- ✓ A list and description of all proposed emission controls, control efficiencies, emission limits, and monitoring for each emission unit and air pollution generating activity.
- ✓ **Criteria Pollutant Emissions** - Estimates of Current Actual Emissions, Current Allowable Emissions, Post-Change Uncontrolled Emissions, and Post-Change Allowable Emissions for the following air pollutants: particulate matter, PM_{10}, $PM_{2.5}$, sulfur oxides (SOx), nitrogen oxides (NOx), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, ammonia (NH_3), fluorides (gaseous and particulate), sulfuric acid mist (H_2SO_4), hydrogen sulfide (H_2S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates.
- ✓ These estimates are to be made for each emission unit, emission generating activity, and the project/facility in total.
- ✓ **Modeling – Air Quality Impact Analysis (AQIA)**
- ✓ **ESA (Endangered Species Act)**
- ✓ **NHPA (National Historic Preservation Act)**

E. TABLE OF ESTIMATED EMISSIONS

The following tables provide the total emissions in tons/year for all pollutants from the calculations required in Section D of this form, as appropriate for the use specified at the top of the form.

E(i) – Proposed New Facility

Pollutant	Potential Emissions (tpy)	Proposed Allowable Emissions (tpy)	
PM	0	0	PM - Particulate Matter PM_{10} - Particulate Matter less than 10 microns in size $PM_{2.5}$ - Particulate Matter less than 2.5 microns in size SOx - Sulfur Oxides NOx - Nitrogen Oxides CO - Carbon Monoxide VOC - Volatile Organic Compound Pb - Lead and lead compounds NH_3 - Ammonia Fluorides - Gaseous and particulates H_2SO_4 - Sulfuric Acid Mist H_2S - Hydrogen Sulfide TRS - Total Reduced Sulfur RSC - Reduced Sulfur Compounds
PM_{10}	0	0	
$PM_{2.5}$	0	0	
SO_x	0	0	
NO_x	232.7	232.7	
CO	148.9	148.9	
VOC	110.3	110.3	
Pb	0	0	
NH_3	0	0	
Fluorides	0	0	
H_2SO_4	0	0	
H_2S	0	0	
TRS	0	0	
RSC	0	0	

Emissions calculations must include fugitive emissions if the source is one the following listed sources, pursuant to CAA Section 302(j):

(a) Coal cleaning plants (with thermal dryers);
(b) Kraft pulp mills;
(c) Portland cement plants;
(d) Primary zinc smelters;
(e) Iron and steel mills;
(f) Primary aluminum ore reduction plants;
(g) Primary copper smelters;
(h) Municipal incinerators capable of charging more than 250 tons of refuse per day;
(i) Hydrofluoric, sulfuric, or nitric acid plants;
(j) Petroleum refineries;
(k) Lime plants;
(l) Phosphate rock processing plants;
(m) Coke oven batteries;
(n) Sulfur recovery plants;
(o) Carbon black plants (furnace process);
(p) Primary lead smelters;
(q) Fuel conversion plants;
(r) Sintering plants;
(s) Secondary metal production plants;
(t) Chemical process plants
(u) Fossil-fuel boilers (or combination thereof) totaling more than 250 million British thermal units per hour heat input;
(v) Petroleum storage and transfer units with a total storage capacity exceeding 300,000 barrels;
(w) Taconite ore processing plants;
(x) Glass fiber processing plants;
(y) Charcoal production plants;
(z) Fossil fuel-fired steam electric plants of more that 250 million British thermal units per hour heat input, and
(aa) Any other stationary source category which, as of August 7, 1980, is being regulated under section 111 or 112 of the Act.

E(ii) – Proposed New Construction at an Existing Facility or Modification of an Existing Facility

Pollutant	Current Actual Emissions (tpy)	Current Allowable Emissions (tpy)	Post-Change Potential Emissions (tpy)	Post-Change Allowable Emissions (tpy)
PM	0	0	0	0
PM_{10}	0	0	0	0
$PM_{2.5}$	0	0	0	0
SO_x	0	0	0	0
NO_x	232.7	232.7	232.7	232.7
CO	148.9	148.9	148.9	148.9
VOC	110.3	110.3	110.3	110.3
Pb	0	0	0	0
NH_3	0	0	0	0
Fluorides	0	0	0	0
H_2SO_4	0	0	0	0
H_2S	0	0	0	0
TRS	0	0	0	0
RSC	0	0	0	0

PM - Particulate Matter
PM_{10} - Particulate Matter less than 10 microns in size
$PM_{2.5}$ - Particulate Matter less than 2.5 microns in size
SOx - Sulfur Oxides
NOx - Nitrogen Oxides
CO - Carbon Monoxide
VOC - Volatile Organic Compound
Pb - Lead and lead compounds
NH_3 - Ammonia
Fluorides - Gaseous and particulates
H_2SO_4 - Sulfuric Acid Mist
H_2S - Hydrogen Sulfide
TRS - Total Reduced Sulfur
RSC - Reduced Sulfur Compounds

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8 Air Program
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY

Checklist - Synthetic Minor Limit Request

(Form SYNMIN)

Use of this information request form is voluntary and not yet approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your proposed project. While submittal of this form is not required, it does offer details on the information we will use to complete your requested approval and providing the information requested may help expedite the process. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

Please submit information to following two entities:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Avenue, 8P-AR
Denver, CO 80202-1129

The Tribal Environmental Contact for the specific reservation:

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact the EPA Region 8 Tribal Air Coordinator:

Alexis North, EPA Region 8 Tribal Air Coordinator
303-312-7005
north.alexis@epa.gov

A. GENERAL INFORMATION

Company Name Samson Resources Company	**Facility Name** South Ignacio Central Delivery Point	
Company Contact or Owner Name Scott Rose		Title Air Quality Specialist
Mailing Address Two West Second Street	Tulsa, Oklahoma 74103-3103	
Email Address srose@samson.com		
Telephone Number (918) 591-1370	Facsimile Number (918) 591-7370	

B. ATTACHMENTS

For each criteria air pollutant, hazardous air pollutant and for all emission units and air pollutant-generating activities to be covered by a limitation, include the following:

- ✓ **Item 1** - The proposed limitation and a description of its effect on current actual, allowable and the potential to emit.
- ✓ **Item 2** - The proposed testing, monitoring, recordkeeping, and reporting requirements to be used to demonstrate and assure compliance with the proposed limitation.
- ✓ **Item 3** - A description of estimated efficiency of air pollution control equipment under present or anticipated operating conditions, including documentation of the manufacturer specifications and guarantees.
- ✓ **Item 4** - Estimates of the Post-Change Allowable Emissions that would result from compliance with the proposed limitation, including all calculations for the estimates.
- ✓ **Item 5** – Estimates of the potential emissions of Greenhouse Gas (GHG) pollutants before and after proposed emission controls.

Description of Operations
South Ignacio Central Delivery Point
SE ¼ Section 32, Township 33N, Range 7W
La Plata County, Colorado

The South Ignacio Central Delivery Point is owned and operated by Samson Resources. The facility is located within the exterior boundaries of the Southern Ute Indian Reservation in the SE ¼ of Section 32, Township 33 North, Range 7 West in La Plata County, Colorado. A facility location map is included as Figure 1.

The facility is comprised of equipment that dehydrates and compresses coal-bed methane gas from several wells to transmission pipeline specifications. Gas entering the facility from the field is first fed to an inlet separator that gravimetrically removes water that may have formed/condensed during transportation from the supplying gas wells. Separator overhead gas is fed to one of the eight compressor engines from a common suction header. The compressors discharge gas to a common discharge header that feeds to scrubbers. The scrubbers separate and collect liquids that may have formed during compression. The compressed gas is then fed to two dehydration units. Tri-ethylene glycol is circulated counter-currently and absorbs water from the saturated gas. Rich glycol is circulated to a reboiler, where moisture is driven to the atmosphere by heating the glycol. Dry gas exits the contactors and is directed to the sales line, where it is metered and exits the facility. The gas processing capacity of the facility is approximately 70 MMscfd with eight compressor engines operating. Figure 2 contains a simplified facility plot plan. A process flow diagram is attached as Figure 3.

Process equipment installed at the facility consists of eight natural gas-fired reciprocating engines, two triethylene glycol dehydration units equipped with reboiler burners, and a flare. The facility emission units are listed in Table 1. There are several insignificant emission units at this facility including various storage tanks and heaters. These units are listed in Table 2.

Table 1: South Ignacio Central Delivery Point Emission Units

Emission Unit ID	Description	Control Equipment
E1	1680 hp Waukesha L7044GSI Compressor Engine	Non-Selective Catalyst
E2	1267 hp Waukesha L7042GL Compressor Engine	Oxidation Catalyst
E3	1267 hp Waukesha L7042GL Compressor Engine	Oxidation Catalyst
E4	1336 hp Waukesha L7042GL Compressor Engine	Oxidation Catalyst
E5	1400 hp Waukesha L5794LT Compressor Engine	Oxidation Catalyst
E6	1400 hp Waukesha L5794LT Compressor Engine	Oxidation Catalyst
E7	1400 hp Waukesha L5794LT Compressor Engine	Oxidation Catalyst
E8	1400 hp Waukesha L5794LT Compressor Engine	Oxidation Catalyst
D1	30 MMscfd PESCO Dehydration Unit Glycol Regenerator	PESCO Control Unit – Condenser & Flare Stack
D2	40 MMscfd PESCO Dehydration Unit Glycol Regenerator	PESCO Control Unit – Condenser & Flare Stack
FUG	Facility Fugitive Emissions	None
CRPV	Compressor Cylinder Rod Packing Vent Emissions	None

Table 2: South Ignacio Central Delivery Point Insignificant Emission Units

Emission Unit ID	Description
IEU1	16 – 500 gallon lubricating oil storage tanks
IEU2	11 – 500 gallon used oil storage tanks
IEU3	2 – 500 gallon ethylene glycol storage tanks
IEU4	4 – 1000 gallon produced water storage tanks
IEU5	1 – 400 bbl slop tank
IEU6	1 – 500 gallon methanol storage tank
IEU7	5 – 0.12 MMBtu/hr natural gas fired tank heaters

Samson is requesting three emission limitations for the facility so that it may retain its status as a synthetic minor source of HAP emissions. The first limitation is a facility-wide formaldehyde emission limit of 9.5 tons during any consecutive twelve months. The second limitation is that benzene emissions from each of the glycol dehydration units shall be limited to 0.9 tons per any consecutive 12 months. The third and final limitation is a facility-wide HAP emission limit of 23 tons during any consecutive 12 months. Compliance with these annual limits will be determined on a rolling 12-month basis. Emission control equipment, control efficiencies, and emission monitoring is discussed in the attached individual equipment sections of the application.

The facility potential to emit is contained in Table 3. The PTE in this table reflects enforceable emission control for engine formaldehyde emissions and dehydration unit benzene emissions and total HAP emissions. The facility-wide emission limits for formaldehyde and total HAP emissions have been incorporated into the facility PTE. All VOC emissions are represented on an uncontrolled basis. Table 4 lists the facility's 2010 emissions.

The South Ignacio Central Delivery Point is an existing, constructed, and operating facility. There are no increases in emission rates or facility potential to emit with this application so an ambient impact analysis has not been included. In addition the facility will have no adverse effects with respect to the ESA or NHPA. ESA and NHPA reports are attached.

Table 3: South Ignacio Central Delivery Point Potential to Emit

Unit	Model	hp	NO_X			CO			VOC			Formaldehyde			Benzene	Total HAP
			g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	tpy	tpy
E1	Waukesha L7044GSI	1680	2.5	9.25	40.5	3.5	12.95	56.7	0.5	1.85	8.1	0.02	0.07	0.32	0	0.3
E2	Waukesha L7042GL	1267	1.5	4.19	18.3	1.0	2.79	12.2	0.7	1.95	8.6	0.10	0.28	1.22	0	1.2
E3	Waukesha L7042GL	1267	1.5	4.19	18.3	1.0	2.79	12.2	0.7	1.95	8.6	0.10	0.28	1.22	0	1.2
E4	Waukesha L7042GL	1336	1.5	4.41	19.3	1.0	2.94	12.9	0.7	2.06	9	0.10	0.29	1.29	0	1.3
E5	Waukesha L5794LT	1400	2.5	7.71	33.8	1.0	3.08	13.5	0.5	1.54	6.8	0.10	0.31	1.35	0	1.4
E6	Waukesha L5794LT	1400	2.5	7.71	33.8	1.0	3.08	13.5	0.5	1.54	6.8	0.10	0.31	1.35	0	1.4
E7	Waukesha L5794LT	1400	2.5	7.71	33.8	1.0	3.08	13.5	0.5	1.54	6.8	0.10	0.31	1.35	0	1.4
E8	Waukesha L5794LT	1400	2.5	7.71	33.8	1.0	3.08	13.5	0.5	1.54	6.8	0.10	0.31	1.35	0	1.4
D1	TEG Dehydration Unit	18 MMscfd		0.12	0.5		0.10	0.4		4.64	20.31			0.0	0.9	13.4
D2	TEG Dehydration Unit	30 MMscfd		0.07	0.3		0.06	0.3		5.59	24.47			0.0	0.9	
FUG	Facility Fugitive Emissions				0.0			0.0			3.1			0.0	0.0	0.0
IEUs	Insignificant Units				0.3			0.2			0.9			0.0	0.0	0.0
Total					232.7			148.9			110.3			9.5	1.8	23.0

Table 4: South Ignacio Central Delivery Point 2010 Emissions

Unit	Model	hp	NO_X			CO			VOC			Formaldehyde			Benzene	Total HAP
			g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy	tpy	tpy
E1	Waukesha L7044GSI	1680	2.5	9.25	21.9	3.5	12.95	54.8	0.5	1.85	7.8	0.02	0.07	0.4	0	0.4
E2	Waukesha L7042GL	1267	1.5	4.19	18.1	1.0	2.79	12.1	0.7	1.95	6.0	0.10	0.28	0.4	0	0.4
E3	Waukesha L7042GL	1267	1.5	4.19	11.1	1.0	2.79	11.7	0.7	1.95	0.2	0.10	0.28	0.3	0	0.3
E4	Waukesha L7042GL	1336	1.5	4.41	19.1	1.0	2.94	12.7	0.7	2.06	6.4	0.10	0.29	0.3	0	0.3
E5	Waukesha L5794LT	1400	2.5	7.71	33.1	1.0	3.08	13.3	0.5	1.54	6.6	0.10	0.31	0.4	0	0.4
E6	Waukesha L5794LT	1400	2.5	7.71	33.5	1.0	3.08	13.4	0.5	1.54	6.7	0.10	0.31	0.4	0	0.4
E7	Waukesha L5794LT	1400	2.5	7.71	33.2	1.0	3.08	13.3	0.5	1.54	6.6	0.10	0.31	0.3	0	0.3
E8	Waukesha L5794LT	1400	2.5	7.71	33.6	1.0	3.08	13.4	0.5	1.54	6.7	0.10	0.31	0.3	0	0.3
D1	TEG Dehydration Unit	18 MMscfd		0.04	0.5		0.03	0.1		0.02	0.1			0.0	0.03	0.07
D2	TEG Dehydration Unit	30 MMscfd		0.12	0.3		0.10	0.4		0.02	0.1			0.0	0.04	0.08
FUG	Facility Fugitive Emissions				0.0			0.0			3.1			0.0	0.0	0.0
IEUs	Insignificant Units				0.3			0.2			0.9			0.0	0.0	0.0
Total					204.7			145.4			51.2			2.8	0.1	3.0

Directions to the Facility

South Ignacio Central Delivery Point
Section 32, Township 33N, Range 7W
La Plata County, Colorado

The South Ignacio Central Delivery Point is located about nine miles southeast of Durango, Colorado. To get to the South Ignacio Central Delivery Point take US Highway 550 to the intersection with County Road 318. Go east onto County Road 318. Follow County Road 318 until the tee in the road. Turn right at the tee and drive to a guardrail in between mile markers 5 and 6. Turn at the next right and follow the road to the South Ignacio Central Delivery Point.

Regulatory Applicability Assessment
South Ignacio Central Delivery Point

40 CFR Part	Description	Applicable Requirement	Reason
Part 50	National Primary and Secondary Ambient Air Quality Standards	N	Ambient standards set forth by theses provisions are not directly enforceable upon a facility. The demonstration of the maintenance of an air quality standard is the responsibility of the Administrator and not that of a specific facility. It is recognized that the Administrator may incorporate requirements into a State or Federal Implementation Plan designed to mitigate an air quality violation which can apply to specific facilities, but the specific air quality standards are not direct applicable requirements to this facility.
Part 51	Requirements for Preparation, Adoption and submittal of Implementation Plans	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act.
Part 52	Approval of Promulgation of Implementation Plans		
52.21	Prevention of Significant Deterioration	N	The facility is not a major stationary source as defined at 40 CFR 52.21(b). The facility has a potential to emit criteria pollutants below the 250 tpy PSD threshold.
52.24	New Source Review	N	The facility is not located in a nonattainment area
Part 53	Ambient Air Monitoring Reference and Equivalent Methods	N	This part sets forth requirements for the monitoring of ambient air. The facility is not required and does not perform ambient air monitoring.
Part 54	Prior Notice of Citizen Suits	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act.
Part 55	Outer Continental Shelf Air Regulations	N	The facility is not located on the Outer Continental Shelf
Part 56	Regional Consistency	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act.
Part 57	Primary Nonferrous Smelter Orders	N	The facility is not a Nonferrous Smelter
Part 58	Ambient Air Quality Surveillance	N	This part sets forth requirements for the monitoring of ambient air. The facility is not required and does not perform ambient air monitoring.
Part 59	Not Promulgated--Reserved		
Part 60	Standards of Performance for New Stationary Sources	N	Most of the standards set forth by these regulations do not apply to the facility because no applicable units exist at the facility. Specific standards which may apply at the facility and may apply in general to natural gas transmission and/or processing facilities include:
Subpart K	VOL Storage Tanks	N	There are no storage tanks at this facility which were constructed prior to March 8, 1978
Subpart Ka	VOL Storage Tanks	N	There are no storage tanks at this facility which were constructed between May18, 1978 and July 23, 1984
Subpart Kb	VOL Storage Tanks	N	All tanks which contain VOL and which were constructed after July 23, 1984 either have capacities less than the applicability threshold of 40 m^3 (251.6 bbl) or have vapor pressures below the 15 kPa applicability threshold.
Subpart GG	Stationary Gas Turbines	N	There are no gas turbines located at this facility.
Subpart KKK	On-Shore Natural Gas Processing Facilities	N	This facility does not process natural gas to extract natural gas liquids.

Regulatory Applicability Assessment
South Ignacio Central Delivery Point

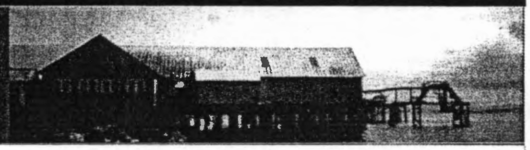
40 CFR Part	Description	Applicable Requirement	Reason
Subpart LLL	On-Shore Natural Gas Sweetening Plants	N	This facility does not process natural gas to remove sulfur compounds.
Subpart JJJJ	Standards of Performance for Ignition Internal Combustion Engines and National Emision Standrads for Hazardous Air Pollutants for Recipricating Internal Combustion Engines	Y	Unit E3 is subject to this Subpart. Future Internal Combustion Engines installed at this facility may be subject to this Subpart and will be in compliance.
Subpart KKKK	Standards of Performance for Stationary Gas Turbines	N	There are no gas turbines located at this facility.
Part 61	National Emission Standards for Hazardous Air Pollutants	N	This facility is not part of any source category for which provisions set forth by these regulations apply.
Part 62	Approval and Promulgation of State Plans for Designated Facilities and Pollutants	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act. They do not directly apply to this facility.
Part 63	National Emission Standards for Hazardous Air Pollutants for Source Categories	Y	Most of the standards set forth by these regulations do not apply to the facility because no applicable units exist at the facility. Specific standards which apply at the facility and may apply in general to natural gas transmission and/or processing facilities include:
Subpart HH	National Emission Standards for Hazardous Air Pollutants from Oil and Natural Gas Production Facilities	Y	This facility is is exempt from the general requirements for area sources. The monitoring and record keeping requirements for the benzene emission limits on each of the dehydration units meets the general recordkeeping requirements of this subpart.
Subpart HHH	National Emission Standards for Hazardous Air Pollutants from Natural Gas Transmission and Storage Facilities	N	Facility is not a natural gas transmission or storage facility.
Subpart ZZZZ	National Emission Standards for Hazardous Air Pollutants for Recipricating Internal Combustion Engines	Y	Unit E3 was constructed after June 12, 2006 and July 1, 2007 so it meets the requirements of JJJJ to be in complaince with this subpart. Unit E1 is an existing 4SRB and Units E2, E4, E5, E6, E7, and E8 are existing 4SLB and have until 10/19/13 to be in compliance with the emission limits of this subpart.
Part 64	Compliance Assurance Monitoring	N	No emission units at the facility are equipped with emission control technology or are limited by an applicable emission limitation.
Part 65	Not Promulgated--Reserved		
Part 66	Assessment and Collection of Noncompliance Penalties by EPA	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act. They do not directly apply to this facility.
Part 67	EPA Approval of State Noncompliance Penalty Program	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act. They do not directly apply to this facility.
Part 68	Chemical Accident Prevention Provisions	N	No substance listed by this regulations is stored on-site at the facility in quantities above applicable threshold values set forth by the regulation.
Part 69	Special Exemptions from the Requirements of the Clean Air Act	N	The facility is not located in an area covered by this regulation.
Part 70	State Operating Permit Programs	N	The facility is not located in an area under the jurisdiction of a regulatory authority which has an EPA-approved part 70 program.
Part 71	Federal Operating Permit Programs	Y	The facility is a major source subject to the provisions of this regulation.
Part 72	Permits Regulation	N	The facility is not an affected facility under the Acid Rain Program.
Part 73	Sulfur Dioxide Allowance System	N	The facility is not an affected facility under the Acid Rain Program.
Part 74	Sulfur Dioxide Opt-Ins	N	The facility has not elected to opt-in to the Acid Rain Program.
Part 75	Continuous Emissions Monitoring	N	The facility is not an affected facility under the Acid Rain Program.

Regulatory Applicability Assessment
South Ignacio Central Delivery Point

40 CFR Part	Description	Applicable Requirement	Reason
Part 76	Acid Rain Nitrogen Oxides Emission Reduction Program	N	The facility is not an affected facility under the Acid Rain Program.
Part 77	Excess Emissions	N	The facility is not an affected facility under the Acid Rain Program.
Part 78	Appeal Procedures for Acid Rain Program	N	The facility is not an affected facility under the Acid Rain Program.
Part 79	Registration of Fuels and Fuel Additives	N	The facility does not sell fuels or additives which are designated by this provision.
Part 80	Regulation of Fuels and Fuel Additives	N	The facility does not sell fuels or additives which are designated by this provision.
Part 81	Designation of Areas for Air Quality Planning Purposes	N	Provision of this part are administrative in nature and implement mandates of the Clean Air Act. They do not directly apply to his facility.
Part 82	Protection of Stratospheric Ozone	N	The Facility does not engage in the distribution or sale of controlled substances, and it does not produce, transform, destroy, import, or export products containing controlled substances.
Part 85	Control of Air Pollution from Mobile Sources	N	The facility does not engage in vehicle manufacturing activities.
Part 86	Control of Air Pollution from New and In-Use Motor Vehicles and New and In-use Motor Vehicle Engines: Certification and Test Procedures	N	The facility does not engage in the certification or testing of motor vehicle engines.
Part 87	Control of Air Pollution from Aircraft and Aircraft Engines	N	The facility does not engage in the use of aircraft or aircraft engines.
Part 88	Clean-fuel Vehicles	N	These provisions apply to vehicle fleets and not to stationary sources.
Part 89	Control of Emissions from new and in-use Nonroad Engines	N	The facility does not engage in the use of nonraod engines as define by these provisions.
Part 90	Control of Emissions from Nonroad Spark-ignition Engines	N	The facility does not engage in the use of nonroad spark-ignition engines as defined by these provisions.
Part 91	Control of Emissions from Marine Spark-ignition Engines	N	The facility does not engage in the use of marine spark-ignition engines.
Part 92	Control of Emissions from Locomotives and Locomotive Engine	N	The facility does not engage in the use of locomotives or locomotive engines.
Part 93	Determining Conformity of Federal Actions to State or Federal Implementation Plans	N	The facility operations are not federal actions.
Part 94	Not Promulgated--Reserved		
Part 95	Mandatory Patent Licenses	N	Provisions of this part are administrative in nature and implement mandates of the Clean Air Act. They do not directly apply to his facility.
Parts 96-99	Not Promulgated--Reserved		

Group	Name	Population	Status	Lead Office	Recovery Plan Name	Recovery Plan Stage
Birds	Yellow-billed Cuckoo (Coccyzus	Western U.S. DPS	Candidate	Sacramento Fish And Wildlife		
Birds	Mexican spotted owl (Strix		Threatened	Arizona Ecological Services	Draft Recovery Plan for the	Draft Revision 1
Birds	Southwestern willow flycatcher		Endangered	Arizona Ecological Services	Final Recovery Plan for the	Final
Flowering Plants	Knowlton's cactus (Pediocactus		Endangered	New Mexico Ecological Services	Knowlton's (=Hedgehog) Cactus	Final
Insects	Uncompahgre fritillary butterfly		Endangered	Western Colorado Ecological	Uncompahgre Fritillary Butterfly	Final
Mammals	Black-footed ferret (Mustela	U.S.A. (specific portions of AZ,	Experimental Population, Non-	Office Of The Regional Director		
Mammals	Canada Lynx (Lynx canadensis)	(Contiguous U.S. DPS)	Threatened	Montana Ecological Services	Recovery Outline for the	Outline
Mammals	New Mexico meadow jumping		Candidate			
Mammals	North American wolverine (Gulo		Candidate	Montana Ecological Services		

National Register of Historic Places



TITLE LIST DISPLAY
From: NPS Digital Library
Term(s) Searched: Colorado and La Plata
Records Displayed: 1 to 15 of 15

Go back to: Revise Search — Sort By: Title | Relevancy | Modified

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Denver and Rio Grande Western Railroad Locomotive No. 315 *[Image]*	8%
Durango High School *[Image]*	8%
Durango Rock Shelters Archeology Site *[Image]*	8%
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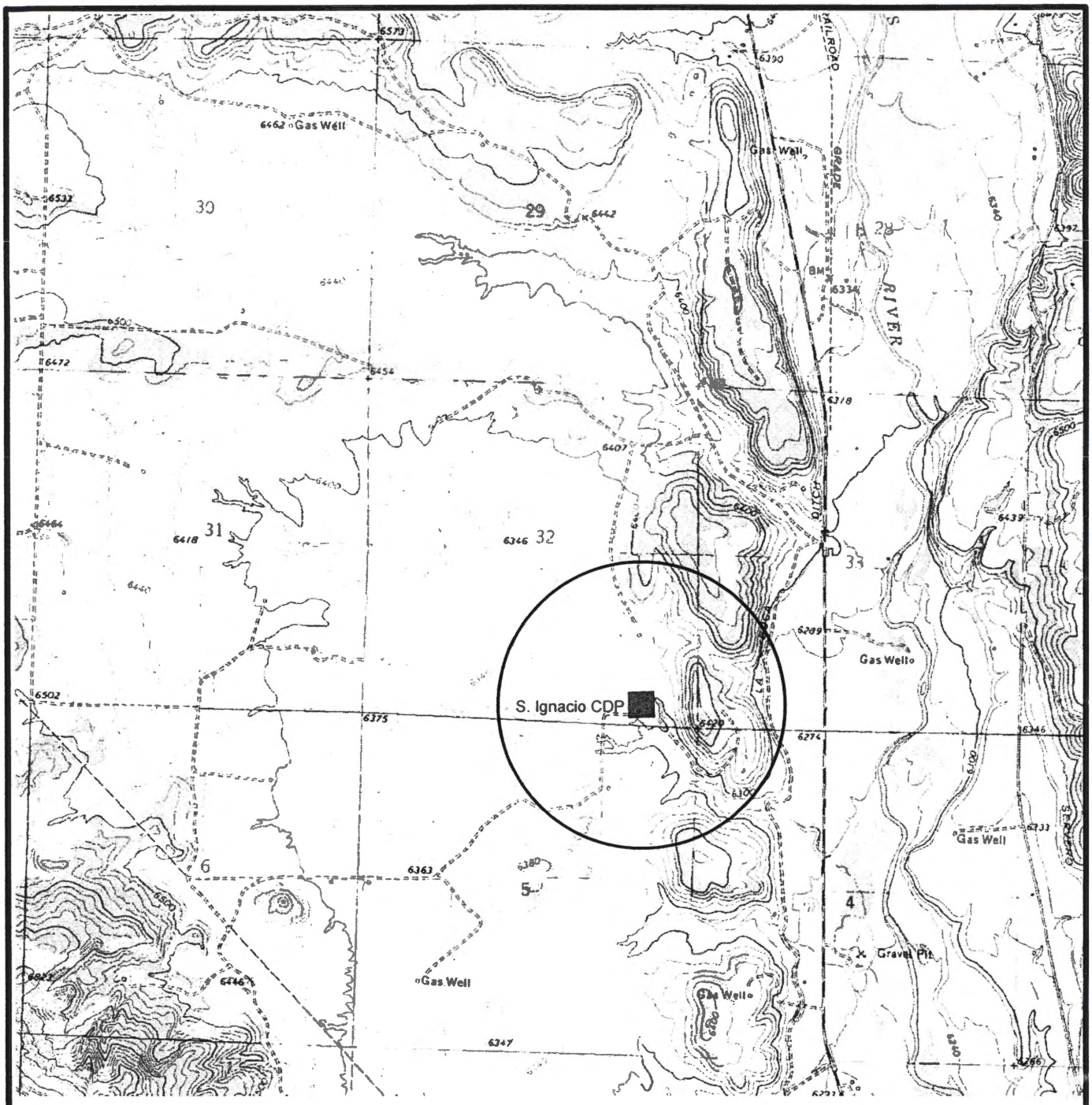
Ute Mountain Ute Mancos Canyon Historic District *[Image]*	8%

Prev##1##Next

FIGURES



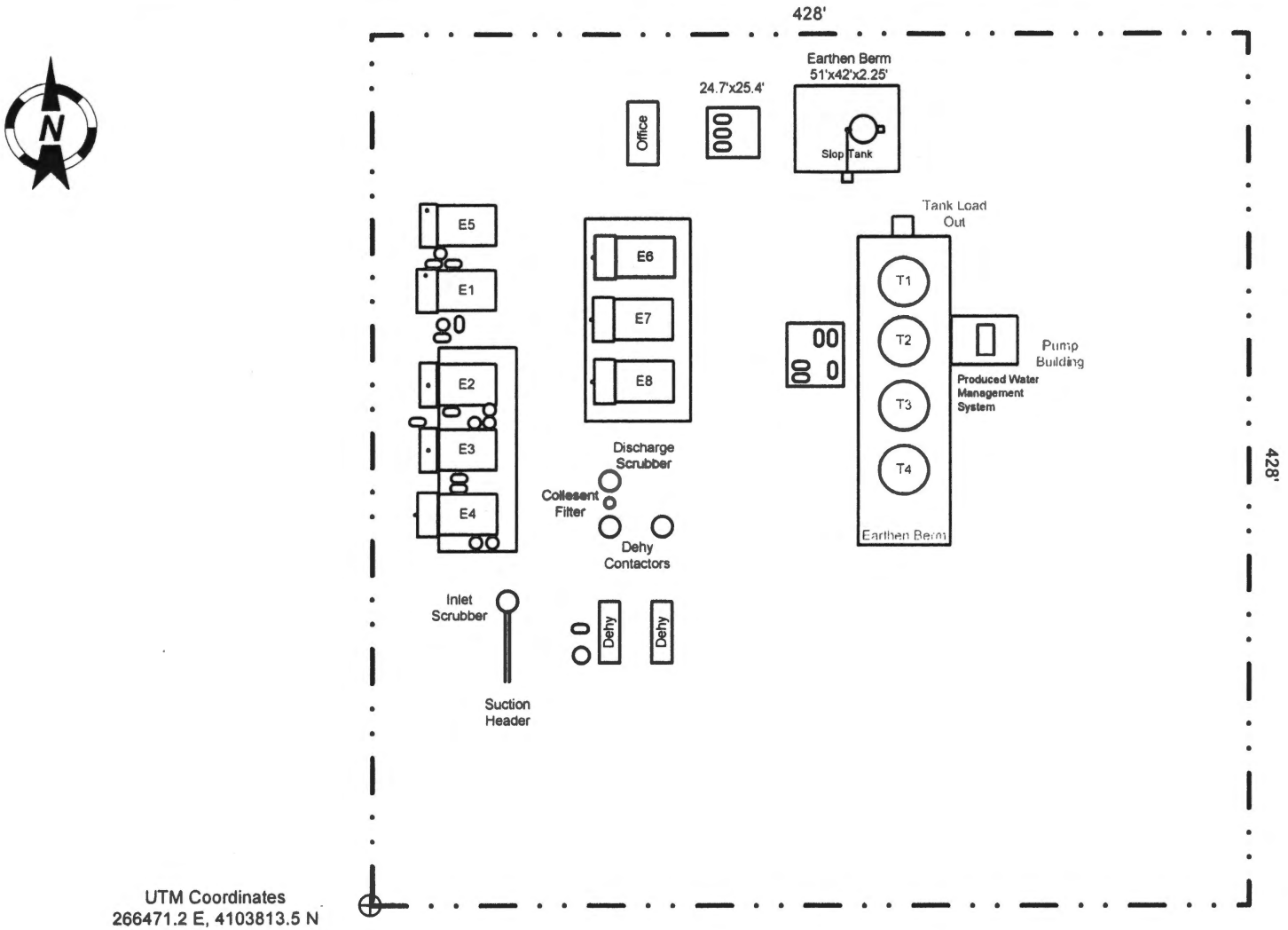
Compliance Partners
4038 Timberline Rd., Suite 100
Ft. Collins, CO 80525 (970) 206-4443
www.compliance-partners.com

Samson

South Ignacio Central Delivery Point

General Facility Location
Section 32, Township 33N, Range 7W
La Plata County, Colorado

PROJECT NAME	FILENAME	SCALE	REVISED	FIGURE NUMBER
Samson - Permitting	Loc.srf	1 in = 700 m	08/20/2008	1



UTM Coordinates
266471.2 E, 4103813.5 N
(NAD 27, Zone 13, meters)

Compliance Partners
4038 Timberline Road, Suite 100, Ft. Collins, CO 80525
phone: 970/206-4443 fax: 720/489-3902
www.compliance-partners.com

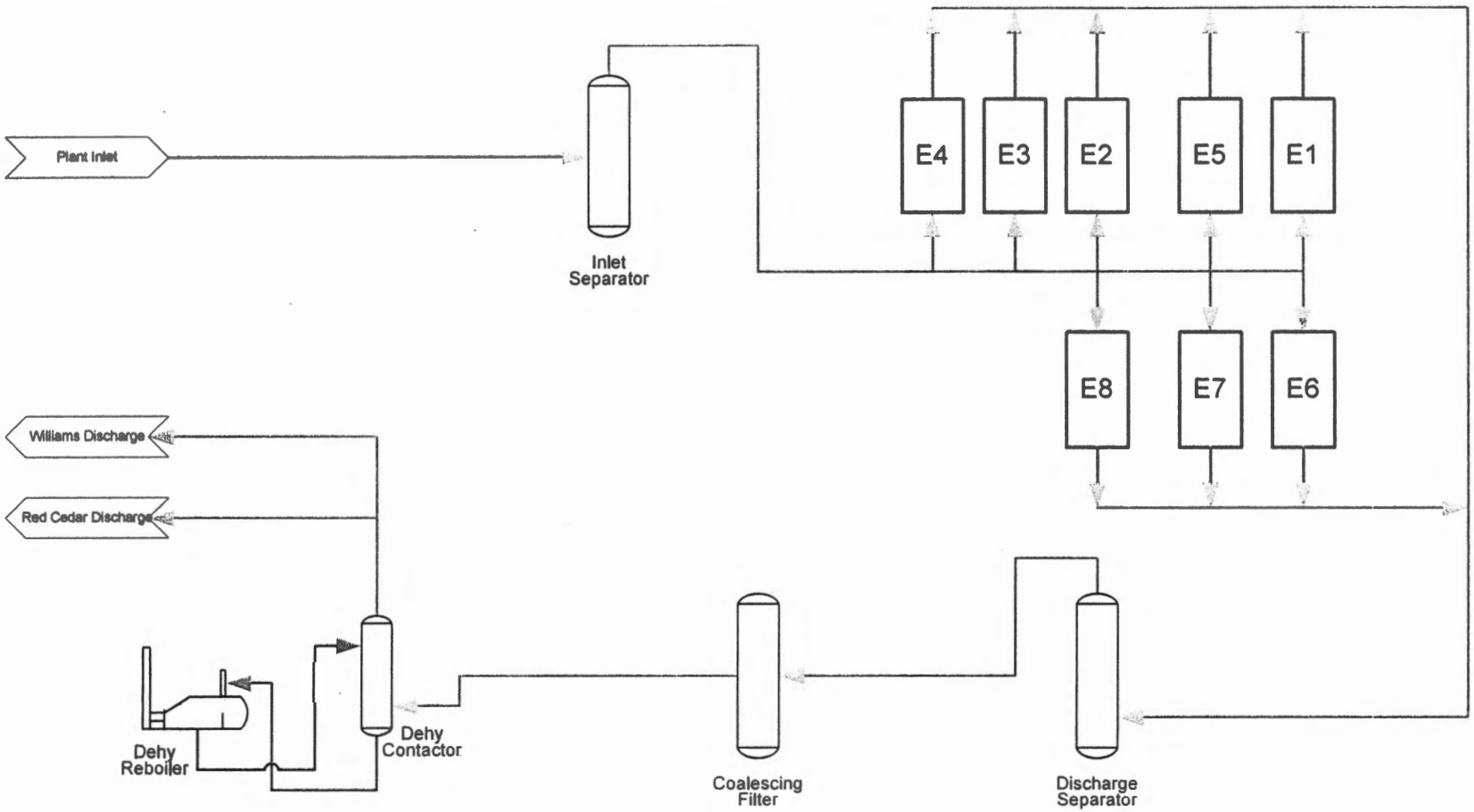
Samson

South Ignacio Central Delivery Point

TITLE

Simplified Plot Plan

PROJECT NAME	FILE NAME	SCALE	REVISED	FIGURE NUMBER
Samson - South Ignacio Permitting	SimPlot.vsd	1 in = 80 ft	08/20/2008	2



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Samson

South Ignacio Central Delivery Point

TITLE

Simplified Process Flow Diagram

PROJECT NAME	FILE NAME	SCALE	REVISED	FIGURE NUMBER
Samson - South Ignacio Permitting	Pfd.vsd	None	08/20/2008	3

INSIGNIFICANT EMISSIONS

Insignificant Emission Justification
South Ignacio Central Delivery Point

Reciprocating Compressors

Reciprocating compressors are sources of VOC emissions from compressor blowdown, starter gas, and cylinder rod packing leaks. Compressor blowdown, starter gas, and cylinder rod packing vent emissions for the compressors at this facility are insignificant.

Compressor Blowdown

Gas remaining in the compressor when shutdown will either remain pressurized in the compressor or it will be vented, usually to atmosphere. The total volume vented when the unit is blown down is a function of the compressor size and the size and pressure of the piping and vessels between the compressor suction and discharge isolation valves. The blowdown volume was based on equipment type and typical operating conditions, as well as the estimation of the VOC emissions from blowdown activities given the typical number of events per year. The facility's representative gas composition was used for these estimations. It should be noted that the number of blowdown events during a given year can change and Samson cannot commit to a limitation on the number of events that may occur. The blowdown emission calculation is illustrated below:

$$CBD = (40{,}927\,scf)\left(\frac{mole}{385\,scf}\right)\left(\frac{0.052\,moles_{VOC}}{100\,moles}\right)\left(\frac{55.438\,lb_{VOC}}{mole_{VOC}}\right)\left(\frac{20\,events}{yr}\right)\left(\frac{ton}{2000\,lb}\right) = 0.03\frac{ton_{VOC}}{yr}$$

Compressor blowdown VOC emissions are estimated to be 0.03 tpy for each compressor and 0.24 tpy VOC for all eight compressors at the facility.

Starter Gas

Compressor starter emissions were estimated using the starter's fuel usage at 110 psi and facility's representative gas composition. The example calculation for short term VOC emissions is presented below.

$$\frac{lb_{VOC}}{hr} = \left(1{,}100\frac{scf}{\min}\right)\left(\frac{mole}{385\,scf}\right)\left(\frac{0.052\,moles_{VOC}}{100\,moles}\right)\left(\frac{55.438\,lb_{VOC}}{mole_{VOC}}\right)\left(\frac{60\min}{hr}\right) = 4.9\frac{lb_{VOC}}{hr}$$

The starter was assumed to operate for 30 seconds per starting event resulting in 0.04 lbs of VOC emitted per starting event. It is estimated that there are 52 starting events per year for each engine. The VOC emissions are estimated at 0.001 tpy for each compressor and 0.01 tpy VOC for all eight compressors.

Cylinder Rod Packing Leaks

Compressor cylinder rod packing gas leakage is a continuous source of compressor emissions. Gas will leak from the packing and within the distance piece, and a vent is typically provided either at both the packing flange and distance piece, or just at the distance piece to direct this gas outside of any building the compressor may be housed within. EPA GasStar reports indicated vent rates of about 12 scfh for new state of the art best performing seals, and these rates can be as high as 900 scfh depending upon seal wear. Canadian/GRI research reports typical rod packing vent rates for standard seals of between 60 and 120 scfh. Vent rates are typically 30 percent higher when the compressor is idle and pressurized. The 60 scfh leakage rate along with a typical facility gas analysis was applied to determine VOC emissions from the facility gas compressor packing.

$$CRPV = \left(60\frac{scf}{hr-cyl}\right)\left(4\frac{cyl}{comp}\right)\left(\frac{mole}{385scf}\right)\left(\frac{0.052moles_{VOC}}{100moles}\right)\left(\frac{55.438lb_{VOC}}{mole_{VOC}}\right)\left(8760\frac{hr}{yr}\right)\left(\frac{ton}{2000lb}\right) = 0.08\frac{ton_{VOC}}{yr}$$

Cylinder rod packing vent VOC emissions are estimated to be 0.08 tpy for each compressor and 0.64 tpy VOC for all eight compressors at the facility.

Tanks

Emissions for the facility storage tanks were estimated using EPA Tanks 4.0.9d. Table 4 illustrates the emission units, the numbers of turnovers per year assumed when estimating emissions from the unit, and the emissions from each unit. The Tanks output for each unit is attached. The tanks at this facility are all insignificant emission units.

Table 4: South Ignacio Central Delivery Point Tank Emissions

Unit ID	Description	Turnovers per Year	VOC Emissions per Tank	VOC Emissions per Unit
			lb/yr	lb/yr
IEU1[1]	16 – 500 gal lubricating oil storage tanks	12	0.12	1.92
IEU2[1]	11 – 500 gal used oil storage tanks	12	0.12	1.32
IEU3[1]	2 – 500 gal ethylene glycol storage tanks	18	1.44	2.88
IEU4[2]	4 – 1000 gal produced water storage tanks	6	<0.1	<0.1
IEU5[3]	1 – 400 bbl slop tank	12	3.98	3.98
IEU6[4]	1 – 500 gal methanol storage tank	6	27.18	27.18

[1] Low vapor pressure.
[2] Low VOC content.
[3] Low vapor pressure, mostly water with some lubricating oil.
[4] Low throughput.

Tank Heaters

Emissions for the tank heaters were calculated using AP-42 emission factors. An example NO_X emission calculation for the 0.12 MMBtu/hr tank heater follows. The CO and VOC emissions were calculated the same way using their representative emission factors. Emissions from the other facility heaters and burners were calculated in the same manner. Table 5 lists the tank heater emissions.

$$\frac{lb_{NO_X}}{hr} = \left(0.12\frac{MMBtu}{hr}\right)\left(\frac{scf}{1020\ Btu}\right)\left(\frac{1x10^6\ Btu}{MMBtu}\right)\left(\frac{100\ lb_{NO_X}}{MMscf}\right)\left(\frac{MMscf}{1x10^6\ scf}\right)\left(\frac{975\ LHV}{1020\ LHV}\right) = 0.01\frac{lb_{NO_X}}{hr}$$

Table 5: South Ignacio Central Delivery Point Heater Emissions

Unit ID	Rating (MMBtu/hr)	Number	Description	Emissions per Heater			Emissions per Unit		
				NO_X (tpy)	CO (tpy)	VOC (tpy)	NO_X (tpy)	CO (tpy)	VOC (tpy)
IEU7	0.12	5	Tank Heaters	0.05	0.04	0.00	0.25	0.21	0.00

TANKS 4.0.9D OUTPUT
LUBRICATING OIL STORAGE TANKS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Lubricating Oil Storage Tanks
City:	Ignacio
State:	Colorado
Company:	Samson Resources
Type of Tank:	Horizontal Tank
Description:	South Ignacio Lube Oil Tanks

Tank Dimensions

Shell Length (ft):	5.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Alamosa, Colorado (Avg Atmospheric Pressure = 11.19 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Lubricating Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Lube Oil	All	55.23	38.46	72.00	45.42	0.0004	0.0002	0.0006	700.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Lubricating Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

Annual Emission Calcaulations

Standing Losses (lb):	0.0925
Vapor Space Volume (cu ft):	40.0203
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.1249
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	40.0203
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.0475
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Daily Avg. Liquid Surface Temp. (deg. R):	514.8995
Daily Average Ambient Temp. (deg. F):	41.0750
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	505.0850
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,667.4918
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1249
Daily Vapor Temperature Range (deg. R):	67.0659
Daily Vapor Pressure Range (psia):	0.0004
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0006
Daily Avg. Liquid Surface Temp. (deg R):	514.8995
Daily Min. Liquid Surface Temp. (deg R):	498.1331
Daily Max. Liquid Surface Temp. (deg R):	531.6660
Daily Ambient Temp. Range (deg. R):	35.4333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid:	
Surface Temperature (psia):	0.0004
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.0300
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Annual Net Throughput (gal/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	0.7500
Total Losses (lb):	0.1225

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Lubricating Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Lube Oil	0.03	0.09	0.12

TANKS 4.0.9D OUTPUT
USED OIL TANKS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Used Oil Storage Tanks
City:	Ignacio
State:	Colorado
Company:	Samson Resources
Type of Tank:	Horizontal Tank
Description:	South Ignacio Lube Oil Tanks

Tank Dimensions

Shell Length (ft):	5.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	12.00
Net Throughput(gal/yr):	6,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Alamosa, Colorado (Avg Atmospheric Pressure = 11.19 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Used Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Used Oil	All	55.23	38.46	72.00	45.42	0.0004	0.0002	0.0008	700.0000			0.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Used Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

Annual Emission Calcaulations	
Standing Losses (lb):	0.0925
Vapor Space Volume (cu ft):	40.0203
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.1249
Vented Vapor Saturation Factor:	1.0000
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	40.0203
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.0475
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Daily Avg. Liquid Surface Temp. (deg. R):	514.8995
Daily Average Ambient Temp. (deg. F):	41.0750
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	505.0850
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,667.4918
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1249
Daily Vapor Temperature Range (deg. R):	67.0659
Daily Vapor Pressure Range (psia):	0.0004
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0006
Daily Avg. Liquid Surface Temp. (deg R):	514.8995
Daily Min. Liquid Surface Temp. (deg R):	498.1331
Daily Max. Liquid Surface Temp. (deg R):	531.6660
Daily Ambient Temp. Range (deg. R):	35.4333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	1.0000
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0004
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.0300
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Annual Net Throughput (gal/yr.):	6,000.0000
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	0.7500
Total Losses (lb):	0.1225

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Used Oil Storage Tanks - Horizontal Tank
Ignacio, Colorado

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Used Oil	0.03	0.09	0.12

TANKS 4.0.9D OUTPUT
ETHYLENE GLYCOL STORAGE TANKS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Ethylene Glycol Tanks
City:	Ignacio
State:	Colorado
Company:	Samson Resources
Type of Tank:	Horizontal Tank
Description:	South Ignacio Ethylene Glycol Tanks

Tank Dimensions

Shell Length (ft):	5.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	18.00
Net Throughput(gal/yr):	9,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Gray/Medium
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Alamosa, Colorado (Avg Atmospheric Pressure = 11.19 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Ethylene Glycol Tanks - Horizontal Tank
Ignacio, Colorado

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Triethylene Glycol	All	51.76	37.44	66.07	44.16	0.0193	0.0193	0.0193	150.2000			74.12	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Ethylene Glycol Tanks - Horizontal Tank
Ignacio, Colorado

Annual Emission Calcaulations

Standing Losses (lb):	0.8208
Vapor Space Volume (cu ft):	40.0203
Vapor Density (lb/cu ft):	0.0005
Vapor Space Expansion Factor:	0.1066
Vented Vapor Saturation Factor:	0.9980
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	40.0203
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.0475
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0005
Vapor Molecular Weight (lb/lb-mole):	150.2000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0193
Daily Avg. Liquid Surface Temp. (deg. R):	511.4276
Daily Average Ambient Temp. (deg. F):	41.0750
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	503.8250
Tank Paint Solar Absorptance (Shell):	0.6800
Daily Total Solar Insulation Factor (Btu/sqft day):	1,667.4918
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1066
Daily Vapor Temperature Range (deg. R):	57.2610
Daily Vapor Pressure Range (psia):	0.0000
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0193
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0193
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0193
Daily Avg. Liquid Surface Temp. (deg R):	511.4276
Daily Min. Liquid Surface Temp. (deg R):	497.1123
Daily Max. Liquid Surface Temp. (deg R):	525.7428
Daily Ambient Temp. Range (deg. R):	35.4333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9980
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0193
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	0.6212
Vapor Molecular Weight (lb/lb-mole):	150.2000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0193
Annual Net Throughput (gal/yr.):	9,000.0000
Annual Turnovers:	18.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	1.4420

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Ethylene Glycol Tanks - Horizontal Tank
Ignacio, Colorado

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Triethylene Glycol	0.62	0.82	1.44

TANKS 4.0.9D OUTPUT
SLOP TANKS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Slop Tank
City:	Ignacio
State:	Colorado
Company:	Samson Resources
Type of Tank:	Vertical Fixed Roof Tank
Description:	South Ignacio Slop Tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.50
Liquid Height (ft) :	19.00
Avg. Liquid Height (ft):	10.00
Volume (gallons):	17,442.02
Turnovers:	12.00
Net Throughput(gal/yr):	209,304.20
Is Tank Heated (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good
Roof Color/Shade:	Red/Primer
Roof Condition:	Good

Roof Characteristics

Type:	Cone
Height (ft)	1.00
Slope (ft/ft) (Cone Roof)	0.00

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Alamosa, Colorado (Avg Atmospheric Pressure = 11.19 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Slop Tank - Vertical Fixed Roof Tank
Ignacio, Colorado

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Slop/Lube Oil	All	55.23	38.46	72.00	45.42	0.0004	0.0002	0.0006	700.0000			207.00	

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Slop Tank - Vertical Fixed Roof Tank
Ignacio, Colorado

Annual Emission Calculations	
Standing Losses (lb):	2.9295
Vapor Space Volume (cu ft):	1,268.0908
Vapor Density (lb/cu ft):	0.0001
Vapor Space Expansion Factor:	0.1249
Vented Vapor Saturation Factor:	0.9998
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	1,268.0908
Tank Diameter (ft):	12.5000
Vapor Space Outage (ft):	10.3333
Tank Shell Height (ft):	20.0000
Average Liquid Height (ft):	10.0000
Roof Outage (ft):	0.3333
Roof Outage (Cone Roof)	
Roof Outage (ft):	0.3333
Roof Height (ft):	1.0000
Roof Slope (ft/ft):	0.0000
Shell Radius (ft):	6.2500
Vapor Density	
Vapor Density (lb/cu ft):	0.0001
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Daily Avg. Liquid Surface Temp. (deg. R):	514.8995
Daily Average Ambient Temp. (deg. F):	41.0750
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	505.0850
Tank Paint Solar Absorptance (Shell):	0.8900
Tank Paint Solar Absorptance (Roof):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,667.4918
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.1249
Daily Vapor Temperature Range (deg. R):	67.0659
Daily Vapor Pressure Range (psia):	0.0004
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.0002
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.0006
Daily Avg. Liquid Surface Temp. (deg R):	514.8995
Daily Min. Liquid Surface Temp. (deg R):	498.1331
Daily Max. Liquid Surface Temp. (deg R):	531.6660
Daily Ambient Temp. Range (deg. R):	35.4333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.9998
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.0004
Vapor Space Outage (ft):	10.3333
Working Losses (lb):	1.0465
Vapor Molecular Weight (lb/lb-mole):	700.0000
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.0004
Annual Net Throughput (gal/yr.):	209,304.2036
Annual Turnovers:	12.0000
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	17,442.0170
Maximum Liquid Height (ft):	19.0000
Tank Diameter (ft):	12.5000
Working Loss Product Factor:	0.7500
Total Losses (lb):	3.9760

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Slop Tank - Vertical Fixed Roof Tank
Ignacio, Colorado

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Slop/Lube Oil	1.05	2.93	3.98

TANKS 4.0.9D OUTPUT
METHANOL TANKS

TANKS 4.0.9d
Emissions Report - Detail Format
Tank Indentification and Physical Characteristics

Identification

User Identification:	Methanol StorageTank
City:	Ignacio
State:	Colorado
Company:	Samson Resources
Type of Tank:	Horizontal Tank
Description:	South Ignacio Methanol Tank

Tank Dimensions

Shell Length (ft):	5.00
Diameter (ft):	4.00
Volume (gallons):	500.00
Turnovers:	6.00
Net Throughput(gal/yr):	3,000.00
Is Tank Heated (y/n):	N
Is Tank Underground (y/n):	N

Paint Characteristics

Shell Color/Shade:	Red/Primer
Shell Condition	Good

Breather Vent Settings

Vacuum Settings (psig):	-0.03
Pressure Settings (psig)	0.03

Meterological Data used in Emissions Calculations: Alamosa, Colorado (Avg Atmospheric Pressure = 11.19 psia)

TANKS 4.0.9d
Emissions Report - Detail Format
Liquid Contents of Storage Tank

Methanol StorageTank - Horizontal Tank
Ignacio, Colorado

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Methyl alcohol	All	55.23	38.46	72.00	45.42	1.2389	0.7068	2.0832	32.0400			32.04	Option 2: A=7.897, B=1474.08, C=229.13

TANKS 4.0.9d
Emissions Report - Detail Format
Detail Calculations (AP-42)

Methanol StorageTank - Horizontal Tank
Ignacio, Colorado

Annual Emission Calcaulations

Standing Losses (lb):	24.3481
Vapor Space Volume (cu ft):	40.0203
Vapor Density (lb/cu ft):	0.0072
Vapor Space Expansion Factor:	0.2625
Vented Vapor Saturation Factor:	0.8839
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	40.0203
Tank Diameter (ft):	4.0000
Effective Diameter (ft):	5.0475
Vapor Space Outage (ft):	2.0000
Tank Shell Length (ft):	5.0000
Vapor Density	
Vapor Density (lb/cu ft):	0.0072
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.2389
Daily Avg. Liquid Surface Temp. (deg. R):	514.8995
Daily Average Ambient Temp. (deg. F):	41.0750
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	505.0850
Tank Paint Solar Absorptance (Shell):	0.8900
Daily Total Solar Insulation Factor (Btu/sqft day):	1,667.4918
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.2625
Daily Vapor Temperature Range (deg. R):	67.0659
Daily Vapor Pressure Range (psia):	1.3765
Breather Vent Press. Setting Range(psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.2389
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.7068
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	2.0832
Daily Avg. Liquid Surface Temp. (deg R):	514.8995
Daily Min. Liquid Surface Temp. (deg R):	498.1331
Daily Max. Liquid Surface Temp. (deg R):	531.6660
Daily Ambient Temp. Range (deg. R):	35.4333
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.8839
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	1.2389
Vapor Space Outage (ft):	2.0000
Working Losses (lb):	2.8353
Vapor Molecular Weight (lb/lb-mole):	32.0400
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	1.2389
Annual Net Throughput (gal/yr.):	3,000.0000
Annual Turnovers:	6.0000
Turnover Factor:	1.0000
Tank Diameter (ft):	4.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	27.1834

TANKS 4.0.9d
Emissions Report - Detail Format
Individual Tank Emission Totals

Emissions Report for: Annual

Methanol StorageTank - Horizontal Tank
Ignacio, Colorado

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Methyl alcohol	2.84	24.35	27.18

EMISSIONS UNITS

COMPRESSOR ENGINES

Emission Unit Description
Compressor Engines
South Ignacio Central Delivery Point

There are eight compressor engines at this facility; one Waukesha L7044GSI model, three Waukesha L7042GL models, and four Waukesha L5794LT models. The fuel for the engines is pipeline quality natural gas. The Waukesha L7044GSI engine, unit E1, is equipped with a non-selective catalyst (NSCR) for the control of NO_X, CO, and formaldehyde (CH_2O). The Waukesha L7042GL engines and the Waukesha L5794LT engines are each equipped with an oxidation catalyst for the control of CO and CH_2O. Detailed emission calculations are attached for each unit. The manufacturer's specification sheet and catalyst specification sheets are also attached. Table 7 lists the serial number, manufacture date and installation/startup date for each of the engines at the South Ignacio Central Delivery Point.

Table 7: South Ignacio Central Delivery Point Engine Information

Unit ID	Serial Number	Manufacture Date	Installation/Startup Date
E1	C-61982/1A	February 2004	08/01/2010
E2	C-60768/1	November 1997	01/29/2007
E3	C-12097/2	February 2008	03/14/2008
E4	C-12554/4	February 1998	09/30/2011
E5	C-15962/1	February 2006	08/24/2007
E6	C-15964/1	March 2006	08/18/2011
E7	C-15838/1	September 2005	03/29/2006
E8	C-15836/1	August 2005	04/05/2005

Performance tests are conducted on the engines at the South Ignacio Central Delivery Point to demonstrate compliance with the facility-wide formaldehyde limit, CO emission limits and Unit E1's NO_X emission limit. Unit E1 is tested quarterly to assess NO_X and CO emissions. Units E2, E3, E4, E5, E6, E7, and E8 are tested quarterly to assess CO emissions. All of the engines at the facility are tested quarterly to demonstrate compliance with the facility-wide formaldehyde emission limit. The testing may change to semi-annual if two consecutive quarterly test results show a sixty percent formaldehyde reduction. The NO_X (E1 only) and CO testing may also change to semi-annual if the monitoring results for two consecutive quarters demonstrate less than eighty percent of the permitted emission limits.

Unit E3 is subject to the requirements of 40 CFR Part 60, Subpart JJJJ. Performance tests are conducted on Unit E3 in accordance with 40 CFR 60.4244 every 8760 hours of operation or every three years, whichever comes first.

Reference method performance tests will be conducted for all replacement catalysts and engines to measure NO_X (E1 only), CO, and formaldehyde emissions to demonstrate compliance with the engine emission limits and the facility-wide formaldehyde emission limit. The performance tests will be conducted within 90 calendar days of catalyst change out or startup of the replacement engine.

The performance tests for NO_X and CO are conducted in accordance with the test methods specified in 40 CFR Part 60, Appendix A. EPA Reference Methods 7E and 10 are used to measure NO_X and CO emissions. The formaldehyde performance tests are performed in accordance with EPA Reference Method 320 or 323 of 40 CFR Part 63, Appendix A or Method CARB 430. The VOC performance tests are conducted in accordance with EPA Reference Method 25A and 18 of 40 CFR Part 63, Appendix A. All tests are performed at a maximum operating rate, 90% to 110% of engine design capacity. Each source test consists of at least three 1-hour or longer valid test runs. Emission results are reported as the arithmetic average of all valid test runs. During each test run data is collected on all parameters necessary to document how formaldehyde emissions were measured or calculated.

In addition to the performance tests, the catalysts are monitored to ensure correct operation so that the facility-wide formaldehyde limit is met. Unit E1 must operate with an engine exhaust temperature/catalyst inlet temperature between 750°F and 1250°F at all times the engine operates. Units E2, E3, E4, E5, E6, E7, and E8 are required to operate with an engine exhaust temperature/catalyst inlet temperature between 500°F and 1250°F at all times the engines operate. Measurements of the engine exhaust/catalyst inlet temperatures are taken on a daily basis. Weekly measurements of the pressure drop across each catalyst are performed and recorded. The pressure drop across each catalyst shall not deviate by more than two inches of water at maximum operating rate from the baseline pressure drop across the catalyst measured during the latest performance test. Corrective actions are taken if any measurement is not within the acceptable range.

Facility-wide emissions of formaldehyde will be calculated at the end of each calendar month from the results of the most recent performance test. The facility-wide emissions will be calculated by taking the emission factor in pounds per hour for each engine and multiplying by the number of operating hours for that month. If no hours are recorded the unit will be calculated as if it ran continuously during that month. The facility-wide emissions will include formaldehyde emissions from the engines and all other units including insignificant emissions units. The facility emissions for the month as described above will be added to the preceding 11 months to record a new rolling 12-month total.

EMISSION UNIT E1
WAUKESHA L7044GSI COMPRESSOR ENGINE

STANDARD EQUIPMENT

AIR CLEANER - Two, dry type with rain shield and service indicator.

BARRING DEVICE - Manual.

BEARINGS - Heavy duty, replaceable, precision type.

BREATHER - Closed system.

CONNECTING RODS - Drop forged steel, rifle drilled.

CONTROL SYSTEM - Pneumatic. Includes pilot operated valves for air start and prelube. Engine mounted control panel with two push button valves. Pilot operated air start valves omitted when starter is not furnished by Waukesha. Includes engine On/Off push button. One mounted on either side of the engine.

CRANKCASE - Integral crankcase and cylinder frame. Main bearing caps drilled and tapped for temperature sensors. Does not include sensors.

CRANKSHAFT - Forged steel, seven main bearings, counterweighted and dynamically balanced.

CYLINDERS - Removable wet type cylinder liners, chrome plated on outer diameter.

CYLINDER HEADS - Twelve interchangeable. Four valves per cylinder, with water cooled exhaust valve seats. Roller valve lifters and hydraulic push rods. Flange mounted ignition coils.

ENGINE MONITOR DEVICES - Thermocouples, K-type, are wired to a bulk head connector for jacket water temperature, lube oil temperature and intake manifold temperature. 25 foot (7.6 m) customer interface and standard thermocouple harnesses are provided for making connections to a customer supplied panel. Magnetic pickup wired for customer supplied tachometer. Lube oil pressure and intake manifold pressure sensing lines are terminated in a common bulk head.

ENGINE ROTATION - Counterclockwise when facing flywheel.

FLYWHEEL - Approx. WR^2 = 155000 lb-in^2; with ring gear (208 teeth), machined to accept two drive adapters: 31.88″ (810 mm) pilot bore, 30.25″ (768 mm) bolt circle, (12) 0.75″ 10 tapped holes; or 28.88″ (734 mm) pilot bore, 27.25″ (692 mm) bolt circle, (12) 0.625″-11 tapped holes and (12) 0.75″-10 tapped holes.

FLYWHEEL HOUSING - No. 00 SAE.

FUEL SYSTEM - Two natural gas, 4″ (102 mm) updraft carburetors and two Fisher Model 99, 2″ (51 mm) gas regulators, mounted. 25 psi (172 kPa) fuel inlet pressure required.

GOVERNOR - Woodward UG-8 LD hydraulic lever type, with friction type speed control. Mounted on right hand side.

IGNITION SYSTEM - Waukesha Custom Engine Control Ignition Module. Electronic digital ignition system. 24V DC power required.

INTERCOOLER - Air-to-water.

LEVELING BOLTS

LIFTING EYES - Requires 9.5 ton Working Load Limit (W.L.L.) anchor shackles.

LUBRICATION - Full pressure, gear type pump. Full flow lube oil filter with replaceable depth-type elements and flexible connections, shipped loose. MICROSPIN® bypass filter, engine mounted. Lube oil strainer, mounted. Air/gas motor driven prelube pump, requires final piping.

MANIFOLDS - Exhaust, (2) water cooled.

OIL COOLER - Shell and tube type, with thermostatic temperature controller and pressure regulating valve. Factory mounted.

OIL PAN - Base type. 90 gallon (340 L) capacity, including filter and cooler.

PAINT - Oilfield orange primer.

PISTONS - Aluminum with floating pin. Oil cooled. 8:1 compression ratio.

SHIPPING SKID - Steel for domestic truck or rail.

TURBOCHARGERS - (2) with water-cooled bearing housing and adjustable wastegates. Single vertical exhaust outlet at rear. Flexible stainless steel exhaust connection with 8″ (203 mm) pipe flange.

VIBRATION DAMPER - Viscous type.

WATER CIRCULATING SYSTEM

Auxiliary Circuit - Belt driven water circulating pump for intercooler and lube oil cooler.

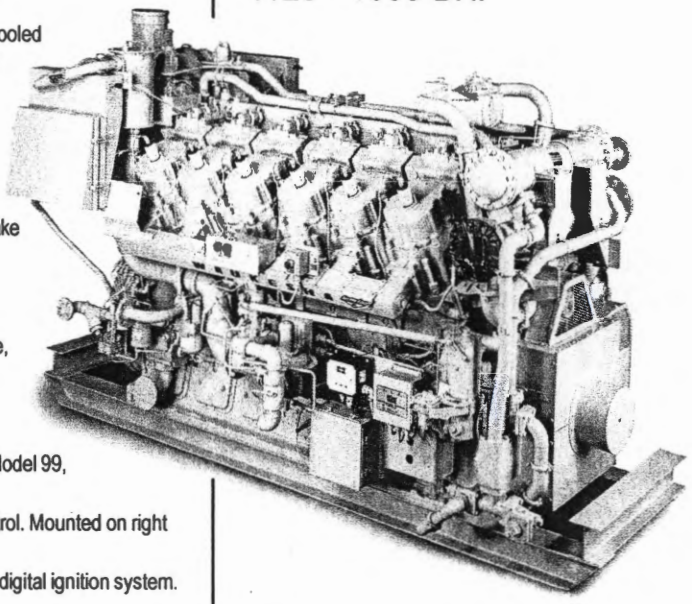
Engine Jacket - Belt driven water circulating pump. Cluster type thermostatic temperature regulating valve, full flow bypass type with 165° - 170° F (74° - 77° C) start to open thermostats. Flange connections and mating flanges for (2) 4″ (102 mm) inlets and (1) 5″ (127 mm) outlet.

WAUKESHA CUSTOM ENGINE CONTROL, DETONATION SENSING MODULE (DSM) – Includes individual cylinder sensors, Detonation Sensing Module, filter and cables. Compatible with Waukesha CEC Ignition Module only. Detonation Sensing Module and filter are mounted and wired. Packager is responsible for 24V DC power supply and ground to the DSM. The DSM meets Canadian Standards Association Class I, Division 2, Group D hazardous location requirements.

Waukesha® SERIES FOUR® VHP

L7044GSI

VHP™ Series Four
1120 - 1680 BHP



Model L7044GSI Turbocharged and Intercooled, Twelve Cylinder, Four-Cycle Gas Engine

SPECIFICATIONS

Cylinders
V 12

Piston Displacement
7040 cu. in.
(115 L)

Bore & Stroke
9.375″ x 8.5″
(238 x 216 mm)

Compression Ratio
8:1

Jacket Water System Capacity
107 gal.
(405 L)

Lube Oil Capacity
90 gal.
(340 L)

Starting System
125 - 150 psi air/gas
24/32 V electric

Dry Weight
22,750 lb.
(10,320 kg)

Waukesha Engine ISO 9001 CERTIFIED

CONTINUOUS POWER RATINGS: L7044GSI VHP SERIES FOUR

Model	I.C. Water Inlet Temp. °F (°C) (Tcra)	C.R.	Brake Horsepower (kWb Output) 800 rpm	900 rpm	1000 rpm	1100 rpm	1200 rpm
L7044GSI	130° (54°)	8:1	1120 (836)	1260 (940)	1400 (1044)	1540 (1149)	1680 (1253)

Rating Standard: All models: Ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and auxiliary water temperature Tcra (clause 10.1) as specified above limited to ± 10° F (± 5° C). Ratings are also valid for SAE J1349, BS5514, DIN6271 and AP17B-11C standard atmospheric conditions.

ISO Standard Power/Continuous Power Rating: The highest load and speed which can be applied 24 hours a day, seven days a week, 365 days per year except for normal maintenance. It is permissible to operate the engine at up to 10% overload, or maximum load indicated by the intermittent rating, whichever is lower, for two hours in each 24 hour period.

All natural gas engine ratings are based on a fuel of 900 Btu/ft³ (35.3 MJ/nm³) SLHV value, with a 91 Waukesha Knock Index®.

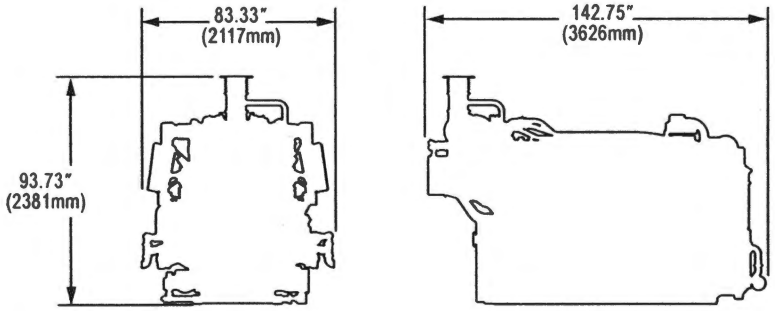
For conditions or fuels other than standard, the Waukesha Engine Sales Engineering Department.

PERFORMANCE: L7044GSI VHP SERIES FOUR

	English 130° F I.C. Water Temperature			Metric 54° C I.C. Water Temperature		
	RPM	1200	1000	RPM	1200	1000
Pre-Catalyst Settings	Power (Bhp)	1680	1400	Power (kWb)	1253	1044
	BSFC (Btu/bhp-hr)	7780	7685	BSFC (kJ/kW-hr)	11009	10874
	NOx (grams/bhp-hr)	12.6	12.1	NOx (g/nm³)	4.7	4.5
	CO (grams/bhp-hr)	13.8	12.2	CO (g/nm³)	5.1	4.5
	NMHC (grams/bhp–hr)	0.36	0.36	NMHC (g/nm³)	0.13	0.13
Low Fuel Consumption Settings	BSFC (Btu/bhp-hr)	7595	7535	BSFC (g/nm³)	10747	10662
	NOx (grams/bhp-hr)	21.3	20.7	NOx (g/nm³)	7.9	7.7
	CO (grams/bhp-hr)	1.6	1.6	CO (g/nm³)	0.6	0.6
	NMHC (grams/bhp–hr)	0.30	0.30	NMHC (g/nm³)	0.11	0.11

NOTES:

1) Fuel consumption and exhaust emissions are based on ISO 3046/1-1995 standard reference conditions and commercial quality natural gas of 900 Btu/ft³ (35.38 MJ/m³ [25, V(0; 101.325)]) saturated lower heat value, Waukesha Knock Index® of 91 and 93% methane content by volume. ISO 3046/1-1995 standard reference conditions are 77°F (25°C) ambient temperature, 29.54 inches Hg (100 kPa) barometric pressure, 30% relative humidity (1kPa/0.3 inches Hg water vapor pressure).
2) S.I. exhaust emissions are corrected to 5% O_2 (0°C and 101.325 kPa).
3) Data will vary due to variations in site conditions. For conditions and/or fuels other than standard, consult the Waukesha Engine Sales Engineering Department.



DRESSER
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Consult your local Waukesha Distributor for system application assistance. The manufacturer reserves the right to change or modify without notice, the design or equipment specifications as herein set forth without incurring any obligation either with respect to equipment previously sold or in the process of construction except where otherwise specifically guaranteed by the manufacturer.

Bulletin 7045 0102

Emission Estimates
Emission Unit E1
South Ignacio Central Delivery Point

Unit E1 is a 1,680 horsepower Waukesha L7044GSI, a 4-stroke rich burn internal combustion engine. The engine is equipped with an NSCR catalyst. The level of control achieved by the catalyst is a federally enforceable permit condition. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Rich-burn Engine with NSCR Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	2.5	g/hp-hr
CO	3.5	g/hp-hr
VOC	0.5	g/hp-hr
Formaldehyde	0.02	g/hp-hr

Site-Rated Horsepower: 1,680 hp

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}680\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 40.5\ tpy$$

$$CO = \frac{(3.5\ g/hp\text{-}hr)(1{,}680\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 56.7\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}680\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 8.1\ tpy$$

$$CH_2O = \frac{(0.02\ g/hp\text{-}hr)(1{,}680\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 0.3\ tpy$$

EMISSION UNIT E2
WAUKESHA L7042GL COMPRESSOR ENGINE

STANDARD EQUIPMENT

AIR CLEANER – Two, dry type with rain shield and service indicator.

BARRING DEVICE – Manual.

BEARINGS – Heavy duty, replaceable, precision type.

BREATHER – Closed system.

CONNECTING RODS – Drop forged steel, rifle drilled.

CONTROL SYSTEM – Pneumatic. Includes pilot operated valves for air start and prelube. Engine mounted control panel with two push button valves. Pilot operated air start valves omitted when starter is not furnished by Waukesha. Includes engine On/Off push button. One mounted on either side of the engine.

CRANKCASE – Integral crankcase and cylinder frame. Main bearing caps drilled and tapped for temperature sensors. Does not include sensors.

CRANKSHAFT – Counterweighted, forged steel, seven main bearings, and dynamically balanced.

CYLINDERS – Removable wet type cylinder liners, chrome plated on outer diameter. Induction hardened.

CYLINDER HEADS – Twelve interchangeable. Two hard faced intake and two hard faced exhaust valves per cylinder. Hard faced intake and exhaust valve seat inserts. Roller valve lifters and hydraulic push rods. Includes prechamber and related fuel control valves.

ENGINE ROTATION – Counterclockwise when facing flywheel.

ENGINE MONITORING DEVICES – Engine thermocouples, K-type, for jacket water temperature, lube oil temperature, intake manifold temperature, individual cylinder exhaust temperature and a common pre turbine temperatures, one on each bank. Magnetic pickup wired for customer supplied tachometer. Lube oil pressure and intake manifold pressure sensing lines are terminated in a common bulk head.

EXHAUST OUTLET – Single vertical at rear. Flexible stainless steel connection with 8″ (203 mm) pipe flange.

FLYWHEEL – Approx. WR^2 = 155000 lb-in^2; with ring gear (208 teeth), machined to accept two drive adapters: 31.88″ (810 mm) pilot bore, 30.25″ (768 mm) bolt circle, (12) 0.75″–10 tapped holes; or 28.88″ (734 mm) pilot bore, 27.25″ (692 mm) bolt circle, (12) 0.625″–11 tapped holes and (12) 0.75″–10 tapped holes.

FLYWHEEL HOUSING – No. 00 SAE.

FUEL SYSTEM – Dual natural gas, 4″ (102 mm) duplex updraft carburetors. Two Fisher Model 99, 2″ (51 mm) gas regulators, 30 – 50 psi (241 – 345 kPa) gas inlet pressure required. Prechamber fuel system and control logic.

GOVERNOR – Woodward UG–8 LD hydraulic lever type, with friction type speed control. Mounted on right hand side.

IGNITION – Waukesha Custom Engine Control Ignition Module. Electronic digital ignition system. 24V DC power required.

INTERCOOLER – Air–to–water.

LEVELING BOLTS

LIFTING EYES

LUBRICATION – Full pressure. Gear type pump. Full flow filter, 36 gallon (136 litres) capacity, not mounted. Includes flexible connections. Includes lube oil strainer, mounted on engine. Air/gas motor driven prelube pump. Requires final piping.

MANIFOLDS – Exhaust, (2) water cooled.

OIL COOLER – With thermostatic temperature controller and pressure regulating valve. Not mounted.

OIL PAN – Base type. 90 gallon (340 litres) capacity including filter and cooler.

PAINT – Oilfield orange primer.

PISTONS – Aluminum with floating pin. 10.5:1 compression ratio. Oil cooled.

SHIPPING SKID – Steel for domestic truck or rail.

TURBOCHARGERS – Two, dry type. Wastegate controlled.

VIBRATION DAMPER – Two, viscous type. Guard included with remote mounted radiator or no radiator.

WATER CIRCULATING SYSTEM

Auxiliary Circuit – For oil cooler and intercooler. Pump is belt driven from crankshaft pulley. Includes thermostatic valve.

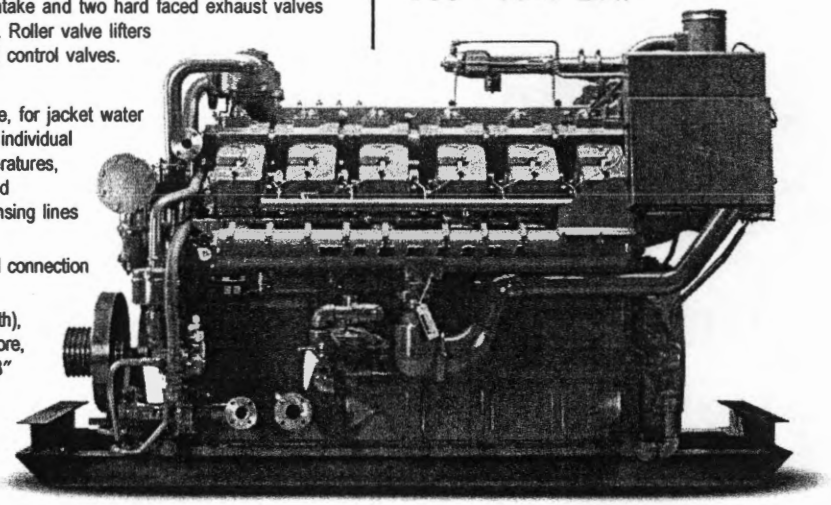
Engine Jacket – Belt driven water circulating pump, cluster type thermostatic temperature regulating valve, full flow bypass type. Flange connections and mating flanges for (2) 4″ (102 mm) inlets and (1) 5″ (127 mm) outlet.

WAUKESHA CUSTOM ENGINE CONTROL, DETONATION SENSING MODULE (DSM) – Includes individual cylinder sensors, Detonation Sensing Module, filter and cables. Device is compatible with Waukesha CEC Ignition Module only. Sensors are mounted and wired to engine junction box. Detonation Sensing Module and filter are shipped loose. One 11 ft. cable provided for connection between engine junction box and filter. One each 15 ft. cable provided for connection between filter and DSM and Ignition Module and DSM. One 20 ft. cable provided for power and ground for filter. All cables are shipped loose. Packager is responsible for power supply and ground to the DSM. 24V DC power is required. The DSM meets Canadian Standards Association Class 1, Group D, Division 2, hazardous location requirements.

Waukesha® VHP

L7042GL

VHP™ Series Gas Engine
886 - 1547 BHP



Model L7042GL Turbocharged and Intercooled, Twelve Cylinder, Lean Combustion, Four-Cycle Gas Engine

SPECIFICATIONS

Cylinders
V 12

Piston Displacement
7040 cu. in.
(115 L)

Bore & Stroke
9.375″ x 8.5″
(238 x 216 mm)

Compression Ratio
10.5:1

Jacket Water System Capacity
107 gal.
(405 L)

Lube Oil Capacity
90 gal.
(340 L)

Starting System
125 - 150 psi air/gas
24/32V electric

Dry Weight
21,000 lb.
(9525 kg)

Full Load Exhaust Emissions
Nox - 1.50 g/bhp-hr
CO - 2.65 g/bhp-hr
HC - 1.00 g/bhp-hr
(non-methane)

Waukesha Engine ISO 9001 CERTIFIED

POWER RATINGS: L7042GL VHP SERIES GAS ENGINES

Model	I.C. Water Inlet Temp. °F (°C) (Tcra)	C.R.	Brake Horsepower (kWb Output) 800 rpm	900 rpm	1000 rpm	1100 rpm	1200 rpm
High Speed Turbo[1]	85° (29°)	10.5:1	928 (692)	1160 (865)	1289 (961)	1418 (1057)	1547 (1154)
High Speed Turbo[1]	130° (54°)	10.5:1	886 (661)	1108 (826)	1232 (919)	1355 (1010)	1478 (1102)
Low Speed Turbo[2]	85° (29°)	10.5:1	1031 (769)	1160 (865)	1289 (961)	— —	— —
Low Speed Turbo[2]	130° (54°)	10.5:1	985 (735)	1108 (826)	1232 (919)	— —	— —

[1]High speed turbocharger match – 1001-1200 rpm

[2]Low speed turbocharger match – 700-1000 rpm

Rating Standard: All models: Ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and auxiliary water temperature Tcra (clause 10.1) as specified above limited to ± 10° F (± 5° C). Ratings are also valid for SAE J1349, BS5514, DIN6271 and AP17B-11C standard atmospheric conditions.

ISO Standard Power/Continuous Power Rating: The highest load and speed which can be applied 24 hours a day, seven days a week, 365 days per year except for normal maintenance. It is permissible to operate the engine at up to 10% overload, or maximum load indicated by the intermittent rating, whichever is lower, for two hours in each 24 hour period.

All natural gas engine ratings are based on a fuel of 900 Btu/ft³ (35.3 MJ/nm³) SLHV value, with a 91 Waukesha Knock Index®.

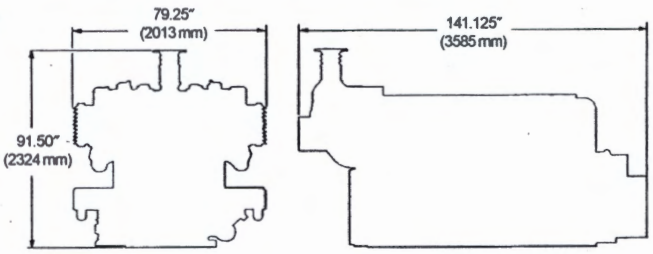
For conditions or fuels other than standard, the Waukesha Engine Sales Engineering Department.

PERFORMANCE: L7042GL VHP SERIES GAS ENGINES

	English	130° F ICW		85° F ICW		Metric	54° C ICW		29° C ICW	
	RPM	1200	1000	1200	1000	RPM	1200	1000	1200	1000
Low NO_x Settings	Power (Bhp)	1478	1232	1547	1289	Power (kWb)	1103	919	1154	962
	BSFC (Btu/bhp-hr)	7155	6815	7180	6840	BSFC (kJ/kW-hr)	10124	9643	10160	9679
	NOx (grams/bhp-hr)	0.90	0.90	0.70	0.70	NOx (g/nm³)	0.37	0.37	0.29	0.29
	CO (grams/bhp-hr)	2.75	2.65	2.65	2.55	CO (g/nm³)	1.14	1.10	1.10	1.05
	NMHC (grams/bhp–hr)	1.00	1.00	1.10	1.10	NMHC (g/nm³)	0.41	0.41	0.45	0.45
Low Fuel Consumption Settings	BSFC (Btu/bhp-hr)	6910	6615	6935	6640	BSFC (kJ/kW-hr)	9778	9360	9813	9396
	NOx (grams/bhp-hr)	1.50	1.60	1.30	1.40	NOx (g/nm³)	0.62	0.66	0.54	0.58
	CO (grams/bhp-hr)	3.00	2.75	2.90	2.65	CO (g/nm³)	1.24	1.14	1.20	1.10
	NMHC (grams/bhp–hr)	0.70	1.00	0.80	1.10	NMHC (g/nm³)	0.29	0.41	0.33	0.45

NOTES:

1) Performance ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and Tcra limited to ± 10° F.
2) Fuel consumptions based on ISO 3046/1-1995 with a +5% tolerance for commercial quality natural gas having a 900 Btu/ft³ saturated low heat value.
3) Data based on standard conditions of 77° F (25° C) ambient temperature, 29.53 inches Hg (100kPa) barometric pressure, 30% relative humidity (0.3 inches Hg / 1 kPa water vapor pressure).
4) Data will vary due to variations in site conditions. For conditions and/or fuels other than standard, consult the Waukesha Engine Sales Engineering Department.



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Bulletin 7005 0102

Emission Estimates
Emission Unit E2
South Ignacio Central Delivery Point

Unit E2 is a 1,267 horsepower Waukesha L7042GL, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	1.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.7	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,267 hp

$$NO_X = \frac{(1.5\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 18.3\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 12.2\ tpy$$

$$VOC = \frac{(0.7\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 8.6\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.2\ tpy$$

EMISSION UNIT E3
WAUKESHA L7042GL COMPRESSOR ENGINE

Emission Estimates
Emission Unit E3
South Ignacio Central Delivery Point

Unit E3 is a 1,267 horsepower Waukesha L7042GL, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	1.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.7	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,267 hp

$$NO_X = \frac{(1.5\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 18.3\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 12.2\ tpy$$

$$VOC = \frac{(0.7\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 8.6\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}267\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.2\ tpy$$

EMISSION UNIT E4
WAUKESHA L7042GL COMPRESSOR ENGINE

Emission Estimates
Emission Unit E4
South Ignacio Central Delivery Point

Unit E4 is a 1,336 horsepower Waukesha L7042GL, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	1.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.7	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,336 hp

$$NO_X = \frac{(1.5\ g/hp\text{-}hr)(1{,}336\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 19.3\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}336\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 12.9\ tpy$$

$$VOC = \frac{(0.7\ g/hp\text{-}hr)(1{,}336\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 9.0\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}336\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.3\ tpy$$

EMISSION UNITS E5, E6, E7, E8
WAUKESHA L5794LT COMPRESSOR ENGINES

STANDARD EQUIPMENT

AIR CLEANER - Two, dry type with rain shield and service indicator.

BARRING DEVICE - Manual.

BEARINGS - Heavy duty, replaceable, precision type.

BREATHER - Closed system.

CONNECTING RODS - Drop forged steel, rifle drilled.

CONTROL SYSTEM - Pneumatic. Includes pilot operated valves for air start and prelube. Engine mounted control panel with two push button valves. Pilot operated air start valves omitted when starter is not furnished by Waukesha. Includes engine On/Off push button. One mounted on either side of the engine.

CRANKCASE - Integral crankcase and cylinder frame. Main bearing caps drilled and tapped for temperature sensors. Does not include sensors.

CRANKSHAFT - Forged steel, seven main bearings, counterweighted and dynamically balanced.

CYLINDERS - Removable wet type cylinder liners.

CYLINDER HEADS - Twelve interchangeable. Four valves per cylinder, with water cooled exhaust valve seats. Roller valve lifters and hydraulic push rods. Flange mounted ignition coils.

DETONATION SENSING MODULE (DSM) - Waukesha Custom Engine Control Detonation Sensing Module includes individual cylinder sensors, Detonation Sensing Module, filter and cables. Compatible with Waukesha CEC Ignition Module only. Detonation Sensing Module and filter are mounted and wired. Packager is responsible for 24V DC power supply and ground to the DSM. The DSM meets Canadian Standards Association Class 1, Division 2, Group D hazardous location requirements.

ENGINE MONITOR DEVICES - Thermocouples, K-type, are wired to a bulk head connector for jacket water temperature, lube oil temperature, intake manifold temperature, individual cylinder exhaust temperature and common pre-turbine temperatures, one on each bank. 25 foot (7.6 m) customer interface and standard thermocouple harnesses are provided for making connections to a customer supplied panel. Magnetic pickup wired for customer supplied tachometer. Lube oil pressure and intake manifold pressure sensing lines are terminated in a common bulk head.

ENGINE ROTATION - Counterclockwise when facing flywheel.

FLYWHEEL - Approx. WR^2 = 155000 lb-in^2; with ring gear (208 teeth), machined to accept two drive adapters: 31.88″ (810 mm) pilot bore, 30.25″ (768 mm) bolt circle, (12) 0.75″ 10 tapped holes; or 28.88″ (734 mm) pilot bore, 27.25″ (692 mm) bolt circle, (12) 0.625″-11 tapped holes and (12) 0.75″-10 tapped holes.

FLYWHEEL HOUSING - No. 00 SAE.

FUEL SYSTEM - Two natural gas, 4″ (102 mm) updraft carburetors and two Fisher Model 99, 2″ (51 mm) gas regulators, mounted. 30 - 50 psi (241 - 345 kPa) fuel inlet pressure required.

GOVERNOR - Woodward UG-8 LD hydraulic lever type, with friction type speed control. Mounted on right hand side.

IGNITION SYSTEM - Waukesha Custom Engine Control Ignition Module. Electronic digital ignition system. 24V DC power required.

INTERCOOLER - Air-to-water.

LEVELING BOLTS

LIFTING EYES - Requires 9.5 ton Working Load Limit (W.L.L.) anchor shackles.

LUBRICATION - Full pressure, gear type pump. Full flow lube oil filter, 36 gallon (136 litres) capacity, with replaceable depth-type elements and flexible connections, shipped loose. MICROSPIN® bypass filter, engine mounted. Lube oil strainer, mounted. Air/gas motor driven prelube pump, requires final piping.

MANIFOLDS - Exhaust (2) water cooled.

OIL COOLER - Shell and tube type, with thermostatic temperature controller and pressure regulating valve. Factory mounted.

OIL PAN - Base type. 90 gallon (340 L) capacity, including filter and cooler.

PAINT - Oilfield orange primer.

PISTONS - Aluminum with floating pin. Oil cooled. 10.2:1 compression ratio.

SHIPPING SKID - Steel for domestic truck or rail.

TURBOCHARGERS - (2) water-cooled bearing housing and differential wastegates. Single vertical exhaust outlet at rear. Flexible stainless steel exhaust connection with 8″ (203 mm) pipe flange.

VIBRATION DAMPER - Viscous type.

WATER CIRCULATING SYSTEM

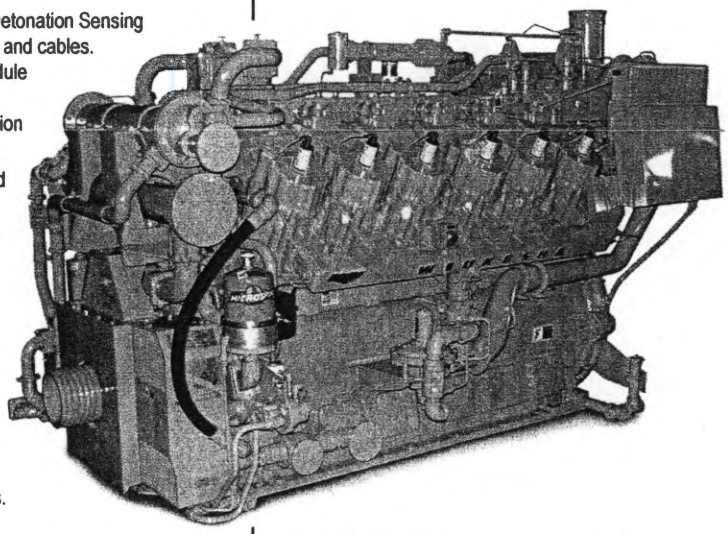
Auxiliary Circuit - Belt driven water circulating pump for intercooler and lube oil cooler. Includes thermostatic valve.

Engine Jacket - Belt driven water circulating pump. Cluster type thermostatic temperature regulating valve, full flow bypass type with 165° - 170° F (74° - 77° C) start to open thermostats. Flange connections and mating flanges for (2) 4″ (102 mm) inlets and (1) 5″ (127 mm) outlet.

Waukesha® SERIES FOUR® VHP

L5794LT

VHP™ Series Four
1205 - 1515 BHP



Model L5794LT Turbocharged and Intercooled, Twelve Cylinder, Lean Combustion, Four-Cycle Gas Engine

SPECIFICATIONS

Cylinders
V 12

Piston Displacement
5788 cu. in.
(95 L)

Bore & Stroke
8.5″ x 8.5″
(216 x 216 mm)

Compression Ratio
10.2:1

Jacket Water System Capacity
107 gal.
(405 L)

Lube Oil Capacity
90 gal.
(340 L)

Starting System
125 - 150 psi air/gas
24/32 V electric

Dry Weight
22,750 lb.
(10,320 kg)

Waukesha Engine ISO 9001 CERTIFIED

POWER RATINGS: L5794LT VHP SERIES FOUR

Model	I.C. Water Inlet Temp. °F (°C) (Tcra)	C.R.	Brake Horsepower (kWb Output) 1000 rpm	1100 rpm	1200 rpm
L5794LT	130° (54°)	10.2:1	1205 (899)	1325 (988)	1445 (1078)
L5794LT	85° (29°)	10.2:1	1260 (940)	1390 (1037)	1515 (1130)

Rating Standard: All models: Ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and auxiliary water temperature Tcra (clause 10.1) as specified above limited to ± 10° F (± 5° C). Ratings are also valid for SAE J1349, BS5514, DIN6271 and AP17B-11C standard atmospheric conditions.

ISO Standard Power/Continuous Power Rating: The highest load and speed which can be applied 24 hours a day, seven days a week, 365 days per year except for normal maintenance. It is permissible to operate the engine at up to 10% overload, or maximum load indicated by the intermittent rating, whichever is lower, for two hours in each 24 hour period.

All natural gas engine ratings are based on a fuel of 900 Btu/ft³ (35.3 MJ/nm³) SLHV value, with a 91 Waukesha Knock Index®.

For conditions or fuels other than standard, the Waukesha Engine Sales Engineering Department.

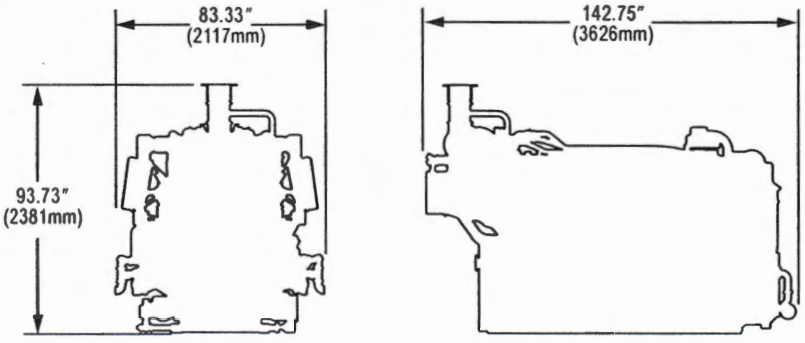
FUEL CONSUMPTION: L5794LT VHP SERIES FOUR

	English	130°F ICW		85°F ICW			Metric	54°C ICW		29° ICW	
Low NO_x Settings	RPM	1200	1000	1200	1000	Low NO_x Settings	RPM	1200	1000	1200	1000
	Power (Bhp)	1445	1205	1515*	1260*		Power (kWb)	1078	899	1130*	940*
	BSFC (Btu/bhp-hr)	7385	7395	7550	7490		BSFC (kJ/kW-hr)	10450	10465	10685	10600
	NOx (grams/bhp-hr)	1.60	1.70	1.00	1.15		NOx (g/nm³)	0.65	0.69	0.40	0.47
	CO (grams/bhp-hr)	1.70	1.65	1.60	1.60		CO (g/nm³)	0.69	0.67	0.65	0.65
	NMHC (grams/bhp-hr)	0.55	0.55	0.55	0.55		NMHC (g/nm³)	0.22	0.22	0.22	0.22
Low Fuel Consumption Settings	BSFC (Btu/bhp-hr)	7080	6950	6955	6940	Low Fuel Consumption Settings	BSFC (kJ/kW-hr)	10020	9835	9840	9820
	NOx (grams/bhp-hr)	2.45	2.75	2.55	2.65		NOx (g/nm³)	0.99	1.11	1.03	1.07
	CO (grams/bhp-hr)	1.80	1.80	1.75	1.75		CO (g/nm³)	0.73	0.73	0.71	0.71
	NMHC (grams/bhp-hr)	0.50	0.50	0.50	0.50		NMHC (g/nm³)	0.20	0.20	0.20	0.20

*No overload is available at these settings.

NOTES:

1) Fuel consumption and exhaust emissions are based on ISO 3046/1-1995 standard reference conditions and commercial quality natural gas of 900 Btu/ft³ (35.38 MJ/m³ [25, V(0; 101.325)]) saturated lower heat value, Waukesha Knock Index® of 91 and 93% methane content by volume. ISO 3046/1-1995 standard reference conditions are 77°F (25°C) ambient temperature, 29.54 inches Hg (100 kPa) barometric pressure, 30% relative humidity (1kPa/0.3 inches Hg water vapor pressure).
2) S.I. exhaust emissions are corrected to 5% O_2 (0°C and 101.325 kPa).
3) Data will vary due to variations in site conditions. For conditions and/or fuels other than standard, consult the Waukesha Engine Sales Engineering Department.



DRESSER
Waukesha

WAUKESHA ENGINE
DRESSER, INC.
1000 West St. Paul Avenue
Waukesha, WI 53188-4999
Phone: (262) 547-3311 Fax: (262) 549-2795
waukeshaengine.dresser.com

WAUKESHA ENGINE
DRESSER INDUSTRIAL PRODUCTS, B.V.
Farmsumerweg 43, Postbus 330
9900 AH Appingedam, The Netherlands
Phone: (31) 596-652222 Fax: (31) 596-628111

Bulletin 8023 0102

JOHNSON MATTHEY

EMISSION CONTROL EQUIPMENT SPECIFICATION
434 Devon Park Drive, Wayne, PA 19087
Tel: 610.971.3100 Fax: 610.971.3116

UE Compression	**Date**	**3/28/2005**
Greenwood Village, CO.	**Quote No.**	**463-4-175**
	Email:	lpullig@uec.unitedengines.com
	Phone:	**720-488-3523**
Les Pullig	**Fax:**	**720-488-3530**

ENGINE DATA	***Rich Burn***
Engine Mfg:	Waukesha
Engine Model:	5794LT
Bhp:	1445
RPM:	1200
Load:	100%
Fuel:	Natural Gas
Temp into Catalyst, °F:	891
Operating Hours, hrs/yr:	8760

ENGINE PREFORMANCE	
Exhaust Flow, acfm:	7900
Exhaust Flow, scfm:	3041
Exhaust Flow, scfh:	182443
Exhaust Flow, lb/hr:	13897
Exhaust MW:	28.9

TYPICAL (Rich Burn)	***MW***		
Ar, vol %:	39.9		-
N2, vol %:	28.0		72.20
O2, vol %:	32.0		7.80
H2O, vol%:	18.0		10.00
CO2, vol %:	44.0		10.00

EMISSIONS DATA	***PRE***	***POST***	***% Reduction***
NOx, g/Bhp-hr:	1.55	1.55	0.0%
NOx, lb/hr:	4.94	4.94	
NOx, tons/yr:	21.63	21.63	
NOx, ppmv:	367.00	367.00	
NOx, ppmvd @ 15% O2:	196.67	196.67	
CO, g/Bhp-hr:	1.84	0.25	86.4%
CO, lb/hr:	5.86	0.80	
CO, tons/yr:	25.68	3.49	
CO, ppmv:	762.42	103.59	
CO, ppmvd @ 15% O2:	408.56	55.51	
NMHC as CH4, g/Bhp-hr:	0.17	0.17	0.0%
NMHC as CH4, lb/hr:	0.54	0.54	
NMHC as CH4, tons.yr.:	2.37	2.37	
NMHC as CH4, ppm:	70.44	70.44	
NMHC as CH4, ppm @ 15% o2:	37.75	37.75	
CH2O as CH4, g/Bhp-hr:	0.16	0.06	62.5%
CH2O as CH4, lb/hr:	0.51	0.19	
CH2O as CH4, tons.yr.:	2.23	0.84	
CH2O as CH4, ppm:	66.30	24.86	
CH2O as CH4, ppm @ 15% o2:	35.53	13.32	

SCOPE OF SUPPLY	**BXO70-14**	***QXC70-14**
Exhaust Line Size, (inches)	**14**	**14**
Attenuation type	**None**	**Critical**
Drawing reference:	**10-OD4070-3**	**8200-1**
Housing:	**Stainless**	**Carbon**
Element(s)(Oxidation)	**1**	**1**
Back Pressure: estimated (inches H2O)	**5**	**7**
Net Price:	**$6,535.00**	**$6,765.00**
Delivery: ARO	**2-3 Weeks**	**6-8 Weeks**

***Integrated Converter/Silencer**
End in....End out
OXIDATION CATALYST

G. W. Kammerer, Engine Industries Sales Manag 281.353.2500 fax : 928-222-4111 email: kammew@jmusa.com

Price firm and valid for 30 days from date of quote, FOB point of Manufacture, excludes any applicable duties and taxes. Terms, net 30 days from date of invoice as offered under Jm's General Terms and Conditions. Warranty 13 months from date of shipment or 12 months from date of start-up. Written notice required. Maximum service temperature 1350 degree F. Minimum operating temperature 750 degrees F.

Data above calculated from engine manufactures data corresponding to catalyst converter settings. A slightly rich to stoichiometric air fuel ratio is required (Oxygen content in exhaust of 0.2% - 0.7%) oxygen sensor millivolts approximately 700 to 800, or lambda of 0.97 to 0.99)

Table I Engine Rich burn

JM
Johnson Matthey

JOHNSON MATTHEY

EMISSION CONTROL EQUIPMENT SPECIFICATION

434 Devon Park Drive, Wayne, PA 19087
Tel: 610.971.3100 Fax: 610.971.3116

Samson Investment Co.	**Date:** 09/10/2007
Samson Plaza	**Quote No.** N/A
Two West Second St.	**Email:** mbutler@samson.com
Tulsa, OK 74103-3103	**Phone:** 918-591-1619
Attn: Mr. Mike Butler	**Fax:**

ENGINE DATA	
Engine Mfg:	Waukesha
Engine Model:	5794LT
Bhp:	1445
RPM:	1200
Load:	100%
Fuel:	Natural Gas
Temp into Catalyst, °F:	600
Operating Hours, hrs/yr:	8760

ENGINE PREFORMANCE	
Exhaust Flow, acfm:	7900
Exhaust Flow, scfm:	3875
Exhaust Flow, scfh:	232528
Exhaust Flow, lb/hr:	17712
Exhaust MW:	28.9

TYPICAL (Rich Burn)	MW		
Ar, vol %:	39.9		-
N2, vol %:	28.0		72.20
O2, vol %:	32.0		7.80
H2O, vol%:	18.0		10.00
CO2, vol %:	44.0		10.00

EMISSIONS DATA	PRE	POST	% Reduction
NOx, g/Bhp-hr:	1.55	1.55	0.0%
NOx, lb/hr:	4.94	4.94	
NOx, tons/yr:	21.63	21.63	
NOx, ppmv:	287.95	287.95	
NOx, ppmvd @ 15% O2:	154.31	154.31	
CO, g/Bhp-hr:	1.84	0.33	82.1%
CO, lb/hr:	5.86	1.05	
CO, tons/yr:	25.68	4.61	
CO, ppmv:	598.20	107.29	
CO, ppmvd @ 15% O2:	320.56	57.49	
NMHC as CH4, g/Bhp-hr:	0.17	0.17	0.0%
NMHC as CH4, lb/hr:	0.54	0.54	
NMHC as CH4, tons.yr.:	2.37	2.37	
NMHC as CH4, ppm:	55.27	55.27	
NMHC as CH4, ppm @ 15% o2:	29.62	29.62	
CH2O as CH4, g/Bhp-hr:	0.22	0.07	69.1%
CH2O as CH4, lb/hr:	0.70	0.22	
CH2O as CH4, tons.yr.:	3.07	0.95	
CH2O as CH4, ppm:	71.52	22.11	
CH2O as CH4, ppm @ 15% o2:	38.33	11.85	

SCOPE OF SUPPLY	BXO70-14	*QXC70-14
Exhaust Line Size, (inches)	14	14
Attenuation type	None	Critical
Drawing reference:	10-OD4070-3	8200-1
Housing:		
Element(s)(Oxidation)		
Back Pressure: estimated (inches H2O)		
Net Price:		
Delivery: ARO		

***Integrated Converter/Silencer**
End in....End out
OXIDATION CATALYST

Jack Carroll Sr. Sales Engineer **ph: 484-320-2** **fax : 484-320-2152928-222-** **email: carrojj@jmusa.com**

Johnson Matthey

JOHNSON MATTHEY

EMISSION CONTROL EQUIPMENT SPECIFICATION

434 Devon Park Drive, Wayne, PA 19087
Tel: 610.971.3100 Fax: 610.971.3116

Samson Investment Co.	**Date:** 09/10/2007
Samson Plaza	**Quote No.** N/A
Two West Second St.	**Email:** mbutler@samson.com
Tulsa, OK 74103-3103	**Phone:** 918-591-1619
Attn: Mr. Mike Butler	**Fax:**

ENGINE DATA	
Engine Mfg:	Waukesha
Engine Model:	5794LT
Bhp:	1445
RPM:	1200
Load:	100%
Fuel:	Natural Gas
Temp into Catalyst, °F:	500
Operating Hours, hrs/yr:	8760

ENGINE PREFORMANCE	
Exhaust Flow, acfm:	7900
Exhaust Flow, scfm:	4279
Exhaust Flow, scfh:	256750
Exhaust Flow, lb/hr:	19557
Exhaust MW:	28.9

TYPICAL (Rich Burn)	MW		
Ar, vol %:	39.9		-
N2, vol %:	28.0		72.20
O2, vol %:	32.0		7.80
H2O, vol%:	18.0		10.00
CO2, vol %:	44.0		10.00

EMISSIONS DATA	PRE	POST	% Reduction
NOx, g/Bhp-hr:	1.55	1.55	0.0%
NOx, lb/hr:	4.94	4.94	
NOx, tons/yr:	21.63	21.63	
NOx, ppmv:	260.79	260.79	
NOx, ppmvd @ 15% O2:	139.75	139.75	
CO, g/Bhp-hr:	1.84	0.40	78.3%
CO, lb/hr:	5.86	1.27	
CO, tons/yr:	25.68	5.58	
CO, ppmv:	541.76	117.77	
CO, ppmvd @ 15% O2:	290.32	63.11	
NMHC as CH4, g/Bhp-hr:	0.17	0.17	0.0%
NMHC as CH4, lb/hr:	0.54	0.54	
NMHC as CH4, tons.yr.:	2.37	2.37	
NMHC as CH4, ppm:	50.05	50.05	
NMHC as CH4, ppm @ 15% o2:	26.82	26.82	
CH2O as CH4, g/Bhp-hr:	0.22	0.08	65.9%
CH2O as CH4, lb/hr:	0.70	0.24	
CH2O as CH4, tons.yr.:	3.07	1.05	
CH2O as CH4, ppm:	64.78	22.08	
CH2O as CH4, ppm @ 15% o2:	34.71	11.83	

SCOPE OF SUPPLY	BXO70-14	*QXC70-14
Exhaust Line Size, (inches)	14	14
Attenuation type	None	Critical
Drawing reference:	10-OD4070-3	8200-1
Housing:		
Element(s)(Oxidation)		
Back Pressure: estimated (inches H2O)		
Net Price:		
Delivery: ARO		

*Integrated Converter/Silencer
End in....End out
OXIDATION CATALYST

Jack Carroll Sr. Sales Engineer **ph: 484-320-2** **fax : 484-320-2152928-222-** **email: carrojj@jmusa.com**

Johnson Matthey

Emission Estimates
Emission Unit E5
South Ignacio Central Delivery Point

Unit E5 is a 1,400 horsepower Waukesha L5794LT, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	2.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.5	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,400 hp

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.8\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 13.5\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.8\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.4\ tpy$$

Emission Estimates
Emission Unit E6
South Ignacio Central Delivery Point

Unit E6 is a 1,400 horsepower Waukesha L5794LT, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	2.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.5	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,400 hp

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.8\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 13.5\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.8\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.4\ tpy$$

Emission Estimates
Emission Unit E7
South Ignacio Central Delivery Point

Unit E7 is a 1,400 horsepower Waukesha L5794LT, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	2.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.5	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,400 hp

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.8\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 13.5\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.8\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.4\ tpy$$

Emission Estimates
Emission Unit E8
South Ignacio Central Delivery Point

Unit E8 is a 1,400 horsepower Waukesha L5794LT, a 4-stroke lean burn internal combustion engine. The engine is equipped with an oxidation catalyst. Potential to emit calculations are presented below.

Potential to Emit: Controlled Configuration
Lean-burn Engine with Oxidation Catalyst

Manufacturer Emission Factors/Testing Experience

NO_X	2.5	g/hp-hr
CO	1.0	g/hp-hr
VOC	0.5	g/hp-hr
Formaldehyde	0.1	g/hp-hr

Site-Rated Horsepower: 1,400 hp

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.8\ tpy$$

$$CO = \frac{(1.0\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 13.5\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.8\ tpy$$

$$CH_2O = \frac{(0.1\ g/hp\text{-}hr)(1{,}400\ hp)(8{,}760\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 1.4\ tpy$$

DEHYDRATION UNITS

Emission Unit Description
Dehydration Units
South Ignacio Central Delivery Point

There are two tri-ethylene glycol dehydration units installed at the South Ignacio Central Delivery Point. The dehydration units, Units D1 and D2, are equipped with flash gas separators that route the flash gas back into the sales line. Units D1 and D2 are each equipped with condensers and emissions from both units are routed to a PESCO BTEX combustor control unit which has a manufacturer guaranteed 98-percent control efficiency. Detailed emission calculations are attached for each unit. The PESCO BTEX unit manufacturer's specification sheet is also attached. Table 8 lists the serial number and installation/startup date for each of the dehydration units at the South Ignacio Central Delivery Point.

Table 8: Jaques Dehydration Unit Information

Unit ID	Description	Serial Number	Installation/Startup Date
D1	30 MMscfd PESCO Dehydration Unit with 1.25 MMBtu/hr reboiler burner	101727	2003
D2	40 MMscfd PESCO Dehydration Unit with 0.75 MMBtu/hr reboiler burner	Custom	2009

Benzene emissions from each dehydration unit are limited to 0.9 tons per consecutive twelve months. There is also a facility-wide HAP emission limit of 23 tons per consecutive twelve month period. To ensure compliance with these limits monthly gas analysis testing will be conducted to use for monthly dehydration unit emission calculations. This testing shall show the temperature and pressure of the inlet gas. Monthly determination of benzene and HAP emissions from the dehydrator will be calculated by using GRI GlyCalc using the current month's wet gas analysis, the temperature and pressure of the gas, the enclosed flare destruction efficiency of 98%, and the maximum gas throughput and glycol pump recirculation rate for each dehydrator. Unit D1 has a maximum throughput of 30 MMscfd and a glycol recirculation rate of 15 gallons per minute and D2 has a maximum throughput of 40 MMscfd and glycol recirculation rate of 17 gallons per minute.

Benzene emissions will be determined from each dehydrator each month. The benzene emissions for that month will be added to the preceding eleven months to record a new 12-month rolling total. HAP emissions will be determined from each dehydrator each month. The HAP emissions will be added to those from the engines and insignificant emissions units listed in the air permit to determine the monthly total. This monthly total will be added to the preceding eleven months to record a new 12-month rolling total.

Records will be kept of the gas analysis testing, GRI Glycalc modeling, and the rolling 12 month emissions totals for benzene and HAPs.

Emission Estimates
Emission Unit D1 - 30 MMscfd PESCO Dehydration Unit
Emission Unit D2 - 40 MMscfd PESCO Dehydration Unit
South Ignacio Central Delivery Point

VOC and HAP emissions may occur when triethylene glycol is regenerated. The emission model GRI-GLYCalc, a thermodynamic-based process simulator for dehydration units, was utilized to estimate emissions from this unit. A worse-case inlet gas analysis was developed based on highest sampled VOC content and maximum anticipated benzene concentration and input to the model. Following is a summary of other worse-case operating parameter model input values:

Parameter	Value	
Inlet Gas Temperature	70	°F
Inlet Gas Pressure	500	psig
Inlet Benzene Concentration	20	ppm
D1 Inlet Gas Throughput	30	MMscfd
D1 Glycol Circulation	15	gpm
D2 Inlet Gas Throughput	40	MMscfd
D2 Glycol Circulation	17	gpm
Flash Vessel Temperature	100	°F
Flash Vessel Pressure	30	psig
Condenser Temperature	120	°F
Condenser Pressure	23	psia (Atmospheric)

Units D1 and D2 will each be equipped with flash gas separators that route the flash gas back into the sales line. The dehydration units are also equipped with condensers and emissions from both units will be routed to a PESCO BTEX combustor unit which has a manufacturer guaranteed 98-percent control efficiency.

D1 - 30 MMscfd Model Results (Output Follows)

VOC Emissions	0.31 tpy (20.3 tpy Uncontrolled)
Benzene Emissions	0.18 tpy (Controlled)

D2 - 40 MMscfd Model Results (Output Follows)

VOC Emissions	0.36 tpy (24.5 tpy Uncontrolled)
Benzene Emissions	0.22 tpy (Controlled)

Emission Limits

Benzene Emissions	0.9 tpy (for each unit)
Facility-wide HAP	23.0 tpy

pesco
process equipment & service company inc

OPERATIONAL GUARANTEE - PESCO FLARE STACK
U.S. PATENT 6485292 (Other Patents Pending)

The PESCO Flare Stack (enclosed flare) is guaranteed to achieve total destruction of 98% or greater of all hydrocarbons present in the overhead stream from the still column of a glycol dehydrator. This assumes that the operating parameters do not exceed those to which the flare stack was initially designed. The PESCO Flare Stack is also guaranteed to meet the environmental requirements as set forth in 40 CFR 60.18.

James Rhodes
Engineering Manager
Process Equipment & Service Co., Inc.

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EMISSION UNIT D1
TEG DEHYDRATION UNIT

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Samson South Ignacio
File Name: C:\Work\Projects\Samson\South Ignacio\Permit Work\Synthetic Minor December 2011\D1MaxCase.ddf
Date: December 15, 2011

DESCRIPTION:

Description: D1 PTE Model
30 MMSCFD PESCO Dehydration Unit

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0182	0.437	0.0798
Ethane	0.0015	0.037	0.0068
Propane	0.0008	0.018	0.0033
Isobutane	0.0004	0.008	0.0015
n-Butane	0.0006	0.015	0.0028
Isopentane	0.0005	0.013	0.0023
n-Pentane	0.0004	0.010	0.0017
n-Hexane	0.0007	0.016	0.0029
Cyclohexane	0.0016	0.039	0.0071
Other Hexanes	0.0007	0.018	0.0032
Heptanes	0.0017	0.042	0.0076
Methylcyclohexane	0.0027	0.065	0.0120
2,2,4-Trimethylpentane	0.0002	0.006	0.0010
Benzene	0.0417	1.000	0.1824
Toluene	0.0087	0.208	0.0379
Xylenes	0.0095	0.229	0.0418
C8+ Heavies	0.0003	0.006	0.0011
Total Emissions	0.0903	2.166	0.3953
Total Hydrocarbon Emissions	0.0903	2.166	0.3953
Total VOC Emissions	0.0705	1.692	0.3087
Total HAP Emissions	0.0607	1.458	0.2660
Total BTEX Emissions	0.0598	1.436	0.2621

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.9114	21.874	3.9920
Ethane	0.0773	1.856	0.3386
Propane	0.0378	0.908	0.1656
Isobutane	0.0177	0.425	0.0776
n-Butane	0.0320	0.768	0.1401
Isopentane	0.0268	0.643	0.1173
n-Pentane	0.0201	0.484	0.0882
n-Hexane	0.0345	0.828	0.1510
Cyclohexane	0.0855	2.053	0.3747
Other Hexanes	0.0378	0.907	0.1655

Heptanes	0.0968	2.324	0.4241
Methylcyclohexane	0.1527	3.666	0.6690
2,2,4-Trimethylpentane	0.0128	0.306	0.0559
Benzene	2.2599	54.238	9.8984
Toluene	0.5370	12.889	2.3522
Xylenes	0.8357	20.057	3.6603
C8+ Heavies	0.4498	10.795	1.9702
Total Emissions	5.6257	135.018	24.6408
Total Hydrocarbon Emissions	5.6257	135.018	24.6408
Total VOC Emissions	4.6370	111.289	20.3102
Total HAP Emissions	3.6799	88.317	16.1178
Total BTEX Emissions	3.6326	87.183	15.9109

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	13.5680	325.632	59.4279
Ethane	0.2840	6.816	1.2439
Propane	0.0620	1.488	0.2715
Isobutane	0.0176	0.421	0.0769
n-Butane	0.0234	0.561	0.1024
Isopentane	0.0160	0.383	0.0700
n-Pentane	0.0093	0.224	0.0408
n-Hexane	0.0080	0.192	0.0351
Cyclohexane	0.0048	0.114	0.0208
Other Hexanes	0.0119	0.286	0.0522
Heptanes	0.0099	0.237	0.0432
Methylcyclohexane	0.0062	0.148	0.0270
2,2,4-Trimethylpentane	0.0027	0.065	0.0119
Benzene	0.0159	0.381	0.0695
Toluene	0.0022	0.053	0.0096
Xylenes	0.0012	0.030	0.0054
C8+ Heavies	0.0039	0.095	0.0173
Total Emissions	14.0469	337.125	61.5254
Total Hydrocarbon Emissions	14.0469	337.125	61.5254
Total VOC Emissions	0.1949	4.677	0.8536
Total HAP Emissions	0.0300	0.720	0.1314
Total BTEX Emissions	0.0193	0.463	0.0845

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	120.00	deg. F
Condenser Pressure:	23.00	psia
Condenser Duty:	2.18e-002	MM BTU/hr
Hydrocarbon Recovery:	0.09	bbls/day
Produced Water:	3.22	bbls/day
Ambient Temperature:	60.00	deg. F
Excess Oxygen:	2.00	%
Combustion Efficiency:	98.00	%
Supplemental Fuel Requirement:	2.18e-002	MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	2.00%	98.00%
Isobutane	1.99%	98.01%
n-Butane	1.99%	98.01%
Isopentane	1.97%	98.03%
n-Pentane	1.97%	98.03%
n-Hexane	1.92%	98.08%
Cyclohexane	1.89%	98.11%
Other Hexanes	1.94%	98.06%
Heptanes	1.80%	98.20%
Methylcyclohexane	1.79%	98.21%
2,2,4-Trimethylpentane	1.81%	98.19%
Benzene	1.84%	98.16%
Toluene	1.61%	98.39%
Xylenes	1.14%	98.86%
C8+ Heavies	0.06%	99.94%

ABSORBER

Specified Absorber Stages:	1.25	
Calculated Dry Gas Dew Point:	1.35	lbs. H2O/MMSCF
Temperature:	70.0	deg. F
Pressure:	500.0	psig
Dry Gas Flow Rate:	30.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.0369	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	39.42	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	18.91	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.42%	96.58%
Carbon Dioxide	99.49%	0.51%
Nitrogen	99.97%	0.03%
Methane	99.97%	0.03%
Ethane	99.88%	0.12%
Propane	99.77%	0.23%
Isobutane	99.63%	0.37%
n-Butane	99.49%	0.51%
Isopentane	99.42%	0.58%
n-Pentane	99.23%	0.77%
n-Hexane	98.50%	1.50%
Cyclohexane	93.49%	6.51%
Other Hexanes	98.91%	1.09%
Heptanes	96.77%	3.23%
Methylcyclohexane	91.82%	8.18%
2,2,4-Trimethylpentane	98.63%	1.37%

Benzene	55.80%	44.20%
Toluene	40.82%	59.18%
Xylenes	20.28%	79.72%
C8+ Heavies	89.90%	10.10%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 100.0 deg. F
Flash Pressure: 30.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.99%	0.01%
Carbon Dioxide	49.63%	50.37%
Nitrogen	6.16%	93.84%
Methane	6.29%	93.71%
Ethane	21.40%	78.60%
Propane	37.89%	62.11%
Isobutane	50.22%	49.78%
n-Butane	57.77%	42.23%
Isopentane	62.81%	37.19%
n-Pentane	68.53%	31.47%
n-Hexane	81.24%	18.76%
Cyclohexane	94.90%	5.10%
Other Hexanes	76.26%	23.74%
Heptanes	90.80%	9.20%
Methylcyclohexane	96.28%	3.72%
2,2,4-Trimethylpentane	82.75%	17.25%
Benzene	99.34%	0.66%
Toluene	99.63%	0.37%
Xylenes	99.87%	0.13%
C8+ Heavies	99.24%	0.76%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	72.68%	27.32%
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	0.80%	99.20%
n-Pentane	0.73%	99.27%
n-Hexane	0.62%	99.38%
Cyclohexane	3.37%	96.63%
Other Hexanes	1.31%	98.69%
Heptanes	0.55%	99.45%
Methylcyclohexane	4.15%	95.85%
2,2,4-Trimethylpentane	1.81%	98.19%

Benzene	5.03%	94.97%
Toluene	7.93%	92.07%
Xylenes	12.92%	87.08%
C8+ Heavies	12.11%	87.89%

STREAM REPORTS:

WET GAS STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.25e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.30e-002	4.93e+001
Carbon Dioxide	5.27e+000	7.65e+003
Nitrogen	1.62e-002	1.50e+001
Methane	9.43e+001	4.99e+004
Ethane	3.16e-001	3.14e+002
Propane	3.01e-002	4.38e+001
Isobutane	5.00e-003	9.58e+000
n-Butane	5.70e-003	1.09e+001
Isopentane	3.10e-003	7.37e+000
n-Pentane	1.60e-003	3.81e+000
n-Hexane	9.99e-004	2.84e+000
Cyclohexane	5.00e-004	1.39e+000
Other Hexanes	1.60e-003	4.54e+000
Heptanes	9.99e-004	3.30e+000
Methylcyclohexane	5.99e-004	1.94e+000
2,2,4-Trimethylpentane	3.00e-004	1.13e+000
Benzene	2.00e-003	5.15e+000
Toluene	3.00e-004	9.11e-001
Xylenes	3.00e-004	1.05e+000
C8+ Heavies	7.99e-004	4.49e+000
Total Components	100.00	5.80e+004

DRY GAS STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.25e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.84e-003	1.69e+000
Carbon Dioxide	5.25e+000	7.61e+003
Nitrogen	1.62e-002	1.50e+001
Methane	9.44e+001	4.99e+004
Ethane	3.16e-001	3.13e+002
Propane	3.00e-002	4.37e+001
Isobutane	4.98e-003	9.54e+000
n-Butane	5.67e-003	1.09e+001
Isopentane	3.08e-003	7.33e+000
n-Pentane	1.59e-003	3.78e+000

n-Hexane	9.86e-004	2.80e+000
Cyclohexane	4.68e-004	1.30e+000
Other Hexanes	1.58e-003	4.50e+000
Heptanes	9.68e-004	3.20e+000
Methylcyclohexane	5.51e-004	1.78e+000
2,2,4-Trimethylpentane	2.96e-004	1.11e+000
Benzene	1.12e-003	2.87e+000
Toluene	1.23e-004	3.72e-001
Xylenes	6.09e-005	2.13e-001
C8+ Heavies	7.20e-004	4.04e+000
Total Components	100.00	5.79e+004

LEAN GLYCOL STREAM

Temperature: 70.00 deg. F
Flow Rate: 1.50e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	8.32e+003
Water	1.50e+000	1.27e+002
Carbon Dioxide	4.66e-011	3.94e-009
Nitrogen	5.46e-015	4.61e-013
Methane	5.76e-018	4.86e-016
Ethane	2.02e-009	1.71e-007
Propane	4.81e-011	4.06e-009
Isobutane	1.25e-011	1.06e-009
n-Butane	1.63e-011	1.37e-009
Isopentane	2.54e-006	2.15e-004
n-Pentane	1.75e-006	1.48e-004
n-Hexane	2.53e-006	2.14e-004
Cyclohexane	3.54e-005	2.99e-003
Other Hexanes	5.94e-006	5.02e-004
Heptanes	6.35e-006	5.36e-004
Methylcyclohexane	7.84e-005	6.62e-003
2,2,4-Trimethylpentane	2.79e-006	2.36e-004
Benzene	1.42e-003	1.20e-001
Toluene	5.48e-004	4.63e-002
Xylenes	1.47e-003	1.24e-001
C8+ Heavies	7.34e-004	6.20e-002
Total Components	100.00	8.45e+003

RICH GLYCOL STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.52e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.73e+001	8.32e+003
Water	2.04e+000	1.74e+002
Carbon Dioxide	4.60e-001	3.94e+001
Nitrogen	5.38e-005	4.60e-003
Methane	1.69e-001	1.45e+001

Ethane	4.23e-003	3.61e-001
Propane	1.17e-003	9.98e-002
Isobutane	4.13e-004	3.53e-002
n-Butane	6.47e-004	5.54e-002
Isopentane	5.02e-004	4.30e-002
n-Pentane	3.46e-004	2.96e-002
n-Hexane	4.99e-004	4.27e-002
Cyclohexane	1.09e-003	9.33e-002
Other Hexanes	5.87e-004	5.02e-002
Heptanes	1.25e-003	1.07e-001
Methylcyclohexane	1.94e-003	1.66e-001
2,2,4-Trimethylpentane	1.84e-004	1.57e-002
Benzene	2.80e-002	2.40e+000
Toluene	6.85e-003	5.85e-001
Xylenes	1.12e-002	9.61e-001
C8+ Heavies	6.03e-003	5.16e-001
Total Components	100.00	8.55e+003

FLASH TANK OFF GAS STREAM

Temperature: 100.00 deg. F
Pressure: 44.70 psia
Flow Rate: 4.97e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	9.71e-002	2.29e-002
Carbon Dioxide	3.44e+001	1.98e+001
Nitrogen	1.18e-002	4.32e-003
Methane	6.46e+001	1.36e+001
Ethane	7.21e-001	2.84e-001
Propane	1.07e-001	6.20e-002
Isobutane	2.31e-002	1.76e-002
n-Butane	3.07e-002	2.34e-002
Isopentane	1.69e-002	1.60e-002
n-Pentane	9.86e-003	9.32e-003
n-Hexane	7.10e-003	8.01e-003
Cyclohexane	4.31e-003	4.76e-003
Other Hexanes	1.06e-002	1.19e-002
Heptanes	7.51e-003	9.87e-003
Methylcyclohexane	4.79e-003	6.16e-003
2,2,4-Trimethylpentane	1.81e-003	2.71e-003
Benzene	1.55e-002	1.59e-002
Toluene	1.82e-003	2.19e-003
Xylenes	8.85e-004	1.23e-003
C8+ Heavies	1.77e-003	3.94e-003
Total Components	100.00	3.39e+001

FLASH TANK GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.51e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.77e+001	8.32e+003
Water	2.05e+000	1.74e+002
Carbon Dioxide	2.29e-001	1.95e+001
Nitrogen	3.33e-006	2.84e-004
Methane	1.07e-002	9.11e-001
Ethane	9.08e-004	7.73e-002
Propane	4.44e-004	3.78e-002
Isobutane	2.08e-004	1.77e-002
n-Butane	3.75e-004	3.20e-002
Isopentane	3.17e-004	2.70e-002
n-Pentane	2.38e-004	2.03e-002
n-Hexane	4.07e-004	3.47e-002
Cyclohexane	1.04e-003	8.85e-002
Other Hexanes	4.49e-004	3.83e-002
Heptanes	1.14e-003	9.74e-002
Methylcyclohexane	1.87e-003	1.59e-001
2,2,4-Trimethylpentane	1.53e-004	1.30e-002
Benzene	2.79e-002	2.38e+000
Toluene	6.85e-003	5.83e-001
Xylenes	1.13e-002	9.60e-001
C8+ Heavies	6.01e-003	5.12e-001
Total Components	100.00	8.52e+003

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.21e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.26e+001	4.76e+001
Carbon Dioxide	1.39e+001	1.95e+001
Nitrogen	3.17e-004	2.84e-004
Methane	1.78e+000	9.11e-001
Ethane	8.03e-002	7.73e-002
Propane	2.68e-002	3.78e-002
Isobutane	9.53e-003	1.77e-002
n-Butane	1.72e-002	3.20e-002
Isopentane	1.16e-002	2.68e-002
n-Pentane	8.73e-003	2.01e-002
n-Hexane	1.25e-002	3.45e-002
Cyclohexane	3.18e-002	8.55e-002
Other Hexanes	1.37e-002	3.78e-002
Heptanes	3.02e-002	9.68e-002
Methylcyclohexane	4.86e-002	1.53e-001
2,2,4-Trimethylpentane	3.49e-003	1.28e-002
Benzene	9.04e-001	2.26e+000
Toluene	1.82e-001	5.37e-001

Component	Conc. (wt%)	Loading (lb/hr)	
Xylenes	2.46e-001	8.36e-001	
C8+ Heavies	8.25e-002	4.50e-001	
Total Components	100.00	7.28e+001	

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 9.38e-002 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	9.98e+001	4.68e+001	998328.
Carbon Dioxide	1.03e-001	4.82e-002	1027.
Nitrogen	3.91e-008	1.83e-008	0.
Methane	2.42e-004	1.14e-004	2.
Ethane	2.34e-005	1.10e-005	0.
Propane	1.18e-005	5.56e-006	0.
Isobutane	3.02e-006	1.42e-006	0.
n-Butane	7.22e-006	3.39e-006	0.
Isopentane	4.22e-006	1.98e-006	0.
n-Pentane	3.41e-006	1.60e-006	0.
n-Hexane	4.72e-006	2.21e-006	0.
Cyclohexane	6.48e-005	3.04e-005	1.
Other Hexanes	4.21e-006	1.97e-006	0.
Heptanes	6.89e-006	3.23e-006	0.
Methylcyclohexane	5.22e-005	2.45e-005	1.
2,2,4-Trimethylpentane	6.05e-007	2.84e-007	0.
Benzene	4.69e-002	2.20e-002	469.
Toluene	8.02e-003	3.76e-003	80.
Xylenes	9.21e-003	4.32e-003	92.
C8+ Heavies	6.36e-007	2.98e-007	0.
Total Components	100.00	4.69e+001	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 2.56e-003 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.35e-002	4.73e-004
Carbon Dioxide	3.92e-001	4.27e-003
Nitrogen	2.26e-006	2.46e-008
Methane	6.85e-003	7.45e-005
Ethane	3.02e-003	3.28e-005
Propane	7.53e-003	8.19e-005
Isobutane	6.90e-003	7.50e-005
n-Butane	1.69e-002	1.84e-004
Isopentane	3.27e-002	3.55e-004
n-Pentane	2.93e-002	3.19e-004
n-Hexane	1.25e-001	1.36e-003
Cyclohexane	4.38e-001	4.76e-003
Other Hexanes	1.03e-001	1.12e-003
Heptanes	8.87e-001	9.64e-003
Methylcyclohexane	1.50e+000	1.63e-002
2,2,4-Trimethylpentane	1.14e-001	1.24e-003

Benzene	1.43e+001	1.55e-001
Toluene	9.26e+000	1.01e-001
Xylenes	3.26e+001	3.54e-001
C8+ Heavies	4.02e+001	4.37e-001
Total Components	100.00	1.09e+000

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 23.00 psia
Flow Rate: 2.23e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.46e+000	7.91e-001
Carbon Dioxide	7.52e+001	1.95e+001
Nitrogen	1.72e-003	2.84e-004
Methane	9.66e+000	9.11e-001
Ethane	4.37e-001	7.73e-002
Propane	1.45e-001	3.77e-002
Isobutane	5.16e-002	1.76e-002
n-Butane	9.30e-002	3.18e-002
Isopentane	6.22e-002	2.64e-002
n-Pentane	4.67e-002	1.98e-002
n-Hexane	6.53e-002	3.31e-002
Cyclohexane	1.63e-001	8.08e-002
Other Hexanes	7.23e-002	3.67e-002
Heptanes	1.48e-001	8.72e-002
Methylcyclohexane	2.36e-001	1.36e-001
2,2,4-Trimethylpentane	1.72e-002	1.15e-002
Benzene	4.53e+000	2.08e+000
Toluene	7.98e-001	4.33e-001
Xylenes	7.64e-001	4.77e-001
C8+ Heavies	1.28e-002	1.28e-002
Total Components	100.00	2.48e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 7.72e-001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	5.58e+001	1.82e-002
Ethane	2.52e+000	1.55e-003
Propane	8.41e-001	7.55e-004
Isobutane	2.98e-001	3.53e-004
n-Butane	5.37e-001	6.36e-004
Isopentane	3.60e-001	5.28e-004
n-Pentane	2.70e-001	3.97e-004
n-Hexane	3.78e-001	6.62e-004
Cyclohexane	9.43e-001	1.62e-003
Other Hexanes	4.18e-001	7.33e-004
Heptanes	8.55e-001	1.74e-003
Methylcyclohexane	1.37e+000	2.73e-003
2,2,4-Trimethylpentane	9.92e-002	2.31e-004

Benzene	2.62e+001	4.17e-002
Toluene	4.61e+000	8.65e-003
Xylenes	4.42e+000	9.54e-003
C8+ Heavies	7.39e-002	2.56e-004
Total Components	100.00	9.03e-002

EMISSION UNIT D2
TEG DEHYDRATION UNIT

GRI-GLYCalc VERSION 4.0 - AGGREGATE CALCULATIONS REPORT

Case Name: Samson South Ignacio
File Name: C:\Work\Projects\Samson\South Ignacio\Permit Work\Synthetic Minor December 2011\D2MaxCase.ddf
Date: December 15, 2011

DESCRIPTION:

Description: D2 PTE Model
40 MMSCFD PESCO Dehydration Unit

Annual Hours of Operation: 8760.0 hours/yr

EMISSIONS REPORTS:

CONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	0.0206	0.494	0.0902
Ethane	0.0017	0.042	0.0076
Propane	0.0009	0.021	0.0037
Isobutane	0.0004	0.010	0.0017
n-Butane	0.0007	0.017	0.0032
Isopentane	0.0006	0.014	0.0026
n-Pentane	0.0004	0.011	0.0020
n-Hexane	0.0007	0.018	0.0033
Cyclohexane	0.0018	0.044	0.0080
Other Hexanes	0.0008	0.020	0.0036
Heptanes	0.0019	0.047	0.0085
Methylcyclohexane	0.0031	0.073	0.0134
2,2,4-Trimethylpentane	0.0003	0.006	0.0011
Benzene	0.0494	1.186	0.2164
Toluene	0.0103	0.248	0.0453
Xylenes	0.0114	0.274	0.0500
C8+ Heavies	0.0003	0.006	0.0011
Total Emissions	0.1054	2.530	0.4618
Total Hydrocarbon Emissions	0.1054	2.530	0.4618
Total VOC Emissions	0.0831	1.994	0.3640
Total HAP Emissions	0.0722	1.732	0.3161
Total BTEX Emissions	0.0712	1.708	0.3117

UNCONTROLLED REGENERATOR EMISSIONS

Component	lbs/hr	lbs/day	tons/yr
Methane	1.0302	24.724	4.5122
Ethane	0.0872	2.092	0.3818
Propane	0.0428	1.028	0.1876
Isobutane	0.0201	0.481	0.0879
n-Butane	0.0362	0.869	0.1586
Isopentane	0.0303	0.727	0.1327
n-Pentane	0.0228	0.547	0.0999
n-Hexane	0.0390	0.937	0.1710
Cyclohexane	0.0972	2.332	0.4256
Other Hexanes	0.0427	1.026	0.1872

Heptanes	0.1097	2.633	0.4805
Methylcyclohexane	0.1738	4.172	0.7614
2,2,4-Trimethylpentane	0.0144	0.346	0.0632
Benzene	2.7143	65.143	11.8887
Toluene	0.6615	15.877	2.8975
Xylenes	1.0695	25.668	4.6844
C8+ Heavies	0.5132	12.316	2.2476
Total Emissions	6.7050	160.919	29.3677
Total Hydrocarbon Emissions	6.7050	160.919	29.3677
Total VOC Emissions	5.5876	134.103	24.4738
Total HAP Emissions	4.4988	107.971	19.7047
Total BTEX Emissions	4.4453	106.688	19.4705

FLASH GAS EMISSIONS

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

FLASH TANK OFF GAS

Component	lbs/hr	lbs/day	tons/yr
Methane	15.3516	368.438	67.2399
Ethane	0.3213	7.712	1.4074
Propane	0.0702	1.685	0.3075
Isobutane	0.0199	0.477	0.0871
n-Butane	0.0265	0.636	0.1160
Isopentane	0.0181	0.434	0.0793
n-Pentane	0.0106	0.253	0.0463
n-Hexane	0.0091	0.218	0.0398
Cyclohexane	0.0054	0.130	0.0238
Other Hexanes	0.0135	0.324	0.0592
Heptanes	0.0112	0.269	0.0491
Methylcyclohexane	0.0071	0.169	0.0309
2,2,4-Trimethylpentane	0.0031	0.074	0.0135
Benzene	0.0191	0.458	0.0836
Toluene	0.0027	0.065	0.0119
Xylenes	0.0016	0.038	0.0069
C8+ Heavies	0.0045	0.109	0.0198
Total Emissions	15.8954	381.490	69.6219
Total Hydrocarbon Emissions	15.8954	381.490	69.6219
Total VOC Emissions	0.2225	5.340	0.9746
Total HAP Emissions	0.0355	0.853	0.1556
Total BTEX Emissions	0.0234	0.561	0.1023

EQUIPMENT REPORTS:

CONDENSER AND COMBUSTION DEVICE

Condenser Outlet Temperature:	120.00	deg. F
Condenser Pressure:	23.00	psia
Condenser Duty:	2.53e-002	MM BTU/hr
Hydrocarbon Recovery:	0.11	bbls/day
Produced Water:	4.29	bbls/day
Ambient Temperature:	60.00	deg. F
Excess Oxygen:	2.00	%
Combustion Efficiency:	98.00	%
Supplemental Fuel Requirement:	2.53e-002	MM BTU/hr

Component	Emitted	Destroyed
Methane	2.00%	98.00%
Ethane	2.00%	98.00%
Propane	1.99%	98.01%
Isobutane	1.99%	98.01%
n-Butane	1.99%	98.01%
Isopentane	1.97%	98.03%
n-Pentane	1.96%	98.04%
n-Hexane	1.91%	98.09%
Cyclohexane	1.87%	98.13%
Other Hexanes	1.93%	98.07%
Heptanes	1.78%	98.22%
Methylcyclohexane	1.76%	98.24%
2,2,4-Trimethylpentane	1.78%	98.22%
Benzene	1.82%	98.18%
Toluene	1.56%	98.44%
Xylenes	1.07%	98.93%
C8+ Heavies	0.05%	99.95%

ABSORBER

Specified Absorber Stages:	1.25	
Calculated Dry Gas Dew Point:	1.38	lbs. H2O/MMSCF
Temperature:	70.0	deg. F
Pressure:	500.0	psig
Dry Gas Flow Rate:	40.0000	MMSCF/day
Glycol Losses with Dry Gas:	0.0492	lb/hr
Wet Gas Water Content:	Saturated	
Calculated Wet Gas Water Content:	39.42	lbs. H2O/MMSCF
Calculated Lean Glycol Recirc. Ratio:	16.09	gal/lb H2O

Component	Remaining in Dry Gas	Absorbed in Glycol
Water	3.50%	96.50%
Carbon Dioxide	99.56%	0.44%
Nitrogen	99.97%	0.03%
Methane	99.98%	0.02%
Ethane	99.90%	0.10%
Propane	99.81%	0.19%
Isobutane	99.69%	0.31%
n-Butane	99.57%	0.43%
Isopentane	99.51%	0.49%
n-Pentane	99.34%	0.66%
n-Hexane	98.73%	1.27%
Cyclohexane	94.45%	5.55%
Other Hexanes	99.07%	0.93%
Heptanes	97.25%	2.75%
Methylcyclohexane	93.01%	6.99%
2,2,4-Trimethylpentane	98.84%	1.16%

Benzene	60.18%	39.82%
Toluene	45.32%	54.68%
Xylenes	23.48%	76.52%
C8+ Heavies	91.35%	8.65%

FLASH TANK

Flash Control: Recycle/recompression
Flash Temperature: 100.0 deg. F
Flash Pressure: 30.0 psig

Component	Left in Glycol	Removed in Flash Gas
Water	99.99%	0.01%
Carbon Dioxide	49.62%	50.38%
Nitrogen	6.15%	93.85%
Methane	6.29%	93.71%
Ethane	21.34%	78.66%
Propane	37.90%	62.10%
Isobutane	50.21%	49.79%
n-Butane	57.76%	42.24%
Isopentane	62.79%	37.21%
n-Pentane	68.51%	31.49%
n-Hexane	81.21%	18.79%
Cyclohexane	94.88%	5.12%
Other Hexanes	76.22%	23.78%
Heptanes	90.77%	9.23%
Methylcyclohexane	96.26%	3.74%
2,2,4-Trimethylpentane	82.70%	17.30%
Benzene	99.34%	0.66%
Toluene	99.62%	0.38%
Xylenes	99.87%	0.13%
C8+ Heavies	99.23%	0.77%

REGENERATOR

No Stripping Gas used in regenerator.

Component	Remaining in Glycol	Distilled Overhead
Water	69.35%	30.65%
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	0.80%	99.20%
n-Pentane	0.73%	99.27%
n-Hexane	0.62%	99.38%
Cyclohexane	3.37%	96.63%
Other Hexanes	1.31%	98.69%
Heptanes	0.55%	99.45%
Methylcyclohexane	4.16%	95.84%
2,2,4-Trimethylpentane	1.81%	98.19%

Benzene	5.03%	94.97%
Toluene	7.93%	92.07%
Xylenes	12.92%	87.08%
C8+ Heavies	12.12%	87.88%

STREAM REPORTS:

WET GAS STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.30e-002	6.58e+001
Carbon Dioxide	5.27e+000	1.02e+004
Nitrogen	1.62e-002	1.99e+001
Methane	9.43e+001	6.65e+004
Ethane	3.16e-001	4.18e+002
Propane	3.01e-002	5.83e+001
Isobutane	5.00e-003	1.28e+001
n-Butane	5.70e-003	1.46e+001
Isopentane	3.10e-003	9.83e+000
n-Pentane	1.60e-003	5.07e+000
n-Hexane	9.99e-004	3.79e+000
Cyclohexane	5.00e-004	1.85e+000
Other Hexanes	1.60e-003	6.06e+000
Heptanes	9.99e-004	4.40e+000
Methylcyclohexane	5.99e-004	2.59e+000
2,2,4-Trimethylpentane	3.00e-004	1.51e+000
Benzene	2.00e-003	6.87e+000
Toluene	3.00e-004	1.21e+000
Xylenes	3.00e-004	1.40e+000
C8+ Heavies	7.99e-004	5.99e+000
Total Components	100.00	7.73e+004

DRY GAS STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.67e+006 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	2.91e-003	2.30e+000
Carbon Dioxide	5.26e+000	1.02e+004
Nitrogen	1.62e-002	1.99e+001
Methane	9.44e+001	6.65e+004
Ethane	3.16e-001	4.18e+002
Propane	3.01e-002	5.82e+001
Isobutane	4.99e-003	1.27e+001
n-Butane	5.68e-003	1.45e+001
Isopentane	3.09e-003	9.78e+000
n-Pentane	1.59e-003	5.04e+000

n-Hexane	9.88e-004	3.74e+000
Cyclohexane	4.72e-004	1.75e+000
Other Hexanes	1.59e-003	6.00e+000
Heptanes	9.73e-004	4.28e+000
Methylcyclohexane	5.58e-004	2.41e+000
2,2,4-Trimethylpentane	2.97e-004	1.49e+000
Benzene	1.20e-003	4.13e+000
Toluene	1.36e-004	5.50e-001
Xylenes	7.05e-005	3.29e-001
C8+ Heavies	7.31e-004	5.47e+000
Total Components	100.00	7.72e+004

LEAN GLYCOL STREAM

Temperature: 70.00 deg. F
Flow Rate: 1.70e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.85e+001	9.43e+003
Water	1.50e+000	1.44e+002
Carbon Dioxide	4.66e-011	4.46e-009
Nitrogen	5.45e-015	5.21e-013
Methane	5.75e-018	5.50e-016
Ethane	2.01e-009	1.93e-007
Propane	4.81e-011	4.60e-009
Isobutane	1.25e-011	1.20e-009
n-Butane	1.62e-011	1.55e-009
Isopentane	2.54e-006	2.43e-004
n-Pentane	1.75e-006	1.68e-004
n-Hexane	2.53e-006	2.42e-004
Cyclohexane	3.54e-005	3.39e-003
Other Hexanes	5.94e-006	5.68e-004
Heptanes	6.35e-006	6.08e-004
Methylcyclohexane	7.88e-005	7.54e-003
2,2,4-Trimethylpentane	2.79e-006	2.67e-004
Benzene	1.50e-003	1.44e-001
Toluene	5.95e-004	5.70e-002
Xylenes	1.66e-003	1.59e-001
C8+ Heavies	7.39e-004	7.07e-002
Total Components	100.00	9.57e+003

RICH GLYCOL STREAM

Temperature: 70.00 deg. F
Pressure: 514.70 psia
Flow Rate: 1.73e+001 gpm
NOTE: Stream has more than one phase.

Component	Conc. (wt%)	Loading (lb/hr)
TEG	9.72e+001	9.43e+003
Water	2.13e+000	2.07e+002
Carbon Dioxide	4.60e-001	4.46e+001
Nitrogen	5.37e-005	5.21e-003
Methane	1.69e-001	1.64e+001

Ethane	4.21e-003	4.08e-001
Propane	1.17e-003	1.13e-001
Isobutane	4.12e-004	3.99e-002
n-Butane	6.46e-004	6.27e-002
Isopentane	5.01e-004	4.86e-002
n-Pentane	3.46e-004	3.35e-002
n-Hexane	4.99e-004	4.84e-002
Cyclohexane	1.09e-003	1.06e-001
Other Hexanes	5.86e-004	5.68e-002
Heptanes	1.25e-003	1.22e-001
Methylcyclohexane	1.94e-003	1.88e-001
2,2,4-Trimethylpentane	1.83e-004	1.78e-002
Benzene	2.97e-002	2.88e+000
Toluene	7.44e-003	7.21e-001
Xylenes	1.27e-002	1.23e+000
C8+ Heavies	6.07e-003	5.88e-001
Total Components	100.00	9.70e+003

FLASH TANK OFF GAS STREAM

Temperature: 100.00 deg. F
Pressure: 44.70 psia
Flow Rate: 5.63e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	1.02e-001	2.72e-002
Carbon Dioxide	3.44e+001	2.25e+001
Nitrogen	1.18e-002	4.89e-003
Methane	6.45e+001	1.54e+001
Ethane	7.20e-001	3.21e-001
Propane	1.07e-001	7.02e-002
Isobutane	2.31e-002	1.99e-002
n-Butane	3.07e-002	2.65e-002
Isopentane	1.69e-002	1.81e-002
n-Pentane	9.87e-003	1.06e-002
n-Hexane	7.11e-003	9.09e-003
Cyclohexane	4.35e-003	5.43e-003
Other Hexanes	1.06e-002	1.35e-002
Heptanes	7.55e-003	1.12e-002
Methylcyclohexane	4.84e-003	7.05e-003
2,2,4-Trimethylpentane	1.81e-003	3.07e-003
Benzene	1.65e-002	1.91e-002
Toluene	1.98e-003	2.71e-003
Xylenes	1.00e-003	1.58e-003
C8+ Heavies	1.79e-003	4.53e-003
Total Components	100.00	3.84e+001

FLASH TANK GLYCOL STREAM

Temperature: 100.00 deg. F
Flow Rate: 1.72e+001 gpm

Component	Conc. (wt%)	Loading (lb/hr)

TEG	9.76e+001	9.43e+003
Water	2.14e+000	2.07e+002
Carbon Dioxide	2.29e-001	2.21e+001
Nitrogen	3.31e-006	3.20e-004
Methane	1.07e-002	1.03e+000
Ethane	9.02e-004	8.72e-002
Propane	4.43e-004	4.28e-002
Isobutane	2.08e-004	2.01e-002
n-Butane	3.75e-004	3.62e-002
Isopentane	3.16e-004	3.05e-002
n-Pentane	2.38e-004	2.30e-002
n-Hexane	4.06e-004	3.93e-002
Cyclohexane	1.04e-003	1.01e-001
Other Hexanes	4.48e-004	4.33e-002
Heptanes	1.14e-003	1.10e-001
Methylcyclohexane	1.88e-003	1.81e-001
2,2,4-Trimethylpentane	1.52e-004	1.47e-002
Benzene	2.96e-002	2.86e+000
Toluene	7.44e-003	7.19e-001
Xylenes	1.27e-002	1.23e+000
C8+ Heavies	6.04e-003	5.84e-001
Total Components	100.00	9.66e+003

FLASH GAS EMISSIONS

Control Method: Recycle/recompression
Control Efficiency: 100.00

Note: Flash Gas Emissions are zero with the Recycle/recompression control option.

REGENERATOR OVERHEADS STREAM

Temperature: 212.00 deg. F
Pressure: 14.70 psia
Flow Rate: 1.58e+003 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	8.48e+001	6.34e+001
Carbon Dioxide	1.21e+001	2.21e+001
Nitrogen	2.75e-004	3.20e-004
Methane	1.55e+000	1.03e+000
Ethane	6.98e-002	8.72e-002
Propane	2.34e-002	4.28e-002
Isobutane	8.31e-003	2.01e-002
n-Butane	1.50e-002	3.62e-002
Isopentane	1.01e-002	3.03e-002
n-Pentane	7.61e-003	2.28e-002
n-Hexane	1.09e-002	3.90e-002
Cyclohexane	2.78e-002	9.72e-002
Other Hexanes	1.19e-002	4.27e-002
Heptanes	2.63e-002	1.10e-001
Methylcyclohexane	4.26e-002	1.74e-001
2,2,4-Trimethylpentane	3.04e-003	1.44e-002
Benzene	8.36e-001	2.71e+000
Toluene	1.73e-001	6.62e-001

Xylenes	2.42e-001	1.07e+000
C8+ Heavies	7.25e-002	5.13e-001
Total Components	100.00	9.23e+001

CONDENSER PRODUCED WATER STREAM

Temperature: 120.00 deg. F
Flow Rate: 1.25e-001 gpm

Component	Conc. (wt%)	Loading (lb/hr)	(ppm)
Water	9.98e+001	6.25e+001	998301.
Carbon Dioxide	1.02e-001	6.42e-002	1024.
Nitrogen	3.89e-008	2.44e-008	0.
Methane	2.41e-004	1.51e-004	2.
Ethane	2.32e-005	1.45e-005	0.
Propane	1.18e-005	7.40e-006	0.
Isobutane	3.01e-006	1.88e-006	0.
n-Butane	7.20e-006	4.51e-006	0.
Isopentane	4.20e-006	2.63e-006	0.
n-Pentane	3.39e-006	2.12e-006	0.
n-Hexane	4.68e-006	2.93e-006	0.
Cyclohexane	6.43e-005	4.03e-005	1.
Other Hexanes	4.18e-006	2.62e-006	0.
Heptanes	6.78e-006	4.25e-006	0.
Methylcyclohexane	5.16e-005	3.23e-005	1.
2,2,4-Trimethylpentane	5.95e-007	3.73e-007	0.
Benzene	4.90e-002	3.07e-002	490.
Toluene	8.45e-003	5.29e-003	84.
Xylenes	9.70e-003	6.08e-003	97.
C8+ Heavies	5.57e-007	3.49e-007	0.
Total Components	100.00	6.27e+001	1000000.

CONDENSER RECOVERED OIL STREAM

Temperature: 120.00 deg. F
Flow Rate: 3.28e-003 gpm

Component	Conc. (wt%)	Loading (lb/hr)
Water	4.53e-002	6.33e-004
Carbon Dioxide	3.95e-001	5.52e-003
Nitrogen	2.55e-006	3.56e-008
Methane	6.77e-003	9.45e-005
Ethane	2.95e-003	4.12e-005
Propane	7.46e-003	1.04e-004
Isobutane	6.83e-003	9.55e-005
n-Butane	1.67e-002	2.33e-004
Isopentane	3.25e-002	4.54e-004
n-Pentane	2.94e-002	4.11e-004
n-Hexane	1.24e-001	1.74e-003
Cyclohexane	4.35e-001	6.08e-003
Other Hexanes	1.02e-001	1.43e-003
Heptanes	8.76e-001	1.22e-002
Methylcyclohexane	1.49e+000	2.08e-002
2,2,4-Trimethylpentane	1.12e-001	1.56e-003

Benzene	1.53e+001	2.14e-001
Toluene	9.94e+000	1.39e-001
Xylenes	3.53e+001	4.93e-001
C8+ Heavies	3.58e+001	5.00e-001
Total Components	100.00	1.40e+000

CONDENSER VENT STREAM

Temperature: 120.00 deg. F
Pressure: 23.00 psia
Flow Rate: 2.53e+002 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Water	7.46e+000	8.98e-001
Carbon Dioxide	7.50e+001	2.21e+001
Nitrogen	1.71e-003	3.20e-004
Methane	9.61e+000	1.03e+000
Ethane	4.34e-001	8.71e-002
Propane	1.45e-001	4.27e-002
Isobutane	5.14e-002	2.00e-002
n-Butane	9.27e-002	3.60e-002
Isopentane	6.19e-002	2.98e-002
n-Pentane	4.65e-002	2.24e-002
n-Hexane	6.48e-002	3.73e-002
Cyclohexane	1.62e-001	9.11e-002
Other Hexanes	7.18e-002	4.13e-002
Heptanes	1.46e-001	9.75e-002
Methylcyclohexane	2.33e-001	1.53e-001
2,2,4-Trimethylpentane	1.69e-002	1.29e-002
Benzene	4.73e+000	2.47e+000
Toluene	8.41e-001	5.17e-001
Xylenes	8.05e-001	5.71e-001
C8+ Heavies	1.12e-002	1.27e-002
Total Components	100.00	2.82e+001

COMBUSTION DEVICE OFF GAS STREAM

Temperature: 1000.00 deg. F
Pressure: 14.70 psia
Flow Rate: 8.89e-001 scfh

Component	Conc. (vol%)	Loading (lb/hr)
Methane	5.48e+001	2.06e-002
Ethane	2.47e+000	1.74e-003
Propane	8.28e-001	8.55e-004
Isobutane	2.93e-001	3.99e-004
n-Butane	5.29e-001	7.19e-004
Isopentane	3.53e-001	5.97e-004
n-Pentane	2.65e-001	4.48e-004
n-Hexane	3.70e-001	7.46e-004
Cyclohexane	9.24e-001	1.82e-003
Other Hexanes	4.09e-001	8.26e-004
Heptanes	8.31e-001	1.95e-003
Methylcyclohexane	1.33e+000	3.06e-003
2,2,4-Trimethylpentane	9.62e-002	2.57e-004

Benzene	2.70e+001	4.94e-002
Toluene	4.80e+000	1.03e-002
Xylenes	4.59e+000	1.14e-002
C8+ Heavies	6.39e-002	2.55e-004
Total Components	100.00	1.05e-001

Gas Analysis

QUESTAR APPLIED TECHNOLOGY

1210 D. Street, Rock Springs, Wyoming 82901

(307) 352-7292

LIMS ID:	N/A		Description:	South Ignacio Suct Header
Analysis Date/Time:	5/6/2011	1:56 PM	Field:	La Plata
Analyst Initials:	AST		ML#:	Samson
Instrument ID:	Instrument 1		GC Method:	Quesbtex
Data File:	QPC66.D			
Date Sampled:	5/1/2011			

Component	Mol%	Wt%	LV%
Methane	94.3395	86.0641	94.1004
Ethane	0.3166	0.5413	0.4996
Propane	0.0301	0.0754	0.0488
Isobutane	0.0050	0.0167	0.0097
n-Butane	0.0057	0.0189	0.0106
Neopentane	0.0005	0.0019	0.0011
Isopentane	0.0026	0.0107	0.0056
n-Pentane	0.0016	0.0064	0.0033
2,2-Dimethylbutane	0.0000	0.0000	0.0000
2,3-Dimethylbutane	0.0003	0.0015	0.0007
2-Methylpentane	0.0007	0.0035	0.0017
3-Methylpentane	0.0006	0.0028	0.0014
n-Hexane	0.0010	0.0051	0.0025
Heptanes	0.0027	0.0146	0.0063
Octanes	0.0004	0.0027	0.0013
Nonanes	0.0004	0.0031	0.0013
Decanes plus	0.0003	0.0021	0.0009
Nitrogen	0.0162	0.0258	0.0104
Carbon Dioxide	5.2758	13.2034	5.2944
Oxygen	0.0000	0.0000	0.0000
Hydrogen Sulfide	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000

Global Properties		Units
Gross BTU/Real CF	964.4	BTU/SCF at 60°F and14.73 psia
Sat.Gross BTU/Real CF	948.8	BTU/SCF at 60°F and14.73 psia
Gas Compressibility (Z)	0.9979	
Specific Gravity	0.6086	air=1
Avg Molecular Weight	17.586	gm/mole
Propane GPM	0.008249	gal/MCF
Butane GPM	0.003424	gal/MCF
Gasoline GPM	0.003867	gal/MCF
26# Gasoline GPM	0.005715	gal/MCF
Total GPM	0.015596	gal/MCF
Base Mol%	99.482	%v/v

Sample Temperature:	48	°F
Sample Pressure:	46	psig
H2SLength of Stain Tube	N/A	ppm

Component	Mol%	Wt%	LV%
Benzene	0.0000	0.0000	0.0000
Toluene	0.0003	0.0017	0.0006
Ethylbenzene	0.0000	0.0000	0.0000
M&P Xylene	0.0003	0.0021	0.0008
O-Xylene	0.0000	0.0000	0.0000
2,2,4-Trimethylpentane	0.0003	0.0020	0.0009
Cyclopentane	0.0000	0.0000	0.0000
Cyclohexane	0.0005	0.0025	0.0010
Methylcyclohexane	0.0006	0.0035	0.0015
Description:	South Ignacio Suct Header		

GRI GlyCalc Information

Component	Mol%	Wt%	LV%
Carbon Dioxide	5.2758	13.2034	5.2944
Hydrogen Sulfide	0.0000	0.0000	0.0000
Nitrogen	0.0162	0.0258	0.0104
Methane	94.3395	86.0641	94.1004
Ethane	0.3166	0.5413	0.4996
Propane	0.0301	0.0754	0.0488
Isobutane	0.0050	0.0167	0.0097
n-Butane	0.0057	0.0189	0.0106
Isopentane	0.0031	0.0126	0.0067
n-Pentane	0.0016	0.0064	0.0033
Cyclopentane	0.0000	0.0000	0.0000
n-Hexane	0.0010	0.0051	0.0025
Cyclohexane	0.0005	0.0025	0.0010
Other Hexanes	0.0016	0.0078	0.0038
Heptanes	0.0010	0.0049	0.0023
Methylcyclohexane	0.0006	0.0035	0.0015
2,2,4 Trimethylpentane	0.0003	0.0020	0.0009
Benzene	0.0000	0.0000	0.0000
Toluene	0.0003	0.0017	0.0006
Ethylbenzene	0.0000	0.0000	0.0000
Xylenes	0.0003	0.0021	0.0008
C8+ Heavies	0.0008	0.0058	0.0027
Subtotal	100.0000	100.0000	100.0000
Oxygen	0.0000	0.0000	0.0000
Total	100.0000	100.0000	100.0000

EMISSION UNIT FUG
FUGITIVE EMISSIONS

Emission Estimates
Emission Unit FUG
South Ignacio Central Delivery Point

Service	Component	Count	Emission factor (lb/component/hr)	VOC	
				(lb/hr)	(tpy)
		VOC Wt. % = 0.163			
Gas	Valves	258	0.00992	0.00	0.02
	Connectors	86	0.00044	0.00	0.00
	Flanges	40	0.00086	0.00	0.00
	Other	116	0.01940	0.00	0.02
	Open End	0	0.00441	0.00	0.00
	Pump Seals	0	0.00529	0.00	0.00
		VOC Wt. % = 100.00			
Slop/Oil	Valves	76	0.00551	0.42	1.83
	Connectors	14	0.00046	0.01	0.03
	Flanges	2	0.00024	0.00	0.00
	Other	2	0.01653	0.03	0.14
	Open End	0	0.00309	0.00	0.00
	Pump Seals	0	0.02866	0.00	0.00
		VOC Wt. % = 100.00			
Glycol	Valves	32	0.00551	0.18	0.77
	Connectors	10	0.00046	0.00	0.02
	Flanges	0	0.00024	0.00	0.00
	Other	2	0.01653	0.00	0.00
	Open End	0	0.00309	0.00	0.00
	Pump Seals	2	0.02866	0.06	0.25
		VOC Wt. % = 50.00			
Water	Valves	65	0.000216	0.01	0.03
	Connectors	40	0.000243	0.00	0.02
	Flanges	2	0.000006	0.00	0.00
	Other	19	0.000053	0.00	0.00
	Open End	0	0.030865	0.00	0.00
	Pump Seals	1	0.000551	0.00	0.00
		767		**0.72**	**3.14**

GREENHOUSE GAS EMISSIONS

Total Greenhouse Gas PTE
Samson Resources Company
South Ignacio Central Delivery Point

Source ID	Description	Green House Gases Emissions		
		CO_2	Methane	N_2O
		tpy	tpy	tpy
E1	Waukesha L7044GSI	6700.59	57.93	0.01
E2	Waukesha L7042GL	4491.21	57.90	0.01
E3	Waukesha L7042GL	4491.21	57.90	0.01
E4	Waukesha L7042GL	4735.31	57.90	0.01
E5	Waukesha L5794LT	5137.33	57.91	0.01
E6	Waukesha L5794LT	5137.33	57.91	0.01
E7	Waukesha L5794LT	5137.33	57.91	0.01
E8	Waukesha L5794LT	5137.33	57.91	0.01
D1	1.25 MMBtu/hr Reboiler	638.63	0.01	0.00
	Glycol Process Vents	85.41	3.99	0.00
D2	0.75 MMBtu/hr Reboiler	383.18	0.01	0.00
	Glycol Process Vents	96.80	4.51	0.00
FUG	Fugitive Leaks	2.83	18.38	0.00
IEUs	Insignificant Units	306.54	0.01	0.00
Total		42481.04	490.17	0.08
CO_2e		42481.04	10293.49	24.67

Total GHG PTE **42,971 tpy**
Total CO_2e **52,799 tpy**

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E1	
	Waukesha L7044GSI Compressor Engine	
Combustion	4 Stroke Rich Burn	
Rating	1680	hp
Operating Hours	8760	hours/year
Fuel Consuption	7780	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions		Emissions		Emissions		Emissions			
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,528	6,692	1.45	6.34	246.77	2.47	3.32	0.09	6,700.59	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.026	0.114	9.41	41.21	1604.59	16.05	21.56	0.56	57.93	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.003	0.013	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E2, E3	
	Waukesha L7042GL Compressor Engines	
Combustion	4 Stroke Lean Burn	
Rating	1267	hp
Operating Hours	8760	hours/year
Fuel Consuption	6910	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,023	4,482	1.45	6.34	246.77	2.47	3.32	0.09	4,491.21	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.018	0.077	9.41	41.21	1604.59	16.05	21.56	0.56	57.90	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.008	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E4	
	Waukesha L7042GL Compressor Engine	
Combustion	4 Stroke Lean Burn	
Rating	1336	hp
Operating Hours	8760	hours/year
Fuel Consuption	6910	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents Emissions		Blowdowns Emissions		Starter Emissions		Totals	Emission Factor Source
	Emission Factor	Emissions									
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,079	4,726	1.45	6.34	246.77	2.47	3.32	0.09	4,735.31	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.018	0.081	9.41	41.21	1604.59	16.05	21.56	0.56	57.90	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.009	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Compressor Engine GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	E5, E6, E7, E8	
	Waukesha L5794LT Compressor Engines	
Combustion	4 Stroke Lean Burn	
Rating	1400	hp
Operating Hours	8760	hours/year
Fuel Consuption	7155	Btu/hp-hr
Fuel Heat Content	975	Btu/scf
Blowdown Volume	40927	scf
Blowdown Events	20	per year
Packing Vent Volume	60	scf/cylinder
Number of cylinders	4	cylinders/engine
Starter Gas Usage	1100	scfm
Start Time	0.5	min
Starting Events	52	per year

Emissions Estimate (per engine)

Pollutant	Exhaust			Rod Packing Vents		Blowdowns		Starter		Totals	Emission Factor Source
	Emission Factor	Emissions		Emissions		Emissions		Emissions			
	(lb/MMBtu)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/event)	(tpy)	(lb/event)	(tpy)	(tpy)	
CO_2	116.889	1,171	5,128	1.45	6.34	246.77	2.47	3.32	0.09	5,137.33	40 CFR Part 98, Subpart C, Table C-1
Methane	0.002	0.020	0.088	9.41	41.21	1604.59	16.05	21.56	0.56	57.91	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0002	0.002	0.010	0	0	0	0	0	0	0.01	40 CFR Part 98, Subpart C, Table C-2

Natural Gas Fired Burner GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	Dehydration Unit Reboilers
Hours of Operation	8760 hrs
D1 Rating	1.25 MMBtu/hr
D2 Rating	0.75 MMBtu/hr

D1 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D1 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	145.81	638.63	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.00	0.01	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

D2 Emissions

Pollutant	Emission Factor (kg/MMBtu)	D2 Emissions		Emission Factor Source
		(lb/hr)	(tpy)	
CO_2	53.0200	87.48	383.18	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	0.002	0.01	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	0.00	0.00	40 CFR Part 98, Subpart C, Table C-2

Glycol Dehydration Process Vents GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Unit	Dehydration Units D1 & D2	
D1 Annual Throughput	30	MMscfd
D2 Annual Throughput	40	MMscfd
Hours of Operation	8760	hrs

Emissions Based on GLYCalc 3.0 Model

D1 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	19.5	85.41	19.5	85.41
Methane	0.911	3.99	0.911	3.99
N_2O	0.0	0	0.0	0.0

D2 Emissions Estimate

Pollutant	Regenerator Overheads Vent		Total	
	lb/hr	tpy	lb/hr	tpy
CO_2	22.1	96.80	22.1	96.80
Methane	1.03	4.51	1.03	4.51
N_2O	0.0	0	0.0	0.0

Fugitive GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Basis

Units	Fugitive Emissions
CO_2	13.232 wt%
CH_4	86.038 wt%

Emissions Estimate

Component	Count	Emission Factor (kg/component-hr)	CO2		Methane	
			(lb/hr)	(tpy)	(lb/hr)	(tpy)
Flanges	40	3.90E-04	0.00	0.02	0.03	0.13
Valves	258	4.50E-03	0.34	1.48	2.20	9.64
Connectors	86	2.00E-04	0.01	0.02	0.03	0.14
Press Relief	0	2.00E-03	0.00	0.00	0.00	0.00
Pump Seals	0	2.40E-03	0.00	0.00	0.00	0.00
Other	116	8.80E-03	0.30	1.30	1.93	8.47
Total			**0.65**	**2.83**	**4.20**	**18.38**

Emission factors obtained from the 1995 Protocol for Equipment Leak Emission Estimates Document EPA-453/R-95-017 Table 2-4: Oil and Gas Production

IEU GHG Emission Estimate
Samson Resources Company
South Ignacio Central Delivery Point

Pollutant	Emission Factor (kg/MMBtu)	Emission Factor Source
CO_2	53.0200	40 CFR Part 98, Subpart C, Table C-1
Methane	0.0010	40 CFR Part 98, Subpart C, Table C-2
N_2O	0.0001	40 CFR Part 98, Subpart C, Table C-2

Heaters and Burners <100 MMBtu/hr

Unit ID	Description	Heater Size	CO_2		Methane		N_2O	
		(MMBtu/hr)	(lb/hr)	(tpy)	(lb/hr)	(tpy)	(lb/hr)	(tpy)
IEU7	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
	Tank Heater	0.12	14.00	61.31	0.00	0.00	0.000	0.00
Heater/Burner Total				**306.54**		**0.01**		**0.00**

From: Eric Wortman/R8/USEPA/US
To: srose@samson.com
Cc: Katie Romero/R8/USEPA/US@EPA, Kathleen Paser/R8/USEPA/US@EPA, bjarrell@southern-ute.nsn.us
Bcc: Claudia Smith/R8/USEPA/US@EPA

Date: Tuesday, September 13, 2011 08:27AM
Subject: S. Ignacio CDP Syn. Minor Limit Request

Scott,

EPA received your application requesting synthetic minor limits under 40 CFR part 49 for the S. Ignacio CDP facility on September 1, 2011. I have reviewed the application and determined that it is administratively incomplete. Your application for synthetic minor limits under the Federal Minor NSR rule should include all the documentation necessary to process the permit action. Since this is a new permit action, an entirely new application must be submitted. References to other applications or permits does not provide a complete application or docket for issuing the permit. As we do with our part 71 program, the application must be a wholly, self contained, independent package. EPA has developed application checklist and instructions for submitting information to our office, which can be found at http://epa.gov/region8/air/permitting/tmnsr.html. Please note that although the use of these checklist is not mandatory, providing all of the information identified on the checklist is recommended for a complete application and will help expedite the permitting process.

Specifically, Samson Resources only provided the information suggested on the Form "SYNMIN" in the September 1st submittal. All of the items listed on Form "NEW" are also necessary to process the request. Additionally, it appeared that some other information may have been omitted from your request. For example, the engines at the facility currently have part 71 emission limits for CO (engine E1 also has a limit for NOx) and your request did not include establishing synthetic minor limits for these pollutants, although I suspect you still require these enforceable emission limits.

Please resubmit your request to establish synthetic minor limits under the Federal Minor NSR rule at this facility with the omitted information necessary to process the application. I can be reached at the contact information below if you have any questions.

I have not reviewed the Jaques submittal, but the same information will be required to process that application. Katie Romero is the permit engineer assigned to that action.

Thank you,

-Eric

Eric Wortman
Environmental Scientist
Air Permitting, Monitoring and Modeling Unit
Office of Partnerships & Regulatory Assistance
EPA Region 8
1595 Wynkoop Street (8P-AR)
Denver, CO 80202-1129

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103-3103
USA
918/591-1791
Fax 918/591-1796

August 29, 2011

Ms. Kathleen Paser
Air and Radiation Program, 8P-AR
U.S. Environmental Protection Agency
Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Like-Kind Engine Replacement
South Ignacio Central Delivery Point (V-SU-0031-08.00)
Samson Resources Company

Dear Ms. Paser:

The Samson Resources Company is herein submitting notification of a like-kind engine replacement for Unit E6 at the South Ignacio Central Delivery Point. The facility is located in the SE/4 of Section 32, Township 33 North, Range 7 West, in La Plata County, Colorado.

Unit E6, a 1400 hp Waukesha 5794LT lean burn reciprocating engine equipped with an oxidation catalyst with Serial Number C-16160/1 was taken out of service on August 17, 2011. The replacement engine is labeled with Serial Number C-15964/1 was originally manufactured in March 2006. The replacement engine was installed and put into service on August 18, 2011.

The facility is not a major source of HAP and will therefore be subject to the area source rules under 40 CFR part 63 subpart ZZZZ (RICE MACT). The engine is not subject to 40 CFR Part 60 subpart JJJJ because the engine was manufactured prior to July 1, 2007.

If you have any questions regarding this replacement please feel free to contact me at (918) 591-1370 or via email at srose@samson.com.

Sincerely,
SAMSON RESOURCES COMPANY

Scott Rose
Environmental Specialist

Cc: South Ignacio File

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103-3103
USA
918/591-1791
Fax 918/591-1796

October 14, 2011

Ms. Kathleen Paser
Air and Radiation Program, 8P-AR
U.S. Environmental Protection Agency
Mail Code 8P-AR
1595 Wynkoop Street
Denver, CO 80202-1129

Re: Like-Kind Engine Replacement
South Ignacio Central Delivery Point (V-SU-0031-08.00)
Samson Resources Company

Dear Ms. Paser:

The Samson Resources Company is herein submitting notification of a like-kind engine replacement for Unit E4 at the South Ignacio Central Delivery Point. The facility is located in the SE/4 of Section 32, Township 33 North, Range 7 West, in La Plata County, Colorado.

Unit E4, a 1267 hp Waukesha 7042 GL lean burn reciprocating engine (serial number C-109901/1) equipped with an oxidation catalyst was taken out of service on September 27, 2011. The engine was replaced with a like-kind replacement, another 1267 hp Waukesha 7042 GL lean burn reciprocating engine (serial number C-12554/4) equipped with an oxidation catalyst on September 30, 2011. The replacement engine was originally manufactured on February 1998. The replacement engine will be tested for an initial performance test in the fourth quarter of 2011 as part of the regularly scheduled testing at this facility.

If you have any questions regarding this change please contact me at 918-591-1370 or at srose@samson.com.

Sincerely,
SAMSON RESOURCES COMPANY

Scott Rose
Air Quality Specialist

Cc: South Ignacio Facility File

Syn. Minor NSR Permit # SM NSR-SU-000031-2011.00

Samson

Samson Plaza
Two West Second Street
Tulsa, Oklahoma 74103-3103
USA
918/591-1791
Fax 918/591-1796

August 29, 2011

Ms. Kathleen Paser
Federal Minor NSR Permit Coordinator
1595 Wynkoop Street (8P-AR)
Denver, CO 80202-1129

Re: Synthetic Minor Limit Request
South Ignacio Central Delivery Point
Samson Resources

Dear Ms. Paser:

Samson Resources Company (Samson) is herein submitting a synthetic minor limit request for its South Ignacio Central Delivery Point facility. This facility is currently permitted under permit V-SU-0031-08.00 under Title V Part 71. This permit has several emissions limitations that Samson would like to operate under and will therefore need to establish under the Minor NSR program.

Enclosed you will find the attachments documenting the limits requested as well as the methods for demonstrating compliance with those limits. Since Samson currently operates with these limits there will be no pre and post emission changes and Samson has enclosed a copy of the 2010 Emission Inventory for the facility. This facility is an existing facility operated by Samson since January 2005.

Please feel free to contact me at (918) 591-1370 or srose@samson.com if you have any questions regarding this application.

Sincerely,
SAMSON RESOURCES COMPANY

Scott Rose
Air Quality Specialist

Cc: File
Brenda Jarrell
Kyle Hunderman

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
Region 8 Air Program
FEDERAL MINOR NEW SOURCE REVIEW PROGRAM IN INDIAN COUNTRY

Checklist - Synthetic Minor Limit Request

(Form SYNMIN)

Use of this information request form is voluntary and not yet approved by the Office of Management and Budget. The following is a check list of the type of information that Region 8 will use to process information on your proposed project. While submittal of this form is not required, it does offer details on the information we will use to complete your requested approval and providing the information requested may help expedite the process. Use of application forms for this program is currently under Office of Management and Budget review and these information request forms will be replaced/updated after that review is completed.

Please submit information to following two entities:

Federal Minor NSR Permit Coordinator
U.S. EPA, Region 8
1595 Wynkoop Avenue, 8P-AR
Denver, CO 80202-1129

The Tribal Environmental Contact for the specific reservation:

If you need assistance in identifying the appropriate Tribal Environmental Contact and address, please contact the EPA Region 8 Tribal Air Coordinator:

Alexis North, EPA Region 8 Tribal Air Coordinator
303-312-7005
north.alexis@epa.gov

A. GENERAL INFORMATION

Company Name Samson Resources	**Facility Name** South Ignacio Central Delivery Point
Company Contact or Owner Name Scott Rose	Title Air Quality Specialist
Mailing Address 2 W. Second Street, Tulsa, OK 74103-3103	
Email Address srose@samson.com	
Telephone Number 918-591-1370	Facsimile Number 918 591-7370

B. ATTACHMENTS

For each criteria air pollutant, hazardous air pollutant and for all emission units and air pollutant-generating activities to be covered by a limitation, include the following:

Item 1 - The proposed limitation and a description of its effect on current actual, allowable and the potential to emit.

Item 2 - The proposed testing, monitoring, recordkeeping, and reporting requirements to be used to demonstrate and assure compliance with the proposed limitation.

Item 3 - The type and quantity of fuels and/or raw materials used.

Item 4 - A description of estimated efficiency of air pollution control equipment under present or anticipated operating conditions, including documentation of the manufacturer specifications and guarantees.

Item 5 - Estimates of the Current Actual Emissions, Current Allowable Emissions including all calculations for the estimates, where applicable.

Item 6 - Estimates of the Post-Change Allowable Emissions that would result from compliance with the proposed limitation, including all calculations for the estimates.

Item 7 – Estimates of the potential emissions of Greenhouse Gas (GHG) pollutants:

Attachments to the Synthetic Minor Limit Request for Indian Country

Item 1: This site has three proposed emissions limitations that Samson proposes to carry over from its Title V Part 71 Program Operating Permit V-SU-0031-08.00. Those limitations are:

1. II.D.2 a Facility-wide formaldehyde (CH2O) emissions shall not exceed 9.5 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12 month basis.
2. III.A.1 Benzene emissions from each of the glycol dehydration units, D1 and D2 shall be limited to 0.9 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12 month basis.
3. III.A.2 Facility-wide HAP emissions shall not exceed 23 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12 month basis.

Limitations 1 and 3 would allow the facility to be considered an area source of HAP emissions and be subject to the area source MACT standards of NESHAP ZZZZ.

Limitation 2 would minimize emissions from the dehydration units and the units would be exempt from NESHAP HH. This limitation is requested due to the varying levels of benzene seen in the inlet gas stream at the facility.

Item 2: Compliance with the limitations will be demonstrated by the following testing methods as outlined in the current Title V permit.

- Limitation 1:
    - Reference method performance tests will be conducted for all replacement engines to measure CH2O emissions from the replacement engines to demonstrate compliance with the facility-wide CH2O emission limit. The performance tests will be conducted within 90 calendar days of the startup of the replacement engine.
    - Upon change out of the catalyst for any engine, a performance test will be conducted for measuring CH2O emissions to demonstrate continued compliance with the emissions limits. The performance test will be conducted within 90 calendar days of the catalyst change out.
    - The performance test for measuring CH2O shall be conducted in accordance with EPA Reference Method 320 or 323 of 40 CFR part 63, Appendix A or Method CARB 430.
    - The performance test will meet the following requirements:
        - All tests shall be performed at a maximum operating rate (90% to 110% of engine design capacity).

        - Each source test shall consist of at least three 1-hour or longer valid test runs. Emission results will be reported as the arithmetic average of all valid test runs and shall be in terms of the emissions limits (lbs/hr and g/bhp-hr)
        - During each test run data shall be collected on all parameters necessary to document how CH2O emissions were measured or calculated.
    - The performance tests on the engines shall be conducted semi-annually to demonstrate compliance with the emission limit. For each engine if the monitoring results for the semi-annual test is less than a 60% emission reduction the testing frequency will revert to quarterly. If after two consecutive quarterly tests show that the 60% CH2O reduction is being achieved the testing rate may return to semi-annually.
    - Facility-wide emissions of CH2O will be calculated at the end of each calendar month from the results of the most recent performance test. The emissions will include CH2O emissions from all other units including insignificant emissions units listed in the Title V permit for the facility.
    - The facility emissions for the month as described above will be added to the preceding 11 months to record a new 12 month total.
    - The facility-wide emissions will be calculated by
        - Taking the emission factor in lbs/hr for each engine and multiplying by the number of operating hours for that month. If no hours are recorded the unit will be calculated as if it ran continuously during that month.
        - Emissions from insignificant emissions units will be recorded as one-twelfth of the annual emission amount listed for IEU's on the most recent Form PTE submitted to either EPA or Tribal Agency delegated authority over air quality.
    - Records of all testing will be kept for a period of 5 years.
- Limitations 2 and 3:
    - Monthly gas analysis testing will be conducted. This testing shall show the temperature and pressure of the inlet gas.
    - Monthly determination of benzene and HAP emissions from the dehydrator will be calculated by using GRI GlyCalc using the following inputs:
        - The current months wet gas analysis
        - The temperature and pressure of the gas.
        - The enclosed flare destruction efficiency
        - Maximum gas throughput and glycol pump recirculation rate for each dehydrator as follows:
            - D1 30 MMSCFD 15 gallons per minute
            - D2 40 MMSCFD 17 gallons per minute
    - Benzene emissions will be determined from each dehydrator each month. The benzene emissions for that month will be added to the preceding 11 months to record a new 12 month total.
    - HAP emissions will be determined from each dehydrator each month. The HAP emissions will be added to those from the engines and insignificant emissions units

listed in the air permit to determine the monthly total. This monthly total will be added to the preceding 11 months to record a new 12 month total.

- Records will be kept of the following:
  - Gas analysis testing.
  - GRI Glycalc modeling.
  - Rolling 12 month emissions totals for Benzene and HAPs.
  - Documentation of the conducted maintenance.

Item 3: All emission units at this facility will be fired only with natural gas. The natural gas will be pipeline quality in all respects except that CO2 concentrations in the gas may not be within pipeline-quality specifications.

Item 4: All lean burn engines at the facility will use and air fuel ratio controller and oxidation catalyst to reduce CO and formaldehyde emissions below the proposed plant wide limit of 9.5 tons per year. The efficiency of each catalyst will vary dependent on site specific conditions such as age of the catalyst and run time of the engine. The effectiveness of the controls and documentation of compliance will be demonstrated by the conditions listed in Item 2 above.

The destruction efficiency of the PESCO flare stack controlling the dehydrators is 98%. This will be maintained by following the manufacturer's recommended preventative maintenance schedules.

Item 5: Current actual emissions are estimated to be at similar levels to the calendar year 2010 emission inventory which is attached.

Current Allowable Emissions – Facility Emissions limits are listed in the current EPA permit V-SU-0031-08.00 in section II.D. The permit is attached.

Item 6: Samson is currently meeting the requested emissions limits under the existing permit therefore there would be no significant emissions changes.

Item 7: This is an existing facility that is not making any physical changes to the manner in which it operates according to its existing permit. There are no emissions increases associated with this application.

pesco
process equipment & service company inc

OPERATIONAL GUARANTEE - PESCO FLARE STACK
U.S. PATENT 6485292 (Other Patents Pending)

The PESCO Flare Stack (enclosed flare) is guaranteed to achieve total destruction of 98% or greater of all hydrocarbons present in the overhead stream from the still column of a glycol dehydrator. This assumes that the operating parameters do not exceed those to which the flare stack was initially designed. The PESCO Flare Stack is also guaranteed to meet the environmental requirements as set forth in 40 CFR 60.18.

James Rhodes
Engineering Manager
Process Equipment & Service Co., Inc.

5680 U.S. HIGHWAY 64 • 87401 / P.O. BOX 828 • 87499 • FARMINGTON, NEW MEXICO • PHONE: (505) 327-2222 • FAX: (505) 327-7550

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 04/30/2012

Federal Operating Permit Program (40 CFR Part 71)

FEE FILING FORM (FF)

Complete this form each time you prepare form FEE and send this form to the appropriate lockbox bank address, along with full payment. This form required at time of initial fee payment, and thereafter, when paying annual fees.

Source or Facility Name **South Ignacio Central Delivery Point**

Mailing Address:

Street/P.O. Box **Two West Second Street** City **Tulsa**

State **OK** ZIP **74103 - 3103**

Contact Person: **Scott Rose** Title **Environmental Specialist**

Telephone (**918**) **591** - **1370** Ext. _____

Total Fee Payment Remitted: $ **11,684.00**

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 04/30/2012

Federal Operating Permit Program (40 CFR Part 71)

CERTIFICATION OF TRUTH, ACCURACY, AND COMPLETENESS (CTAC)

This form must be completed, signed by the "Responsible Official" designated for the facility or emission unit, and sent with each submission of documents (i.e., application forms, updates to applications, reports, or any information required by a part 71 permit).

A. Responsible Official

Name: (Last) **Dalton** (First) **Mark** (MI) ____

Title **Attorney-in-Fact**

Street or P.O. Box **Two West Second Street**

City **Tulsa** State **OK** ZIP **74103 - 3103**

Telephone **(918) 591 – 1369** Ext. _____ Facsimile **(918) 591 - 7369**

B. Certification of Truth, Accuracy and Completeness (to be signed by the responsible official)

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in these documents are true, accurate and complete.

Name (signed) Mark S. Dalton

Name (typed) **Mark Dalton** Date: 3 / 21 / 11

EPA United States Environmental Protection Agency

OMB No. 2060-0336, Approval Expires 04/30/2012

Federal Operating Permit Program (40 CFR Part 71)

FEE CALCULATION WORKSHEET (FEE)

Use this form initially, or thereafter on an annual basis, to calculate part 71 fees.

A. General Information

Type of fee (Check one): ___Initial __X__Annual

Deadline for submitting fee calculation worksheet **04 / 01 / 2011**

For initial fees, emissions are based on (Check one):

___ Actual emissions for the preceding calendar year. (Required in most circumstances.)

___ Estimates of actual emissions for the current calendar year. (Required when operations commenced during the preceding calendar year.)

Date commenced operations ____/____/_____

___ Estimates of actual emissions for the preceding calendar year. (Optional after a part 71 permit was issued to replace a part 70 permit, but only if initial fee payment is due between January 1 and March 31; otherwise use actual emissions for the preceding calendar year.)

For annual fee payment, you are required to use actual emissions for the preceding calendar year.

B. Source Information: Complete this section only if you are paying fees but not applying for a permit.

Source or facility name **South Ignacio Central Delivery Point**

Mailing address: Street or P.O. Box **Two West Second Street**

City **Tulsa** State **OK** ZIP **74103 - 3103**

Contact person **Scott Rose** Title **Environmental Specialist**

Telephone (**918**) **591** - **1370** Ext_____ Part 71 permit no. **V-SU-0031-08.00**

C. Certification of Truth, Accuracy and Completeness: Only needed if not submitting a separate form CTAC.

I certify under penalty of law, based on information and belief formed after reasonable inquiry, the statements and information contained in this submittal (form and attachments) are true, accurate and complete.

Name (signed) _____

Name (typed) _____ Date:____/____/_____

D. Annual Emissions Report for Fee Calculation Purposes -- Non-HAP

You may use this to report actual emissions (tons per year) of regulated pollutants (for fee calculation) on a calendar-year basis for both initial and annual fee calculation purposes. Section E is designed to report HAP emissions. Quantify all actual emissions, including fugitives, but do not include insignificant emissions and certain regulated air pollutants that are not counted for fee purposes, such as CO (see instructions). You may round to the nearest tenth of a ton on this form. Sum the emissions in each column and enter a subtotal at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000 for that column.

This data is for **2010** (year)

Emission Unit ID	NOx	VOC	SO2	PM10	Lead	Other
E1	**21.9**	**7.8**				
E2	**18.1**	**6.0**				
E3	**11.1**	**0.2**				
E4	**19.1**	**6.4**				
E5	**33.1**	**6.6**				
E6	**33.5**	**6.7**				
E7	**33.2**	**6.6**				
E8	**33.6**	**6.7**				
D1	**0.5**	**0.1**				
D2	**0.3**	**0.1**				
SUBTOTALS	**204.4**	**47.2**				

E. Annual Emissions Report for Fee Calculation Purposes -- HAP

HAP Identification. Identify individual HAP emitted at the facility, identify the CAS number, and assign a unique identifier for use in the second table in this section. Whenever assigning identifier codes, use "HAP1" for the first, "HAP2" for the second, and so on.

Name of HAP	CAS No	Identifier
Formaldehyde	**50-00-0**	**HAP 1**

HAP Emissions. Report the actual emissions of individual HAP identified above. Use the identifiers assigned in the table above. Include all emissions, including fugitives, and do not include insignificant emissions. You may round to the nearest tenth of a ton. Sum the emissions in each column and enter a subtotal at the bottom of the page. If any subtotal exceeds 4,000 tons, enter 4,000.

This data is for **2010** (year)

Emissions Unit ID	Actual Emissions (Tons/Year)							
	HAP 1	HAP___	HAP___	HAP___	HAP___	HAP___	HAP___	HAP___
E1	**0.4**							
E2	**0.4**							
E3	**0.3**							
E4	**0.3**							
E5	**0.3**							
E6	**0.4**							
E7	**0.3**							
E8	**0.3**							
D1	**0.0**							
D2	**0.0**							
SUBTOTALS	**2.8**							

F. Fee Calculation Worksheet

This section is used to calculate the total fee owed for both initial and annual fee payment purposes. Reconciliation is only for cases where you are paying the annual fee and you used any type of estimate of actual emissions when you calculated the initial fee. If you do not need to reconcile fees, only complete line 1-5 and then skip down to lines 21 – 26. See instructions for more detailed explanation.

1. Sum the emissions from section D of this form (non-HAP) and enter the total (tons).	**251.6**
2. Sum the emissions from section E of this form (HAP) and enter the total (tons).	**2.8**
3. Sum lines 1 and 2.	**254.4**
4. Enter the emissions that were counted twice. If none, enter "0."	**0**
5. Subtract line 4 from line 3, round to the nearest ton, and enter the result here.	**254**

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "CURRENT" CALENDAR YEAR)

Only complete lines 6-10 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year in which you paid initial fees; otherwise skip to line 11 or to line 21.

6. Enter the total estimated actual emissions for the year the initial fee was paid (previously reported on line 5 of the initial fee form).	
7. If line 5 is greater than line 6, subtract line 6 from line 5, and enter the result. Otherwise enter "0."	
8. If line 6 is greater than line 5, subtract line 5 from line 6, and enter the result. Otherwise enter "0."	
9. If line 7 is greater than 0, multiply line 7 by last year's fee rate ($/ton) and enter the result here. This is the underpayment. Go to line 21.	
10. If line 8 is greater than 0, multiply line 8 by last year's fee rate ($/ton) and enter the result here. This is the overpayment. Go to line 21.	

RECONCILIATION
(WHEN INITIAL FEES WERE BASED ON ESTIMATES FOR THE "PRECEDING" CALENDAR YEAR)

Only complete lines 11-20 if you are paying the first annual fee and initial fees were based on estimated actual emissions for the calendar year preceding initial fee payment; otherwise skip to line 21. If completing this section, you will also need to complete sections D and E to report actual emissions for the calendar year preceding initial fee payment.

11. Sum the actual emissions from section D (non-HAP) for the calendar year preceding initial fee payment and enter the result here.	
12. Sum the actual emissions from section E (HAP) for the calendar year preceding initial fee payment and enter the result here.	
13. Add lines 11 and 12 and enter the total here. These are total actual emissions for the calendar year preceding initial fee payment.	
14. Enter double counted emission from line 13 here. If none, enter "0."	
15. Subtract line 14 from line 13, round to the nearest ton, and enter the result here.	

16. Enter the total estimated actual emissions previously reported on line 5 of the initial fee form. These are estimated actual emissions for the calendar year preceding initial fee payment.	
17. If line 15 is greater than line 16, subtract line 16 from line 15, and enter the result here. Otherwise enter "0."	
18. If line 16 is greater than line 15, subtract line 15 from line 16, and enter the result here. Otherwise enter "0."	
19. If line 17 is greater than 0, multiply line 17 by last year's fee rate ($/ton) and enter the result here. This is the underpayment.	
20. If line 18 is greater than 0, multiply line 18 by last year's fee rate ($/ton) and enter the result on this line. This is the overpayment.	
FEE CALCULATION	
21. Multiply line 5 (tons) by the current fee rate ($46/ton) and enter the result here.	**$11,684.00**
22. Enter any underpayment from line 9 or 19 here. Otherwise enter "0."	**0**
23. Enter any overpayment from line 10 or 20 here. Otherwise enter "0."	**0**
24. If line 22 is greater than "0," add it to line 21 and enter the result here. If line 23 is greater than "0," subtract this from line 21 and enter the result here. Otherwise enter the amount on line 21 here. This is the fee adjusted for reconciliation.	**$11,684.00**
25. If your account was credited for fee assessment error since the last time you paid fees, enter the amount of the credit here. Otherwise enter "0."	**0**
26. Subtract line 25 from line 24 and enter the result here. Stop here. This is the total fee amount that you must remit to EPA.	**$11,684.00**

Samson

South Ignacio Central Delivery Point
V-SU-0031-08.00
2010 Engine Emissions

Using Manufacturer's Emission Factors

Unit	Make	Model	hp	2010 Operating Hours	NOx			VOC		
					g/hphr	lb/hr	tpy	g/hphr	lb/hr	tpy
E1	Waukesha	L7044GSI	1680	8457	used test results below		21.9	0.5	1.9	7.8
E2	Waukesha	L7042GL	1267	8637	1.5	4.2	18.1	0.5	1.4	6.0
E3	Waukesha	L7042GL	1267	8358	used test results below		11.1	used test results below		0.2
E4	Waukesha	L7042GL	1336	8634	1.5	4.4	19.1	0.5	1.5	6.4
E5	Waukesha	L5794LT	1400	8595	2.5	7.7	33.1	0.5	1.5	6.6
E6	Waukesha	L5794LT	1400	8696	2.5	7.7	33.5	0.5	1.5	6.7
E7	Waukesha	L5794LT	1400	8615	2.5	7.7	33.2	0.5	1.5	6.6
E8	Waukesha	L5794LT	1400	8711	2.5	7.7	33.6	0.5	1.5	6.7
Total							203.6			47.0

Using Test Results

Month	EF (lb/hr)	E1 NO_x Operating Hours	Emissions (lb/month)
January	3.99	700	2793.0
February	3.99	672	2681.3
March	3.99	639	2549.6
April	6.94	703	4878.8
May	6.94	736	5107.8
June	6.94	720	4996.8
July	6.94	664	4608.2
August	6.94	705	4892.7
September	3.87	716	2770.9
October	3.87	744	2879.3
November	3.87	714	2763.2
December	3.87	744	2879.3
Total lb/yr			43800.9
Total tpy			21.9

EF (lb/hr)	E3 NO_x Operating Hours	Emissions (lb/month)	EF (lb/hr)	E3 VOC Operating Hours	Emissions (lb/month)
2.97	605	1796.9	0.03	605	18.2
2.97	672	1995.8	0.03	672	20.2
2.97	655	1945.4	0.03	655	19.7
2.97	714	2120.6	0.03	714	21.4
2.97	672	1995.8	0.03	672	20.2
2.97	639	1897.8	0.03	639	19.2
2.97	740	2197.8	0.03	740	22.2
2.97	740	2197.8	0.03	740	22.2
2.1	720	1512.0	0.05	720	36.0
2.1	740	1554.0	0.05	740	37.0
2.1	717	1505.7	0.05	717	35.9
2.1	744	1562.4	0.05	744	37.2
		22282.0			309.4
		11.1			0.2

Samson

South Ignacio Central Delivery Point
V-SU-0031-08.00
2010 Facility Formaldehyde Emissions

Unit	January-10			February-10			March-10			April-10			May-10			June-10		
	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)
E1	0.002	700	1.4	0.002	672	1.3	0.002	639	1.3	0.096	703	67.5	0.096	736	70.7	0.064	720	46.1
E2	0.116	744	86.3	0.116	672	78.0	0.116	667	77.4	0.064	714	45.7	0.064	744	47.6	0.073	693	50.6
E3	0.096	605	58.1	0.096	672	64.5	0.096	655	62.9	0.068	714	48.6	0.068	672	45.7	0.030	639	19.2
E4	0.073	744	54.3	0.073	670	48.9	0.073	672	49.1	0.073	714	52.1	0.073	741	54.1	0.053	716	37.9
E5	0.105	744	78.1	0.105	669	70.2	0.105	649	68.1	0.126	712	89.7	0.126	741	93.4	0.046	694	31.9
E6	0.071	744	52.8	0.071	670	47.6	0.071	744	52.8	0.087	678	59.0	0.087	742	64.6	0.073	720	52.6
E7	0.071	729	51.8	0.071	672	47.7	0.071	672	47.7	0.066	706	46.6	0.066	744	49.1	0.053	696	36.9
E8	0.062	744	46.1	0.062	671	41.6	0.062	720	44.6	0.057	714	40.7	0.057	744	42.4	0.082	712	58.4
Total			428.9			399.8			403.9			449.9			467.6			333.6

Unit	July-10			August-10			September-10			October-10			November-10			December-10		
	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)	EF (lb/hr)	Operating Hours	Emissions (lb/month)
E1	0.064	664	42.5	0.064	705	45.1	0.171	716	122.4	0.171	744	127.2	0.187	714	133.5	0.187	744	139.1
E2	0.073	744	54.3	0.073	739	53.9	0.084	718	60.3	0.084	740	62.2	0.116	718	83.3	0.116	744	86.3
E3	0.030	740	22.2	0.030	740	22.2	0.053	720	38.2	0.053	740	39.2	0.068	717	48.8	0.068	744	50.6
E4	0.053	740	39.2	0.053	736	39.0	0.062	720	44.6	0.062	742	46.0	0.075	718	53.9	0.075	721	54.1
E5	0.046	742	34.1	0.046	742	34.1	0.089	711	63.3	0.089	744	66.2	0.082	713	58.5	0.082	734	60.2
E6	0.073	742	54.2	0.073	741	54.1	0.094	720	67.7	0.094	739	69.5	0.096	718	68.9	0.096	738	70.8
E7	0.053	741	39.3	0.053	744	39.4	0.050	717	35.9	0.050	740	37.0	0.053	718	38.1	0.053	736	39.0
E8	0.082	744	61.0	0.082	744	61.0	0.043	717	30.8	0.043	744	32.0	0.043	715	30.7	0.043	742	31.9
Total			346.8			348.8			463.2			479.3			515.7			532.0

Unit	Hours	CH2O Emissions	
		lb/yr	tpy
E1	8457	798.1	0.4
E2	8637	785.9	0.4
E3	8358	520.2	0.3
E4	8634	573.2	0.3
E5	8595	747.8	0.4
E6	8696	714.6	0.4
E7	8615	508.5	0.3
E8	8711	521.2	0.3
Total		5169.5	2.8

Emission Estimates
Emission Unit E1
Waukesha 7044GSI
South Ignacio Central Delivery Point

Manufacturer Emission Factors

VOC 0.5 g/hp-hr

Site-Rated Horsepower: 1,680 hp

2010 Actual Emissions

$$\text{VOC} = \frac{(0.5\ \text{g/hp-hr})(1{,}680\ \text{hp})(8457\ \text{hr/yr})}{(454\ \text{g/lb})(2{,}000\ \text{lb/ton})} = 7.8\ \text{tpy}$$

NO_X emissions are calculated using the most recent test results and the engine operating hours for the month. Annual NO_X emissions are calculated by summing the monthly emissions. The attached 2010 Engine Emissions spreadsheet gives the monthly and annual NO_X emissions of the unit.

$$\text{Monthly } NO_X = \textit{Tested EF}\ \frac{lb}{hr} \cdot \frac{\textit{Operational Hours}}{month} = \frac{lb\ NO_X}{month}$$

$$\text{Annual } NO_X = \sum_{January}^{December} \textit{Monthly } NO_X$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = \textit{Tested EF}\ \frac{lb}{hr} \cdot \frac{\textit{Operational Hours}}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} \textit{Monthly } CH_2O$$

Emission Estimates
Emission Unit E2
Waukesha 7042GL
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	1.5	g/hp-hr
VOC	0.5	g/hp-hr

Site-Rated Horsepower: 1,267 hp

2010 Actual Emissions

$$NO_X = \frac{(1.5\ g/hp\text{-}hr)(1{,}267\ hp)(8637\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 18.1\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}267\ hp)(8637\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.0\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Emission Estimates
Emission Unit E3
Waukesha 7042GL
South Ignacio Central Delivery Point

NO_X emissions are calculated using the most recent test results and the engine operating hours for the month. Annual NO_X emissions are calculated by summing the monthly emissions. The attached 2010 Engine Emissions spreadsheet gives the monthly and annual NO_X emissions of the unit.

$$\text{Monthly } NO_X = \textit{Tested EF} \frac{lb}{hr} \cdot \frac{\textit{Operational Hours}}{month} = \frac{lb\ NO_X}{month}$$

$$\text{Annual } NO_X = \sum_{January}^{December} \textit{Monthly } NO_X$$

VOC emissions are calculated using the most recent test results and the engine operating hours for the month. Annual VOC emissions are calculated by summing the monthly emissions. The attached 2010 Engine Emissions spreadsheet gives the monthly and annual VOC emissions of the unit.

$$\text{Monthly VOC} = \textit{Tested EF} \frac{lb}{hr} \cdot \frac{\textit{Operational Hours}}{month} = \frac{lb\ VOC}{month}$$

$$\text{Annual VOC} = \sum_{January}^{December} \textit{Monthly VOC}$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = \textit{Tested EF} \frac{lb}{hr} \cdot \frac{\textit{Operational Hours}}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} \textit{Monthly } CH_2O$$

Emission Estimates
Emission Unit E4
Waukesha 7042GL
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	1.5	g/hp-hr
VOC	0.5	g/hp-hr

Site-Rated Horsepower: 1,336 hp

2010 Actual Emissions

$$NO_X = \frac{(1.5\ g/hp\text{-}hr)(1{,}336\ hp)(8634\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 19.1\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}336\ hp)(8634\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.4\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Emission Estimates
Emission Unit E5
Waukesha L5794LT
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	2.5	g/hp-hr
VOC	0.5	g/hp-hr

Site-Rated Horsepower: 1,400 hp

2010 Actual Emissions

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8595\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.1\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8595\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.6\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Emission Estimates
Emission Unit E6
Waukesha L5794LT
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	2.5 g/hp-hr
VOC	0.5 g/hp-hr

Site-Rated Horsepower: 1,400 hp

2010 Actual Emissions

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8696\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.5\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8696\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.7\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Emission Estimates
Emission Unit E7
Waukesha L5794LT
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	2.5	g/hp-hr
VOC	0.5	g/hp-hr

Site-Rated Horsepower: 1,400 hp

2010 Actual Emissions

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8615\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.2\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8615\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.6\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Emission Estimates
Emission Unit E8
Waukesha L5794LT
South Ignacio Central Delivery Point

Manufacturer Emission Factors

NO_X	2.5	g/hp-hr
VOC	0.5	g/hp-hr

Site-Rated Horsepower: 1,400 hp

2010 Actual Emissions

$$NO_X = \frac{(2.5\ g/hp\text{-}hr)(1{,}400\ hp)(8711\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 33.6\ tpy$$

$$VOC = \frac{(0.5\ g/hp\text{-}hr)(1{,}400\ hp)(8711\ hr/yr)}{(454\ g/lb)(2{,}000\ lb/ton)} = 6.7\ tpy$$

Formaldehyde emissions are calculated on a monthly basis using the preceding quarterly test results and the engine operating hours for the month. Annual formaldehyde emissions are calculated by summing the monthly emissions. The attached 2010 Facility Formaldehyde Emissions spreadsheet gives the monthly and annual formaldehyde emissions of the unit.

$$\text{Monthly } CH_2O = Tested\ EF \frac{lb}{hr} \cdot \frac{Operational\ Hours}{month} = \frac{lb\ CH_2O}{month}$$

$$\text{Annual } CH_2O = \sum_{January}^{December} Monthly\ CH_2O$$

Samson

South Ignacio Central Delivery Point
V-SU-0031-08.00
2010 Dehydration Unit Emissions

Month	Benzene Emissions				Toluene Emissions			
	D1		D2		D1		D2	
	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month
January-10	0.97	30.10	1.19	36.95	0.00	0.00	0.00	0.00
February-10	0.57	15.93	0.64	17.84	0.03	0.90	0.04	1.04
March-10	0.02	0.74	0.03	0.84	0.07	2.17	0.08	2.51
April-10	0.12	3.66	0.14	4.11	0.13	3.96	0.15	4.44
May-10	0.07	2.26	0.08	2.45	0.11	3.26	0.12	3.57
June-10	0.11	3.21	0.12	3.57	0.11	3.24	0.12	3.72
July-10	0.08	2.33	0.08	2.51	0.13	3.91	0.14	4.28
August-10	0.08	2.33	0.08	2.51	0.13	3.91	0.14	4.28
September-10	0.09	2.58	0.10	2.85	0.13	3.78	0.14	4.20
October-10	0.02	0.59	0.02	0.65	0.07	2.08	0.08	2.39
November-10	0.02	0.57	0.02	0.63	0.07	2.01	0.08	2.31
December-10	0.04	1.33	0.05	1.49	0.09	2.85	0.10	3.22
Total	2.18	65.63	2.54	76.40	1.05	32.07	1.18	35.96

Month	Ethylbenzene Emissions				Xylene Emissions			
	D1		D2		D1		D2	
	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month
January-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
February-10	0.05	1.26	0.05	1.48	0.02	0.50	0.02	0.62
March-10	0.00	0.00	0.00	0.00	0.12	3.84	0.15	4.59
April-10	0.00	0.00	0.00	0.00	0.19	5.76	0.22	6.51
May-10	0.00	0.00	0.00	0.00	0.20	6.29	0.23	7.19
June-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
July-10	0.00	0.00	0.00	0.00	0.18	5.70	0.21	6.48
August-10	0.00	0.00	0.00	0.00	0.18	5.70	0.21	6.45
September-10	0.00	0.00	0.00	0.00	0.15	4.53	0.17	5.19
October-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
November-10	0.00	0.00	0.00	0.00	0.00	0.00	0.00	0.00
December-10	0.00	0.00	0.00	0.00	0.20	6.14	0.23	7.04
Total	0.05	1.26	0.05	1.48	1.25	38.46	1.44	44.07

Month	Total HAP Emissions				VOC Emissions			
	D1		D2		D1		D2	
	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month	lb/day	lb/month
January-10	0.97	30.10	1.19	36.95	1.05	32.64	1.29	39.90
February-10	0.67	18.62	0.75	20.97	0.72	20.27	0.81	22.79
March-10	0.22	6.94	0.26	8.15	0.32	9.98	0.37	11.53
April-10	0.45	13.38	0.50	15.06	0.63	18.84	0.71	21.18
May-10	0.38	11.81	0.43	13.21	0.51	15.75	0.57	17.58
June-10	0.22	6.45	0.24	7.29	0.41	12.42	0.47	14.01
July-10	0.38	11.90	0.43	13.27	0.51	15.84	0.57	17.67
August-10	0.38	11.90	0.43	13.27	0.51	15.84	0.57	17.67
September-10	0.36	10.86	0.41	12.24	0.54	16.17	0.61	18.18
October-10	0.09	2.67	0.10	3.07	0.14	4.31	0.16	4.90
November-10	0.09	2.58	0.10	2.97	0.14	4.17	0.16	4.74
December-10	0.34	10.45	0.38	11.90	0.42	13.02	0.48	14.76
Total	4.54	137.66	5.22	158.35	5.91	179.25	6.75	204.91

Total Emissions Per Unit

HAP	D1 (lb/year)	D1 (tpy)	D2 (lb/year)	D2 (tpy)
Benzene	65.63	0.03	76.40	0.04
Toluene	32.07	0.02	35.96	0.02
Ethylbenzene	1.26	0.00	1.48	0.00
Xylene	38.46	0.02	44.07	0.02
Total HAP	137.66	0.07	158.35	0.08
VOC	179.25	0.09	204.91	0.10

Samson

South Ignacio Central Delivery Point
V-SU-0031-08.00
2010 Dehydration Unit Reboiler Emissions

Dehydration Unit Reboilers

Type	<100 MMBtu/hr

Unit	D1 Reboiler	
Heater Size	1.25	MMBtu/hr
Hours of Operation	8760	hr
Heat Content	1000	Btu/scf

Emissions

Pollutant	Emission Factor*	Emissions	
	lb/MMscf	lb/hr	tpy
NO_X	100	0.12	0.53
CO	84	0.10	0.44
VOC	5.5	0.01	0.03
Formaldehyde	0.075	0.00	0.00
SO2	0.6	0.00	0.00
PM	7.6	0.01	0.04

*Emission factors obtained from AP-42 Tables 1.4-1, 1.4-2 and 1.5-2.

Unit	D2 Reboiler	
Heater Size	0.75	MMBtu/hr
Hours of Operation	8760	hr
Heat Content	1000	Btu/scf

Emissions

Pollutant	Emission Factor*	Emissions	
	lb/MMscf	lb/hr	tpy
NO_X	100	0.07	0.32
CO	84	0.06	0.27
VOC	5.5	0.00	0.02
Formaldehyde	0.075	0.00	0.00
SO2	0.6	0.00	0.00
PM	7.6	0.01	0.02

*Emission factors obtained from AP-42 Tables 1.4-1, 1.4-2 and 1.5-2.

Emission Estimates
Emission Unit D1
30 MMscfd PESCO Dehydration Unit
South Ignacio Central Delivery Point

The emission model GRI-GLYCalc Version 4.0, a thermodynamic-based process simulator for dehydration units, was utilized to estimate emissions from this unit. Monthly runs were performed in accordance with Operating Permit V-SU-0031-08.00 using the maximum gas throughput of the unit and maximum glycol recirculation rate. The gas composition, temperature, and pressure were obtained from the monthly gas sample. A summary of other average operating parameter values follows:

Parameter	Value
Inlet Gas Throughput	30.0 MMscfd
Glycol Circulation	15.0 gpm
Flash Vessel Temperature	100.0 °F
Flash Vessel Pressure	30.0 psig
Flash Gas Destruction Efficiency	98.0 %

VOC and HAP emissions from the dehydration unit were calculated on a monthly basis using the monthly GRI-GLYCalc output. Annual VOC and HAP emissions were calculated by summing the monthly emissions. The attached 2010 Dehydration Unit Emissions spreadsheet gives the monthly and annual benzene, toluene, ethylbenzene, xylene, total HAP, and VOC emissions of the unit.

$$\text{Annual VOC} = \sum_{January}^{December} Monthly\ VOC = 0.09 \text{ tpy}$$

$$\text{Annual HAP} = \sum_{January}^{December} Monthly\ HAP = 0.07 \text{ tpy}$$

Emission Estimates
Emission Unit D2
40 MMscfd NATCO Dehydration Unit
South Ignacio Central Delivery Point

The emission model GRI-GLYCalc Version 4.0, a thermodynamic-based process simulator for dehydration units, was utilized to estimate emissions from this unit. Monthly runs were performed in accordance with Operating Permit V-SU-0031-08.00 using the maximum gas throughput of the unit and maximum glycol recirculation rate. The gas composition, temperature, and pressure were obtained from the monthly gas sample. A summary of other average operating parameter values follows:

Parameter	Value
Inlet Gas Throughput	40.0 MMscfd
Glycol Circulation	17.0 gpm
Flash Vessel Temperature	100.0 °F
Flash Vessel Pressure	30.0 psig
Flash Gas Destruction Efficiency	98.0 %

VOC and HAP emissions from the dehydration unit were calculated on a monthly basis using the monthly GRI-GLYCalc output. Annual VOC and HAP emissions were calculated by summing the monthly emissions. The attached 2010 Dehydration Unit Emissions spreadsheet gives the monthly and annual benzene, toluene, ethylbenzene, xylene, total HAP, and VOC emissions of the unit.

$$\text{Annual VOC} = \sum_{January}^{December} Monthly\ VOC = 0.08 \text{ tpy}$$

$$\text{Annual HAP} = \sum_{January}^{December} Monthly\ HAP = 0.10 \text{ tpy}$$

United States Environmental Protection Agency
Region 8
Air Program
1595 Wynkoop Street
Denver, Colorado 80202

AIR POLLUTION CONTROL
TITLE V PERMIT TO OPERATE

In accordance with the provisions of title V of the Clean Air Act and 40 CFR part 71 and applicable rules and regulations,

Samson Resources
South Ignacio Central Delivery Point

is authorized to operate air emission units and to conduct other air pollutant emitting activities in accordance with the permit conditions listed in this permit.

This source is authorized to operate at the following location:

Southern Ute Indian Reservation
SE ¼ of Section 32, Township 33N, Range 7W
La Plata County, Colorado

Terms not otherwise defined in this permit have the meaning assigned to them in the referenced regulations. All terms and conditions of the permit are enforceable by EPA and citizens under the Clean Air Act.

Callie A. Videtich

8/10/09

Callie A. Videtich, Director
Air Program
US EPA Region 8

Date

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AIR POLLUTION CONTROL
TITLE V PERMIT TO OPERATE
Samson Resources
South Ignacio Central Delivery Point

Permit Number: V-SU-0031-08.00
Replaces Permit No.: V-SU-0031-01.04

Issue Date: August 10, 2009
Effective Date: August 20, 2009
Expiration Date: August 20, 2014

The permit number cited above should be referenced in future correspondence regarding this facility.

Permit Revision History

DATE OF REVISION	TYPE OF REVISION	SECTION NUMBER AND TITLE	DESCRIPTION OF REVISION
April 2004	Initial Permit Issuance		**Permit #V-SU-0031-01.00 with 4 modifications:** #V-SU-0031-01.01 – Significant Modification – Incorporated Synthetic Minor Limits #V-SU-0031-01.02 – Administrative - Change Responsible Official #V-SU-0031-01.03 – Administrative Amendment - Streamlined Permit #V-SU-0031-01.04 - Significant Modification – Incorporated Synthetic Minor Limits
2009	Renewal Permit Issuance		**Permit #V-SU-0031-08.00**

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Abbreviations and Acronyms

AR	Acid Rain
ARP	Acid Rain Program
bbls	Barrels
BACT	Best Available Control Technology
CAA	Clean Air Act [42 U.S.C. Section 7401 et seq.]
CAM	Compliance Assurance Monitoring
CEMS	Continuous Emission Monitoring System
CFR	Code of Federal Regulations
CMS	Continuous Monitoring System (includes COMS, CEMS and diluent monitoring)
COMS	Continuous Opacity Monitoring System
CO	Carbon monoxide
CO_2	Carbon dioxide
DAHS	Data Acquisition and Handling System
dscf	Dry standard cubic foot
dscm	Dry standard cubic meter
EIP	Economic Incentives Programs
EPA	Environmental Protection Agency
FGD	Flue gas desulfurization
gal	Gallon
gpm	Gallons per minute
H_2S	Hydrogen sulfide
gal	gallon
HAP	Hazardous Air Pollutant
hr	Hour
ICE	Internal Combustion Engine
Id. No.	Identification Number
kg	Kilogram
lb	Pound
MACT	Maximum Achievable Control Technology
MVAC	Motor Vehicle Air Conditioner
Mg	Megagram
MMBtu	Million British Thermal Units
MMscfd	Million Standard Cubic Feet per Day
mo	Month
NESHAP	National Emission Standards for Hazardous Air Pollutants
NMHC	Non-methane hydrocarbons
NOx	Nitrogen Oxides
NSPS	New Source Performance Standard
NSR	New Source Review
pH	Negative logarithm of effective hydrogen ion concentration (acidity)
PM	Particulate Matter
PM_{10}	Particulate matter less than 10 microns in diameter
ppm	Parts per million
PSD	Prevention of Significant Deterioration
PTE	Potential to Emit
psi	Pounds per square inch
psia	Pounds per square inch absolute
RICE	Reciprocating internal combustion engine
RMP	Risk Management Plan
scfm	Standard cubic feet per minute
SI	Spark Ignition
SNAP	Significant New Alternatives Program
SO_2	Sulfur Dioxide
tpy	Ton Per Year
US EPA	United States Environmental Protection Agency
VOC	Volatile Organic Compounds

List of Tables

I. Source Information and Emission Unit Identification

I.A. Source Information

Parent Company Name: Samson Resources

Plant Name: South Ignacio Central Delivery Point

Plant Location: SE ¼ of Section 32, T33N R7W
Lat. 37° 3' 14.1" N Long. -107° 37' 30.8" W

Region: 8

State: Colorado

County: La Plata

Reservation: Southern Ute Indian Reservation

Tribe: Southern Ute Indian Tribe

Responsible Official: Attorney-in-Fact

SIC Code: 1311 – Natural Gas Production

AFS Plant Identification Number: 0806700287

Other Clean Air Act Permits: There are no other Federal Clean Air Act (CAA) permits, such as minor NSR or PSD.

Description of Operations: The South Ignacio Central Delivery Point facility compresses inlet coal-bed methane gas to transmission pipeline pressures. Gas entering the facility from the field is first fed to an inlet separator that removes water gravimetrically that may have condensed during transportation from the gas wells. Separator overhead is fed to one of eight compressor engines from a common suction header. The compressors discharge gas to a common discharge header that feeds to scrubbers. Scrubbers separate and collect liquids that may have formed during compression. The compressed gas is then fed to two dehydration units operating in parallel. Tri-ethylene glycol is circulated counter-currently and absorbs water. Rich glycol is circulated to a reboiler, where moisture is driven to the atmosphere by heating the glycol. Dry gas exits the contactors and is directed to one of two sales lines, where it is metered and exits the facility. The current gas processing capacity of the facility is 70 MMscfd.

I.B. Source Emission Points

Table 1 - Emission Units
Samson Resources South Ignacio Central Delivery Point

Emission Unit Id.	Description	Control Equipment
E1	1680 hp, Waukesha 7044 GSI Rich Burn Compressor Engine, natural gas fired: Serial No. C-13225/1 Manufactured 5/2005 Installed 1/6/2006	Non-Selective Catalyst
E2	1267 hp, Waukesha 7042 GL Lean Burn Compressor Engine, natural gas fired: Serial No. C-60768/1 Manufactured 11/1997 Installed 1/29/2007	Oxidation Catalyst
E3	Serial No. C-12097/2 Manufactured 2/2008 (NSPS JJJJ - engine) Installed 3/14/2008	
E4	1336 hp, Waukesha 7042 GL Lean Burn Compressor Engine, natural gas fired: Serial No. C-10990/1 Manufactured March 2007 Installed May 7, 2007	Oxidation Catalyst
E5	1400 hp, Waukesha 5794 LT Lean Burn Compressor Engine, natural gas fired: Serial No. C-15962/1 Manufactured 2/2006 Installed 8/24/2007	Oxidation Catalyst
E6	Serial No. C-16160/1 Manufactured 11/2005 Installed 4/8/2006	
E7	Serial No. C-15838/1 Manufactured 9/2005 Installed 3/29/2006	
E8	Serial No. C-15836/1 Manufactured 8/2005 Installed 4/5/2006	
D1	30 MMscfd Dehydration Unit glycol regenerator & 1.25 MMBtu/hr natural gas-fired reboiler burner: Serial No. 101727 Installed 2003	PESCO Control Unit: Condenser & Enclosed Flare Stack
D2	40 MMscfd Dehydration Unit Glycol Regenerator & 0.75 MMBtu/hr natural gas-fired reboiler burner: Serial No. Custom Installed 2/2009	PESCO Control Unit: Condenser & Enclosed Flare Stack

Table 2 - Insignificant Emission Units
Samson Resources South Ignacio Central Delivery Point

Unit ID	Description
IEU1	16 - 500 gal. lubricating oil storage tanks (low vapor pressure)
IEU2	11 - 500 gal. used oil storage tanks (low vapor pressure)
IEU3	2 - 500 gal. ethylene glycol storage tanks (low vapor pressure)
IEU4	4 - 1000 gal. produced water storage tanks (low VOC content)
IEU5	1 - 400 bbl. slop tank (mostly water w/some lubricating oil - low vapor pressure)
IEU6	1 - 500 gal. methanol storage tank (low throughput)
IEU7	1 – 0.75 MMBtu/hr natural gas fired reboiler burner
IEU8	1 – 1.25 MMBtu/hr natural gas fired reboiler burner
IEU9	5 - 0.12 MMBtu/hr natural gas fired tank heaters

II. Specific Requirements for Engines

Certain requirements in Section II of this permit (subsections of Sections II.D., II.E., II.F., II.G., II.H., and II.I.) have been created, at the permittee's request, specifically to recognize the catalysts for limiting the PTE of nitrogen oxides, carbon monoxide, and formaldehyde emissions.

[CAA 304(f)(4), 40 CFR 71.6(b) and 71.7(e)(1)(i)(A)(4)(i)]

II.A. 40 CFR Part 60 and 40 CFR Part 63 General Provisions

1. 40 CFR Part 60, Subpart A – Standards of Performance for New Stationary Sources, General Provisions: This facility is subject to the requirements of 40 CFR part 60, subpart A as outlined in Table 3 of 40 CFR 60, subpart JJJJ. Notwithstanding conditions in this permit, the permittee shall comply with all applicable requirements of 40 CFR part 60.

   [40 CFR 60.4246]

2. 40 CFR Part 63, Subpart A – National Emission Standards for Hazardous Air Pollutants for Source Categories, General Provisions: This facility is not subject to any of the requirements of 40 CFR part 63, subpart A.

   [40 CFR 63.6590(c)]

II.B. 40 CFR 63, Subpart ZZZZ – National Emission Standards for Hazardous Air Pollutants for Reciprocating Internal Combustion Engines [40 CFR 63.6580-63.6675]

1. This facility is subject to the requirements of 40 CFR part 63, subpart ZZZZ. Notwithstanding conditions in this permit, the permittee shall comply with all applicable requirements of 40 CFR part 63, subpart ZZZZ.

2. The permittee must meet the requirements of 40 CFR part 63, subpart ZZZZ by meeting the requirements of 40 CFR part 60, subpart JJJJ, for spark ignition engines. No further requirements apply to engine unit E3 under 40 CFR part 63.

   [40 CFR 63.6590(c)]

II.C. 40 CFR 60, Subpart JJJJ – Standards of Performance for Stationary Spark Ignition Internal Combustion Engines [40 CFR 60.4230 – 60.4248]

1. This facility is subject to the requirements of 40 CFR part 60, subpart JJJJ. Notwithstanding conditions in this permit, the permittee shall comply with all applicable requirements of 40 CFR part 60, subpart JJJJ.

2. 40 CFR part 60, subpart JJJJ applies to the following engine:

   E3: 1267 hp Waukesha, natural gas-fired, lean-burn engine;
   Reconstructed post-June 12, 2006; Manufactured February 2008.

   [40 CFR 60.4230(a)(5)]

3. The permittee shall demonstrate compliance with 40 CFR 60, subpart JJJJ according to one of the following methods:

(a) Certified Engine:

(i) Operate an engine certified according to procedures specified in 40 CFR 60, subpart JJJJ for the same model year; and

(ii) Demonstrate compliance according to one of the methods specified in §60.4231(a); or

(b) Non-Certified Engine:

(i) Operate a non-certified engine and demonstrate compliance with the emission standards specified in the emissions table in Section II.D. of this permit and according to the testing requirements specified in §60.4244, as applicable; and

(ii) Keep a maintenance plan and records of conducted maintenance and, to the extent practicable, maintain and operate the engine in a manner consistent with good air pollution control practice for minimizing emissions; and

(iii) Conduct an initial performance test and subsequent performance testing according to 40 CFR 60.4244, every 8,760 hours of operation or 3 years, whichever comes first, thereafter to demonstrate compliance.

[Explanatory Note: The performance testing requirements, as required for in 40 CFR 60, subpart JJJJ, can be found in the Appendix to this permit, Section VI.]

[40 CFR 60.4243]

4. Requirements pursuant to 40 CFR 60, subpart JJJJ are taken from the Federal Register as published on January 18, 2008 (73 FR 3568).

II.D. Emission Limits

1. Emissions from engine units E1, E2, E3, E4, E5, E6, E7, and E8 shall not exceed the following limits:

Unit	Source of Emission Limit	CO		NOx		VOC	
		g/hp-hr	lbs/hr	g/hp-hr	lbs/hr	g/hp-hr	lbs/hr
E1	Part 71 Permit/Consent Agreement	3.5	12.9	2.5	9.2	-	-
E2	Part 71 Permit/Applicant Requested	1.0	2.79	-	-	-	-
E3	Part 71 Permit/Applicant Requested	1.0	2.79	-	-	-	-
	NSPS JJJJ–Manuf. on or after 1/1/08	4.0*	-	2.0*	-	1.0*	-
	NSPS JJJJ – Manuf. on or after 7/1/10 [40 CFR 60.4233(f)(4) and (e)]	2.0*	-	1.0*	-	0.7*	-
E4	Part 71 Permit/Applicant Requested	1.0	2.94	-	-	-	-
E5	Part 71 Permit/Applicant Requested	1.0	3.08	-	-	-	-
E6	Part 71 Permit/Applicant Requested	1.0	3.08	-	-	-	-
E7	Part 71 Permit/Applicant Requested	1.0	3.08	-	-	-	-
E8	Part 71 Permit/Applicant Requested	1.0	3.08	-	-	-	-

* Emission limit is for non-certified engines.

2. Facility-wide formaldehyde (CH_2O) emissions shall not exceed 9.5 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12-month total.

II.E. Work Practice and Operational Requirements

1. Unit E1, a Waukesha 7044 GSI reciprocating natural gas compressor engine with 1,680 brake horsepower (bhp) shall be equipped with a Johnson Matthey non-selective catalytic reduction unit for the control of NOx, CO, and CH_2O.

2. Units E2 and E3, which are Waukesha 7042 GL lean burn reciprocating natural gas compressor engines each rated at 1,267 brake horsepower (bhp), shall each be equipped with an oxidation catalyst for the control of CO and CH_2O.

3. Unit E4, a Waukesha 7042 GL lean burn reciprocating natural gas compressor engine with 1,336 bhp shall be equipped with an oxidation catalyst for the control of CO and CH_2O.

4. Units E5, E6, E7, and E8, which are Waukesha L5794LT reciprocating natural gas compressor engines each rated at 1,400 bhp, shall each be equipped with an oxidation catalyst for the control of CO and CH_2O.

5. The permittee shall follow, for each engine and any respective non-selective catalyst and oxidation catalyst, the manufacturer's recommended maintenance schedule and procedures to ensure optimum performance of each engine and catalyst.

6. The permittee shall install temperature sensing devices before the catalyst for each engine in order to continuously monitor the inlet temperature of the catalyst for each engine. Each temperature-sensing device shall be accurate to within plus or minus 3 °F.

7. The engine exhaust temperature for unit E1 at the inlet to the non-selective catalyst, shall be maintained at all times the engine operates at no less than 750 °F and no more than 1,250 °F. The engine exhaust temperature for units E2, E3, E4, E5, E6, E7, and E8 at the inlet to each oxidation catalyst, shall be maintained at all times the engine operates at no less than 500 °F and no more than 1,250 °F.

8. If the catalyst inlet temperature on an engine deviates from the acceptable range listed for each engine in Section II.E.7 above, then the following actions shall be taken:

   (a) Immediately upon determining a deviation of the catalyst inlet temperature, corrective action shall be taken on that engine to assess performance problems and/or tuning issues and the catalyst shall be inspected for possible damage and problems affecting catalyst effectiveness (including, but not limited to, plugging, fouling, destruction, or poisoning of the catalyst).

   (b) If the problem can be corrected by following the engine and/or the catalyst manufacturer's recommended procedures, then the permittee shall correct the problem within 24 hours of inspecting the engine and catalyst.

(c) If the problem can not be corrected using the manufacturer's recommended procedures, then the affected engine shall cease operating immediately and shall not be returned to routine service until the catalyst inlet temperature is measured and found to be within the acceptable temperature range for that engine. The permittee shall also notify EPA in writing of the problem within 15 working days of observing the problem and include in the notification the cause of the problem and a corrective action plan that outlines the steps and timeframe for bringing the inlet temperature range into compliance. (The corrective action may include removal and cleaning of the catalyst according to the manufacturer's methods or replacement of the catalyst.)

9. The permittee shall install gauges before and after the catalyst for each engine in order to monitor pressure drop across the catalyst. The pressure sensing devices shall be accurate to within plus or minus five-tenths (0.5) inches of water.

10. The pressure drop across the catalyst for units E3, E4, E5, and E6 shall not change by more than 2 inches of water at maximum operating rate (90% to 110% of engine capacity at site elevation) from the baseline pressure drop across the catalyst measured during the latest performance test as required by Section II.F.6(d).

11. A pressure drop which exceeds the pressure drop range for an engine or replacement engine as indicated above shall be considered indicative of catalyst fouling or break through and the catalyst shall be inspected and cleaned or replaced, if necessary.

12. The permittee's completion of any or all of the actions prescribed by Sections II.E.8(a) through (c) and II.E.11 of this permit shall not constitute, nor qualify as, an exemption from any CO, NOx, or CH_2O emission limits in this permit.

13. All emission units at the South Ignacio Central Delivery Point shall be fired only with natural gas. The natural gas shall be pipeline-quality in all respects except that CO_2 concentrations in the gas shall not be required to be within pipeline-quality.

[Explanatory Note: The purpose of permit Section 13, above, is to ensure that there are no contaminants in the fuel that might foul the catalyst. In general, pipeline-quality natural gas is (1) within ± 5% of the heating value of pure methane, or 1,010 Btu/per cubic foot under standard atmospheric conditions, and (2) free of water and toxic or corrosive contaminants. However, CO_2 is not a potential foulant of the catalyst and has therefore been excluded from the requirement.]

II.F. Testing Requirements [40 CFR 71.6(a)(3)(i)(A) through (C)]

1. Performance Tests:

(a) Reference method performance tests shall be conducted for all replacement engines to measure CH_2O emissions from the replacement engines to demonstrate compliance with the facility-wide CH_2O emission limit in Section II.D. The performance test for CH_2O shall be conducted within 90 calendar days of startup of a replacement engine.

[Explanatory Note: An initial reference method performance test was conducted for units E2, E3, E6, E7, and E8 for measuring CH_2O emissions from the engines to demonstrate compliance with the facility-wide CH_2O emission cap in Section II.D. when the emission limits were originally permitted on 11/30/2005. The initial performance test for CH_2O was conducted within 60 calendar days of 11/30/2005]

(b) Reference method performance tests shall be conducted for replacement engines for unit E1 to measure NOx and CO emissions to demonstrate compliance with the emission limits in Section II.D. The performance tests for NOx and CO shall be conducted within 90 calendar days of startup of a replacement engine.

(c) Reference Method performance tests shall be conducted, according to 40 CFR 60.4244, upon startup and for all new and replaced engines subject to NSPS JJJJ that are non-certified to measure NOx, CO, and VOC emissions to demonstrate compliance with the emission limits in Section II.D. In addition, the permittee must conduct subsequent performance tests on non-certified engines every 8,760 hours of operation or 3 years, which ever comes first.

[40 CFR 60.4243(b)(2)(ii)]

2. Upon change out of the catalyst for any engine, a performance test shall be conducted for measuring NOx (E1 only) and CO and CH_2O emissions to demonstrate continued compliance with the emission limits in Section II.D. and to re-establish temperature and pressure baselines. The performance test shall be conducted within 90 calendar days of the catalyst change out.

3. The performance tests for NOx and CO shall be conducted in accordance with the test methods specified in 40 CFR part 60, Appendix A. EPA Reference Method 7E or ASTM D-6438-03 shall be used to measure NOx emissions. EPA Reference Method 10 shall be used to measure CO emissions.

4. The performance test for measuring CH_2O emissions shall be conducted in accordance with EPA Reference Method 320 or 323 of 40 CFR part 63, Appendix A or Method CARB 430.

5. The performance test for measuring VOC emissions shall be conducted in accordance with EPA Reference Method 25A and 18 of 40 CFR part 63, Appendix A.

[40 CFR 4244, Table 2]

6. All tests for NOx, CO, VOC, and CH_2O emissions must meet the following requirements:

(a) All tests shall be performed at a maximum operating rate (90% to 110% of engine design capacity);

(b) Each source test shall consist of at least three 1-hour or longer valid test runs. Emission results shall be reported as the arithmetic average of all valid test runs and shall be in terms of the emission limits (lbs/hr and g/hp-hr);

(c) During each test run, data shall be collected on all parameters necessary to document how NOx, CO, VOC, and CH_2O emissions were measured or calculated (such as test run length, minimum sample volume, volumetric flow rate, moisture and oxygen corrections, etc.);

(d) During each test run, the pressure drop across each oxidation catalyst and the inlet temperature to the oxidation catalyst for each engine shall be measured. The baseline pressure drop shall be the arithmetic average of all valid test runs; and

(e) The source testing plans for NOx, CO, and CH_2O emissions approved by EPA on May 19, 2004 and June 3, 2004 shall be followed. The source testing plans for VOC emissions pursuant to 40 CFR 60.4244 shall be followed. The source testing plan shall include and addresses the following elements:

(i) Purpose of the test;
(ii) Engines and catalysts to be tested;
(iii) Expected engine operating rate(s) during test;
(iv) Schedule/dates for test;
(v) Sampling and analysis procedures (sampling locations, test methods, laboratory identification);
(vi) Quality assurance plan (calibration procedures and frequency, sample recovery and field documentation, chain of custody procedures); and
(vii) Data processing and reporting (description of data handling and quality control procedures, report content).

II.G. Monitoring Requirements [40 CFR 71.6(a)(3)(i)(A) through (C)]

1. The permittee shall measure NOx (E1 only) and CO emissions from all engines at least quarterly to demonstrate compliance with the emission limits in Section II.D, above. To meet this requirement, the permittee shall measure NOx (E1 only) and CO emissions from each engine using a portable analyzer and the monitoring protocol approved by EPA on June 3, 2004. If the monitoring results for two (2) consecutive quarters are less than eighty percent (80%) of both the NOx and CO emission limits in Section II.D., then the required monitoring frequency shall change from quarterly to semi-annual. If monitoring results for any one engine ever exceed more than 80% of either the NOx (E1 only) or CO emission limits, then the required monitoring frequency shall revert back to quarterly for that engine only. Semi-annual monitoring may be resumed after two (2) consecutive quarters of monitoring results that demonstrate less than 80% of the NOx (E1 only) and CO emission limits.

2. The permittee shall measure CH_2O emissions from all engines at least quarterly to demonstrate compliance with the facility-wide CH_2O emission limit in Section II.D, above. To meet this requirement, the permittee shall measure CH_2O emissions from each engine and replacement engine using the performance test methods and requirements listed in Section II.F, above and the test plan approved by EPA on June 3, 2004.

   For each engine, if the monitoring results for two (2) consecutive quarters show that the CH_2O emission reduction meets or exceeds 60%, then the required monitoring frequency shall change from quarterly to semi-annually. If monitoring results ever show that the CH_2O emission

reduction is less than 60%, then the required monitoring frequency shall revert back to quarterly. Semi-annual monitoring may be resumed after two (2) consecutive quarters of monitoring results that demonstrate CH_2O emission reductions meet or exceed 60%.

3. Measurements of the engine exhaust temperature at the inlet to each catalyst shall be taken at least daily.

4. Measurements of the pressure drop across each catalyst shall be taken at least weekly.

II.H. Recordkeeping Requirements [40 CFR 71.6(a)(3)(ii), 40 CFR 60.4245]

1. Facility-wide emissions of CH_2O shall be calculated at the end of each calendar month from the results of the most recent performance test required in Section II.G.2 for units E1, E2, E3, E4, E5, E6, E7, and E8. The monthly emissions shall include CH_2O emissions from all other units, including insignificant emitting units, listed in Tables 1 and 2 of this permit. These emissions shall be recorded.

2. The permittee shall, at the end of each month, add the CH_2O emissions for that month to the calculated emissions for the preceding 11 months and record a new 12-month total. CH_2O emissions from all controlled, uncontrolled, and insignificant emitting units (Tables 1 and 2 of this permit) shall be included in the calculation.

3. The facility-wide emissions of CH_2O shall be calculated as follows:

   (a) For the eight engines (E1, E2, E3, E4, E5, E6, E7, and E8), emissions for the month shall be calculated by multiplying the most recent CH_2O test result for that engine, in pounds per hour, by the number of operating hours for that engine for that month. If data on operating hours are not available for that unit for that month, full-time operation of the unit for that month shall be assumed.

   (b) For the remaining emitting units at the facility, except insignificant emitting units, emissions for the month for each unit shall be calculated by multiplying the CH_2O emission factor for that unit, in pounds per hour by the number of operating hours for that unit for that month. If data on operating hours are not available for that unit for that month, full-time operation of the unit shall be assumed.

   (c) Emissions for insignificant emission units for each month shall be recorded as one-twelfth of the annual emission amount listed for IEUs on the most recent Form PTE of the part 71 documents submitted to EPA, unless the IEUs have changed, in which case the permittee shall provide the basis for the new IEU emission calculations with the next required report.

4. The permittee shall comply with the following recordkeeping requirements:

   (a) Records shall be kept of all temperature measurements required by Section II.G.3 of this permit, as well as a description of any corrective actions taken pursuant to Section II.E.9 of this permit.

(b) Records shall be kept of vendor specifications to demonstrate that the accuracy of the temperature-sensing thermocouples at each catalyst is at least as accurate as that specified in Section II.E.6 of this permit.

(c) Records shall be kept of all pressure drop measurements required by Sections II.G.4 and II.E.9 of this permit, as well as a description of any corrective actions taken pursuant to Section II.E.11 of this permit.

(d) Records shall be kept that are sufficient to demonstrate, pursuant to Section II.E.13 of this permit, that the fuel for the engines is pipeline-quality natural gas in all respects, with the exception of CO_2 concentration in the natural gas.

5. The permittee shall keep records of all required testing (Section II.F.) and monitoring (Section II.G) in this permit. The records shall include the following:

(a) The date, place, and time of sampling or measurements;

(b) The date(s) analyses were performed;

(c) The company or entity that performed the analyses;

(d) The analytical techniques or methods used;

(e) The results of such analyses or measurements; and

(f) The operating conditions as existing at the time of sampling or measurement.

6. The permittee must keep records of the following for engine E3:

(a) All notifications submitted to comply with this subpart and all documentation supporting any notification;

(b) Maintenance conducted on the engine;

(c) If E3 is a certified engine, documentation from the manufacturer that the engine is certified to meet the emission standards and information as required in 40 CFR parts 90 and 1048; and

(d) If E3 engine is not a certified engine or is a certified engine operating in a non-certified manner and subject to §60.4243(a)(2), documentation that the engine meets the emission standards.

[40 CFR 60.4245(a)]

II.I. <u>Notifications and Reporting Requirements</u>
[40 CFR 71.6(a)(3)(iii), 40 CFR 60.4245 & 60.19]

1. The permittee shall submit to EPA a written report of the results of any performance tests and temperature and pressure drop measurements required in Section II.F. of this permit. This report shall be submitted within 90 calendar days of the date of testing completion.

2. The permittee shall submit to EPA, as part of the semi-annual monitoring reports required in Section IV of this permit, a report of any instances where:

   (a) The temperature at the inlet to the catalyst is outside the limits established in Section II.E.8, and a description of any corrective actions taken;

   (b) The pressure drop across the catalyst is outside the limits established in Section II.E.11., and a description of any corrective actions taken;

   (c) An exceedance of the NOx or CO emission limits in Section II.D.1 has occurred, and a description of any corrective actions taken; or

   (d) An exceedance of the facility-wide CH_2O emission limit in Section II.D.2 has occurred, and a description of any corrective actions taken.

3. If no such instances of deviations, outlined in Section II.I.2(a) through (d) above, have been detected, then the permittee shall submit to EPA, as part of the semi-annual monitoring reports required in Section IV of this permit a statement that says so.

4. The permittee must, for engines that have not been certified by an engine manufacturer to meet the emission standards in §60.4231(c), submit an initial notification as required in §60.7(a)(1). The notification must include the following information:

   (a) Name and address of the owner or operator;

   (b) The address of the affected source;

   (c) Engine information including make, model, engine family, serial number, model year, maximum engine power, and engine displacement;

   (d) Emission control equipment; and

   (e) Fuel used.

   [40 CFR 60.4245(c)]

5. The permittee must submit a copy of each performance test as required by §60.4244 and Section II.F.1 within 60 days after the test has been completed.

   [40 CFR 60.4245(d)]

III. Specific Requirements for Glycol Dehydrators

Certain requirements in Section III of this permit have been created, at the permittee's request, to limit the PTE of benzene from the glycol dehydrators (D1 and D2) and facility-wide hazardous air pollutants; specifically, Sections III.A, III.B, III.C, III.D, III.E.

[CAA 304(f)(4), 40 CFR 71.6(b) and 71.7(e)(1)(i)(A)(4)(i)]

III.A. Emission Limits

1 Benzene emissions from each of the glycol dehydration units, D1 and D2, shall be limited to 0.9 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12-month total.

2. Facility-wide HAP emissions shall not exceed 23 tons during any consecutive 12 months. Compliance with the annual limits shall be determined on a rolling 12-month total.

III.B. Work Practice and Operational Requirements

1. The permittee shall install and operate a PESCO Control Unit capable of reducing uncontrolled benzene emissions from both dehydrators (D1 and D2) by no less than 98%, and:

   (a) Emissions from the both dehydration unit process vents (D1 and D2) shall be routed to the enclosed flare;

   (b) A flame must be present on the enclosed flare at all times during which either one or both of the dehydration units (D1 and/or D2) are operating. The dehydration units (D1 and D2) shall not be operated if a flame is not present in the enclosed flare;

   (c) The permittee shall utilize the emergency shutdown (ESD) valve for safety considerations only; and

   (d) The permittee shall minimize visible emissions from the enclosed flare stack.

2. The permittee shall follow, for each dehydration unit and the PESCO Control Unit, the manufacturer's recommended maintenance schedule and procedures to ensure optimum performance.

III.C. Monitoring Requirements [40 CFR 71.6(a)(3)(i)(A) through (C)]

1. The permittee shall perform monthly testing of the inlet wet gas stream to the dehydrators (extended wet gas analysis). The analysis shall include the inlet gas temperature and pressure at which the sample was taken.

2. The permittee shall determine the monthly benzene and total HAP emissions from each dehydrator using GRI GlyCalc Version 4.0. The input parameter to the model shall include:

(a) The current months inlet wet gas analysis;

(b) The temperature and pressure of the gas provided in the inlet wet gas analysis;

(c) The enclosed flare control efficiency; and

(d) The maximum gas throughput and glycol pump recirculation rate for each dehydrator as follows:

Dehydration Unit ID	Maximum Gas Throughput	Maximum Glycol Pump Recirculation Rate
D1	30 MMscfd	15 gallons per minute
D2	40 MMscfd	17 gallons per minute

3. Benzene emissions from each dehydrator shall be recorded at the end of each month. The permittee shall, at the end of each month, add the benzene emissions for that month to the calculated emissions for the preceding eleven months and record a new twelve-month total.

4. Facility-wide HAP emissions shall be determined as follows:

(a) HAP emissions from each dehydrator and all other units operating at the facility, including insignificant units, listed in Tables 1 and 2 of this permit, shall be recorded at the end of each month;

(i) HAP emissions from the dehydrators shall be determined using the GRI GlyCalc model required in Section III.C.2;
(ii) HAP emissions from the engines shall be determined using the methods outlined in Section II.H of this permit;
(iii) Emissions for insignificant emission units for each month shall be recorded as one-twelfth of the annual emission amount listed for IEUs on the most recent Form PTE of the part 71 documents submitted to EPA, unless the IEUs have changed, in which case the permittee shall provide the basis for the new IEU emission calculations with the next required report.

(b) The permittee shall sum the HAP emissions from each dehydrator, and all other units operating at the facility, including insignificant units, listed in Tables 1 and 2 of this permit each month;

(c) The permittee shall, at the end of each month, add the HAP emissions for that month to the calculated HAP emissions for the preceding eleven months and record a new twelve month total.

III.D. Recordkeeping Requirements [40 CFR 71.6(a)(3)(ii) and 40 CFR 63.774(d)(1)]

1. The permittee shall comply with the following recordkeeping requirements:

   (a) Records shall be kept of the dehydrator and control equipment specifications;

   (b) Records shall be kept of the equipment manufacturer's recommended maintenance schedule and procedures;

   (c) Records shall be kept of the monthly GRI GlyCalc modeling analysis; and

   (d) Records shall be kept of the rolling 12 month emission totals for benzene emissions from the dehydrator and the facility-wide HAP emissions.

2. The permittee shall keep records of all required gas analysis testing. The records shall include the following:

   (a) The date, place, and time of sampling or measurements;

   (b) The date(s) analyses were performed;

   (c) The company or entity that performed the analyses;

   (d) The analytical techniques or methods used;

   (e) The results of such analyses or measurements; and

   (f) The operating conditions as existing at the time of sampling or measurement (gas flow rate, gas temperature, and gas pressure).

3. The permittee shall retain records of all required monitoring data and support information for a period of at least 5 years from the date of the monitoring sample, measurement, report, or application. These records shall be made available upon request by EPA. Support information includes all calibration and maintenance records, all original strip-chart recordings for continuous monitoring instrumentation, and copies of all reports required by this permit.

III.E. Reporting Requirements [40 CFR 71.6(a)(3)(iii)]

The permittee shall submit to EPA, as part of the semi-annual monitoring reports required in Section IV.B.1. of this permit, where an excursion of the benzene emission limit or facility-wide HAP emission limit has occurred, as well as a description of any corrective actions taken. If no such instances have been detected, then a statement shall be provided to say so.

IV. Facility-Wide Requirements

Conditions in this section of the permit apply to all emissions units located at the facility, including any units not specifically listed in Table 1 and Table 2 of Section I.B.

[40 CFR 71.6(a)(1)]

IV.A. General Recordkeeping Requirements [40 CFR 71.6(a)(3)(ii)]

The permittee shall comply with the following generally applicable recordkeeping requirements:

1. If the permittee determines that his or her stationary source that emits (or has the potential to emit, without federally recognized controls) one or more hazardous air pollutants is not subject to a relevant standard or other requirement established under 40 CFR part 63, the permittee shall keep a record of the applicability determination on site at the source for a period of five years after the determination, or until the source changes its operations to become an affected source, whichever comes first. The record of the applicability determination shall include an analysis (or other information) that demonstrates why the permittee believes the source is unaffected (e.g., because the source is an area source).

   [40 CFR 63.10(b)(3)]

2. Records shall be kept, as required by the Off Permit Changes condition of this permit which are made in accordance with the approved Alternative Operating Scenario condition of this permit.

IV.B. General Reporting Requirements

1. The permittee shall submit to EPA reports of any monitoring and recordkeeping required under this permit semi-annually by April 1st and October 1st of each year. The report due on April 1st shall cover the prior six-month period from July 1st through December 31st. The report due on October 1st shall cover the prior six-month period from January 1st through June 30th. All instances of deviations from permit requirements must be clearly identified in such reports. All required reports must be certified by a responsible official consistent with Section V.E. of this permit.

2. The permittee shall promptly report to the EPA Regional Office deviations from permit requirements, including those attributable to upset conditions as defined in this permit, the probable cause of such deviations and any corrective actions or preventive measures taken. "Prompt" is defined as follows:

   (a) Any definition of "prompt" or a specific timeframe for reporting deviations provided in an underlying applicable requirement as identified in this permit;

   (b) Where the underlying applicable requirement fails to address the time frame for reporting deviations, reports of deviations will be submitted based on the following schedule:

      (i) For emissions of a hazardous air pollutant or a toxic air pollutant (as identified in the applicable regulation) that continue for more than an hour in excess of permit requirements, the report must be made within 24 hours of the occurrence;

(ii) For emissions of any regulated air pollutant, excluding a hazardous air pollutant or a toxic air pollutant that continues for more than two hours in excess of permit requirements, the report must be made within 48 hours; and

(iii) For all other deviations from permit requirements, the report shall be submitted with the semi-annual monitoring report.

3. If any of the conditions in IV.B.2(b)(i) or (ii), are met, the source must notify EPA by telephone (1-800-227-8917) or facsimile (303-312-6064) based on the timetables listed above. *[Notification by telephone or fax must specify that this notification is a deviation report for a part 71 permit].* A written notice, certified consistent with Section V.E. of this permit must be submitted within 10 working days of the occurrence. All deviations reported under this Section must also be identified in the 6-month report required under permit Section IV.B.1.

[Explanatory note: To help part 71 permittees meet reporting responsibilities, EPA has developed a form "PDR" for prompt deviation reporting. The form may be found on EPA website at: http://www.epa.gov/air/oaqps/permits/p71forms.html]

4. "Deviation" means any situation in which an emissions unit fails to meet a permit term or condition. A deviation is not always a violation. A deviation can be determined by observation or through review of data obtained from any testing, monitoring, or recordkeeping established in accordance with §71.6(a)(3)(i) and (a)(3)(ii). For a situation lasting more than 24 hours which constitutes a deviation, each 24 hour period is considered a separate deviation. Included in the meaning of deviation are any of the following:

(a) A situation where emissions exceed an emission limitation or standard;

(b) A situation where process or emissions control device parameter values indicate that an emission limitation or standard has not been met;

(c) A situation in which observations or data collected demonstrate noncompliance with an emission limitation or standard or any work practice or operating condition required by the permit; or

(d) A situation in which an exceedance or an excursion, as defined in 40 CFR part 64 occurs.

IV.C. Permit Shield [40 CFR 71.6(f)(3)]

Nothing in this permit shall alter or affect the following:

1. The liability of a permittee for any violation of applicable requirements prior to or at the time of permit issuance;

2. The ability of the EPA to obtain information under section 114 of the CAA; or

3. The provisions of section 303 of the CAA (emergency orders), including the authority of the Administrator under that section.

IV.D. Alternative Operating Scenarios [40 CFR 71.6(a)(9) and 40 CFR 71.6(a)(3)(ii)]

Engine Replacement/Overhaul

1. Replacement of an existing permitted compressor engine with an engine of the same make, model, horsepower rating, and configured to operate in the same manner as the engine being replaced, and which satisfies all of the provisions for Off Permit Changes in this permit, including the provisions specific to engine replacement, shall be considered an allowed alternative operating scenario under this permit.

2. Any emission limits, requirements, control technologies, testing, or provisions that apply to engines that are replaced under this Alternative Operating Scenarios section shall also apply to the replacement engines, including initial performance testing requirements.

3. A replacement engine for unit E3 shall be considered a new unit and thus subject to the performance tests required by Section II.F, and all other conditions applicable to unit E3 in this permit.

4. Replacement of a permitted compressor engine with an engine subject to 40 CFR part 60, subpart JJJJ is not allowed under this alternative operating scenario.

5. Replacement of a permitted compressor engine with an engine subject to 40 CFR part 63, subpart ZZZZ is not allowed under this alternative operating scenario.

[Explanatory note: This section was included to allow for Off Permit replacement of engines that may have existing federally enforceable limits created in this permit. Replacement engines which trigger new applicable requirements (i.e., NSPS, NESHAP, etc.) must be processed through a minor permit modification. (See Section V.I. of this permit).]

V. Part 71 Administrative Requirements

V.A. Annual Fee Payment [40 CFR 71.6(a)(7) and 40 CFR 71.9]

1. The permittee shall pay an annual permit fee in accordance with the procedures outlined below.

[40 CFR 71.9(a)]

2. The permittee shall pay the annual permit fee each year no later than April 1st. The fee shall cover the previous calendar year.

[40 CFR 71.9(h)]

3. The fee payment shall be in United States currency and shall be paid by money order, bank draft, certified check, corporate check, or electronic funds transfer payable to the order of the U.S. Environmental Protection Agency.

[40 CFR 71.9(k)(1)]

4. The permittee shall send fee payment and a completed fee filing form to:

For regular U.S. Postal Service mail	For non-U.S. Postal Service Express mail (FedEx, Airborne, DHL, and UPS)
U.S. Environmental Protection Agency FOIA and Miscellaneous Payments Cincinnati Finance Center P.O. Box 979078 St. Louis, MO 63197-9000	U.S. Bank Government Lockbox 979078 U.S. EPA FOIA & Misc. Payments 1005 Convention Plaza SL-MO-C2-GL St. Louis, MO 63101

[40 CFR 71.9(k)(2)]

5. The permittee shall send an updated fee calculation worksheet form and a photocopy of each fee payment check (or other confirmation of actual fee paid) submitted annually by the same deadline as required for fee payment to the address listed in Section V.E. of this permit.

[40 CFR 71.9(h)(1)]

[Explanatory note: The fee filing form "FF" and the fee calculation worksheet form "FEE" may be found on EPA website at: http://www.epa.gov/air/oaqps/permits/p71forms.html]

6. Basis for calculating annual fee:

   (a) The annual emissions fee shall be calculated by multiplying the total tons of actual emissions of all "regulated pollutants (for fee calculation)" emitted from the source by the presumptive emissions fee (in dollars/ton) in effect at the time of calculation.

[40 CFR 71.9(c)(1)]

(i) "Actual emissions" means the actual rate of emissions in tpy of any regulated pollutant (for fee calculation) emitted from a part 71 source over the preceding calendar year. Actual emissions shall be calculated using each emissions units actual operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted during the preceding calendar year.

[40 CFR 71.9(c)(6)]

(ii) Actual emissions shall be computed using methods required by the permit for determining compliance, such as monitoring or source testing data.

[40 CFR 71.9(h)(3)]

(iii) If actual emissions cannot be determined using the compliance methods in the permit, the permittee shall use other federally recognized procedures.

[40 CFR 71.9(e)(2)]

[Explanatory note: The presumptive fee amount is revised each calendar year to account for inflation, and it is available from EPA prior to the start of each calendar year.]

(b) The permittee shall exclude the following emissions from the calculation of fees:

(i) The amount of actual emissions of each regulated pollutant (for fee calculation) that the source emits in excess of 4,000 tpy;

[40 CFR 71.9(c)(5)(i)]

(ii) Actual emissions of any regulated pollutant (for fee calculation) already included in the fee calculation; and

[40 CFR 71.9(c)(5)(ii)]

(iii) The quantity of actual emissions (for fee calculation) of insignificant activities [defined in §71.5(c)(11)(i)] or of insignificant emissions levels from emissions units identified in the permittee's application pursuant to §71.5(c)(11)(ii).

[40 CFR 71.9(c)(5)(iii)]

7. Fee calculation worksheets shall be certified as to truth, accuracy, and completeness by a responsible official.

[40 CFR 71.9(h)(2)]

[Explanatory note: The fee calculation worksheet form already incorporates a section to help you meet this responsibility.]

8. The permittee shall retain fee calculation worksheets and other emissions-related data used to determine fee payment for 5 years following submittal of fee payment. [Emission-related data include, for example, emissions-related forms provided by EPA and used by the permittee for fee calculation purposes, emissions-related spreadsheets, and emissions-related data, such as

records of emissions monitoring data and related support information required to be kept in accordance with §71.6(a)(3)(ii).]

[40 CFR 71.9(i)]

9. Failure of the permittee to pay fees in a timely manner shall subject the permittee to assessment of penalties and interest in accordance with §71.9(l).

[40 CFR 71.9(l)]

10. When notified by EPA of underpayment of fees, the permittee shall remit full payment within 30 days of receipt of notification.

[40 CFR 71.9(j)(2)]

11. A permittee who thinks an EPA assessed fee is in error and who wishes to challenge such fee, shall provide a written explanation of the alleged error to EPA along with full payment of the EPA assessed fee.

[40 CFR 71.9(j)(3)]

V.B. Annual Emissions Inventory [40 CFR 71.9(h)(1)and (2)]

The permittee shall submit an annual emissions report of its actual emissions for both criteria pollutants and regulated HAPS for this facility for the preceding calendar year for fee assessment purposes. The annual emissions report shall be certified by a responsible official and shall be submitted each year to EPA by April 1st.

The annual emissions report shall be submitted to EPA at the address listed in Section V.E. of this permit.

[Explanatory note: An annual emissions report, required at the same time as the fee calculation worksheet by §71.9(h), has been incorporated into the fee calculation worksheet form as a convenience.]

V.C. Compliance Requirements

1. Compliance with the Permit

   (a) The permittee must comply with all conditions of this part 71 permit. Any permit noncompliance constitutes a violation of the CAA and is grounds for enforcement action; for permit termination, revocation and re-issuance, or modification; or for denial of a permit renewal application.

   [40 CFR 71.6(a)(6)(i)]

   (b) It shall not be a defense for a permittee in an enforcement action that it would have been necessary to halt or reduce the permitted activity in order to maintain compliance with the conditions of this permit.

   [40 CFR 71.6(a)(6)(ii)]

   (c) For the purpose of submitting compliance certifications in accordance with Section V.C.2 of this permit, or establishing whether or not a person has violated or is in

violation of any requirement of this permit, nothing shall preclude the use, including the exclusive use, of any credible evidence or information, relevant to whether a source would have been in compliance with applicable requirements if the appropriate performance or compliance test or procedure had been performed.

[Section 113(a) and 113(e)(1) of the Act, 40 CFR 51.212, 52.12, 52.33, 60.11(g), and 61.12]

2. Compliance Schedule

(a) For applicable requirements with which the source is in compliance, the source will continue to comply with such requirements.

[40 CFR 71.5(c)(8)(iii)(A)]

(b) For applicable requirements that will become effective during the permit term, the source shall meet such requirements on a timely basis.

[40 CFR 71.5(c)(8)(iii)(B)]

3. Compliance Certifications

The permittee shall submit to EPA a certification of compliance with permit terms and conditions, including emission limitations, standards, or work practices annually each year no later than April 1st. The compliance certification shall cover the same 12-month period as the two consecutive semi-annual monitoring reports.

[Explanatory note: To help part 71 permittees meet reporting responsibilities, EPA has developed a reporting form for annual compliance certifications. The form may be found on EPA website at: http://www.epa.gov/air/oaqps/permits/p71forms.html]

The compliance certification shall be certified as to truth, accuracy, and completeness by a responsible official consistent with §71.5(d). The certification shall include the following:

(a) Identification of each permit term or condition that is the basis of the certification;

(b) The identification of the method(s) or other means used for determining the compliance status of each term and condition during the certification period, and whether such methods or other means provide continuous or intermittent data. Such methods and other means shall include, at a minimum, the methods and means required in this permit. If necessary, the permittee also shall identify any other material information that must be included in the certification to comply with section 113(c)(2) of the CAA, which prohibits knowingly making a false certification or omitting material information;

(c) The status of compliance with each term and condition of the permit for the period covered by the certification based on the method or means designated in (ii) above; and

(d) The certification shall identify each deviation and take it into account in the compliance certification;

(i) Such other facts as the EPA may require to determine the compliance status of the source; and

(ii) Whether compliance with each permit term was continuous or intermittent.

[40 CFR 71.6(c)(5)]

V.D. Duty to Provide and Supplement Information
[40 CFR 71.6(a)(6)(v), 71.5(a)(3), and 71.5(b)]

1. The permittee shall furnish to EPA, within a reasonable time, any information that EPA may request in writing to determine whether cause exists for modifying, revoking, and reissuing, or terminating the permit, or to determine compliance with the permit. Upon request, the permittee shall also furnish to the EPA copies of records that are required to be kept pursuant to the terms of the permit, including information claimed to be confidential. Information claimed to be confidential must be accompanied by a claim of confidentiality according to the provisions of 40 CFR part 2, subpart B.

[40 CFR 71.6(a)(6)(v) and 40 CFR 71.5(a)(3)]

2. The permittee, upon becoming aware that any relevant facts were omitted or incorrect information was submitted in the permit application, shall promptly submit such supplementary facts or corrected information. In addition, a permittee shall provide additional information as necessary to address any requirements that become applicable after the date a complete application is filed, but prior to release of a draft permit.

[40 CFR 71.5(b)]

V.E. Submissions [40 CFR 71.5(d), 71.6(c)(1) and 71.9(h)(2)]

1. Any document (application form, report, compliance certification, etc.) required to be submitted under this permit shall be certified by a responsible official as to truth, accuracy, and completeness. Such certifications shall state that based on information and belief formed after reasonable inquiry, the statements and information in the document are true, accurate, and complete.

[Explanatory note: EPA has developed a reporting form "CTAC" for certifying truth, accuracy and completeness of part 71 submissions. The form may be found on EPA website at: http://www.epa.gov/air/oaqps/permits/p71forms.html]

2. Any documents required to be submitted under this permit, including reports, test data, monitoring data, notifications, compliance certifications, fee calculation worksheets, and applications for renewals and permit modifications shall be submitted to:

Part 71 Permit Contact
Air Program, 8P-AR
U.S. Environmental Protection Agency, Region 8
1595 Wynkoop Street
Denver, Colorado 80202

V.F. Severability Clause [40 CFR 71.6(a)(5)]

The provisions of this permit are severable, and in the event of any challenge to any portion of this permit, or if any portion is held invalid, the remaining permit conditions shall remain valid and in force.

V.G. Permit Actions [40 CFR 71.6(a)(6)(iii)]

This permit may be modified, revoked, reopened, and reissued, or terminated for cause. The filing of a request by the permittee for a permit modification, revocation and reissuance, or termination, or of a notification of planned changes or anticipated noncompliance does not stay any permit condition.

V.H. Administrative Permit Amendments [40 CFR 71.7(d)]

The permittee may request the use of administrative permit amendment procedures for a permit revision that:

1. Corrects typographical errors;

2. Identifies a change in the name, address, or phone number of any person identified in the permit, or provides a similar minor administrative change at the source;

3. Requires more frequent monitoring or reporting by the permittee;

4. Allows for a change in ownership or operational control of a source where the EPA determines that no other change in the permit is necessary, provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to the EPA;

5. Incorporates into the part 71 permit the requirements from preconstruction review permits authorized under an EPA-approved program, provided that such a program meets procedural requirements substantially equivalent to the requirements of §§71.7 and 71.8 that would be applicable to the change if it were subject to review as a permit modification, and compliance requirements substantially equivalent to those contained in §71.6; or

6. Incorporates any other type of change which EPA has determined to be similar to those listed above in subparagraphs 1 through 5 above.

[Explanatory Note: If subparagraphs 1 through 5 above do not apply, please contact EPA for a determination of similarity prior to submitting your request for an administrative permit amendment under this provision.]

V.I. Minor Permit Modifications [40 CFR 71.7(e)(1)]

1. The permittee may request the use of minor permit modification procedures only for those modifications that:

(a) Do not violate any applicable requirement;

(b) Do not involve significant changes to existing monitoring, reporting, or recordkeeping requirements in the permit;

(c) Do not require or change a case-by-case determination of an emission limitation or other standard, or a source-specific determination for temporary sources of ambient impacts, or a visibility or increment analysis;

(d) Do not seek to establish or change a permit term or condition for which there is no corresponding underlying applicable requirement and that the source has assumed to avoid an applicable requirement to which the source would otherwise be subject. Such terms and conditions include:

(i) A federally enforceable emissions cap assumed to avoid classification as a modification under any provision of title I; and
(ii) An alternative emissions limit approved pursuant to regulations promulgated under section 112(i)(5) of the CAA;

(e) Are not modifications under any provision of title I of the CAA; and

(f) Are not required to be processed as a significant modification.

[40 CFR 71.7(e)(1)(i)(A)]

2. Notwithstanding the list of changes ineligible for minor permit modification procedures in paragraph 1 above, minor permit modification procedures may be used for permit modifications involving the use of economic incentives, marketable permits, emissions trading, and other similar approaches, to the extent that such minor permit modification procedures are explicitly provided for in an applicable implementation plan or in applicable requirements promulgated by EPA.

[40 CFR 71.7(e)(1)(i)(B)]

3. An application requesting the use of minor permit modification procedures shall meet the requirements of §71.5(c) and shall include the following:

(a) A description of the change, the emissions resulting from the change, and any new applicable requirements that will apply if the change occurs;

(b) The source's suggested draft permit;

(c) Certification by a responsible official, consistent with §71.5(d), that the proposed modification meets the criteria for use of minor permit modification procedures and a request that such procedures be used; and

(d) Completed forms for the permitting authority to use to notify affected States as required under §71.8.

[40 CFR 71.7(e)(1)(ii)]

4. The source may make the change proposed in its minor permit modification application immediately after it files such application. After the source makes the change allowed by the preceding sentence, and until the permitting authority takes any of the actions authorized by §71.7(e)(1)(iv)(A) through (C), the source must comply with both the applicable requirements governing the change and the proposed permit terms and conditions. During this time period, the source need not comply with the existing permit terms and conditions it seeks to modify. However, if the source fails to comply with its proposed permit terms and conditions during this time period, the existing permit terms and conditions it seeks to modify may be enforced against it.

[40 CFR 71.7(e)(1)(v)]

5. The permit shield under §71.6(f) may not extend to minor permit modifications.

[40 CFR 71.7(e)(1)(vi)]

V.J. <u>Group Processing of Minor Permit Modifications</u> [40 CFR 71.7(e)(2)]

1. Group processing of modifications by EPA may be used only for those permit modifications:

   (a) That meet the criteria for minor permit modification procedures under Section V.I.1. of this permit; and

   (b) That collectively are below the threshold level of 10 percent of the emissions allowed by the permit for the emissions unit for which the change is requested, 20 percent of the applicable definition of major source in §71.2, or 5 tpy, whichever is least.

[40 CFR 71.7(e)(2)(i)]

2. An application requesting the use of group processing procedures shall be submitted to EPA, shall meet the requirements of §71.5(c), and shall include the following:

   (a) A description of the change, the emissions resulting from the change, and any new applicable requirements that will apply if the change occurs;

   (b) The source's suggested draft permit;

   (c) Certification by a responsible official, consistent with §71.5(d), that the proposed modification meets the criteria for use of group processing procedures and a request that such procedures be used;

   (d) A list of the source's other pending applications awaiting group processing, and a determination of whether the requested modification, aggregated with these other applications, equals or exceeds the threshold set under subparagraph (a)(ii) above; and

   (e) Completed forms for the permitting authority to use to notify affected States as required under §71.8.

[40 CFR 71.7(e)(2)(ii)]

3. The source may make the change proposed in its minor permit modification application immediately after it files such application. After the source makes the change allowed by the preceding sentence, and until the permitting authority takes any of the actions authorized by §71.7(e)(1)(iv)(A) through (C), the source must comply with both the applicable requirements governing the change and the proposed permit terms and conditions. During this time period, the source need not comply with the existing permit terms and conditions it seeks to modify. However, if the source fails to comply with its proposed permit terms and conditions during this time period, the existing permit terms and conditions it seeks to modify may be enforced against it.

[40 CFR 71.7(e)(2)(v)]

4. The permit shield under §71.6(f) may not extend to group processing of minor permit modifications.

[40 CFR 71.7(e)(2)(vi)]

V.K. Significant Permit Modifications [40 CFR 71.7(e)(3)]

1. The permittee must request the use of significant permit modification procedures for those modifications that:

   (a) Do not qualify as minor permit modifications or as administrative amendments;

   (b) Are significant changes in existing monitoring permit terms or conditions; or

   (c) Are relaxations of reporting or recordkeeping permit terms or conditions.

[40 CFR 71.7(e)(3)(i)]

2. Nothing herein shall be construed to preclude the permittee from making changes consistent with part 71 that would render existing permit compliance terms and conditions irrelevant.

[40 CFR 71.7(e)(3)(i)]

3. Permittees must meet all requirements of part 71 for applications, public participation, and review by affected states and tribes for significant permit modifications. For the application to be determined complete, the permittee must supply all information that is required by §71.5(c) for permit issuance and renewal, but only that information that is related to the proposed change.

[40 CFR 71.7(e)(3)(ii), 71.8(d), and 71.5(a)(2)]

V.L. Reopening for Cause [40 CFR 71.7(f)]

1. The permit may be reopened and revised prior to expiration under any of the following circumstances:

   (a) Additional applicable requirements under the Act become applicable to a major part 71 source with a remaining permit term of 3 or more years. Such a reopening shall be

completed not later than 18 months after promulgation of the applicable requirement. No such reopening is required if the effective date of the requirement is later than the date on which the permit is due to expire, unless the original permit or any of its terms and conditions have been extended pursuant to §71.7 (c)(3);

(b) Additional requirements (including excess emissions requirements) become applicable to an affected source under the acid rain program. Upon approval by the Administrator, excess emissions offset plans shall be deemed to be incorporated into the permit;

(c) EPA determines that the permit contains a material mistake or that inaccurate statements were made in establishing the emissions standards or other terms or conditions of the permit; or

(d) EPA determines that the permit must be revised or revoked to assure compliance with the applicable requirements.

V.M. Property Rights [40 CFR 71.6(a)(6)(iv)]

This permit does not convey any property rights of any sort, or any exclusive privilege.

V.N. Inspection and Entry [40 CFR 71.6(c)(2)]

Upon presentation of credentials and other documents as may be required by law, the permittee shall allow EPA or an authorized representative to perform the following:

1. Enter upon the permittee's premises where a part 71 source is located or emissions-related activity is conducted, or where records must be kept under the conditions of the permit;

2. Have access to and copy, at reasonable times, any records that must be kept under the conditions of the permit;

3. Inspect at reasonable times any facilities, equipment (including monitoring and air pollution control equipment), practices, or operations regulated or required under the permit; and

4. As authorized by the CAA, sample or monitor at reasonable times substances or parameters for the purpose of assuring compliance with the permit or applicable requirements.

V.O. Emergency Provisions [40 CFR 71.6(g)]

1. In addition to any emergency or upset provision contained in any applicable requirement, the permittee may seek to establish that noncompliance with a technology-based emission limitation under this permit was due to an emergency. To do so, the permittee shall demonstrate the affirmative defense of emergency through properly signed, contemporaneous operating logs, or other relevant evidence that:

   (a) An emergency occurred and that the permittee can identify the cause(s) of the emergency;

(b) The permitted facility was at the time being properly operated;

(c) During the period of the emergency the permittee took all reasonable steps to minimize levels of emissions that exceeded the emissions standards, or other requirements in this permit; and

(d) The permittee submitted notice of the emergency to EPA within 2 working days of the time when emission limitations were exceeded due to the emergency. This notice must contain a description of the emergency, any steps taken to mitigate emissions, and corrective actions taken. This notice fulfills the requirements for prompt notification of deviations.

2. In any enforcement proceeding, the permittee attempting to establish the occurrence of an emergency has the burden of proof.

3. An "emergency" means any situation arising from sudden and reasonably unforeseeable events beyond the control of the source, including acts of God, which situation requires immediate corrective action to restore normal operation, and that causes the source to exceed a technology-based emission limitation under the permit due to unavoidable increases in emissions attributable to the emergency. An emergency shall not include noncompliance to the extent caused by improperly designed equipment, lack of preventive maintenance, careless or improper operation, or operator error.

V.P. Transfer of Ownership or Operation [40 CFR 71.7(d)(1)(iv)]

A change in ownership or operational control of this facility may be treated as an administrative permit amendment if the EPA determines no other change in this permit is necessary and provided that a written agreement containing a specific date for transfer of permit responsibility, coverage, and liability between the current and new permittee has been submitted to EPA.

V.Q. Off Permit Changes [40 CFR 71.6(a)(12) and 40 CFR 71.6(a)(3)(ii)]

The permittee is allowed to make certain changes without a permit revision, provided that the following requirements are met, and that all records required by this section are kept on site at the source for a period of five (5) years:

1. Each change is not addressed or prohibited by this permit;

2. Each change shall meet all applicable requirements and shall not violate any existing permit term or condition;

3. Changes under this provision may not include changes subject to any requirement of 40 CFR parts 72 through 78 or modifications under any provision of title I of the CAA;

4. The permittee must provide contemporaneous written notice to EPA of each change, except for changes that qualify as insignificant activities under §71.5(c)(11). The written notice must describe each change, the date of the change, any change in emissions, pollutants emitted, and any applicable requirements that would apply as a result of the change;

5. The permit shield does not apply to changes made under this provision;

6. The permittee must keep a record describing all changes that result in emissions of any regulated air pollutant subject to any applicable requirement not otherwise regulated under this permit, and the emissions resulting from those changes; and

7. For replacement of a permitted engine with an engine of the same make, model, horsepower rating, and configured to operate in the same manner as the engine being replaced, in addition to satisfying all other provisions for off permit changes, the permittee satisfies the following provisions:

   (a) The replacement engine employs air emissions control devices, monitoring, record keeping and reporting that are equivalent to those employed by the engine being replaced;

   (b) The replacement of the existing engine does not constitute a major modification or major new source as defined in Federal PSD regulations (40 CFR 52.21);

   (c) No new applicable requirements, as defined in 40 CFR 71.2, are triggered by the replacement; and

   (d) The following information is provided in a written notice to EPA, prior to installation of the replacement engine, in addition to the standard information listed above for contemporaneous written notices for off permit changes:

      (i) Make, model number, serial number, horsepower rating and configuration of the existing engine and the replacement engine;
      (ii) Manufacture date, commence construction date (per the definitions in 40 CFR 60.4230(a) and 63.2), and installation date of the replacement engine at the facility;
      (iii) If applicable, documentation of the cost to rebuild a replacement engine versus the cost to purchase a new engine in order to support claims that an engine is not "reconstructed", as defined in 40 CFR 60.15 and 40 CFR 63.2;
      (iv) 40 CFR part 60, subpart IIII (CI Engine NSPS) non-applicability documentation as appropriate;
      (v) 40 CFR part 60, subpart JJJJ (SI Engine NSPS) non-applicability documentation as appropriate;
      (vi) 40 CFR part 63, subpart ZZZZ (RICE MACT) non-applicability documentation for major sources, as appropriate;
      (vii) 40 CFR part 63, subpart ZZZZ (RICE MACT) non-applicability documentation for area sources, as appropriate; and
      (viii) Documentation to demonstrate that the replacement does not constitute a major new source or major modification, as defined in Federal PSD rules (40 CFR 52.21), as follows:

(A) If the replacement will not constitute a "physical change or change in the method of operation" as described in §52.21(b)(2)(i), an explanation of how that conclusion was reached shall be provided.

(B) If the replacement will constitute a "physical change or change in the method of operation" as described §52.21(b)(2)(i), the following information shall be provided:

(1) If the existing source is a "major stationary source" as defined in §52.21(b)(1): For each "regulated NSR pollutant" as defined in §52.21(b)(50), a demonstration (including all calculations) that the replacement will not be a "major modification" as defined in §52.21(b)(2). A modification is major only if it causes a "significant emissions increase" as defined in §52.21(b)(40), and also causes a "significant net emissions increase" as defined in §§52.21(b)(3) and (b)(23).

The procedures of §52.21(a)(2)(iv) shall be used to calculate whether or not there will be a significant emissions increase. If there will be a significant emissions increase, then calculations shall be provided to demonstrate there will not be a significant net emissions increase. These latter calculations shall include all source-wide contemporaneous and creditable emission increases and decreases, as defined in §52.21(b)(3), summed with the PTE of the replacement unit(s).

If netting is used to demonstrate that the replacement will not constitute a "major modification," verification shall be provided that the replacement engine(s) or turbine(s) employ emission controls at least equivalent in control effectiveness to those employed by the engine(s) or turbine(s) being replaced.

PTE of replacement unit(s) shall be determined based on the definition of PTE in §52.21(b)(4). For each "regulated NSR pollutant" for which the PTE is not "significant," calculations used to reach that conclusion shall be provided.

(2) If the existing source is not a "major stationary source" as defined in §52.21(b)(1): For each "regulated NSR pollutant," a demonstration (including all calculations) that the replacement engine(s) or turbine(s), by itself, will not constitute a "major stationary source" as defined in §52.21(b)(1)(i).

8. The notice shall be kept on site and made available to EPA on request, in accordance with the general recordkeeping provision of this permit.

9. Submittal of the written notice required above shall not constitute a waiver, exemption, or shield from applicability of any applicable standard or PSD permitting requirements under

40 CFR 52.21 that would be triggered by the replacement of any one engine, or by replacement of multiple engines.

V.R. Permit Expiration and Renewal [40 CFR 71.5(a)(1)(iii), 71.5(a)(2), 71.5(c)(5), 71.6(a)(11), 71.7(b), 71.7(c)(1), and 71.7(c)(3)]

1. This permit shall expire upon the earlier occurrence of the following events:

   (a) Five (5) years elapse from the date of issuance; or

   (b) The source is issued a part 70 or part 71 permit under an EPA approved or delegated permit program.

   [40 CFR 71.6(a)(11)]

2. Expiration of this permit terminates the permittee's right to operate unless a timely and complete permit renewal application has been submitted at least 6 months but not more than 18 months prior to the date of expiration of this permit.

   [40 CFR 71.5(a)(1)(iii)]

3. If the permittee submits a timely and complete permit application for renewal, consistent with §71.5(a)(2), but EPA has failed to issue or deny the renewal permit, then all the terms and conditions of the permit, including any permit shield granted pursuant to §71.6(f) shall remain in effect until the renewal permit has been issued or denied.

   [40 CFR 71.7(c)(3)]

4. The permittee's failure to have a part 71 permit is not a violation of this part until EPA takes final action on the permit renewal application. This protection shall cease to apply if, subsequent to the completeness determination, the permittee fails to submit any additional information identified as being needed to process the application by the deadline specified in writing by EPA.

   [40 CFR 71.7(b)]

5. Renewal of this permit is subject to the same procedural requirements that apply to initial permit issuance, including those for public participation, affected State, and tribal review.

   [40 CFR 71.7(c)(1)]

6. The application for renewal shall include the current permit number, description of permit revisions and off permit changes that occurred during the permit term, any applicable requirements that were promulgated and not incorporated into the permit during the permit term, and other information required by the application form.

   [40 CFR 71.5(a)(2) and 71.5(c)(5)]

VI. Appendix

VI.A. Inspection Information

1. Directions to Facility:

From the intersection of U.S. Highway 550 and County Road 318 in La Plata County, Colorado, go east on County Road 318 to the tee in the road. Turn right at the tee and drive to between mile markers 5 and 6 to a guardrail. Turn at the next right and drive to the South Ignacio facility.

2. Latitude and Longitude coordinates:

Lat. 37° 3' 14.1" N Long. -107° 37' 30.8" W

3. Safety Considerations:

Persons entering the site are required to wear a hard hat, safety glasses, safety toe footwear, hearing protection, and fire retardant clothing.

VI.B. 40 CFR 60, Subpart JJJJ Performance Testing

Testing Requirements for Owners and Operators

Sec. 60.4244 What test methods and other procedures must I use if I am an owner or operator of a stationary SI internal combustion engine?

Owners and operators of stationary SI ICE who conduct performance tests must follow the procedures in paragraphs (a) through (f) of this section.

(a) Each performance test must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and according to the requirements in Sec. 60.8 and under the specific conditions that are specified by Table 2 to this subpart.

(b) You may not conduct performance tests during periods of startup, shutdown, or malfunction, as specified in Sec. 60.8(c). If your stationary SI internal combustion engine is non-operational, you do not need to startup the engine solely to conduct a performance test; however, you must conduct the performance test immediately upon startup of the engine.

(c) You must conduct three separate test runs for each performance test required in this section, as specified in Sec. 60.8(f). Each test run must be conducted within 10 percent of 100 percent peak (or the highest achievable) load and last at least 1 hour.

(d) To determine compliance with the NO_X mass per unit output emission limitation, convert the concentration of NO_X in the engine exhaust using Equation 1 of this section:

$$ER = \frac{C_d \times 1.912 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 1)}$$

Where:

ER = Emission rate of NO_X in g/HP-hr.
C_d = Measured NO_X concentration in parts per million by volume (ppmv). 1.912x10-\3\ = Conversion constant for ppm NO_X to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meter per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, horsepower-hour (HP-hr).

(e) To determine compliance with the CO mass per unit output emission limitation, convert the concentration of CO in the engine exhaust using Equation 2 of this section:

$$ER = \frac{C_d \times 1.164 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 2)}$$

Where:

ER = Emission rate of CO in g/HP-hr.
C_d = Measured CO concentration in ppmv. 1.164x10-\3\ = Conversion constant for ppm CO to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in HP-hr.

(f) For purposes of this subpart, when calculating emissions of VOC, emissions of formaldehyde should not be included. To determine compliance with the VOC mass per unit output emission limitation, convert the concentration of VOC in the engine exhaust using Equation 3 of this section:

$$ER = \frac{C_d \times 1.833 \times 10^{-3} \times Q \times T}{HP - hr} \qquad \text{(Eq. 3)}$$

Where:

ER = Emission rate of VOC in g/HP-hr.
C_d = VOC concentration measured as propane in ppmv. 1.833x10-\3\ = Conversion constant for ppm VOC measured as propane, to grams per standard cubic meter at 20 degrees Celsius.
Q = Stack gas volumetric flow rate, in standard cubic meters per hour, dry basis.
T = Time of test run, in hours.
HP-hr = Brake work of the engine, in HP-hr.

(g) If the owner/operator chooses to measure VOC emissions using either Method 18 of 40 CFR part 60, appendix A, or Method 320 of 40 CFR part 63, Appendix A, then it has the option of correcting the measured VOC emissions to account for the potential differences in measured values between these methods and Method 25A. The results from Method 18 and Method 320 can be corrected for response factor differences using Equations 4 and 5 of this section. The corrected VOC concentration can then be placed on a propane basis using Equation 6 of this section.

$$RF_i = \frac{C_{Mi}}{C_{Ai}} \quad \text{(Eq. 4)}$$

Where:

RF_i = Response factor of compound i when measured with EPA Method 25A.
C_{Mi} = Measured concentration of compound i in ppmv as carbon.
C_{Ai} = True concentration of compound i in ppmv as carbon.

$$C_{icorr} = RF_i x C_{imeas} \quad \text{(Eq. 5)}$$

Where:

$C_{i\ corr}$ = Concentration of compound i corrected to the value that would have been measured by EPA Method 25A, ppmv as carbon.
$C_{i\ meas}$ = Concentration of compound i measured by EPA Method 320, ppmv as carbon.

$$C_{Peq} = 0.6098 x C_{icorr} \quad \text{(Eq. 6)}$$

Where:

C_{Peq} = Concentration of compound i in mg of propane equivalent per DSCM.