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**Via Email**

August 30, 2019  
Erica LeDoux  
Environmental Engineer  
U.S. EPA - Region 6  
Multimedia Division Air Permits Section 6MM-AP  
1445 Ross Avenue  
Dallas, TX 75202-2733

RE: 40 CFR 49.151 True Minor Source Registration  
Harvest Four Corners LLC's Ojito Compressor Station

Dear Ms. LeDoux:

In accordance with 40 CFR 49.151, *Federal Minor New Source Review Program in Indian Country*, Harvest Four Corners LLC (Harvest) is submitting the attached Part 2 registration in accordance with the *Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing segments of the Oil and Natural Gas Sector*.

The attached Part 2 registration is for a second 1,097 horsepower Waukesha 7042GL compressor engine equipped with a low-speed turbocharger and ancillary equipment and follows the April 19, 2019 Part 1 registration for the second engine. The facility is a true minor source as demonstrated by the attached emission calculations as it has the potential to emit regulated NSR pollutants in amounts less than major source thresholds without the need to take an enforceable restriction to reduce its potential to emit to such levels.

Please contact me at (505) 632-4475 or at [khong@harvestmidstream.com](mailto:khong@harvestmidstream.com) should you have any questions regarding this submittal.

Respectfully submitted,

A handwritten signature in blue ink, appearing to read "Kijun Hong".

Kijun Hong  
Environmental Specialist

Xc: Bonnie Braganza, U.S. EPA Region 6



United States Environmental Protection Agency

<https://www.epa.gov/tribal-air/tribal-minor-new-source-review>

April 29, 2019

**Part 2: Submit Within 60 Days After Startup  
 of Production -- Emission and Production  
 Information**

**FEDERAL IMPLEMENTATION PLAN FOR TRUE MINOR SOURCES IN INDIAN  
 COUNTRY IN THE OIL AND NATURAL GAS PRODUCTION AND NATURAL  
 GAS PROCESSING SEGMENTS OF THE OIL AND NATURAL GAS SECTOR  
 Registration for New True Minor Oil and Natural Gas Sources and Minor  
 Modifications at Existing True Minor Oil and Natural Gas Sources**

Please submit information to:

[Reviewing Authority  
 Address  
 Phone]

Erica LeDoux  
 Environmental Engineer  
 U.S. EPA - Region 6  
 Multimedia Division Air Permits Section 6MM-AP  
 1445 Ross Avenue  
 Dallas, TX 75202-2733  
 214-665-7265

**A. GENERAL SOURCE INFORMATION (See Instructions Below)**

<b>1. Company Name</b> Harvest Four Corners, LLC		<b>2. Source Name</b> Ojito Compressor Station	
<b>3. Type of Oil and Natural Gas Operation</b> Natural Gas Compressor Station		<b>4. New Minor Source?</b> <input type="checkbox"/> Yes <input checked="" type="checkbox"/> No	
		<b>5. True Source Modification?</b> <input checked="" type="checkbox"/> Yes <input type="checkbox"/> No	
<b>6. NAICS Code</b> 213112		<b>7. SIC Code</b> 1389	
<b>8. U.S. Well ID(s) or API Number(s) [if applicable]</b> N/A			
<b>9. Area of Indian Country</b> Jicarilla Apache	<b>10. County</b> Rio Arriba	<b>11a. Latitude</b> 36.506964	<b>11b. Longitude</b> -107.192883

**B. CONTACT INFORMATION (See Instructions Below)**

<b>1. Owner Name</b> Harvest Four Corners, LLC		Title Travis Jones - EH&S Manager	
Mailing Address 1111 Travis Street, Houston, TX 77002			
Email Address trjones@harvestmidstream.com			
Telephone Number 713-289-2630		Facsimile Number	
<b>2. Operator Name (if different from owner)</b> Same as Owner		Title	
Mailing Address			
Email Address			
Telephone Number		Facsimile Number	
<b>3. Source Contact</b> Kijun Hong		Title Environmental Specialist	
Mailing Address 1755 Arroyo Drive, Bloomfield, NM 87413			
Email Address khong@harvestmidstream.com			
Telephone Number 505-632-4475		Facsimile Number 505-632-4782	

<b>4. Compliance Contact</b>	
<b>Kijun Hong</b>	Title <b>Environmental Specialist</b>
Mailing Address <b>1755 Arroyo Drive, Bloomfield, NM 87413</b>	
Email Address <b>khong@harvestmidstream.com</b>	
Telephone Number <b>505-632-4475</b>	Facsimile Number <b>505-632-4782</b>

**C. EMISSIONS AND OTHER SOURCE INFORMATION**

Include all of the following information in the table below and as attachments to this form:

*Note: The emission estimates can be based upon actual test data or, in the absence of such data, upon procedures acceptable to the Reviewing Authority. The following procedures are generally acceptable for estimating emissions from air pollution sources: (1) unit-specific emission tests; (2) mass balance calculations; (3) published, verifiable emission factors that are applicable to the unit (i.e., manufacturer specifications); (4) other engineering calculations; or (5) other procedures to estimate emissions specifically approved by the Reviewing Authority. Guidance for estimating emissions can be found at <https://www.epa.gov/chief>.*

- Narrative description of the operations.
- Identification and description of any air pollution control equipment and compliance monitoring devices or activities.
- Type and actual amount (annually) of each fuel that will be used.
- Type of raw materials used (e.g., water for hydraulic fracturing).
- Actual, annual production rates.
- Actual operating schedules.
- Any existing limitations on source operations affecting emissions or any work practice standards, where applicable, for all regulated New Source Review (NSR) pollutants at your source. Indicate all requirements referenced in the Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector that apply to emissions units and air pollution generating activities at the source or proposed. Include statements indicating each emissions unit that is an emissions unit potentially subject to the requirements referenced in the FIP, but does not meet the definition of an affected facility under the referenced requirement, and therefore, is not subject to those requirements.
- For each emissions unit comprising the new source or modification, estimates of the total allowable (potential to emit) annual emissions at startup of production from the air pollution source for the following air pollutants: particulate matter, PM<sub>10</sub>, PM<sub>2.5</sub>, sulfur oxides ( ), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Allowable annual emissions are defined as: emissions rate of an emissions unit calculated using the maximum capacity of a stationary source to emit a pollutant under its physical and operational design. Any physical

or operational limitation on the capacity of the source to emit a pollutant, including air pollution control equipment and restrictions on hours of operation or on the type or amount of material combusted, stored, or processed, shall be treated as part of its design if the limitation, or the effect it would have on emissions, is legally and practically enforceable. You must determine the potential for emissions within 30 days from the startup of production.

- For each emissions unit comprising the new source or modification, estimates of the total actual annual emissions during the upcoming, consecutive 12 months from the air pollution source for the following air pollutants: particulate matter (PM, PM<sub>10</sub>, PM<sub>2.5</sub>), sulfur oxides (SO<sub>x</sub>), nitrogen oxides (NO<sub>x</sub>), carbon monoxide (CO), volatile organic compound (VOC), lead (Pb) and lead compounds, ammonia (NH<sub>3</sub>), fluorides (gaseous and particulate), sulfuric acid mist (H<sub>2</sub>SO<sub>4</sub>), hydrogen sulfide (H<sub>2</sub>S), total reduced sulfur (TRS) and reduced sulfur compounds, including all calculations for the estimates. Estimates of actual emissions must take into account equipment, operating conditions, and air pollution control measures. You should calculate an estimate of the actual annual emissions using estimated operating hours, production rates, in-place control equipment, and types of materials processed, stored, or combusted.

#### D. TABLE OF ESTIMATED EMISSIONS

Provide in the table below estimates of the total allowable annual emissions in tons per year (tpy) and total actual annual emissions (tpy) for the following pollutants for all emissions units comprising the new source or modification.

<b>POLLUTANT</b>	<b>TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)</b>	<b>TOTAL ACTUAL ANNUAL EMISSIONS (TPY)</b>
<b>PM</b>	0.35	0.35
<b>PM<sub>10</sub></b>	0.35	0.35
<b>PM<sub>2.5</sub></b>	0.35	0.35
<b>SO<sub>x</sub></b>	0.02	0.02
<b>NO<sub>x</sub></b>	15.90	15.90
<b>CO</b>	28.08	28.08
<b>VOC</b>	10.60	10.60
<b>Pb</b>	0	0

**Note: The emission rates shown above are for the second Waukesha 7042GL engine. Total facility emissions are shown in the summary tables later on in this document.**

<b>POLLUTANT</b>	<b>TOTAL ALLOWABLE ANNUAL EMISSIONS (TPY)</b>	<b>TOTAL ACTUAL ANNUAL EMISSIONS (TPY)</b>
<b>NH3</b>	0	0
<b>Fluorides</b>	0	0
<b>H<sub>2</sub>SO<sub>4</sub></b>	0	0
<b>H<sub>2</sub>S</b>	0	0
<b>TRS</b>	0	0

## Instructions for Part 2

Please answer all questions. If the item does not apply to the source and its operations write “n/a”. If the answer is not known write "unknown".

### A. General Source Information

1. Company Name: Provide the complete company name. For corporations, include divisions or subsidiary name, if any.
2. Source Name: Provide the source name. Please note that a source is a site, place, or location that may contain one or more air pollution emitting units.
3. Type of Operation: Indicate the generally accepted name for the oil and natural gas production or natural gas processing segment operation (e.g., oil and gas well site, tank battery, compressor station, natural gas processing plant).
4. New True Minor Source: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
5. True Minor Source Modification: [Per Federal Indian Country Minor New Source Review Rule, 40 CFR 49.153].
6. North American Industry Classification System (NAICS): The NAICS Code for your oil and natural gas source can be found at the following link for North American Industry Classification System:  
<http://www.census.gov/eos/www/naics/>.
7. Standard Industrial Classification Code (SIC Code): Although the new NAICS code has replaced the SIC codes, much of the Clean Air Act permitting processes continue to use these codes. The SIC Code for your oil and natural gas source can be found at the following link for Standard Industrial Classification Codes:  
[http://www.osha.gov/pls/imis/sic\\_manual.html](http://www.osha.gov/pls/imis/sic_manual.html).
8. U.S. Well ID or API Number: Unique well identifier as assigned by the Federal or State oil and gas regulatory agency with primacy, using the American Petroleum Institute (API) Standard for number format (pre-2014) or the Professional Petroleum Data Management (PPDM) Association US Well Number Standard (2014-present). Provide IDs for all oil and natural gas production wells associated with the facility, if applicable. May not be applicable for downstream production sources, such as compressor stations.
9. Area of Indian Country: Provide the name of the Indian reservation within which the source is operating.
10. County: Provide the County within which the source is operating.
11. Latitude & Longitude (11a. and 11b.): Provide latitude and longitude location(s) in decimal degrees, indicating the datum used in parentheses. These are GPS (global positioning system) coordinates. This information should be provided in decimal degrees with 6 digits to the right of the decimal point, indicating the datum used in parentheses (i.e., NAD 27, NAD 83, WGS 84 – WGS 84 is preferred over NAD 27).

### B. Contact Information

Please provide the information requested in full.

1. Owners: List the full name (last, middle initial, first) of all owners of the source.
2. Operator: Provide the name of the operator of the source if it is different from the owner(s).
3. Source Contact: The source contact must be the local contact authorized to receive requests for data and information.
4. Compliance Contact: The compliance contact must be the local contact responsible for the source's compliance with this rule. If this is the same as the Source Contact please note this on the form.

### C. Attachments

The information requested in the attachments will enable the U.S. Environmental Protection Agency (EPA) to understand the type of oil and natural gas source being registered and the nature and extent of the air pollutants to be emitted.

**Disclaimers:**

The public reporting and recordkeeping burden for this collection of information is estimated to average 6 hours per response. Send comments on the Agency's need for this information, the accuracy of the provided burden estimates, and any suggested methods for minimizing respondent burden, including through the use of automated collection techniques to the Director, Collection Strategies Division, U.S. Environmental Protection Agency (2822T), 1200 Pennsylvania Ave., NW, Washington, D.C. 20460. Include the OMB control number in any correspondence. Do not send the completed form to this address.

Information in these forms submitted in compliance with the final Federal Indian Country Minor NSR rule may be claimed as confidential. A company may assert a claim of confidentiality for information submitted by clearly marking that information as confidential. Such information shall be treated in accordance with EPA's procedures for information claimed as confidential at 40 CFR part 2, subpart B, and will only be disclosed by the means set forth in the subpart. If no claim of confidentiality accompanies the report when it is received by EPA, it may be made public without further notice to the company (40 CFR 2.203).



**Narrative Description of Operations**

The Ojito Compressor Station, now owned and operated by Harvest Four Corners, LLC (Harvest) and originally constructed prior to 1976, is a natural gas compressor station on a natural gas pipeline. This compressor station is currently operating under a Federal Implementation Plan (FIP) registration with construction authorized by EPA on October 17, 2017. The original FIP registration was for one Waukesha 7042GL compressor engine and ancillary equipment.

With the April 2019 submittal of the Part 1 forms for the *Registration for New True Minor Oil and Natural Gas Sources and Minor Modifications at Existing True Minor Oil and Natural Gas Sources*, Harvest began the permitting process to add a second 1,097-hp Waukesha 7042GL compressor engine package, 500-gallon lube oil tank and 500-gallon used oil tank, in accordance with the *Federal Implementation Plan (FIP) for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector*. Also as part of this modification, a 25-bbl skid drain tank, to contain rain/wash water runoff from the compressor skid, was installed on an existing concrete pad with no new surface disturbance. The facility as currently constructed also includes a pig launcher which collects liquids (consisting of water and hydrocarbons condensed from the natural gas) removed from the pipeline by pigging operations, condensate storage tanks and other ancillary equipment. The facility remains a true minor source with this expansion, as defined the *Federal Minor New Source Review Program in Indian Country* regulations, at §49.152(d). With this application, Harvest is submitting Part 2 of the registration.

**Description of Emission Units & Air Pollution Generating Activities**

<b>Emission Unit No.</b>	<b>Unit Description</b>	<b>Control Equipment</b>
E-1	IC Engine Manufacturer – Waukesha Model – 7042GL Design – 4 Stroke Lean Burn (4SLB) Capacity – 1,097 horsepower Manufactured (commence construction) November 10, 1998 Installed – February 22, 2018 Fuel Type – Natural Gas Primary Use – Natural gas compressor driver Serial Number – C-12695/1	None
E-2	<b>IC Engine</b> <b>Manufacturer – Waukesha</b> <b>Model – 7042GL</b> <b>Design – 4 Stroke Lean Burn (4SLB)</b> <b>Capacity – 1,097 horsepower</b> <b>Manufactured (commence construction) July 21, 1978</b> <b>Installed – August 2, 2019</b> <b>Fuel Type – Natural Gas</b> <b>Primary Use – Natural gas compressor driver</b> <b>Serial Number – 319838</b>	None
EG-1	IC Engine Manufacturer – Waukesha Roline Model – H88RU Design – 4 Stroke Rich Burn (4SRB) Capacity – 180 horsepower Manufactured (commence construction) – unknown Installed – pre-1976 Fuel Type – Natural Gas Primary Use – Emergency Generator Serial Number – 65X1946	None

New equipment shown in red font

T-11	4200 gal Condensate Storage Tank Manufacturer – American Tank and Steel Model – N-5169 Installed – 1976 Primary use – Storage of natural gas condensate Maximum usage gal/day – 126 Maximum usage gal/yr. – 23,100 Serial Number – N-5169	Fixed Roof
T-12	4200 gal Condensate Storage Tank Manufacturer – American Tank and Steel Model – S-5168 Installed – 1976 Primary use – Storage of natural gas condensate Maximum usage gal/day – 126 Maximum usage gal/yr. – 23,100 Serial Number – S-5168	Fixed Roof
T-13	500-gallon Lube Oil Storage Tank	Fixed Roof
T-14	500-gallon Used Oil Storage Tank	Fixed Roof
T-15	500-gallon Lube Oil Storage Tank	Fixed Roof
T-16	500-gallon Used Oil Storage Tank	Fixed Roof
T-17	25 bbl Waste Water Tank (skid drain tank)	Fixed Roof
F-1	Valves, Flanges, Seals, etc (piping components) Installed – 1976	None
SSM	Startup, shutdown and maintenance emissions from compressors and associated piping Installed – 1976	None
PL	Pig Launcher emissions Installed – 1976	None
TL	Truck Loading Emissions	None

New equipment shown in red font

### **Air Pollution Control Equipment & Compliance Monitoring Devices or Activities**

The Ojito Compressor Station will not utilize any air pollution control equipment or compliance monitoring devices.

**Fuel Usage, Raw Materials Annual Production Rates and Operating Schedules**

The compressor engines are used to compress field natural gas. Fuel use and engine capacity are provided on the attached emission calculation worksheets. The facility operates up to 24 hours per day, seven days per week, 52 weeks per year.

**Limitations on Source Operations (Regulatory Requirements as per §49.105)**

The Potential To Emit (PTE) emissions for all regulated pollutants from the facility are less than the NSR major source thresholds. Potentially applicable regulations include:

***NSPS JJJJ (Standards of Performance for Stationary Spark Ignition Internal Combustion Engines)***

**EU E-1** – This regulation is not applicable. Although, the Waukesha 7042GL compressor engine was relocated to this location on February 22, 2018, it had commenced construction November 10, 1998, prior to the regulation's effective date of June 12, 2006 (40 CFR §60.4230(a)(4)).

**EU E-2** - This regulation is not applicable since this Waukesha 7042GL compressor engine was relocated to this location in June 2019 and initially commenced construction prior to the regulation's effective date of June 12, 2006 (40 CFR §60.4230(a)(4)).

**EU EG-1** - This regulation is not applicable. The Waukesha Roline emergency generator engine was installed before 1976, prior to the regulation's effective date of June 12, 2006 (§60.4230(a)(4)).

***NESHAP ZZZZ (National Emissions Standards for Hazardous Air Pollutants for Stationary Reciprocating Internal Combustion Engines)***

**EU E-1** – This regulation is applicable. The facility is a remote area source of HAP emissions. The Waukesha 7042GL compressor engine is an existing non-emergency SI 4SLB RICE, and therefore must meet the inspection and maintenance requirements of Table 2d, row 8 (§63.6603(a)). Record of an annual evaluation of the facility's remote area source status must be maintained. 8 (§63.6603(f)).

**EU E-2** - This regulation is applicable. The facility is a remote area source of HAP emissions. The Waukesha 7042GL compressor engine is an existing non-emergency SI 4SLB RICE, and therefore must meet the inspection and maintenance requirements of Table 2d, row 8 (§63.6603(a)). Record of an annual evaluation of the facility's remote area source status must be maintained. (§63.6603(f))

**EU EG-1** – This regulation is applicable. The facility is a remote area source of HAP emissions. The Waukesha Roline emergency generator engine is an existing non-emergency SI 4SLB RICE, and therefore must meet the inspection and maintenance requirements of Table 2d, row 5 (§63.6603(a)). The unit must be operated and

maintained according to a maintenance plan (§63.6625(e)(3)) and must be fitted with a non-resettable hour meter (§63.6625(f)). The unit must be operated according to the requirements of §63.6640(f) in order to be considered an emergency stationary RICE.

**NSPS K, Ka and Kb** (*Standards of Performance for Storage Vessels*)

**EU T-11 thru T-17** – These regulations are not applicable. The capacities of these tanks are less than the applicable thresholds of each regulation.

**NSPS OOOO** (*Standards of Performance for Crude Oil and Natural Gas Production, Transmission and Distribution for which Construction, Modification or Reconstruction Commenced After August 23, 2011, and on or before September 18, 2015*)

**EU E-1** – This regulation is not applicable. The compressor associated with this compressor engine commenced construction January 18, 1994, prior to August 23, 2011 (§60.5365(c)).

**EU E-2** – This regulation is not applicable. The compressor associated with this compressor engine commenced construction in October 1993 prior to August 23, 2011 (§60.5365(c)).

**EU T-11 and T-12** – This regulation is not applicable. The tanks commenced construction in 1976, prior to August 23, 2011 (§60.5365(e)).

**EU T-13 through T-16** – This regulation is not applicable. The tanks commenced construction after August 23, 2011 (§60.5365(e)).

**EU T-17** - This regulation is not applicable. The tank commenced construction after August 23, 2011 (§60.5365(e)).

**NSPS OOOOa** (*Standards of Performance for Crude Oil and Natural Gas Facilities for which Construction, Modification or Reconstruction Commenced After September 18, 2015*)

**EU E-1** – This regulation is not applicable. The compressor associated with this reciprocating engine is replacing compression of greater total horsepower and thus does not trigger a modification of the compressor station for purposes of §60.5397a (§60.5365a(j)(2)).

**EU E-2** - This regulation is not applicable. The compressor associated with this reciprocating engine is replacing compression of greater total horsepower and thus does not trigger a modification of the compressor station for purposes of §60.5397a (§60.5365a(j)(2)).

**EU T-13 through T-16** – This regulation is not applicable. Although the tanks commenced construction after August 23, 2011, the potential to emit VOC from each tank is less than 6 TPY (§60.5365a(e)).

**EU T-17** - This regulation is not applicable. Although the tank commenced construction after August 23, 2011, the potential to emit VOC from the tank is less than 6 TPY (§60.5365a(e)).

**Estimated Allowable and Actual Emissions**

The attached emissions workbook estimates the allowable (potential) emissions of criteria, HAP and GHG emissions from the facility. As it is anticipated that the facility will operate continuously (24 hours per day, 365 days per year), total actual emissions during the upcoming consecutive 12 months may be equal to the allowable emissions.

**Other**

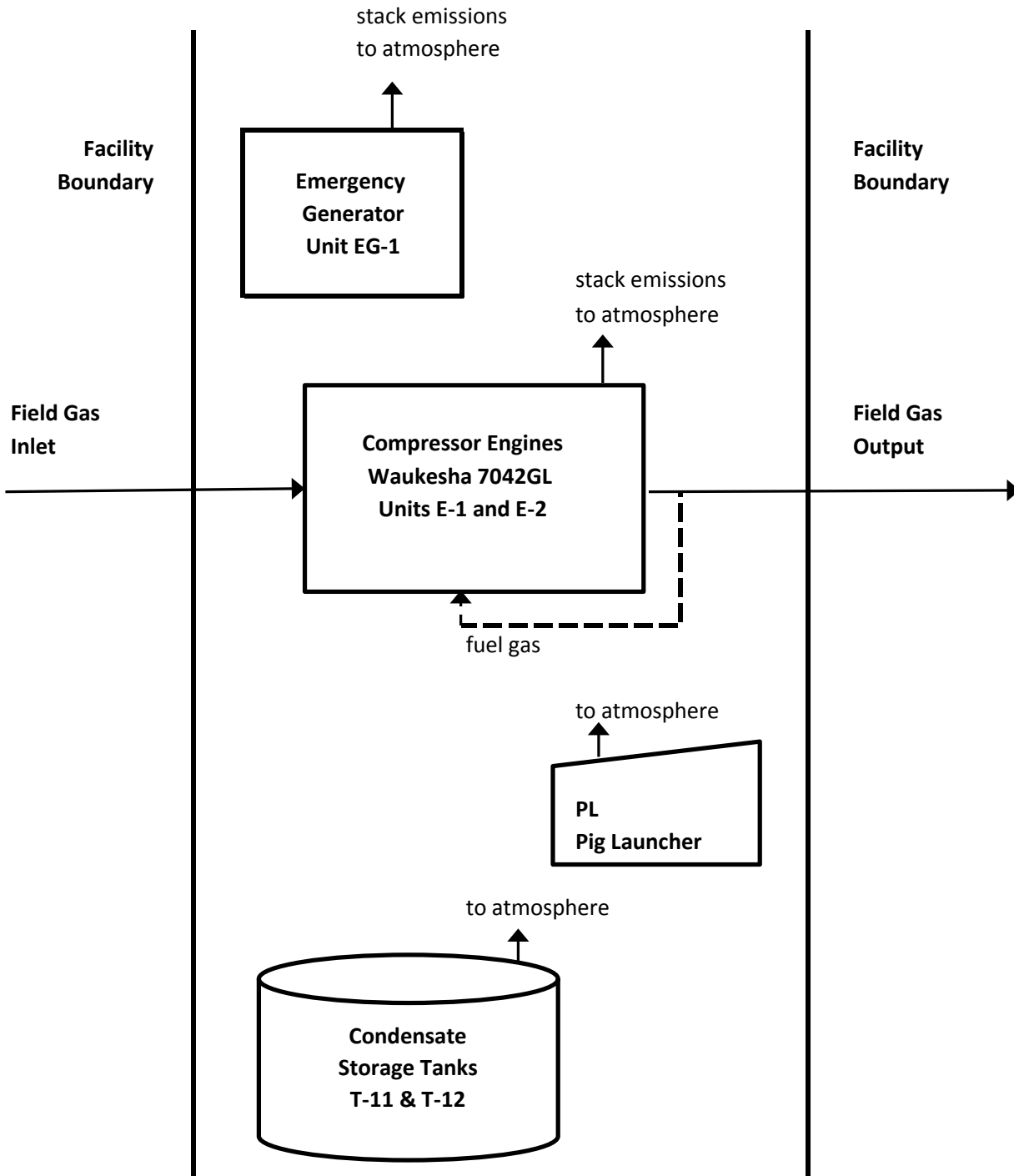
Other than the following site map, facility layout diagram and process flow diagram, no other information is being provided with this registration.







### Ojito Compressor Station Process Flow Diagram



## Facility Total Projected Emissions (Criteria Pollutants)

Company: **Harvest Four Corners, LLC**

Facility: **Ojito Compressor Station**

Date/Rev: **August 2019, Revision 0**

Unit Number	Description	NOX		CO		VOC		SOX		TSP		PM10		PM2.5	
		pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy
EU-1	Waukesha 7042GL	3.63	15.90	6.41	28.08	2.42	10.60	5E-03	0.02	0.08	0.35	0.08	0.35	0.08	0.35
EU-2	Waukesha 7042GL	3.63	15.90	6.41	28.08	2.42	10.60	5E-03	0.02	0.08	0.35	0.08	0.35	0.08	0.35
Gen	Waukesha H884U	3.96	0.99	3.42	0.86	0.06	0.01	--	--	--	--	--	--	--	--
T-11	4200 gal Condensate Tank	--	--	--	--	--	10.08	--	--	--	--	--	--	--	--
T-12	4200 gal Condensate Tank	--	--	--	--	--	1.02	--	--	--	--	--	--	--	--
T-13	500 gal Lube Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-14	500 gal Used Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-15	500 gal Lube Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-16	500 gal Used Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-17	25 bbl Skid Drain Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--
F-1	Fugitive Emissions	--	--	--	--	1.01	4.42	--	--	--	--	--	--	--	--
SSM	SSM Emissions	--	--	--	--	--	7.66	--	--	--	--	--	--	--	--
PL	Pig Launcher Emissions	--	--	--	--	--	6.51	--	--	--	--	--	--	--	--
TL	Truck Loading Emissions	--	--	--	--	53.26	0.15	--	--	--	--	--	--	--	--
<b>Total:</b>		11.22	32.78	16.24	57.02	59.17	51.05	0.01	0.04	0.16	0.70	0.16	0.70	0.16	0.70

Equipment in red font is the focus of the August 2019 Part 2 FIP Registration

## Facility Total Projected Emissions Hazardous Air Pollutants)

Company: Harvest Four Corners, LLC

Facility: Ojito Compressor Station

Date/Rev: August 2019, Revision 0

Unit Number	Description	Total HAPs		Formaldehyde		n-Hexane		Benzene		Toluene		Ethylbenzene		Xylenes		224 Trimethylpentane	
		pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy	pph	tpy
EU-1	Waukesha 7042GL	0.43	1.87	0.41	1.78	--	--	0.01	0.06	0.01	0.02	--	--	3.38E-03	0.01	--	--
EU-2	Waukesha 7042GL	0.43	1.87	0.41	1.78	--	--	0.01	0.06	0.01	0.02	--	--	3.38E-03	0.01	--	--
Gen	Waukesha H884U	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-11	Condensate Tank	--	0.31	--	--	--	0.27	--	0.04	--	0	--	0.0011	--	0.0012	--	0.0023
T-12	Condensate Tank	--	0.05	--	--	--	0.05	--	0.0020	--	0	--	6.50E-05	--	7.00E-05	--	0.0002
T-13	500 gal Lube Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-14	500 gal Used Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-15	500 gal Lube Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-16	500 gal Used Oil Storage Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
T-17	25 bbl Skid Drain Tank	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--	--
F-1	Fugitive Emissions	0.02	0.10	--	--	0.02	0.08	0.002	0.01	0.002	0.01	0.0000	0.0002	0.000	0.001	0.0004	0.0017
SSM	SSM Emissions	--	0.18	--	--	--	0.14	--	0.02	--	0.02	--	0.0004	--	0.002	--	0.0026
PL	Pig Launcher Emissions	--	0.15	--	--	--	0.12	--	0.01	--	0.01	--	0.000	--	0.002	--	0.002
TL	Truck Loading Emissions	2.56	0.01	--	--	2.44	0.007	0.11	0.0003	--	--	0.003	9.30E-06	0.004	1.00E-05	0.009	2.50E-05
	<b>Total</b>	3.44	4.56	0.81	3.57	2.46	0.67	0.13	0.19	0.012	0.08	0.003	0.002	0.011	0.04	0.009	0.009

Equipment in red font is the focus of the August 2019 Part 2 FIP Registration

### Green House Gas Emissions Data and Calculations

Sources	Facility Total Emissions				
	CO2 tpy	CH4 tpy	N2O tpy	GHG tpy	CO2e tpy
Engine & Turbine Exhaust	11,305.11	0.21	0.02	11,305.34	11316.78
SSM Blowdowns	0.60	21.92	--	22.52	548.63
Reciprocating Compressor Venting	2.85	103.73	--	106.58	2596.17
Pig Launcher	0.51	18.63	--	19.15	466.34
Equipment Leaks	0.20	7.24	--	7.44	181.30
Natural Gas Pneumatic Device Venting	1.27	46.03	--	47.30	1152.03
Natural Gas Driven Pneumatic Pump Venting	0.05	1.96	--	2.02	49.13
Storage Tanks	0.09	1.08	--	1.16	26.97
<b>Total</b>	<b>11,310.67</b>	<b>200.81</b>	<b>0.02</b>	<b>11,511.51</b>	<b>16,337.34</b>

#### Engine & Turbine Exhaust Emissions

Unit Numbers	Description	Emission Factors			Emission Rates		
		CO2 kg/MMBtu	CH4 kg/MMBtu	N2O kg/MMBtu	CO2 tpy	CH4 tpy	N2O tpy
EU-1	Engine	53.06	0.001	0.0001	5,652.55	0.11	0.01
EU-2	Engine	53.06	0.001	0.0001	5,652.55	0.11	0.01
	<b>Total</b>				<b>11,305.11</b>	<b>0.21</b>	<b>0.02</b>

The emissions factors are taken from 40 CFR 98, Subpart C, Tables C-1 & C-2  
 Emission Rates (tpy) = kg/MMBtu x 2.2 lb/kg x MMBtu/yr / 2,000 lb/ton

Unit Numbers	Description	Fuel Types	Operating Times, hr/yr	LHV Design Heat Rates, MMBtu/hr	HHV	
					Design Heat Rates, MMBtu/hr	Fuel Usages, MMBtu/yr
EU-1 - EU-2	Engines	Nat. Gas	8,760	9.95	11.06	96,847

The fuel types and operating times are provided by Harvest  
 The LHV design heat rates are taken from manufacturers data  
 HHV Design Heat Rates (MMBtu/hr) = LHV Design Heat Rates (MMBtu/hr) / 0.9 LHV/HHV  
 HHV Fuel Usages (MMBtu/yr) = HHV Design Heat Rates (MMBtu/hr) x hr/yr

#### SSM Blowdown Emissions

Unit Numbers	Description	Total Gas Losses, scf/yr	CO2 Emission Factors, lb/scf	CH4 Emission Factors, lb/scf	Emission Rates	
					CO2, tpy	CH4, tpy
SSM	SSM Blowdowns	1,300,000	0.0009	0.0337	0.60	21.92

The annual blowdown volumes are calculated from data provided by Harvest  
 The CO2 and CH4 emission factors are calculated from the facility extended gas analysis  
 Emission Rates (tpy) = scf/yr x lb/scf / 2,000 lb/ton

## Green House Gas Emissions Data and Calculations

### Reciprocating Compressor Venting Emissions

Unit Numbers	Description	Emission Rates	
		CO2 tpy	CH4 tpy
NA	Blowdown Valve Leakage	0.27	9.91
NA	Rod Packing Emissions	2.57	93.82
NA	Isolation Valve Leakage	0.00	0.00
	Total	2.85	103.73

Operating or standby mode - includes blowdown valve leakage through blowdown vent stack

Operating mode - includes rod packing emissions

Non-operating depressurized mode - includes isolation valve leakage through open blowdown vents (without blind flanges)

Rod packing gas emissions assume 4 cylinders per compressor

A combination of equations W-26 & W-36 (Subpart W) is used to calculate reciprocating compressor emissions

As the NMED requires CO2 & CH4 emissions rather than CO2e emissions, it is not necessary to include the global warming potential from equation W-36

CO2 Emission Rates (tpy) = # x scf/hr x hr/yr x (CO2 Mole Percent (%) / 100) x CO2 Density (kg/scf) x (2,204.6 lb/tonne / 2,000 lb/ton) / 1,000 kg/tonne

CH4 Emission Rates (tpy) = # x scf/hr x hr/yr x (CH4 Mole Percent (%) / 100) x CH4 Density (kg/scf) x (2,204.6 lb/tonne / 2,000 lb/ton) / 1,000 kg/tonne

Unit Numbers	Description	Number of Compressors #	Gas Emissions, scf/hr	Operating Times, hr/yr	CO2 Mole Percents, %	CH4 Mole Percents, %	CO2 Density, kg/scf	CH4 Density, kg/scf
NA	Blowdown Valve Leakage	2	33.5	8,760	0.80	79.77	0.0526	0.0192
NA	Rod Packing Emissions	2	317.2	8,760	0.80	79.77	0.0526	0.0192
NA	Blowdown Valve Leakage (Standby)	2	10.5	0	0.80	79.77	0.0526	0.0192

The number of compressors are provided by Harvest

Blowdown valve leakage (33.5 scf/hr) and rod packing emissions occur in operating mode

Blowdown valve leakage (10.5 scf/hr) occurs in standby pressurized mode

Emission factors are the three year rolling average (2012-2014) of all measurements in the Harvest Four Corners, LLC compressor fleet located at natural gas processing plants

The operating times (the average operating times for all station compressors combined) are provided by Harvest

The facility CO2 and CH4 contents are taken from the facility extended gas analysis

The CO2 & CH4 densities (kg/scf) are taken from Subpart W, Paragraph 98.233(v)

### Pig Launcher Emissions

Unit Numbers	Description	Total Gas Losses, scf/yr	CO2 Emission Factors, lb/scf	CH4 Emission Factors, lb/scf	Emission Rates	
					CO2, tpy	CH4, tpy
PL	Pig Launcher	1,105,000	0.0009	0.0337	0.51	18.63
	Total				0.51	18.63

The annual blowdown volumes are calculated from data provided by Harvest

The CO2 and CH4 emission factors are calculated from the facility extended gas analysis

Emission Rates (tpy) = scf/yr x lb/scf / 2,000 lb/ton

### Green House Gas Emissions Data and Calculations

#### Equipment Leaks Emissions

Unit Numbers	Description	Emission Rates	
		CO2, tpy	CH4, tpy
NA	Valves	0.2	5.6
NA	Connectors	0.0	0.7
NA	Open-Ended Lines	0.0	0.4
NA	Pressure Relief Valves	0.0	0.5
	Total	0.2	7.2

A combination of equations W-31 & W-36 (Subpart W) is used to calculate uncombusted CO2 & CH4 emissions

As the NMED requires CO2 & CH4 emissions rather than CO2e emissions, it is not necessary to include the global warming potential from equation W-36

$$\text{CO2 Emission Rate (tpy)} = \# \times \text{scf/hr/component} \times (\text{CO2 Content (mole \%)} / 100) \times \text{hr/yr} \times \text{CO2 Density (kg/scf)} \times (2,204.6 \text{ lb/tonne} / 2,000 \text{ lb/ton}) / 1,000 \text{ kg/tonne}$$

$$\text{CH4 Emission Rate (tpy)} = \# \times \text{scf/hr/component} \times (\text{CH4 Content (mole \%)} / 100) \times \text{hr/yr} \times \text{CH4 Density (kg/scf)} \times (2,204.6 \text{ lb/tonne} / 2,000 \text{ lb/ton}) / 1,000 \text{ kg/tonne}$$

Unit Numbers	Description	Number of Components, #	Emission Factors, scf/hr /component	CO2 Contents, mole %	CH4 Contents, mole %	Operating Times, hr/yr	CO2 Density, kg/scf	CH4 Density, kg/scf
NA	Valves	315	0.121	0.80	79.77	8,760	0.0526	0.0192
NA	Connectors	263	0.017	0.80	79.77	8,760	0.0526	0.0192
NA	Open-Ended Lines	88	0.031	0.80	79.77	8,760	0.0526	0.0192
NA	Pressure Relief Valves	19	0.193	0.80	79.77	8,760	0.0526	0.0192

The number of sources are calculated based on the number of compressors and dehydrators at the station (see criteria pollutant and HAP equipment leaks calculations)

The emission factors are taken from Subpart W, Table W-1A (Western U.S. - Gas Service)

The facility CO2 and CH4 contents are taken from the facility extended gas analysis

The operating times are provided by Harvest (default is the entire year)

The CO2 & CH4 densities are taken from Subpart W, Paragraph 98.233(v)

#### Natural Gas Pneumatic Device Venting Emissions

Unit Numbers	Description	Number of Devices, #	Emission Factors, scf/hr/device	Operating Times, hr/yr	Emission Rates	
					CO2 tpy	CH4 tpy
NA	Continuous High Bleed Pneumatic Devices	0	37.3	8,760	0.00	0.00
NA	Intermittent Bleed Pneumatic Devices	23	13.5	8,760	1.26	45.83
NA	Continuous Low Bleed Pneumatic Devices	1	1.39	8,760	0.01	0.21
	Total				1.27	46.03

The number of devices are provided by Harvest

The emission factors are taken from Subpart W, Table W-1A (Western U.S. - Gas Service)

The operating times are provided by Harvest

Equation W-1 (Subpart W) is used to calculate CO2 & CH4 emissions

As the NMED requires CO2 & CH4 emissions in addition to CO2e emissions, it is necessary to divide by the global warming potentials

$$\text{CO2 Emission Rates (tpy)} = \# \times \text{scf/hr/device} \times (\text{CO2 Content (mole \%)} / 100) \times \text{CO2 Conversion Factors (tonne CO2e/scf)} \times \text{hr/yr} \times (2,204.6 \text{ lb/tonne} / 2,000 \text{ lb/ton}) / \text{CO2 Global Warming Potentials (tonne CO2e/tonne CO2)}$$

$$\text{CH4 Emission Rates (tpy)} = \# \times \text{scf/hr/device} \times (\text{CH4 Contents (mole \%)} / 100) \times \text{CH4 Conversion Factors (tonne CO2e/scf)} \times \text{hr/yr} \times (2,204.6 \text{ lb/tonne} / 2,000 \text{ lb/ton}) / \text{CH4 Global Warming Potentials (tonne CO2e/tonne CH4)}$$

Unit Numbers	Description	CO2 Contents, mole %	CH4 Contents, mole %	CO2 Conversion Factors, tonne CO2e /scf	CH4 Conversion Factors, tonne CO2e /scf	CO2 Global Warming Potentials, tonne CO2e /tonne CO2	CH4 Global Warming Potentials, tonne CO2e /tonne CH4
NA	Continuous High Bleed Pneumatic Devices	0.80	79.77	5.262E-05	4.790E-04	1	25
NA	Continuous Low Bleed Pneumatic Devices	0.80	79.77	5.262E-05	4.790E-04	1	25
NA	Intermittent Bleed Pneumatic Devices	0.80	79.77	5.262E-05	4.790E-04	1	25

The facility CO2 and CH4 contents are taken from the facility extended gas analysis

### Green House Gas Emissions Data and Calculations

The conversion factors are taken from Subpart W, Paragraph 98.233(a)  
 The global warming potentials are taken from 40 CFR Part 98, Table A-1

#### Natural Gas Driven Pneumatic Pump Venting Emissions

##### Emission Rates

Unit Number	Description	Number of Pumps, #	Emission Factor, scf/hr/pump	Operating Time, hr/yr	Emission Rates	
					CO2, tpy	CH4, tpy
NA	Pneumatic Pump Venting	1	13.3	8,760	0.05	1.96

The number of pumps are provided by Harvest

The emission factor is taken from Subpart W, Table W-1A (Western U.S. - Gas Service)

The operating time is provided by Harvest (default is the entire year)

Equation W-2 (Subpart W) is used to calculate CO2 & CH4 emissions

As the NMED requires CO2 & CH4 emissions in addition to CO2e emissions, it is necessary to divide by the global warming potentials

CO2 Emission Rate (tpy) = # x scf/hr/pump x (CO2 Content (mole %) / 100) x CO2 Conversion Factor (tonne CO2e/scf) x hr/yr x (2,204.6 lb/tonne / 2,000 lb/ton) / CO2 Global Warming Potentials (tonne CO2e/tonne CO2)

CH4 Emission Rate (tpy) = # x scf/hr/pump x (CH4 Content (mole %) / 100) x CH4 Conversion Factor (tonne CO2e/scf) x hr/yr x (2,204.6 lb/tonne / 2,000 lb/ton) / CH4 Global Warming Potentials (tonne CO2e/tonne CH4)

Unit Number	Description	CO2 Content, mole %	CH4 Content, mole %	CO2 Conversion Factor, tonne CO2e /scf	CH4 Conversion Factor, tonne CO2e /scf	CO2 Global Warming Potential, tonne CO2e /tonne CO2	CH4 Global Warming Potential, tonne CO2e /tonne CH4
NA	Pneumatic Pump Venting	0.80	79.77	5.262E-05	4.790E-04	1	25

The facility CO2 and CH4 contents are taken from the facility extended gas analysis

The conversion factors are taken from Subpart W, Paragraph 98.233(a)

The operating time is provided by Harvest (the default is the entire year)

The global warming potentials are taken from 40 CFR Part 98, Table A-1

#### Storage Tank Emissions

Unit Number	Description	Emission Rates	
		CO2 tpy	CH4 tpy
T11	Storage Tank	0.09	1.08
T12	Storage Tank	0.00	0.00
	Total	0.09	1.08

The emission rates are taken from ProMax output files, as applicable

### Green House Gas Emissions Data and Calculations

#### Gas Stream Composition

Components	Mole Percents, %	Molecular Weights lb/lb-mole	Component Weights lb/lb-mole	Weight Percent of Total %	Emission Factors lb/scf
Carbon Dioxide	0.7991	44.01	0.35	1.6818	0.0009
Hydrogen Sulfide	0.0000	34.07	0.00	0.0000	0.0000
Nitrogen	0.4059	28.01	0.11	0.5437	0.0003
Methane	79.7710	16.04	12.80	61.1898	0.0337
Ethane	10.5685	30.07	3.18	15.1976	0.0084
Propane	4.9525	44.09	2.18	10.4422	0.0058
IsoButane	0.8509	58.12	0.49	2.3650	0.0013
Normal Butane	1.3870	58.12	0.81	3.8551	0.0021
IsoPentane	0.4532	72.15	0.33	1.5637	0.0009
Normal Pentane	0.3398	72.15	0.25	1.1724	0.0006
Cyclopentane	0.0134	70.14	0.01	0.0449	0.0000
n-Hexane	0.0966	86.17	0.08	0.3981	0.0002
Cyclohexane	0.0320	84.16	0.03	0.1288	0.0001
Other Hexanes	0.2216	86.18	0.19	0.9133	0.0005
Heptanes	0.0433	100.20	0.04	0.2075	0.0001
Methylcyclohexane	0.0324	98.19	0.03	0.1521	0.0001
2,2,4-Trimethylpentane	0.0015	100.21	0.00	0.0072	0.0000
Benzene	0.0125	78.11	0.01	0.0467	0.0000
Toluene	0.0101	92.14	0.01	0.0445	0.0000
Ethylbenzene	0.0002	106.17	0.00	0.0010	0.0000
Xylenes	0.0013	106.17	0.00	0.0066	0.0000
C8+ heavies	0.0072	110.00	0.01	0.0379	0.0000
Total	100.0000		20.91	100.0000	0.0551
VOC			4.47	--	0.0118

Gas stream composition obtained from Ojito extended gas analysis dated 2/1/19

Component Weights (lb/lb-mole) = [Mole Percents (%) / 100] x Molecular Weights (lb/lb-mole)

Weight Percent of Total (%) = 100 x Component Weights (lb/lb-mole) / Total Component Weight (lb/lb-mole)

Emission Factors (lb/scf) = [Mole Percents (%) / 100] x Molecular Weights (lb/lb-mole) / 379.4 scf/lb-mole



## Engine Exhaust Emissions Calculations

Unit Number: **EU-1 and EU-2**

Description: Waukesha L7042GL **(4SLB equipped with low-speed turbocharger)**

Note: The data on this worksheet applies to each individual emissions unit identified above.

### Horsepower Calculations

<b>6,960</b> ft above MSL	Elevation	
<b>1,232</b> hp	Nameplate hp	Mfg. data
1,097 hp	Mfg. Site-rated hp	Mfg. product bulletin Power Derate, S8154-6, April 2001 (loss of 2% for every 1,000 ft over 1,500 ft)

### Engine Specifications

<b>1000</b> rpm	Engine rpm	Mfg. data
<b>7040</b> cu in	Engine displacement	Mfg. data
123.46 psi	BMEP	Mfg. data $(+[(792,000 \times \text{Mfg. Site-rated hp}) / (\text{rpm} * \text{in}^3)])$

### Fuel Consumption

<b>7272</b> Btu/hp-hr	Brake specific fuel consumption	Mfg. data (carried forward from previous appl.)
7.98 MMBtu/hr	Hourly fuel consumption	Btu/hp-hr x Mfg. site-rated hp / 1,000,000
8,867 scf/hr	Hourly fuel consumption	MMBtu/hr x 1,000,000 / Btu/scf
<b>8,760</b> hr/yr	Annual operating time	Harvest Four Corners LLC
69,909 MMBtu/yr	Annual fuel consumption	MMBtu/hr x hr/yr
77.68 MMscf/yr	Annual fuel consumption	scf/hr x hr/yr / 1,000,000
<b>900</b> Btu/scf	Field gas heating value	Nominal heat content

### Steady-State Emission Rates

Pollutants	Emission Factors, g/hp-hr	Uncontrolled Emission Rates	
		pph	tpy
NOX	<b>1.50</b>	3.63	15.90
CO	<b>2.65</b>	6.41	28.08
VOC	<b>1.00</b>	2.42	10.60

NO<sub>x</sub>, CO & VOC emissions taken from Waukesha Bulletin **7005 0102**

Uncontrolled Emission Rates (pph) = g/hp-hr x Mfg. Site-rated hp / 453.59 g/lb

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

## Engine Exhaust Emissions Calculations

Unit Number: **EU-1 and EU-2**

Description: Waukesha L7042GL *(4SLB equipped with low-speed turbocharger)*

Pollutants	Emission Factors, lb/MMBtu	Uncontrolled Emission Rates	
		pph	tpy
SO2	5.88E-04	4.69E-03	0.02
TSP	9.99E-03	0.08	0.35
PM10	9.99E-03	0.08	0.35
PM2.5	9.99E-03	0.08	0.35

Emission factors taken from AP-42, Table 3.2-2

Particulate factors include both filterable and condensable emissions

Uncontrolled Emission Rates (pph) = lb/MMBtu x MMBtu/hr

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

### Exhaust Parameters

<b>802</b> °F	Stack exit temperature	Mfg. data (carried forward from previous appl.)
<b>8156</b> acfm	135.933333 Stack flowrate	Mfg. data (carried forward from previous appl.)
<b>1.02</b> ft	Stack exit diameter	Harvest Four Corners LLC
0.82 ft <sup>2</sup>	Stack exit area	3.1416 x ((ft / 2) ^2)
162.54 fps	Stack exit velocity	acfm / ft <sup>2</sup> / 60 sec/min
<b>22.00</b> ft	Stack height	Harvest Four Corners LLC

**GRI-HAPCalc® 3.0**  
**Engines Report**

<b>Facility ID:</b>	OJITO	<b>Notes:</b>
<b>Operation Type:</b>	COMPRESSOR STATION	
<b>Facility Name:</b>	OJITO COMPRESSOR STATION	
<b>User Name:</b>		
<b>Units of Measure:</b>	U.S. STANDARD	

*Note: Emissions less than 5.00E-09 tons (or tonnes) per year are considered insignificant and are treated as zero. These emissions are indicated on the report with a "0". Emissions between 5.00E-09 and 5.00E-05 tons (or tonnes) per year are represented on the report with "0.0000".*

**Engine Unit**

Unit Name: EU-1,2  
 Hours of Operation: 8,760 Yearly  
 Rate Power: 1,097 hp  
 Fuel Type: FIELD GAS  
 Engine Type: 4-Stroke, Lean Burn  
 Emission Factor Set: FIELD > EPA > LITERATURE  
 Additional EF Set: -NONE-

**Calculated Emissions (ton/yr)**

<u>Chemical Name</u>	<u>Emissions</u>	<u>Emission Factor</u>	<u>Emission Factor Set</u>
<b>HAPs</b>			
Formaldehyde	1.7812	0.16830000 g/bhp-hr	GRI Literature
Benzene	0.0550	0.00520000 g/bhp-hr	GRI Literature
Toluene	0.0222	0.00210000 g/bhp-hr	GRI Literature
Xylenes(m,p,o)	0.0148	0.00140000 g/bhp-hr	GRI Literature
<b>Total</b>	1.8732		

## 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.  $WR^2 = 155000 \text{ lb-in}^2$ ; 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.

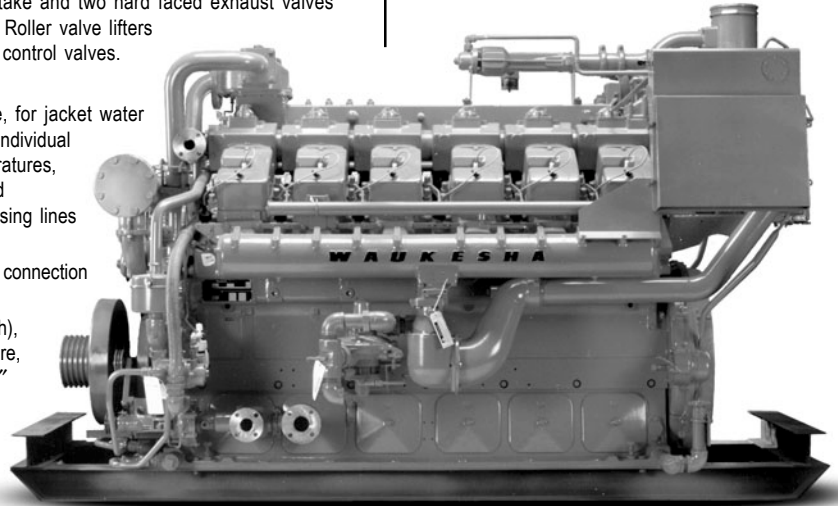
# Waukesha<sup>®</sup>

## VHP

# L7042GL

## VHP™ Series Gas Engine

### 886 - 1547 BHP



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

## SPECIFICATIONS

<b>Cylinders</b> V 12	<b>Starting System</b> 125 - 150 psi air/gas 24/32V electric
<b>Piston Displacement</b> 7040 cu. in. (115 L)	<b>Dry Weight</b> 21,000 lb. (9525 kg)
<b>Bore &amp; Stroke</b> 9.375" x 8.5" (238 x 216 mm)	<b>Full Load Exhaust Emissions</b> Nox - 1.50 g/bhp-hr CO - 2.65 g/bhp-hr HC - 1.00 g/bhp-hr (non-methane)
<b>Compression Ratio</b> 10.5:1	
<b>Jacket Water System Capacity</b> 107 gal. (405 L)	
<b>Lube Oil Capacity</b> 90 gal. (340 L)	

Waukesha Engine  
 **ISO 9001**  
CERTIFIED

## POWER RATINGS: L7042GL VHP SERIES GAS ENGINES

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

<sup>1</sup>High speed turbocharger match – 1001-1200 rpm

<sup>2</sup>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 T<sub>cr</sub> (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/ft<sup>3</sup> (35.3 MJ/nm<sup>3</sup>) SLHV value, with a 91 Waukesha Knock Index®.

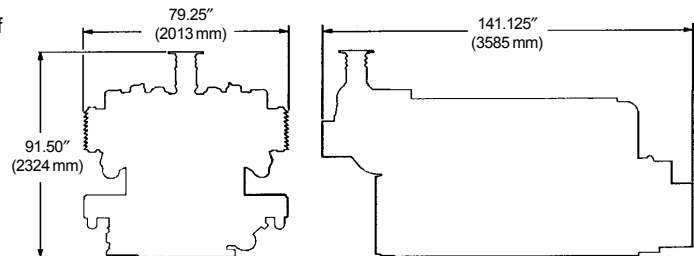
For conditions or fuels other than standard, the Waukesha Engine Sales Engineering Department.

## PERFORMANCE: L7042GL VHP SERIES GAS ENGINES

English		130° F ICW		85° F ICW		Metric		54° C ICW		29° C ICW	
Low NO <sub>x</sub> Settings	RPM	1200	1000	1200	1000	RPM	1200	1000	1200	1000	
	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	
	NO <sub>x</sub> (grams/bhp-hr)	0.90	0.90	0.70	0.70	NO <sub>x</sub> (g/nm <sup>3</sup> )	0.37	0.37	0.29	0.29	
	CO (grams/bhp-hr)	2.75	2.65	2.65	2.55	CO (g/nm <sup>3</sup> )	1.14	1.10	1.10	1.05	
	NMHC (grams/bhp-hr)	1.00	1.00	1.10	1.10	NMHC (g/nm <sup>3</sup> )	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	
	NO <sub>x</sub> (grams/bhp-hr)	1.50	1.60	1.30	1.40	NO <sub>x</sub> (g/nm <sup>3</sup> )	0.62	0.66	0.54	0.58	
	CO (grams/bhp-hr)	3.00	2.75	2.90	2.65	CO (g/nm <sup>3</sup> )	1.24	1.14	1.20	1.10	
	NMHC (grams/bhp-hr)	0.70	1.00	0.80	1.10	NMHC (g/nm <sup>3</sup> )	0.29	0.41	0.33	0.45	

### NOTES:

- Performance ratings are based on ISO 3046/1-1995 with mechanical efficiency of 90% and T<sub>cr</sub> limited to ± 10° F.
- Fuel consumptions based on ISO 3046/1-1995 with a +5% tolerance for commercial quality natural gas having a 900 Btu/ft<sup>3</sup> saturated low heat value.
- 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).
- Data will vary due to variations in site conditions. For conditions and/or fuels other than standard, consult the Waukesha Engine Sales Engineering Department.



Waukesha

WAUKESHA ENGINE  
DRESSER, INC.

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Bulletin 7005 0102

WAUKESHA ENGINE  
DRESSER INDUSTRIAL PRODUCTS, B.V.

Farmsumerweg 43, Postbus 330  
9900 AH Appingedam, The Netherlands  
Phone: (31) 596-652222 Fax: (31) 596-628111

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.

## Engine Exhaust Emissions Calculations

Unit Number: **Gen**  
 Description: Emergency generator, Waukesha RoiLine H884U  
 Type: Four Stroke Rich Burn (Naturally Aspirated)

Note: The data on this worksheet applies to each individual emissions unit identified above.

### Horsepower Calculations

**6,960** ft above MSL  
**180** hp  
**500** hr/yr

Elevation  
 Nameplate hp  
 Annual operating time

From previous applications  
 Harvest Four Corners LLC

### Steady-State Emission Rates

Pollutants	Emission Factors, lb/hp-hr	Uncontrolled Emission Rates,	
		pph	tpy
NOX	<b>2.20E-02</b>	3.96	0.99
CO	<b>1.90E-02</b>	3.42	0.86
VOC	<b>3.09E-04</b>	0.056	0.014

Emission factors taken from **AP-42 Section 3.2, Table 3.2-2, 1/95**

Uncontrolled Emission Rates (pph) = g/hp-hr x Mfg. Site-rated hp / 453.6 g/lb

Uncontrolled Emission Rates (tpy) = Uncontrolled Emission Rates (pph) x hr/yr / 2,000 lb/ton

SO<sub>2</sub> and Particulate (PM<sub>10</sub> & PM<sub>2.5</sub>) emissions are assumed negligible

Table 3.2-2 (English Units). CRITERIA EMISSION FACTORS FOR UNCONTROLLED NATURAL GAS PRIME MOVERS<sup>a</sup>

EMISSION FACTOR RATING: A (except as noted)

Pollutant	Gas Turbines (SCC 2-02-002-01)		2-Cycle Lean Burn (SCC 2-02-002-52)		4-Cycle Lean Burn (SCC 2-02-002-53)		4-Cycle Rich Burn (SCC 2-02-002-54)	
	lb/hp-hr (power output)	lb/MMBtu (fuel input)	lb/hp-hr (power output)	lb/MMBtu (fuel input)	lb/hp-hr (power output)	lb/MMBtu (fuel input)	lb/hp-hr (power output)	lb/MMBtu (fuel input)
NO <sub>x</sub>	2.87 E-03	0.34	0.024	2.7	0.026	3.2	0.022	2.3
CO	1.83 E-03	0.17	3.31 E-03	0.38	3.53 E-03	0.42	0.019	1.6
CO <sub>2</sub> <sup>b</sup>	0.89	110	0.89	110	0.89	110	0.89	110
TOC	3.97 E-04	0.053	0.013	1.5	0.011	1.2	2.65 E-03	0.27
TNMOC	2.20 E-05	0.002	9.48 E-04	0.11	1.59 E-03	0.18	3.09 E-04	0.03
CH <sub>4</sub>	3.75 E-04	0.051	0.012	1.4	9.04 E-03	1.1	2.43 E-03	0.24

<sup>a</sup> References 1-5. Factors are based on entire population. Factors for individual engines from specific manufacturers may vary.  
 SCC = Source Classification Code. TNMOC = total nonmethane organic compounds.

<sup>b</sup> EMISSION FACTOR RATING: B. Based on 100% conversion of the fuel carbon to CO<sub>2</sub>. CO<sub>2</sub> [lb/MMBtu] = 3.67\*C/E, where C = carbon content of fuel by weight (0.75), and E = energy content of fuel, 0.0239 MMBtu/lb. The uncontrolled CO<sub>2</sub> emission factors are also applicable to natural gas prime movers controlled by combustion modifications, NSCR, and SCR.

## Storage Tank Emissions Data and Calculations

Unit Number: **Storage tanks**  
 Description: Storage tank emissions summary

Source	Description	Uncontrolled Working / Breathing (W/B) Losses (TANKS)		Uncontrolled Flash Emissions (HYSYS or VMGSim) (ton/yr)	Total Uncontrolled Emissions (ton/yr)
		(lb/yr)	(ton/yr)		
Tank T11	Condensate Storage Tank (100 bbl)				
VOC	<i>(including flash emissions)</i>	<b>2,046.82</b>	1.02	<b>9.05</b>	10.08
Benzene		<b>4.05</b>	0.002	<b>0.04</b>	0.038
Ethylbenzene		<b>0.13</b>	6.50E-05	<b>0.001</b>	0.001
n-Hexane		<b>93.76</b>	0.05	<b>0.225</b>	0.27
Toluene		<b>0</b>	0	<b>0</b>	0
Xylenes		<b>0.14</b>	7.00E-05	<b>0.001</b>	0.001
2,2,4 Trimethylpentane		<b>0.35</b>	1.75E-04	<b>0.002</b>	0.002
Tank T12	Condensate Storage Tank (100 bbl)				
VOC	<i>(no flash emissions as this tank is an overflow tank for T-11)</i>	<b>2,046.82</b>	1.02	0	1.02
Benzene		<b>4.05</b>	0.002	0	0.002
Ethylbenzene		<b>0.13</b>	6.50E-05	0	6.50E-05
n-Hexane	<i>assume throughput = Tank T-11</i>	<b>93.76</b>	0.05	0	0.05
Toluene		<b>0</b>	0	0	0
Xylenes		<b>0.14</b>	7.00E-05	0	7.00E-05
2,2,4 Trimethylpentane		<b>0.35</b>	1.75E-04	0	1.75E-04





Bryan Research & Engineering, Inc.

**ProMax<sup>®</sup> 3.2**

with  
**TSWEET<sup>™</sup> & PROSIM<sup>™</sup>**

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## Simulation Report

Project: Ojito Tank Flash 4-5-2017.pmx

icensed to Williams Midstream Natural Gas Liquids, Inc. and Customer's Org

Client Name: Williams  
Location: Ojito  
Job: Permit Application

ProMax Filename: C:\Users\khong\Desktop\Ojito Tank Flash 4-5-2017.pmx  
ProMax Version: 3.2.13330.0  
Simulation Initiated: 4/5/2017 9:19:18 AM

### Bryan Research & Engineering, Inc.

Chemical Engineering Consultants  
P.O. Box 4747 Bryan, Texas 77805  
Office: (979) 776-5220  
FAX: (979) 776-4818  
<mailto:sales@bre.com>  
<http://www.bre.com>

Report Navigator can be activated via the ProMax Navigator Toolbar.

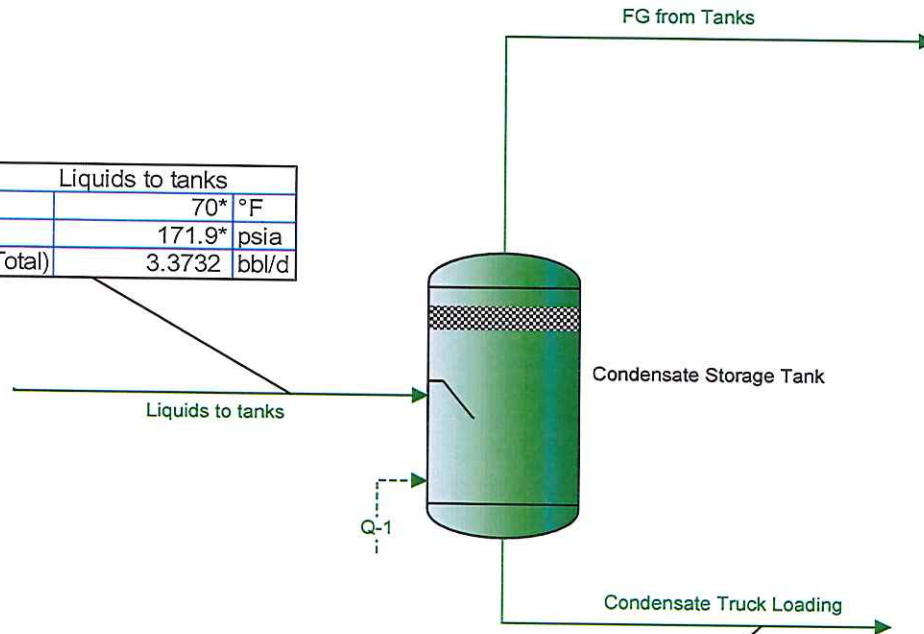
An asterisk (\*), throughout the report, denotes a user specified value.

A question mark (?) after a value, throughout the report, denotes an extrapolated or approximate value.

# Ojito Condensate Flash Emissions

Stream FG from Tanks C3+ Mass Flow =9.053 ton/yr

Properties	Liquids to tanks
Temperature(Total)	70* °F
Pressure(Total)	171.9* psia
Std Liquid Volumetric Flow(Total)	3.3732 bbl/d



Properties	Condensate Truck Loading
Temperature(Total)	65 °F
Pressure(Total)	11.9 psia
Std Liquid Volumetric Flow(Total)	3* bbl/d

Process Streams	Condensate Truck Loading	FG from Tanks	Liquids to tanks
Composition	Status: Solved	Solved	Solved
Phase: Total	From Block: Condensate Storage Tank	Condensate Storage Tank	--
	To Block: --	--	Condensate Storage Tank
<b>Mass Fraction</b>			
Nitrogen	0	0	0*
Methane	0.000166370	0.0914968	0.00763299*
Carbon Dioxide	3.82082E-05	0.00733059	0.000634389*
Ethane	0.00156936	0.130823	0.0121363*
Propane	0.0111260	0.251021	0.0307383*
Isobutane	0.0105982	0.0898366	0.0170762*
n-Butane	0.0305920	0.179439	0.0427609*
Isopentane	0.0383959	0.0833232	0.0420689*
n-Pentane	0.0421173	0.0668702	0.0441410*
Isohexane	0.0537157	0.0334483	0.0520587*
n-Hexane	0.0434105	0.0191722	0.0414289*
2,2,4-Trimethylpentane	0.00117485	0.000180200	0.00109353*
Benzene	0.00681456	0.00304708	0.00650655*
Heptane	0.228503	0.0315078	0.210562*
Toluene	0	0	0*
Octane	0.253246	0.0106546	0.233413*
Ethylbenzene	0.00243479	8.82787E-05	0.00224296*
m-Xylene	0.00312129	9.38779E-05	0.00287379*
Nonane	0.0596093	0.000782392	0.0548000*
C10	0.215367	0.000885707	0.197832*
<b>Mass Flow</b>	<b>lb/h</b>	<b>lb/h</b>	<b>lb/h</b>
Nitrogen	0	0	0*
Methane	0.00501389	0.245503	0.250517*
Carbon Dioxide	0.00115148	0.0196694	0.0208208*
Ethane	0.0472959	0.351022	0.398317*
Propane	0.335305	0.673536	1.00884*
Isobutane	0.319398	0.241048	0.560446*
n-Butane	0.921955	0.481469	1.40342*
Isopentane	1.15714	0.223572	1.38071*
n-Pentane	1.26929	0.179425	1.44872*
Isohexane	1.61883	0.0897481	1.70858*
n-Hexane	1.30827	0.0514427	1.35971*
2,2,4-Trimethylpentane	0.0354066	0.000483510	0.0358901*
Benzene	0.205371	0.00817588	0.213547*
Heptane	6.82615	0.0845413	6.91070*
Toluene	0	0	0*
Octane	7.63208	0.0285884	7.66067*
Ethylbenzene	0.0733776	0.000236868	0.0736144*
m-Xylene	0.0940666	0.000251892	0.0943185*
Nonane	1.79645	0.00209930	1.79855*
C10	6.49053	0.00237652	6.49291*
<b>Mole Fraction</b>			
Nitrogen	0	0	0*
Methane	0.00105038	0.240640	0.04324*
Carbon Dioxide	8.79330E-05	0.00702791	0.00131*
Ethane	0.00528621	0.183568	0.03668*
Propane	0.0255555	0.240186	0.06335*
Isobutane	0.0184684	0.0652146	0.0267*
n-Butane	0.0533099	0.130259	0.06686*
Isopentane	0.0539011	0.0487271	0.05299*
n-Pentane	0.0591253	0.0391055	0.0556*
Isohexane	0.0631334	0.0163766	0.0549*
n-Hexane	0.0510215	0.00938692	0.04369*
2,2,4-Trimethylpentane	0.00104172	6.65600E-05	0.00087*
Benzene	0.00883614	0.00164589	0.00757*
Heptane	0.228950	0.0132671	0.19097*
Toluene	0	0	0*
Octane	0.224548	0.00393548	0.1857*
Ethylbenzene	0.00232286	3.50839E-05	0.00192*
m-Xylene	0.00297779	3.73092E-05	0.00246*
Nonane	0.0470740	0.000257385	0.03883*
C10	0.153310	0.000262648	0.12636*

Process Streams	Condensate Truck Loading	FG from Tanks	Liquids to tanks
Properties	Status: Solved	Solved	Solved
Phase: Total	From Block: Condensate Storage Tank	Condensate Storage Tank	--
	To Block: --	--	Condensate Storage Tank
<b>Property</b>	<b>Units</b>		
Temperature	°F	65	65*
Pressure	psia	11.9	11.9*
Molecular Weight	lb/lbmol	101.284	42.1924
Mass Density	lb/ft³	43.1053	0.0903139
Molar Flow	lbmol/h	0.297550	0.0635942
Mass Flow	lb/h	30.1371	2.68319
Liquid Volumetric Flow	gpm		3.70405
Std Liquid Volumetric Flow	sgpm	0.0875*	0.0108837
Vapor Volumetric Flow	ft³/h		29.7096
Std Vapor Volumetric Flow	MMSCFD	0.00270997	0.000579192



Certificate of Analysis  
 Number: 2030-16060333-001A

Carencro Laboratory  
 4790 NE Evangeline Thruway  
 Carencro, LA 70520  
 Phone 337-896-3055

Williams Field Services  
 Williams Field Services  
 c/o Alpha Bioscience Company  
 2030 Afton Place  
 Farmington, NM 87401

July 05, 2016

Field:  
 Station Name: ENH Reiever  
 Station Location: RIO Arriba Co, NM  
 Sample Point:  
 Analyzed: 07/05/2016 15:11:50 by GR

Sampled By: MM-GAS  
 Sample Of: Liquid Spot  
 Sample Date: 06/23/2016 12:30  
 Sample Conditions: 150 psig, @ 77 °F  
 Method: GPA-2186M/GPA-2103  
 Cylinder No: 577

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Methane	4.324	16.043	0.805	0.300	1.836
Carbon Dioxide	0.131	44.010	0.067	0.817	0.056
Ethane	3.668	30.069	1.280	0.356	2.458
Propane	6.335	44.096	3.242	0.507	4.372
Iso-Butane	2.670	58.122	1.801	0.563	2.189
n-Butane	6.686	58.122	4.510	0.584	5.280
Iso-Pentane	5.299	72.149	4.437	0.625	4.855
n-Pentane	5.560	72.149	4.656	0.631	5.049
i-Hexanes	5.490	84.675	5.394	0.669	5.517
n-Hexane	4.369	86.175	4.370	0.664	4.501
2,2,4-Trimethylpentane	0.087	114.231	0.115	0.697	0.113
Benzene	0.757	78.114	0.686	0.885	0.530
Heptanes	19.097	94.554	20.956	0.720	19.909
Toluene	NIL	NIL	NIL	NIL	NIL
Octanes	18.570	108.620	23.412	0.734	21.835
Ethylbenzene	0.192	106.167	0.237	0.872	0.186
Xylenes	0.246	106.167	0.303	0.885	0.234
Nonanes	3.883	123.996	5.591	0.753	5.081
Decanes Plus	12.636	123.673	18.138	0.775	15.999
	100.000		100.000		100.000

Calculated Physical Properties

	Total	C10+
Specific Gravity at 60°F	0.6840	0.7753
API Gravity at 60°F	75.369	51.010
Molecular Weight	86.161	123.673
Pounds per Gallon (in Vacuum)	5.703	6.464
Pounds per Gallon (in Air)	5.696	6.457
Cu. Ft. Vapor per Gallon @ 14.73 psia	25.058	19.788

*Patti L. Petro*

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis  
 Number: 2030-16060333-001A

Carencro Laboratory  
 4790 NE Evangeline Thruway  
 Carencro, LA 70520  
 Phone 337-896-3055

Williams Field Services  
 Williams Field Services  
 c/o Alpha Bioscience Company  
 2030 Afton Place  
 Farmington, NM 87401

July 05, 2016

Field:  
 Station Name: ENH Reiever  
 Station Location: RIO Arriba Co, NM  
 Sample Point:  
 Analyzed: 07/05/2016 15:11:50 by GR

Sampled By: MM-GAS  
 Sample Of: Liquid Spot  
 Sample Date: 06/23/2016 12:30  
 Sample Conditions: 150 psig, @ 77 °F  
 Method: GPA-2186M/GPA-2103  
 Cylinder No: 577

Analytical Data

Components	Mol. %	MW	Wt. %	Sp. Gravity	L.V. %
Nitrogen	NIL	28.013	NIL	0.807	NIL
Carbon Dioxide	0.131	44.010	0.067	0.817	0.056
Methane	4.324	16.043	0.805	0.300	1.836
Ethane	3.668	30.069	1.280	0.356	2.458
Propane	6.335	44.096	3.242	0.507	4.372
Iso-butane	2.670	58.122	1.801	0.563	2.189
n-Butane	6.686	58.122	4.510	0.584	5.280
Iso-pentane	5.299	72.149	4.437	0.625	4.855
n-Pentane	5.560	72.149	4.656	0.631	5.049
Hexanes	9.859	85.340	9.764	0.667	10.018
Heptanes Plus	55.468	107.856	69.438	0.744	63.887
	100.000		100.000		100.000

Calculated Physical Properties

	Total	C7+
Specific Gravity at 60°F	0.6840	0.7436
API Gravity at 60°F	75.369	58.801
Molecular Weight	86.161	107.856
Pounds per Gallon (in Vacuum)	5.703	6.199
Pounds per Gallon (in Air)	5.696	6.192
Cu. Ft. Vapor per Gallon @ 14.73 psia	25.058	21.761

*Patti L. Petro*

Hydrocarbon Laboratory Manager

Quality Assurance: The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.



Certificate of Analysis  
 Number: 2030-16060333-001A

Carencro Laboratory  
 4790 NE Evangeline Thruway  
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 Phone 337-896-3055

Williams Field Services  
 Williams Field Services  
 c/o Alpha Bioscience Company  
 2030 Afton Place  
 Farmington, NM 87401

July 05, 2016

Field:  
 Station Name: ENH Reiever  
 Station Location: RIO Arriba Co, NM  
 Sample Point:

Sampled By: MM-GAS  
 Sample Of: Liquid Spot  
 Sample Date: 06/23/2016 12:30  
 Sample Conditions: 150 psig, @ 77 °F  
 Cylinder No: 577

**Analytical Data**

Test	Method	Result	Units	Detection Limit	Lab Tech.	Analysis Date
Color Visual	Proprietary	Water White			GR	07/05/2016
API Gravity @ 60° F	ASTM D-5002	66.68	°		GR	07/05/2016
Specific Gravity @ 60/60° F	ASTM D-5002	0.7140			GR	07/05/2016
Density @ 60° F	ASTM D-5002	0.7133	g/ml		GR	07/05/2016
Shrinkage Factor	Proprietary	0.9110			GR	07/05/2016
Flash Factor	Proprietary	161.3567	Cu. Ft./S.T. Bbl		GR	07/05/2016

Hydrocarbon Laboratory Manager

Quality Assurance:

The above analyses are performed in accordance with ASTM, UOP, GPA guidelines for quality assurance, unless otherwise stated.

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

**Identification**

User Identification:	Ojito T-11 & T-12
City:	Bloomfield
State:	NM
Company:	Williams
Type of Tank:	Vertical Fixed Roof Tank
Description:	Ojito 100 bbl condensate tanks T-11 & T-12

**Tank Dimensions**

Shell Height (ft):	14.00
Diameter (ft):	7.00
Liquid Height (ft) :	14.00
Avg. Liquid Height (ft):	7.00
Volume (gallons):	4,200.00
Turnovers:	10.95
Net Throughput(gal/yr):	45,990.00
Is Tank Heated (y/n):	N

**Paint Characteristics**

Shell Color/Shade:	Gray/Light
Shell Condition:	Good
Roof Color/Shade:	Gray/Light
Roof Condition:	Good

**Roof Characteristics**

Type:	Dome
Height (ft)	0.00
Radius (ft) (Dome Roof)	7.00

**Breather Vent Settings**

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

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

**Ojito T-11 & T-12 - Vertical Fixed Roof Tank**  
**Bloomfield, NM**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Ojito 07-05-16	All	64.94	53.24	76.64	58.39	7.1163	5.6430	8.8667	62.5281			96.09	
2,2,4-Trimethylpentane (isooctane)						0.6857	0.4887	0.9450	114.2300	0.0012	0.0002	114.23	Option 2: A=6.8118, B=1257.84, C=220.74
Benzene						1.3372	0.9653	1.8208	78.1100	0.0069	0.0020	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Decane (-n)						0.0374	0.0286	0.0489	142.2900	0.1814	0.0015	142.29	Option 1: VP60 = .033211 VP70 = .041762
Ethylbenzene						0.1286	0.0854	0.1894	106.1700	0.0024	0.0001	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Heptane (-n)						0.7080	0.4981	0.9910	100.2000	0.2096	0.0320	100.20	Option 3: A=37358, B=8.2585
Hexane (-n)						2.1727	1.6003	2.9030	86.1700	0.0976	0.0458	86.17	Option 2: A=6.876, B=1171.17, C=224.41
i-butane						28.6704	23.0459	35.2667	58.1300	0.0450	0.2785	58.13	Option 1: VP60 = 26.098 VP70 = 31.306
Isopentane						11.2522	8.5746	14.3915	72.1500	0.0444	0.1078	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
n-butane						28.6704	23.0459	35.2667	58.1300	0.0721	0.4462	58.13	Option 1: VP60 = 26.098 VP70 = 31.306
Nonane (-n)						0.0741	0.0558	0.0981	128.2600	0.0559	0.0009	128.26	Option 1: VP60 = .065278 VP70 = .08309
Octane (-n)						0.1666	0.1231	0.2250	114.2300	0.2341	0.0084	114.23	Option 1: VP60 = .145444 VP70 = .188224
Pentane (-n)						7.6199	5.8716	9.7769	72.1500	0.0466	0.0766	72.15	Option 3: A=27691, B=7.558
Xylenes (mixed isomers)						0.1073	0.0710	0.1586	106.1700	0.0030	0.0001	106.17	Option 2: A=7.009, B=1462.266, C=215.11



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

**Ojito T-11 & T-12 - Vertical Fixed Roof Tank**  
**Bloomfield, NM**

Annual Emission Calculations	
Standing Losses (lb):	1,559.5769
Vapor Space Volume (cu ft):	287.8693
Vapor Density (lb/cu ft):	0.0790
Vapor Space Expansion Factor:	0.7176
Vented Vapor Saturation Factor:	0.2617
Tank Vapor Space Volume:	
Vapor Space Volume (cu ft):	287.8693
Tank Diameter (ft):	7.0000
Vapor Space Outage (ft):	7.4801
Tank Shell Height (ft):	14.0000
Average Liquid Height (ft):	7.0000
Roof Outage (ft):	0.4801
Roof Outage (Dome Roof)	
Roof Outage (ft):	0.4801
Dome Radius (ft):	7.0000
Shell Radius (ft):	3.5000
Vapor Density	
Vapor Density (lb/cu ft):	0.0790
Vapor Molecular Weight (lb/lb-mole):	62.5281
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.1163
Daily Avg. Liquid Surface Temp. (deg. R):	524.6094
Daily Average Ambient Temp. (deg. F):	56.1542
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731
Liquid Bulk Temperature (deg. R):	518.0642
Tank Paint Solar Absorptance (Shell):	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	1,765.3167
Vapor Space Expansion Factor	
Vapor Space Expansion Factor:	0.7176
Daily Vapor Temperature Range (deg. R):	46.7976
Daily Vapor Pressure Range (psia):	3.2237
Breather Vent Press. Setting Range (psia):	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.1163
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	5.6430
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	8.8667
Daily Avg. Liquid Surface Temp. (deg R):	524.6094
Daily Min. Liquid Surface Temp. (deg R):	512.9100
Daily Max. Liquid Surface Temp. (deg R):	536.3088
Daily Ambient Temp. Range (deg. R):	27.9250
Vented Vapor Saturation Factor	
Vented Vapor Saturation Factor:	0.2617
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	7.1163
Vapor Space Outage (ft):	7.4801
Working Losses (lb):	487.2416

Vapor Molecular Weight (lb/lb-mole):	62.5281
Vapor Pressure at Daily Average Liquid	
Surface Temperature (psia):	7.1163
Annual Net Throughput (gal/yr.):	45,990.0000
Annual Turnovers:	10.9500
Turnover Factor:	1.0000
Maximum Liquid Volume (gal):	4,200.0000
Maximum Liquid Height (ft):	14.0000
Tank Diameter (ft):	7.0000
Working Loss Product Factor:	1.0000
Total Losses (lb):	2,046.8185

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

**Emissions Report for: Annual**

**Ojito T-11 & T-12 - Vertical Fixed Roof Tank**  
**Bloomfield, NM**

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
n-butane	217.40	695.87	913.27
Isopentane	52.53	168.14	220.67
Pentane (-n)	37.33	119.48	156.81
Hexane (-n)	22.32	71.44	93.76
Ojito 07-05-16	487.24	1,559.58	2,046.82
i-butane	135.68	434.30	569.98
Heptane (-n)	15.61	49.97	65.58
Octane (-n)	4.10	13.13	17.24
Nonane (-n)	0.44	1.39	1.83
Decane (-n)	0.71	2.29	3.00
2,2,4-Trimethylpentane (isooctane)	0.08	0.27	0.35
Benzene	0.97	3.09	4.05
Ethylbenzene	0.03	0.10	0.13
Xylenes (mixed isomers)	0.03	0.11	0.14

**TANKS 4.0.9d**  
**Emissions Report - Summary Format**  
**Tank Identification and Physical Characteristics**

**Identification**

User Identification:	Ojito Compressor Station 25 bbl skid drain tank
City:	Bloomfield
State:	New Mexico
Company:	Harvest Four Corners, LLC
Type of Tank:	Horizontal Tank
Description:	Storage tank used to contain skid drain liquids (Water and oil)

**Tank Dimensions**

Shell Length (ft):	8.00
Diameter (ft):	6.00
Volume (gallons):	1,000.00
Turnovers:	12.00
Net Throughput(gal/yr):	12,000.00
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

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

**Ojito Compressor Station 25 bbl skid drain tank - Horizontal Tank**  
**Bloomfield, New Mexico**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Skid Drain Fluids	All	67.36	53.93	80.79	59.23	0.3195	0.1992	0.4986	18.0013			34.40	
Residual oil no. 6						0.0001	0.0000	0.0001	190.0000	0.5000	0.0001	387.00	Option 1: VP60 = .00004 VP70 = .00006
Water						0.3344	0.2084	0.5218	18.0000	0.5000	0.9999	18.00	Option 1: VP60 = .255246 VP70 = .362758

**TANKS 4.0.9d**  
**Emissions Report - Summary Format**  
**Individual Tank Emission Totals**

**Emissions Report for: Annual**

**Ojito Compressor Station 25 bbl skid drain tank - Horizontal Tank**  
**Bloomfield, New Mexico**

Components	Losses(lbs)		
	Working Loss	Breathing Loss	Total Emissions
Skid Drain Fluids	1.64	6.22	7.86
Residual oil no. 6	0.00	0.00	0.00
Water	1.64	6.22	7.86

**TANKS 4.0.9d**  
**Emissions Report - Summary Format**  
**Tank Identification and Physical Characteristics**

**Identification**

User Identification:	Ojito CS 500 gal lube oil
City:	Albuquerque
State:	New Mexico
Company:	Harvest Four Corners, LLC
Type of Tank:	Horizontal Tank
Description:	500 gallon lube oil tank Harvest Ojito Compressor Station

**Tank Dimensions**

Shell Length (ft):	6.00
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:	Gray/Medium
Shell Condition	Good

**Breather Vent Settings**

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

Meteorological Data used in Emissions Calculations: Albuquerque, New Mexico (Avg Atmospheric Pressure = 12.15 psia)

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

**Ojito CS 500 gal lube oil - Horizontal Tank**  
**Albuquerque, New Mexico**

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F)			Liquid Bulk Temp (deg F)	Vapor Pressure (psia)			Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
		Avg.	Min.	Max.		Avg.	Min.	Max.					
Residual oil no. 6	All	67.36	53.93	80.79	59.23	0.0001	0.0000	0.0001	190.0000			387.00	Option 1: VP60 = .00004 VP70 = .00006



**TANKS 4.0.9d**  
**Emissions Report - Summary Format**  
**Individual Tank Emission Totals**

**Emissions Report for: Annual**

**Ojito CS 500 gal lube oil - Horizontal Tank**  
**Albuquerque, New Mexico**

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Residual oil no. 6	0.00	0.00	0.00

## Equipment Leaks Emissions Calculations

Unit Number: **F1**

Description: Valves, Connectors, Seals &amp; Open-Ended Lines

### Steady-State Emission Rates

Equipment	Number of Components # of sources	Emission Factors kg/hr/source	Emission Factors lb/hr/source	Uncontrolled TOC Emission Rates	
				pph	tpy
Valves	315	0.0045	0.0099	3.12	13.66
Connectors	263	0.0002	0.0004	0.12	0.51
Pump Seals	0	0.0024	0.0053	0.00	0.00
Compressor Seals	32	0.0088	0.0194	0.62	2.71
Pressure Relief Valves	19	0.0088	0.0194	0.37	1.61
Open-Ended Lines	88	0.0020	0.0044	0.39	1.70
<b>Total</b>				<b>4.61</b>	<b>20.19</b>

Number of components based on the numbers of compressors and dehydrators at the station (see next page)

Emission factors taken from the EPA "1995 Protocol for Equipment Leak Emission Estimates"

Emission factors (lb/hr/source) = Emission factors (kg/hr/source) x 2.2 lb/kg

Uncontrolled TOC Emission Rates (pph) = lb/hr/source x # of sources

Uncontrolled TOC Emission Rates (tpy) = Uncontrolled TOC Emission Rates (pph) x 8,760 hr/yr / 2,000 lb/ton

Components	Mole Percents %	Molecular Weights lb/lb-mole	Component Weights lb/lb-mole	Weight Percent of TOC %	Uncontrolled Emission Rates	
					pph	tpy
Carbon dioxide	0.7991	44.010				
Hydrogen sulfide	0.0000	34.070				
Nitrogen	0.4059	28.013				
Methane	79.7710	16.043	1279.766	62.584		
Ethane	10.5685	30.070	317.795	15.541		
Propane	4.9525	44.097	218.390	10.680	4.92E-01	2.16
Isobutane	0.8509	58.123	49.457	2.419	1.11E-01	0.49
n-Butane	1.3870	58.123	80.617	3.942	1.82E-01	0.80
Isopentane	0.4532	72.150	32.698	1.599	7.37E-02	0.32
n-Pentane	0.3398	72.150	24.517	1.199	5.53E-02	0.24
Cyclopentane	0.0134	70.134	0.940	0.046	2.12E-03	9.28E-03
n-Hexane	0.0966	86.177	8.325	0.407	1.88E-02	0.08
Cyclohexane	0.0320	84.161	2.693	0.132	6.07E-03	2.66E-02
Other hexanes	0.2216	86.177	19.097	0.934	4.30E-02	0.19
Heptanes	0.0433	100.204	4.339	0.212	9.78E-03	0.04
Methylcyclohexane	0.0324	98.188	3.181	0.156	7.17E-03	3.14E-02
2,2,4-Trimethylpentane	0.0015	114.231	0.171	0.008	3.86E-04	1.69E-03
Benzene	0.0125	78.114	0.976	0.048	2.20E-03	9.64E-03
Toluene	0.0101	92.141	0.931	0.046	2.10E-03	9.19E-03
Ethylbenzene	0.0002	106.167	0.021	0.001	4.79E-05	2.10E-04
Xylenes	0.0013	106.167	0.138	0.007	3.11E-04	1.36E-03
C8+ Heavies	0.0072	114.231	0.822	0.040	1.85E-03	8.12E-03
<b>Total</b>	<b>100.0000</b>		2044.874			
<b>Total VOC</b>				<b>21.875</b>	<b>1.01E+00</b>	<b>4.42</b>

Gas stream composition obtained from Ojito extended gas analysis dated 2/1/19

Component Weights (lb/lb-mole) = (% / 100) \* Molecular Weights (lb/lb-mole)

Weight Percent of TOC (%) = 100 x Component Weights (lb/lb-mole) / Total Component Weight (lb/lb-mole)

Uncontrolled Emission Rates (pph) = Total Uncontrolled TOC Emission Rate (pph) x (% / 100)

Uncontrolled Emission Rates (tpy) = Total Uncontrolled TOC Emission Rate (tpy) x (% / 100)

## Equipment Leaks Emissions Calculations

Unit Number: **F1**

Description: Valves, Connectors, Seals &amp; Lines

Number of Compression Units at the Facility: **2**Number of Dehydrators at the Facility: **0**

Process Equipment Description	Equipment Count						Instrument Count		
	Valves	Connectors	Pump Seals	Compressor Seals	Pressure Relief Valves	Open-end	Flow	Level	Pressure
Station inlet, meter run to pulsation dampener	17	14	0	0	1	13	3	0	3
Pulsation dampener	12	8	0	0	0	2	0	4	1
Compressor suction header	7	4	0	0	0	3	0	0	1
Suction header feed to instrument gas header	3	1	0	0	0	1	0	0	0
Compressor discharge header and bypass to station discharge	6	5	0	0	0	3	0	1	1
Compressor discharge header and suction header bypass lines	4	2	0	0	0	2	0	0	1
Fuel gas header	2	2	0	0	1	2	0	0	1
Instrument gas header	2	2	0	0	1	2	0	0	0
Station discharge header	9	5	0	0	1	6	0	0	2
Fuel gas recovery header	2	2	0	0	1	2	0	0	0
Fuel gas feed and filter loop	15	9	0	0	0	1	0	4	1
Instrument gas feed and filter loop	9	11	0	0	0	3	0	0	0
Produced water storage tank	1	0	0	0	0	1	0	1	0
ESD panel	12	0	0	0	0	0	0	0	0
Starting gas header	6	2	0	0	1	3	0	0	0
Hot gas header	2	2	0	0	0	2	0	0	0
Volume bottle lop	12	4	0	24	1	2	0	0	1
Components from Compressors	88	118	0	8	12	22	0	8	18
Components from dehydrators	0	0	0	0	0	0	0	0	0
Total	209	191	0	32	19	70	3	18	30
Adjusted Total	315	263	0	32	19	88			

The following additions are included in the Adjusted Total:

- 1 valve is added for each open end line
- 2 connectors are added for each flow meter
- 2 valves, 2 connectors and 1 open end line are added for each level gauge
- 1 connector is added for each pressure gauge

The component count is based on an evaluation of the Sim Mesa Compressor Station (two stage compression)



2030 Afton Place  
Farmington, NM 87401  
(505) 325-6622

Analysis No: HM190005  
Cust No: 33700-10125

### Well/Lease Information

Customer Name: HARVEST MIDSTREAM  
Well Name: OJITO COMPRESSOR STN  
County/State: NM  
Location:  
Field:  
Formation:  
Cust. Stn. No.:

Source: N/A  
Well Flowing:  
Pressure: 145 PSIG  
Flow Temp: 62 DEG. F  
Ambient Temp: 38 DEG. F  
Flow Rate: MCF/D  
Sample Method:  
Sample Date: 01/30/2019  
Sample Time: 7.45 AM  
Sampled By: JOHNNY A.  
Sampled by (CO): HARVEST MID.

Heat Trace:

Remarks: CALCULATED MOLECULAR WEIGHT = 20.9492

### Analysis

Component:	Mole%:	Unnormalized %:	**GPM:	*BTU:	*SP Gravity:
Nitrogen	0.4059	0.4019	0.0450	0.00	0.0039
CO2	0.7991	0.7912	0.1370	0.00	0.0121
Methane	79.7710	78.9836	13.5690	805.69	0.4419
Ethane	10.5685	10.4642	2.8360	187.03	0.1097
Propane	4.9525	4.9036	1.3690	124.61	0.0754
Iso-Butane	0.8509	0.8425	0.2790	27.67	0.0171
N-Butane	1.3804	1.3668	0.4370	45.03	0.0277
Neopentane 2,2 dmc3	0.0066	0.0065	0.0030	0.26	0.0002
I-Pentane	0.4532	0.4487	0.1660	18.13	0.0113
N-Pentane	0.3398	0.3364	0.1240	13.62	0.0085
Neohexane	0.0152	N/R	0.0060	0.72	0.0005
2-3-Dimethylbutane	0.0129	N/R	0.0050	0.61	0.0004
Cyclopentane	0.0134	N/R	0.0040	0.50	0.0003
2-Methylpentane	0.0869	N/R	0.0360	4.13	0.0026
3-Methylpentane	0.0363	N/R	0.0150	1.72	0.0011
C6	0.0966	0.4675	0.0400	4.59	0.0029
Methylcyclopentane	0.0703	N/R	0.0250	3.16	0.0020
Benzene	0.0125	N/R	0.0040	0.47	0.0003
Cyclohexane	0.0320	N/R	0.0110	1.43	0.0009
2-Methylhexane	0.0095	N/R	0.0040	0.52	0.0003
3-Methylhexane	0.0101	N/R	0.0050	0.55	0.0003
2-2-4-Trimethylpentane	0.0015	N/R	0.0010	0.09	0.0001
i-heptanes	0.0057	N/R	0.0020	0.30	0.0002
Heptane	0.0180	N/R	0.0080	0.99	0.0006

Methylcyclohexane	0.0324	N/R	0.0130	1.69	0.0011
Toluene	0.0101	N/R	0.0030	0.45	0.0003
2-Methylheptane	0.0022	N/R	0.0010	0.14	0.0001
4-Methylheptane	0.0012	N/R	0.0010	0.07	0.0000
i-Octanes	0.0006	N/R	0.0000	0.04	0.0000
Octane	0.0017	N/R	0.0010	0.11	0.0001
Ethylbenzene	0.0002	N/R	0.0000	0.01	0.0000
m, p Xylene	0.0010	N/R	0.0000	0.05	0.0000
o Xylene (& 2,2,4 tmc7)	0.0003	N/R	0.0000	0.02	0.0000
i-C9	0.0004	N/R	0.0000	0.03	0.0000
C9	0.0003	N/R	0.0000	0.02	0.0000
i-C10	0.0004	N/R	0.0000	0.03	0.0000
C10	0.0002	N/R	0.0000	0.02	0.0000
i-C11	0.0000	N/R	0.0000	0.00	0.0000
C11	0.0001	N/R	0.0000	0.01	0.0000
C12P	0.0001	N/R	0.0000	0.01	0.0000
<b>Total</b>	<b>100.00</b>	<b>99.013</b>	<b>19.150</b>	<b>1244.53</b>	<b>0.7221</b>

\* @ 14.730 PSIA DRY & UNCORRECTED FOR COMPRESSIBILITY

\*\*@ 14.730 PSIA & 60 DEG. F.

COMPRESSIBILITY FACTOR (1/Z):	1.0036	CYLINDER #:	08
BTU/CU.FT IDEAL:	1247.4	CYLINDER PRESSURE:	124 PSIG
BTU/CU.FT (DRY) CORRECTED FOR (1/Z):	1251.8	ANALYSIS DATE:	02/01/2019
BTU/CU.FT (WET) CORRECTED FOR (1/Z):	1230.0	ANALYSIS TIME:	01:54:01 AM
DRY BTU @ 15.025:	1276.9	ANALYSIS RUN BY:	PATRICIA KING
REAL SPECIFIC GRAVITY:	0.7243		

**GPM, BTU, and SPG calculations as shown above are based on current GPA constants.**

**GPA Standard: GPA 2286-14**

**GC: SRI Instruments 8610 Last Cal/Verify: 02/01/2019**

**GC Method: C12+BTEX Gas**

EPA-453/R-95-017

# 1995 Protocol for Equipment Leak Emission Estimates

Emission Standards Division

U.S. ENVIRONMENTAL PROTECTION AGENCY  
Office of Air and Radiation  
Office of Air Quality Planning and Standards  
Research Triangle Park, North Carolina 27711

November 1995

TABLE 2-4. OIL AND GAS PRODUCTION OPERATIONS AVERAGE EMISSION FACTORS (kg/hr/source)

Equipment Type	Service <sup>a</sup>	Emission Factor (kg/hr/source) <sup>b</sup>
Valves	Gas	4.5E-03
	Heavy Oil	8.4E-06
	Light Oil	2.5E-03
	Water/Oil	9.8E-05
Pump seals	Gas	2.4E-03
	Heavy Oil	NA
	Light Oil	1.3E-02
	Water/Oil	2.4E-05
Others <sup>c</sup>	Gas	8.8E-03
	Heavy Oil	3.2E-05
	Light Oil	7.5E-03
	Water/Oil	1.4E-02
Connectors	Gas	2.0E-04
	Heavy Oil	7.5E-06
	Light Oil	2.1E-04
	Water/Oil	1.1E-04
Flanges	Gas	3.9E-04
	Heavy Oil	3.9E-07
	Light Oil	1.1E-04
	Water/Oil	2.9E-06
Open-ended lines	Gas	2.0E-03
	Heavy Oil	1.4E-04
	Light Oil	1.4E-03
	Water/Oil	2.5E-04

<sup>a</sup>Water/Oil emission factors apply to water streams in oil service with a water content greater than 50%, from the point of origin to the point where the water content reaches 99%. For water streams with a water content greater than 99%, the emission rate is considered negligible.

<sup>b</sup>These factors are for total organic compound emission rates (including non-VOC's such as methane and ethane) and apply to light crude, heavy crude, gas plant, gas production, and off shore facilities. "NA" indicates that not enough data were available to develop the indicated emission factor.

<sup>c</sup>The "other" equipment type was derived from compressors, diaphragms, drains, dump arms, hatches, instruments, meters, pressure relief valves, polished rods, relief valves, and vents. This "other" equipment type should be applied for any equipment type other than connectors, flanges, open-ended lines, pumps, or valves.

## Compressor Blowdown Emissions Calculations

Unit Number: **SSM**  
 Description: Compressor & Piping Associated With Station

**Throughput**

<b>2</b> # of units	Number of units	Harvest Four Corners LLC
<b>200</b> events/yr/unit	Blowdowns per year per unit	Harvest Four Corners LLC
<b>3,250</b> scf/event	Gas loss per blowdown	Harvest Four Corners LLC
1,300,000 scf/yr	Annual gas loss	# of units x events/yr/unit x scf/event

**Emission Rates**

Pollutants	Emission Factors, lb/scf	Uncontrolled, Emission Rates, tpy
VOC	1.179E-02	7.66
2,2,4-Trimethylpentane	3.962E-06	2.58E-03
Benzene	2.573E-05	1.67E-02
Ethylbenzene	5.597E-07	3.64E-04
n-Hexane	2.194E-04	1.43E-01
Toluene	2.453E-05	1.59E-02
Xylene	3.638E-06	2.36E-03

Emission factors calculated from gas composition (see table below)  
 Uncontrolled Emission Rates (tpy) = scf/yr x lb/scf / 2,000 lb/ton

**Gas Composition**

Components	Mole Percent %	Molecular Weights, lb/lb-mole	Emission Factors, lb/scf
Carbon dioxide	0.7991	44.01	9.269E-04
Hydrogen sulfide	0.0000	34.07	0.000E+00
Nitrogen	0.4059	28.01	2.997E-04
Methane	79.7710	16.04	3.373E-02
Ethane	10.5685	30.07	8.376E-03
Propane	4.9525	44.09	5.755E-03
Isobutane	0.8509	58.12	1.303E-03
n-Butane	1.3870	58.12	2.125E-03
Isopentane	0.4532	72.15	8.618E-04
n-Pentane	0.3398	72.15	6.462E-04
Cyclopentane	0.0134	70.14	2.477E-05
n-Hexane	0.0966	86.17	2.194E-04
Cyclohexane	0.0320	84.16	7.098E-05
Other hexanes	0.2216	86.18	5.034E-04
Heptanes	0.0433	100.20	1.144E-04
Methylcyclohexane	0.0324	98.19	8.385E-05
2,2,4-Trimethylpentane	0.0015	100.21	3.962E-06
Benzene	0.0125	78.11	2.573E-05
Toluene	0.0101	92.14	2.453E-05
Ethylbenzene	0.0002	106.17	5.597E-07
Xylenes	0.0013	106.17	3.638E-06
C8+ Heavies	0.0072	110.00	2.088E-05
Total	100.0000		
Total VOC			1.179E-02

Gas stream composition obtained from **Ojito** extended gas analysis dated **2/1/19**  
 Emission Factors (lb/scf) = (% / 100) x lb/lb-mole / 379.4 scf/lb-mole



### Pig Launcher Emissions Calculations

Unit Number: **PL**  
 Description: Pig Launcher

**Throughput**

**260** events/yr  
**4,250** scf/event  
 1,105,000 scf/yr

Blowdowns per year  
 Gas loss per blowdown  
 2.43 mcf/blowdown + 1.82 mcf per purge  
 Annual gas loss

Harvest Four Corners LLC  
 Harvest Four Corners LLC  
 events/yr x scf/event

**Emission Rates**

Pollutants	Emission Factors lb/scf	Uncontrolled, Emission Rates tpy
VOC	1.179E-02	6.51
2,2,4-Trimethylpentane	3.962E-06	2.19E-03
Benzene	2.573E-05	1.42E-02
Ethylbenzene	5.597E-07	3.09E-04
n-Hexane	2.194E-04	1.21E-01
Toluene	2.453E-05	1.36E-02
Xylene	3.638E-06	2.01E-03

Emission factors calculated from gas composition (see table below)  
 Uncontrolled Emission Rates (tpy) = scf/yr x lb/scf / 2,000 lb/ton

**Gas Composition**

Components	Mole Percents %	Molecular Weights lb/lb-mole	Emission Factors lb/scf
Carbon dioxide	0.7991	44.01	9.269E-04
Hydrogen sulfide	0.0000	34.07	0.000E+00
Nitrogen	0.4059	28.01	2.997E-04
Methane	79.7710	16.04	3.373E-02
Ethane	10.5685	30.07	8.376E-03
Propane	4.9525	44.09	5.755E-03
Isobutane	0.8509	58.12	1.303E-03
n-Butane	1.3870	58.12	2.125E-03
Isopentane	0.4532	72.15	8.618E-04
n-Pentane	0.3398	72.15	6.462E-04
Cyclopentane	0.0134	70.14	2.477E-05
n-Hexane	0.0966	86.17	2.194E-04
Cyclohexane	0.0320	84.16	7.098E-05
Other hexanes	0.2216	86.18	5.034E-04
Heptanes	0.0433	100.20	1.144E-04
Methylcyclohexane	0.0324	98.19	8.385E-05
2,2,4-Trimethylpentane	0.0015	100.21	3.962E-06
Benzene	0.0125	78.11	2.573E-05
Toluene	0.0101	92.14	2.453E-05
Ethylbenzene	0.0002	106.17	5.597E-07
Xylenes	0.0013	106.17	3.638E-06
C8+ Heavies	0.0072	110.00	2.088E-05
Total	100.0000		
Total VOC			1.179E-02

Gas stream composition obtained from **Ojito** extended gas analysis dated **2/1/19**  
 Emission Factors (lb/scf) = (% / 100) x lb/lb-mole / 379.4 scf/lb-mole

## Truck Loading Emissions Calculations

Unit Number: **F2**  
 Description: Truck Loading

### Emission Factor

<b>0.6</b>	Saturation factor S	AP-42 Table 5.2-1 (submerged loading & dedicated service)
<b>7.1163</b> psia	True vapor pressure of liquid P	TANKS 4.0 output file
<b>62.5281</b> lb/lb-mole	Molecular weight of vapors M	TANKS 4.0 output file
<b>64.94</b> °F	Temperature of liquid	TANKS 4.0 output file
524.61 °R	Temperature of liquid T	°F + 459.67
6.34 lb/10 <sup>3</sup> gal	Emission factor L	AP-42 Section 5.2 Equation 1

$$L = 12.46 \frac{SPM}{T}$$

### Production Rate

<b>8.40</b> 10 <sup>3</sup> gal/hr	Maximum hourly production rate	Harvest Four Corners LLC
<b>46.20</b> 10 <sup>3</sup> gal/yr	Maximum annual production rate	Harvest Four Corners LLC

### Steady-State Emission Rates

Pollutant	Uncontrolled Emission Rates	
	pph	tpy
VOC	53.26	0.15

Uncontrolled Emission Rate (pph) = lb/10<sup>3</sup> gal x 10<sup>3</sup> gal/hr  
 Uncontrolled Emission Rate (tpy) = lb/10<sup>3</sup> gal x 10<sup>3</sup> gal/yr / 2000 lb/ton

Pollutants	Percent of VOC %	Emission Rates	
		pph	tpy
224 Trimethylpentane	<b>0.02</b>	9.11E-03	2.50E-05
Benzene	<b>0.20</b>	1.05E-01	2.90E-04
Ethylbenzene	<b>0.01</b>	3.38E-03	9.30E-06
n-Hexane	<b>4.58</b>	2.44E+00	6.71E-03
Xylenes	<b>0.01</b>	3.64E-03	1.00E-05

Percent of VOC calculated from the TANKS 4.0 results  
 Percent of VOC (%) = 100 x Pollutant Emission Rate (lb/yr) / Total VOC Emission Rate (lb/yr)  
 Emission Rates (pph) = VOC Emission Rate (pph) x (% / 100)  
 Emission Rates (tpy) = VOC Emission Rate (tpy) x (% / 100)

loading operation, resulting in high levels of vapor generation and loss. If the turbulence is great enough, liquid droplets will be entrained in the vented vapors.

A second method of loading is submerged loading. Two types are the submerged fill pipe method and the bottom loading method. In the submerged fill pipe method, the fill pipe extends almost to the bottom of the cargo tank. In the bottom loading method, a permanent fill pipe is attached to the cargo tank bottom. During most of submerged loading by both methods, the fill pipe opening is below the liquid surface level. Liquid turbulence is controlled significantly during submerged loading, resulting in much lower vapor generation than encountered during splash loading.

The recent loading history of a cargo carrier is just as important a factor in loading losses as the method of loading. If the carrier has carried a nonvolatile liquid such as fuel oil, or has just been cleaned, it will contain vapor-free air. If it has just carried gasoline and has not been vented, the air in the carrier tank will contain volatile organic vapors, which will be expelled during the loading operation along with newly generated vapors.

Cargo carriers are sometimes designated to transport only one product, and in such cases are practicing "dedicated service". Dedicated gasoline cargo tanks return to a loading terminal containing air fully or partially saturated with vapor from the previous load. Cargo tanks may also be "switch loaded" with various products, so that a nonvolatile product being loaded may expel the vapors remaining from a previous load of a volatile product such as gasoline. These circumstances vary with the type of cargo tank and with the ownership of the carrier, the petroleum liquids being transported, geographic location, and season of the year.

One control measure for vapors displaced during liquid loading is called "vapor balance service", in which the cargo tank retrieves the vapors displaced during product unloading at bulk plants or service stations and transports the vapors back to the loading terminal. Figure 5.2-5 shows a tank truck in vapor balance service filling a service station underground tank and taking on displaced gasoline vapors for return to the terminal. A cargo tank returning to a bulk terminal in vapor balance service normally is saturated with organic vapors, and the presence of these vapors at the start of submerged loading of the tanker truck results in greater loading losses than encountered during nonvapor balance, or "normal", service. Vapor balance service is usually not practiced with marine vessels, although some vessels practice emission control by means of vapor transfer within their own cargo tanks during ballasting operations, discussed below.

Emissions from loading petroleum liquid can be estimated (with a probable error of  $\pm 30$  percent)<sup>4</sup> using the following expression:

$$L_L = 12.46 \frac{SPM}{T} \quad (1)$$

where:

$L_L$  = loading loss, pounds per 1000 gallons ( $\text{lb}/10^3 \text{ gal}$ ) of liquid loaded

S = a saturation factor (see Table 5.2-1)

P = true vapor pressure of liquid loaded, pounds per square inch absolute (psia)  
(see Figure 7.1-5, Figure 7.1-6, and Table 7.1-2)

M = molecular weight of vapors, pounds per pound-mole ( $\text{lb}/\text{lb-mole}$ ) (see Table 7.1-2)

T = temperature of bulk liquid loaded,  $^{\circ}\text{R}$  ( $^{\circ}\text{F} + 460$ )

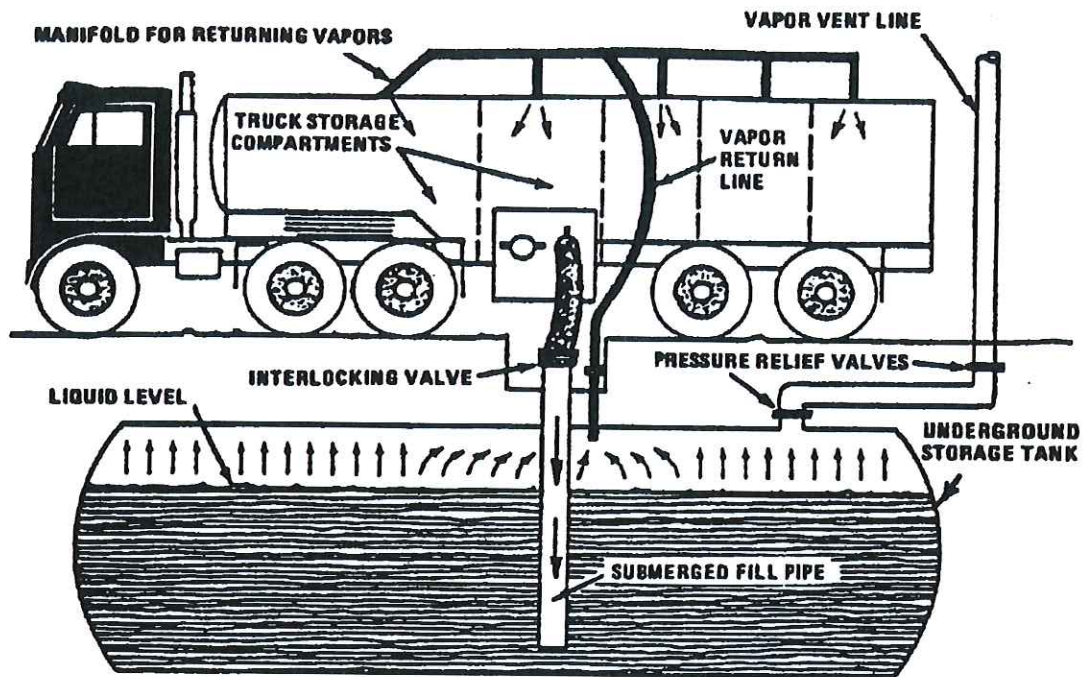


Figure 5.2-5. Tank truck unloading into a service station underground storage tank and practicing "vapor balance" form of emission control.

Table 5.2-1. SATURATION (S) FACTORS FOR CALCULATING PETROLEUM LIQUID LOADING LOSSES

Cargo Carrier	Mode Of Operation	S Factor
Tank trucks and rail tank cars	Submerged loading of a clean cargo tank	0.50
	Submerged loading: dedicated normal service	0.60
	Submerged loading: dedicated vapor balance service	1.00
	Splash loading of a clean cargo tank	1.45
	Splash loading: dedicated normal service	1.45
	Splash loading: dedicated vapor balance service	1.00
Marine vessels <sup>a</sup>	Submerged loading: ships	0.2
	Submerged loading: barges	0.5

<sup>a</sup> For products other than gasoline and crude oil. For marine loading of gasoline, use factors from Table 5.2-2. For marine loading of crude oil, use Equations 2 and 3 and Table 5.2-3.

**Procedures to Address Threatened and Endangered Species and Historic Properties for the Federal Implementation Plan for True Minor Sources in Indian Country in the Oil and Natural Gas Production and Natural Gas Processing Segments of the Oil and Natural Gas Sector**

**Section 1: Contact Information**

Business name: <i>Harvest Four Corners, LLC</i>	Site address: <i>36.506964, -107.192883</i>
Send all correspondence regarding this evaluation to (mailing address): <i>1755 Arroyo Drive Bloomfield, NM 87413</i>	Contact for this notification: Name: <i>Kijun Honey</i> Phone: <i>505-632-4475</i> Email: <i>khoney@harvestmidstream.com</i>

**Section 2: Evaluation of Threatened and Endangered Species and Historic Properties**

**1. Threatened or Endangered Species**

Please indicate under which criterion in Appendix A you satisfy after evaluating the effects on threatened or endangered species as a result of your construction, modification or operation of your new or modified minor source of air pollutants. Be sure to include all documentation identified in Appendix A with this evaluation.

- A    B    C    D    E

**2. Historic Properties**

Please indicate under which criterion in Appendix B you satisfy after evaluating the effects to historic properties as a result of your construction, modification or operation of your new or modified minor source of air pollutants? Be sure to include all documentation identified in Appendix B with this evaluation.

- No historic properties affected    No adverse effects    Adverse effects

**Section 3: Signature**

Name: <u><i>[Signature]</i></u> (Signature)	Name: <u><i>Kijun Honey</i></u> (Print or Type)
Title: <u><i>Environmental Specialist</i></u>	Date: <u><i>8/30/2019</i></u>

X

## Appendix A – Threatened or Endangered Species Requirements

The purpose of this appendix is to assist you in completing the screening procedure to address threatened or endangered species to be eligible for the Oil and Natural Gas Minor Source Federal Implementation Plan. To be eligible for the FIP, you must demonstrate that you qualify under one of the criteria listed in this appendix with respect to the protection of species that are federally-listed as threatened or endangered under the ESA or of habitat that is federally-designated as “critical habitat” under the ESA.

This appendix provides you information on the following:

- **Section 1.0:** Listed Species Eligibility Criteria and
- **Section 2.0:** Guidance for Determining Which Listed Species Criterion Applies.

### 1.0 Listed Species Eligibility Criteria

To be eligible for the FIP, you must obtain confirmation from the EPA that you completed the screening procedure and meet one of the eligibility criteria listed below. You must also specify in your submittal the basis for your selection of the applicable eligibility criterion and provide documentation supporting the criterion selected. If you have not obtained confirmation from the EPA regarding listed species eligibility criteria, you will not be eligible for the FIP, and you must apply for a site-specific permit.

Note: (1) Your evaluation must provide sufficient documentation to support your determination that you satisfy the requirements of the particular criterion selected. (2) While coordination between you and the U.S. Fish and Wildlife Service (FWS) and/or the National Marine Fisheries Service (NMFS); together, the “Services,” is not necessarily required in all cases, the EPA encourages you to coordinate with the relevant Service(s) and to do so early in the planning process.

You must comply with any applicable terms, conditions, or other requirements developed in the process of meeting any of the eligibility criteria (A-E) in this section to remain eligible for the FIP. Documentation of these requirements shall be maintained by the permittee for the duration of time the affected emissions unit(s) is (are) covered under the FIP.

The following is a summary of the five eligibility criteria. See Section 2.0 for detailed instructions to determine which criterion applies for your specific action:

#### Criterion A:

No federally-listed threatened or endangered species or designated critical habitat(s) of such species are likely to occur within the action area for your project.<sup>1</sup>

#### Criterion B:

Federally-listed threatened or endangered species or their designated critical habitat(s) are likely to occur within the action area of your source, but the construction and operation of your new minor source or construction and operation of the modification to your existing minor source is not likely to adversely affect listed threatened or endangered species or critical habitat. This determination may include consideration of any air pollution controls or other changes to the construction and/or operation of your new or modified source that you will adopt to ensure that construction, modification

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<sup>1</sup> *Action area* means all areas to be affected directly or indirectly by your project and may be broader than the immediate project area [See, e.g., 50 CFR 402.02].

and operation of your new or modified source are not likely to adversely affect listed species or critical habitat. To make this certification, you must include the following in your documentation: (1) identify any federally listed species and/or designated critical habitat located within the action area of your source; (2) the distance between your site and the listed species or designated critical habitat (in miles); and (3) any other information necessary (e.g., a detailed map of the action area and supporting justification) to show that the construction/modification and operation of your new or modified source are not likely to cause any adverse effects to the listed threatened or endangered species or their critical habitat.

**Criterion C:**

Coordination between you and the Service(s) has been concluded and has addressed the effects of your new or modified true minor source's construction/modification and operation on federally-listed threatened or endangered species and federally-designated critical habitat. The coordination must result in a written concurrence from the relevant Service(s) that your new or modified true minor source's construction/modification and operation are not likely to adversely affect listed species or critical habitat. You must include copies of the correspondence between yourself and the Service(s) with your submittal.

**Criterion D:**

Consultation between another Federal Agency and the Service(s) under section 7 of the ESA has been concluded. The consultation must have addressed the effects of your true minor source's construction/modification and operation on federally-listed threatened or endangered species and federally-designated critical habitat. The result of this consultation must be either:

1. A biological opinion that concludes that the action in question (taking into account the effects of your source's construction/modification and operation) is not likely to jeopardize the continued existence of listed species, or result in the destruction or adverse modification of critical habitat; or
2. Written concurrence from the applicable Service(s) with a finding that the source's construction/modification and operation are not likely to adversely affect federally-listed species or federally-designated critical habitat.

You must include copies of the relevant documentation cited above in your submittal.

**Criterion E:**

You have obtained an incidental take permit from the Service(s) under section 10 of the ESA in connection with your construction/modification and operation activities, and this permit addresses the effects of the source on relevant federally-listed species and federally-designated critical habitat. You must include copies of the incidental take permit and associated documentation and correspondence between yourself and the Service(s) with your submittal.

## 2.0 Determining Which Criterion Applies

To qualify for the FIP, you need to meet one of the five criteria listed above. You must follow the procedures in Steps 1 through 5 below to determine the listed species criterion, if any, under which your project is eligible for the FIP.

### **Step 1 - Determine if Previous or Separate Assessments Have Already Addressed Your Source**

You should first determine whether you are eligible to select either Criterion *D* or *E* based on an ESA section 7 consultation previously completed by another Federal Agency (Criterion *D*) or an ESA section 10 permit (Criterion *E*) issued by the Service(s) as follows:

**Meeting Criterion D:** If consultation under section 7 of the ESA has been concluded in connection with another Federal Agency's review of your source, you may be eligible to select Criterion *D*. To be eligible to select Criterion *D*, you must confirm that all the following are true:

- A consultation between a Federal Agency and the Service(s) under section 7 of the ESA has been concluded. Consultations can be either formal or informal, and would have occurred in connection with a separate action by a separate Federal Agency (e.g., as part of a separate Federal Agency's authorization for you to construct or operate your business in Indian country). The consultation must have addressed the effects of the construction, modification and operation of your new or modified source on all federally-listed threatened or endangered species and all federally-designated critical habitat in your action area. The result of this consultation must be either:
  - a. A biological opinion that concludes that the construction, modification and operation of your new or modified source is not likely to jeopardize the continued existence of any listed species, nor result in the destruction or adverse modification of any designated critical habitat. The consultation must have included consideration of the effects of your facility's emissions and other related activities on all listed species and designated critical habitat in your action area; or
  - b. Written concurrence (e.g., letter of concurrence) from the applicable Service(s) with a finding that the construction, modification and operation of your new or modified source are not likely to adversely affect listed species or designated critical habitat.
- The consultation remains current, in accordance with 50 CFR § 402.16; or, if re-initiation of consultation is required (e.g., due to a new species listing or critical habitat designation or new information), such reinitiated consultation is concluded, and the result of the consultation is consistent with the statements above. Attach a copy of any consultation re-initiation documentation from the Service(s) or other consulting Federal Agency.

**If all of the above are true, you may select Criterion *D*.** You must also provide a description of the basis for the criterion selected. In your submittal you must also provide the Biological Opinion (or Public Consultation Tracking System tracking number) or concurrence letter and any other documentation supporting your determination.

**If any of the above is not true, you may not select Criterion *D*.** For example: if the biological opinion or written concurrence from the Service(s) did cover some but not all of the listed species or critical habitat in your action area; or if the consultation is no longer current (e.g., due to new species listings); then you are not eligible under Criterion *D*.

**Meeting Criterion E:** You have obtained an incidental take permit under section 10 of the ESA, and this permit addresses the effects of the construction/modification and operation of your new or modified source on federally-listed species and designated critical habitat in your action area.

You may rely on a section 10 permit that you have previously obtained so long as it addresses the construction/modification and operation of your new or modified source and all federally-listed species and designated critical habitat in your action area. (Note: If you do not hold a section 10 permit already, you can



consider obtaining one, however, it may be more efficient to instead meet the requirements for Criterion A, B or C as described in Steps 2 – 5.)

If you choose to apply for a new section 10 permit, you must follow applicable Service procedures (see 50 CFR § 17.22(b)(1) for FWS and § 222.22 for NMFS). Application instructions for section 10 permits for FWS and NMFS can be obtained by accessing the FWS and NMFS websites (<http://www.fws.gov> and <http://www.nmfs.noaa.gov>) or by contacting the appropriate FWS and NMFS regional office.

**If the above is true, you may select Criterion E.** You must also provide a description of the basis for the criterion selected. In your submittal you must provide a copy of the permit issued by the Service(s).

**If the above is not true, you may not select Criterion E at this time and must proceed to Step 2.**

**Step 2 - Determine if Listed Threatened or Endangered Species or their Designated Critical Habitat(s) are Likely to Occur within the Action Area of your Minor Source.**

You must determine, to the best of your knowledge, whether species federally listed as either threatened or endangered, or their designated critical habitat(s), are located within the action area of your minor source.<sup>2</sup> This is a two-step process. The first step is to determine your action area. When defining the boundaries of your action area, you should take into account the following criteria:

- *Ground disturbance* – Effects during construction, maintenance and operation of the facility should be considered.
- *Changes in water quality/quantity (both surface and groundwater)* – This would include effects that may extend far beyond the footprint of the facility. An example may be stormwater runoff from impervious surfaces (containing sediments or other contaminants) on the site that may reach water bodies (including ditches that empty into water bodies) some distance from a facility. All receiving water bodies that could receive pollutants from the facility's construction, maintenance, or operation should be included in the action area.
- *Air Quality Impacts* – Effects during construction, maintenance and operation of the facility should be considered.
- *Lighting effects* – Effects during construction, maintenance and operation of the facility should be considered.
- *Noise Disturbance* – Effects during construction, maintenance and operation of the facility should be considered.

Note: If you have questions about determining the extent of the action area, you should coordinate with the local Service field office as noted below. If site-specific conditions exist such that the action area would be limited to the facility footprint, but that fact may not be obvious from a map or figure, submit a narrative description of the action area in addition to a map for evaluation of the action area selected. To determine the field office that corresponds to your project site, visit: <http://www.fws.gov/endangered/regions/index.html> and <http://www.nmfs.noaa.gov/> (under the left tab for "Regions").

After determining the boundaries of the action area, you will next determine if listed species and/or critical habitat are expected to exist there. Relevant sources of information regarding the locations of listed species and critical habitats are often organized along county and/or township lines. You should thus first identify the counties and/or townships within which your action area is located. You would then consult relevant sources of information regarding the locations of listed

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<sup>2</sup> For definitions of terms that you might encounter when addressing the listed species requirements, go to: <http://www.fws.gov/midwest/endangered/glossary/index.html> and <http://www.fws.gov/northeast/nyfo/es/actionarea.htm>.

species and critical habitats. The local offices of the FWS and NMFS often maintain lists of federally listed threatened or endangered species on their Internet sites. For FWS terrestrial and aquatic species information, you can use the FWS on-line mapping tool, the Information, Planning, and Consultation System, located at <http://www.fws.gov/ipac/>.

In most cases, listed species and designated critical habitat lists will allow you to determine if any such species or habitat exists in your county or township. You can also find critical habitat designations and associated requirements at 50 CFR Parts 17 and 226 (see <http://www.access.gpo.gov>). You may also use the FWS Critical Habitat Portal (see <http://criticalhabitat.fws.gov/crithab/>).

- ***If there are no listed species or critical habitat in the counties/townships where your action area is located you may select Criterion A.*** You must also provide a description of the basis for the criterion selected and provide documentation supporting the criterion selected in your submittal.
- ***If there are listed species and/or critical habitat in the counties/townships in your action area,*** you should contact your local FWS or NMFS office to determine if the listed species are known to exist within the specific action area of your minor source and if any designated critical habitat areas overlap the action area of your minor source.
  - ***If your local FWS or NMFS office indicates that these species and/or critical habitat could exist within the action area of your minor source, you must do one of the following to determine if the species and/or critical habitat may actually be present in or may use your action area:***
    - ***Conduct visual inspections.*** This method may be particularly suitable for sites that are smaller in size or located in non-natural settings such as highly urbanized areas or industrial parks where there is little or no natural habitat.
    - ***Conduct a formal biological survey.*** In some cases, particularly for larger sites, biological surveys may be an appropriate way to assess whether species are located within the action area of your minor source. Biological surveys are frequently performed by environmental consulting firms. A biological survey may in some cases be useful to conduct in conjunction with Steps 3, 4 or 5 of these instructions.
- ***If, after performing one or more of the assessments above, you determine that there are no listed species or critical habitat in your action area, you may select Criterion A.*** You must also provide a description of the basis for the criterion selected and provide documentation supporting the criterion selected in your submittal.
- ***If, listed species or critical habitat are located in your action area then proceed to step 3.***

## 2.3 Step 3

### **Determine if the Construction/Modification or Operation of Your New or Modified Minor Source is Likely to Adversely Affect Listed Threatened or Endangered Species or Designated Critical Habitat**

If in Step 2 you determine, based on communication with your local FWS or NMFS office, or otherwise, that listed species and/or critical habitat could exist within the action area of your new or modified minor source, you must next assess whether the construction/modification or operation of your new or modified minor source is likely to adversely affect listed threatened or endangered species or designated critical habitat.

Potential adverse effects from construction/ modification and operation activities include direct and indirect effects and could include, but are not limited to, the following:

- *Habitat Disturbance.* Surface disturbance activities such as excavation, site development, grading, and associated light and noise may adversely affect listed species or their habitat.
- *Operation of the Source.* Source operations could result in additional traffic, noise and light that could affect species or habitat.
- *Water-Related Impacts.* Changes in water usage or water discharges may affect listed species or their habitat.
- *Air Emission Impacts.* Increases in emission of certain pollutants may in certain cases affect vegetation growth patterns that can affect listed species or their habitat.

The scope of effects to consider will vary with each site and project. If you are having difficulty determining whether your project is likely to adversely affect listed species or critical habitat, or one of the Services has already raised concerns to you, you should contact the appropriate office of the FWS or NMFS for assistance.

- ***If adverse effects to listed threatened or endangered species or their critical habitat are not likely, then you may select Criterion B.*** You must provide the following specific information with your submittal:
  1. The federally listed species and/or designated habitat that are located within the action area of your minor source;
  2. The distance between your site and the listed species or designated critical habitat (in miles); and
  3. Any other information necessary to show that the construction/modification and operation of your source are not likely to cause any adverse effects to the listed threatened or endangered species or their critical habitat.
- ***If adverse effects to listed threatened or endangered species or their critical habitat are likely,*** you must follow Step 4 below.

## 2.4 Step 4

### **Determine if Measures Can Be Implemented to Avoid Adverse Effects**

If you determine in Step 3 that adverse effects from the construction/modification or operation of your new or modified minor source are likely to occur, you can still select eligibility Criterion B if you undertake appropriate measures to avoid or eliminate the likelihood of adverse effects prior to operating under the FIP. These measures may involve relatively simple changes to construction activities such as re-routing construction to bypass an area where species are located, relocating source activities, or modifying the “footprint” of the site.

- ***If you are able to implement appropriate measures to avoid the likelihood of adverse effects, then you may select Criterion B.*** The measures you adopt to avoid or eliminate adverse effects must be implemented for the

duration of the construction/modification and operation of your new or modified minor source under the FIP. You must also provide a description of the basis for the criterion selected, and the following specific information: ( 1) the federally listed species and/or designated habitat that are located within the action area of your minor source; ( 2) the distance between your source and the listed species or designated critical habitat (in miles); and (3) what steps were or will be taken to avoid the likelihood of adverse effects.

- ***If you cannot determine sufficient measures to implement to avoid the likelihood of adverse effects, you must follow the procedures in Step 5.***

## 2.5 Step 5

### Coordinate with the Service(s)

If in Step 4 you cannot determine sufficient measures to avoid the likelihood of adverse effects, you must contact the applicable Service(s). You may still be eligible for the FIP if the likely adverse effects can be addressed through meeting criterion C.

- **Criterion C:** You have coordinated with the Service(s) and have addressed the effects of the construction/modification and operation of your new or modified minor source on federally-listed threatened or endangered species and federally-designated critical habitat. The Service(s) must provide written concurrence that the construction/modification and operation of your new or modified minor source is not likely to adversely affect listed species or critical habitat.
  - ***If you have obtained the Service(s) written concurrence as described above,*** then you may select Criterion C. As part of your submittal, you must provide a description of the basis for the criterion selected and must include copies of the correspondence between you and the applicable Service(s).

## Appendix B – Historic Property Screening Process

### 1.0 Background

The purpose of this appendix is to assist you in completing the screening procedure for addressing historic properties that are either listed on, or eligible for listing on, the National Register for Historic Places in order to be eligible for the Oil and Natural Gas Minor Source Federal Implementation Plan (FIP).

To be eligible to operate under the FIP, you must demonstrate that you qualify under one of the criteria listed in this appendix with respect to the protection of historic properties under the NHPA.

To address any issues relating to historic properties, the EPA has developed the screening process in this appendix to enable source owners/operators to: (1) appropriately consider the potential impacts, if any, resulting from the construction, modification, and/or operation of a new or modified emission source on historic properties and, (2) if applicable, determine whether actions can be taken to mitigate any such impacts. Although each decision that a minor source is eligible for the FIP does not constitute a separate Federal undertaking, the screening process in this appendix provides an appropriate site-specific means of addressing historic property issues in connection with the FIP.

#### Key Terms

**Historic property**– prehistoric or historic districts, sites, buildings, structures, or objects that are included in or eligible for inclusion in the National Register of Historic Places, including artifacts, records, and remains that are related to and located within such properties

**SHPO**– The State Historic Preservation Officer for a particular state

**THPO or Tribal representative**– The Tribal Historic Preservation Officer for a particular Tribe or, if there is no THPO, the representative designated by such Tribe for NHPA purposes

If the impacts from your source have already been reviewed under another Federal agency’s approval process (e.g., the Bureau of Land Management authorizing operation of your source in Indian country) then documentation from that review may satisfy the requirements of this section.

### 2.0 Instructions for Source Owners/Operators

You are required to follow the screening process in this appendix to determine if the construction, modification or operation of a new or modified minor source of air pollutants on your site has the potential to cause effects to historic properties, and whether or not you need to contact your State Historic Preservation Officer (SHPO), Tribal Historic Preservation Officer (THPO), or other tribal representative for further information. You may not begin construction under the FIP until you have completed this screening process and obtained confirmation of satisfactory completion from the EPA. The following four steps describe how applicants can meet the historic property requirements under this permit.

#### Step 1

**Have prior professional cultural resource surveys or other evaluations determined whether historic properties exist in the area of your proposed source? Or, have prior earth disturbances precluded the existence of historic properties in the area of your proposed source?**

If it has already been determined that no historic properties exist in the area of your proposed source based on available information, including information that may be provided by your applicable SHPO, THPO, or other tribal representative, then you may submit the appropriate documentation of “**no historic properties affected**” with your submittal, and no further screening steps are necessary.

Similarly, if earth disturbances that have occurred prior to your project have eliminated the possibility that historic properties exist on your site or in the area affected by your new or modified minor source, then you may submit the appropriate documentation of **“no historic properties affected”** with your submittal, and no further screening steps are necessary.

During the 30-day period following receipt of your screening process documentation by the EPA, the SHPO, THPO, or other tribal representative may request that the EPA deny eligibility for the FIP based on concerns about potential adverse impacts to historic properties. The EPA will evaluate any such request and notify you if any additional information is needed to address adverse impacts to historic properties.

## Step 2

**If you are constructing, or modifying a minor source of air pollutants, as defined in 40 CFR § 49.152, you must determine if the construction, modification or operation of the minor source will have an effect on historic properties.**

If your answer to the questions in Step 1 is “no,” then you must assess whether the activities related to the construction, modification or operation of your new or modified minor source will have an effect on historic properties. Activities that could have an adverse effect on historic properties could include, for example:

- Excavations;
- Demolitions of existing buildings;
- Construction of foundations (e.g., for buildings, tanks or stacks);
- Installations of underground tanks;
- Addition of impervious surfaces; and
- Increases in truck traffic during excavation, demolition, or construction.

*Note: This list is not intended to be exhaustive. Other activities that are not on this list may involve earth-disturbing activities and must also be examined for their potential to affect historic properties. For more information, go to the National Park Service, National Register of Historic Places database found at <http://www.nps.gov/history/nr/research/index.htm>.*

The assessment may be based on a site map of your source and an analysis of historical sources, knowledge of the area, an assessment of the types of activities you are engaging in, considerations of any controls and/or management practices you will adopt to ensure that your activities will not have an effect on historic properties, and any other relevant factors.

If you determine based on this assessment that the activities related to the construction, modification or operation of your new or modified minor source will not cause effects to historic properties, then you may submit the appropriate documentation of **“no historic properties affected”** with your submittal, and no further screening steps are necessary. During the 30-day period following receipt of your screening process documentation by the EPA, the SHPO, THPO, or other tribal representative may request that the EPA delay your approval of eligibility for the FIP based on concerns about potential adverse impacts to historic properties. The EPA will evaluate any such request and notify you if any additional information is needed to address adverse impacts to historic properties.

If you are installing or modifying equipment that has the potential to have an adverse effect on historic properties, then you must proceed to Step 3.

## Step 3

**If you are constructing or modifying a minor source and you have not satisfied the conditions in Steps 1-2, you must contact and consult with the appropriate historic preservation authorities.**

Where you are constructing or modifying a minor source and you cannot determine in Step 2 that this activity will not have effects on historic properties, then you must contact the relevant SHPO, THPO, or other tribal representative to request their views as to the likelihood that historic properties may be adversely affected by the construction, modification or operation of your new or modified minor source.

*Note: Addresses for SHPOs and THPOs may be found on the Advisory Council on Historic Preservation's (ACHP's) website (<http://www.achp.gov/programs.html>). In instances where a tribe does not have a THPO, you should contact the appropriate Tribal government office designated by the tribe for this purpose when responding to this permit eligibility condition.*

You must submit the following minimum information in order to properly initiate your request for information:

1. Project name (i.e., the name or title most commonly associated with your project);
2. A narrative description of the project;
3. Name, address, phone and fax number, and email address (if available) of the operator;
4. Most recent U.S. Geological Survey map section (7.5 minute quadrangle) showing actual project location and boundaries clearly indicated; and
5. Sections of site map that show locations where activities might cause an adverse effect on historic properties.

Without submitting this minimum information, your request cannot be considered. You will need to provide the SHPO, THPO, or other tribal representative a minimum of 15 calendar days after they receive these materials to respond to your request for information about your project. You are advised to get a receipt from the post office or other carrier confirming the date on which your letter was received.

If you do not receive a response within 15 calendar days after receipt by the SHPO, THPO, or other tribal representative of your request, then you may indicate this in your submittal, and no further screening steps are necessary. Or, if the applicable SHPO, THPO, or other tribal representative responds to your request with an indication that no historic properties will be adversely affected by the construction or modification of your minor source, then you may submit the appropriate documentation of **"no adverse effects"** with your submittal, and no further screening steps are necessary.

During the 30-day period following receipt of your screening process documentation **by the EPA**, the SHPO, THPO, or other tribal representative may request that the EPA place a hold on authorization based on concerns about potential adverse impacts to historic properties. The EPA will evaluate any such request and notify you if any additional information is needed to address adverse impacts to historic properties before continuing review of your submittal.

If within 15 calendar days of receipt of your request the applicable SHPO, THPO, or other tribal representative responds with a request for additional information or for further consultation regarding appropriate measures for treatment or mitigation of effects on historic properties caused by the construction, modification or operation of your minor source, you must comply with this request and proceed to Step 4.

## **2.4 Step 4**

### **Consultation with your applicable SHPO, THPO, or other tribal representative.**

If, following your discussions with the appropriate historic preservation authorities in Step 3, the applicable SHPO, THPO, or other tribal representative requests additional information or further consultation, you must respond with such

information or consult to determine impacts and appropriate measures to mitigate such impacts to historic properties that may be caused by the construction, modification or operation of your new or modified minor source site. If after consultation it is determined that there will be no adverse effects to historic properties, then you may submit the appropriate documentation of **"no adverse effects"** with your submittal, and no further screening steps are necessary. If as a result of your discussions with the applicable SHPO, THPO, or tribal representative, you enter into, and comply with, a written agreement regarding treatment and/or mitigation of impacts on your site, then you may submit the appropriate documentation of **"adverse effects"** with your submittal.

If, however, agreement on an appropriate treatment or mitigation plan cannot be reached between you and the SHPO, THPO, or other tribal representative within 30 days of your response to the SHPO, THPO, or other tribal representative's request for additional information or further consultation, you may submit your screening process documentation to the EPA, but you must indicate that you have not negotiated measures to avoid or mitigate such effects. You must also include the following with your submittal:

1. Copies of any written correspondence between you and the SHPO, THPO, or other tribal representative; and
2. A description of any significant remaining disagreements as to mitigation measures between you and the SHPO, THPO, or other tribal representative.

During the 30-day period following receipt of your submittal **by the EPA**, the SHPO, THPO or other tribal representative may request that the EPA place a hold on confirmation based upon concerns regarding potential adverse effects to historic properties. The EPA, in coordination with the SHPO, THPO or other tribal representative, will evaluate any such request and notify you if any additional measures to address potential adverse effects to historic properties are necessary.



# IPaC resource list

This report is an automatically generated list of species and other resources such as critical habitat (collectively referred to as *trust resources*) under the U.S. Fish and Wildlife Service's (USFWS) jurisdiction that are known or expected to be on or near the project area referenced below. The list may also include trust resources that occur outside of the project area, but that could potentially be directly or indirectly affected by activities in the project area. However, determining the likelihood and extent of effects a project may have on trust resources typically requires gathering additional site-specific (e.g., vegetation/species surveys) and project-specific (e.g., magnitude and timing of proposed activities) information.

Below is a summary of the project information you provided and contact information for the USFWS office(s) with jurisdiction in the defined project area. Please read the introduction to each section that follows (Endangered Species, Migratory Birds, USFWS Facilities, and NWI Wetlands) for additional information applicable to the trust resources addressed in that section.

## Location

Rio Arriba County, New Mexico



## Local office

New Mexico Ecological Services Field Office

☎ (505) 346-2525

📅 (505) 346-2542

2105 Osuna Road Ne  
Albuquerque, NM 87113-1001

<http://www.fws.gov/southwest/es/NewMexico/>

[http://www.fws.gov/southwest/es/ES\\_Lists\\_Main2.html](http://www.fws.gov/southwest/es/ES_Lists_Main2.html)

# Endangered species

**This resource list is for informational purposes only and does not constitute an analysis of project level impacts.**

The primary information used to generate this list is the known or expected range of each species. Additional areas of influence (AOI) for species are also considered. An AOI includes areas outside of the species range if the species could be indirectly affected by activities in that area (e.g., placing a dam upstream of a fish population, even if that fish does not occur at the dam site, may indirectly impact the species by reducing or eliminating water flow downstream). Because species can move, and site conditions can change, the species on this list are not guaranteed to be found on or near the project area. To fully determine any potential effects to species, additional site-specific and project-specific information is often required.

Section 7 of the Endangered Species Act **requires** Federal agencies to "request of the Secretary information whether any species which is listed or proposed to be listed may be present in the area of such proposed action" for any project that is conducted, permitted, funded, or licensed by any Federal agency. A letter from the local office and a species list which fulfills this requirement can **only** be obtained by requesting an official species list from either the Regulatory Review section in IPaC (see directions below) or from the local field office directly.

For project evaluations that require USFWS concurrence/review, please return to the IPaC website and request an official species list by doing the following:

1. Draw the project location and click CONTINUE.
2. Click DEFINE PROJECT.
3. Log in (if directed to do so).
4. Provide a name and description for your project.
5. Click REQUEST SPECIES LIST.

Listed species<sup>1</sup> and their critical habitats are managed by the [Ecological Services Program](#) of the U.S. Fish and Wildlife Service (USFWS) and the fisheries division of the National Oceanic and Atmospheric Administration (NOAA Fisheries<sup>2</sup>).

Species and critical habitats under the sole responsibility of NOAA Fisheries are **not** shown on this list. Please contact [NOAA Fisheries](#) for [species under their jurisdiction](#).

1. Species listed under the [Endangered Species Act](#) are threatened or endangered; IPaC also shows species that are candidates, or proposed, for listing. See the [listing status page](#) for more information.
2. [NOAA Fisheries](#), also known as the National Marine Fisheries Service (NMFS), is an office of the National Oceanic and Atmospheric Administration within the Department of Commerce.

The following species are potentially affected by activities in this location:

## Mammals

NAME

STATUS

Canada Lynx *Lynx canadensis* Threatened  
 There is **final** critical habitat for this species. Your location is outside the critical habitat.  
<https://ecos.fws.gov/ecp/species/3652>

New Mexico Meadow Jumping Mouse *Zapus hudsonius luteus* Endangered  
 There is **final** critical habitat for this species. Your location is outside the critical habitat.  
<https://ecos.fws.gov/ecp/species/7965>

## Birds

NAME	STATUS
Least Tern <i>Sterna antillarum</i> No critical habitat has been designated for this species. <a href="https://ecos.fws.gov/ecp/species/8505">https://ecos.fws.gov/ecp/species/8505</a>	Endangered
Mexican Spotted Owl <i>Strix occidentalis lucida</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/8196">https://ecos.fws.gov/ecp/species/8196</a>	Threatened
Southwestern Willow Flycatcher <i>Empidonax traillii extimus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/6749">https://ecos.fws.gov/ecp/species/6749</a>	Endangered
Yellow-billed Cuckoo <i>Coccyzus americanus</i> There is <b>proposed</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/3911">https://ecos.fws.gov/ecp/species/3911</a>	Threatened

## Amphibians

NAME	STATUS
Jemez Mountains Salamander <i>Plethodon neomexicanus</i> There is <b>final</b> critical habitat for this species. Your location is outside the critical habitat. <a href="https://ecos.fws.gov/ecp/species/4095">https://ecos.fws.gov/ecp/species/4095</a>	Endangered

## Critical habitats

Potential effects to critical habitat(s) in this location must be analyzed along with the endangered species themselves.

THERE ARE NO CRITICAL HABITATS AT THIS LOCATION.

## Migratory birds

Certain birds are protected under the Migratory Bird Treaty Act<sup>1</sup> and the Bald and Golden Eagle Protection Act<sup>2</sup>.

Any person or organization who plans or conducts activities that may result in impacts to migratory birds, eagles, and their habitats should follow appropriate regulations and consider implementing appropriate conservation measures, as described [below](#).

1. The [Migratory Birds Treaty Act](#) of 1918.
2. The [Bald and Golden Eagle Protection Act](#) of 1940.

Additional information can be found using the following links:

- Birds of Conservation Concern <http://www.fws.gov/birds/management/managed-species/birds-of-conservation-concern.php>
- Measures for avoiding and minimizing impacts to birds <http://www.fws.gov/birds/management/project-assessment-tools-and-guidance/conservation-measures.php>
- Nationwide conservation measures for birds <http://www.fws.gov/migratorybirds/pdf/management/nationwidestandardconservationmeasures.pdf>

The birds listed below are birds of particular concern either because they occur on the [USFWS Birds of Conservation Concern](#) (BCC) list or warrant special attention in your project location. To learn more about the levels of concern for birds on your list and how this list is generated, see the FAQ [below](#). This is not a list of every bird you may find in this location, nor a guarantee that every bird on this list will be found in your project area. To see exact locations of where birders and the general public have sighted birds in and around your project area, visit the [E-bird data mapping tool](#) (Tip: enter your location, desired date range and a species on your list). For projects that occur off the Atlantic Coast, additional maps and models detailing the relative occurrence and abundance of bird species on your list are available. Links to additional information about Atlantic Coast birds, and other important information about your migratory bird list, including how to properly interpret and use your migratory bird report, can be found [below](#).

For guidance on when to schedule activities or implement avoidance and minimization measures to reduce impacts to migratory birds on your list, click on the PROBABILITY OF PRESENCE SUMMARY at the top of your list to see when these birds are most likely to be present and breeding in your project area.

NAME

BREEDING SEASON (IF A BREEDING SEASON IS INDICATED FOR A BIRD ON YOUR LIST, THE BIRD MAY BREED IN YOUR PROJECT AREA SOMETIME WITHIN THE TIMEFRAME SPECIFIED,

WHICH IS A VERY LIBERAL  
ESTIMATE OF THE DATES INSIDE  
WHICH THE BIRD BREEDS  
ACROSS ITS ENTIRE RANGE.  
"BREEDS ELSEWHERE" INDICATES  
THAT THE BIRD DOES NOT LIKELY  
BREED IN YOUR PROJECT AREA.)

### Pinyon Jay *Gymnorhinus cyanocephalus*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

<https://ecos.fws.gov/ecp/species/9420>

Breeds Feb 15 to Jul 15

### Willet *Tringa semipalmata*

This is a Bird of Conservation Concern (BCC) throughout its range in the continental USA and Alaska.

Breeds elsewhere

## Probability of Presence Summary

The graphs below provide our best understanding of when birds of concern are most likely to be present in your project area. This information can be used to tailor and schedule your project activities to avoid or minimize impacts to birds. Please make sure you read and understand the FAQ "Proper Interpretation and Use of Your Migratory Bird Report" before using or attempting to interpret this report.

### Probability of Presence (■)

Each green bar represents the bird's relative probability of presence in the 10km grid cell(s) your project overlaps during a particular week of the year. (A year is represented as 12 4-week months.) A taller bar indicates a higher probability of species presence. The survey effort (see below) can be used to establish a level of confidence in the presence score. One can have higher confidence in the presence score if the corresponding survey effort is also high.

How is the probability of presence score calculated? The calculation is done in three steps:

1. The probability of presence for each week is calculated as the number of survey events in the week where the species was detected divided by the total number of survey events for that week. For example, if in week 12 there were 20 survey events and the Spotted Towhee was found in 5 of them, the probability of presence of the Spotted Towhee in week 12 is 0.25.
2. To properly present the pattern of presence across the year, the relative probability of presence is calculated. This is the probability of presence divided by the maximum probability of presence across all weeks. For example, imagine the probability of presence in week 20 for the Spotted Towhee is 0.05, and that the probability of presence at week 12 (0.25) is the maximum of any week of the year. The relative probability of presence on week 12 is  $0.25/0.25 = 1$ ; at week 20 it is  $0.05/0.25 = 0.2$ .
3. The relative probability of presence calculated in the previous step undergoes a statistical conversion so that all possible values fall between 0 and 10, inclusive. This is the probability of presence score.

To see a bar's probability of presence score, simply hover your mouse cursor over the bar.

## Breeding Season (■)

Yellow bars denote a very liberal estimate of the time-frame inside which the bird breeds across its entire range. If there are no yellow bars shown for a bird, it does not breed in your project area.

## Survey Effort (|)

Vertical black lines superimposed on probability of presence bars indicate the number of surveys performed for that species in the 10km grid cell(s) your project area overlaps. The number of surveys is expressed as a range, for example, 33 to 64 surveys.

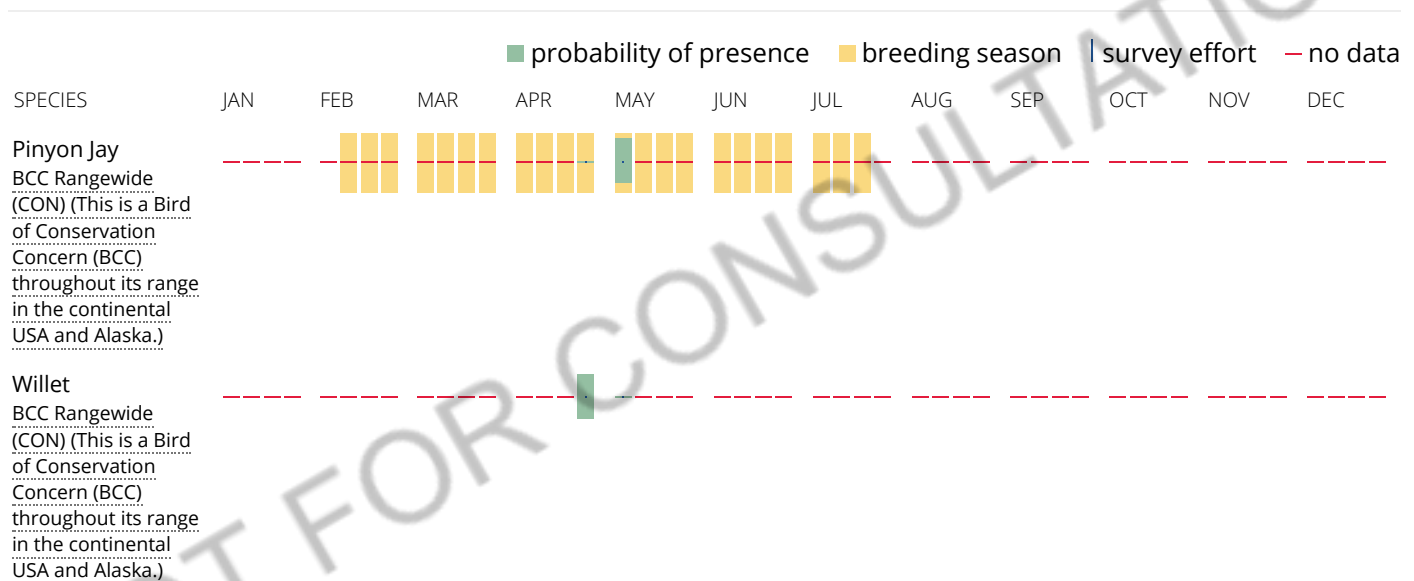
To see a bar's survey effort range, simply hover your mouse cursor over the bar.

## No Data (—)

A week is marked as having no data if there were no survey events for that week.

## Survey Timeframe

Surveys from only the last 10 years are used in order to ensure delivery of currently relevant information. The exception to this is areas off the Atlantic coast, where bird returns are based on all years of available data, since data in these areas is currently much more sparse.



**Tell me more about conservation measures I can implement to avoid or minimize impacts to migratory birds.**

[Nationwide Conservation Measures](#) describes measures that can help avoid and minimize impacts to all birds at any location year round. Implementation of these measures is particularly important when birds are most likely to occur in the project area. When birds may be breeding in the area, identifying the locations of any active nests and avoiding their destruction is a very helpful impact minimization measure. To see when birds are most likely to occur and be breeding in your project area, view the Probability of Presence Summary. [Additional measures](#) and/or [permits](#) may be advisable depending on the type of activity you are conducting and the type of infrastructure or bird species present on your project site.

**What does IPaC use to generate the migratory birds potentially occurring in my specified location?**

The Migratory Bird Resource List is comprised of USFWS [Birds of Conservation Concern \(BCC\)](#) and other species that may warrant special attention in your project location.

The migratory bird list generated for your project is derived from data provided by the [Avian Knowledge Network \(AKN\)](#). The AKN data is based on a growing collection of [survey, banding, and citizen science datasets](#) and is queried and filtered to return a list of those birds reported as occurring in the 10km grid cell(s) which your project

intersects, and that have been identified as warranting special attention because they are a BCC species in that area, an eagle ([Eagle Act](#) requirements may apply), or a species that has a particular vulnerability to offshore activities or development.

Again, the Migratory Bird Resource list includes only a subset of birds that may occur in your project area. It is not representative of all birds that may occur in your project area. To get a list of all birds potentially present in your project area, please visit the [AKN Phenology Tool](#).

### **What does IPaC use to generate the probability of presence graphs for the migratory birds potentially occurring in my specified location?**

The probability of presence graphs associated with your migratory bird list are based on data provided by the [Avian Knowledge Network \(AKN\)](#). This data is derived from a growing collection of [survey, banding, and citizen science datasets](#).

Probability of presence data is continuously being updated as new and better information becomes available. To learn more about how the probability of presence graphs are produced and how to interpret them, go to the Probability of Presence Summary and then click on the "Tell me about these graphs" link.

### **How do I know if a bird is breeding, wintering, migrating or present year-round in my project area?**

To see what part of a particular bird's range your project area falls within (i.e. breeding, wintering, migrating or year-round), you may refer to the following resources: [The Cornell Lab of Ornithology All About Birds Bird Guide](#), or (if you are unsuccessful in locating the bird of interest there), the [Cornell Lab of Ornithology Neotropical Birds guide](#). If a bird on your migratory bird species list has a breeding season associated with it, if that bird does occur in your project area, there may be nests present at some point within the timeframe specified. If "Breeds elsewhere" is indicated, then the bird likely does not breed in your project area.

### **What are the levels of concern for migratory birds?**

Migratory birds delivered through IPaC fall into the following distinct categories of concern:

1. "BCC Rangewide" birds are [Birds of Conservation Concern](#) (BCC) that are of concern throughout their range anywhere within the USA (including Hawaii, the Pacific Islands, Puerto Rico, and the Virgin Islands);
2. "BCC - BCR" birds are BCCs that are of concern only in particular Bird Conservation Regions (BCRs) in the continental USA; and
3. "Non-BCC - Vulnerable" birds are not BCC species in your project area, but appear on your list either because of the [Eagle Act](#) requirements (for eagles) or (for non-eagles) potential susceptibilities in offshore areas from certain types of development or activities (e.g. offshore energy development or longline fishing).

Although it is important to try to avoid and minimize impacts to all birds, efforts should be made, in particular, to avoid and minimize impacts to the birds on this list, especially eagles and BCC species of rangewide concern. For more information on conservation measures you can implement to help avoid and minimize migratory bird impacts and requirements for eagles, please see the FAQs for these topics.

### **Details about birds that are potentially affected by offshore projects**

For additional details about the relative occurrence and abundance of both individual bird species and groups of bird species within your project area off the Atlantic Coast, please visit the [Northeast Ocean Data Portal](#). The Portal also offers data and information about other taxa besides birds that may be helpful to you in your project review. Alternately, you may download the bird model results files underlying the portal maps through the [NOAA NCCOS Integrative Statistical Modeling and Predictive Mapping of Marine Bird Distributions and Abundance on the Atlantic Outer Continental Shelf](#) project webpage.

Bird tracking data can also provide additional details about occurrence and habitat use throughout the year, including migration. Models relying on survey data may not include this information. For additional information on marine bird tracking data, see the [Diving Bird Study](#) and the [nanotag studies](#) or contact [Caleb Spiegel](#) or [Pam Loring](#).

### What if I have eagles on my list?

If your project has the potential to disturb or kill eagles, you may need to [obtain a permit](#) to avoid violating the Eagle Act should such impacts occur.

### Proper Interpretation and Use of Your Migratory Bird Report

The migratory bird list generated is not a list of all birds in your project area, only a subset of birds of priority concern. To learn more about how your list is generated, and see options for identifying what other birds may be in your project area, please see the FAQ "What does IPaC use to generate the migratory birds potentially occurring in my specified location". Please be aware this report provides the "probability of presence" of birds within the 10 km grid cell(s) that overlap your project; not your exact project footprint. On the graphs provided, please also look carefully at the survey effort (indicated by the black vertical bar) and for the existence of the "no data" indicator (a red horizontal bar). A high survey effort is the key component. If the survey effort is high, then the probability of presence score can be viewed as more dependable. In contrast, a low survey effort bar or no data bar means a lack of data and, therefore, a lack of certainty about presence of the species. This list is not perfect; it is simply a starting point for identifying what birds of concern have the potential to be in your project area, when they might be there, and if they might be breeding (which means nests might be present). The list helps you know what to look for to confirm presence, and helps guide you in knowing when to implement conservation measures to avoid or minimize potential impacts from your project activities, should presence be confirmed. To learn more about conservation measures, visit the FAQ "Tell me about conservation measures I can implement to avoid or minimize impacts to migratory birds" at the bottom of your migratory bird trust resources page.

## Facilities

### National Wildlife Refuge lands

Any activity proposed on lands managed by the [National Wildlife Refuge](#) system must undergo a 'Compatibility Determination' conducted by the Refuge. Please contact the individual Refuges to discuss any questions or concerns.

THERE ARE NO REFUGE LANDS AT THIS LOCATION.

### Fish hatcheries

THERE ARE NO FISH HATCHERIES AT THIS LOCATION.

## Wetlands in the National Wetlands Inventory



Impacts to [NWI wetlands](#) and other aquatic habitats may be subject to regulation under Section 404 of the Clean Water Act, or other State/Federal statutes.

For more information please contact the Regulatory Program of the local [U.S. Army Corps of Engineers District](#).

THERE ARE NO KNOWN WETLANDS AT THIS LOCATION.

#### **Data limitations**

The Service's objective of mapping wetlands and deepwater habitats is to produce reconnaissance level information on the location, type and size of these resources. The maps are prepared from the analysis of high altitude imagery. Wetlands are identified based on vegetation, visible hydrology and geography. A margin of error is inherent in the use of imagery; thus, detailed on-the-ground inspection of any particular site may result in revision of the wetland boundaries or classification established through image analysis.

The accuracy of image interpretation depends on the quality of the imagery, the experience of the image analysts, the amount and quality of the collateral data and the amount of ground truth verification work conducted. Metadata should be consulted to determine the date of the source imagery used and any mapping problems.

Wetlands or other mapped features may have changed since the date of the imagery or field work. There may be occasional differences in polygon boundaries or classifications between the information depicted on the map and the actual conditions on site.

#### **Data exclusions**

Certain wetland habitats are excluded from the National mapping program because of the limitations of aerial imagery as the primary data source used to detect wetlands. These habitats include seagrasses or submerged aquatic vegetation that are found in the intertidal and subtidal zones of estuaries and nearshore coastal waters. Some deepwater reef communities (coral or tubercid worm reefs) have also been excluded from the inventory. These habitats, because of their depth, go undetected by aerial imagery.

#### **Data precautions**

Federal, state, and local regulatory agencies with jurisdiction over wetlands may define and describe wetlands in a different manner than that used in this inventory. There is no attempt, in either the design or products of this inventory, to define the limits of proprietary jurisdiction of any Federal, state, or local government or to establish the geographical scope of the regulatory programs of government agencies. Persons intending to engage in activities involving modifications within or adjacent to wetland areas should seek the advice of appropriate federal, state, or local agencies concerning specified agency regulatory programs and proprietary jurisdictions that may affect such activities.