ENLINK
MIDSTREAM

September 24, 2015

Mr. William Durham
West Virginia Department of Environmental Protection
Division of Air Quality
601 57th Street
Charleston, WV 25304

Re: Permit Determination for the WV Oil Gathering LLC, Stockley Station

Dear Mr. Durham,

Please see the attached Permit Determination for the Stockley Station located in Wallback, WV. The site has 2 above ground storage tanks a 3300 bbl crude oil tank and a 400 bbl brine tank along with truck loading and unloading. Emission rates are under the 6lb/hr and 10 tpy permitting thresholds. If there are any questions, please contact me at Robert.Douglas@enlink.com or at 469-308-6320.

Sincerely,

Robert Douglas

2501 Cedar Springs, Suite 100 > Dallas, Texas 75201
214.953.9500 office > 214.953.9501 fax

EnLink.com

PERMIT DETERMINATION FOR THE STOCKLEY STATION WALLBACK, WEST VIRGINIA

West Virginia Oil Gathering, LLC
157 Lower Eureka Lane
St. Mary's, WV 26170

September 2015

WEST VIRGINIA
DEPARTMENT OF ENVIRONMENTAL PROTECTION
DIVISION OF AIR QUALITY
601 57th Street, SE
Charleston, WV 25304
Phone: (304) 926-0475
www.dep.wv.gov/daq

PERMIT DETERMINATION FORM (PDF)

FOR AGENCY USE ONLY: PLANT I.D. # _____

PDF # _____ PERMIT WRITER: _____

1. NAME OF APPLICANT (AS REGISTERED WITH THE WV SECRETARY OF STATE'S OFFICE):
West Virginia Oil Gathering, LLC

2. NAME OF FACILITY (IF DIFFERENT FROM ABOVE):
Stockley Station

3. NORTH AMERICAN INDUSTRY CLASSIFICATION SYSTEM (**NAICS**) CODE:
424710

4A. MAILING ADDRESS:
157 Lower Eureka Lane
St.Mary's, WV 26170

4B. PHYSICAL ADDRESS:
5831 Wallback Road
Wallback, WV 25285

5A. DIRECTIONS TO FACILITY (PLEASE PROVIDE **MAP** AS **ATTACHMENT A**):
Take exit 34 on I-79 and head south and go approximately 1.65 mile. The site will be on the right side of the road.

5B. NEAREST ROAD:
RT 36 Wallback RD

5C. NEAREST CITY OR TOWN:
Wallback

5D. COUNTY:
Clay

5E. UTM NORTHING (KM):
4266441.21

5F. UTM EASTING (KM):
488201.06

5G. UTM ZONE:
17S

6A. INDIVIDUAL TO CONTACT IF MORE INFORMATION IS REQUIRED:
Robert Douglas

6B. TITLE:
Environmental Specialist

6C. TELEPHONE:
304-665-2461 ext 6319

6D. FAX:
304-665-1223

6E. E-MAIL:
Robert.Douglas@enlink.com

7A. DAQ PLANT I.D. NO. (FOR AN EXISTING FACILITY ONLY):
___ ___ ___ - ___ ___ ___ ___ ___

7B. PLEASE LIST ALL CURRENT 45CSR13, 45CSR14, 45CSR19 AND/OR TITLE V (45CSR30) PERMIT NUMBERS ASSOCIATED WITH **THIS** PROCESS (FOR AN EXISTING FACILITY ONLY):
NA

7C. IS THIS PDF BEING SUBMITTED AS THE RESULT OF AN ENFORCEMENT ACTION? IF YES, PLEASE LIST:
NO

8A. TYPE OF EMISSION SOURCE (CHECK ONE):
☐ **NEW SOURCE** ☐ **ADMINISTRATIVE UPDATE**
☐ **MODIFICATION** **X OTHER** (PLEASE EXPLAIN IN 11B)

8B. IF ADMINISTRATIVE UPDATE, DOES DAQ HAVE THE APPLICANT'S CONSENT TO UPDATE THE EXISTING PERMIT WITH THE INFORMATION CONTAINED HEREIN?
☐ **YES** ☐ **NO**

9. IS *DEMOLITION* OR PHYSICAL *RENOVATION* AT AN EXISTING FACILITY INVOLVED? ☐ **YES** **X NO**

10A. DATE OF ANTICIPATED INSTALLATION OR CHANGE:
____/____/20__.

10B. DATE OF ANTICIPATED START-UP:
____/____/20__.

11A. PLEASE PROVIDE A **DETAILED PROCESS FLOW DIAGRAM** SHOWING EACH PROPOSED OR MODIFIED PROCESS EMISSION POINT AS **ATTACHMENT B**.

11B. PLEASE PROVIDE A **DETAILED PROCESS DESCRIPTION** AS **ATTACHMENT C**.

12. PLEASE PROVIDE **MATERIAL SAFETY DATA SHEETS (MSDS)** FOR ALL MATERIALS PROCESSED, USED OR PRODUCED AS **ATTACHMENT D**. FOR CHEMICAL PROCESSE, PLEASE PROVIDE A MSDS FOR EACH COMPOUND EMITTED TO AIR.

13A. **REGULATED AIR POLLUTANT EMISSIONS:**

⇒ **FOR A NEW FACILITY,** PLEASE PROVIDE PLANT WIDE EMISSIONS BASED ON THE POTENTIAL TO EMIT (PTE) FOR THE FOLLOWING AIR POLLUTANTS INCLUDING ALL PROCESSES.

⇒ **FOR AN EXISTING FACILITY,** PLEASE PROVIDE THE PROPOSED CHANGE IN EMISSIONS BASED ON THE PTE OF ALL PROCESS CHANGES FOR THE FOLLOWING AIR POLLUTANTS.

PTE FOR A GIVEN POLLUTANT IS TYPICALLY BEFORE AIR POLLUTION CONTROL DEVICES AND IS COLLECTED BASED ON THE MAXIMUM DESIGN CAPACITY OF PROCESS EQUIPMENT.

POLLUTANT	HOURLY PTE (LB/HR)	YEARLY PTE (TON/YR) (HOURLY PTE MULTIPLIED BY 8760 HR/YR) DIVIDED BY 2000 LB/TON
PM	0.32	2.21
PM_{10}	0.09	0.60
VOCs	2.09	2.90
CO	NA	NA
NO_x	NA	NA
SO_2	NA	NA
Pb	NA	NA
HAPs (AGGREGATE AMOUNT)	0.10	0.00
TAPs (INDIVIDUALLY)*	NA	NA
OTHER (INDIVIDUALLY)*	NA	NA

* ATTACH ADDITIONAL PAGES AS NEEDED

13B. PLEASE PROVIDE ALL **SUPPORTING CALCULATIONS** AS **ATTACHMENT E**.

CALCULATE AN HOURLY AND YEARLY PTE OF EACH PROCESS EMISSION POINT (SHOWN IN YOUR DETAILED PROCESS FLOW DIAGRAM) FOR ALL AIR POLLUTANTS LISTED ABOVE INCLUDING INDIVIDUAL HAP'S (LISTED IN SECTION 112[b] OF THE 1990 CAAA), TAP'S (LISTED IN 45CSR27), AND OTHER AIR POLLUTANTS (E.G. POLLUTANTS LISTED IN TABLE 45-13A OF 45CSR13, MINERAL ACIDS PER 45CSR7, ETC.).

14. **CERTIFICATION OF DATA**

I, Aaron Fleming (*TYPE NAME*) ATTEST THAT ALL THE REPRESENTATIONS CONTAINED IN THIS APPLICATION, OR APPENDED HERETO, ARE TRUE, ACCURATE, AND COMPLETE TO THE BEST OF MY KNOWLEDGE BASED ON INFORMATION AND BELIEF AFTER REASONABLE INQUIRY, AND THAT I AM A ***RESPONSIBLE OFFICIAL**** (*PRESIDENT, VICE PRESIDENT, SECRETARY OR TREASURER, GENERAL PARTNER OR SOLE PROPRIETOR*) OF THE APPLICANT.

SIGNATURE OF RESPONSIBLE OFFICIAL: Aaron Fleming

TITLE: Director, Crude Supply DATE: 9 / 23 / 15

** THE DEFINITION OF THE PHRASE '***RESPONSIBLE OFFICIAL***' CAN BE FOUND AT 45CSR13, SECTION 2.23.

NOTE: PLEASE CHECK ENCLOSED ATTACHMENTS:

X ATTACHMENT A X ATTACHMENT B X ATTACHMENT C X ATTACHMENT D X ATTACHMENT E

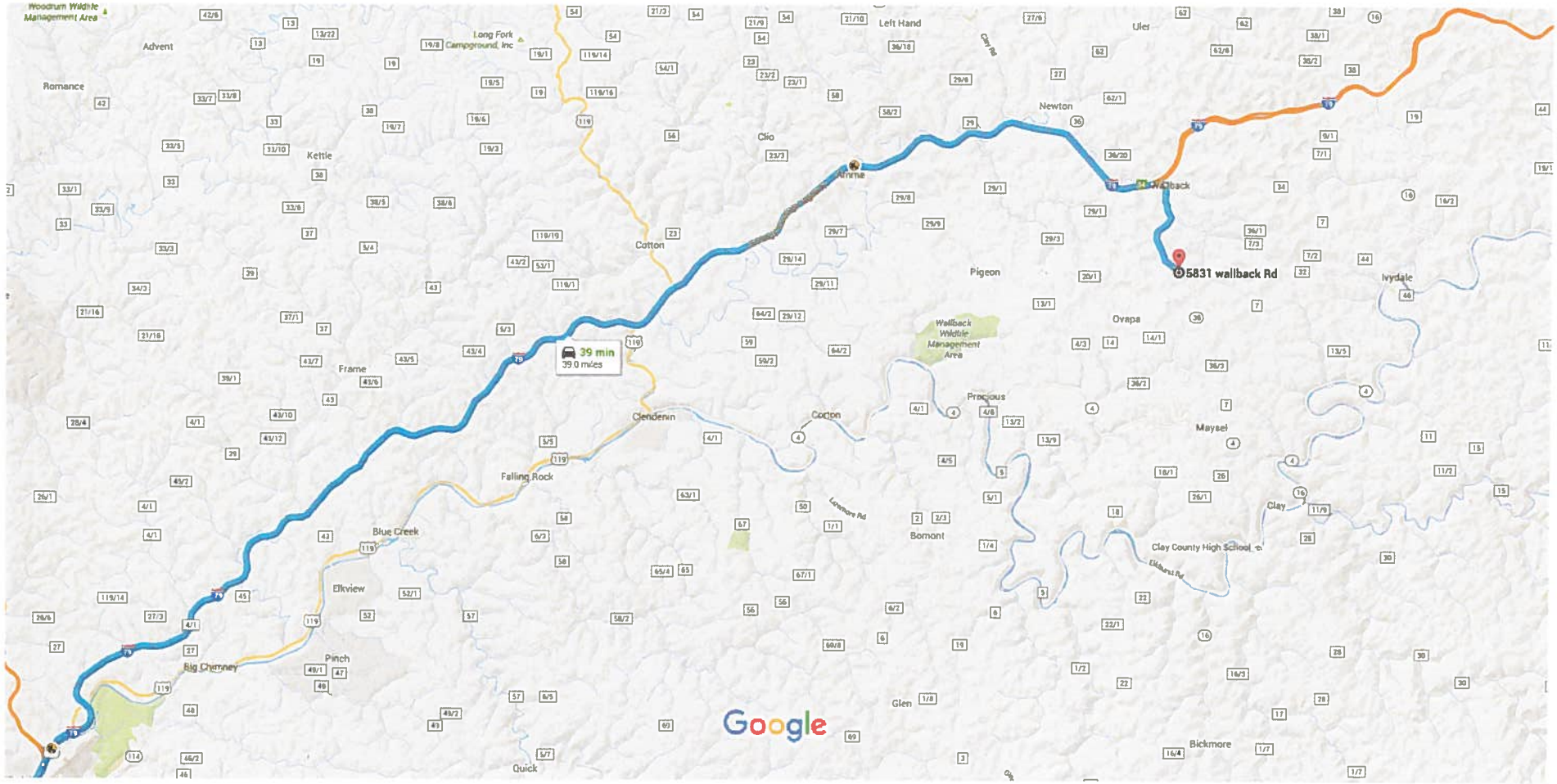
RECORDS ON ALL CHANGES ARE REQUIRED TO BE KEPT AND MAINTAINED ON-SITE FOR TWO (2) YEARS.

THE PERMIT DETERMINATION FORM WITH THE INSTRUCTIONS CAN BE FOUND ON DAQ'S PERMITTING SECTION WEB SITE:

www.dep.wv.gov/daq

Attachment A

Google Maps Charleston, WV to 5831 wallback Rd, Wallback, WV 25285 Drive 39.0 miles, 39 min



Map data ©2015 Google 2 mi

Charleston, WV

Get on I-64 W/I-77 N from Capitol St

3 min (0.6 mi)

1. Head northeast on Dickinson St toward Lee St E

413 ft

2. Turn left at the 2nd cross street onto Washington St E

374 ft

3. Turn right at the 1st cross street onto Capitol St

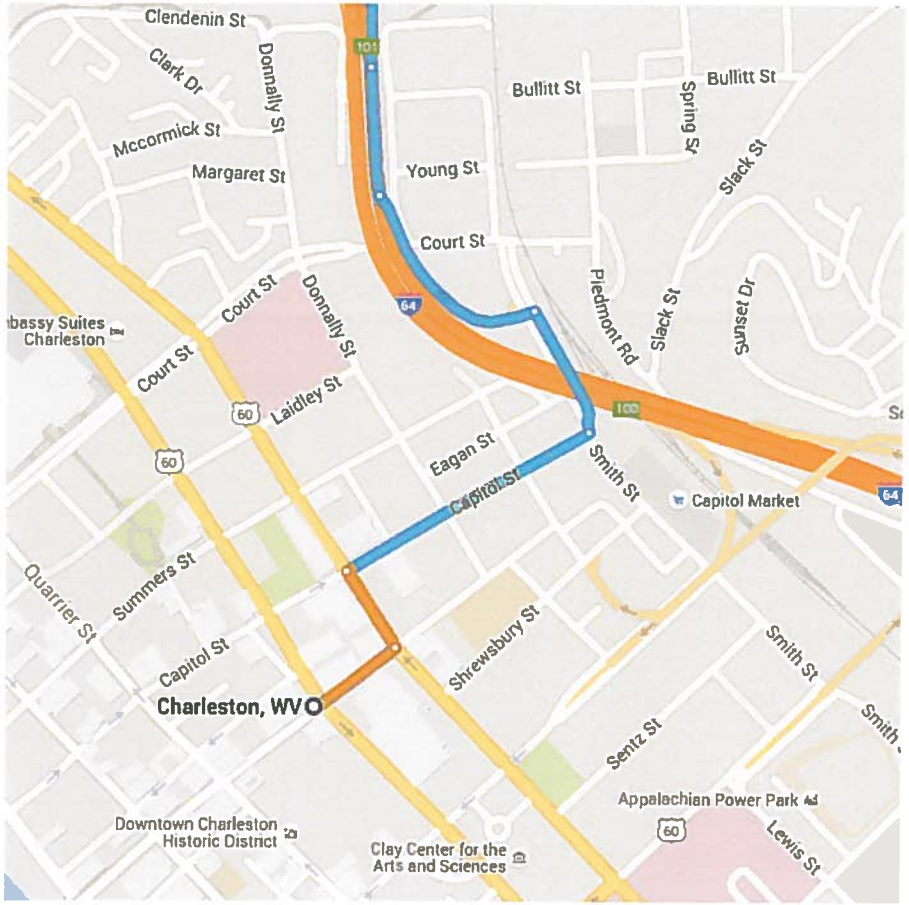
0.2 mi

4. Turn left onto Smith St

0.1 mi

5. Turn left to merge onto I-64 W/I-77 N toward I-79/Parkersburg/Huntington

0.2 mi



Follow I-79 N to WV-36 S in III. Take exit 34 from I-79 N

31 min (36.0 mi)

6. Merge onto I-64 W/I-77 N

0.1 mi

7. Use the right 2 lanes to take the Interstate 77 N/Interstate 79 N exit toward Parkersburg

0.5 mi

8. Continue onto I-77 N

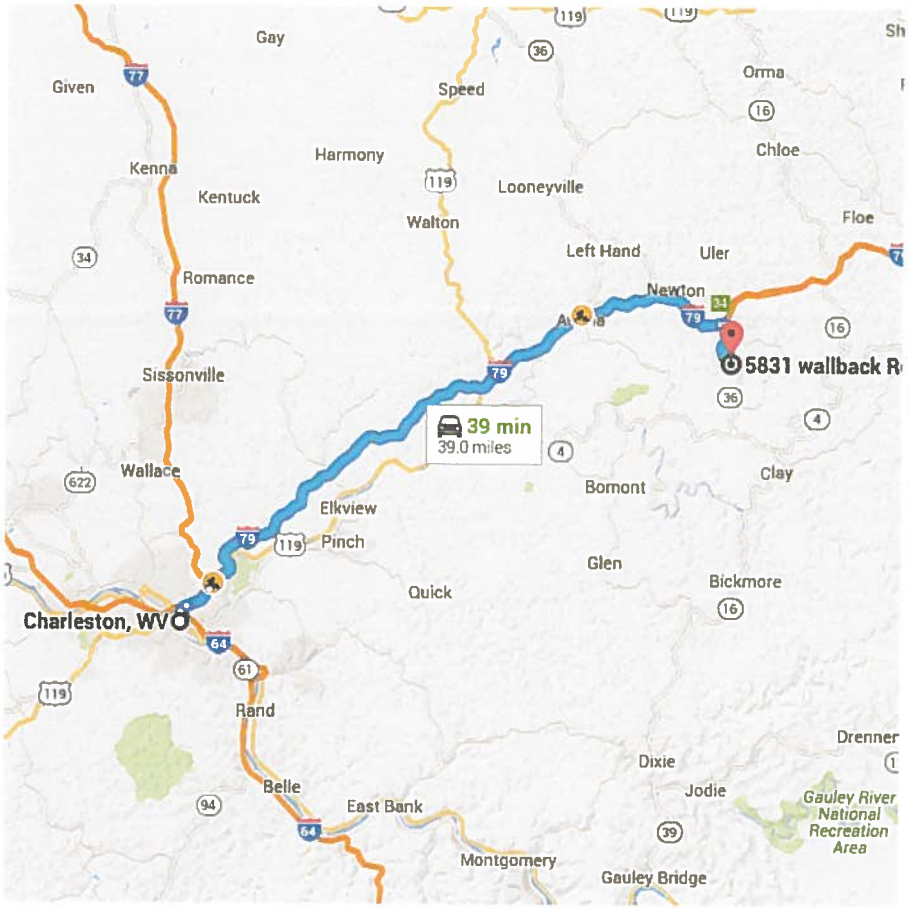
1.4 mi

9. Keep right at the fork to continue on I-79 N, follow signs for Clarksburg

33.7 mi

10. Take exit 34 for W Virginia 36 toward Wallback Clay

0.3 mi



Follow WV-36 S to wallback Rd in A

4 min (2.4 mi)

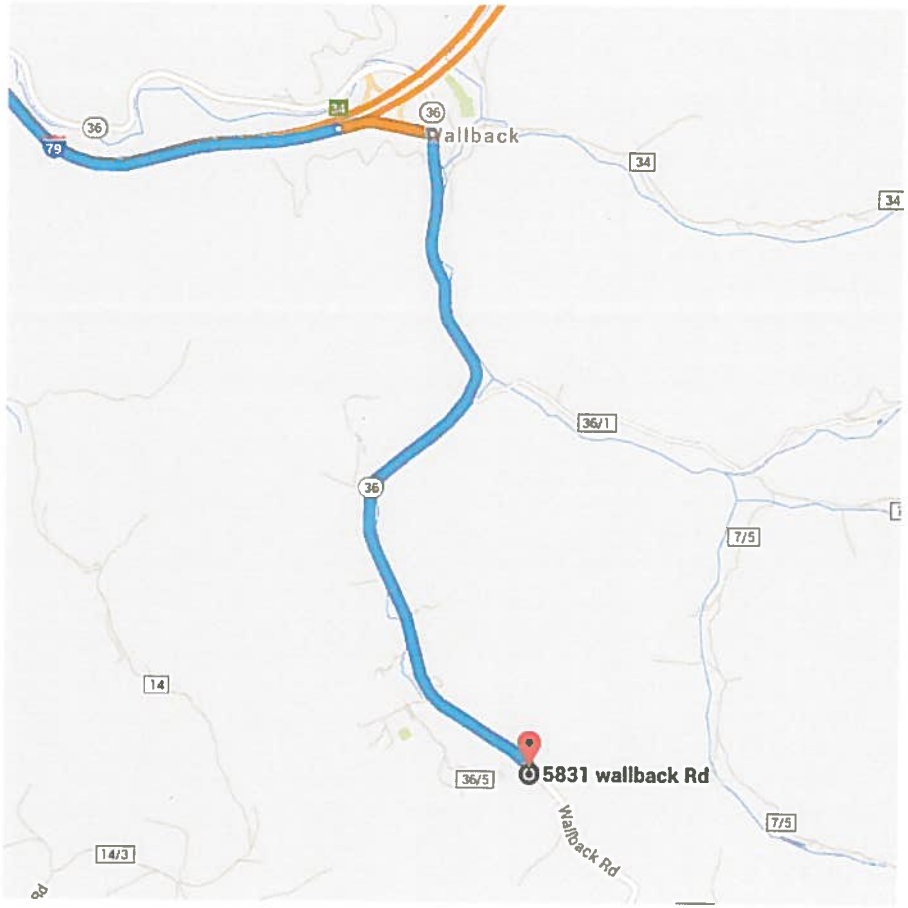
11. Turn right onto WV-36 S

2.4 mi

12. Turn right onto wallback Rd

Destination will be on the right

102 ft



5831 wallback Rd

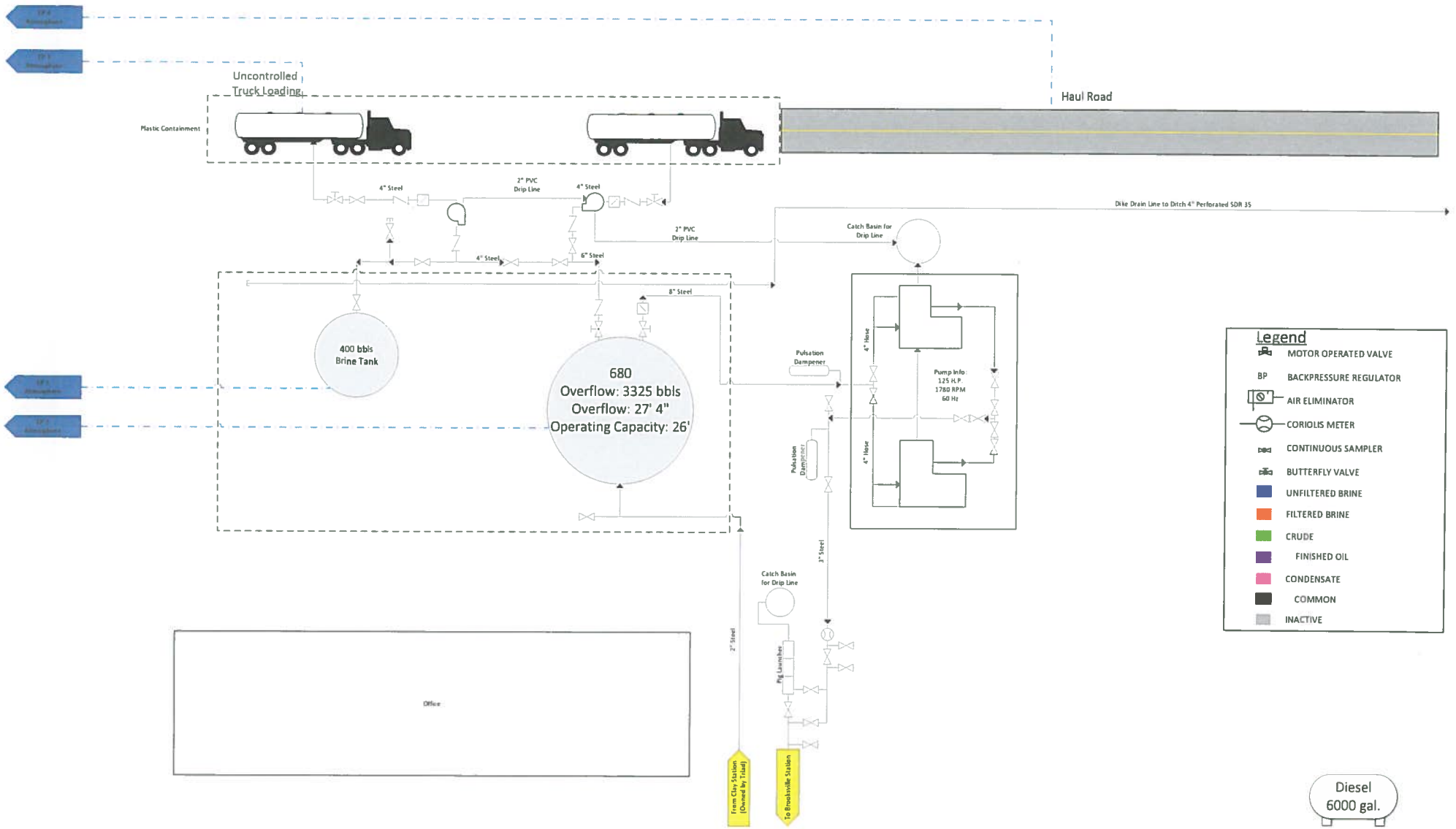
Wallback, WV 25285

These directions are for planning purposes only. You may find that construction projects, traffic, weather, or other events may cause conditions to differ from the map results, and you should plan your route accordingly. You must obey all signs or notices regarding your route.

Attachment B

Stockley Station

ENLINK MIDSTREAM



Attachment C

Stockley Facility Description

The Stockley Station receives brine and crude oil solutions from surrounding gas and oil wells via tanker truck and pipeline. The fluids are stored in either the 3300 bbl crude oil storage tank (emission point 2) equipped with an internal floating roof or the 400 bbl brine tank (Emission Point 1). The 3,300 bbl crude tank, constructed in 1985, is subject to the recordkeeping requirements and inspections of 40 CFR 60 Subpart Kb. The 400 bbl brine tank, also installed in 1985, is not subject to Subpart Kb. There is also one de minimis diesel fuel tank, item 58 from Table 45-1B, located at the site.

Oil is trucked or piped into the facility at a rate not to exceed 1,204,500 bbls per year. Throughput to the brine tank will not exceed 3,504,000 bbls per year. Typically, fluids are removed from the facility via pipeline. In the event there is an issue with the pipeline, fluids can be loaded back onto a tanker trucks from the tanks (emission point 3). Trucks leaving or entering the facility drive on a short haul road (emissions point 4) when entering or leaving the facility.

Emissions rates from all sources are below the 6 lb/hr and 10 tpy permitting threshold. HAP emission rates are also significantly below the major source thresholds.

Attachment D

Petroleum Crude Oil Solution

Safety Data Sheet

according to Federal Register / Vol. 77, No. 58 / Monday, March 26, 2012 / Rules and Regulations

Revision date: 07/14/2015

SECTION 1: Identification of the substance/mixture and of the company/undertaking

1.1. Product identifier

Product form : Mixture

Product name : Petroleum Crude Oil Solution

Other means of identification : Earth oil, petroleum oil, rock oil

1.2. Relevant identified uses of the substance or mixture and uses advised against

Use of the substance/mixture : Fuel

1.3. Details of the supplier of the safety data sheet

Enlink Midstream
2501 Cedar Springs Road
Suite 100
Dallas, TX 75201
www.enlink.com

1.4. Emergency telephone number

Emergency number : 866-394-9839
CHEMTREC: 1-800-824-9300

SECTION 2: Hazards identification

2.1. Classification of the substance or mixture

GHS-US classification

Simple Asphy	H380
Flam. Liq. 2	H225
Skin Irrit. 2	H315
Muta. 1B	H340
Carc. 1A	H350
Repr. 2	H361
STOT SE 3	H336
STOT RE 1	H372
Asp. Tox. 1	H304
Aquatic Acute 2	H401
Aquatic Chronic 2	H411

Full text of H-phrases: see section 16

2.2. Label elements

GHS-US labelling

Hazard pictograms (GHS-US) :

GHS02 GHS07 GHS08 GHS09

Signal word (GHS-US) : Danger

Hazard statements (GHS-US) :
H225 - Highly flammable liquid and vapor
H304 - May be fatal if swallowed and enters airways
H315 - Causes skin irritation
H336 - May cause drowsiness or dizziness
H340 - May cause genetic defects (Dermal, Inhalation, oral)
H350 - May cause cancer (Dermal, Inhalation, oral)
H361 - lung/respiratory system, Skin (Dermal, Inhalation)
H372 - Causes damage to organs (eye, lung/respiratory system, Skin) through prolonged or repeated exposure (Dermal, Inhalation, oral)
H380 - May displace oxygen and cause rapid suffocation
H401 - Toxic to aquatic life
H411 - Toxic to aquatic life with long lasting effects

Precautionary statements (GHS-US) :
P201 - Obtain special instructions before use
P202 - Do not handle until all safety precautions have been read and understood
P210 - Keep away from heat, hot surfaces, open flames, sparks. - No smoking
P233 - Keep container tightly closed

P240 - Ground/bond container and receiving equipment
P241 - Use explosion-proof electrical, ventilating equipment
P242 - Use only non-sparking tools
P243 - Take precautionary measures against static discharge
P260 - Do not breathe vapor, mist, fume
P261 - Avoid breathing vapor, fume, mist
P264 - Wash hands, forearms and face, clothing thoroughly after handling
P270 - Do not eat, drink or smoke when using this product
P271 - Use only outdoors or in a well-ventilated area
P273 - Avoid release to the environment
P280 - Wear protective gloves, protective clothing, eye protection
P301 + P310 - If swallowed: Immediately call doctor, POISON CENTER
P302 + P352 - If on skin: Wash with plenty of water
P303 + P361 + P353 - If on skin (or hair): Take off immediately all contaminated clothing. Rinse skin with water/shower
P304 + P340 - If inhaled: Remove person to fresh air and keep comfortable for breathing
P308 + P313 - If exposed or concerned: Get medical advice/attention
P312 - Call doctor, POISON CENTER if you feel unwell
P314 - Get medical advice/attention if you feel unwell
P321 - Specific treatment (See Section four (4) of this document on this label)
P331 - Do NOT induce vomiting
P332+P313 - If skin irritation occurs: Get medical advice/attention
P362 - Take off contaminated clothing and wash before reuse
P370+P378 - In case of fire: Use carbon dioxide (CO_2), dry extinguishing powder, foam to extinguish
P391 - Collect spillage
P403+P233 - Store in a well-ventilated place. Keep container tightly closed
P403+P235 - Store in a well-ventilated place. Keep cool
P405 - Store locked up
P501 - Dispose of contents/container to a licensed hazardous-waste disposal contractor or collection site except for empty clean containers which can be disposed of as non-hazardous waste

2.3. Other hazards

Other hazards not contributing to the classification : Product contains Dimethylpentanes mixture in a weight % ranging from 1-3%. This material can contain toxic levels of hydrogen sulfide vapor that accumulate in the vapor spaces of storage and transport compartments. Hydrogen sulfide vapor can cause eye, skin and respiratory tract irritation.

2.4. Unknown acute toxicity (GHS-US)

Not applicable

SECTION 3: Composition/information on ingredients

3.1. Substance

Not applicable

3.2. Mixture

Name	Product identifier	%	GHS-US classification
Crude Oil	(CAS No) 8002-05-9	<= 100	Flam. Liq. 2, H225 Aquatic Acute 2, H401
n-decane	(CAS No) 872-05-9	4 - 10	Flam. Liq. 3, H226 Skin Irrit. 2, H315 Asp. Tox. 1, H304
n-Pentane	(CAS No) 109-66-0	2 - 7	Simple Asphy, H380 Flam. Liq. 2, H225 Acute Tox. 4 (Oral), H302 STOT SE 3, H336 Aquatic Acute 2, H401 Aquatic Chronic 2, H411

Name	Product identifier	%	GHS-US classification
n-Hexane	(CAS No) 110-54-3	1 - 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
n-Heptane	(CAS No) 142-82-5	2 - 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Octane	(CAS No) 111-65-9	1 - 5	Flam. Liq. 2, H225 Skin Irrit. 2, H315 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 1, H400 Aquatic Chronic 1, H410
Nonane	(CAS No) 111-84-2	1 - 5	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation:gas), H332 Skin Irrit. 2, H315 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Chronic 4, H413
n-Butane	(CAS No) 106-97-8	1 - 5	Simple Asphy, H380 Flam. Gas 1, H220 Liquefied gas, H280
Methylcyclohexane	(CAS No) 108-87-2	1 - 4	Flam. Liq. 2, H225 Skin Irrit. 2, H315 STOT SE 3, H336 Asp. Tox. 1, H304 Aquatic Acute 2, H401 Aquatic Chronic 2, H411
Toluene	(CAS No) 108-88-3	<= 2	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Repr. 2, H361 STOT SE 3, H336 STOT RE 2, H373 Asp. Tox. 1, H304
1,2,4-trimethylbenzene	(CAS No) 95-63-6	<= 2	Flam. Liq. 3, H226 Acute Tox. 4 (Inhalation), H332 Skin Irrit. 2, H315 STOT SE 3, H335 Aquatic Chronic 2, H411
Benzene	(CAS No) 71-43-2	<= 1	Flam. Liq. 2, H225 Skin Irrit. 2, H315 Muta. 1B, H340 Carc. 1A, H350 STOT RE 1, H372 Asp. Tox. 1, H304

Full text of H-phrases: see section 16

SECTION 4: First aid measures

4.1. Description of first aid measures

First-aid measures general : Ensure that medical personnel are aware of the material(s) involved and take precautions to protect themselves.

First-aid measures after inhalation : If exposed: Remove person to fresh air. If person is not breathing, provide artificial respiration. If necessary, provide additional oxygen once breathing is restored if trained to do so. Seek medical attention immediately.

First-aid measures after skin contact : Remove and isolate contaminated clothing and shoes. In case of contact with substance, immediately flush skin or eyes with running water for at least 20 minutes. Wash with plenty of soap and water. In case of burns, immediately cool affected skin for as long as possible with cold water. Do not remove clothing if adhering to skin.

First-aid measures after eye contact : Flush eyes with lukewarm water for 15 minutes opening and closing eyelids to ensure adequate rinsing. If redness, irritation, pain, or tearing occurs, seek medical attention. Remove contact lenses, if present and easy to do. Continue rinsing.

First-aid measures after ingestion : Do not induce vomiting because of danger of aspirating liquid into lungs, causing serious damage and chemical pneumonitis. If spontaneous vomiting occurs, keep head below hips to prevent aspiration and monitor for breathing difficulty. Never give anything by mouth to an unconscious person. Keep affected person warm and at rest. Get Immediate Medical Attention.

4.2. Most important symptoms and effects, both acute and delayed

Symptoms/injuries after inhalation : Volatile components of this product can cause respiratory and nasal irritation, headache, dizziness, drowsiness, nausea and loss of coordination. Significant concentrations of hydrogen sulfide gas can be present in the vapor space of storage tanks and bulk transport compartments. With the loss of highly volatile components, weathered oil does not present an inhalation hazard.

Symptoms/injuries after skin contact : May cause moderate irritation. Prolonged or repeated exposure can cause dermatitis, folliculitis or oil acne.

Symptoms/injuries after eye contact : Causes eye irritation.

Symptoms/injuries after ingestion : Swallowing this material may be harmful. May cause irritation of the mouth, throat and gastrointestinal tract. Symptoms may include salivation, pain, nausea, vomiting and diarrhea. Aspiration into lungs may cause chemical pneumonia and lung damage.

4.3. Indication of any immediate medical attention and special treatment needed

No additional information available

SECTION 5: Firefighting measures

5.1. Extinguishing media

Suitable extinguishing media : For small fires — Class B fire-extinguishing media such as CO_2, dry chemical, foam (AFFF/ATC) or water spray can be used. Larger fires -water spray, fog or foam (AFFF/ATC) can be used.

5.2. Special hazards arising from the substance or mixture

Fire hazard : HIGHLY FLAMMABLE: Will be easily ignited by heat, sparks or flames. Vapors may travel to source of ignition and flash back. Most vapor are heavier than air. They will spread along ground and collect in low or confined areas. Runover to sewer may create fire. Many liquids are lighter than water.

Explosion hazard : Will form explosive mixtures with air. Vapor explosion hazard indoors, outdoors or in sewers. Containers may explode when heated. Runoff to sewer may create fire or explosion hazard.

Reactivity : Highly flammable liquid and vapor.

5.3. Advice for firefighters

Firefighting instructions : Move containers from fire area if you can do it without risk. Gas fires should not be extinguished unless the gas flow can be stopped immediately. Shut off gas source and allow the fire to burn itself out.

Protection during firefighting : Wear positive pressure self-contained breathing apparatus (SCBA).**Structural firefighters'** protective clothing will only provide limited protection. Always wear thermal protective clothing when handling refrigerated/cryogenic liquids.

Other information : If tank, rail car or tank truck is involved in a fire, ISOLATE for 800 meters (1/2 mile) in all directions; also, consider initial evacuation for 800 meters (1/2 mile) in all directions. Fire involving Tanks or Car/Trailer Loads: Fight fire from maximum distance or use unmanned hose holders or monitor nozzles. Cool containers with flooding quantities of water until well after fire is out. Withdraw immediately in case of rising sound from venting safety devices or discoloration of tank. ALWAYS stay away from tanks engulfed in fire. For massive fire, use unmanned hose holders or monitor nozzles; if this is impossible, withdraw from area and let fire burn.

SECTION 6: Accidental release measures

6.1. Personal precautions, protective equipment and emergency procedures

General measures : Eliminate every possible source of ignition.

6.1.1. For non-emergency personnel

Emergency procedures : Evacuate unnecessary personnel. Large Spill: Consider initial downwind evacuation for at least 300 meters (1000 feet).

6.1.2. For emergency responders

Protective equipment : Equip cleanup crew with proper protection.

Emergency procedures : As an immediate precautionary measure, isolate spill or leak area for at least 50 meters (150 feet) in all. Keep unauthorized personnel away. Stay upwind. Keep out of low areas. Ventilate closed spaces before entering.

6.2. Environmental precautions

Avoid contact of spilled material with soil and prevent runoff entering surface waterways. Inform the relevant authorities if the product has caused environmental pollution (sewers, waterways, soil or air). Toxic to aquatic organisms, may cause long-term adverse effects in the aquatic environment.

6.3. Methods and material for containment and cleaning up

For containment : ELIMINATE all ignition sources (no smoking, flares, sparks or flames in immediate area). All equipment used when handling the product must be grounded. Do not touch or walk through spilled material. Stop leak if you can do it without risk. If possible, turn leaking containers so that gas escapes rather than liquid. Use water spray to reduce vapor or divert vapor cloud drift. Avoid allowing water runoff to contact spilled.

Methods for cleaning up : Large Spill: Dike far ahead of liquid spill for later disposal. Water spray may reduce vapor; but may not prevent ignition in closed spaces. Prevent entry into waterways, sewers, basements or confined areas.

SECTION 7: Handling and storage

7.1. Precautions for safe handling

Additional hazards when processed : In use, may form flammable vapor-air mixture. Keep away from heats; sparks open flames, hot surfaces. - No smoking. Do not pressurize, cut, or weld containers. Handle empty containers with care because residual vapor are flammable.

Precautions for safe handling : Avoid contact with skin, eyes and clothing. Earth all parts which can be electrically charged. Prevent the build-up of electrostatic charge.

Hygiene measures : Practice good housekeeping. Wash thoroughly after handling. Change contaminated clothing. Do not reuse until laundered.

7.2. Conditions for safe storage, including any incompatibilities

Technical measures : Ground/bond container and receiving equipment. Store in a segregated, approved and labelled area. Ensure effective ventilation. Vent waste air only via suitable separators or scrubbers. Take precautionary measures against electrostatic discharges.

Storage conditions : Keep away from heat, sparks and flame surfaces. Keep container tightly closed in a dry and well-ventilated place. Proper grounding procedures to avoid static electricity should be followed. OSHA requires cylinder storage be segregated from oxidizers and other combustible materials by a distance of at least 30 feet.

Incompatible products : Store away from strong oxidizing materials. Strong acids. Strong bases.

Incompatible materials : Sources of ignition. Heat sources.

7.3. Specific end use(s)

Use of the substance/mixture : Fuel

SECTION 8: Exposure controls/personal protection

8.1. Control parameters

n-Hexane (110-54-3)		
ACGIH	ACGIH TWA (mg/m³)	176 mg/m³
ACGIH	ACGIH TWA (ppm)	50 ppm
ACGIH	Remark (ACGIH)	CNS impair; peripheral
OSHA	OSHA PEL (TWA) (mg/m³)	1800 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

n-Pentane (109-66-0)		
ACGIH	ACGIH TWA (ppm)	1000 ppm
OSHA	OSHA PEL (TWA) (mg/m³)	2950 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	1000 ppm

Toluene (108-88-3)		
ACGIH	ACGIH TWA (ppm)	20 ppm
ACGIH	Remark (ACGIH)	Visual impair; female repro;
OSHA	OSHA PEL (TWA) (ppm)	200 ppm
OSHA	OSHA PEL (Ceiling) (ppm)	300 ppm
OSHA	Remark (US OSHA)	(2) See Table Z-2.

n-Heptane (142-82-5)		
ACGIH	ACGIH TWA (ppm)	400 ppm

n-Heptane (142-82-5)		
OSHA	OSHA PEL (TWA) (mg/m³)	2000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

Octane (111-65-9)		
ACGIH	ACGIH TWA (ppm)	300 ppm
ACGIH	Remark (ACGIH)	URT irr
OSHA	OSHA PEL (TWA) (mg/m³)	2350 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

Nonane (111-84-2)		
ACGIH	ACGIH TWA (ppm)	200 ppm
ACGIH	Remark (ACGIH)	CNS impair
OSHA	Not applicable	

n-Butane (106-97-8)		
ACGIH	ACGIH STEL (ppm)	1000 ppm
OSHA	Not applicable	

Methylcyclohexane (108-87-2)		
ACGIH	ACGIH TWA (ppm)	400 ppm
ACGIH	Remark (ACGIH)	URT irr; CNS impair; liver & kidney
OSHA	OSHA PEL (TWA) (mg/m³)	2000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

1,2,4-trimethylbenzene (95-63-6)		
ACGIH	ACGIH TWA (mg/m³)	123 mg/m³
ACGIH	ACGIH TWA (ppm)	25 ppm
OSHA	Not applicable	

Benzene (71-43-2)		
ACGIH	ACGIH TWA (mg/m³)	1.6 mg/m³
ACGIH	ACGIH TWA (ppm)	0.50 ppm
ACGIH	ACGIH STEL (mg/m³)	8 mg/m³
ACGIH	ACGIH STEL (ppm)	2.5 ppm
ACGIH	Remark (ACGIH)	Leukemia
OSHA	OSHA PEL (TWA) (ppm)	1 ppm (See 29 CFR 1910.1028) OSHA AL 0.5 ppm TWA
OSHA	OSHA PEL (STEL) (ppm)	5 ppm
OSHA	Remark (US OSHA)	Engineering and work practice controls shall be used to keep exposures below 10 ppm unless it is proven to be not feasible.

n-Decane (872-05-9)	
ACGIH	Not applicable
OSHA	Not applicable

Crude Oil (8002-05-9)		
ACGIH	Not applicable	
OSHA	OSHA PEL (TWA) (mg/m³)	2000 mg/m³
OSHA	OSHA PEL (TWA) (ppm)	500 ppm

8.2. Exposure controls

Appropriate engineering controls	: Emergency eye wash fountains and safety showers should be available in the immediate vicinity of any potential exposure. Ensure good ventilation of the work station.
Materials for protective clothing	: Nitrile. Butyl Rubber. Neoprene.
Hand protection	: Chemical-resistant, impervious gloves complying with an approved standard should be worn at all times when handling chemical.
Eye protection	: Use safety glasses and/or full face shield where splashing is possible. Maintain eye wash fountain in work area.
Skin and body protection	: Nitrile rubber gloves.
Respiratory protection	: If exposure limits are exceeded or irritation is experienced, NIOSH approved respiratory protection should be worn.

SECTION 9: Physical and chemical properties

9.1. Information on basic physical and chemical properties

Physical state	: Liquid
Appearance	: Viscous liquid/semi-solid.
Color	: Black;Yellow;Dark green
Odor	: Hydrocarbon
Odor threshold	: No data available
pH	: No data available
Relative evaporation rate (butylacetate=1)	: No data available
Melting point	: No data available
Freezing point	: No data available
Boiling point	: 37.7 - 537.7 °C (100 to 1000°F)
Flash point	: 15.5 - 93.3 °C (60-200°F)
Auto-ignition temperature	: >= 260 °C (500°F)
Decomposition temperature	: No data available
Flammability (solid, gas)	: No data available
Vapor pressure	: <= 724 (0 - 0) mm Hg (at 100°F) (13.9 psi)
Relative vapor density at 20 °C	: 1.5 - 3 (AIR=1)
Relative density	: 0.7 - 1
Density	: 6.6 - 8.2 (Pounds/gallon)
Solubility	: No data available
Log Pow	: No data available
Log Kow	: No data available
Viscosity, kinematic	: No data available
Viscosity, dynamic	: No data available
Explosive properties	: No data available
Oxidising properties	: No data available
Explosive limits	: No data available

SECTION 10: Stability and reactivity

10.1. Reactivity

Highly flammable liquid and vapor.

10.2. Chemical stability

Stable at normal temperatures and pressure.

10.3. Possibility of hazardous reactions

Hazardous polymerization will not occur.

10.4. Conditions to avoid

Heat, sparks, open flame, and other ignition sources.

10.5. Incompatible materials

Strong Oxidizers, i.e. chlorates, bromates, peroxides, nitrates, halons.

10.6. Hazardous decomposition products

Combustion may produce carbon monoxide and other harmful substances.

SECTION 11: Toxicological information

11.1. Information on toxicological effects

Acute toxicity : Not classified

n-Hexane (110-54-3)	
LD50 oral rat	25 g/kg Industrial Health. Vol. 32, Pg. 145, 1994.
LC50 inhalation rat (ppm)	48000 ppm/4h

n-Pentane (109-66-0)	
LD50 oral rat	400 mg/kg National Technical Information Service. Vol. OTS0556690,

n-Heptane (142-82-5)	
LC50 inhalation rat (ppm)	25131 ppm/4h (103gm/m3/4H) Gigiena Truda i Professional'nye Zabolevaniya. Labor Hygiene and Occupational Diseases. Vol. 32(10), Pg. 23, 1988.

Octane (111-65-9)	
LC50 inhalation rat (ppm)	25257 ppm/4h (118 g/m³) Gigiena Truda i Professional'nye Zabolevaniya. Labor Hygiene and Occupational Diseases. Vol. 32(10), Pg. 23, 1988.

Nonane (111-84-2)	
LC50 inhalation rat (ppm)	3200 ppm/4h Toxicology and Applied Pharmacology. Vol. 44, Pg. 53, 1978.

n-Butane (106-97-8)	
LC50 inhalation rat (mg/l)	658 mg/l/4h Farmakologiya i Toksikologiya Vol. 30, Pg. 102, 1967.

Methylcyclohexane (108-87-2)	
LD50 oral rat	> 3200 mg/kg National Technical Information Service. Vol. OTS0556685
LC50 inhalation rat (ppm)	82 ppm/1h National Technical Information Service. Vol. OTS0556685

Benzene (71-43-2)	
LD50 oral rat	930 mg/kg
LD50 dermal rabbit	> 9400 µl/kg
LC50 inhalation rat (ppm)	5714 ppm/4h

n-Decane (872-05-9)	
LD50 oral rat	> 10000 mg/kg National Technical Information Service. Vol. OTS0535205,
LD50 dermal rabbit	> 10000 mg/kg National Technical Information Service. Vol. OTS0535205

Crude Oil (8002-05-9)	
LD50 oral rat	> 4300 mg/kg

Skin corrosion/irritation : Causes skin irritation.

Serious eye damage/irritation : Not classified

Respiratory or skin sensitisation : Not classified

Germ cell mutagenicity : May cause genetic defects (Dermal, Inhalation, oral).

Carcinogenicity : May cause cancer (Dermal, Inhalation, oral).

Toluene (108-88-3)	
IARC group	3 - Not classifiable

Benzene (71-43-2)	
IARC group	1 - Carcinogenic to humans
National Toxicology Program (NTP) Status	2 - Known Human Carcinogens

Crude Oil (8002-05-9)	
IARC group	3 - Not classifiable

Reproductive toxicity : lung/respiratory system, Skin (Dermal, Inhalation).

Specific target organ toxicity (single exposure)	: May cause drowsiness or dizziness.
Specific target organ toxicity (repeated exposure)	: Causes damage to organs (eye, lung/respiratory system, Skin) through prolonged or repeated exposure (Dermal, Inhalation, oral).
Aspiration hazard	: May be fatal if swallowed and enters airways.
Symptoms/injuries after inhalation	: Volatile components of this product can cause respiratory and nasal irritation, headache, dizziness, drowsiness, nausea and loss of coordination. Significant concentrations of hydrogen sulfide gas can be present in the vapor space of storage tanks and bulk transport compartments. With the loss of highly volatile components, weathered oil does not present an inhalation hazard.
Symptoms/injuries after skin contact	: May cause moderate irritation. Prolonged or repeated exposure can cause dermatitis, folliculitis or oil acne.
Symptoms/injuries after eye contact	: Causes eye irritation.
Symptoms/injuries after ingestion	: Swallowing this material may be harmful. May cause irritation of the mouth, throat and gastrointestinal tract. Symptoms may include salivation, pain, nausea, vomiting and diarrhea. Aspiration into lungs may cause chemical pneumonia and lung damage.

SECTION 12: Ecological information

12.1. Toxicity

Ecology - general : The product can cause fouling of shoreline and may be harmful to aquatic life in low concentrations.

n-Hexane (110-54-3)	
LC50 fishes	2500 (≤ 113) µg/l 96 hr Fathead minnow (pimephales promelas)

n-Pentane (109-66-0)	
LC50 fishes	9.87 mg/l mg/l (Exposure time: 96 h - Species: Oncorhynchus mykiss)
EC50 Daphnia	9.74 mg/l mg/l (Exposure time: 48 h - Species: Daphnia magna)
LC50 fish	11.59 mg/l mg/l (Exposure time: 96 h - Species: Pimephales promelas)

n-Heptane (142-82-5)	
LC50 fishes	375 mg/l Ghatak, D.B., M.M. Hossain, and S.K. Konar 1988. Acute Toxicity of n-Heptane and n-Hexane on Worm and Fish. Environ.Ecol. 6(4):943-947

Octane (111-65-9)	
EC50 other aquatic organisms	0.38 Species: water flea)

methylcyclohexane (108-87-2)	
LC50 fishes	5.8 (5.8 - 181000) mg/l

Crude Oil (8002-05-9)	
LC50 fishes	3 mg/l Mayer, F.L.Jr., and M.R. Ellersieck 1986. Manual of Acute Toxicity: Interpretation and Data Base for 410 Chemicals and 66 Species of Freshwater Animals. Resour.Publ.No.160, U.S.Dep.Interior, Fish Wildl.Serv., Washington, DC :505 p. (USGS Data File); Moles, A., S.D. Rice, and S. Korn 1979. Sensitivity of Alaskan Freshwater and Anadromous Fishes to Prudhoe Bay Crude Oil and Benzene. Trans.Am.Fish.Soc. 108(4):408-414
EC50 Daphnia	5.3 ml/l MacLean, M.M., and K.G. Doe 1989. The Comparative Toxicity of Crude and Refined Oils to Daphnia magna and Artemia. Environment Canada, EE-111, Dartmouth, Nova Scotia :64 p.
EC50 Daphnia	1.65 mg/l MacLean, M.M., and K.G. Doe 1989. The Comparative Toxicity of Crude and Refined Oils to Daphnia magna and Artemia. Environment Canada, EE-111, Dartmouth, Nova Scotia :64 p.

12.2. Persistence and degradability

Petroleum Crude Oil Solution	
Persistence and degradability	Not established.

12.3. Bioaccumulative potential

Petroleum Crude Oil Solution	
Bioaccumulative potential	This product is not expected to bioaccumulate.

n-Pentane (109-66-0)	
Log Pow	3.39

n-Butane (106-97-8)	
Log Pow	2.89

12.4. Mobility in soil

No additional information available

12.5. Other adverse effects

Effect on the global warming : No known ecological damage caused by this product.

SECTION 13: Disposal considerations

13.1. Waste treatment methods

Waste disposal recommendations : This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a"characteristic" hazardous waste. This product could also contain benzene at >0.5ppm and could exhibit the characteristics of "toxicity" (D018) as determined by the toxicity characteristic leaching procedure (TCLP). This material could become a hazardous waste if mixed or contaminated with hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

SECTION 14: Transport information

In accordance with DOT

Transport document description : UN1267 Petroleum crude oil, 3, III

UN-No.(DOT) : UN1267

Proper Shipping Name (DOT) : Petroleum crude oil

Department of Transportation (DOT) Hazard Classes : 3 - Class 3 - Flammable and combustible liquid 49 CFR 173.120

Hazard labels (DOT) : 3 - Flammable liquid

Packing group (DOT) : III - Minor Danger

DOT Special Provisions (49 CFR 172.102)	:	144 - If transported as a residue in an underground storage tank (UST), as defined in 40 CFR 280.12, that has been cleaned and purged or rendered inert according to the American Petroleum Institute (API) Standard 1604 (IBR, see 171.7 of this subchapter), then the tank and this material are not subject to any other requirements of this subchapter. However, sediments remaining in the tank that meet the definition for a hazardous material are subject to the applicable regulations of this subchapter. 357 - A bulk packaging that emits hydrogen sulfide in sufficient concentration that vapor evolved from the crude oil can present an inhalation hazard must be marked as specified in §172.327 of this part. IB2 - Authorized IBCs: Metal (31A, 31B and 31N); Rigid plastics (31H1 and 31H2); Composite (31HZ1). Additional Requirement: Only liquids with a vapor pressure less than or equal to 110 kPa at 50 C (1.1 bar at 122 F), or 130 kPa at 55 C (1.3 bar at 131 F) are authorized. T4 - 2.65 178.274(d)(2) Normal..... 178.275(d)(3) TP1 - The maximum degree of filling must not exceed the degree of filling determined by the following: Degree of filling = 97 / (1 + a (tr - tf)) Where: tr is the maximum mean bulk temperature during transport, and tf is the temperature in degrees celsius of the liquid during filling. TP8 - A portable tank having a minimum test pressure of 1.5 bar (150 kPa) may be used when the flash point of the hazardous material transported is greater than 0 C (32 F).
DOT Packaging Exceptions (49 CFR 173.xxx)	:	150
DOT Packaging Non Bulk (49 CFR 173.xxx)	:	202
DOT Packaging Bulk (49 CFR 173.xxx)	:	242
DOT Quantity Limitations Passenger aircraft/rail (49 CFR 173.27)	:	5 L
DOT Quantity Limitations Cargo aircraft only (49 CFR 175.75)	:	60 L
DOT Vessel Stowage Location	:	B - (i) The material may be stowed "on deck" or "under deck" on a cargo vessel and on a passenger vessel carrying a number of passengers limited to not more than the larger of 25 passengers, or one passenger per each 3 m of overall vessel length; and (ii) "On deck only" on passenger vessels in which the number of passengers specified in paragraph (k)(2)(i) of this section is exceeded.

Additional information

Other information : No supplementary information available.

ADR

No additional information available

Transport by sea

UN-No. (IMDG)	:	1267
Proper Shipping Name (IMDG)	:	PETROLEUM CRUDE OIL
Class (IMDG)	:	3 - Flammable liquids
Packing group (IMDG)	:	III - substances presenting low danger

Air transport

No additional information available

SECTION 15: Regulatory information

15.1. US Federal regulations

Petroleum Crude Oil Solution
Not listed on the United States TSCA (Toxic Substances Control Act) inventory

n-Hexane (110-54-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists) :	5000 lb

Pentane (as n-pentane) (109-66-0)
Listed on the United States TSCA (Toxic Substances Control Act) inventory Not listed on the United States SARA Section 313

Toluene (108-88-3)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists) :	1000 lb

n-Heptane (142-82-5)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Octane (111-65-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Nonane (111-84-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

n-Butane (106-97-8)
Listed on the United States TSCA (Toxic Substances Control Act) inventory Not listed on the United States SARA Section 313

methylcyclohexane (108-87-2)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

1,2,4-trimethylbenzene (95-63-6)
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313

Benzene (71-43-2)	
Listed on the United States TSCA (Toxic Substances Control Act) inventory Listed on United States SARA Section 313 Not listed on the United States SARA Section 313	
RQ (Reportable quantity, section 304 of EPA's List of Lists) :	10 lb

n-decane (872-05-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

Crude Oil (8002-05-9)
Listed on the United States TSCA (Toxic Substances Control Act) inventory

15.2. International regulations

CANADA

No additional information available

EU-Regulations

No additional information available

Classification according to Regulation (EC) No. 1272/2008 [CLP]

Classification according to Directive 67/548/EEC [DSD] or 1999/45/EC [DPD]

Not classified

15.2.2. National regulations

Benzene (71-43-2)
Listed on IARC (International Agency for Research on Cancer) Listed as carcinogen on NTP (National Toxicology Program)

15.3. US State regulations

Toluene (108-88-3)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
No	Yes	Yes	Yes	

Benzene (71-43-2)				
U.S. - California - Proposition 65 - Carcinogens List	U.S. - California - Proposition 65 - Developmental Toxicity	U.S. - California - Proposition 65 - Reproductive Toxicity - Female	U.S. - California - Proposition 65 - Reproductive Toxicity - Male	No significance risk level (NSRL)
Yes	Yes	No	Yes	

n-Hexane (110-54-3)

U.S. - Delaware - Pollutant Discharge Requirements - Reportable Quantities
U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Massachusetts - Right To Know List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - Pennsylvania - RTK (Right to Know) List

Pentane (as n-pentane) (109-66-0)

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Toluene (108-88-3)

U.S. - Maine - Air Pollutants - Hazardous Air Pollutants
U.S. - Massachusetts - Right To Know List
U.S. - Michigan - Critical Materials List
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances
U.S. - Pennsylvania - RTK (Right to Know) List

n-Heptane (142-82-5)

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Octane (111-65-9)

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Nonane (111-84-2)

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

n-Butane (106-97-8)

U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

methylcyclohexane (108-87-2)

U.S. - Idaho - Non-Carcinogenic Toxic Air Pollutants - Acceptable Ambient Concentrations
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

1,2,4-trimethylbenzene (95-63-6)
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

Crude Oil (8002-05-9)
U.S. - New Jersey - Right to Know Hazardous Substance List
U.S. - New York - Reporting of Releases Part 597 - List of Hazardous Substances

SECTION 16: Other information

Revision date : 07/14/2015

Full text of H-phrases::

Acute Tox. 4 (Inhalation)	Acute toxicity (inhal.), Category 4
Acute Tox. 4 (Inhalation:gas)	Acute toxicity (inhalation:gas) Category 4
Acute Tox. 4 (Oral)	Acute toxicity (oral), Category 4
Aquatic Acute 1	Hazardous to the aquatic environment — Acute Hazard, Category 1
Aquatic Acute 2	Hazardous to the aquatic environment — Acute Hazard, Category 2
Aquatic Chronic 1	Hazardous to the aquatic environment — Chronic Hazard, Category 1
Aquatic Chronic 2	Hazardous to the aquatic environment — Chronic Hazard, Category 2
Aquatic Chronic 4	Hazardous to the aquatic environment — Chronic Hazard, Category 4
Asp. Tox. 1	Aspiration hazard, Category 1
Carc. 1A	Carcinogenicity, Category 1A
Flam. Gas 1	Flammable gases, Category 1
Flam. Liq. 2	Flammable liquids, Category 2
Flam. Liq. 3	Flammable liquids, Category 3
Liquefied gas	Gases under pressure : Liquefied gas
Muta. 1B	Germ cell mutagenicity, Category 1B
Repr. 2	Reproductive toxicity, Category 2
Simple Asphy	Simple Asphyxiant
Skin Irrit. 2	Skin corrosion/irritation, Category 2
STOT RE 1	Specific target organ toxicity — Repeated exposure, Category 1
STOT RE 2	Specific target organ toxicity — Repeated exposure, Category 2
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Narcosis
STOT SE 3	Specific target organ toxicity — Single exposure, Category 3, Respiratory tract irritation
H220	Extremely flammable gas
H225	Highly flammable liquid and vapor
H226	Flammable liquid and vapor
H280	Contains gas under pressure; may explode if heated
H302	Harmful if swallowed
H304	May be fatal if swallowed and enters airways
H315	Causes skin irritation
H332	Harmful if inhaled

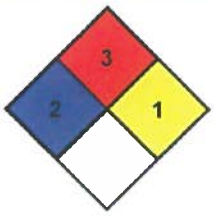
Full text of H-phrases::

H335	May cause respiratory irritation
H336	May cause drowsiness or dizziness
H340	May cause genetic defects
H350	May cause cancer
H361	Suspected of damaging fertility or the unborn child
H372	Causes damage to organs through prolonged or repeated exposure
H373	May cause damage to organs through prolonged or repeated exposure
H380	May displace oxygen and cause rapid suffocation
H400	Very toxic to aquatic life
H401	Toxic to aquatic life
H410	Very toxic to aquatic life with long lasting effects
H411	Toxic to aquatic life with long lasting effects
H413	May cause long lasting harmful effects to aquatic life

NFPA health hazard : 2 - Intense or continued exposure could cause temporary incapacitation or possible residual injury unless prompt medical attention is given.

NFPA fire hazard : 3 - Liquids and solids that can be ignited under almost all ambient conditions.

NFPA reactivity : 1 - Normally stable, but can become unstable at elevated temperatures and pressures or may react with water with some release of energy, but not violently.



HMIS III Rating

Health : 2 Moderate Hazard - Temporary or minor injury may occur

Flammability : 3 Serious Hazard

Physical : 1 Slight Hazard

SDS US (GHS HazCom 2012)

The information and recommendations contained herein are based upon tests, data, and information resources believed to be reliable. However, EnLink Midstream, L.P., and its related operations or divisions (EnLink) do not guarantee the accuracy or completeness, nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of goods, the merchantability of the goods or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage may be required. EnLink assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of this data. No warranty against infringement of any patent, copyright or trademark is made or implied

CROSSTEX

DANGER

Safety Data Sheet

MSDS ID NO: 011
Revision date: May 10, 2013

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name:	Petroleum Crude Oil Solution
Synonyms:	Earth oil, petroleum oil, rock oil
Chemical family:	Petroleum hydrocarbon mixture
Formula:	Crude oil is a complex mixture of paraffinic, cycloparaffinic and aromatic hydrocarbons covering carbon numbers ranging from C_1 to over C_{60}. It is amber to black in color.
Producer:	Crosstex Energy Services, L.P. 2501 Cedar Springs Road Suite 100 Dallas, TX 75201 www.crosstexenergy.com

Emergency Line	**866-394-9839**	**Available 24 hours**
CHEMTREC	**800-424-9300**	
Crosstex	**214-953-9500**	**Available during normal business hours** ****Ask for Compliance Dept****

Section 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Crude oil is a volatile and extremely flammable liquid. Keep away from heat, flame and sources of ignition. This material can contain toxic levels of hydrogen sulfide vapor that accumulate in the vapor spaces of storage and transport compartments. Hydrogen sulfide vapor can cause eye, skin and respiratory tract irritation. This product may contain benzene, which may cause cancer or damage blood-forming organs. Aspiration (inadvertent suction) of liquid into the lungs can produce chemical pneumonia or even death.

OSHA-GHS Hazard Statements:
DANGER! — Highly Flammable Liquid and Vapor

Inhalation: Volatile components of this product can cause respiratory and nasal irritation, headache, dizziness, drowsiness, nausea and loss of coordination. Significant concentrations of hydrogen sulfide gas can be present in the vapor space of storage tanks and bulk transport compartments. With the loss of highly volatile components, weathered oil does not present an inhalation hazard.

Ingestion: May cause irritation of the mouth, throat and gastrointestinal tract, leading to nausea, vomiting, headache, dizziness, drowsiness and diarrhea. Minute amounts aspirated into the lungs can produce chemical pneumonitis, pulmonary edema or lung injury, which in severe cases may be fatal.

Skin contact: Moderate skin irritation may occur upon short-term exposure. Prolonged or repeated liquid contact can cause dermatitis, folliculitis or oil acne.

Eye contact: May cause slight irritation.

Carcinogenic evaluation: The International Agency for Research on Cancer (IARC) has determined there is limited evidence for the carcinogenicity of crude oil in animals. The IARC has determined there is inadequate evidence of carcinogenicity of crude oil in humans. Crude oil is not classifiable as to its carcinogenicity to humans (Group 3).

Name	IARC carcinogens:	NTP carcinogens:	ACGIH — carcinogens	OSHA — select carcinogens
Benzene 71-43-2	Supplement 7 (1987) Monograph 29 (1982)	Known human carcinogen listed	A1 — Confirmed human carcinogen	Present

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

Crude oil is a complex mixture of paraffinic, cycloparaffinic and aromatic hydrocarbons covering carbon numbers ranging from C_1 to over C_{60}. It is amber to black in color. Crude oil contains small amounts of sulfur, nitrogen and oxygen compounds as well as trace amounts of heavy metals. The most prevalent constituents of crudes from various localities are provided below. This is not a complete list of all components. Other components may be present in concentrations of less than 1%, or carcinogens present in concentrations of less than 0.1%.

Material information:

Name	CAS No.	Weight %
N-decane and decanes	872-05-9	4-10
N-pentane and isomers	109-66-0; 78-78-4	2-7
N-heptane	142-82-5	2-5
N-hexane	110-54-3	1-5
N-octane and isomers	111-65-9; 540-84-1	1-5
N-nonane	111-84-2	1-5
N-butane and isomers	106-97-8	1-5
Methylcyclohexane	108-87-2	1-4
Dimethylpentanes	Mixture	1-3
1,2,4-trimethylbenzene	95-63-6	0-2
Toluene	108-88-3	0-2
Benzene	71-43-2	0-1

Note: *The above weight percentages are represented in ranges as estimates. Due to variations in source locations, components of crude oil will vary.*

Section 4, FIRST AID MEASURES

Inhalation: Remove the affected person to fresh air; if the affected person is not breathing or breathing is irregular, provide artificial respiration, CPR and/or oxygen by trained personnel and seek emergency medical attention.

Skin contact: Remove contaminated clothing; wash affected area with soap and water; launder contaminated clothing before reuse. If irritation persists, seek medical attention.

Ingestion: Aspiration hazard if swallowed. DO NOT induce vomiting; if vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs; seek immediate medical attention. Vomiting may be induced only under the supervision of a physician.

Eye contact: Check for and remove contact lenses. Flush eyes with clear, tepid running water for 15 minutes while holding eyelids open. If symptoms or irritation persist, seek medical attention.

Section 5. FIREFIGHTING MEASURES

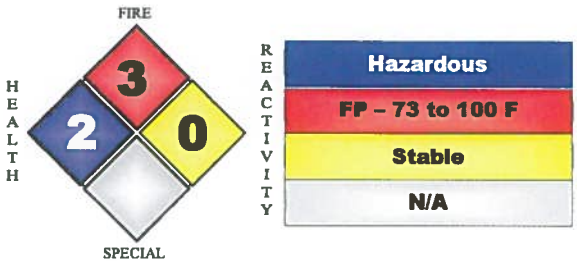
Suitable extinguishing media: Small fires — Class B fire-extinguishing media such as CO_2, dry chemical, foam (AFFF/ATC) or water spray can be used. Large fires — water spray, fog or foam (AFFF/ATC) can be used. Firefighting should be attempted only by those who are adequately trained and equipped with proper protective equipment.

Specific hazards: This product has been determined to be a flammable liquid per the OSHA Hazard Communication Standard and should be handled accordingly. Vapors may travel along the ground or be moved by ventilation and ignited by many sources such as pilot lights, sparks, electric motors, static discharge or other ignition sources at locations distant from material handling. Flashback can occur along vapor trail. For additional fire-related information, see NFPA 30 or the North American Emergency Response Guide 115.

Special protective equipment for firefighters: Avoid using straight water streams. Water may be ineffective in extinguishing low flash point fires but can be used to cool exposed surfaces. Avoid excessive water spray application. Water spray and foam (AFFF/ATC) must be applied carefully to avoid frothing and from as far a distance as possible. Keep runoff water out of sewers and water sources.

NFPA rating:

Health:	**2**
Flammability:	**3**
Instability/reactivity:	**0**
Other:	**N/A**



Section 6. ACCIDENTAL RELEASE MEASURES

Personal precautions: STEPS TO BE TAKEN IN THE EVENT MATERIAL IS RELEASED OR SPILLED: Immediately contact emergency personnel. See Section 8 for minimum personal protective equipment (PPE). Additional PPE may be necessary; consult a specialist before handling this product. Evacuate and ventilate area; confine and absorb into absorbent material; place material into approved containers for disposal. For spills in excess of allowable quantities (RQ), notify the National Response Center at (800) 424-8802. Refer to CERCLA 40 CFR and SARA Title III, Section 313 40 CFR 372 for detailed instructions concerning reporting requirements.

Section 7. HANDLING AND STORAGE

Handling: Keep container closed when not in use. Protect containers from abuse and extreme temperatures. Keep away from all sources of ignition. Empty containers may contain residue that may form explosive or toxic vapors. Do not weld or cut near empty container. Use non-sparking tools when opening and closing containers. Maintain well-ventilated work areas to minimize exposure when handling this material. Comply with all applicable EPA, OSHA, NFPA and consistent state and local requirements. Use appropriate grounding and bonding practices.

Avoid skin contact. Exercise good personal hygiene, including removal of soiled clothing and prompt washing with soap and water.

Storage: Hydrocarbons are basically non-conductors of electricity and can become electrostatically charged during mixing, filtering and pumping at high flow rates or loading and transfer operations. If this charge reaches a sufficiently high level, sparks can form that may ignite the vapors of flammable liquids. Sudden release of hot organic chemical vapors or mists from process equipment operating under elevated temperature and pressure or sudden ingress of air into vacuum equipment may result in ignitions without the presence of obvious ignition sources. Nozzle spouts must be kept in contact with the containers or tank during the entire filling operation. A buildup of static electricity can occur upon re-entry into a vehicle during transfer, especially in cold or dry climate conditions. The charge is generated by the action of dissimilar fabrics (clothing or upholstery) rubbing across each other as a person enters/exits the vehicle. A flash fire can result from this discharge if sufficient flammable vapors are present. Therefore, do not get back in your vehicle while transfer is in progress.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits:

Name	CAS No.	Weight %	OSHA — PEL (ppm)	ACGIH® TLV® (ppm)	NIOSH REL (ppm)
N-decane and decanes	872-05-9	4-10	Not established	Not Established	Not Established
N-pentane	78-78-4	2-7	1,000; 600 [A]	600 (pentane/isomers)	120; 610 - STEL
N-heptane	142-82-5	2-5	500	400 ppm 1639 mg/m^3	500 ppm 2000 mg/m^3
N-hexane	110-54-3	1-5	500	50	50
N-octane and isomers	111-65-9; 540-84-1	1-5	300	500	75; 385 — STEL
N-nonane	111-84-2	1-5	Not established	200	200
N-butane and isomers	75-28-5	1-5	Not established	1,000 [B]	800
Methylcyclohexane	108-87-2	1-4	500	400	400
Dimethylpentanes	Mixture	1-5	Not established	Not Established	Not established
1,2,4-trimethylbenzene	95-63-6	1-2	Not established	25	25
Toluene	108-88-3	2-5	200; 300 ceiling; 100 [A]	20 ppm	200 ppm; 300 ceiling
Benzene	71-43-2	1 5 — STEL	0.5 2.5 — STEL Skin – potential absorption	0.1 1 — STEL	

All exposure limits listed are 8-hour time weighted average (TWA) — except where noted otherwise.

TWA — Time Weighted Average is an average value of exposure over the course of an 8-hour work shift.
STEL — Short-Term Exposure Limit, a TWA exposure that occurs over a 15-minute time period
PEL — Permissible Exposure Limit is the maximum amount or concentration of a chemical that a worker may be exposed to under OSHA regulations.
[A] Federal OSHA 1989 PELs were vacated but are in use and enforced by many state OSHA plans.
[B] Aliphatic hydrocarbon gas (alkane C_1-C_4)

Engineering measures: The use of local exhaust ventilation is recommended to control emissions near the source. Provide mechanical ventilation of confined spaces. Use explosion-proof ventilation equipment.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: None required while threshold limits are kept below maximum allowable concentrations; if TWA exceeds limits, NIOSH-approved respirator must be worn. Refer to 29 CFR 1910.134 for complete regulations.

Skin and body protection: Neoprene, butyl or nitrile rubber gloves

Eye protection: Chemical splash goggles. Refer to 29 CFR 1910.133.

Hygiene measures: Minimize body contact with this, as well as all chemicals in general. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance:	Black, dark green, or yellow liquid
Physical state (solid/liquid/gas):	Viscous liquid/semi-solid
Substance type (pure/mixture):	Mixture
Color:	Black, dark green, or yellow
Odor:	Strong hydrocarbon or sulfur odor
Molecular weight:	No data available
pH:	Not applicable
Boiling point/range (5-95%):	100°-1100°F
Melting point/range:	No data available
Decomposition temperature:	Not applicable
Specific gravity:	0.7-1.0
Density:	6.6-8.2 pounds/gallon
Vapor density:	1.5-3.0 (air=1)
Vapor pressure:	0-724 mm Hg @ 100°F
Evaporation rate:	No data available
Flash point:	<60° to >200°F
Auto-ignition temperature:	>500°F
Flammable limits in air — (lower):	No data available
Flammable limits in air — (upper):	No data available

Section 10. STABILITY AND REACTIVITY

Stability: This material is stable at 70°F, 760 mm pressure.

Polymerization: Will not occur.

Hazardous decomposition products: Carbon oxides (CO, CO_2), sulfur oxides (SO, SO_2), nitrogen oxides NO, NO_2)

Materials to avoid: Strong oxidizers such as nitrates, chlorates, and peroxides

Conditions to avoid: Sources of heat or ignition

Section 11. TOXICOLOGICAL INFORMATION

Acute toxicity: See table below.

Chronic toxicity:

This product contains benzene at a level of >0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in humans. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Product information (toxicological data does not exist for this mixture)**:**

Name	CAS No.	Inhalation:	Dermal:	Oral:
Petroleum Crude Oil	8002-05-9	No data available	No data available	No data available
N-hexane	110-54-3	Rat LC_{50} 48,000ppm/4 hrs	No data available	Rat LD_{50} 25,000 mg/kg
N-pentane	109-66-0	Rat LC_{50} 364,000ppm/4 hrs	No data available	No data available
N-heptane	142-82-5	Rat LC_{50} 103,000ppm/4 hrs	No data available	No data available
Benzene	71-43-2	Rat LC_{50} 10,000ppm/7 hrs	No data available	Human LD_{Lo} 50 mg/kg

Carcinogenic and chronic health effect information: ***refer to Health Hazard Section 2***

Section 12. ECOLOGICAL INFORMATION

Ecotoxicity Effects: Coating action of oil can kill birds, plankton, algae and fish. Keep out of all bodies of water and sewage drainage systems.
Two crude oils were tested in a battery of Ecotoxicity tests. The 96 hour lethal loading (LL_{50}) values for rainbow trout were 21 and 41 milligrams/liter (mg/l). LL_{50} values for invertebrate organisms were determined to be 2.7 and 4.1 mg/l.

Section 13. DISPOSAL CONSIDERATIONS

Cleanup considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a "characteristic" hazardous waste. This product could also contain benzene at > 0.5 ppm and could exhibit characteristics of "toxicity" as determined by the toxicity characteristic leaching procedure (TCLP). This material could become hazardous waste or other substance(s). It is the

responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

Section 14. TRANSPORT INFORMATION

Please refer to 40 CFR 172.101:
DOT:

Transport information:	This product when transported via U.S. commerce would be regulated by DOT regulations.
Proper shipping name:	Petroleum crude oil
UN/identification no.:	UN 1267
Hazard class:	3
Packing group:	II
DOT reportable quantity (lbs):	Not applicable

Section 15. REGULATORY INFORMATION

U.S. TSCA (Toxic Substance Control Act)

All components of this product are listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory) or are exempted from listing because a Low Volume Exemption has been granted in accordance with 40 CFR 723.50.

SARA Section 302: This product does not contain components listed on EPA's Extremely Hazardous Substance (EHS) List.

SARA Section 304:

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ or greater amounts, according to 40 CFR 302.

Name	CERCLA/SARA — Hazardous substances and their reportable quantities (RQ)
Benzene	10 pounds final RQ
N-hexane	5,000 pounds final RQ
Toluene	1,000 pounds final RQ

SARA TITLE III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE:	**HEALTH HAZARD**
CHRONIC:	**HEALTH HAZARD**
FIRE:	**FIRE HAZARD**
REACTIVITY:	**NO**
SUDDEN RELEASE:	**NO**

313 REPORTABLE INGREDIENTS

This product is a toxic chemical subject to annual reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: Benzene, N-hexane, Toluene, 1,2,4-trimethylbenzene.

NOTE: *User must consult with applicable state and local agencies for special specifics, determinations or compliance obligations regarding this product.*

Section 16. OTHER INFORMATION

The information and recommendations contained herein are based upon tests, data, and information resources believed to be reliable. However, Crosstex Energy Services, L.P., and its related operations or divisions (Crosstex) do not guarantee the accuracy or completeness, nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of goods, the merchantability of the goods or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage may be required. Crosstex assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of this data. No warranty against infringement of any patent, copyright or trademark is made or implied.

Safety Data Sheet

MSDS ID NO: 012
Revision date: April 2014

Section 1. CHEMICAL PRODUCT AND COMPANY IDENTIFICATION

Product name:	Produced Water Solution
Synonyms:	Formation Water; Crude Oil Separated Water; Salt Water Brine; Separated Water; Sweet Water
Chemical family:	Water
Formula:	A mixture of water, salts, and hydrocarbons, with variable amounts of impurities.
Producer:	EnLink Midstream, L.P. 2501 Cedar Springs Road Suite 100 Dallas, TX 75201 www.EnLink.com

Emergency Line	**866-394-9839**	**Available 24 hours**
CHEMTREC	**800-424-9300**	
EnLink	**214-953-9500**	**Available during normal business hours** ****Ask for Compliance Dept****

Section 2. HAZARDS IDENTIFICATION

EMERGENCY OVERVIEW

Produced water is potentially toxic based on impurities, including salts. This product may be contaminated with crude oil or hydrocarbon condensate. Liquid contact may cause irritation of the eyes and skin. Ingestion may cause gastrointestinal irritation, nausea, and vomiting. Inhalation of liquid mist may cause mild mucous membrane irritation.

OSHA-GHS Hazard Statement:
DANGER — May Cause Cancer *(category 1)*
WARNING — Causes Eye Irritation *(category 2B)*

Inhalation: No inhalation hazard under normal conditions. Vapor spaces of storage and transport compartments may contain hydrogen sulfide and/or hydrocarbon vapor. If misting occurs, may cause mild mucous membrane irritation of the nose, throat and upper respiratory tract. This product contains benzene which may cause cancer, or be toxic to blood-forming organs.

Ingestion: May cause gastrointestinal irritation, leading to nausea, vomiting, and diarrhea.

Skin contact: May cause skin irritation with prolonged or repeated contact. Liquid may be absorbed through skin in toxic amounts if large areas of skin are exposed repeatedly.

Eye contact: May cause moderate irritation.

Carcinogenic Repeated and prolonged exposures may be harmful and may cause cancer.

Name	IARC carcinogens:	NTP carcinogens:	ACGIH — carcinogens	OSHA — select carcinogens
Benzene 71-43-2	Supplement 7 (1987) Monograph 29 (1982)	Known human carcinogen	A1 — Confirmed human carcinogen	Present

Section 3. COMPOSITION / INFORMATION ON INGREDIENTS

The composition of produced water can vary significantly depending on its source, and may contain a variety of dissolved mineral salts, including sodium chloride, calcium chloride, and potassium chloride. It may also contain small amounts of condensate or crude oil as a contaminant.

Material information:

Name	CAS No.	Weight %
Sodium chloride	7647-14-5	5-20
N-hexane	110-54-3	0.1-1
Benzene	71-43-2	0.1-1
Hydrogen sulfide	7783-06-4	Trace <0.1

Note: *The above weight percentages are represented in ranges as estimates. Due to variations in source locations, components of produced water will vary.*

Section 4, FIRST AID MEASURES

Inhalation: Ensure your own safety and use the appropriate respiratory protection to immediately remove the affected person to fresh air. If the affected person is not breathing or breathing is irregular, provide artificial respiration, CPR and/or oxygen by trained personnel and seek emergency medical attention.

Skin contact: Remove contaminated clothing; wash affected area with soap and water; launder contaminated clothing before reuse. If irritation persists, seek medical attention.

Ingestion: Aspiration hazard if swallowed. DO NOT induce vomiting; if vomiting occurs spontaneously, keep head below hips to prevent aspiration of liquid into lungs and monitor for breathing difficulties. Seek immediate medical attention. Vomiting may be induced only under the supervision of a physician.

Eye contact: Check for and remove contact lenses. Flush eyes with clear, tepid running water for 15 minutes while holding eyelids open. If symptoms or irritation persist, seek medical attention.

Section 5. FIREFIGHTING MEASURES

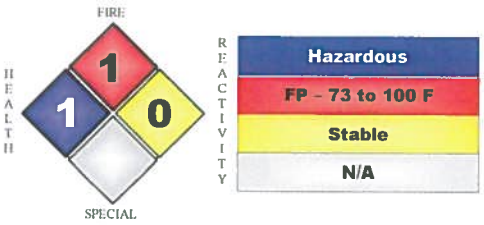
Suitable extinguishing media: Small fires — Class B fire-extinguishing media such as CO_2, dry chemical, foam (AFFF/ATC) or water spray can be used.
Large fires — use extinguishing agent suitable for the surrounding fire.

Specific hazards: This product is not flammable; however, sufficient hydrocarbon vapors may accumulate from oil or natural gas condensate floating on the surface of the produced water to cause a flash fire. The fire should burn out rapidly depending on the amount of oil and natural gas condensate floating on the surface of the produced water.

Special protective equipment for firefighters: For fires beyond the initial stage when the potential chemical hazard is unknown or in enclosed or confined spaces, emergency responders in the immediate hazard area should wear self-contained breathing apparatus (SCBA) and protective clothing. Use approved gas detectors for confined spaces.

NFPA rating:

Health:	1
Flammability:	1
Instability/reactivity:	0
Other:	N/A



Section 6. ACCIDENTAL RELEASE MEASURES

Personal precautions: STEPS TO BE TAKEN IN THE EVENT MATERIAL IS RELEASED OR SPILLED: Immediately contact emergency personnel. This material may burn, but it will not ignite readily. Keep all sources of ignition and hot metal surfaces away from the spill/release if it is safe to do so. Prevent further leakage or spillage if safe to do so. Do not allow material to enter drains, sewers or waterways. Recover by pumping (using an explosion-proof motor or hand pump), or use sand or other oil-absorbing materials. Carefully shovel, scoop, or sweep into a waste container for reclamation or disposal. See Section 8 for minimum personal protective equipment (PPE). For spills in excess of allowable quantities (RQ), notify the National Response Center at (800) 424-8802. Refer to CERCLA 40 CFR and SARA Title III, Section 313 40 CFR 372 for detailed instructions concerning reporting requirements.

Section 7. HANDLING AND STORAGE

Handling: Handle as a flammable liquid. Tank headspaces should always be regarded as potentially flammable. Bond and ground containers during product transfer and avoid static electrical discharge and all ignition sources during filling, discharging, and sampling from storage tanks. Electrical equipment should be approved for classified areas. Do not pressurize, cut, heat, weld, grind, or exposure containers to sources of ignition. Refer to OSHA regulations, ANSI Z49.1 and other standards pertaining to cleaning, repairing, welding or similar operations.

Storage: Keep containers in well-ventilated areas away from flame, sparks, and excessive temperatures. Keep containers closed and clearly labeled. Empty product containers may contain flammable or explosive vapors. Special precautions should be taken when entering or handling tanks, containers, or equipment containing produced water due to hazards associated with hydrocarbon vapor, including benzene, hydrogen sulfide, and possible radioactive contamination from naturally-occurring radioactive materials (NORM). All equipment should be checked for radioactivity or opened to the atmosphere and have forced ventilation applied at least 4 hours prior to confined space entry or handling. Avoid skin contact with any surface. Exercise good personal hygiene, including removal and laundering or disposal of soiled clothing and prompt washing with soap and water.

Section 8. EXPOSURE CONTROLS / PERSONAL PROTECTION

Occupational Exposure Limits:

Name	CAS No.	Weight %	OSHA — PEL (ppm)	ACGIH® TLV® (ppm)	NIOSH REL (ppm)
Sodium chloride	7647-14-5	5-20	Not Established	Not Established	Not Established
N-hexane	110-54-3	1-5	500	50	50
Benzene	71-43-2	0-1	1 5 — STEL Ref: 29 CFR 1910.1028	0.5 2.5 — STEL Skin – potential absorption	0.1 1 — STEL
Hydrogen sulfide	7783-06-4	<0.1	20 — Ceiling	1 5 — STEL	10 — STEL (10 minutes)

All exposure limits listed are 8-hour time weighted average (TWA) — except where noted otherwise.

TWA — Time Weighted Average is an average value of exposure over the course of an 8-hour work shift.
STEL — Short-Term Exposure Limit, a TWA exposure that occurs over a 15-minute time period
PEL — Permissible Exposure Limit is the maximum amount or concentration of a chemical that a worker may be exposed to under OSHA regulations.
Ceiling — This limit may not be exceeded at any time.

Engineering measures: The use of local exhaust ventilation is recommended to control emissions near the source. Provide mechanical ventilation of confined spaces. Use explosion-proof ventilation equipment.

PERSONAL PROTECTIVE EQUIPMENT

Respiratory protection: None required while threshold limits are kept below maximum allowable concentrations; if TWA exceeds limits, NIOSH-approved respirators must be worn. Refer to 29 CFR 1910.134 for complete regulations.

Skin and body protection: Neoprene, butyl or nitrile rubber gloves

Eye protection: Chemical splash goggles. Refer to 29 CFR 1910.133.

Hygiene measures: Minimize body contact with this, as well as all chemicals in general. Wash hands before eating, drinking, smoking, or using toilet facilities. Promptly remove contaminated clothing and launder before reuse.

Section 9. PHYSICAL AND CHEMICAL PROPERTIES

Appearance: Clear, amber, or brown liquid
Physical state (solid/liquid/gas): Liquid
Substance type (pure/mixture): Mixture
Color: Varies from clear to dark brown
Odor: Faint hydrocarbon odor
Molecular weight: Varies
pH: 4.9 – 8.5
Boiling point/range (5-95%): >212° F (100°C)
Melting point/range: <32° F (0°C)
Decomposition temperature: Not available

Specific gravity:	1.0 – 1.1 @ 68° F
Density:	8.34-9.18 pounds/gallon
Vapor density:	<3 (air=1)
Vapor pressure:	13 – 20 mm Hg @ 68°F
Evaporation rate:	No data available
Flash point:	Variable organic and dissolved gases are flammable
Auto-ignition temperature:	No data available
Flammable limits in air — (lower):	No data available
Flammable limits in air — (upper):	No data available

Section 10. STABILITY AND REACTIVITY

Stability:	This material is stable
Polymerization:	Will not occur.
Hazardous decomposition products:	Carbon oxides (CO, CO_2), sulfur oxides (SO, SO_2), nitrogen oxides NO, NO_2), Hydrogen sulfide
Materials to avoid:	Strong oxidizers such as nitrates, chlorates, and peroxides, strong acids
Conditions to avoid:	Sources of heat or ignition

Section 11. TOXICOLOGICAL INFORMATION

Acute toxicity:
Product information (toxicological data does not exist for this mixture):

Name	CAS No.	Inhalation:	Dermal:	Oral:
Sodium chloride	7647-14-5	Rat LC_{50} 42,000ppm/4 hrs	Rabbit LD_{50} >10,000 mg/kg	Rat LD_{50} 3,000 mg/kg
N-hexane	110-54-3	Rat LC_{50} 48,000ppm/4 hrs	No data available	Rat LD_{50} 25,000 mg/kg
Benzene	71-43-2	Rat LC_{50} 10,000ppm/7 hrs	No data available	Human LD_{Lo} 50 mg/kg
Hydrogen sulfide	7783-06-4	Rat LC_{50} 700 mg/m^3 /4 hrs	No data available	No data available

Chronic toxicity:
Hexane: reproductive, teratogenic, and tumorigenic health effects have occurred in experimental animals. This product contains benzene at a level of >0.1%. Repeated or prolonged exposure to benzene at concentrations in excess of the TLV may cause serious injury to blood-forming organs. Significant chronic exposure to benzene vapor has been reported to produce various blood disorders ranging from anemia to certain forms of leukemia (cancer) in humans. Benzene produced tumors in rats and mice in lifetime chronic toxicity studies, but the response has not been consistent across species, strain, sex or route of exposure. Animal studies on benzene have demonstrated immune toxicity, chromosomal aberrations, testicular effects and alterations in reproductive cycles and embryo/fetotoxicity, but not teratogenicity.

Carcinogenic and acute health effect information: ***refer to Health Hazard Section 2***

Section 12. ECOLOGICAL INFORMATION

Ecotoxicological Data:	Sodium chloride: EC50 Water flea (Daphnia magna): 340 – 469mg/l 48 hours. EC50 American eel (Anguilla rostrata): 100 – 27,260mg/l 96 hours.
Ecotoxicity Effects:	Not expected to be harmful to aquatic organisms.

Section 13. DISPOSAL CONSIDERATIONS

Cleanup considerations: This product as produced is not specifically listed as an EPA RCRA hazardous waste according to federal regulations (40 CFR 261). However, when discarded or disposed of, it may meet the criteria of a "characteristic" hazardous waste. This product could also contain benzene at > 0.5 ppm and could exhibit characteristics of "toxicity" as determined by the toxicity characteristic leaching procedure (TCLP). This material could become hazardous waste or other substance(s). It is the responsibility of the user to determine if disposal material is hazardous according to federal, state and local regulations.

Section 14. TRANSPORT INFORMATION

Please refer to 40 CFR 172.101: This product when transported via U.S. commerce is not regulated by the Department of Transportation (DOT).

Transport information:
Proper shipping name:
UN/identification no.:
Hazard class:
Packing group:
DOT reportable quantity (lbs):

Section 15. REGULATORY INFORMATION

U.S. TSCA (Toxic Substance Control Act)

All components of this product are listed on the U.S. Toxic Substances Control Act Chemical Inventory (TSCA Inventory) or are exempted from listing because a Low Volume Exemption has been granted in accordance with 40 CFR 723.50.

SARA Section 302: This product may contain the following component listed on EPA's Extremely Hazardous Substance (EHS) List.

Hydrogen sulfide	100 pounds EPCRA RQ	500 pounds TPQ

SARA Section 304:

The Comprehensive Environmental Response, Compensation and Liability Act (CERCLA) has notification requirements for releases or spills to the environment of the Reportable Quantity (RQ) or greater amounts, according to 40 CFR 302.

Name	CERCLA/SARA — Hazardous substances and their reportable quantities (RQ)
Benzene	10 pounds final RQ
N-hexane	5,000 pounds final RQ
Hydrogen sulfide	100 pounds final RQ

SARA TITLE III Sections 311/312 Hazardous Categories (40 CFR 370.21)

ACUTE:	**HEALTH HAZARD**
CHRONIC:	**HEALTH HAZARD**
FIRE:	**NO**
REACTIVITY:	**NO**
SUDDEN RELEASE:	**NO**

313 REPORTABLE INGREDIENTS

This product is a toxic chemical subject to annual reporting requirements of Section 313 of the Emergency Planning and Community Right-To-Know Act of 1986 and of 40 CFR 372: Benzene (0.1% de minimis concentration), N-hexane, hydrogen sulfide.

NOTE: *User must consult with applicable state and local agencies for special specifics, determinations or compliance obligations regarding this product.*

Section 16. OTHER INFORMATION

The information and recommendations contained herein are based upon tests, data, and information resources believed to be reliable. However, EnLink Midstream, L.P., and its related operations or divisions (EnLink) do not guarantee the accuracy or completeness, nor shall any of this information constitute a warranty, whether expressed or implied, as to the safety of goods, the merchantability of the goods or the fitness of the goods for a particular purpose. Adjustment to conform to actual conditions of usage may be required. EnLink assumes no responsibility for results obtained or for incidental or consequential damages, including lost profits, arising from the use of this data. No warranty against infringement of any patent, copyright or trademark is made or implied.

Attachment E

Company Name: West Virginia Oil Gathering
Site: Stockley
Location: Charleston, WV

Emissions Summary - Potential Emission Rate												
			VOC		PM		$PM_{2.5}$		PM_{10}		HAPs	
Unit	Emission Source	Description	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY	lb/hr	TPY
LOAD-1	Loading Losses	Loading Losses for Produced Water	1.428	0.01							0.10	0.00
OTK 1	Crude Oil Storage Tank	1 - 3,300 bbl Crude Oil Storage Tank	0.232	1.02								
Water Tank	Produced Water Tank	1 - 400 bbl Produced Water Tank	0.294	1.29								
FUG	Fugitive	Fugitive Emissions	0.135	0.59								
Roadway	Roadway	Roadway emissions			0.32	2.21	0.01	0.06	0.09	0.60		
		Total	**2.09**	**2.90**	**0.32**	**2.21**	**0.01**	**0.06**	**0.09**	**0.60**	**0.10**	**0.00**

CO - Carbon monoxide
VOC - Volatile organic compounds
PM_{10} - Particulate matter (measuring 10 µm or less)
HAP - Hazardous air pollutant
lb/hr - pound per hour
TPY - tons per year
COND - Condenstate tank
PWTK - Produced water tank
LL - Loading Losses
FUG - Fugitive emissions

Owner: West Virginia Oil Gatheirng
Site Name: Stockley
EPN: OTK and Water Tank

Total Maximum Potential to Emit (Working/Breathing)						
		Emissions Per Tank				
Type	Pollutant	Working and Breathing (lb/hr)	Working and Breathing[1] (TPY)	Number of Tanks (No.)	Total Annual (lb/hr)	Total Annual (TPY)
Tank #680	VOC	0.232	1.017	1	0.232	1.017
BR1	VOC	0.294	1.288	1	0.294	1.288
Total	VOC	0.526	2.305	2	0.526	2.305

[1]Working and Breathing Losses are calculated using TANKS 4.09d (See TANKS RESULTS tab)

Company Name: West Virginia Oil Gatheirng
Site: Stockley
Equipment: FUG

Fugitive Emissions						
Component	Service[1]	Number of Components[2]	Emission Factor (lb/hr/comp)	Weight % VOC	VOC Emissions (lb/hr)	VOC Emissions (TPY)
Valves	Gas		0.0099	100	0.000	0.000
	Light Oil	20	0.0055	100	0.110	0.482
	Heavy Oil		0.000019		0.000	0.000
	Water/Oil		0.00022	100	0.000	0.000
Connectors	Gas		0.00044	100	0.000	0.000
	Light Oil	20	0.00046	100	0.009	0.040
	Heavy Oil		0.000017		0.000	0.000
	Water/Oil		0.00024	100	0.000	0.000
Flanges	Gas		0.00086	100	0.000	0.000
	Light Oil	15	0.00024	100	0.004	0.016
	Heavy Oil		0.00000086		0.000	0.000
	Water/Oil		0.0000064	100	0.000	0.000
Open-ended lines	Gas		0.0044	100	0.000	0.000
	Light Oil	4	0.0031	100	0.012	0.054
	Heavy Oil		0.00031		0.000	0.000
	Water/Oil		0.00055	100	0.000	0.000
Other[3]	Gas		0.019	100	0.000	0.000
	Light Oil		0.017	100	0.000	0.000
	Heavy Oil		0.00007		0.000	0.000
	Water/Oil		0.031		0.000	0.000
				TOTAL	0.135	0.592

Notes:

[1] Water/oil is any stream in oil service with water content greater than 50% up to water content of 99%. Above 99% water emissions are negligible.

[2] Number of each component and type of service estimated based on a similar facility.

[3] Other equipment includes, compressors, pressure relief valves, relief valves, diaphragms, drains, dump arms, hatches, instruments, meters, polished rods, and vents.

Table 3: Projected Emissions Calculations, Truck Loading Operations
Stockley Facility, West Virginia Oil Gatheirng

Control Efficiency: 0.0%

Commodity	Annual Avg. Temp. (°R)	Chemical Component	Vapor MW (lb/lb-mole)	Saturation Factor	Pv (psia)	Loss [1] C_L (lb/Mgal)	Maximum Throughput (Mgal/yr)	Vapor [2] Weight Fraction	Uncontrolled Emissions (ton/yr)	Controlled Emissions (ton/yr)	HAP?
Produced Water	514.5	Total VOC	19.5	0.6	0.30	0.09	148	1.000	0.01	**0.01**	
		Benzene						0.0007	0.00	0.000	X
		Cumene						0.0000	0.00	0.000	X
		Ethylbenzene			Barrels Loaded per Day		9,600	0.0001	0.00	0.000	X
		Hexane						0.0663	0.00	0.000	X
		Naphthalene						0.0000	0.00	0.000	X
		Toluene						0.0011	0.00	0.000	X
		2,2,4-trimethylpentane						0.0000	0.00	0.000	X
		m-Xylene						0.0003	0.00	0.000	X
		o-Xylene						0.0001	0.00	0.003	X
		p-Xylene						0.0002	0.00	0.000	X
		Unidentified						0.9312	0.01	0.006	
									Total HAPs =	**0.00**	

[1] From AP-42, Section 5.2 Transportation and Marketing of Petroleum Liquids:

$C_L = 12.46((S)(P)(M))/(T)$

Where,

C_L = Loading loss (lb/1000 gal)
S = saturation factor (from Table 5.2-1)
Pv = mixture vapor pressure, psia
M = vapor molecular weight
T = average annual temperature, R

[2] Based upon lab analysis of representative product (Intertek ALS Crude Oil, Newport OH, October 2012).

Hourly Emissions

Hourly Emissions Control Efficiency: **0.0%**

Commodity	Annual Avg. Temp. (°R)	Chemical Component	Vapor MW (lb/lb-mole)	Saturation Factor	Pv (psia)	Loss[1] C_L (lb/Mgal)	Maximum Throughput (Gal/hr)	Vapor[2] Weight Fraction	Uncontrolled Emissions (lb/hr)	Controlled Emissions (lb/hr)	HAP?
Produced Water	514.5	**Total VOC**	19.5	0.6	0.30	0.085	16,800	1.000	1.43	**1.43**	
		Benzene						0.0007	0.00	0.001	X
		Cumene						0.0000	0.00	0.000	X
		Ethylbenzene						0.0001	0.00	0.000	X
		Hexane						0.0663	0.10	0.095	X
		Naphthalene						0.0000	0.00	0.000	X
		Toluene						0.0011	0.00	0.002	X
		2,2,4-trimethylpentane						0.0000	0.00	0.000	X
		m-Xylene						0.0003	0.00	0.000	X
		o-Xylene						0.0001	0.00	0.000	X
		p-Xylene						0.0002	0.00	0.000	X
		Unidentified						0.9312	1.33	1.330	
									Total HAPs =	**0.10**	

[1] From AP-42, Section 5.2 Transportation and Marketing of Petroleum Liquids:

$C_L = 12.46((S)(P)(M))/(T)$ Where,

C_L = Loading loss (lb/1000 gal)
S = saturation factor (from Table 5.2-1)
Pv = mixture vapor pressure, psia
M = vapor molecular weight
T = average annual temperature, R

[2] Based upon a similar facility. Crosstex will be performing a HAP analysis on the product, and the speciation will be updated once these results are received.

Table A.3. F001 - Unpaved Roadways and Parking Areas

	Round Trips	Distance Traveled per trip (Ft)	Distance Traveled (miles)
W - Light Duty	2000	1040	393.94
W - Diesel Straight Tank Trucks	17500	1175	3894.41
W - Tractor Trailer	250	1175	55.63
s	6.4		
P	140		

Vehicle Weight (tons)		Miles Traveled per Vehicle Type	
		Per Year	Per Hour
W - Light Duty (round trip 1040 ft)	3.5	393.94	0.045
W - Diesel Straight Tank Trucks (round trip 1175 ft)	16.2	3894.41	0.445
W - Tractor Trailer (round trip 1175 ft)	24.3	55.63	0.006

Data given in the EAC Form 3111 submitted in the previous application

Data given in an email sent by Bill Couts to Lisa Swanson April 12, 2013

$E = k(s/12)^a(w/3)^b[(365-P)/365]$

	k	a	b
PM	4.9	0.7	0.45
PM10	1.5	0.9	0.45
PM2.5	0.15	0.9	0.45

Road Usage

Hours/Day	Days/Year
24	365

	E - Light Duty	E - Diesel Straight Tank Trucks	E - Tractor Trailer
PM	2.0850	4.1549	4.9866
PM10	0.5629	1.1216	1.3462
PM2.5	0.0563	0.1122	0.1346

Total Site Emissions	lb/hr[1]	tpy
PM	0.32	2.21
PM10	0.09	0.60
PM2.5	0.01	0.06

1. lb/hr are calculated as the Light Duty Emissions and the greater of the Tank Trucks and Tractor Trailers. Tank Trucks and Tractor Trailers cannot be on the road at the same time

	Emissions	E - Light Duty
	lb/hr	tons/yr
PM	0.09	0.41
PM10	0.03	0.11
PM2.5	0.00	0.01

	Emissions	E - Diesel Straight Tank Trucks
	lb/hr	tons/yr
PM	0.19	0.82
PM10	0.05	0.22
PM2.5	0.01	0.02

	Emissions	E - Tractor Trailer
	lb/hr	tons/yr
PM	0.22	0.98
PM10	0.06	0.27
PM2.5	0.01	0.03

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

Identification

User Identification:	Stockly #680
City:	Charleston
State:	West Virginia
Company:	Appalachian Oil Purchasers
Type of Tank:	Internal Floating Roof Tank
Description:	Stockly Tank

Tank Dimensions

Diameter (ft):		30.00
Volume (gallons):		138,600.00
Turnovers:		365.00
Self Supp. Roof? (y/n):	N	
No. of Columns:		1.00
Eff. Col. Diam. (ft):		1.00

Paint Characteristics

Internal Shell Condition:	Light Rust
Shell Color/Shade:	White/White
Shell Condition	Good
Roof Color/Shade:	White/White
Roof Condition:	Good

Rim-Seal System

Primary Seal:	Liquid-mounted
Secondary Seal	None

Deck Characteristics

Deck Fitting Category:	Detail	
Deck Type:	Bolted	
Construction:	Sheet	
Deck Seam:	Sheet: 5 Ft Wide	
Deck Seam Len. (ft):		141.37

Deck Fitting/Status	Quantity
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1
Roof Leg or Hanger Well/Adjustable	10
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1
Stub Drain (1-in. Diameter)/Slit Fabric Seal 10% Open	4
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

Stockly #680 - Internal Floating Roof Tank
Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Crude oil (RVP 5)	Jan	45.77	41.75	49.79	55.00	2.3308	N/A	N/A	54.5527			190.16	Option 4: RVP=5
Benzene						0.7763	N/A	N/A	78.1100	0.0010	0.0012	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.1589	N/A	N/A	50.0000	0.9432	0.7356	207.00	Option 4: RVP=5
Cyclohexane						0.8130	N/A	N/A	84.1600	0.0067	0.0081	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						2.9598	N/A	N/A	70.1300	0.0011	0.0049	70.13	Option 1: VP40 = 2.514 VP50 = 3.287
Ethylbenzene						0.0650	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						7.0377	N/A	N/A	72.1500	0.0116	0.1221	72.15	Option 1: VP40 = 5.878 VP50 = 7.889
Methylcyclopentane						1.1852	N/A	N/A	84.1600	0.0065	0.0115	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						4.9398	N/A	N/A	72.1500	0.0155	0.1145	72.15	Option 3: A=27691, B=7.558
Toluene						0.2087	N/A	N/A	92.1300	0.0039	0.0012	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0538	N/A	N/A	106.1700	0.0087	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Feb	47.56	43.02	52.10	55.00	2.4236	N/A	N/A	54.5884			190.16	Option 4: RVP=5
Benzene						0.8186	N/A	N/A	78.1100	0.0010	0.0012	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.2407	N/A	N/A	50.0000	0.9432	0.7338	207.00	Option 4: RVP=5
Cyclohexane						0.8563	N/A	N/A	84.1600	0.0067	0.0082	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.0987	N/A	N/A	70.1300	0.0011	0.0049	70.13	Option 1: VP40 = 2.514 VP50 = 3.287
Ethylbenzene						0.0695	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						7.3991	N/A	N/A	72.1500	0.0116	0.1234	72.15	Option 1: VP40 = 5.878 VP50 = 7.889
Methylcyclopentane						1.2456	N/A	N/A	84.1600	0.0065	0.0116	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						5.1518	N/A	N/A	72.1500	0.0155	0.1148	72.15	Option 3: A=27691, B=7.558
Toluene						0.2215	N/A	N/A	92.1300	0.0039	0.0012	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0576	N/A	N/A	106.1700	0.0087	0.0007	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Mar	52.57	47.25	57.88	55.00	2.6964	N/A	N/A	54.6762			190.16	Option 4: RVP=5
Benzene						0.9468	N/A	N/A	78.1100	0.0010	0.0012	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.4816	N/A	N/A	50.0000	0.9432	0.7292	207.00	Option 4: RVP=5
Cyclohexane						0.9870	N/A	N/A	84.1600	0.0067	0.0085	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.5155	N/A	N/A	70.1300	0.0011	0.0050	70.13	Option 1: VP50 = 3.287 VP60 = 4.177
Ethylbenzene						0.0834	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						8.4322	N/A	N/A	72.1500	0.0116	0.1262	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
Methylcyclopentane						1.4274	N/A	N/A	84.1600	0.0065	0.0120	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						5.7821	N/A	N/A	72.1500	0.0155	0.1156	72.15	Option 3: A=27691, B=7.558
Toluene						0.2608	N/A	N/A	92.1300	0.0039	0.0013	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0693	N/A	N/A	106.1700	0.0087	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Apr	56.95	50.83	63.07	55.00	2.9533	N/A	N/A	54.7389			190.16	Option 4: RVP=5
Benzene						1.0724	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.7094	N/A	N/A	50.0000	0.9432	0.7261	207.00	Option 4: RVP=5
Cyclohexane						1.1146	N/A	N/A	84.1600	0.0067	0.0088	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.9054	N/A	N/A	70.1300	0.0011	0.0051	70.13	Option 1: VP50 = 3.287 VP60 = 4.177
Ethylbenzene						0.0975	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						9.3592	N/A	N/A	72.1500	0.0116	0.1277	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
Methylcyclopentane						1.6040	N/A	N/A	84.1600	0.0065	0.0123	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						6.3854	N/A	N/A	72.1500	0.0155	0.1164	72.15	Option 3: A=27691, B=7.558
Toluene						0.3000	N/A	N/A	92.1300	0.0039	0.0014	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0811	N/A	N/A	106.1700	0.0087	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11

Crude oil (RVP 5)	May	61.13	54.69	67.57	55.00	3.2160	N/A	N/A	54.7931			190.16	Option 4: RVP=5
Benzene						1.2050	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.9424	N/A	N/A	50.0000	0.9432	0.7234	207.00	Option 4: RVP=5
Cyclohexane						1.2491	N/A	N/A	84.1600	0.0067	0.0090	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						4.2974	N/A	N/A	70.1300	0.0011	0.0051	70.13	Option 1: VP60 = 4.177 VP70 = 5.24
Ethylbenzene						0.1129	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						10.2910	N/A	N/A	72.1500	0.0116	0.1288	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
Methylcyclopentane						1.7892	N/A	N/A	84.1600	0.0065	0.0126	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						7.0093	N/A	N/A	72.1500	0.0155	0.1172	72.15	Option 3: A=27691, B=7.558
Toluene						0.3420	N/A	N/A	92.1300	0.0039	0.0014	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0940	N/A	N/A	106.1700	0.0087	0.0009	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Jun	64.81	58.34	71.27	55.00	3.4635	N/A	N/A	54.8478			190.16	Option 4: RVP=5
Benzene						1.3324	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						3.1599	N/A	N/A	50.0000	0.9432	0.7207	207.00	Option 4: RVP=5
Cyclohexane						1.3779	N/A	N/A	84.1600	0.0067	0.0092	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						4.6879	N/A	N/A	70.1300	0.0011	0.0052	70.13	Option 1: VP60 = 4.177 VP70 = 5.24
Ethylbenzene						0.1281	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						11.2185	N/A	N/A	72.1500	0.0116	0.1303	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
Methylcyclopentane						1.9659	N/A	N/A	84.1600	0.0065	0.0128	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						7.5977	N/A	N/A	72.1500	0.0155	0.1179	72.15	Option 3: A=27691, B=7.558
Toluene						0.3828	N/A	N/A	92.1300	0.0039	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.1068	N/A	N/A	106.1700	0.0087	0.0009	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Jul	66.29	60.27	72.31	55.00	3.5672	N/A	N/A	54.8669			190.16	Option 4: RVP=5
Benzene						1.3869	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						3.2514	N/A	N/A	50.0000	0.9432	0.7197	207.00	Option 4: RVP=5
Cyclohexane						1.4330	N/A	N/A	84.1600	0.0067	0.0093	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						4.8457	N/A	N/A	70.1300	0.0011	0.0052	70.13	Option 1: VP60 = 4.177 VP70 = 5.24
Ethylbenzene						0.1347	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						11.5935	N/A	N/A	72.1500	0.0116	0.1307	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
Methylcyclopentane						2.0413	N/A	N/A	84.1600	0.0065	0.0129	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						7.8469	N/A	N/A	72.1500	0.0155	0.1182	72.15	Option 3: A=27691, B=7.558
Toluene						0.4004	N/A	N/A	92.1300	0.0039	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.1124	N/A	N/A	106.1700	0.0087	0.0009	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Aug	65.57	59.79	71.34	55.00	3.5165	N/A	N/A	54.8578			190.16	Option 4: RVP=5
Benzene						1.3602	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						3.2066	N/A	N/A	50.0000	0.9432	0.7202	207.00	Option 4: RVP=5
Cyclohexane						1.4059	N/A	N/A	84.1600	0.0067	0.0093	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						4.7689	N/A	N/A	70.1300	0.0011	0.0052	70.13	Option 1: VP60 = 4.177 VP70 = 5.24
Ethylbenzene						0.1314	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						11.4109	N/A	N/A	72.1500	0.0116	0.1305	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
Methylcyclopentane						2.0044	N/A	N/A	84.1600	0.0065	0.0128	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						7.7248	N/A	N/A	72.1500	0.0155	0.1180	72.15	Option 3: A=27691, B=7.558
Toluene						0.3918	N/A	N/A	92.1300	0.0039	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.1096	N/A	N/A	106.1700	0.0087	0.0009	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Sep	62.41	56.76	68.05	55.00	3.3005	N/A	N/A	54.8134			190.16	Option 4: RVP=5
Benzene						1.2480	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						3.0165	N/A	N/A	50.0000	0.9432	0.7224	207.00	Option 4: RVP=5
Cyclohexane						1.2926	N/A	N/A	84.1600	0.0067	0.0091	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						4.4329	N/A	N/A	70.1300	0.0011	0.0051	70.13	Option 1: VP60 = 4.177 VP70 = 5.24
Ethylbenzene						0.1180	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						10.6130	N/A	N/A	72.1500	0.0116	0.1294	72.15	Option 1: VP60 = 10.005 VP70 = 12.53
Methylcyclopentane						1.8490	N/A	N/A	84.1600	0.0065	0.0126	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						7.2091	N/A	N/A	72.1500	0.0155	0.1175	72.15	Option 3: A=27691, B=7.558
Toluene						0.3557	N/A	N/A	92.1300	0.0039	0.0015	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0983	N/A	N/A	106.1700	0.0087	0.0009	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Oct	56.93	51.37	62.50	55.00	2.9525	N/A	N/A	54.7388			190.16	Option 4: RVP=5
Benzene						1.0720	N/A	N/A	78.1100	0.0010	0.0013	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.7087	N/A	N/A	50.0000	0.9432	0.7261	207.00	Option 4: RVP=5
Cyclohexane						1.1142	N/A	N/A	84.1600	0.0067	0.0088	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.9042	N/A	N/A	70.1300	0.0011	0.0051	70.13	Option 1: VP50 = 3.287 VP60 = 4.177

Ethylbenzene						0.0975	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						9.3564	N/A	N/A	72.1500	0.0116	0.1277	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
Methylcyclopentane						1.6035	N/A	N/A	84.1600	0.0065	0.0123	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						6.3834	N/A	N/A	72.1500	0.0155	0.1164	72.15	Option 3: A=27691, B=7.558
Toluene						0.2999	N/A	N/A	92.1300	0.0039	0.0014	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0811	N/A	N/A	106.1700	0.0087	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Nov	52.31	47.72	56.89	55.00	2.6816	N/A	N/A	54.6719			190.16	Option 4: RVP=5
Benzene						0.9397	N/A	N/A	78.1100	0.0010	0.0012	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.4686	N/A	N/A	50.0000	0.9432	0.7295	207.00	Option 4: RVP=5
Cyclohexane						0.9798	N/A	N/A	84.1600	0.0067	0.0085	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.4922	N/A	N/A	70.1300	0.0011	0.0050	70.13	Option 1: VP50 = 3.287 VP60 = 4.177
Ethylbenzene						0.0826	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						8.3769	N/A	N/A	72.1500	0.0116	0.1260	72.15	Option 1: VP50 = 7.889 VP60 = 10.005
Methylcyclopentane						1.4174	N/A	N/A	84.1600	0.0065	0.0119	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						5.7477	N/A	N/A	72.1500	0.0155	0.1156	72.15	Option 3: A=27691, B=7.558
Toluene						0.2586	N/A	N/A	92.1300	0.0039	0.0013	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0686	N/A	N/A	106.1700	0.0087	0.0008	106.17	Option 2: A=7.009, B=1462.266, C=215.11
Crude oil (RVP 5)	Dec	47.80	43.92	51.67	55.00	2.4358	N/A	N/A	54.5928			190.16	Option 4: RVP=5
Benzene						0.8243	N/A	N/A	78.1100	0.0010	0.0012	78.11	Option 2: A=6.905, B=1211.033, C=220.79
Crude oil (RVP 5)						2.2515	N/A	N/A	50.0000	0.9432	0.7335	207.00	Option 4: RVP=5
Cyclohexane						0.8621	N/A	N/A	84.1600	0.0067	0.0083	84.16	Option 2: A=6.841, B=1201.53, C=222.65
Cyclopentane						3.1168	N/A	N/A	70.1300	0.0011	0.0049	70.13	Option 1: VP40 = 2.514 VP50 = 3.287
Ethylbenzene						0.0701	N/A	N/A	106.1700	0.0018	0.0002	106.17	Option 2: A=6.975, B=1424.255, C=213.21
Isopentane						7.4461	N/A	N/A	72.1500	0.0116	0.1235	72.15	Option 1: VP40 = 5.878 VP50 = 7.889
Methylcyclopentane						1.2537	N/A	N/A	84.1600	0.0065	0.0117	84.16	Option 2: A=6.8628, B=1186.059, C=226.04
Pentane (-n)						5.1799	N/A	N/A	72.1500	0.0155	0.1148	72.15	Option 3: A=27691, B=7.558
Toluene						0.2232	N/A	N/A	92.1300	0.0039	0.0012	92.13	Option 2: A=6.954, B=1344.8, C=219.48
Xylenes (mixed isomers)						0.0581	N/A	N/A	106.1700	0.0087	0.0007	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)

Stockly #680 - Internal Floating Roof Tank
Charleston, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Rim Seal Losses (lb):	3.8937	4.0665	4.5822	5.0781	5.5967	6.0976	6.3107	6.2062	5.7665	5.0765	4.5539	4.0895
Seal Factor A (lb-mole/ft-yr):	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000	1.6000
Seal Factor B (lb-mole/ft-yr (mph)^n):	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000	0.3000
Value of Vapor Pressure Function:	0.0446	0.0466	0.0524	0.0580	0.0638	0.0695	0.0719	0.0707	0.0658	0.0580	0.0521	0.0468
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	2.3308	2.4236	2.6964	2.9533	3.2160	3.4635	3.5672	3.5165	3.3005	2.9525	2.6816	2.4358
Tank Diameter (ft):	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000
Vapor Molecular Weight (lb/lb-mole):	54.5527	54.5884	54.6762	54.7389	54.7931	54.8478	54.8669	54.8578	54.8134	54.7388	54.6719	54.5928
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Withdrawal Losses (lb):	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822	137.3822
Number of Columns:	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Effective Column Diameter (ft):	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000	1.0000
Net Throughput (gal/mo.):	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000	4,215,750.0000
Shell Clingage Factor (bbl/1000 sqft):	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060	0.0060
Average Organic Liquid Density (lb/gal):	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230	7.0230
Tank Diameter (ft):	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000
Deck Fitting Losses (lb):	22.3076	23.2978	26.2519	29.0932	32.0644	34.9340	36.1550	35.5561	33.0371	29.0841	26.0900	23.4292
Value of Vapor Pressure Function:	0.0446	0.0466	0.0524	0.0580	0.0638	0.0695	0.0719	0.0707	0.0658	0.0580	0.0521	0.0468
Vapor Molecular Weight (lb/lb-mole):	54.5527	54.5884	54.6762	54.7389	54.7931	54.8478	54.8669	54.8578	54.8134	54.7388	54.6719	54.5928
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Tot. Roof Fitting Loss Fact.(lb-mole/yr):	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000	275.0000
Deck Seam Losses (lb):	2.0442	2.1349	2.4056	2.6660	2.9382	3.2012	3.3131	3.2582	3.0274	2.6651	2.3908	2.1469
Deck Seam Length (ft):	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700	141.3700
Deck Seam Loss per Unit Length Factor (lb-mole/ft-yr):	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400	0.1400
Deck Seam Length Factor(ft/sqft):	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000	0.2000
Tank Diameter (ft):	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000	30.0000
Vapor Molecular Weight (lb/lb-mole):	54.5527	54.5884	54.6762	54.7389	54.7931	54.8478	54.8669	54.8578	54.8134	54.7388	54.6719	54.5928
Product Factor:	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000	0.4000
Total Losses (lb):	165.6277	166.8814	170.6218	174.2194	177.9815	181.6149	183.1609	182.4027	179.2131	174.2080	170.4168	167.0477

Roof Fitting/Status	Quantity	Roof Fitting Loss Factors KFa(lb-mole/yr)	KFb(lb-mole/(yr mph^n))	m	Losses(lb)
Access Hatch (24-in. Diam.)/Unbolted Cover, Ungasketed	1	36.00	5.90	1.20	46.0395
Automatic Gauge Float Well/Unbolted Cover, Ungasketed	1	14.00	5.40	1.10	17.9043
Column Well (24-in. Diam.)/Built-Up Col.-Sliding Cover, Ungask.	1	47.00	0.00	0.00	60.1072
Ladder Well (36-in. Diam.)/Sliding Cover, Ungasketed	1	76.00	0.00	0.00	97.1946
Roof Leg or Hanger Well/Adjustable	10	7.90	0.00	0.00	101.0312
Sample Pipe or Well (24-in. Diam.)/Slit Fabric Seal 10% Open	1	12.00	0.00	0.00	15.3465
Stub Drain (1-in. Diameter)/	4	1.20	0.00	0.00	6.1386
Vacuum Breaker (10-in. Diam.)/Weighted Mech. Actuation, Gask.	1	6.20	1.20	0.94	7.9290

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

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Stockly #680 - Internal Floating Roof Tank
Charleston, West Virginia

	Losses(lbs)				
Components	Rim Seal Loss	Withdrawl Loss	Deck Fitting Loss	Deck Seam Loss	Total Emissions
Crude oil (RVP 5)	61.32	1,648.59	351.30	32.19	2,093.40
Benzene	0.08	1.65	0.45	0.04	2.21
Crude oil (RVP 5)	44.50	1,554.95	254.97	23.36	1,877.79
Cyclohexane	0.54	11.05	3.11	0.28	14.98
Cyclopentane	0.31	1.81	1.78	0.16	4.06
Ethylbenzene	0.01	2.97	0.07	0.01	3.06
Isopentane	7.83	19.12	44.84	4.11	75.90
Methylcyclopentane	0.76	10.72	4.33	0.40	16.20
Pentane (-n)	7.15	25.55	40.97	3.75	77.43
Toluene	0.09	6.43	0.49	0.04	7.05
Xylenes (mixed isomers)	0.05	14.34	0.30	0.03	14.72

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

Identification

User Identification:	Stockly BR1
City:	Charleston
State:	West Virginia
Company:	West Virginia Oil Gathering
Type of Tank:	Vertical Fixed Roof Tank
Description:	Stockly Tank

Tank Dimensions

Shell Height (ft):	20.00
Diameter (ft):	12.00
Liquid Height (ft) :	20.00
Avg. Liquid Height (ft):	16.00
Volume (gallons):	16,920.59
Turnovers:	8,697.57
Net Throughput(gal/yr):	147,168,000.00
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)	12.00

Breather Vent Settings

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

Meterological Data used in Emissions Calculations: Charleston, West Virginia (Avg Atmospheric Pressure = 14.25 psia)

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

Stockly BR1 - Vertical Fixed Roof Tank
Charleston, West Virginia

Mixture/Component	Month	Daily Liquid Surf. Temperature (deg F) Avg.	Min.	Max.	Liquid Bulk Temp (deg F)	Vapor Pressure (psia) Avg.	Min.	Max.	Vapor Mol. Weight.	Liquid Mass Fract.	Vapor Mass Fract.	Mol. Weight	Basis for Vapor Pressure Calculations
Brine	Jan	48.84	43.20	54.48	57.22	0.1800	0.1461	0.2206	19.8840			18.88	
Crude oil (RVP 5)						2.3003	2.0462	2.5792	50.0000	0.0500	0.1466	207.00	Option 4: RVP=5
Water						0.1703	0.1374	0.2098	18.0200	0.9500	0.8534	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Feb	51.29	44.55	58.03	57.22	0.1968	0.1537	0.2502	19.8126			18.88	
Crude oil (RVP 5)						2.4184	2.1050	2.7684	50.0000	0.0500	0.1415	207.00	Option 4: RVP=5
Water						0.1866	0.1448	0.2387	18.0200	0.9500	0.8585	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Mar	57.27	48.89	65.66	57.22	0.2436	0.1803	0.3258	19.6527			18.88	
Crude oil (RVP 5)						2.7269	2.3026	3.2121	50.0000	0.0500	0.1299	207.00	Option 4: RVP=5
Water						0.2322	0.1706	0.3126	18.0200	0.9500	0.8701	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Apr	62.62	52.57	72.66	57.22	0.2936	0.2061	0.4123	19.5249			18.88	
Crude oil (RVP 5)						3.0289	2.4819	3.6687	50.0000	0.0500	0.1205	207.00	Option 4: RVP=5
Water						0.2810	0.1956	0.3974	18.0200	0.9500	0.8795	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	May	67.58	56.53	78.63	57.22	0.3478	0.2373	0.5012	19.4177			18.88	
Crude oil (RVP 5)						3.3326	2.6870	4.0969	50.0000	0.0500	0.1125	207.00	Option 4: RVP=5
Water						0.3341	0.2261	0.4847	18.0200	0.9500	0.8875	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Jun	71.63	60.22	83.05	57.22	0.3984	0.2701	0.5776	19.3373			18.88	
Crude oil (RVP 5)						3.5985	2.8901	4.4393	50.0000	0.0500	0.1065	207.00	Option 4: RVP=5
Water						0.3838	0.2581	0.5599	18.0200	0.9500	0.8935	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Jul	72.90	62.13	83.68	57.22	0.4156	0.2886	0.5892	19.3133			18.88	
Crude oil (RVP 5)						3.6851	3.0000	4.4900	50.0000	0.0500	0.1047	207.00	Option 4: RVP=5
Water						0.4006	0.2762	0.5714	18.0200	0.9500	0.8953	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Aug	71.71	61.60	81.82	57.22	0.3994	0.2833	0.5554	19.3358			18.88	
Crude oil (RVP 5)						3.6035	2.9691	4.3420	50.0000	0.0500	0.1064	207.00	Option 4: RVP=5
Water						0.3848	0.2710	0.5380	18.0200	0.9500	0.8936	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Sep	67.66	58.46	76.85	57.22	0.3487	0.2540	0.4731	19.4161			18.88	
Crude oil (RVP 5)						3.3374	2.7920	3.9651	50.0000	0.0500	0.1124	207.00	Option 4: RVP=5
Water						0.3350	0.2424	0.4571	18.0200	0.9500	0.8876	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Oct	61.24	52.96	69.51	57.22	0.2798	0.2090	0.3711	19.5567			18.88	
Crude oil (RVP 5)						2.9483	2.5015	3.4571	50.0000	0.0500	0.1229	207.00	Option 4: RVP=5
Water						0.2676	0.1985	0.3570	18.0200	0.9500	0.8771	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Nov	55.53	49.19	61.88	57.22	0.2291	0.1823	0.2862	19.6973			18.88	
Crude oil (RVP 5)						2.6341	2.3167	2.9856	50.0000	0.0500	0.1331	207.00	Option 4: RVP=5
Water						0.2180	0.1725	0.2738	18.0200	0.9500	0.8669	18.02	Option 2: A=8.10765, B=1750.286, C=235
Brine	Dec	50.60	45.34	55.85	57.22	0.1919	0.1583	0.2317	19.8324			18.88	
Crude oil (RVP 5)						2.3845	2.1400	2.6510	50.0000	0.0500	0.1429	207.00	Option 4: RVP=5
Water						0.1818	0.1492	0.2206	18.0200	0.9500	0.8571	18.02	Option 2: A=8.10765, B=1750.286, C=235

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

Stockly BR1 - Vertical Fixed Roof Tank
Charleston, West Virginia

Month:	January	February	March	April	May	June	July	August	September	October	November	December
Standing Losses (lb):	0.4815	0.5726	0.9751	1.3607	1.8255	2.0834	2.1112	1.9002	1.4590	1.0946	0.6611	0.4721
Vapor Space Volume (cu ft):	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781
Vapor Density (lb/cu ft):	0.0007	0.0007	0.0009	0.0010	0.0012	0.0014	0.0014	0.0014	0.0012	0.0010	0.0008	0.0007
Vapor Space Expansion Factor:	0.0454	0.0554	0.0710	0.0874	0.0985	0.1038	0.0983	0.0914	0.0812	0.0708	0.0524	0.0421
Vented Vapor Saturation Factor:	0.9560	0.9521	0.9414	0.9302	0.9184	0.9076	0.9040	0.9074	0.9182	0.9332	0.9447	0.9532
Tank Vapor Space Volume:												
Vapor Space Volume (cu ft):	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781	545.4781
Tank Diameter (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Vapor Space Outage (ft):	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231
Tank Shell Height (ft):	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000
Average Liquid Height (ft):	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000	16.0000
Roof Outage (ft):	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231
Roof Outage (Dome Roof)												
Roof Outage (ft):	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231	0.8231
Dome Radius (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Shell Radius (ft):	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000	6.0000
Vapor Density												
Vapor Density (lb/cu ft):	0.0007	0.0007	0.0009	0.0010	0.0012	0.0014	0.0014	0.0014	0.0012	0.0010	0.0008	0.0007
Vapor Molecular Weight (lb/lb-mole):	19.8840	19.8126	19.6527	19.5249	19.4177	19.3373	19.3133	19.3358	19.4161	19.5567	19.6973	19.8324
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1800	0.1968	0.2436	0.2936	0.3478	0.3984	0.4156	0.3994	0.3487	0.2798	0.2291	0.1919
Daily Avg. Liquid Surface Temp. (deg. R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Average Ambient Temp. (deg. F):	32.1000	35.5000	45.8500	54.8000	63.5000	71.4500	75.0500	73.9000	67.6500	56.2000	46.8000	37.0000
Ideal Gas Constant R (psia cuft / (lb-mol-deg R)):	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731	10.731
Liquid Bulk Temperature (deg. R):	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933	516.8933
Tank Paint Solar Absorptance (Shell):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Tank Paint Solar Absorptance (Roof):	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400	0.5400
Daily Total Solar Insulation Factor (Btu/sqft day):	625.9737	850.2836	1,184.6862	1,514.6470	1,780.2020	1,910.5999	1,836.9933	1,675.5029	1,369.9719	1,046.0392	678.9578	533.0136
Vapor Space Expansion Factor												
Vapor Space Expansion Factor:	0.0454	0.0554	0.0710	0.0874	0.0985	0.1038	0.0983	0.0914	0.0812	0.0708	0.0524	0.0421
Daily Vapor Temperature Range (deg. R):	22.5687	26.9683	33.5365	40.1815	44.1967	45.6643	43.1113	40.4536	36.7700	33.0961	25.3858	21.0192
Daily Vapor Pressure Range (psia):	0.0745	0.0965	0.1455	0.2062	0.2639	0.3074	0.3006	0.2721	0.2190	0.1622	0.1039	0.0734
Breather Vent Press. Setting Range(psia):	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600	0.0600
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1800	0.1968	0.2436	0.2936	0.3478	0.3984	0.4156	0.3994	0.3487	0.2798	0.2291	0.1919
Vapor Pressure at Daily Minimum Liquid Surface Temperature (psia):	0.1461	0.1537	0.1803	0.2061	0.2373	0.2701	0.2886	0.2833	0.2540	0.2090	0.1823	0.1583
Vapor Pressure at Daily Maximum Liquid Surface Temperature (psia):	0.2206	0.2502	0.3258	0.4123	0.5012	0.5776	0.5892	0.5554	0.4731	0.3711	0.2862	0.2317
Daily Avg. Liquid Surface Temp. (deg R):	508.5095	510.9624	516.9429	522.2886	527.2494	531.3037	532.5737	531.3788	527.3254	520.9055	515.2035	510.2689
Daily Min. Liquid Surface Temp. (deg R):	502.8673	504.2203	508.5588	512.2432	516.2002	519.8876	521.7958	521.2654	518.1329	512.6314	508.8570	505.0141
Daily Max. Liquid Surface Temp. (deg R):	514.1517	517.7044	525.3271	532.3339	538.2986	542.7198	543.3515	541.4922	536.5179	529.1795	521.5500	515.5237
Daily Ambient Temp. Range (deg. R):	18.2000	19.6000	21.7000	24.0000	24.0000	23.3000	21.3000	21.0000	22.3000	24.0000	21.0000	18.0000
Vented Vapor Saturation Factor												
Vented Vapor Saturation Factor:	0.9560	0.9521	0.9414	0.9302	0.9184	0.9076	0.9040	0.9074	0.9182	0.9332	0.9447	0.9532
Vapor Pressure at Daily Average Liquid: Surface Temperature (psia):	0.1800	0.1968	0.2436	0.2936	0.3478	0.3984	0.4156	0.3994	0.3487	0.2798	0.2291	0.1919
Vapor Space Outage (ft):	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231	4.8231
Working Losses (lb):	133.3366	145.2396	178.3622	213.5341	251.5837	287.0430	299.0288	287.7395	252.2105	203.8854	168.0921	141.7811

Vapor Molecular Weight (lb/lb-mole):	19.8840	19.8126	19.6527	19.5249	19.4177	19.3373	19.3133	19.3358	19.4161	19.5567	19.6973	19.8324
Vapor Pressure at Daily Average Liquid Surface Temperature (psia):	0.1800	0.1968	0.2436	0.2936	0.3478	0.3984	0.4156	0.3994	0.3487	0.2798	0.2291	0.1919
Net Throughput (gal/mo.):	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000	12,264,000.0000
Annual Turnovers:	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678	8,697.5678
Turnover Factor:	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701	0.1701
Maximum Liquid Volume (gal):	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925	16,920.5925
Maximum Liquid Height (ft):	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000	20.0000
Tank Diameter (ft):	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000	12.0000
Working Loss Product Factor:	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500	0.7500
Total Losses (lb):	133.8181	145.8122	179.3373	214.8948	253.4092	289.1264	301.1400	289.6397	253.6695	204.9800	168.7532	142.2532

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

Emissions Report for: January, February, March, April, May, June, July, August, September, October, November, December

Stockly BR1 - Vertical Fixed Roof Tank
Charleston, West Virginia

	Losses(lbs)		
Components	Working Loss	Breathing Loss	Total Emissions
Brine	2,561.84	15.00	2,576.83
Crude oil (RVP 5)	305.84	1.75	307.58
Water	2,256.00	13.25	2,269.25