Print Form

DEQ
State of Oregon Department of Environmental Quality

ADMINISTRATIVE INFORMATION

FORM AQ101
ANSWER SHEET

FOR DEQ USE ONLY	
Permit Number: 26048 ST 01	Type of Application:
Application No: 029076	RNW ☑ MOD ☐ NEW ☐ EXT ☐
Date Received : 04 25 2017	
Regional Office: NWR	Check No. Amount $

1. Company		2. Facility Location	
Legal Name:	Oil Re-Refining Company Inc. DBA Fuel Processors Inc.	Name:	
Mailing Address:	4150 N. Suttle Road	Street Address:	Same
City, State, Zip Code:	Portland, OR 97217	City, County, Zip Code:	
Number of employees (corporate):		Number of employees (facility):	
3. Facilty Contact Person		**4. Industrial Classification Code(s)**	
Name:	Scott Briggs	Primary SIC and NAICS:	5093
Title:	President	Secondary SIC and NAICS:	2992
Telephone number:	503-286-8352	**5. Other DEQ Permits**	
Fax. number:	503-286-5027	Solid waste applied for	
e-mail address:	scottb @orrcorecycles.com		

6. Permit Action:

- ☐ New Simple ACDP
- ☐ New Construction ACDP
- ☐ New Standard ACDP
- ☐ New Standard ACDP (PSD/NSR)
- ☐ Renewal of an existing permit without changes (include form AQ403 for Standard ACDPs)
- ☒ Renewal of an existing permit with changes (include form AQ403 for Standard ACDPs)
- ☐ Revision (or Modification) to an existing permit application

7. Signature

I hereby apply for permission to discharge air contaminants in the State of Oregon, as stated or described in this application, and certify that the information contained in this application and the schedules and exhibits appended hereto, are true and correct to the best of my knowledge and belief.

Scott Briggs	President 503-286-8352
Name of official (Printed or Typed)	Title of official and phone number
Scott Briggs	04/25/2017
Signature of official	Date

FEE INFORMATION

(Make the check payable to DEQ)

Note: The initial application fees and annual fees specified below (OAR 340-216-8020, Table 2, Parts 1 and 2) are only required for initial permit applications. These fees are not required for an application to renew or modify an existing permit. The appropriate specific activity fee(s) specified below (OAR 340-216-8020, Table 2, Part 3) applies to permit modifications or may be in addition to initial permit application fees.

OAR 340-216-8020, Table 2, Part 1 – INITIAL PERMITTING APPLICATION FEES:		
Short Term Activity ACDP	☐	$3,600.00
Basic ACDP	☐	$144.00
Assignment to General ACDP	☐	$1,440.00
Simple ACDP	☐	$7,200.00
Construction ACDP	☐	$11,520.00
Standard ACDP	☐	$14,400.00
Standard ACDP (Major NSR or Type A State NSR)	☐	$50,400.00
OAR 340-216-8020, TABLE 2, PART 2 - ANNUAL FEES:		
Simple ACDP – Low Fee Class	☐	$2,304.00
Simple ACDP – High Fee Class	☐	$4,608.00
Standard ACDP	☐	$9,216.00
OAR 340-216-8020, TABLE 2, PART 3 - SPECIFIC ACTIVITY FEES:		
Non-Technical Permit Modification	☐	$432.00
Basic Technical Permit Modification	☐	$432.00
Simple Technical Permit Modification	☐	$1,440.00
Moderate Technical Permit Modification	☐	$7,200.00
Complex Technical Permit Modification	☐	$14,400.00
Major NSR or type A State NSR Permit Modification	☐	$50,400.00
Modeling review (outside Major NSR or Type A State NSR)	☐	$7,200.00
Public Hearing at Source's Request	☐	$2,880.00
State MACT Determination	☐	$7,200.00
TOTAL FEES		**$ 0.00**

SUBMIT TWO COPIES OF THE COMPLETED APPLICATION TO:

New or Modified Permits (include fees):	**Permit Renewals (no fees):**
Oregon Department of Environmental Quality Business Office 811 SW Sixth Avenue Portland, OR 97204-1390	Oregon Department of Environmental Quality Air Quality Program, Western Region Office 4026 Fairview Industrial Drive Salem, Oregon 97302

ADMINISTRATIVE INFORMATION

CONTACT LIST

1. Company Information:

Legal Name:	Other company name (if different than legal name):
Oil Re-Refining Company, Inc.	DBA Fuel Processors Inc.

2. Site Contact Person: *(A person who deals with DEQ staff about equipment problems.)*

Name:	Telephone number:
Scott Briggs	503-286-8352
Title:	E-mail address:
President	Scottb@orrcorecycles.com

3. Facility Contact Person: *(If other than the site contact person, a person involved with all environmental issues at the facility although they may be housed at a different site.)*

Name:	Telephone number:
Title:	E-mail address:

4. Mailing Contact Person: *(If other than the site contact person, a person to whom the company would like all agency communications directed.)*

Name:	Telephone number:
Title:	E-mail address:

5. Invoice Contact Person: *(If other than the site contact person, a valid contact information to which invoices and communications related to resolving invoice questions can be directed.)*

Name:	Telephone number:
Title:	E-mail address:

Print Form

FACILITY DESCRIPTION

FORM AQ102
INSTRUCTIONS

State of Oregon Department of Environmental Quality

Instructions

1. Provide a text description of the facility processes. In describing the facility and in preparing the permit application, the applicant should always remember that the permit should be written to cover the facility as it will operate for the future permit term. A permit term is five or ten years depending on the type of permit issued. Providing information on future operations now may prevent the need for the additional cost of permit modifications in the future. The applicant should provide the information requested below.

   - A description of the current processes that emit air pollutants;
   - The fuels used and products produced in these processes;
   - If this application is for a permit modification, a discussion of the proposed modification;
   - If this application is for a renewed ACDP, a description of any anticipated modifications to the facility's existing processes during the pending permit term that the ACDP will need to address; and
   - If this application is for an initial or renewed ACDP, a description of any anticipated construction at the facility during the pending permit term that the ACDP will need to address.

2. Attach a plot plan showing the location of all stacks and vents though which regulated pollutants are released to the atmosphere.

3. Attach a process flow diagram which shows the air pollutant emitting processes at the facility. The applicant should ask the DEQ permit writer about the level of detail that is required. The diagram should illustrate the following:
   - All regulated air pollutant-emitting devices and processes at the facility, labeled with the same identification numbers that the applicant assigned them in Form Series AQ200.
   - Flow routes of contaminated air from processes to emission control equipment and emission points.
   - All air pollution control devices at the facility, labeled with the same identification numbers that the applicant assigned them in Form Series AQ300.
   - The location of all stacks and vents through which regulated pollutants are released to the atmosphere.
   - Any materials handling activities that emit regulated pollutants (e.g., loading crushed rock, storage piles, etc.) not addressed in a Device/Process Form (series AQ200).
   - Any fuel storage and piping systems on the facility property.

4. Attach a city map or drawing showing the facility location, property lines and its relation to nearby (i.e., within 1 mile) sensitive receptors such as residential areas, hospitals, schools, etc. If the facility is located in a rural area, the applicant should note distances on approaching roads and also mark the location of landmarks.

FACILITY DESCRIPTION

State of Oregon Department of Environmental Quality

Facility Name: Oil Re-Refinig Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

1. Description of facility and processes:

See Attached

2. Attach plot plan.

3. Attach process flow diagram.

4. Attach a city map or drawing showing the facility location.

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The oil recycler.

AQ-102 ATTACHMENT

The facility was built in 1984 and recycles used oil and related products. ORRCO accepts and processes used oil, oil filters, spent antifreeze, fuels and spent fuels, oily water, oily solids, and used oil spill cleanup material.

The permittee operates a used oil reprocessing and blending facility. There are four fuel burning sources and three existing oil 'cookers' or distillation units that heat the oil to 250 degrees Fahrenheit to remove the water and fuel. The water and fuel are condensed and recovered in a receiver tank. The four sources are heater #9, heater #10, heater #11 and a 75hp steam boiler. The steam is used to heat various processes throughout the plant. The primary source of VOCs is the bubble condenser that all three cookers vent to.

There are five additional permit modifications. The attached diagram titled 'proposed air permit modifications 1 through 5' shows where the modifications are connected in the existing process. The numbers are in order of construction and installation. A description of each is below:

1. The first modification is to change the existing bubble condenser to standard tube and shell condensers. This change is detailed in the NOC applied for and included in the MAO. This change will reduce potential annual VOC emissions from over 30 tons to less than 5 tons without a thermal oxidizer.
2. The second modification will be the addition of a thermal oxidizer (TO) to our existing heater. This system will be supplied by Lundberg and the quote is attached. This will be installed and operational before the remaining modifications are completed. The TO system will have a carbon bypass system that will automatically switch to when the TO fails to operate within parameters. This system will sound an alarm and allow time to shutdown processes if the TO is not operational. The TO will have a minimum temperature of 1400 degrees F with a one second minimum retention time. The discharge from the distillation processes, the rocket during the combustion cycle, The wiped film evaporator (WFE), and the sour water stripper will be connected to the TO. The carbon system will have two carbon drums in series with a sample port between them as a test port. The performance of the first drum can be tested with our four gas meter. When the performance degrades the second drum is placed into the first drums position and a new drum is placed in the second drums position.
3. The Sour Water Stripper (SWS) is a system designed for processing the distillated water from re-refining to remove the VOCs, mercaptans, alcohols and light fuel product emulsified in the water. The system operates below the boiling temperature of water and the vapor goes directly into the TO for destruction. The stripped water goes to water treatment for further processing.

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4. There are several parts to item #4 including the membrane system with the catalyst distillation, the rocket clay polishing system, and the wiped film evaporator. All these systems are heated with the existing heater capacity.

   The Membrane system is a Patented Nano filtration system that separates the pure oil from the impurities and asphalt components. This requires the addition of a proprietary catalyst before running through the membrane. The catalyst is removed by distillation and reused. The membrane has a permeate and a reject component. The permeate is the extracted oil and the reject is the flux. Both go through a distillation process to remove the catalyst. The permeate goes to the rocket for final polishing and the reject goes to the WFE to extract the remaining base oil from the asphalt.

   The rocket clay polishing system consists of several columns filled with activated bauxite media. The system has two cycles, Polish and Reactivation. During the polish cycle the permeate or base oil from the WFE is pumped into the columns and the bauxite absorbs the color bodies and some of the metals. When the bauxite media is saturated and no longer has the ability to improve the oil the system goes to the reactivation cycle. Reactivation starts with a forced drain down where the vacuum blower draws air through the columns draining out most of the oil, preparing for combustion by having an air flow through the bauxite. Electric band heaters are then turned on and the remaining oil in the media starts to burn. This is a controlled burn by varying the amount of air. The columns burn like a giant cigar, there is a band of heat moving down the column over 24 hours. During the regeneration cycle oil continues to drain and is recovered. After the cool down period the bauxite is ready for polishing again. The bauxite can be regenerated hundreds of times.

   The Wiped Film Evaporator (WFE) is the final component of the re-refining process and consists of a high temperature flash tank (500 degrees F) feeding a 1.8 square meter WFE under high vacuum. This system is the industry standard for making base oil and is needed to make a quality asphalt from the reject of the membrane.

5. Trans-mix distillation and diesel recovery system. This is another distillation process to remove the gasoline from diesel and recover both products. The distilled fuel from the RFO cooking process is also recovered through this second distillation.

DEQ
State of Oregon Department of Environmental Quality

NOTICE OF INTENT TO CONSTRUCT

FORM AQ104
ANSWER SHEET

FOR DEQ USE ONLY	
Permit Number:	Regional Office:
Application No:	Date Received :

1. Source Number: 26-3048-ST-01	
2. Company	**3. Facility Location**
Legal Name: Oil Re-Refining Company, Inc	Name: Same
Ownership type: Privately Owned	Plant start date:
Mailing Address: 4150 N Suttle Road	Street Address: Same
City, State, Zip Code: Portland, OR 97217	City, County, Zip Code: Same
4. Number of Employees (corporate):	Number of Employees (plant site):

5. Facility Contact Person	**6. Industrial Classification Code(s)**
Name: Scott Briggs	SIC: 5093 / 1799
Title: Principal	NAICS: 423930 / 562910
Phone number: 503-286-8352	**7. Type of construction/change:** (see instructions)
Fax number:	Type 1
e-mail address: scottb@orrco.biz	

8. Signature

I certify that the information contained in this notice, including any schedules and exhibits attached to the notice, are true and correct to the best of my knowledge and belief.

Scott Briggs — Name of official (Printed or Typed)

Principal — Title of official and phone number

Scott Briggs — Signature of official

3-24-17 — Date

Construction Information

9. Description of proposed construction:

See Attached.

10. Will the construction increase the capacity of the facility? No If yes, how much?

11. Will the construction increase pollutant emissions? No If yes, how much (see question 19) ?

12. Will the construction cause new pollutant emissions? No If yes, which pollutants and how much?

13. Estimated timing of construction.

a. Commence date: 4/15/17
b. Begin date: 5/15/17
c. Completion date: 9/15/17

14. Will tax credits be requested once construction is completed? NO

15. Attach relevant forms from Form Series AQ200, Device/Process Forms.

16. Attach relevant forms from Form Series AQ300, Control Device Description Forms, if applicable.

17. Attach process flow diagram.

18. Attach a city map or drawing showing the facility location.

19. If applicable, attach a Land Use Compatibility Statement.

Emissions Data

20. Pre-and Post-Construction emissions summary data

a. Emissions Point	b. Pollutant	c. Pre-Construction Emissions		d. Post-Construction Emissions	
		short-term (specify unit)	Annual (tons/year)	short-term (specify unit)	Annual (tons/year)
Cooker conversi	VOC's		31.7		4.2
Kiln & Scrubber	PM		0.7		0.0
	PM10		0.6		0.0
	PM2.5		0.5		0.0
	SO2		2.0		0.0
	NOx		5.2		0.0
	VOC		2.1		0.0
	CO		1.4		0.0
One Rocket Filte	SO2		0.0		0.385
All other emissio					

SUBMIT TWO COPIES OF THE COMPLETED NOTICE OF INTENT TO CONSTRUCT TO THE DEPARTMENT REGIONAL OFFICE SHOWN BELOW:

Oregon Department of Environmental Quality
Northwest Region
700 NE Multnomah Street, Suite 600
Portland, OR 97232

ROCKET FIZED

ALS Tribology

UIN 03C29BD

Oil

Unit No. TK68

Unit:
Make FIZED
Model
Serial No.

Site

Compartment:
Name Oil
Make
Model
Serial No.
Capacity:

Customer:

PETROLUBE
4150 North Suttle Rd
Portland OR 97217
USA

DIAGNOSIS

No interpretation of results provided. Sample run for test data only.

ANALYST: Stan.Leitz

Normal

LEGEND

Severe | Abnormal | Caution | Normal

Solutions for Performance

DATE SAMPLED	12-May-14
DATE RECEIVED	13-May-14
DATE REPORTED	13-May-14
LAB NO.	40110415264
SIF NO.	15442486
TIME ON UNIT	
TIME ON OIL	
OIL BRAND	Unidentified
OIL TYPE	Unidentified
OIL GRADE	Unidentified
OIL ADDED	
FILTER	Not Applicable
OIL CHANGED	
WO NUMBER	
Metals (ppm)	
Iron (Fe)	9
Chromium (Cr)	<1
Lead (Pb)	35
Copper (Cu)	21
Tin (Sn)	<1
Aluminium (Al)	<1
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	<1
Contaminants (ppm)	
Silicon (Si)	18
Sodium (Na)	<1
Potassium (K)	<5
Additives (ppm)	
Magnesium (Mg)	6
Calcium (Ca)	40
Barium (Ba)	<1
Phosphorus (P)	399
Zinc (Zn)	204
Molybdenum (Mo)	<1
Boron (B)	<5
Contaminants	
Water (%)	<0.05
Physical Tests	
Viscosity (cSt 40C)	24.2
PQ Index	<10
Solids (%)	<0.1
Physical / Chemical	
Sulfur (D4294/D5453/D7039)	1573
Additional	
Same Day Service	Yes

ROCKET POLISHED OIL

ALS Tribology

UIN 03C4022

Oil

Unit No. Permeate Rocket 50 G

Unit:
Make
Model
Serial No.

Site

Compartment:
Name Oil
Make
Model
Serial No.

Capacity: 50.0 gal

Customer:

PETROLUBE
4150 North Suttle Rd
Portland OR 97217
USA

DIAGNOSIS

No interpretation of results provided. Sample run for test data only.

ANALYST: Stan.Leitz

Normal

LEGEND

Severe | Abnormal | Caution | Normal

Solutions for Performance

DATE SAMPLED	13-May-14
DATE RECEIVED	15-May-14
DATE REPORTED	16-May-14

LAB NO.		40110416456
SIF NO.		15459984
TIME ON UNIT		
TIME ON OIL		
OIL BRAND		Unidentified
OIL TYPE		Unidentified
OIL GRADE		Unidentified
OIL ADDED	gal	
FILTER		Not Applicable
OIL CHANGED		
WO NUMBER		

Metals (ppm)	
Iron (Fe)	3
Chromium (Cr)	<1
Lead (Pb)	<1
Copper (Cu)	2
Tin (Sn)	2
Aluminium (Al)	2
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	<1
Contaminants (ppm)	
Silicon (Si)	5
Sodium (Na)	<1
Potassium (K)	<5
Additives (ppm)	
Magnesium (Mg)	<1
Calcium (Ca)	6
Barium (Ba)	<1
Phosphorus (P)	<1
Zinc (Zn)	14
Molybdenum (Mo)	<1
Boron (B)	<5
Contaminants	
Water (%)	<0.05
Physical Tests	
Viscosity (cSt 40C)	22.4
PQ Index	<10
Solids (%)	<0.1
Physical / Chemical	
Sulfur (D4294/D5453/D7039)	374
Additional	
Same Day Service	Yes

ALS Tribology

UIN 03C45AD

Oil

Unit No. Rocket Waste Tank 76

Unit:
Make
Model
Serial No.

Site

Compartment:
Name Oil
Make
Model
Serial No.

Capacity:

Customer:

PETROLUBE
4150 North Suttle Rd
Portland OR 97217
USA

DIAGNOSIS

No interpretation of results provided. Sample run for test data only.

ANALYST: Stan.Leitz

Normal

LEGEND

Severe | Abnormal | Caution | Normal

Solutions for Performance

DATE SAMPLED	15-May-14
DATE RECEIVED	16-May-14
DATE REPORTED	16-May-14
LAB NO.	40110416526
SIF NO.	15462829
TIME ON UNIT	
TIME ON OIL	
OIL BRAND	Unidentified
OIL TYPE	Unidentified
OIL GRADE	Unidentified
OIL ADDED	
FILTER	Not Applicable
OIL CHANGED	
WO NUMBER	
Metals (ppm)	
Iron (Fe)	14
Chromium (Cr)	<1
Lead (Pb)	85
Copper (Cu)	22
Tin (Sn)	1
Aluminium (Al)	<1
Nickel (Ni)	<1
Silver (Ag)	<1
Titanium (Ti)	<1
Vanadium (V)	1
Contaminants (ppm)	
Silicon (Si)	19
Sodium (Na)	<1
Potassium (K)	<5
Additives (ppm)	
Magnesium (Mg)	6
Calcium (Ca)	30
Barium (Ba)	<1
Phosphorus (P)	457
Zinc (Zn)	74
Molybdenum (Mo)	1
Boron (B)	11
Contaminants	
Water (%)	0.11
Physical Tests	
Viscosity (cSt 40C)	16.3
PQ Index	<10
Solids (%)	<0.1
Physical / Chemical	
Sulfur (D4294/D5453/D7039)	1833

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Attachment A

Notice of Intent to Construct Description 3/24/17

ORRCO is planning on the following changes to our process. These changes will reduce our VOC emissions. We would like to start implementing these changes immediately upon approval. The specific changes are:

1. Replace the bubble condenser with standard tube and shell heat exchangers/condensers on the three existing cookers: #9, #10, and #11.
2. Change the three cookers from batch to continuous flow (no change in PTE).
3. Remove the Kiln and Scrubber.
4. Install a single column rocket for testing and data acquisition for our permit renewal.

Replace Bubble Condenser:

The existing bubble condenser is the largest source of VOCs in our permit. The vapors from cooker tanks #9, #10 and #11 are condensed in the bubble tank. We propose replacing it with three separate shell and tube condensers, one on each cooker. These condensers would each have a separate receiver to collect the light distillates and water. The vent from these receivers will vent to atmosphere like to bubble condenser except the vapor stream will not flow through the liquid reducing the VOCs emitted. The emission data shows no change as a conservative worst case. There will be additional reductions from the increased efficiency of the continuous flow conversion below. Attached are process flow diagrams of the existing cookers and of the proposed condenser changes.

Change the three cookers from batch to continuous flow:

The three cookers are currently batch processes. We fill the cook tank, heat it (250 degrees F. typically), then transfer the cooked oil to a storage tank. There are many benefits to a continuous flow cooker: it is much more efficient by using the heat of the cooked oil as it exits to preheat the oil feeding into the cooker. This reduces emissions by burning less fuel. The feed rate can vary depending on the production needs but the PTE is not increased because the maximum cooking capacity is not increased.

Remove the Kiln and Scrubber:

We will reduce emission by no longer burning products in the kiln and removing the water scrubber.

Install a single column rocket:

ORRCO has a single column oil polishing system (Rocket) and we propose installing for testing and data acquisition. This would allow a more accurate calculation for our permit renewal as well as providing verified data for emissions.

We look forward to working with you, completing these improvements, and finalizing our air permit renewal. Please let me know if you have any questions and require additional information.

Scott Briggs

A: 4150 N. Suttle Road * Portland, OR 97217 P: 503.286.8352 F: 503.286.5027 W: www.orrco.biz

MISCELLANEOUS PROCESS OR DEVICE

Facility Name: Oil Re-Refining Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

Process Information

1. ID Number	Rocket 1
2. Descriptive name	Rocket regenerative clay polish system
3. Existing or future?	Future
4. Date commenced	April 2017
5. Date installed/completed	TBD
6. Description of process:	
See attached AQ230 #1	

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Base oil or permeate oil	36,000	Gallons/week	1,872,000	Gallons
Products				
Polished oil	33,480	Gallons/Week	1,740,960	Gallons

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

TO-1

State of Oregon Department of Environmental Quality

MISCELLANEOUS PROCESS OR DEVICE — **FORM AQ230 ANSWER SHEET**

Facility Name: Oil Re-Refining Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

Process Information

1. ID Number	WFE-1
2. Descriptive name	Wiped Film Evaporator #1
3. Existing or future?	Future
4. Date commenced	September 2017
5. Date installed/completed	TBD
6. Description of process:	
See attached AQ230 #2	

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Used Oil	60,000	Gallons/week	3,120,000	Gallons
Products				
Base Oil	45,000	Gallons/Week	2,340,000	Gallons
Asphalt Flux	9,000		468,000	
Fuel Distilate	4,200		218,400	
Water	1,800		93,600	

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

TO-1

Facility Name: Oil Re-Refining Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

Process Information

1. ID Number	FT 1 to 5
2. Descriptive name	Flash Tank distillation units 1 to 5
3. Existing or future?	Future
4. Date commenced	April 2017
5. Date installed/completed	TBD
6. Description of process:	
See attached AQ230 #3	

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Used oil Permeate & Heptane	30,000	Gallons/week	1,560,000	Gallons
Used oil membrane reject & Heptane	5,000		260,000	
Transmix	30,000		1,560,000	
Products				
Base oil	15,000	Gallons/Week	780,000	Gallons
Reject Flux	15,000		780,000	
Gasoline	20,000		1,040,000	
Diesel	10,000		520,000	

12. Control devices(s) (yes/no)	Yes
If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).	
TO-1	

State of Oregon Department of Environmental Quality

MISCELLANEOUS PROCESS OR DEVICE

FORM AQ230
ANSWER SHEET

Facility Name: Oil Re-Refining Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

Process Information

1. ID Number	SWS-1
2. Descriptive name	Sour Water Stripper
3. Existing or future?	Future
4. Date commenced	April 2017
5. Date installed/completed	TBD
6. Description of process:	
See attached AQ230 #4	

Operating Schedule

7. Seasonal or year-round?	Year-round
8. Batch or continuous operation?	Continuous
9. Projected maximum hours/day	24
10. Projected maximum hours/year	8760

11. Process/device capacity:	Short term capacity		Annual usage	
Raw materials	Amount	Units	Amount	Units
Emulsified Distillate Water from used oil process	20,000	Gallons/week	1,040,000	Gallons
Products				
VOC Stripped Water	19,400	Gallons/Week	1,008,800	Gallons

12. Control devices(s) (yes/no) Yes

If yes, provide the ID number and complete and attached the applicable series AQ300 form(s).

TO-1

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ATTACHMENT

AQ-230 #1

The rocket clay polishing system consists of several columns filled with activated bauxite media. The system has two cycles, Polish and Reactivation. During the polish cycle the permeate or base oil from the WFE is pumped into the columns and the bauxite absorbs the color bodies and some of the metals. When the bauxite media is saturated and no longer has the ability to improve the oil the system goes to the reactivation cycle. Reactivation starts with a forced drain down where the vacuum blower draws air through the columns draining out most of the oil, preparing for combustion by having an air flow through the bauxite. Electric band heaters are then turned on and the remaining oil in the media starts to burn. This is a controlled burn by varying the amount of air. The columns burn like a giant cigar, there is a band of heat moving down the column over 24 hours. During the regeneration cycle oil continues to drain and is recovered. The combustion gases go to the thermal oxidizer. After the cool down period the bauxite is ready for polishing again. The bauxite can be regenerated hundreds of times.

AQ-230 #2

The Wiped Film Evaporator (WFE) system consists of a high temperature flash tank (500 degrees F) that is similar to all the other distillation units except the higher temperature removes the diesel from the base oil. The flash tank feeds a 1.8 square meter WFE under high vacuum. The WFE is a jacketed heated column with a mechanical wiping system that spreads the oil into a thin film on the internal hot surface allow it to evaporate very fast. There is an internal condenser that re-condenses the oil immediately. The non-condensable portion is the asphalt flux. This system is the industry standard for making base oil and also makes quality asphalt from the reject of the membrane system.

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ATTACHMENT

AQ-230 #3

There are five flash tank distillation units in addition to the three oil cookers and the WFE flash tank. They all operate on the same process of heating the product to boil off the distillate and re-condensing the distillate. Most operate under vacuum creating a lower boiling temperature and allowing the vapor stream to be directed to the thermal oxidizer (TO) through the vacuum pump discharge piping. Four of the distillation units are used in the membrane process. The membrane filter system is not an air contaminate source on its own since it is a sealed filtration unit. However it requires the addition of a catalyst to lower the viscosity of the oil allowing the permeate to pass through the membrane leaving contaminates and flux behind in the reject. The catalyst is then removed through distillation and reused. Four of the five distillation units are used for this, two stages for the permeate and two for the reject. The fifth unit is used to process transmix (transmix is a mixture of fuels usually diesel and gasoline) and fuel distillate from the used oil cookers. It separates the diesel from the gasoline to be reused as fuel.

AQ-230 #4

The Sour Water Stripper (SWS) is a system designed for processing the distillated water from re-refining to remove the VOCs, mercaptans, alcohols and light fuel product emulsified in the water. The system operates below the boiling temperature of water and the vapor goes directly into the TO for destruction. The stripped water goes to water treatment for further processing.

A: 4150 N. Suttle Road * Portland, OR 97217 P: 503.286.8352 F: 503.286.5027 W: www.orrco.biz

MISCELLANEOUS CONTROL DEVICE INFORMATION

FORM AQ307 ANSWER SHEET

Facility Name: Oil Re-Refining Company, Inc., DBA Fuel Processors, Inc. Permit Number: 26-3048

1.	Control Device ID	TO-1
2.	Process/Device(s) Controlled	Provideds VOC destruction for all plant distilation units, Rocket system, Sour Water Stripper, and Wiped Film Evaporator.
3.	Year installed	Projected 2017-2018
4.	Manufacturer/Model No.	Lundberg
5.	Control Efficiency (%)	99%
6.	Design inlet gas flow rate (acfm)	340
7.	Design parameter(s)	Minumum 1400 F for 1 second, see attached
8.	Inlet gas pretreatment? (yes/no) If yes, list control device ID and complete a separate control device form	no
9.	Describe the control device	
	Thermal Oxidizer and bypass carbon filter. See attached desciption.	

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AQ-307 ATTACHMENT

The second modification will be the addition of a thermal oxidizer (TO) to our existing heater. This system will be supplied by Lundberg and the quote is attached. The TO system will have a carbon bypass system that will automatically switch to when the TO fails to operate within parameters. This system will sound an alarm and allow time to shutdown processes if the TO is not operational. The TO will have a minimum temperature of 1400 degrees F with a one second minimum retention time. The discharge from the distillation processes, the rocket during the combustion cycle, The wiped film evaporator (WFE), and the sour water stripper will be connected to the TO. The carbon system will have two carbon drums in series with a sample port between them as a test port. The performance of the first drum can be tested with our four gas meter. When the performance degrades the second drum is placed into the first drums position and a new drum is placed in the second drums position.

A: 4150 N. Suttle Road * Portland, OR 97217 P: 503.286.8352 F: 503.286.5027 W: www.orrco.biz

LUNDBERG

13201 Bel-Red Road
Bellevue, Washington 98005
tel: 425.283.5070
fax: 425.283.5081

December 9, 2016

Reference: P-165641

Attention: Mr. Scott Briggs

Subject: Thermal Oxidizer

Oil Re-Refining Company
4150 N Suttle Rd.
Portland, OR 97217

Mr. Briggs:

We are pleased to submit a proposal for the supply of a thermal oxidizer system for the Oil Re-Refining Company in Portland, Oregon. The proposed system will treat the VOC-laden vent gas and exhaust into an existing heat recovery system.

Lundberg has established a reputation for quality, performance, and expertise. This background and experience has been utilized in preparing this proposal to meet your particular requirements.

If you have any questions after reviewing this proposal, please call me at (425) 283-5070, or our representative in your area, Mr. Paul Sicurezza of the Brad Thompson Company in Bellevue, WA at (360) 635-7005. A personal visit with you and/or your staff to discuss our proposal may also be arranged.

We appreciate the opportunity to present this proposal and look forward to your favorable consideration.

INTRODUCTION

The home office of Lundberg is located in Bellevue, Washington, with satellite offices in Monroe, Louisiana; Jacksonville, Florida; and Old Saybrook, Connecticut. Lundberg serves the European market through our wholly owned subsidiary A.H. Lundberg Systems, S.L. located in Bilbao, Spain. Throughout the rest of the world, we are represented by independent agents. Since the founding of A.H. Lundberg Associates nearly 40 years ago, Lundberg has grown from a supplier of peripheral process systems within the pulp and paper industry to become a leading supplier of environmental, evaporation, chemical processing, and energy efficiency solutions to a wide variety of industries including pulp and paper, wood products, green energy, biomass, chemical, mining, and others. Continuous involvement in a limited area permits us to offer specialized services resulting in up-to-date technology.

Lundberg has provided several thermal oxidizers to the pulp and paper and chemical processing industries. We have included our reference list for incinerators, attached under separate cover.

PROCESS DESCRIPTION

The proposed system is designed to thermally treat the VOC-laden waste steam generated from the oil re-refining process. To meet your environmental regulation requirements, the system has been designed to operate at a temperature of 1400°F with a retention time of one (1) second at nominal operating conditions.

The proposed incinerator consists of horizontal combustion chamber designed for efficient gas mixing. The chamber is lined with insulating fire brick. We have included a transition flange to connect to your existing waste heat recovery system. The outlet nozzle is also brick lined. Note that, because of the small chamber dimensions, an access door is not included on the chamber.

The proposed burner system has been designed to provide the maximum turn down feasible to match the relatively low flow of inlet gas. Combustion air will be preset for start-up and nominal operating conditions. The supplied fan will be shipped loose and will require piping in the field. Support fuel has been taken to be refined recycled No.2 fuel oil. An additional propane pilot is required for the burner, a five-gallon (5-gallon) bottle will last a year or more.

The BMS and combustion control panel will be wired to an assembled fuel oil train and propane gas pilot train. The control panel will be housed in a NEMA 4 wall mount and has a Honeywell display with first out annunciator.

DESIGN BASE

THERMAL OXIDIZER	
Inlet Dry Gas Flow Rate:	152 lbs/hr at 70°F
Inlet VOC Loading	
Acetone:	500 ppm
Benzene:	500 ppm
MEK:	150 ppm
Carbon Disulfide:	170 ppm
Chloroethane:	36 ppm
MIBK:	37 ppm
Toluene:	610 ppm
Xylene:	27 ppm
Carbonyl Sulfide:	1,300 ppm
Hydrogen Sulfide:	2,600 ppm
Methyl Mercaptan:	640 ppm
Refined Recycled No. 2 Fuel Oil Consumption:	1.0 gal/hr at 10 psig (Nominal)
Outlet Gas Flow to Heat Recovery:	340 ACFM at 1,400°F (Nominal)

PROPOSED SUPPLY

ITEM	QUANTITY	DESCRIPTION
1	One (1) lot	**Process Engineering,** including: a. Piping and instrumentation diagrams b. Customer vessel drawings c. Instrument and control valve specifications d. Operation and maintenance manual
2	One (1) only	**Oxidizer Chamber** – 30 in. OD by 62 in. T/T; CS shell per API-650 with brick lining; CS support saddles; flanged outlet connection; high temperature paint on all exposed CS surfaces.
3	One (1) only	**Burner** – Maxon Kinemax; Maximum 1 MMBtu/hr; 28.6:1 turndown; includes propane pilot ignitor, 6000 V ignition transformer, and UV flame scanner.
4	One (1) only	**Combustion Air Fan** – 81 SCFM at 28 inH_2O; includes inlet venturi, auto combustion air balance valve, manual atomizing air balance valve and 1 HP (preliminary) motor.
5	One (1) only	**BMS and Combustion Control Panel** – NEMA 4 wall mount; Honeywell S7800A display with first out annunciator.
6	One (1) only	**Propane Gas Plot Train** – Pre-wired and assembled; includes Y strainer, manual shutoff valves, pressure regulator, and safety shutoff valves.
7	One (1) only	**No. 2 Fuel Oil Train** – Pre-wired and assembled; includes oil pre-filter, manual shut off valves, pressure switches, safety shutoff valves, and pressure regulator.

WORK BY OTHERS

Receipt and safe storage of all material and equipment at the job site.
Preparation of all equipment foundations.
Installation of instruments and connections.
Supply of instruments and control valves (except as noted).
Supply of process piping and hand valves (except as noted).
Supply of service, steam, condensate piping, and valves.
Supply of electric motors and starters (except as noted).
Supply of all thermal insulation.
Field erection and installation of all equipment and piping.
All electrical work and wiring.
Field paint and painting.
System clean-out prior to start-up.
Supply of pumps.
Supply of platforms.
Rigging plans for lifting and setting equipment.
Handling of asbestos, lead, or contaminated soils.

TECHNICAL/PROJECT ENGINEER

The services of a technical engineer for purposes of process consultation, system audits, start-up services, training, etc. can be made available at a rate of $1,500.00 per man day (man day being eight (8) hours) or portion thereof, plus expenses at cost. Charges after eight (8) hours will be billed at $210.00 per hour. There is no premium for working weekends; however, travel time to and from the plant site and the normal domicile of the engineer is billed at the daily rate.

Expenses are to include first class food and lodging, travel to and from plant site to lodging, and economy travel to and from project from the normal domicile of the engineer.

MATERIAL AND WORKMANSHIP

We guarantee every part of the apparatus delivered in accordance with this proposal will be of proper material and workmanship, and agree to replace any part or parts which may prove defective in material or workmanship within one (1) year from date of shipment, it being agreed that such replacement is the full extent of our liability in this connection. Scope of supply of such replacement shall be identical to the scope of supply of the original project. Corrosion or wear from abrasion shall not be considered as defective materials. The best engineering practice will always be followed and materials used will be clearly specified. We shall not be held liable or responsible for work done or expense incurred in connection with repairs, replacements, alterations, or additions made, except on our written authority.

VENDOR'S RESPONSIBILITY

In the course of design of processes and/or equipment where the Vendor provides process flow diagrams, layouts, and installation diagrams, it is anticipated that Vendor-furnished design will be followed. Changes in design without written approval of the Vendor will relieve the Vendor of responsibility for performance of the supplied equipment.

DRAWINGS LIMITATION

All Vendor drawings supplied to the customer or his engineer under an order resulting from this proposal will remain the property of the Vendor and are conditionally loaned with the understanding that they will not be copied or used except as authorized by us. Reuse of the designs as shown on the drawings for another project is specifically prohibited.

SECURITY INTEREST

Lundberg reserves the right to request a security interest in the materials provided as a part of this proposal, and Buyer agrees to provide information needed to assist Lundberg in obtaining a security interest and to execute such documents Lundberg reasonably requests to create a security interest. Security interest language is available on request.

CONFIDENTIALITY OF PROPOSAL INFORMATION

This proposal contains confidential information and remains the property of Lundberg, and is conditionally loaned. The information contained herein is not to be shared with any party except those within the Buyer's company who are involved in its evaluation or outside consultants who are assisting the Buyer with this specific project. Specifically prohibited is the distribution of such information to any individual or business deemed to be a competitor by Lundberg.

Sincerely,

Peter Englund

Process Engineer

Lundberg

cc: Mr. Paul Sicurezza, Brad Thompson Company / Bellevue, Washington

Our ultimate capacity will be on the order of 18 – 25 cfm or 110 – 152 lb/hr. 4.5lb/hr of VOCs max. The gasses are at ambient temperature and there is no nitrogen purging.

Composition

We are estimating from 1 – 3% VOC's. From another Oil plant's Vent gas analysis we have the following data:

Acetone	500 ppm
Benzene	500 ppm
MEK	150 ppm
Carbon disulfide	170 ppm
Chloroethane	36 ppm
MIBK	37 ppm
Toluene	610 ppm
Xylenes	27 ppm
Carbonyl Sulfi	1300 ppm
H2S	2600 - 7500 ppm
Methyl Mercaptan	640 ppm

Note that the numbers add up to a range of 0.6 - 1.1% VOCs. The max 3% accounts for uncertainty.

Sincerely,

Jack Valentine

Vice President

D: (360) 210-0515 | F: (360) 335-1663 | C: (503) 709-8420 | E: jack@pce-pbc.com

<image003.png>

Pacific Combustion Engineering – Ponder Burner Company | 3720 S Truman Street, Suite 1 | Washougal, WA 98671 | Main Phone: (360) 335-1443 Website: www.pce-pbc.com

#11 Cooker With Thermal Oxidizer

Distilled Vapors

Cooling Water Out

Heat Exchanger/ Condenser

Cooling Water In

Cooker Tank 250F

Liquid Level

Used Oil Feed In

Flow Control Valve

P11 Circulation Pump

Flow Control Valve

Processed Oil Out

Vent to TOX

Condensed Distillate Receiver

Fuel to tank 52

Recovered Fuel Pump

Water to tank 19

Process Water pump

Stack To Atmosphere

Heater #11+ Thermal Oxidizer 1400F

Thermal Oxidizer

Main Burner

Flame Arrestor

3- way Automatic Vapor Control Valve

Vent to Atmosphere

Test Port

Carbon Barrel #1

Carbon Barrel #2

Steam from Boiler (for heating)

Condensate Return To Boiler

Sour Water In from process water tank

Sour Water Stripper (SWS)

Vent to TO

Stripped Water to water treatment

Recovered Fuel to Fuel blend tank

From # 9 Cooker

From #10 Cooker

From WFE Vacuum system

From Rocket during Re-activation

TITLE: TOX on #11 Cooker with SWS				DRAWN BY:
FILENAME:	SCALE: NTS	SIZE: B	1 OF 6	REVISED: 09/30/16

Hazardous Air Pollutant (HAP)
Emission Detail Sheet

Form AQ403
Answer Sheet

Facility Name: Oil Re-Refining Company, Inc, DBA Fuel Processors, Inc. Permit number: 26-3048

Emission Data

1. Emissions Point	2. Annual Production Rate (apecify units)		3. Pollutant	4. Emission Factor	5. EF reference	6. Annual Emissions (tons/yr)
Oil Burners	913.6	kgal	Arsenic	1.10E-01	AP-42	5.02E-02
			Benzene	2.14E-04	AP-42	9.78E-05
			Cadmium	9.30E-03	AP-42	4.25E-03
			Chromium	2.00E-02	AP-42	9.14E-03
			Cobalt	2.10E-04	AP-42	9.59E-05
			Ethytlbenzene	6.36E-05	AP-42	2.91E-05
			Formaldehyde	3.30E-02	AP-42	1.51E-02
			Lead	1.50E-02	AP-42	6.85E-03
			Manganese	6.80E-02	AP-42	3.11E-02
			Nickel	1.10E-02	AP-42	5.02E-03
			Phenol	2.40E-03	AP-42	1.10E-03
			Acenaphthene	2.11E-05	AP-42	9.64E-06
			Acenaphthylene	2.53E-07	AP-42	1.16E-07
			Anthracene	1.22E-06	AP-42	5.57E-07
			Benz(a)anthracene	4.01E-06	AP-42	1.83E-06
			Benzo(a)pyrene	4.03E-03	AP-42	1.84E-03
			Benzo(b)fluoranthe	1.48E-06	AP-42	6.76E-07
			Benzo(g,h,i)peryler	2.26E-06	AP-42	1.03E-06
			Chrysene	2.38E-06	AP-42	1.09E-06
			Dibenz(a,h)anthrac	1.67E-06	AP-42	7.63E-07
			Fluoranthene	4.84E-06	AP-42	2.21E-06
			Fluorene	4.47E-06	AP-42	2.04E-06
			Indeno(1,2,3-cd)py	2.14E-06	AP-42	9.78E-07
			Naphthalene	1.13E-03	AP-42	5.16E-04
			Phenanthrene	1.05E-05	AP-42	4.80E-06
			Pyrene	4.25E-06	AP-42	1.94E-06
			Octachlorodibenzo-	3.10E-09	AP-42	1.42E-09
			Toluene	6.20E-03	AP-42	2.83E-03
			1,1,2-Trichloroetha	2.36E-04	AP-42	1.08E-04
			Xylene	1.09E-04	AP-42	4.98E-05
Condenser Vents	10,000	kgal	Benzene	3.17E-03	CARB TOG Prof	1.58E-02
			Ethytlbenzene	1.30E-02	CARB TOG Prof	6.52E-02
			Hexane	4.84E-02	CARB TOG Prof	2.42E-01
			Methylene Chloride	6.16E-05	CARB TOG Prof	3.08E-04
			Toluene	1.32E-02	CARB TOG Prof	6.60E-02
			Xylene	1.22E-03	CARB TOG Prof	6.10E-03

Rocket Filtration	1872	Kgal	Arsenic	8.56E-03	AP-42	8.01E-03
			Benzene	1.66E-05	AP-42	1.56E-05
			Cadmium	7.24E-04	AP-42	6.77E-04
			Chromium	1.56E-03	AP-42	1.46E-03
			Cobalt	1.63E-05	AP-42	1.53E-05
			Ethytlbenzene	4.95E-06	AP-42	4.63E-06
			Formaldehyde	2.57E-03	AP-42	2.40E-03
			Lead	1.17E-03	AP-42	1.09E-03
			Manganese	5.29E-03	AP-42	4.95E-03
			Nickel	8.56E-04	AP-42	8.01E-04
			Phenol	1.87E-04	AP-42	1.75E-04
			Acenaphthene	1.64E-06	AP-42	1.54E-06
			Acenaphthylene	1.97E-08	AP-42	1.84E-08
			Anthracene	9.49E-08	AP-42	8.88E-08
			Benz(a)anthracene	3.12E-07	AP-42	2.92E-07
			Benzo(a)pyrene	3.14E-04	AP-42	2.93E-04
			Benzo(b)fluoranthe	1.15E-07	AP-42	1.08E-07
			Benzo(g,h,i)perylen	1.76E-07	AP-42	1.65E-07
			Chrysene	1.85E-07	AP-42	1.73E-07
			Dibenz(a,h)anthrac	1.30E-07	AP-42	1.22E-07
			Fluoranthene	3.77E-07	AP-42	3.52E-07
			Fluorene	3.48E-07	AP-42	3.26E-07
			Indeno(1,2,3-cd)py	1.66E-07	AP-42	1.56E-07
			Naphthalene	8.79E-05	AP-42	8.23E-05
			Phenanthrene	8.17E-07	AP-42	7.65E-07
			Pyrene	3.31E-07	AP-42	3.09E-07
			Octachlorodibenzo-	2.41E-10	AP-42	2.26E-10
			Toluene	4.82E-04	AP-42	4.51E-04
			1,1,2-Trichloroetha	1.84E-05	AP-42	1.72E-05
			Xylene	8.48E-06	AP-42	7.94E-06
Tank vents	25140	kgal	Benzene	2.27E-03	CARB TOG Prof	2.85E-02
			Ethytlbenzene	2.80E-03	CARB TOG Prof	3.52E-02
			Hexane	4.44E-03	CARB TOG Prof	5.58E-02
			Methylene Chloride	1.32E-05	CARB TOG Prof	1.66E-04
			Toluene	2.84E-03	CARB TOG Prof	3.56E-02
			Xylene	5.68E-03	CARB TOG Prof	7.13E-02
Sour Water Stripp	1008.8	kgal	Benzene	4.69E-02	Analysis	2.37E-02
			Ethylbenzene	1.53E-02	Analysis	7.70E-03
			Xylenes	9.51E-02	Analysis	4.80E-02
			Toluene	1.66E-01	Analysis	8.38E-02
Wiped Film Evap	6240	kgal	Acetone	5.69E-02	Analysis	1.78E-01
			Benzene	1.62E-02	Analysis	5.05E-02
			2-Butauone (MEK)	5.98E-03	Analysis	1.87E-02
			Carbon disulfide	9.76E-03	Analysis	3.05E-02
			Chloroethane	3.28E-03	Analysis	1.02E-02
			Ethylbenzene	2.00E-04	Analysis	6.24E-04

			Tetrachloroethene	5.00E-03	Analysis	1.56E-02
			Toluene	3.65E-02	Analysis	1.14E-01
			m,p-Xylene	5.60E-03	Analysis	1.75E-02
			o-Xylene	1.58E-03	Analysis	4.93E-03
			Xylenes	7.20E-03	Analysis	2.25E-02
			Carbonyl sulfide	1.25E-01	Analysis	3.89E-01
			Hydrogn Sulfide	3.15E-01	Analysis	9.82E-01

Emission Point	Pollutant	Preconstruction Emissions Annual tons/yr	Post Construction Emissions Annual Tons/yr
Oil Burners	PM	10.2	11.4
	PM_{10}	8.2	9.1
	$PM_{2.5}$	4.7	5.1
	SO_2	26.5	16.4
	No_x	3.8	4.2
	CO	1	1.1
	VOC	0	0.2
Rotary Burner	PM	2.3	0
	PM_{10}	1.8	0
	$PM_{2.5}$	1	0
	SO_2	6.7	0
	No_x	2.9	0
	CO	0.8	0
	VOC	0	0
Rocket	PM	0	3.7
	PM_{10}	0	3
	$PM_{2.5}$	0	1.7
	SO_2	0	10.8
	No_x	0	1.4
	CO	0	0.4
	VOC	0	0
Condenser Ven	VOC	37	0.1
Water Evap	VOC	1	0
SWS	VOC	0	0.3
WF Evaporator	VOC	0	0.7
Tank Losses		1	1.8
Totals	PM	12.5	15.1
	PM_{10}	10	12.1
	$PM_{2.5}$	5.7	6.8
	SO_2	33.2	27.2
	No_x	6.7	5.6
	CO	1.8	1.5
	VOC	39	3.1
	Total Emissions	108.9	71.4

Process Calculations

Annual Processing of used oil

10,000,000 Gallons

Estimated Constitutents of used oil

Fuel Oil	74%	7,400,000	Gallons
Water	20%	2,000,000	Gallons
Light Ends	6%	600,000	Gallons

Heat Input to Cookers

Energy = Cp*Mp*Gallons*ΔT

Where Cp = Specific Heat In Btu/lb Mp= Mass/gal in Lbs/gallon

Fuel Oil	0.5	Fuel Oil	7.7
Water	1	Water	8.3
Light Ends	0.4	Light Ends	7.8

ΔT= Change of Temperature

Fuel Oil	60	°	to	250	°	=	190 °	=	5413.1 mmBTU
Water	60	°	to	212	°	=	152 °	=	2535.36 mmBTU
Light End	60	°	to	230	°	=	170 °	=	318.24 mmBTU

Required Heat for Cooking 8,267 mmBTU

Heat Input to Heaters in Gallons

Efficency of Heater/Cooker Proces 50%

Requied Heat input 16,533 mmBTU

BTU's per gallon of Fuel (0.1385 mmBTU/gallon 119,375 Gallons

Heat Input for Water Evaporation

Annual Water Evaporation 0 Gallons

Where Cp = Specific Heat In Btu/lb Mp= Mass/gal in Lbs/gallon

Water	1	Water	8.3

ΔT= Change of Temperature

Water	60	°	to	212	°	=	152 °	=	0 mmBTU

Efficency of Evaporation Process 50%

Required Heat input 0 mmBTU

BTU's per gallon of Fuel (0.1385 mmBTU/gallon 0 Gallons

Heat Input for Miscellaneous Processes

28,000 mmBTU

Boiler Efficiency 62%

Requied Heat input 45,161 mmBTU

BTU's per gallon of Fuel (0.1385 mmBTU/gallon 326,074 Gallons

Fuel Requirement for Processing

445,449 Gallons

Emissions from Fuel Oil Burning

Fuel Oil Usage for Heaters/Cookers & Boiler

445,449 Gallons

Percentage of Waste Oil 100%

Emission Factors in lbs/10^3 gal

	Waste Oil	No. 2	
PM	51.2	2	11.4 Tons/yr
PM_{10}	40.8	1	9.1 Tons/yr
$PM_{2.5}$	23.0	0.24	5.1 Tons/yr
SO_2	73.5	71	16.4 Tons/yr
NO_X	19.0	20	4.2 Tons/yr
CO	5.0	5	1.1 Tons/yr
VOC	1.0	0.252	0.2 Tons/yr

Waste Oil EF from AP-42 Table 1.11
No. 2 EF from AP-42 Table 1.3

Emissions from Rocket Tube Filtration System

Maximum Process Throughput 1,872,000 Gallons

Emission Factors in lbs/10^3 gal

PM	3.98	3.7 Tons/yr
PM_{10}	3.17	3.0 Tons/yr
$PM_{2.5}$	1.79	1.7 Tons/yr
SO_2	11.56	10.8 Tons/yr
NO_X	1.48	1.4 Tons/yr
CO	0.39	0.4 Tons/yr
VOC	0.08	0.1 Tons/yr

Emissions from Water Evaporation

Annual amount of water Evaporated 0 Gallons

VOC Emission Factor in lbs/10^3 ga 0.83 0.0 Tons/yr
From analysis and Material Balance

Emissions from Condensers

Annual Used Oil Processed 10,000,000 Gallons

VOC Emission Factor in lbs/10^3 ga 0.44 2.2 Tons/yr
From Emission Estimation Technique Manual for Oil Recycling
Environment Australia December 1999 pg 13
(53 kg/ML x 3.78 L/gal x 2.2 lbs/kg) x 1000

Emissions from Tanks

Annual Tank Throughput 38,103,000 Gallons

Emissions	1.8 Tons/yr

Emissions figured using AP-42 and Mass Balance Equations

Total Emissions

PM	15.1 Tons/yr
PM_{10}	12.1 Tons/yr
$PM_{2.5}$	6.8 Tons/yr
SO_2	27.2 Tons/yr
NO_X	5.6 Tons/yr
CO	1.5 Tons/yr
VOC	4.3 Tons/yr

Emission Calculations for Rocket Regenerateable Clay Polish Unit

Emission Calculations for Sulfur
Test with 900 gallons was conducted. The input stock was 0.1423% S at the end of the run, the recovered oil 790 gallons of 0.0555% S, the recovered waste oil was 40 gallons at .1833% S
Lost up the stack (900x6.71x0.001423)-(790x6.71x0,000555)-(40x6.71x0.001833)= 5.19lbs S per 900gallons cleaned. Or 5.76/1000 gallons processed
95% of the sulfur will combine with oxygen and form SO2. So 5.76 lbs of S produces 11.5 lbs of SO2/1000 gals processed.

Esitmate of how much oil is processed through the Rocket tubes on a weeekly and annual basis;

6000 gal/6 tube set X 6 tube sets x 1 regeneration per 6 tube set / week = 36,000 gallons/week
36,000 gallons/week X 52 weeks/ year = 1,872,000 gallons /year

Estimate of how much oil is burn out of the rocket tubes per generation cycle on a weekly and annual basis

If 70 gallons of oil is lost for every 900 gallons processed Then assuming.
When processing 1,872,000 gallons, 7.8% or145,600 gallons would be consumed.

EMISSION CALCULATIONS

Source: Rocket Tube Oil Filtration System

Pollutant	Amount of Fuel Burned (Gallons)	Emission Factors (lbs/1000 gal)	Reference	Emissions (lbs/yr)	RPO EF
PM	145,600	51.2	AP-42	7454.7	3.98
PM_{10}	145,600	40.8	AP-42	5940.5	3.17
$PM_{2.5}$	145,600	23.0	FIRE	3354.6	1.79
NO_X	145,600	19.0	AP-42	2766.4	1.48
CO	145,600	5.0	AP-42	728.0	0.39
VOC	145,600	1.0	AP-42	145.6	0.08

The following calculations were used to determine the uncontrolled annual $PM/PM_{10}/PM_{2.5}$ and SO2
Conservatively assume $PM/PM_{10}/PM_{2.5}$ and SO_2 "burn out " emissions are equivalent to the combustion of

Pollutant	Rocket Processed OIL (Gallons)	Emission Factors (lbs/1000 gal)	Reference	Uncontrolled Emissions (tons/yr)
PM	1,872,000	3.98	See above	3.727
PM_{10}	1,872,000	3.17	See above	2.970
$PM_{2.5}$	1,872,000	1.79	See above	1.677
SO_2	1,872,000	11.56	See Calculations	10.820
NO_X	1,872,000	1.48	See above	1.383
CO	1,872,000	0.39	See above	0.364
VOC	1,872,000	0.08	See above	0.073

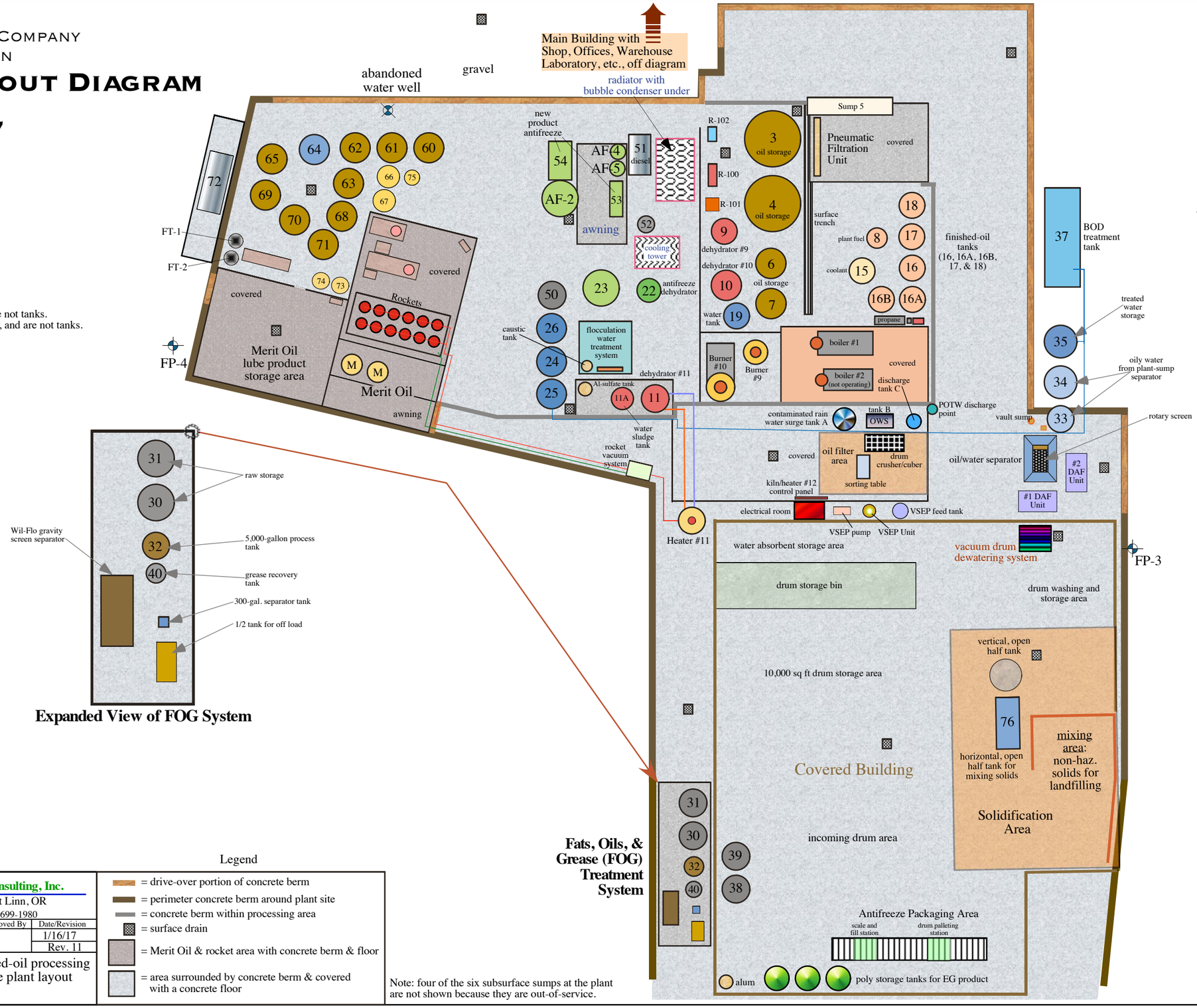
OIL RE-REFINING COMPANY
PORTLAND, OREGON

PLANT LAYOUT DIAGRAM

JANUARY 2017

Orrco™
The oil recycler.

Notes:
FT-1 and FT-2 are evaporators, and are not tanks.
R-100, R-101, and R-102 are receivers, and are not tanks.



Expanded View of FOG System

Fats, Oils, & Grease (FOG) Treatment System

Legend

- = drive-over portion of concrete berm
- = perimeter concrete berm around plant site
- = concrete berm within processing area
- = surface drain
- = Merit Oil & rocket area with concrete berm & floor
- = area surrounded by concrete berm & covered with a concrete floor

Coles Environmental Consulting, Inc.
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Schematic Diagram: No Scale	Approved By	Date/Revision
		1/16/17
		Rev. 11

Figure 2. Oil Re-Refining Co. used-oil processing facility: closeup view showing the plant layout and key plant components

Note: four of the six subsurface sumps at the plant are not shown because they are out-of-service.

Note: Locations of site features are approximate.

Process Flow Diagram for the ORRCo Water Treatment System

Orrco™ The oil recycler.

Distillate Water from Plant's Petroleum-Fluids Process

rotary screen unit

solids

screened water

DAF Unit #3

solids

to chemical treatment

VSEP (nano-filtration) Unit

concentrate

permeate

to VSEP treatment

VSEP feed tank

Distillate Water

35

DAF Unit #1

solids

Settling Tanks

24

25

26

(alum/NaOH)

trucks deliver oily disillate water (B)

half tank

recovered oil

recovered oil

Guard Tanks

3

4

planned

see process diagram

Tank 11A

concentrate to distillation

sludge/solids/flocs

trucks deliver oils and oily water (B)

Sump/OWS

33

34

recovered oil

recovered oil

optional path to the WilFlo table

solids feed

trucks deliver oily water (B)

19

recovered oil

Process Water

filtered water

Vacuum Drum Filter

WILFLOW

solids to landfill after HW analyses

BOD aeration

37

Final Treatment

optional H_2O_2 treatment

DAF Unit #2

filter

Gallons

water meter

process water sampling port

process water discharge to POTW

Note: simplified schematic process-flow diagram only. Components are not to scale. Please see Applicable Environmental Regulation Matrix.

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Schematic Diagram	Approved By	Date/Revision
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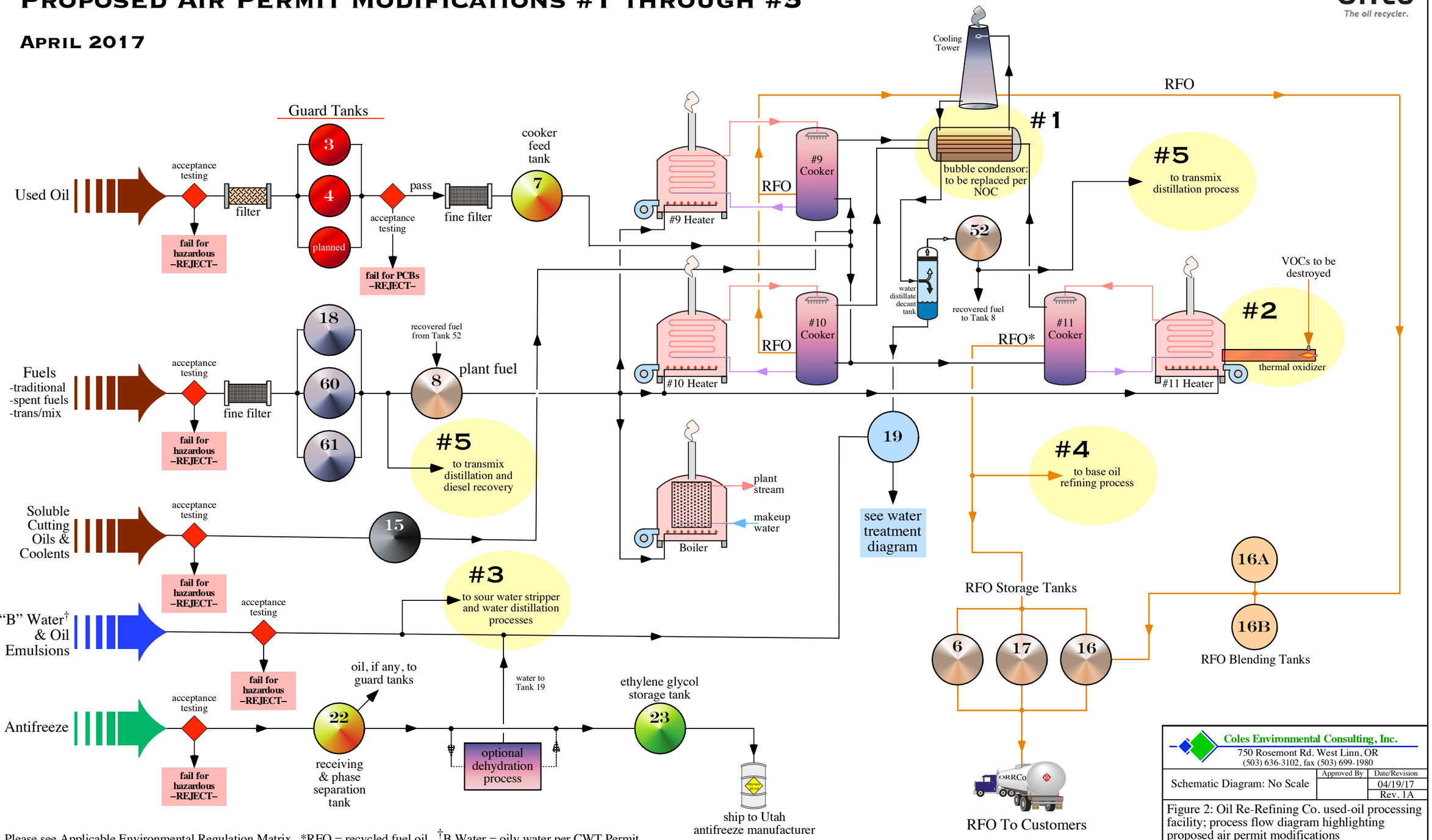
		Rev. 12

Figure 1. Process flow diagram for ORRCo's waste-water treatment system.

OIL RE-REFINING COMPANY
PORTLAND, OREGON

PROPOSED AIR PERMIT MODIFICATIONS #1 THROUGH #5

APRIL 2017



Please see Applicable Environmental Regulation Matrix. *RFO = recycled fuel oil. †B Water = oily water per CWT Permit.

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Schematic Diagram: No Scale	Approved By	Date/Revision
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		Rev. 1A

Figure 2: Oil Re-Refining Co. used-oil processing facility; process flow diagram highlighting proposed air permit modifications