

Lane Regional Air Protection Agency Simple Air Contaminant Discharge Permit

Review Report

OR-CAL, Inc.

29454 Meadowview Road Junction City, Oregon 97448 https://orcalinc.com/

Source Information:

Primary SIC	2879 – Pesticides and	
	Agricultural Chemicals	
	325320 – Pesticide and Other	
NAICS	Agricultural Chemical	
	Manufacturing	
Source	B.55 – Pesticide manufacturing	

Categories (LRAPA title 37, Table 1)	5,000 or more tons/year annual production.
Public Notice Category	Ш

Compliance and Emissions Monitoring Requirements:

Unassigned Emissions	N
Emission Credits	N
Compliance Schedule	N
Source Test [date(s)]	N

5.	
COMS	N
CEMS	N
Ambient monitoring	Ν

Reporting Requirements

Annual Report (due date)	2/15
Semi-Annual Report (due date)	N
GHG Report (due date)	N
Monthly Report (due date)	N

Quarterly Report (due date)	Ν
Excess Emissions Report	Y
Other Reports (due date)	Ν

Air Programs

NSPS (list subparts)	N
NESHAP (list subparts)	N
CAM	N
Regional Haze (RH)	N
TACT	N
40 CFR Part 68 Risk Management	N
Synthetic Minor (SM)	N
SM-80	N
Title V	N

Major FHAP Source	Ν
Federal Major Source	Ν
Type A State New Source Review	
Type B State New Source Review	
Prevention of Significant	Ν
Deterioration (PSD)	
Nonattainment New Source Review	Ν
(NNSR)	

Permit No. 206131

Permittee Identification

1. OR-CAL, Inc. ("OR-CAL" and/or "the facility") operates an agricultural chemical manufacturing facility at 29454 Meadowview Road in Junction City, Oregon.

General Background Information

2. OR-CAL operates four (4) separate production lines at this location for batch production of liquid products.

Production Line 1 is used to produce suspension concentrates. There are three (3) mix tanks (Emission Units K1, K2, and K3) on this production line. Raw materials (powder and liquid) are loaded into the tanks through access hatches that are only opened for loading raw materials and period checks on equipment and product during operation. The finished product is packaged directly from the production tank through a closed system.

Production Line 2 is used to produce non-pesticide crop protectants. Raw material (powder) is mechanically conveyed from the storage silo (Emission Unit S1) to the mix tank (Emission Unit M1), where it is combined with water and other raw materials (both powder and liquid). Once mixed, the product is transferred to a holding tank (Emission Unit T7). The finished product is stored in one (1) of two (2) tanks (Emission Units T4B and T8). Approximately 20 percent of the product packaging is done in an open system, the rest is done in a closed system. Losses (i.e., air emissions) are accounted for in the open system, but not the closed system.

Production Line 3 is used to produce the pesticide product Lime Sulfur. Raw material (powder) is mechanically conveyed from the storage silo (Emission Unit S2) to kettle K5, where it is combined with water and other raw materials (both powder and liquid). Kettle K5 is heated with steam from a natural gas boiler. Once cooled, the solid byproduct is separated from the liquid product, and the liquid product is transferred to one (1) of the seven (7) storage tanks. The solid byproduct is dewatered and shipped offsite.

Production Line 4 is used to produce dilute solutions of pesticide products. Concentrated solutions are mixed with other ingredients and the final product is stored in holding tank T2B. No emissions are assessed from this production line.

The facility has a natural gas-fired Parker boiler, with a maximum heat input rating of 2.1 MMBtu per hour, that generates steam for kettle K5 and Production Line 3. The facility also has eight (8) natural gas-fired area heaters. Four (4) have maximum heat input ratings of 0.2 MMBtu per hour each, and four (4) have maximum heat input ratings of 0.125 MMBtu/hr each. The area heaters would normally be considered Categorically Insignificant Activities (CIA). However, because the facility does not have a separate gas meter for the boiler, they have elected to consider all natural gas combustion as a significant emission unit.

Reasons for Permit Action and Fee Basis

3. This permit action is for the initial issuance of a Simple Air Contaminant Discharge Permit (ACDP). LRAPA had previously visited the facility in 2011 and determined that they did not require an air permit. LRAPA subsequently visited the facility in 2022 and determined that the facility had exceeded the threshold under Title 37, Table 1, Part B: 55 of 5,000 or more tons per year annual production of pesticide.

Attainment Status

4. The facility is located in an area that has been designated as attainment or unclassified for all criteria pollutants. The facility is outside the Eugene-Springfield UGB as defined in LRAPA 29-0010 which designates the Eugene-Springfield CO and PM₁₀ maintenance areas. The facility is

also located outside the Eugene-Springfield UGB as described in the current Eugene-Springfield Metropolitan Area General Plan, as amended.

Permitting History

5. LRAPA has reviewed and issued the following permitting actions to this facility:

Date(s) Approved/Valid	Permit Action Type	Description
Upon Issuance	Simple ACDP	Initial permit.

Compliance History

- 6. This facility has not been inspected by LRAPA since the facility was constructed in 2013.
- 7. LRAPA has not issued any violation notices and/or taken enforcement action against this facility since it was constructed in 2013.

Source Testing

8. The facility is not required to conduct source testing at this time. LRAPA is not aware of any historical source testing conducted at this facility.

Emission Unit Descriptions

9. The emission units (EUs) regulated by this permit are the following:

Emission Unit ID	Emission Unit Description	Pollution Control Device (PCD ID)	Pollution Control Device Description	Installed / Last Modified
Production	Line 1			
K1	Production Line 1 – Mix Tank K1		NA	2013
K2	Production Line 1 – Mix Tank K2		NA	2013
K3	Production Line 1 – Mix Tank K3		NA	2013
Production	Line 2			
S1	Production Line 2 – Storage Silo	BV2	Bin Vent	2013
M1	Production Line 2 – Mix Tank		NA	2013
T7	Production Line 2 – Hold Tank T7		NA	2014
T8	Production Line 2 – Storage Tank T8		NA	2014
T4B	Production Line 2 – Storage Tank T4B		NA	2014
P2	Production Line 2 – Packaging		NA	2013
Production Line 3				
S2	Production Line 3 – Storage Silo	BV3	Bin Vent	2013
Facility Wide Natural Gas				
NG	Facility Wide Natural Gas		NA	2013

Significant Emission Units

10. <u>Production Line 1</u>

The VOC, hazardous air pollutant and toxic air contaminant emissions from Emission Units K1, K2, and K3 are calculated using the methodology from EPA's Emission Inventory Improvement Program, Methods or Estimating Emissions from Chemical Manufacturing Facilities (August

2007) – Section 3.7. For calculating VOC emissions, the facility has assumed the properties of the VOC constituent with the highest vapor pressure are representative as the VOC content of the mixture for simplicity.

11. <u>Production Line 2</u>

The VOC emissions from Emission Units T7, T8, and T4B are calculated using equations in EPA, AP-42. Section 7.1 – Organic Liquid Storage. The facility has assumed the properties of the predominant VOC constituent are representative as the VOC content of the mixture for simplicity. The predominant VOC constituent also has the highest vapor pressure. The VOC emissions from Emission Unit M1 are calculated using the methodology from EPA's Emission Inventory Improvement Program, Methods or Estimating Emissions from Chemical Manufacturing Facilities (August 2007) – Section 3.7. The facility has assumed the properties of the predominant VOC constituent are representative as the VOC content of the mixture for simplicity. The predominant VOC constituent also has the highest vapor pressure. The VOC emissions from Emission Unit P2 are calculated using the methodology from EPA's Emission Inventory Improvement Program, Methods or Estimating Emissions from Chemical Manufacturing Facilities (August 2007) -Section 3.1. For calculating VOC emissions, the facility has assumed the properties of the VOC constituent with the highest vapor pressure are representative as the VOC content of the mixture for simplicity. The particulate matter emissions from Emission Unit S1 assume a constant exit grain loading from the silo bin vents, a constant air flow during silo loading, and a maximum number of hours of silo loading. The facility believes that the bin vents are inherent process equipment, but LRAPA has not acted on this assertion as of the preparation of this review report.

12. <u>Production Line 3</u>

The particulate matter emissions from Emission Unit S2 assume a constant exit grain loading from the silo bin vents, a constant air flow during silo loading, and a maximum number of hours of silo loading. The facility believes that the bin vents are inherent process equipment, but LRAPA has not acted on this assertion as of the preparation of this review report.

13. Facility Wide Natural Gas

The emissions from natural gas combustion are based on emission factors from Oregon DEQ AQEF05 (8/2011) and the equations from EPA 40 CFR 98 Subpart C. Hazardous air pollutant and toxic air contaminant emission factors are from DEQ 2020 Air Toxics Emission Inventory Combustion Emission Factor Tool.

Nuisance, Deposition and Other Emission Limitations

- 14. Under LRAPA 49-010(1), the permittee must not cause or allow air contaminants from any source subject to regulation by LRAPA to cause a nuisance. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.
- 15. Under LRAPA 32-055, the permittee must not cause or permit the emission of particulate matter which is larger than 250 microns in size at sufficient duration or quantity as to create an observable deposition upon the real property of another person. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.
- 16. Under LRAPA 32-090(1), the permittee must not discharge from any source whatsoever such quantities of air contaminants which cause injury or damage to any persons, the public, business or property; such determination is to be made by LRAPA. Compliance is demonstrated through documentation of all complaints received by the facility from the general public and following procedures to notify LRAPA of receipt of these complaints.

Emission Limitations

- 17. The facility is subject to the visible emission limitations under LRAPA 32-010(3). For sources, other than wood-fired boilers, no person may emit or allow to be emitted any visible emissions that equal or exceed an average of 20 percent opacity for a period or periods aggregating more than three (3) minutes in any one (1) hour. Compliance is demonstrated through a plant survey of visible emissions using EPA Method 22 to be completed at least once a quarter. The permittee is required to take corrective action if any visible emissions are identified or conduct a Modified EPA Method 9 test if the visible emissions cannot be eliminated. In addition, the permittee must prepare and maintain an Operation & Maintenance Plan for all particulate matter emission control devices at the facility.
- 18. The non-fuel burning equipment at this source that emit particulate matter are subject to the following particulate matter emission limitations under LRAPA 32-015(2)(b)(B): For sources installed, constructed, or modified on or after June 1, 1970 but prior to April 16, 2015 for which there are no representative compliance source test results, the particulate matter emission limit is 0.14 grains per dry standard cubic foot. Compliance is demonstrated through a plant survey of visible emissions using EPA Method 22 to be completed at least once a quarter. The permittee is required to take corrective action if any visible emissions are identified or conduct a Modified EPA Method 9 test if the visible emissions cannot be eliminated. In addition, the permittee must prepare and maintain an Operation & Maintenance Plan for all particulate matter emission control devices at the facility.
- 19. The fuel burning equipment at this source that emit particulate matter are subject to the following particulate matter emission limitations under LRAPA 32-030(1)(b): For sources installed, constructed or modified on or after June 1, 1970 but prior to April 16, 2015, for which there are no representative compliance source test results prior to April 16, 2015, the permittee must not cause, suffer, allow, or permit particulate matter emissions in excess of 0.14 grains per dry standard cubic foot. Compliance is demonstrated through a plant survey of visible emissions using EPA Method 22 to be completed at least once a quarter. The permittee is required to take corrective action if any visible emissions are identified or conduct a Modified EPA Method 9 test if the visible emissions cannot be eliminated. In addition, the permittee must prepare and maintain an Operation & Maintenance Plan for all particulate matter emission control devices at the facility.
- 20. Emission Units S1 and S2 are subject to the process weight rate emission limitations under LRAPA 32-045(1). No person may cause, suffer, allow, or permit the emissions of particulate matter in any one (1) hour from any process in excess of the amount shown in LRAPA 32-8010, for the process weight rate allocated to such process. Process weight is the total weight of all materials introduced into a piece of process equipment. Liquid and gaseous fuels and combustion air are not included in the total weight of all materials. Compliance is demonstrated through a plant survey of visible emissions using EPA Method 22 to be completed at least once a quarter. The permittee is required to take corrective action if any visible emissions are identified or conduct a Modified EPA Method 9 test if the visible emissions cannot be eliminated. In addition, the permittee must prepare and maintain an Operation & Maintenance Plan for all particulate matter emission control devices at the facility.
- 21. The control equipment at the facility must be operated and maintained at the highest and best practicable treatment and control of air contaminant emissions so as to maintain overall air quality at the highest possible levels, and to maintain contaminant concentrations, visibility reduction, odors, soiling, and other deleterious factors at the lowest possible levels under LRAPA 32-005(1). Compliance for the control equipment at the facility will be demonstrated through implementation of an Operation & Maintenance Plan.

Typically Achievable Control Technology (TACT)

- 22. All emission units at this facility were installed after 1994. LRAPA 32-008(2) requires new units installed or existing emission units modified on or after January 1, 1994, meet TACT if the emission unit meets the following criteria: The emission unit is not subject to Major NSR in title 38, Type A State NSR in LRAPA title 38, an applicable Standard of Performance for New Stationary Sources in title 46, or any other standard applicable only to new or modified sources in title 32, title 33, or title 39 for the regulated pollutant emitted; the source is required to have a permit; if new, the emission unit has emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant; if modified, the emission unit would have an increase in emissions of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to or greater than one (1) ton per year of any criteria pollutant equal to pollutant equal to pollutant; and LRAPA determines that the proposed air pollution control devices and emission reduction processes do not represent TACT.
 - 22.a. The following emission units are not subject to TACT because they do not have potential emissions of criteria pollutants equal to or greater than one (1) ton per year: K1, S1, T7, T8, T4B, P2, S2, and NG.
 - 22.b. The following emission unit are subject to TACT because they have potential emissions of criteria pollutants equal to or greater than one (1) ton per year: K2, K3, and M1. For the purposes of TACT applicability, the facility has conservatively calculated emissions to assume production is occurring in open top vessels assumed the properties of the VOC constituent with the highest vapor pressure are representative as the VOC content of the mixture. While a formal TACT analysis has not been conducted, TACT for these emission units would likely be a requirement that each of these emission units be equipped with a cover or lid that must be closed at all times when they are in operation, except for manual operations that require access, such as material addition and removal, inspection, sampling and cleaning. Controls are not considered economically feasible for these emission units at the calculated potential emission rates.

Plant Site Emission Limits (PSELs)

23. Provided below is a summary of the baseline emissions rate, netting basis, and PSELs for this facility.

Pollutant	Baseline Emission Rate (TPY)	Netting Basis Proposed (TPY)	Plant Site Emission Limit (PSEL) Proposed (TPY)	PSEL Increase Over Netting Basis (TPY)	Significant Emission Rate (TPY)
PM	NA	0	De minimis	NA	25
PM 10	NA	0	De minimis	NA	15
PM _{2.5}	NA	0	De minimis	NA	10
CO	NA	0	1.2	1.2	100
NOx	NA	0	1.5	1.5	40
SO ₂	NA	0	De minimis	NA	40
VOC	NA	0	8.1	8.1	40
GHG (CO ₂ eq)	NA	0	De minimis	NA	75,000

- 23.a. The facility does not have a baseline emission rate for PM, PM₁₀, CO, NO_x, SO₂ or VOC because the facility was not in operation during either the 1977 or 1978 baseline year. A baseline emission rate is not established for PM_{2.5} in accordance with LRAPA 42-0048(3). The facility has no baseline for GHGs because the facility did not request a baseline for this pollutant.
- 23.b. The netting basis for all pollutants is 0 (zero) in accordance with LRAPA 42-0046(4).
- 23.c. In accordance with OAR 340-222-0041(2), the PSELs for CO, NO_X, and VOC are set equal to the source's potential to emit. No PSELs are set for PM, PM₁₀, PM_{2.5}, SO₂ and

GHGs in accordance with LRAPA 42-0020(3)(a) because these pollutants are emitted below the de minimis as defined in LRAPA title 12.

Unassigned Emissions and Emission Reduction Credits

24. The facility has zero (0) unassigned emissions. Unassigned emissions are equal to the netting basis minus the source's current PTE, minus any banked emission reduction credits. The facility has zero (0) tons of emission reduction credits.

New Source Review (NSR) and Prevention of Significant Deterioration (PSD)

25. This source is located in an area that is designated attainment or unclassified for all regulated pollutants. The proposed PSELs are less than the federal major source threshold for non-listed sources of 250 TPY per regulated pollutant and are not subject to Major NSR.

Federal Hazardous Air Pollutants/Toxic Air Contaminants

- 26. Potential annual federal hazardous air pollutant emissions (HAP) are based on the potential to emit of the facility operating under permit limitations. The potential emissions of federal HAPs are below the major source thresholds of 10 TPY of any single federal HAP and 25 TPY for the aggregate of federal HAPs. The maximum potential emission of a single federal HAP is 0.037 tons per year (acetaldehyde). The potential aggregate of federal HAP emissions are 0.040 tons per year. The facility is considered a natural minor or area source of federal HAPs.
- 27. Under the Cleaner Air Oregon (CAO) program, only existing sources that have been notified by LRAPA and new sources are required to perform risk assessments. This source has not been notified by LRAPA and is, therefore, not yet required to perform a risk assessment or report annual emissions of toxic air contaminants (TAC). LRAPA required reporting of approximately 600 toxic air contaminants in 2016 and regulates approximately 260 toxic air contaminants that have Risk Based Concentrations established in the rule. All federal HAPs are on the list of approximately 600 toxic air contaminants. After the source is notified by LRAPA, they must update their inventory and perform a risk assessment to see if they must reduce risk from their toxic air contaminant emissions. Until then, sources will be required to report toxic air contaminant emissions triennially.

Pollutant	CAS/DEQ Number	Potential Emissions (TPY)	Federal HAP	CAO Air Toxic
Organics				
Acetaldehyde	75-07-0	3.7E-02	Y	Y
Acrolein	107-02-8	3.9E-05	Y	Y
Benzene	71-43-2	1.1E-03	Y	Y
Ethyl benzene	100-41-4	1.4E-04	Y	Y
Formaldehyde	50-00-0	2.5E-04	Y	Y
Hexane	110-54-3	9.1E-05	Y	Y
Toluene	108-88-3	5.3E-04	Y	Y
Xylenes	1330-20-7	3.9E-04	Y	Y
Polycyclic aromatic hydrocarbons (PAHs)	401	1.5E-06	Y	Y
Benzo(a)pyrene	50-32-8	1.7E-08	Y	Y
Naphthalene	91-20-3	4.4E-06	Y	Y
Metals	·			·

28. Provided below is a summary of the potential emissions of federal HAPs and CAO TACs from this facility.

Pollutant	CAS/DEQ	Potential Emissions	Federal	CAO Air Toxio
Arsenic and compounds	7440-38-2	2.9E-06	Y	Y
Beryllium and Compounds	7440-41-7	1.7E-07	Y	Y
Cadmium and compounds	7440-43-9	1.6E-05	Y	Y
Chromium and compounds	7440-47-3	2.0E-05	Y	Y
Cobalt and compounds	7440-48-4	1.2E-06	Y	Y
Manganese and compounds	7439-96-5	5.5E-06	Y	Y
Mercury and compounds	7439-97-6	3.8E-06	Y	Y
Nickel and compounds	7440-02-0	3.0E-05	Y	Y
Selenium and compounds	7782-49-2	3.5E-07	Y	Y

Toxics Release Inventory

- 29. The Toxics Release Inventory (TRI) is a federal program that tracks the management of certain toxic chemicals that may pose a threat to human health and the environment, over which LRAPA has no regulatory authority. It is a resource for learning about toxic chemical releases and pollution prevention activities reported by certain industrial facilities. Section 313 of the Emergency Planning and Community Right-to-Know Act (EPCRA) created the TRI program. In general, chemicals covered by the TRI program are those that cause:
 - Cancer or other chronic human health effects;
 - Significant adverse acute human health effects; or
 - Significant adverse environmental effects.

There are currently over 650 chemicals covered by the TRI program. Facilities that manufacture, process or otherwise use these chemicals in amounts above established levels must submit annual TRI reports on each chemical. NOTE: The TRI program is a federal program over which LRAPA has no regulatory authority. LRAPA does not guarantee the accuracy of any information copied from EPA's TRI website.

In order to report emissions to the TRI program, a facility must operate under a reportable NAICS code, meet a minimum employee threshold, and manufacture, process, or otherwise use chemicals in excess of the applicable reporting threshold for the chemical. For the calendar year 2022, this facility did not report to the TRI program.

New Source Performance Standards (NSPSs)

- 30. There are no emission units at this facility for which NSPS have been promulgated or are applicable. LRAPA reviewed the following NSPS to determine their applicability to this facility:
 - 30.a. 40 CFR 60 subpart Kb Standards of Performance for Volatile Organic Liquid Storage Vessels (Including Petroleum Liquid Storage) for Which Construction, Reconstruction, or Modification Commenced After July 23, 1984 is not applicable because the capacity of the storage tanks at this facility are below the applicability threshold of 75 m³ (19,812.9 gallons).
 - 30.b. 40 CFR 60 subpart VV and VVa Standards of Performance for Equipment Leaks of Volatile Organic Compounds in the Synthetic Organic Chemical Manufacturing Industry (SOCMI) is not applicable to this facility because the facility does not produce as intermediates or final products any of the chemicals listed in 40 CFR 60.489.
 - 30.c. 40 CFR 60 subpart III Standards of Performance for Volatile Organic Compound Emissions from the SOCMI Air Oxidation Unit Processes is not applicable to this facility because the facility does not produce any of the chemicals listed in 40 CFR 60.617 as a product, co-product, by-product, or intermediate.

- 30.d. 40 CFR 60 subpart NNN Standards of Performance for Volatile Organic Compound Emissions from SOCMI Distillation Operations is not applicable to this facility because the facility does not produce any of the chemicals listed in 40 CFR 60.667 as a product, co-product, by-product, or intermediate.
- 30.e. 40 CFR 60 subpart RRR Standards of Performance for Volatile Organic Compound Emissions from SOCMI Reactor Processes is not applicable to this facility because the facility does not produce any of the chemicals listed in 40 CFR 60.707 as a product, coproduct, by-product, or intermediate.

National Emission Standards for Hazardous Air Pollutants (NESHAPs)

- 31. There are no emission units at this facility for which NESHAPs are applicable. LRAPA reviewed the following NESHAPs to determine their applicability to this facility:
 - 31.a. 40 CFR 63 subpart VVVVV(6V) National Emission Standards for Hazardous Air Pollutants for Chemical Manufacturing Area Sources is not applicable to this facility. This regulation applies to the owners or operators of a chemical manufacturing process unit (CMPU) at an area source and for which the HAP listed in Table 1 to 40 CFR 63 subpart 6V are present in the CMPU as specified in 40 CFR 63.11494(2)(i) through (iv). The facility has reviewed these criteria and stated that they are not subject to this NESHAP.
 - 31.b. 40 CFR 63 subpart BBBBBBB(7B) National Emission Standards for Hazardous Air Pollutants for Area Sources: Chemical Preparations Industry is not applicable to this facility because the facility does not have any process operations described by the NAICS code 325998. The facility is covered by NAICS code 325320.

Recordkeeping Requirements

32. The facility is required to keep and maintain a record of the following information for a period of at least five (5) years.

Activity	Parameter	Units	Minimum Recording Frequency
PSEL Recordkeeping			
Production Line 1	Production Rate	Gallon	Monthly
Production Line 2 Production	Production Rate	Gallon	Monthly
Production Line 2 Packaging	Packaging Rate	Gallon	Monthly
Facility-wide natural gas	Usage	MMCF	Monthly
General Recordkeeping			
Log of nuisance complaints	Not Applicable	Not Applicable	Upon receipt of complaint
Visible Emission Survey	Not Applicable	Not Applicable	Quarterly
Operation and Maintenance Plan	Not Applicable	Not Applicable	Maintain current version on-site
Upset log of all planned and unplanned excess emissions, as required by Condition G16 of the permit	Not Applicable	Not Applicable	Per occurrence

Reporting Requirements

33. The facility must submit to LRAPA the following reports by no later than the dates indicated in the table below:

Report	Reporting Period	Due Date
PSEL pollutant emissions as calculated according to Conditions 5 and 6 of the permit, including the supporting process information.	Annual	February 15
A summary of maintenance and repairs performed on any pollution control devices at the facility.	Annual	February 15
A summary of all complaints received by the permittee and their resolution as required by Condition G11 of the permit.	Annual	February 15
The upset log required by Condition G14 of the permit, if any planned or unplanned excess emissions have occurred during the reporting period.	Annual	February 15

34. The permittee is not subject to greenhouse gas reporting under OAR 340 Division 215 because actual greenhouse gas emissions are less than 2,500 metric tons (2,756 short tons) of CO₂ equivalents per year. If the source ever emits more than this amount, they will be required to report greenhouse gas emissions.

Public Notice

35. Pursuant to OAR 340-216-0064(5)(a), which became effective on March 1, 2023, issuance of a renewed Simple Air Contaminant Discharge Permit requires public notice in accordance with OAR 340-209-0030(3)(c) [aka LRAPA 31-0030(3)(c)], which requires LRAPA to provide notice of the proposed permit action and a minimum of 35 days for interested persons to submit written comments.

The draft permit was on public notice from March 1, 2024 to April 5, 2024. No comments were submitted during the 35-day comment period.

JJW/RR 04/08/2024

Emission Detail Sheets:

		Table 1							
	Input Proco		Dar	amotore					
		lunction		Oregon					
	OK-CAL, INC	.—Junction	City,	Oregon					
			Pro	posed Produ	iction or Through	out Re	hte		
Parameter	Hourly	/ Parameter		Dai	ly Parameter		Annur	al Parameter	
Facility-Wide									
Facility Hours of Operation				24.0	(hrs/day)	(1)	8,760	(hrs/yr)	(1)
Raw Material Silos									
Production Line 2 Silo Filling Hours of Operation				6.00	(hrs/day)	(2)	1,144	(hrs/yr)	(1)
Production Line 3 Silo Filling Hours of Operation				2.00	(hrs/day)	(2)	208	(hrs/yr)	(1)
Facility Production									
Line 1 Production Rate			(3)	1,600	(gal/day)	(1)	582,300	(gal/yr)	(1)
Line 2 Production Rate			(3)	10,960	(gal/day)	(1)	4,000,400	(gal/yr)	(1)
Line 3 Production Rate			(3)	10,000	(gal/day)	(1)	3,650,000	(gal/yr)	(1)
Line 4 Production Rate			(3)	18,000	(gal/day)	(1)	3,753,300	(gal/yr)	(1)
Line 2 Packaging									
Line 2 Product Packaging Rate	2,500	(gal/hr)	(1)				2,000,200	(gal/yr)	(4)
Natural Gas Combustion Devices									
Boiler Natural Gas Heat Input	2.10	(MMBtu/hr)	(1)	50.4	(MMBtu/day)	(a)	18,396	(MMBtu/yr)	(b)
Boiler Natural Gas Usage	2.0E-03	(MMscf/hr)	(c)	0.049	(MMscf/day)	(a)	17.9	(MMscf/yr)	(b)
Area Heaters Natural Gas Heat Input	1.30	(MMBtu/hr)	(1)	31.2	(MMBtu/day)	(a)	11,388	(MMBtu/yr)	(b)
Area Heaters Natural Gas Usage	1.3E-03	(MMscf/hr)	(c)	0.030	(MMscf/day)	(a)	11.1	(MMscf/yr)	(b)
All notes and references are provided on the following page. S	ee Table 1 (Contir	nued), Input Prod	cess Ra	tes and Para	meters.				
	Tab	le 1 (Confin	ued)						
	Input Proces	ss Rates and	l Parc	ameters			1		
	OR-CAL, Inc	.—Junction	City,	Oregon			1		
			TÌ						
Notes									
gal = gallon.									
hr = hour.									
MMBtu = million British thermal units.									
MMscf = million standard cubic feet.									
yr = year.									
^(a) Daily parameter ("unit"/day) = (hourly parameter ["unit"/hr	1) x (daily facility h	ours of operation	n [hrs/d	ay])					
^(b) Annual parameter ("unit"/yr) = (hourly parameter ["unit"/hr	1) x (annual facility	, hours of operat	ion (hrs	/yr])					
^(c) Hourly natural gas usage (MMscf/hr) = (hourly natural gas	heat input [MMBI	· ·u/hr]) / (default	naturc	I gas high he	at value [MMBtu/I	MMso	f])		
Default natural gas high heat v alue (MMBtu/MMscf) =	1,026	(5)	0 0					
	,								
References									
⁽¹⁾ Information provided by OR-CAL, Inc.									
⁽²⁾ Information provided by OR-CAL, Inc. Estimate av erage f	ill time of 2 hours.								
⁽³⁾ Production through batch process. Batch duration areate	er than 1 hour.		+ +						
⁽⁴⁾ Information provided by OR-CAL, Inc. Conservatively ass	ume 50 percent of	total annual Lin	e 2 pro	duct is packa	aged in the open s	/stem			
(5) 40 CFR Part 98 Subpart C, Table C-1, "Default CO ₂ Emission	n Factors and High	Heat Values for	Various	Types of Fuel					

							Table 2	2								
				Stor	rage Tank	s—Inpu	ut Assum	ptions and	d Parame	eters						
					OR-CA	L, Inc.	—Junctio	on City, O	regon							
Tank	Number	Tank	Tank		Tank Info	rmation		Emissions Controlled	Tank Dime	nsions ⁽¹⁾	Maximum Liquid	Tank Size ^(a)	Proc	luct T	hroughput	
ID	of Tanks	Heated? ⁽¹⁾	Temp. ⁽²⁾		Physical Par	ameter (1)	or Fugitive	Diameter	Height	Height ⁽³⁾	(gal/tank)	Daily	,	Annua	1
		(Yes/No)	(°F)	Roof Type	Orientation	Paint Shade	Tank Condition	(1)	(ff)	(ff)	(ff)		(gal/da	ıy)	(gal/yr))
Production Line 2																
T7 (Hold Tank)	1	No	77.0	FR	Vertical	White	Average	Fugitive	7.0	7.1	6.1	1,756	10,960	(4)	4,000,400	(5)
T8 (Storage Tank)	1	No	77.0	FR	Vertical	White	Average	Fugitive	10.0	21.0	20.0	11,750	11,750	(6)	2,260,820	(b)
T4B (Storage Tank)	1	No	77.0	FR	Vertical	White	Average	Fugitive	9.0	20.0	19.0	9,041	9,041	(6)	1,739,580	(b)
Notes																
°F = degrees Fahrenh	neit.										-					
ft = feet.																
ft ³ = cubic feet.																
FR = fixed-roof tank t	ype.										-					
gal = gallon.																
hr = hour.																
lb = pound.											-					
yr= year.																
^(a) Tank size (gal/tan	$(k) = \pi/4 \times (c$	diameter of ta	nk [ft]) ² x (mo	aximum liq	uid height [ff])	x (7.48 g	al/ft³)									
^(b) Annual product t	hroughput	(gal/yr) = (ann	nual product	productio	n [gal/yr]) x (te	ank capa	icity [gal]) /	(total storage	capacity [g	al])						
	Annual	Liquid Calciur	n production	(gal/yr) =	4,000,400	(5)										
References														-		
⁽¹⁾ Information provi	ded by OR	-CAL, Inc.												-		
⁽²⁾ Assumes standard	d ambient t	emperature of	f 25℃ (77°F) s	ince the st	orage tanks a	re not hea	ated.							-		
⁽³⁾ AP-42 Chapter 7	(June 2020)	; see equation	1-36 notes. F	or v ertica	l tanks, v alue i	s set to or	e minus the	tank shell heig	ght.					-		
⁽⁴⁾ See Table 1, Inpu	t Process Ro	ates and Para	meters. Assun	ne maximu	um daily throug	ghput equ	Jal to total c	aily productio	on rate.							
⁽⁵⁾ See Table 1, Inpu	t Process Ro	ates and Para	meters.											<u> </u>		
⁽⁶⁾ Maximum daily th	nroughput (assumed to be	equal to ta	nk capaci	ty.											

					Table 3				
		Produ	ction Mix	Tanks—In	put Assum	ptions and Pa	rameters		
			OR-	CAL, Inc.—	Junction	City, Oregon			
				Emissions		Tank Properties	(1)	Production	n Parameters
Tank ID	Number of Tanks	Tank Heated? ⁽¹⁾ (Yes/No)	Tank Temp. ⁽²⁾ (°F)	Controlled or Fugitive	Diameter (ft)	Tank Capacity (gal/tank)	Operating Volume (gal/tank)	Duration of Operation ⁽³⁾ (hrs/batch)	Annual Batches (1) (batches/yr)
Production Line 2									
M1 (Mix Tank)	1	No	77.0	Fugitive	7.50	2,111	1,370	3.00	2,920
Production Line 1									
K1 (Mix Tank 1)	1	No	77.0	Fugitive	3.83	242	105	5.00	730
K2 (Mix Tank 2)	1	No	77.0	Fugitive	5.00	734	402	5.00	730
K3 (Mix Tank 3)	1	No	77.0	Fugitive	5.50	1,207	798	5.00	730
Notes									
°F = degrees Fahrenhe	eit.								
ft = feet.									
gal = gallon.									
hr = hour.									
yr= year.									
References									
⁽¹⁾ Information provide	ed by OR-C	AL, Inc.							
⁽²⁾ Assumes standard (ambient ten	nperature of 25	5°C (77°F) sinc	e the tanks are	not heated.				
⁽³⁾ Information provide	ed by OR-C	AL, Inc. Repres	ents maximur	m duration of o	peration.				

				Table	e 4				
		Raw	Material Stor	age Silo	s PM	Emission Esti	mates		
			OR-CAL, Ind	c.—Junc	tion (City, Oregor	1		
P	arameter		Production	Line 2 Silo		Productio	n Line 3 Silo		
Annual Silo F	Fill Hours (hrs/yr)	(1)	1,14	14		2	08		
		-		Emi	ssion E	stimates		Total Emissi	on Estimates
Pollutant	Emission Rate	F	Production	Line 2 Silo	b)	Production	n Line 3 Silo		
	(ID/nr)		Hourly ^(a) (Ib/hr)	Annual (tons/yı		Hourly ^(a) (Ib/hr)	Annual ^(b) (tons/yr)	Hourly (Ib/hr)	Annual (tons/yr)
PM	0.21	(c)	0.21	0.12		0.21	0.021	0.41	0.14
PM ₁₀	0.21	(4)	0.21	0.12		0.21	0.021	0.41	0.14
PM _{2.5}	0.21	(4)	0.21	0.12		0.21	0.021	0.41	0.14
Notes									
cfm = cubic feet pe	r minute.								
dscf = dry standard	cubic feet.								
gr = grain.									
hr = hour.									
lb = pound.									
min = minute.									
PM = particulate m	atter.								
yr = year.			(l= (l= -1))						
(b) Again of a missions e	estimate (ib/nr) = (emissio	n rate	lio/nrj)	al alla fillia a c		-1) (1 (0, 000)			
(c) PM emission rate	estimate (tons/yr) = (em	ssion ra				(10hs/2,000h)			
	(inviti) – (grain loading	Grain lo	$() \times (all llow [clift])$, , , , , , , , , , , , , , , , , , , ,			
	Air flow, d	urina sik	aaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaaa	1 200	(2)				
				1,200	(5)				
References									
⁽¹⁾ See Table 1, Inpu	ut Process Rates and Par	ameter	s.						
⁽²⁾ Donaldson Comp	oany, Inc. emissions state	ement fo	or filter media. Filter	r media has	anave	erage emissions le	ev el of no more thar	1 0.002 grains per (dry standard
cubic foot. Conse	erv ativ ely assume 10 tim	es this f	or the maximum e	missions lev e	el.	-			
⁽³⁾ Information prov	ided by OR-CAL, Inc.								
⁽⁴⁾ Assumes 100% of	PM is equal to $PM_{2.5}$.								

		Tabl	e 5		
Product	ion line 2	Hold Tank	17 VOC Emission Estime	ites	
110000	OR-CAI		tion City Oregon		
	ON-CAL	, me. Jone	chon chy, oregon		
Parameter		(Units)	Producti	on Line 2	AP-42 Variable
PRODUCTION VALUES		. ,			1
Storage Tank ID	(1)		T7 (Hol	d Tank)	
Total Number of Storage Tanks	(1)				
Total Annual Throughput	(1)	(gal/yr)	4,000	,400	
Total Annual Throughput	(d)	(bbl/yr)	95,	248	Q
Maximum Dally Inroughput	(1)	(gai/aay)	10,	1	
Annual Days of Operation	(2)	(days/yr)	3	5	
TANK PROPERTIES	1	(==)=,,,,,			
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)		Fixed	Roof	
Heated or Non-heated?	(1)		Non-H	eated	
Controlled or Fugitive?	(1)		Fugi	tive	
Control Efficiency	(1)	(%)			
lank Root Color	(1)		Wr	ite	
	(1)		Ave	ite	
Tank Shell Condition	(1)		Ave	rage	
Horizontal or Vertical	(1)		Ver	ical	
Tank Diameter	(1)	(f†)	7.	00	D
Tank Shell Height	(1)	(ft)	7.	10	Hs
Roof Type	(3)		Do	me	
Maximum Liquid Height	(1)	(ft)	6.	0	H _{LX}
Minimum Liquid Height	(4)	(††)	I.	00	H _{LN}
	(1)	(°F)	71	0	т
Liquid Molecular Weight	(5)	(lb/lb-mole)	4	.1	Mi
Vapor Molecular Weight	(5)	(lb/lb-mole)	40	.1	My
True Vapor Pressure	(b)	(psia)	1.	4	P _{VA}
ENVIRONMENTAL FACTORS					
Average Daily Maximum Ambient Temperature	(8)	(°R)	51	2	T _{AX}
Average Daily Minimum Ambient Temperature	(8)	(°R)	50	2	T _{AN}
Average Daily lotal Insolation on a Horizontal Surface	(0)	(Btu/ft²-day)	1,2	04	· · · · · · · · · · · · · · · · · · ·
CALCULATED VARIABLES	1				
Average Daily Ambient Temperature Range	(c)	(°R)	20	.1	ΔΤ
Tank Roof Surface Solar Absorptance	(10)		0.	25	a _R
Tank Shell Surface Solar Absorptance	(10)		0.	25	as
Average Tank Surface Solar Absorptance	(d)		0.	25	a
Average Daily Vapor Temperature Range	(e)	(°R)	20	.1	ΔT _v
Vapor Space Expansion Factor	(1)		0.0	36	K _E
Liquid Heighi Tank Shell Padius	(1)	(11)		50	P.
Tank Roof Height	(14)	(ft)	0.	94	H.
Roof Outage	(15)	(ft)	0.	48	H _{RO}
Vapor Space Outage	(9)	(f†)	4.	03	H _{VO}
Vented Vapor Saturation Factor	(h)	-	0.	во	Ks
Average Daily Ambient Temperature	(i)	(°R)	5	2	T _{AA}
Liquid Bulk Temperature	())	(°R)	5	3	TB
Average Vapor Temperature	(K)	(°R)	5	5	
Annual Standing Loss	(m)	(ID/IT) (Ib/vr)	7.5	7	
Daily Standing Loss	(n)	(lb/day)	0.0	43	
Working Loss Calculations					
Annual Net Working Loss Throughput	(o)	(ft ³ /yr)	534	720	V _Q
Annual Sum of the Increase is Liquid Level	(p)	(ft/yr)	13,	894	ΣH _{QI}
Number of Turnov ers per Year	(q)		2,7	24	N
Working Loss Turnover (Saturation) Factor per Year	(1)	-	0.	18	K _N
Daily Sum of the Increase is Liquid Level	(q)	(tt°/day)	ا,4 مو	1	۷ _Q ۲H-
Number of Turnovers per Dav	(q)	(ii/duy) 	7	46	∠rī _{QI} N
Working Loss Turnover (Saturation) Factor per Day	(1)		1.	00	K _N
Working Loss Product Factor	(26)		1.	00	K _P
Vent Setting Correction Factor	(27)		1.	00	K _B
Annual Working Loss	(s)	(Ib/yr)	90	5	Lw
Daily Working Loss	(†)	(lb/day)	14	.0	
Annual Total Tank Routine Losses	(U)	(tons/yr)	0.	46	Lr
Daily Total (ank Routine Losses	(v) (w)	(lb/day)	14	.0	
All notes and references are provided on the following page. See Table 5 IC	Continued). Pr	roduction Line ?	Hold Tank T7 VOC Emission Estim	ates.	

			Table		1						
			lable	5 (Continue	ed)		i .				
	Producti	ion Line 2	2 Hold	fank 17 VO	C Emission	Estim	ates				
		OR-CAL	, Inc.—	Junction C	ity, Orego	n					
N	otes										
bb	ol = barrel.										
Bt	u = British thermal unit.										
°C 0E	= degrees Celsius.										
ft											
ft ²	= square foot										
ft ³	= cubic foot.										
go	al = gallon.										
lb	= pound.										
lb	mol = pound mole.										
m	m Hg = millimeters mercury.										
ps	i = pounds per square inch.										
ps	ia = pounds per square inch absolute.										
٩R	= degrees Rankine.										
yr	= year.										
(a)	Total annual or daily throughput (bbl/"unit") = (total annual or daily thro	oughput (gal	/"unit"]) x	(bbl/42 gal)							
(b)	Vapor pressure (psia) = (0.019337 psi/mm Hg) x (10)^([constant A] - [{con	nstant B (°C)	} / {([liquid	i temperature {	F}] - 32) x (5/9)	+ (const	ant C [°C])}]);	See Reference	(6).		
	Constant A =	8.247	(7)								
	Constant B (°C) =	1670.4	(7)								
1-	Constant C (°C) =	232.96	(7)				(PD)11 0	(mmm - 1 ⁻²)			
(c)	Average daily ambient temperature range ("R) = ([daily maximum amb	nem remper	uiure ("R)	- Laaliy minimu	muniplent ter	nperatur	= {`κ}]); see Re	erence (9).			
(e)	Average rank surrace solar absorbance = ((rank root surrace solar absorbance) = (ro 7) = (ro 7) = (ro 7)	prancej + [t	unik shell :	unace solar ab	veraco torili	2, see Re	ar absort	a)			
	x lay erage daily total insolation factor (8tu/(8t dau)) is so Reference (1)	5 N D B B B B B B B B B B B B B B B B B B	range (*R	n, + ([0.02] x [a	v Gruge Tarik Sl	mace so	u uusoipianc	9			
(f)	Vapor space expansion factor = (0.0018) × (average daily approximate	·/· erature rana	= [0R1)- c -	e Reference /1/	n						
(g)	Vapor space outgage (ff) = (tank shell beight [ff1] = (fauid beight [ff1] = (r	of outride H	- [N] J, 36	eference (14)	1.						
(h)	Vented v apor saturation factor = (1) / (11 + 10.053) x (v apor pressure of	t av eraae di	aily liquid	surface temper	ature (psia)1 v	[v apor s	bace outage A	t}]): See Refer	ence (17)		
((Average daily ambient temperature (°R) = (laverage daily maximum a	mbient tem	perature {	R}1 + laverage	daily minimun	ambier	t temperature	(%R)1) / (2): See	Reference (18).		
G	If non-heated tank: Liquid bulk temperature (°R) = (av erage daily ambi	ient temperc	ture [°R])	+ ([0.003] x [tai	nk shell surface	solar ab	orptance {°R}]				
	x [av erage daily total insolation factor (Btu/ft²-day)]); See Reference (1	9).									
	For heated tanks, the setpoint temperature for the storage tank is assum	ed to be rep	resentati	e of the liquid	oulk temperat	ure.					
(k)	Av erage v apor temperature (°R) = ([2.2 x $\frac{1}{10} + 1)$ / $\frac{1}{10}$	diameter ft	}+1.1]>	av erage dail	ambient tem	perature	{°R}] + [0.8 × {lic	uid bulk temp	erature °R }] + [0	0.021	
	x {tank roof surface solar absorptance} x {av erage daily total insolation	factor Btu/f	†²-day }]	+ [0.013 x {tank	shell height ff	}/{tan	diameter ft	} x {tank shell s	urface solar absorp	otance}	
	x {av erage daily total insolation factor { Btu/ft²-day }]) / (2.2 x [tank she	ell height {ft}]	/ [tank	diameter (ft)] +	.9); See Refere	ence (20)					
((Vapor density (lb/ft*) = ([v apor molecular weight {lb/lb-mole}] x [true v d	apor pressure	e {psia}]) ,	' ([10.731 psia-ft	/lb-mole-°R] x	[averag	e vapor temp	erature {°R}]); S	ee Reference (21)		
(m)	Annual standing loss (lb/yr) = (365) x (v apor space exp. factor per day)	x ([π/4] x [d	iameter (f	t}]²) x (v apor sp	ace outate (ff]) x (v er	ted v apor satu	uration factor)	x (stock v apor de	nsity [lb/ftª])	
	x (1 - [control efficiency {%} / 100]); See Reference (22).										
(n)	Daily standing loss (Ib/day) = (annual standing loss [Ib/yr]) / (365 days/y	r)									
(0)	Net working loss throughput $(ff^{a}/yr) = (5.614 ff^{a}//bbl) \times (total annual through$	ughput [bbl/	yr]); See	Reference (23).							
(p)	Annual sum of the increases in liquid lev el (ff/yr) = ([5.614] x [total annual	al throughpu	t {bbl/yr}]) / ([π/4] x [tan	k diameter {ft}]	²); See R	eference (24).				
(9)	Number of turnov ers per year = (annual sum of the increases in liquid lev	/el [ft/yr]) / ([maximur	n liquid height {	t}] - [minimum	liquid he	aight {ft}]); See I	Reference (25).			
(1)	If N <= 36, working loss turnov er factor equal to 1, or working loss turnov e	erfactor = ([1	80] + [nui	mber of turnov e	rs per year]) /	([6] x [nu	mber of turnov	ers per year]);	See Reference (2)	').	
(3)	Annual working loss (lb/yr) = (net working loss throughput [ff³/yr]) x (work	ing loss turno	verfacta	r) x (working los:	product facto	or) x (v ap	or density [lb/f	tª]) x (v ent set	ting correction fac	tor)	
(1	x (1- [control efficiency (%) / 100]); See Reference (28).							(111)			
	Dally working loss (ID/day) = (net working loss throughput [ft²/day]) x (wi	orking loss tur	nov er taa	ctor) x (working	oss product ta	ctor) x (v	apor aensity (i	o/π·j) x (vent	setting correction t	actor)	
(u)	x (1 - [control elliclency (%) / 100]); see Reletence (28).		working k	vses //b/vr111 v	top/2000.lb):	Coo Pofo	ence (29)				
(v)	$D_{ally} total tank routine losses (Ib/day) = (Ially standing losses (Ib/day)) = (Ia$)] + [annoar E (daibuwarki	ing losses	Ib (day)): See F	eference (29)	See Kelei	ence (27).				
(w)	Duily for an known e losses (ib/ddy) = (ddily standing losses (ib/ddy)) = Average hours tank routine losses (ib/ddy) = (ddily total tank routine losses)	F (Gally Work	Iday/24	n)	elelelice (27).						
	Average noony rank roome losses (ib/m) - (adily roral rank roome losse.	3[10/009]]/x	(009/24)	•)							
Re	ferences										
(1)	See Table 2. Storage Tanks—Input Assumptions and Parameters										
(2)	See Table 1, Input Process Rates and Parameters.										
(3)	Conservative assumption based on typical tank designs.										
(4)	AP-42, Chapter 7 (June 2020); see equation 1-36. For vertical tanks, valu	e set to 1. Fo	or horizon	tal tanks, v alue	set to 0.						
(5)	Conservatively assumes 100 percent VOC content for mixture in tank. As	ssumed phys	ical prop	erties of predorr	inant VOC co	nstituent	as representati	ve of VOC cor	ntent of mixture.		
(6)	AP-42 Chapter 7.1 (Nov ember 2019) Table 7.1-3, "Physical Properties of S	elected Petr	ochemic	als." See table re	ference (b).						
(7)	AP-42 Chapter 7.1 (Nov ember 2019) Table 7.1-3, "Physical Properties of S	elected Petr	ochemic	als." Assumed ph	ysical properti	es of pre	dominant VOC	constituent as	representativ e of	VOC content o	fmixtur
(8)	AP-42, Chapter 7 (June 2020); Table 7.1-7. Assumes information for Eugen	ie, Oregon.									
(9)	AP-42, Chapter 7 (June 2020); see equation 1-11.										
(10)	AP-42, Chapter 7 (June 2020); Table 7.1-6.										
(11)	AP-42, Chapter 7 (June 2020); see equation 1-7.										
(12)	AP-42, Chapter 7 (June 2020); see equation 1-12.										
(13)	AP-42, Chapter 7 (June 2020); see equation 1-16. Per equation 1-16, liqu	id height typ	ocally ass	umed to be at t	he half-full lev	el in the	bsence of site	specific data.			
(14)	AP-42, Chapter / (June 2020); see equation 1-18 for cone roofs (assumes	standard co	one roof sl	ope of 0.0625 ft,	π), or see equ	ation 1-2	v tor dome roof	s (assumes mod	amed dome roof ro	aius equation).	·
(16)	AP-42, Chapter 7 (June 2020); see equation 1-17 for cone roots, or see ec	quation 1-19	tor aome	roots.							
(17)	AP-42, Chapter 7 (June 2020); see equation 1-16.	assura or the	Vapora	essure at av	ae daily fault	surfaces	emperatura				
(18)	AP-42, Chapter 7 (June 2020); see equation 1-21. Assumes true v apor pri AP-42, Chapter 7 (June 2020); see equation 1-20	us the	v upor pi	UI OV ero	ge aaliy liquid	30110Ce	emperarure.				
(19)	AP-42 Chapter 7 (June 2020); see equation 1-30.										
(20)	AP-42 Chapter 7 (June 2020); see equation 1-32. Note the simplified ver	sion of this er	auation 4	a equation 1-	33) was not us	ed since	HS/D is not equ	al to 0.5 and	allows for variance	es in a _n and a	
(21)	AP-42, Chapter 7 (June 2020); see equation 1-32. Note the simplified Ver		, sandti (t								
(22)	AP-42, Chapter 7 (June 2020); see equation 1-4.										
(23)	AP-42, Chapter 7 (June 2020); see equation 1-39.										
(24)	AP-42, Chapter 7 (June 2020); see equation 1-37.										
(25)	AP-42, Chapter 7 (June 2020); see equation 1-36.										
(26)	AP-42, Chapter 7 (June 2020); see notes for equation 1-35. Assumes KP =	0.75 for crud	e oils, or 1	for all other org	anic liquids.						
(26)	AP-42, Chapter 7 (June 2020); see notes for equation 1-35. Assumes KP = AP-42, Chapter 7 (June 2020); see notes for equation 1-35.	0.75 for crud	e oils, or 1	for all other org	anic liquids.						
(27)	AP-42, Chapter 7 (June 2020); see notes for equation 1-35. Assumes KP = AP-42, Chapter 7 (June 2020); see notes for equation 1-35. AP-42, Chapter 7 (June 2020); see equation 1-35.	0.75 for crud	e oils, or 1	for all other org	anic liquids.						

		Tabl	o.4		
				•	
Productio	on Line 2 S	storage Ian	k 18 VOC Emission Estin	nates	
	OR-CAL	, Inc.—Juno	ction City, Oregon		
Parameter		(Units)	Producti	on Line 2	AP-42 Variable
PRODUCTION VALUES					
Storage Tank ID	(1)	-	T8 (Store	ge Tank)	
Total Number of Storage Tanks	(1)				
Total Annual Throughput	(1)	(gal/yr)	2,260	,820	
Total Annual Throughput	(a)	(bbl/yr)	53,	329	Q
Maximum Daily Throughput	(1)	(gal/day)	11,	750	
Maximum Daily Throughput	(a)	(bbl/day)	2	0	
Annual Days of Operation	(2)	(days/yr)	3/	5	
TANK PROPERTIES					
Tank Type (Fixed Roof or Internal Floating Roof Tank)	(1)		Fixed	Roof	
Heated or Non-heated?	(1)		Non-H	eated	
Controlled or Fugitive?	(1)		Fug	tive	
Control Efficiency	(1)	(%))	
Tank Roof Color	(1)		WI	ite	
Tank Roof Condition	(1)		Ave	age	
Tank Shell Color	(1)		WI	ite	
Tank Shell Condition	(1)		Ave	age	
Horizontal or Vertical	(1)		Ver	ical	
Tank Diameter	(1)	(ft)	10	.0	D
Tank Shell Height	(1)	(ft)	2	.0	Hs
Roof Type	(3)		Do	me	
Maximum Liquid Height	(1)	(f†)	20	.0	H _{LX}
Minimum Liquid Height	(4)	(f†)	1.	00	H _{LN}
TANK CONTENT PROPERTIES					
Liquid Temperature	(1)	(°F)	77	.0	Т
Liquid Molecular Weight	(5)	(lb/lb-mole)	46	.1	ML
Vapor Molecular Weight	(5)	(lb/lb-mole)	40	.1	M _V
True Vapor Pressure	(b)	(psia)	1.	14	P _{VA}
ENVIRONMENTAL FACTORS					
Average Daily Maximum Ambient Temperature	(8)	(°R)	51	2	T _{AX}
Average Daily Minimum Ambient Temperature	(8)	(°R)	50	12	T _{AN}
Average Daily Total Insolation on a Horizontal Surface	(8)	(Btu/ft ² -day)	1,2	04	I
CALCULATED VARIABLES				;;;;;	
Standing Loss Calculations					
Average Daily Ambient Temperature Range	(c)	(°R)	20	.1	ΔT_A
Tank Roof Surface Solar Absorptance	(10)		0.	25	a _R
Tank Shell Surface Solar Absorptance	(10)		0.	25	as
Average Tank Surface Solar Absorptance	(d)		0.	25	a
Average Daily Vapor Temperature Range	(e)	(°R)	20	.1	ΔT_V
Vapor Space Expansion Factor	(1)		0.0	36	Ke
Liquid Height	(13)	(††)	10	.5	HL
Tank Shell Radius	(1)	(††)	5.	00	_
lank Root Height	(14)	(11)			Rs
Root Outage	(10)	()	1.	34	Rs H _R
	(15)	(ft)	0.	34 59	Rs H _R H _{RO}
Vapor Space Outage	(15)	(ft) (ft)	1. 0. 11	34 59 .2	R _S H _R H _{RO} H _{VO}
Vapor Space Outage Vented Vapor Saturation Factor	(15) (g) (h)	(ft) (ft) 	1. 0. 1 0.	34 59 .2 50	Rs HR HRO HVO KS -
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature	(15) (g) (h) (i)	(ft) (ft) (°R)	1 0 1 0. 5	34 59 .2 50 2 2	Rs HR HRO HVO Ks TAA
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature	(15) (g) (h) (i) (j)	(ft) (ft) (°R) (°R)	1 0 1 0 5 5	34 59 2.2 50 2 3 5	R ₅ H _R H _{RO} H _{VO} K ₅ T _{AA} T _B
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature	(15) (9) (h) (i) (i) (k)	(ft) (ft) (°R) (°R) (°R)	1 0 0 0 5 5 5	34 59 2 2 3 3 5 5	Rs HR HRO HVO Ks TAA T8 TV
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature Stock Vapor Density	(15) (g) (h) (i) (j) (k) (l) (l)	(ft) (ft) (°R) (°R) (°R) (Ib/ft ³)	1. 0 1 0 5 5 5 5 9.5	34 59 2 2 3 5 5-03	Rs HR HRO HVO Ks TAA T8 TV WV
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature Stock Vapor Density Annual Standing Loss	(15) (9) (h) (i) (j) (k) (l) (l) (m)	(ft) (ft) (°R) (°R) ([°] R) ([°] R) ([°] R) ([°] R) ([°] R)	1 0 0 1 0 0 0 5 5 5 5 5 5 6 6 6	34 59 2 2 3 5 5 -03 	Rs HR HRO HVO KS TAA TB TV WV Ls
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss	(15) (g) (h) (i) (j) (k) (k) (l) (m) (m)	(ft) (ft) (°R) (°R) (lb/ft ³) (lb/yr) (lb/day)	1 0 0 5 5 5 5 5 5 6 6 6 0 0	55 50 50 2 3 5 5 5 5 5 5 8 8 8	Rs HR HROO HVOO KS TAA TB TV WV LS
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Calculations	(15) (g) (h) (i) (j) (k) (l) (m) (n)	(ft) (ft) (°R) (°R) (lb/ft ³) (lb/yr) (lb/yr)	1 0 1 0 5 5 5 5 5 5 5 5 5 6 6 6 0	54 59 50 2 3 5 5 5 5 5 8 9 8 8	Rs Hg HRco Hvo Ks TAA Tb Tv Wv Ls
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Average Vapor Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput	(15) (g) (h) (i) (i) (k) (i) (k) (i) (m) (n) (o)	(ft) (ft) (°R) (°R) (lb/ft ³) (lb/yr) (lb/yr) (lb/day)	1 0 1 0 5 5 5 5 5 5 5 5 5 5 6 6 6 0 0 0 0 0 0	59 22 23 55 603 9 18 196 196	Rs Hg Hgo Hvo Ks Tas Tv Wv Ls
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput Annual Sum of the Increase Is Liquid Level	(15) (g) (h) (i) (i) (k) (k) (i) (n) (n) (o) (o) (c)	(ff) (ff) (°R) (°R) (Ib/ff ³) (Ib/yr) (Ib/yr) (Ib/dgy) (ff ³ /yr) (ff/yr)	1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Rs HR HRO HVO KS TAA TB TV WV Ls
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Demsetry Annual Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Throughput	(15) (g) (h) (i) (i) (k) (i) (k) (i) (n) (n) (n) (n) (n) (o) (p) (q) (d)	(ff) (ff) (^c R) (^c R) (^l D/ff ³) (^l D/ff ³) (^l D/day) (^{ff)} /yr) (^{ff)} /yr)	1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	34 59 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	R ₃ H _R H _{RO} H _{VO} K _S T _{AA} T _B T _V W _V L _S V _Q ΣH _{QI} N
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Claculations Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Throughput	(15) (g) (h) (i) (i) (k) (l) (n) (n) (n) (n) (o) (c) (c) (c) (c) (c) (c) (c)	(ff) (ff) (^o R) (^o R) (ⁱ CR) (ⁱ D/ff ³) (ⁱ D/ff ³) (ⁱ D/dy) (ⁱ D/dy) (ⁱ f/yr) (ⁱ f/yr)	1 0 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 5 -03 -9 -8 -8 -9 -8 -9 -8 -9 -8 -9 -8 -9 -8 -9 -8 -9 -9 -8 -9 -9 -9 -9 -9 -9 -9 -9 -9 -9	Rs HR HROO HVOO KS TAA TV WV LS ZHGI N KN
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Daily Standing Loss Working Loss Throughput Annual Net Working Loss Throughput Number of Turnovers per Year Working Loss Turnover (Saturation) Factor per Year Daily Net Working Loss Throughput Daily Net Working Loss Throughput Daily Wet Working Loss Throughput	(15) (g) (h) (i) (i) (i) (k) (i) (k) (i) (k) (i) (k) (i) (k) (i) (i) (i) (i) (i) (i) (i) (i) (i) (i	(ff) (ff) (ff) (°R) (°R) (Ib/ff ³) (Ib/yr) (Ib/day) (ff ³ /yr) (ff/yr) (ff/yr) (ff/day)		54 59 2 2 3 5 5 -0-3 -	Rs Hg Hgo Hvo Ks Total Tg Wv Ls Vo XHol N KN Vo
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput Annual Net Working Loss Throughput Number of Turnovers per Year Working Loss Turnover (Saturation) Factor per Year Daily Stw or the Increase is Liquid Level Number of Jurnovers per Year Daily Stw or the Increase is Liquid Level Daily Sum of the Increase is Liquid Level Daily Sum of the Increase is Liquid Level Daily Sum of the Increase is Liquid Level	(15) (g) (h) (i) (i) (j) (k) (i) (k) (n) (n) (n) (n) (c) (g) (g) (g) (f) (c) (c) (c) (c) (c)	(ff) (ff) (ff) (°R) (°R) (lb/yt) (lb/yt) (lb/yt) (lb/yt) (ff ³ /yt) (ff ³ /yt) (ff ³ /yt) (ff ³ /day) (ff ³ /day)	1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 22 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Rs H _R H _{RO} Hvo Ks TAA TB Tv Wv Ls O Va Va Va KN Va
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Warding Loss Figure (Experiment)	(15) (g) (h) (i) (i) (k) (i) (k) (i) (m) (m) (m) (m) (m) (m) (m) (m) (m) (m	(ff) (ff) (fR) (°R) (lb/ff ³) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (ff/yr) (ff/yr) (ff/day) (ff/day) (ff/day)	1 0 1 0 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	R ₃ H _R H _{RO} H _{VO} K ₅ T _{AA} T _B Tv Wv L ₅ V _Q ZH _{QI} N K _N V _Q ZH _{QI} N K _N V _Q ZH _{QI} N
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stack Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Throughput Annual Net Working Loss Throughput Annual Net Working Loss Throughput Ouriging Loss Vorking Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day	(15) (g) (h) (i) (i) (k) (i) (k) (n) (n) (n) (n) (p) (g) (g) (g) (g) (g) (g) (g) (g) (g) (g	(ff) (ff) (ff) (°R) (°R) (Ib/ff ³) (Ib/ff ³) (Ib/day) (Ib/day) (ff ³ /yr) (ff/yr) (ff/day) (ff/day) (ff/day)	1 0 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 -03 -9 18 -03 -03 -9 18 -03 -03 -03 -03 -03 -03 -03 -03	Rs HR HRO HVO Ks TAA Ty Wv Ls Hold VQ Ls Khold VQ ZHQI N KN VQ ZHQI N KN ZHQI N KN KN KK N KN KK N KN
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Claculations Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Turnover (Factor	(15) (g) (h) (i) (i) (k) (i) (k) (r) (r) (r) (r) (r) (r) (r) (r) (r) (r	(ff) (ff) (^c R) (^c R) (^l b/ff ³) (^l b/ff ³) (^l b/ff ³) (^l b/day) (^{ff/3} /day) (^{ff/3} /day) 	1 0 0 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 5 5 5 5 5 5 5 5 5 5 5 5	Rs HR HRO HVO KS TAA TB TV WV LS ZHGI N ZHGI N KN
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Daily Standing Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Turnover (Saturation) Factor per Year Daily Net Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day	(15) (a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	(ff) (ff) (ff) (°R) (°R) (Ib/ff ³) (Ib/ff ³) (Ib/day) (ff ³ /day) (ff ³ /day) (ff/day)	1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5	54 59 2 2 3 5 5 -0-3 5 -0-3	Rs H _R H _{RO} H _{VO} K _S Total Ts Tv Wv Ls Vo XH _{QI} N K _N
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Daily Standing Loss Throughput Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Turnoughput Daily Net Working Loss Throughput Daily Net Working Loss Throughput Verking Loss Turnover (Saturation) Factor per Year Doily Net Working Loss Throughput Daily Starding Loss Turnoughput Daily Starding Loss Turnoughput Daily Starding Loss Turnoughput Daily Starding Loss Turnoughput Daily Starding Loss Turnover (Saturation) Factor per Year Working Loss Turnover Saturation) Factor per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Turnover (Saturation) Factor per Day Daily Starding Loss Turnover (Saturation) Factor per Day Daily String L	(15) (a) (b) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	(ft) (ft) (ft) (ft) (eR) (eR) (b/ft ³) (b/ft ³) (b/yr) (ft/yr) (ft/yr) (ft/yr) (ft/day) (1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5	34 59 .2 50 2 3 5 :03 .9 18 196 48 33 31 71 .0 .05 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00 .00	Rs H _R H _{RO} H _{VO} Ks TAA TB TV Wv Ls VQ ΣHQI N KN VQ ΣHQI N KN
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Daily Standing Loss Working Loss Calculations Annual Net Working Loss Throughput Annual Net Working Loss Throughput Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Turnover (Saturation) Factor per Year Daily Net Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Daily Working Loss	(15) (g) (h) (l) (l) (k) (l) (m) (m) (m) (m) (c) (c) (c) (c) (c) (c) (c) (c) (c) (c	(ff) (ff) (fR) (°R) (°R) (Ib/fr ³) (Ib/yr) (Ib/yr) (ff ³ /yr) (ff/yr) (ff/yr) (ff/day)	1 0 1 0 1 0 5 5 5 5 5 5 5 5 5 5 5 5 5	34 59 .2 50 2 3 5 -03 .9 18 196 48 33 31 71 .0 .05 .00 .00 .00 .00 .00 .00 .00 .00	R ₃ H _R H _{RO} H _{VO} K _S T _{AA} T _B T _V W _V L _S V _Q ZH _{QI} N K _N V _Q ZH _{QI} N K _N V _Q ZH _{QI} N K _N K _R L _W
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Claculations Annual Net Working Loss Throughput Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Turnover (Saturation) Factor per Year Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Morking Loss Daily Working Loss Dail	(15) (g) (h) (i) (i) (k) (k) (n) (n) (n) (n) (n) (n) (n) (n) (n) (n	(ft) (ft) (ft) (°R) (°R) (lb/ft ³) (lb/yr) (lb/day) (ft ³ /day) (ft ³ /day) (ft ³ /day) (ft/day) (ft/day) (ft/day) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (lb/yr) (ft ³ /day) (ft/day)		54 59 2 3 5 -003 5 -003 .9 8 8 -003 .9 8 8 -003 .0 9 196 48 33 31 71 .0 0 5 5 00 00 00 00 00 00 00 00 00 00 00	Rs HR HRO HVO Ks TAA TV WV Ls Ls PHOI N KN VQ EHQI N KN VQ EHQI N KN KN KN KR Lk KN KR KR Lk K8 Lk K8 Lk K8 Lk K8 Lk
Vapor Space Outage Vented Vapor Saturation Factor Average Daily Ambient Temperature Liquid Bulk Temperature Stock Vapor Density Annual Standing Loss Daily Standing Loss Working Loss Claculations Annual Net Working Loss Throughput Annual Sum of the Increase is Liquid Level Number of Turnovers per Year Working Loss Throughput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Pear Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Turnover (Saturation) Factor per Day Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Turnover (Saturation) Factor per Day Daily Vorking Loss Daily Total Tank Routine Losses Daily Total Tank Routine Losses	(15) (g) (h) (i) (i) (k) (i) (k) (i) (i) (i) (i) (i) (i) (i) (i) (i) (i	(ff) (ff) (ff) (^o R) (^o R) (^o R) (ⁱ b/y7) (ⁱ b/y7) (ⁱ b/y7) (ⁱ f) ³ /day) (ⁱ		34 59 .2 50 2 3 5 -03 .9 18 196 48 13 31 71 .0 00 00 00 77 .0 10 10 11	Rs HR HRO HVO KS TAA TV WV LS ZHGI N ZHQI N KN KN

		Table (6 (C	ontinued	d)			
Productio	n Line 2	Storaae	e Tar	nk T8 VO	CE	mission	Estir	mates
	OR CAL	Inc	lum	alion Cit)rogon		1
	OK-CAL	., mc.—	1011		y, C	Jegon		
Notes								
bbl = barrel.								
Btu = British thermal unit.								
°C = degrees Celsius.								
°F = dearees Fahrenheit.								
ft = foot								
$t^2 = course foot$								
II = CODIC 1001.								
gai = galion.								
ib = pound.								
lb-mol = pound mole.								
mm Hg = millimeters mercury.								
psi = pounds per square inch.								
psia = pounds per square inch absolute.								
°R = degrees Rankine.								
yr = year.								
(a) Total annual or daily throughput (bbl/"unit") = (total annual or daily thro	ughput (gal	l/"unit"]) x	(bbl/4	2 gal)				
(b) Vapor pressure (psia) = (0.019337 psi/mm Ha) x (10)^([constant A] - [[con	nstant B (°C)	} / {(fliauid	Itema	erature (°F)	1 - 32	2) x (5/9) + (const	tent C [°C])}]): See Reference (6).
Constant 4 =	8 247	(7)			1	-,,.,.,		
Constant A (90) -	1/70.4	(7)						
Considni B (-C) =	16/0.4	(7)						
Constant C (°C) =	232.96	(7)						
(c) Av erage daily ambient temperature range ("R) = ([daily maximum ambient)	pient temper	ature ("R}]	- [do	ily minimum	amt	pient tempe	ratu	ine {"R}]); See Reference (9).
Av erage tank surface solar absorbance = ([tank roof surface solar absor	ptance] + [t	tank shell s	urfac	e solar abso	orpta	nce]) / 2; Se	e Re	aterence (IU).
(e) Av erage daily v apor temperature range (eR) = ([0.7] x [av erage daily t	emperature	range {°R}]) + ([0.02] x [ave	erage	e tank surfa	ce so	afar absorptance]
x [av erage daily total insolation factor (Btu/ff2-day)]); See Reference (1	1).							
(1) Vapor space expansion factor = (0.0018) x (av erage daily v apor tempe	erature rang	e [°R]); Se	e Refe	erence (12).				
(g) Vapor space outage (ff) = (tank shell height [ff]) - (liquid height [ff]) + (re	oof outage [ft]); See Re	eferer	ce (16).				
(h) Vented v apor saturation factor = (1) / ([1] + [0.053] x [v apor pressure at	t av erage d	aily liquid :	surfac	e temperat	ture {	psia}] x [v a	por s	space outage (ft)); See Reference (17).
() Av erage daily ambient temperature (°R) = ((av erage daily maximum a	mbient tem	oerature (*	R}1 +	íaveraae d	Iailv r	ninimum an	nbier	nt temperature (%)1) / (2); See Reference (18).
() If non-beated tank: Liquid bulk temperature (°R) = (average daily ambi	ient tempero	nture (°R1)	+ (10)	1031 x Itank	shell	surface solo	nab	Somtance (%R)
x law arrange daily total insolation factor (Rty (#2 day)1); See Reference (1)	01		. ([0.		51101			Additional (M)
x [average daily for an insolation racio (storn - day)]), see kelerence (n	7). 			le e Kenndel len				
For heared ranks, the serpoint temperature for the storage rank is assume	ed to be rep	senialiv		ne ilquia bi	JIKTE	mperature.		
Average v apor temperature ("K) = ([2.2 X {rank snell neight IT } / {rank	aiameter fi	r }+1.1] x	lave	rage aally c	ampi	ent temper	ature	3 (*k]] + [0.8 x (liquid buik temperature *k }] + [0.021
x {tank roof surface solar absorptance} x {average daily total insolation	factor Btu/	ft*-day }]	+ [0.0	13 x {tank sh	nell h	eight ff }/	{tan	1k diameter ft }x {tank shell surface solar absorptance}
x {av erage daily total insolation factor { Btu/ft²-day }]) / (2.2 x [tank sh	ell height {ft}] / [tank c	diame	ter {ft}] + 1.9	?); Se	e Reference	e (20)	ð
(I) Vapor density (Ib/ft ^a) = ([v apor molecular weight {Ib/Ib-mole}] x [true v of the second se	apor pressure	e {psia}]) /	([10.7	'31 psia-ftª/l	lb-mo	ole-°R] x [av	erag	ge v apor temperature {°R}]); See Reference (21).
(m) Annual standing loss (lb/yr) = (365) x (v apor space exp. factor per day)	x ([π/4] x [d	iameter (ft) x[] 2	(v apor spa	ceo	utate [ff]) x	(v er	nted v apor saturation factor) x (stock v apor density [lb/ftª])
x (1 - [control efficiency (%) / 100]); See Reference (22).								
(n) Daily standing loss (lb/day) = (annual standing loss [lb/yr]) / (365 days/y	r)							
(o) Net working loss throughput (ff²/yr) = (5.614 ff²//bbl) x (total annual throu	ughput (bbl,	/yr]); See F	Refere	nce (23).				İ
(p) Annual sum of the increases in liquid level (ff/yr) = ([5.614] x [total annual	al throughpu	it {bbl/yr}]) / ([π	/4] x [tank d	diam	eter {ft}] 2); S	ee R	Reference (24).
(q) Number of turnov ers per year = (annual sum of the increases in liquid lev	/el[ft/vr])/(Imaximun	n liqui	d height (ff)	1 - [m	ninimum liqu	id he	eight (ft)]): See Reference (25)
(1) If N <= 36 working loss turnov er factor equal to 1, or working loss turnov e	r factor = ([]	801 + (nun	nher	oftumovers	ner	(earl) / ([6]	x Ini	mber of turnovers per year 1: See Reference (27)
(i) Appugl working loss femer of fact working loss three open in (i) appugl working loss femer of a section of the fact working loss three open in (ii) appugl working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of a section of the fact working loss femer of the fact working loss femer of a section of the fact working loss femer of t	ing loss turns	worfactor	d v hu	orking loss n	por j	int factor) v	hear	and an density (Ib (#11) × (v ant satting correction factor)
Alihodi wolking loss (losy) – (ner wolking loss intologi por (in /yij) x (wolking loss)	ing ioss ionic) X (W	unung ioss p	Jour		(v u	dordensity (b/n)) x (veni sening conection racio)
x (1- [control eniciency (%) / 100]); see Relefence (28).								
¹⁷ Daily working loss (lb/day) = (net working loss throughput [tf³/day]) x (w	orking loss tui	mov er tac	tor) x	(working los	s pro	duct tactor) x (v	vapor density [lb/ff*]) x (vent setting correction factor)
x (1 - [control efficiency (%) / 100]); See Reference (28).								
Annual total tank routine losses (tons/yr) = ([annual standing losses {lb/yr]	}] + [annual	working la	osses (I	o/yr}]) x (to	on/2,0	000 lb); See	Refe	mence (29).
(v) Daily total tank routine losses (lb/day) = (daily standing losses [lb/day]) -	+ (daily work	ing losses [lb/do	y]); See Ref	feren	ce (29).		
(w) Av erage hourly tank routine losses (lb/hr) = (daily total tank routine losses	s [lb/day]) x	(day/24 h	nr)					
References								
(1) See Table 2, Storage Tanks—Input Assumptions and Parameters.								
(2) See Table 1, Input Process Rates and Parameters.								
(3) Conservative assumption based on typical tank desians.								<u>i</u>
(4) AP-42, Chapter 7 (June 2020); see equation 1-36. For vertical tanks value	e set to 1. F	or horizont	al tar	iks, value se	et to (D.		
⁽⁵⁾ Conservatively assume 100 percent VOC content for mixture in tank Ac	sumed obve	ical propo	rties o	foredomine	ant V	OC constitu	ient -	as representative of VOC content of mixture
(6) AP-42 Chapter 7.1 (November 2010) Table 7.1.2 "Physical Pro-	elected Prival	rochemic -		e table refe	V	e (b)		
Vr-42 Chapter 7.1 (November 2017) Table 7.1-3, Physical Properties of 3	elected reli	, .	15. 30			.e (b).		
Mr-42 Chapter 7.1 (November 2019) Table 7.1-3, "Physical Properties of S	elected Peti	rocnemico	ais.' As	sumed phys	sical	properties o	ı pre	suporminaria vOC constituent as representative of VOC content of mixtu
(a) AP-42, Chapter 7 (June 2020); Table 7.1-7. Assumes information for Eugen	ie, Oregon.							
AP-42, Chapter 7 (June 2020); see equation 1-11.								
⁽¹⁰⁾ AP-42, Chapter 7 (June 2020); Table 7.1-6.								
(11) AP-42, Chapter 7 (June 2020); see equation 1-7.								
(12) AP-42, Chapter 7 (June 2020); see equation 1-12.								
⁽¹³⁾ AP-42, Chapter 7 (June 2020); see equation 1-16. Per equation 1-16, liqu	id height typ	pically assu	med	to be at the	e hal	f-full lev el in	the	dubsence of site-specific data.
(14) AP-42, Chapter 7 (June 2020); see equation 1-18 for cone roofs (assumes	standard co	one roof sk	ope o	f 0.0625 ft/ft), or s	ee equatio	n 1-2	20 for dome roofs (assumes modified dome roof radius equation).
(15) AP-42, Chapter 7 (June 2020); see equation 1-17 for cone roofs. or see equation	quation 1-19	for dome	roofs.					
(16) AP-42, Chapter 7 (June 2020); see equation 1-16.								
⁽¹⁷⁾ AP-42, Chapter 7 (June 2020): see equation 1-21. Assumes true v apor pr	essure as the	e v anor pr	essure	ataveraa	e da	ilv liquid sud	ace	emperature.
(18) AP-42 Chapter 7 (June 2020); see equation 1-30					, au	,		
(19) AP-42, Chapter 7 (June 2020), see equation 1-30.								
(20) AD 40 Character 7 (June 2020); see equation 1-31.						 		
AP-42, Chapter / (June 2020); see equation 1-32. Note the simplified v er	sion of this ea	quation (e	.g. ec	uation 1-33	s) wa	is not used s	ince	: $\mu_{S/D}$ is not equal to 0.5, and allows for variances in a_R and a_S .
Ar-42, Chapter / (June 2020); see equation 1-22.								
AP-42, Chapter 7 (June 2020); see equation 1-4.								
(23) AP-42, Chapter 7 (June 2020); see equation 1-39.								
(24) AP-42, Chapter 7 (June 2020); see equation 1-37.								
(25) AP-42, Chapter 7 (June 2020); see equation 1-36.								
(26) AP-42, Chapter 7 (June 2020); see notes for equation 1-35. Assumes KP =	0.75 for crud	le oils, or 1	for all	other organ	nic lic	quids.		
(27) AP-42, Chapter 7 (June 2020); see notes for equation 1-35.				-				
(28) AP-42, Chapter 7 (June 2020); see equation 1-35.								
⁽²⁹⁾ AP-42, Chapter 7 (June 2020); see equation 1-1.								

		Tabl	e 7		
Produ	ction Line 2 S	torage Tan	k T4B VOC Emission Estin	nates	
	OR-CAL	, Inc.—Jun	ction City, Oregon		
Parameter		(Units)	Producti	on Line 2	AP-42 Variable
PRODUCTION VALUES		1	T40 (Cher	an Teally	
Storage Tank ID	(1)		14B (Stor	nge lank)	
Total Annual Throughput	(1)	(gal/yr)	1,73	,580	
Total Annual Throughput	(a)	(bbl/yr)	41,	419	Q
Maximum Daily Throughput	(1)	(gal/day)	9,0	41	
Maximum Daily Throughput	(a)	(bbl/day)	2	5	
Annual Days of Operation	(2)	(days/yr)	30	5	
TANK PROPERTIES		r			
Tank Type (Fixed Root or Internal Floating Root Tank)	(1)		Fixed	Roof	
	(1)		Fuci	tive	
Control Efficiency	(1)	(%)	109		
Tank Roof Color	(1)		WI	ite	
Tank Roof Condition	(1)		Ave	age	
Tank Shell Color	(1)		WI	ite	
Tank Shell Condition	(1)		Ave	age	
Horizontal or Vertical	(1)	-	Ver	ical	-
Iank Diameter	(1)	(ft)	9.	0	D
Poof Type	(3)	(11)	20		Hs
Maximum Liquid Height	(1)	 (ft)	Do	0	
Minimum Liquid Height	(4)	(1)	1	0	Him
		()	··· ··		• *EN
Liquid Temperature	(1)	(°F)	77	.0	Т
Liquid Molecular Weight	(5)	(lb/lb-mole)	40	.1	ML
Vapor Molecular Weight	(5)	(lb/lb-mole)	40	.1	Mv
True Vapor Pressure	(b)	(psia)	1.	4	P _{VA}
ENVIRONMENTAL FACTORS	101		-	-	
Average Daily Maximum Ambient Temperature	(8)	(°R)	52	2	T _{AX}
Average Daily Minimum Ambient Temperature	(8)	(⁻ K)	51	04	I
		(BIU/II -ddy)	1,4	04	'
Standing Loss Calculations					
Average Daily Ambient Temperature Range	(c)	(°R)	20	.1	ΔΤΑ
Tank Roof Surface Solar Absorptance	(10)		0.	25	CI _R
Tank Shell Surface Solar Absorptance	(10)		0.	25	as
Average Tank Surface Solar Absorptance	(d)		0.	25	a
Average Daily Vapor Temperature Range	(e)	(°R)	20	.1	ΔT _v
Vapor Space Expansion Factor	(1)		0.0	36	KE
Liquid Heigni Tank Shell Padius	(1)	(11)	1	50	HL P.
Tank Roof Height	(14)	(11)	4.	20 21	Ho
Roof Outage	(15)	(ft)	0.	62	H _{RO}
Vapor Space Outage	(9)	(ft)	10	.6	H _{VO}
Vented Vapor Saturation Factor	(h)	-	0.	61	Ks
Average Daily Ambient Temperature	(i)	(°R)	5	2	T _{AA}
Liquid Bulk Temperature	(j)	(°R)	5	3	TB
Average Vapor Temperature	(k)	(°R)	5	5	Tv
Stock Vapor Density	(1)	(lb/ft ³)	9.5	-03	Wv
Daily Standing Loss	(m)	(Ib/day)	5	./	L _S
Working Loss	1.4	(ID/ddy)	0.	4	
Annual Net Working Loss Throughput	(0)	(ft ³ /vr)	232	524	Vo
Annual Sum of the Increase is Liquid Level	(p)	(ft/yr)	3,6	55	ΣH _{QI}
Number of Turnovers per Year	(q)	-	20	3	N
Working Loss Turnover (Saturation) Factor per Year	(r)		0.	31	K _N
Deily Met Merking Less Three shows	(0)	(ft ³ /day)	1,2	08	V _Q
Daliy Net working Loss throughput	(-)	(,			711
Daily Sum of the Increase is Liquid Level	(p)	(ft/day)	15	.0	ΣH _{QI}
Daily see working Loss Introloginput Daily Sum of the Increase is Liquid Level Number of Turnovers per Day	(a) (q)	(ft/day) 	19	.0 06	ΣH _{QI} N
Dairy Ner Working Loss Introdgrippi Dairy Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Turnover (Saturation) Factor per Day	(p) (q) (r)	(ft/day) 	15 1. 1.	.0 96 00	N K _N
Daily Net Working Loss Introduction Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Product Factor	(p) (q) (r) (26) (27)	(ff/day) 	19 1. 1. 1.	.0 06 00 00	ΣH _{QI} N K _N K _P
Daily Ner Working Loss Intradigipul Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Product Factor Vent Setting Correction Factor Annual Working Loss	(p) (p) (q) (r) (26) (27) (s)	(ft/day) (lb/m)	19 1. 1. 1. 1.	.0 06 00 00 00	ΔΠ _{QI} N K _N K _P K ₈
Daily Ner Working Loss Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Product Factor Vent Setting Correction Factor Annual Working Loss Daily Working Loss	(c) (p) (q) (r) (26) (27) (s) (t)	(tr/day) (ff/day) (lb/yr) (lb/yay)	19 1. 1. 1. 1. 64	0 0 0 0 0 7 .5 	2 H _{GI} N Ksi K _P Kg Lw
Daily Ner Working Loss Intradigipui Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Product Factor Vent Setting Correction Factor Annual Working Loss Daily Working Loss Daily Working Loss	(1) (1) (2) (2) (2) (2) (2) (2) (2) (2) (2) (2	(tr) / day) (ff/day) (lb/yr) (lb/day) (tons/yr)	19 1. 1. 1. 1. 6 ⁶ 11 0.	0 06 00 00 77 55 37	Σh _{Gl} N K _N K _P K _B L _W L _Y
Daily Ner Working Loss Intradigipui Daily Sum of the Increase is Liquid Level Number of Turnovers per Day Working Loss Turnover (Saturation) Factor per Day Working Loss Product Factor Vent Setting Correction Factor Annual Working Loss Daily Working Loss Annual Total Tank Routine Losses Daily Total Tank Routine Losses	(c) (c) (q) (r) (28) (27) (s) (t) (t) (v) (v)	(ff/day) (lb/yr) (lb/day) (lb/day)	15 1. 1. 1. 1. 6' 1' 0. 1 1 1. 1. 1. 1. 1. 1. 1. 1.	.0 06 00 00 00 00 00 00 00 00 0	Σh _{Gl} N K _N K _P K ₈ Lw Lr

								1					
			Table 2	7 (Co	ntinue	4)							
	Productio	n line 2 S	torage	Tank		C Emission	Feti	mater					
	1100000110	II LINE Z J	loiuge	- unit			L311	indies					
		OR-CAL	., Inc.—	Junc	tion Cit	y, Oregon		i					
N.	atas												
N C	oles												
bb	bi = barrel.												
Btu	u = British thermal unit.												
°C	C = degrees Celsius.												
٩F	= dearees Fahrenheit.												
ft -	= foot												
11 *	- 1001.												
Π-	= square toot.												
ft ³	³ = cubic foot.												
go	al = gallon.												
lb	= pound.							1					
lb.	-mol = pound mole												
								i					
m	Im Hg = millimeters mercury.												
ps	si = pounds per square inch.												
ps	sia = pounds per square inch absolute.							i					
°R	e dearees Rankine.												
vr	= vegr							1					
(a)		and the second formed	//5		2 11								
	Total annual of a ally infoughput (bbl/ unit) = (foral annual of a ally info	ougripui (gai	/ Unii]) x	(001/42	zgaij								
(D)	Vapor pressure (psia) = (0.019337 psi/mm Hg) x (10)^([constant A] - [{co	onstant B (°C)	} / {([liquid	tempe	erature {°F}] - 32) × (5/9) + (const	tant C [°C])}]); Se	e Reference	⇒ (6).			
	Constant A =	8.247	(7)										
	Constant B (°C) =	1670.4	(7)										
	Constant C (9C) =	232.04	(7)					<u> </u>					
(c)	Average deity ambient temperature (***) = (*	hight town	11/7 ature (8011	Let - 2		ambiosttos	-	6 (9011): S == 0 (ronoo /01				
1-1	Average daily ambient temperature range ("K) = ([aaliy maximum am	uem remper	uiuie ("K}]	- laai	y minimum	ampient temp	erutu	е { ⁻ к}]]; See кеte	ience (9).				
(d)	" Av erage tank surface solar absorbance = ([tank roof surface solar absorbance]	orptance] + [t	ank shell s	urface	solar abso	rptance]) / 2; S	ee Re	erence (10).					
(e)	Average daily v apor temperature range (°R) = ([0.7] x [average daily	temperature	range {°R}]) + ([0	0.02] x [ave	erage tank surfa	ce so	ar absorptance]					
	x [average daily total insolation factor (Btu/ff2-dav)]): See Reference (11).											
(f)	Vanor space expansion factor = $(0.0018) \times (av orago doi/v =$	/	- 10D11-6-	a Pofe	ence (10)								
(-)	vapor space expansion ractor = (0.0018) x (average daily vapor temp	berature rang	e [·ĸ]); se	e keler	ence (12).								
(9)	vapor space outage (tt) = (tank shell height [ff]) - (liquid height [ff]) + (t	root outage [i	πj); See Re	eterenc	ce (16).								
(h)	Vented v apor saturation factor = (1) / ([1] + [0.053] x [v apor pressure of	at av erage d	aily liquid :	surface	e temperat	ure (psia)] x [v c	ipor s	pace outage {ft}); See Refer	ence (17).			
(1)	Av erage daily ambient temperature (°R) = ([av erage daily maximum of a state of a st	ambient temp	oerature {	'R}] + [o	av erage d	aily minimum ar	nbier	nt temperature {%	?}]) / (2); See	a Reference (18).			
0	If non-beated tank: Liquid bulk temperature (%) = (average daily amb	ient temper	ture (°R1)	+ ((0.00	131 x Itank	shell surface sol	ar ab	somtance (PR)					
				. ([0.00	ool x frank	5.10. 50.1000 50.							
	x [average daily total insolation factor (Btu/ff*-day)]); See Reference (19).											
	For heated tanks, the setpoint temperature for the storage tank is assured	ned to be rep	presentativ	e of th	ne liquid bu	ulk temperature.							
(k)	Average v apor temperature (°R) = ([2.2 x {tank shell height ft } / {tank	k diameter ff	}+1.1] x	[aver	age daily d	ambient temper	ature	{°R}] + [0.8 x {liqu	id bulk temp	oerature °R }] +	[0.021		
	x (tank roof surface solar absorptance) x (average daily total insolation	factor IBtu/	ft²-dav }]	+ [0.0]	3 x {tank sh	ell height 1ft1}	{tan	k diameter 1ft1}>	{tank shells	surface solar absc	rotar	ice}	
	x (av erage daily total insolation factor (1 Btu/ft2-day 131) / (2.2 x [tank st	ell height (ft)	/ Itank c	liamet	er /ft11 + 1 9	1: See Referenc	e (20)						
(1)		ioimoigin (in)	/ [IGHK C	///////////////////////////////////////	Ci (ii)] + 1.7	, see keierene	5 (20)		1 (00)11)				
	Vapor density (ib/π²) = ([v apor molecular weight {ib/ib-mole}] x [true v	apor pressure	e (psia}) /	([10.73	si psia-m²/i	p-mole-«k] x [a	/ erag	ge vapor temper	ature (**)]);	See Keterence (2	1).		
(m)	Annual standing loss (lb/yr) = (365) x (v apor space exp. factor per day) x ([π/4] x [d	iameter (ft	}]²) X (v apor spa	ce outate [ff]) >	(ver	ted v apor satur	ation factor)	x (stock v apor d	ensity	[lb/ff*])	
	x (1 - [control efficiency {%} / 100]); See Reference (22).							i i					
(n)	Daily standing loss (Ib/day) = (annual standing loss (Ib/yr)) / (365 days/	vr)											
(0)	Not working loss throughout (#2(vs) = (5.414 #2(/bbl) v. (total appual thro	ughput (bbl	(url): Soo F	oforor	00 (02)			+					
(-)			yij), see r	eleiei	100 (23).								
(P)	Annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in liquid level (π/yr) = ([5.614] x [foral annual sum of the increases in lincreases increases in	iai throughpu	[{nv\idd} t) / ((π/·	4) x (tank d	aiameter (17}]*);;	ее к	eterence (24).					
(q)	Number of turnov ers per year = (annual sum of the increases in liquid le	evel [ft/yr]) / ([maximun	n liquid	height {ft}] - [minimum liqu	uid he	aght {ft}]); See Re	ference (25)				
(r)	If N <= 36, working loss turnov er factor equal to 1, or working loss turnov	erfactor = ([1	80] + [nun	nber of	f turnov ers	per year]) / ([6]	x [nu	mber of turnov e	rs per year])	; See Reference (27).		
(s)	Annual working loss (lb/vr) = (net working loss throughput [ft ^a /vr]) x (working loss throug	kina loss turna	v er factor) x (wo	orkina loss c	roduct factor) >	(v a	or density (lb/ftª) x (v ent se	tting correction fo	ctor)		
	x (1- Icontrol efficiency (%) / 1001): See Reference (28)	-					i i				T İ		
(1)									()				
	Daily working loss (lb/day) = (net working loss throughput [π-/day]) x (w	orking loss tui	nov er tac	tor) x (working los	s product tacto	r) x (v	apor aensity (ib/	m ²]) x (vent	setting correction	n tacte	Sr)	
	x (1 - [control efficiency {%} / 100]); See Reference (28).												
(u)	^{II} Annual total tank routine losses (tons/yr) = ([annual standing losses {lb/y	rr}] + [annual	working la	sses (lb	/yr }]) x (to	on/2,000 lb); See	Refe	rence (29).					
(v)	Daily total tank routine losses (lb/day) = (daily standing losses [lb/day])	+ (daily work	ing losses [lb/day	/]); See Ret	ference (29).							
(w)	Average bourly tank routine losses (Ib/br) = (daily total tank routine losses	es [lb/dav]) x	(day/24 h	r)									
				1									
Re	eferences												
Re (1)	eferences ¹ See Table 2, Storage Tanks—Input Assumptions and Parameters.												
(1) (2)	eferences ¹⁾ See Table 2, Storage Tanks—Input Assumptions and Parameters. ¹¹ See Table 1, Input Process Rates and Parameters.												
(1) (2) (3)	eferences ¹ See Table 2, Storage Tanks—Input Assumptions and Parameters. ²¹ See Table 1, Input Process Rates and Parameters. ¹⁰ Conserv at we assumption based on hysical tank designs.												
Re (1) (2) (3) (4)	see Table 2, Storage Tanks—Input Assumptions and Parameters. ¹⁹ See Table 1, Input Process Rates and Parameters. ¹⁰ Conservative assumption based on typical tank designs. ¹⁰ PA42. Choner 7, Unput Profiles as equation 1.24. Escuention the term of the security of t		or horizos*	al ter:	s value	t to 0							
Re (1) (2) (3) (4)	efferences ¹ See Table 2, Storage Tanks—Input Assumptions and Parameters. ¹⁰ See Table 1, Input Process Rates and Parameters. ¹⁰ Conservative assumption based on typical tank designs. ¹¹ AP42, Chapter 7 (June 2020): see equation 1-36. For vertical tanks, val ¹¹ Conservative assumptions and table 12000.	ue set to 1. Fr	or horizont	al tank	s, v alue se	et to 0.			-11/07				
Re (1) (2) (3) (4) (5)	eferences ¹ See Table 2, Storage Tanks—Input Assumptions and Parameters. ⁹ See Table 1, Input Process Rates and Parameters. ¹⁰ Conserv ative assumption based on typical tank designs. ¹¹ AP-42, Chapter 7 (June 2020): see equation 1-36. For vertical tanks, v al ¹² Conserv ative by assume 100 percent VOC content for mixture in tank. A	ue set to 1. Fi	or horizont cal prope	al tank ties of	s, v alue se predomino	et to 0.	Jent	qs representativ e	of VOC cor	itent of mixture.			
Re (1) (2) (3) (4) (5) (6)	If see Table 2, Storage Tanks—Input Assumptions and Parameters. If See Table 1, Input Process Rates and Parameters. Ocnservative assumption based on typical tank designs. If AP42, Chapter 7 (June 2020); see equation 1-36. For vertical tanks, v al Conservative view assumed to percent VOC content for mixture in tank. A AP42, Chapter 7.1 (November 2019) Table 7.1-3. "Physical Properties of	ue set to 1. Fr ssumed physi Selected Petr	or horizont cal proper	al tank ties of 1ls." See	s, v alue se predomino e table refe	t to 0. ant VOC constitu rence (b).	Jent	as representativ e	of VOC cor	Itent of mixture.			
Re (1) (2) (3) (4) (5) (6) (7)	eferences ¹¹ See Table 2, Storage Tanks—Input Assumptions and Parameters. ¹¹ See Table 1, Input Process Rates and Parameters. ¹¹ Conservative assumption based on typical tank designs. ¹¹ AP-42, Chapter 7 (June 2020); see equation 1-36. For vertical tanks, val ¹¹ Conservatively assume 100 percent VOC content for mixture in tank. A ¹² AP-42 Chapter 7.1 (November 2019) Table 7.1-3, "Physical Properties of ¹³ AP-42 Chapter 7.1 (November 2019) Table 7.1-3, "Physical Properties of	ue set to 1. Fr ssumed physi Selected Petr Selected Petr	or horizont cal proper rochemicc	al tank rties of 115." See	s, v alue se predomino a table refe umed phys	t to 0. ant VOC constituerence (b). sical properties of	Jent of pre	as representativ e	of VOC cor	ntent of mixture.	of VO	C content of m	nixtur
Re (1) (2) (3) (4) (5) (6) (7) (8)	Perferences Sector Sec	ue set to 1. Fi ssumed physi Selected Petri Selected Petri ne, Oregon.	or horizont cal prope rochemicc rochemicc	al tank rties of 115." See 115." Assi	s, v alue se predomino e table refe umed phys	t to 0. ant VOC constitu rence (b). ical properties o	Jent of pre	es representativ e	of VOC cor	s representative of	of VO(C content of m	nixtur
Re (1) (2) (3) (4) (5) (6) (7) (8) (9) (9)	efferences ¹ See Table 2, Storage Tanks—Input Assumptions and Parameters. ¹⁰ See Table 2, Input Process Rates and Parameters. ¹⁰ Conservative assumption based on typical tank designs. ¹¹ Conservative assumption based on typical tank designs. ¹² Conservative yassume 100 percent VOC content for mixture in tank. A ¹⁴ PA-42 Chapter 7.1 (November 2019) Table 7.1-3, Physical Properties of ¹⁴ PA-42 Chapter 7.1 (November 2019) Table 7.1-3, Physical Properties of ¹⁴ PA-42 Chapter 7.1 (November 2019) Table 7.1-3, Physical Properties of ¹⁴ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Assumes information for Euge ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties of ¹⁵ PA-42 Chapter 7.1 (November 2019) Table 7.1-7, Physical Properties Physical Properties Physical Properties Physical Properties Physical Properties Physical Properties Physical P	ue set to 1. Fr ssumed physi Selected Petr Selected Petr ne, Oregon.	or horizont cal prope rochemicc	al tank rties of Ils." See Ils." Assi	s, v alue se predomino e table refe umed phys	It to 0. Int VOC constitution rence (b). Sical properties of	Jent of pre	es representative	of VOC cor onstituent a	itent of mixture.	of VO(2 content of m	nixtur
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Ree (1) (2) (3) (4) (5) (6) (7) (8) (9) (10) (11) (12) (13) (14) (15) (14) (15) (14) (15) (14) (15) (15) (12) (22) (22) (22) (22) (22) (22) (22	Performed 1 ³ See Table 2, Storage Tanks—Input Assumptions and Parameters. 1 ³ See Table 1, Input Process Rates and Parameters. 1 ³ Conservative assumption based on hypical tank designs. 1 ⁴ Conservative assumption based on hypical tank designs. 1 ⁶ Conservative assumption based on hypical tank designs. 1 ⁶ Conservative yassume 100 percent VOC content for mixture in tank. A 1 ⁶ AP-42, Chapter 7, 1 (November 2019) Table 7, 1-3, Physical Properties of 1 ⁶ AP-42, Chapter 7, Line 2020); Table 7, 1-7, Assumes information for Euge 1 ⁶ AP-42, Chapter 7, Line 2020); Table 7, 1-7, Assumes information for Euge 1 ⁶ AP-42, Chapter 7, Line 2020); Table 7, 1-7, Assumes information for Euge 1 ⁶ AP-42, Chapter 7, Line 2020); Table 7, 1-4. 1 ⁷ AP-42, Chapter 7, Line 2020); Table 7, 1-6. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-14. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-16. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-17. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-18. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-21. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-30. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-31. 1 ⁸ AP-42, Chapter 7, Line 2020); see equation 1-32. 1 ⁸ AP-42, Chapter 7, Line 2020); see equ	ue set to 1. F ssumed physi Selectad Peth Selectad Peth ne, Oregon. Uid height typ s standard ce quation 1-19 resure as the rision of this es	r hoizont cal prope occhemica cochemica occhemica iscally ass. v apor pr quation (e e ols, or 1	al tanh tries of Is." See Is." Ass umed t ppe of coofs. essure essure for all d	s, v alue se predomination table refe table refe phy: o be at this o be at this o be at this at a v erage uation 1-32	t to 0. Inf VOC constituence (b). iscal properties of a half-full level in b, ar see equation b, ar see equation construction of the set	of pre-	es representative	of VOC cor onstituent a pecific data assumes ma	allows for v arian	radius	C content of m	

									I
			Ta	ble 8					
		Production	1 Line 2 Mix Ta	nk VOC	Emi	ssion Estimat	es		
		OR	CAL, Inc.—Ju	nction C	ity, (Oregon			
		Parameter						M1 (Mix Tank)	
	D	iameter of Tank (1	it)			(1)	7.50	
	Surf	ace Area of Tank	(ft ²)			(0)	44.2	
		Temperature (°F)				(1)	77.0	
	Duration	of Operation (hr	s/batch)			(1,		3.00	
	Annu	di Barches (Darch	nes/yr)			().	4	2,920	
	Annoan		11 (1115/ 91)				, 	8,780	
								M1 (Mix Tank)	
	Weight Percent	Gas Phase Mass	Vapor Pressure			Partial Pressure	,		
Pollutant	in Solution ⁽²⁾	Transfer	(d)	Liquid Me	ole (e)	(f)	Evaporatio	n Emissions	Estimates
	(%)	(ff/s)	(psi)	Fraction	,	(psi)	(lb/s)	Hourly ^(h)	Annual ⁽ⁱ⁾
		(, 0)					(10/3)	(lb/hr)	(ton/yr)
VOC	10.0	3.5E-03	1.14	0.087		0.099	1.2E-04	0.44	1.93
Notes									
°C = degrees Celsius.					_				
°F = degrees Fahrenheit.					_				
IT = TEET.									
ft ³ = cubic foot									
hr = hour									
lb = pound.									
lb-mol = pound mole.									
mi = mile.									
mm Hg = millimeters mercury.									
psi = pounds per square inch.									
°R = degrees Rankine.									
s = seconds.									
yr = year.									
(a) Surface area of tank (ft ²) =	π/4 x (diameter of	tank [ft])							
(c) Annual hours of operation	(hrs/yr) = (duration	of operation [hrs/b	atch]) x (annual bo	atches (bate	hes/h	۱r])	011/3		
Gas-phase mass transfer c	oeπicient (π/s) = (U.	00438) X (air v elocit	y [mi/nr])*** x (18 /	[molecular \	veign	r or vOC la/al of vOC	n}])''~	see keterence (3).	
	N	All All All All All All All All All All	VOC (lb/lb-mol) =	46.07	(4)				
(d) Vapor pressure (psi) = (0.01	9337 psi/mm Ha) x	(10)^([constant A]	- [(constant B (°C))	-0.0/ / {([liquid ter	nperc	ature (°F}] - 32) x (;	5/9) + (constant	C [°C])}]): See Referen	ce (6).
		Liquid t	emperature (°F) =	77	(7)				
			Constant A =	8.247	(8)				
			Constant B (°C) =	1670.4	(8)				
			Constant C (°C) =	232.96	(8)				
^(e) Liquid mole fraction = (wei	ght percent in solut	ion [%])/100 x (av e	erage molecular we	ight solution	[lb/lb	-mol]) / (molecul	ar weight of VO	C [lb/lb-mol])	
	Av erage m	nolecular weight so	ution (lb/lb-mol) =	40.0	(10)				
	N	olecular weight of	VOC (lb/lb-mol) =	46.07	(5)				
¹⁷ Partial pressure of VOC (ps	i) = (v apor pressure	ot constituent [psi]) x (liquid mole frac	tion)		(III) (III)		,	
<pre>verified verified pre>	molecular weight o	vOC [lb/lb-mol]	(gas-phase mass f	ranster coef	icient	[Π/s]) x (surface)	area ot tank (ff*)]	
x (panal v apor pressure o	i voc (psij) / ((gas	constant (psi·π²/%	VOC (Ib/Ib mal) =		(5)	ы7.6/JJ; see кeter	ence (s).		
	~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~~	Gas constant (r	$si \cdot ft^3 / R \cdot lb - moll =$	10.7	191				
^(h) Hourly emissions estimate (	b/hr) = (evaporatio	on rate [lb/s]) x (3.6	00 s/hr)						
(i) Annual emissions estimate	(tons/yr) = (ev apor	ation rate [lb/s]) x	3,600 s/hr) x (annua	al hours of op	erati	on [hr/yr]) x (ton/	2,000 lb)		
References									
⁽¹⁾ See Table 3, Production M	ix Tanks—Input Assu	umptions and Para	meters.						
⁽²⁾ Estimate developed base	d on review of bat	ch records. VOC co	ntent of product is	below 10 pe	rcent	. Conservatively	assume 10 perc	ent for this purpose.	
⁽³⁾ EPA, Emission Inventory Im	provement Program	n. "Methods for Estir	nating Air Emissions I	rom Chemic	al Mc	anufacturing Facil	ities" (August 200	7). See Section 3.7.	
⁽⁴⁾ The mixing v essel is located	d under an enclosu	re and air flow acro	oss the tank surface	is assumed t	o be	negligible. Howev	er for conserv of	tism, MFA assumes a mi	nimum
(5) Assumed a basis of a creating of the shold a creating (5)	oss the tank surface	or 1.12 mph (0.5 m,	s) based on EPA gu	idance doo	umer	ntation for calm w	rind speeds.		
(6) AP 42 Chapter 7.1 (Norman	es of preaominant v	3 "Physical Pro-	representative of V		or mi	table reference //			
(7) Assumes standard ambien	t temperature of 25	-o, Priysical Proper	nes or selected Petro	ochemicals	366 	iuble reierence (l	J).		
⁽⁸⁾ AP-42 Chapter 7.1 (Novem	ber 2019) Table 7 1	-3, "Physical Proper	ties of Selected Pet	ochemicals	" Assi i	med physical pro	perties of predo	minant VOC constituer	it as
representative of VOC. cor	ntent of mixture.	2, 11, 3, 6 6 1 1 6 9 6			, 330				
⁽⁹⁾ Assume properties of predo	ominant VOC const	ituent. Vapor press	ure derived from bu	blicly-availe	able c	hemical data usi	ng the Clausius	Clapeyron relation at t	he
specified tank temperatur	е.								
⁽¹⁰⁾ Estimate developed base	d on review of bat	ch records.							

							Τα	ble 9	1							
					Р	roduction Li	ne 1 Mix To	inks VOC	Emission Estir	nates						
					•	OR-C		unction Ci		indico						
	1					01-07	AL, IIIC. 30		iy, olegon							
		Param	eter				1 (Mix Tank 1)		ĸ	2 (Mix Tank 2	<u> </u>		3 (Mix Tank 3	<u> </u>		
		Diameter of Ta	ank (ft)		(1)		3.83	,	ĸ	5.00	,		5.50	,	1	
		Surface Area of	Tank (ft ² )		(a	1	11.5			19.6			23.8			
		Temperature	e (°F)		(1)		77.0			77.0			77.0			
	Durat	tion of Operatio	n (hrs/batch)		(1)		5.00			5.00			5.00			
	Ar	nnual Batches (b	oatches/yr)		(1)		730			730			730		1	
	Annu	al Hours of Ope	ration (hrs/yr)		(b)		3,650			3,650			3,650		1	
						1										
						к	(Mix Tank 1	)	ĸ	2 (Mix Tank 2	)	к	3 (Mix Tank 3	)		
Pollutant	Weight Percent in Solution ⁽²⁾	Gas Phase Mass Transfer	Vapor Pressure ^(d)	Liquid Mole	Partial Pressure ^(f)	Evaporation	Emissions	s Estimates	Evaporation	Emissions	s Estimates	Evaporation	Emissions	s Estimates	Total Emissic	ons Estimates
	(%)	Coefficient ^(C) (ff/s)	(psi)	Fraction (e	(psi)	Rate ^(g) (Ib/s)	Hourly ^(h)	Annua ⁽ⁱ⁾ (ton/yr)	Rate ^(g) (Ib/s)	Hourly ^(h)	Annual ⁽ⁱ⁾	Rate ^(g) (lb/s)	Hourly ^(h)	Annual ⁽ⁱ⁾	Hourly (lb/hr)	Annual (ton/yr)
VOC	5.00	3.5E-03	17.4	0.027	0.47	1.5E-04	0.53	0.98	2.5E-04	0.91	1.66	3.1E-04	1.10	2.01	2.55	4.65
Notes																
°C = degrees	Celsius.		lb-mol = pou	und mole.												
°F = degrees	Fahrenheit.		mi = mile.													
ft = feet.			mm Hg = mi	llimeters mercu	ry.											
$ft^2 = square for$	oot.		psi = pound	s per square in	ch.											
ft ³ = cubic fo	ot.		°R = degree	s Rankine.												
hr = hour.			s = seconds.													
lb = pound.			yr = year.													
^(a) Surface a	rea of tank (ft²) = τ	r/4 x (diameter of	tank [ft] )													
^(b) Annual ho	ours of operation (h	rs/yr) = (duration	of operation [h	nrs/batch]) x (c	innual batches [	batches/hr])										
(c) Gas-phas	e mass transfer co	efficient (ft/s) = (0.	.00438) x (air v e	elocity [mi/hr]) ^o	⁷⁸ x (18 / [molecu	ular weight of VO	C lb/lb-mol}]) ^{1/}	see	Reference (3).							
		Airve	elocity (mi/hr) =	1.12 (	4)											
(d)	Molec	ular weight of VO	(10) A ((	44.05 (	5)		11 001 (5 (0) -		(COLUMN A D. (	10						
vapor pre	essore (psi) = (0.019)	vov psi/mm Hg) x	(IU)^([constan	ii Aj - [{constar	11 D ("C)} / {([liqui	a remperature ("F	'}] - 32) X (5/9) 4	e (constant C )	[·C]]]]; See Refer	ence (6).						
			Constant A =	8.063 (	7)											
_				295.47	7)											
(e) Liquid mo	le fraction = (weid	nt percent in solut	tion [%]1/100 ×	average mole	cular weight solu	tion (lb/lb-mol1)	/ (molecular we	eight of VCIC II	lb/lb-mol1)							
Liquid III0	Av erage molec	ular weight solutio	on (lb/lb-mol) =	24.0 (	8)											
	Molec	ular weight of VO	C (lb/lb-mol) =	44.05 (	5)											
^(†) Partial pre	essure of VOC (psi)	= (v apor pressure	of constituent	[psi]) x (liquid	mole fraction)											
(g) Ev aporat	ion rate (lb/s) = (m	olecular weight o	f VOC [lb/lb-m	iol]) x (gas-pha	ise mass transfer (	coefficient [ft/s]) >	(surface area	of tank [ft]) x	(partial v apor pr	ressure of VOC	[psi] ) / ([gas c	onstant {psi·ft³/°	R · lb-mol}]			
x [tank te	mperature {°F} + 45	9.67]); see Refere	nce (3).													
	Molec	ular weight of VO	C (lb/lb-mol) =	44.05 (	5)											
	G	as constant (psi · I	ft ³ /°R · Ib-mol) =	10.7								<u>i</u>				
(h) Hourly em	issions estimate (Ib.	/hr) = (ev aporatio	on rate [lb/s]) ×	c (3,600 s/hr)												
() Annual er	missions estimate (te	ons/yr) = (ev apor	ation rate [lb/s	]) x (3,600 s/hr)	x (annual hours	of operation [hr/y	/r]) x (ton/2,000	) lb)								
References																
⁽¹⁾ See Table	3, Production Mix	Tanks—Input Assu	umptions and F	°arameters.												
⁽²⁾ Estimate o	developed based	on review of bate	ch records. VO	C content of p	roduct is below 5	percent. Conser	v ativ ely assum	e 5 percent fo	or this purpose.							1

(a) EPA, Emission Inventory Improvement Program. "Methods for Estimating Air Emissions from Chemical Manufacturing Facilities" (August 2007). See Section 3.7. ⁽⁴⁾ The mixing vessel is located inside a building with bay doors and no HVAC system. The bay doors are open allowing for some air flow through the space, though air flow across the tank surface is assumed to be negligible.
 However for conservatism, MFA assumes a minimum wind speed threshold across the tank surface of 1.12 mph (0.5 m/s) based on EPA guidance documentation for calm wind speeds. ⁽⁵⁾ Conserv atively assumes lowest molecular weight of all VOC constituents in solution. (4) AP-42 Chapter 7.1 (Nov ember 2019) Table 7.1-3, "Physical Properties of Selected Petrochemicals." See table reference (b). [7] AP-42 Chapter 7.1 (Nov ember 2019) Table 7.1-3. "Physical Properties of Selected Petrochemicals." Conservatively assumes highest vanor pressure of VOC constituents in solution.

(8) Estimate developed based on review of batch records.

			Tal	ole 10					
	Production	Line 2 Pac	:kag	ging VOC	: Em	ission Estir	nat	es	
	OR	CAL Inc	-Ju	nction Ci	itv. (	Dreaon			1
		,				jen			
	Pai	ameter						Produc	tion line 2
	Ambient Tem	perature (°F)	)				(1)	11000	77.0
	Maximum Hourly	Fill Rate (ga	, I/hr)				(2)		2,500
	Annual Fill Va	olume (gal/yr	)				(2)	2,0	000,200
					1				
Pollutant	Weight Percent in Solution ⁽⁴⁾	Vapor Press	Liquid Mo Fraction	le (b)	Partial Press	ure	Emissio Hourly ^(d)	ns Estimates	
	(%)	(psi)				(psi)		(lb/hr)	(ton/yr)
VOC	10.0	1.14		0.087	7 0.099			1.3E-04	0.10
Notes									
°C = degrees Celsius.									
°F = degrees Fahrenheit.									
$ft^3 = cubic foot.$									
gal = gallon.									
hr = hour.									
lb = pound.									
lb-mol = pound mole.									
mm Hg = millimeters mercury.									
psi = pounds per square inch.									
°R = degrees Rankine.									
yr = year.									
^(a) Vapor pressure (psi) = (0.01	9337 psi/mm Hg) x (	10)^([constar	nt A] -	[{constant B	(°C)}	/ {([liquid tem	pera	ture {°F}] - 32) x (	5/9)
+ (constant C [°C])}]); See	Reference (5).								
	Liquid t	emperature (°	°F)=	77	(6)				
		Constan	† A =	8.247	(7)				
		Constant B (°	°C) =	1670.4	(7)				
		Constant C (°	°C) =	232.96	(7)				
^(b) Liquid mole fraction = (wei	ght percent in solut	ion [%])/100 x	(ave	rage molecu	arwe	eight solution [	lb/lb·	-mol] )	
/ (molecular weight of VOC	C [lb/lb-mol])								
Av erage r	nolecular weight so	lution (lb/lb-m	nol) =	40.0	(8)				
N	Aolecular weight of	VOC (lb/lb-m	nol) =	46.07	(9)				
^(d) Partial pressure of VOC (ps	i) = (vapor pressure	of constituent	[psi]	) x (liquid mo	e fra	ction)			
^(e) Hourly emissions estimate (I	b/hr) = (partial pres	sure of constitu	uent	[psi]) x (maxiı	num	hourly fill rate	[gal/ł	nr]) x (ft³/7.48 ga	l)
/ ([gas constant {psi·ft³/°R	·lb-mol}] x [ambier	it temperature	e {°F} +	+ 459.67]) x (n	nolec	ular weight of	VOC	[lb/lb-mol]); see	Reference (10).
	Gas constant (p	osi∙ft³/°R · Ib-m	nol) =	10.7					
Ν	Aolecular weight of	VOC (lb/lb-m	nol) =	46.07	(9)				
^(f) Annual emissions estimate	(lb/yr) = (partial pre	ssure of constit	tuent	[psi]) x (annu	Jal fill	v olume [gal/y	/r]) x	(ft³/7.48 gal)	
/ ([gas constant {psi·ft³/°R	·lb-mol}] x [ambier	t temperature	e {°F} +	+ 459.67]) x (n	nolec	ular weight of	VOC	[lb/lb-mol]); see	Reference (10).
	Gas constant (p	osi∙ft³/°R · Ib-m	ol) =	10.7					
Ν	A olecular weight of	VOC (lb/lb-m	iol) =	46.07	(9)				

			Table	e 10	(Continue	ed)				
		Production	Line 2 Pac	:ka	ging VOC	Em	ission Esti	mat	es	
		OR-	CAL, Inc	—Jı	unction Ci	ty, C	Dregon			
Ref	ierences									
(1)	Assumes standard ambient	t temperature of 25°	PC (77°F) as ar	nave	erage annual	estim	ate.			
(2)	See Table 1, Input Process	Rates and Paramet	ers.							
(3)	Estimate developed based	d on review of batc	h records. VO	Ссо	ntent of prod	uct is	below 10 pe	rcent.	. Conserv ativ e	ly assume
	10 percent for this purpose.									
(4)	Assume properties of predo	minant VOC consti	tuent. Vapor p	oressu	ure deriv ed fro	om pu	ublicly-availd	ible cl	hemical data	using the
	Clausius-Clapeyron relation	n at the specified to	ink temperatu	Jre.						
(5)	AP-42 Chapter 7.1 (Nov em	ıber 2019) Table 7.1-	3, "Physical Pr	oper	ties of Selecte	d Pet	rochemicals.	"See t	table reference	e (b).
(6)	Assumes standard ambient	t temperature of 25°	°C (77°F) since	the	oroduct is not	heat	ed for packc	ıging.		
(7)	AP-42 Chapter 7.1 (Nov em	ber 2019) Table 7.1-	3, "Physical Pr	oper	ties of Selecte	d Pet	rochemicals.	" Assur	med physical p	properties of
	predominant VOC constitu	uent as representati	ve of VOC co	nten	t of mixture.					
(8)	Estimate developed based	d on review of batc	h records.							
(9)	Assumed physical propertie	es of predominant V	OC constitue	nt as	representativ	e of \	VOC content	of mix	xture.	
(10)	EPA, Emission Inventory Imp	orov ement Program	. "Methods fo	r Estin	nating Air Emis	sions	from Chemic	al Ma	nufacturing Fo	acilities"
	(August 2007). See Section	3.1.								

				Table 1	1				
Na	lural Gas Co	mbu	stion Criteri	ia Pollu	lant	and GHG E	mission Est	imates	
		OR	-CAL, Inc.—	-Junctio	on C	ity, Oregon	1		
Parame	ter		Boi	ler		Area H	leaters		
Hourly Natural Gas Usage	e (MMscf/hr)	(1)	2.0E	-03		1.31	E-03		
Annual Natural Gas Usag	e (MMscf/yr)	(1)	17	.9		11	1.1		
				Freelo					
	Emission Eac	hor	Boi	Emi: Ier	sion	csiimales Area H	leaters	Total Emissi	ons Estimates
Pollutant	(lb/MMscf)	b F		Annual	(b)		Annual ^(b)	Hourly	Annua
	(,	′	(lb/hr)	(tons/v	m)	(lb/hr)	(tons/vr)	(lb/hr)	(tons/vi)
PM	2.5	(3)	5.1E-03	0.022	.,	3.2E-03	0.014	3.2E-03	0.036
PM10	2.5	(3)	5.1E-03	0.022		3.2E-03	0.014	3.2E-03	0.036
PM _{2.5}	2.5	(3)	5.1E-03	0.022		3.2E-03	0.014	3.2E-03	0.036
NO _X	100	(3)	0.20	0.90		0.13	0.55	0.13	1.45
СО	84	(3)	0.17	0.75		0.11	0.47	0.11	1.22
VOC	5.5	(3)	0.011	0.049		7.0E-03	0.031	7.0E-03	0.080
SO ₂	2.6	(3)	5.3E-03	0.023		3.3E-03	0.014	3.3E-03	0.038
Pb	5.0E-04	(4)	1.0E-06	4.5E-0	6	6.3E-07	2.8E-06	6.3E-07	7.3E-06
CO ₂	120,000	(4)	246	1,076		152	666	152	1,742
CH ₄	2.26	(c)	4.6E-03	0.020	)	2.9E-03	0.013	2.9E-03	0.033
N ₂ O	0.23	(c)	4.6E-04	2.0E-0	3	2.9E-04	1.3E-03	2.9E-04	3.3E-03
CO ₂ e	120,124	(d)	246	1,077	, ,	152	667	152	1,744
Notes									
hr = hour.					_				
kg = kilograms.									
ID = pound.	na al cusita								
MMBIU = million British Ther	mai uniis.								
^(a) Hourly emissions estimat	e (lb/br) = (emissio	on fac	or [lb/MMscfl)	x (hourly n	atural		(scf/brl)		
^(b) Annual emissions estima	te(tons/vr) = (em	ission f	actor [lb/MMsc	fl) x (annu	alna	tural aas usaae	$[MMscf/vr]) \times (1$	on/2000 lb)	
(c) Emission factor (lb/MMs	cf) = (emission fac	tor [kc	/MMBtul) x (2.2	205 lb/ka) x	(def	ault natural aas	hiah heat valu	e [MMBtu/MMs	cfl)
Default natural c	as high heat valu	Je (MI	ABtu/MMscf) =	1,026	(2)				
	CH₄ emission	facto	r (kg/MMBtu) =	1.0E-03	(5)				
2	N ₂ O emission	facto	r (kg/MMBtu) =	1.0E-04	<del>(</del> 5)		4	,	
^(d) CO e emission factor (lb	/MMscf) = (CO2	emissic	n factor [lb/MN	1scf]) + ([C	H em	nission factor {lb/	MMscf}] x [CH	global warming	potential])
+ ([N O emission factor {	[b/MMscf}] x [N (	) glob	al warming pot	ential])					
	CH₄ global	lwarm	ing potential =	25.0	(6)				
	N ₂ O global	lwarm	ing potential =	298	(6)				
References									<b>L</b>
⁽¹⁾ See Table 1, Input Proc	ess Rates and Pa	ramete	ers.						
⁽²⁾ 40 CFR Part 98 Subpart	C, Table C-1, "De	fault C	O ₂ Emission Fac	tors and H	igh He	eat Values for Vo	arious Types of F	uel."	
Oregon DEQ AQ-EF05 (/	August 2011). Emis	sion fa	ctor for natural	gas combu	ustion	provided by th	e Oregon Depc	irtment of	
Environmental Quality f	for uncontrolled m	nedium	n boilers less that	n 100 MMB	stu/hr.				
(5) 40 CEP Root 00 Submont			NO Emission For	nteria Pollu	rious	una Greenhou	se Gases from N	iatural Gas Con	idustion."
(6) 40 CFR Part 98 Subpart					SUOIN				

ļ.																		
								To	able 12									
						Criteria	Pollutan	t and GH	G Emissio	on Estima	es Sumn	nary						
OR-CAL, Inc.—Junctio									Unction	City, Ored	ion							
								Emission	Estimates									
Pollutant -	Raw Mai	erial Silos	Production	n Line 2 Hold	Production Line 2 Storage Tanks			Production	n Line 2 Mix	Productio	n Line 1 Mix	Product	ion Line 2	Total No	itural Gas	Total Facili Estin	ty Emissions	
	Raw Material Silos		Tank		T8 T4B		Tank		Tanks		Packaging		Combustion		compares			
	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual	Hourly	Annual
	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)	(lb/hr)	(tons/yr)
PM	0.41	0.14													3.2E-03	0.036	0.41	0.18
PM10	0.41	0.14											1		3.2E-03	0.036	0.41	0.18
PM _{2.5}	0.41	0.14												-	3.2E-03	0.036	0.41	0.18
NO _X															0.13	1.45	0.13	1.45
CO															0.11	1.22	0.11	1.22
VOC			0.58	0.46	0.63	0.49	0.49	0.37	0.44	1.93	2.55	4.65	1.3E-04	0.10	7.0E-03	0.080	4.69	8.08
\$O ₂															3.3E-03	0.038	3.3E-03	0.038
Pb															6.3E-07	7.3E-06	6.3E-07	7.3E-06
CO ₂ e															152	1,744	152	1,744

								Tab	e 13									
						Pro	oduction Lir	e 1 Mix Tan	e 1 Mix Tanks HAP Emission Estimates									
							OR-CA	L, Inc.—Jun	ction City,	Oregon								
			Param	eter				к	1 (Mix Tank 1	)	к	2 (Mix Tank 2	)	K	3 (Mix Tank 3	)		
			Diameter of T	ank (ft)			(1)		3.83			5.00			5.50			
		Su	Inface Area of	Tank (ff*)			(3)		77.0			77.0			23.8			
		Duratio	on of Operatio	n (hrs/batch)			(1)		5.00			5.00			5.00			
		Ann	nual Batches (b	patches/yr)			(1)		730			730			730			
		Annuc	al Hours of Ope	ration (hrs/yr)			(b)		3,650			3,650			3,650			
								ĸ	1 (Mix Tank 1	)	ĸ	2 (Mix Tank 2	)	ĸ	3 (Mix Tank 3	)		
Pollutant	CAS	Molecular Weight	Percentin	Mass Transfer	Vapor Pressure ^(d)	Fraction ^(e)	Partial Pressure ⁽⁷⁾	Evaporation	Emissions	s Estimates	Evaporation	Emissions	: Estimates	Evaporation	Emissions	Estimates	Total Emissia	ons Estimates
		(lb/lb-mol)	Solution ⁽²⁾ (%)	Coefficient ^(c) (ff/s)	(psi)	(lb-mol/ lb-mol)	(psi)	Rate ^(g) (Ib/s)	Hourly ^(h)	Annual ⁽ⁱ⁾	Rate ^(g) (Ib/s)	Hourly ^(h)	Annual ⁽¹⁾	Rate ^(g) (Ib/s)	Hourly ^(h)	Annual ⁽ⁱ⁾	Hourly (lb/br)	Annual (ten (ur)
Benzene	71-43-2	78.11	0.010	2.9E-03	1.84	3.1E-05	5.7E-05	3.1E-08	(ID/III) 1.1E-04	2.1E-04	5.3E-08	1.9E-04	(10H/yr) 3.5E-04	6.5E-08	(ID/HF) 2.3E-04	4.3E-04	(ID/III) 5.4E-04	9.8E-04
Acetaldehyde	75-07-0	44.05	0.040	3.5E-03	17.4	2.2E-04	3.8E-03	1.2E-06	4.3E-03	7.8E-03	2.0E-06	7.3E-03	0.013	2.4E-06	8.8E-03	0.016	0.020	0.037
Notes																		
°C = degrees Celsiu	JS.																	
°F = degrees Fahre	nheit.																	
ft = feet.																		
ft ³ = cubic foot																		
hr = hour.																		
lb = pound.																		
lb-mol = pound mo	de.																	
mi = mile.																		
mm Hg = millimeter	s mercury.																	
°R = degrees Ranki	ne																	
s = seconds.																		
yr = year.																		
^(a) Surface area of	$tank (ft^2) = \pi/2$	4 x (diameter of to	ank [ft] )															
(c) Annual hours of	operation (hr.	s/yr) = (duration o	foperation [hrs/	(batch]) x (annuc	al batches [bat	ches/hr])												
Gas-phase mas	s transfer coel	mcient (m/s) = (0.0	0438) x (dir veio	ciry [mi/nr]) x (	locity (mi/br) =	1 12 (A)	5/ID-moi}])	see kererence	3].									
^(d) Vapor pressure	(psi) = (0.01933	37 psi/mm Hg) x (1	10)^([constant A	A] - [{constant B (°	C)} / {([liquid te	mperature (°F)]	- 32) x (5/9) + (c	nstant C [°C])}]	); See Referen	ce (5).								
				Constant	A - benzene =	6.906 (6)												
				Constant B - I	penzene (°C) =	1211 (6)												
				Constant C - I	penzene (°C) =	220.79 (6)												
			0	Constant A - a	cetaldenyde =	8.063 (6)		<b> </b>										
			C	onstant C - aceta	Idenyde (°C) =	295.47 (6)												
(e) Liquid mole frac	tion = (weight	t percent in solutio	on [%])/100 x (a	v erage molecular	weight solution	[lb/lb-mol]) / (r	nolecular weigh	of HAP [lb/lb-m	nol])									
			Av erage molec	ular weight solutio	on (Ib/Ib-mol) =	24.0 (2)												
⁽¹⁾ Partial pressure	of HAP (psi) =	(vapor pressure o	f constituent (ps	si]) x (liquid mole f	raction [lb-mol/	lb-mol])												
								Table 13 (0	Continued	)								
						Pro	duction Lir	e 1 Mix Tan	ks HAP Em	, nission Estin	nates							
							OR-CA	Linc.—Jun	ction City.	Oregon								
									· · · · · · · · · · · · · · · · · · ·									
(k) Evaporation ra	te (Ib/s) = (mo	lecular weight of I	HAP [lb/lb-mol])	x (gas-phase mo	iss transfer coeff	icient [ft/s]) x (si	urface area of to	nk [ft²]) x (partic	al vapor pressu	ure of HAP [psi]]	) / ([gas constant	{psi · ft³/°R · lb-	mol}]					
x [tank temper	ature {°F} + 459	.67] ); see Referen	ce.															
			G	as constant (psi ·	ft³/°R · Ib-mol) =	10.7												
(m) Applied environment	estimate (lb/h	nr) = (evaporation	n rate [lb/s] ) x (3	3,600 s/hr)	nual hour of -	e eretien first -11	y (kep (2.000 h-1											
Annual emission	s estimate (foi	15/y1) = (ev apora	non rate [ID/S]).	x (3,600 s/nr) X (ar	iniudi nours of o	peration [nr/yr]]	x (ron/2,000 lb)											
References																		
(1) See Table 3, Pro	duction Mix T	anks—Input Assur	mptions and Pa	rameters.														
(2) Estimate dev ela	oped based a	n review of batch	h records.															
(3) "Preferred and	Alternative Me	ethods for Estimation	ng Air Emissions f	rom Semiconduct	or Manufacturi	ng" prepared b	y Eastern Resea	ch Group, Inc. c	lated February	/ 1999.								
threshold acres	et is located in	iside a building wi	ith bay doors ar	na no HVAC system	n. Ine bay doo	for calm wind	wing for some ai	niow through th	e space, thoug	gn air flow acro	oss the tank surfac	e is assumed f	o be negligible	e. Howev er for co	nserv atism, M	FA assumes a m	inimum wind s	speed
⁽⁵⁾ AP-42 Chapter	7.1 (Nov embe	er 2019) Table 7.1-3	3, "Physical Prop	erties of Selected	Petrochemicals	." See table refe	rence (b).											
(6) AP-42 Chapter	7.1 (Nov embe	r 2019) Table 7.1-3	3, "Physical Prop	erties of Selected	Petrochemicals													

			Tabl	- 1 <i>4</i>				
		Natural Gas	Combustion	HAP Emission	n Estimates	1		
		OR-CA	L, Inc.—Jun	ction City, Ore	egon			
Parameter			Во	biler	Natural Gas	Area Heaters		
Hourly Natural Gas Usage (MMscf/hr)		(1)	2.0	E-03	1.3	E-03		
Annual Natural Gas Usage (MMscf/yr)		(1)	1	7.9	1	1.1		
				Emissions	Estimates			
НАР	CAS	Emission Factor (2)	Во	biler	Natural Gas	Area Heaters	Total Emissi	ons Estimates
		(lb/MMscf)	Hourly ^(a)	Annual ^(b)	Hourly ^(a)	Annual ^(b)	Hourly	Annual
Organic Compounds		1 1	(10/11)	(IONS/ yr)	(10/11)	(IONS/ yr)	(10/11)	(10113/ 91)
	75-07-0	4 3E-03	8.8E-04	3.9E-05	5.4E-06	2.4E-05	1.4E-05	6.2E-05
Acrolein	107-02-8	2.7E-03	5.5E-06	2.4E-05	3.4E-06	2.4E 05	8.9E-06	3.9E-05
Benzene	71-43-2	2.7 E 00 8 0E-03	1.6E-05	7.2E-05	1.0E-05	1.5E 05	2.7E-05	1.2E-04
	100-41-4	9.5E-03	1.0E 0.5	8.5E-0.5	1.0E 05	5.3E-05	3 1E-05	1.2E 04
Formaldehyde	50-00-0	0.017	3.5E-0.5	1.5E-04	2 2E-05	9.4E-0.5	5.6E-05	2.5E-04
Hexane	110-54-3	6.3E-03	1.3E-0.5	5.6E-0.5	8.0E-06	3.5E-0.5	2 1E-05	9 1E-0.5
Toluene	108-88-3	0.037	7.5E-05	3.3E-04	4.6E-05	2.0E-04	1.2E-04	5.3E-04
Xylenes (mixed isomers)	1330-20-7	0.027	5.6E-05	2.4E-04	3.4E-05	1.5E-04	9.0E-05	3.9E-04
Polycyclic Aromatic Hydrocarbons (PA				1				
PAHs	PAHs	1.0E-04	2.0E-07	9.0E-07	1.3E-07	5.5E-07	3.3E-07	1.5E-06
Benzo(a)pyrene	50-32-8	1.2E-06	2.5E-09	1.1E-08	1.5E-09	6.7E-09	4.0E-09	1.7E-08
Naphthalene	91-20-3	3.0E-04	6.1E-07	2.7E-06	3.8E-07	1.7E-06	9.9E-07	4.4E-06
Metals	1				•			
Arsenic and Compounds	7440-38-2	2.0E-04	4.1E-07	1.8E-06	2.5E-07	1.1E-06	6.6E-07	2.9E-06
Beryllium and Compounds	7440-41-7	1.2E-05	2.5E-08	1.1E-07	1.5E-08	6.7E-08	4.0E-08	1.7E-07
Cadmium and Compounds	7440-43-9	1.1E-03	2.3E-06	9.9E-06	1.4E-06	6.1E-06	3.6E-06	1.6E-05
Chromium and Compounds	7440-47-3	1.4E-03	2.9E-06	1.3E-05	1.8E-06	7.8E-06	4.6E-06	2.0E-05
Cobalt and Compounds	7440-48-4	8.4E-05	1.7E-07	7.5E-07	1.1E-07	4.7E-07	2.8E-07	1.2E-06
Manganese and Compounds	7439-96-5	3.8E-04	7.8E-07	3.4E-06	4.8E-07	2.1E-06	1.3E-06	5.5E-06
Mercury and Compounds	7439-97-6	2.6E-04	5.3E-07	2.3E-06	3.3E-07	1.4E-06	8.6E-07	3.8E-06
Nickel and Compounds	7440-02-0	2.1E-03	4.3E-06	1.9E-05	2.7E-06	1.2E-05	7.0E-06	3.0E-05
Selenium and Compounds	7782-49-2	2.4E-05	4.9E-08	2.2E-07	3.0E-08	1.3E-07	8.0E-08	3.5E-07
Notes								
HAP = Hazardous Air Pollutant.								
hr = hour.								
kg = kilograms.								
lb = pound.								
MMBtu = million British thermal units.								
MMscf = million standard cubic feet.								
yr = year.								
^(a) Hourly emissions estimate (lb/hr) = (emiss	sion factor [lb/	MMscf]) x (hourly no	atural gas usage	[MMscf/hr])				
^(b) Annual emissions estimate (tons/yr) = (er	mission factor [	lb/MMscf]) x (annu	al natural gas us	age [MMscf/yr]) x	(tons/2,000 lb)			
References								
⁽¹⁾ See Table 1, Input Process Rates and Po	arameters.							
⁽²⁾ Oregon DEQ approved natural gas co	mbustion emis	sion factors. Assumes	heat input less th	han 10 MMBtu/hr.				

		Table	e 15					
	HAP	Emission Estir	nates Summ	ary				
	OR-CA	L, Inc.—Junc	ction City, Or	egon				
			Emission	Estimates				
НАР	CAS	Production Li	ne 1 Mix Tanks	Total Natural G	as Combustion	Total Facility Emissions Estimates		
		Hourly (lb/hr)	Annual (tons/yr)	Hourly (lb/hr)	Annual (tons/yr)	Hourly (lb/hr)	Annual (tons/yr)	
Organic Compounds	•		•					
Acetaldehyde	75-07-0	0.020	0.037	1.4E-05	6.2E-05	0.020	0.037	
Acrolein	107-02-8			8.9E-06	3.9E-05	8.9E-06	3.9E-05	
Benzene	71-43-2	5.4E-04	9.8E-04	2.7E-05	1.2E-04	5.7E-04	1.1E-03	
Ethylbenzene	100-41-4			3.1E-05	1.4E-04	3.1E-05	1.4E-04	
Formaldehyde	50-00-0			5.6E-05	2.5E-04	5.6E-05	2.5E-04	
Hexane	110-54-3			2.1E-05	9.1E-05	2.1E-05	9.1E-05	
Toluene	108-88-3			1.2E-04	5.3E-04	1.2E-04	5.3E-04	
Xylenes (mixed isomers)	1330-20-7			9.0E-05	3.9E-04	9.0E-05	3.9E-04	
Polycyclic Aromatic Hydrocarbons (PAH)						-		
Polycyclic Aromatic Hydrocarbons (PAH)	PAHs			3.3E-07	1.5E-06	3.3E-07	1.5E-06	
Benzo(a)pyrene	50-32-8			4.0E-09	1.7E-08	4.0E-09	1.7E-08	
Naphthalene	91-20-3			9.9E-07	4.4E-06	9.9E-07	4.4E-06	
Metals						-		
Arsenic and Compounds	7440-38-2			6.6E-07	2.9E-06	6.6E-07	2.9E-06	
Beryllium and Compounds	7440-41-7			4.0E-08	1.7E-07	4.0E-08	1.7E-07	
Cadmium and Compounds	7440-43-9			3.6E-06	1.6E-05	3.6E-06	1.6E-05	
Chromium and Compounds	7440-47-3			4.6E-06	2.0E-05	4.6E-06	2.0E-05	
Cobalt and Compounds	7440-48-4			2.8E-07	1.2E-06	2.8E-07	1.2E-06	
Manganese and Compounds	7439-96-5			1.3E-06	5.5E-06	1.3E-06	5.5E-06	
Mercury and Compounds	7439-97-6			8.6E-07	3.8E-06	8.6E-07	3.8E-06	
Nickel and Compounds	7440-02-0			7.0E-06	3.0E-05	7.0E-06	3.0E-05	
Selenium and Compounds	7782-49-2			8.0E-08	3.5E-07	8.0E-08	3.5E-07	
Total HAPs		0.021	0.038	3.9E-04	1.7E-03	0.021	0.040	
M	aximum Single HA	P (Acetaldehyde	e)			0.020	0.037	