

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT <i>ENGINEERING DIVISION</i> APPLICATION PROCESSING AND CALCULATIONS	PAGES 9	PAGE 1
	APPL. NO. 497451/497452	DATE 2/4/2010
	PROCESSED BY Rafik Beshai	CHECKED BY

**PERMIT TO CONSTRUCT AND
REMOVAL OF PERMIT TO OPERATE**

COMPANY NAME BP WEST COAST PRODUCTS LLC
BP CARSON REFINERY

COMPANY ADDRESS P.O. BOX 6210
CARSON, CA 90749

EQUIPMENT LOCATION 2350 E. 223rd STREET
CARSON, CA 90749

FACILITY ID 131003

PERMIT TO OPERATE TO BE ELIMINATED

Process 15: OIL WATER SEPARATION					
System 9: STORM WATER HANDLING AND TREATING SYSTEM					S13.6
Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
SUMP, FIRE TRAINING SUMP, 82.7 CUBIC FEET CAPACITY; WIDTH: 3 FT, DEPTH: 9 FT 2.25 IN; LENGTH: 3 FT A/N 428167	D2749				B59.2, D90.9

PERMIT TO CONSTRUCT

Process 15: OIL WATER SEPARATION					
System 12: SUMPS, OTHER					
Equipment	ID No.	Connected To	RECLAIM Source Type/ Monitoring Unit	Emissions and Requirements	Conditions
SUMP, FIRE TRAINING SUMP, 216 CUBIC FEET CAPACITY; LENGTH: 6 FT; WIDTH: 6 FT; DEPTH: 6 FT A/N 497452	DX				B59.2, D90.9, H23.22

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BACKGROUND

BP West Coast Products LLC submitted A/Ns 497451 and 497452 for a Permit to Construct (PC) for a new firewater sump serving its fire training facility. A/N 497452 was submitted for the new PC and A/N 497451 was submitted for processing of the RECLAIM/Title V permit amendment. Concurrent with issuance of a PC for a new sump, will be elimination of the existing fire training sump (D2749) from BP's permit. BP seeks to re-locate its fire training activities to a new location, also in the northeast area of the refinery, and thus requires construction of a new firewater sump. Both sumps, sump D2749 and the new sump which above is designated as DX, are not subject to requirements under District Rule 1176, 40 CFR 60 Subpart QQQ and District Regulation XIII-BACT and therefore are not controlled.

The existing fire training sump, D2749, is permitted under A/N 428167 (Permit No. F83156 issued July 12, 2006). Previously, the sump did not have a District permit.

PROCESS DESCRIPTION

The new sump will store wastewater from fire training exercises and stormwater. The facility is relocating its existing fire training facility to a new location and thus requires construction of a new sump. The new sump has the following dimensions: 6 ft length, 6 ft width, and 6 ft depth and a capacity of 216 cubic feet (~ 1500 gallons). Fire training exercises will be conducted at the new location using either propane (from an 890 gallon tank) or Amber 363 (from two 500 gallon tanks). Amber 363 is described in its MSDS (Attachment #2) as an organic petroleum liquid, which is a complex (C9 – C20) hydrocarbon mixture which contains less than 0.0015% wt (15 ppm sulfur). It has an API gravity of 46.4 at 60°F, boiling point in the range of 381 to 510°F, and a vapor pressure of 0.35 mm Hg at 66°F. The subject sump will receive partially burned fuels, from fire training exercises, and stormwater. The fire training exercises take place occasionally; however, the sump will operate 24 hours per day, 7 days per week, for 52 weeks per year. Wastewater from the new sump will routed to the facility's wastewater treatment system.

Equipment Specifications

Description	Dimensions/Capacity	Existing or New Equipment
Sump		
Fire Training Sump - Uncontrolled	Length: 6 ft, Width: 6 ft, Depth: 6 ft; 216 cubic feet	New Equipment

Note: Attachment #3 is a design sketch of the new sump

At this facility, wastewater is either routed through preliminary oil/water separators (e.g. No. 6 or No. 8 Oil Separator) or is routed through lift stations into wastewater tanks (Tank Nos. 19, 20, and 21). Wastewater is treated is through the No. 9 Wastewater Final Treatment System, including No. 9 Oil Water Separator and three Induced Gas Floatation (IGF) Units. The treatment process also includes polymer and bleach addition.

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The new sump is exempt from control requirements under District Rule 1176, since it is expected to only receive wastewater with a VOC content under 5 mg per liter. BP has submitted a laboratory report for testing of wastewater from the existing fire training sump (Attachment #1). The analysis results, for a sample collected on December 20, 2007 and analyzed by TestAmerica, indicate that volatile organics were not detected. The sample was analyzed by GC/MS, according to EPA Method 8260B, for volatile organics with oxygenates. None of the volatile organic species tested were detected in the sample (note: the reporting limit ranged from 2 to 150 ug/l).

Analysis of Fire Training Sump Water, Sampled on December 20, 2007

Analyte	Result (ug/l)
Benzene	ND (< 2 ug/l)
Carbon Tetrachloride	ND (< 5 ug/l)
Chlorobenzene	ND (< 2 ug/l)
Chloroform	ND (< 2 ug/l)
1,2-Dibromo-3-chloropropane	ND (< 5 ug/l)
1,4-Dichlorobenzene	ND (< 2 ug/l)
Dichlorodifluoromethane	ND (< 5 ug/l)
1,1-Dichloroethane	ND (< 2 ug/l)
Ethylbenzene	ND (< 2 ug/l)
Hexachlorobutadiene	ND (< 5 ug/l)
Methylene Chloride	ND (< 5 ug/l)
Naphthalene	ND (< 5 ug/l)
Styrene	ND (< 2 ug/l)
1,1,2,2-Tetrchloroethane	ND (< 2 ug/l)
Toluene	ND (< 2 ug/l)
1,1,2-Trichloroethane	ND (< 2 ug/l)
Trichlorofluoromethane	ND (< 5 ug/l)
Vinyl Chloride	ND (< 5 ug/l)
o-Xylene	ND (< 2 ug/l)
m,p-Xylene	ND (< 2 ug/l)
Xylenes, Total	ND (< 4 ug/l)
Methyl-tert-butyl Ether (MTBE)	ND (< 5 ug/l)

ND: Not Detected

The function of the existing fire training sump (D2749), as described in the evaluation under A/N 428167, is collection of rainwater and wastewater generated from occasional fire training exercises. Fluid collected is pumped to the #8 Separator of the Wastewater Treatment System. BP plans to demolish this sump, since the fire training exercises will be relocated.

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EMISSION CALCULATION

Operation of the new fire training sump will result in emissions of VOCs and Toxic Air Contaminants (TAC). However, the project has associated reductions in VOCs and TACs, since existing sump D2749 will be demolished. The VOC emissions calculated for sump D2749, under A/N 428167, are discussed below and are compared to the VOC emissions associated with the new sump. These VOC emissions rates (reduction in VOC emissions due to demolition of sump D2749 and increase in VOC due to operation of the new sump) are equal and offsetting. Therefore, the project results in no net change in VOC emissions. Further, since the project results in no change in VOC emissions, no change in TAC emissions is expected (since these are typically a function of total VOC emissions).

VOC Emissions from Sump D2749 – From A/N 428167 Evaluation

Emissions from the uncontrolled sump are based on the 5 mg per liter maximum fluid VOC concentration. This concentration is equal to a weight fraction of 0.005 g VOC per gram of liquid. Using a liquid VOC molecular weight of 92 lbs per lb-mole, the mole fraction of VOC in the liquid is calculated to be:

$$= 0.005 \text{ lbs VOC} / 92 \text{ lbs/lb-mole} / (0.005 \text{ lbs VOC} / 92 \text{ lbs/lb-mole} + 0.995 \text{ lbs H}_2\text{O} / 18 \text{ lbs/lb-mole})$$

$$= 0.00098 \text{ moles VOC/moles liquid}$$

The vapor fraction of VOC is then calculated from the vapor pressure of VOC (1.5 psia) and the total pressure, as follows:

$$= 0.00098 \times 1.5 \text{ psia} / 14.696 \text{ psia} = 0.000100 \text{ or } 100 \text{ ppm VOC}$$

Using the maximum flow of 10.12 cfm, the uncontrolled/controlled emissions rate is calculated to be:

$$\text{Uncontrolled/Controlled Emissions, (R1) or (R2)}$$

$$= 100 \text{ ppm} \times 10.12 \text{ cfm} \times 78 \text{ lbs/lb-mole} \times 60 \text{ min/hr} / 1 \times 10^6 \text{ ppm} \times 379 \text{ cf/lb-mole}$$

$$= \mathbf{0.012 \text{ lbs/hr, } 0.30 \text{ lbs/day, } 109.5 \text{ lbs/yr (uncontrolled and controlled emissions)}}$$

Since the flow rate used corresponds to high number of turnovers, any emissions associated with breathing loss would be expected to be no more than 1% of working loss and is therefore not added to the above emissions rate.

VOC Emissions From New Wastewater Sump

VOC emissions from the new wastewater sump are calculated using the methodology outlined in AP-42, section 4.3.2. The methodology for calculation of emissions from Wastewater Treatment and Storage systems, which are not aerated and have an oil film of thickness less than 1 cm, requires calculation of

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k_g – gas phase mass transfer coefficient, m/s (using equation 2); K_{oil} – oil phase mass transfer coefficient, m/s (using equation 9); and finally emissions rate N , g/s (using equation 22).

1. Calculate the gas phase mass transfer coefficient (Equation 2):

$$k_g \text{ (m/s)} = (4.82 \times 10^{-3})(U_{10})^{0.78} (Sc_G)^{-0.67} (d_e)^{-0.11}$$

where:

$$Sc_G = \mu_a / (\rho_a D_a)$$

$$d_e \text{ (m)} = 2(A/\pi)^{0.5}$$

$$= \frac{(4.82 \times 10^{-3}) \times (U_{10})^{0.78} \times (\mu_a)^{-0.67} \times (2A^{0.5})^{-0.11}}{(\rho_a D_a)^{-0.67} \times (\pi^{0.5})^{-0.11}}$$

$$= \frac{(4.82 \times 10^{-3}) \times (4.47)^{0.78} \times (1.81 \times 10^{-4})^{-0.67} \times (2 \times 3.34^{0.5})^{-0.11}}{(1.20 \times 10^{-3} \times 0.08)^{-0.67} \times (3.14^{0.5})^{-0.11}}$$

$$= 8.28 \times 10^{-3} \text{ m/s}$$

$U_{10} = 4.47 \text{ m/s}$ (AP-42 Section 4.3 default)

Air viscosity $\mu_a = 1.81 \times 10^{-4} \text{ g/cm}^2$ (AP-42 Section 4.3 default)

Surface Area $A = 3.34 \text{ m}^2$ (equal to 6 ft x 6 ft)

Air Density $\rho_a = 1.20 \times 10^{-3} \text{ g/cm}^3$ (AP-42 Section 4.3 default)

VOC diffusivity in air $D_a = 0.08 \text{ cm}^2/\text{s}$ (average diffusivity of BETX)

2. Calculate the oil phase mass transfer coefficient (Equation 9):

$$K_{oil} = k_g K_{eqoil}$$

where:

$$K_{eqoil} = P^* \rho_a MW_{oil} / (\rho_{oil} MW_a P_o)$$

$$= \frac{(8.28 \times 10^{-3}) \times (4.61 \times 10^{-4}) \times (1.20 \times 10^{-3}) \times (230)}{(0.7999) \times (29) \times (1)}$$

$$= 4.54 \times 10^{-8} \text{ m/s}$$

k_g = gas phase mass transfer coefficient, calculated above

Vapor Pressure $P^* = 4.61 \times 10^{-4} \text{ atm}$ (MSDS)

Air Density $\rho_a = 1.20 \times 10^{-3} \text{ g/cm}^3$ (AP-42 Section 4.3 default)

Oil Molecular Weight $MW_{oil} = 230 \text{ g/mol}$ (similar to diesel)

Oil Density $\rho_{oil} = 0.7999 \text{ g/cm}^3$ (MSDS)

Air Molecular Weight $MW_a = 29 \text{ g/mol}$

Atmospheric Pressure $P_o = 1 \text{ atm}$

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3. Calculate VOC emissions (Equation 22):

$$N(\text{g/s}) = K_{\text{oil}} C_{\text{L,oil}} A$$

where:

$$C_{\text{L,oil}}(\text{g/m}^3) = Q_{\text{oil}}(C_{\text{oil}}^*) / (K_{\text{oil}} A + Q_{\text{oil}})$$

and:

$$C_{\text{oil}}^* = C_0 / FO$$

$$Q_{\text{oil}} = (FO)(Q)$$

$$= \frac{K_{\text{oil}} \times Q \times C_0 \times A}{K_{\text{oil}} \times A + FO \times Q}$$

$$= \frac{(4.54 \times 10^{-8}) \times (0.028 \times 5) \times (3.34)}{(4.54 \times 10^{-8}) \times (3.34) + (0.001) \times (0.028)}$$

K_{oil} = oil phase mass transfer coefficient, calculated above
Surface Area $A = 3.34 \text{ m}^2$ (equal to 6 ft x 6 ft)
Volumetric flow rate $Q = 0.028 \text{ m}^3/\text{s}$ (450 gpm)
Initial Concentration of constituent in liquid $C_0 = 5 \text{ g/m}^3$
Fraction of volume which is oil $FO = 0.001$

$$= 7.54 \times 10^{-4} \text{ g/s}$$

$$= \mathbf{0.0060 \text{ lbs/hr, 0.14 lbs/day, 52.44 lbs/yr (uncontrolled and controlled emissions)}}$$

The VOC emissions rate is calculated to be less than the VOC emissions calculated for sump D2749 (as determined under A/N 428167). Therefore, the project results in no net increase in VOC emissions.

RULE EVALUATION

CEQA: The CEQA Applicability Form (400-CEQA) indicates that the project does not have any impacts which trigger the preparation of a CEQA document. The expected impacts of the project on the environment are not significant, therefore the preparation of an Environmental Impact Report (EIR) is not required for this project.

Rule 212: Rule 212 requires public noticing for a new source or a modification of a source at a facility subject to Regulation XX, if it is within 1000 feet of a school. The new sump will not be within 1000 feet of a school (Attachment #4 shows nearby schools – there are no schools within ¼ mile of the facility). Rule 212 requires noticing when the emission increase exceeds any of the daily maxima specified in Rule 212 (g). The project will not result in an increase in VOC emissions exceeding 30 lbs VOC/day, which is the threshold limit stated in 212(g). Public noticing is also required if the modification results in an increase in exposure to Toxic Air Contaminants (TAC) such that the Maximum

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Individual Cancer Risk (MICR) is greater than 1 in a million (1×10^{-6}). Attachment #5 is a Tier I Screening Health Risk Assessment (HRA) showing that exposure to TAC emissions from the new sump are not expected to result in a MICR of 1×10^{-6} . TAC emissions in this analysis were calculated from the maximum VOC emissions, as shown in the Emissions Calculation section, and the speciation profile for gasoline since this is the worst-case product with respect to TAC content (see Attachment #6). Public noticing is not required for this project and the requirements of Rule 212 are met.

- Rule 401** With proper operation and maintenance, the sump is not expected to produce visible emissions with a shade as dark as or darker than that designated Ringelmann No. 1 by the US Bureau of Mines, for a period of 3 minutes in any hour. Therefore, compliance with this rule is expected.
- Rule 402** With proper operation and maintenance, the sump is not expected to result in a public nuisance. Compliance with this rule is expected.
- Rule 463** This rule applies to above ground tanks used to store organic liquid with a capacity of 19,815 gallons or greater and to above ground storage tanks with a capacity between 251 gallons and 19,815 gallons, used to store gasoline. The sump is not an above ground storage tank. Therefore, this rule does not apply to the subject equipment.
- Rule 464** The sump is not used for oil/water separation, but for temporary storage prior to pumping to wastewater treatment system. Therefore, the sump is not subject to the requirements of this rule.
- Reg IX** The sump is not required to be in compliance with Standards of Performance for New Stationary Sources, promulgated under 40 CFR 60 Subpart QQQ – Standards of Performance for VOC Emissions from Petroleum Refinery Wastewater Systems. This regulation is applicable to equipment in “oily wastewater” service. This regulation defines “oily wastewater” as “wastewater generated during refinery process which contains oil, emulsified oil, or other hydrocarbons. The regulation also provides examples of refinery processes which generate “oily wastewater.” The new sump will not handle wastewater generated from refinery processes, but from fire training exercises. Therefore, it is not subject to the requirements of this regulation.
- Rule 1176** The fire training sump is exempt from control requirements of this rule, since it is expected to receive fluid with a VOC content of less than 5 mg per liter. BP has submitted a laboratory report for wastewater obtained from the existing firewater sump, showing VOCs were not detected in this wastewater. Per 1176(i)(5)(J), wastewater systems which receive liquid streams, with a VOC content of less than 5 mg/l, as determined by EPA Test Method 8240 or equivalent, are exempt from specified provisions of this rule. Permit conditions B59.2 and D90.9 limit the sump to receiving

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liquids with a maximum VOC content of 5 mg per liter and require annual sampling and testing of wastewater to ensure that this limit is not exceeded.

- Reg XIII** This rule contains requirements including that Best Available Control Technology (BACT) standards are met, that emissions offsets in the form of Emissions Reduction Credits (ERC)s be provided for an emissions increase, and that modeling be conducted to assess the impacts of the project on ambient air quality. Since the project (to eliminate sump D2749 and construct and operate a new wastewater sump) does not result in a change in criteria pollutant emissions, it is not subject to the requirements of this regulation. Further, it is exempt from BACT and offset requirements since VOC emissions from the new equipment are under 0.5 lbs/day.
- Rule 1401** This rule has requirements that the project not result in an increase in Maximum Individual Cancer Risk (MICR) of 1×10^{-6} if T-BACT is not met or 10×10^{-6} if T-BACT is used, that chronic and acute hazard indices not exceed 1.0, and the cancer burden not exceed 0.5. The project (to eliminate wastewater sump D2749 and construct and operate a new wastewater sump) is not expected to result in an increase in TAC emissions. Attachment #5 is a Tier I Screening HRA indicating that TAC emissions from the new sump will not result in a violation of this rule.
- Reg XVII** This rule applies to increases in emissions of pollutants for which attainment with ambient air quality standards has been achieved in the South Coast Air Basin (i.e. NO₂, SO₂, CO and lead). The wastewater sump does not emit these pollutants, therefore Reg XVII requirements do not apply to this project.
- Reg XX** The facility is a part of the District's RECLAIM program and therefore is subject to RECLAIM requirements. However, the new wastewater sump will not emit NO_x or SO₂ and therefore RECLAIM requirements do not apply to this equipment.
- Reg XXX** The facility is subject to Reg XXX and a Title V permit was issued to this facility on September 1, 2009. The project results in a De Minimis Significant Permit Amendment of the Title V permit, as defined in Rule 3000. As such, it is subject to the 45 day EPA review process.
- 40 CFR 63, Subpart CC** This regulation defines Group 1 Wastewater Streams as streams which have a total annual benzene loading of 10 megagrams per year or greater, have a flow rate of 0.02 liters per minute or greater and a benzene concentration of 10 ppm or greater. Group 1 Wastewater streams are required to comply with the requirements of Sections 61.340 through 61.355 of 40 CFR 61 Subpart FF. Based on the analytical result submitted for the existing fire training sump, the new wastewater sump is classified as a Group 2 Wastewater Stream. As such, it is not required to meet any control standards or work practices standards under this regulation.

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RECOMMENDATIONS

Issue the Permit to Construct with the following permit conditions.

B59.2 The operator shall only use the following materials in this device:

wastewater with a VOC content of 5 mg per liter or less.

[RULE 1176, 9-13-1996]

[Devices subject to this condition: DX]

D90.9 The operator shall sample and analyze the VOC content in each inlet fluid to the sump according to the following specifications:

The operator shall analyze once per year according to EPA Test Method 8240, or equivalent test method.

[RULE 1176, 9-13-1996]

[Devices subject to this condition: DX]

H23.22 This equipment is subject to the applicable requirements of the following rules or regulations:

<u>Contaminant</u>	<u>Rule</u>	<u>Rule/Subpart</u>
VOC	District Rule	1176

[RULE 1176, 9-13-1996]

[Devices subject to this condition: DX]