

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 6	PAGE 1
	APPL NO 512832R 512833R	DATE 1/12/2011
	PROCESSED BY GCR	CHECKED BY CA

**PERMIT TO OPERATE EVALUATION**

**APPLICANT'S NAME:** ORANGE COUNTY SANITATION DISTRICT (OCS D)

**MAILING ADDRESS:** 10844 ELLIS AVENUE  
FOUNTAIN VALLEY, CA 92708-7018  
ATTN.: TERRY AHN, REGULATORY SPECIALIST

**EQUIPMENT ADDRESS:** 22212 BROOKHURST STREET (PLANT NO. 2)  
HUNTINGTON BEACH, CA 92646-8406

**FACILITY ID.:** 29110

**APPLICATION NO.512832:**

**EQUIPMENT DESCRIPTION:**

STORAGE TANK, FIXED ROOF, ID NO. 211TNK076 (P2 NSC), HYDROCHLORIC ACID, 8' - 0" DIA. X 13' - 0" H., 4,000-GALLON CAPACITY AND VENTING THROUGH A 55-GALLON DRUM CONTAINING (50% SULPHASORB XL AND 50% SAFETYSORB BLEND OR EQUAL) ACTIVATED CARBON.

**APPLICATION NO. 512833:**

**EQUIPMENT DESCRIPTION:**

STORAGE TANK, FIXED ROOF, ID NO. 201TNK450 (P2 SSC), HYDROCHLORIC ACID, 7' - 0" DIA. X 10' - 0" H., 2,000-GALLON CAPACITY AND VENTING THROUGH A 55-GALLON DRUM CONTAINING (50% SULPHASORB XL AND 50% SAFETYSORB BLEND OR EQUAL) ACTIVATED CARBON.

**CONDITIONS:**

1. OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT IS ISSUED UNLESS OTHERWISE NOTED BELOW.  
[RULE 204]
2. THIS EQUIPMENT SHALL BE PROPERLY MAINTAINED AND KEPT IN GOOD OPERATING CONDITION AT ALL TIMES.  
[RULE 204]
3. THIS EQUIPMENT SHALL STORE HYDROCHLORIC ACID WITH CONCENTRATION OF 38 WEIGHT PERCENT OR LESS ONLY.  
[RULE 204]
4. THE MAXIMUM AMOUNT OF HYDROCHLORIC ACID FILLED INTO THIS STORAGE TANK SHALL NOT EXCEED 2,000 GALLONS PER MONTH.  
[RULE 1303 (b) (1) - OFFSET]

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 6	PAGE 2
	APPL NO 512832R 512833R	DATE 1/12/2011
	PROCESSED BY GCR	CHECKED BY

5. THIS EQUIPMENT SHALL NOT BE FILLED UNLESS THE VENT GASES PASS THROUGH A 55-GALLON DRUM CONTAINING ACTIVATED CARBON.  
[RULE 1303 (a) (1)-BACT]
6. THE OPERATOR SHALL REPLACE THE CARBON PER MANUFACTURER'S RECOMMENDATION.  
[RULE 204]
7. RECORDS REQUIRED BY THIS PERMIT SHALL BE KEPT AND MAINTAINED FOR AT LEAST FIVE YEARS AND MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.  
[RULE 204]

**BACKGROUND:**

On 7/22/2010, Orange County Sanitation District (OCSD) submitted above applications for permits to operate the existing HCl-acid storage tanks, at their Plant 2, for the North Scrubber Complex (512832) and South Scrubber Complex (512833). These applications were submitted under the provision of Rule 310 (Amnesty for unpermitted equipment) and, hence, not subject to higher fees for PO no PC.

Also, a separate A/N 512604 is submitted for the construction of a 10,000 gal acid storage tank (existing, described under an APC equipment, that requires a separate permit) with addition of a fume scrubber.

This is a Title V facility. A/N 513687 is also filed for the TV Revision. Most recent TV revision (01) was issued May 28, 2009 (A/N 496824).

**PROCESS DESCRIPTION:**

The existing Foul Air Treatment Systems at the North and South Scrubber Complex (NSCor SSC) consists of chemical scrubbers where recirculating scrubbing liquid trickles down through the packed bed and contacts the foul air which is passed up through the bed to remove odors. NaOH and NaOCl solutions used for the scrubber and HCl is used for periodic cleaning of the packed bed to remove hardwater desposits and chemical buildup.

**EMISSIONS:**

**A/N 512832:** (4000 gal. Tank)

The emissions can be assessed using the following equations:

**Working loss:**

Acid filling rate: 2000 gallon truck delivery, pumped at @ 50 gpm, 3 times a year (40 minutes/event)  
Annual throughput = 13,000 gal per OCSD 10/14/2010 E-mail.

$$\begin{aligned}
 L_w &= (F)(1 \text{ cft}/7.48 \text{ gal})(1 \text{ lb-mole}/380 \text{ cf})(M_v)(P/14.7 \text{ psia}) \\
 &= 2.4 \times 10^{-5} \times F \times P \times M_v \\
 &= 2.4 \text{ E-05} \times 2000 \times 2.90 \times 36.5
 \end{aligned}$$

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES	PAGE
	6	3
	APPL NO 512832R 512833R	DATE 1/12/2011
	PROCESSED BY GCR	CHECKED BY

$L_w = 5.08 \text{ lbs HCl /day}$  (with no vapor return line to truck and vapor venting to passive C-drum)  
 $= 5.08 \text{ lbs/mo.}$

$L_w =$  working loss (lb/day)

$F =$  filling rate (gal/day), 2000 gal/day (40 min filling time, once every 4-month)

$P =$  true vapor pressure (psia)

$= 150 \text{ mm Hg @ } 20 \text{ deg C, max. } 37.14\% \text{ HCl (23}^{\circ} \text{ Be)}$

$= 2.90 \text{ psia}$

$M_v =$  molecular weight of vapor (lb/lb-mole) = 36.5

Breathing loss:

$L_B = (V_o)(\Delta T/T_{avg})(1/v)(P/14.7)(M_v)$

$L_B =$  breathing loss (lb/day)

$V_o =$  volume of vapor above liquid surface (cf)

$= 50\% \text{ of max tank vol of } 327 \text{ cf} = 164 \text{ cf}$

$\Delta T =$  average daily temperature change (deg R or F) = **25 deg R**

$T_{avg} =$  average daily temperature (deg R) =  $65 + 460 = 525 \text{ deg R}$

$(V_o)(\Delta T/T_{avg}) =$  Vol of vapor expelled from the tank due to avg. temp. change (cft)

$P =$  true vapor pressure (Psia) = **2.90 psia @ 20 deg C**

$V = 10.73 (FT^3 \text{ Psia/ lbmole } ^{\circ}R) T_{AV} (^{\circ}R) (1/14.7 \text{ psia})$

$= (10.73) (525)/14.7$

$= 383.21$

$(1/v) = 1/383.21 = 0.0026$

$M_v =$  molecular weight of vapor (lb/lb-mole) = **36.5**

$L_B = (164) (25/525) (0.0026) (2.90/14.7) (36.5)$

$= 0.15 \text{ lbs/day}$

$= 0.15 \times 30 = 4.5 \text{ lbs/mo.}$

Total uncontrolled HCl emission =  $5.08 + 4.5 = 9.58 \text{ lbs/mo.} = 0.32 \text{ lbs/day} = 0.01 \text{ lb/hr.}$

At 99% control efficiency\* for Carbon (per OCSD E-mail information, Oct. 15, 2010

Controlled emission =  $0.1 \text{ lb/mo} = 0.003 \text{ lb/day} = 0.0001 \text{ lb/hr}$

No offset required.

Estimated Carbon Life: (4,000 gal tank venting to 55 gal carbon media)

Chlorine removal capacity = 15% minimum by wt. [PureAir Filtration Safetysorb Media Specs.]

Media Bulk density = 45 lbs/cu. ft.

55 gal. drum  $\times$  cf/7.48 gal  $\times$  45 lbs/cf = 330 lbs C

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 6	PAGE 4
	APPL NO 512832R 512833R	DATE 1/12/2011
	PROCESSED BY GCR	CHECKED BY

= 297 lbs C @ 90% full drum

HCl emission/ tank filling, 2000 gal = 5.1 lbs HCl  
 (297 lbs C) ( 0.15 lb HCl/lb C) = 5.1 lb HCl/filling x N fillings  
 N fillings = 9

So, estimated C life to saturate all C = 3 yrs (9 fillings/3 fillings/yr = 3 yrs)

**A permit condition is imposed that carbon shall be replaced per manufacturer's recommendation.**

PureAir Filtration Safetysorb Media Spec sheet states that Pure Air filtration provides free quarterly media testing for the life of the media installation. Test data will provide remaining impregnate content, total life prediction and projected replacement date. All analysis to be performed at manufacturer's certified laboratory.

**A/N 512833:** (2000 gal. Tank)

The emissions can be assessed using the following equations:

Working loss:

Acid filling rate: 2000 gallon truck delivery, pumped at @ 50 gpm, 3 times a year (40 minutes/event)  
 Annual throughput = 5,200 gal per OCSD 10/14/2010 E-mail.

$$L_w = (F)(1 \text{ cft}/7.48 \text{ gal})(1 \text{ lb-mole}/380 \text{ cf})(M_v)(P/14.7 \text{ psia})$$

$$= 2.4 \times 10^{-5} \times F \times P \times M_v$$

$$= 2.4 \text{ E-}05 \times 2000 \times 2.90 \times 36.5$$

$$L_w = \mathbf{5.08 \text{ lbs HCl/day}}$$
 (with no vapor return line to truck and vapor venting to passive C-drum)  

$$= 5.08 \text{ lbs/mo.}$$

$L_w$  = working loss (lb/day)

$F$  = filling rate (gal/day), 2000 gal/day (40 min filling time, once every 4-month)

$P$  = true vapor pressure (psia)

= 150 mm Hg @ 20 deg C, **max. 37.14% HCl** (23<sup>0</sup> Be)

= 2.90 psia

$M_v$  = molecular weight of vapor (lb/lb-mole) = 36.5

Breathing loss:

$$L_B = (V_o)(\Delta T/T_{avg})(1/v) (P/14.7) (M_v)$$

$L_B$  = breathing loss (lb/day)

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	<b>PAGES</b> 6	<b>PAGE</b> 5
	<b>APPL NO</b> 512832R 512833R	<b>DATE</b> 1/12/2011
	<b>PROCESSED BY</b> GCR	<b>CHECKED BY</b>

$V_o$  = volume of vapor above liquid surface (cf)

= 50% of max tank vol of 192 cf = **96 cf**

Delta T = average daily temperature change (deg R or F) = **25 deg R**

$T_{avg}$  = average daily temperature (deg R) = 65 + 460 = **525 deg R**

$(V_o)(\Delta T/T_{avg})$  = Vol of vapor expelled from the tank due to avg. temp. change (cft)

$P$  = true vapor pressure (Psia) = **2.90 psia @ 20 deg C**

$V = 10.73(FT^3 \text{ Psia/ lbmole } ^\circ R) T_{AV} (^{\circ}R) (1/14.7 \text{ psia})$

= (10.73) (525)/14.7

= 383.21

$(1/v) = 1/383.21 = 0.0026$

$M_v$  = molecular weight of vapor (lb/lb-mole) = **36.5**

$L_B = (96) (25/525) (0.0026) (2.90/14.7) (36.5)$

= **0.085 lbs/day**

= 0.085 x 30 = 2.55 lbs/mo.

Total uncontrolled HCl emission = 5.08 + 2.55 = 7.63 lbs/mo. = 0.25 lb/day = 0.01 lb/hr

At 99% control efficiency for Carbon (per OCSD E-mail information, Oct. 15, 2010)

Controlled emission = 0.08 lb/mo = 0.002 lb/hr = 0.0001 lb/hr.

No offset required.

### **RULES EVALUATION:**

#### **Rule 212:**

There are no schools within 1/4 mile of the emission source.

HCl is non-carcinogenic- no risk. No public notice required. Compliance is expected.

#### **Rule 401 (Visible Emissions):**

With proper operation, maintenance and control of equipment compliance is expected.

#### **Rule 402 (Nuisance):**

With proper operation, maintenance and control of equipment compliance is expected.

#### **Regulation XIII:**

Estimated daily HCl emission is > 1 lb/day and acid vapors will be venting through the granular carbon media (permit condition) with assumed control efficiency of 99%.

No modeling or offsets is required. Compliance is expected.

#### **Rule 1401:**

HCl is not carcinogenic, no cancer risk.

<b>SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT</b>  <b>ENGINEERING AND COMPLIANCE DIVISION</b>  <b>PERMIT APPLICATION EVALUATION AND CALCULATIONS</b>	PAGES 6	PAGE 6
	APPL NO 512832R 512833R	DATE 1/12/2011
	PROCESSED BY GCR	CHECKED BY

Controlled HCl emission is less than chronic (298 lbs/yr) and acute (1.05 bs/hr), worst-case at 25 meters receptor, Screening Emission Levels listed under Table-1A. No further HIC/HIA evaluation is required. Compliance is expected.

**Rule 1401.1:**

Not applicable as this is an existing facility.

**REG. XXX:**

Compliance is expected. Title V revision A/N 513687 is filed to include these two permits (A/Ns 512832 & 512833) and, another acid storage tank with afume scrubber A/N 512604.

**Recommendations:**

A permit to operate is recommended, for each of the above applications, with proposed conditions listed on Pgs. 1-2.

Upon approval of these permits, it should be included under TV Revision (02), A/N 513687, Section D.