

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES	PAGE
	7	1
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY CAT

PERMIT TO CONSTRUCT EVALUATION

APPLICANT'S NAME: ORANGE COUNTY SANITATION DISTRICT (OCSD)

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

EQUIPMENT DESCRIPTION:

ODOR CONTROL SYSTEM, TREATING EXHAUST FROM DISSOLVED AIR FLOATATION THICKENERS (DAFTS), CONSISTING OF:

1. EXHAUST HEADER FROM FOUR (4) DISSOLVED AIR FLOATATION THICKENERS (DAFTS) AND TWO (2) POLYMER MIX TANKS.
2. THREE (3) FOUL-AIR EXHAUST FANS (ONE STANDBY), EACH 100 H.P., MAXIMUM 35,000 CFM CAPACITY.
3. HUMIDIFICATION, IN-DUCT, WITH TWELVE (12) SPARY NOZZLES, AND EQUIPPED WITH HYDROGEN SULFIDE (H2S) ANALYZER. AND THREE (3) BIOFILTER
4. THREE (3) BIOFILTER CELLS, CONCRETE WALLED, CUSTOM DESIGNED, EACH BIOFILTER CELL 20' W. X 33' L. X 9' D., CONTAINING PROPRIETARY INORGANIC MINERAL BASED MEDIA, EQUIPPED WITH INLET FOUL-AIR FLOW METERS, SAMPLING PORTS AND SURFACE IRRIGATION SYSTEM.

Conditions: (Revised 2/28/12, as deemed necessary, based on OCSD comments to Draft permit)

1. CONSTRUCTION AND OPERATION OF THIS EQUIPMENT SHALL BE CONDUCTED IN COMPLIANCE WITH ALL DATA AND SPECIFICATIONS SUBMITTED WITH THE APPLICATION UNDER WHICH THIS PERMIT TO CONSTRUCT 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 BE OPERATED BY PERSONNEL PROPERLY TRAINED IN ITS OPERATION.
[RULE 204]

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 2
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

4. THIS PERMIT SHALL EXPIRE IF CONSTRUCTION OF THE EQUIPMENT IS NOT COMPLETED WITHIN ONE YEAR FROM THE DATE OF ISSUANCE OF THIS PERMIT UNLESS AN EXTENSION IS GRANTED BY THE EXECUTIVE OFFICER.
[RULE 205]
5. A TEMPERATURE INDICATOR SHALL BE INSTALLED AND MAINTAINED IN THE MAIN FOUL-AIR HEADER PRIOR TO FOUL-AIR DISTRIBUTION TO THE BIOFILTERS. THE INLET FOUL AIR TEMPERATURE READINGS, TAKEN ON A MONTHLY BASIS, SHALL BE MAINTAINED IN THE RANGE OF EQUIPMENT DESIGN SPECIFICATIONS OR AS PER MANUFACTURER'S RECOMMENDATION, AND WRITTEN SPECIFICATIONS SHALL BE KEPT ON FILE.
[RULE 204]
6. A HYDRGEN SULFIDE (H₂S) ANALYZER SHALL BE INSTALLED AND MAINTAINED IN THE MAIN FOUL-AIR HEADER PRIOR TO FOUL-AIR DISTRIBUTION TO THE BIOFILTERS. FOUL-AIR H₂S CONCENTRATION (PPMV) SHALL BE MONITORED ON A MONTHLY BASIS AND RESULTS RECORDED. WHEN H₂S ANALYZER IS NOT OPERATING, COLORIMETRIC H₂S TUBES, HAND HELD H₂S ANALYZERS OR ANY OTHER DISTRICT APPROVED METHODS SHALL BE USED FOR H₂S MONITORING.
[RULE 204]
7. FOUL-AIR FLOW RATE (SCFM) MONITORING AND INDICATING DEVICE OR SYSTEM SHALL BE INSTALLED AND MAINTAINED IN THE FOUL AIR INLET DUCT TO EACH BIOFILTER.
[RULE 204]
8. FOUL-AIR FLOW RATE SHALL BE MONITORED AND RECORDED ON A DAILY BASIS. TOTAL FLOW RATE READING FOR INLET FOUL-AIR TO THREE (3) BIOFILTER CELLS SHALL NOT EXCEED 35,000 SCFM. .
[RULE 402, 1401]
9. THE INCOMING FOUL AIR HUMIDIFICATION AND SURFACE IRRIGATION SYSTEMS SHALL BE MAINTAINED IN GOOD OPERATING CONDITION, AT ALL TIMES, AND SHALL BE UTILIZED TO MAINTAIN THE DESIRED MOISTURE CONTENT FOR THE BIOFILTER MEDIA.
[RULE 204]
10. HYDROGEN SULFIDE (H₂S) AND AMMONIA (NH₃) EMISSIONS FROM EACH BIOFILTER SURFACE (MULTI-POINT) SHALL BE MONITORED AT LEAST ONCE A MONTH USING PORTABLE ANALYZERS. THE MULTI-POINT SURFACE READINGS (PPMV) SHALL BE AVERAGED AND RECORDED.
[RULE 204]
11. EMISSIONS OF H₂S FROM THE BIOFILTER SHALL NOT EXCEED 0.0175 LB/HR (93 PPBV AT THE SURFACE AT 35,000 SCFM).
[RULE 204]
12. THE OWNER OR OPERATOR OF THE EQUIPMENT SHALL CONDUCT SOURCE PERFORMANCE TESTS UNDER THE FOLLOWING CONDITIONS:
 - I. A TEST PROTOCOL SHALL BE SUBMITTED TO AQMD NO LATER THAN 45 DAYS BEFORE THE PROPOSED TEST DATE AND SHALL BE APPROVED BY THE EXECUTIVE OFFICER BEFORE THE TEST COMMENCES. AT A MINIMUM, THE TEST PROTOCOL SHOULD INCLUDE THE FOLLOWING:

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 3
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

- a. A DESCRIPTION OF THE EQUIPMENT TESTED. INCLUDE A PROCESS SCHEMATIC INDICATING SAMPLING LOCATIONS/PORTS; SAMPLING DUCT/STACK DIMENSIONS ALONG WITH UPSTREAM AND DOWNSTREAM FLOW DISTURBANCES (E.G. ELBOWS, TEES AND FANS).
 - b. A BRIEF PROCESS DESCRIPTION.
 - c. OPERATING CONDITIONS UNDER WHICH THE TEST WILL BE PERFORMED, INCLUDING INLET AIR FLOW RATE (SCFM), TEMPERATURE, AND % MOISTURE.
 - d. A DESCRIPTION OF THE SAMPLING AND ANALYTICAL METHODS FOR EACH CONSTITUENT MEASURED.
 - e. COMPLETE CALCULATIONS FOR FLOW RATES, CONCENTRATIONS (PPMV), EMISSION RATES AND CONTROL EFFICIENCIES.
 - f. A DESCRIPTION OF THE CALIBRATION AND QUALITY ASSURANCE PROCEDURES.
 - g. SAMPLING FACILITIES SHALL COMPLY WITH THE DISTRICT GUIDELINES FOR CONSTRUCTION OF SAMPLING AND TESTING FACILITIES, PURSUANT TO RULE 217.
 - h. A STATEMENT DETERMINING THAT THE TESTING LABORATORY QUALIFIES AS AN "INDEPENDENT TESTING LABORATORY" UNDER RULE 304 (NO CONFLICT OF INTEREST) AND SIGNED BY THE RESPONSIBLE AUTHORITY.
- II. THE TESTS SHALL DETERMINE BIOFILTER'S INLET AND OUTLET EMISSIONS FOR TOTAL NON-METHANE ORGANIC COMPOUNDS (TNMOC), H₂S AND AMMONIA TO DETERMINE BIOFILTER'S CONTROL EFFICIENCY, IN WEIGHT PERCENT. TEST RESULTS SHOULD INCLUDE INLET AND OUTLET TNMOC AND AMMONIA CONCENTRATIONS (PPMV), AND EMISSIONS (LBS/HR), AND SPECIATED ANALYSIS FOR TNMOCS,
- III. THE TESTS SHALL BE CONDUCTED AND A WRITTEN REPORT SUBMITTED TO THE SCAQMD WITHIN 60 DAYS AT MAXIMUM FOUL-AIR INLET FLOW RATE AT WHICH THE EQUIPMENT WILL BE OPERATED, BUT NOT LATER THAN 180 DAYS AFTER INITIAL START-UP.
[RULE 204, 217, 402, 1401]
13. SMOKE BOMB TESTS SHALL BE CONDUCTED INITIALLY AND, THEREAFTER, EVERY THREE YEARS TO DEMONSTRATE UNIFORM DISTRIBUTION OF AIR FLOWS, AREA OF COMPACTION AND/OR CHANNELING THAT NEEDS REPAIR.
[RULE 204]
14. ANY BREAKDOWN OR MALFUNCTION OF THIS EQUIPMENT RESULTING IN EXCESSIVE ODOR EMISSIONS INTO THE ATMOSPHERE SHALL BE REPORTED TO THE SCAQMD WITHIN TWENTY FOUR HOURS AFTER OCCURRENCE, AND IMMEDIATE REMEDIAL MEASURES SHALL BE

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 4
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

UNDERTAKEN TO CORRECT THE PROBLEM AND PREVENT FURTHER EMISSIONS INTO THE ATMOSPHERE.
[RULE 430, 402]

14. ALL RECORDS REQUIRED BY THIS PERMIT SHALL BE KEPT AND MAINTAINED FOR AT LEAST FIVE YEARS, AND SHALL BE MADE AVAILABLE TO AQMD PERSONNEL UPON REQUEST.
[RULE 204]

BACKGROUND

On January 28, 2011, Orange County Sanitation District (OCSD) submitted this A/N 518276 for the new construction of an odor control equipment (Biofilter) to treat foul-air from the four (4) dissolved air floatation thickeners (DAFTs) and two (2) polymer mixing tank ventilation.

Above proposed odor control system, consisting of three biofilter cells, is part of the OCSD's Job No. P2-89, that involves rehabilitation of the existing four DAFTs and to replace the existing odor control system. E (existing chemical scrubbers 'F' and biotrickling filter 'G' permitted under F99408 (A/N 444113) will be demolished and replaced with new odor control system-Biofilter. The DAFTs

(Included under PO 93957, A/N 222809, Equipment Description Item #13) rehabilitation project involves replacement of mechanical equipment, collector mechanism, saturation system, polymer storage and feed system, electrical and instrumentation and other related equipment. Existing concrete domes for DAFTs will be replaced with geodesic domes for easier access by plant personnel. As there is no change in the treatment capacity and hence change in emissions no modification permit is required for the current permit, D93957 (A/N 222809).

OCSD has also submitted a separate A/N 518235 for Title V revision to include the proposed new odor control equipment.

PROCESS DESCRIPTION:

The existing four (4) DATTs will undergo rehabilitation work as described above.

DAFTs accept secondary biosolids from, (1) waste activated sludge from aeration basins and (2) waste secondary sludge from the trickling filter clarifiers. High pressure air is dissolved in the liquid and then released into the tank at atmospheric pressure. Suspended solid particles attach to the air bubbles causing them to float to the surface. The solids are then skimmed of the surface.

The 48" Diameter FRP foul-air header collects exhaust from the 4-DAFTs and ventilation air flow from the two polymer storage tanks. Total combined exhaust, 35000 cfm (8500 cfm/TDAF tank x 4 DAFTs = 34,000 cfm + 1000 cfm from polymer tanks = 35,000 cfm, total). The exhaust system consists of three blowers (two duty fans and one-standby); each 100 HP. Exhaust flow will be split equally to send 11,667 cfm to each biofilter cell (3- concrete walled cells). There is a humidification system consisting of 12 nozzles (sprayed into the header) with 0.34 gpm for each nozzle. This will conditioned the biofilter inlet air to maintain desired moisture and temperature for the biofilter media consisting of proprietary inorganic media. There will be a header in-line H2S analyzer to monitor H2S concentration in foul-air to be treated by the biofilter.

Biofilter consists of three (3) concrete walled cells, biofilter media, inlet flow rate meters, sampling ports and irrigation sprinklers system to maintain adequate moisture and temperature for the media.

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 5
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

Incoming TNMOC, H₂S and ammonia (odors) is destroyed by the bacteria and treated; odor free air is exhausted into the atmosphere. Estimated control efficient 98% (wt) or better, based on similar type of biofilter permitted.

Each biofilter cell: 20' W. x 33' L. x 9' media depth
Total exhaust flow rate = 35,000 cfm (11,667 cfm per cell).

Designed for 30 seconds Empty Bed Contact Time.

Recommended inlet foul-air temperature = 122 deg F (after humidification), based on previous biofilter permitted.

Media moisture = maintained at least 45%

GENERIC BIOFILTER PRINCIPAL & OPERATION: (INFORMATION PURPOSE ONLY):

Biofiltration is a well-established technology in Germany, the Netherlands and other European countries and is recognized by North America in last few years. Biofiltration is gaining recognition because of its low operating and capital costs, and it is also a clean pollution control technology. It reduces organic emissions to water, carbon dioxide and salts. For wastewater odor control and for degradable organics in concentrations of less than 1,000 ppmv, biofiltration is an extremely attractive alternative.

Biofiltration is a naturally occurring process in which microorganisms, including bacteria, fungi and actinomycetes, break down organic compounds into carbon dioxide and water. In this process, the microorganisms grow on materials such as soil, compost, peat or heather, and some synthetic materials (e.g. activated carbon, polystyrene) which provide bulking and structural stability. In this particular case, media consists of a mixture of rice hulls, mulch bark and wood chips. The microorganisms live in a thin layer of moisture, the biofilm, on the surface areas of the filter material. As contaminated off-gases enter the biofilter, they diffuse and are adsorbed onto the biofilm, where the microorganisms oxidize them to CO₂, water and salts. The residence time of the off-gases - how long it takes for them to be biochemically degraded - depends on factors such as the composition of the waste stream, its flow rate, moisture, temperature, oxygen levels, etc.

EMISSIONS:

The following emissions are estimated for TNMOC (VOC)*, H₂S and ammonia.

Inlet foul air = 35000 cfm total (3-cells)
Inlet concentration, TNMOC = 3 ppmv
H₂S = 2 ppmv and,
Ammonia = 2 ppmv

(Above values are higher than actual samples analyzed in 2002 (DAFTs' exhaust).

Control efficiency = 98% (wt), average for H₂S and ammonia
= 99% (wt) TNMOC

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 6
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

(From Rule 1401 analysis-spreadsheet),

	R1 lbs/hr (uncon.)	R2 lbs/hr (cont.)	lbs/day
TNMOC(VOC)*	1.60	0.016	0.38
H2S ⁺	0.38	0.008	0.19
Ammonia	0.19	0.004	0.09

* Assume ROG = TOG (methylene chloride, exempt VOC, with undetectable conc.)

+ Assmed 2 ppmv H2S in foul-air inlet to biofilter (application stated 0.93 ppmv H2S)

RULES EVALUATION:

Rule 212:

There are no schools within 1000' of the emission source.
 Estimated cancer risk is 1.22 E-08 < one- in- a million.
 No offsets 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.

H2S & NH3 ODOR CONTROL ANALYSIS:

SCREEN 3 model analysis (volume source) indicated 1-hr maximum ground level con. @ 15 m = 761.6 µg/m3 (worst-case).

For estimated H₂S emission = 0.0075 lbs/hr

$$\begin{aligned}
 @ 0.0075 \text{ lbs H}_2\text{S /hr} \times 761.6 \text{ µg/m}^3 / 1 \text{ lb/hr} &= 5.71 \text{ µg/m}^3 \\
 &= 5.71 \times 0.02445 / 34 \\
 &= 0.004 \text{ ppmv H}_2\text{S} \\
 &= \mathbf{4.0 \text{ ppbv}} < 30 \text{ ppbv H}_2\text{S limit under CSAAQS.} \\
 &\text{And } < 8 \text{ ppbv H}_2\text{S odor threshold under OEHHA.}
 \end{aligned}$$

California State Ambient Air Quality Standard (CSAAQS)
 California Office of Environmental Health Hazard Assessment Office (OEHHA).

For estimated NH₃ emission = 0.0038 lbs/hr

$$\begin{aligned}
 @ 0.0038 \text{ lbs NH}_3 \text{ /hr} \times 761.6 \text{ µg/m}^3 / 1 \text{ lb/hr} &= 2.89 \text{ µg/m}^3 \\
 &= 2.89 \times 0.02445 / 17 \\
 &= 0.004 \text{ ppmv H}_2\text{S} \\
 &= \mathbf{4.0 \text{ ppbv}} \text{ (No CSAAQS standard for NH}_3\text{)} \\
 &\text{And } < 17 \text{ ppmv NH}_3 \text{ odor threshold under}
 \end{aligned}$$

SOUTH COAST AIR QUALITY MANAGEMENT DISTRICT ENGINEERING AND COMPLIANCE DIVISION PERMIT APPLICATION EVALUATION AND CALCULATIONS	PAGES 7	PAGE 7
	APPL NO 518276 REV	DATE 03/08/2012
	PROCESSED BY GCR	CHECKED BY

OEHHA.

California State Ambient Air Quality Standard (CSAAQS)
California Office of Environmental Health Hazard Assessment Office (OEHHA).

Regulation XIII:

This regulation is not applicable to the installation of odor control equipment to an existing facility (no emission increase).

Rule 1401:

Estimated cancer risk is 1.22×10^{-8} < one in a million. HIA & HIC value, each, is expected less than 1. Compliance is expected.

Rule 1401.1:

Exempt, as this is an existing facility.

Regulation XXX:

OCSD has filed Title V revision A/N 519235 to include this odor control equipment. Compliance is expected.

40 CFR 64 Compliance Assurance Monitoring (CAM) Plan:

Foul-air generated from the DAFTs (35,000 cfm) is treated by the odor control equipment to control TNMOC (VOC) and H₂S, ammonia (odors). This application is not subject to CAM applicability based on;

- Application is considered for De Minimis Significant Permit Revision with VOC daily emission of < 30 lb/day.
- Title V permit revision application received after 4/20/1998.
- Post control PTE VOC emission < MST (Pre control PTE VOC is also < MST)
- Emission unit (DAFTs) is not subject to emission limit or standards.

Recommendation:

A permit to construct is recommended with proposed conditions listed on page 1- 4.

Note: Upon approval, this PC to be included under Title V revision A/N 518235.