

Engineering Evaluation Report
Bridge Housing, Plant #23674
1400 San Leandro Boulevard, San Leandro
Application #28187

Background

Bridge Housing (Applicant) has applied for an Authority to Construct and Permit to Operate an air stripper, S-1, for treatment of collected groundwater at the Marea Alta Housing residential development, located at 1400 San Leandro Boulevard in San Leandro. The property is currently a parking lot owned by San Francisco Bay Area Rapid Transit (BART) and is being redeveloped into an affordable multi-unit residential apartment complex with a two-story underground parking facility for BART patrons and residents.

Prior to use as a BART parking lot, the property was occupied by residences and used for agricultural storage of hay, grain, wood/lumber, and coal. The site is surrounded by properties with documented petroleum and solvent contamination, including now-closed gasoline dispensing facilities and an automotive facility. Removal of leaking underground storage tanks and remediation of the nearby properties has been performed and closed, or is currently in the process of being performed. Sampling and analysis of the collected subsurface groundwater at this site found low levels of petroleum hydrocarbons and toxic metals.

The Applicant has proposed to install a permanent foundation/basement dewatering system to collect the groundwater at this site seasonally, during the portion of the year when the groundwater level rises. To dispose of the collected groundwater to the San Leandro storm water system, the petroleum hydrocarbon contamination must be reduced to meet the water quality restrictions set by the city. To achieve this reduction, the Applicant has proposed to use an air stripper to evaporate the organic compounds from the collected groundwater. After initial review of the project, the proposed project was revised to include abatement of the proposed air stripper by two mist eliminators, in series, to reduce the amount of water mist entrained in the stripper exhaust and reduce carry-out of toxic metals.

**S-1, Air Stripper, H2K Technologies DTA-6 Diffused Aeration Tank, 100 gallon per minute maximum capacity, abated by
A-1, Mist Eliminator, AMACS 8P, two 4" thick mist eliminators in series**

The proposed operation will emit very low levels of volatile organic compounds (VOC), including emissions of certain organic toxic air contaminants, as well as toxic metals also contained in the groundwater. The emissions from the proposed project have been estimated based on laboratory analyses of the groundwater, which detected low levels of the toxic air contaminant, perchloroethylene (PCE), along with levels of other organic and metal compounds. The projected actual processing rate for the air stripper is 30 gallons of groundwater per minute, however the project impacts have been based on the maximum operating capacity of the equipment, 100 gallons per minute, and at concentrations of contaminants greater than the measured levels in order to quantify the worst-case emissions.

In addition to the air stripper, the project also includes operation of a 20,000 gallon groundwater storage/settling tank. The storage tank is exempt from District permit requirements per District Regulation 2-1-123.2, since the organic content of the groundwater will be less than 1% by weight.

Emission Calculations

Though the proposed air stripper is expected to be in operation seasonally, to estimate worst-case emissions, it was assumed that the system will be operate 365 days per year and flowrate of 100 gallons per minute (the maximum capacity of the equipment).

Emissions of organic hydrocarbons and individual toxic compounds have been calculated using the following equation:

$$E = C_i * Q * C_o$$

where:

- E = Emissions,
- C_i = Influent Concentration,
- Q = Flow Rate,
- C_o = Dimensional Constant (Conversion Factor)

Volatile Organic Compound (VOC) Emissions:

The data used to estimate the maximum VOC emissions from the project are summarized below:

- * Maximum VOC influent concentration: 200 micrograms/liter (actual concentration 29 micrograms/liter)
- * Assumption that 100% of the organic compounds are stripped from the groundwater and emitted
- * No abatement of organic emissions
- * Volume of groundwater: 100 gallons per minute (actual projected volume 30 gallons per minute)
- * Continuous operation 24 hours per day, 365 days per year (actual projected operation 24 hours per day, half the year)

$$\begin{aligned} 200 \text{ micrograms VOC/liter} * (100 \text{ gal/min}) * [(1\text{g}/1\text{E}6 \text{ microgram}) * (1 \text{ lb}/453.6\text{g}) * (28.32 \text{ liters}/7.481 \\ \text{gal}) * (60 \text{ min}/\text{hour}) * (24 \text{ hours}/\text{day})] &= \mathbf{0.24 \text{ pound VOC/day}} \\ 0.24 \text{ lbs/day} * (365 \text{ days}/\text{year}) = 87.7 \text{ lbs VOC/year} &= \mathbf{0.0439 \text{ tons VOC per year}} \end{aligned}$$

Based on these parameters, the worst-case emissions from the proposed operation will be no more than 88 pounds of volatile organic compounds per year (0.24 pound per day). Since the organic compounds detected in the groundwater did not include any non-precursor organic compounds, it is assumed that the volatile organic compound emissions will consist entirely of precursor organic compounds (POC).

Toxic Air Contaminant (TAC) Emissions:

The Applicant provided a laboratory analysis of the toxic air contaminant compounds in the groundwater. Due to the potential fluctuation of the contamination levels in the groundwater, the measured concentrations were scaled up to assess potential worst-case emissions. The initial worst-case assessment of TAC emissions assumed 100% of the organic and metallic TACs in the groundwater would be emitted. It was also assumed that the metal TACs would be emitted as particulate matter in the form of, PM2.5 and PM10, pollutants which are subject to regulation.

The initial worst-case TAC emissions were calculated in the attached spreadsheet and are summarized in Table 1a below with the acute and chronic health risk analysis trigger levels from Table 2-5-1 of Regulation 2, Rule 5. As shown, the initial worst-case estimate of TAC emissions triggered a health risk analysis under Regulation 2, Rule 5. This analysis was performed and is discussed in more detail in the section below addressing compliance with Regulation 2, Rule 5.

Table 1a
Initial Estimate of Worst-Case Toxic Air Contaminant Emissions

Pollutant	Influent concentration microgm/liter	Hourly Emissions (lbs/hour)	Annual Emissions (lbs/year)	Acute Trigger Level (lbs/hr)	Chronic Trigger Level (lbs/year)
benzene	0.5	2.50E-05	2.19E-01	6.00E-02	2.90E+00
chloroform	20	1.00E-03	8.77E+00	3.30E-01	1.50E+01
methyl tert butyl ether	20	1.00E-03	8.77E+00	---	1.60E+02
methylene chloride	0.5	2.50E-05	2.19E-01	3.10E+01	8.20E+01
perchloroethylene	45	2.25E-03	1.97E+01	4.40E+01	1.40E+01
trichloroethylene	5	2.50E-04	2.19E+00	---	4.10E+01
vinyl chloride	0.5	2.50E-05	2.19E-01	1.00E+02	1.10E+00
arsenic	1	5.01E-05	4.39E-01	4.40E-04	1.60E-03
cadmium	0.1	5.01E-06	4.39E-02	---	1.90E-02
chromium	1.5	7.51E-05	6.58E-01	---	5.10E-04
copper	2	1.00E-04	8.77E-01	2.20E-01	---
mercury	0.5	2.50E-05	2.19E-01	1.30E-03	2.10E-01
nickel	6	3.00E-04	2.63E+00	3.10E-05	3.10E-01
selenium	1	5.01E-05	4.39E-01	---	8.00E+00

Based on the emissions in Table 1a, the initial health risk analysis results were found to exceed approvable levels defined in Regulation 2, Rule 5 as discussed in more detail later. The Applicant performed another laboratory analysis of the TAC contents of the groundwater, which found similar levels of TAC compounds as the original analysis. Since the second laboratory analysis did not reduce the potential health impacts of the project to approvable levels, the Applicant revised the project to include two mist eliminators in series to reduce the carry-out of particulate TACs in the water mist. Due to the reduction in water mist emissions from the process by the proposed mist eliminators, the expected particulate TAC compound emissions were reduced.

The particulate TAC emissions from the revised project are expected to be reduced by 99% by weight or greater, based on the manufacturer's estimates of the efficiency of the mist eliminators. The revised abated metal TAC emissions have been summarized in Table 1b below. The abated particulate emissions and unabated organic compound emissions from the revised project have been summarized in Table 1c below.

Table 1b
Project Revision – Abatement of Particulate Toxic Air Contaminant Emissions

Pollutant	Influent concentration microgm/liter	Hourly Emissions (lbs/hour)	Annual Emissions (lbs/year)	Acute Trigger Level (lbs/hr)	Chronic Trigger Level (lbs/year)
benzene	0.5	2.50E-05	2.19E-01	6.00E-02	2.90E+00
chloroform	20	1.00E-03	8.77E+00	3.30E-01	1.50E+01
methyl tert butyl ether	20	1.00E-03	8.77E+00	---	1.60E+02
methylene chloride	0.5	2.50E-05	2.19E-01	3.10E+01	8.20E+01
perchloroethylene	45	2.25E-03	1.97E+01	4.40E+01	1.40E+01
trichloroethylene	5	2.50E-04	2.19E+00	---	4.10E+01
vinyl chloride	0.5	2.50E-05	2.19E-01	1.00E+02	1.10E+00
arsenic	1	5.01E-07	4.39E-03	4.40E-04	1.60E-03
cadmium	0.1	5.01E-08	4.39E-04	---	1.90E-02
hexavalent chromium	1.2	6.01E-07	5.26E-03	---	5.10E-04
copper	2	1.00E-06	8.77E-03	2.20E-01	---
mercury	0.5	2.50E-07	2.19E-03	1.30E-03	2.10E-01
nickel	6	3.00E-06	2.63E-02	3.10E-05	3.10E-01
selenium	1	5.01E-07	4.39E-03	---	8.00E+00
lead	0.5	2.50E-07	2.19E-03	---	2.90E-01

Table 1c
Criteria Pollutant Emissions, including abatement of PM Emissions

Pollutant	Annual Emissions (lbs/yr)	Annual Emissions (tpy)	Daily Emissions (lbs/day)
PM10	0.09	0.00005	0.0003
PM2.5	0.09	0.00005	0.0003
POC	87.7	0.0439	0.24
NOx	---	---	---
SO2	---	---	---
CO	---	---	---

Cumulative Increase

The District tracks increases in emissions in criteria pollutants from each permitted facility. These emissions were reset in April 1991 for all facilities. Since the proposed operation will be a new facility, there are no pre-existing cumulative emissions. The criteria pollutant emission increase charged for S-1 will be the maximum permitted emissions for the project, summarized below:

Table 2
P#23674, Cumulative Emission Increases Since 4/5/91

Pollutant	Existing Total, tpy	Project Increase, tpy	New Total, tpy
PM10	0	0.00005	0.00005
PM2.5	0	0.00005	0.00005
POC	0	0.0439	0.0439
NOx	0	0	0
SO2	0	0	0
CO	0	0	0

Compliance Determination

Regulation 1, "General Provisions and Definitions"

The facility is subject to Regulation 1, Section 301, which prohibits discharge of air contaminants resulting in public nuisance. The proposed air stripper will result in low levels of emissions of organic compounds and toxic air contaminants on a seasonal basis. Due to the very low level of expected emissions, the operation is not expected to be a source of public nuisance.

Regulation 2, Rule 1, "Permits – General Requirements"

California Environmental Quality Act (CEQA): District Regulation 2, Rule 1, Section 310 specifies that all proposed new and modified sources subject to District permit requirements must be reviewed in accordance with CEQA requirements, except for ministerial projects or projects exempt from CEQA under Section 2-1-312. The engineering review for this project requires only the application of standard permit conditions and standard emission factors in accordance with Chapter 9.1, Air Stripping, of the District's Permit Handbook and therefore is not discretionary as defined by CEQA. This project is therefore not subject to CEQA review.

Public Notification: The public notification requirements of Regulation 2-1-412 apply to modifications which result in an increase in toxic air contaminant or hazardous air contaminant emission at facilities within 1,000 feet of the boundary of a K-12 school. The District's database shows this facility is within 1,000 feet of the outer boundary of St. Leander School, and as such, the public notification requirements in District Regulation 2-1-412 apply, since the air stripper will be a new source of toxic air contaminant emissions. In accordance with CA Health and Safety Code and District Regulation 2-1-412, a public notice will be published and sent to the home addresses of the students at the high school and each residence within 1,000 feet of the operation.

Regulation 2, Rule 2, "Permits – New Source Review"

Best Available Control Technology (BACT): Per Regulation 2, Rule 2, Section 301 BACT is required of new or modified sources with potential criteria pollutant emissions of 10.0 pounds per day or more. The maximum daily organic compound and particulate emissions from S-1 based on continuous operation 24 hours per day are each significantly less than 1.0 pound per highest day, therefore BACT is not triggered.

Emission Offsets: The POC and nitrogen oxide (NO_x) emission offset requirements are specified in District Regulation 2, Rule 2, Section 302. POC and NO_x emission offsets must be provided for new or modified sources located at a facility if the potential facility emissions exceed 10 tons per year of the pollutant. The maximum permitted POC emissions from S-1 are estimated at 0.02 tons per year, therefore POC emission offsets are not required. There will be no emissions of NO_x from the project.

The PM_{2.5}, PM₁₀, and sulfur dioxide (SO₂) emission offset requirements are specified in District Regulation 2, Rule 2, Section 303. PM₁₀ and SO₂ emission offsets must be provided for new or modified sources located at a facility that has the potential to emit 100 tons per year or more of PM_{2.5}, PM₁₀, or SO₂. Since the maximum permitted emissions from S-1 are estimated at 0.004 tons per year of PM_{2.5} and PM₁₀ and since there will be no emissions of SO₂ from the project, PM_{2.5}, PM₁₀, and SO₂ emission offsets are not required.

PSD BACT Requirement: The federal Prevention of Significant Deterioration (PSD) BACT requirements in District Regulation 2, Rule 2, Section 304 apply to each PSD pollutant for which the net increase in project emissions will be significant, as defined in Section 2-2-227. The emissions from the proposed air stripper are less than the significant emission thresholds, therefore the PSD BACT requirements do not apply.

Regulation 2, Rule 5, “Permits – New Source Review of Toxic Air Contaminants”

Health Risk Assessment (HRA): The District’s regulation concerning toxic air contaminant emissions is codified in Regulation 2, Rule 5, New Source Review of Toxic Air Contaminants. The TAC emissions from new and modified sources are subject to a health risk assessment review, if the emissions of any individual TAC exceed either the acute or chronic emission thresholds defined in Table 2-5-1.

The air stripper is expected to operate at a processing rate of 30 gallons per minute, 24 hours per day, for half of the year. Initially, the project was proposed as exempt from District permit requirements, however, based on this actual projected operating rate, the emissions of arsenic, chromium, and nickel exceeded the health risk analysis trigger levels in Table 2-5-1 in Regulation 2, Rule 5. The District determined that the project was not exempt from permit requirements and that a health risk analysis was required.

The initial worst-case TAC emissions from the air stripper were then calculated based on projected maximum concentrations of organic and metal TACs in the groundwater at the maximum processing capacity of 100 gallons per minute, based on operation 365 days per year with no abatement, as requested by the Applicant. The TAC concentrations from the laboratory analysis were increased to the higher levels to account for potential fluctuation in the groundwater contamination levels. At the actual projected rate of operation, the estimated worst-case emissions of additional TACs – cadmium, mercury, and perchloroethylene also exceeded the health risk analysis trigger levels. The resulting unabated TAC emission estimates based on this maximum processing rate have been summarized in Table 1a, with the associated health risk analysis trigger levels.

The initial health risk assessment based on the emissions from Table 1a calculated an estimated increase in cancer risk from unabated continuous operation of S-1 exceeding 178 in a million, with a chronic hazard index of 1.14. The primary risk drivers were chromium and arsenic. These levels exceed the health risk limits specified in Regulation 2, Rule 5. Due to this unapprovable level of risk, the Applicant performed a second analysis of the groundwater to verify the TAC concentrations. The second analysis found a higher level of arsenic and similar level of hexavalent chromium compared to the original analysis. Both sets of laboratory test results and the maximum concentrations of TACs assessed in the revised health risk analysis have been summarized in Table 4a below:

**Table 4a
 TAC Contents in Groundwater and Basis of Initial HRA**

TAC	Original concentration microgram/liter	Second Analysis microgram/liter	Revised HRA microgram/liter
benzene	< 0.05	< 0.05	0.5
chloroform	2.3	2.0	20
methyl tert butyl ether	2.0	0.7	20
methylene chloride	< 0.05	0.19	0.5
perchloroethylene	28	17	45
trichloroethylene	2.3	2.3	5
vinyl chloride	< 0.07	--	0.5
arsenic	0.38	0.57	1
cadmium	0.051	0.050	0.1
hexavalent chromium	0.79	0.62	1.2
copper	0.46	1.3	2
lead	n/a	0.16	0.5
mercury	0.035	--	0.5
nickel	3.3	4.1	6
selenium	0.41	0.47	1

Since the project risk was primarily due to metal contaminants, the Applicant revised the project to include 2 mist eliminators in series, which reduce carry out of water mist and therefore reduce the emissions of the solid contaminants contained in the water mist. The manufacturer of the mist eliminators has indicated that the mist eliminators should achieve an abatement efficiency of greater than 99% by weight. Based on this, the emissions were revised to include a 99% by weight reduction in particulate TAC emissions, as shown in Table 1b. The abated emissions of arsenic and hexavalent chromium still exceed the chronic health risk trigger levels for these compounds, so the health risk analysis was repeated, based on the TAC concentrations in Table 4a and the abated TAC emissions in Table 1b. The procedures and results are discussed below.

Modeling: The AERMOD air dispersion computer model (version 16216r) was used to estimate annual average ambient air concentrations. The model was run with Oakland International Airport (KOAK - 2009 -2013) AERMOD ready meteorological data, since this data is the closest representative meteorological data set for the project site. BAAQMD meteorology staff processed the meteorological data set using Oakland International Airport station upper air data for the same time period. The model was referenced in NAD 83 UTM coordinates and used 10 meter NED terrain data files for Alameda County. Model runs were made with rural dispersion coefficients based on the typing scheme proposed by Auer, which best represents land use around this facility. Stack and building parameters for the analysis were based on information provided by the Applicant.

TAC emissions were adjusted for toxicity and assumed exposure levels, then modeled to output risk directly (see attached spreadsheet tables). Model runs were set up to estimate the maximum project risk in the following categories: (1) Cancer Risk and (2) Chronic Hazard Index for Residential, School and Off-site Worker receptors; and (3) Acute Hazard Index for the maximally exposed receptor. Chronic exposure assumptions assume continuous operation while Acute exposure risk assumes a maximum hourly emission rate at the source. The California Air Resources Board's Hotspots Analysis and Reporting Program (HARP), version 1.4f was used to determine the Chronic Hazard Index (HI) and Acute HI risk values for each compound.

Health Risk: Estimates of residential risk assume potential exposure to annual average TAC concentrations occur 24 hours per day, 350 days per year, for a 70-year lifetime. Risk estimates for offsite workers assume potential exposure occurs 8 hours per day, 245 days per year, for 40 years. Risk estimates for students assume a higher breathing rate, and potential exposure is assumed to occur 10 hours per day, 36 weeks per year, for 9 years.

Cancer risk adjustment factors (CRAFs) were used to calculate all cancer risk estimates. The CRAFs are age-specific weighting factors used in calculating cancer risks from exposures of infants, children and adolescents, to reflect their anticipated special sensitivity to carcinogens. This risk assessment methodology is considered to be health-protective. The estimated health risks for this permit application are presented in Table 4b below.

Non-Cancer Lead Exposure Guidance: The state Office of Environmental Health Hazard Assessment guidelines for analysis of lead non-cancer health risk include analyzing census data to determine whether the Maximum Exposure Area coincides with a census tract with a potential for "high exposure" or "average exposure" to lead. Per the California Air Resources Board's lead risk management guideline (Table 8-Air Concentrations Associated with Proposed Neurodevelopmental Risk Management Levels), the approvable average lead concentration is $< 0.12 \text{ ug/m}^3$ for high exposure areas and $< 0.30 \text{ ug/m}^3$ for average exposure areas. The maximum one-month average lead concentration for this project ($4.54\text{E-}6 \text{ ug/m}^3$) is far below the screening levels for areas with high lead exposures.

Table 4b
Project Health Risks: S-1: Continuous operation, 100 gallons per minute, abated by A-1, Two mist eliminators in series achieving 99% control, by weight

Receptor	NAD 83 UTM Coordinates (meters)		Cancer Risk (in a million)	Chronic HI	Acute HI
	Easting (x)	Northing (y)			
Resident	574,120.8	4,175,224	1.79	0.012	N/A
Worker	574,160.8	4,175,284	0.15	0.0018	N/A
Student- Davis	574,100.8	4,175,484	0.030	0.00026	NA
Student- Carpentier	574,047.9	4,175,352.8	0.171	0.00149	NA
PMI (1-hour)	574,040.8	4,175,184	N/A	N/A	0.0022

Schools: St-Leander School, 1345 Carpentier Street, San Leandro, CA 94577
 St-Leander School, 451 Davis Street, San Leandro, CA 94577

The revised HRA estimated the maximum project cancer risk is 1.8 in a million, the maximum project chronic hazard index is estimated at 0.012, and the acute hazard index is estimated at 0.0022. Emissions from the residential health risk from VOCs comprised 19% and from the metals comprised 81% of the total cancer risk, corresponding to a cancer risk of 0.34 in a million due to VOC emissions, and the cancer risk of 1.45 in a million from metals. Further, the risk from the project was found to be primarily due to hexavalent chromium emissions and to a much lesser degree due to arsenic emissions.

Pursuant to Regulation 2, Rule 5, Section 301, best available control technology for toxics (TBACT) must be applied to any new or modified source of TACs where the source cancer risk is greater than 1 in a million. Since the cancer risk due to VOC emissions is less than 1 in a million, no abatement of organic emissions is required under Section 2-5-301. The cancer risk due to metal TAC emissions exceeds 1 in a million, after abatement with the mist eliminators, and greatly exceeds 1 in a million without the proposed abatement, therefore TBACT review is required for particulate metal TAC emissions.

The District's BACT/TBACT Guidelines include guidance for groundwater treatment with an air stripper, Document 2.1.1, dated 6/16/95, however control technologies are only defined for organic emissions. There are no defined standards for abatement of particulate emissions. Both the California Air Resources Board BACT Clearinghouse and EPA's BACT/RACT/LAER Clearinghouse were searched and also contained no control technology standards for particulate emissions from air strippers. An online search turned up no standards for particulate emission control from air stripping of contaminated groundwater. Without specific determinations, the proposed abatement of particulate emissions with the two mist eliminators in series at a very high efficiency of 99% by weight has been deemed to meet TBACT. Since TBACT has been met, the project risk and hazard quotient are approvable pursuant to Regulation 2, Rule 5, Section 302.

In addition, the maximum 30-day lead exposure from the project was found to be 0.0000045 ug/m³, well below 0.12 ug/m³ approvable level for areas with high lead exposure under the state's Air Toxics "Hot

Spots” Information and Assessment Act (Assembly Bill 2588, 1987). Since the projected exposure is significantly less than the approvable levels determined by the state’s Office of Environmental Health Hazard Assessment guidelines for analysis of lead non-cancer risk, the project is approvable.

The requirement to operate 2 mist eliminators in series to abate the particulate emissions from the air stripper have been included in the permit conditions for this source. The actual efficiency of the two mist eliminators in series will be verified with source testing, as well as the emissions of the two primary risk drivers, hexavalent chromium and arsenic.

**Regulation 2, Rule 6, “Permits - Major Facility Review”
40 CFR Part 70, State Operating Permit Programs (Title V)**

The federal operating permit program requirements in 40 CFR Part 60 have been codified in District Regulation 2, Rule 6. As this facility is not a major facility, not a phase II acid rain facility, not a subject solid waste incinerator, and not a designated facility, this facility is not subject to Regulation 2, Rule 6 and is not required to obtain a Title V Federal Operating Permit.

Regulation 3, “Fees”

Regulation 3 specifies the application and Permit to Operate fees. The Applicant has paid the applicable fees, including the first year of Permit to Operate fees, which were billed under Invoice 3VK61.

Regulation 6, Rule 1, “Particulate Matter – General Requirements”

All sources are subject to the particulate emission and opacity standards in Regulation 6, Rule 1. Section 6-1-303 specifies that visible emissions may not be as dark or darker than No. 2 on the Ringelmann Chart, for more than 3 minutes in any hour. Section 6-1-305 prohibits emissions of visible particles from causing a public nuisance. The particulate emissions from the project will consist of extremely low levels of particulate contained in the water mist emitted from the air stripper. The project was revised to include use of two mist eliminators in series, which are expected to reduce the of water mist and thereby reduce particulate matter contained within the water mist, by 99% by weight. These levels of particulate matter are not in the visible range, therefore compliance with the opacity limitation and the public nuisance prohibition is expected.

Section 6-1-401 requires the operator to have the means to know the appearance of emissions from the operations at all times. The air stripper exhaust will be located on the 6th floor of the development and will be visible for inspection at all times.

Regulation 8, Rule 47, “Organic Compounds – Air Stripping and Soil Vapor Extraction Operations”

Regulation 8, Rule 47 regulates volatile organic compound emissions from air stripping and soil vapor extraction equipment used to treat groundwater or contaminated soil. The limited exemption in Section 8-47-113 applies to operations with total emissions of less than 1 pound per day of the following compounds: benzene, vinyl chloride, perchloroethylene, methylene chloride, trichloroethylene. This exemption allows unabated operation of the air stripper if the operation passes a Health Risk Analysis.

The expected emissions of these compounds from the proposed air stripping operation are 0.06 pound per day, therefore the operation may operate without abatement if the health risk analysis is approvable under Regulation 2, Rule 5. Since the health risk analysis found that the risk from organic TACS is 0.34 in a million, which is approvable under Regulation 2, Rule 5, the volatile organic compound emissions from

the proposed air stripper are exempt from the control requirement in Section 8-47-301.

Section 8-47-302 requires abatement of any operation with total organic compound emissions greater than 15 pounds per day. The worst-case organic emissions from the proposed air stripper are 0.13 pounds per day and the actual projected emissions are significantly less than this level, so Section 8-47-302 does not apply.

Section 8-47-501 requires records of water analysis be maintained for a minimum of 2 years. Section 8-47-601 requires sampling and analysis of the influent water to the air stripper once a day for the first 3 days of operation, and once per calendar month thereafter. These requirements have been included in the proposed permit conditions.

Regulation 11, Rule 1, “Hazardous Pollutants – Lead”

Regulation 11, Rule 1 regulates emissions of lead to the atmosphere. Section 11-1-302 limits emissions of lead to 1.0 ug/m³ averaged over 24 hours and Section 11-1-3033 limits emissions of lead to 1.0 ug/m³ above background concentrations, averaged over 30 days. The air dispersion modeling performed under Regulation 2, Rule 5 found that expected maximum concentration of lead emitted from the air stripper would be 0.0000045 ug/m³, which is significantly less than these limits. Therefore, the facility is expected to comply with this regulation.

Code of Federal Regulations, Title 40, Chapter I, Subchapter C, Part 63, Subpart GGGGG, “National Emission Standards for Hazardous Air Pollutants: Site Remediation”

This regulation establishes national emission limitations and work practice standards for hazardous air pollutants (HAP) emitted from site remediation activities. The regulation applies to site remediation operations which:

- clean up a “remediation material” defined in Section 63.7957;
- occurs at a facility with one or more other stationary sources that emit HAP and which belong to a source category that is regulated under 40 CFR Part 63; and
- the facility is a major source of HAP, defined as a facility with potential emissions of 10 tons or more of any single HAP or 25 tons per year or more of any combination of HAPs.

The proposed air stripper will process groundwater that contains compounds meeting the definition of “remediation material” since the compounds in the groundwater are both designated as HAPs and are found in naturally occurring media (groundwater). However, the remediation operation is not located at a facility operating other stationary sources belonging to a source category regulation under 40 CFR Part 63, and the facility is not a major source of HAP, since the emissions from this facility will be significantly less than the major source HAP thresholds. Therefore, the proposed air stripper is not subject to this federal regulation.

Proposed Permit Conditions

Permit conditions will be imposed to enforce the parameters used to calculate the project emissions and will require testing to ensure that the project does not exceed the emissions estimated.

1. Notwithstanding the requirements in Part 8, the owner/operator shall ensure that no more than 52,560,000 gallons of groundwater is processed at S-1 in any 12-month period and shall ensure that S-1 is abated at all times by A-1, consisting of two mist eliminators in series. [basis: Cumulative Increase]

2. The owner/operator shall ensure that total volatile organic compound (VOC) emissions from S-1 do not exceed 88 pounds per year. Compliance with this emission limit can be demonstrated by laboratory analysis of the groundwater demonstrating a VOC concentration not exceeding 200 micrograms per liter. [basis: Cumulative Increase]
3. The owner/operator may operate S-1 without abatement of organic compounds, as long as the combined benzene, vinyl chloride, trichloroethylene, methylene chloride, and perchloroethylene emissions do not exceed 1 pound per day. Compliance with this emission limit can be demonstrated by laboratory analysis of the groundwater to determine the concentrations of these compounds and emission calculations based on this analysis, assuming all of the compounds are emitted and a groundwater treatment rate of 144,000 gallons per day or the maximum flowrate calculated in Part 8. [basis: Regulation 8-47-113]
4. The owner/operator shall ensure that the toxic air contaminant emissions from S-1 do not exceed the following limits:
 - a. Hexavalent chromium: 0.0053 pounds in any 12-month period
 - b. Arsenic: 0.0044 pounds in any 12-month period[basis: Regulation 2, Rule 5, TBACT]
5. The owner/operator must demonstrate compliance with the emission limits in Part 2, and 3 through collection and analysis of the influent groundwater sent to S-1 as follows: For each of the first three days of operation, the owner/operator shall collect and analyze at least one influent groundwater sample. The owner/operator shall collect and analyze at least one sample thereafter for each calendar month of operation. The owner/operator shall collect samples in accordance with the EPA's or Regional Water Quality Control Board's analytical methods. [basis: Cumulative Increase, Regulation 8-47-601]
6. The owner/operator must demonstrate compliance with the emission limits in Part 4 through source testing to establish emission rates of the listed compounds and an assumed annual groundwater treatment rate of 52,560,000 gallons or the maximum flowrate calculated in Part 8, or by laboratory analysis of the groundwater to determine the concentrations of the listed compounds, measurement of total suspended particulate in the groundwater, and applying the concentration of each compound to the total particulate emissions measured through source testing. The owner/operator shall source test S-1 no later 60 days of start-up and annually thereafter. [basis: Regulation 2, Rule 5, TBACT]
7. The owner/operator shall obtain approval for all source test procedures from the District's Source Test Section prior to conducting any tests. The owner/operator shall comply with all applicable testing requirements as specified in Volume IV of the District's Manual of Procedures. The owner/operator shall notify the District's Source Test Section, in writing, of the source test protocols and projected test dates at least 7 days prior to testing. The owner/operator shall submit the source test results to the District staff no later than 60 days after the source test. [basis: Cumulative Increase, Regulation 2, Rule 5, TBACT]

8. If testing indicates exceedance of the emission limits in Part 2, 3, or 4, the owner/operator shall immediately reduce the flowrate to S-1 and maintain the flowrate to S-1 at a rate which does not result in exceedance of any of the emission limits in Parts 2, 3, and 4. The owner/operator shall notify the Engineering Division of the test results and identify the reduction in maximum flowrate to S-1 within 30 days.
[basis: Cumulative Increase, Regulation 2, Rule 5, TBACT, Regulation 8-47-113]
9. The owner/operator shall conduct all inspection and maintenance on the mist eliminators recommended by the manufacturer. [basis: Regulation 2, Rule 5, TBACT]
10. The owner/operator shall maintain records of all groundwater analysis, monthly records of the amount of groundwater treated at S-1, annual quantities of the amount of groundwater treated at S-1 calculated at the end of each month, source testing, inspection and maintenance records, and any other data necessary to demonstrate compliance with this conditional Permit to Operate. All measurements, records, and data shall be retained for at least two years following the date upon which the data is recorded and made available for inspection by the District upon request.
[basis: Cumulative Increase, Regulation 2, Rule 5, TBACT, Reg. 8-47-113, Reg. 8-47-501]
11. The owner/operator shall report any non-compliance with these conditions to the Compliance and Enforcement Division at the time that it is first discovered. **The submittal shall detail the corrective action taken and shall include the data showing the exceedance as well as the time of occurrence.**
[basis: Cumulative Increase, Regulation 2, Rule 5, TBACT, Reg. 2-1-403, Reg. 8-47-113]

Recommendation

The District has reviewed the material contained in the permit application for the proposed project and has made a preliminary determination that the project is expected to comply with all applicable requirements of District, state, and federal air quality-related regulations. The preliminary recommendation is to issue an Authority to Construct for the equipment listed below. However, the proposed source will be located within 1000 feet of a K-12 school, triggering the public notification requirements of District Regulation 2-1-412. After comments are received and reviewed, the District will make a final determination on the permit.

I recommend that the District initiate a public notice and consider any comments received prior to taking any final action on issuance of an Authority to Construct for the following source:

**S-1, Air Stripper, H2K Technologies DTA-6 Diffused Aeration Tank, 100 gallon per minute maximum capacity, abated by
A-1, Mist Eliminator, AMACS 8P, two 4" thick mist eliminators in series**

Tamiko Endow, Senior Air Quality Engineer

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