

**Engineering Evaluation
California Crosspoint Academy
25500 Industrial Blvd, Hayward, California 94545
Facility ID 202956
Application No. 674021**

Project Description: Sub-Slab Depressurization/Vapor Intrusion Mitigation Systems

Background

On behalf of California Crosspoint Academy, Catalyst Environmental Solutions has applied for an Authority to Construct for the following equipment:

**S-1 Sub-Slab Depressurization System w/ Two (2) Blowers
Blower: RadonAway RP Pro Series, RP265, Maximum 375 CFM each, 750 CFM total
Unabated**

The California Crosspoint Academy (the Site) is a private school for students Grades 4-12 and has a new building (Building 2) under construction at the Site. Lab analysis of soil vapor beneath the building shows the presence of various volatile organic compounds (VOC) that pose a risk to the indoor air quality of the building. The VOCs detected in soil vapor include various petroleum hydrocarbons, chlorinated VOCs and fluorinated VOCs. The Alameda County Department of Environmental Health (ACDEH) has required the design, construction, and operation of an Active Sub-Slab Depressurization System (SSD) to mitigate the risk of VOC vapor intrusion into the indoor air of the building. The proposed SSD, S-1, will include two (2) identical radon fans (blowers) that will draw contaminated air from beneath the building slab through vertical risers and discharge the air to the atmosphere from two (2) individual exhaust points located on the roof of the building. The two (2) blowers will be grouped as one source, S-1. No abatement is proposed for the system. The source and emission point breakdown is summarized in Table 1 below.

Table 1. Facility ID 202956 Source/Emission Point Breakdown				
Source ID	Emission Point ID	Vacuum Blower Make/Model	Blower Max Flow Rate (SCFM)	Total Source Flow Rate (SCFM)
S-1	P-1	RadonAway RP 265	375	750
	P-2	RadonAway RP 265	375	

The proposed SSD is located at a school and will therefore be subject to a school public notice pursuant to Regulation 2-1-412.

Emission Calculations

Lab results of soil vapor data will be used to estimate precursor organic compound (POC), non-precursor organic compound (NPOC), and toxic air contaminant (TAC) emissions. It is assumed that the equipment will operate 24 hours a day, 365 days a year. The following are assumptions used to estimate emissions.

- Equipment will operate 24 hours/day and 365 days/year.
- Operating conditions: Pressure = 1 Atm; Inlet Temperature = 21°C; 1 mole occupies 24.15 Liters (or 386.8 ft³/lb-mol).
- The inlet concentration of pollutants corresponds to the maximum concentration found from lab analysis of soil vapor.
- No abatement is proposed.

- NPOC cumulative emissions are based on the sum of all NPOC found in soil vapor data.
- POC cumulative emissions will be set to an equivalent emission rate as NPOC emissions.
- TAC emissions will be based on soil vapor data submitted with this application.
- The influent flow rate for the source is 750 SCFM, which corresponds to the maximum combined flow rate of both blowers.

Table 2 below summarizes the pollutants found in soil vapor, the pollutant designations, inlet concentrations, and emission rates from S-1.

Table 2. Emissions Review for Sub-Slab Depressurization System (S-1)									
Pollutant	CAS	Pollutant Designation			Inlet Conc. ($\mu\text{g}/\text{m}^3$)	Emission Rates			
		POC	NPOC	TAC		Hourly (lbs/hr)	Daily (lbs/day)	Annual (lbs/yr)	Annual (tons/yr)
1,1-Difluoroethane	75-37-6		X		33,000	9.26E-02	2.22	811.4	0.406
1,2,4-Trimethylbenzene	108-67-8	X			3	8.70E-06	2.09E-04	7.62E-02	3.81E-05
2-Butanone	78-93-3	X		X	43	1.21E-04	2.90E-03	1.06	5.29E-04
Acetone	67-64-1		X		390	1.09E-03	2.63E-02	9.59	4.79E-03
Carbon Disulfide	75-15-0		X	X	81	2.27E-04	5.46E-03	1.99	9.96E-04
Ethyl Acetate	141-78-6	X			6	1.57E-05	3.77E-04	0.14	6.88E-05
Ethyl tert-butyl ether	637-92-3	X			7	1.94E-05	4.65E-04	0.17	8.48E-05
Ethylbenzene	100-41-4	X		X	9	2.50E-05	6.00E-04	0.22	1.09E-04
Methyl Isobutyl Ketone	108-10-1	X			19	5.33E-05	1.28E-03	0.47	2.34E-04
Hexane	110-54-3	X		X	24	6.74E-05	1.62E-03	0.59	2.95E-04
tert-Butanol	75-65-0	X			81	2.27E-04	5.46E-03	1.99	9.96E-04
Tetrachloroethene	127-18-4		X	X	25	7.02E-05	1.68E-03	0.61	3.07E-04
Tetrahydrofuran	109-99-9	X			72	2.02E-04	4.85E-03	1.77	8.85E-04
Toluene	108-88-3	X		X	17	4.77E-05	1.15E-03	0.42	2.09E-04
Vinyl Chloride	75-01-4	X		X	2	5.61E-06	1.35E-04	4.92E-02	2.46E-05
Total Xylenes ¹	1330-20-7	X		X	93	2.61E-04	6.26E-03	2.29	1.14E-03

Notes:

1. Total Xylenes is the sum of all isomers of Xylene.

Table 3 below summarizes the total organics emissions from S-1. The sum of POC emissions from Table 2 is equal to 9.23 lbs/year, but the POC emission rates will be assumed to be the same as the NPOC emission rates to allow for potential variation.

Table 3. Organics Emissions Review for Sub-Slab Depressurization System (S-1)				
Pollutant	Hourly Emissions (lbs/hour)	Daily Emissions (lbs/day)	Annual Emissions (lbs/year)	Annual Emissions (tons/year)
POC	0.094	2.26	823.6	0.412
NPOC	0.094	2.26	823.6	0.412
Total Organics	0.19	4.51	1,647.1	0.824

Cumulative Increase

Table 4. Cumulative Increase			
Pollutant	Current Permitted Emissions, Post 4/5/1991 (ton/yr)	Application New Emissions Increase (ton/yr)	New Cumulative Increase (ton/yr)
POC	0.000	0.412	0.412

Toxic Risk Screening

A project is subject to Regulation 2, Rule 5 if emissions of toxic air contaminants (TAC) exceed any acute or chronic trigger levels in Table 2-5-1 of Regulation 2-5. This is a new facility, so there are no related sources to include in the project. Therefore, the project review of TAC emissions will include only the emissions from S-1. Table 5 provides a summary of the project TAC emissions.

Table 5. Project Toxic Air Contaminant Emissions						
Pollutant	CAS #	Hourly Emission Rate (lb/hr)	Acute Trigger Level (lb/hr)	Annual Emission Rate (lb/yr)	Chronic Trigger Level (lb/yr)	Exceeds Acute or Chronic Trigger Level?
2-Butanone	78-93-3	1.21E-04	5.80E+00	1.06E+00	-	No
Carbon Disulfide	75-15-0	2.27E-04	2.70E+00	1.99E+00	3.10E+04	No
Ethylbenzene	100-41-4	2.50E-05	-	2.19E-01	3.30E+01	No
Hexane	110-54-3	6.74E-05	-	5.90E-01	2.70E+05	No
Tetrachloroethene	127-18-4	7.02E-05	8.80E+00	6.15E-01	1.40E+01	No
Toluene	108-88-3	4.77E-05	2.20E+00	4.18E-01	1.60E+04	No
Vinyl Chloride	75-01-4	5.61E-06	8.00E+01	4.92E-02	1.10E+00	No
Total Xylenes	1330-20-7	2.61E-04	9.70E+00	2.29E+00	2.70E+04	No

As shown above, TAC emissions from this project are well below any applicable toxic trigger levels of Regulation 2-5, Table 2-5-1. Therefore, the requirements of Regulation 2-5 do not apply. The facility will be required to perform laboratory analysis to demonstrate that project emissions are below the toxic trigger levels of Regulation 2-5, Table 2-5-1.

Offsets

Pursuant to Regulation 2-2-302, offsets must be provided for any new or modified source at a facility that emits, or is permitted to emit, more than 10 tons per year of precursor organic compounds (POCs) or nitrogen oxides (NO_x). Furthermore, pursuant to Regulation 2-2-303 offsets must be provided for any new or modified source at a major facility with a cumulative increase that exceeds 1.0 ton per year of PM₁₀, PM_{2.5}, or sulfur dioxide (SO₂).

The facility is not expected to have a PTE greater than 10 tons per year of POC or NO_x, nor is the facility a major facility of PM₁₀, PM_{2.5}, and SO₂. Therefore, the requirements of Regulations 2-2-302 and 2-2-303 do not apply.

Best Available Control Technology (BACT)

In accordance with Regulation 2-2-301, Best Available Control Technology (BACT) is triggered for any new or modified source with the potential to emit 10 pounds or more per highest day of POC, NPOC, nitrogen oxides (NO_x), carbon monoxide (CO), sulfur dioxides (SO₂), particulate matter less than 10 micrometer (PM₁₀) and particulate matter less than 2.5 micrometer (PM_{2.5}).

NPOC and POC emissions are expected to be well below 10 lbs/day. Therefore, BACT review is not required.

California Environmental Quality Act (CEQA)

This project is classified as ministerial under the District Regulation 2-1-311, because the engineering review for this project requires only the application of standard emission factors and established formulas as specified in Chapter 9.2 of the District's Permit Handbook. This review follows objective procedures and applies standard permit conditions; and therefore, the review of this project is not discretionary as defined by CEQA. Since this project is ministerial, it is not subject to CEQA review requirement of Regulation 2-1-310, and no further CEQA analysis is required.

Statement of Compliance

Regulation 8, Rule 47 – Air Stripping & Soil Vapor Extraction Operations

Pursuant to Section 8-47-301, any soil vapor extraction operation (including sub-slab depressurization) which emits benzene, vinyl chloride, tetrachloroethene, methylene chloride, and/or trichloroethene shall be vented to a control device which reduces emissions to the atmosphere by at least 90 percent by weight. However, a source may be exempt from this abatement requirement per Section 8-47-113 if total emissions of the applicable compounds are less than one pound per day, and if the source passes a health risk screening analysis per Section 8-47-402.

S-1 will emit tetrachloroethene and vinyl chloride. Table 6 below provides a summary of the daily emissions of these compounds.

Table 6. Regulation 8, Rule 47 Compound Daily Emissions from S-1	
8-47 Compound	Daily Emission Rate (lbs/day)
Tetrachloroethene	1.68E-03
Vinyl Chloride	1.34E-04
8-47 Compound Total	1.82E-03

As shown in Table 6, total daily emissions of the applicable compounds are well below one pound per day. Furthermore, the emission rates of these compounds are below their respective Table 2-5-1 acute and chronic trigger levels, as shown in Table 5. Therefore, S-1 meets the health risk screening requirement of Section 8-47-402 and, per Section 8-47-113, is exempt from the emission control requirements of Section 8-47-301.

Pursuant to Section 8-47-302, any sub-slab depressurization operation that emits more than 15 lbs/day of total organic compounds shall vent emissions to a control device which reduces total organic compound emissions by at least 90% by weight.

As shown in Table 3, total organic emissions from S-1 will be well below 15 lbs/day. Therefore, S-1 is not subject to the emission control requirements of Section 8-47-302.

Other Potential Regulatory Requirements

Prevention of Significant Deterioration (PSD), New Source Performance Standards (NSPS), and National Emission Standards for Hazardous Air Pollutants (NESHAPS) are not triggered.

Public Notification (Regulation 2-1-412)

The proposed source is located within an overburdened community (OBC), but an HRA is not required. However, the proposed source will be located at the California Crosspoint Academy (Grades 4-12) at 25500 Industrial Blvd, Hayward, CA 94545. The project is therefore subject to the school public notification requirements of Regulation 2-1-412. Anthony W. Ochoa Middle School (Grades 7-8) at 2121 Depot Rd, Hayward, CA 94545 is also located within a quarter mile of the proposed source. A public notice will be sent to all parents of the above-mentioned schools, and all addresses within 1,000 feet of the facility. There will be a 30-day public comment period.

Permit Conditions

Permit Condition #27876 Applies to S-1

1. The owner/operator of Sub-Slab Depressurization System (S-1) shall not exceed an aggregate influent vapor flow rate of 750 standard cubic feet per minute (scfm) from the blowers.
[Basis: Cumulative Increase, Toxics]
2. In no event shall the toxic air contaminant (TAC) emissions from S-1 exceed the trigger levels listed in Table 2-5-1 of Regulation 2, Rule 5.
[Basis: Toxics]
3. The emissions from S-1 shall not exceed 823.6 pounds of precursor organic compounds (POC) and 823.6 pounds of non-precursor organic compounds (NPOC) per 12-month consecutive period. [Basis: Cumulative Increase]
4. Upon initial start-up, the owner/operator shall take air samples from S-1 for laboratory analysis using EPA Method TO-15. The air samples shall be taken at the following locations:
 - a. At the outlet of both blowers prior to venting to the atmosphere.

The owner/operator shall use the results from the laboratory report to calculate the total TAC, POC, and NPOC emissions emitted to the atmosphere, using the maximum design flowrate of S-1. The owner/operator shall submit the laboratory report and calculated TAC, POC, and NPOC emissions within 21 days of the initial startup, to demonstrate compliance with Parts 2 & 3 of this condition.

[Basis: Regulation 2-1-403]

5. The owner/operator shall maintain the following information for each month of operation:
 - a. Hours and time of operation.
 - b. Each emission test, analysis, or monitoring results logged in for the day of operation they were taken.
 - c. Total throughput of soil vapor from S-1 in standard cubic feet.

Such records shall be retained and made available for inspection by the District for two (2) years following the date the data is recorded.

[Basis: Recordkeeping]

6. The owner/operator shall report any noncompliance with these conditions to the Compliance and Enforcement Division at the time that it is first discovered. The owner/operator shall detail the corrective action taken and include the data showing the exceedance as well as the time of occurrence in the submittal.

[Basis: Regulation 2-1-403]

7. The owner/operator shall maintain a file containing all measurements, records and other data that are required to be collected pursuant to the various provisions of this condition. All measurements, records and data required to be maintained by the operator shall be retained for at least two (2) years following the date the data is recorded.

[Basis: Regulation 1-523]

End of Conditions

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 1,000 feet of at least one school, which triggers the public notification requirements of District Regulation 2-1-412. After the 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 sources:

- S-1 Sub-Slab Depressurization System w/ Two (2) Blowers**
Blower: RadonAway RP Pro Series, RP265, Maximum 375 CFM each, 750 CFM total
Unabated

By: _____



Date: 3/6/2023

Cameron Fee
Air Quality Engineer I