UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION IX
75 Hawthorne Street
San Francisco, CA 94105-3901

May 20, 2022

Mr. Joshua Nandi
Northrop Grumman
One Space Park Mail Stop: NGC CER-XE6D21
Redondo Beach, CA 90278

SENT VIA EMAIL

Re: EPA Technical Comments on the Passive SSDS O&M Plan and SSDS Evaluation, 825 Stewart Avenue Sunnyvale, CA, TRW Microwave Superfund Site (CERCLIS ID# CAD009159088)

Dear Mr. Nandi:

Thank you for submitting the Northrop Grumman documents for EPA's review.

The attached technical memoranda present EPA's technical comments for the following documents prepared by Northrop Grumman / AECOM for the Former TRW Microwave Site, 825 Stewart Drive, Sunnyvale, CA:

- Passive Sub Slab Depressurization System, Operation and Maintenance (O&M) Plan - dated March 31, 2022
- Evaluation of Passive Sub Slab Depressurization System (SSDS) - dated April 15, 2022

Based on EPA's technical review the O&M Plan and SSDS Evaluation, these reports are not approved by EPA at this time. Please refer to the attached technical memoranda for specific comments.

Based on the EPA visit that occurred on August 19, 2021, to inspect the 825 Stewart Drive building, which is currently leased by Apple, Inc. (Apple), EPA concluded that the building's HVAC system was well balanced to maintain a positive pressure within the occupied building areas. The likelihood for vapor intrusion is low under normal building operations. EPA understands that Apple intentionally operates the HVAC system to balance room pressures, heating, and air turn-over to support their operations. HVAC is one of the engineering controls used to mitigate the potential for vapor intrusion but, as specified in the review comments attached, improvements to the O&M are required. While modifications to the building passive subslab ventilation system are being addressed, EPA requires that one round of indoor air samples be collected to document protectiveness under current conditions.

In the attached technical memoranda, there are recommendations to change the discharge points elevations and to potentially transform the passive sub slab ventilation system into an active one. For a final determination whether the passive system coupled with the HVAC operation are still protective, EPA recommends an evaluation of the current subslab soil gas concentration conditions be conducted.

EPA also recommends a building-wide slab pressure differential evaluation to identify areas of the building where positive pressure at the slab is not obtained. This information will further assist in the decision to convert the existing system to an active one.

One of the technical comments attached refers to defining the system as a passive ventilation system, instead of a passive depressurization system. EPA recognizes that when the system was installed back in 2014, it was called as passive sub-slab vapor collection (SVC) system and over the years this term was used interchangeable with "passive depressurization system." It is EPA's understanding that the system's design and intended use have not changed.

EPA requests that NGC provide a written response within 30-days to address EPA's comments above and provided in the attached technical memoranda. Please feel free to contact me anytime at abreu.lilian@epa.gov or 415-972-3010 if you have any questions or comments.

Sincerely,

LILIAN ABREU Digitally signed by LILIAN ABREU
Date: 2022.05.20 13:03:53 -07'00'

Lilian Abreu, MS, PhD
Remedial Project Manager
Superfund and Emergency Management Division

Enclosures

cc: Holly Holbrook, AECOM
Mark Riley, AECOM

ED_013213_00000560-00002

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

REGION 9

75 Hawthorne Street
San Francisco, CA 94105-3901

April 25, 2022

MEMORANDUM (sent via email only)

SUBJECT: Passive Sub Slab Depressurization (SSD) System Operation and Maintenance Plan (Document Control Number [DCN] FY22SEMD_161) and Evaluation of Passive SSD System, Former TRW Microwave Site, Sunnyvale, California

FROM: Mathew Plate, Environmental Scientist
Quality Assurance Branch

THROUGH: Audrey L Johnson, Manager
Quality Assurance Branch

TO: Lilian Abreu, Remedial Project Manager
Superfund Division California Sites

Michael Schulman, Remedial Project Manager
Superfund Division California Sites

These documents provided by Northrop Grumman for the Former TRW Microwave Site, dated March 31 and April 15, 2022, were reviewed based on guidance provided in the following documents:

- *OSWER Technical Guide for Assessing and Mitigating the Vapor Intrusion Pathway from Subsurface Vapor Sources to Indoor Air* (USEPA OSWER, June 2015)
- *Guidance for the Evaluation and Mitigation of Subsurface Vapor Intrusion to Indoor Air, Final*, (California Department of Toxic Substances Control, October 2011)
- *Vapor Intrusion Mitigation Advisory, Final*, (California Department of Toxic Substances Control, October 2011)

The O&M Plan and SSD Evaluation would benefit from a more thoughtful evaluation of SSD system engineering.

Questions or comments regarding this review should be referred to me at (415) 972-3799.

Lilian Abreu, Michael Schulman
April 25, 2022

Concerns

1. [O&M Plan; Annual Inspection Protocol] This section notes that inspections are limited to the roof components. Elements of inspection should also include:
    - Verification that the floor slab and barrier system have not been breached or otherwise compromised.
    - Evaluation to confirm that the building has not been modified in a manner that could compromise the system.
    - Evaluation of changes to building use. (this could be changes in mechanical operations or changes in exposure scenarios that we not envisioned when the system was designed).

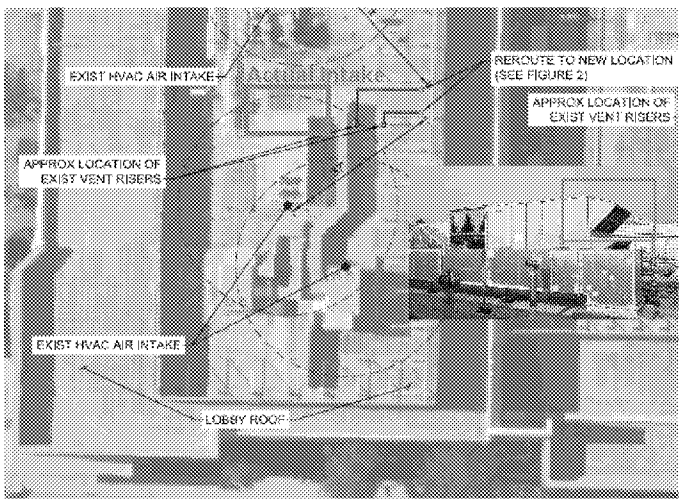
2. [O&M Plan; General] A building-specific inspection checklist should be developed and included with this plan.

3. [O&M Plan; Appendix A, Passive SSD System Design Drawings] The design drawing should be updated to reflect the current building configuration.

4. [SSD Evaluation; Duct] The design selected introduces long horizonal duct runs and several duct bends on the roof. These features will reduce the effectiveness of the system by causing resistance to air flow.

5. [SSD Evaluation; Vent height] The current height proposed does not appear to be sufficient to clear obstructions. Clearing obstructions is important for dispersion of pollutants and to provide sufficient exposure to wind (which provides part of the driving force for proper passive SSD operation).

6. [SSD Evaluation; Location of HVAC intakes] The HVAC intake location is mislabeled. Please correct this and verify that the other HVAC intakes were properly located.



APTIM

Technical Memorandum

Technical Review of Proposed Modification to a Passive Vapor Intrusion Mitigation System Installed at the Former TRW Site, Sunnyvale, CA

Date: May 20, 2022

To: Dr. Lilian Abreu
U.S. Environmental Protection Agency
Task Order Project Officer

From: Mr. Bill Morris
Vapor Mitigation Sciences LLC on behalf of Aptim Federal Services LLC

Task Order: TO 0025

Project No.: 500291-01410003

Vapor Mitigation Sciences' (VMS) task was to review several documents regarding the passive system and proposed modifications to the passive system installed previously at the former TRW building at 825 Stewart Avenue, Sunnyvale, CA.

Documents reviewed are as follows:

- Memorandum from Mathew Plate, regarding the "Passive Sub Slab Depressurization (SSD) System Operation and Maintenance Plan (Document Control Number [DCN] FY22SEMD_161) and Evaluation of Passive SSD System, Former TRW Microwave Site, Sunnyvale, California"

- A letter to Mr. Kurt Batsel, dated October 7, 2021, regarding the "EPA Site Visit and Vapor Intrusion Field Assessment, 825 Stewart Avenue, Sunnyvale, CA, TRW Microwave Superfund Site (CERCLIS ID# CAD009159088)"

- A Northrop Grumman / AECOM Document dated March 31, 2022, regarding the "Passive Sub Slab Depressurization System, Operation and Maintenance Plan, Former TRW Microwave Site, 825 Stewart Drive, Sunnyvale, CA" • A Northrop Grumman / AECOM

ED_013213_00000560-00005

Document dated April 15, 2022, regarding the "Evaluation of Passive Sub Slab Depressurization System, Former TRW Microwave Site, 825 Stewart Drive, Sunnyvale, CA"

General Comments

1. Based on professional judgement, VMS identifies the current mitigation system as a sub-slab venting system instead of a sub-slab depressurization (SSD) system. It would be challenging with significant uncertainty to determine if depressurization is occurring under the slab even with the roof turbines rotating. These turbines may provide upwards of 0.2 inches of water column vacuum at the riser, and it would be difficult to measure sustained negative pressure differentials under the slab caused by the system configuration.

2. VMS recommends that the requested HVAC building test and balance information be collected during varying weather conditions. It is important to understand what the building pressures are during various weather conditions (i.e., windy vs. no wind days, high pressure vs. low pressure days, etc.). Temperature inversions are common occurrences in the Bay Area. When the inversion occurs atop a building it may result in concentrated effluents to get pushed back down to the roof and have a potential to re-entrain into the building through intakes on the roof. VMS has experienced this phenomenon on several sites along the West Coast in California with active systems and exhaust flow around 15-20 cubic feet per minute (cfm) and a passive system would generally have less flow than this.

3. The discharge of the pipes should be above the screen walls to be exposed to the wind as much as possible and ensure there is no chance of re-entrainment into the building. VMS recommends the exhaust points are located above the screen wall, whether the system is passive or active.

4. If sub slab soil gas concentrations are known to be elevated and indoor air sampling indicates unacceptable indoor air concentrations, while pressure differential data indicate the system is being protective, then re-entrainment at the building's rooftop is a possibility (and this may explain the unacceptable indoor air concentrations). A second booster fan can be used to increase the velocity at the exhaust point and dilute the concentrations making re-entrainment less likely.

5. Based on VMS professional judgement, additional building flow and balance data and indoor air results should be collected to assist with the evaluation of the design modifications to the passive sub slab ventilation system that will be implemented. If the additional data indicates an issue, then possibly upgrading to an active system may be prudent and more cost-effective than identifying where the issue is across the entire building footprint. An evaluation of the

ED_013213_00000560-00006

HVAC systems' flow and balances will help with determining the efficacy of the HVAC in augmenting the passive sub slab ventilation system.

ED_013213_00000560-00007