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Lilian Abreu
United States Environment Protection
Agency
Region 9
75 Hawthorne Street
San Francisco, CA 94105-3901

Response to Comments on the Passive Sub Slab Depressurization System Operation and Maintenance Plan and Evaluation of Passive SSD System, Former TRW Microwave Site, Sunnyvale, California

Dear Ms. Abreu

AECOM, on behalf of Northrop Grumman Systems Corporation (Northrop Grumman), prepared responses to the comments included in your May 20, 2022 letter. As required by the United States Environmental Protection Agency (USEPA), Northrop Grumman will conduct one round of indoor air samples to document protectiveness of the sub-slab venting (SSV) system under current operating conditions. It is assumed that the sampling design will be similar to the previous sampling event performed in 2016. A work plan will be prepared and submitted to USEPA to document the planned sampling approach. The timing and design of this sampling event will be coordinated with the current building tenant, Apple, Inc.

USEPA also recommended an evaluation of the current sub-slab soil gas concentrations as well as a building-wide slab pressure differential evaluation. The need for these evaluations will be assessed after completion of the indoor air sampling event.

Please see responses to specific comments in the sections below.

Response to comments received from Mathew Plate, Environmental Scientist, USEPA Quality Assurance Branch.

1. *Comment:* [Operation and Maintenance (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).

   Response: These components will be added to the O&M Plan and a revised version will be submitted.

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

   Response: A checklist will be included in the revised O&M Plan.

3. *Comment:* [O&M Plan; Appendix A, Passive Sub-slab Depressurization (SSD) System Design Drawings] The design drawing should be updated to reflect the current building configuration.

   Response: The design drawings are correct in relation to the overall exterior building layout. Information regarding the interior and roof HVAC configuration will require cooperation from the current tenant, some of which is considered secure information by the tenant.

4. *Comment:* [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.

   Response: Although there is some friction loss through the pipe runs, given the passive nature of the system (providing a preferential pathway for sub-slab vapors to migrate through rather than into the building), the overall impact on effect on the system is likely to be relatively minor. No changes were made to the proposed ducting/vent height design.

5. *Comment:* [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).

   Response: Building codes in the City of Sunnydale direct that roof protrusions not be visible from street level, as described in the Sunnyvale Municipal Code 19.38.020. Screening of equipment. However, the design of the windscreen allows for airflow for both under and over the windscreen and adequate flow to drive the turbines. No changes were made to the proposed ducting/vent height design.

6. *Comment:* [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.

   Response: The locations presented on the figure were based on discussions with the building HVAC contractors on site at the time of a site visit. The HVAC intake locations will be clarified with the property owner/tenant and the figure will be corrected and resubmitted if needed.

<u>Response to comments received from Bill Morris, Vapor Mitigation Sciences LLC on behalf of Aptim Federal Services LLC</u>.

1. *Comment:* 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.

   Response: As stated in the USEPA letter, the system's design and intended use have not changed. However, for the sake of clarity, references to the system will be modified to refer to it as a SSV system rather than a SSD system.

2. *Comment:* 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.

Response: Northrop Grumman does not have any operational control of the HVAC operation. Therefore, this request would need to be evaluated by the property tenant, Apple.

3. *Comment:* 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.

   Response: See the response to USEPA comment 5.

4. *Comment:* 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.

   Response: Comment noted.

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

   Response: Per the requirements from USEPA, an indoor sampling event will be performed to evaluate conditions under the current system configuration.

If you have any questions or would like to discuss, please reach out to the Northrop Grumman Project Manager, Joshua Nandi Joshua.Nandi@ngc.com or 310-912-8307.

Yours sincerely,

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