June 1, 2020

Submitted via email to: DWQ-vaporintrusion@waterboards.ca.gov

State Water Resources Control Board, Division of Water Quality, CalEPA VI Workgroup
Attention: Abe Waggoner
1001 I Street, 15th Floor
Sacramento, CA 95814

Re: Comments – February 2020 Draft Supplemental Guidance: Screening and Evaluating Vapor Intrusion

Dear Mr. Waggoner:

The Southern California Alliance of Publicly Owned Treatment Works (SCAP), Central Valley Clean Water Association (CVCWA), Bay Area Clean Water Agencies (BACWA) and California Association of Sanitation Agencies (CASA) appreciate the opportunity to comment on the February 2020 Draft Supplemental Guidance: Screening and Evaluating Vapor Intrusion (Draft Supplemental Guidance) document.

Because the Draft Supplemental Guidance mentions sewer systems as a preferential pathway for vapor intrusion it is important that DTSC and State Water Board staff consult with wastewater industry representatives in order to make sure the sewer system operational assumptions and reference documents accurately represent actual California sewer operating conditions. We respectfully request a series of meetings with the Draft Supplement Guidance authors in order to refine the understanding of California sewer collection systems and improve the approach to evaluating those systems as a pathway for vapor intrusion.

We recognize that sewers have undesirable gases, particularly methane and hydrogen sulfide. These gasses are natural byproduct of sewage. However, it is worth noting that California Engineering Standards and Building Codes are specifically designed to <u>prevent</u> sewer gases from entering the buildings to protect the public from sewer gases that are undesirable to inhabitants. As an industry, we have been very successful with this function. It has been consistently documented that in a properly designed, constructed and maintained sewer system, there is negligible to no risk to building occupants from sewer gases. More importantly, it is worth emphasizing that sewer gases travel with the wastewater <u>away</u> from buildings and not towards buildings. This is a part of good engineering practice and its well-documented effects are discussed in greater detail below. Put simply, if sewer gases are entering a building from the sewer, then the building is likely not meeting building code requirements.

Having reviewed the Draft Supplemental Guidance and participated in the Technical and General webinar sessions, we offer five comments for consideration and further discussion:

1. Sewer systems should not be considered preferential pathways for building vapor intrusion.
2. Cured in place pipe sewer rehabilitation is effective in preventing sewer gas entry to buildings.
3. Long term sewer mitigation measures identified in the Draft Supplemental Guidance have the potential to disrupt the collection system air flow balance, cause clogging or sewer overflows, and create other disruptions to the sewer system.
4. The Draft Supplemental Guidance is overbroad in its description of buildings that should be evaluated simply due to their connection to sewers that receive vapor forming chemicals (VFCs), or pass through or overlie VFC-contaminated soil or groundwater.
5. More time and coordination are needed to evaluate claims relating to sewers.

Each of these comments is further detailed below to provide technical and scientific context.

In sum, we are concerned with the Draft Supplemental Guidance's inclusion of sanitary sewer pipes as preferential pathways for building vapor intrusion due to the erroneous assumption that soil vapors preferentially travel through sewer pipes towards or into buildings. Moreover, the mitigation identified in the document could create problems within the sewer network and compromise public health. We requests that, before developing and issuing the final guidance, DTSC and State Water Board staff arrange with wastewater industry trade association professionals the necessary meetings to discuss sewer collection system design and operation, the likelihood of sewer pipes serving as pathways to convey soil vapor into buildings, and the appropriate way to approach modifications to sewer systems. We believe such collaboration will result in a markedly improved guidance document.

COMMENT NO 1:
Sewer systems should not be considered preferential pathways for building vapor intrusion

As described below, sewers are designed and operate in a manner to create negative pressure, which causes air (including any soil vapor contained in the air) to flow ***away*** from buildings. Therefore, by their nature, sewers are not preferential pathways for soil vapor to enter into buildings.

Wastewater (water used within a building that is not consumed) is removed from a building via the waste piping system. Wastewater first flows through a P-trap, which is a U-shaped pipe that holds standing water and prevents sewer gases from entering the building. By state and local plumbing codes, every water fixture with a drain must have a P-trap.

The drain system within a building works by gravity, allowing wastewater to flow down gradient through a series of pipes which typically increase in diameter as more fixtures are connected. These drain pipes are connected to a vent pipe system that is designed to bring fresh air into the drain pipes to prevent suction that would either stop or slow the free flow of wastewater. Vent pipes exit the building through one or more roof vents. The roof vents allow air into the waste piping system.

In multistory buildings, fixtures typically connect to a waste piping main stack which eventually exits the building below grade through the foundation. Single story building waste piping collects wastewater from the building fixtures with drains eventually combining into a single pipe exiting the building below grade. In municipal systems, the sewer line connecting the building wasting piping to the municipal sewer main is known as a sewer lateral or Property Service Connection (PSC). Many laterals are provided with a ground level wye-cleanout, or two-way cleanout, which allows blockages to be more easily removed.

After the lateral connects to the sewer main, the wastewater flows down gradient to progressively larger mains known as trunk sewers. Eventually the trunk sewer reaches a pump station or wastewater treatment plant. As wastewater flows down the collection system pipeline network, the liquid pulls air with it, creating a consistent flow of air in the headspace above the liquid in the pipeline.

The dynamics of the sewer headspace atmosphere, including the transport of air (gas) in sewers, is discussed in scientific publications authored by Richard L. Corsi, PhD, P.E. These publications reported the concept of a Reduction Factor (RF), which is the measured ratio of the headspace airflow rate to wastewater flow rate ranging from near zero up to 0.8 at the air/water interface. The conclusions and points of note in Dr. Corsi's publications include:

- Liquid drag causes gas flow in the same direction as wastewater flow, and is the only ventilation mechanism that acts continuously.
- Under conditions of low resistance to ambient air inflow and sewer gas exhaust, liquid drag can induce maximum gas mean velocities of up to 0.66 feet per second (fps) or 0.2 meters per second (m/s).
- Actual velocities in sanitary sewers are expected to be on the order of:
    - 0.13 to 0.66 fps (0.04 to 0.2 m/s) for small pipes up to 0.25 m diameter (10-inch diameter);

- 0.010 to 0.66 fps (0.003 to 0.20 m/s) for mid-sized pipes up to 1.0 m diameter (39-inches); and
- 0.016 to 0.59 fps (0.005 to 0.18 m/s) for large pipes up to 2.5 m diameter (98-inches).

SCAP members conducted a research project in which they measured headspace air velocity in Southern California sewers. The study utilized 30 data points converted to headspace air velocity for the depth of flow. A range of magnehelic pressure and vacuum gauges with varying sensitivities were used to conduct the pressure measurements. An air flow balometer with manhole cover adapter plate was used to measure the volume of air flow being drawn into the sewer pipe system. The study showed that headspace air velocity ranged between 0.11 fps to 2.3 fps with an average field result of 0.55 fps. These field measurements for a Southern California collection system are in alignment with Dr. Corsi's findings.

For a Southern California sewer siphon air jumper research project conducted by SCAP members, sewer headspace vacuum or pressure was measured at manholes, with any existing air jumpers both plugged and unplugged. The measured instantaneous vacuum was from 0.05 inches water column (in. WC) to 0.20 in. WC at a temporarily plugged siphon air jumper location. Airflow rates into manholes on large trunk sewers were measured at up to 600 cubic feet per minute (cfm) further confirming the significant head space air flow away from buildings.

This Southern California empirical testing and research, conducted in 2005, clearly demonstrate that sewer collection systems operate under negative air pressure conditions with headspace air flowing ***away*** from buildings not towards or into buildings. As such, sewer systems should not be considered a preferential pathway for building vapor intrusion.

COMMENT NO 2:
Cured In Place Pipe (CIPP) Sewer Rehabilitation Basics

CIPP rehabilitation is a valuable tool for the wastewater industry to rehabilitate aging sewer and lateral pipelines to increase their reliability and usable life. It is highly economical, quick and eliminates the need for costly, time consuming and disruptive excavation. Any public exposure to CIPP curing vapors is temporary, one day or less, and transient. CIPP is widely accepted as a 50-year repair, if a sewer main and building lateral were to be rehabilitated using CIPP on separate dates the potential building exposure to CIPP curing vapors would be two times in 50-years.

During the CIPP installation process, a resin impregnated felt tube typically made of polyester is inverted or pulled through a damaged mainline sewer pipe. The liner can be inverted using water or air pressure. Hot water or steam can be used to accelerate the curing rate of the resin. If a fiberglass tube is used, the curing of the resin can also be triggered though the use of UV light introduced into the tube. As the resin cures, it forms a tight-fitting, fully structural jointless replacement pipe.

Styrene-based resin systems properly used in CIPP produce a safe and environmentally sound solution to the need for restoring the nation's failing infrastructure and have been used for nearly 50 years in CIPP. The trenchless nature of CIPP installation makes for a potentially more cost-effective and less disruptive method than traditional "dig and replace" pipe repair methods. As such, any vapor intrusion during the CIPP process due to an internal building plumbing malfunction would be temporary and transient, should a short duration intrusion occur the effects dissipate quickly.

Because styrene odor can be detected at concentrations as low as 0.16 ppm, depending on one's ability to detect odors, styrene's odor can be a nuisance to those not familiar with the odor. To minimize short term odor during the installation of CIPP, residents/homeowners are informed of the CIPP installation schedule and what to expect. They should also be advised to ensure that their sewer drain P-traps are functional and filled with water. By design, properly maintained sewer laterals and interior plumbing systems prevent sewer gases and other vapor intrusions.

There has been recent research conducted jointly with universities in the USA and Canada by the National Association of Sewer Service Companies (NASSCO), a trade association dedicated to protecting the health and safety of worker and communities through the proper assessment, maintenance and rehabilitation of underground infrastructure, and NASSCO member companies regarding vapor intrusion concerns. While we appreciate the importance of protecting public health and the need for this Guidance Document update, it is critical to have additional time to thoroughly review the reference documents that pertain to CIPP sewer rehabilitation and provide feedback to DTSC staff on their relevance to this issue.

COMMENT NO 3:

Long term sewer mitigation measures identified in the Draft Supplemental Guidance (Step 4b, Pages 28-29) have the potential to disrupt the collection system air flow balance, cause clogging or sewer overflows, and create other disruptions to the sewer system

We agree with the short term vapor intrusion risk mitigation recommendations of adding water to dry P-traps and replacing damaged toilet bowl gaskets. This is simply good maintenance that should be performed regardless of vapor intrusion concerns.

We have significant concerns with some of the long term recommendations identified in the Draft Supplemental Guidance, such as venting, installing check valves and rerouting the sewer pipeline:

- Venting of sewer systems beyond plumbing code and municipal engineering standards is a delicate procedure and must be analyzed carefully by engineers with specific sewer air flow experience to avoid disruption of the overall collection system air flow balance.
- Installing check valves in gravity sewer pipelines is highly discouraged and can lead to clogging or even sewer overflows. Additionally, a check valve on a building lateral would block the beneficial airflow that exists in sewer collection systems pulling air away from the building. In rare cases where a building pad elevation is low in comparison to the sewer main elevation, the wastewater agency will recommend a backwater device to prevent sewage from back flowing up into the building during hydro jetting pipeline cleaning or extreme high flow events. It should be noted that this scenario is rare and there is not full agreement in the industry on this practice. It is widely accepted in the wastewater industry that these backwater devices can be problematic with respect to blockages and should be used with caution.
- There may be instances where it is beneficial to reroute a sewer main for a variety of reasons. It should be noted that generally sewer mains are routed to provide convenient building lateral connections. Rerouting a typical sewer main creates a myriad of building connection challenges that need to be carefully evaluated. Additionally, it is very costly to the sewer service ratepayers and disruptive to the public.

In light of these points, we urge DTSC and State Water Board staff to discuss with wastewater industry professionals these proposed mitigation measures and their impacts to buildings and the sewer system before including these measures in the final guidance.

COMMENT NO 4:
The Draft Supplemental Guidance is overbroad in its description of buildings that should be evaluated simply due to their connection to sewers that receive vapor forming chemicals (VFCs), or pass through or overlie VFC-contaminated soil or groundwater

The Draft Supplemental Guidance (Page 10) states:

> Situations where conduit air is likely to be impacted by site contamination include:
>
> - Known discharge directly into a sewer or drain;
> - Conduits intersecting soil contamination within a VFC release area;
> - Conduits intersecting groundwater contamination; or
> - Conduits located directly above contaminated groundwater.

The Draft Supplemental Guidance further provides, "If it is determined that conduit air is likely to be impacted and the conduit(s) is connected to a building or has the potential to release vapors below a building, proceeding to an indoor air investigation (Step 3) is recommended for that building."

The above statement suggests that anytime a sewer receives or has received discharges containing VFCs or passes through or over VFC contamination, buildings connected to or overlying the sewer network should be evaluated for indoor air impacts. This recommendation could result in the unnecessary evaluation of numerous buildings as parties chase sewer lines throughout communities impacted by VFC releases. Such investigations would result in wasted resources and unfounded concerns. Soil vapor simply does not move throughout sewer systems to enter buildings. As set forth above in Comment No. 1, sewers are designed such that sewer pipeline headspace travels ***away*** from buildings. The recommendation should be removed or significantly narrowed to specific, well-defined, circumstances.

COMMENT NO. 5:
More time and coordination is needed to evaluate claims relating to sewers

We appreciate the importance of protecting public health and the need for updated guidance regarding vapor intrusion. However, the Draft Supplemental Guidance is the first California EPA guidance document that we are aware of that specifically identifies sewers as preferential pathways for building vapor intrusion. As a result, we require additional time to thoroughly review the reference documents and provide additional feedback to DTSC staff on their relevance to California wastewater collection systems. This extra time is particularly necessary as the COVID-19 restrictions have caused disruption to our members' organizations, limiting resources available for fully evaluating the Draft Supplemental Guidance's claims relating to sewers. We request that DTSC not rush into issuance of the final guidance and instead take the time to meet with our professionals within the wastewater community.

We appreciate DTSC's consideration of these comments and strongly urges DTSC to proceed in close coordination with the wastewater sector on any sewer collection system recommendations DTSC is contemplating. The California wastewater trade association partners signing on this letter and our collective membership have tremendous expertise on collection system operation and are willing to assist in this area.

We look forward to additional correspondence and coordination.

To close, we respectfully request a series of meetings with the Draft Supplement Guidance authors in order to refine the understanding of California sewer collection systems and improve the approach to evaluating those systems as a pathway for vapor intrusion. Please call or email Steve Jepsen at 760.415.4332 or sjepsen@scap1.org to make arrangements.

Sincerely,

Steve Jepsen, Executive Director
Southern California Alliance of Publicly Owned Treatment Works (SCAP)

Lorien Fono, Executive Director
Bay Area Clean Water Agencies (BACWA)

Debbie Webster, Executive Officer
Central Valley Clean Water Association (CVCWA)

Adam Link, Executive Director
California Association of Sanitation Agencies (CASA)

cc: Eileen Sobeck – Executive Officer - SWRCB
Jonathan Bishop – Deputy Executive Officer – SWRCB
Joaquin Esquivel, Chair – SWRCB
Dorene D'Adamo, Vice Chair – SWRCB
Tam Doduc, Member – SWRCB
Sean Maguire, Member - SWRCB
Laurel Firestone, Member - SWRCB