Roe, Dilan, Env. Health

From: Yola Bayram [ybayram@awrcorp.net]
Sent: Monday, November 11, 2013 11:59 AM
To: Roe, Dilan, Env. Health
Subject: RE: 1700 Jefferson St. Oakland RO#151 SOP
Attachments: 2013 11 10 SOP - Soil Gas Screening FINAL.pdf

Hi Dilan,

Thank you. I've attached our SOP for soil gas screening. We will only be doing soil gas screening above the utility lines in this field effort. We will be including the SOP for soil gas sampling for inhalation risk for future soil gas sample collection in the addendum.

Thank you!

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-----Original Message-----
From: Roe, Dilan, Env. Health [mailto:Dilan.Roe@acgov.org]
Sent: Monday, October 21, 2013 6:41 PM
To: Yola Bayram
Subject: RE: 1700 Jefferson St. Oakland RO#151

Hi Yola:

Your request for a one-month extension to the submittal date of November 18, 2012 for the Work Plan Addendum is acceptable. The new submittal date is December 23, 2013.

Please note however, that prior to collecting the soil gas samples above the utility lines, please submit full standard operating procedures (SOPs) for the soil gas sample collection and analysis, as requested by Barb Jakub in her email dated July 12, 2013. In order to expedite the review and approval of these SOPs please submit to me via email.

Thanks-you,

Dilan Roe, P.E.
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PDF copies of case files can be reviewed/downloaded at:

http://www.acgov.org/aceh/lop/ust.htm

STANDARD OPERATING PROCEDURES

INSTALLATION of TEMPORARY SOIL GAS WELL and COLLECTION of SCREENING LEVEL SOIL GAS SAMPLE

This document describes Applied Water Resources' standard operating procedures (SOPs) to install a temporary soil gas well and collect a screening level sample of soil gas. Screening level samples of soil gas could be used as part of a site investigation, such as to delineate a source area, assess shallow preferential pathways, evaluate potential migration within underground utility corridors, map a shallow plume of volatile compounds in ground water, etc.

This SOP is not appropriate for the collection of soil gas samples for purpose of assessing risk to indoor air quality.

This SOP is based on guidance from the soil gas investigations advisory (DTSC, 2012). Specific field procedures are summarized below.

Construction of a Temporary Soil Gas Well

Temporary soil gas wells are typically used for one or two sampling events and then decommissioned in accordance with the local regulating agency requirements and the methods described in the Well Abandonment Section.

The Work Plan and the objectives of the investigation should specify the depth at which the soil gas sample should be collected. The boring within which the soil gas well is constructed is typically created by using direct push drilling equipment, but can be advanced using hollow, solid stem, or hand auger. The borehole diameter will be a minimum of 2 inches. If soil conditions are stable, then the soil gas well can be constructed in an open, uncased, borehole. If soil conditions are unstable, then the borehole will be cased prior to well construction.

All equipment, tools, and materials used to construct the borehole and well must be clean, dry, and free of chemicals, including cleaning chemicals. Implement the following steps once the desired depth of the borehole and soil gas sampling depth has been determined:

1. Drill the borehole to the desired sampling depth.
2. Place a minimum 2-inch thick bed of sand in the bottom of the boring to ensure that the tubing is not in direct contact with the bottom. Sand will be RMC Lonestar 2/12 mix, or similar.
3. Place a clean 3/4-inch diameter PVC pipe into the borehole that extends from the top of the sand at the bottom of the borehole to 1 to 3 feet above ground surface.
4. Measure and cut a length of the sample tubing that is equal to the desired sampling depth plus 1 to 5 feet. The additional length of tubing will remain above ground surface to enable collection of the soil gas sample.

5. The sample tubing will be made of material that will not react with site contaminants (i.e. Teflon, stainless steel) and with an inside diameter of 1/8 to 1/4 inches that is appropriate for the equipment to be used to collect the soil gas sample. Attach a filter at the bottom of the tubing to prevent sand from entering the tubing.

6. Install the tubing into the borehole by threading the tubing through the PVC pipe to the top of the sand. Placement of the tubing within the PVC will keep the tubing centered within the borehole, keep the filter completely within the sand pack materials, and maintain integrity of the well seal by eliminating contact of the tubing with the native geologic materials.

7. Place a minimum of 6 inches and maximum of 10 inches of sand pack above the filter. Use a separate small diameter PVC pipe to tremie sand into borings deeper than 15 feet to avoid bridging. Do not place sand directly into the PVC pipe containing the tubing because the sand will likely bridge and lock the tubing within the PVC pipe, preventing proper completion of the well.

8. Lift PVC pipe containing the tubing to the top of the sand pack while keeping the tube bottom with filter at the desired depth. If present, also raise the borehole casing and tremie pipe to the top of the sand pack. Measure the depth to the top of the sand pack and add additional sand as necessary. Record all the final depth to the top of sand pack.

9. Place a minimum 6 inches and maximum of 12 inches of dry granular bentonite above the sand pack.

10. Prepare a thick bentonite grout mixture by hydrating bentonite within a container at ground surface. The mixture should approximate the consistency of applesauce.

11. Remove the PVC pipe containing the tubing. Remove the tremie pipe. While holding the sample tubing so that it is centered within the borehole, fill the borehole to the surface with hydrated bentonite grout mixture.

12. If present, remove the borehole casing and add more bentonite grout to top off the boring to ground surface.

13. Install a gas-tight valve or fitting at the end of the tubing and protect the temporary well and tubing with a barricade, flagging, or similar.

14. If the well is permanent, complete the installation with a traffic rated well box.

Collecting a Screening Level Sample of Soil Gas

Following completion of the soil gas well, allow the subsurface to equilibrate back to representative conditions for at least one hour prior to collecting a soil gas sample. Do not collect soil gas screening samples during or within two days of a rainfall event.

1. Assess the sample tubing and confirm that the well is intact and its integrity has not been compromised.

2. Calculate the volume of air within the soil gas well that will be purged prior to collecting a soil gas sample. One purge volume is the sum of the following volumes:

    - The internal volume of tubing,
    - The void space of the sand pack around the bottom of the tubing and filter (assume 30% porosity), and
    - The void space of the dry bentonite in the annular space, (assume 30% porosity). Assume this bentonite has not been hydrated.

3. Attach a centrifugal or vacuum pump to the ground surface end of the tubing and a Tedlar bag (or similar) to collect the screening level sample of soil gas. Following the removal of each purge volume, collect a soil gas sample within the Tedlar bag.

4. Using a meter designed to measure the target analytes (i.e. photoionization detector, 4-Gas meter, or Flame Ionization Detector), measure the concentration of volatile chemicals within the Tedlar bag. Monitor the meter continuously for at least 30 seconds and record the maximum concentration measured.

5. Continue purging and measuring concentrations until concentrations appear to stabilize within approximately 10% for three consecutive measurements. If concentrations do not stabilize after 10 purge volumes, then sampling may cease.

Well Abandonment

After sample collection ceases at a soil gas well, the well will be abandoned with concurrence from the local regulating agency. Unless otherwise directed by the regulatory agency, the following steps should be followed when decommissioning a soil gas well:

1. Either remove the tubing by pulling out of the borehole, or cut the well tubing as far below ground surface as possible;

2. Remove the hydrated bentonite grout to within approximately 1 foot of finished grade. If the borehole was advanced through hard surface materials (e.g. asphalt, concrete), fill the borehole

with suitable materials to finished grade. If the borehole was advanced through soil, fill the last foot of the borehole hole with compacted native material.

3. If the borehole and soil gas well penetrates a confining clay unit, then overdrilling the borehole to remove all sand materials followed by tremie grouting is recommended to prevent potential contaminant migration across distinct lithologic zones. The driller will utilize methods that assure the overdrilling does not drift off the borehole and soil gas well. All overdrilled holes will be grouted in accordance with local regulatory specifications.

4. In all cases, restore pavement and vegetation to approximate original conditions, or as requested by the land owner.

References

DTSC, California EPA, and RWQCB San Francisco and Los Angeles; *Advisory, Active Soil Gas Investigations*, April 2012.