DEPARTMENT OF NATURAL RESOURCES & ENVIRONMENTAL CONTROL
DIVISION OF AIR & WASTE MANAGEMENT
SITE INVESTIGATION & RESTORATION BRANCH

STANDARD OPERATING PROCEDURE
ACTIVE SOIL GAS SAMPLING

GENERAL PROVISIONS:

This is the default procedure to be followed when installing and sampling active soil gas monitoring points. Alternative methods may be proposed and approved by DNREC-SIRB on a case by case basis.

PROCEDURE:

1) Order summa® canisters from the laboratory for 30 minute sample collection time (0.2 L/min).
2) The summa® canisters must be individually certified clean.
3) The summa canister must be used within 24 hours of shipment to avoid picking up contamination. Record the vacuum pressure in each summa canister. If it doesn't match the lab recorded value, it can't be used.
4) Install using a geoprobe® direct-push sampling device. The vapor point (VP) will be constructed of one-inch PVC riser. The PVC screen with be 0.010-slot well screen to a minimum depth of 3 feet below ground surface. The screen length will be 1 foot long maximum. The VP will be completed to ground surface.
5) The annular space between each well screen and borehole will filled with a sand pack consisting of Jessie morie#1 well sand from the bottom of the borehole to 0.5 feet above the screened interval. A bentonite grout seal will be placed from the annular space above the sand pack to the surface. Alternatively the VP may have a well vault constructed. A lockable expansion plug will be placed on top of each riser pipe. All connections must be threaded and no solvent or glue will be used in the construction of the well.
6) Sampling will not take place until 24 hours after construction.
7) Each VP will be gauged to verify its total depth and well volume.
8) A PVC cap fitted with a short length of Teflon-lined polyethylene tubing will be placed on the wellhead to allow connection of the sample purge pump and sampling devices.
9) The tubing will be attached to the cap with a new brass hose barb fitted with a ball valve to prevent short-circuiting of air into the well.
10) Liquid silicon will be applied to the connection of the PVC pipe and cap.
11) In order to confirm construction of the VP, do the following:
    personnel will connect to the tubing. Personnel will monitor the air being drawn out of the ground. The oxygen level (O_2) in the tubing must remain significantly (more than 2 percent) less than atmospheric conditions (20.8%) ie less than 18.8%. If levels do not stabilize at 18.8% O_2 or less then short-circuiting is occurring and the well will have to be resealed or possibly re-installed.
12) Conduct a QA/QC test of the equipment. The VP must pass the QA/QC test in order to collect the samples in the canisters.

Please review October 2006 New York State Department of Health, "Guidance for Evaluating Soil Vapor Intrusion," pages 26-28 for additional guidance on conducting QA/QC procedures.

1) Helium or propylene may be used as a tracer gas.
2) The QA/QC set-up is as follows:
    a. Drill 3 holes in a plastic five gallon bucket-2 on sides and 1 on top.
    b. Place a small relief valve in one side hole. Seal with silicon caulking.
    c. Place tubing into inside of bucket through one of the side holes and seal with silicon caulking.
    d. Hook this tubing to the tracer gas.
    e. Hook up the tubing to the top of well cap and pass tubing through hole on the top of the bucket. Seal with silicon caulking.
    f. Seal the bucket to the ground with bentonite.
    g. Fill a Ziploc with the tracer gas and measure the tracer gas. Note the concentration. This represent the concentration in the bucket.
    h. Fill the bucket with tracer gas.
    i. Place a small clamp on the tubing.
    j. Hook the tracer gas instrument to the end of the tubing.
    k. The concentration measure from the end of the tubing should be less than 10% of concentration in the Ziploc. This indicates a good seal.
    l. If it is greater than 10%, recheck all fittings and seal fitting on the well until it meets this 10% rule.
13) Prior to completing the sampling, the personnel will complete a sampling form (attached) noting pertinent weather conditions, vacuum present in the canister when the sampling began, weather it passed QA/QC, etc. Compare the vacuum pressure on the canister with the lab vacuum pressure, if it is different by more than 10% then don't sample with the canister.
14) A small vacuum pump, limited to less than 0.2 liter per minute, will be connected to the tubing from the well cap and allowed to purge for a calculated 3 well volumes.
15) At the completion of the purge period, the valve will be turned to the off position and the pump disconnected.
16) A summa® canister will be immediately connected to the well cap's sample tubing, the pinch clamp will be removed and the canister will be collected at a rate not to exceed 0.2 L/min.
17) The canister must be shut off while vacuum still remains the canister. Note the remaining vacuum from the vacuum gauge on the sampling form.
18) Personnel collecting the samples will avoid using permanent markers, or wearing perfume or cologne.
19) Don't collect samples if water is present in the VP.
20) Soil gas samples should not be collected less than 24 hours after a heavy rain.
21) An ambient air summa canister sample and duplicate should be collected at the same time as the soil gas samples. The ambient air sample should be collected at the approximate height of an adult breathing zone. The work plan should specify the number and location for duplicates and ambient air samples.

APPLICABILITY:

This procedure applies to all employees of the Site Investigation & Restoration Branch, SIRB contractors and any other HSCA consultants.