

Guidelines for Excavation Within DFRC GW Plume Boundaries

Hazard Analysis:

The entire area within the boundaries described by the OU6 plume map is under laden with a contaminated groundwater plume and therefore additional precautions are required. In some areas within the plume boundaries, diluted potassium permanganate (an oxidizing reagent) has been injected into the groundwater as a treatment. Because the concentrations of contaminants and reagent vary within the plume, it is unknown what the concentration might be at any given spot. Therefore, the entire area must be considered contaminated.

The major contaminants and their health indicators are:

- Trichloroethylene (TCE), ACGIH 50 ppm TLV, 200 STEL, (OSHA 100 ppm PEL)
- Benzene, ACGIH 0.5 ppm TLV, 2.5 STEL, (OSHA 1 ppm PEL)
- Toluene, ACGIH 50 ppm TLV, (OSHA 200 ppm PEL)

All of which are either known or suspected carcinogens and:

- Xylene, ACGIH 100 ppm TLV/OSHA, 150 ppm STEL, which is not a suspected carcinogen.

Since the excavations may reach 10-12-feet in depth, the possibility of encountering saturated soil or groundwater (GW) exists. There are three possible exposure pathways to contaminants for workers that disturb soil within the plume boundaries – vapor inhalation, dermal contact with contaminated groundwater, and ingestion of contaminated soil or groundwater.

Vapor Inhalation:

Due to the possible escape of hazardous vapors from contaminated groundwater (& therefore contaminated soil, if wet) workers must take appropriate action to minimize exposures to hazardous vapors. All excavations shall be monitored using a photo ionization detector (PID), to identify hydrocarbon concentrations. When an action level is reached, the appropriate action must be taken. Since one or more of the listed vapors can be absorbed through the skin the following personal protective equipment (PPE) is recommended:

- Tyvek coveralls, PVA (polyvinyl alcohol) gloves, and safety goggles
- A respirator with an OV (organic vapor) cartridge.

Note that all workers must be trained in the proper use of each element of PPE and, if a respirator is worn, fitted for the specific respirator.

Vapor Monitoring			
Parameter	Zone Location and Monitoring Level	Action Level (above background)	Response Activity
VOCs (total PID)	Breathing Zone (every 15 minutes during intrusive activities)	> 1 ppm to 5 ppm	Don PPE, respirator
VOCs (total PID)	Breathing Zone (every 15 minutes during intrusive activities)	> 5 ppm	Stop work, exit, contact Dryden Safety

Notes:

VOC = volatile organic compound

> = greater than

PID = photo ionization detector

PID must be calibrated daily.

Breathing zone is face height at the surface for equipment operators, and face height inside trench for pipe installers.

To establish background: Monitor ambient air for 2 minutes, 100 yards away from any excavation.

For workers that enter trenches that have saturated soil or GW present and the breathing zone is below the ground surface, a protective engineering control would be to use fans to evacuate any vapors, plus continuous air monitoring in the trench.

Dermal Contact with Contaminated Groundwater:

As with vapors, groundwater (GW) can be absorbed through skin and requires the same PPE. Note that wet soil is considered groundwater (GW) contaminated and needs the same controls. When the soil or water is purple, this is an indicator that potassium permanganate is present.

- In addition to other PPE, if GW or saturated soil is encountered, face shields are needed.
- If purple soil or purple GW is encountered, wear butyl rubber gloves
- If rubber gloves are needed, wear PVA gloves underneath.

When GW or saturated soil is encountered, all contaminated PPE (including leather gloves, if worn) must be disposed as hazardous waste. Store materials in a sealed drum and then coordinate disposal with NASA by calling Steve Fedor at 661.276.7603, or 661.810.7621 when job is done.

All removed soil should be returned to the excavated area. If any excess soil remains, it must be put in a clean drum (NASA can provide), labeled (NASA will provide) then lid replaced and sealed. At the completion of the job, each drum must be sampled and the sample sent to a lab and analyzed for TCE and others. Drum can be emptied only when lab results show the soil is not contaminated (dump at borrow pit), or contaminated (dispose as HW).

Ingestion of Contaminated Soil or Groundwater

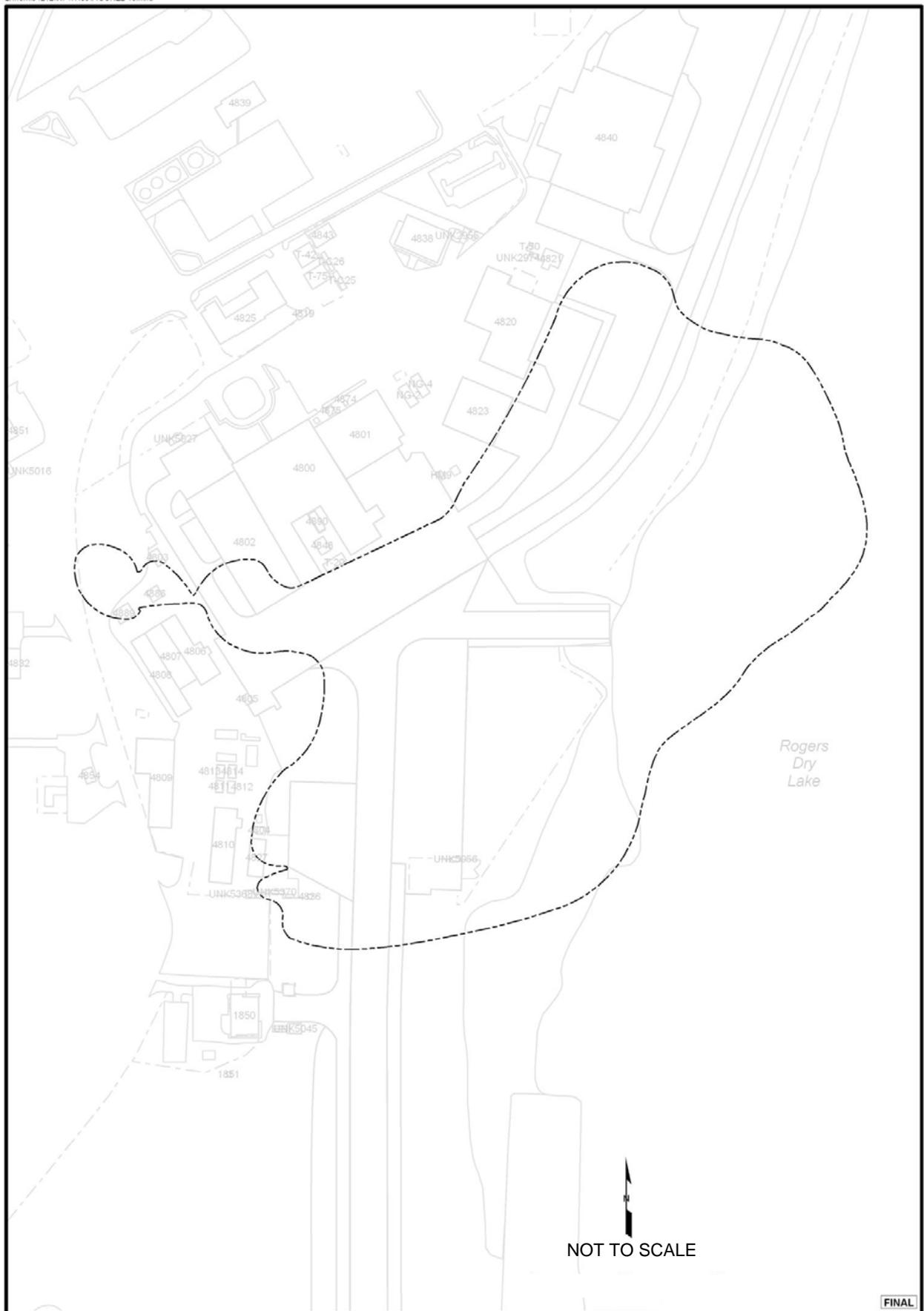
To avoid ingestion, workers should wash hands with soap and water prior to eating, drinking, or smoking.

General Precautions:

- If a worker has difficulty breathing, remove to a safe distance until the condition improves.
- If bare skin becomes exposed to GW or saturated soil, wash immediately with soap and water. Contractor shall keep hand/face washing supplies (One 5-gallon bucket, soap, paper towels) on hand at worksite
- To remove permanganate stains use a cleaning solution of 3 parts 2% hydrogen peroxide, 3 parts vinegar, 3 parts water

Notes:

1. If vapors are detected above the action level(s) in the worker breathing zone(s), it is likely they will clear after a few minutes and work can proceed without vapor protection PPE.
2. If persistent vapors above the action level(s) are detected in the trenches, fans may be a way to keep the vapor concentrations below the action level.



2-57

FINAL

EXPLANATION

----- LAND USE CONTROL BOUNDARY

**Operable Unit 6
Land Use Control Boundary**

Date 09-2006

Project No.
54212

**Operable Unit 6
Record of Decision
Edwards AFB**

Figure

2-15