

**Arizona Department of Environmental Quality UST Program
Release Reporting & Corrective Action Guidance**

APPENDIX D BEDROCK INVESTIGATION

The purpose of this guidance is to provide UST owner/operators with a standard set of minimum procedures to be performed when bedrock is encountered during site characterization. These procedures should be performed in accordance and in conjunction with site characterization procedures outlined in this document. Additional procedures may be required by the UST Program on a site-specific basis, *e.g.*, when an impact is known to an existing receptor.

When bedrock is encountered during site characterization, it is strongly recommended that the UST Program be contacted prior to conducting investigations into bedrock to determine the potential for groundwater contamination. This is due to the difficulty in assessing subsurface fluid flows in bedrock (*i.e.*, high costs, limitations in investigation technologies and methods, complexity and variability in site conditions). Therefore, before further field activities are conducted after the initial sampling of soils above the soil-bedrock interface, a meeting with the LUST site case manager should be held to develop an appropriate site-specific investigative strategy. If a meeting is requested, the owner/operator should propose an approach for investigation of contamination into bedrock. Documentation of the proposed investigative approach should be submitted with the meeting request so that UST Program staff may have sufficient time for review of the document, and an appropriate meeting date can be scheduled.

The following procedures can be used to evaluate the potential for LUST contamination to have impacted groundwater. **Do not** attempt to sample bedrock.

- C The vertical extent of soil contamination should be determined until the the soil-bedrock interface is encountered. Attempts should be made to collect a soil sample directly above the interface for laboratory analysis .

- C No groundwater investigation into bedrock is necessary when:
 - (i) soil contamination at the soil-bedrock interface is at or below the ADEQ minimum GPLs and groundwater is not present at the interface; or
 - (ii) soil contamination at the soil-bedrock interface is greater than the ADEQ minimum GPLs and it can be demonstrated that groundwater and surface water is not impacted (*e.g.*, the water table occurs at extreme depth relative to the soil-bedrock interface).

- C Investigation into the bedrock **may** be required when soil contamination at the soil-bedrock interface is above the ADEQ minimum GPLs and the presence of groundwater in the area has been documented under the following conditions:
 - (i) the known historic high groundwater level is within 30 feet below the soil-

**Arizona Department of Environmental Quality UST Program
Release Reporting & Corrective Action Guidance**

- bedrock interface; OR
 - (ii) a fracture network is documented to occur between the soil-bedrock interface and the highest seasonal level of groundwater.
- When the level of groundwater occurs above the soil-bedrock interface, the procedures for characterizing the extent of contamination in the water-bearing zone above the soil-bedrock interface should be followed in accordance with site characterization procedures outlined in this document. Depending upon site-specific criteria, further investigation below the soil-bedrock interface may not be required. Please confer with the LUST site case manager prior to conducting further investigative activities.
- The following factors are among those factors which may apply in developing a plan for installing a monitor well network into bedrock:
 - (i) Existing quality of groundwater prior to release impact;
 - (ii) Depth to groundwater;
 - (iii) Sole source aquifer and availability of alternative water sources;
 - (iv) Groundwater level relative to soil-bedrock interface;
 - (v) Type of contamination;
 - (vi) Potential or presence of free product on or below the soil-bedrock interface;
 - (vii) Presence of available bedrock cores from adjacent properties which are representative of the bedrock occurring at the LUST site;
 - (viii) Presence of nearby bedrock outcropping;
 - (ix) Location of potential receptors within and outside of the plume; or
 - (x) Location and construction specifications of existing wells which are impacted.
- When investigation into bedrock for potential impacts to groundwater is deemed necessary, see Appendix G for monitor well construction.