

EXECUTIVE SUMMARY

In November 1993, a limited screening investigation was conducted along the Three Mile Dual-Wall Wastewater Pipeline, (3MP) at Hill Air Force Base, Utah. The pipeline conveys pumped contaminated groundwater from Operable Units 1 and 2 to the base Industrial Waste Treatment Plant. The work described in this report was initiated after learning that water collecting in the manhole sumps on the pipeline actually contained low concentrations of trichloroethene (TCE). This water had been pumped on a several occasions from the manholes onto surrounding soil, under the belief that the water was clean.

The investigation focused primarily on the area near eight manholes and involved a soil gas survey and manhole water sampling to identify potentially contaminated areas along the pipeline. Based on the results of the soil gas survey, limited soil sampling was performed in December 1994 to characterize the TCE concentration in the soil matrix. Soil samples were collected at the location of the highest TCE soil gas concentrations at each manhole.

This report discusses the background of the pipeline, field sampling methodologies, field sampling results, and conclusions and recommendations regarding further investigation, pipeline improvements and pipeline testing procedures.

The results of the soil gas survey, soil sampling, and manhole water sampling are:

- ▶ TCE concentrations in soil vapor were detected around 6 of 8 original pipeline manholes in the range of 0.1 to 14 $\mu\text{g/L}$, at least two orders of magnitude greater than detection limits on the truck-mounted gas chromatograph.
- ▶ TCE was detected in a surface soil (0-2 ft below ground level, bgl) sample near Manhole #3 at 68.8 $\mu\text{g/Kg}$ but was nondetect in a subsurface soil sample collected from 10-12 ft bgl. The contamination was at a manhole location that had never been pumped, and was above the elevation of the pipeline. Further confirmation sampling at the surface soil location showed no contamination present. The cause for the false sample is being looked into. It is not believed that the contamination first shown at this location is real.
- ▶ TCE was also detected at 142 $\mu\text{g/Kg}$ in a subsurface soil sample collected at 10-12 ft bgl near Manhole #4 but was nondetect at 5-7 ft bgl suggesting that a leak in the containment system of the pipeline or manhole is the source of the TCE contamination at this location.
- ▶ TCE was the major contaminant present in manhole water samples, ranging from 5 to 51 $\mu\text{g/L}$, with the highest concentrations present in Manholes #6 and #8. All November 1993 TCE concentrations were several orders of magnitude less than similar sampling results in March 1993, where TCE concentrations ranged up to 2.9 mg/L.

A conceptual model was developed based on the screening investigation which depicts the potential primary sources of pipeline leaks, secondary sources of leaks, and routes of contaminant migration in the environment. This model allows a visual understanding of the potential sources of leaks to the surrounding soil from the pipeline/manhole system.

On the basis of the preliminary site investigation and evaluation of the pipeline

construction, the following conclusions and recommendations were made:

- ▶ The TCE concentration in subsurface soil near Manhole #4 warrants additional investigation of the soil matrix to determine the extent of contamination. In addition, it is unknown whether the shallow groundwater (approximately 25 ft bgl) is impacted, therefore a groundwater sample is warranted at this location.
- ▶ On the basis of pipeline observations and engineering calculations, no improvements are recommended to the carrier pipeline, pending further investigation of TCE levels in soil and groundwater. The HDPE material is able to accommodate the expansion and contraction stresses associated with the yearly temperature fluctuation. Also, the calculated strength of the carrier pipe (SDR 21) and the containment pipe (SDR 32.5) should withstand normal operating pressures of the pipeline.

- ▶ It is recommended to replace existing pipeline manholes with underground vaults. The vaults should be constructed with the access manhole and leak indicator system located within the security fence, thereby eliminating damage to exposed equipment from snow plows or other work on the roadway.
- ▶ A decision logic matrix for the pipeline was developed. Preliminary costs for testing and repairs were compiled for evaluation of the prospective testing and repair methods.