EXECUTIVE SUMMARY

This report describes the findings of Phase II of the remedial investigation (RI) at Operable Unit 1 at Hill Air Force Base, Utah (Hill AFB). The objectives of the Phase II investigation were to fill data gaps identified during Phase I of the OU 1 RI regarding the nature and extent of contamination associated with the specific disposal sites that comprise OU 1. Additional soil, ground-water, surface-water, sediment, and light non-aqueous phase liquid (LNAPL) samples were collected and analyzed for volatile organic compounds; base, neutral, and acid extractable compounds; pesticides; polychlorinated biphenyls (PCBs); dioxins, furans; total petroleum hydrocarbons; metals; cyanide; and anions. All data gaps were filled during this investigation. The results of the Phase II investigation are consistent with and corroborate Phase I data, except for the areal distribution of the 1,2 dichloroethene (DCE) contaminant plume and the detection of pesticides, PCBs, dioxins, and furans. The results of the Phase II investigation are consistent with and corroborate Phase I data, except for the areal distribution of the 1,2-dichloroethene (DCE) contaminant plume in the upper portion of the shallow on-Base and off-Base aquifers, and the detection of pesticides, PCBs, dioxins, and furans in soil and LNAPL.

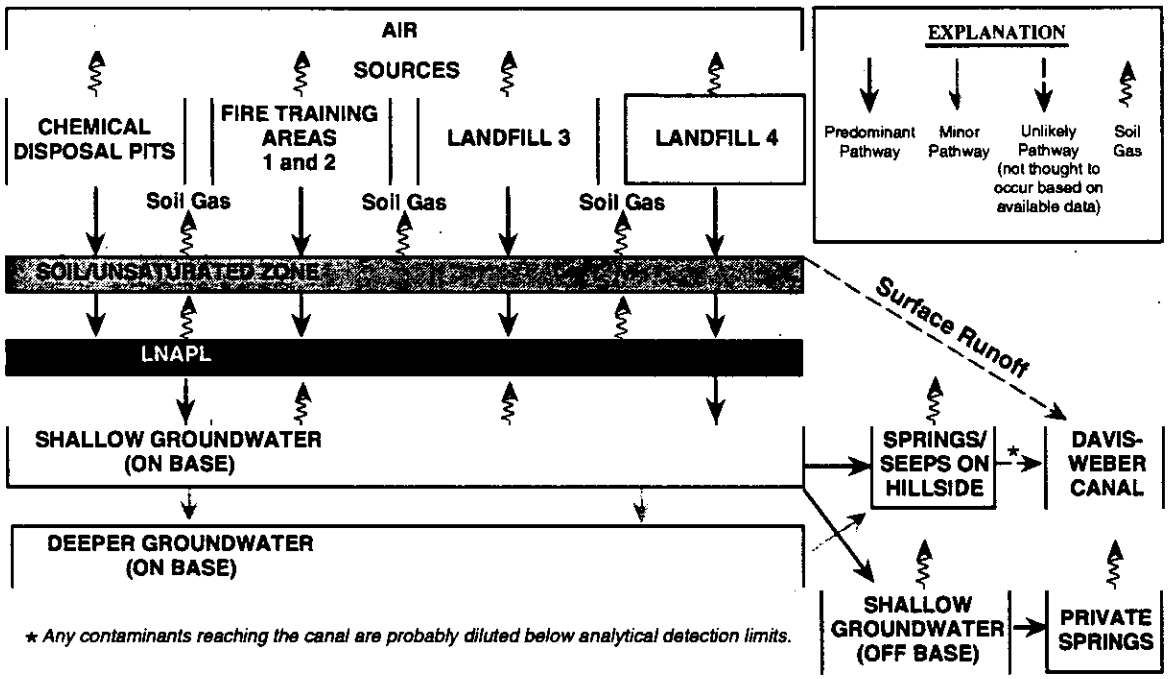
The areal extent of the DCE contaminant plume in the upper portion of the shallow on-Base and off-Base aquifers has been redefined (more widespread) based on the results of the Phase II investigation. based on the results of the Phase II investigation, which included additional lateral ground-water sampling locations. The concentration of DCE reported for ground water from sites that were sampled in both 1990 and 1992 were similar, except for ground water from two monitoring wells installed in the upper portion of the unconfined aquifer in the Weber River Valley. DCE was detected in the ground water sample from monitoring well M-60 at a concentration of 98 µg/l in 1992, but was not detected during 1990 sampling. DCE was not detected in the ground water from monitoring well M-59 during 1992 sampling, however it was detected at a concentration of 130 µg/l during 1990 sampling. The results of the Phase II investigation indicate that the LNAPL that occurs at Fire Training Area 1 and downgradient of the Chemical Disposal Pits is a major secondary source of contamination at OU 1. The results of this investigation also indicate that PCBs, dioxins, and furans are present in the soil and LNAPL at OU 1.

The results of the Phase II investigation indicate that the LNAPL that occurs at Fire Training Area 1 and downgradient of the Chemical Disposal Pits is a major secondary source of contamination at OU 1. Percent level concentrations of fuel and chlorinated solvents were detected in the LNAPL. In addition, polychlorinated biphenyls, dioxins, and furans were detected in both LNAPL samples collected downgradient of the Chemical Disposal Pits at concentrations that indicate high risk based on a 10^{-4} risk factor. No PCBs were detected in the LNAPL sample collected from Fire Training Area 1, however, dioxins and furans were detected at concentrations that indicate high risk based on a 10^{-4} risk factor.

Polychlorinated biphenyls, dioxins, and furans were also detected in soil samples. Polychlorinated biphenyls were detected in 13 of 34 subsurface soil samples analyzed for PCBs. The highest concentrations of PCBs (up to 8 µg/g) were found in subsurface soils

from the Chemical Disposal Pits. The risk for PCBs for subsurface soils is considered low based on a 10^{-6} risk factor. Polychlorinated biphenyls were detected in three of the 13 surface soil samples (0 to 6-inches below ground surface) at concentrations ranging from 0.14 to 0.45 µg/g. Based on a risk factor of 10^{-4} to 10^{-6} the risk associated with these samples is moderate. Dioxins and furans were detected in 16 of the 22 soil samples analyzed for these compounds. The reported concentrations for dioxins and furans in subsurface soil ranged from low picograms/gram to low nanograms/gram. Like the LNAPL, the highest concentrations of dioxins and furans were detected in subsurface soil from Fire Training Area 1. The risk associated with dioxins and furans for subsurface soil is considered low based on a 10^{-6} risk factor.

The conceptual model for contaminant fate and transport, as shown below, has been revised based on the data collected during Phase II of the RI. The predominant contamination migration pathway is from the unsaturated soil to the upper portion of the shallow on-Base aquifer. Once in the shallow ground water, the contaminants either attenuate in the aquifer matrix and capillary fringe or migrate laterally in ground water where they are discharged at seeps and springs that occur along the failure planes of the slumps on the hillside adjoining OU 1, or they are discharged to the shallow unconfined aquifer in the Weber River Valley. The primary migration route of contaminants from the upper portion of the shallow on-Base aquifer to the unconfined off-Base shallow aquifer appears to occur along preferential flow paths consisting of interconnected sand stringers in the western portion of OU 1 and the Weber River Valley. Although the upper portion and the deeper portion of the shallow on-Base aquifer are hydraulically connected, migration of contaminants to the deeper portion of the shallow on-Base aquifer is considered a minor pathway because very few contaminants have been found in the deeper portion of the aquifer, and the silty clay layer underlying OU 1 likely retards the vertical migration of contaminants.



CONCEPTUAL MODEL OF CHEMICAL TRANSPORT