2.0
HISTORY OF THE NORTHWEST BOUNDARY SYSTEM

Rocky Mountain Arsenal (RMA), located 10 miles northeast of Denver in Adams County, Colorado, (Figure 2-1) was established in the spring of 1942 as a chemical warfare agent manufacturing facility. During the years following the war, the Arsenal neutralized and demilitarized chemical warfare agents.

In 1947, the Julius Hyman Company leased part of the South Plants facility for the production of pesticides. The Shell Oil Company took over the operation of the pesticide manufacturing facilities in 1952. During the years the facility was operated by Shell, chlorinated organic and organophosphorus pesticides were manufactured.

Construction of the North Plants manufacturing facility was completed in 1953. This facility was responsible for the manufacture of GB nerve agent until 1957 and for munitions filling operations until 1970. From 1970 to 1982, RMA was engaged in the disposal of chemical warfare materials.

In 1975, the Army initiated water quality monitoring programs to evaluate the nature and extent of contamination and to develop response actions to control contaminant migration. In 1980, a groundwater surveillance program identified a contaminant plume in the alluvial groundwater leaving RMA to the northwest in Section 22, T2S R67W.

Construction of the NWBS (Figure 2-2) containment system began in March 1983, and the system became operational in 1984. The NWBS was designed to intercept and remove dibromochloropropane (DBCP) as well as other organic compounds, from the alluvial groundwater.

The NWBS is located in the south half of Section 22 along the northwest boundary of RMA. The groundwater extraction system consists of a partial slurry wall, a row of 15 groundwater extraction wells, and a parallel row of 21 groundwater injection wells. Current operations rely

on the creation of a reverse hydraulic gradient (from a northwest to a southeast gradient) in the vicinity of the NWBS to enhance the capture of contaminants by the extraction wells. A slurry wall (approximately 1,425 feet long prior to the recent 665-foot extension to the northeast) was constructed between the two rows of wells at the northeast end of the system to provide additional control of groundwater movement. Along the southwest end of the system, where a paleochannel has been identified, the capture of contaminants is based entirely on hydrodynamic control (a hydraulic barrier) created by the use of extraction and injection wells.

Recent investigations (Stollar 1989) indicated that low concentrations of organic contaminants within the alluvial groundwater may be bypassing the system and migrating offpost. Additionally, other contaminants are present in the NWBS area but are not completely treated by the current treatment system.

As part of the Short-Term Improvements IRA, Shell investigated contaminant bypass of the NWBS, and responded in June 1990 with a plan to extend the boundary system 665 feet to the northeast. This system extension was completed in October 1990.

Shell's Short-Term Improvements IRA assessment (MKE 1990 and MKE 1991) also identified dieldrin as the most widely distributed contaminant bypassing the system to the southwest. The objective of the Short-Term Improvements IRA is the implementation of any appropriate improvements to rectify bypass of the dieldrin plume to the southwest of the NWBS.

3.0
INTERIM RESPONSE ACTION OBJECTIVES

The Comprehensive Monitoring Program (CMP) Annual Groundwater Report for 1988 (Stollar 1989) identified some groundwater contaminants present within the Northwest Corridor of Rocky Mountain Arsenal (RMA) that apparently were not being captured completely and/or treated completely by the NWBS. This IRA investigation conducted by the Army evaluated the system's ability to meet remediation needs for the next five years and to treat the intercepted groundwater to existing ARARs. The following objectives were delineated to meet the needs of this IRA:

- Assess the groundwater capture portion of the NWBS and evaluate the potential for contaminated groundwater within the unconfined aquifer to bypass the NWBS.

- Assess the quality and quantity of contaminated groundwater approaching the NWBS and characterize the migratory pathways of plumes.

- Assess the treatment system of the NWBS through an evaluation involving effectiveness, implementability, and cost. Alternatives will be selected, as necessary, for the capture and treatment of contaminated groundwater approaching or bypassing the system through the unconfined aquifer.