

II. CHEMICAL AGENT PROGRAM HISTORY

2.0 General

Rocky Mountain Arsenal (RMA) was established in 1942 with the mission of manufacturing and assembling mustard (blistering agent) and incendiary munitions. During World War II, the Arsenal manufactured chemical and incendiary munitions until 1945 when it was placed in standby status. Portions of the Arsenal were then leased to private industry for the production of commercial pesticides and herbicides. The principal lessee was Shell Chemical Company which produced various commercial pesticides and herbicides until 1982.

RMA was reactivated in 1950 during the Korean emergency to produce chemical and incendiary munitions. Also during this period between 1951 and 1953, the Nerve Agent Plant was constructed. GB (nerve agent) was manufactured from 1953 to 1957. Munitions were filled with GB agent from 1953 to 1969.

In May 1969, the Department of the Army decided to dispose of certain chemical munitions which were obsolete and excess to the National Deterrent Stockpile. RMA initiated the destruction of mustard in October 1969 and completed the project in July 1974. The destruction of GB agent and munitions occurred between 1973 and 1976.

From 1972 to 1985, various chemical agents were destroyed at RMA.

After 1985, the Program Manager for Clean Up of RMA was established with environmental clean up as the only mission.

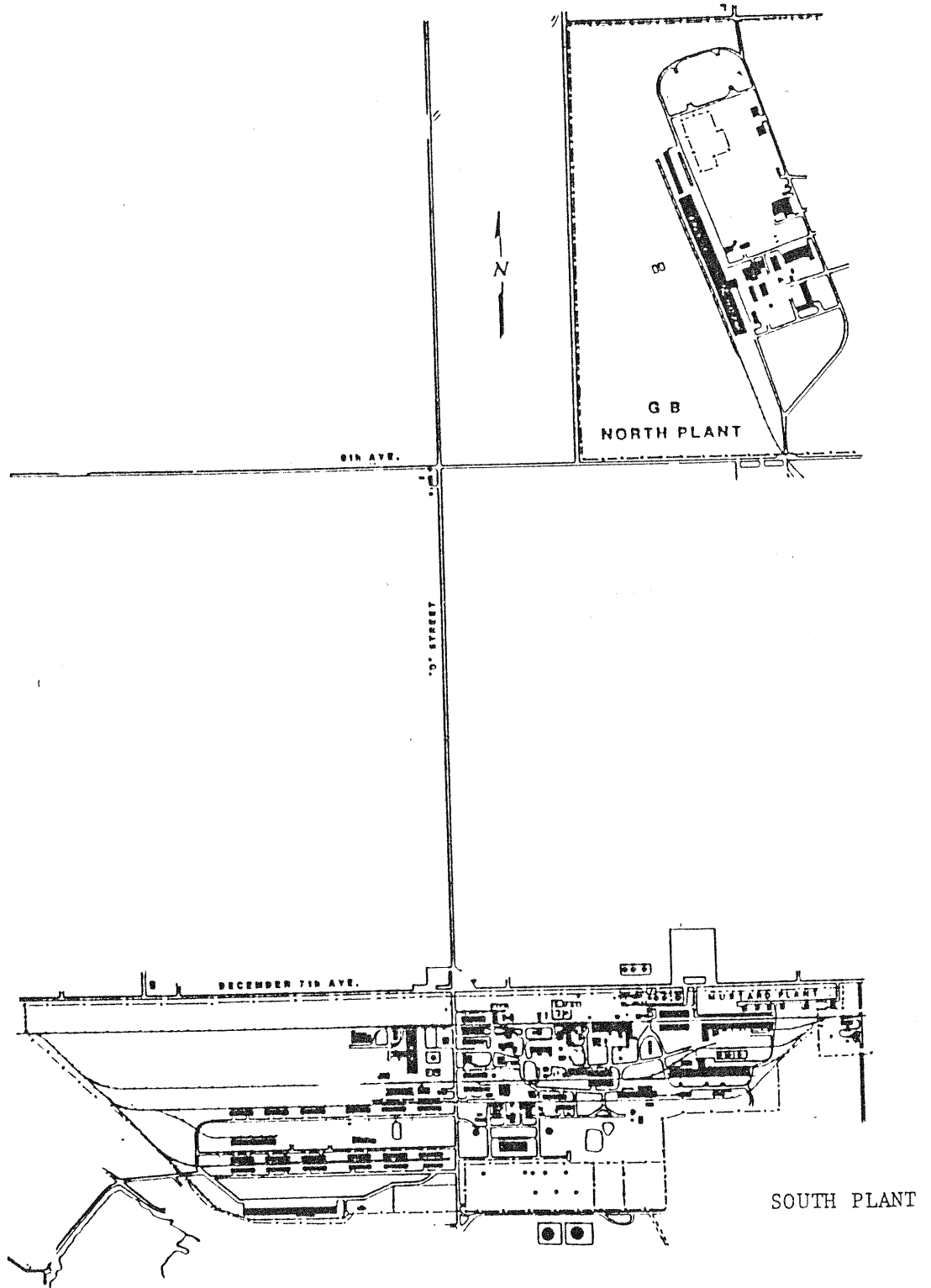
V. CHRONOLOGY OF EVENTS

5.0 General

The significant events leading to the proposed decision to sample, decontaminate, and dismantle chemical process piping/equipment and ancillary materials at RMA are listed below.

<u>Date</u>	<u>Event</u>
1987	U.S. Army initiated the survey of former chemical process equipment/piping in North and South Plants at RMA.
1988	U.S. Army completed the survey of chemical process piping/equipment sampling plan.
1989	U.S. Army initiated sampling of piping/equipment in some buildings in the North and South Plants.
1990	U.S. Army decontaminated piping/equipment in some buildings in the North Plants.
1990	U.S. Army sampled 2,354 one-ton containers.

Figure 6.2-1
Location Map - RMA



South Plants

- Buildings 537, 538, 413, 422, 512, 514, and 742A which were used for mustard-agent operations during World War II and demilitarization during the 1970s.
- Buildings 523 and 413 which were used for white phosphorus operations between 1943 through 1946.
- Other buildings not listed here will be part of this project and will be identified as specific work plans are prepared.
- Storage Yard.

North Plants

- Buildings 1501, 1503, 1506, 1601, 1601A, 1603, 1606, 1611, and 1703 which were used for GB manufacturing, storage, and munitions filling.
- Other buildings not listed here will be part of this project and will be identified as specific work plans are prepared.
- Storage Yard.

6.2 Building Descriptions

6.2.1 General

The North and South Plants in relation to other areas at RMA are shown in Figure 6.2-1.

6.2.2 South Plants

Building locations in the South Plants Area are shown in Figure 6.2-2.

2.0 SITE DESCRIPTION

2.1 LOCATION AND SITE HISTORY

The STFP is defined as the composite plume of benzene, toluene, and xylene (collectively referred to as BTX), bicycloheptadiene (BCHPD), and dicyclopentadiene (DCPD) dissolved in the uppermost water-bearing zone (WBZ1) groundwater. The dissolved plume originates from the area of a LNAPL plume located near Tank 464A. The STFP is migrating in the direction of Lower Derby Lake and Lake Ladora.

The STFP and LNAPL plume constituents include compounds previously stored in the South Tank Farm (STF) and used in the manufacture of pesticides and compounds potentially associated with other production, disposal, and storage activities in the South Plants. Between 1947 and 1978, Tanks 464A, 464B, and others were used intermittently to store DCPD and BCHPD bottoms generated from pesticide manufacturing.

Tanks 464A and 464B were cleaned in 1956, 1966, and 1967. In 1956, BCHPD bottoms were "pumped" onto the ground, and the affected area was later cleaned up. In 1966, residue from a mixture of fuel oil and BCHPD bottoms containing DCPD was buried in the STF. In 1967, a mixture of DCPD bottoms and fuel oil was collected in a low spot in the STF, and later drummed and shipped offsite. From 1960-1963, leakage of BCHPD/DCPD bottoms occurred from a pipe connected to Tank 464A, although the quantity spilled is unknown. Additional disposal and spill events involving BCHPD and DCPD occurred at unidentified locations in the STF in 1964 and 1978, respectively.

Although records do not show that either benzene, toluene, or xylene were stored in the STF, a large spill of benzene

containing toluene and xylene impurities reportedly occurred at an unidentified location in the STF in 1948. Toluene may also have been present in trace amounts in BCHPD.

2.2 HYDROGEOLOGY

Two geologic units occur in the STFP study area: an upper alluvial unit, underlain by the Denver Formation. The alluvium consists of brown, unconsolidated, silty sand with increasing silt and clay content at depth. The alluvium ranges from approximately 5 feet thick near the STF to 25 feet thick near Lake Ladora.

The Denver Formation underlying the alluvium is composed of brown to green, weathered and unweathered claystones, mudstones, and siltstones. These strata, referred to as the VC (volcaniclastic unit) and VCE (volcaniclastic equivalent unit) in the South Plants Study Area Report (Ebasco 1989), are fractured. The uppermost portion of the Denver Formation is weathered and averages 4 to 6 feet thick, but may extend to approximately 20 feet at some locations. Lithologic variability near the leading edge of the STFP is shown by the geologic cross-section in Figure 2-1.

The STFP affects the WBZ1, as defined in the South Plants Study Area Report (Ebasco 1989). WBZ1 encompasses saturated alluvium and the uppermost weathered Denver Formation. The top of WBZ1 is defined by the water table and the base is defined by a green to brown Denver Formation claystone exhibiting a lesser degree of fracturing and weathering (Ebasco 1989, Shell 1989). In the STFP area, WBZ1 ranges in saturated thickness from approximately 10 to 25 feet.