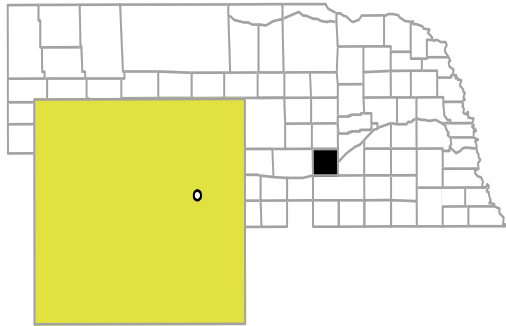


**CORNHUSKER ARMY
AMMUNITION PLANT
NEBRASKA
EPA ID# NE2213820234**

**EPA Region 7
City: 6 miles west of Grand Island
County: Hall County
Other Names: CHAAP**

03/13/2009



SITE DESCRIPTION

The former Cornhusker Army Ammunition Plant (CHAAP) is located in the east part of Hall County, Nebraska, approximately three miles west of the City of Grand Island, and consisted of 12,042 acres. The former CHAAP was owned by the U.S. Army, but was operated by a contractor, making it a government-owned/contractor operated (GOCO) facility. The plant was built in 1942 to produce munitions and provide support functions during World War II, and produced bombs, artillery shells, boosters, mines and rockets. It has been in and out of production over the years. The plant consists of five main components: five major production areas where munitions were loaded, assembled, and packed; a fertilizer manufacturer; two major storage facilities; sanitary landfills; and burning grounds where materials contaminated with explosives were ignited. When the plant was active, staff disposed of wastewater contaminated with explosives into 56 earthen surface impoundments, which were located near the five production areas. Dried solids from the bottom of the pits periodically were scraped and ignited at the burning ground. The site was active intermittently from 1942 to 1973, producing during World War II, the Korean War, and the Vietnam War. Between the wars, and after 1973, it was kept on standby status. During operation, the principal explosive compounds used during munitions production at CHAAP were 2,4,6-trinitrotoluene (TNT), cyclonite (RDX) and, to a lesser extent, cyclotetramethylenetetranitramine (HMX). Other chemical materials used to support munitions production included freon, paints, grease, oil, and solvents. Solvents reportedly used at CHAAP included acetone, trichloroethylene (TCE), and 1,1,1-trichloroethane (1,1,1-TCA).

During the CHAAP ammunitions production years, a total of five Load, Assemble, and Pack load lines (LL) were the major production areas and centers of operations. The ammunitions production required the use and disposal of large amounts of water. The explosives wastewater

operations included: screening, melting and mixing, rod and pellet manufacturing, remelt and refill, and washing and laundry.

The site received the explosives in flake form. It was screened and sifted for material handling purposes and was used to incorporate explosives (2,4,6-TNT and RDX) into munitions. The explosives wastes and residues associated with munitions loading, assembly and packing operations resulted in a ground water contamination plume that originated near the CHAAP load lines and extends northeastward toward Grand Island. One of the contamination pathways, wastewater was generated by the ventilation systems where the explosive dust from the screening operations was collected and washed from the air with Schneible units (wet scrubbers). The water from the Schneible units ran through settling tanks and was recycled, leaving excess wastewater. Additional wastewater was also generated from periodic machinery and interior building surfaces wash-down.

Some wastewater ran via interior building drains into a sack sump (concrete pit) where a filter bag (made of canvas-like material) was placed to collect the solid explosive particles. Then the wastewater was transferred via open concrete channels into circular earthen impoundments. The walls of the impoundment were masonry-lined, with the bottom open to the sand and gravel strata. One overflow channel was routed from the impoundment to the leaching pit that was designated to handle any water that did not filter into the bottom of the impoundment. This overflow occurred due to the limited filtering capacity of the sack sump to trap explosive particles. The particles were periodically scraped from the bottom of both the earthen impoundments and leaching pits, and ignited at the burning grounds (CHAAP-005 OB/OD Area, OU5) located in the northwest section of CHAAP in tract 19.

CHAAP has been on standby status since 1973, the operation leases land for agriculture, grazing, and wildlife management activities. During the time of site inactivity, some of the buildings on site may have been used for grain bin activities.

On July 22, 1987, the CHAAP was listed on the National Priorities List (NPL) due to ground water contamination resulting from site operations. As a consequence of common disposal practices during war time, ground water was impacted by explosives. Ground water containing explosive residue migrated from the cesspools and leach pits located in the center of the plant approximately two miles beyond the CHAAP boundary into the Grand Island City limits. The CHAAP was declared excess property and most maintenance ceased in 1989. At the time of the Interim Record of Decision (ROD) for Operable Unit 1 (OU1) in 1994, the affected ground water encompassed a disjointed area six miles long and one-half mile wide. Nitrates were also detected in ground water. However, these may have originated from other sources, including agricultural activities in the area.

Geology & Hydrology – Grand Island Formation Aquifer

The geology of the site consists of approximately 3 to 20 feet of loess deposit, which are underlain by 50 to 100 feet of quaternary age sand and gravel. These deposits are the primary source of ground water in Hall County. The ground water flow direction from the site is towards the east-northeast. The depth of the ground water ranges from 5 to 35 feet beneath the ground

surface at CHAAP. Shallow ground water underlying CHAAP occurs as an unconfined water table aquifer within the alluvial sands and gravels. Historically, the water table surface has generally been less than 10-feet below ground surface (BGS). Total thickness of the water table aquifer ranges from about 50 to 60 feet. Hydraulic conductivity values range up to 670 feet per day.

The predominant ground water flow direction with the water table aquifer near CHAAP is to the northeast toward the city of Grand Island. Regional horizontal gradients of 4 to 7-feet mile have been measured in the area. The Grand Island formation aquifer is used regionally as a water supply source for irrigation and potable water. Locally, there are a number of irrigation wells in use east of CHAAP. However, in the vicinity of the existing explosives contaminated plume, all private, domestic water is being supplied by the City of Grand Island. The City's municipal well field is located southeast of the city near the Platte River (approximately 10-miles southeast of CHAAP).

Fullerton Formation Aquitard - The underlying Fullerton clay unit is a relatively low-permeability unit that appears to act as a barrier to ground water flow (i.e., aquitard).

Holdrege Formation Aquifer. - The sands and gravels of the Holdrege Formation act as a confined aquifer unit (confined by the overlying Fullerton clay unit). Water level data from deep monitoring wells indicate that the general ground water flow direction appears to have a northeasterly component (similar to the overlying Grand Island Formation aquifer).

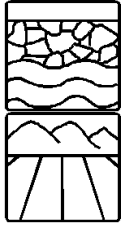
Site Responsibility:

This site is being addressed through Department of Defense (DOD) Federal Facility actions. Cornhusker Army Ammunition Plant is participating in the Installation Restoration Program, a specially funded program established by the Department of Defense (DoD) in 1978, to identify, investigate, and control migration of hazardous contaminants at military and other DoD facilities. An Interagency Agreement between the EPA, Nebraska Department of Environmental Control, and the DoD was signed in 1990. Under this Agreement, the Army is investigating and cleaning up the site.

The USACE Project Manager is Terri L. Thomas at (402) 995-2749

NPL LISTING HISTORY	
Proposed Date:	10/15/84
Final Date:	07/22/87
Deleted Date:	

THREATS AND CONTAMINANTS



Releases from the surface impoundments have contaminated approximately 500 private wells. Activities at the site currently are limited to maintenance and leasing operations. The Omaha District Corps of Engineers is in the process of selling the property. Polluted ground water has migrated off the site and has been detected as far as 7 miles beyond the plant's border. The area affected by ground water contamination is mostly suburban, and residents now rely on public water supply for drinking water. Approximately 3,000 people live within 1 mile, and 27,000 live within 3 miles of the site. Ground water also is used for farmland irrigation and for watering livestock.

Ground water both on and off the site is contaminated with various explosives. Soils are contaminated with various explosives and heavy metals such as lead, chromium, and cadmium. Human and livestock health may be adversely affected by drinking contaminated groundwater or through direct contact with contaminated soil. The provision of bottled water and alternate water supplies has reduced the potential of exposure to hazardous substances in the drinking water.

CLEANUP APPROACH

Response Action Status

The Army provided bottled water to the 250 homes with contaminated wells until residences could be hooked up to the city's water system. In 1986, the municipal water system was extended to 800 residences in Grand Island. In 1987, the Army started an incineration program to treat the contaminated soil in the 56 surface impoundments. Workers excavated the soil and then incinerated it to destroy the contaminants. The excavated pits were backfilled with off-site sand and gravel, and the ash from the incinerator was landfilled on site. The Army had burned 40,000 tons of soil, when the State-monitored operation ended in 1988. In 1991 and 1992, the Army provided bottled water to additional homes with contaminated wells until residences were hooked up to the City's water system. In addition, the Army built a protective barrier around unexploded ordinance at the burning ground in 1993.

Ground water: In 1990, an investigation by the Department of the Army identified several areas of potential contamination. The Army investigated the plume of ground water that moved off site to determine the types and levels of contaminants present and the extent of threat to human health and the environment. The Army submitted a draft report of the investigation in early 1993, but EPA, the Army, and the State of Nebraska agreed that additional work would be necessary due to data gaps.

This work involved dividing the site into smaller areas to facilitate the additional field work required:

OU 01: ROD was signed 9/1994, followed up with an Explanation of Significant Difference 2/1997 and a ROD Amendment 9/2001. The ground water plume is being remediated in a long term operation (LTO) which includes long-term monitoring (LTM) and monitored natural attenuation (MNA). LTM sampling occurs in March annually. The USACE is also conducting studies to see if the ground water can be cleaned up faster with an injection in-situ technology. Documents important to this OU are:

- * Geo tech report 3/30/1982
- * ROD 11/1994,
- * ESD 2/7/1997
- * ROD Amendment 8/2001
- * 9/2004 UXO Migration
- * Final estimate of Minimum Distance for GW Extraction wells & GW flow model Update
- * Final LTM reports for 2000 thru 2008

OU 02: Administration Base Housing Area, Abandoned Burning Ground, Magazine areas, Drainage Ditches and Miscellaneous Storage Areas. ROD with Institutional controls was signed 9/1998. Document important to this OU is:

- * ROD

OU 03: SOILS - Nitrate Area, Pistol Range Burning Grounds (multiple sites) and Sanitary Landfill (multiple sites). ROD for Institutional Control and Remedial Action was signed 4/1999. USACE has performed removal of soil contaminants for lead and RDX. Monitored natural attenuation at a site (source) for TCA is at slightly elevated concentrations above action levels in agreement with NDEQ. Documents important to this OU are:

- *ROD 10/1999
- * 4/2001 GW Sampling & Analysis Event for TCE Plume
- * LTM final report 1999 - 2008

OU 04: Load Line (LL) facility soils, sediments and surface water - ROD for Institutional Controls signed 2/2000. There have been investigation and clean-up actions after ROD to remove asbestos, debris, explosives-contaminated soils. Documents important to this OU are:

- * ROD 02/18/2000
- * RV 8/1988
- * LL 1-3 RV 8/25/2006
- * LL 4 RV 10/30/2007

OU 05: CHAAP-005 Open Burning/Open Detonation (OB/OD) - OU5 was reassigned from DOD's Installation Restoration Program (IRP) to the Military Munitions and Restoration Program (MMRP) at the end of FY04. Under the MMRP, the work to be conducted for OU5 is classified as Military Explosive Constitutes/Ordinances and Explosives (MEC/OE). This process will include an Engineering Evaluation/Cost Analysis (EE/CA) and Removal Action to excavate/sift soils, conduct site characterization, determine if additional work needs to be

performed, and complete a ROD.

The USACE/US Army is currently planning the first stage of work under the MEC/OE. This plan consists of excavation/sifting of soil to expose fabric-explosive gravel mines. Excavation to uncover these explosive devices would be conducted until undisturbed soil has been reached. Before site characterization could occur, excavated soil would be sifted to extract any exposed gravel mines. Under the second stage of work, sifted soil, as well as the excavated site, would be characterized for contaminant concentrations that exceed recreation/conservation risk levels. If appropriate, characterized soil above risk levels would be transported and disposed of as required under RCRA.

Currently, the USACE does not plan to backfill the excavation site since the adjacent area was created to be a storm retention cell for flood inundation from Silver Creek.

After the site characterization, it will be determined if additional EE/CAs and Removal Action(s) are needed before the ROD is completed.

Site Facts:

ENVIRONMENTAL PROGRESS



The extension of the municipal water supply to over 800 residences and the provision of bottled water to additional homes has reduced the potential of exposure to hazardous substances in the drinking water. The excavation and incineration of contaminated soil has resulted in elimination of a primary source of contaminants and reduced other pathways of contamination at the Cornhusker Army Ammunition Plant site. These actions protect the public health and the environment. The construction of the onsite ground water extraction system began the summer 1997, and was completed a year later. The system extracts contaminated ground water at seven onsite wells. After passing through a carbon filtration system, the drinking water quality ground water discharges to ditches on the site. The offsite contamination plume continues to shrink, as measured by the ground water monitoring study. The extraction wells are capturing all of the plume before it leaves the site. A ROD Amendment was signed in September 2001, to change the offsite plume treatment to natural attenuation. Ground water models show that the off site plume will be below cleanup levels in 3-5 years and on site plume in 10 to 15 years. Following the annual Installation Action Plan meeting in July 2005, the Army revised the Federal Facility Agreement schedule in August 2005, and the Army has awarded \$3.5 million in contracts to develop installation wide work plans for ground water monitoring, sampling under former Load lines 1 & 2 slabs, and asbestos removal. Ground water monitoring around Tracts 19, 20 and 21 will focus on freon releases previously identified, which could be indicative of additional buried gravel mines. Additional characterization of sites will be included in future work. Phase II work under the contracts will involve site specific work from data generated during the Phase I investigations

COMMUNITY INVOLVEMENT

The site has an active County Reuse Committee, Hall County, which has been leading the efforts to find suitable future uses for property that has been or will be transferred out of Army ownership.

SITE REPOSITORY



Grand Island Public Library
211 No. Washington Street
Grand Island, NE 68802
(308) 385-5333

Superfund Records Center
901 N. 5th St.
Kansas City, KS 66101
Mail Stop SUPR
(913)551-7166

Cornhusker Army Ammunition Plant
102 North 60th Road
Grand Island, NE 68803
(308) 384- 2300

REGIONAL CONTACTS

SITE MANAGER: Diana J. Bailey
E-MAIL ADDRESS: bailey.diana@epa.gov.
PHONE NUMBER: (913) 551-7717

**COMMUNITY INVOLVEMENT
COORDINATOR:** Beckie Himes
PHONE NUMBER: (913) 551-7253
E-MAIL ADDRESS: himes.beckie@epa.gov

STATE CONTACT: Ed Southwick, NDEH
PHONE NUMBER: (402) 471-2988

MISCELLANEOUS INFORMATION

STATE: NE
CONGRESSIONAL DISTRICT: 073W
EPA ORGANIZATION: 03
SFD-SUPR/IANE

MODIFICATIONS

Created by: Karla
Asberry/SUPRFUND/R7/US
EPA/US
Created Date: 10/17/97 02:20 PM

Last Modified by: Beckie
Himes/R7/USEPA/US
Last Modified Date: 03/13/2009 11:53 AM

