

# FACT SHEET – Investigation and Risk Assessment Summary LHAAP – 18/24 Burning Ground No. 3 and Unlined Evaporation Pond March 2011

## Site History

LHAAP-18/24 is comprised of two sites – LHAAP-18, Burning Ground No. 3, and LHAAP-24, the Unlined Evaporation Pond (UEP). LHAAP-18 has been used since 1955 as a burial and burning ground for various industrial wastes and hazardous wastes generated at LHAAP. Burned and buried wastes included solvents, oil, red phosphorous, rocket motor wash out residues, illuminating mixtures, oxidizing agents and detergents. Use of burn pits and trenches was discontinued in 1984. LHAAP-24, the former UEP was constructed in 1963 to collect water from the washout of rocket motor casings and process waste sumps. After it was discovered that the UEP was contaminating the groundwater beneath the site, the pond was no longer used after 1984 and was closed down under Resource Conservation and Recovery Act (RCRA) in 1986. An interim remedial action was performed at LHAAP-18/24 in 1997. Under that action, 32,000 cubic yards of contaminated soil was excavated and treated by low temperature thermal desorption. Also, the groundwater extraction and treatment system was installed to control the migration of contaminated groundwater. In February 2001, a perchlorate treatment unit was added to the groundwater treatment system to reduce the concentration of perchlorate in the treated groundwater. Additional modifications were made to the groundwater extraction system in 2007 and 2008 to improve the capture of contaminants. The treatment system is currently in operation.

## Site Characteristics

LHAAP-18/24 is generally vegetated with grass and weeds and is dissected by asphalt paved roads. It is situated on a natural topographic high slightly west of a topographic divide between Harrison Bayou and Saunders Branch. Harrison Bayou flows within approximately 200 feet of the western corner of LHAAP-18/24. There are no surface water bodies running through the site. Surface drainage occurs in all directions, but the flow is generally captured by manmade ditches and drainage swales that direct the flow toward Harrison Bayou to the west and north. Harrison Bayou drains into Caddo Lake, which is located approximately 1 mile northeast of LHAAP-18/24. There are three groundwater zones at LHAAP-18/24: shallow, intermediate and deep. The shallow extends from 10 to 53 feet below ground surface (bgs), the intermediate zone extends from 44 to 80 feet bgs, and the deep zone extends from 98 to 185 ft bgs.

Several adjacent pairs of shallow and intermediate groundwater wells showed comparable water levels indicating interconnection between those zones. The overlapping depth ranges of the shallow and intermediate wells and the minimal difference between groundwater elevations in the shallow and intermediate zones indicate that these zones are interconnected in portions of LHAAP-18/24, and are treated as one groundwater zone. The predominant groundwater flow direction in the shallow and intermediate groundwater zones is to the northeast in wet periods and to the northwest during dry periods.

## Summary of Investigation Activities

Investigations were conducted by several contractors from 1980 through the present. Based on the findings of each investigation, more sampling was performed to further evaluate the nature and extent of contamination in the soil, sediment, surface water and groundwater. Each investigation was approved by TCEQ and USEPA. Samples have been analyzed for metals, volatile organic compounds (VOCs), semi-volatile organic compounds (SVOCs), pesticides/PCBs, metals, and/or dioxins and furans. Between 2000 and 2002, additional samples were collected for the analysis of perchlorate in both the soil and groundwater. In summary more than 70 soil/sediment samples have been collected to evaluate and delineate soil and sediment contamination. Several monitoring wells were installed in the groundwater zones (42 shallow wells, 14 intermediate wells, 7 shallow/intermediate wells and 4 deep wells) and more than 1500 groundwater samples were collected from active monitoring wells at LHAAP-18/24 to evaluate the extent of groundwater contamination.

## Investigation Findings

Samples collected from the investigation activities reported groundwater contamination at LHAAP-18/24. Soil samples collected at LHAAP-18/24 reported low concentrations of lead and explosives; however, these concentrations were found to be below the ecological preliminary remediation goal and were not considered chemicals of concern. Though the surface water samples reported low level concentrations of arsenic, copper, lead and zinc historically, the quarterly surface water sampling performed verified that LHAAP-18/24 does not appear to be affecting the surface water. The sample results were compared to both federal and state standards. A Baseline Human Health Risk Assessment (BHHA) and Ecological Screening Evaluation was conducted in 2002 to evaluate risk to the hypothetical future maintenance worker and screen data to further assess if an ecological risk assessment was needed. Based on the ecological screening data, it was concluded that an ecological risk assessment was needed. A Baseline Ecological Risk Assessment was conducted in 2007.

## Human Health Risk Assessment

A Baseline Human Health Risk Assessment (BHHA) was conducted for LHAAP-18/24 to determine current and future effects of contaminants on human health. It was concluded that soil does not pose unacceptable cancer risk or non-cancer hazard to a hypothetical future maintenance worker and hence does not require any remedial action. The groundwater poses both unacceptable cancer risk and unacceptable non-cancer hazard to a hypothetical future maintenance worker.

## Ecological Risk Assessment

A Baseline Ecological Risk Assessment (BERA) was conducted for LHAAP-18/24 to evaluate potential hazards to ecological resources. Ecological hazards were found to be within acceptable limits at LHAAP-18/24. Thus, no action is needed at LHAAP-18/24 to protect ecological resources.

## Chemicals of Potential Concern (COPCs)

### Groundwater

The chemicals of potential concern (COPCs) for shallow/intermediate groundwater zone at LHAAP-18/24 are volatile organic compounds (methylene chloride [MC], trichloroethene [TCE], chloroform, cis-1,2-dichloroethene [cis-1,2-DCE], trans-1,2-DCE, vinyl chloride [VC], 1,1-dichloroethene [1,1-DCE], 1,2-dichloroethane [1,2-DCA], tetrachloroethene [PCE], benzene, and 1,1,2-trichloroethane [1,1,2-TCA], seven metals (antimony, arsenic, barium, chromium, manganese, thallium and nickel), one explosive (1,3,5-trinitrobenzene) and perchlorate. The deep zone groundwater has not been impacted by contaminants.

## General Response Actions to be Evaluated:

The following general response actions that will be evaluated in the Feasibility Study:

- **No Action:** Provides a comparative baseline against which other alternatives can be evaluated.
- **Land Use Controls:** Establish access/administrative/physical controls that would eliminate/reduce access to the site.
- **Containment:** Another method of reducing risk to receptors is through containment, which reduces access to the contaminated medium or migration potential of the contamination medium.
- **Removal:** Remove contaminated media or waste material to either relocate or prepare it for treatment or disposal. Some examples include excavation of soil or extraction of contaminated groundwater.
- **In Situ Treatment:** Addition of chemical or biological additives to soil/groundwater which modifies the physical/biological properties of the medium resulting in reduced toxicity, mobility or volume of the contaminant medium. Some examples are, in-situ chemical oxidation, permeable reactive barrier and enhanced bioremediation.
- **Ex Situ Treatment:** Provide varying levels of waste treatment following removal of waste to reduce volume, mobility or toxicity of the waste. Some examples include pump and treat systems.
- **Disposal:** Involves disposal of removed wastes at new or existing, permitted disposal facilities.

