

# Remedial Investigation Report Lower Sasa Fuel Burning Pond

Fleet and Industrial Supply Center (FISC)  
Apra Harbor, Guam

June 1995

## EXECUTIVE SUMMARY

This report presents the results of the Remedial Investigation (RI) activities conducted at the Lower Sasa Fuel Burning Pond site (site) at the Fleet and Industrial Supply Center (FISC) on the island of Guam, Mariana Islands. Activities performed during this RI were conducted as part of Contract Task Order (CTO) 0050, authorized under U.S. Navy Comprehensive Long-Term Environmental Action Navy (CLEAN) Contract No. N62742-90-DO019.

### Site Background

The site is a component of the FISC Guam Fuel Department, which is located near the Apra Harbor shoreline on the southwest coast of Guam. The site historically consisted of a fuel burning pond, an adjacent former deballast (oil/water separator) facility constructed by the Guam Oil Refining Company (GORCO), and surrounding areas designated as wetlands. The GORCO deballast facility was recently demolished. Waste water discharged from the fuel burning pond flows into a wetlands area north and northwest of the fuel burning pond. Wetlands areas are also present to the west and south of the fuel burning pond. The entire site is situated at an elevation of approximately 4 to 8 feet above Mean Lower Low Water (MLLW).

The fuel burning pond was originally designed to hold oily waste water discharged from the FISC Fuel Department facility east of Marine Drive. From the early 1950s to 1970, the fuel burning pond functioned as a crude oil/water separator. When the fuel burning pond was filled to its maximum capacity, waste water on which less dense petroleum, oil, and lubricant (POL) products floated was discharged from the pond into the low-lying wetlands to the north, leaving a residue of less dense POL products in the pond. This POL residue was burned off within the confines of the pond. The resulting sludge was removed from the pond and disposed.

### Remedial Investigation Activities

Previous investigations that identified contaminants in soils and ground water led to the development of a scope-of-work for performing a RI at the site. RI field activities at the site were initiated in April 1993 and were completed in June 1994. Field activities included a geophysical survey, a soil gas survey, surface soil sampling, surface-water sampling, trenching/soil sampling, soil borings/soil sampling, and installation and sampling of ground-water monitoring wells. Additional field activities included a biological reconnaissance, biological sampling, a wetlands delineation study, and wetlands sediment sampling. Data collection, evaluation, and interpretation activities conducted as a part of this RI include historical land use, demographic, archaeological, and climatological data acquisition. Hydraulic gradient determination and limited contaminant fate and transport data were used to develop a conceptual site model in support of a screening risk

assessment (SRA).

### Nature and Extent of Contamination

Three locations within the site have been identified as areas impacted by contaminants: the drainage channel that receives waste water discharged from the fuel burning pond, an area along the eastern perimeter of the fuel burning pond, and an area north of the former GORCO deballast facility that is known as the old sludge burial area.

Sediment in the drainage channel area contains high concentrations of total extractable petroleum hydrocarbons (TEPHs) (as gasoline, diesel, kerosene, and lubricant oil). Oil and grease, total recoverable petroleum hydrocarbons (TRPHs), 11 metals, 15 polynuclear aromatic hydrocarbons (PAHs), and four pesticides were also identified in sediment samples from this area. The source of contamination in the drainage channel area is from historic discharges of waste water from the fuel burning pond.

In an area approximately 25 feet east of the fuel burning pond, contaminants such as TEPHS, TRPHs, oil and grease, 11 PAHs, two non-PAH semivolatiles organic compounds (SVOCs), one volatile organic compound (VOC), and 11 metals were identified in subsurface soil. The horizontal extent of soil contamination is currently unknown; however, the vertical extent appears to be limited to the upper 5 to 7 feet of the soil column. Low concentrations of TEPHS, TRPHS, oil and grease, PAHS, metals, and one VOC were detected in ground-water samples from this area. The source of the contamination in this area is not known, but may be attributed to one or all of the following sources: 1) leakage from the fuel burning pond, 2) leakage from the pipeline where waste water is discharged into the fuel burning pond, or 3) leachate from the old sludge burial area, which may extend beneath the former GORCO deballast facility.

An area identified as an old sludge burial area is approximately 20 feet north of the former GORCO deballast facility. TEPHS, VOCs, metals, and pesticides were detected in soil samples from this old sludge burial area. The horizontal extent of the old sludge burial area is currently unknown, but based on soil gas survey results, it is likely that the old sludge burial area extends south beneath the site of the former GORCO deballast facility and west toward the fuel burning pond. The vertical extent of the old sludge burial area appears to be limited to the upper 8 feet of the soil column. Ground water beneath the old sludge burial area has not been fully investigated; however, low concentrations of chemical constituents, including TEPHS, have been detected in ground water underlying the eastern perimeter of the fuel burning pond. At the low concentrations that were detected, the ground-water exposure pathway is considered insignificant to both human and ecological receptors.

Contaminants consisting of TEPHS, PAHs, and metals were detected in some sediment samples taken from random locations in the wetlands north of the fuel burning pond.

### Conceptual Site Model

The sediment pathway is considered to be complete and potentially significant at the site. Contaminated surface sediments are present within the drainage channel and, to a lesser degree, within the adjacent wetlands. Due to the presence of surface contamination, direct contact with the contaminated sediment is possible. Potential receptors include onsite workers, the general public who may trespass on the site, vegetation, aquatic life, and wildlife. Based upon data collected during this RI, the air exposure pathway, ground-water exposure pathway, and surface-water exposure pathway are considered incomplete and are not considered in the SRA.

## Screening Risk Assessment

The SRA focused on the risks associated with the historic accumulation of petroleum-derived compounds within the drainage channel and the wetlands north of the fuel burning pond. Based on the absence of exposure pathways and/or elevated concentrations of contaminants, the old sludge burial area and the soils and ground water beneath the fuel burning pond were excluded from the SRA.

The compounds of potential concern (COPC) identified in the sediment from the drainage channel and northern wetlands included selected PAHS, pesticides, and metals. Based on results of the screening human health risk assessment (SHHRA), the level of risk to humans is well below or within the U.S. Environmental Protection Agency (EPA) acceptable cancer risk and hazard levels for both carcinogenic and non-carcinogenic effects. A screening ecological risk assessment (SERA) was also performed in the course of this RI. A significant risk to ecological receptors was identified along and at the mouth of the drainage channel; however, it was determined that there is no significant risk to ecological receptors in the other areas of the wetlands.

## Recommendations

Based on the results of the SRA, removal and disposal or off-site remediation of contaminated sediments present within and near the drainage channel is recommended in order to reduce the risk for potential exposure to ecological receptors in the wetlands north of the fuel burning pond. Such a measure can be performed under a Non-Time-Critical Removal Action. Additional sediment sampling and analysis would be necessary to determine the horizontal and vertical extent of contaminated sediment in and around the drainage channel.

It is recommended that contaminated sediments in areas of the northern wetlands that are outside of the drainage channel area be allowed to remediate naturally, without intervention. A benchscale test to evaluate the potential for bioremediation of wetlands sediments indicates that through microbial activity, contaminants within these sediments are currently being naturally degraded.

Current operative engineering controls should be re-evaluated to confirm that the controls are effective in preventing future POL releases into the fuel burning pond, and from the pond, into the northern wetlands. The evaluation of engineering controls should include, but not necessarily be limited to, a review of engineered-control structures, design, as-built construction, operational condition, and current status. With the installation of seven ground-water monitoring wells around the perimeter of the fuel burning pond, it is suggested that periodic ground-water sampling and analysis (annually or biannually) be performed as a means of evaluating the integrity of the concrete liner in the fuel burning pond.

It is further recommended that the fuel burning pond and adjacent wetlands area be secured from human trespass and incidental dumping by erecting a fence with a locking gate around the site.



[Back to Executive Summaries](#)