CLEANUP

BROOKS RAND MODEL III ATOMIC FLUORESCENCE MERCURY ANALYZER

LEAD ACTIVITY
Southwest Division Naval Facilities Engineering Command (SWDIV)

STATUS
Complete

MISSION
Perform rapid field analysis

REQUIREMENT
Certain processes at Navy stations require that mercury be handled near water. In the event of a mercury spill, the Navy requires technology to promptly characterize contaminated sediment, thereby providing a more thorough site evaluation. This technology could be available to sites where mercury is stored and handled.

DESCRIPTION
In August 1996 mercury was accidentally spilled into the San Diego Bay while being transferred from the carrier pier to a ship docked at Berth Oscar at Naval Air Station (NAS) North Island. During the immediate cleanup response to the mercury spill into the water near Berth Oscar, a Brooks Rand Model III Atomic Fluorescence Mercury Analyzer was used. The mercury analyzer was instrumental in promptly characterizing remaining sediment and dredged sediment after each dredging round during the Mercury Removal Action.

The Brooks Rand Model III Atomic Fluorescence Mercury Analyzer is a methodology that allows for rapid field analysis with minimal time required for sample preparation and analysis. Samples are chemically pretreated in ordinary containers and then analyzed for headspace mercury vapor. Mercury in water samples is reduced by the addition of stannous chloride. Mercury is liberated from solids through digestion with acid or an iodine-based extractant. Aided by vigorous agitation after addition of the reductant, and consistent with Henry's Law, the elemental mercury partitions between the solution and headspace. About 2 minutes for water and 20 minutes for solids are required to complete analysis. While the levels of precision and accuracy are not as high as can be achieved using standard laboratory mercury analytical methods, the speed of the procedure and the quality of the data make this a very suitable technology for rapid field screening, as required for emergency responses such as the Mercury Removal Action.

Using the mercury analyzer, NAS North Island successfully determined the extent and area of contamination.

The cleanup at NAS North Island was performed in several stages and lasted several months. A final series of samples was then collected and analyzed to ensure the removal of the mercury from the area.

BENEFITS

- Rapid field analysis with minimal time for sample preparation and analysis
- Speed of the procedure and quality of the data suitable for rapid field screening
- Cost savings over conventional laboratory analysis due to reduced processing time
- Extent of contamination can be delineated, allowing for reduced disposal costs for low level contaminated soils

ACCOMPLISHMENTS/CURRENT STATUS

Date	Activity
AUG 1996	Mercury Analyzer used during mercury spill emergency response action near NAS North Island Berth Oscar
JAN 1999	Document technology in NELP Web page write-up

FUTURE PLAN OF ACTION & MILESTONES

Not Applicable

COLLABORATION/TECHNOLOGY TRANSFER

The project was achieved through a cooperative working relationship with SWDIV, NAS North Island, and OHM. Brooks Rand developed the mercury analyzer used in the clean-up efforts. OHM provided the emergency spill response team required under the Remedial Action Contract (RAC). Technical guidance and geochemical/oceanographic expertise was provided by SPAWAR Systems Center.

BIBLIOGRAPHY

- OHM, Preliminary Draft Removal Action Closeout Report, Emergency Removal Action for Mercury Spill at Berth Oscar, NAS North Island. June 1997.

RELATED GOVERNMENT INTERNET SITES

SPAWAR Environmental Web Site

RELATED NAVY GUIDEBOOK REQUIREMENTS

- 02012 Waste Stream Determinations/Analysis

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