



Grand Bahama Ship Repair Facility Environmental Management Plan Freeport, Grand Bahama

March 2001

Introduction

The Office of the Prime Minister (OPM) of the Bahamas, through the Bahamas Environment, Science and Technology (BEST) Commission, initiated an intensive environmental review and regulatory regime to ensure that the Freeport Ship Care Facility (FSCF) is developed and operated under the highest environmental standards. Ship repair operations have the potential to produce liquid, solid waste and air emissions.



The FSCF is a ship repair and refurbishment facility located within the Freeport Harbour area at Freeport, Grand Bahama Island. The development encompasses 18 acres of land leased from the Grand Bahama Port Authority (GBPA) and includes two dry docks, a finger pier, two workshops, and an office.

The Government of the Bahamas required the developer of the ship repair facility, Lloyd Werft Bahamas (LWB), a subsidiary of Lloyd Werft Bremerhaven GmbH of Germany, to prepare an Environmental Impact Assessment (EIA) of potential environmental impacts associated with design, construction, operations and maintenance of the facility.

The OPM and BEST Commission sponsored additional environmental studies focusing on the operation, environmental management, and long-term monitoring of the facility in regard to environmental sustainability of Grand Bahama.

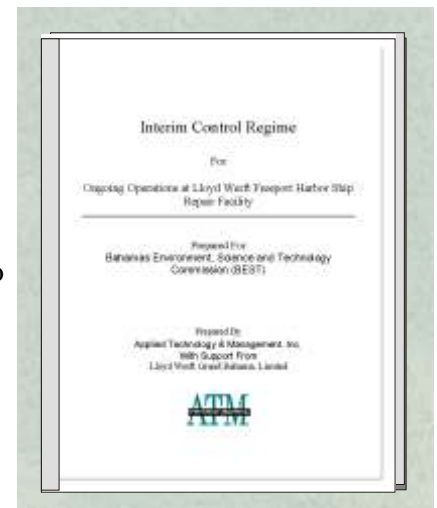
The Government of the Bahamas selected Applied Technology and Management, Inc. (ATM), an international environmental consulting firm, to perform independent environmental assessments and monitoring of the facility during 2000 and 2001.

ATM's work included:

- Update of the EIA for the ship repair facility;
- Develop interim environmental control standards for initial operations and testing at the ship repair facility, which includes reporting requirements to the Government;
- Conduct field-level environment studies of water quality, sediments and air quality to establish baseline condition; and
- Develop an environmental management plan for the long-term operations of the ship repair facility that includes a permanent control regime and monitoring of water quality and sediments and reporting requirements to the Government.

Interim Control Regime (ICR) Established Early

The BEST Commission and ATM developed and put in place an Interim Control Regime (ICR) to regulate the construction and initial operations testing of the ship repair facility. The ICR included mechanisms to control pollution and provide regular monitoring reports to the Government and ATM. Under the direction of Dr. Donald Cooper, an agreement was forged between the OPM and Freeport ship repair facility managers that provided a regulatory program for environmental controls, monitoring, and reporting during this early stage.



Onsite Environmental Review of Initial Operations and Pollution Control

The BEST Commission empowered ATM to monitor the construction, operations, and environmental controls set by the ICR and to assure that field-level pollution control measures and reporting requirements were executed. ATM completed five monitoring and inspection episodes in development and implementation of the ICR program and prepared reports for the OPM and BEST Commission.



ATM's James Craven inspects dry dock control systems

Corrective procedures were enforced in the field and recorded in progress reports to the Government. ATM developed recommendations for safe handling and storage of hazardous materials in specialized containers in a secured area.



ATM's Pete Peterson conducts audit of environmental controls



Hazardous materials storage containers

Scientific Studies

Baseline Water and Air Quality Monitoring

ATM completed hydrologic, water quality and air quality monitoring to expand the initial monitoring completed for the Environmental Impact Statement (EIA).

The goal of the monitoring program is to establish a baseline data set to compare with future monitoring data. If future monitoring data detect an increase in pollution, then corrective action is required by the Government to remedy operational problems that are harmful to the environment. Results of the hydrologic and water quality studies indicated little to no flushing of the basin area and that potential pollution would be confined to the immediate project area.



Water quality monitoring by ATM staff

Design and Operational Modification for Environmental Protection

Several design and operational improvements were made based on interaction with ATM and the BEST Commission during construction and

operations testing. An ultra-high-pressure cleaning system using a combination of hydrowashing and high-pressure water cleaning is proposed to minimize the need for grit blasting of ship hulls. This method practically



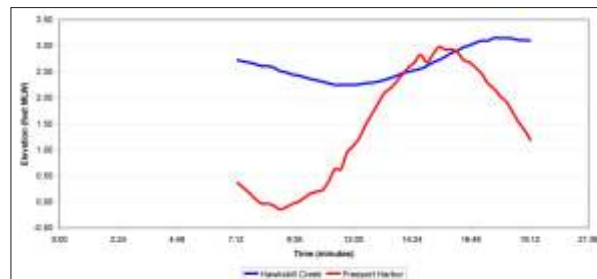
New pier



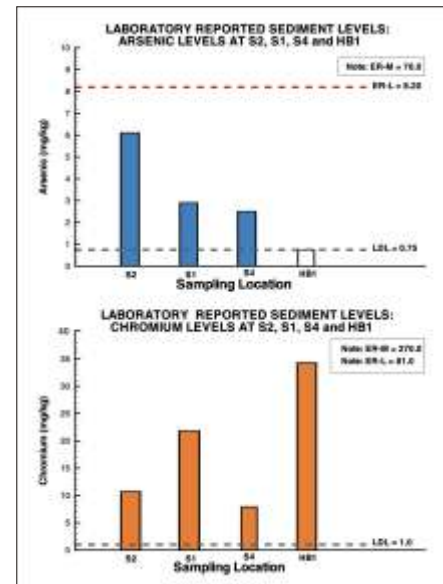
Air quality monitor



Surface water sampling locations



Tidal phase and amplitude data



Sediment analysis



Cascade filtration system

eliminates air pollution concerns while conserving waste and landfill capacity.

The modified project design also included a biological wastewater treatment plant, which will handle all domestic wastewater and all gray water discharges. An oil/water separation unit was specified to handle oily bilge water before discharge.

Temporary waste treatment measures were developed under the ICR to manage black water, oily bilge water and dry dock process water. Dry dock process water is collected in floor drains with basket screens connected to a cascade filtration system.



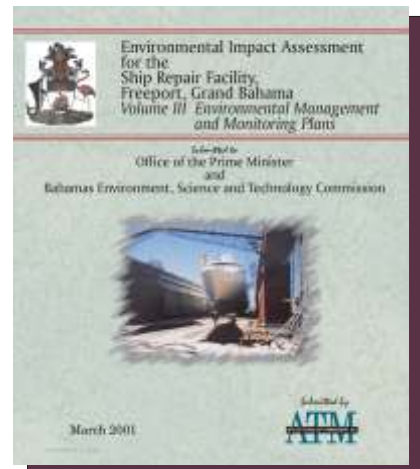
Floor drains and screens

Environmental Management and Monitoring Plan Development

ATM prepared a comprehensive environmental management plan that includes a detailed analysis of ship repair operations and available environmental control strategies. This document serves as a guideline document for preparation of the final environmental management plan that shall be completed by the Freeport ship repair facility and approved by the Government before full-time operations can commence.

The FSCF environmental management plan will include the following:

- Wastewater Management Plan (WWMP)
- Waste Petroleum Management Plan (WPMP)
- Spill Prevention Control and Countermeasure Plan (SPCCP)
- Stormwater Pollution Prevention Plan (SWPP)
- Air Quality Management Plan (AQMP)
- Petroleum Materials Management Plan (PMMP)
- Hazardous Waste Management Plan (HWMP)
- Hazardous Material Management Plan (HMMP)
- Solid Waste Management Plan (SWMP)
- Health and Safety Plan
- Environmental Monitoring Program Plan (EMPP).



Study Results

ATM's independent environmental study and monitoring of operations concluded that exercising the recommended management and monitoring program will provide the environmental controls and standards of operations at the facility to protect the public and sustain the environment. The ship repair facility plans to utilize environmental standards and health and safety standards on par with European, United States and Canadian standards.

Air Quality

Early concerns about air quality impacts have been alleviated with the use of specialized hydrowashing and high-pressure water cleaning over extensive grit blasting operations.

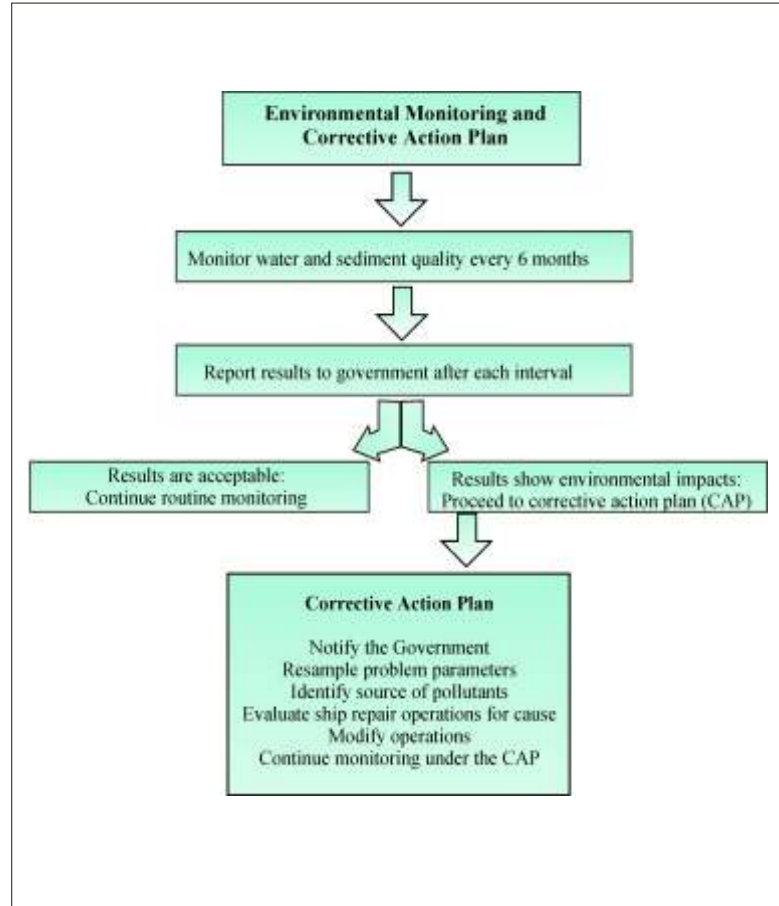




Background levels of air pollutants (particulates and volatile organics) in the harbour area are currently typical of an industrial area and should not be significantly impacted by ship repair operations using best management practices.

Water Quality

The greatest potential threat to environmental quality is reduced water quality based on discharge of contaminants associated with ship repair operations. ATM has designed a long-term water quality monitoring study to assess potential future impacts. If future monitoring detects degradation of water quality, a corrective action program shall be implemented to address these concerns.



Acknowledgments

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Mr. Michael Wallace, Department of Environmental Health Services, Freeport, Grand Bahama

