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**ATSDR** Agency for Toxic Substances & Disease Registry Public Health Assessments & Health Consultations

## PETITIONED PUBLIC HEALTH ASSESSMENT

MARINE SHALE PROCESSORS, INC.  
AMELIA, ST. MARY PARISH, LOUISIANA

### SUMMARY

Marine Shale Processors, Inc. (MSP), Morgan City, LA, processes solid and hazardous wastes in a large industrial kiln to ultimately produce an aggregate. That aggregate and the process have been the focus of regulatory scrutiny and public concern about the health implications of the operation. As a result of that concern, the Agency for Toxic Substances and Disease Registry (ATSDR) was petitioned by the Louisiana Department of Health and Hospitals, the Mayor of Morgan City, and U.S. Senator J. Bennett Johnston of LA to conduct a Public Health Assessment of the operation and the aggregate. This public health assessment is an evaluation of existing environmental data, both on and off site, local health outcome data, and community health concerns. The contaminants of concern identified in this assessment include lead and cadmium associated with the aggregate. Also discussed are alleged past releases to site soils and the adjacent Bayou Boeuf of stored waste, such as creosote materials and oil-drilling muds. Concern has also been expressed about contaminated water discharges from the operating site, products of combustion associated with the kiln, and fugitive organic vapor emissions associated with waste storage, handling, and feed preparation before wastes are fed to the kiln.

Community health concerns focus on the prevalence of multiple neuroblastomas in the area, as well as a perceived excess of birth defects. There is also concern about the potential adverse health effects of placement of aggregate in the area.

Available data show there is contamination both on and off site resulting from activities at MSP. However, close examination of the environmental and potential human exposure pathways indicates contamination is below levels of health concern. Air emissions from the plant stack and fugitive site emissions both on and off site are generally below levels of public health concern. The emission of air contaminants should continue to be limited by state and federal environmental agencies. Air emissions of nickel, chromium, and hydrogen chloride have been found to be somewhat high on occasion, but they have not exceeded human health standards when analyzed with respect to "worst case" exposure situations.

Fish assays for the contaminants associated with the facility do not implicate MSP as a significant source of contamination. Fish sampled in 1986 contained mercury at levels of concern; however, that contamination was not readily attributable to MSP. Follow-up metals assays were not conducted. Further assays of fish flesh for heavy metals should be conducted to see if a potential human exposure problem exists, regardless of the contaminant source.

MSP quality control data show the aggregate produced for sale contains high total lead, cadmium, and barium; however, it is reported that company policy limits the sale of aggregate to material that passes environmental leaching standards. ATSDR questions the degree of bioavailability of the lead in the aggregate when subject to the pH of stomach

According to available blood lead data, workers handling the aggregate and citizens living near the aggregate currently do not show elevated blood lead levels. Occupational studies associated with aggregate exposure use too high a detection limit to make those data useful in estimating blood lead levels in children. Additional leaching and animal ingestion studies suggest that an individual would have to ingest an unrealistically high amount of aggregate to approach an exposure level of acute concern; however, there is a data gap relating to body burden in humans from long-term exposure to the aggregate.

Another data gap exists about whether the physical size or structure of fine or crushed aggregate poses a respiratory hazard. Preliminary scanning electron microscope (SEM) studies suggest a structure for some particles that contains sharp angles, not unlike other particulate matter linked to fibrosis production in the lung. ATSDR does not have enough information to know what fraction of the particulate has this structure and whether the particulate is actually aggregate from MSP or from other sources, including natural materials. More information is needed to understand the situation.

On-site air and water monitoring programs at MSP are useful and should be continued as a quality control check for possible releases from the plant. The proposed continuous stack gas emissions monitoring and analysis system should provide an extra measure of safety in guarding against poor combustion conditions. Other ongoing quality assurance measures, which include radiation scanning of incoming materials, sampling and analysis of wastes to be processed, and leach testing of produced aggregate, should be continued.

Using the findings described and identified data gaps, ATSDR considers this site an indeterminate Public Health Hazard. That conclusion is based primarily on the data gaps about the safety of the aggregate under conditions of Chronic exposure and its use in areas where dust generation and inhalation could occur.

Using the data evaluated, it is not possible to link adverse health outcomes that might be present in the community living near the MSP site with site-related exposures. The existing community health concerns and the results from a limited evaluation of health outcome data, however, indicate that adverse health conditions might be occurring in the community that could be related to exposure to hazardous substances present in the environment.

To obtain further health information about those health conditions, ATSDR will conduct a Community Health Investigation in the community living near MSP. In addition, an education program will be carried out to advise local public health professionals of the nature and possible consequences of exposures to contaminants present in the environment. Input from the community in these activities will be obtained through the formation of a Community Assistance Panel. The panel will allow for information exchange with ATSDR staff throughout the process.

## **BACKGROUND**

### **A. SITE DESCRIPTION AND HISTORY**

The Marine Shale Processing, Inc. (MSP) facility is in St. Mary Parish in southern Louisiana on Highway 90 between Morgan City to the west and Amelia to the east. South of the site is

The area surrounding the facility consists largely of light industry. MSP processes solid and hazardous wastes to produce aggregate for sale. The aggregate has been used in construction as a road cover and as a fill material in St. Mary and other parishes. On site buildings on site house administrative, maintenance,

and process control functions. Other portions of the facility are used for waste material handling, storage, and preparation for feeding to the process kiln. Process aggregate is also stored on site. MSP has operated at its current location since 1985. Descriptions of facility processes and procedures throughout this report are based upon information furnished to ATSDR by MSP.

MSP burns solid and hazardous materials and pumpable high BTU (high heat value) liquids to produce a residue. That residue can be sold as is, if certain criteria are met, or it can be further processed at high temperatures to produce a slagged (molten) aggregate. Solid and hazardous materials fed to the process kiln are weighed and screened before being emptied and mixed in the holding feed tanks. About 10% of incoming feed materials are sampled to verify their shipping manifests. Incoming shipments are screened for gamma radiation.

Shipping containers are shredded and also processed in the kiln. All process residue and slagged aggregate is chemically analyzed by the Toxicity Characteristic Leaching Procedure (TCLP) procedure before being released for sale. If the residue or slagged aggregate exceeds 80% of the EPA TCLP standards, it is reprocessed in the slagging furnace. Fly ash, captured by the plant's air pollution control devices (see discussion following), is also processed with aggregate in the slagging furnace.

The primary combustion chamber used in the process is a 275-foot-long rotary kiln furnace operated at a minimum of 1,600° F. According to MSP, the flue gas remains in the chamber for 9 seconds. Combustion products from the rotary kiln are further reacted in two "oxidizer sections" or afterburners. The slagging furnace is located between the oxidizers and is operated at 2300° F to 2700° F. The flue gas residence time of the oxidizers is about 10 to 12 seconds. From the oxidizers, the hot exhaust gases pass through a wet quench system to cool them before gas cleaning. After cooling, dry powdered hydrated lime is sprayed into the gas stream to neutralize acid gases produced during the combustion process. Finally, the exhaust gases are passed through fabric filters (baghouses) before release to the environment.

MSP reports the combustion system has a number of safeguards intended to minimize the severity and duration of process breakdown conditions. Those conditions could disturb the balance of combustion reactions and ultimately lead to excessive air emissions from the process stack. Automatic waste feed shutoff (AWFSO) devices are used in conjunction with the monitoring of critical operating temperatures, pressures, and exhaust gas quality. If such operating conditions exceed or fall below acceptable limits, waste feed to the kiln is automatically stopped by the AWFSO/feed interlock. A related safeguard is the continuous emissions monitoring system (CEMS). Monitored parameters include hydrogen chloride (HCl), sulfur dioxide, oxygen, carbon dioxide, and argon; there are also provisions for monitoring carbon monoxide and total hydrocarbons. MSP reports that it is actively developing and implementing the online use of a mass spectrometer to identify and quantitate selected pollutant species such as dichlorobenzene, carbon tetrachloride, and chlorobenzene.

Throughout its operating history, MSP has been subject to various environmental and safety inspections. Both the Louisiana Department of Environmental Quality (LDEQ) and the Environmental Protection Agency (EPA) Region VI have conducted a number of inspections

and studies associated with the facility's operation and use of the resulting aggregate. The Occupational Safety and Health Administration (OSHA) has inspected the facility to review worker safety and the potential for exposures to hazardous materials. MSP also funds various environmental and occupational monitoring systems, as well as special studies (e.g., stack tests) to characterize the impact of its operations.

In conducting this public health assessment, ATSDR has accumulated a considerable amount of information related to the facility; met with state health officials, state environmental quality officials, U.S. Environmental Protection Agency (EPA) personnel; and heard the health concerns of local citizens. (See references for a complete list of documents reviewed.) Reviewing existing data from the MSP facility is difficult because of its complexity and the large amount to examine. It is recognized that additional information (existing or collected at a later date) could alter the conclusions of this public health assessment.

## B. SITE VISIT

Several site visits were made in conjunction with this public health assessment. On August 27-30, 1989, ATSDR representatives visited with personnel from the Louisiana Department of Health and Hospitals (LDHH) to gather background information on the site and to tour the plant. ATSDR conducted this trip to assist in deciding whether to prepare a public health assessment in response to a petition received by the Agency. After formally accepting the petition, in late February 1990 ATSDR returned to New Orleans to meet with health officials and representatives of the State Department of Environmental Quality (LDEQ). ATSDR personnel reviewed relevant health department files and identified materials to be copied for use in conducting the assessment. ATSDR personnel also met with MSP representatives to discuss the public health assessment process. On April 24-26, 1990, ATSDR visited LDEQ offices in Baton Rouge to review files and to identify additional materials useful to the assessment process. After visiting with LDEQ, ATSDR representatives went to Morgan City to complete the site visit. While in Morgan City, ATSDR again toured the MSP facility and the surrounding area. ATSDR conducted a public meeting to gather information from local citizens on their concerns about potential health implications associated with MSP operations. Finally, ATSDR visited several locations where MSP aggregate has been used, including roadways, a parking area, and two residences.

## C. DEMOGRAPHICS, LAND USE, AND NATURAL RESOURCE USE

Land use near the MSP plant is generally light industry and commercial. Much of the local industry appears to have supported a once-active, off-shore drilling industry; many of those businesses are now inactive. In addition to businesses near MSP, there are reports of inactive dump sites in the area; however, their locations and contents were not described to ATSDR.

Census data were available for Amelia, Morgan City, and surrounding areas. No formal, detailed demographic data were available to describe populations in the immediate vicinity of the MSP facility; consequently, ATSDR must rely on site visit observations to evaluate how people could be exposed to contaminants that might be released from MSP. The residential area nearest the site consists of a small cluster of mobile homes immediately northwest and adjacent to the active part of the MSP facility; MSP employees live in these homes. There were no children observed in this area. Other residents live about 1.5 to 2.0 miles in both directions along Highway 90, away from the plant. Those people are residents of Morgan City (est. pop. 16,030) and Amelia (est. pop. 1,800). Miscellaneous mobile home-type buildings are closer to MSP; however, they did not appear to be residences. No facilities



occupied by people with compromised health status, such as hospitals or nursing homes, were seen within a 2-mile radius of MSP.

There was no evidence of agriculture or commercial fishing near MSP. Water supply for both Morgan City and Amelia is obtained from Lake Palourde, which is about 2 miles north of the MSP facility. The lake is linked to Bayou Boeuf, which flows past the MSP site. Water from the plant area is reported to normally flow away from the lake. Both Lake Palourde and Bayou Boeuf have been designated by the State LDEQ as "suitable for primary and secondary recreation, propagation of fish and wildlife, and public water supply".

#### D. STATE AND LOCAL HEALTH DATA

Health data for the parish are available from a variety of sources. Sources reviewed were these:

1. Vital Statistics: The Public Health Statistics of the Office of Preventive and Public Health Services of the State of Louisiana provides yearly summaries of statistical information gathered from birth and death certificates. Reportable diseases are included in the report; age, race, and parish are noted. Birth certificate information on congenital malformations was also available.
2. Louisiana Tumor Registry: In 1973, the National Cancer Institute funded an incidence registry for the Greater New Orleans Area. In 1980, the state funded the registry and expanded it to cover other areas of the state. This volume included data on cancer incidence in southern Louisiana from 1983 to 1986.
3. Report of A Case-Control Study of Neuroblastoma in St. Mary Parish from the Louisiana State University Medical School Department of Pathology: This study examined excess cases of neuroblastoma in the parish in the years 1986 and 1987; five cases were in the study. Two control groups were used: a group of children born in the same hospital as the cases and a group of children from Bogalusa, Louisiana.

### COMMUNITY HEALTH CONCERNS

Community health concerns about the facility can be grouped into four main areas: safety of the aggregate; contamination of Bayou Boeuf from creosote and heavy metals; stack emissions; and the cluster of neuroblastomas in the area. Several community members are also concerned about an alleged large number of birth defects and neurological disorders in the area.

Aggregate produced by the facility, which has a high concentration of heavy metals, has been used in the past as a fill material in St. Mary and surrounding parishes. Citizens are concerned about adverse effects those heavy metals could have on health if they are released into the environment.

There is documented past creosote and heavy metals contamination, from two storage barges, of the sediment of Bayou Boeuf surrounding the facility. Citizens question the extent of the contamination and its effect on the fish and waters of the bayou.

The presence of visible emissions from the stack and the widespread belief that MSP has never passed a stack test have led to concerns about the exact nature of emissions from the stack. Citizens note that, if the emissions are unknown, health effects cannot be determined.

In the period from 1986 to 1987, there was an excess number of leukemia cases in St. Mary Parish, according to a study conducted by the Louisiana State University Medical School. The study did not identify any differences in occupational, industrial, or environmental exposures between cases and controls. The community remains concerned that an unidentified "trigger" could still exist.

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