MONSANTO COMPANY
(Muscatine, Iowa)

GENERAL DESCRIPTION

The 454-acre site is located in the SW 1/4 of Section 27, the S 1/2 of Section 28, the N 1/2 of Section 33, and the NW 1/4 of Section 34, T76N, R2W approximately four miles south of the city of Muscatine, Iowa. Monsanto Chemical Company is the owner of record. The site was entered on the Registry in June 1990. A chemical manufacturing plant has been operated at the site since 1961. Originally a manufacturer of ammonia, the plant now manufactures several agricultural herbicides and acrylonitrile/butadiene/styrene (ABS) plastics.

SITE CLASSIFICATION

In 2017 this site is re-classified "d" - site closed with continued management in accordance with 455B.427.3.

TYPE AND QUANTITY OF HAZARDOUS WASTE

- **Pesticides and Chlorinated Hydrocarbons**

Contaminated groundwater was first detected at the site in 1975. The quantity of hazardous waste released is undetermined. Elevated concentrations of the herbicide Diallate and monochlorobenzene (MCB) have been detected in ground water. The soil and groundwater contamination is attributed to several factors. Spills in unpaved areas are believed to be the most significant source of contamination. For many of the early years of plant operation, wastewater was conveyed from production units through unlined ditches at the site. The company has installed an extensive groundwater monitoring system at the site. In addition, two wells have been installed beneath the plant site near the center of the contaminant plume. These wells have been used since 1983 to pump contaminated water for on-site treatment. There have also been four separate investigative studies done at the site.

SUMMARY OF PUBLIC HEALTH AND ENVIRONMENTAL CONCERNS

- **The Primary public health concern from this site is potential exposure to contaminated drinking water**

Public Health:

The Muscatine Island Aquifer provides the major source of groundwater in the area. The city of Muscatine operates two well fields in the aquifer. The nearest is the Progress Well Field, located about two miles northeast of the site. Numerous irrigation wells are located in the area.

Environmental:

The site is located in a part of the Mississippi River flood plain known as Muscatine Island. In the vicinity of the plant, the alluvial sand and gravel deposits are generally about 140 feet thick. The Mississippi River is immediately east of the site and Spring Lake and Beatty's Pond are directly to the south. Other small lakes, sloughs, and wetlands are found nearby.

The groundwater beneath the site is highly contaminated with several herbicides and other chemicals. However, the pumping of purge wells has helped reduce the levels of contamination. Monochlorobenzene has decreased from a high of 50,000ug/l to 5,000ug/l in the center of the plume in the herbicide production area. The most significant herbicide contaminants are alachlor (Lasso), atrazine, butachlor (Machete), diallate (Avadex), and propochlor (Ramrod). This includes alachlor up to 27,200ug/l. Significant contamination has reached a depth of 95 feet at the site.

On-site soil contaminants are the same ones observed in the groundwater. Alachlor is the most widespread and, in general, is found in the highest concentrations (up to 7,157 mg/kg). The highest level for diallate is 8,859 mg/kg. Soil contamination has been found to increase with depth to ten feet in many locations.

SUMMARY OF ASSESSMENT, MONITORING OR REMEDIAL ACTIONS

The EPA is the lead agency for the site. Oversight of site investigations and remedial actions are conducted under the authority of the RCRA program.

The EPA and the company signed a Consent Order in June 1989 to complete a RCRA Facility Investigation/Corrective Measures Study (RFI/CMS) under RCRA authority. The RFI was completed in February 1990 and approved by the EPA in January 1991. The report of the Investigation analysis and the CMS was submitted to the EPA in the second quarter of 1991.

Interim remedial activities required under the June 1989 Consent Agreement included groundwater monitoring, groundwater pumping to keep the contaminant plumes within the facility boundary, and treating contaminated groundwater.

The EPA approved the Corrective Measure Design and Operations and Maintenance Plan in July 1995. The required remedial action includes the following:

- Site restrictions to control site access (fencing) and current and future land use (deed restrictions).
- Pumping groundwater from the facility's production wells to create a cone of depression on the ground water to maintain contaminant plume on the facility property.

- Extracting and treatment of contaminated groundwater with a liquid phase activated carbon adsorption system.
    - Using treated groundwater as cooling water and discharging to the Mississippi River under an NPDES permit.

2005: Monsanto completed the closure of their fifth and final regulated unit under the RCRA hazardous waste permit. They also are working towards updating their corrective measures program, including installing a new monitoring well. The RCRA hazardous waste permit has been continued since 1999 to allow Monsanto to close their regulated units and will be renewed in 2006 for corrective action only, no regulated units.
2007: One new monitoring well installed in spring of 2007. Annual ground water monitoring reports are submitted to EPA to track performance of Corrective Measures. Monitoring indicates complete on-site containment of mono-chlorobenzene ground water plume.
2008: 2007 report received. Annual ground water monitoring reports are submitted to EPA to track performance of Corrective Measures (CM). Indications are that chlorobenzene groundwater plume is being contained by active pumping. 3/3/2008
2009: 2008 report received 2/24/2009. Annual ground water monitoring reports are submitted to EPA to track performance of CM and monitoring of dillate and mono-chlorobenzene (MCB). EPA indicates that the site is complying with EPA's requirements. Groundwater purging and monitoring will continue.
2010: 2009 annual report received 2/25/2010. Annual ground water monitoring reports are submitted to EPA to track performance of CM and monitoring of dillate and mono-chlorobenzene (MCB). Report indicates 55.7 million gallons of groundwater purged in 2009 – 46 million required in permit. Groundwater monitoring will continue.
2011: EPA reviewed Sediment and Surface water investigation work plan, 8/31/2011
2012: EPA approves sediment and surface water monitoring plan
2013: 2012 Annual report to EPA on 2/27/2013
2014 2013 Annual report to EPA on 2/28/2014, DNR letter to facility RE amendment to 455B on 9/26/2014
2017: 2016 Annual report received and site reclassified ?

<u>2018</u>: Monsanto Company prepared a Corrective Measures Performance Evaluation Report (CMPE) for the Muscatine Iowa facility in accordance with the requirements of Resource Conservation and Recovery Act (RCRA) for review to evaluate the effectiveness and performance of the specified corrective measures

2020 (and 2019): No new activities.

2021: RCRA annual reports and sampling continues.

2022: RCRA Reports to EPA continue

2023: Submission of the 2022 CMI Annual Monitoring Report. Soil testing completed in February 2023 due to planned construction activities. Grid 229 and 230 composite sampling yielded no TCLP or chlorobenzene concentrations, and low level diallate.

2024: No new activities, construction permit issued for new water supply well.

2025: No new activities.

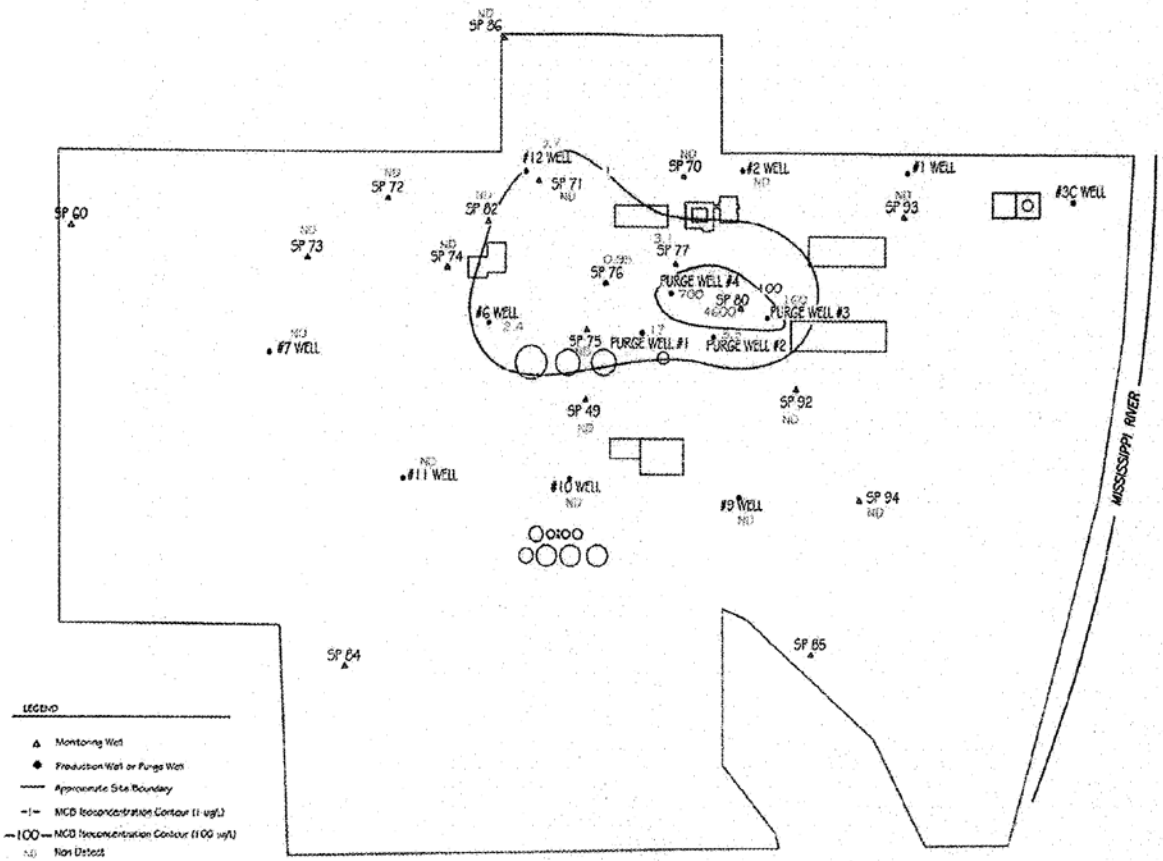

FIGURE 5

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WESTON SOLUTIONS

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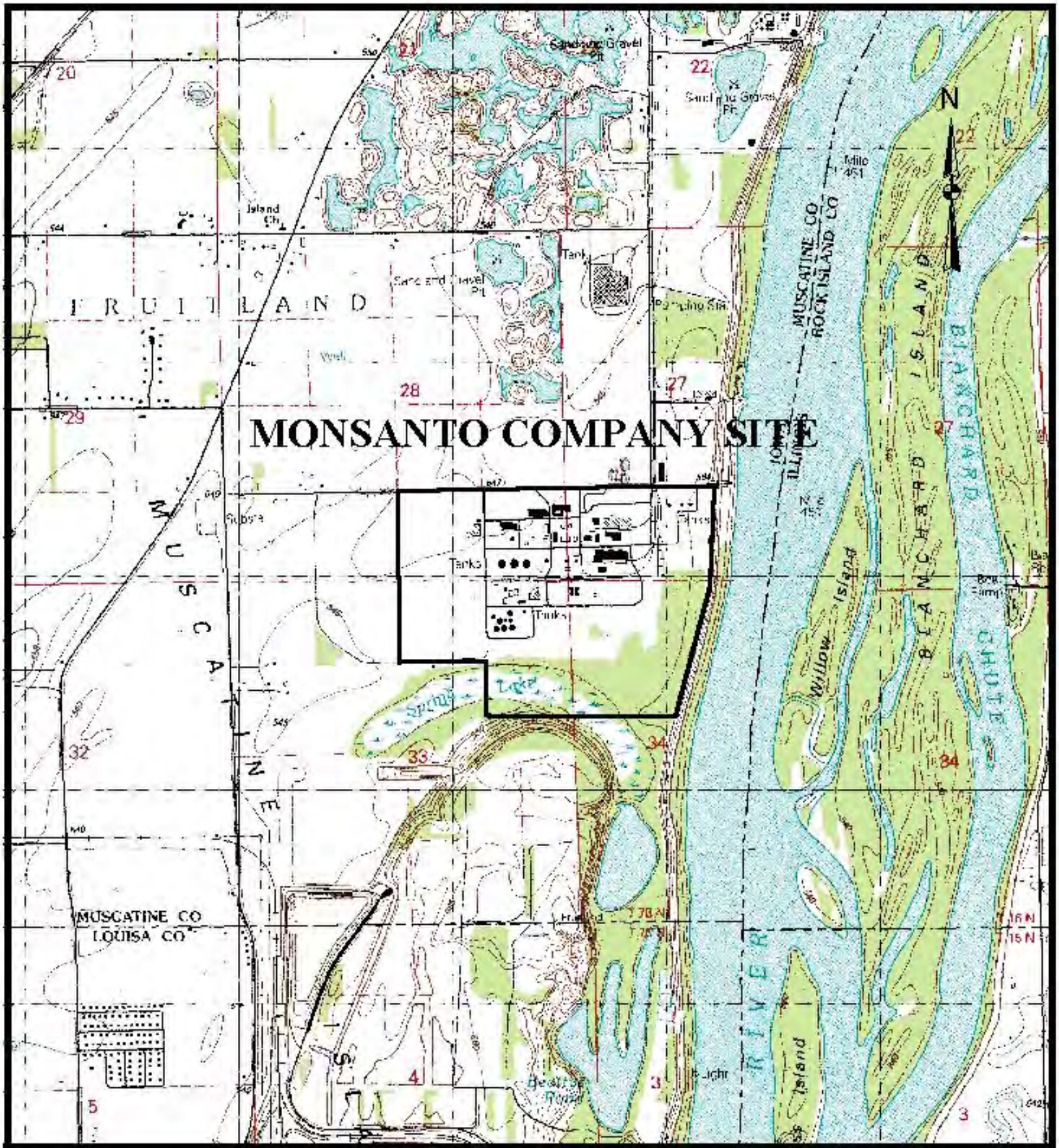
48864

MCB IN GROUNDWATER
Fall 2006
MONSANTO MUSCATINE SITE
MUSCATINE, IOWA

(Monsanto Company)



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