

COMPLIANCE ORDER

IN THE MATTER OF

UNITED STATES SURGICAL CORPORATION)
MALLINCKRODT LLC)
)
CONCERNING A CHLORALKALI)
MANUFACTURING FACILITY IN) DESIGNATION OF
ORRINGTON, PENOBSCOT COUNTY, MAINE) UNCONTROLLED HAZARDOUS
FORMERLY OWNED AND OPERATED BY) SUBSTANCE SITE
MALLINCKRODT INC.) AND ORDER
)
)
PROCEEDING UNDER 38 M.R.S.A.)
§ 1365, UNCONTROLLED HAZARDOUS)
SUBSTANCE SITES LAW)

This Compliance Order is issued to United States Surgical Corporation and Mallinckrodt LLC (collectively "Mallinckrodt"), organized and existing under the laws of Delaware, by the Maine Department of Environmental Protection (the "Department" or "DEP"). This designation of the Site¹ as an Uncontrolled Hazardous Substance Site and the related order is made pursuant to the authority vested in the Commissioner of the State of Maine Department of Environmental Protection ("Commissioner") under the Uncontrolled Hazardous Substance Sites Law, 38 M.R.S.A. §§ 1361-1371.

1. As more particularly described below, Mallinckrodt Inc. (a New York corporation) owned and operated a chloralkali manufacturing facility located adjacent to the Penobscot River in Orrington, Maine, on a parcel of property described in the Town of Orrington Tax Map #005 and Lot #068 (referred to hereinafter as the "Facility" or the "Site"). In December 2006, Mallinckrodt Inc. merged into Mallinckrodt Holdings, Inc. (a Nevada corporation), and Mallinckrodt Holdings, Inc. merged into United States Surgical Corporation (a Delaware corporation). Thus United States Surgical Corporation is the legal successor to Mallinckrodt Inc. In March 2007, United States Surgical Corporation and Mallinckrodt LLC entered into a "Contribution and Assumption Agreement" by which United States Surgical Corporation conveyed certain insurance policies to Mallinckrodt LLC, and Mallinckrodt LLC assumed potential liabilities arising from the Site.

¹ The Facility was operated over time by Mallinckrodt Inc., LCP Chemicals and Plastics, Inc., and HoltraChem Manufacturing Co. Because HoltraChem last operated the site, the Department has most recently referred to the site as the HoltraChem Site. It may also now be referred to as the Mallinckrodt Site.

Mallinckrodt LLC is a subsidiary of United States Surgical Corporation, which is a subsidiary of Covidien Ltd., a corporation that is organized and exists under the laws of Bermuda.

RCRA Citizen Suit

2. On April 10, 2000 the Natural Resources Defense Council, Inc. ("NRDC") and Maine People's Alliance filed a citizen suit against Mallinckrodt under the Resource Conservation and Recovery Act, 42 U.S.C. § 6972(a)(1)(B), ("RCRA"), in the United States District Court for the District of Maine (Civil Action No. 00-69-B) ("federal court case").² In this lawsuit the NRDC and Maine People's Alliance alleged that Mallinckrodt had, over a period of years, discharged mercury from the Site into the Penobscot River and that these discharges resulted in an imminent and substantial endangerment to the public health and the environment.

3. After trial on July 29, 2002 the United States District Court for the District of Maine found that Mallinckrodt had contributed to the mercury-bearing releases from the Site. Judge Carter found that "Mallinckrodt's actions at the plant site, may present an imminent and substantial endangerment to the public health and the environment."³ The Court found that "the evidence clearly demonstrated that the Penobscot River is contaminated with mercury through the mouth of the River and into the Bay. Reliable evidence further established that mercury levels are elevated in Penobscot downriver sediments, that mercury is methylating downriver, and that such methylmercury is bioavailable [sic], entering biota, and biomagnifying throughout the food web. As a result, dangerously high levels of mercury may be present in Penobscot fish and other sea food consumed by the public. These elevated body burdens of mercury may also present an imminent and substantial endangerment to the environment."⁴ The Court also found that "scientific literature concerning the effects of mercury in an aquatic system teaches that methylation is a continuous process that can go on for decades or longer, creating the most severe adverse impacts downstream from the original mercury sources".⁵ The Court took note of the regulatory efforts of DEP and U. S. Environmental Protection Agency (EPA) to clean up the Site and adjacent Penobscot River sediment but also found these efforts were not directed at downriver sections of the Penobscot River. Accordingly, the Court ordered Mallinckrodt to participate, along with the NRDC and Maine People's Alliance, in a study to determine the extent of existing harm to the Penobscot River and Bay south of the plant and the need for a remediation plan.

4. On November 25, 2003 the Court issued a follow-up order describing the procedures to be followed in implementing the Penobscot River Study described above.⁶ Mallinckrodt appealed all District Court orders to the United States Court of Appeals for the First Circuit, which upheld the

² *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237 (D. Me. 2002).

³ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 251 (D. Me. 2002).

⁴ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 251 (D. Me. 2002).

⁵ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 251 (D. Me. 2002).

⁶ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co., LLC, et al.*, 295 F. Supp. 2d 97 (D. Me. 2003).

District Court in all respects.⁷ Mallinckrodt then filed a petition for a writ of certiorari, which was denied by the United States Supreme Court.⁸

5. On March 7, 2008 the Court issued an order approving the Phase I Penobscot River Mercury Study Report⁹. In that Court order Judge Carter found that “it is now established in the record that mercury (Hg) deposited in the Penobscot River in significant quantities and to substantial negative effect from the HoltraChem site has and is now in the process of methylation posing a danger to the health of the wildlife in the River and risks of a substantial nature to the well-being of human beings who ingest the products in the River.”¹⁰
6. During the federal court case, the parties, including Mallinckrodt, filed joint stipulations of fact including Joint Stipulations 64¹¹ and 65.¹²
7. In the federal court case, the Court found after looking at the evidence the following facts among others:
 - a. “The chlor-alkali plant in Orrington, Maine that is the subject of this action (“the Plant”) was built in 1967. From December 9, 1967 to April 30, 1982, Mallinckrodt Inc. or one of its affiliates (collectively “Mallinckrodt”) owned and operated the Plant and the 240-acre site on which it is located on the banks of the Penobscot River (“the Facility”). Mallinckrodt Inc. then known as International Minerals and Chemical Corporation (“IMC”), was the first entity to own the plant.”¹³ “Sobin Chlor-Alkali was an affiliate of IMC. IMC changed its name to IMCERA Group Inc. in 1990, to Mallinckrodt Group Inc. in 1994, and to Mallinckrodt Inc. in 1996.”¹⁴
 - b. “From 1982 to 1994, the plant was owned and operated by Hanlin Group, Inc. (“Hanlin”) (d/b/a LCP Chemicals and Plastics, Inc.). In 1991, Hanlin and its related companies filed a voluntary bankruptcy petition pursuant to Chapter 11 of the Bankruptcy Code.”¹⁵ “Hanlin is not a defendant in this action.”¹⁶

⁷ *Maine People’s Alliance v. Mallinckrodt, Inc.*, 471 F.3d 277 (1st Cir. 2006).

⁸ *Mallinckrodt Inc. V. Maine People’s Alliance*, 128 S. Ct. 93 (U.S. 2007).

⁹ Penobscot River Mercury Study, Phase I of the Study 2006 – 2007 by Penobscot River Mercury Study Panel dated January 24, 2008.

¹⁰ Order approving Phase I Report from *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co., LLC, and Mallinckrodt, Inc.*, Civil No. 00-69-B-C (D. Me. 2008) dated March 7, 2008.

¹¹ Joint Exhibit 64 from *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237 (D. Me. 2002) dated February 26, 2002 and signed by attorneys for Mallinckrodt, Maine People’s Alliance and NRDC.

¹² Joint Exhibit 65 from *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237 (D. Me. 2002) dated February 27, 2002 and signed by attorneys for Mallinckrodt, Maine People’s Alliance and NRDC.

¹³ *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

¹⁴ *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 n.1 (D. Me. 2002).

¹⁵ *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

¹⁶ *Maine People’s Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 n.2 (D. Me. 2002).

- c. "EPA filed a RCRA administrative action against Hanlin in 1986 that resulted in a consent agreement that same year ("1986 Agreement")."¹⁷
- d. "In 1989, Hanlin brought an action against Mallinckrodt in this Court, alleging that Mallinckrodt was responsible for the environmental hazards at the site that were the subject of EPA's 1986 action and seeking recovery for expenses related to compliance with the 1986 Agreement."¹⁸
- e. "The lawsuit by Hanlin resulted in a settlement on April 3, 1991 ("1991 Settlement"), pursuant to which Mallinckrodt assumed responsibility for a portion of the costs of completing the study under the 1986 Agreement. The 1991 Settlement did not resolve how the costs of corrective action would be shared."¹⁹
- f. "On July 29, 1991, EPA brought a RCRA action against Hanlin in this Court for failing to comply with the 1986 Agreement."²⁰
- g. "In 1993, this Court entered a Consent Decree between EPA and Hanlin that superseded the 1986 Agreement and required Hanlin to conduct a site investigation and corrective measures study at the site under the corrective action provisions of RCRA ("1993 Consent Decree")."²¹
- h. "Defendant HoltraChem Manufacturing Company, LLC. ("HoltraChem") owned and operated the plant from 1994 until the plant ceased operation in September 2000."²² "HoltraChem continues to own the plant, but dissolved as a corporate entity in March 2001. Since that time, HoltraChem has neither defended itself in this action nor participated in ongoing corrective action activities under the 1993 Consent Decree. The clerk of this Court entered a default order against HoltraChem in this action on February 5, 2002."^{23, 24}

¹⁷*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

¹⁸*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

¹⁹*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²⁰*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²¹*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²²*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

²³*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 n.3 (D. Me. 2002).

²⁴ Since the time Joint Stipulation #65 was filed with the District Court and since the Court made this finding, the Town of Orrington foreclosed on the property that includes the Site for failure to pay taxes. As of February 3, 2003, the property is now owned by the Town of Orrington.

- i. "In 1994, when HoltraChem bought the plant, it assumed Hanlin's obligations under the 1993 Consent Decree and the 1991 Settlement."²⁵
- j. "In 1995, following the bankruptcy of Hanlin and HoltraChem's acquisition of the plant, the 1993 Consent Decree was modified to reflect that certain obligations under the 1993 Consent Decree were assumed by HoltraChem. Among other things, HoltraChem assumed Hanlin's obligations to complete the RCRA corrective action process."²⁶
- k. "The 1993 Consent Decree contemplates a three-phase process: site investigation, a study of possible corrective measures, and remediation."²⁷
- l. "Pursuant to the 1993 Consent Decree, Mallinckrodt and HoltraChem submitted a multi-volume Site Investigation Report in December 1995 prepared by environmental consultant Camp, Dresser & McKee ("CDM")."²⁸
- m. "In March 1997, EPA and the Maine Department of Environmental Protection ("MDEP") issued a draft notice of disapproval and comments on the 1995 Site Investigation Report."²⁹
- n. "In December 1998, Mallinckrodt and HoltraChem again submitted a multi-volume Supplemental Site Investigation Report prepared by CDM."³⁰
- o. "On April 10, 2000, EPA and MDEP provided a notice of disapproval along with comments on the 1998 Supplemental Site Investigation Report and Proposed Media Protection Standards."³¹ The Site Investigation Report and Supplemental Site Investigation Report shall be referred to collectively as the "SI Report".

²⁵ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²⁶ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²⁷ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 243 (D. Me. 2002).

²⁸ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 244 (D. Me. 2002).

²⁹ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 244 (D. Me. 2002).

³⁰ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 244 (D. Me. 2002).

³¹ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 244 (D. Me. 2002).

8. In the federal case, the Court found after looking at the evidence the following facts among others:
- a. “The plant began operation on December 9, 1967. Peter DeAngelis was responsible for operation of the plant from its start up through April 30, 1982, the full period of Mallinckrodt's ownership/operation of the plant.”³²
 - b. “The facility production process utilized mercury; there were approximately 82 tons of mercury on site at any one time.”³³
 - c. “Mercury losses from the facility from December 1967 into June 1970 were a major economic concern for the plant.”³⁴ “Mr. DeAngelis³⁵ directed A.L. MacMillan, a plant employee, to estimate mercury losses from the facility. Mr. MacMillan prepared a memorandum dated March 18, 1970, estimating average daily mercury production losses at 107 pounds, including 19 pounds of mercury daily lost through brine sludge, an unknown quantity of which was recycled back into the system.”³⁶ “Mr. DeAngelis does not have a basis for a more accurate estimate than the one set forth in the MacMillan memorandum, but disputes that the total amount was lost from the facility.”³⁷
 - d. “The plant sent mercury-contaminated brine sludge into its sewer, then through the facility's outfall directly into the Penobscot River, every day, continuously, from December 9, 1967 into June 1970. The plant did not attempt to estimate mercury concentration in brine sludge from 1967 to 1982, and, although Mr. DeAngelis is unaware of information about mercury concentration in the facility's brine from 1967 to 1982, mercury discharges declined over time.”³⁸
 - e. “The State of Maine did not know from December 1967 into June of 1970 that the facility was discharging mercury to the Penobscot River. The facility did not state on its application for a waste discharge license that it was discharging mercury, because the facility first became aware of laboratory results showing mercury in its effluent in April 1970.”³⁹

³² *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

³³ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

³⁴ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 241 (D. Me. 2002).

³⁵ Mr. Peter DeAngelis was Mallinckrodt's Plant Manager at the Facility.

³⁶ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 (D. Me. 2002).

³⁷ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 n.4 (D. Me. 2002).

³⁸ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 (D. Me. 2002).

³⁹ *Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 (D. Me. 2002).

- f. “Mr. DeAngelis believes that the plant's own estimate of 1.5 to 2.5 pounds of mercury per day in the effluent discharged through the facility's outfall is fairly accurate for the period from the plant's startup to the construction of Mac's Pond, based on the April 1970 laboratory results. However, this estimate does not include mercury discharged through air emissions or groundwater and Mallinckrodt admits more mercury was discharged from the [facility] through air emissions than through the facility outfall.”⁴⁰
- g. “Mallinckrodt constructed Mac's Pond, the first landfill on the site, around June 15, 1970. Mac's Pond was located on a downgrade between the facility and the Penobscot River. Until the creation of Hicel's Pond in July 1970, the facility put brine sludge in Mac's Pond, which was open and unlined.”⁴¹

RCRA Corrective Action

- 9. Pursuant to the Resources Conservation and Recovery Act (RCRA), the EPA has pursued corrective action at this Site dating back to the mid 1980's. DEP assisted EPA in its efforts to investigate and remediate the Site and Mallinckrodt funded this investigation. Mallinckrodt's consultant Camp Dresser & McKee (CDM), drafted Site Investigation Reports, Corrective Measures Studies and other related deliverables.
- 10. Mallinckrodt provided the following information in the Site Investigation Report regarding the operation of the facility. "Since its construction in 1967, the plant has been engaged in the manufacture of chlorine and related products, including: sodium hydroxide (caustic soda); sodium hypochlorite (chlorine bleach); hydrochloric acid; and chloropicrin."⁴²

"The chlor-alkali process produces chlorine by subjecting saturated brine to low-voltage, high-amperage direct current between a metal anode and a flowing bed of mercury (the cathode). Chlorine is formed as a gas at the cell anodes. The sodium forms an amalgam with the mercury. The sodium-mercury amalgam flows out of the cell to a decomposer. Purified water is added at the decomposer and the sodium is released from the mercury and bonds with the hydroxide in the water to form sodium hydroxide (NaOH) and hydrogen gas. Hydrogen gas is used by the plant to produce steam and in the manufacture of hydrochloric acid. The chlorine gas stream is purified by passing it through concentrated sulfuric acid which absorbs the water. The dilute sulfuric acid is transported offsite as a product. Chlorine related products such as hydrochloric acid and sodium hypochlorite bleach are produced with chlorine.”⁴³

“The depleted brine flowing out of the electrolytic cells is treated with hydrochloric acid to liberate and remove additional chlorine gas. The brine stream is then purified by the addition of sodium hydroxide and carbon dioxide to form insoluble precipitates. The precipitates form the K071 brine

⁴⁰*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 (D. Me. 2002).

⁴¹*Maine People's Alliance et al. v. HoltraChem Manufacturing Co. and Mallinckrodt Inc.*, 211 F. Supp. 2d 237, 242 (D. Me. 2002).

⁴²Site Investigation Report, HoltraChem Manufacturing Site, Orrington, Maine, Volume I Text dated December 22, 1998, at 2-3.

⁴³*Id.* at 2-3.

purification sludges. The brine is then resaturated with salt and returned to the cells. Sodium hydrosulfide (NaSH) is used to facilitate mercury removal in the wastewater treatment system. (Formerly, sodium borohydride was used to facilitate mercury precipitation). The waste product of the wastewater treatment step is the K106 brine [sic] sludge"⁴⁴ from the mercury cell process.

"Chloropicrin, a tri-chlorinated nitromethane used as a soil fumigant, is manufactured in a separate part of the plant. Chloropicrin manufacture began in the early 1970s.... Calcium chloride is used to dry the chloropicrin. The calcium chloride is dissolved into the brine system when it becomes saturated. Prior to this practice, the initial batches of spent calcium chloride may have been placed into the onsite landfills."⁴⁵

11. According to the hazardous waste manifests and annual reports relating to the Mallinckrodt site, since closure of the onsite landfills in 1983 the mercury bearing sludges have been disposed of off site. From September 1984 through August of 2008, the mercury bearing sludges have been deposited in a licensed hazardous waste landfill in Canada called Stablex Canada Inc. This facility was selected by the Quebec's Ministry of the Environment in 1981 as the site for the construction and operation of a hazardous waste treatment plant and disposal cells at one of three sites identified as being environmentally appropriate for such a facility. Comprehensive environmental assessment studies and public hearings were held prior to the site being developed. The facility began operations in June 1983. The facility treats each waste to create a concrete-like mixture. This treated waste is then landfilled. The final product is reported by Stablex to have an extremely low permeability (less than 10^{-7} cm/sec) and has physical and chemical properties to ensure long-term security. All waste landfilled must be treated to be non-hazardous based upon the Provincial Leachability Test before it is landfilled.⁴⁶
12. The Site is located on the east bank of the Penobscot River on a 235-acre parcel of land. The immediate plant area is approximately 12 acres. See Figure 1. The 235-acre parcel is an area zoned industrial by the Town of Orrington but is surrounded by primarily residential property. See Figure 2. The closest residence is approximately 300 feet from the property boundary. The Penobscot Energy Recovery Corporation, a licensed solid waste to energy incineration plant, is located adjacent to the Site. The Site has a flooded gravel pit onsite which is the source of a stream referred to generally as the "Southerly Stream." Approximately 50 acres are developed and include the manufacturing facility, five landfills, a surface impoundment and waste piles. Approximately 70 acres were impacted by Mallinckrodt's operations. The Southerly Stream flows 3,200 feet from the gravel pit, by Landfill #2, through the industrial portion of the site and into the Penobscot River. The Penobscot River is designated by the State of Maine as a Class B river upstream of the site and Class SC at and downgradient of the site under 38 M.R.S.A. §§ 465 and 465-B. A Class B designation is the 3rd highest fresh water classification and shall be of such quality that they are suitable for the designated uses of drinking water supply after treatment, fishing, recreation in and on the water, industrial process and cooling water supply, hydroelectric power generation, and navigation and as habitat for fish and other aquatic life. The habitat shall be characterized as unimpaired. A Class SC designation is the 3rd highest estuarine and marine

⁴⁴ Id. at 2-4.

⁴⁵ Id. at 2-4.

⁴⁶ Stablex Canada Inc. Audit Package, ISO 9001 and ISO 14001, February 2007, Stablex Canada Overview, page 1, 3, and 4.

classification and shall be of such quality that they are suitable for recreation in and on the water, fishing, aquaculture, propagation and restricted harvesting of shellfish, industrial process and cooling water supply, hydroelectric power generation, navigation and as a habitat for fish and other estuarine and marine life.

The Site is further described below:⁴⁷

a. The manufacturing facility consists and/or consisted of:

- i. chlorate building;
- ii. mercury retort building;
- iii. old mercury retort building;
- iv. mercury cell building for the production of chlorine and sodium hydroxide;
- v. chloropicrin building for the production of the pesticide chloropicrin;
- vi. brine handling tanks and piping;
- vii. wastewater treatment plant and sludge press;
- viii. caustic storage and loading facilities;
- ix. acid storage and loading facilities;
- x. salt storage;
- xi. chlorine storage tanks and loading facilities;
- xii. chloropicrin storage tanks and loading facilities;
- xiii. bleach storage and loading facilities;
- xiv. utility building;
- xv. laboratory;
- xvi. hydrogen compressor building;
- xvii. transformer yard;
- xviii. maintenance building;
- xix. chlorine tank car test building;
- xx. store room building;
- xxi. office building and associated other structures; and
- xxii. nitromethane building.

b. The waste handling sites are known to consist of, or consisted of:

- i. six leachfields with associated structures;
- ii. five landfills⁴⁸;

⁴⁷ As partially described in the Mallinckrodt report prepared by Camp, Dresser and McKee entitled "Site Investigation Report, HoltraChem Manufacturing Site, Orrington, Maine" dated December 22, 1998.

⁴⁸ Four of the landfills were unlicensed hazardous waste landfills that predated the Hazardous Waste Management Rules and one was an interimly licensed hazardous waste landfill. The Board of Environmental Protection (BEP) approved a closure plan for Landfill #5, the interimly licensed landfill, on December 5, 1983. In this closure order the BEP made many findings including that the groundwater monitoring system had found carbon tetrachloride in the groundwater and that the carbon tetrachloride had been placed in the landfill by IMC (now Mallinckrodt) on a regular basis in violation of the conditions of their interim license. The Board approved the closure plan and post closure plan conditioned upon a hydrogeologic study of the site at which point the Commissioner may modify the post closure plan, may specify additional monitoring wells, and may require such additional measures necessary to protect the public health and safety and the environment. Landfills licensed under interim license standards on the federal or state level were not required to immediately meet all hazardous waste facility standards. Interim license status was intended to be a temporary status prior

- iii. a surface impoundment;
- iv. two waste piles including old equipment and piping;
- v. sludge handling and storage facilities;
- vi. generator satellite accumulation and storage area;
- vii. filled former gravel pit (landfill ridge);
- viii. industrial sewer; and
- ix. wastewater discharge pipe and outfall.

c. The Site also contains or contained old equipment, tanks, piping and materials at various places around the property.

13. The six leachfields were utilized at various times and received sanitary wastes, laboratory waste, and change house waste which included mercury. The leachfields are identified on Figure 1.⁴⁹ The five hazardous waste landfills and the surface impoundment at the site are described below and identified on Figure 2.⁵⁰ All five landfills were used for disposal of mercury-bearing brine sludges. The surface impoundment was used for the temporary storage of process brine waste when excess brine was present in the system.

The six leachfields and associated structures are described below and identified on Figure 1.

<u>Leachfield #</u> ⁵¹	<u>Description</u> ⁵²
Leachfield #1	Primary leachfield constructed in 1979, four separate fields, leachfield still in use.
Leachfield #2	Change house leachfield constructed in 1975, use of leachfield discontinued between 1978-1980.
Leachfield #3	Office/Administration building leachfield, date of construction unknown, leachfield use reduced in 1978-1980 to only wastewater from kitchen. Other wastes were redirected to leachfield #10.

to final hazardous waste rules being written and to give facilities an opportunity to upgrade to final hazardous waste facility standards. Many facilities across the country elected to cease using their landfills in lieu of coming into compliance with the final hazardous waste rule standards.

⁴⁹ Based on Septic System Summary Report submitted to DEP by HoltraChem Manufacturing Company, Figure 1 dated October 17, 1997.

⁵⁰ Figure prepared by John Lynam of DEP GIS Unit.

⁵¹ Leachfield numbering from report submitted to DEP by HoltraChem Manufacturing Company entitled Revised Summary Report of Septic Tanks and Leachfields at HoltraChem Manufacturing Company in Orrington, Maine dated March 27, 1998. The report identifies 10 septic systems but only six leachfields. The leachfield numbering relates to the septic system that it is associated with, in many cases multiple septic systems discharged to a single leachfield. There is no leachfield #4, 6, 7, or 9 listed in the report.

⁵² Leachfield descriptions from report submitted to DEP by HoltraChem Manufacturing Company entitled Revised Summary Report of Septic Tanks and Leachfields at HoltraChem Manufacturing Company in Orrington, Maine dated March 27, 1998.

Leachfield #5	Chlorate Engineering Office leachfield, date of construction unknown, use of leachfield discontinued in 1980.
Leachfield #8	Old Maintenance building hemlock plank leachfield, date of construction unknown, use of leachfield discontinued between 1978-1980.
Leachfield #10	Office/Administration Office leachfield constructed during 1979-1980, leachfield still in use.

The five landfills are described below and identified on Figure 2.

<u>Landfill #</u>	<u>Active Dates of Operation</u>	<u>Size (sq.ft.)</u>	<u>Location</u>
Landfill #1 includes:	1970 – 1972 (Area around landfill #1 also used from 1967 – 1972)		West of the plant, in small valley adjoining Penobscot River
1A		3,000	
1B		2,000	
Lined Process Lagoon (surface impoundment for brine)	1982 – present	2,925	
Landfill #2	1971 - 1973	12,000	Northeast of plant, in valley
Landfill #3	1972	38,000	North of plant, on northeast trending ridge
Landfill #4	1972 – 1980	45,000	North of plant on ridge northeast of Landfill #3
Landfill #5	1978 - 1983	17,500	Northeast of plant on ridge, northeast of Landfill #4

The surface impoundment⁵³ is still present but no longer contains process waste. The landfills no longer receive waste. Landfill #5, identified on Figure 2, was the last landfill in operation and last received waste on or about September 1, 1983.

The two waste piles are described below:

<u>Waste pile #</u>	<u>Description</u>	<u>Location</u>
Waste pile #1	Scrap metal storage area	Northeast of the Maintenance Building
Waste pile #2	Old equipment storage area	Adjacent to the Nitromethane Building

14. Based on information provided in the Site Investigation report and hazardous waste manifest records, in the course of the operation at the Site, at a minimum, the following hazardous substances were known to be generated:

- a. Mercury and mercury-contaminated substances. This waste is defined as hazardous waste, classification D009, pursuant to 06-096 CMR ch. 850, § 3.
- b. Brine purification muds which are waste containing mercury from the mercury cell process used in the facility’s production of chlorine. These wastes are defined as hazardous waste, classification K071, pursuant to 06-096 CMR ch. 850, § 3.
- c. Sludge from the wastewater treatment plant. This waste containing mercury is defined as hazardous waste, and assigned the classification number K106, pursuant to 06-096 CMR ch. 850, § 3.
- d. Carbon tetrachloride. This waste is defined as a hazardous waste, classification F001, pursuant to 06-096 CMR ch. 850, § 3.
- e. Waste paint, paint solvents, and degreasing solvents. These wastes are defined as hazardous waste, classification D001, pursuant to 06-096 CMR ch. 850, § 3.
- f. Waste acetone and methyl ethyl ketone. These wastes are defined as hazardous waste, classification F003, pursuant to 06-096 CMR ch. 850, § 3.
- g. Polychlorinated biphenyl (PCB) contaminated waste. This waste is defined as hazardous waste, classification M002, pursuant to 06-096 CMR ch. 850, § 3.
- h. Off specification waste oil with halogen content greater than 4,000 ppm. This waste is classified as a hazardous waste, M001, pursuant to 06-096 CMR ch. 860, § 4.

⁵³ Shown as “lined process lagoon” on Figures 1 and 2.

15. In addition to the 1998 Site Investigation Report, Mallinckrodt also submitted numerous other reports that documented the investigation and characterization of the Site, including the following:

- HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Studies Field Investigation Report dated May 27, 2003, Revised September 19, 2003 by Camp Dresser and McKee Inc.; and
- Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001.

16. In a letter dated February 7, 2002 Mallinckrodt submitted proposed Preliminary Media Protection Standards (clean up standards) for the Site that they proposed as protective of public health and the environment. These are attached as Attachment 1.⁵⁴ Mallinckrodt submitted a Corrective Measures Study Workplan for the Site dated June 17, 2002 that included corrective measures that were to be retained for further detailed evaluation, including the excavation and offsite disposal of soils, including the five landfills.⁵⁵ On August 13, 2002 a public hearing was held by the Department and EPA regarding the appropriateness of the proposed Preliminary Media Protection Standards (PMPS) and the Corrective Measures Study (CMS) Workplan. Sixty separate comments were received on the proposed Preliminary Media Protection Standards and the Corrective Measures Study Workplan.⁵⁶ By a joint letter issued on January 21, 2003 DEP and EPA approved the Preliminary Media Protection Standards for the Site with revisions, as well as the Corrective Measures Study Workplan with conditions. The approved revised Preliminary Media Protection Standards now referred to as Media Protection Standards (MPS) are attached as Attachment 2. The Media Protection Standards are substantially similar to the Preliminary Media Protection Standards proposed by Mallinckrodt in its letter of February 7, 2002. The most significant change that EPA and DEP made to Mallinckrodt's proposed Preliminary Media Protection Standards was to change the basis for the Preliminary Media Protection Standards for mercury in sediment to the DEP standard that sets a goal for fish tissue levels of not more than 0.2 ppm of mercury, rather than the 0.3 ppm that is set forth in EPA guidance. This change results in a lowering of the sediment Media Protection Standard from an average of 3.2 ppm to 2.2 ppm⁵⁷. The soil Media Protection Standard, which is based on the sediment value, was correspondingly also lowered from 3.2 ppm to 2.2 ppm.⁵⁸

⁵⁴ Camp, Dresser and McKee letter dated February 7, 2002 from Ernest Ashley to Stacy Ladner, Maine DEP and Ernest Waterman US EPA, Region I.

⁵⁵ Mallinckrodt Inc., Corrective Measures Study Work Plan, HoltraChem Manufacturing Site, Orrington, Maine, dated June 17, 2002.

⁵⁶ HoltraChem Manufacturing Company Site Orrington, Maine Preliminary Media Protection Standards and Corrective Measures Study Workplan, Basis Statement and Response to Comment December 31, 2002, Enclosure 3 of January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine.

⁵⁷ This sediment value was for onsite sediments and sediments in the Penobscot River in the near vicinity of the facility. The agencies specifically deferred a sediment preliminary media protection standard for areas of the river further afield pending resolution of the Federal Court Case.

⁵⁸ January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine, at 1.

The lowering of the sediment and soil Media Protection Standards for mercury was the consequence of primarily two factors. First, the State of Maine adopted 0.2⁵⁹ ppm in fish tissue level as the state statutory standard on June 15, 2001, after EPA and DEP had tentatively decided on the fish tissue action level to use at the Site. Second, public comment on the proposed Preliminary Media Protection Standards contained numerous requests that the agencies use the state's fish tissue action level which had been finalized in statute after the Mallinckrodt/EPA/DEP discussions on the issue. EPA and DEP determined that the more stringent Maine standard was appropriate to use for this site.⁶⁰

EPA and DEP also eliminated the use of the 10.7 ppm limit for mercury in sediment and imposed a limit of one-quarter acre for the area used to determine "average" contamination levels. The agencies also stipulated that the two sediment hot spot areas identified in previous public meetings will be remediated. The locations are generally shown on maps in Attachment 3. Remediation of those areas would have resulted from an application of either the 3.2 or 2.2 ppm Preliminary Media Protection Standard. This change was made in response to public concerns about how averaging of sediment data would be used to demonstrate achievement of the sediment Media Protection Standard.⁶¹

EPA and DEP also limited the scope of the sediment Preliminary Media Protection Standard to the area immediately adjacent to the Site. Numerous comments were received from the public asserting the need for a more extensive study of the lower Penobscot River in order to establish a river wide sediment Preliminary Media Protection Standard. The agencies decided to postpone setting a Preliminary Media Protection Standard for the sediment in the Penobscot River downstream of the Site. This conclusion was reached in part as a result of the federal court case, in which the United States District Court for the District of Maine has ordered Mallinckrodt to fund an independent study to determine: (1) the extent of the existing harm to the Penobscot River and Bay south of the plant site, (2) the need for a remediation plan, if any, and (3) the elements of, and schedule for, completion of such a remediation plan. If the court-ordered study indicates that active remediation of the lower Penobscot is both necessary and feasible, EPA and DEP will want to consider those findings in any future action taken by the agencies. The agencies agree with the Court's finding that there is not currently a conflict between the Court's order requiring study of the lower river and any agency action.⁶²

Also in the joint letter issued on January 21, 2003 by DEP and EPA was the approval, with conditions, of the Mallinckrodt Corrective Measures Study Workplan. Key modifications to the workplan included: (1) retaining as a corrective measure for soils the evaluation of the excavation and removal of one or more onsite landfills as an option, (2) retaining as a corrective measure for soils the evaluation of the consolidation of one or more of the onsite landfills as an option, (3)

⁵⁹ In the January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards, an error was made in one location of the letter. In one location the Maine mercury fish tissue action level was stated as 2.2 ppm instead of 0.2 ppm. This error was corrected in the summary of this document provided in this Order.

⁶⁰ January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine, at 1.

⁶¹ January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine, at 2.

⁶² January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine, at 2.

retaining as a corrective measure for soils the evaluation of pipe removal of the industrial sewer as an option, (4) retaining as a corrective measure for soils that any onsite disposal unit must include the design criteria for the RCRA-C units,⁶³ and (5) installing an interim groundwater recovery well to capture the more heavily mercury contaminated groundwater downgradient of the industrial site and in the vicinity of Landfill #1.⁶⁴

17. On May 27, 2003 Mallinckrodt submitted a Corrective Measures Study dated May 2003. In this report Mallinckrodt evaluated various options for remediation of the Site. Specifically the report evaluates several options including the excavation and offsite disposal of soils, sediments and Landfill #2 but not Landfills #1, 3, 4, or 5. It also recommended the plugging of the old industrial sewer lines in lieu of removal. Mallinckrodt included in the report the Preliminary Media Protection Standards as approved by EPA and Maine DEP in the report⁶⁵. Mallinckrodt recommended in the Corrective Measures Study that the Corrective Action Program consist of: the excavation and treatment for elemental mercury-contaminated soils beneath the cell building; consolidation and capping of plant area soils; capping of Landfill #2 and the landfill ridge area soils; dredging of the Southern Cove sediments and the consolidation and capping of them with the plant area soils; the construction of a groundwater containment, collection, and treatment system; the plugging and abandonment in place of the industrial sewers; the lining of the piped portion of the Southerly Stream if leakage into the stream was detected; and the performance of operation of the groundwater pumping and treatment system, maintenance, and monitoring.⁶⁶
18. On July 23, 2003 the Department sent a letter to Mallinckrodt requesting that it revise and resubmit the Corrective Measures Study. In this letter the Department asked Mallinckrodt to include an evaluation of the removal of all landfills and to include an estimate of the emissions, truck traffic, and cost for accomplishing this, as compared against other alternatives. The Department also requested the removal of the old industrial sewer be included in the revised Corrective Measures Study.⁶⁷
19. Mallinckrodt submitted a revised Corrective Measures Study dated September 19, 2003. In this report Mallinckrodt included the Preliminary Media Protection Standards as approved by EPA and Maine DEP⁶⁸. Also in the revised Corrective Measures Study, Mallinckrodt conducted a threshold screening of potential corrective measures. As a part of this threshold screening, Mallinckrodt considered, in accordance with the joint EPA and DEP work plan approval⁶⁹, among other alternatives, the excavation and offsite disposal of soils, sediments, and landfills. This alternative

⁶³ RCRA - C refers to the Federal Resource Conservation and Recovery Act (RCRA), Subtitle C which is the section of law that governs hazardous waste management. RCRA - D refers to the same Act but the Subtitle D provision which governs non hazardous waste management. RCRA - C is a common name used to refer to a Hazardous Waste Program as opposed to RCRA - D which is a common name used to refer to a Solid Waste Program.

⁶⁴ January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine, at 2 and 3 of Enclosure 2.

⁶⁵ The Preliminary Media Protection Standards are in section 2.2 of the report, the numeric Preliminary Media Protection Standards in Table 2-1 of the report and the narrative standards within the text of section 2 of the report.

⁶⁶ Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study, May 2003.

⁶⁷ July 23, 2003 letter to Patricia Duft, Mallinckrodt, Inc. from Stacy Ladner, Maine DEP.

⁶⁸ These are contained in section 2.2 of the revised Corrective Measures Study, the numeric Preliminary Media Protection Standards (PMPS) in Table 2-1 of the report and the narrative standards within the text of section 2 of the report.

⁶⁹ January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine includes conditional approval of the Corrective Measures Study workplan.

met the threshold screening criteria (excluding the chloropicrin spill area)⁷⁰. Even though the excavation of Landfills #1, 3, 4, and 5 met the threshold screening criteria^{71, 72}, Mallinckrodt failed to carry the alternative of the excavation of these landfills through for a full evaluation. According to Mallinckrodt, the basis for this action was that they had

“evaluated the excavation and removal of Landfill 2, the one landfill that does not have an impermeable geomembrane cap. This landfill also has waste typically in contact with groundwater, while the other landfills do not. The other landfills have effective caps, will not have waste in contact with groundwater, and will be the subject of long-term groundwater monitoring. Therefore, the PMPSs and corrective action objectives for these landfills are adequately addressed without additional corrective action. The screening and detailed evaluation results are therefore not applicable to Landfills 1, 3, 4, and 5. However, the impacts [truck traffic and air emissions] and costs of removing these landfills are discussed in Section 4 [of the CMS report] for the purposes of comparison with the other alternatives.”⁷³

What was not discussed in the report was the long-term reliability and effectiveness; reduction in the toxicity, mobility or volume of the wastes; short term effectiveness; or implementability of this alternative.

The removal of the old industrial sewer was also evaluated as a part of the threshold screening of potential corrective measures. The removal of the old industrial sewer met the threshold screening

⁷⁰ Table 3-1, Table 3-2, Table 3-3, Table 3-4, and Table 3-6 of the Corrective Measures Study report.

⁷¹In the Corrective Measures Study, Mallinckrodt refers to the “threshold criteria” as “threshold screening criteria”. According to EPA’s CMS guidance (OSWER Directive 9902.3-2A) technologies that pass the screening step would be assembled into specific alternatives that would be evaluated against the threshold criteria (protect human health and the environment; attain media cleanup standards set by the implementing agency; control the source of releases so as to reduce or eliminate, to the extent practicable, further releases that may pose a threat to human health and the environment; and comply with applicable standards for management of wastes). Alternatives that meet the threshold criteria are further evaluated against five additional balancing criteria (long-term reliability and effectiveness; reduction in the toxicity, mobility or volume of wastes; short-term effectiveness; implementability; and cost).

⁷² In the September 19, 2003 Corrective Measures Study, Mallinckrodt in Section 3.3 provided additional details on the meaning of the threshold screening criteria. Specifically “overall protection of human health and the environment” includes for human health factors the mitigation of short and long term risks to human health created by residual contamination, including consideration of overall protection of human health during and after implementation of the corrective measure. Protection of environmental factors includes the mitigation of short and long term environmental effects of implementing each alternative, both beneficial and adverse effects. Overall protection of environmental receptors is considered. The ability of an alternative to reduce exposure and direct contact of environmental receptors with contamination is considered.

Under “Attainment of media cleanup standards” an assessment is made as to whether any preliminary media protection standard will not be achieved by the corrective measure due to technical infeasibility.

Under “control of sources of releases” the degree to which the sources of releases will be controlled or removed is considered. An evaluation is made of the ability of the alternative to adequately control the sources of releases to reduce or eliminate, to the extent practicable, further releases of hazardous waste or hazardous constituents to the environment.

“Compliance with applicable waste management standards” considers whether the corrective measure alternative meets the applicable Federal, State and local regulations.

⁷³ Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study, September 19, 2003, at 3-6.

criteria (Table 3-8 of the CMS report). Even though it met the threshold screening criteria, Mallinckrodt also failed to carry this alternative forward for a detailed evaluation.

Mallinckrodt recommended in the revised Corrective Measures Study that the Corrective Action Program consist of: the excavation and treatment for elemental mercury-contaminated soils beneath the cell building; consolidation and capping of plant area soils; capping of Landfill #2 and the landfill ridge area soils; dredging of the Southern Cove sediments and the consolidation and capping of them with the plant area soils; the construction of a groundwater containment, collection, and treatment system; the plugging and abandonment in place of the industrial sewers; and the performance of operations, maintenance, and monitoring.⁷⁴

20. The Department disagrees with the CMS technical reasons why removal of the landfills was not carried forward for detailed evaluation. These reasons include but are not limited to the fact that leakage discharges from landfills # 2, 3, 4 and 5, that landfill #2 and landfill #4 are seasonally in contact with the groundwater table, and that landfill #1 is not able to be monitored for leakage due to the strong contaminant signal passing through the landfill #1 area from upgradient sources. Even though the Department was not fully in agreement with the revised CMS, the Department was interested in obtaining public comments on the options as outlined in the revised CMS.
21. The revised Corrective Measures Study was the subject of public review and comment, including a public hearing on January 13, 2004. The public comment period closed on January 16, 2004. Thirty seven separate comments were received on the appropriateness of Mallinckrodt's Corrective Measures Study and their recommended option. Most of these comments were opposed to the Mallinckrodt recommended corrective actions for the Site, specifically what was viewed by the public as undue focus on short term impacts at the expense of long term risks and long term effectiveness and permanence of the clean up. Many of the commenters specifically asked to have the mercury soil and landfills removed from the site so that future generations would not have to deal with these wastes.⁷⁵
22. On November 22, 2004 the Department requested additional information as a part of the Corrective Measures Study record. This information included a detailed evaluation of two alternatives. (1)⁷⁶ The excavation and disposal in an onsite management unit equivalent to a RCRA Subtitle C landfill of all solid media exceeding the Preliminary Media Protection Standards. These media include plant area soils, cell building soils, sediments, landfill ridge soils, and sludges and other mercury-contact material from all five landfills. Free elemental mercury, if present, was to be removed by physical treatment processes such as gravity separation or soil washing. Chemical stabilization was to be applied to sludges, fines from soil washing, and any media with sorbed mercury content above Land Disposal Restriction limits⁷⁷. (2)⁷⁸ Excavation and disposal offsite in a licensed disposal unit of all solid media exceeding the Preliminary Media Protection Standards. These media include plant area soils, cell building soils, sediments, landfill

⁷⁴ Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study, September 19, 2003.

⁷⁵ Mallinckrodt Site, aka HoltraChem Manufacturing Company Site, Orrington, Maine, Corrective Measures Study Basis Statement and Response to Comments, September 5, 2008.

⁷⁶ Referred to by Mallinckrodt as "Requested Alternative A".

⁷⁷ Land Disposal Restrictions identify hazardous wastes that are restricted from land disposal without prior treatment to reduce the toxicity and/or mobility of hazardous constituents in the waste. 06-096 CMR Chapter 852 and 40 CFR Part 268.

⁷⁸ Referred to by Mallinckrodt as "Requested Alternative B".

ridge soils, and sludges and other mercury-contact material from all five landfills. Media were to be treated prior to shipment to meet the requirements of the disposal facility or, if necessary, to reduce emissions during excavation and/or transportation. If emissions could be successfully managed by other means, media could be treated at the disposal facility.⁷⁹

23. Mallinckrodt submitted the additional information regarding the evaluation of alternatives in a report entitled Attachment 1 - Response to MEDEP Request for Additional Information, dated February 2005. In this document the excavation and offsite disposal of all sediments and soils exceeding the Preliminary Media Protection Standards, including landfill sludges and materials was identified as "Requested Alternative B." The total volume of material to be excavated was estimated at 246,720 cubic yards. Eighty thousand one hundred (80,100) cubic yards would be transported to an industrial (special waste) landfill and one hundred sixty thousand one hundred (160,100) cubic yards to a hazardous waste landfill. Mallinckrodt rejected this option as well as another consolidation option referred to as "Requested Alternative A."⁸⁰ This concluded the RCRA Corrective Measures Study Process.
24. At the time of EPA authorization of DEP's RCRA Corrective Action Program, EPA and DEP entered into a 1997 memorandum of agreement under which EPA acknowledged that DEP would issue a clean up order for the Site.

Uncontrolled Sites Law and Order

25. The Maine Uncontrolled Hazardous Substance Sites Law, 38 M.R.S.A. §§ 1361 et seq. defines "hazardous substance"⁸¹ as:
 - a. Any substance identified by the Board of Environmental Protection under 38 M.R.S.A. § 1319-0 as a hazardous waste;
 - b. Any substance identified by the Board under 38 M.R.S.A. § 1319 as a hazardous matter;⁸²
 - c. Any substance designated pursuant to the United States Comprehensive Environmental Response, Compensation and Liability Act of 1980, Public Law 96-510 §§ 101 and 102 [Superfund];
 - d. Any toxic pollutant listed under the United States Federal Water Pollution Control Act § 307(a);

⁷⁹ November 22, 2004 letter to Patricia Duft, Mallinckrodt, Inc. from Stacy Ladner, Maine DEP.

⁸⁰ Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington Maine, Attachment 1- Response to MEDEP Request for Additional Information, dated February 2005. A revised version of this document was produced and filed by Mallinckrodt entitled the same as the original but with the addition of "Revised April 2005 to address MEDEP comments). This revision contained changes to the emission estimates between the various options and as compared to the Mallinckrodt version recommended in the CMS.

⁸¹ 38 M.R.S.A. § 1362(1).

⁸² 06-096 CMR Chapter 800 (February 3, 1981).

- e. Any hazardous air pollutant listed under the United States Clean Air Act § 112;
 - f. Any imminently hazardous chemical substance or mixture with respect to which the Administrator of the United States Environmental Protection Agency has taken action pursuant to the United States Toxic Substances Control Act § 7; and
 - g. Waste oil as defined in 38 M.R.S.A. § 1303-C.
26. An “uncontrolled hazardous substance site” or “uncontrolled site” is defined at 38 M.R.S.A. § 1362(3) as “an area or location, whether or not licensed, at which hazardous substances are or were handled or otherwise came to be located, if it is concluded by the commissioner that the site poses a threat or hazard to the health, safety or welfare of any person or to the natural environment and that action..... is necessary to abate, clean up or mitigate that threat or hazard. The term includes all contiguous land under the same ownership or control and includes without limitation all structures, appurtenances, improvements, equipment, machinery, containers, tanks and conveyances on the site “.
27. A “responsible party” is defined at 38 M.R.S.A. § 1362(2)(B) to include “any person who owned or operated the uncontrolled site from the time any hazardous substance arrived there.”
28. The legislative intent of the Uncontrolled Hazardous Substance Sites Law is stated at 38 M.R.S.A. § 1361 as:

The Legislature finds and declares that uncontrolled hazardous substance sites within the jurisdiction of the State present a hazard to all the people of the State and that hazard poses a threat or potential threat to the public health, safety or welfare, to the environment of the State and to owners and users of property near or adjacent to uncontrolled sites.

The Legislature further finds that adequate measures must be taken to ensure that the threats posed by uncontrolled hazardous substance sites are abated, cleaned up or mitigated properly.

The Legislature further finds that it is in the public interest of the State and its citizens to provide the capacity for prompt and effective planning and implementation of plans to abate, clean up or mitigate threats posed or potentially posed by uncontrolled sites. This paramount state interest outweighs any burden, economic or otherwise, imposed by this chapter. [Emphasis added]

29. Mallinckrodt handled hazardous substances, as that term is defined at 38 M.R.S.A. § 1362(1) and the regulations promulgated thereunder, including mercury and other chemicals in the manufacturing activities described above,⁸³ and generated hazardous wastes, as described above

⁸³ By way of example, mercury is defined as a toxic pollutant under the Federal Water Pollution Control Act, Section 307(a); a hazardous air pollutant under the Clean Air Act, Section 112; and a hazardous waste under 06-096 CMR 850 (July 20, 2004).

and as defined at 38 M.R.S.A. § 1319-O and regulations promulgated thereunder, from said manufacturing activities, including mercury sludges which were handled on the Site.

30. Mallinckrodt's handling of hazardous substances at the Site has resulted in the discharge of hazardous substances upon the land, into the air, into the groundwater and into the surface waters of the State.
31. Besides the above referenced discharges of mercury, the SI Report documented many additional discharges and spills of hazardous wastes and other hazardous substances as well as other pollutants. See Attachment # 4.
32. The following hazardous substances in addition to mercury, as defined in 38 M.R.S.A. § 1362(1), are found in environmental media on the Site: cresol, 1,1 dichloroethane, 1,1 dichloroethene, acetone, bromoform, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, hexachlorethane, methylene chloride, pentachloroethane, polychlorinated biphenyl, tetrachloroethene, trichloroethene, arsenic, barium, lead, cadmium, chromium, and manganese.
33. Besides these hazardous substances, other contaminants of concern are located on the Site. They include: bromodichloromethane, chloropicrin, and dibromochloromethane. Although not listed as hazardous substances pursuant to Maine law, these contaminants pose the following dangers to public health and the environment:

Bromodichloromethane and dibromochloromethane are trihalomethanes, two of four chemicals that are formed when chlorine reacts with organic matter. The other two trihalomethanes are chloroform and bromoform. Bromodichloromethane is classified by the US Environmental Protection Agency as a probable human carcinogen based upon inadequate human data and sufficient evidence of carcinogenicity in two animal species.⁸⁴ Dibromochloromethane is classified by the EPA as a possible human carcinogen based upon inadequate human data and limited evidence of carcinogenicity in animals.⁸⁵

Chloropicrin is a poison by ingestion, intravenous, and intraperitoneal⁸⁶ routes. It is a powerful irritant that affects all surfaces. It causes lacrimation, vomiting, bronchitis, pulmonary edema, and irritation to gastrointestinal and respiratory tracts. Its primary lethal effect is to produce lung injury. An additional toxic effect is its reaction with SH-groups in hemoglobin thus interfering with oxygen transport. Chloropicrin vapor is heavier than air and spreads along the ground. It has been used as a military poison gas and is used as a fumigant insecticide.⁸⁷

34. Soil samples taken at the Site as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf show the presence in the soils at the Site of mercury and other pollutants.

⁸⁴ Toxnet, U.S. National Library of Medicine, National Institutes of Health, last revised March 7, 2005.

⁸⁵ Toxnet, U.S. National Library of Medicine, National Institutes of Health, last revised February 5, 2003.

⁸⁶ Definition of intraperitoneal is within the peritoneal cavity, the area that contains the abdominal organs. Medical Dictionary of MedicineNet.com, last editorial review 3/26/98.

⁸⁷ Site Investigation Report, HoltraChem Manufacturing Site, Orrington, Maine, Volume V, Appendix E dated December 22, 1995.

The other hazardous substances and pollutants include chloropicrin, arsenic, barium, cadmium, chromium, lead, and polychlorinated biphenyls (PCBs). A partial summary of these samples is attached as Appendix #1. Those bolded are present at levels exceeding the Media Protection Standards.

35. Laboratory analyses of groundwater samples taken at the Site as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf show the presence in the groundwater at the Site of mercury and other pollutants. The other hazardous substances and pollutants include 1,1 dichloroethane, acetone, bromodichloromethane, bromoform, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, chloropicrin, dibromochloromethane, methylene chloride, tetrachloroethene, trichloroethene, and manganese. A partial summary of these samples is attached as Appendix #2. A partial summary of groundwater samples from around the five landfills is attached as Appendix #3. Those bolded are present at levels exceeding the Media Protection Standards.
36. Surface water samples taken at the Site as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf show the presence in the surface water at the Site of mercury and other pollutants. The other hazardous substances and pollutants include carbon tetrachloride and chloroform. A summary of these samples is attached as Appendix #4. Those bolded are present at levels exceeding the Media Protection Standards.
37. Surface water samples taken adjacent to the Site in the Penobscot River as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf shows the presence of mercury. A summary of these samples is attached as Appendix #5.
38. Sediment samples taken at the Site as reported in the SI Report show the presence in the sediment at the Site of mercury. This hazardous substance is present at levels exceeding Media Protection Standards. A summary of these samples is attached as Appendix #6. Those bolded are present at levels exceeding the Media Protection Standards.
39. Sediment samples taken adjacent to the Site in the Penobscot River as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf show the presence of mercury. This hazardous substance is present at levels exceeding Media Protection Standards. A summary of these samples is attached as Appendix #7. Those bolded are present at levels exceeding the Media Protection Standards.
40. Sediment samples taken downstream from the Site in the Penobscot River as reported in the SI Report and subsequent reports produced on Mallinckrodt's behalf show the presence of mercury. A summary of these samples is attached as Appendix #8.
41. Biological samples taken at the Site as reported in the SI Report show the presence of mercury in biota at the Site at levels substantially in excess of background biota. A summary of these samples is attached as Appendix #9.
42. HoltraChem installed a groundwater collection system on Site adjacent to the Southerly Stream for the collection of high pH and mercury contaminated groundwater in this area of the Site.

Mallinckrodt installed a groundwater collection system consisting of one well that is pumped continually, downgradient of Landfill #1, which partially captures and treats the mercury contaminated groundwater from the industrial portion of the Site. These groundwater collection systems only partially capture and treat contaminated groundwater from the industrial part of the Site. Uncaptured contaminated groundwater is still discharging to the Penobscot River from this area and will continue until the full scale corrective measure for groundwater is implemented.⁸⁸

43. The SI Report and subsequent reports submitted on Mallinckrodt's behalf document that the groundwater quality, surface water quality and biological life in the vicinity of the Site and the Penobscot River are threatened by the continued presence of hazardous substances including but not limited to mercury, on and emanating from the Site.⁸⁹
44. The SI Report and subsequent reports submitted on Mallinckrodt's behalf document that the sediments in the Penobscot River, Southerly Stream and Northerly Drainage are contaminated with the hazardous substance, mercury, which pollutes the surface water and negatively affects the biological life on and adjacent to the Site.⁹⁰
45. The SI Report and subsequent reports submitted on Mallinckrodt's behalf document that soils on the Site are contaminated with the hazardous substance, mercury, and other contaminants which negatively affect the groundwater quality, surface water quality, sediment quality, air quality, and biological life on and adjacent to the Site.⁹¹
46. The SI Report and subsequent reports submitted on Mallinckrodt's behalf document that hazardous substances and other pollutants including mercury found in the Southerly Stream and Northerly Drainage are discharged to the Southerly Cove, which is in the Penobscot River adjacent to the Site, and that contaminated groundwater on the Site flows toward and eventually discharges to the same cove, and other parts of the Penobscot River.⁹²
47. As part of the Site Investigation process overseen by EPA and DEP, Media Protection Standards designed to protect the public health and safety were developed as the cleanup levels for soils, ground water, surface water and sediment. Hazardous substances remain onsite that, as described above, exceed the Media Protection Standards and therefore pose a danger to the public health, safety and the environment.
48. In a 1995 groundwater quality assessment report for Landfill #5 done by Acheron, Inc. on behalf of HoltraChem. HoltraChem acknowledged the existence of “statistically significant increases in concentrations of an indicator parameter during an Interim Status Detection Monitoring Program.”⁹³ “The December 1994 round served as a verification – resampling round for statistical exceedances observed in TOX⁹⁴ values for wells B-306-B1 and B-306-B2 during the October

⁸⁸ Mallinckrodt has also installed treatment systems on two of the Ferry Road residential wells for the removal of salt.

⁸⁹ See Appendix 1 through 9 of this Order.

⁹⁰ See Appendix 1, 4 through 9 of this Order.

⁹¹ See Appendix 1 through 9 of this Order.

⁹² See Appendix 2 through 8 of this Order.

⁹³ Ground Water Quality Assessment Plan for Landfill #5, February 3, 1995, Acheron, Inc. for HoltraChem, at 1.

⁹⁴ The TOX (total organic halides) method detects all organic halides containing chlorine, bromine, and iodine.

1994 round.”⁹⁵ “Carbon tetrachloride was disposed of in the north end of Landfill #5. IMC disposed of 360 gallons of this material from July 1980 to February 1982.”⁹⁶ “Landfill #4 also received carbon tetrachloride and chlorate wastes, and data collected during the Phase I SI suggested that ground water is often in contact with the wastes at the base of Landfill #4.”⁹⁷ Carbon tetrachloride and its breakdown product chloroform are organic halides and are measured as chlorine by the TOX test⁹⁸.

49. In a 1996 report on ground water quality for Landfill #5 by Acheron, Inc. for HoltraChem, “HoltraChem propose[d] to continue assessment monitoring of trigger wells 306-B1 and 306-B2, to monitor concentrations of carbon tetrachloride and chloroform downgradient of Landfill 5 as discussed in 40 CFR Part 265.93(d)(7). Background (upgradient) wells 303-B1/B2/B3/01 will also continue to be sampled as part of the quarterly Assessment Monitoring Program to provide a basis for comparison of water quality upgradient and downgradient of Landfill #5.”⁹⁹ Mallinckrodt has continued this triggered¹⁰⁰ assessment monitoring of Landfill #5 and has not disputed the presence of contamination in the downgradient wells monitoring Landfill #5.

50. The landfills onsite pose a number of concerns when considering a long term solution to the hazardous substances present on the Site:

a. Siting Concerns:

- i. The Maine Hazardous Waste Management Rules (Rules) 06-096 CMR 850-857 set out siting criteria for the location of landfills for hazardous waste. The Rules contain rebuttable presumptions¹⁰¹ for a waste facility for hazardous waste located (partial list):
 1. On facility property located on a wetland;
 2. On facility property located within 300 feet of any 100 year flood plain or within 300 feet of any documented flood of greater magnitude;
 3. On facility property located within one mile upgradient of any underground source of public drinking water, or within the watershed of a surface water source of public drinking water, or within 1,000 feet of any source of potable water for human or livestock; or

⁹⁵ Ground Water Quality Assessment Plan for Landfill #5, February 3, 1995, Acheron, Inc. for HoltraChem, at 18.

⁹⁶ Ground Water Quality Assessment Plan for Landfill #5, February 3, 1995, Acheron, Inc. for HoltraChem, at 9.

⁹⁷ Ground Water Quality Assessment Plan for Landfill #5, February 3, 1995, Acheron, Inc. for HoltraChem, at 35.

⁹⁸ Parameters used as indicators of ground-water contamination are pH, specific conductance, total organic carbon, and total organic halogen. A comparison of background values to downgradient wells using the Student’s t-test is done to determine statistically significant increases, and decreases in the case of pH, over background values. If the comparisons show a significant increase, or pH decrease, resampling is done and if it is still a significant increase, or pH decrease, a groundwater assessment monitoring program must be implemented. 06-096 CMR Chapter 855.9B and 40 CFR Part 265.92-93 (July 1, 1988).

⁹⁹ Report on Initial Ground Water Quality Assessment Monitoring Program Landfill 5, March 1996, by Acheron, Inc. for HoltraChem, at 22.

¹⁰⁰ “Triggered” is a term used to reference wells that have statistically significant increases, or decreases for pH, of the indicators of groundwater contamination. These wells are therefore “triggered” and are required to have ongoing assessment monitoring of the specific type and levels of contamination.

¹⁰¹ Areas of a site that meet the “rebuttable presumption” criteria are presumed to pose serious threats to public health or welfare or to the environment such that a license for a facility cannot be issued. This presumption can only be overcome by persuasive evidence that the facility is unique in some way that allows for compliance with the intent of the rule. 06-096 CMR 854.7B.

4. On facility property located such that it may pose a threat to fisheries or wildlife or other natural resources in an area including a sanctuary, refuge, or preserve, a state or federal park, sanctuary, or designated wilderness area, or a critical area, or to fish in a fish hatchery.
- ii. The Rules in 06-096 CMR 4F requires interimly licensed hazardous waste facilities, such as the Mallinckrodt site, and that are leaving waste on site, to obtain a post closure license for among other things the groundwater monitoring and corrective action activities at the site. The Rules in 06-096 CMR 10A(11) require that “the Department will consider an application only when an applicant has demonstrated sufficient title, right, or interest in all of the property which is proposed for development or use. An applicant shall demonstrate in writing sufficient title, right and interest...”
 - iii. Landfills at the site are located on property with wetlands including a pond, Southerly Stream and associated wetlands. Landfill #2 is located directly adjacent to Southerly Stream (less than 50 feet). Landfill #1 is located within 300 feet of the 100 year flood plain of the Penobscot River. Landfill #2, #3, #4, and #5 is located within 300 feet of the 100 year flood plain of the Southerly Stream. Landfill #1 is located within 1,000 feet of sources of potable water for humans or livestock. The location of the five landfills poses a threat to fisheries, wildlife, and natural resources due to their close location to the Penobscot River and Southerly Stream which flows to the Penobscot River. The Site is not owned by Mallinckrodt, nor is the Department aware of any title, right or interest to the property which Mallinckrodt holds.
- b. Design Concerns:
- i. The Rules contain performance and design standards for the establishment, construction, alteration and operation of waste landfills for hazardous waste in Maine:
 1. “Landfills are regarded by the Board as the least preferable method of hazardous waste handling. While it is expected that the expense of landfilling will discourage its use, the Board, prior to approval of any application for a hazardous waste landfill, will consider whether alternative preferred method(s) exist for handling a waste proposed to be landfilled.”¹⁰²
 2. “A hazardous waste landfill must be designed, constructed, and installed to prevent any migration of wastes out of the landfill to adjacent subsurface soil or ground water or surface water at any time during the life, including the post-closure period, of the landfill.”¹⁰³
 3. All new, replacement, or expanded portions of a landfill must be at least double-lined with at least one of the liners a minimum thickness of 80

¹⁰² 06-096 CMR 854.8A(1)

¹⁰³ 06-096 CMR 854.8A(2)

mil's. The liners must overlie a minimum of ten (10) feet of clay deposits.¹⁰⁴

4. "A leachate detection, collection, and removal system must be installed immediately above the top liner to assure that leachate is collected and removed. In addition a leachate detection, collection and removal system must be installed between the top and bottom liners."¹⁰⁵
5. "A buffer zone of at least 200 feet must be designed and maintained between the boundaries of the facility property and the boundaries of the landfill and of any other area of the property where hazardous waste will be handled."¹⁰⁶

- ii. The landfills at the site do not meet the current Maine design standards for hazardous waste landfills. The landfills do not have a double or single liner beneath the landfilled wastes. There is no leachate collection system beneath any of the landfills. Landfills #2, #3, #4 and #5 have not been designed or operated to prevent the migration of wastes from the units as evidenced by the leaching from these landfills. Landfill #1 does not have a 200 foot buffer between the landfill and the property boundary. Landfill #2 does not have a 200 foot buffer from the landfill to the area expected to be developed by the current property owner. Landfill #3 does not have a 200 foot buffer between it and a hazardous waste handling area, the onsite wastewater treatment plant. The bottom of Landfills #2¹⁰⁷ and #4¹⁰⁸ are in contact seasonally with groundwater.

51. The industrial sewer and other associated pathways beneath the HoltraChem industrial portion of the site continue to contribute mercury to the Penobscot River. Approximately 0.02 pounds of mercury exited this system through one monitored location, Outfall 001, in 2007. This is 28 times the amount discharged by the licensed wastewater treatment process for 2007.¹⁰⁹ In addition a three day violation of the facility's wastewater license for maximum daily mercury discharge occurred from January 12 through 14, 2008. The stated cause of this exceedance was from groundwater and/or storm water infiltration into the outfall. The treated sources (process water including decontamination water, partial groundwater collection system in area of landfill #1, and groundwater collection system in the area of the railroad loading shed and the Southerly Stream) represented about 27% (29,400 gallons) of the total flow measured (109,000 gallons) at the outfall to the Penobscot River.¹¹⁰ Another three day violation of the facility's wastewater license occurred from February 20 through the 22, 2008. The stated cause of this exceedance was again from groundwater and/or storm water infiltration into the outfall. The treated sources represented about 37% (38,539 gallons) of the total flow measured (103,000 gallons) at the outfall to the

¹⁰⁴ 06-096 CMR 854.8B (1) (2) and (4).

¹⁰⁵ 06-096 CMR 854.8B(8)

¹⁰⁶ 06-096 CMR 854.8B(15)

¹⁰⁷ Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study, September 19, 2003 at 3-6.

¹⁰⁸ January 15, 2004 letter from Patricia Hitt Duft of Mallinckrodt, Attachment 1, page 3.

¹⁰⁹ December 2007 Discharge Monitoring Report filed by David R. Tonini, PE., CDM on behalf of Mallinckrodt, January 9, 2008.

¹¹⁰ Non-Compliance /Incident Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, January 18, 2008.

Penobscot River¹¹¹. A third five day violation of the facility's wastewater license for maximum daily mercury discharge occurred from March 10 through 14, 2008. The stated cause of this exceedance was again from groundwater and/or storm water infiltration into the outfall. The treated sources represented about 40% (50,310 gallons) of the total flow measured (125,000 gallons) at the outfall to the Penobscot River¹¹². For the first three months of 2008, the amount of mercury discharged just through outfall 001 is 0.03 lbs.¹¹³ or already over what was discharged from this outfall during the entire 2007. A fourth four day violation of the facility's wastewater license for maximum daily mercury discharge occurred from May 1 through 4, 2008. The stated cause of this exceedance was again from groundwater and/or storm water infiltration into the outfall. The treated sources represented about 31% (44,409 gallons) of the total flow measured (144,000 gallons) at the outfall to the Penobscot River¹¹⁴. For the first four months of 2008, the amount of mercury discharged just through outfall 001 is 0.06 lbs.^{115, 116}

On October 5 and 6, 1999 Vermont Pipeline Services conducted a television inspection of the industrial sewers on behalf of HoltraChem Manufacturing Co¹¹⁷. The inspection report notes that the piping runs leading to outfall 001 are under water, as is manhole #13 which is the last manhole between the old industrial sewer and outfall 001. An analysis of the report by the Department concluded that "much of the pipe was uninspectable due to surcharged manholes, debris obstructions, crushed or out-of-round pipe, steam obscuring the camera's view, or lack of access....the entire process sewer collection network seems to flow without treatment to the discharge weir near the Southerly Stream. There pH is monitored continuously, but the wastewater is tested for other constituents only per HMC's NPDES permit^{118, 119, 120}." These underground pipes, fill material, and associated structures will continue to provide short circuit pathways unless they are removed.

52. On August 21, 2006 the U.S. Department of Health and Human Services, Agency for Toxic Substances and Disease Registry (ATSDR) issued a Health Consultation on the public health hazard of four remedial alternatives for the HoltraChem site.¹²¹ This Health Consultation was requested by the Maine Department of Health and Human Services and the Maine Department of Environmental Protection. The alternatives evaluated ranged from leaving media undisturbed to

¹¹¹ Non-Compliance /Incident Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, February 25, 2008.

¹¹² Revised Non-Compliance /Incident Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, March 17, 2008.

¹¹³ March 2008 Discharge Monitoring Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, April 8, 2008.

¹¹⁴ Non-Compliance/Incident Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, May 9, 2008.

¹¹⁵ March 2008 Discharge Monitoring Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, April 8, 2008.

¹¹⁶ Non-Compliance/Incident Report filed by David R. Tonini, CDM on behalf of Mallinckrodt, May 9, 2008.

¹¹⁷ Television Inspection, Orrington, Maine prepared by Vermont Pipeline Services, cover letter dated October 27, 1999.

¹¹⁸ Email memo from Fred Lavallee to Scott Whittier, dated April 18, 2000, paragraph 1 and 3.

¹¹⁹ The reference in the email to the entire process sewer flowing untreated to outfall 001 does not refer to wastes which were treated in the wastewater treatment plant and then discharged through outfall 002 into the process sewer lines to outfall 001. Outfall 001 discharges to the Penobscot River.

¹²⁰ HMC refers to HoltraChem and NPDES refers to the National Pollution Discharge Elimination System. A number of the contaminants found in the groundwater and soils onsite are not monitored and reported in the Discharge Monitoring Reports required in the NPDES permit #ME0000639, by way of one example, chloropicrin.

¹²¹ HoltraChem Manufacturing Company, Orrington, Penobscot County, Maine, Health Consultation, August 21, 2006, U.S. Department of Health and Human Services, Public Health Service, Agency for Toxic Substances and Disease Registry, Division of Health Assessment and Consultation.

disposal in an onsite management unit to removal and disposal in an offsite facility.¹²²The alternative selected in this Order was one of the four alternatives evaluated by ATSDR.

As a part of this evaluation, ATSDR reviewed data from the Industrial Source Complex Short Term (ISCST3) dispersion model and concluded that mercury concentrations in off-site areas would not be a public health hazard.¹²³ This conclusion was based on only one landfill being open for remediation at a time and modeled emissions – not environmental data. Therefore ATSDR concluded that landfill excavation should proceed cautiously with increased frequency of air monitoring for mercury until analytical data on the type of mercury and its concentration are obtained and evaluated. Specifically ATSDR recommended increased frequency of mercury air monitoring when each landfill is initially opened, until air monitoring shows that mercury levels are consistently below levels of health concern. They further recommended that the modeling be re-run if:

- a. Analytical data from materials in the landfills show that the mercury present is different or its concentration is higher than estimated,
- b. More than one landfill will be open at a time,
- c. The assumed hours (7 am to 9 pm) or months of operation (May 1st through November 30th) change,
- d. Any development is proposed within 1 mile of the plant before completion of the excavation of the 5 landfills; or
- e. Any other changes occur that could affect the off site concentrations of mercury.¹²⁴

53. Various alternatives were identified in the Corrective Measures Study process including the alternative of removal of the contaminants from solid media onsite. Those alternatives were presented to the public for public comment on January 13, 2004. In consideration of public comments, after review of the Uncontrolled Hazardous Substance Sites Law including its preamble, after analysis of the various alternatives, and to remove the threats to public health, safety and the environment, the Department selects the following remedies to protect public health, provide long term protection of the environment, result in acceptable long term maintenance requirements, reduce or eliminate the future source of mercury and other pollution and to address the threats:

- a. The remedy described as "Requested Alternative B" from the report produced by Mallinckrodt entitled, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine, Attachment 1 - Response to MEDEP Request for Additional Information dated February 2005. Under this alternative Mallinckrodt would:
 - i. Excavate all solid media exceeding the Media Protection Standards. This includes all Plant Area Soils, Cell Building Soils, Sediments, Landfill Ridge Soils, and sludge and other mercury-contaminated material from all five landfills;
 - ii. Prior to shipment, treat media to meet the requirements of the disposal facilities or, if necessary, to reduce emissions during excavation and/or transportation (If

¹²² Id. at 5.

¹²³ Id. at 10.

¹²⁴ Id. at 12.

emissions can be successfully managed by other means, media may be treated at the disposal facility to meet acceptance requirements.); and

- iii. Dispose of all excavated media exceeding the Media Protection Standards in licensed offsite disposal units.
- b. The remedy described as "Threshold Screening for Surface Water Alternative, Table 3-8", removal of the industrial sewer threats through pipe removal. This alternative was evaluated in the document prepared by Mallinckrodt entitled Mallinckrodt Inc, HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study dated September 19, 2003.
- c. The remedy described as "Alternative 1 for Corrective Measures for groundwater." The remedy described as from the report produced by Mallinckrodt entitled, Mallinckrodt Inc, HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study dated September 19, 2003. Under this alternative Mallinckrodt would:
 - i. Construct a groundwater cutoff barrier wall downgradient of the plant and Landfill #1;
 - ii. Develop a groundwater extraction system comprised of a series of groundwater pumping wells upgradient of the barrier wall; and
 - iii. Pump the contaminated groundwater to a groundwater treatment system.
- d. Corrective actions to address the surface water impacts including:
 - i. Removal of Lined Process Lagoon, Section 6.7.1 from the report produced by Mallinckrodt entitled, Mallinckrodt Inc, HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Study dated September 19, 2003;
 - ii. Operations, maintenance and monitoring of groundwater pumping and treatment system; and
 - iii. Ongoing monitoring of surface waters to assess impacts with provisions for additional corrective actions to meet Media Protection Standards, if applicable.

54. A Comprehensive Monitoring Plan submitted on behalf of Mallinckrodt was approved by the Department on June 16, 1998 and subsequently modified on February 21, 2001 for the purpose of monitoring the discharges at and from the Site and the solid waste management units.¹²⁵ A

¹²⁵ Corrective actions at hazardous waste facilities extend to discharges and waste management units where either solid or hazardous waste was managed, regardless of the time at which waste was placed in such unit. Owners and operators of landfills are subject to a post closure permit or other similar enforceable document if they received waste after July 26, 1982 or certified closure after January 26, 1983. This enforceable document must institute corrective action for all releases of hazardous waste or constituents from any solid waste management unit at the facility. 40 CFR 265.121; 40 CFR 270.1(c); 40 CFR 264.101; and EPA RCRA Permit Policy Compendium 9502.1985(09), December 16, 1985. Landfill #5 last received hazardous waste after July 1982 and certified closure after January 1983. Therefore under Federal Law, all of the solid waste management units, including the other four landfills, are subject to corrective actions. Under Maine Law, any sites where hazardous substances are located and are released into the environment authorizes the State to pursue remedial actions when necessary. 38 MRSA § 1362 and 1365.

Sediment Prevention Plan submitted on behalf of Mallinckrodt was approved by the Department on October 6, 1998 for the purposes of preventing the discharge of sediment from the Site.

55. HoltraChem began and Mallinckrodt completed removal of chemicals from the Facility and removal of mercury from the cells. Mallinckrodt began dismantling the Facility including the cleaning of tanks and structures and the dismantling of the plant but further removal and dismantling activities must be completed before the remedial activities associated with soils, groundwater, solid waste management units, surface water, air emissions, and sediments can begin.
56. The Department conditionally approved a proposal, now referred to as "Phase 4¹²⁶" of the Facility Dismantling Plan, on October 10, 2006 and a "Phase 5¹²⁷" of the Facility Dismantling Plan, on August 2, 2007. Mallinckrodt has completed implementation of Phase 4 and Phase 5. Phases 4 and 5 partially satisfy the Uncontrolled Hazardous Substance Sites Law objective of eliminating structures that will not be used at the conclusion of remediation and that would impede remediation of the contaminated media, but additional tasks beyond Phase 4 and 5 must be accomplished to attain these objectives.
57. Dismantlement of all structures at the Facility, not to be used after the conclusion of remediation, is necessary to remove all remaining sources of hazardous substance located in and under these structures and to prevent structures from falling into disrepair and becoming physical hazards. Dismantlement of these structures is also necessary to enable remedial activities associated with soils, groundwater, solid waste management units, and sediment to proceed at the Site in an efficient manner.

CONCLUSIONS OF LAW

Based upon the investigation, inspections, sampling and analysis described above, the Commissioner has determined that:

- A. Hazardous substances, as defined in 38 M.R.S.A. § 1362(1) and other pollutants, including but not limited to, cresol, 1,1 dichloroethane, 1,1 dichloroethene, acetone, bromoform, carbon disulfide, carbon tetrachloride, chlorobenzene, chloroform, chloromethane, hexachlorethane, methylene chloride, pentachloroethane, polychlorinated biphenyl, tetrachloroethene, trichloroethene, bromodichloromethane, chloropicrin, dibromochloromethane, arsenic, barium, lead, cadmium, chromium, manganese, and mercury have come to be located in the environmental media at the Site;
- B. Hazardous substances and contaminants of concern located at and released into the environment at the Site pose a threat, or danger, or hazard to the public health, to the safety of

¹²⁶ Phase 4 includes the demolition of the Cell Building, Hydrogen Building, Retort Building, Liquefaction Building,, Drying Shed, Utility Building, Sludge Press Building, and 11 tanks.

¹²⁷ Phase 5 includes the demolition of 3 River Well Pump Houses, the Old Well Pump Station, Paint Shop, Filtered Brine Pump House, Nitromethane Building, 9 tanks, and 4 pipe racks.

any person or to the environment, and migration of these constituents will continue off site if actions are not taken;

- C. Remedial action is necessary to terminate, abate, clean up, or mitigate the threat, danger, likelihood of danger, or hazard to the public health or safety and to the environment posed by the presence of hazardous substances and contamination of concern at the Site;
- D. The Facility is an uncontrolled hazardous substance site as defined in 38 M.R.S.A. § 1362(3);
- E. Mallinckrodt owned and operated the Facility including the chloralkali manufacturing facility in Orrington at the time hazardous substances, including but not limited to mercury, came to be located at the Site and accordingly, is a responsible party as defined in 38 M.R.S.A. §1362(2);
- F. In 1991 Hanlin and its related companies filed a voluntary bankruptcy petition pursuant to Chapter 11 of the Bankruptcy Code. Hanlin no longer exists and has no known assets to address the discharges of pollutants described in this Order. HoltraChem, which dissolved as a company in March 2001, does not exist, and has no known assets to address the discharges of pollutants described in this Order. Of the three companies that owned and operated the Facility over its operating life, only Mallinckrodt remains as a financially viable entity; and
- G. The response ordered in this Order is necessary to terminate or mitigate the threat or the danger or likelihood of danger to human health and the environment posed by the aforesaid presence of hazardous substances at the Site.

THEREFORE, pursuant to 38 M.R.S.A. § 1365, the Commissioner hereby DESIGNATES the Mallinckrodt Site in Orrington, Maine an Uncontrolled Hazardous Substance Site and ORDERS United States Surgical Corporation, Mallinckrodt LLC, and their successors in interest to comply with the following:

- 1. Mallinckrodt shall continue the implementation of dismantling in accordance with the approved plans and in accordance with the schedule contained in those plans, as may be modified with the approval of the Department.
- 2. By December 30, 2008 Mallinckrodt shall submit a Facility Dismantling Plan for the Department's review and approval for the remaining Structures, as defined in (c)(i) below, on the Site, including but not limited to:
 - a. The Facility Dismantling Plan shall provide for at least the following activities:
 - i. removal and cleanup of all underground piping, and associated contaminated soils, not to be used in the remediation;
 - ii. removal and closure of the surface impoundment;
 - iii. removal of pavement where necessary to access contaminated media;
 - iv. removal of piping, tanks, equipment, foundations and other structures not to be used at the conclusion of remediation (unless the Town of Orrington requests that such structures remain and DEP concurs);

- v. decontamination of any buildings and structures which will remain at the conclusion of the remedial activities; and
 - vi. shipment of all containers of waste to a facility authorized to accept them.
- b. The Facility Dismantling Plan shall include a provision for the monitoring of air quality such that appropriate worker safety provisions can be implemented and Maine Ambient Air Guidelines (MAAG) met during activities covered by the Plan. For ambient air monitoring, the measurement device must be able to achieve mercury detection levels in the 100 ng/m³ range and the data must be instantaneously available. The Plan must contain a Perimeter Air Monitoring Plan (PAM) which ensures that any offsite exceedance of the Maine Ambient Air Guidelines for mercury will be promptly detected. The Perimeter Air Monitoring Plan will supplement existing air monitoring activities with measures specific to the type and location of ongoing work. The Perimeter Air Monitoring Plan will provide for the monitoring for all Maine Ambient Air Standards that are expected to be present in the air and for mercury bound to particulates, as well as in gaseous form. The Perimeter Air Monitoring Plan must further identify corrective measures to be taken upon exceedances of any standard including the mercury Maine Ambient Air Guidelines, and procedures for notification of DEP.
- c. The Facility Dismantling Plan shall be organized in the following manner and shall include, but shall not be limited to:
- i. A narrative description of the proposed work which includes cleaning and removal of all buildings, materials, and components ("Structures") listed in paragraph 2(a) above as well as applicable facility or site plans for the proposed actions;
 - ii. The general approach and order of operations to be used for each of the above Structures;
 - iii. Procedures for the removal and disposal of all solids, sludges, and residual liquids remaining in the above Structures;
 - iv. Procedures for the cleaning and decontaminating of the above Structures;
 - v. Technical specifications for any containment structures to be utilized during the closure;
 - vi. The intended destination of all Structures, and the acceptance criteria of any offsite receiving facilities;
 - vii. Testing procedures for the acceptance criteria of the receiving facility, including all necessary quality assurance measures developed in accordance with the EPA Requirements for Quality Assurance Project Plans, EPA QA/R-5, EPA/240/B-01/003, Environmental Protection Agency, March 2001;
 - viii. Method of transportation for all Structures to be disposed offsite;
 - ix. Measures required to prepare Structures for transport;
 - x. Measures for the cleaning and decontamination of any buildings, equipment, and structures which will not be removed at project conclusion. Containment, management, and disposal of decontamination solutions must be addressed;
 - xi. Recordkeeping and manifesting procedures to be used to document all phases of the work;

- xii. A proposed schedule, in the form of a Gantt chart based on calendar dates, for all tasks and subtasks listed in (i) above;
 - xiii. A description of the nature and frequency of groundwater, surface water and sediment and air monitoring during and after the dismantling action is implemented;
 - xiv. A Site Safety Plan which covers all personnel and activities onsite during the work; and
 - xv. The key personnel responsible for the proposed work, their roles and responsibilities, and an organizational chart which identifies the lines of authority and communication for this project.
- d. Mallinckrodt shall also provide an electronic copy of the final version within 30 days of approval by the Department of the plan.
3. Mallinckrodt shall by January 31, 2009 provide a Corrective Measures Implementation Plan for the Department's review and approval that will at a minimum provide for:
- a. Excavation of all solid media exceeding the Media Protection Standards. This includes all Plant Area Soils, Cell Building Soils, Retort and Old Retort Building Soils, Sediments, Landfill Ridge Soils, and sludge and other mercury-contaminated material from all five landfills;
 - b. Prior to shipment, treatment of media to meet the requirements of the disposal facilities or, if necessary, to reduce emissions during excavation and/or transportation (If emissions can be successfully managed by other means, media may be treated at the disposal facility to meet acceptance requirements);
 - c. Disposal of all excavated media exceeding the Media Protection Standards in licensed offsite disposal units;
 - d. Removal of the industrial sewer;
 - e. Construction of a groundwater cutoff barrier wall downgradient of the plant and landfill #1; provisions for extraction of contaminated groundwater and the treatment of these groundwaters in a treatment system;
 - f. Removal of the Lined Process Lagoon and regrade to minimize infiltration;
 - g. Monitoring of air, surface water, sediment and groundwater to ensure compliance with Media Protection Standards. The plan will provide for the monitoring for all Maine Ambient Air Standards and for mercury bound to particulates, as well as in gaseous form. The plan must further identify corrective measures to be taken upon exceedances of any standard including the mercury Maine Ambient Air Guidelines, and procedures for notification of DEP. The plan shall include mercury air monitoring sufficient to at a minimum meet the provisions of the Facility Dismantling Plan Program described in 2b above;
 - h. Proceeding cautiously with removal of Landfill #2 initially, and thereafter each of the other landfills, including increased air monitoring and analysis of landfill materials as each landfill is opened;
 - i. Abandonment of monitoring well MW 506-B1 by tremie grouting before removal of waste from landfill #4;

- j. Limiting the excavation size, number of landfills opened at a time to one, hours of operation and season of work for excavation and handling of soils, sediments and wastes per the recommendations of ATSDR;
 - k. Provisions for the Department requiring any treatment of solid media to be performed within an enclosed structure, maintained under negative pressure, and with treatment of all air exhausted from the structure unless Mallinckrodt demonstrates persuasively to the Department's satisfaction, prior to undertaking the work, that it can be accomplished without offsite exceedances of the mercury Maine Ambient Air Guideline;
 - l. Conducting any further characterization, investigation, surveys, sampling, analyses, treatability studies or pilot testing required to implement the selected corrective measures;
 - m. A Quality Assurance Project Plan for testing contaminated media in accordance with the EPA guidance, EPA QA/R-5, EPA/240/B-01/003, Environmental Protection Agency, March 2001;
 - n. Reassessing potential air quality impacts if initial air monitoring or landfill materials are significantly different from the values modeled by DEP and evaluated by ATSDR;
 - o. Proposing additional Media Protection Standards to the Department for its review and approval if as a part of implementing the Corrective Measures additional contaminants are discovered or if contaminants are discovered in different media from those where Media Protection Standards are established;
 - p. Proposing a detailed schedule of the phases of the implementation plan with the schedule beginning no later than May 30, 2009;
 - q. Electronic submittal of the final version of the Corrective Measures Implementation Plan within 30 days of approval by the Department and any intermediate versions of the Plan at the request of the Department; and
 - r. To the extent not covered above provide for:
 - (a) removal of contaminated sediments in the Penobscot River Southerly Cove, Southerly Stream and Northern Drainage;
 - (b) interception and treatment of contaminated groundwater;
 - (c) removal of contaminated on site soils; and
 - (d) removal of the five on site landfills.
4. Mallinckrodt shall conduct all activities under this Order in compliance with the Maine Hazardous Waste Septage and Solid Waste Management Act, 38 M.R.S.A. §§ 1301 *et seq.*; Protection and Improvement of Waters Act, 38 M.R.S.A. §§413 *et seq.*; Protection and Improvement of Air Act, 38 M.R.S.A. §§ 581-610A; and the applicable Department rules including the Maine Hazardous Waste Management Rules, Chapters 850-857, and the Wastewater Rules, Chapters 520-525, 530 and 584 and other applicable Federal, State and local laws.
5. Mallinckrodt shall modify the Sediment Prevention Plan approved on October 6, 1998 as needed to address the measures proposed in the Facility Dismantling Plan and the Corrective Measures Implementation Plan above, and shall submit the modified plan for the Department's review and approval by March 1, 2009. Upon its approval, Mallinckrodt shall conduct all further activities in accordance with the modified Sediment Prevention Plan. Mallinckrodt shall also submit an electronic copy of the final version of the Plan.

6. Mallinckrodt shall continue to implement the Comprehensive Monitoring Plan approved by the Department on June 16, 1998 and as subsequently modified on February 21, 2001. As a part of the Corrective Measures Implementation Plan, Mallinckrodt shall by January 31, 2009 submit a revised Comprehensive Monitoring Plan for use during the Plan implementation and post Plan implementation for the Department's review and approval. This revised Comprehensive Monitoring Plan shall include, but not be limited to:
 - a. A description of the nature and frequency of groundwater, surface water, soil, air, and sediment monitoring during and after the remedial action is implemented, including confirmation sampling;
 - b. A maintenance plan for the monitoring network to keep the network in good condition, and to make any repairs deemed necessary by the DEP;
 - c. Frequency and format of reporting such monitoring required by this plan including providing in the Maine electronic data deliverable format¹²⁸;
 - d. A proposal for the establishment of background values where specified by the Media Protection Standards; and
 - e. Points of compliance for all media including through out the area of contamination¹²⁹ point of compliance for groundwater.

7. Mallinckrodt shall continue operation of the wastewater treatment plant and groundwater collection systems until such time as the Commissioner deems in writing that these systems are no longer necessary. Mallinckrodt may not petition the Commissioner for the termination of the groundwater collection and treatment system until any plume of contaminants in groundwater on the Site and any plume of contaminants that may emanate from the Site following the discontinuance of the pump and treat system has reached the Media Protection Standards specified in this Order. These levels must be maintained for twelve consecutive quarters at all areas of the Site. If the Commissioner acknowledges, in writing, following receipt and approval of a written report from Mallinckrodt which demonstrates that such levels have been attained and maintained and can be expected by the Department to be maintained in the future, the Commissioner may terminate groundwater collection and treatment. Once the Commissioner has terminated the

¹²⁸ Results must be provided electronically in the Department's Environmental Data Deliverable (EDD) format for the Environmental and Geographic Analysis Database (EGAD). This must include field parameter data, water level and flow data, and laboratory analytical data for soil and groundwater. Laboratory analytical data must include field quality control sample results, surrogate recoveries in percent, and matrix spike/matrix duplicate recoveries in percent. All reports that include discussion of new data must include that data in the EDD format as an electronic deliverable. Specific EDD formats and additional information can be found on the Department's EGAD web page at <http://www.maine.gov/dep/rwm/egad/>. Any additional questions about the EDD or EGAD should be referred to Erika Bonenfant, the Department's groundwater database manager at 207-287-5767. According to the Department's legal authorities 10 MRSA section 9418(1) and 9418(2) (A) provide statutory authority for the Department to require electronic submission of data in a specified format.

Sample locations and other geographic location data must be provided to sub-meter accuracy in a map file or table for uploading to the Department's GIS (Arc GIS). Universal Transverse Mercator (UTM) coordinates based on North American Datum (NAD) 1983 are preferred but at a minimum the projection, units, and datum must be submitted.

¹²⁹This type of point of compliance is also known as "throughout the plume" point of compliance in the EPA Handbook of Groundwater Protection and Cleanup Policies for RCRA Corrective Action, EPA 530-R-04-030, April 2004. In the Handbook, page 6.3, "for final cleanups selected to return groundwater to its maximum beneficial use, EPA recommends regulators set the point of compliance throughout the area of contaminated groundwater".

groundwater collection and treatment system in the vicinity of the Southerly Stream, Mallinckrodt must remove the groundwater collection system and restore this section of the Southerly Stream to as close to a natural condition as possible.

8. Mallinckrodt shall secure the Site and provide an onsite contact person who is knowledgeable about the Facility and its former operations and is available during normal business hours.
9. Mallinckrodt shall, by December 31, 2008, establish a trust fund to provide financial assurance, the terms and amount of which are acceptable to the Department, and shall fund such trust fund, for activities included in this Order, the operation of the wastewater treatment plant, groundwater collection system, groundwater monitoring, and maintenance of the Ferry Road filtration systems.
10. All documents, including letters and reports, submitted pursuant to this Order will be submitted by Mallinckrodt according to (a), (b) and (c) below.
 - a. Six (6) copies of all documents submitted shall be sent to the State of Maine as follows:
Maine Department of Environmental Protection
HoltraChem Corrective Action Project Manager
Attention: Stacy Ladner
Bureau of Remediation and Waste Management
Department of Environmental Protection
State House Station 17
Augusta, ME 04333-0017.
 - b. One (1) copy of the Facility Dismantling Plan(s), Corrective Measures Implementation Plan and other key documents submitted shall be sent to the Orrington Local Repository as follows:
Margaret L. Capen Orrington Town Librarian
c/o HoltraChem Repository
Orrington Public Library
15 School Street
Orrington, ME 04474
 - c. One (1) electronic copy of any document submitted pursuant to this Order, not otherwise already requested electronically, at the request of the Department.
11. If DEP disapproves or modifies any plan including the Facility Dismantling Plan or Corrective Measures Implementation Plan Mallinckrodt shall, within thirty (30) days of receipt of DEP's comments on the plan, submit an amended plan to DEP with such additional information as necessary to obtain DEP approval.
12. DEP will review all draft and final work plans, proposals or reports required to be submitted to DEP for approval pursuant to this Order and will notify Mallinckrodt in writing of its approval, in whole or in part, its approval with modification, in whole or in part, or its disapproval, in whole or in part.

13. Within fourteen (14) days of receiving DEP approval, including approval with modification, of any work plan, proposal or report including without limitation the Facility Dismantling Plan and the Corrective Measures Implementation Plan, Mallinckrodt shall commence work and implement the DEP approved actions required by the work plan(s), proposal or report in accordance with the standards, specifications and implementation schedule stated in the work plan(s), proposal or report. All DEP approved actions, including approvals and approvals with modifications, shall be deemed incorporated into and enforceable under this Order.
14. For every approval with modification, DEP will specify the nature of the required modification. DEP's modification shall be deemed incorporated into and enforceable under this Order, and Mallinckrodt shall incorporate such modification into the relevant work plan, proposal or report within thirty (30) days of receipt of such approval with modification unless DEP agrees in writing to an extended period.
15. In the event of any disapproval, DEP's written notice will specify the reasons for disapproval and the modifications that must be made prior to approval of any such work plan, proposal or report. Mallinckrodt shall submit a revision to DEP for approval, within thirty (30) days of receipt of DEP's disapproval of any work plan, proposal, or report. DEP shall approve, approve with modification, or disapprove any resubmitted work plan, proposal or report. If DEP disapproves a resubmitted work plan, proposal or report required under this Order, Mallinckrodt shall then be in violation of this Order.
16. Mallinckrodt shall carry out the activities in accordance with the Facility Dismantling Plan and the corrective action activities in accordance with the Corrective Measures Implementation Plan as modified and approved by the DEP including the schedule set forth therein.
17. Mallinckrodt shall provide monthly written reports to DEP on the implementation of the Facility Dismantling Plan and the Corrective Measures Implementation Plan until such time as the Plans are fully completed. Each report is to be submitted to DEP no later than five (5) days after the end of each month beginning with the end of the first full month following the effective date of this Order. At a minimum, these reports shall contain the following:
 - a. A description of the actions taken toward achieving compliance with this Order;
 - b. A detailed summary of all results of sampling, tests, shipments from the Site and other data received by Mallinckrodt in the prior reporting period pursuant to this Order regarding the facility;
 - c. A discussion of all tasks and actions completed during the past reporting period, and all such actions and tasks that are scheduled for the coming reporting period including the date for initiating and completing such activities. A percent completion estimate shall be given for each individual task; and
 - d. Identification of any elements not completed as required and any problems or anticipated problems, including the scheduled completion date, the new anticipated completion date, the reason(s) for the delay and the actions taken to minimize the delay.

- e. The quantity of waste shipped to the various disposal locations and such other information as the Department may request to assess the progress of the work.
 - f. In addition Mallinckrodt shall provide, if requested by the Department, information regarding the activities onsite on a more frequent basis.
 - g. Following completion of the Facility Dismantling Plan and again at the completion of the Corrective Measures Implementation Plan, report that summarizes the ultimate disposition of the various wastes and quantity breakdowns for disposal locations and by type of waste.
18. DEP may from time to time determine that certain actions, including, without limitation, additional stabilization measures, are necessary in addition to the work and deliverables included in the Facility Dismantling Plan or the Corrective Measures Implementation Plan submitted pursuant to this Order. If DEP determines that work additional to that required in any approved plan is necessary, DEP will notify Mallinckrodt in writing that Mallinckrodt is required to perform the additional work after modifying the work plan as necessary. In making such determination, DEP will also specify the time frame for performing such work and will specify the basis and reason for DEP's determination that the additional work is necessary.
19. Within fourteen (14) days of receiving notice of DEP's determination that additional work is necessary, or pursuant to an alternate timeframe agreed to by the parties, Mallinckrodt shall within this same fourteen (14) days have an opportunity to meet with DEP to discuss the additional work required by DEP. Thereafter, Mallinckrodt shall within ten (10) days perform the additional work requested by DEP. All additional work performed by Mallinckrodt under this Order shall be performed in a manner consistent with this Order.
20. Within seven (7) days of the effective date of this Order, Mallinckrodt shall provide a copy of this Order to all agents, contractors, subcontractors, laboratories, and consultants retained to conduct or monitor any portion of the work to be performed pursuant to this Order. For any such person or entities retained thereafter, Mallinckrodt shall provide a copy of this Order upon the date of such retention or within seven (7) days of Mallinckrodt learning that such person or entity has been so retained.
21. All work performed pursuant to this Order shall be under the direction and supervision of a Maine professional engineer or geologist with expertise in hazardous waste site investigations and remediation. Mallinckrodt shall notify DEP in writing within seven (7) days after retaining or learning of any other person's retention of an engineer/geologist to supervise and carry out work in accordance with this Order. This notification shall include the name, title, and qualifications of the engineer or geologist, and of any contractors or subcontractors to be used in carrying out the terms of this Order.
22. All remedial work shall be conducted under the third party oversight of an independent inspector selected by the Department who shall report independently and directly to the Department on compliance with the terms of this order and plans and work produced under this order. Such

reports shall be conducted at least on a monthly basis. The format and content of the report shall be acceptable to the Department and shall be submitted to the Department Project Manager or her designee. This provision shall commence when active remedial actions begin and continue until the site is in the Operations and Maintenance stage. The cost of the independent inspector shall be borne by Mallinckrodt.

23. On or before the November 30, 2008 Mallinckrodt shall notify DEP in writing of its designated Project Coordinator, who shall be responsible for overseeing the implementation of the Order. Unless otherwise specified, all communications between Mallinckrodt and DEP, and all documents, reports approvals and other correspondence concerning the activities performed pursuant to the terms and conditions of the Order, shall be directed through the Mallinckrodt Project Coordinator and the DEP Project Manager, Stacy Ladner, or their respective designees, which designation shall be in writing.
24. Mallinckrodt may designate a new Project Coordinator and DEP may designate a new Project Manager, provided that Mallinckrodt, if Mallinckrodt is making the re-designation, and DEP, if it is making the re-designation, notifies the other party to the Order, in writing, at least seven (7) days prior to such re-designation.
25. Mallinckrodt shall preserve all records necessary for enabling DEP to evaluate compliance under this Order, including copies of all documents or information maintained in any form by Mallinckrodt or by its contractors, subcontractors, or any other person acting on its behalf, until authorized by DEP to do otherwise. Mallinckrodt shall notify DEP not less than thirty (30) days prior to the destruction of any documents. Upon request by DEP, Mallinckrodt shall provide DEP with the records.
26. Upon request by DEP, Mallinckrodt and/or any other person acting on its behalf shall within 14 days make available all records and information relating to the required activities.
27. If at any time, in the sole judgment of DEP, it becomes necessary or desirable to hold a public meeting or meetings in order to inform the public about the condition of the Site or the work being performed at the Site pursuant to this Order, DEP shall notify Mallinckrodt of such meeting and may require a representative of Mallinckrodt to participate in such public meeting.
28. DEP and EPA and/or any DEP or EPA authorized representative may enter and freely move about the Site during the implementation of this Order at any reasonable time. Mallinckrodt shall permit such persons to inspect, take samples, verify compliance with the provisions of this Order, take other necessary actions and copy all records, files, photographs, documents, and other writings, including all sampling and monitoring data, in any way pertaining to work undertaken pursuant to this Order. To the extent that the Site or any other property to which access is required for the implementation of this Order is owned or controlled by persons other than Mallinckrodt, Mallinckrodt shall use its best efforts to secure from such persons access for Mallinckrodt, as well as for the DEP and its representatives.
29. All work undertaken by Mallinckrodt or any other person acting on its behalf pursuant to this Order shall be performed in compliance with all applicable Federal, State and local laws and

regulations, including all Occupational Safety and Health Act and Department of Transportation regulations. Mallinckrodt or a person acting on its behalf shall file a timely and complete application for all Federal, State and local permits which are necessary for the performance of the work. This Order is neither a permit nor a modification of a permit.

30. Nothing contained in this Order shall be construed to prevent DEP from seeking legal or equitable relief to enforce the terms of this Order or from taking other actions it deems appropriate or necessary to protect the public health or the environment including establishing a Media Protection Standard for the sediment in the Penobscot River downstream of the Site.
31. Nothing in this Order shall constitute or be construed as a release from any claim, cause of action or demand in law or equity against Mallinckrodt or any other person, firm, partnership, trust, corporation, or other business organization or relating in any way to the generation, storage, treatment, handling, transportation, release, or disposal of any hazardous substances, hazardous wastes, pollutants, or contaminants found at, taken to, or taken from the Site.
32. This Order does not address any claims for natural resource damages or civil or criminal penalties or any other claims or causes of action which DEP may now have or may have in the future against Mallinckrodt based upon the facts stated above. DEP does not waive and specifically reserves all such claims, causes of action and enforcement authorities. By way of example only, DEP reserves the right to expend and recover funds; to bring “imminent and substantial endangerment” actions as well as natural resource damages actions; to assess penalties for violations of compliance with hazardous waste, wastewater, and air requirements; to address releases other than those identified in the Order; to require further study or action as necessary to respond to any releases from the Site, including those addressed in this Order; and to bring actions as appropriate under any of the other statutes it administers. DEP also reserves the right to bring actions against non-parties if appropriate. This Order does not prevent the Department from requiring additional remedial activities, if the Department determines such activities are necessary in order to protect the public health or environment.
33. The DEP shall not be liable for any injuries or damage to persons or property resulting from acts or omissions of Mallinckrodt in carrying out activities pursuant to this Compliance Order nor shall the DEP be held as a party to any contract entered into by Mallinckrodt in carrying out the activities pursuant to this Compliance Order. The DEP, its agents, and its employees shall be indemnified and saved and held harmless from any and all claims or causes of action against the DEP arising from or on account of acts or omissions of Mallinckrodt, its officers, employees, agents, or contractors in carrying out the activities pursuant to this Compliance Order.
34. Within thirty (30) days of the date of this Compliance Order, Mallinckrodt shall obtain or require its contractor(s) and subcontractors to obtain a policy or policies of insurance providing at least the following coverages in connection with the activities at the Site by Mallinckrodt or its employees, agents, contractors or subcontractors under this Compliance Order:
 - a. Comprehensive General Liability Insurance, including Contractors Protective Coverage, in an amount of not less than \$1,000,000.00 per occurrence, combined single limit, general aggregate, \$10,000,000.00;

- b. Automobile Liability Insurance in an amount of not less than \$2,000,000.00 per occurrence;
- c. Professional Liability Insurance and Contractor's Pollution Liability Insurance in an amount of not less than \$5,000,000.00 per occurrence, \$10,000,000.00 aggregate; and
- d. Workers' Compensation Insurance adequate to meet the statutory requirements of all jurisdictions having authority over such claims, including but not limited to the State of Maine, and Employer's Liability Insurance in an amount of not less than \$1,000,000.00 per occurrence.

The State of Maine shall be named as additional insureds in the policy or policies required under subsections a, b, c, and d above. Mallinckrodt shall maintain such insurance or require its contractor(s) to maintain such insurance in force until the Department issues a certificate of completion for all on-site construction of remedial action activities other than Operation and Maintenance activities, and shall require any Operation and Maintenance contractor to maintain such insurance during the period of the Operation and Maintenance activities.

Before starting any on-site work, and annually thereafter, Mallinckrodt shall submit to the DEP certification of coverages maintained in compliance with this section. In addition, Mallinckrodt shall furnish the Department with copies of those policies purchased specifically for activities undertaken pursuant to this Compliance Order.

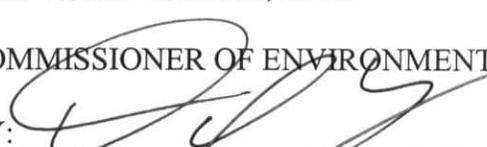
Anything herein notwithstanding, in no event is Mallinckrodt relieved of its obligation to implement in a timely fashion the remedial design work and remedial action under this Compliance Order by reason of any inability to obtain, or failure to maintain in force any insurance policies required in this section, any insurance required by this paragraph, or by reason of any dispute between Mallinckrodt and any of its insurers concerning any claim arising out of the design, construction, implementation or operation of the remedy, or arising out of any other activity required under this Compliance Order.

DONE AND DATED AT AUGUSTA, MAINE, THIS 24th,

DAY OF NOVEMBER, 2008.

COMMISSIONER OF ENVIRONMENTAL PROTECTION

BY:


DAVID P. LITTELL

24 NOV 2008
DATE

NOTICE OF RIGHT TO APPEAL

Appeals of this Order must be filed within 10 working days of receipt of this Order with the Board of Environmental Protection, pursuant to 38 M.R.S.A. § 1365(4). Appeals must be directed to the Attention of Chair, Susan M. Lessard; c/o Terry Hanson, 17 State House Station, Augusta, Maine 04333-0017 with a copy to Project Manager, Stacy Ladner, at the same address and a copy to Peter LaFond at 6 State House Station, Augusta, Maine 04333-0017. Within 15 working days after receipt of the appeal, the Board shall hold a hearing, make findings of fact, and vote on a decision that continues, revokes, or modifies the Order. The process for the appeal is set forth at 38 M.R.S.A. § 1365(4).

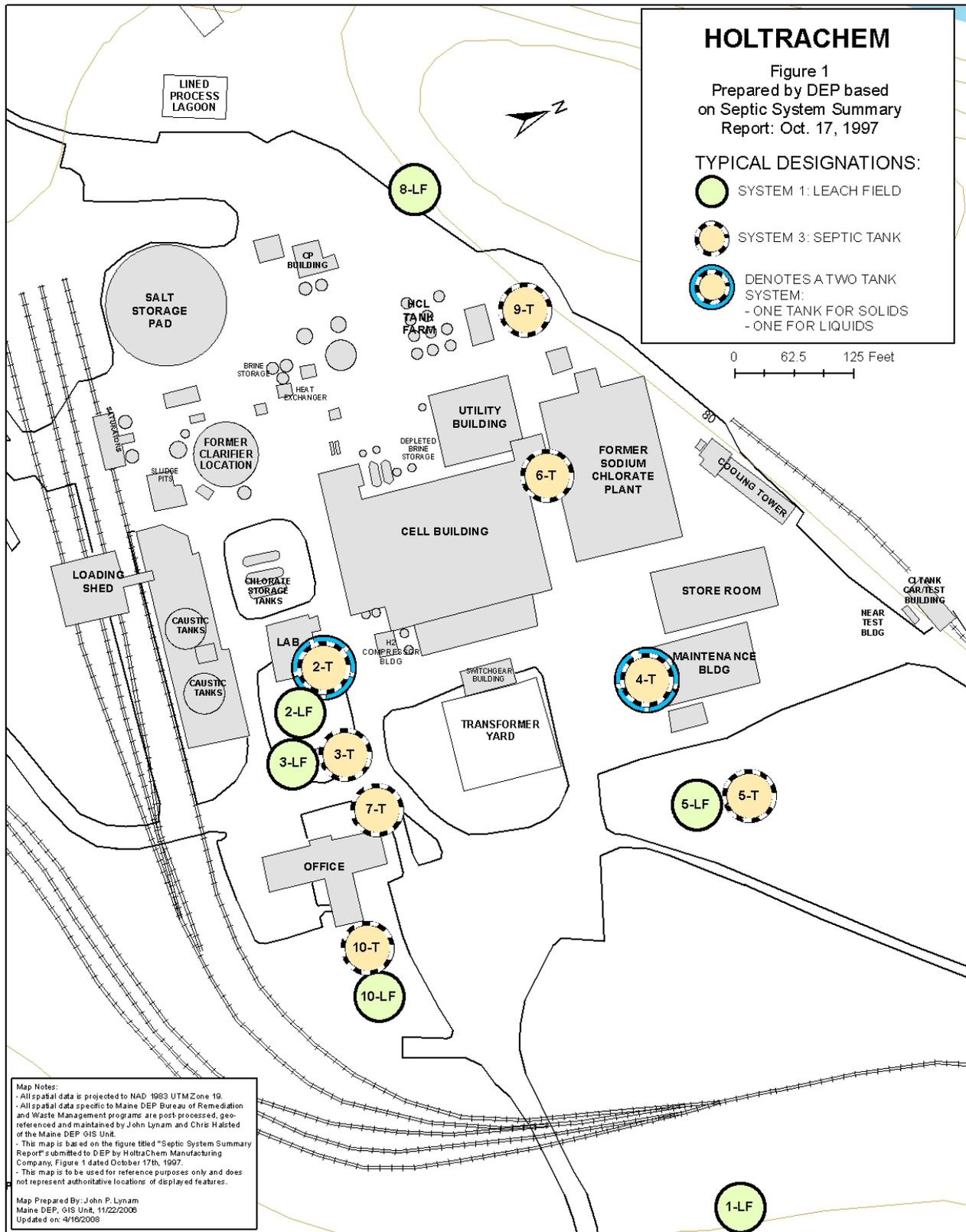


Figure 1

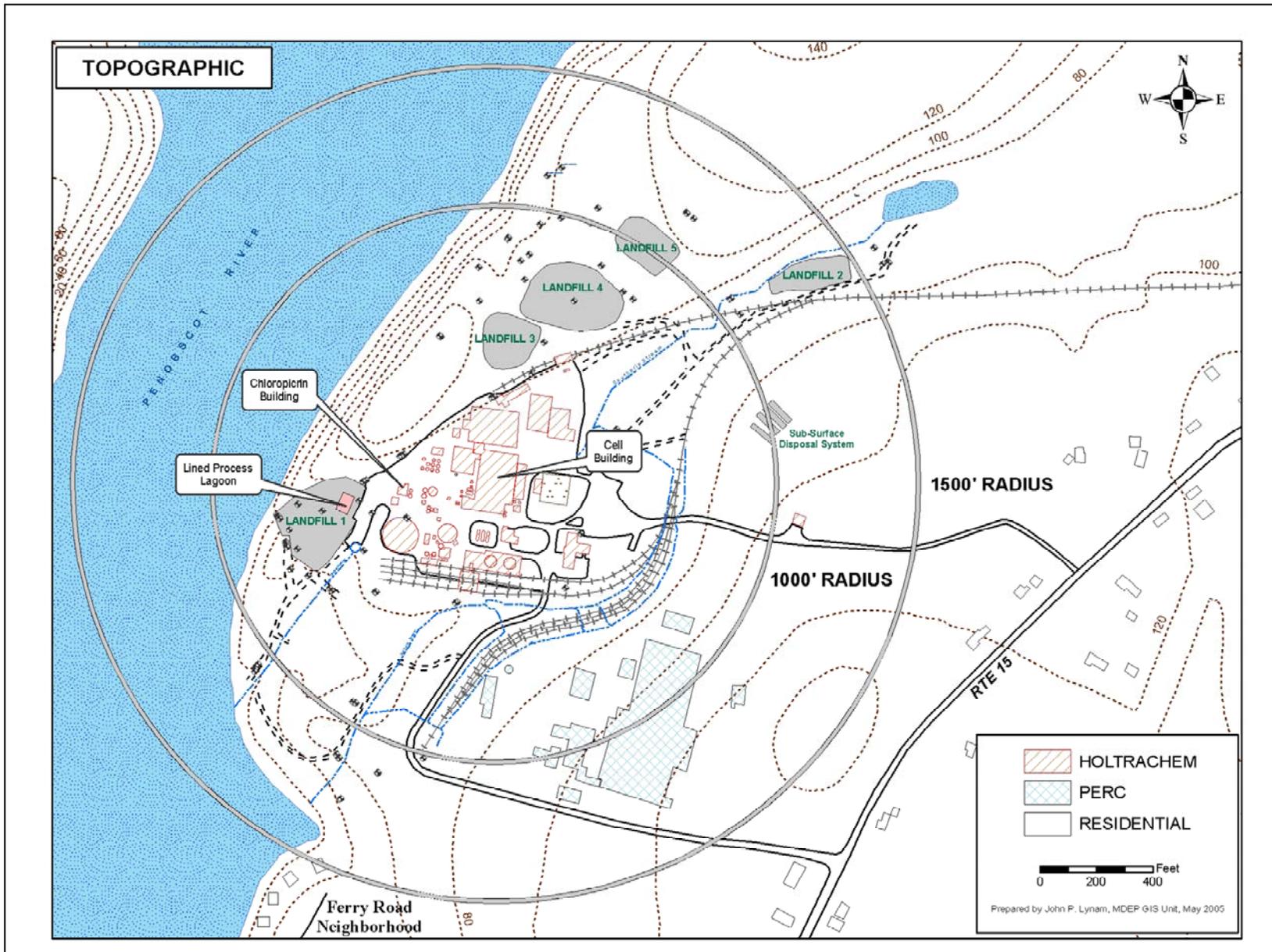


Figure 2

Attachment 1
Proposed Media Protection Standards proposed by Mallinckrodt
From Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Table 10-2 revised on February 7, 2002

SITE INVESTIGATION
HOLTRACHEM MANUFACTURING SITE
ORRINGTON, MAINE
Table 10-2
PROPOSED PRELIMINARY MEDIA PROTECTION STANDARDS

<i>MEDIA</i>	<i>CONSTITUENT</i>	<i>PMPs</i>	<i>POINT OF COMPLIANCE</i>	<i>BASIS</i>	<i>INDICATIONS</i>
Groundwater:	Mercury, Manganese, VOCs and SVOCs	MCLs/ MEGs and site specific risk-based proposed PMPs	Wells on PERC Property Wells downgradient of Plant and Landfill Area 1 Internally, wells downgradient of landfills	Is protective of human health and potential ecological receptors. Discharge of groundwater < MCLs/MEGs results in a de minimis impact on river water quality.	Indicates containment and collection of groundwater along a line of control established between the plant and the Southerly Stream and along the base of Landfill Area 1. Continued monitoring downgradient of landfills and downriver property line wells.
Surface Water:	Mercury, VOCs Conductivity and pH.	Mercury: State Ambient Water Quality Criteria (AWQC) and Ambient Criteria (AC) VOCs: MCLs/ MEGs Conductivity and pH: Upstream background	Penobscot River: Downstream of plant after full mixing Onsite: Southerly Stream	Application of ambient water quality criteria guidance which specifies the use of dissolved metals for comparison with standards.	Will be addressed by on-site measures to reduce the flux of Hg to the stream, ditch and river to the extent practicable.
Sediment: Southern Cove, Penobscot River, and Southerly Stream and North Ditch	Mercury	Southern Cove: Average ≤ 3.2 mg/kg with no concentrations >10.7 mg/kg remaining outside of existing sedge beds. Penobscot River: 10.7 mg/kg Hg used to evaluate downriver sediments On-Site: 3.2 mg/kg	Penobscot River: Average sediment concentration in Southern Cove with a not to exceed concentration. Existing sedge beds in the Southern Cove not to be disturbed. On-Site: All points in stream and ditch < 3.2 mg/kg.	Measured site-specific partitioning coefficients of cove sediments relate <3.2 mg/kg in sediments to <0.3 mg/kg in fish (EPA recommended maximum). Not to exceed sediment concentration of 10.7 mg/kg (management decision) results in <3.2 mg/kg average concentration in the Southern Cove and provides a standard for evaluation of downriver sediments.	Indicates removal of sediment in the vicinity of the HoltraChem and North Ditch outfalls and sediment in the middle of the Southern Cove mudflat, and removal of all areas of sediment >3.2 ppm in Southerly Stream and North Ditch to the extent practicable.
Site Soil	Mercury, Chloropicrin, PCBs	Manage soil with > 3.2 mg/kg. Excavate or contain Hg hot spots greater than 10 mg/kg to the extent practical (to 10 feet or 6 inches into undisturbed till or to bedrock, whichever is shallower). The extent of what is practical to excavate would be defined in the CMS. Manage soil with > 140 ug/kg chloropicrin and/or PCBs > 1 mg/kg.	All site soil.	Related to and protective of Southern Cove and stream/ditch sediments under proposed remediated conditions. Protective of Ecological and Human Health.	Indicates plant area to be capped. Hg hot spots greater than 10 mg/kg will be excavated or contained. Soils with greater than 10 mg/kg which are excavated will be placed under the plant area cap or in a designed Corrective Action Management Unit (CAMU) which will meet RCRA Title C specifications
Air	Mercury	0.31 ug/m ³ 24 hour average	Plant property line	EPA Region III risk-based concentration at hazard index = 1.	No action remedial action indicated because the highest annual average concentration measured and modeled to be one order of magnitude lower, and the HoltraChem plant has closed.

2/7/02

Attachment 2
Numeric Media Protection Standards (MPS)¹³⁰

Constituent¹³¹

Media	Mercury	Manganese	Acetone	Chloro-picrin	Chloroform	Carbon tetrachloride	Hexachloroethane	Pentachloroethane	m-cresol	p-cresol	PCBs	TCE
Groundwater	2.0 ug/L ¹	500 ug/L or background ²	700 ug/L	30 ug/L	57 ug/L	3.0 ug/L	7.0 ug/L	13 ug/L	35 ug/L	3.5 ug/L		5.0 ug/L
Surface Water (on-site)	0.91 ug/L ³				57 ug/L	3.0 ug/L						
Surface Water (Penobscot R)	background											
Sediment (on-site)	2.2mg/kg											
Sediment (Penobscot R. in Southern Cove)	Average: 2.2 mg/kg Averaged areas less than 1/4 acre in size											
Soil	2.2 mg/kg			0.125 mg/kg							1.0 mg/kg	
Air ⁴	0.31 ug/m ³											

1. At achievement of this MPS it must be demonstrated that surface water MPS is being attained or that untreated ground water discharge will not significantly lower the existing water quality. If one or the other of these conditions cannot be demonstrated, ground water capture and treatment will be continued. In addition Maine's fish tissue residue standards need to be assessed for attainment prior to shutting the ground water treatment system down.
2. All background values referenced in this table were originally to be established during the Corrective Measures Study. They now are being required as a part of implementing this Order. Background values must also be established and met for conductivity, salinity, alkalinity, and pH in surface water and ground water.
3. The surface water standards for mercury are for total metal values (particulate plus dissolved), not dissolved metals. Discharge at this level must also be documented to not significantly lower the existing water quality and that fish meet the fish tissue residue value or for onsite fish are not significantly elevated over two other reference sites.
4. The air standard is a 24 hour averaged value at the property line and a not to exceed value (i.e. air monitoring readings must remain below 0.31 ug/m³) at points of offsite exposure.

¹³⁰ This table is similar to the text in the January 21, 2003 joint EPA and DEP Notice of Preliminary Media Protection Standards for the HoltraChem Manufacturing Facility in Orrington, Maine. Text is no longer identified as "preliminary".

¹³¹ ug/L is micrograms per liter. mg/L is milligrams per liter. mg/kg is milligrams per kilogram. ug/m³ is micrograms per cubic meter. PCBs stands for polychlorinated biphenyl. TCE stands for trichloroethene.

Attachment 2 (continued)

Numeric Media Protection Standards

Constituent

Media	1,1 dichloroethane	1,1 dichloroethene	Cis 1,2 dichloroethene	Trans 1,2 dichloroethene	Carbon disulfide	Bromo form	Methylene chloride	Bromodichloromethane
Groundwater	70 ug/L	0.6 ug/L	70 ug/L	100 ug/L	600 ug/L	44 ug/L	5.0 ug/L	6 ug/L

Attachment 2 (continued)

Numeric Media Protection Standards

Constituent

Media	Dibromochloromethane	2,4, 5 -T	Cadmium	Ethylbenzene	Xylene	Tetrachlorothene
Groundwater	4 ug/L	50 ug/L				5 ug/L
Soil			8 mg/kg	13 mg/kg	190 mg/kg	

Attachment 2 (continued)

Narrative Standards

Sediment (Penobscot River) - The two highly elevated areas of mercury contamination will at a minimum be removed. Sampling numbers (RSC 009, RSD 015H, RSD 015G, RSD 015E, RSD 016A, RSD 016B, RSC 012, RSC 020, RSC 010, RSD 015F, RSD 015B, RSD 015A, and RSD 015C) and (RSC 024, RSD 011C, RSD 010A, RSC 019, RSC 018, RSD 010B, RSD 010C, RSD 011A, RSD 011B, RSD 011G and RSD 011F) represents these areas.

Soil - All soils onsite and adjacent to the site that may potentially contain mercury greater than 2.2 ppm must be vegetated, paved or otherwise stabilized to prevent erosion during any construction or remediation. In addition an industrial sweeper will be utilized on all parking lots, roadways and other paved areas each spring to collect any potentially contaminated soils. All catch basins shall contain "socks" to filter and collect any potentially contaminated soils or sediments. These socks shall be removed and cleaned or replaced periodically to maintain their effectiveness.

Surface Water - Areas of mercury contamination will be collected for treatment and will be prevented from entering the onsite surface water. At such time as Mallinckrodt believes that no further treatment is warranted, they will need to make a demonstration that: (1) the resident fish in the onsite stream meet the 0.2 ppm fish tissue residue value or that the level is not significantly elevated over two appropriate reference sites, (2) the .91 ug/l level will be achieved in the onsite surface waters, (3) a discharge at the .91 ug/l level, or such lower level as may be present, and in the quantity present in the onsite surface water will not significantly lower the Penobscot River water quality, including during storm events (4) and a discharge at that level and quantity will not adversely affect the fish tissue levels in the Penobscot River.



- LEGEND**
- ▲ Hg between 0 and 2.1 ppm
 - ▲ Hg between 2.1 and 3.2 ppm
 - ▲ Hg between 3.2 and 10 ppm
 - ▲ Hg greater than 10 ppm
 - ▲ No Data
- PERC Outfall Basemap

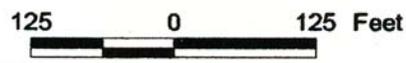
 = Generalized hot spot



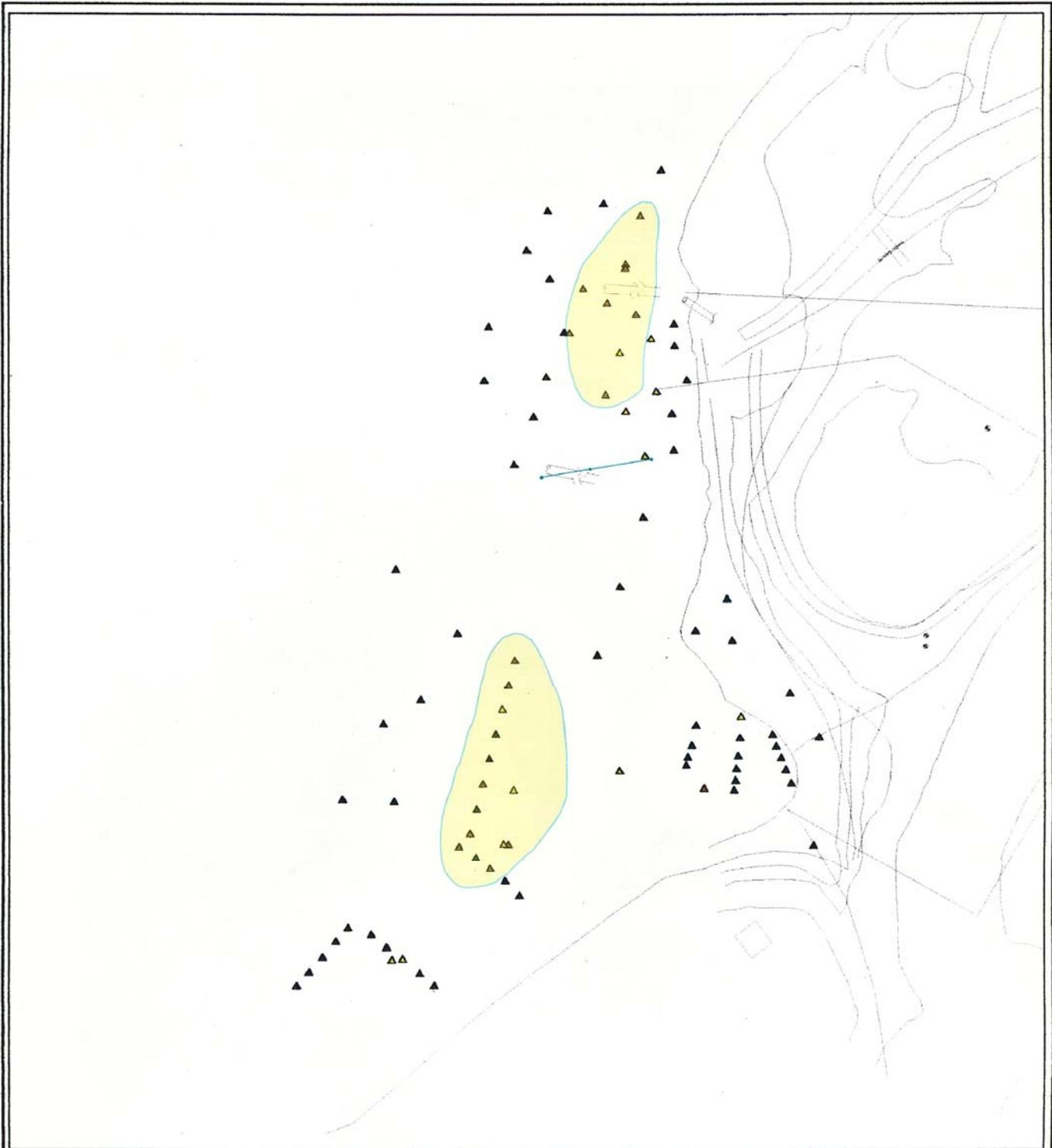
**HoltraChem Manufacturing Site
Orrington, Maine**

Sediment Sample Data

Depth = Surface to 0.2 ft.



Attachment 3 (1 of 3)



- LEGEND**
- ▲ Hg between 0 and 2.1 ppm
 - ▲ Hg between 2.1 and 3.2 ppm
 - ▲ Hg between 3.2 and 10 ppm
 - ▲ Hg greater than 10 ppm
 - ▲ No Data

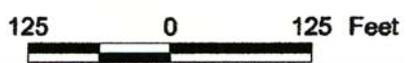
 = Generalized hot spot



**HoltraChem Manufacturing Site
Orrington, Maine**

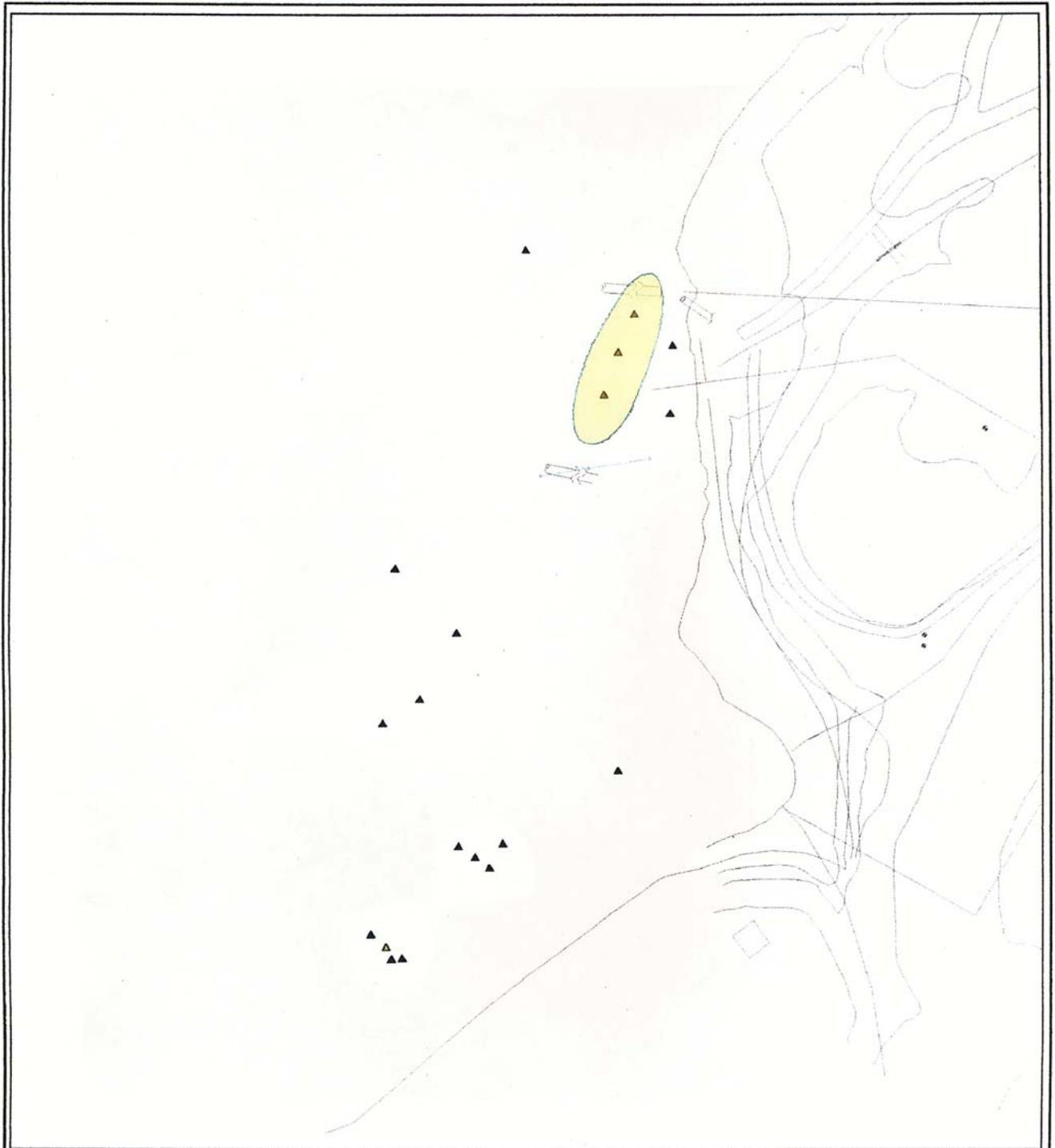
Sediment Sample Data

 PERC Outfall
 Basemap



Depth, 0.8 - 1.0 ft.

Attachment 3 (2 of 3)



- LEGEND**
- ▲ Hg between 0 and 2.1 ppm
 - ▲ Hg between 2.1 and 3.2 ppm
 - ▲ Hg between 3.2 and 10 ppm
 - ▲ Hg greater than 10 ppm
 - ▲ No Data

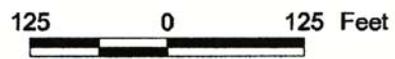
 = Generalized hot spot



**HoltraChem Manufacturing Site
Orrington, Maine
Sediment Sample Data**

 PERC Outfall
Basemap

CDM



Depth > 1.0 ft.

Attachment 3 (3 of 3)

Attachment #4

REPORTED SPILLS AND RELEASES¹³²

<u>DISCHARGE</u>	<u>LOCATION</u>	<u>DATE</u>	<u>VOLUME</u>
Hydrochloric Acid	Railroad loading area	Feb -68	Unknown
Caustic Soda	Railroad loading area	Jun-69	Unknown
Brine	Filtered brine tank	Jul-69	Unknown
Mercury	Uncovered in trenches near building	May-70	Unknown
Oil	Southwall of utility building	May-70	Unknown
Effluent/washup wastes/Cell	Unlined brine storage lagoon	Jul-70 to	Unknown
End Box Water	(Hickel's Pond)	Oct-70	
Caustic Soda	Caustic soda storage tank	Feb-71	Unknown
Mercury	Mercury cell building	Jun-71	Unknown
Brine	Brine filter storage tank	Jul-71	Unknown
Sulfuric Acid	Sulfuric acid heat exchanger tube	Oct-71	Unknown
Brine	Depleted brine sampling station	Feb-72	Unknown
Mercury	Southwall of cell building	Apr-72	Unknown
Oil	External substation	Apr-72	Unknown
Brine	Brine clarifier tank	Jul-72	Unknown
Sulfuric Acid	Sulfuric acid coolers	Sep-73	Unknown
Filtered Brine	Brine filter	Mar-75	Unknown
Oil	Unknown	May-75	Unknown
Mercury	Spent liquor pump	May-75	Unknown
Fuel Oil	Unknown	May-75	100 gals
Brine	Brine clarifier	May-76	Unknown
Hydrochloric Acid	HCl storage tank	Oct-76	Unknown
Brine	Two breaks in return line from brine storage lagoon**	Mar-77 to Oct 78 *	Unknown
Acid	Unknown	Dec-77	Unknown
Sulfuric Acid	Drying shed area	Dec-77	Unknown
Caustic	Caustic storage tank	May-78	Unknown
Brine	Return line to brine storage lagoon	May-78 *	Unknown
Hydrochloric Acid	Return line to brine storage lagoon	Jul-78 *	Unknown
Brine	Return line to brine storage lagoon	Jun-79 *	Unknown
Brine	Brine storage lagoon	Jun-79 *	Unknown
Oil	Unknown	Oct-79	100-gals
Brine	Return line to brine storage lagoon	Apr-81 *	Unknown
Oil	Unknown	Jun-81	Unknown
Brine	Unknown	Jul-81 *	Unknown
Brine/chloropicrin	Brine storage lagoon	Jul-81 *	Unknown
Brine	FRP line to brine storage lagoon	Sep-81	Unknown
Caustic soda	Truck loading area	Jul-83	Unknown
Chlorine	Plant area	Jul-83	Unknown
Chlorine/mercury	Plant area	Dec-83	Unk/0.82 lbs
Chloropicrin	Plant area	Feb-85	1500 gals
Brine/ Hydrochloric Acid	FRP line to brine storage lagoon	Apr-86	Unknown
Diesel Fuel	Salt storage pad	Jan-87	10-15 gals
Chloropicrin	Plant area	Jan-87	1000 gals
Brine	Lagoon area	Apr-88	10 gals
Hydrochloric Acid	Loading area	May-88	10 gals
Wastewater	Plant area	May-88	200 gals
Brine	Plant area	May-88	100-200 gals

¹³² Table, including source information at the end, from the Mallinckrodt report prepared by Camp, Dresser and McKee entitled "Site Investigation Report, HoltraChem Manufacturing Site, Orrington, Maine" dated December 22, 1998, Volume II, Table 2-4.

<u>DISCHARGE</u>	<u>LOCATION</u>	<u>DATE</u>	<u>VOLUME</u>
Hydrochloric Acid	Loading area	May-88	150 gals
Brine	Plant area	May-88	1000 gals
Brine	Plant area	Jun-88	5-10 gals
Brine Sludge	Sludge pit	Jun-88	200 gals
Brine	Sludge pit	Jul-88	25-30 gals
Hydrochloric Acid	Railroad tracks	Jul-88	20 gals
Brine	Plant area	Aug-88	250 gals
Brine	Plant area	Aug-88	75 gals
Brine	Brine pump	Aug-88	50 gals
Hydrochloric Acid 20%	Loading area	Aug-88	50 gals
Hydrochloric Acid 20%	Plant area	Sep-88	50-100 gals
Hydrochloric Acid 23%	Near PERC	Oct-88	1-2 gals
Hydrochloric Acid	Process tank	Nov-88	1-5 gals
Hydrochloric Acid	Process tank	Nov-88	100 gals
Brine/ Hydrochloric Acid	FRP line to brine storage lagoon	Dec-88	Unknown
Caustic soda	Loading area	Dec-88 *	5-10 gals
Fuel oil (#2)	Oil Delivery Area	Jan-89	160 gals
Caustic soda	Railroad loading area	Feb-89	100 gals
Brine	Plant area	May-89	100-150 gals
Brine	Brine lagoon	May-89	300-400 gals
Brine	North brine pump	May-89	30 gals
Hydrochloric Acid	Plant area	Jul-89	25 gals
Dechlorinated Brine	Plant area	Aug-89	100 gals
Wastewater containing Hg	Plant area	Sep-89	250-300 gals
Fuel oil (#2)	Storm drain area	Dec-89	350 gals
Chlorine gas	HCl plant	Dec-89	50-300 gals
Chlorine gas	Brine tank area	Sep-90	<1 lb.
Brine (w/30 ppm Hg)	Brine line failure	Oct-90	500-1000 gals
Solid Carbonate/caustic	Under railroad tracks	Oct-90	Unknown
Brine	Return line from brine storage lagoon	Oct-90 *	280 gals
Brine	Return line from brine storage lagoon	Nov-90*	Unknown
Chlorine gas	Liquidification unit	Nov-90	2 lbs
Hydrochloric Acid (28%)	Tank car overflow	Jan-91	820 gals
Brine (w/30-60 ppm Hg)	Solid Recovery pit/drainage ditch	Jan-91	200 gals
Hydrochloric Acid	Tank car overflow	Jan-91	100 gals
Brine (w/30 ppm Hg)	Brine line failure	Feb-91	700-1500 gals
Brine (w/30 ppm Hg)	Brine line failure	Jun-91	200 gals
Hydrochloric Acid (28%)	Tank car overflow	Jun-91	820 gals
Hydrochloric Acid	Plant area	Mar-92	270 gals
Hydrochloric Acid (4-5%)	Plant area	Jun-92	100 gals
Chlorine gas	HCl plant	Aug-92	5-8 lbs
Sodium hypochlorite	4800 gals. Discharged to Penobscot	Aug-92	>8000 gals
Chlorine gas	Compression & liquification	Aug-92	24 lbs
Hydrochloric Acid gas	HCl plant	Dec-92	30 lbs
Hydrochloric Acid gas	Acid storage tank	Aug-93	200 gals
Hydrochloric Acid	Storage tank	Sep-93	400 gals
Mercury	Sewer system	Jan-94	0.343 lbs
Caustic soda	Tank truck loading	Jan-94	40 gals
Diesel fuel	Plant area	Jan-94	unknown

<u>DISCHARGE</u>	<u>LOCATION</u>	<u>DATE</u>	<u>VOLUME</u>
Chlorine gas	Hypo tower and circulation tank	Jan-94	Unknown
Hydraulic fluid	Salt unloading area	Jun-94	15 gals
Brine	Plant area	Jul-94	20 gals
Diesel fuel	Plant area	Aug-94	20 gals
Fuel oil	Cell room west	Aug-94	20 gals
Fuel oil	Cell room west	Aug-94	5 gals
Chlorine gas	Cell room	Aug-94	<10 lbs
Chlorine gas	Plant area	Aug-94	<10 lbs
Chlorine gas	Hypo system	Sep-94	<10 lbs
Brine/sludge	North sludge pit	Sep-94	200 gals
Spent acid	Loading area	Nov-94	50 gals
Chlorine gas	Drop lines of the B condensers	Dec-94	<10 lbs
Hydrochloric acid	HCl truck loading area	Dec-94	20 gals
Hydrochloric acid	HCl truck loading area	Dec-94	10-15 gals
Hydrochloric acid	HCl truck loading area	Dec-94	20 gals
Brine	Sludge filter	Jan-95	200 gals
Caustic soda	NaOH truck loading area	Jan-95	20-25 gals
Caustic soda	NaOH truck loading area	Jan-95	5-10 gals
Hydrochloric acid	HCl truck loading area	Jan-95	20 gals
Caustic soda	NaOH truck loading area	Feb-95	10 gals
Depleted brine	Depleted brine receiver	Feb-95	200-300 gals
Hydrochloric acid	HCl truck loading area	Apr-95	25 gals
Hydrochloric acid	HCl truck loading area	Apr-95	50 gals
Brine	Sludge pit	Jun-95	175 gals
Hydrochloric acid	HCl plant	Oct-95	80 gals
Brine	Above cell feed pump house	Oct-95	100 gals
Brine	Lined Pond	Feb-96	20 gals
Brine	Sludge filter	Mar-96	100 gals
Hydrochloric acid	HCl tank car loading area	Jun-96	100 gals
Hydrochloric acid	HCl tank car loading area	Aug-96	200 gals
Diesel	Near truck scales	Oct-96	100 gals
Brine	Polish filters	Dec-96	10 gals
Caustic soda	North side of w.caustic storage	Jan-97	10 gals
Hydrochloric acid	HCl truck loading area	Jan-97	10 gals
Brine	Brine tank leak	Feb-97 *	Unknown
Brine	North filter backwash receiver tank	Mar-97 *	Unknown
Brine	Clarifier to outfall 003	May-97	1000 gals
Caustic soda	Caustic truck loading station	Jun-97	15 gals
Brine	West side of south pit sump	Aug-97	25 gals
Hydrogen gas condensate	Hydrogen compressor building	Aug-97	200 gals
Brine	Dechlor brine pumphouse	Oct-97	50 gals
Brine	Precoat tank Ep#173	Oct-97	20 gals
Hydrochloric acid	HCl tank car loading area	Oct-97	15-20 gals
Chlorine	Tank car loading shed	Nov-97	1300 lbs liquid
Chloropicrin	Chloropicrin loading station	Dec-97	10 gals
Hydrochloric acid	HCl truck loading area	Jan-98	10-15 gals
Brine	West of polish filter pre-coat tank	Jan-98	55 gals
Brine	Brine polish filter pre-coat discharge line	Mar-98	50-60 gals
Brine	Clarified brine pump house	Apr-98	15 gals

<u>DISCHARGE</u>	<u>LOCATION</u>	<u>DATE</u>	<u>VOLUME</u>
Hydrochloric acid	HCl truck loading area	May-98	20-30 gals
Caustic soda	Brine receiver overflow water	May-98	<300 gals
Brine	Brine sludge pits	Jun-98	75-100 gals
Brine	Polish filters	Jul-98	25 gals
Stormwater from Caustic dike	3rd Chlorine loading station	Jul-98	<800 gals
Chlorine	Hypo tower (gas)	Aug-98	<10 lbs
Sulfuric acid	Sulfuric acid head tank	Aug-98	100 gals

Hg: Mercury

HCl: Hydrochloric Acid

* Indicates date of repair. Duration of leaks of releases is unknown.

** Two breaks in returns line were found during this period. Exact repair dates are unknown.

This table was developed from information taken from Acheron Report: "Interim Report to LCP Chemicals- Maine on the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine Facility "1991"; from Memorandum, dated 4/12/93, from Donald Robbins Sr. Geologist ME DEP; contained in EPA work plan comment letter dated 6/21/93; from a records review of MEDEP, Bangor 8/94; from a records review at HoltraChem 8/98; and from spill reports provided by the HoltraChem Plant.

**Appendix #1
Soil Samples - Onsite Maximum Concentrations**

(Contaminants exceeding Media Protection Standard¹³³ bolded in table)

Sample Location	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date
SSS-065-01	Sand blasting area	Arsenic ¹³⁴		13.0 mg/kg ¹³⁵	10/7/97
SSS-067-01	Sand blasting area	Barium ¹³⁶		200.0 mg/kg ¹³⁷	10/7/97
SSS-067-01	Sand blasting area	Cadmium	8.0 mg/kg	3.7 mg/kg ¹³⁸	10/7/97
SSS-09B-02	Chloropicrin Building area	Chloropicrin	0.125 mg/kg	0.320 mg/kg ¹³⁹	8/17/94
SSS-067-01	Sand blasting area	Chromium ¹⁴⁰		49.0 mg/kg ¹⁴¹	10/7/97
SSS-067-01	Sand blasting area	Lead ¹⁴²		59.0 mg/kg ¹⁴³	10/7/97
SB8-02_7.5-9.5	Cell Building area	Mercury	2.2 mg/kg	2500 mg/kg ¹⁴⁴	11/12/01
SS7-01-0-.5	Transformer area	Polychlorinated biphenyl (Arochlor 1260)	1.0 mg/kg	3.28 mg/kg ¹⁴⁵	11//12/01

¹³³ Media Protection Standards established in document issued by US Environmental Protection Agency and Maine Department of Environmental Protection entitled HoltraChem Manufacturing Company site, Orrington, Maine Preliminary Media Protection Standards and Corrective Measures Study Workplan Basis Statement and Response to Comments dated December 31, 2002.

¹³⁴ Maine Remedial Action Guideline for Contaminated Soils, July 20, 1997 for arsenic is 10 mg/kg for a residential guideline and 30 mg/kg for both the trespasser and adult worker guidelines. The arsenic soil guideline for protection of groundwater is 29 mg/kg.

¹³⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-22.

¹³⁶ Maine Remedial Action Guideline for Contaminated Soils, July 20, 1997 for barium is 10,000 mg/kg for a residential, trespasser and adult worker guidelines. The barium soil guideline for protection of groundwater is 1,600 mg/kg.

¹³⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., at Table 3-22.

¹³⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., at Table 3-22.

¹³⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., at Table 3-20.

¹⁴⁰ Maine Remedial Action Guideline for Contaminated Soils, July 20, 1997 for chromium+6 is 950 mg/kg for a residential guideline, 5,350 mg/kg for the trespasser guideline, and 10,000 mg/kg for the adult worker guideline. The chromium+6 soil guideline for protection of groundwater is 38 mg/kg.

¹⁴¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., at Table 3-22.

¹⁴² Maine Remedial Action Guideline for Contaminated Soils, July 20, 1997 for lead is 375 mg/kg for a residential guideline, 700 mg/kg for the trespasser guideline, and 700 mg/kg for the adult worker guideline.

¹⁴³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II, dated December 22, 1998 by Camp Dresser & McKee Inc., at Table 3-22.

¹⁴⁴ HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Studies Field Investigation Report dated May 27, 2003, Revised September 19, 2003 by Camp Dresser and McKee Inc., Table 2-1.

¹⁴⁵ HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Studies Field Investigation Report dated May 27, 2003, Revised September 19, 2003 by Camp Dresser and McKee Inc., at Table 2-3.

Appendix #2
Groundwater Analysis - Onsite Maximum Concentrations

(Contaminants exceeding Media Protection Standard **bolded in table**)

Well	Area Monitoring	Contaminant	Media Protection Standard ¹⁴⁶	Maximum Concentration	Date	Date Last Tested
B-327-01	Manufacturing area	pH	Background	13.01 SU ¹⁴⁷	11/12/98	11/8/01
MW 401-01	Landfill #1 and Manufacturing area	pH	Background	3.63 SU ¹⁴⁸	7/23/98	11/7/01
MW501-01	Landfill #1 and Manufacturing area	Total dissolved solids	Background	110,000 mg/L ¹⁴⁹	7/22/98	7/22/98
MW501-01	Landfill #1 and Manufacturing area	Salinity	Background	4.0% (from sodium) ¹⁵⁰	7/22/98	7/22/98
B327-01				4.0% (from sodium) ¹⁵¹	7/22/98	7/22/98
MW510-01	Manufacturing area	Chloride	Background	66,000 mg/L ¹⁵²	11/8/01	11/8/01
B326-02	Landfill #1 and Manufacturing area	Sodium	Background	180,000 mg/L ¹⁵³	7/23/98	11/10/05
MW403-02	Manufacturing area	Manganese	500 ug/L or background	21,000 ug/L ¹⁵⁴	10/2/97	10/2/97
MW501-01	Landfill #1 and Manufacturing area	Mercury-dissolved	2.0 ug/L ¹⁵⁵	6,261 ug/L ¹⁵⁶	9/21/99	1/16/08
MW501-01	Landfill #1 and Manufacturing area	Mercury total		14,289 ug/L ¹⁵⁷	5/21/01	1/16/08
B316-B1	Manufacturing area	Acetone	700 ug/L	7,300 ug/L ¹⁵⁸	10/8/97	10/8/97
MW501-01	Landfill #1 and	Bromodichloromethane	6.0 ug/L	55 ug/L ¹⁵⁹	7/1/03	1/16/08

¹⁴⁶ Background values to be determined as a part of this Order.

¹⁴⁷ Annual Report on 2000 Comprehensive Monitoring Program, Table 3-10, dated March 2001, Acheron Engineering, Environmental & Geological Consultants, HoltraChem Manufacturing Company, Orrington, Maine.

¹⁴⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁴⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁵⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁵¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁵² HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Studies Field Investigation Report dated May 27, 2003, Revised September 19, 2003 by Camp Dresser and McKee Inc., Table 2-8.

¹⁵³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

¹⁵⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

¹⁵⁵ Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

¹⁵⁶ Annual Report on 1999 Comprehensive Monitoring Program, Table 3-9, dated April 2000, HoltraChem Manufacturing Co., Orrington, Maine, Acheron Engineering and Geological Consulting for HoltraChem.

¹⁵⁷ Letter report from Earth Tech, A Tyco International Ltd. Company, entitled Laboratory Analytical Results for the May 2001 Sampling Event at the HoltraChem Site, Orrington, Maine dated August 8, 2001 transmitting May 2001 data.

¹⁵⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-13.

Well	Area Monitoring	Contaminant	Media Protection Standard ¹⁴⁶	Maximum Concentration	Date	Date Last Tested
	Manufacturing area					
MW501-01	Landfill #1 and Manufacturing area	Bromoform	44 ug/L	120 ug/L ¹⁶⁰	7/22/98	1/16/08
B316-B1	Manufacturing area	Carbon disulfide	600 ug/L	8,900 ug/L ¹⁶¹	6/28/90	10/8/97
MW-402-01	Landfill #1	Carbon tetrachloride	3.0 ug/L	880 ug/L	11/10/05	11/10/05
MW410-B1	Landfill #3 and #4	Chloroform	57 ug/L	570 ug/L ¹⁶²	5/9/95	1/16/08
B316-01	Manufacturing area	Chloropicrin	30 ug/L	50,000 ug/L ¹⁶³	5/4/95	10/23/01
B316-01	Manufacturing area	m & p-cresol		1,800 ug/L ¹⁶⁴	5/4/95	5/4/95
		m-cresol	35 ug/L	NT		
MW402-01	Landfill #1	p-cresol	3.5 ug/L	ND	10/24/01	10/24/01 ¹⁶⁵
MW501-01	Landfill #1 and manufacturing area	Dibromochloromethane	4.0 ug/L	93 ug/L ¹⁶⁶	7/22/98	1/16/08
MW507-01	Manufacturing area	1,1 dichloroethane	70 ug/L	8.1 ug/L ¹⁶⁷	10/8/97	10/8/97
B320-01	Manufacturing area	1,1 dichloroethene	0.6 ug/L	13 ug/L ¹⁶⁸	12/89	10/7/97
B-327-01	Manufacturing area	Cis 1,2 dichloroethene	70 ug/L	5.2 ug/L ¹⁶⁹	5/9/95	10/6/97
B327-01	Manufacturing area	Trans 1,2 dichloroethene	100 ug/L	8.0 ug/L ¹⁷⁰	6/90	10/6/97
MW513-01	Landfill #1 and Manufacturing area	Hexachloroethane	7.0 ug/L	270 ug/L ¹⁷¹	10/22/01	10/22/01
MW404-01	Manufacturing area	Methylene chloride	5.0 ug/L	30 ug/L ¹⁷²	5/2/95	10/9/97
B316-01	Manufacturing area	Pentachloroethane	35 ug/L	340 ug/L ¹⁷³	5/4/95	5/4/95

¹⁵⁹Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated October 3, 2003 transmitting first and second quarterly monitoring data for 2003.

¹⁶⁰Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

¹⁶¹Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume IV Appendices A, B, C & D dated December 22, 1995 by Camp Dresser & McKee Inc., Appendix A Selected Tables & Figures from previous investigations.

¹⁶²Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-11.

¹⁶³Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

¹⁶⁴Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

¹⁶⁵Letter report from Roy F. Weston Inc. entitled Final Expanded Site Inspection Report, HoltraChem Manufacturing, dated 10/3/02, Attachment B, Table 1B.

¹⁶⁶Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

¹⁶⁷Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-13.

¹⁶⁸Interim Report to LCP Chemicals - Maine on the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine, Facility January 15, 1991 by Acheron, Inc., Table 3-11.

¹⁶⁹Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

¹⁷⁰Interim Report to LCP Chemicals - Maine on the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine, Facility January 15, 1991 by Acheron, Inc., Table 3-11.

¹⁷¹Letter report from Roy F. Weston Inc. entitled Final Expanded Site Inspection Report, HoltraChem Manufacturing, dated 10/3/02, Attachment B, Table 1B.

¹⁷²Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

¹⁷³Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

Well	Area Monitoring	Contaminant	Media Protection Standard ¹⁴⁶	Maximum Concentration	Date	Date Last Tested
B326-02	Landfill #1 and Manufacturing area	2,4,5-T	50.0 ug/L	0.3 ug/L ¹⁷⁴	5/4/95	5/4/95
MW513-01	Landfill #1 and Manufacturing area	Tetrachloroethene (PCE)	5.0 ug/L	13 ug/L ¹⁷⁵	11/10/05	11/10/05
MW501-01	Landfill #1 and Manufacturing area	1,1,1 Trichloroethane	0.2 ug/L ¹⁷⁶	1.5 ug/L ¹⁷⁷	4/13/05	1/16/08
B326-02	Landfill #1 and Manufacturing area	Trichloroethene (TCE)	5.0 ug/L	29 ug/L ¹⁷⁸	12/13/89	11/10/05

¹⁷⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

¹⁷⁵ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated December 9, 2005 transmitting third and fourth quarterly monitoring data for 2005.

¹⁷⁶ This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but was no criterion was established for this value in the approval of the Preliminary Media Protection Standards in December 31, 2002.

¹⁷⁷ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated June 6, 2005 transmitting first quarterly monitoring data for 2005.

¹⁷⁸ Interim Report to LCP Chemicals - Maine on the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine, Facility January 15, 1991 by Acheron, Inc., Table 3-11.

Appendix #3
Groundwater Analysis - Onsite Maximum Concentrations around Landfills

(Contaminants exceeding Media Protection Standard **bolded in table**)

Well	Area Monitoring	Contaminant	Media Protection Standard ¹⁷⁹	Maximum Concentration ^{180, 181}	Date	Date Last Tested
MW501-01	Landfill #1	pH	Background	9.55 SU ¹⁸²	11/6/00	4/5/06
MW 401-01	Landfill #1	pH	Background	3.63 SU ¹⁸³	7/23/98	11/7/01
MW501-01	Landfill #1	Total dissolved solids	Background	110,000 mg/L ¹⁸⁴	7/22/98	7/22/98
MW501-01	Landfill #1	Salinity	Background	4.0% (from sodium) ¹⁸⁵	7/22/98	7/22/98
MW501-01	Landfill #1	Chloride	Background	62,000 mg/L ¹⁸⁶	10/8/97	7/22/98
B326-02	Landfill #1	Sodium	Background	180,000 mg/L ¹⁸⁷	7/23/98	11/10/05
MW501-01	Landfill #1	Manganese	500 ug/L or background	14 mg/L ¹⁸⁸	10/8/97	11/9/05
MW501-01	Landfill #1	Mercury-dissolved	2.0 ug/L ¹⁸⁹	6,261 ug/L ¹⁹⁰	9/21/99	1/16/08
MW501-01	Landfill #1	Mercury total		14,289 ug/L ¹⁹¹	5/21/01	1/16/08
B326-02	Landfill #1	Acetone	700 ug/L	11 ug/L ¹⁹²	5/4/95	11/10/05
MW501-01	Landfill #1	Bromodichloromethane	6.0 ug/L	55 ug/L ¹⁹³	7/1/03	1/16/08
MW501-01	Landfill #1	Bromoform	44 ug/L	120 ug/L ¹⁹⁴	7/22/98	1/16/08
B326-02	Landfill #1	Carbon disulfide	600 ug/L	20 ug/L ¹⁹⁵	7/23/98	11/10/05

¹⁷⁹ Background values to be determined as a part of this Order.

¹⁸⁰ ND = not detected

¹⁸¹ NT = not tested

¹⁸² Annual Report on 2000 Comprehensive Monitoring Program, Table 3-10, dated March 2001, Acheron Engineering, Environmental & Geological Consultants, HoltraChem Manufacturing Company, Orrington, Maine.

¹⁸³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁸⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁸⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

¹⁸⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

¹⁸⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

¹⁸⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

¹⁸⁹ Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

¹⁹⁰ Annual Report on 1999 Comprehensive Monitoring Program, Table 3-9, dated April 2000, HoltraChem Manufacturing Co., Orrington, Maine, Acheron Engineering and Geological Consulting for HoltraChem.

¹⁹¹ Letter report from Earth Tech, A Tyco International Ltd. Company, entitled Laboratory Analytical Results for the May 2001 Sampling Event at the HoltraChem Site, Orrington, Maine dated August 8, 2001 transmitting May 2001 data.

¹⁹² Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

¹⁹³ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated October 3, 2003 transmitting first and second quarterly monitoring data for 2003.

¹⁹⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

¹⁹⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

Well	Area Monitoring	Contaminant	Media Protection Standard ¹⁷⁹	Maximum Concentration ^{180, 181}	Date	Date Last Tested
MW402-01	Landfill #1	Carbon tetrachloride	3.0 ug/L	880 ug/L ¹⁹⁶	11/10/05	11/10/05
MW501-01	Landfill #1	Chloroform	57 ug/L	290 ug/L ¹⁹⁷	7/22/98	1/16/08
MW513-01	Landfill #1	Chloropicrin	30 ug/L	28,000 ug/L ¹⁹⁸	12/2/97	11/10/05
B326-02	Landfill #1	m & p-cresol		ND	5/4/95	5/4/95 ¹⁹⁹
	Landfill #1	m-cresol	35 ug/L			
MW402-01	Landfill #1	p-cresol	3.5 ug/L	ND	10/24/01	10/24/01 ²⁰⁰
MW501-01	Landfill #1	Dibromochloromethane	4.0 ug/L	93 ug/L ²⁰¹	7/22/98	1/16/08
MW501-01	Landfill #1	1,1 dichloroethane	70 ug/L	1.1 ug/L ²⁰²	11/11/04	1/16/08
B-326-02	Landfill #1	1,1 dichloroethene	0.6 ug/L	2.9 ug/L ²⁰³	9/15/05	1/16/08
MW501-01	Landfill #1	Cis 1,2 dichloroethene	70 ug/L	4.0 ug/L ²⁰⁴	4/29/03	1/16/08
MW501-01	Landfill #1	Trans 1,2 dichloroethene	100 ug/L	ND	1/16/08	1/16/08 ²⁰⁵
MW513-01	Landfill #1	Hexachloroethane	7.0 ug/L	270 ug/L ²⁰⁶	10/22/01	10/23/01
MW501-01	Landfill #1	Methylene chloride	5.0 ug/L	ND	1/16/08	1/16/08 ²⁰⁷
B326-02	Landfill #1	Pentachloroethane	35 ug/L	ND	5/4/95	5/4/95 ²⁰⁸

¹⁹⁶ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated December 9, 2005 transmitting third and fourth quarterly monitoring data for 2005.

¹⁹⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

¹⁹⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-13.

¹⁹⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁰⁰ Letter report from Roy F. Weston Inc. entitled Final Expanded Site Inspection Report, HoltraChem Manufacturing, dated 10/3/02, Attachment B, Table 1B.

²⁰¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²⁰² Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated December 29, 2004, Table 4th Quarter November 2004 Groundwater Monitoring Results.

²⁰³ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated December 9, 2005 transmitting third and fourth quarterly monitoring data for 2005.

²⁰⁴ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated October 3, 2003 transmitting first and second quarterly monitoring data for 2003.

²⁰⁵ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 31 of 74.

²⁰⁶ Letter report from Roy F. Weston Inc. entitled Final Expanded Site Inspection Report, HoltraChem Manufacturing, dated 10/3/02, Attachment B, Table 1B.

²⁰⁷ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 31 of 74.

²⁰⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
B326-02	Landfill #1	2,4,5-T	50.0 ug/L	0.3 ug/L ²⁰⁹	5/4/95	5/4/95
MW513-01	Landfill #1	Tetrachloroethene (PCE)	5.0 ug/L	13 ug/L ²¹⁰	11/10/05	11/10/05
MW501-01	Landfill #1	1,1,1 Trichloroethane	0.2 ug/L ²¹¹	1.5 ug/L ²¹²	4/13/05	1/16/08
B326-02	Landfill #1	Trichloroethene (TCE)	5.0 ug/L	29 ug/L ²¹³	12/13/89	11/10/05

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW409-B1	Landfill #2	pH	Background	8.1 SU ²¹⁴	6/28/00	11/7/00
MW409-B1	Landfill #2	pH	Background	6.6 SU ²¹⁵	10/1/97	11/7/00
MW409-01	Landfill #2	Total dissolved solids	Background	1,200 mg/L ²¹⁶	5/8/95	7/22/98
MW409-01	Landfill #2	Salinity	Background	0.08% (from sodium) ²¹⁷	5/8/95	7/22/98
MW409-01	Landfill #2	Chloride	Background	200 mg/L ²¹⁸	5/8/95	7/22/98
MW409-01	Landfill #2	Sodium	Background	240 mg/L ²¹⁹	5/8/95	7/22/98
MW409-01	Landfill #2	Manganese	500 ug/L or background	370 ug/L ²²⁰	5/8/95	5/10/98
MW409-B1	Landfill #2	Mercury-dissolved	2.0 ug/L ²²¹	.5 ug/L ²²²	11/7/00	11/7/00
MW409-B1	Landfill #2	Mercury total		2.2 ug/L ²²³	3/21/00	11/7/00

²⁰⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²¹⁰ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated December 9, 2005 transmitting third and fourth quarterly monitoring data for 2005.

²¹¹ This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but was no criterion was established for this value in the approval of Preliminary Media Protection Standards in December 31, 2002.

²¹² Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated June 6, 2005 transmitting first quarterly monitoring data for 2005.

²¹³ Interim Report to LCP Chemicals - Maine on the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine, Facility January 15, 1991 by Acheron, Inc., Table 3-11.

²¹⁴ Annual Report on 2000 Comprehensive Monitoring Program, Table 3-10, dated March 2001, Acheron Engineering, Environmental & Geological Consultants, HoltraChem Manufacturing Company, Orrington, Maine.

²¹⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-12.

²¹⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²¹⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²¹⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²¹⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²²⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²²¹ Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

²²² Annual Report on 2000 Comprehensive Monitoring Program, Table 3-10, dated March 2001, Acheron Engineering, Environmental & Geological Consultants, HoltraChem Manufacturing Company, Orrington, Maine.

²²³ Annual Report on 2000 Comprehensive Monitoring Program, Table 3-10, dated March 2001, Acheron Engineering, Environmental & Geological Consultants, HoltraChem Manufacturing Company, Orrington, Maine.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW409-01	Landfill #2	Acetone	700 ug/L	ND	7/22/98	7/22/98 ²²⁴
MW409-01	Landfill #2	Bromodichloromethane	6.0 ug/L	ND	7/22/98	7/22/98 ²²⁵
MW409-01	Landfill #2	Bromoform	44 ug/L	ND	7/22/98	7/22/98 ²²⁶
MW409-01	Landfill #2	Carbon disulfide	600 ug/L	ND	7/22/98	7/22/98 ²²⁷
MW409-B1	Landfill #2	Carbon tetrachloride	3.0 ug/L	5 ug/L ²²⁸	10/1/97	7/22/98
MW409-01	Landfill #2	Chloroform	57 ug/L	ND	7/22/98	7/22/98 ²²⁹
MW409-01	Landfill #2	Chloropicrin	30 ug/L	ND	7/22/98	7/22/98 ²³⁰
	Landfill #2	m & p-cresol		NT		
	Landfill #2	m-cresol	35 ug/L			
	Landfill #2	p-cresol	3.5 ug/L	NT		
MW409-01	Landfill #2	Dibromochloromethane	4.0 ug/L	ND	7/22/98	7/22/98 ²³¹
MW409-01	Landfill #2	1,1 dichloroethane	70 ug/L	ND	7/22/98	7/22/98 ²³²
MW409-01	Landfill #2	1,1 dichloroethene	0.6 ug/L	ND	7/22/98	7/22/98 ²³³
MW409-01	Landfill #2	Cis 1,2 dichloroethene	70 ug/L	ND	7/22/98	7/22/98 ²³⁴
MW409-01	Landfill #2	Trans 1,2 dichloroethene	100 ug/L	ND	7/22/98	7/22/98 ²³⁵
	Landfill #2	Hexachloroethane	7.0 ug/L	NT		

²²⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²²⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²²⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²²⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²²⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-13.

²²⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²³⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²³¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²³² Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²³³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume VII H Attachments, Laboratory Data dated December 22, 1998 by Camp Dresser & McKee Inc., CDM Lab, Laboratory Report dated August 24, 1998, page 6 of 38.

²³⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume VII H Attachments, Laboratory Data dated December 22, 1998 by Camp Dresser & McKee Inc., CDM Lab, Laboratory Report dated August 24, 1998, page 6 of 38.

²³⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume VII H Attachments, Laboratory Data dated December 22, 1998 by Camp Dresser & McKee Inc., CDM Lab, Laboratory Report dated August 24, 1998, page 6 of 38.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW409-01	Landfill #2	Methylene chloride	5.0 ug/L	ND	7/22/98	7/22/98 ²³⁶
	Landfill #2	Pentachloroethane	35 ug/L	NT		
	Landfill #2	2,4,5-T	50.0 ug/L	NT		
MW409-01	Landfill #2	Tetrachloroethene (PCE)	5.0 ug/L	ND	7/22/98	7/22/98 ²³⁷
MW409-01	Landfill #2	1,1,1 Trichloroethane	0.2 ug/L ²³⁸	ND	7/22/98	7/22/98 ²³⁹
MW409-01	Landfill #2	Trichloroethene (TCE)	5.0 ug/L	ND	7/22/98	7/22/98 ²⁴⁰

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW405-01	Landfill #3	pH	Background	10.36 SU ²⁴¹	7/21/98	11/7/00
P-2A	Landfill #3	pH	Background	5.85 SU ²⁴²	1/16/08	1/16/08
MW405-B1	Landfill #3	Total dissolved solids	Background	2,000 mg/L ²⁴³	5/3/95	10/2/97
MW410-B1	Landfill #3	Salinity	Background	0.15% (from sodium) ²⁴⁴	7/21/98	7/21/98
MW410-B1	Landfill #3	Chloride	Background	780 mg/L ²⁴⁵	7/21/98	7/21/98
MW410-B1	Landfill #3	Sodium	Background	730,000 ug/L ²⁴⁶	7/21/98	7/21/98

²³⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²³⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume VII H Attachments, Laboratory Data dated December 22, 1998 by Camp Dresser & McKee Inc., CDM Lab, Laboratory Report dated August 24, 1998, page 6 of 38.

²³⁸ This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but no criteria was established for this contaminant in the approval of Preliminary Media Protection Standards in December 31, 2002.

²³⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume VII H Attachments, Laboratory Data dated December 22, 1998 by Camp Dresser & McKee Inc., CDM Lab, Laboratory Report dated August 24, 1998, page 6 of 38.

²⁴⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-15.

²⁴¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁴² Mallinckrodt, HoltraChem Manufacturing Site, Landfill #5, Groundwater Monitoring Program, 2007 Annual Report, 4th Quarter October 2007 transmitted via July 7, 2008 email from Ernest Ashley to Stacy Ladner with attached table. The table incorrectly is identified as the October 2007 sampling event when it actually occurred on January 16, 2008.

²⁴³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²⁴⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁴⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁴⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW405-B1	Landfill #3	Manganese	500 ug/L or background	940 ug/L ²⁴⁷	10/2/97	10/2/97
MW410-B1	Landfill #3	Mercury-dissolved	2.0 ug/L ²⁴⁸	134 ug/L ²⁴⁹	5/21/01	1/16/08
MW410-B1	Landfill #3	Mercury total		126.6 ug/L ²⁵⁰	5/21/01	1/16/08
MW410-B1	Landfill #3	Acetone	700 ug/L	ND	1/16/08	1/16/08 ²⁵¹
MW410-B1	Landfill #3	Bromodichloromethane	6.0 ug/L	ND	1/16/08	1/16/08 ²⁵²
MW410-B1	Landfill #3	Bromoform	44 ug/L	ND	1/16/08	1/16/08 ²⁵³
P-13	Landfill #3	Carbon disulfide	600 ug/L	12 ug/L ²⁵⁴	10/1/03	1/16/08
MW-410-B1	Landfill #3	Carbon tetrachloride	3.0 ug/L	430 ug/L ²⁵⁵	9/22/95	1/16/08
MW410-B1	Landfill #3	Chloroform	57 ug/L	570 ug/L ²⁵⁶	5/9/95	1/16/08
P-13	Landfill #3	Chloropicrin	30 ug/L	840 ug/L ²⁵⁷	5/10/95	7/27/98
P-2A	Landfill #3	m & p-cresol		ND	5/4/95	5/4/95 ²⁵⁸
	Landfill #3	m-cresol	35 ug/L			
P-2A	Landfill #3	p-cresol	3.5 ug/L	ND	9/27/89	9/27/89 ²⁵⁹
MW410-B1	Landfill #3	Dibromochloromethane	4.0 ug/L	ND	1/16/08	1/16/08 ²⁶⁰

²⁴⁷ 6010A Aqueous Analysis Report, Page 98 of 225 from Camp Dresser & McKee Inc. dated 10/9/97.

²⁴⁸ Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

²⁴⁹ Letter report from Earth Tech, A Tyco International Ltd. Company, entitled Laboratory Analytical Results for the May 2001 Sampling Event at the HoltraChem Site, Orrington, Maine dated August 8, 2001 transmitting May 2001 data.

²⁵⁰ Letter report from Earth Tech, A Tyco International Ltd. Company, entitled Laboratory Analytical Results for the May 2001 Sampling Event at the HoltraChem Site, Orrington, Maine dated August 8, 2001 transmitting May 2001 data.

²⁵¹ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 13 of 74.

²⁵² Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁵³ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁵⁴ Letter report from Camp Dresser & McKee Inc. entitled Analytical Results, September 2003 Groundwater Sampling, HoltraChem Manufacturing Site, Orrington, Maine dated November 20, 2003.

²⁵⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-11.

²⁵⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-11.

²⁵⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

²⁵⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁵⁹ Interim Report to LCP Chemicals, Maine, On the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine Facility Appendices, Vol II dated January 15, 1991, Appendix H, Appendix IX, Chemical Data – Groundwater, NET Atlantic Laboratory, Cambridge Div.

²⁶⁰ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
P-13	Landfill #3	1,1 dichloroethane	70 ug/L	2.0 ug/L ²⁶¹	8/27/01	1/16/08
P-13	Landfill #3	1,1 dichloroethene	0.6 ug/L	1.2 ug/L ²⁶²	9/29/04	1/16/08
MW410-B1	Landfill #3	Cis 1,2 dichloroethene	70 ug/L	ND	1/16/08	1/16/08 ²⁶³
MW410-B1	Landfill #3	Trans 1,2 dichloroethene	100 ug/L	ND	1/16/08	1/16/08 ²⁶⁴
P-2A	Landfill #3	Hexachloroethane	7.0 ug/L	11 ug/L ²⁶⁵	5/4/95	5/4/95
MW410-B1	Landfill #3	Methylene chloride	5.0 ug/L	ND	1/16/08	1/16/08 ²⁶⁶
P-2A	Landfill #3	Pentachloroethane	35 ug/L	ND	5/4/95	5/4/95 ²⁶⁷
P-2A	Landfill #3	2,4,5-T	50.0 ug/L	ND	5/4/95	5/4/95 ²⁶⁸
MW410-B1	Landfill #3	Tetrachloroethene (PCE)	5.0 ug/L	2.1 ug/L ²⁶⁹	6/23/05	1/16/08
MW410-B1	Landfill #3	1,1,1 Trichloroethane	0.2 ug/L ²⁷⁰	ND	1/16/08	1/16/08 ²⁷¹
MW410-B1	Landfill #3	Trichloroethene (TCE)	5.0 ug/L	1.4 ug/L ²⁷²	6/23/05	1/16/08

²⁶¹Letter report from Earth Tech, A Tyco International Ltd. Company entitled Comprehensive Monitoring Program, August 2001 Sampling Event, HoltraChem Manufacturing Site, Orrington, Maine dated October 18, 2001, Table August 2001 Ground Water Monitoring results. The Table incorrectly identifies 1,1 Dichloroethane with 1,1 Dichloroethene.

²⁶²Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated November 19, 2004 transmitting third round quarterly monitoring data for 2004.

²⁶³Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁶⁴Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁶⁵Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁶⁶Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁶⁷Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁶⁸Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁶⁹Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated August 3, 2005 transmitting second round quarterly monitoring data for 2005.

²⁷⁰This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but no criterion was established for this contaminant in the approval of Preliminary Media Protection Standards in December 31, 2002.

²⁷¹Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁷²Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated August 3, 2005 transmitting second round quarterly monitoring data for 2005.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW405-01	Landfill #4	pH	Background	10.36 SU ²⁷³	7/21/98	11/7/00
P-2A	Landfill #4	pH	Background	5.85 SU ²⁷⁴	1/16/08	1/16/08
MW405-B1	Landfill #4	Total dissolved solids	Background	2,000 mg/L ²⁷⁵	5/3/95	10/2/97
MW410-B1	Landfill #4	Salinity	Background	0.15% (from sodium) ²⁷⁶	7/21/98	7/21/98
MW506-B1	Landfill #4	Chloride	Background	850 mg/L ²⁷⁷	7/21/98	7/21/98
MW506-B1	Landfill #4	Sodium	Background	790,000 ug/L ²⁷⁸	7/21/98	10/22/01
MW405-B1	Landfill #4	Manganese	500 ug/L or background	940 ug/L ²⁷⁹	10/2/97	10/2/97
MW506-B1	Landfill #4	Mercury-dissolved	2.0 ug/L ²⁸⁰	143.4 ug/L ²⁸¹	8/27/01	1/16/08
MW506-B1	Landfill #4	Mercury total		151.7 ug/L ²⁸²	8/27/01	1/16/08
P-13	Landfill #4	Acetone	700 ug/L	6.4 ug/L ²⁸³	1/16/08	1/16/08
MW410-B1	Landfill #4	Bromodichloromethane	6.0 ug/L	ND	1/16/08	1/16/08 ²⁸⁴
MW410-B1	Landfill #4	Bromoform	44 ug/L	ND	1/16/08	1/16/08 ²⁸⁵
P-13	Landfill #4	Carbon disulfide	600 ug/L	12 ug/L ²⁸⁶	10/1/03	1/16/08
MW-410-B1	Landfill #4	Carbon tetrachloride	3.0 ug/L	430 ug/L ²⁸⁷	9/22/95	1/16/08

²⁷³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁷⁴ Mallinckrodt, HoltraChem Manufacturing Site, Landfill #5, Groundwater Monitoring Program, 2007 Annual Report, 4th Quarter October 2007 transmitted via July 7, 2008 email from Ernest Ashley to Stacy Ladner with attached table. The table incorrectly is identified as the October 2007 sampling event when it actually occurred on January 16, 2008.

²⁷⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

²⁷⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁷⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁷⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-14.

²⁷⁹ 6010A Aqueous Analysis Report, Page 98 of 225 from Camp Dresser & McKee Inc. dated 10/9/97.

²⁸⁰ Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

²⁸¹ Letter Report from Camp Dresser & McKee entitled HoltraChem Site, Orrington, Maine, Groundwater Monitoring Program, Assessment & Recommended Changes, Attachment D, Water Quality, Data Table & Time History Plots, Landfill #4 Assessment Monitoring dated May 13, 2004.

²⁸² Letter Report from Camp Dresser & McKee entitled HoltraChem Site, Orrington, Maine, Groundwater Monitoring Program, Assessment & Recommended Changes, Attachment D, Water Quality, Data Table & Time History Plots, Landfill #4 Assessment Monitoring dated May 13, 2004.

²⁸³ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 26 of 74.

²⁸⁴ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁸⁵ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁸⁶ Letter report from Camp Dresser & McKee Inc. entitled Analytical Results, September 2003 Groundwater Sampling, HoltraChem Manufacturing Site, Orrington, Maine dated November 20, 2003.

²⁸⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-11.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW410-B1	Landfill #4	Chloroform	57 ug/L	570 ug/L ²⁸⁸	5/9/95	1/16/08
P-13	Landfill #4	Chloropicrin	30 ug/L	840 ug/L ²⁸⁹	5/10/95	7/27/98
P-2A	Landfill #4	m & p-cresol		ND	5/4/95	5/4/95 ²⁹⁰
	Landfill #4	m-cresol	35 ug/L			
P-2A	Landfill #3	p-cresol	3.5 ug/L	ND	9/27/89	9/27/89 ²⁹¹
MW410-B1	Landfill #4	Dibromochloromethane	4.0 ug/L	ND	1/16/08	1/16/08 ²⁹²
P-13	Landfill #4	1,1 dichloroethane	70 ug/L	2.0 ug/L ²⁹³	8/27/01	1/16/08
P-13	Landfill #4	1,1 dichloroethene	0.6 ug/L	1.2 ug/L ²⁹⁴	9/29/04	1/16/08
MW410-B1	Landfill #4	Cis 1,2 dichloroethene	70 ug/L	ND	1/16/08	1/16/08 ²⁹⁵
MW410-B1	Landfill #4	Trans 1,2 dichloroethene	100 ug/L	ND	1/16/08	1/16/08 ²⁹⁶
P-2A	Landfill #4	Hexachloroethane	7.0 ug/L	11 ug/L ²⁹⁷	5/4/95	5/4/95
MW506-B1	Landfill #4	Methylene chloride	5.0 ug/L	ND	1/16/08	1/16/08 ²⁹⁸
P-2A	Landfill #4	Pentachloroethane	35 ug/L	ND	5/4/95	5/4/95 ²⁹⁹
P-2A	Landfill #4	2,4,5-T	50.0 ug/L	ND	5/4/95	5/4/95 ³⁰⁰
MW410-B1	Landfill #4	Tetrachloroethene (PCE)	5.0 ug/L	2.1 ug/L ³⁰¹	6/23/05	1/16/08

²⁸⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-11.

²⁸⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-9.

²⁹⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁹¹ Interim Report to LCP Chemicals, Maine, On the Nature, Extent and Fate of Environmental Contaminants at the Orrington, Maine Facility Appendices, Vol II dated January 15, 1991, Appendix H, Appendix IX, Chemical Data – Groundwater, NET Atlantic Laboratory, Cambridge Div.

²⁹² Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁹³ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated October 18, 2001, Table August 2001 Ground Water Monitoring results. The Table incorrectly identifies 1,1 Dichloroethane with 1,1 Dichloroethene.

²⁹⁴ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated November 19, 2004 transmitting third round quarterly monitoring data for 2004.

²⁹⁵ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁹⁶ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

²⁹⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

²⁹⁸ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 23 of 74.

²⁹⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

³⁰⁰ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-10.

³⁰¹ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated August 3, 2005 transmitting second round quarterly monitoring data for 2005.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
MW410-B1	Landfill #4	1,1,1 Trichloroethane	0.2 ug/L ³⁰²	ND	1/16/08	1/16/08 ³⁰³
MW410-B1	Landfill #4	Trichloroethene (TCE)	5.0 ug/L	1.4 ug/L ³⁰⁴	6/23/05	1/16/08

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
B-307-B1	Landfill #5	pH	Background	11.2 SU ³⁰⁵	9/25/89	4/4/06
B-306-B2	Landfill #5	pH	Background	6.17 SU ³⁰⁶	4/20/04	4/3/06
B306-B1	Landfill #5	Total dissolved solids	Background	2,100 mg/L ³⁰⁷	5/9/95	9/30/97
B306-B1	Landfill #5	Salinity	Background	0.16% (from sodium) ³⁰⁸	5/9/95	5/9/95
B-306-B1	Landfill #5	Chloride	Background	3,300 mg/L ³⁰⁹	3/27/90	9/30/97
B-306-B1	Landfill #5	Sodium	Background	650 mg/L ³¹⁰	12/12/89	9/30/97
P-3	Landfill #5	Manganese	500 ug/L or background	600 ug/L ³¹¹	5/10/95	5/10/95
B-304-B1	Landfill #5	Mercury-dissolved	2.0 ug/L ³¹²	0.4 ug/L ³¹³	4/12/95	10/1/07
P-3	Landfill #5	Mercury total		4.7 ug/L ³¹⁴	5/10/95	5/10/95
B306-B1	Landfill #5	Acetone	700 ug/L	12 ug/L ³¹⁵	6/24/98	1/16/08
B306-B1	Landfill #5	Bromodichloromethane	6.0 ug/L	ND	1/16/08	1/16/08 ³¹⁶
B306-B1	Landfill #5	Bromoform	44 ug/L	ND	1/16/08	1/16/08 ³¹⁷

³⁰² This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but no criterion was established for this contaminant in the approval of Preliminary Media Protection Standards in December 31, 2002.

³⁰³ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 12 of 74.

³⁰⁴ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated August 3, 2005 transmitting second round quarterly monitoring data for 2005.

³⁰⁵ Annual Report, RCRA Groundwater Monitoring, LCP Maine dated March 1991, by Acheron Engineering Environmental & Geological Consultants, Table 5.

³⁰⁶ Letter report from Camp Dresser & McKee Inc. entitled Groundwater Monitoring Results, HoltraChem Manufacturing Site, Orrington, Maine dated June 17, 2004 transmitting first quarterly monitoring data for 2004.

³⁰⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

³⁰⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

³⁰⁹ Annual Report, RCRA Groundwater Monitoring, LCP Maine dated March 1991, by Acheron Engineering Environmental & Geological Consultants, Table 5.

³¹⁰ Annual Report, RCRA Groundwater Monitoring, LCP Maine dated March 1991, by Acheron Engineering Environmental & Geological Consultants, Table 5.

³¹¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-8.

³¹² Plus must meet surface water media protection standard or groundwater discharge must not significantly lower the existing water quality, plus fish tissue residue needs to be assessed.

³¹³ Letter report from Acheron Inc. dated June 21, 1995 entitled Results of April 12, 1995 sampling of Landfill #5, Table 2.

³¹⁴ Report on Initial Groundwater Quality Assessment Monitoring Program, Landfill #5, HoltraChem Manufacturing, Orrington, Maine dated March 1996, Table 2-4.

³¹⁵ Comprehensive Annual Report, 1998 Groundwater Detection and Assessment Monitoring Program, Landfill #5, HoltraChem Manufacturing, Orrington, Maine dated February 1999, Table 3-3.

³¹⁶ Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
B306-B1	Landfill #5	Carbon disulfide	600 ug/L	ND	1/16/08	1/16/08 ³¹⁸
B306-B1	Landfill #5	Carbon tetrachloride	3.0 ug/L	30 ug/L ³¹⁹	11/20/02	1/16/08
B306-B1	Landfill #5	Chloroform	57 ug/L	18 ug/L ³²⁰	6/18/96	1/16/08
B306-B1	Landfill #5	Chloropicrin	30 ug/L	ND	9/30/97	9/30/97 ³²¹
	Landfill #5	m & p-cresol		NT		
	Landfill #5	m-cresol	35 ug/L			
	Landfill #5	p-cresol	3.5 ug/L	NT		
B306-B1	Landfill #5	Dibromochloromethane	4.0 ug/L	ND	1/16/08	1/16/08 ³²²
B306-B1	Landfill #5	1,1 dichloroethane	70 ug/L	ND	1/16/08	1/16/08 ³²³
B306-B1	Landfill #5	1,1 dichloroethene	0.6 ug/L	ND	1/16/08	1/16/08 ³²⁴
B306-B1	Landfill #5	Cis 1,2 dichloroethene	70 ug/L	ND	1/16/08	1/16/08 ³²⁵
B306-B1	Landfill #5	Trans 1,2 dichloroethene	100 ug/L	ND	1/16/08	1/16/08 ³²⁶
	Landfill #5	Hexachloroethane	7.0 ug/L	NT		
B306-B1	Landfill #5	Methylene chloride	5.0 ug/L	ND	1/16/08	1/16/08 ³²⁷
	Landfill #5	Pentachloroethane	35 ug/L	NT		
B304-B1	Landfill #5	2,4,5-T	50.0 ug/L	ND	6/26/90	6/26/90 ³²⁸
B306-B1	Landfill #5	Tetrachloroethene (PCE)	5.0 ug/L	ND	1/16/08	1/16/08 ³²⁹

³¹⁷Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³¹⁸Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 20 of 74.

³¹⁹Letter report from Earth Tech, A Tyco International Ltd. Company entitled Analytical Results, November 2002 Groundwater Sampling, HoltraChem Manufacturing Site, Orrington, Maine Dated January 14, 2003.

³²⁰Comprehensive Annual Report, 1996 Groundwater Detection and Assessment Monitoring Program, Landfill #5, HoltraChem Manufacturing Company, Orrington, Maine dated March 1997, Table 3-3.

³²¹Bimonthly Program Report No. 11, Site Investigation, HoltraChem Manufacturing Site, Formerly LCP Chemicals-Maine, Orrington, Maine dated January 15, 1998, Camp Dresser & McKee Inc., Table 3-1.

³²²Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²³Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²⁴Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²⁵Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²⁶Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²⁷Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³²⁸Interim Report to LCP Chemicals – Maine on the Nature, Extent & Fate of Environmental Contaminants at the Orrington, Maine Facility, dated January 15, 1991, Table 3-12.

Well	Area Monitoring	Contaminant	Media Protection Standard	Maximum Concentration	Date	Date Last Tested
B306-B1	Landfill #5	1,1,1 Trichloroethane	0.2 ug/L ³³⁰	ND	1/16/08	1/16/08 ³³¹
B306-B1	Landfill #5	Trichloroethene (TCE)	5.0 ug/L	ND	1/16/08	1/16/98 ³³²

³²⁹Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³³⁰This value is the Maine Maximum Exposure Guideline and EPA Maximum Contaminant Level but no criterion was established for this contaminant in the approval of Preliminary Media Protection Standards in December 31, 2002.

³³¹Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

³³²Landfill #5 Groundwater Monitoring Program 2007 Annual Report, Mallinckrodt Inc., HoltraChem Manufacturing Site, Orrington, Maine dated March 2008, Camp Dresser & McKee Inc., Alpha Analytical Laboratories Certificate of Analysis page 19 of 74.

Appendix #4

Surface Water Analysis - Onsite Maximum Concentrations

(Contaminants exceeding Media Protection Standard bolded in table)

Sampling Location	Area Monitored	Contaminant	Media Protection Standard ³³³	Maximum Concentration	Date
SSW-010-02	Manufacturing area	carbon tetrachloride	3.0 ug/L	5.1 ug/L ³³⁴	10/8/97
SSW-010-01	Manufacturing area	chloroform	57 ug/L	44 ug/L ³³⁵	9/22/94
SSW-005-01	Manufacturing area, northern ditch	mercury	0.91 ug/L	37 ug/L ³³⁶	9/22/94
SSW-005-01	Manufacturing area, northern ditch	conductivity	Background	2.28 mS/m ³³⁷	9/22/94
SSW-005-01	Manufacturing area, northern ditch	salinity	Background	0.1 % ³³⁸	9/22/94
SSW-007-01	Manufacturing area, Southern Stream	pH	Background	9.54 SU ³³⁹	9/21/94
Southerly Stream	Manufacturing area, Southern Stream	pH	Background	10.41 SU	12/17/97

³³³ Background values to be determined as a part of this Order.

³³⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-27.

³³⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-27.

³³⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-26.

³³⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-26.

³³⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-26.

³³⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-26.

Appendix #5

Surface Water Analysis - Penobscot River adjacent to the Site

Sampling Location	Area Monitored	Contaminant	Media Protection Standard	Maximum Concentration	Date
RSW-04	Southern Cove, Penobscot River	Mercury	Background ³⁴⁰	0.0703 ug/L ³⁴¹	6/6/95

Area Monitored	Dissolved Mercury	Total Mercury	Date
Outfalls and Southern Cove area, Penobscot River ³⁴²	2763 ng/L ³⁴³ Mean of twenty sampling stations	4134 ng/L ³⁴⁴ Mean of twenty sampling stations	9/98 ³⁴⁵

³⁴⁰ Background to be determined as a part of this Order.

³⁴¹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-29.

³⁴² These sampling locations included turbid samples. Turbid samples contain solid particles and generally represent mercury sorbed to soils or sediments.

³⁴³ Summary by DEP toxicologist (1/19/01) of data in report by Acheron Engineering Services, entitled "HoltraChem Manufacturing Company 1998 Penobscot River Mercury Study Final Report".

³⁴⁴ Summary by DEP toxicologist (1/19/01) of data in report by Acheron Engineering Services, entitled "HoltraChem Manufacturing Company 1998 Penobscot River Mercury Study Final Report".

³⁴⁵ Date of data collection of the twenty sampling stations.

Appendix #6

Sediment Analysis - Onsite Maximum Concentration

(Contaminants exceeding Media Protection Standard bolded in table)

Sampling Location	Area Monitored	Contaminant	Media Protection Standard	Maximum Concentration	Date
SSD-005-01	Northern Drainage Ditch, Manufacturing area	Mercury	2.2 mg/kg	1,000 mg/kg ³⁴⁶	9/22/94
ND-A3-1	Northern Drainage Ditch, Manufacturing area	Mercury	2.2 mg/kg	910 mg/kg ³⁴⁷	11/7/01

³⁴⁶ Sediment represented by this sample removed as an emergency action in May 1995.

³⁴⁷ HoltraChem Manufacturing Site, Orrington, Maine, Corrective Measures Studies Field Investigation Report dated May 27, 2003, Revised September 19, 2003 by Camp Dresser and McKee Inc., Table 2-4.

Appendix #7

Sediment Analysis - Penobscot River adjacent to the Site

(Contaminants exceeding Media Protection Standard bolded in table)

Sampling Location	Area Monitored	Contaminant	Media Protection Standard	Maximum Concentration	Date
RSD-11A-02	Northern Ditch and Wastewater Outfall	Mercury	2.2 mg/kg	460 mg/kg ³⁴⁸	8/12/97

Area Monitored	Contaminant	Depth of Sample ³⁴⁹	Mean ³⁵⁰	Range ³⁵¹	Maximum ³⁵²
Southern Cove, Penobscot River	Mercury	0 - 0.1 feet	4.1 mg/kg	0.2 - 22 mg/kg	22 mg/kg
Southern Cove, Penobscot River	Mercury	0.8 - 1.0 feet	28.7 mg/kg	0.2 - 460 mg/kg	460 mg/kg
Southern Cove, Penobscot River	Mercury	1.3 - 1.5 feet	28.3 mg/kg	5.8 - 63 mg/kg	63 mg/kg
Southern Cove, Penobscot River	Mercury	1.8 - 2.0 feet	173 mg/kg	66 - 280 mg/kg	280 mg/kg

³⁴⁸ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-32.

³⁴⁹ From Stacy Ladner Memo (11/20/06), summarizing data from Camp, Dresser and McKee Site Investigation Report (1998).

³⁵⁰ From Stacy Ladner Memo (11/20/06), summarizing data from Camp, Dresser and McKee Site Investigation Report (1998).

³⁵¹ From Stacy Ladner Memo (11/20/06), summarizing data from Camp, Dresser and McKee Site Investigation Report (1998).

³⁵² From Stacy Ladner Memo (11/20/06), summarizing data from Camp, Dresser and McKee Site Investigation Report (1998).

Appendix #8

Sediment Analysis - Penobscot River downstream from the Site

Sampling Location	Contaminant	Maximum Concentration	Date
DP8-AS Cove #8 in Penobscot River approximately 2 miles downstream from HoltraChem	Mercury	3.3 mg/kg ³⁵³	8/17/00

Sampling Location	Contaminant	Sample Depth	Mean Concentration	Range in Concentration
Penobscot River from approximately .5 to 4 miles downstream from HoltraChem	Mercury	0.0 to 0.2 feet ³⁵⁴	0.74 mg/kg (CDM data) ³⁵⁵	0.01 - 2.1 mg/kg (CDM data) ³⁵⁶
Penobscot River from approximately .5 to 4 miles downstream from HoltraChem	Mercury	0.8 to 1.0 feet ³⁵⁷	1.13 mg/kg (CDM data) ³⁵⁸	0.160 - 3.3 mg/kg (CDM data) ³⁵⁹
Penobscot River from approximately 3 miles to 25 miles downstream from HoltraChem	Mercury	Top 2 cm ³⁶⁰	1.09 mg/kg (NRDC data) ³⁶¹	0.32 - 2.74 mg/kg (NRDC data)

³⁵³ Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001, Appendix A-3.

³⁵⁴ Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001, Appendix A-3.

³⁵⁵ CDM data in this table is from the Mallinckrodt studies produced by Camp, Dresser and McKee in 1998 and 2000.

³⁵⁶ Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001, Appendix A-3.

³⁵⁷ Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001, Appendix A-3.

³⁵⁸ CDM data in this table is from the Mallinckrodt studies produced by Camp, Dresser and McKee in 1998 and 2000.

³⁵⁹ Evaluation of Ecological Health of the Lower Penobscot River prepared by Camp Dresser & McKee, Inc. and Menzie-Cura and Associates, Inc. dated January 19, 2001, Appendix A-3.

³⁶⁰ Natural Resources Defense Council study of 1999, Sampling Methodology

³⁶¹ NRDC data in this table is from the Natural Resources Defense Council study of 1999, data collected on 10/18-19/99.

Appendix #9

Biological Samples taken at the Site and at a Reference Site (Dorothea Dix Park, Hamden)

Sampling Location ³⁶²	Species Sampled	Contaminant	Maximum Concentration	Date
SIS-002-RR80 Upper Meadow Field Between Landfill #3/#4 and the Penobscot River	Onsite Earthworm	Mercury	2.820 ug/g ³⁶³ wet weight	6/6/95
SIS-004-RR82 Dorothea Dix Park in Hamden	Reference Site Earthworm	Mercury	0.044 ug/g ³⁶⁴ wet weight	6/7/95
SMS-E7-RR90 On ridge near Landfill #1	Onsite Small Mammal (Deer Mouse)	Mercury	0.198 ug/g ³⁶⁵ wet weight	6/7/95
SMS-R5-RR92 Dorothea Dix Park in Hamden	Reference Site Small Mammal (Deer Mouse)	Mercury	0.018 mg/kg ³⁶⁶ wet weight	6/7/95
SMS-R7-RR93 Dorothea Dix Park in Hamden	Reference Site Small Mammal (Deer Mouse)	Mercury	0.016 mg/kg ³⁶⁷ wet weight	6/8/95
SMS-R8-RR94 Dorothea Dix Park in Hamden	Reference Site Small Mammal (Short Tailed Shrew) ³⁶⁸	Mercury	0.064 mg/kg ³⁶⁹ wet weight	6/7/95

³⁶² Samples were single samples not composites. Deer mouse and short tail shrew were washed to remove soil and placed in individual baggies for transport to the laboratory. Earthworms and soil were collocated and sent for analysis at the laboratory.

³⁶³ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-38.

³⁶⁴ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-38 and 9-17.

³⁶⁵ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-39.

³⁶⁶ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-39 and 9-18.

³⁶⁷ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-39 and 9-18.

³⁶⁸ No short tailed shrew was found on site for comparison to this reference site small mammal.

³⁶⁹ Site Investigation Report HoltraChem Manufacturing Site, Orrington, Maine, Volume II Tables dated December 22, 1998 by Camp Dresser & McKee Inc., Table 3-39 and 9-18.

Appendix 10

This Appendix contains the excerpts from documents referred to in the body of the order and accompanying footnotes.