STATE OF MAINE
DEPARTMENT OF ENVIRONMENTAL PROTECTION
STATE HOUSE STATION 17 AUGUSTA, MAINE 04333

BOARD ORDER

STATE OF MAINE
BOARD OF ENVIRONMENTAL PROTECTION

IN THE MATTER OF

UNITED STATES SURGICAL CORPORATION and MALLINCKRODT LLC	)	APPEAL OF DESIGNATION OF UNCONTROLLED HAZARDOUS SUBSTANCE SITE AND ORDER
CONCERNING A CHLOR-ALKALI MANUFACTURING FACILITY IN ORRINGTON, PENOBSCOT COUNTY, MAINE	)	
PROCEEDING UNDER 38 M.R.S.A. § 1365 UNCONTROLLED HAZARDOUS SUBSTANCE SITES LAW	)	FINDINGS OF FACT AND ORDER ON APPEAL

Pursuant to the provisions of 38 M.R.S.A. §§ 1361-1371 and 5 M.R.S.A. §§ 9051-9064, the Maine Board of Environmental Protection ("Board") has considered the appeal of UNITED STATES SURGICAL CORPORATION AND MALLINCKRODT LLC (collectively "Mallinckrodt") of the Order of the Maine Commissioner of Environmental Protection dated November 24, 2008 ("Commissioner's Order"), designating the chlor-alkali plant site ("Site")[1] in Orrington, Maine an Uncontrolled Hazardous Substance Site and ordering Mallinckrodt to remediate the Site including, among other requirements, removing sludges and other contaminated material from five landfills. Based on a review of testimony and exhibits, the record of the Board's public hearing on this appeal, post-hearing briefs, and other related materials that are part of the record for this appeal, the Board incorporates and adopts the findings of fact, conclusions of law, decision, and order issued by the Commissioner, including all figures, attachments, and appendices, except as specifically mentioned herein, and further makes the following findings of fact, conclusions, and decision.

1. INTRODUCTION

A. Site History

The chlor-alkali plant in Orrington, Maine began operation in 1967 and closed in 2000. The plant used a mercury cell process to produce chlorine and other products offered for sale. The Site is located on the banks of the Penobscot River and is approximately 235 acres in size. Approximately 77 acres of the Site were impacted by plant operations. International Minerals and Chemical Corporation ("IMC") or one of its affiliates constructed the plant and owned and operated the plant from 1967 to 1982. During this

[1] The site is variously referred to as the HoltraChem Manufacturing Facility and the Mallinckrodt site in documents filed by the parties.

period, IMC or one of its affiliates discharged mercury waste directly into the river, then constructed and used five landfills that remain on-site today for the disposal of mercury and other waste.[2]

In 1982, the plant was sold to LCP Chemicals and Plastics, Inc., later known as Hanlin Group, Inc. Hanlin filed for bankruptcy in 1991, but operated the plant until 1994.

In 1986, the U.S. Environmental Protection Agency ("EPA") entered into an administrative agreement with LCP requiring investigation of the Site. After Hanlin (previously known as LCP) pursued court action in 1989 alleging that IMC was responsible for the environmental hazards at the Site, Hanlin and IMCERA (previously known as IMC) in 1991 entered into a private settlement agreement whereby IMCERA assumed responsibility for certain costs of studying the Site. EPA filed an action under the federal Resource Conservation and Recovery Act ("RCRA") in 1991 against Hanlin. In 1993, the U.S. District Court entered a Consent Decree ("1993 Consent Decree") between Hanlin and EPA that required Hanlin to investigate pollution at the Site and develop remedial alternatives for the Site. The 1993 Consent Decree did not require implementation of corrective measures.

The plant was sold in 1994 to HoltraChem Manufacturing Company, LLC, which operated the plant until it ceased operations in 2000. The 1993 Consent Decree was modified in 1995 to add HoltraChem as a party.

HoltraChem and Mallinckrodt performed the Site Investigation in 1995 and 1998, with oversight by EPA and the Maine Department of Environmental Protection ("DEP" or "Department").[3] After HoltraChem dissolved in 2001, DEP dealt exclusively with Mallinckrodt on issues related to the Site including developing alternatives for remediation, i.e., the Corrective Measures Study. A lengthy description of the site investigation and corrective measures process at this Site is provided in the Commissioner's Order. Initially EPA was the lead agency, and DEP was a partner in this process. Later DEP took over the lead for the Site during the development stages of the Corrective Measures Study.

The Town of Orrington is the current owner of the Site, by virtue of a tax lien certificate filed in 2002 and subsequent foreclosure in 2003.

[2] IMC changed its name to IMCERA Group Inc. in 1990, to Mallinckrodt Group Inc. in 1994, and to Mallinckrodt, Inc. in 1996. Then in 2006, Mallinckrodt, Inc. merged into Mallinckrodt Holdings, Inc., which on the same day merged into United States Surgical Corporation (one of the two entities named in the Commissioner's Order). Mallinckrodt LLC (the other entity named in the Commissioner's Order) is a wholly owned subsidiary of United States Surgical Corporation.

[3] Neither the DEP nor Mallinckrodt (or its corporate predecessors) was a party to the 1993 Consent Decree or the 1995 Modification.

Mallinckrodt has performed monitoring and certain remedial measures at the Site including, among others, removal of chemicals from the facility, cleaning of tanks and structures, some facility dismantling, removal of the cell building, and some groundwater extraction and treatment.[4]

B. Commissioner's Order

When DEP and Mallinckrodt were unable to agree on implementation of additional remedial measures at the Site, on November 24, 2008, the Commissioner issued a Compliance Order pursuant to the Uncontrolled Hazardous Substance Sites Law, 38 M.R.S.A. §§ 1361 -1371 ("Uncontrolled Sites Law"), designating the Site in Orrington, Maine an Uncontrolled Hazardous Substance Site and ordering United States Surgical Corporation and Mallinckrodt LLC to remediate the Site.

Among other things, the Commissioner's Order requires:

- Excavation of contaminated soils;
- Excavation of contaminated sediments;
- Excavation of sludges and other contaminated material from the five landfills;
- Removal of the industrial sewer;
- Facility dismantling;
- Construction of a groundwater cutoff barrier wall;
- Extraction of contaminated groundwater and treatment;
- Continued operation of the wastewater treatment plant;
- Monitoring of air, surface water, sediment, and groundwater;
- Preparation or modification of plans for DEP's review and approval to accomplish remediation (including Facility Dismantling Plan, Corrective Measures Implementation Plan, Sediment Prevention Plan, Comprehensive Monitoring Plan);
- Site security;
- Establishment of a trust fund for financial assurance;
- Monthly written reports;
- Third party independent inspector;
- Participation in public meetings; and
- Insurance coverage.

[4] In 2003 Mallinckrodt began implementing a multi-phase Department-approved plan for dismantling and removal of Site buildings and equipment. In brief, Phase I involved the removal of the mercury electrolysis process materials and equipment. Phase 2 involved removal of process piping and other appurtenances known or suspected of being contaminated with mercury. Phase 3 involved cleaning and removal of debris and remaining tank contents. Phase 4 involved removal of buildings and superstructures that were contaminated to a level that the debris could be potentially considered hazardous waste. Phase 5 involved removal of unused buildings, tanks and pipe racks within the footprint of the proposed soil consolidation area and removal of safety hazards. Since 2003 Mallinckrodt has contracted with CDM to operate the wastewater treatment facility at the Site. CDM began pumping of the groundwater extraction well at Landfill 1 in January of 2005.

C. Mallinckrodt's Appeal

On December 19, 2008, Mallinckrodt filed an appeal and request for hearing pursuant to 38 M.R.S.A. § 1365(4). Mallinckrodt makes the following arguments among others:

- The Commissioner does not have statutory authority under 38 M.R.S.A. § 1365(1)(B) to require clean-up at the Site;
- United States Surgical Corporation is not a "responsible party" under 38 M.R.S.A. § 1365(1)(B);
- The clean-up requirements in the Commissioner's Order are not necessary, pose unnecessary risks to public health and the environment, are not justified by good science, are based on old data and do not reflect current site conditions, and do not reflect an appropriate balancing of applicable remedy selection criteria; and it is not necessary to excavate and transport off-site for disposal the five landfills at the Site;
- The administrative requirements in the Commissioner's Order, including the establishment of a trust fund for financial assurance, insurance, indemnification, and third-party oversight, are unnecessary and beyond the Commissioner's authority;
- 38 M.R.S.A. § 1365(1) violates the Due Process Clause of the U.S. and Maine Constitutions by failing to provide a meaningful hearing before deprivation of a property right, failing to provide opportunity for a hearing free of threat of coercive and ruinous penalties for noncompliance, and failing to provide a fair and unbiased administrative proceeding;
- The Commissioner's Order is preempted by the Supremacy Clause of the U.S. Constitution;
- The Commissioner failed to name a necessary party by not naming the Town;
- 38 M.R.S.A. § 1365(1) is unconstitutionally vague; and
- The remedy selection process is an unconstitutional delegation of legislative power to the executive and is arbitrary and capricious.

In its Notice of Appeal, Mallinckrodt requests that the Board rescind the Commissioner's Order or, in the alternative, modify the Order.

2. APPLICABLE LAW

The Commissioner's Order was issued pursuant to the Uncontrolled Hazardous Substance Sites Law (38 M.R.S.A. §§ 1361-1371), and the Board finds that the Uncontrolled Sites Law governs this appeal.

The Uncontrolled Sites Law at 38 M.R.S.A. § 1362(3) defines an "uncontrolled hazardous substance site" as follows:

> 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 under this chapter 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.

The Uncontrolled Sites Law at 38 M.R.S.A. § 1365 provides authority for the Commissioner to designate a location as an uncontrolled hazardous substance site[5] and to issue an order as follows:

> 1. **Investigation.** Upon finding, after investigation, that a location at which hazardous substances are or were handled or otherwise came to be located may create a danger to the public health, to the safety of any person or to the environment, the commissioner may:
>
> A. Designate that location as an uncontrolled hazardous substance site;
>
> B. Order any responsible party dealing with the hazardous substances to cease immediately or to prevent that activity and to take an action necessary to terminate or mitigate the danger or likelihood of danger; and
>
> C. Order any person contributing to the danger or likelihood of danger to cease or prevent that contribution.
>
> 2. **Orders.** Any order issued under this section shall contain findings of fact describing, insofar as possible, the hazardous substances, the site of the activity and the danger to the public health or safety.

"Responsible party" is defined in relevant part as "[t]he owner or operator of the uncontrolled site" or "[a]ny person who owned or operated the uncontrolled site from the time any hazardous substance arrived there." 38 M.R.S.A. § 1362(2).

The right to appeal an Uncontrolled Sites Order is addressed in 38 M.R.S.A. § 1365(4) as follows:

> 4. **Compliance; appeal.** The person to whom the order is directed shall comply immediately and may apply to the board for a hearing on the order if the application is made within 10 working days after receipt of the order by a responsible party. Within 15 working days after receipt of the application, the board shall hold a hearing, make findings of fact and vote on a decision that continues, revokes or modifies the order. That decision must be in writing and signed by the board chair using any means for signature authorized in the department's rules and published within 2 working days after the hearing and vote. The nature of the hearing before the

[5] *See also* 38 M.R.S.A. §1364(4) (providing authority for Commissioner to declare a site to be an uncontrolled hazardous substance site).

> board is an appeal. At the hearing, all witnesses must be sworn and the commissioner shall first establish the basis for the order and for naming the person to whom the order is directed. The burden of going forward then shifts to the person appealing to demonstrate, based upon a preponderance of the evidence, that the order should be modified or rescinded. The decision of the board may be appealed to the Superior Court in accordance with Title 5, chapter 375, subchapter 7.

The Maine Legislature's declaration of findings and purpose of the Uncontrolled Sites Law is found at 38 M.R.S.A. § 1361:

> 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 promptly.
>
> 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.

3. PROCEDURAL HISTORY OF APPEAL

A. Adjudicatory Proceeding / Intervention

The Board Chair, acting as Presiding Officer, determined that the appeal before the Board is an adjudicatory proceeding under the Maine Administrative Procedure Act, 5 M.R.S.A. §§ 9051-9064 ("Maine APA"), and established a deadline for motions to intervene and objections. The deadline for receipt of petitions for leave to intervene was June 10, 2009. The Board received three timely petitions for intervention. Following consideration at the Board's June 18, 2009 meeting, the Board granted intervenor status to the Town of Orrington and the Maine People's Alliance. Heather Foster withdrew her petition to intervene.

B. Pre-hearing Conferences and Procedural Orders

Six pre-hearing conferences were held in this matter to address procedural issues and various motions by the parties. The matters discussed in the conferences and the Chair's rulings are set forth in the Board's procedural orders. Thirteen procedural orders were issued by the Board's Chair. The procedural orders are summarized in Appendix A which is attached to this Decision and incorporated herein in its entirety.

Mallinckrodt appealed the Chair's rulings to the full Board on five separate occasions; those appeals were considered and decided at regular meetings of the Board.

C. Pre-Filed Testimony and Public Hearing

The parties submitted pre-filed testimony and pre-filed rebuttal testimony, along with attached and stand-alone exhibits prior to the hearing. In addition, the parties stipulated to admission of a number of exhibits (known as Joint Exhibits). At the hearing held in Augusta, Maine on January 25 through February 4, 2010, witnesses summarized their pre-filed testimony, were subject to cross-examination, and were asked questions by the Board and its staff, including its consultant. A session was held the evening of January 28, 2010 in Orrington in order to receive testimony from the general public. In addition, written comments from members of the public were accepted through February 4, 2010. Witnesses for Maine People's Alliance testified at the Orrington session. Following the hearing, the parties submitted post-hearing briefs, proposed orders, and responsive briefs. The Board held deliberative sessions on May 6, May 20, June 3, August 5, and August 19, 2010.

4. LEGAL AND PROCEDURAL ISSUES RAISED IN APPEAL

A. Legal Issues Raised and Decided During Pre-Hearing Process

Numerous legal and procedural issues and objections were raised in this proceeding prior to the hearing, and the majority of these issues were addressed in pre-hearing conferences, Procedural Orders, and appeals to the full Board. As set forth under the appropriate Procedural Order in Appendix A, the following legal and procedural issues, among others, have been considered and decided by the Board and those decisions will not be reiterated in their entirety in this decision document.[6] In brief:

(1) The applicable law is the Uncontrolled Sites Law. The statutory elements of the Uncontrolled Sites Law are as follows:

(a) "Hazardous substances are or were handled or otherwise came to be located" at a specific location,
(b) The hazardous substances at the location "may create a danger to the public health, to the safety of any person or to the environment,"
(c) The ordered remedial action is "necessary to terminate or mitigate the danger or likelihood of danger," and
(d) The persons to whom the order is directed are "responsible parties."

(2) No federal law applies to this proceeding. The 11 criteria used as guidance by EPA in choosing remedies under the federal Resource Conservation and Recovery Act

[6] Additional issues that will not be revisited include objections related to intervention, project orientation slides, demonstrative exhibits, time allotted for the hearing, and witness panels.

("RCRA") are not legal standards applicable to this proceeding. However, the 11 RCRA criteria are potentially useful as factors that the Board may consider in evaluating the alternative site remedies presented to it. For that reason, the Board determined that the parties were permitted to present relevant evidence on the 11 factors if they so chose.[7]

(3) The Uncontrolled Sites Law does not require that the Commissioner pursue clean up of a site only by bringing a Superior Court action; the designation of an uncontrolled site and the issuance of an order requiring clean up of that site is one of the options available to the Commissioner. Nor does the statute limit the Commissioner's authority to emergencies or situations in which a responsible party is currently engaged in handling hazardous substances at the site.

(4) Nothing in the Uncontrolled Sites Law limits a party's evidence to data and information that was in existence at the time the Commissioner issued his order. Especially where, as here, more than a year passed between issuance of the clean up order and the hearing, all relevant evidence would be admitted regardless of when it was generated or obtained.

(5) The Uncontrolled Sites Law provides that at an appeal hearing the Commissioner has the initial burden of production and must present his testimony and evidence first, after which the person to whom the order is directed has the opportunity to present testimony and evidence in support of its position. Each party bears the burden of persuasion with respect to the facts supporting the actions it wishes the Board to take. The standard of proof for all findings of fact made by the Board is "preponderance of the evidence."

(6) The Board's standard of review is *de novo*. No deference need be given to the Commissioner's findings of fact or conclusions of law. This means that, with respect to the RCRA criterion of "state acceptance," it is the Board that determines on appeal what is acceptable to the State.

(7) The Board's decision is independently based on the merits of the technical and scientific evidence presented to it. Because the Board is the decision-maker in this appeal proceeding, evidence regarding alleged political pressure on and bias of the Commissioner in issuing his order is legally irrelevant. However, during the hearing the parties were permitted to cross-examine the Commissioner's witnesses with respect to these topics for purposes of challenging their credibility.

[7] The 11 RCRA criteria are divided into threshold criteria (overall protection of human health and the environment; attainment of media clean-up standards; control of sources of releases; and compliance with applicable waste management standards) and balancing criteria (long-term reliability and effectiveness; reduction of toxicity, mobility or volume of hazardous wastes; short-term effectiveness; implementability; cost; community acceptance; and State acceptance).

(8) The absence of any agency rule of practice specific to appeals under the Uncontrolled Sites Law does not deprive the Board of authority to hear and decide the appeal. This proceeding is governed by the procedures of the Maine APA, Sections 345-A and 1365 of Title 38, and the ad hoc procedures established by the Presiding Officer early in the proceeding after input from all parties. These procedures, along with the procedural direction given at the six prehearing conferences and in the 13 Procedural Orders, gave all parties full and fair knowledge of the process by which the Board would conduct this proceeding and make its decision.

B. Additional Motions Filed Before Hearing

On January 19, 2010, Mallinckrodt filed two motions regarding the term "necessary" in the Uncontrolled Sites Law. The Presiding Officer ruled, in a January 20, 2010 email to the parties, that the two motions would be held until post-hearing briefs were submitted, at which time the Board would consider the motions along with any other arguments by the parties relating to the constitutionality of the Uncontrolled Hazardous Substance Sites Law.

While challenges to the constitutionality of the statute itself are ultimately for a court to decide, it is appropriate for the Board to state its position and to rule on these issues. Having considered the two motions and the objections thereto, the Board believes that the Uncontrolled Sites Law does not violate due process and denies both motions. First, as to Mallinckrodt's Motion for Definition and Delineation of the Criteria That the Board Will Use to Determine Whether the Commissioner's Proposed Remedy is "Necessary" pursuant to 38 M.R.S.A. § 1365, the Board finds that due process does not require such definition and delineation. The word "necessary" is a common word that is well within the realm of understanding of the Board and the parties. There simply is no need for a ruling on what this word means or for a ruling on criteria that the Board will use to determine whether the remedial action ordered by the Commissioner is necessary. It is clear from reading the statute that the Board must engage in a factual analysis of the type and volume of hazardous substances on site; the location of these substances in relation to ground water, surface water, land and air; the present and future physical and chemical interaction of these substances with and transport through these media; and the present and future risk to public health, safety and the environment. It is this factual analysis that leads to a determination of what remedy is "necessary" to protect public health, safety and the environment.

Second, as to Mallinckrodt's Motion for Ruling That the Undefined Term "Necessary" in 38 M.R.S.A. § 1365 is an Unconstitutional Delegation of Legislative Power, the Board is not persuaded by Mallinckrodt's arguments. Administrative boards that hear appeals are often tasked with applying the facts of a case to applicable law which typically contains words that must be interpreted in light of the Board members' backgrounds, education, and experiences. There is nothing unique or overly complex about the word "necessary" that would require the Maine Legislature to have defined that word in the Uncontrolled Sites Law or required the Department to adopt a definition or criteria by rule. "Necessary" is simply not a word that is "so vague that people of common intelligence must guess at its meaning."

See Uliano v. Board of Environmental Protection, 2009 ME 89, ¶ 15, 977 A.2d 400, 408 (quoting *Town of Baldwin v. Carter*, 2002 ME 52, ¶ 10, 794 A.2d 62, 67). The Board finds that the term "necessary" is not unconstitutionally vague and is not an improper delegation of legislative authority.

C. Additional Constitutional Issues Raised by Mallinckrodt

Mallinckrodt raised certain constitutional arguments in its Notice of Appeal which are addressed in this section.

(1) Failure to provide meaningful hearing before effecting deprivation of property right, and violation of due process by failure to provide opportunity for hearing free of threat of coercive and ruinous penalties. While Mallinckrodt raised these two arguments in its Notice of Appeal, the Board finds that both arguments are moot because the Commissioner agreed to stay the compliance deadlines in the Order until the Board issues a final decision, agreed that no penalties for noncompliance would accrue during the stay period, and agreed to stay the statutory deadlines for holding the hearing and issuing a decision.

(2) Violation of due process by failing to provide a fair and unbiased administrative proceeding. This argument, raised in Mallinckrodt's Notice of Appeal, contains several sub-arguments that were not raised or addressed during the pre-hearing process and will be addressed here. First, Mallinckrodt argues that "[t]he Department's staff serves as the Board's technical advisors notwithstanding their involvement in the decision that is the subject of this appeal" and "[t]he Board has a pattern and practice of limiting the right to cross-examine current Department staff." The Board finds that these arguments are without merit. Department staff that participated in the Commissioner's decision did not advise the Board in this proceeding and those staff members were subject to cross-examination. Additionally, the Board hired an independent consultant to assist the Board's Executive Analyst with review of the evidence presented.

Second, Mallinckrodt argued in its Notice of Appeal that "[t]he Board will be advised and represented by legal counsel from the Office of the Attorney General notwithstanding that those same counsel serve as counsel to the Department and the Commissioner in connection with Board proceedings." The Board finds no due process violation in the Attorney General's practice of assigning one assistant attorney general to represent the Board and other assistant attorneys general to represent the Commissioner in an adjudicatory proceeding. *See Superintendent of Insurance v. Attorney General*, 558 A.2d 1197, 1202-04 (Me. 1989).

Third, Mallinckrodt argued in its Notice of Appeal that "the Board ha[s] a direct or indirect financial interest in the Order on appeal as a result of the hazardous waste transportation fees that would be generated if the remedy required by the Order is implemented." The Board finds that the possibility of hazardous waste transportation fees being assessed does not constitute a financial incentive to the Board to improperly judge the merits of the Commissioner's Order.

The Maine Hazardous Waste Fund is only one of a number of sources of the Board's funding. In addition, the Board's funding is capped each year, and the Board can make expenditures only in accord with allocations approved by the Legislature.[8] Additionally, Board members are not State employees; they receive only a modest per diem and expenses for their service.[9] The Board has scrupulously addressed Mallinckrodt's appeal based solely on its merits and without any consideration of fees that may or may not be generated as a consequence of its decision.

(3) Preemption by Supremacy Clause. Mallinckrodt argues that "[t]he Order is preempted by the Supremacy Clause of the United States Constitution . . . because the Site has already been addressed by a federal Consent Decree and by a Memorandum of Agreement between the Department and EPA." First, as set forth in description of Site History in Finding of Fact 1(A), neither Mallinckrodt nor the State of Maine was a party to the 1993 Consent Decree or the 1995 Modification to the Consent Decree. Second, the Consent Decree did not require implementation of corrective measures and so the Site has not "already been addressed." Third, a review of the 1997 Memorandum of Agreement between the Department and EPA concerning the State's implementation of its hazardous waste management program shows that it does not require that EPA make the final remedy selection decision under the RCRA process in the Consent Decree. In any event, the Board finds that EPA has not made such a decision, and nothing in the 1993 Consent Decree or the 1997 Memorandum of Agreement precludes the Department from making the final remedy selection decision under State law.

5. DESIGNATION OF RESPONSIBLE PARTIES

A. Statutory Requirement

In its review of the Commissioner's Order, the Board must determine whether the persons to whom the Order is directed are responsible parties under the Uncontrolled Sites Law. 38 M.R.S.A. § 1365(1). A "responsible party" under the Uncontrolled Sites Law includes "[a]ny person who owned or operated the uncontrolled site from the time any hazardous substance arrived there." 38 M.R.S.A. § 1362(2). The Commissioner directed the Order to two parties, United States Surgical Corporation and Mallinckrodt LLC.

B. Mallinckrodt LLC

Mallinckrodt LLC is a wholly owned subsidiary of United States Surgical Corporation. Mallinckrodt does not contest that Mallinckrodt LLC is a "responsible party" for the Site. Mallinckrodt witness Kathryn Zeigler testified that "Mallinckrodt LLC or one of its predecessors [sic] affiliates . . . owned and

[8] See 38 M.R.S.A. § 341-G
[9] See 38 M.R.S.A. § 341-C(6) and Title 5, section 12004-D.

operated the Facility."[10] The Board therefore finds that the Commissioner's Order was properly directed to Mallinckrodt LLC as a responsible party for the Site.

C. United States Surgical Corporation

The Commissioner asserts that United States Surgical Corporation is the direct corporate successor to Mallinckrodt, Inc. and its predecessor IMC. By virtue of this corporate succession, the Commissioner argues that United States Surgical Corporation is a responsible party for this Site. The evidence in this regard, which is summarized in the Commissioner's Exhibit C-41, shows the following:

- IMC or one of its affiliates owned and operated the plant from 1967 to 1982;
- In 1990, IMC (a New York corporation) changed its name to IMCERA Group, Inc.;
- In 1994, IMCERA Group, Inc. changed its name to Mallinckrodt Group, Inc.;
- In 1996, Mallinckrodt Group, Inc. changed its name to Mallinckrodt, Inc. (a New York corporation);
- In December 2006, Mallinckrodt, Inc. merged with and into Mallinckrodt Holdings, Inc. (a Nevada corporation); and
- On the same day in December 2006, Mallinckrodt Holdings, Inc. merged with and into United States Surgical Corporation (a Delaware corporation which is a wholly owned subsidiary of Covidien Ltd.).[11]

Even though Mallinckrodt, in its Notice of Appeal, argued that United States Surgical Corporation is not a responsible party, Mallinckrodt did not contest through pre-filed testimony, exhibits, or in testimony at the hearing any of the official or corporate records or related testimony.

The Board is persuaded by the testimony, the numerous official and corporate documents in the record, and corporate successor liability law that United States Surgical Corporation is a responsible party for the Site under the Uncontrolled Sites Law, and finds that the Commissioner's Order therefore was properly directed to United States Surgical Corporation as well as to Mallinckrodt LLC.[12]

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[10] Although Mallinckrodt witness Zeigler denied knowledge of the March 2007 "Contribution and Assumption Agreement," the evidence in the record shows that only this agreement provides a connection between Mallinckrodt LLC and liabilities of the IMC-Mallinckrodt, Inc.-United States Surgical Corporation chain of corporate succession.

[11] Although Mallinckrodt witness Zeigler testified that Mallinckrodt, Inc. changed its name to Mallinckrodt LLC in 2007, the Board finds this testimony not to be credible given the testimony of Commissioner witness Stacy Ladner and the official and corporate records admitted as exhibits.

[12] Mallinckrodt argues in its Notice of Appeal that the Commissioner failed to name a necessary party in the Order by not naming the Town of Orrington. Nothing in the Uncontrolled Sites Law requires the Commissioner to name all possible responsible parties in a clean-up order issued pursuant to 38 M.R.S.A. §1365.

6. HAZARDOUS SUBSTANCES AND OTHER CONTAMINANTS OF CONCERN PRESENT AT THE SITE

A. Statutory Requirement

In its review of the Commissioner's Order, the Board must determine whether "hazardous substances are or were handled or otherwise came to be located" at the Site that "may create a danger to the public health, to the safety of any person or to the environment." 38 M.R.S.A § 1365(1). There is no real dispute as to these statutory elements of the Uncontrolled Sites Law. "Hazardous substances" are defined at 38 M.R.S.A § 1362(1) and include a wide range of substances found at this Site, including, but not limited to, mercury.

B. Hazardous Substances at the Site

(1) The Board finds that from 1967 to 2000, the plant was engaged in the manufacture of chlorine and related products, including: sodium hydroxide (caustic soda); sodium hypochlorite (chlorine bleach); hydrochloric acid; and chloropicrin.

(2) Chlorine was produced using the chlor-alkali process. The chlor-alkali process produces chlorine by subjecting saturated brine to low-voltage, high-amperage current between a metal anode and a flowing bed of mercury (the cathode). Chlorine is formed as a gas at the cell anodes. The major wastes generated during this process included brine purification sludge and wastewater treatment plant sludge, both of which contain mercury. Brine purification sludge from the mercury cell process is a hazardous waste, classification number K071, pursuant to 06-096 CMR 850(3). Wastewater treatment plant sludge from the mercury cell process is a hazardous waste, classification number K106, pursuant to 06-096 CMR 850(3). These wastes are therefore hazardous substances as defined in 38 MRSA § 1362(1).

(3) Mercury, which was used as a cathode in the chlor-alkali process, and mercury contaminated substances are defined as hazardous waste, classification D009, pursuant to 06-096 CMR 850(3). Mercury and mercury contaminated wastes are therefore hazardous substances as defined in 38 MRSA § 1362(1). Mercury is a neurotoxin. Elemental mercury volatilizes at ambient temperatures and when inhaled readily crosses the blood-brain barrier and the placenta. The toxicity value for elemental mercury is 0.3 micrograms per cubic meter (300 nanograms per cubic meter) or 0.04 parts per billion. Divalent mercury can be transformed to methylmercury by microorganisms naturally present in soils, fresh water and salt water; and any form of mercury entering surface water can be converted to methymercury. Methymercury can bioaccumulate in living organisms and when ingested is readily absorbed and distributed throughout the body. It readily crosses the blood brain barrier and the placenta.

(4) Carbon tetrachloride was used to remove high levels of nitrogen trichloride from the chlorine gas generated as part of the chlor-alkali process. It is defined as a hazardous waste,

classification F001, pursuant to 06-096 CMR 850(3) and is therefore a hazardous substance as defined in 38 M.R.S.A. § 1362(1). Carbon tetrachloride has been identified as a probable human carcinogen.

(5) Other hazardous substances found in environmental media at the Site include: cresol; 1,1 dichloroethane; 1,1 dichloroethene; acetone; bromoform; carbon disulfide; chlorobenzene; chloroform; chloromethane; hexachloroethane; methylene chloride; pentachloroethane; polychlorinated biphenyls; tetrachloroethene; trichloroethylene; arsenic; barium; lead; cadmium; chromium; and manganese.

(6) There is no dispute that the hazardous substances identified above were handled at this Site or otherwise came to be located at this Site. There is no dispute that the following wastes were disposed of on-site:

Disposal Area	**Dates of Operation**	**Waste Type Received**	**Estimated Quantity of Waste**
Hickel's Pond*	July 1970-Oct 1970	Dilute Brine	Unknown
Mac's Pond (southeast of Landfill Area 1)	Prior to June 1970-1971	Process wastewater / brine sludge (K071)	1000 tons of sludge (later removed to Landfill 3)
Cells 1A and 1B	1970 or 1971-1972	Process wastewater / brine sludge (K071)	1000 tons of sludge
Hillside by 1A and 1B	1967-1972	Graphite anodes contaminated with mercury Construction debris	Unknown Unknown
Landfill 2	1971-1973	K071/K106 waste Carbon tetrachloride	1500 tons of sludge 4 gallons
Landfill 3	1972	Waste excavated from Mac's Pond	1000 tons
Landfill 4	1972-1980	K071/K106 waste Chlorate waste Carbon tetrachloride	8000 tons of sludge 100 tons 1700 gallons
Landfill 5	1978-1983	K071/K106 waste Chlorate waste Carbon tetrachloride	3300 tons of sludge 100 tons 360 gallons

* The existing lined process lagoon was constructed in 1982 in the same location as the former Hickel's Pond.

(7) There is also no dispute that the facility discharged mercury contaminated brine sludge into its industrial sewer and then through its outfall into the Penobscot River from December 1967 to June 1970.

(8) In addition to the intentional discharge of wastes to its industrial sewer and the placement of wastes in on-site landfills and the lagoon, hazardous substances were likely discharged to air,

land, surface waters and groundwater through accidental spills that occurred over the operational life of the facility.

(9) Based on the above findings of fact, the Board finds that hazardous substances as defined in 38 M.R.S.A. § 1362(1) were handled or otherwise came to be located at the Site and that the hazardous substances may create a danger to the public health, to the safety of any person or to the environment.

C. Other Contaminants of Concern

(1) In addition to the hazardous substances identified above, other contaminants of concern are located on the Site including chloropicrin.

(2) Chloropicrin, a tri-chlorinated nitromethane used as a soil fumigant, was manufactured in a separate part of the plant. Calcium chloride was used to dry the chloropicrin. Spent calcium chloride contaminated with chloropicrin was disposed of in the on-site landfills. Chloropicrin damages mucous membranes and when inhaled damages the lungs and can cause death. Choropicrin is also a poison by ingestion. Chloropicrin is highly toxic to fish, aquatic invertebrates and mammals.

D. Media Protection Standards

(1) Media Protection Standards ("MPS") represent the maximum concentration of contaminants in various media, exposure to which is determined to present an "acceptable" risk, i.e. to be protective of public health, safety and the environment. Media Protection Standards include both numeric and narrative standards.

(2) Contaminants of concern at the Site for which MPSs have been established include: mercury; manganese; acetone; chloropicrin; carbon tetrachloride; hexachloroethane; pentachloroethane; m-cresol; p-cresol; polychlorinated biphenyls; trichloroethylene; 1,1 dichloroethane; 1,1 dichloroethene; cis 1,2 dichloroethene; trans 1,2 dichloroethene; carbon disulfide; bromoform; methylene chloride; bromodichloromethane; dibromochloromethane; 2,4,5- T; cadmium; ethylbenzene; xylene; and tetrachloroethene.

(3) The final Media Protection Standards for the Site are set forth in Attachment 2 of the Commissioner's Order. For a few chemicals, the media protection standards use background values which still need to be established.

(4) During the pre-hearing process, it was established that Mallinckrodt and the Commissioner agreed to the media protection standards with one exception. Mallinckrodt objects to the narrative standard for soil erosion contained at the end of Attachment 2 to the Commissioner's

Order, and in particular, the insertion of five words (underlined below). That narrative standard reads as follows:

> 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.

Mallinckrodt objects to the five words added to the soil narrative standard in part because the additional language represents a departure from the Preliminary Media Protection Standards issued by the Department and EPA in 2003. Moreover, Mallinckrodt argues that the additional words in the narrative standard make the mercury standard confusing and that it could be interpreted to require removal of all soils on the Site that exceed the numeric Media Protection Standard.[13]

Ms. Ladner, testifying for the Commissioner, stated that the Commissioner's Order itself requires removal of all soils that exceed the Media Protection Standards. She testified that the soil narrative standard "essentially incorporated the Sediment Control Plan approved by the Department and implemented at the Site during the time of HoltraChem's ownership and which had been effective in preventing mercury bound to soils from leaving the Site." Ms. Ladner testified that the Commissioner modified the narrative standard for soils from the Preliminary Media Protection Standards to the final Media Protection Standards "by the addition of five words to the first sentence to make it clear that erosion control measures, such as vegetation, paving, or otherwise stabilizing the soils would be necessary during any construction or remediation." According to the Commissioner, the disputed sentence in the soil narrative standard means that if soil were disturbed that could reasonably be expected to exceed the Media Protection Standard, Mallinckrodt would need to ensure that such soil could not erode by implementing erosion control measures typical of any construction site.

The Board finds no legal impediment in the fact that the Commissioner changed the narrative soil standard following issuance of the Preliminary Media Protection Standards. The Board also finds that the soils narrative standard for mercury should include a provision to prevent erosion of potentially contaminated soils during construction and remediation and therefore upholds the narrative standard for soil erosion in Attachment 2 to the Commissioner's Order. Mallinckrodt's objection to the removal of all soils on-site with mercury concentrations above the MPS is addressed in Findings of Fact 10(C) and 10(D) of this Decision.

[13] While Mallinckrodt has agreed to excavate soils above the Media Protection Standard of 2.2 mg/kg in some areas of the Site, Mallinckrodt objects to the removal all such soils from the Site.

7. REMEDIAL ACTION UNDER THE UNCONTROLLED SITES LAW

The Uncontrolled Sites Law allows the Commissioner to order a responsible party to take remedial action at the site that is "necessary to terminate or mitigate the danger or likelihood of danger" to "the public health, to the safety of any person or to the environment." 38 M.R.S.A § 1365(1).[14] In its review of the Commissioner's Order, the Board must determine whether the ordered remedial action meets this standard.

In its appeal, Mallinckrodt objected strenuously to the remedial actions ordered by the Commissioner. For that reason, the remainder of this Decision is devoted to a discussion of the site conditions; the remedial actions required by the Commissioner's Order and Mallinckrodt's response; the specific disputed requirements; groundwater contamination, monitoring and remediation; requirements generally not disputed; the schedule for implementation of remedial actions; and certain administrative requirements in dispute.

8. SITE CONDITIONS

A. Contaminants of Concern

While media protection standards have been established for a number of contaminants of concern, the contaminants of concern ("COC") at the Site that the parties focused on as central to the selection of the remedy for the Site are mercury, carbon tetrachloride, trichloroethylene, and chloropicrin. In addition to information addressed in Findings of Fact 6(B) and 6(C) of this Decision, some properties of these contaminants that influence remedial action decisions are summarized in this section.

(1) Mercury may exist in elemental, inorganic or organic forms. Elemental mercury is liquid at ambient temperatures. It is denser than water and has a tendency to move downward through soils. This downward movement is counteracted by a tendency to form beads which can become trapped in pore spaces. Elemental mercury binds tightly to soils, but has the potential to volatilize when exposed to air. The largest potential remaining source of elemental mercury on-site is thought to be the area beneath the cell building.

(2) The mercury in the brine purification sludges and wastewater treatment plant sludges is thought to be present largely in inorganic forms (including mercuric chloride and mercuric hydroxides) which are much more soluble in water than elemental mercury. Sludges generated prior to

[14] Similarly, the statutory definition of "[u]ncontrolled hazardous substance site" provides that an uncontrolled site is one in which the commissioner has concluded "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 under this chapter is necessary to abate, clean up or mitigate that threat or hazard." 38 M.R.S.A. § 1362(3).

construction of the wastewater treatment plant,[15] which was designed to precipitate mercury, are more likely to contain mercuric chloride. Mercuric chloride is one million times more soluble in water than elemental mercury.

(3) Methylmercury has been documented in sediments in Southern Cove adjacent to the Site at concentrations above the media protection standard of 2.2 milligrams per kilogram (mg/kg). Methymercury is more soluble in fats than in water and bioaccumulates in living organisms; the primary route of exposure to methylmercury is through ingestion.[16] Once formed, methylmercury is not readily decomposed.

(4) Carbon tetrachloride, chloropicrin, and trichloroethylene adsorb less strongly than mercury to soils and have migrated through the soil to groundwater.

(5) Because of their heavier molecular weights and limited solubility in water, carbon tetrachloride and chloropicrin tend to sink through the water table and can penetrate deep into an aquifer.

B. Overview of Site Features and Groundwater Flow Conditions

(1) The Site is located on a 235 acre property adjacent to the Penobscot River. Approximately 77 acres have been impacted by plant operations. The immediate plant area comprises 12 acres and is relatively level with an elevation of approximately 65 feet above sea level.

(2) A number of subsurface investigations have been conducted at the Site since 1975.

(3) An elongated bedrock ridge, whose axis trends in a northeasterly-southwesterly direction, is located north of the plant area. The ground elevation approaches 145 feet above sea level along the ridge. Landfills 3, 4 and 5 are located on the bedrock ridge. These landfills appear to overlie a thin layer of glacial till, or are located directly on bedrock. Waste in Landfill 4 is periodically in contact with the water table. The Landfill Ridge Disposal Area is located northwest of Landfill 4. Groundwater from the ridge flows both north toward the Penobscot River and south toward the plant area; there is a strong vertical gradient into bedrock.

(4) Landfill 2 is located in a depression northeast of the plant area adjacent to Southerly Stream.

[15] The first wastewater treatment system was installed in February 1972 and used sodium borohydride to precipitate mercury. The wastewater treatment system was modified and expanded in 1979. A new wastewater treatment system was constructed in 1997.

[16] The Commissioner's Order, Attachment 2, Numeric Media Protection Standards states that the media protection standard established for mercury in surface waters is 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. Fish must meet the fish tissue residue value of 0.2 ppm or, for on-site fish, the level must not be significantly elevated over two other reference sites."

(5) A long thin deposit of shallow sand that is much more permeable than the surrounding bedrock or till and clay deposits is located at the base of the bedrock ridge. It channels groundwater in the overburden flowing south from the bedrock ridge area and west from the area of Landfill 2 along the base of the scarp toward Landfill 1 and the Penobscot River.

(6) There is a deep bedrock valley beneath the plant area; the bedrock surface rises again south of the plant area near the property boundary with the Penobscot Energy Recovery Company ("PERC") facility. Groundwater in surficial deposits flows from PERC toward the plant area and discharges to the Penobscot River. The thickest deposits of sand and gravel are located at the western end of the Site adjacent to the Penobscot River and are up to 94 feet thick. There is dispute over the potential for groundwater to move through bedrock fractures to the Ferry Road areas south of the plant. This issue is discussed further in Finding of Fact 11(B) of this Decision.

(7) Groundwater at the Site moves primarily to the west, discharging to the Penobscot River.

(8) There are three existing partial groundwater collection systems at the Site. The first is the underdrain for the chlorate building, which discharged into the Northern Drainage Ditch through much of the year. The second is the Southerly Stream Interceptor Trench installed in overburden on the south side of the rail spurs downgradient of the caustic loading area. It intercepts alkaline groundwater caused by past spills of sodium hydroxide before it reaches Southerly Stream. The captured groundwater is pumped to the on-site treatment plant, treated for mercury and pH, and discharged. The third groundwater collection system consists of extraction Well 601 located downgradient of Landfill 1. Well 601 is positioned in the sandy zone below the level of the river and collects a portion of the groundwater moving westward toward the Penobscot River. Groundwater from Well 601 is pumped to the on-site treatment plant, treated to remove mercury, and discharged through Outfall 001.

(9) There is a disagreement over the magnitude of the current flux of mercury toward the river which is estimated at 0.5 pounds per year by Mallinckrodt and approximately 3 pounds per year by the Commissioner. However, there is agreement that the flux of mercury has decreased over time. Estimates by consultant Camp Dresser & McKee ("CDM") based on 1997/1998 data indicate a mercury flux below Landfill 1 at that time of approximately 14 pounds/year.

(10) Two borings (P-10, P-11) placed to the bottom of Landfill 1 in August of 1980 found maximum concentrations of 154 and 680 mg/kg mercury in the mercury waste. One boring placed to the bottom of Landfill 2 in 2001 found a concentration of 357 mg/kg mercury in the Landfill 2 waste. A boring placed through Landfill 4 in 1997 at MW-506 found a maximum concentration of 350 mg/kg mercury in the Landfill 4 waste.

(11) The form of the mercury in the landfills is unknown, but it is most likely ionic mercury in the form of mercuric chloride or mercuric hydroxide both of which have a tendency to adsorb to

surfaces such as iron oxide and aluminum oxide surfaces. Wastes from the wastewater treatment plant are more likely to be mercuric hydroxide, which is less soluble than mercuric chloride and therefore less mobile in groundwater than mercuric chloride.

(12) Groundwater is currently monitored semi-annually at 33 on-site monitoring wells and 2 nearby residential wells with a different list of parameters tested during each sampling period. Recent sampling has focused on a limited number of parameters of interest to each area intercepted by each respective monitoring well.

(13) Mercury is currently found in groundwater above the MPS of 2.0 ug/liter in the Landfill Area 1 wells with the concentration of dissolved mercury[17] in MW-501-01of 375.7 ug/liter on 6/24/09 (historical maximum of 6260.6 ug/liter on 9/22/99). Total mercury was detected at 3 well points along the northwest perimeter of Landfill 2 during a one-time landfill investigation in 2000 with a concentration of 5.9 ug/liter total mercury in LF2-WP12/WP19; dissolved mercury was not detected in any of the well points at that time. Landfill 2 well points have not been sampled since 2000. Current levels of dissolved mercury in groundwater samples from Landfill 3 and 4 monitoring wells show 0.9 ug/liter in P-2A on 9/9/09, 0.7 ug/liter in MW-410-B1 on 9/9/09, and <0.3 ug/liter in MW-506-B1. The historical maximum concentration level of dissolved mercury at these locations was: 57 ug/liter in P-2A on 5/21/10, 134 ug/liter in MW-410-B1 (downgradient) on 5/21/01 and 143.4 ug/liter in MW-506-B1 (located in bedrock beneath landfill 4) on 8/27/01. Current levels of dissolved mercury in samples from the Landfill 5 monitoring wells are below the MPS. The historical maximum was 4.7 ug/liter in P-003 on 5/10/95. Monitoring wells in the plant area contain dissolved mercury with a concentration of 4.9 ug/liter at MW-510-01 on 6/24/09.

(14) Carbon tetrachloride has been detected in bedrock monitoring wells associated with Landfills 1, 2, 3, 4, and 5 and the plant area. Concentrations have decreased over time. Concentrations currently exceed the MPS of 3.0 ug/liter in monitoring wells associated with Landfills 3 and 4 (B-309-B1, MW-410-B1, MW-506-B1, and P-2A). Mallinckrodt testified that the carbon tetrachloride is in the bedrock fractures under Landfill 4 and that this area is the likely source of continuing contamination in downgradient wells.

(15) Trichloroethylene has historically been present above the MPS of 5.0 ug/liter in the plant area and Landfill Area 1, at levels below the MPS in Landfill 3 and 4 monitoring wells, but has not been detected in either Landfill 2 well points and monitoring wells or Landfill 5 monitoring wells. The Commissioner testified that the source of the trichloroethylene is unknown, but stated that it is probably associated with a pocket of contaminated soil that resulted from a spill or discharge in an area lying to the east of Landfill 1.

[17] The values reported for dissolved mercury in groundwater are from samples that were filtered through a 0.45 micron filter. The Commissioner and Mallinckrodt disagree on whether filtered samples accurately represent concentrations of dissolved mercury. This issue is discussed in Finding of Fact 10(B)(1) of this Decision.

(16) Chloropicrin has been detected in the plant area and monitoring wells associated with Landfill Area 1 and Landfills 3 and 4. It has not been detected in either Landfill 2 or Landfill 5 monitoring wells. Chloropicrin groundwater concentrations have decreased with time, but continue to exceed the MPS of 30 ug/liter in the plant area and some monitoring wells associated with Landfill Area 1.

9. REMEDIAL ACTION REQUIRED BY ORDER AND MALLINCKRODT'S RESPONSE

A. Remedial Action Alternatives Considered

(1) In its Corrective Measures Study (May 2003) and Attachment 1: Response to MEDEP Request for Additional Information (April 2005), CDM evaluated several alternatives for remediation of the Site. These alternatives included: 1) On-Site Containment, which included among other things, leaving the existing landfills except Landfill 2 in place and consolidating contaminated soils and sediments and materials from Landfill 2 in a new on-site landfill; 2) On-Site Consolidation, which involved among other things, excavating all five landfills and consolidating them with other contaminated soils and sediments in a new on-site landfill with or without a liner ("CAMU" or Corrective Action Management Unit); 3) removal of all five landfills and contaminated soils and sediments for disposal off-site, the so-called "Dig and Haul" alternative. In its pre-filed testimony and at the hearing, Mallinckrodt proposed yet another alternative, namely the "Woodard & Curran" or "Source Removal" alternative. At the hearing Mallinckrodt stated its willingness to implement the On-Site Containment, On-Site Consolidation, or Woodard & Curran alternatives.

(2) At the hearing, Commissioner witness Ms. Ladner testified that there are no licensed hazardous waste landfills (RCRA Subtitle C) in the State, the Site is a poor location for a hazardous waste disposal landfill, and the Site could not meet the requirements of the Maine Hazardous Waste Management Regulations for the licensing of such a facility given factors such as its location adjacent to the Penobscot River, depth to bedrock at the Site, and proximity to residential groundwater supplies. Mallinckrodt questioned the Commissioner's previous requests for an analysis of the On-Site Consolidation (CAMU) alternative if the Commissioner believed it could not be licensed at the Site; Mallinckrodt stated its view that it would be possible to construct such a facility if clay were brought to the Site to create the required base. However, Mallinckrodt did not provide evidence on the ability to meet the licensing requirements for a RCRA Subtitle C landfill at the Site.

(3) Based upon this testimony and consideration of the requirements of the Hazardous Waste Management Regulations, the Board finds that the On-Site Containment and On-Site Consolidation Options are not viable remedial alternatives for the Site. Accordingly, the Board finds that it is appropriate to limit its consideration of the remedial action alternatives to the

remedy set forth in the Commissioner's Order and to Mallinckrodt's proposed alternative (Woodard & Curran / Source Removal), or some variation thereof.

B. Remedy Required by Commissioner's Order

(1) In brief, the Commissioner's Order requires the following actions:
- Excavation of contaminated soils;
- Excavation of contaminated sediments;
- Excavation of sludges and other contaminated material from the five landfills;
- Removal of the industrial sewer;
- Facility dismantling;
- Construction of a groundwater cutoff barrier wall;
- Extraction of contaminated groundwater and treatment;
- Continued operation of the wastewater treatment plant;
- Monitoring of air, surface water, sediment, and groundwater;
- Preparation or modification of plans for DEP's review and approval to accomplish remediation (including Facility Dismantling Plan, Corrective Measures Implementation Plan, Sediment Prevention Plan, Comprehensive Monitoring Plan);
- Site security;
- Establishment of a trust fund for financial assurance;
- Monthly written reports;
- Third party independent inspector;
- Participation in public meetings; and
- Insurance coverage.

(2) The remedy set forth in the Commissioner's Order requires the excavation and off-site disposal of an estimated 240,220 cubic yards (360,330 tons) of wastes and contaminated media at an estimated cost of $205 million to $250 million.

(3) In support of its ordered remedy, the Commissioner argues, in brief, that mercury is highly toxic; it is an immortal waste which must be isolated from the environment in perpetuity; the existing landfills are poorly sited and contain wastes in contact with groundwater which have leached and will continue to leach into ground and surface waters; and the Site could not be licensed for hazardous waste disposal under existing rules.

C. Mallinckrodt's Proposed Remedy

(1) Mallinckrodt objects to the removal of Landfills 2, 3, 4 and 5. In response to the Commissioner's Order, Mallinckrodt has proposed the following alternative remedy for the Site.

- Groundwater: Installation of pumping wells, onsite treatment of groundwater via a new groundwater treatment plant, discharge to the Penobscot River, installation of a slurry trench barrier wall (if needed).
- Surface water – lined process lagoon: Removal of water and sediment from the lagoon, backfilling and regrading to minimize infiltration.
- Sediments in Southern Cove: Dredge and dewater, dispose of in industrial landfill (approx. 12,200 cubic yards). Mitigation and restoration of disturbed wetland vegetation.
- Landfill Area 1: Excavate soils contaminated above 2.2 mg/kg mercury; approx 48,800 cubic yards to be disposed of off-site in a hazardous waste landfill.
- Landfill 2: Re-engineer cap incorporating an impermeable membrane (RCRA Subtitle C cap). At the hearing Mallinckrodt proposed to install an upgradient sheet pile wall or slurry wall for groundwater diversion and extend the new geomembrane cover underneath the Southerly Stream.
- Landfill Ridge Area: Excavate landfill ridge soils and transport to and dispose of in industrial landfill (approx. 22,600 cubic yards).
- Landfill 3. No action.
- Landfill 4. No action for cap. Installation of bedrock groundwater extraction well to capture and treat carbon tetrachloride. At the hearing, Mallinckrodt acknowledged the need to depress the groundwater table beneath Landfill 4 to prevent leaching of contaminants to groundwater.
- Landfill 5. No action.
- Cell building: Excavate soils with visible signs of mercury, treat on-site to remove elemental mercury; dispose of elemental mercury off-site with the fine fraction sent to a hazardous waste disposal facility (approx. 2400 cubic yards), the coarse fraction to an industrial landfill (approx. 9800 cubic yards).
- Plant area soils: Excavate soils exceeding 2.2 mg/kg mercury, chemically stabilize soils, transport to and dispose of in an industrial landfill (approx. 34,100 cubic yards).
- Other: Chloropicrin spill area - no action - the groundwater extraction system will contain, remove and treat chloropicrin; excavate PCB-contaminated transformer area soils (approx. 20 cubic yards) to industrial landfill; industrial sewer - clean and remove, excavate soils surrounding sewer exceeding MPS of 2.2 mg/kg mercury, transport to and dispose of in industrial landfill (approx. 1400 cubic yards).

(2) The Woodard & Curran alternative proposed by Mallinckrodt would involve the excavation and off-site disposal of an estimated 131,320 cubic yards (196,980 tons) of waste and contaminated media at an estimated cost of $94 million to $100 million dollars.

(3) In support of its proposed alternative that leaves Landfills 2 through 5 in place, Mallinckrodt argues in brief:

- Levels of contaminants in groundwater have decreased over time and the only exceedences of the Media Protection Standards are mercury in the vicinity of Landfill Area 1 and carbon tetrachloride near Landfill 4.
- Any groundwater that has been contaminated by the landfills will be captured and treated by the groundwater collection and wastewater treatment system.
- Landfills 2-5 are capped, stabilized, regularly monitored, and should not be disturbed. Disturbing landfills (excavation) will result in the volatilization of elemental mercury to the air, and mobilization of mercury to the groundwater. Excavation and off-site disposal will also increase emissions of carbon dioxide; and transporting large volumes of waste for off-site disposal is counter to the state's efforts to control emissions of greenhouse gases (carbon dioxide) and other air pollutants (nitrous oxides).
- Mallinckrodt's alternative presents fewer risks to public health and the environment.
- There are significant cost, logistical and implementation time differences between the proposals which argue in favor of Mallinckrodt's proposed alternative.

D. Factors to be Considered when Evaluating Remedial Options

(1) As stated in Finding of Fact 2 of this Decision, the Uncontrolled Sites Law is the governing law in this proceeding and the Board must find that the ordered remedy is "necessary to terminate or mitigate the danger or likelihood of danger" to "the public health, to the safety of any person or to the environment." 38 M.R.S.A § 1365(1). In deciding what is "necessary" Mallinckrodt has argued that the Board must evaluate potential remedies against the RCRA criteria. However, the Board has found that "...the 11 RCRA criteria used by the parties in developing and evaluating alternative remedies are not legal standards to be met, but rather factors which may be considered by the Board when evaluating the remedy for the site and reaching its ultimate decision under the statute." While the RCRA criteria are only factors which may be considered, there is general agreement that the remedy for the Site must be protective of human health and the environment, attain media protection standards, control sources of releases of contaminants, and comply with applicable waste management standards (i.e., the RCRA threshold criteria).

(2) When evaluating remedial action alternatives for the Site, witnesses for both the Commissioner and Mallinckrodt agreed on the following points:
- Opening of the landfills will lead to mercury releases to air, and likely to ground and surface waters, that will need to be controlled during remedial activities.
- An effective groundwater collection and treatment system must be installed to capture and treat releases from waste units during remedial activities and to remediate existing contamination. The existing systems need to be maintained until such time as the replacement systems are operational.
- If waste materials remain on-site in landfills, they must be isolated from surface and groundwaters otherwise the mercury in the waste may be mobilized.

- Once in surface waters such as the Penobscot River, the mercury will be converted to methylmercury which bioaccumulates.
- It is critical to limit and control the discharge of mercury to the Penobscot River.

10. REMEDIAL ACTION REQUIREMENTS DISPUTED

A. Removal of Landfills

The Commissioner's Order requires the removal of Landfills 1, 2, 3, 4 and 5. Mallinckrodt objects. Before addressing each landfill in turn, there are several issues common to all landfills that will be discussed first. These include the extent of groundwater contamination at the Site; landfill siting, design, and construction issues; remediation implementability issues; air emissions associated with removal of the landfills; and cost.

B. General Issues

(1) Characterization of Groundwater Contamination

In arguing for excavation and off-site disposal of all contaminated media, the Commissioner argues that the extent of groundwater contamination at the Site is not well documented and is likely greater than current monitoring reflects. For example, the Commissioner points to the fact that wells around Landfill 2 have not been sampled since 2000. The Commissioner also argues that the filtering of groundwater samples has resulted in under-reporting of dissolved mercury in groundwater at the Site. Commissioner witness Dr. Beane argues that the filters can absorb mercury and thereby underestimate the concentration of mercury present in groundwater, especially when determining concentrations approaching the media protection standard. Dr. Beane points to significant differences in mercury concentrations in filtered versus unfiltered samples even at low monitoring well turbidities. By way of example, a sample from MW-410-B1 on 9/9/2009 with a turbidity of 0.88 NTU showed a mercury concentration of 0.7 ug/liter in the filtered sample and 3.2 ug/liter mercury in the unfiltered sample. Dr. Beane testified that, "State of the art sampling practice is to collect groundwater samples in such a way that silt and clay in the well are not disturbed and entrained in the sample" and that it is Department policy to "rely on unfiltered non-turbid samples."

Mallinckrodt witness Mr. Sevee testified to the contrary. He states that there have been numerous assessments of the Site, the groundwater is well characterized, and the wells that have been eliminated from the monitoring program had levels of contaminants below the Media Protection Standards. With respect to the issue of filtering groundwater samples at the time of collection, Mr. Sevee testified that, when sampling groundwater for dissolved contaminants, samples are routinely filtered over a 0.45 micron filter to determine the soluble component, i.e., the component that is actually in molecular form in the water. He further argues that, "if your objective is to assess whether the groundwater is creating a threat to the

environment and the river, you should recognize that the filtered samples actually overestimate in general the amount of mercury that is moving through the groundwater system" since small particles still pass through the filter.

The Board finds that there are gaps and inconsistencies in groundwater information, but the data is sufficient to select a remedy for the Site and neither Mallinckrodt nor the Commissioner argued to the contrary. The Board finds that groundwater sampling wells should be adequately developed to reduce turbidity in order to provide for accurate monitoring of contaminants migrating through groundwater. The Board also finds that it is important to resolve the inconsistency between filtered and unfiltered sample results at low turbidity levels to accurately assess the level of contamination at the Site. The Board further finds that it is important to ensure consistency in sampling in order to assess changes in concentration of contaminants over time and therefore the efficacy of remedial actions. Therefore, the Board finds that monitoring wells should be adequately developed to eliminate turbidity as a source of sample contamination and that unfiltered samples must be analyzed periodically in conjunction with filtered samples to determine the extent of variability in sample results and better assess whether the MPS are being achieved. Groundwater issues are discussed further in Finding of Fact 11 of this Decision.

(2) Landfill Siting, Design, and Construction Issues

In arguing for the removal of all landfills, the Commissioner's witnesses testified that the landfills fail to meet one or more of the hazardous waste landfill siting criteria under current rules. The Commissioner testified that there are private residences with bedrock wells within 1,200 feet of the landfills, Landfill 2 directly abuts a classified stream, and Landfill 1 lies within the 100-year floodplain setback of the Penobscot River.[18] With respect to design, the landfills are unlined, without any form of leachate collection, situated such that hazardous waste sits directly on top of bedrock (Landfills 3, 4, and 5), and waste is periodically in contact with the groundwater (Landfills 2 and 4).[19]

Additionally, the Commissioner's witnesses expressed significant concerns with the Hypalon caps for Landfills 1, 3 and 4, which are now 30 years old, and significant concerns about the condition of the HDPE cap for Landfill 5, which is now 26 years old. Testimony from Mallinckrodt indicates that the clay cover on Landfill 2 has deteriorated since installation and now allows some 20% of rainfall to pass through the waste.

Mallinckrodt argues that Landfills 2 through 5 are sufficient as they are with the exception of the need for a new synthetic cover on Landfill 2 and drainage improvements around Landfills 2 and 4. Mallinckrodt witness Mr. Cote provided a lengthy discussion during the hearing on the

[18] See 06-096 CMR 854(7).
[19] See 06-096 CMR 854(8).

condition of the landfills and comparisons with other industrial landfills in Maine and argued that landfills that were constructed well before current RCRA Subtitle C standards were developed have often been left in place with a long-term monitoring and maintenance plan.

The Board finds that the existing landfills do not meet the siting and design standards of the Department's Hazardous Waste Management Regulations (06-096 CMR 854) and that a new hazardous waste landfill could not be sited and constructed in this location; however, that is not sufficient rationale for ordering the excavation and off-site disposal of all of the existing landfills. The condition of each landfill and the requirements for their remediation are discussed in Finding of Fact 10(C) of this Decision. For landfills remaining on-site in accordance with this Decision, a plan for identifying when the landfill covers require repair or replacement and funding for the repair or replacement of the landfill covers are necessary.

(3) Implementability Issues

(a) Disposal Facilities. In arguing against removal and off-site disposal of Landfills 2 through 5, Mallinckrodt argues that the Commissioner's remedy is not implementable. Mallinckrodt raises issues with the Stablex facility in Blainville, Quebec Province, Canada, which would likely receive the shipments of hazardous waste from the Site. For example, Mallinckrodt witness Mr. Kasper testified that processing capacity at Stablex is limited to 300 metric tons per day. The Commissioner's remedy would require an estimated 360,330 tons (240,220 cubic yards) to be disposed of off-site over a period of several years, approximately 240,000 tons (160, 000 cubic yards) of which would require disposal at a hazardous waste facility such as Stablex. Mallinckrodt argued that accepting this amount of waste from this Site would leave Stablex unable to service other customers.

Mr. Lavallee, testifying for the Commissioner, stated that according to Stablex staff, the facility's current soil processing capacity allows it to accept 300 metric tons per day over and above the amount received from its regular customers. Mr. Lavallee also testified that Stablex has historically added treatment capacity and made significant capital investments to meet the needs of large, multi-year projects.

Mallinckrodt also suggested that the Land Disposal Restrictions (LDR) may affect Stablex's capacity or that Quebec may enact an LDR of its own that would limit the ability of Stablex to accept wastes from the Site. The Commissioner responded that Stablex is licensed to accept mercury contaminated wastes such as those found at the Site.

There was also testimony at the hearing about the Stablex Audit Package. While the Stablex facility is located outside of the United States, it is a stable waste management operation with nearly three decades of experience in hazardous waste treatment and disposal, including Maine customers such as prior owners of the HoltraChem Site. Its siting, design, and operation appear to comply with regulatory requirements which, although different, appear comparable to

facilities in the United States. Mr. Lavallee testified that the facility has a clean bill of health from the Quebec regulatory authorities. The Board also notes that the facility is located within a few hundred miles of the point of waste generation and is, in fact, the facility where Mallinckrodt has previously disposed of mercury wastes and debris from this Site. Furthermore, the Board understands that Stablex recently adapted its treatment process to provide for waste containing free elemental mercury, which allows waste from the Site to be shipped to Stablex with no prior on-site treatment in Orrington.

The Board finds no impediment to the use of Stablex for disposal of contaminated media from the Site that would preclude implementation of the Commissioner's ordered remedy. While questions remain regarding the ability of Stablex to accept the total volume of hazardous waste which would be generated if the Commissioner's Order were to be implemented, the Board does not attempt to resolve this question since other facilities may be able to accept hazardous waste from the Site if necessary; moreover, as discussed in Finding of Fact 10(C) of this Decision, the Board does not find that all five landfills must be removed and disposed of off-site.

(b) Transportation. Mallinckrodt testified about the number of truck trips that would be required to transport wastes to the Stablex facility if the Commissioner's remedy were implemented, asserting that it will result in unnecessary traffic and accidents, damage to roads, and increased emissions of greenhouse gases and other air pollutants. The Commissioner responded primarily by arguing that rail transport makes the most sense for this Site. There is a railroad spur at the Site, and it was used for years to ship chlorine and other products until the facility closed in 2000. Commissioner witness Mr. Lavallee testified that an inspection by Maine Department of Transportation staff in 2008 suggested the rail spur's condition was generally good. Mallinckrodt testified that the existing rail siding and loading facility have been out of operation for approximately ten years and would require repair and upgrades costing approximately $500,000 prior to use, with annual maintenance costs of approximately $125,000. Commissioner witness Ladner testified that rail transport has proven cost-effective in transporting mercury-contaminated media at other projects including the Velsicol site in New Jersey, which transported mercury contaminated waste by rail to the Stablex facility.

The Board finds that rail most likely is the best method of shipment in order to minimize traffic and wear on roads. Although Maine's Climate Change Law does not require the Board to consider greenhouse gas emissions in its review of the Commissioner's Order, the Board notes that rail transport, as compared to truck transport, would also reduce emissions of greenhouse gases and other air pollutants. As the Department oversees the implementation of the Commissioner's Order, as modified by this Decision, the Board encourages the use of rail to transport contaminated media from the Site to disposal facilities to the extent possible.

(4) Air Issues

The record contains extensive testimony on the potential for air quality impacts during excavation of the landfills and contaminated soils from mercury emissions. Although the Commissioner and Mallinckrodt used somewhat different approaches and inputs, their estimates of the impacts to off-site receptors are similar. In all cases, the modeled annual average mercury concentrations were below the media protection standard. Dr. Fowler of the U.S. Agency for Toxic Substances and Disease Registry (ATSDR) testifying for the Commissioner and Mr. Bigham testifying for Mallinckrodt both concluded that the removal of the landfills could be done safely.

In addition, removal of the cell building (which contained a significant amount of elemental mercury) was successfully completed several years ago while safely addressing potential mercury air emissions. The landfills are expected to contain less elemental mercury than the cell building. The Commissioner's Order requires air monitoring during remediation similar to that performed during the cell building dismantling, and Mallinckrodt has not objected to this requirement. Also, there was testimony showing that stabilization (treatment) of soils containing elemental mercury is the activity associated with the most mercury vapor releases, but the remedy in the Commissioner's Order will likely no longer require any on-site treatment given the current ability of Stablex to treat the wastes at its facility prior to disposal.

The Board finds, based on all the evidence in the record, that air emissions from removing the landfills will not result in adverse effects on public health provided monitoring is conducted and work practices and schedules are adjusted as necessary in response to real-time monitoring results.

(5) Cost

Mallinckrodt argues that the Commissioner's remedy, estimated at between $205 and $250 million, is not cost effective when compared with other alternatives, including Mallinckrodt's proposed remedy, which Mr. Vallaincourt, testifying for Mallinckrodt, estimated during the hearing would cost from $94 to $100 million.

The Commissioner responds that the Legislature has determined that cost is not a factor when determining the remedy that is necessary at the site. The findings and purpose section of the Uncontrolled Sites Law at 38 M.R.S.A. § 1361 states:

> 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 promptly.

> 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.

The Board finds that cost is not a factor under the Uncontrolled Sites Law when determining the remedy necessary to protect public health and safety and the environment. Cost would only become relevant if choosing among equally protective remedies, in which case the Board could then consider the cost effectiveness of equally protective remedies. That scenario is not present here as there are no two equally protective remedies that have been ordered or proposed. Rather, based on its assessment of all of the evidence in the record, the Board has determined that the remedy required by the Commissioner's Order, as modified by this Decision, is the remedy that is technically necessary to protect public health, safety and the environment from contaminants at the Site.

C. Landfill Specific Issues

(1) Landfill Area 1

(a) The Commissioner's Order requires removal of Landfill 1 including the lined process lagoon. Mallinckrodt now generally agrees that Landfill 1 should be removed. In Mr. Vaillancourt's pre-filed testimony and at the hearing, he supported removing Landfill 1, and the so-called Woodard & Curran alternative proposed by Mallinckrodt includes such removal.

(b) The evidence in the record shows the following. Landfill 1 was operated by Mallinckrodt's predecessors from 1970 to 1972. Landfill 1 is approximately two acres in size and sits on a hillside sloping to the Penobscot River. The lined process lagoon sits on top of Landfill 1. Landfill 1 lies almost entirely within the Penobscot River floodplain setback requirement for hazardous waste landfills. There is less than 20 feet from the high tide mark of the river to the Hypalon cover. To prevent possible slope failure, this area was armored with a rip rap blanket in 1999. The landfill has a fairly uniform slope of 30 percent towards the river. Landfill 1 received process waste water, 1000 tons of brine sludge (K071), and mercury contaminated graphite anodes. Two borings placed through this landfill in August of 1980 found maximum concentrations of 154 and 680 mg/kg of mercury in the waste. This landfill was covered with soil in 1972 and a Hypalon geomembrane in 1980. Landfill 1 is a continuing source of groundwater contamination including mercury; the concentration of dissolved mercury in MW-501-01 was 375.7 ug/liter on 6/24/09. Exceedences of the MPS for groundwater have occurred for numerous contaminants of concern. All of the wells with mercury levels currently above the MPS are located in Landfill Area 1.

(c) Mallinckrodt now agrees that Landfill 1 must be removed; however, the Commissioner and Mallinckrodt disagree on the depth to which contaminated media beneath the landfill should be removed.

(d) The source of mercury contamination to groundwater for Landfill 1 is claimed by Commissioner's witness Dr. Beane to be in the sand and gravel below the water table and just above the till layer beneath the lined process lagoon and down-slope from the lagoon. The Commissioner argues that removal of contaminated soil should proceed through the water table to glacial till in the area immediately downgradient from the lined process lagoon and likely down to the area where the aquifer thickens at river level in order to remove this source of contamination. Dr. Beane states that source removal at Landfill 1 can only be successful if soils under the lined process lagoon down to the till surface and soils downslope of the lagoon between the water table and the till surface are removed. He maintains that desorption from these soils, some of which are more than 30 feet deep, sustains the mercury plume in groundwater.

(e) The Woodard & Curran alternative proposed by Mallinckrodt in pre-filed testimony and at the hearing states that material from Landfill Area 1 that exceeds the MPS of 2.2 mg/kg mercury will be removed. Mallinckrodt witness Mr. Vaillancourt testified that there is a "hot spot" of mercury almost directly under the lagoon. However, the "Woodard and Curran" proposal that was supported by Mallinckrodt throughout the hearing does not appear to include excavation and offsite disposal of original in-place contaminated soil under Landfill 1 that exceeds the MPS. Rather, based upon testimony at the hearing, Mallinckrodt would remove the waste and address remaining soil contamination through a new groundwater extraction and treatment system. Mr. Vaillancourt testified that excavation to the till layer would be problematic given the groundwater flow through overburden and the location of the landfill with respect to the river. He testified that the groundwater table beneath Landfill 1 is very steep; the groundwater moves very quickly; and the excavation could become filled with water.

(f) The Board finds, and there is no dispute, that removal of Landfill 1 is necessary to address the danger or likelihood of danger to the public health and safety and the environment from the hazardous substances in this landfill. However, the Board finds Mr. Vaillancourt's testimony regarding limitations on depth of excavation of soils persuasive especially given the proximity of the landfill to the Penobscot River, the thickness of the sand and gravel layer, and the steepness of the water table in this portion of the Site. The Board also finds that excavation should not be limited to removal of fill material to native soil. Rather "hot spots" of contamination beneath fill material must be addressed since reliance on groundwater extraction and treatment to remove high levels of contaminants adhering to soils may significantly extend the time needed to achieve media protection standards and has the potential to release more mercury to the river over time through the wastewater treatment facility than removal and off-site disposal of contaminated soils. Accordingly, the Board finds that Mallinckrodt must conduct tests to determine the concentration of contaminants in the soils beneath the wastes in

Landfill 1 and the ability of the contaminants of concern to desorb from the soils. Information from these tests shall be used by the Commissioner to determine the necessary depth of soils excavation at Landfill 1. A more complete description of the required tests is set forth in Finding of Fact 10(D) of this Decision.

The Board further finds that if soils with contaminants above media protection standards remain on-site, the area of contaminated soils must be graded appropriately and covered to prevent infiltration and further leaching of contaminants to groundwater, which may include installation of a synthetic cap over remaining contaminated soils. The Department shall determine the appropriate cover for any such areas based on the concentration of contaminants in remaining soils above the MPS. See discussion in Finding of Fact 10(D) of this Decision.

(2) Landfill 2

(a) The Commissioner's Order requires removal of Landfill 2. Mallinckrodt objects. Instead Mallinckrodt proposes to replace the existing cap and install engineering measures to isolate the landfill from both groundwater and surface water. Specifically Mallinckrodt proposes to install an upgradient sheet pile wall or slurry wall for groundwater diversion combined with recapping the landfill with a synthetic cover, and extending the new geomembrane cover underneath the Southerly Stream to discourage direct groundwater discharge into the stream.

(b) The evidence in the record shows the following. Landfill 2 was operated from 1971 through 1973. It is approximately 12,000 square feet in size and is the smallest landfill at the Site. The waste in the landfill is in contact with groundwater at certain times of the year. The landfill is directly adjacent to the Southerly Stream, a classified body of water which at times touches the landfill. Groundwater flows away from Landfill 2 by three distinct routes: in general groundwater flows southwesterly in the shallow sandy deposit that parallels the base of the ridge scarp; during times of high groundwater levels, the groundwater discharges to the Southerly Stream; and groundwater flows downward through soils into bedrock beneath Landfill 2. Landfill 2 contains brine sludge, a listed hazardous waste due to mercury content (K071). Carbon tetrachloride was also reportedly placed in this landfill and was detected in MW-409-B1 (just west of Landfill 2) in concentrations just above the MPS.

(c) A boring placed through Landfill 2 in 2001 by an EPA contractor found 357 mg/kg of mercury in the waste. Landfill 2 reportedly received approximately 1500 tons of brine sludge. Brine sludge contains the more soluble ionic form of mercury. Landfill 2 was covered with soil in 1973, and capped with clay in 1980. The cover system over Landfill 2 has cracked and is more permeable than when it was put in place in 1980. Cracks in the cap allow rainfall to move through the cap down into the waste. During periods of high groundwater, the water table also comes up into the waste, then moves through the bottom of the waste with most of the groundwater discharging to the nearby stream.

(d) Regular monitoring of Landfill 2 has not occurred since 2000. Groundwater samples and sediment samples taken from the Southerly Stream directly downstream of Landfill 2 prior to 2000 showed exceedences of carbon tetrachloride in groundwater (5 ug/liter at MW-409-B1 in 1997) and mercury in stream sediments (19 mg/kg at SSD-002-01 in 1994).

(e) A surface water sample below Landfill 2 had a value of 0.7 µg/liter total mercury (media protection standard of 0.91µg/liter). Mallinckrodt's witness Mr. Vaillancourt testified that mercury contamination in the Southerly Stream may be from atmospheric deposition or from contamination during construction of Landfill 2 rather than leaching of contaminants from Landfill 2. However, this argument is not supported by the mercury soil test results presented in Exhibit C-21 which show numerous clean soil sample results in the Site soils in this general area which one would not expect to be the case if the mercury was the result of atmospheric deposition.

(f) Additionally, well MW-409-01, which monitors the sandy aquifer at the base of the bedrock ridge downgradient from Landfill 2, has chloride concentrations above background levels, and well MW-409-B1 had both elevated chloride and carbon tetrachloride above the media protection standard the last time it was sampled in 1997. CDM conducted a shallow soil and groundwater investigation in 2000 that showed salty water in most of the geoprobe wells along the northwest side of Landfill 2 as well as detectable total mercury in several samples.

(g) The Board finds the evidence in the record indicates that contaminants from Landfill 2 have leached and may be continuing to leach into the Stream. There is no dispute that the bottom of the landfill is at least seasonally below the water table. Commissioner witness Beane testified that at seasonal high water, the lower 5 feet of waste is below the water table. The Board finds, and it is not disputed, that any wastes allowed to remain on-site must be isolated from ground and surface waters and Mallinckrodt has proposed to do so here. However, given the location of Landfill 2 in a topographic depression and the need to manage ground and surface waters around Landfill 2 indefinitely in order to isolate the waste from contact with water, the Board is not persuaded that Mallinckrodt's proposed measures will protect the environment and prevent the discharge of mercury and other contaminants of concern from Landfill 2 in the future. The Board also finds that Mallinckrodt's proposal to install an upgradient sheet pile wall or slurry wall to divert upgradient groundwater flow and extend a new geomembrane cover underneath the Southerly Stream could have an adverse impact on the stream by depressing the water table and limiting groundwater discharge and therefore flow in the stream.

(h) The Board finds that the removal of Landfill 2 is necessary to terminate or mitigate the danger or likelihood of danger to public health and safety and the environment from the hazardous substances present in this landfill. The Board bases its conclusion on the factual findings as set forth above, particularly the nature of the wastes placed in the landfill, the mercury measured in the geoprobe borings, the mercury found in the sediment downstream of

this landfill, the undisputed need to isolate wastes from ground and surface waters, the fact that the landfill is located in a topographic depression and the waste is in contact with groundwater at certain times of the year, the lack of a synthetic cover, the location of the landfill directly adjacent to the Southerly Stream, and the groundwater flow routes. The Board is not persuaded that Mallinckrodt's proposal to install a new cap, a sheet pile wall, and a geomembrane cover underneath Southerly Stream is sufficient to protect public health and safety and the environment.

(i) As with Landfill 1, the depth of the excavation of contaminated soils beneath Landfill 2 shall be determined based upon an assessment of the potential for contaminants of concern adsorbed to soils beneath the landfill to desorb at concentrations that would cause the groundwater to exceed the Media Protection Standards as set forth in Finding of Fact 10(D) of this Decision.

(3) Landfill 3 and Landfill 4

(a) The Commissioner's Order requires the excavation and off-site disposal of Landfills 3 and 4. Mallinckrodt objects. Rather Mallinckrodt proposes to provide for replacement geomembrane caps in the future and to install an extraction well to depress the groundwater table beneath Landfill 4 and to remove and treat the carbon tetrachloride in bedrock groundwater.

(b) Witnesses for both the Commissioner and Mallinckrodt testified that it is difficult to differentiate the effects of Landfill 3 and Landfill 4 given their proximity to one another and that it is logical to treat them as a unit for remediation purposes.

(c) Landfills 3 and 4 are located on the bedrock ridge north of the plant area.

(d) Landfill 3 was constructed, filled with wastes excavated from Mac's Pond, and closed in 1972. It is approximately 38,000 square feet in size and reportedly received an estimated 1000 tons of brine sludge which contains mercury and is a listed hazardous waste (K071). The area was capped with soil in 1972 and with a Hypalon cap in 1980. The base of Landfill 3 is separated from bedrock by a layer of till ranging from zero to fifteen feet in thickness. The water table below the landfill is at or near the bedrock surface.

(e) Landfill 4 received brine and wastewater treatment plant sludge and other wastes from 1972 to 1980. Landfill 4 is approximately 45,000 square feet in area and reportedly received an estimated 8000 tons of sludge listed as hazardous waste (K071, K106), 100 tons of chlorate plant wastes, and 1700 gallons of carbon tetrachloride. Some wastes in Landfill 4 were placed on bedrock. There is a perched groundwater table that rises into the waste when there is a major precipitation event. Landfill 4 has a Hypalon cap installed in 1980. No documentation

was found or provided for Landfill 4 closure. A boring placed through the landfill in August of 1997 found 350 mg/kg mercury in the waste.

(f) Mallinckrodt witness Mr. Sevee testified that he considers the monitoring wells around Landfills 3 and 4 to be associated with both landfill units. Likewise, previous investigations came to the same conclusion.

(g) Of the eleven monitoring wells[20] in the vicinity of Landfills 3 and 4, P-2A, P-13, MW-309-B1, MW-410-B1, and MW-506-B1 are currently monitored. Monitoring wells MW-405-B1 and MW-405-01 are down-gradient of Landfills 3 and 4, and provide some historical information.

(h) In addition to concerns about the condition of the existing covers, the Commissioner cites the following groundwater data in support of his argument that Landfills 3 and 4 should be removed.

Sample Point	Last Sampled for MPS Parameter	MPS Exceedence	MPS Standard	Maximum Result for Year Last Sampled*
P-13	2009	Mercury	2 ug/liter	6.3 ug/liter (UF)
P-13	2009	Carbon tetrachloride	3 ug/liter	14 ug/liter
P-13	2001	Chloropicrin	30 ug/liter	9500 ug/liter
MW410-B1	2009	Mercury	2 ug/liter	3.2 ug/liter (UF)
MW410-B1	2009	Carbon tetrachloride	3 ug/liter	22 ug/liter
P-2A	2009	Mercury	2 ug/liter	4.7 ug/liter (UF)
P-2A	2009	Carbon tetrachloride	3 ug/liter	13 ug/liter
MW405-01	2000	Mercury	2 ug/liter	9.5 ug/liter
MW405-B1	1997	Carbon tetrachloride	3 ug/liter	9 ug/liter
MW506-B1	2009	Mercury	2 ug/liter	8.6 ug/liter (UF)
MW506-B1	2009	Carbon tetrachloride	3 ug/liter	34 ug/liter
B309-01	2009	Carbon tetrachloride	3 ug/liter	4.1 ug/liter

* (F) = filtered sample
(UF) = unfiltered sample, low turbidity

(i) Mallinckrodt argues that the mercury data cited by the Commissioner is for unfiltered samples rather than filtered and therefore does not reflect the concentration of mercury dissolved in groundwater.

[20] Monitoring wells listed as being down-gradient of Landfills 3 and 4 include: P-2A, P-3, P-4, P-13, MW-405-B1, MW-405-01, MW-406-B1, MW-406-01, and MW-410-B1. Well MW-309-B1 is located west of Landfill 4, along the ridge toward the Penobscot River. Monitoring well MW-506-B1 was drilled through Landfill 4 and monitors groundwater in the bedrock aquifer directly under Landfill 4.

(j) A comparison of recent filtered and unfiltered samples shows the following concentrations of mercury in groundwater. All of the filtered samples are below the MPS of 2.0 ug/liter.

Sample Point	Date	Filtered Hg ug/liter	Unfiltered Hg ug/liter	Turbidity (NTU)
P-2A	3/23/09	<0.3	<0.3	1.14
P-2A	6/23/09	0.3	4.7	9.1
P-2A	9/9/09	0.9	2.6	1.55
MW 410-B1	3/24/29	<0.3	0.4	1.55
MW 410-B1	6/23/09	<0.3	2.1	1.96
MW 410-B1	9/9/09	0.7	3.2	0.88
MW 506-B1	3/24/09	0.3	4.6	2.6
MW 506-B1	6/23/09	1.5	7.5	2.32
MW 506-B1	9/9/09	<0.3	3.8	1.53

Data from Beane rebuttal testimony, Table 2

(k) A review of time series graphs of dissolved (filtered) mercury indicates that the concentrations of dissolved mercury in P-2A, MW-410-B1 and MW-506-B1, while previously above the MPS, have fluctuated near the MPS since 2005. Dissolved mercury concentrations have declined as follows: P-2A from 57.1 ug/liter on 5/21/01 to 0.9 ug/liter on 9/9/09; MW-410-B1 from 134 ug/liter on 5/21/01to 0.7 ug/liter on 9/9/09; and MW-506-B1 from 143.3 ug/liter on 8/27/01 to <0.3 ug/liter on 9/9/09.

(l) Mallinckrodt acknowledges that groundwater monitoring samples from P-13 detect carbon tetrachloride. Carbon tetrachloride, assumed to be the result of its past disposal in Landfill 4, continues to exceed the 3 ug/l media protection standard beneath and downgradient of the bedrock ridge in MW-506-B1, MW-410-B1, and P-2A.

(m) In support of its position that Landfills 3 and 4 should remain in place, Mallinckrodt argues that the landfills are located on a bedrock ridge (in this case approximately 90 feet above the river) and outside the 500 year floodplain, are stable and in good condition and that the concentration of contaminants in groundwater is decreasing and is currently below MPS for mercury. Mallinckrodt argues that the existing caps on Landfills 3 and 4 are made from Hypalon, a material which can last for hundreds of years, and should a cap fail, it can be replaced with a new geomembrane. Groundwater contaminated by carbon tetrachloride can be addressed with a groundwater extraction and treatment system. Mallinckrodt further argues that excavation of the landfills as ordered by the Commissioner has the potential to mobilize contaminants in the landfills resulting in further contamination of air, land, surface water and ground water. Excavation of the landfills will cause colloidal transport of mercury to the groundwater and delay the time it will take for groundwater at the Site to achieve media protection standards. Mallinckrodt also argues that excavation and off-site disposal of wastes and soils will generate significant mercury emissions to air.

(n) Based on the evidence in the record, and provided additional controls are implemented as provided herein, the Board finds that excavation and off-site disposal of Landfills 3 and 4 is not necessary to protect public health and safety and the environment. The Board is persuaded that the wastes contained in Landfills 3 and 4 can be effectively isolated from the environment so that they will not contribute to groundwater or surface water contamination above the media protection standards. This finding is based on the decreasing concentration of contaminants of concern in groundwater and the location of the landfills on the bedrock ridge where they can be effectively isolated from contact with ground and surface waters. However, if wastes are to remain onsite, it is critical that the wastes be effectively isolated. Evidence in the record indicates that the installation of the existing Hypalon caps is not well documented, the condition of the Hypalon caps after 30 years is unknown, and therefore their ability to prevent infiltration long-term is uncertain. Additionally water has been shown to pond periodically between Landfills 3 and 4, creating the potential for water to infiltrate beneath the edges of the existing landfill cover. The Board finds that in order to be protective of public health and safety and the environment, a single RCRA Subtitle C cap must be constructed over Landfills 3 and 4. A groundwater extraction and treatment system must be installed to prevent groundwater from coming into contact with wastes in Landfill 4 in the future and to collect and treat existing groundwater contaminated with carbon tetrachloride and chloropicrin. Because the wastes will be effectively contained on site, the potential remobilization of contaminants to ground and surface waters and emissions to air associated with excavation of these landfills, which contain an estimated 80,400 tons of material, is avoided. For all these reasons, the Board finds that the management of Landfills 3 and 4 on site in accordance with the additional necessary controls specified herein is protective of public health and safety and the environment.

(4) Landfill 5

(a) Landfill 5 is located on the bedrock ridge to the northeast of Landfill 4. It is approximately 28,000 square feet in size, and was operated from 1978 to 1983. Landfill 5 received approximately 3300 tons of mercury contaminated sludge (K071 and K106), 100 tons of chlorate waste, and 360 gallons of carbon tetrachloride. In 1980, the chlorate plant waste was removed from Landfill 5 and transferred to Landfill 4 prior to capping of Landfill 4. The western portion of Landfill 5 was lined with clay prior to disposal of the brine sludge. Half of the sludge deposited in this landfill was solidified by the "Solidtex" process. The Landfill was closed in 1984 pursuant to a 1983 Board of Environmental Protection Order. Closure of Landfill 5 was performed in the winter of 1983-1984 to comply with deadlines in the order. Condition B of the 1983 Board Order reserves the right of the Commissioner to require changes and additional measures to protect public health and the environment. The landfill has not been certified by the State as RCRA closed.

(b) In arguing for removal of Landfill 5, the Commissioner's witnesses raised significant concerns about the condition of the HDPE cap, including creases and wrinkles due to stiffness of the HDPE during winter installation. David Burns testified that the HDPE used to cap

Landfill 5 was thinner than he would use in the solid waste program for closure of municipal landfills.

(c) With respect to groundwater, the Commissioner argues that no wells were installed directly through the landfill and into the underlying native material below the waste so the extent of contamination is unknown. Waste materials were placed on or very close to bedrock. Leachate from this landfill can travel directly into the bedrock aquifer.

(d) The downgradient wells around Landfill 5 include B-306-B1, B-306-B2, B-306-B3 and B-304-01 and B-304-B1. Of these wells, only B-306-B1 and B-306-B2 are currently monitored for most parameters. With only one downgradient monitoring location (two bedrock wells at this location) currently being monitored and the difficulty of adequately monitoring within bedrock, Commissioner witness Dr. Beane argues there is uncertainty regarding groundwater flow direction and groundwater quality around this landfill.

(e) The Board finds that wells in the B-304 and B-306 clusters have shown elevated levels of chloride suggesting that leaching has occurred. However, a review of a time series graph of dissolved mercury indicates that the concentration of dissolved mercury in B-304-B1 has never exceeded the MPS and was <0.3 ug/liter on 3/23/09. Similarly, the concentration of dissolved mercury in B-306-B2 has never exceeded the MPS and was <0.3 ug/liter on 6/23/09. Carbon tetrachloride has been detected in B-306-B1 and B-306-B2 but levels have been consistently below the MPS since 2004 in B1 and since 2000 in B2. Trichloroethylene and chloropicrin have not been detected in Landfill 5 wells.

(f) As with Landfills 3 and 4, Mallinckrodt argues that Landfill 5 is located on a bedrock ridge (in this case approximately 90 feet above the river) and outside the 500 year floodplain. The landfill cap is made of HDPE which can be expected to last for centuries, excavation of the wastes will only serve to mobilize contaminants and increase emissions to groundwater, surface water and air. Mallinckrodt further argues that there is no evidence that groundwater in this area contains concentrations of the contaminants of concern above the MPS.

(g) Based on the evidence in the record, and provided additional controls are implemented as provided herein, the Board finds that it is not necessary to remove Landfill 5 to protect public health, safety and the environment. Rather, the Board finds that the contaminants can be effectively contained on-site. Although monitoring wells in the vicinity are limited in number, there are no contaminants of concern above the MPS. However, given the circumstances under which the HDPE cap was installed, the lack of documentation on its condition, and the need to ensure that water does not penetrate the cap in the future, the Board finds that a new RCRA Subtitle C cap and revised groundwater monitoring system is necessary to ensure that the remedy is protective of public health and safety and the environment. The Board finds that the management of Landfill 5 on-site in accordance with the additional necessary controls specified herein is protective of public health and safety and the environment.

D. Determination of Depth of Removal of Contaminated Soil under Landfills 1 and 2

The "Woodard & Curran" proposal that was supported by Mallinckrodt at the hearing did not include excavation and offsite disposal of Landfill 2 nor did it include excavation of any original in-place contaminated soil under Landfill 1. The Board finds that the potential for release of adsorbed COCs, such as mercury, from soils under these landfills exists but is not quantified, therefore the time frame over which adsorbed COCs may desorb at concentrations in the groundwater above the MPSs is not known. To the extent that the desorption could take place within the time frame of the operation of the extraction well system, natural precipitation recharge and groundwater flow through the soil under the landfills may naturally reduce the adsorbed concentration of COCs below the level that would produce an exceedence of MPS in groundwater. This might, for example, dictate that a permeable soil cover over the area of Landfill 1 may allow the natural removal of remaining adsorbed COCs that are above levels of concern. On the other hand, if the area formerly occupied by Landfill 1 were to be covered with a relatively impervious cover, concentrations of COCs adsorbed to soils under this area may remain high, requiring perpetual maintenance of the cover system to prevent eventual release through cover deterioration.

Therefore, the Board finds that Mallinckrodt must conduct a study, proposed to and approved by the Department, to determine the approximate distribution of concentrations of mercury, chloropicrin, carbon tetrachloride and trichloroethylene in the soils (both saturated and unsaturated) under Landfills 1 and mercury and carbon tetrachloride under Landfill 2. Mallinckrodt shall conduct column leaching tests such that the adsorption/desorption or other degradation processes of the residual soil contamination beneath the landfills can be quantified, and on this basis the Department shall determine the area and depth of soil excavation beneath the landfills. This determination must be based on modeling natural desorption/degradation processes and other considerations such as the type of final cover to be placed over the area of the landfills after they are excavated.

11. GROUNDWATER REMEDIATION

A. Groundwater Barrier Wall

(1) The Commissioner's Order requires that an improved groundwater extraction and treatment system, including a slurry wall, be installed prior to excavation of landfills and other contaminated media. Dr. Beane testified that the purpose of the slurry wall is to improve the operation of the groundwater extraction system by helping to collect the water as it comes across the Site and to keep river water from flowing into the extraction system. Pulling river water into the treatment system would increase the amount of water treated, decrease the effectiveness of the treatment system, and potentially lead to increased discharges of mercury to the river. The slurry wall would be approximately 800 hundred feet long and would run from approximately well cluster 401 to well cluster 316, and would be 60 feet plus deep.

(2) Upon questioning, Dr. Beane confirmed that a slurry wall must be breached following completion of groundwater remediation, otherwise groundwater would likely back up behind the wall and alter groundwater flows. Dr. Beane acknowledged that breaching a slurry wall and re-establishing natural groundwater flows is problematic. He stated that there may be a way of proceeding without a slurry wall if one could demonstrate that there would be adequate capture of groundwater and that there would be no increase in discharge of mercury to the river.

(3) Mallinckrodt witness Mr. Vaillancourt testified that there may not be enough room to build the slurry wall prior to excavation of Landfill 1. Landfill 1 is located adjacent to the Penobscot River in an area where the topography drops off sharply toward the river. Mr. Vaillancourt recommends a slurry wall as a last resort.

(4) With respect to the requirement in the Commissioner's Order to install a slurry wall in addition to extraction wells prior to excavation of Landfill Area 1 or any other contaminated media at the Site in order to limit infiltration of river water, the Board finds that the slurry wall may not be necessary. Rather, installation of a series of extraction wells positioned to intercept contaminated groundwater flow and sized to limit draw of water from the river should be considered. Mallinckrodt shall model groundwater flow at the Site to determine the appropriate number and location of extraction wells needed to capture contaminated groundwater, and the appropriate location for a slurry wall should one become necessary. The modeling results shall be submitted to the Commissioner for review and approval of the proposed groundwater extraction system. If modeling indicates that a series of extraction wells alone cannot adequately capture contaminated groundwater, the Commissioner may require installation of the slurry wall in addition to the extraction wells. If a slurry wall is installed, provision must be made for breaching the slurry wall at the end of its useful life and re-establishing natural groundwater flows to the extent practicable.

(5) The Board finds that the modified groundwater extraction and treatment system, the design of which is to be determined through modeling, must be in place prior to excavation of wastes at the Site given the likelihood that excavation will mobilize wastes from the landfills and other contaminated soils.

B. Ferry Road Wells

(1) Included in the Commissioner's Order is a requirement on page 35, paragraph 9, that the financial assurance include maintenance of the Ferry Road residential well salt removal systems. The Order on page 33, paragraph 3(r)(b), also requires interception and treatment of contaminated groundwater. The two residential wells[21] on Ferry Road closest to the Mallinckrodt plant have been sampled regularly since the 1995 Site Investigation conducted by

[21] Desanctis and Hazeltine

CDM because of their elevated salt content. Witnesses for the Commissioner and Mallinckrodt disagree on the source of the salt in the residential wells in the Ferry Road area, just south of the Site.

(2) The Commissioner's witness, Dr. Beane, maintained that the salt in the wells is geochemically similar to the salt used in the manufacturing process at the Site and that bedrock fracture patterns as yet undiscovered could account for the transport of not only salt, but potentially mercury and other COCs from the plant area to the Ferry Road wells. Dr. Beane testified that the diagnostic "fingerprint" of bromide/chloride ratio of monitoring wells between Ferry Road and the plant matched that of the residential wells on Ferry Road. He also testified that the salt and brine handling areas in the plant area were the only local sources of salt large enough and perennial enough to sustain the concentrations of salt (or chloride) in the monitoring wells between the Ferry Road wells and the plant area, and that the salt was likely transported to the monitoring wells and the Ferry Road wells by way of bedrock fractures.

(3) John Sevee, testifying for Mallinckrodt, stated that it is his belief that the salt in the Ferry Road wells either came from seawater or road salt, probably from the direction of the PERC facility. He stated that he reviewed the same geochemical data used by Dr. Beane in evaluating possible source material, but arrived at different conclusions. He stated that there have never been detectable levels of mercury in Ferry Road residents' wells, and bedrock samples between the Site and Ferry Road show no elevated levels of mercury. He testified that the Site geology, including the bedrock contours between the Site and Ferry Road residents, is such that groundwater cannot flow to Ferry Road.

(4) Both Dr. Beane and Mr. Sevee agree that groundwater does not flow from the plant area to Ferry Road through surficial deposits; the issue is possible migration through bedrock fractures.

(5) Dr. Beane testified that additional monitoring wells would probably help determine whether the brine handling and salt handling areas of the Site or some other source is responsible for salt contamination of the Ferry Road residential wells.

(6) The Board finds that the information in the record is inconclusive with respect to the source of the salt contamination in the Ferry Road residential wells and that pump tests and/or additional monitoring wells are needed to resolve the matter. However, since the Site has many monitoring wells with very high salt content due to the extensive amount of brine waste created, the evidence is sufficient to require Mallinckrodt to continue to sample and treat the affected residential wells until the matter can be resolved. It is important that the issue be resolved if possible prior to implementation of additional groundwater extraction and treatment systems at the Site which would alter the groundwater regime and make assessment of the source of the salt contamination difficult to impossible. Therefore, Mallinckrodt shall propose a plan, to be approved by the Commissioner, to resolve the outstanding issue surrounding the source of salt contamination in these wells. Mallinckrodt shall continue to maintain water treatment of these wells unless it demonstrates to the Commissioner's satisfaction that the Site is not the source of

contamination of these wells. If further monitoring, testing, or modeling of groundwater flow in this area demonstrates that the Site is the source of the salt contamination in the Ferry Road wells, the groundwater pump and treat system for the Site must be designed to capture this contamination and prevent its migration from the Site.

C. Comprehensive Monitoring Plan

The Commissioner's Order at page 34, paragraph 6 requires the continuation of the existing Comprehensive Monitoring Plan and the submittal of a revised Comprehensive Monitoring Plan. The revised plan would include all media, establish media protection standards for those not yet established, and revise the existing plan to better monitor the Site. Ms. Ladner testified that this type of monitoring is typical of sites with contamination and is required at hazardous waste sites with contamination including groundwater contamination. Mallinckrodt did not specifically object to this provision of the Commissioner's Order.

In light of the information developed as part of the Board hearing process and in light of the proposed areas and types of remediation required by the Commissioner's Order as modified by this Decision, including removal of Landfills 1 and 2 and provisions to provide for management of Landfills 3 through 5 on-site, the Board finds that a comprehensive review of all media monitoring needs is required.

Mallinckrodt shall propose, for Department review and approval, a revised Comprehensive Monitoring Plan for all media to ensure that short-term impacts are adequately monitored during remediation activities and that progress toward long-term goals for air quality, surface water quality, groundwater quality, and site-resident biota can be reliably measured. Mallinckrodt shall set forth Data Quality Objectives and programs to meet these objectives in a final Quality Assurance Project Plan (QAPP) to be used during remediation and beyond.

In particular, with respect to groundwater monitoring, the program shall ensure that the short-term groundwater impacts are monitored during and immediately after disturbing landfill areas, the plant area, the northwest ridge contaminated soil area, and any areas that may be affected if a slurry wall is constructed. The excavation of soil in areas of contaminated soil or groundwater can expose underlying soils and aquifer units to new geochemical states, change precipitation recharge, and change groundwater flow direction. Water quality monitoring wells designed to detect any impact from any short-term landfill disturbance should be located no farther than 100 feet from the edge of the waste material in the landfill. Short-term monitoring that is not required for long-term monitoring should be discontinued as it becomes evident that no changes have occurred that have caused the MPSs to be exceeded, and that no unexpected increases in COCs have occurred that require continued monitoring.

In addition to monitoring water quality in short-term impacted areas, water level measurements, particularly in multi-level well clusters, are needed to monitor groundwater regime changes that occur as part of remediation.

With respect to the extraction well system that will be designed and constructed near the western edge of the Site, non-pumping upgradient and downgradient monitoring wells should be installed to measure drawdown and changes in water quality as a result of pumping.

With respect to the operation of the extraction well systems along both the western edge of the Site and in the area of Landfills 3 through 5, planned shut-offs of the wells should occur for brief periods at least annually to determine the extent to which the "rebound" water quality effects of rewetting portions of the aquifer that will be dewatered by the wells are occurring. During this time, annual maintenance of the well (such as well rejuvenation, if required) should also be scheduled. This cycling of the wells will aid in understanding the adsorption/desorption behavior of the contaminants that are being captured in the extraction well systems. The maximum permissible length of time for these planned outages should be determined through computer simulation modeling using the new groundwater model that is required by this Decision. The model should be used to estimate the amount of time a well field can be shut off without being able to capture contaminants that would otherwise escape it during the shut-off period.

The monitoring well network for Landfills 3 through 5 shall be redesigned to reflect the fact that these landfills will remain on-site with new RCRA Subtitle C caps and a groundwater collection system, and to make it more reliable in its ability to identify potential releases from any specific individual landfill. Additional deep bedrock wells extending to approximately sea level should be part of any well cluster in that area to provide better definition of vertical gradients and a better chance of monitoring the possible presence of a Dense Non-aqueous Phase Liquid (DNAPL) such as carbon tetrachloride.

It is important to acquire baseline data for all proposed long-term monitoring locations. The groundwater model required to be developed by this Decision should be used to simulate the state of the Site in the long-term conditions under both extraction well pumping and non-pumping modes. The position of long-term monitoring wells should be chosen based on the results of the groundwater simulation model, taking into account the historical distribution of contamination on the Site.

The monitoring plan should be reviewed by the Department annually to determine if additional wells are needed or if wells can be eliminated. Wells that no longer provide useful information or are not needed to determine operational efficiency or to determine compliance should be abandoned properly using Department-approved procedures. The use of monitoring wells should not be extended indefinitely simply because they have been monitored in the past.

Monitoring well performance should be measured annually. Wells in which the drawdown under a fixed rate of pumping has increased significantly since the previous year or wells that produce excessive turbidity should be re-developed and, if that is unsuccessful in rehabilitating the well, the well should be abandoned and a new well should be installed near the abandoned well that will accomplish the same sampling objective as the abandoned well.

D. Groundwater Collection and Wastewater Treatment

The Commissioner's Order at pages 34-35, paragraph 7, requires the continued operation of the existing groundwater collection systems and wastewater treatment plant. The provision also includes shut down criteria for when the wastewater treatment plant could be terminated. Ms. Ladner testified that the requirement for treatment of contaminated waters, including language for termination of the system, is typical of remediation orders. Mallinckrodt has not objected to the need for the collection and treatment of groundwater or the operation of a wastewater treatment plant to treat contamination. It has not objected to the shutdown criteria. Mallinckrodt has proposed to build a new wastewater treatment plant on-site.

The requirement for continued operation of the wastewater treatment plant and groundwater collection systems is upheld; however, given that mercury contaminated wastes will remain on-site in Landfills 3, 4 and 5, and possibly elsewhere as discussed in Findings of Fact 10(C) and 10(D) of this Decision, the Board finds that the groundwater collection and treatment system must be revised. Mallinckrodt shall submit, for Department review and approval, a comprehensive groundwater collection and treatment system plan incorporating requirements for groundwater collection at the western end of the Site, in the vicinity of Landfills 2 through 5, and any groundwater determined to be migrating to the Ferry Road residential wells. The groundwater extraction and treatment system must be designed to address mercury contamination as well as organic contaminants including carbon tetrachloride which evidence indicates has leaked and may continue to leach from wastes in the vicinity of Landfill 4. The water collected from the areas around Landfills 3, 4 and 5 cannot be used to dilute concentrations of mercury in treated discharge water. Rather, the water from this area must be monitored for compliance with the media protection standards prior to being combined with groundwater collected from the vicinity of Landfill Area 1. The Board finds that the Department will determine when the system may be shut down, and the level of groundwater monitoring required to determine whether the system needs to be re-activated to address contaminated groundwater.

E. Wastewater Discharge

In his testimony, Dr. Beane expressed concern that the groundwater extraction and treatment system if not designed properly could draw excessive amounts of uncontaminated water from the river into the system, thereby diluting the level of contaminants in the water going to the wastewater treatment facility. In such instances, the wastewater discharge could meet the concentration limit for the discharge but still discharge excessive amounts of mercury to the river. The Board shares this concern. Therefore, discharge limits should be established based upon both concentration of contaminant and the mass of contaminant. Wastewater discharges shall be monitored in such a fashion as to measure continuously the liquid volume rate of discharge, and at least once daily the amount of mercury and other parameters with set discharge limits. The wastewater discharge limits should be set in terms of both concentration and maximum daily and monthly average mass discharge limit for mercury, carbon tetrachloride, trichloroethylene, chloropicrin and other contaminants of concern as the Department deems necessary.

Additionally, since this Decision requires collection and treatment of contaminated groundwater from the Landfill 4 area, the groundwater from the Landfill 4 area shall not be co-mingled with the groundwater collected from the Landfill 1 area prior to determination of compliance with media protection standards.

F. Meteorological Station

At the hearing, the adequacy of meteorological data obtained from the Bangor International Airport was challenged by Mallinckrodt. While not deciding that matter here, the Board finds that, given the extent of remedial action activities required at the Site, it is necessary to have accurate site-specific information to assist with monitoring requirements during remediation. Therefore, the Board finds that a continuously-recording meteorological station must be established at the Site. It must begin collecting data before active remediation begins on the Site and shall continue until all earthwork activities at the Site have ceased. The station shall record, at a minimum, wind speed and direction, precipitation, relative humidity, air temperature, and such other air quality parameters that the Department deems necessary to document conditions during site earthwork activities.

12. REMEDIAL ACTION REQUIREMENTS GENERALLY NOT DISPUTED

A. Facility Dismantling

The Commissioner's Order on pages 30 and 31, paragraphs 1 and 2 requires the continued dismantling of structures on the property and the submittal of a Facility Dismantling Plan to accomplish this task. Ms. Ladner testified that dismantling is required to remove all structures that pose a hazard at the Site or that overlie contaminated media. She testified that it is necessary to remove the structures and equipment in order to properly clean up the Site. Mallinckrodt does not object to most of the facility dismantling activities required by the Order. Mallinckrodt's only objection is to page 30, paragraph 2(a)(iv) of the Commissioner's Order that requires "removal of piping, tanks, equipment, foundations and other structure not to be used at the conclusion of the remediation (unless the Town of Orrington requests that such structures remain and DEP concurs)." Mallinckrodt argues that it is unnecessary and beyond the Commissioner's authority to remove such equipment and structures irrespective of whether such items are contaminated.

The Board understands the Commissioner's testimony to mean that the removal of the majority of structures at the Site is necessary in order to address hazards and contamination at the Site. The Board finds that it is likely that most structures will need to be removed in order to remediate the Site. However, to the extent there may be structures located in uncontaminated portions of the property that are demonstrated to be free of contamination and whose presence would not hinder remedial activities, Mallinckrodt is not required to remove the structures solely because the Town would like the structures removed. Otherwise, the Board upholds the Facility Dismantling Plan required by the Commissioner's

Order, with the exception of the deadline for submittal and specific timeframes therein, as necessary to address a danger or likelihood of danger to the public health and safety and the environment.[22]

B. Corrective Measures Implementation Plan

The Commissioner's Order on pages 32 and 33, paragraph 3 includes a provision for the submittal of a Corrective Measures Implementation Plan for, among other things, the removal of all solid media over the media protection standards. Ms. Ladner testified that an implementation plan is typical of orders at contaminated sites. Mallinckrodt did not object to the need for a Corrective Measures Implementation Plan. Mallinckrodt does however object to the deadline for submittal and certain of the listed requirements including:

- the portion of the requirement in (3)(a) that involves the removal of Landfills 2 through 5 from the Site. [see also mention of removal of landfills in (3h), (3i), and (3r)]; and
- construction of a groundwater cutoff barrier as an initial matter, rather than as a last resort (3e).

With the exception of the deadline for submittal, the requirement to remove Landfills 3, 4 and 5, and the requirement to install the groundwater barrier cutoff wall as an initial matter which is discussed in Finding of Fact 11(A) of this Decision, the requirement for a Corrective Measures Implementation Plan is upheld as necessary to address a danger or likelihood of danger to public health and safety and the environment.

C. Sediment Prevention Plan

The Commissioner's Order on page 33, paragraph 5 requires a Sediment Prevention Plan for the Site. Ms. Ladner testified that the existing Sediment Control Prevention Plan must be continued as modified to take into account any remedial actions. She further testified that most if not all construction projects or certainly those with contaminated soils would reasonably contain a plan for control of erosion. Ms. Ladner also testified about the mercury contamination in soil eroding on the property and ending up in the catch basins onsite. She discussed a piece of the Sediment Prevention Plan that prevents this eroding soil from leaving the Site through the use of sediment socks in the catch basins. The Board finds that it is necessary that these measures be continued and improved as active remediation begins. Mallinckrodt has not objected to this provision of the Commissioner's Order. However, Mallinckrodt has objected to five words of an erosion control standard as part of the media protection standards, a part of the soil narrative standards. Mallinckrodt's objections are discussed in Finding of Fact 6(D) under Media Protection Standards. The requirement for modification of the Sediment Prevention Plan, except for the deadline for submittal of the modified plan, is upheld as necessary to address a danger or likelihood of danger to public health and safety and the environment.

[22] With this and certain other plans required by the Commissioner's Order, the Board understands that the deadlines for submittal must be reset. New deadlines are set at the end of this Decision.

D. Restore Southerly Stream

The Commissioner's Order on pages 34-35, paragraph 7, requires the removal of the Southerly Stream Interceptor Trench (located south of the plant area near the rail spur) and the restoration of the Southerly Stream once the Commissioner has determined the groundwater collection system is no longer needed. Dr. Beane and Commissioner Littell testified regarding the requirement to restore this stream. Commissioner Littell also discussed the need to protect this classified body of water and to restore it so that humans and wildlife may again utilize it. Mallinckrodt has not objected to this provision to restore the Southerly Stream. The Board finds that Southerly Stream must be restored across the Site as part of the overall remediation of the Site and upholds this requirement as necessary to address a danger or likelihood of danger to the public health and safety and the environment.

E. Sediment and Soil Removal

Evidence in the record shows that there are an estimated 1000 pounds of mercury in Southern Cove. The Commissioner's Order on page 32, paragraph 3(a) and page 33, paragraph 3(r)(a) requires the removal of sediments in the Penobscot River Southern Cove that are above the media protection standards. The Commissioner's Order in Attachments 2 and 3 describes the media protection standards for these sediments as both a numeric standard and a narrative standard. The Order requires the removal of hot spot areas of the cove irrespective of the application of the sediment numeric standard. Mallinckrodt has not objected to this provision of the Order. There are, however, some apparent inconsistencies in how Mallinckrodt witnesses described what would be done with these sediments. To clarify any possible confusion, the Board finds that identified hot spots must be removed. The Board upholds the requirements for dredging of Southern Cove as necessary to address a danger or likelihood of danger to the public health and safety and the environment.

The Commissioner's Order on page 32, paragraph 3(a) and page 33, paragraph 3(r) requires the removal of all solid media including soils that exceed the media protection standards. The Board understands that this includes the plant area soils, cell building soils, retort and old retort building soils, sediments both from the Southerly Stream and the Northern Drainage Ditch, landfill ridge soils, as well as any other area on-site of soils in excess of the media protection standards. Except as provided for in Findings of Fact 10(C) and 10(D) of this Decision, the Board finds this requirement is necessary to address a danger or likelihood of danger to public health and safety and the environment.

F. Industrial Sewer Removal

The Commissioner's Order on page 32, paragraph 3(d) requires the removal of the industrial sewer. Ms. Ladner testified that these old sewer pipes, bedding, and connections allow contaminated surface waste, groundwater, and residues from the old sewer system to flow untreated to the Penobscot River. She states that this old system bypasses the existing interim groundwater collection system. This sewer will continue to provide ongoing pathways for discharges of contaminants as long as the system exists. Ms.

Ladner further states that the best long-term solution to this problem is the removal of the sewer system. Dr. Beane testified that mercury-contaminated groundwater leaks into the sewer and drains to the discharge weir, bypassing the groundwater treatment system, and that this has been the cause of violations of Mallinckrodt's wastewater discharge license for mercury content. Dr. Beane further testified that the industrial sewer and the surrounding backfill may contain significant mercury. The industrial sewer should be removed followed by backfilling with compacted fine grain soils to limit groundwater flow through these excavations. While initially proposing to close the industrial sewer in place, Mallinckrodt now agrees that the sewer system and associated contamination should be removed from the Site. Mr. Vaillancourt testified that CDM, Mallinckrodt's former consultant, thought plugging the sewer was adequate. However when Woodard and Curran examined the data for Mallinckrodt, they agreed with the Commissioner that the industrial sewer should be removed. The Board finds that removal of the industrial sewer is necessary to address a danger or likelihood of danger to public health and safety and the environment and upholds the requirement.

G. Site Security

The Commissioner's Order on page 35, paragraph 8, requires Mallinckrodt to secure the Site and provide an on-site contact person. Ms. Ladner testified that a number of provisions that are typically included in orders addressing contaminated sites were also included in the Mallinckrodt Order. One of the provisions that Ms. Ladner mentions is the requirement for providing site security. Mallinckrodt has not objected to this provision. The Board finds that site security is necessary to address a danger or likelihood of danger to public health and safety and the environment and upholds the requirement.

H. Reporting

Ms. Ladner testified that a number of provisions are included in the Commissioner's Order that are typical of orders for contaminated sites. One of those provisions is contained on pages 36-37, paragraph 17, which requires monthly progress reports during the dismantling and corrective measures implementation phases. The Board finds that this type of reporting by the responsible party to the DEP is typical. Mallinckrodt did not object to these progress reports. The Board finds that the reporting requirement is necessary for effective implementation of the remedy and upholds the requirement as necessary to address a danger or likelihood of danger to the public health and safety and the environment.

I. Additional Work

Ms. Ladner testified that the Commissioner's Order includes provisions included in other orders addressing contaminated sites. One such item is a provision that reserves the right of DEP to require additional work. The Commissioner's Order on page 37, paragraph 18 contains a provision that authorizes DEP to require such other actions at the Site if necessary. In its testimony, Mallinckrodt offered no objection to this provision. The Board finds that as remediation proceeds, circumstances will undoubtedly arise as more information is obtained about the nature and extent of contamination at the

Site which will need to be addressed. The Board therefore upholds this provision as necessary to address a danger or likelihood of danger to public health and safety and the environment.

13. SCHEDULE FOR IMPLEMENTATION OF REMEDIAL ACTIONS

During the hearing, there was considerable debate regarding the time required to implement the Commissioner's ordered remedy and Mallinckrodt's proposed remedy. While not a factor in determining the remedy necessary for the Site, the Board finds that it is important to implement the requirements of this Decision as expeditiously as possible to reduce the risks posed by the Site. Accordingly, the Board finds that implementation of the remedy should be conducted in stages with tasks undertaken in a logical sequence that maximizes environmental benefit. Work plans for various tasks should be prepared in separate documents with the higher priority tasks given the highest priority for review and implementation so that higher priority tasks can be initiated prior to development and approval of the work plans for other, lower priority tasks. A suggested approach is set forth in Appendix B to this Decision document. The Department shall determine the appropriate sequence of tasks and modify the sequence as circumstances warrant.

14. ADMINISTRATIVE REQUIREMENTS IN DISPUTE

A. Financial Assurance

The Commissioner's Order at page 35, paragraph 9, requires financial assurance in the form of a trust fund, the terms and amount of which are acceptable to the Department. The Board finds that financial assurance is necessary to ensure implementation of both near-term remedial activities and future, long-term operation and maintenance costs associated with clean-up of the Site.

While different types of financial assurance are possible, the Commissioner argues that a trust fund is necessary for this Site. The Commissioner testified that one former owner of the chlor-alkali plant went bankrupt and another dissolved. The Commissioner also testified that Mallinckrodt has undergone significant corporate reorganization in recent years, and United States Surgical Corporation has reportedly transferred its environmental liabilities to Mallinckrodt LLC. There was also testimony that we are in an economic climate where very large corporations can quickly cease to exist. The Commissioner argued that there is no assurance that Mallinckrodt (meaning both United States Surgical Corporation and Mallinckrodt LLC) will exist for as long as operation and maintenance must continue at this Site into the future.

The Commissioner's witnesses testified that other financial assurance methods such as letters of credit have not always been renewed at the end of their term, which could leave the State with a large unfunded liability. The Town also testified about the need for a robust financial assurance provision.

Mallinckrodt objects to the requirement to establish a trust fund to finance the costs of both the near-term remedial activities and the long-term operation and maintenance costs associated with the required

remedy. Mallinckrodt also challenges the Commissioner's authority to require financial assurance in the form of a trust fund. However, Mallinckrodt testified that it is willing to establish a trust fund for the long-term operation and maintenance costs, while using a letter of credit for near-term remedial activities.

The Board finds that the Commissioner's authority to issue an Uncontrolled Hazardous Substance Sites Order includes authority to require necessary financial assurance, including establishment of a trust fund, to ensure that the ordered remedial actions are carried out.

The Board finds that a letter of credit is not sufficient to ensure that the necessary funds will be available to remediate this Site. However, the Board finds that the requirement to establish a trust fund to finance the entire remediation is not necessarily warranted. Other forms of financial assurance, such as the use of bonds which may be discharged as remedial action obligations are met, should be used to finance near-term remedial activities. Given that wastes will remain on-site to be managed for decades, the Board finds that a trust fund is the appropriate mechanism for financing the long-term operation and maintenance requirements for the Site. The Board upholds the financial assurance requirements of the Commissioner's Order, as modified herein, as necessary to address a danger or likelihood of danger to public health and safety and the environment.

B. Independent Oversight Inspector

The Commissioner's Order at page 37, paragraph 22 requires the hiring of an independent inspector under the direction and supervision of the DEP but paid for by Mallinckrodt. Ms. Ladner testified that the DEP will not have the resources to establish a resident inspector at all times, and given the magnitude of the construction project, the need for careful monitoring of air emissions, and community concerns, the Commissioner included this provision for an independent inspector reporting directly to DEP. She testified that the DEP believes this will give the State the necessary oversight and the public the comfort that operations are closely monitored. Mallinckrodt argued in its Notice of Appeal that the Commissioner lacks statutory authority to require Mallinckrodt to conduct all its work under the oversight of a third party inspector.

The Board notes that the Department has required an independent oversight inspector for sites in Maine including at this Site. In 1998, a Consent Decree and Order between the DEP and HoltraChem included a provision for the hiring of various professionals. In 1997 an Administrative Consent Agreement and Enforcement Order between DEP and HoltraChem required HoltraChem to hire an independent engineer to conduct an on-site evaluation of the risks posed by tanks and piping at the facility. The engineer was to make recommendations to HoltraChem and the DEP and provide a report. HoltraChem was then to provide the DEP with a plan and schedule to address the engineer's recommendations. Mr. Hyland testified about a project going on at the time of the hearing in the City of Bangor where the DEP had third-party oversight at a coal tar site. He further stated that there were many consent orders for clean-up that included third-party oversight.

The Board finds the requirement for an independent oversight inspector is necessary to address a danger or likelihood of danger to the public health and safety and the environment under the circumstances of this case, and therefore to be within the Commissioner's authority under the Uncontrolled Sites Law. The Board further finds that the Commissioner's authority under the Uncontrolled Sites Law includes not only the authority to order necessary remediation, but also the implied authority to impose reasonable terms and conditions to ensure that the required remediation is completed safely, responsibly, and in a manner that does not jeopardize public resources. The requirement of an independent oversight inspector is such a reasonable condition and is upheld as necessary to address a danger or likelihood of danger to public health and safety and the environment.

C. Indemnification and Hold Harmless Provisions

The Commissioner's Order on page 39, paragraph 33, contains a requirement that the DEP shall be indemnified and held harmless from any and all claims or causes of action against DEP arising from or on account of acts or omissions of Mallinckrodt (including its employees and contractors) in carrying out the activities pursuant to the Order. Mallinckrodt objects to the hold harmless provision of the Order stating that the provision is unnecessary, unwarranted, and not authorized under the law. Ms. Zeigler states that Mallinckrodt is unaware of any instance where this provision has been used in other orders under the Uncontrolled Sites Law. The Board notes that the consent decree for the George West site signed in 2000 includes a hold harmless provision that is not unlike the provision in the Commissioner's Order issued to Mallinckrodt. As with the requirement of an independent oversight inspector discussed immediately above, the Board finds that the indemnification and hold harmless provisions are reasonable conditions necessary to ensure the required remediation is performed responsibly and at no risk of liability to the public, and as such are within the scope of the Commissioner's authority under the Uncontrolled Sites Law. The indemnification and hold harmless provisions are upheld as necessary to address a danger or likelihood of danger to public health and safety and the environment.

D. Insurance

The Commissioner's Order on pages 39-40, paragraph 34 requires that Mallinckrodt obtain or require its contractors to obtain insurance policies providing certain minimum coverage and requires that the State of Maine be named as an additional insured. Ms. Ladner testified that the Commissioner's Order requires standard liability insurance typical of insurance required for other remedial situations in Maine. While Mallinckrodt appeared to offer no objection to the amounts of coverage, Mallinckrodt did argue in its Notice of Appeal that the Commissioner lacks statutory authority to require insurance and to require that the State be named as an additional insured. Here, where a complex and long-term clean-up will be required, the Board finds that these insurance provisions are reasonable and necessary to ensure the required remediation is performed responsibly and at no risk of liability to the public, and as such are within the scope of the Commissioner's authority under the Uncontrolled Sites Law. The Board further finds that the amounts of insurance requested are reasonable and upholds this requirement as necessary to address a danger or likelihood of danger to public health and safety and the environment.

E. Attendance Required at Public Meetings

The Commissioner's Order requires at page 38, paragraph 27 that if requested by DEP, Mallinckrodt will attend and participate in any public meeting to inform the public about the condition of the Site or the work being performed at the Site. Ms. Zeigler testified that Mallinckrodt objected to being required to participate in public meetings to inform the public of their actions. Mallinckrodt also argued in its Notice of Appeal that the Commissioner lacks statutory authority to require Mallinckrodt to produce a representative at any public meeting. Ms. Ladner testified that it is important that responsible parties attend public meetings to inform the public of their actions. Mr. Hyland testified that there are other agreements where responsible parties are required to participate in public meetings or public hearings. The Board finds that Mallinckrodt's attendance at public meetings is necessary to the proper functioning of the remedial project, and therefore this requirement is within the Commissioner's authority under the Uncontrolled Sites Law. This attendance requirement is upheld as necessary to address a danger or likelihood of danger to public health and safety and the environment.

CONCLUSIONS

BASED on the above Findings of Fact, the Board makes the following conclusions:

1. The persons to whom the Commissioner's Order is directed, United States Surgical Corporation and Mallinckrodt LLC, are responsible parties under the Uncontrolled Sites Law.

2. Hazardous substances, including but not limited to mercury, carbon tetrachloride, and trichloroethylene, are or were handled or otherwise came to be located at the former HoltraChem Site in Orrington, Maine.

3. The hazardous substances at the Site may create a danger to the public health, to the safety of any person or to the environment.

4. The ordered remedial action, as modified by this Decision, is necessary to terminate or mitigate the danger or likelihood of danger posed by the hazardous substances at the Site to the public health, to the safety of any person or to the environment.

UNITED STATES SURGICAL CORPORATION and MALLINCKRODT LLC	)	**APPEAL OF DESIGNATION OF UNCONTROLLED HAZARDOUS SUBSTANCE SITE AND ORDER**
	)	
ORRINGTON, PENOBSCOT COUNTY, MAINE PROCEEDING UNDER 38 M.R.S.A. § 1365	)	**FINDINGS OF FACT AND ORDER ON APPEAL**

DECISION

THEREFORE, the Board DENIES the appeals of UNITED STATES SURGICAL CORPORATION and MALLINCKRODT LLC and UPHOLDS and incorporates in its entirety the Commissioner's November 24, 2008 Order designating the Site an Uncontrolled Hazardous Substance Site and ordering remediation of the Site with the following MODIFICATIONS:

1. Paragraph 1 on page 30 of the Commissioner's Order requiring Mallinckrodt to continue with implementation of the dismantling plan as previously approved by the Department is modified as set forth in Paragraph 2 below.

2. The requirement for the Facility Dismantling Plan on page 30, Paragraph 2(a)(iv) of the Commissioner's Order requiring Mallinckrodt to remove all structures not to be used at the conclusion of the remediation unless the Town of Orrington requests that the structures remain and DEP concurs is modified to read as follows: "removal of piping, tanks, equipment, foundations and other structures not to be used at the conclusion of the remediation (unless the Town of Orrington requests that such structures remain and the DEP concurs); except that Mallinckrodt is not required to remove structures located on uncontaminated portions of the property that are demonstrated to be free of contamination and whose presence would not hinder remedial activities." The revised deadline for submission of the Facility Dismantling Plan is set forth in Paragraph 8 below.

3. The requirement for the Corrective Measures Implementation Plan on page 32 of the Commissioner's Order is modified as follows:

   (a) Paragraph 3(a) is modified to remove the reference to removal of all five landfills. The requirement is revised to read: "Excavation of 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 sludges and other mercury contaminated material from Landfill Area 1 and Landfill 2, except that the depth to which contaminated soil under Landfills 1 and 2 will be removed shall be determined as specified in Finding of Fact 10(D) of this Decision.

   (b) Paragraph 3(e) is modified to reflect the Board's finding that the groundwater cutoff barrier wall will only be constructed if necessary. The requirement is revised to read: "Provisions for extraction of contaminated groundwater and the treatment of these groundwaters in a treatment system; including provisions for construction of a groundwater cutoff barrier wall, if needed, downgradient of the plant area and Landfill Area 1."

   (c) Paragraph 3(h) is modified to remove the reference to removal of all of the landfills. The requirement is revised to read: "Proceeding cautiously with removal of Landfill 2 initially, and

thereafter Landfill 1, including increased air monitoring and analysis of landfill materials as the landfills are opened."

(d) Paragraph 3(i) is modified to remove the reference to removal of Landfill 4. The requirement is modified to read: "Abandonment of monitoring well MW-506-B1 by tremie grouting before construction of the RCRA Subtitle C cap."

(e) Paragraph 3(p) is modified to read: "Proposing a detailed schedule for phases of the implementation plan as set forth in Paragraph 8 below."

(f) Paragraph 3(r)(d) is modified to read: "removal of Landfills 1 and 2."

(g) A new paragraph 3(s) is added to address construction of the RCRA Subtitle C caps over Landfills 3, 4, and 5 to read: "A plan for construction of a single RCRA Subtitle C cap over Landfills 3 and 4, and a RCRA Subtitle C cap over Landfill 5."

(h) A new paragraph 3(t) is added to address groundwater modeling to read: "Develop and implement a work plan for a comprehensive calibrated 3-dimensional groundwater model for the Site to evaluate: (a) the need for a slurry wall in the surficial materials of the western part of the Site, (b) the optimum arrangement of groundwater extraction wells along the western boundary of the Site, (c) the optimum arrangement of groundwater extraction wells around Landfills 3-5 to capture residual carbon tetrachloride, (d) possible groundwater dewatering schemes should they be required to excavate contaminated materials from below the water table, and (e) the possible sources of the salt in the Ferry Road wells."

(i) A new paragraph 3(u) is added to address excavation of soils beneath Landfills 1 and 2 as set forth in Findings of Fact 10(C) and 10(D) of this Decision to read: "Develop and implement a work plan for a soils investigation beneath Landfills 1 and 2, followed by laboratory TCLP column tests to determine the capacity of soils under Landfill 1 to leach mercury, chloropicrin, carbon tetrachloride, and trichloroethylene in concentrations that would exceed the MPS; and the capacity of soils under Landfill 2 to leach mercury and carbon tetrachloride in concentrations that would exceed the MPS."

4. The requirement on page 34, Paragraph 6 of the Commissioner's Order regarding the Comprehensive Monitoring Plan is modified to read: "Mallinckrodt shall propose, for Department review and approval, a revised Comprehensive Monitoring Plan for all media to ensure that short-term impacts are adequately monitored during remediation activities and that progress toward long-term goals for air quality, surface water quality, groundwater quality, and site-resident biota can be reliably measured. As set forth in Finding of Fact 10(B)(1) of this Decision, unfiltered samples must be analyzed periodically in conjunction with filtered samples to determine mercury concentrations in groundwater. Mallinckrodt shall set forth Data Quality Objectives and programs to meet these

objectives in a final Quality Assurance Project Plan (QAPP) to be used during remediation and beyond. The 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 format;
(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 throughout the area of contamination point of compliance for groundwater.

5. The requirement on page 34-35, Paragraph 7 of the Commissioner's Order regarding continued operation of the wastewater treatment plant and groundwater collection systems shall be modified to incorporate the requirements set forth in Finding of Fact 11 Groundwater Remediation of this Decision.

6. The requirement on page 35, Paragraph 9 of the Commissioner's Order requiring establishment of a trust fund to provide financial assurance is modified to read: "Mallinckrodt shall, within three months of this decision, obtain surety bonds guaranteeing payment and/or performance of remedial activities required by this Order, the terms and amounts of which are acceptable to the Department, except that Mallinckrodt shall establish a trust fund to provide financial assurance for long-term operations and maintenance of the wastewater treatment plant, groundwater collection system, groundwater monitoring, maintenance of Ferry Road filtration systems, and the periodic replacement of RCRA Subtitle C caps over Landfills 3, 4 and 5 and cover systems over any contaminated soils remaining on-site after removal of Landfills 1 and 2 and plant area soils."

7. The Commissioner during the course of the appeal proceeding pointed out a few minor errors in the Commissioner's Order. These parts of the Order are modified as follows:

   (a) In Appendix 2 (on page 59) and Appendix 3 (on pages 62, 64, 66 and 71), the Media Protection Standard for 1,1,1 trichloroethane should be 200 ug/L and not 0.2 ug/L.

   (b) In Appendix 2 (on page 57), the maximum value for bromodichloromethane should be 54 ug/L instead of 55 ug/L for MW501-01, and the date should be July 22, 1998 instead of July 1, 2003.

8. Prior to the filing of Mallinckrodt's appeal, the Commissioner agreed to stay any compliance deadline in the Order until the Board issues a final decision on the appeal. The parties recognized

that the Board would need to reset the deadlines. The deadlines in the section of the Commissioner's Order starting on page 30 are hereby modified as follows:

(a) In Paragraph No. 2 (on page 30), the deadline for submitting a Facility Dismantling Plan is changed from "By December 30, 2008" to "Within four (4) months of the date of the Board's decision on Mallinckrodt's appeal or such other time as may be specified by the Department as part of a phased approach to implementing the remedy required by the Board's Decision."

(b) In Paragraph No. 3 (on page 32), the deadline for submitting a single, comprehensive Corrective Measures Implementation Plan is deleted. The Corrective Measures Implementation Plan shall be divided into phases so that work may begin on higher priority tasks as suggested in Appendix B before final approval of the entire plan. The deadline for submission of the work plan for the first phase of the implementation plan is "within ninety (90) days of the date of the Board's decision on Mallinckrodt's appeal."

(c) In Paragraph No. 3(p) (on page 33), the start date for the phases of the implementation plan of no later than "May 30, 2009" is deleted. Work on specific discrete portions of the remedy shall commence within thirty (30) days of the Department's final approval of the work plan or such other time as may be determined by the Department."

(d) In Paragraph No. 5 (on page 33), the deadline for submitting a modified Sediment Prevention Plan is changed from "by March 1, 2009" to "within ninety (90) days of the date of the Board's decision on Mallinckrodt's appeal."

(e) In Paragraph No. 6 (on page 34), the deadline for submitting a revised Comprehensive Monitoring Plan is changed from "by January 31, 2009" to "within ninety (90) days of the date of the Board's decision on Mallinckrodt's appeal."

(f) In Paragraph No. 9 (on page 35), the deadline for establishing financial assurance, the terms and amount of which are acceptable to the Department, is changed from "by December 31, 2008" to "within ninety (90) days of the date of the Board's decision on Mallinckrodt's appeal."

(i) In Paragraph No. 23 (on page 38), the deadline for Mallinckrodt to notify the Department in writing of its designated Project Coordinator is changed from "On or before the November 30, 2008" to "Within thirty (30) days of the date of the Board's decision on Mallinckrodt's appeal."

(j) In Paragraph No. 34 (on page 39), the deadline for obtaining insurance is changed from "Within thirty (30) days of the date of this Compliance Order" to "No later than two (2) weeks before any on-site work."

DONE AND DATED AT AUGUSTA, MAINE THIS 19th DAY OF August, 2010.

BOARD OF ENVIRONMENTAL PROTECTION

BY: Susan M. Lessard
SUSAN M. LESSARD, Chair

Notice of Appeal Rights

The decision of the Board of Environmental Protection may be appealed to the Superior Court in accordance with 38 M.R.S.A. § 1365(4), the Maine Administrative Procedure Act, 5 M.R.S.A. § 11001 *et seq.*, and Maine Rule of Civil Procedure 80C. A party's appeal must be filed with the Superior Court within 30 days of receipt of notice of the Board's decision. A nonparty's appeal must be filed within 40 days of the date the decision was rendered. Failure to file a timely appeal will result in the Board's decision becoming final. The Maine Administrative Procedure Act, Department of Environmental Protection statutes governing a particular matter and the Maine Rules of Civil Procedure must be consulted for the substantive and procedural details applicable to judicial appeals.

Appendix A: Summary of Procedural History

1. First Procedural Order. In the First Procedural Order dated (January 16, 2009), the Presiding Officer ruled on Mallinckrodt's request for an administrative stay of the appeal pending the outcome of Mallinckrodt's litigation against the Commissioner in the U.S. District Court for the District of Maine.[23] The Presiding Officer granted a stay of its proceedings only until the U.S. District Court ruled on the Commissioner's motion to dismiss Mallinckrodt's complaint.[24]

2. Second Procedural Order. In the Second Procedural Order (dated May 29, 2009), the Presiding Officer lifted the administrative stay of the Board's proceedings in response to the U.S. District Court's granting of the Commissioner's motion to dismiss Mallinckrodt's complaint.[25] The Presiding Officer also found that the appeal proceeding is an adjudicatory proceeding under the Maine Administrative Procedure Act (Maine APA), and the order set the deadline for motions to intervene and objections.

3. Third Procedural Order. The Third Procedural Order (dated June 19, 2009) documented the Board's actions on the petitions to intervene, as described in Finding of Fact 3(A) above.

4. Fourth Procedural Order. The Fourth Procedural Order (dated July 2, 2009) documented the outcome of the pre-hearing conference held on June 26, 2009 and addressed two motions filed by Mallinckrodt: (a) Motion to Dismiss for Failure to Pursue Clean-up in Superior Court, and (b) Motion to Dismiss Compliance Order or, in the Alternative, Stay Proceeding for Failure to Adopt Rules of Practice. The Fourth Procedural Order denied both motions. In denying the first motion, the Presiding Officer ruled that "the Commissioner's authority to issue a clean-up order is not limited to emergencies or to situations in which a responsible party is currently engaged in handling hazardous substances at the site" and that "Title 38, § 1365 does not require the Commissioner to pursue clean-up of the site only by bringing a Superior Court action." As to the second motion, the Fourth Procedural Order ruled that "the absence of any agency rule of practice specific to this type of adjudicatory proceeding (an appeal under Title 38, § 1365) does not deprive the board of authority to hear and decide the appeal." The Presiding Officer also ruled that the Maine APA, 38 M.R.S.A. § 345-A and 1365, and ad hoc procedures established by the Presiding Officer (see Procedures Document discussed below) provide procedural guidance and ensure fairness to all parties.

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[23] Following issuance of the Commissioner's Order, Mallinckrodt filed suit in federal court seeking to enjoin enforcement of the Order and seeking a declaratory judgment that the Order is unlawful. *Mallinckrodt LLC v. Littell*, 616 F.Supp.2d 128, 130, 132 (D. Me. 2009).

[24] Prior to Mallinckrodt's request for stay of the appeal, the Commissioner agreed to stay any compliance deadline in the Order until the Board issued a final decision and that no penalties for noncompliance with deadlines in the Order would accrue during the stay period. Mallinckrodt and the Commissioner also agreed to stay the statutory deadlines for holding the hearing and issuing a decision.

[25] *See Mallinckrodt LLC*, 616 F.Supp.2d at 130, 150 (granting motion to dismiss based on abstention grounds).

In addition, the Fourth Procedural Order addressed Mallinckrodt's request that it be permitted to introduce evidence regarding alleged political pressure on and bias of the Commissioner in issuing his Order. The Presiding Officer denied that request, ruling that "[t]he Board is the actual decision-maker in this proceeding; accordingly, questions related to alleged political pressure and bias in the Commissioner's decision-making process are not relevant to the Board's proceeding." The Presiding Officer explained: "In accordance with 38 M.R.S. § 1365(4), the Commissioner must establish the basis for the order and the naming of the person to whom the order is directed. Mallinckrodt has the opportunity to present evidence demonstrating that the order should be modified or rescinded. The Board will be making its decision based on the facts in the record which address the technical and scientific basis for the remedy. If the remedy ordered by the Commissioner is not supported by sufficient technical and scientific evidence to satisfy the Board that it is the appropriate remedy, questions related to political pressure and bias will not be germane to the discussion because the order will be modified or rescinded. Conversely, if the remedy offered has sufficient technical and scientific basis to demonstrate to the Board that it is the appropriate remedy, questions related to political pressure and bias will again not be germane because the remedy – however motivated – is justified by the technical and scientific evidence. For this reason, the issues to be addressed at the hearing will be limited to technical issues surrounding the remedy."

The Fourth Procedural Order also addressed participation of the parties in the hearing and conduct of the proceeding. The order attached and incorporated a final "Procedures Document" which was developed after input from all parties and which set forth procedures on the serving and filing of papers, public participation, conferences, presiding officer rulings, hearing location, pre-filed written testimony, exhibits, general conduct of the hearing, testimony and cross-examination, witnesses, offers of proof and continuances. Among other things, the Fourth Procedural Order set deadlines for the parties to submit lists of material factual issues and expert witnesses by issue area.

Mallinckrodt appealed the Fourth Procedural Order to the Board. After considering the appeal at the Board's regular July 16, 2009 meeting, the Board denied the appeal and affirmed the Fourth Procedural Order.

5. Fifth Procedural Order. The Fifth Procedural Order (dated July 29, 2009) documented the outcome of the pre-hearing conference held on July 24, 2009. In the order, the Presiding Officer reiterated certain clarifications she had made at the Board's regular July 16, 2009 meeting concerning the Fourth Procedural Order. Among these clarifications, the Presiding Officer stated that her ruling excluding presentation of evidence of alleged political pressure and bias does not prevent the parties from challenging a witness' credibility on cross-examination. The order provided that informal transcripts of regular Board meetings and prehearing conferences created by Mallinckrodt for its own use would not be included in the record of the appeal proceeding and prohibited citation to any such transcripts in submissions to the Board. The order set a deadline for the parties to submit written position statements on the legal standards applicable to the Board's consideration of the appeal, and the order set a deadline for the parties to confirm agreement on the media protection

standards. In addition, among other things, the order addressed the role of the Board's consultant in the proceeding.

6. Sixth Procedural Order. In the Sixth Procedural Order (dated August 28, 2009), after considering written submissions by the parties, the Presiding Officer ruled that the Uncontrolled Hazardous Substance Sites Law is the governing law. As to the federal RCRA criteria, the Presiding Officer ruled that "[s]ince the RCRA criteria are not established in State law or rule, the Board is not required to make a finding on each of these criteria when reviewing the Commissioner's Order or any alternative remedy that may be put forward by Mallinckrodt." The Presiding Officer ruled that "the 11 RCRA criteria used by the parties in developing and evaluating alternative remedies are not legal standards to be met, but rather factors which may be considered by the Board when evaluating the remedy for the site and reaching its ultimate decision under the statute." Noting the potential usefulness of the RCRA criteria in evaluating alternative site remedies, the Presiding Officer ruled that "the parties may present relevant evidence on each of these factors."

   As to the media protection standards set forth in Attachment 2 of the Commissioner's Order, the Presiding Officer noted that at the July 24, 2009 pre-hearing conference, Mallinckrodt and the Commissioner stated their agreement that the Numeric Media Protection Standards apply to remedy selection. The Presiding Officer noted that Mallinckrodt in a later memorandum stated it did not agree with the media protection standards, but it only specified one area of disagreement - regarding the narrative standards for soil. In the Sixth Procedural Order, the Presiding Officer set a deadline for Mallinckrodt to identify each media protection standard that it contests and the basis for the challenge.

   Mallinckrodt appealed the Sixth Procedural Order to the Board. After considering the appeal at the Board's regular September 3, 2009 meeting, the Board denied the appeal and affirmed the Sixth Procedural Order.

7. Seventh Procedural Order. The Seventh Procedural Order (dated September 16, 2009) documented the outcome of the pre-hearing conference held on September 11, 2009. In the order, the Presiding Officer, among other things, addressed stipulations, the *de novo* standard of review, witness lists, submission of exhibits, demonstratives, pre-filed testimony and exhibits, and Board project orientation. As to the media protection standards, the Presiding Officer noted that Mallinckrodt confirmed that its only concern was with the narrative standard for soils and whether it could be interpreted to apply to the landfills. The Presiding Officer also requested that the parties submit their positions on the burden of proof and the record upon which the Board's decision will be based.

8. Eighth Procedural Order. In the Eighth Procedural Order (dated October 8, 2009, as revised October 15, 2009), after considering written submissions by the parties, the Presiding Officer made rulings concerning the burden of proof and the record upon which the Board's decision will be based. The Presiding Officer ruled that the Uncontrolled Sites Law addresses the burden of production and that at the hearing the "Commissioner will present testimony and evidence in support of his position first,

after which Mallinckrodt will present testimony and evidence in support of its position." The Presiding Officer also ruled that "each party bears the burden of persuasion with respect to the facts supporting the actions it wishes the Board to take." Specifically, the Eighth Procedural Order states that:

> [T]he Commissioner has the burden of persuading the Board that the statutory elements of the Uncontrolled Sites Law are met, namely that:
>
> 1. "Hazardous substances are or were handled or otherwise came to be located" at a specific location,
> 2. The hazardous substances at the location "may create a danger to the public health, to the safety of any person or to the environment,"
> 3. The ordered remedial action is "necessary to terminate or mitigate the danger or likelihood of danger," and
> 4. The persons to whom the order is directed are "responsible parties."

As to Mallinckrodt's burden of persuasion, and based on Mallinckrodt's position in the Notice of Appeal, the Presiding Officer ruled that "Mallinckrodt has the burden of persuading the Board that the Order should be revoked because the evidence does not support making the factual findings that underlie each of the statutory elements of the Uncontrolled Sites Law, or that the Order should be modified to make different factual findings regarding one or more of the statutory elements."

The Presiding Officer ruled that the standard of proof for all findings of fact made by the Board is "preponderance of the evidence." Regarding the record upon which the Board's decision will be based, the Presiding Officer ruled that "the record before the Board will include all relevant evidence admitted during the course of the proceeding until the close of the record at the conclusion of the hearing, regardless of the date when the evidence was obtained." The Eighth Procedural Order also addressed issues related to witness lists.

Mallinckrodt appealed the Eighth Procedural Order to the Board. After considering the appeal at the Board's regular October 15, 2009 meeting, the Board denied the appeal and affirmed the Eighth Procedural Order.

9. Ninth Procedural Order. The Ninth Procedural Order (dated November 3, 2009) documented the outcome of the pre-hearing conference held on October 30, 2009. In the order, the Presiding Officer addressed the fact that pre-filed testimony of Mallinckrodt's witnesses was not sworn, set deadlines for the parties to respond to motions to strike certain pre-filed testimony, and addressed witness issues concerning agency staff. In addition, the Presiding Officer referred to comments submitted by the Commissioner and Mallinckrodt on the draft presentation slides for the project orientation for the Board, and she set a deadline for comments on revised slides to be developed by Board staff. The project orientation for the Board was set for November 19, 2010.

10. Tenth Procedural Order. In the Tenth Procedural Order (dated November 10, 2009), after considering the motions to strike filed by the Commissioner and Mallinckrodt and the responses by the parties, the Presiding Officer ruled on the motions to strike as follows: (1) struck one sentence from Mallinckrodt witness Zeigler's pre-filed testimony; (2) struck the pre-filed testimony and accompanying exhibits of Mallinckrodt witness Thomas; (3) struck certain parts of the pre-filed testimony of Mallinckrodt witness DeVillars; (4) refused to strike certain pre-filed testimony of Mallinckrodt witnesses Vaillancourt, Bigham, and Chaffee; (5) refused to strike certain pre-filed testimony of Commissioner witnesses Fowler, Ostrowski, Lavallee, Stahler, Smith, and Ladner; (6) refused to strike certain pre-filed testimony of Commissioner witnesses Beane, Ladner, and Stahler, but ruled that parties must provide dates of sample data; (7) refused to strike the term "Mallinckrodt Site" from testimony presented on behalf of the Commissioner; (9) refused to strike certain pre-filed testimony of Commissioner Littell; and (10) refused to strike testimony of Maine People's Alliance witnesses Judd, Galland, Conmee, and Graham, but reallocated the testimony to the Orrington session of the hearing at which members of the public also testified.

    Mallinckrodt appealed the Tenth Procedural Order's rulings as to witnesses Thomas and DeVillars to the Board. After considering the appeal at the Board's regular November 19, 2009 meeting, the Board denied the appeal and affirmed the Tenth Procedural Order.

11. Eleventh Procedural Order. The Eleventh Procedural Order (dated December 30, 2009) documented the outcome of the pre-hearing conference held on December 18, 2009. In the order, the Presiding Officer granted the Commissioner's motion to strike Mallinckrodt's request for DEP employee John James to appear as a rebuttal witness. The Presiding Officer addressed Mallinckrodt's motion to strike certain pre-filed rebuttal testimony of the Commissioner's witnesses as follows: (1) refused to strike the Phase I Report (from the Maine People's Alliance litigation in federal court), the Update to the Phase I Report, and related pre-filed testimony; (2) refused to strike certain statements by witnesses Littell and Ladner; (3) refused to strike testimony by witnesses that Mallinckrodt argued was unduly repetitious, among other things; (4) struck certain references in witnesses Hyland and Ladner's testimony to bankruptcy; (5) refused to strike certain references in witnesses Hyland and Littell testimony concerning the State's mercury policy and global greenhouse gas emissions; and (6) refused to strike testimony of witness Stahler regarding site redevelopment. In addition, the Presiding Officer addressed use of documents in cross-examination and demonstratives, witness issues, and hearing schedule and organization, among other items. The order also set deadlines for submittal of information on sequence of presentation of witnesses, composition of witness panels, and time required, as well as for submission of demonstratives.

    Mallinckrodt appealed the Eleventh Procedural Order's ruling allowing the Phase I Report and related testimony. After considering the appeal at the Board's regular January 7, 2010 meeting, the Board denied the appeal and affirmed the Eleventh Procedural Order.

12. Twelfth Procedural Order. In the Twelfth Procedural Order (dated January 6, 2010), the Presiding Officer ruled on Mallinckrodt's motion for legal ruling regarding the state acceptance criterion. The Presiding Officer referred to her earlier ruling on the role of the RCRA criteria in the proceeding and noted that as a practical matter the Board would determine in its decision what is acceptable to the State, but ruled that Mallinckrodt may cross-examine witness Ladner on her testimony and may argue in its post-hearing brief the weight the Board should give to the testimony on state acceptance of the remedy.

13. Thirteenth Procedural Order. The Thirteenth Procedural Order (dated January 13, 2010) documented the outcome of the prehearing conference held on January 12, 2010. In the order, the Presiding Officer addressed, among other items, hearing schedule, hearing logistics, post-hearing briefs, and deadlines concerning demonstrative exhibits.[26]

[26] By email dated January 20, 2010, the Presiding Officer ruled that a number of Mallinckrodt's demonstratives would not be allowed for use at the hearing. By letter dated January 22, 2010, Mallinckrodt requested reconsideration of ten demonstratives. At a sidebar during the hearing, the Presiding Officer denied that request.

Appendix B: Suggested Approach for Implementation of the Remedy

The following is a suggested approach for implementing the remedy required by this Decision in stages. The Department shall determine the appropriate sequence of tasks and modify the sequence as circumstances warrant. The work plans described below for various tasks would be prepared in separate documents with the work plans for the higher priority tasks given higher priority for review and implementation.

A. Stage 1: Highest Priority

Technical

- Develop and implement the Site Security Plan.
- Develop a Health and Safety Plan.
- Modify and implement the Sediment Prevention Plan.
- Develop and implement a revised Comprehensive Site Monitoring Plan including a revised Quality Assurance Project Plan.
- Develop a work plan for, and implement the development of, a comprehensive calibrated 3-dimensional groundwater model for the Site to evaluate: (a) the need for a slurry wall in the surficial materials of the western part of the Site, (b) the optimum arrangement of groundwater extraction wells along the western boundary of the Site, (c) the optimum arrangement of groundwater extraction wells around Landfills 3-5 to capture residual carbon tetrachloride, (d) possible groundwater dewatering schemes should they be required to excavate contaminated materials from below the water table, and (e) the possible sources of the salt in the Ferry Road wells.
- Develop and begin implementing the work plan for the removal and disposal of the Southern Cove contaminated sediments.
- Develop the work plan for the on-site management of contaminated soils and off-site transportation and disposal of contaminated soils.

Administrative

- Develop financial assurance agreements and financial instruments.
- Name Project Management Team and Quality Assurance and Quality Control Team.
- Provide the required insurance coverage.
- Select the Third Party Inspector.

B. Stage 2: Second Priority (This stage should start upon the approval of all required plans for Stage 1, completion and submission of the groundwater modeling study, financial assurance agreement, and implementation of insurance coverage.)

- Implement any improvements to staging areas and transportation infrastructure necessary for temporary storage and off-site transport of contaminated soils and materials.

- Develop work plan and implement pilot testing for extraction wells.
- Develop and begin implementing work plan for the geotechnical investigation and preliminary design for a potential slurry wall.
- Develop and begin implementing a work plan for a soils investigation beneath Landfills 1 and 2, followed by laboratory TCLP column tests to determine the capacity of soils under Landfill 1 to leach mercury, chloropicrin, carbon tetrachloride, or trichloroethylene in concentrations that would exceed the MPS and soils under Landfill 2 to leach mercury and carbon tetrachloride in concentrations that would exceed the MPS.
- Develop and begin implementing a work plan for the water treatment plant and related infrastructure upgrades.
- Develop and implement a work plan for evaluation of the existing conditions around and in Landfills 3-5 in preparation for the design of new RCRA Subtitle C covers for these landfills.
- Develop a work plan for the removal of contaminated soils and materials in the Landfill Ridge Disposal Area northwest of Landfill 4.
- Develop a work plan for the demolition of the remaining above-ground abandoned industrial facilities at the Site.
- Develop a work plan for and implement the air monitoring related to Site soil removal activities, beginning with the Landfill Ridge Disposal Area northwest of Landfill 4 and Landfill 2.

C. Stage 3: Third Priority (This stage should begin after the approval of all required plans listed under Stage 2, completion of extraction well pilot tests, preliminary design of a slurry wall, and investigation of the current geometry and condition of the covers for Landfills 3-5.)

- Unless the decision has been made that a slurry wall is needed first, implement full extraction well array along the western boundary of the Site. If a slurry wall is needed, do final design and implement construction.
- Implement full extraction well array in the vicinity of Landfills 3-5.
- Implement demolition of the remaining above-ground abandoned plant facilities at the Site.
- Implement the removal of contaminated soils and other materials in the Landfill Ridge Disposal Area northwest of Landfill 4.
- Develop a work plan for and begin implementing the removal of the below-ground sewer lines.
- Begin excavation and removal of Landfill 2.
- Develop a work plan for and implement the identification of the volume of contaminated soils that must be removed in the plant area.
- Do preliminary design of the RCRA C covers for Landfills 3-5 and associated grading.

D. Stage 4: Fourth Priority (This stage should start after approval of all studies and decisions on the limits of excavation under Landfills 1 and 2 have been completed.)

- Begin excavation and removal of Landfill 1 and related components such as the lined process lagoon.
- Develop work plan for and implement the restoration of the Northerly and Southerly Streams.
- Develop work plan for and implement the removal of contaminated soils in the plant area and transformer area, except under the cell building.

E. Stage 5: Fifth Priority (This stage should start after the characterization of soils in the plant area has been completed to identify those soils that require removal, and preliminary design has been approved for the RCRA Subtitle C covers for Landfills 3-5.)

- Do final design of the RCRA C covers for Landfills 3-5 and begin construction of new covers.
- Develop work plan for, and implement the removal of, contaminated soils under the cell building.

The following general time frames should be followed in the development of work plans and implementation of remedies, unless otherwise specified.

- Mallinckrodt's time from the start of a Remedy Stage to the submission of a work plan or preliminary design should be 60 calendar days.
- Implementation time for any field or laboratory study or for any remedy described by a work plan would be based on implementation schedules as approved by the Department with each work plan.