

UNITED STATES DISTRICT COURT

DISTRICT OF MAINE

MAINE PEOPLE'S ALLIANCE and
NATURAL RESOURCES DEFENSE
COUNCIL, INC.,

Plaintiffs

v.

Civil No. 00-69-B-C

HOLTRACHEM MANUFACTURING
COMPANY, LLC and MALLINCKRODT
INC.,

Defendants

Gene Carter, District Judge

"When dealing with any non-linear system, especially a complex one, you can't just think in terms of parts or aspects and just add things up and say that the behavior of this and the behavior of that, added together, makes the whole thing. With a complex non-linear system you have to break it up into pieces and then study each aspect, and then study the very strong interaction between them all. Only [in] this way can you describe the whole system."

— Murray Gell-Mann, Nobel Laureate, quoted in T.L. Friedman,
THE LEXUS AND THE OLIVE TREE, Anchor Books (2000).

MEMORANDUM OF DECISION AND ORDER

The Maine People's Alliance ("MPA") and the Natural Resources Defense Council, Inc. ("NRDC") have brought this citizen suit under 42 U.S.C. § 6972(a)(1)(B) of the Resource Conservation and Recovery Act ("RCRA"). Responsibility for the implementation and enforcement of RCRA rests principally with the Administrator of the

Environmental Protection Agency ("EPA"), 42 U.S.C. §§ 6903(1), 6928, 6973, but the statute also contains a citizen suit provision, which permits private citizens to enforce its provisions in some circumstances. *See* 42 U.S.C. § 6972. In this case, the remaining Defendant Mallinckrodt Inc., formerly owned and operated a chemical manufacturing facility in Orrington, Maine ("the facility" or "the plant"). The parties have stipulated that the plant, under the ownership of Mallinckrodt and subsequently of others, discharged mercury directly into the Penobscot River and released mercury-tainted air emissions. Mallinckrodt is involved in an ongoing regulatory process with the EPA and the Maine Department of Environmental Protection ("MDEP") that is aimed at addressing mercury contamination stemming from the plant site. Though it is anticipated in some quarters that this process will generate a remediation plan for the plant site and an area of the Penobscot River adjacent to the plant known as "the southern cove," as of trial no "media protection standards" were finalized from that undertaking. Mallinckrodt has agreed, however, to take certain steps to remediate the plant site as well as the southern cove. The remediation plan being considered does not address the Penobscot River south of the plant. Tr. 2A at 17.

At trial, the evidence focused on the status of the Penobscot River south of the plant and the upper Penobscot Bay ("downriver"). Plaintiffs assert that mercury-containing water discharge and air emissions from the plant, under Mallinckrodt's ownership, have contaminated the lower Penobscot River, creating an imminent and substantial endangerment to the health and environment. Plaintiffs seek injunctive relief, in the form of an order requiring that Mallinckrodt undertake an independent scientific study of mercury contamination in that portion of the Penobscot downriver of the plant

and to develop and implement a remediation plan. *See* 42 U.S.C. § 6972(a) (authorizing district courts "to restrain any person who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste . . ., to order such person to take such other action as may be necessary, or both."); *see also Meghrig v. KFC Western, Inc.*, 516 U.S. 479, 116 S. Ct. 1251, 134 L. Ed. 2d 121 (1996).

I. FACTS

The following facts are either stipulated by the parties or found by the Court based on the evidence presented at trial.

A. The Ownership History of the Plant

The chlor-alkali plant in Orrington, Maine that is the subject of this action was built in 1967. *See* Joint Ex. 65 ¶ 1. From December 9, 1967 to April 30, 1982, Mallinckrodt Inc., or one of its affiliates (collectively "Mallinckrodt") owned and operated the plant and the 240-acre site on which it is located on the banks of the Penobscot River. *See* Joint Ex. 65 ¶ 1. Mallinckrodt Inc., then known as International Minerals and Chemical Corporation ("IMC"), was the first entity to own the plant.¹ *See* Joint Ex. 65 ¶ 1. From 1982 to 1994, the plant was owned and operated by Hanlin Group, Inc. ("Hanlin") (d/b/a LCP Chemicals and Plastics, Inc.). *See* Joint Ex. 65 ¶ 3. In 1991, Hanlin and its related companies filed a voluntary bankruptcy petition pursuant to Chapter 11 of the Bankruptcy Code.² *See* Joint Ex. 65 ¶ 3. Defendant HoltraChem

¹ Sobin Chlor-Alkali was an affiliate of IMC. IMC changed its name to IMCERA Group Inc. in 1990 to Mallinckrodt Group Inc. in 1994, and to Mallinckrodt Inc. in 1996. *See* Joint Ex. 65 ¶ 1.

² Hanlin is not a Defendant in this action. *See* Joint Ex. 65 ¶ 3.

Manufacturing Company, LLC. ("HoltraChem") owned and operated the plant from 1994 until the plant ceased operation in September 2000.³ *See* Joint Ex. 65 ¶ 4.

B. Mercury Releases During Mallinckrodt's Ownership of the Plant

The plant began operation on December 9, 1967. *See* Joint Ex. 64 ¶ 1. Peter DeAngelis was responsible for operation of the plant from its start up through April 30, 1982, the full period of Mallinckrodt's ownership and operation of the plant. *See* Joint Ex. 64 ¶ 1. The facility production process utilized mercury; there were approximately 82 tons of mercury on site at any one time. *See* Joint Ex. 64 ¶ 2. Mercury losses from the facility from December 1967 into June 1970 were a major economic concern for the plant. *See* Joint Ex. 64 ¶ 3. Mr. DeAngelis directed A.L. MacMillan, a plant employee, to estimate mercury losses from the facility. *See* Joint Ex. 64 ¶ 3. Mr. MacMillan prepared a memorandum dated March 18, 1970, estimating average daily mercury production losses at 107 pounds, including 19 pounds of mercury daily lost through brine sludge, an unknown quantity of which was recycled back into the system.⁴ *See* Joint Ex. 64 ¶ 3.

The plant sent mercury-contaminated brine sludge into its sewer, then through the facility's outfall directly into the Penobscot River, every day, continuously, from December 9, 1967, into June 1970. *See* Joint Ex. 64 ¶ 4. The plant did not attempt to estimate mercury concentration in brine sludge from 1967 to 1982, and, although Mr.

³ HoltraChem continues to own the plant, but dissolved as a corporate entity in March 2001. *See* Joint Ex. 65 ¶ 4. Since that time, HoltraChem has neither defended itself in this action nor participated in ongoing corrective action activities under the 1993 Consent Decree. *See* Joint Ex. 65 ¶ 4; Joint Ex. 8. The Clerk of this Court has entered a default order against HoltraChem in this action on February 5, 2002. *See* Docket No. 69; Joint Ex. 65 ¶ 4. On February 18, 2002, the Court reserved ruling on Plaintiffs' Motion for Default Judgment Against HoltraChem Manufacturing. *See* Endorsement Docket No. 44.

⁴ Mr. DeAngelis does not have a basis for a more accurate estimate than the one set forth in the MacMillan memorandum, but disputes that the total amount was lost from the facility. *See* Joint Ex. 64 ¶ 3.

DeAngelis is unaware of information about mercury concentration in the facility's brine from 1967 to 1982, mercury discharges declined over time. *See* Joint Ex. 64 ¶ 4.

The State of Maine did not know from December 1967 into June of 1970 that the facility was discharging mercury to the Penobscot River. *See* Joint Ex. 64 ¶ 5. The facility did not state on its application for a waste discharge license that it was discharging mercury, because the facility first became aware of laboratory results showing mercury in its effluent in April 1970. *See* Joint Ex. 64 ¶ 5. Mallinckrodt constructed Mac's Pond, the first landfill on the site, around June 15, 1970. Mac's Pond was located on a downgrade between the facility and the Penobscot River. *See* Joint Ex. 64 ¶ 7. Until the creation of Hickel's Pond in July 1970, the facility put brine sludge in Mac's Pond, which was open and unlined. *See* Joint Ex. 64 ¶ 7. Mr. DeAngelis believes that the plant's own estimate of 1.5 to 2.5 pounds of mercury per day in the effluent discharged through the facility's outfall is fairly accurate for the period from the plant's startup to the construction of Mac's Pond, based on the April 1970 laboratory results. *See* Joint Ex. 64 ¶ 6. However, this estimate does not include mercury discharged through air emissions or groundwater and Mallinckrodt admits that more mercury was discharged from the through air emissions than through the facility outfall. *See* Joint Ex. 64 ¶ 6.

On July 27, 1970, the United States brought an action against Mallinckrodt.⁵ *See* Joint Ex. 64 ¶ 8. The complaint alleged that effluent waste daily and continuously discharged to the Penobscot River "contain[ed] significant quantities of mercury or mercury compounds suspended in solution."⁶ *See* Joint Ex. 64 ¶ 8. In response to the federal suit, in July 1970 the facility constructed Hickel's Pond to divert process waste.

⁵ The complaint was amended on August 21, 1970. *See* Joint Ex. 64 ¶ 8.

⁶ Mr. DeAngelis had no information with which to dispute those allegations. *See* Joint Ex. 64 ¶ 8.

See Joint Ex. 64 ¶ 9. Hickel's Pond, which was later lined, was located close to the Penobscot River, on a down slope from the plant buildings. *See* Joint Ex. 64 ¶ 9. Starting in late August 1970, the United States and the facility both took samples of sediment from the Penobscot River near the plant outfall, including one set that Mr. DeAngelis took himself. *See* Joint Ex. 64 ¶ 10. These were the first sediment samples that the plant took in the Penobscot River.⁷ *See* Joint Ex. 64 ¶ 10.

Following an EPA request that the facility remove mercury deposits from the Penobscot River near the site, T.W. Beak, one of Mallinckrodt's consultants, issued a report dated March 21, 1972, recommending no sediment removal, but proposing an environmental mercury survey for the summer of 1972. *See* Joint Ex. 64 ¶ 11. In a May 23, 1972, letter from Mr. DeAngelis to T.W. Beak, Mr. DeAngelis wrote that the facility would take periodic river, fish, and sediment samples and would keep the results on file. *See* Joint Ex. 64 ¶ 12. To his knowledge, the facility did not do any further such sampling.⁸ *See* Joint Ex. 64 ¶ 12.

C. Federal Enforcement During Hanlin's Ownership of the Plant

EPA filed a RCRA administrative action against Hanlin in 1986 that resulted in a consent agreement that same year ("1986 Agreement"). *See* Joint Ex. 65 ¶ 6. In 1989, Hanlin brought an action against Mallinckrodt in this Court, alleging that Mallinckrodt was responsible for the environmental hazards at the site that were the subject of EPA's 1986 action and seeking recovery for expenses related to compliance with the 1986 Agreement. *See* Joint Ex. 65 ¶ 7. The lawsuit by Hanlin resulted in a settlement on April

⁷ Sometime during 1970, Mr. DeAngelis became aware of fish analysis results from the Saint Clair River downstream from a chlor-alkali plant that showed extremely high levels of mercury in the fish there. *See* Joint Ex. 64 ¶ 13.

⁸ Mr. DeAngelis would have been aware of such sampling, and he was unaware of any sample results on file. *See* Joint Ex. 64 ¶ 12.

3, 1991 ("1991 Settlement"), pursuant to which Mallinckrodt assumed responsibility for a portion of the costs of completing the study under the 1986 Agreement. *See* Joint Ex. 65 ¶ 8; Joint Ex. 4. The 1991 Settlement did not resolve how the costs of corrective action would be shared. *See* Joint Ex. 65 ¶ 8; Joint Ex. 4. On July 29, 1991, EPA brought a RCRA action against Hanlin in this Court for failing to comply with the 1986 Agreement. *See* Joint Ex. 65 ¶ 9. In 1993, this Court entered a Consent Decree between EPA and Hanlin that superseded the 1986 Agreement and required Hanlin to conduct a site investigation and corrective measures study at the site under the corrective action provisions of RCRA ("1993 Consent Decree"). *See* Joint Ex. 65 ¶ 10; Joint Ex. 8.

In 1994, when HoltraChem bought the plant, it assumed Hanlin's obligations under the 1993 Consent Decree and the 1991 Settlement. *See* Joint Ex. 65 ¶ 11. In 1995, following the bankruptcy of Hanlin and HoltraChem's acquisition of the plant, the 1993 Consent Decree was modified to reflect that certain obligations under the 1993 Consent Decree were assumed by HoltraChem. *See* Joint Ex. 65 ¶ 12; Defendant's Exs. 84, 85. Among other things, HoltraChem assumed Hanlin's obligations to complete the RCRA corrective action process. *See* Joint Ex. 65 ¶ 12; Defendant's Exs. 84, 85. The 1993 Consent Decree contemplates a three-phase process: site investigation, a study of possible corrective measures, and remediation. *See* Joint Ex. 65 ¶ 13. The RCRA corrective action process for the plant site is nearing the end of the first phase. *See* Joint Ex. 65 ¶ 13. Although the State of Maine is not a signatory to the 1993 Consent Decree, the MDEP has worked closely with the EPA in commenting on and overseeing work performed under the decree. *See* Joint Ex. 65 ¶ 14. A 1997 Memorandum of Agreement between EPA and MDEP provides that EPA will continue to administer the 1993

Consent Decree, with "considerable" State input, until the corrective measures study phase is complete. *See* Joint Ex. 65 ¶ 14; Plaintiffs' Ex. 186.

Pursuant to the 1993 Consent Decree, Mallinckrodt and HoltraChem submitted a multi-volume Site Investigation Report in December 1995 prepared by environmental consultant Camp, Dresser & McKee ("CDM"). *See* Joint Ex. 65 ¶ 15; Joint Ex. 13. In March 1997, EPA and MDEP issued a draft notice of disapproval and comments on the 1995 Site Investigation Report. *See* Joint Ex. 65 ¶ 16; Defendant's Ex. 104. In December 1998, Mallinckrodt and HoltraChem again submitted a multi-volume Supplemental Site Investigation Report prepared by CDM. *See* Joint Ex. 65 ¶ 17; Joint Ex. 24. On April 10, 2000, EPA and MDEP provided a notice of disapproval along with comments on the 1998 Supplemental Site Investigation Report and Proposed Media Protection Standards. *See* Joint Ex. 65 ¶ 18; Joint Ex. 29. Throughout the site investigation process, MDEA and EPA asked for and recommended that Mallinckrodt collect data from downriver areas to determine whether mercury was methylating and whether such methylation was having an adverse impact on the river south of the plant. *See* Tr. 2A at 81-82; Tr. 2B at 9-11; Tr. 3A at 53-54; Tr. 3C at 24; Tr. 5A at 34; Joint Ex. 29 at 3; Joint Ex. 89 at 9; Joint Exs. 35 and 36 at 1 and attachment at 1. Despite these requests, Mallinckrodt took very few steps to collect data bearing on the effects of mercury downriver of the plant.⁹ The limited data collected related to determining the effects downriver included sampling killifish, commonly known as minnows, and two wildlife surveys. The testimony at trial clearly established that the ongoing RCRA corrective action does not contemplate any remediation for the lower river. The 1993

⁹ Mallinckrodt's failure to undertake sampling at all trophic levels appears to have been by design. *See* Plaintiffs' Ex. 48.

Consent Decree continues to govern the corrective action activities at the site. *See* Joint Ex. 65 ¶ 19.

D. Mercury in Aquatic Systems

Mercury from natural and man-made sources is released into the air, soil, and water. Over time, the ultimate depository for mercury is in the sediments of the earth's oceans, lakes, and rivers. *See* Def. Ex. 310 at 17. There, microorganisms convert the inorganic mercury to its organic form known as methylmercury. *See* Def. Ex. 310 at 17. When mercury is methylated through ingestion by microorganisms, a carbon atom is added onto the mercury atom. This additional atom is what converts mercury into methylmercury, allowing it to be readily accumulated in both animals and human beings. *See* Def. Ex. 533 at 4. Methylmercury is the element's most bioavailable, and most toxic, form of mercury. Tr. 1A at 33.

Once released from microorganisms, methylmercury rapidly diffuses, binding to proteins in aquatic biota. From there it marches up the food chain, amplifying in concentration, through a process known as biomagnification. *See* Def. Ex. 533 at 4. Smaller fish absorb the methylmercury from water as it passes over their gills and as they feed on methylmercury-tainted plankton. In turn, these fish are eaten by bigger fish, which is why the highest concentrations of methylmercury are found in fish at the top of the aquatic food chain. Also, the older the fish, the more time methylmercury has in which to accumulate. Large, predatory species like cormorants, osprey, and eagles contain more methylmercury in their tissues than smaller, nonpredatory fish species. It not only accumulates in the aquatic food chain but tends to concentrate strongly as it passes upward in the food chain. Thus, methylmercury concentrations in predator fish

can be millions of times higher than those of the surrounding water. *See* Def. Ex 533 at 4. Mercury is the only metal known to biomagnify, and the health and environmental concerns about its effects center on this unique property. *See* Tr. 1A at 32; Tr. 9 at 5-6; Tr. 7B at 20-21.

E. Effects of Mercury on Human Beings and Animals

Methylmercury is a highly toxic substance with a number of adverse health effects associated with its exposure in humans and animals. Methylmercury's effects are largely sublethal: Methylmercury may not kill an animal, but it will impair the animal's ability to reproduce. Tr. 1A at 24-25, 33; Tr. 9 at 5. Even at very low doses, mercury attacks the nervous system, the kidneys, the immune system, and the reproductive system. Tr. 1A at 24, 33. Methylmercury is classified as a developmental neurotoxicant, which causes harm to the human central nervous system and is "extremely toxic to the developing brain." *See* Joint Ex. 28 at 4; Tr. 4A at 9-10, 13-14. Low-dose prenatal methylmercury exposure from maternal consumption of fish or other seafood has been associated with neurotoxicity in children. The public is exposed to methylmercury principally through the consumption of contaminated fish. Once ingested, methylmercury is absorbed into the bloodstream and distributes to all tissues including the brain and developing fetus. *See* Joint Ex. 40 at 2-2; Tr. 4A at 10. In an adult, this mercury can take months to excrete; however, in the fetal brain, the mercury cannot be excreted. Tr. 4A at 11-12.

Credible testimony was given by Dr. Philippe Grandjean, Plaintiffs' expert, on the risk of adverse effects of methylmercury exposure. *See* Joint Ex. 28 at 8. Dr. Grandjean studied the effects of mercury exposure in women and children living in the Faroes

Islands. The Faroes study determined that, even at low levels of exposure, methylmercury effects the development of the central nervous system including: (1) motor function deficits; (2) neuropsychological impairment to attention, language, visuospatial performance, and verbal and visuospatial memory; and (3) developmental delays corresponding to one to two months in development for each doubling of exposure. *See* Tr. 4A at 14-15, 17-18; Joint Ex. 59. Methylmercury also causes damage to the cardiovascular system, including difficulty regulating heartbeat and blood pressure in children, *see* Joint Ex. 60, and heart disease and stroke in adults. *See* Joint Exs. 58, 63. Although the effects from exposure to methylmercury are significantly more pronounced in small children and developing fetuses, the damage from exposure to methylmercury is permanent in all populations. *See* Tr. 4A at 29-31.

The EPA has set the Reference Dose ("RfD") for consumption of methylmercury at 0.1 µg/kg body weight/day. Tr. 4A at 48-49. The RfD is EPA's estimate, within an order of magnitude, of a dose above which human health risks are presented. Tr. 4A at 50. The State of Maine bases fish consumption advisories on the EPA RfD and Dr. Grandjean's Faroes Island study. *See* Plaintiffs' Ex. 228 at 16-17. The health risks depend on the total consumption of methylmercury from all sources, including freshwater and ocean fish. *See* Tr. 4B at 10-12. The consumption of Penobscot fish like the eels sampled near the plant site in 1995 would expose an individual to a level of methylmercury above the RfD.¹⁰ *See* Tr. 4B at 11-19; Joint Ex. 13 at Table 9-4 (Vol. II). A pregnant woman could not eat a single Penobscot fish in the measured range without endangering fetal health. *See* Tr. 4B at 18-19.

¹⁰ Indeed, Dr. Grandjean believed that the degree of endangerment is even greater because the RfD "err[s] on the side of fish consumption ... not on the side of safety." *See* Tr. 4A at 54-55.

II. DISCUSSION

A. Resource Conservation and Recovery Act ("RCRA")

To successfully prosecute a RCRA claim under 42 U.S.C. § 6972(a)(1)(B), Plaintiffs must demonstrate that Mallinckrodt is a "person" who satisfies the following provision:

any past or present generator, past or present transporter, or past or present owner or operator of a treatment, storage, or disposal facility, who has contributed or who is contributing to the past or present handling, storage, treatment, transportation, or disposal of any solid or hazardous waste which may present an imminent and substantial endangerment to health or the environment.

42 U.S.C. § 6972(a)(1)(B). Mallinckrodt does not dispute that it is a "person" who released "solid waste" into the Penobscot River.¹¹ There is also no genuine dispute in the record that some mercury originating from the plant during Mallinckrodt's ownership has migrated downriver; that mercury is available for methylation downriver, Tr. 5A at 22-23; Tr. 9 at 6; that some mercury is methylating in sediments downriver, Tr. 7B at 95; that methylmercury once in the food web biomagnifies, Joint Ex. 533; or of the harmful effects of mercury on human beings or animals, Joint Ex. 28. The discrete issue, raised in this case, is whether mercury methylation is occurring downriver of the plant to such a degree that it may present a risk of imminent and substantial harm to health or the environment.

1. Imminent and Substantial Endangerment

Under § 6972(a) of RCRA, it is not necessary that Plaintiffs show that the contamination is harming, or will harm, health or the environment. A finding that an

¹¹ Mallinckrodt stipulated that it is a "person" against whom an action may be brought as defined in RCRA § 6903(15). *See* Joint Ex. 65 at 2. Mallinckrodt also stipulated that the mercury-bearing releases originating at the plant, during the time that Mallinckrodt owned the plant, are "solid waste" as defined in RCRA §§ 6903(5) and (27). *See* Joint Ex. 65 ¶ 5.

activity may present an imminent and substantial endangerment does not require a showing of actual harm. The term "endangerment" has been interpreted by courts to mean a threatened or potential harm. *See Dague v. City of Burlington*, 935 F.2d 1343, 1355-56 (2nd Cir. 1991), *rev'd on other grounds*, 505 U.S. 557, 112 S. Ct. 2638, 120 L. Ed. 2d 449 (1992); *United States v. Price*, 688 F.2d 204, 211 (3rd Cir. 1982); *United States v. Waste Industries, Inc.*, 734 F.2d 159 (4th Cir. 1984); *Ethyl Corp. v. Environmental Protection Agency*, 541 F.2d 1 (D.C. Cir.)(*en banc*), *cert. denied*, 426 U.S. 941, 96 S. Ct. 2663, 49 L. Ed. 2d 394 (1976)(construing the term "will endanger" as used in the Clean Air Act); *Reserve Mining Company v. Environmental Protection Agency*, 514 F.2d 492, 528 (8th Cir.1975) (*en banc*) (construing the word "endangering" as used in the emergency powers provision of the Clean Water Act prior to 1970); *United States v. Vertac Chemical Corp.*, 489 F. Supp. 870, 885 (E.D. Ark. 1980). The standard under § 6972(a) is in fact even more lenient than that, because injunctive relief is authorized when there *may* be a risk of harm, not just when there is a risk of harm. This sweeping provision indicates Congress's intent "to confer upon the courts the authority to grant affirmative equitable relief to the extent necessary to eliminate *any risk* posed by toxic wastes." *Dague*, 935 F.2d at 1355 (quoting *United States v. Price*, 688 F.2d at 213-14) (emphasis added in *Dague*).

An endangerment need not be an immediate one in order for it to be "imminent." An endangerment is "imminent" if factors giving rise to it are present, even though the harm may not be realized for some time. "A finding of 'imminency' does not require a showing that actual harm will occur immediately so long as the risk of threatened harm is present." *Dague*, 935 F.2d at 1356; *see also Meghrig*, 516 U.S. at 486, 116 S. Ct. 1251

(quoting *Price v. United States Navy*, 39 F.3d 1011, 1019 (9th Cir. 1994)). In *Meghrig*, the Supreme Court stated that "[a]n endangerment can only be 'imminent' if it 'threaten[s] to occur immediately,' ... and the reference to waste which 'may present' imminent harm quite clearly excludes waste that no longer presents a danger." *Id.* at 485-86, 116 S. Ct. at 1255. The Court went on to state that although "there must be a threat which is present now, ... the impact of the threat may not be felt until later." *Id.* at 486, 116 S. Ct. at 1255 (quoting *Price v. United States Navy*, 39 F.3d 1011, 1019 (9th Cir. 1994)).

In terms of substantiality, Plaintiffs need not quantify the risk of harm in order to establish an endangerment. Courts asked to decide whether RCRA has been violated often employ nondefinitive data in assessing the risk posed by the waste. That is because the evaluation of a risk of harm involves medical and scientific conclusions that "clearly lie on the frontiers of scientific knowledge ", such that "proof with certainty is impossible." *Reserve Mining*, 514 F.2d at 519-20 (internal quotations and citations omitted). The *Reserve Mining* case involved a question of whether the discharge of a substance which, "under an acceptable but unproved medical theory may be considered carcinogenic," into Lake Superior was " 'endangering the health or welfare of persons' " and thus was subject to abatement under the Clean Water Act. *Id.* at 529. In determining that injunctive relief was appropriate, the Court reasoned as follows:

In assessing probabilities in this case, it cannot be said that the probability of harm is more likely than not. Moreover, the level of probability does not readily convert into a prediction of consequences. On this record it cannot be forecast that the rates of cancer will increase from drinking Lake Superior water or breathing Silver Bay air. The best that can be said is that the existence of this asbestos contaminant in air and water gives rise to a reasonable medical concern for the public health.

Id. at 520. An endangerment is "substantial," therefore, "if there is some reasonable cause for concern that someone or something may be exposed to risk or harm ... if remedial action is not taken." *Raymond K. Hoxsie Real Estate Trust v. Exxon Educ. Fdn.*, 81 F. Supp. 2d 359, 366 (D.R.I. 2000) (citations omitted). Courts will not find that an imminent and substantial endangerment exists "if the risk of harm is remote in time, completely speculative in nature, or de minimis in degree." *United States v. Reilly Tar & Chem. Corp.*, 546 F. Supp. 1100, 1109 (D. Minn. 1982).

Mallinckrodt asserts that there is no evidence of an imminent and substantial endangerment in the Penobscot River. Plaintiffs respond that people and animals ingesting mercury-laden fish and bivalves from the Penobscot River may be exposed to dangerous levels of the metal. The Court will review some of the evidence presented at trial to determine whether a risk of injury to the public health or the environment as a result of mercury downriver is sufficiently likely.

2. Evidence of Biomagnification of Mercury Downriver¹²

a. Sediments

The National Oceanic and Atmospheric Administration ("NOAA") has established guidelines for sediment mercury concentrations of 0.15 parts per million ("ppm") as the effects range low ("ER-L") and 0.71 ppm as the effects range median ("ER-M"). *See* Joint Ex. 15 at 32. Sediment mercury concentrations below the ER-L denote that the adverse effects on sediment-dwelling organisms may be observed

¹² The parties provided a great deal of additional information at trial not addressed in this opinion. Although all of the evidence was useful to the Court, much of it was not directly related on the question of whether methylmercury is being produced downriver in such sufficient degree that it would be harmful to health or the environment. For instance, the concentrations of mercury found in eels sampled from the plant site, although probative on the health effects of consuming mercury contaminated sea food, was not germane to methylation downriver.

infrequently. *See* Joint Ex. 41 at 9. Sediment mercury concentrations above the ER-M denote that adverse effects among sediment-dwelling organisms would frequently be observed.¹³ *See* Joint Ex. 41 at 9. Sediment mercury concentrations between the ER-L and the ER-M indicate that there may be effects to the biota resulting from the mercury present. *See* Tr. 1A at 16-17. The 1999 study by Dr. Livingston and the 2000 study by CDM showed sediment mercury concentrations in the lower Penobscot River exceeding the ER-M established by NOAA. *See* Joint Ex. 44 at 14; Joint Ex. 42 App. C-1. Dr. Livingston's data showed sediment mercury concentrations exceeded a NOAA's ER-L at four of the five Frankfort Flats subtidal stations he sampled. *See* Plaintiffs' Ex. 159. All five Frankfort Flats intertidal samples exceeded ER-M. *See* Plaintiffs' Ex. 159. At Fort Point Cove, all five subtidal stations exceeded ER-L and two of the intertidal stations exceeded the ER-L. *See* Plaintiffs' Ex. 159. In one sample of Frankfort Flats sediment, of Dr. Livingston found mercury levels exceeded 4.6 ppm. *See* Joint Ex. 44; Plaintiffs' Exs. 150A and 151. CDM's study also found concentrations exceeding NOAA effects ranges in nearly all samples from Frankfort Flats and Fort Point Cove. *See* Joint Ex. 42 App. C-1.

These mercury concentrations rank among the highest in Maine, and Maine mercury concentrations are on the upper end of mercury concentrations found elsewhere in the United States. *See* Joint Ex. 41 at 18-19; Tr. 9 at 6, 44-45. On average, the amounts of mercury in downriver Penobscot sediments were five times higher than those

¹³ Mercury sediment concentrations exceeding the ER-M does not, by alone, demonstrate an adverse biological impact, but there is a 42.3% chance of adverse effects. *See* Joint Ex. 15 at 32; Tr. 1A at 16-17; Tr. 6B at 85-86. The Court notes that studies show that there was a "low accuracy of the ER-L and ER-M mercury guidelines in predicting adverse effects compared to [] other metals." Joint Ex. 15 at 33. For NOAA, this imprecision "highlight[ed] the need for site-specific effects-based data for determining sediment mercury concentrations that are a threat to aquatic biota." *Id.*

measured in the Kennebec River. *See* Joint Ex. 41 Table A-3b; Joint Ex. 42 Figs. 15, 16; Tr. 6B at 80; Tr. 4C at 57. Recognizing that the mere presence of mercury contaminated sediments is alone not enough to constitute an imminent and substantial endangerment, the Court will consider other evidence presented by the parties on the issue of endangerment to health and the environment.

b. Benthos

Benthos are microorganisms that live on or near the river bottom. Benthos play a very important role in aquatic systems by producing food for organisms that live in the system. *See* Tr. 1B at 67. Toxicity tests on Penobscot River benthos conducted by CDM showed impaired growth and reproduction at many of the downriver stations of Frankfort Flats and Fort Point Cove. *See* Plaintiff's Ex. 159; Joint 42 at 35 and App. D. All of the Frankfort Flats subtidal stations showed significant reductions in growth compared with a laboratory control. *See* Plaintiffs' Ex. 159; Joint Ex. 42 App. D-2. In general, Penobscot sediments did not exceed NOAA effects levels for other pollutants. *See* Joint Ex. 42 at 27. The data demonstrating the high levels of sediment mercury combined with the data on growth and reproduction of benthos indicate that mercury may be responsible for the observed toxicity. *See* Tr. 9 at 14; Joint Ex. 15 at 36; Tr. 6B at 85-86.

c. Killifish

Killifish samples were taken from ten stations in the Penobscot River. Killifish is an omnivore, which occupies a low trophic level and feeds in the water column. *See* Joint Ex. 42 App. A-4. Eight of the ten stations sampled were either upriver of the plant or within two miles downriver of the plant. The locations of these eight sampling stations make the data gained from them of very limited value in terms of determining what is

happening downriver. Likewise, the ultimate data gained from combining the ten killifish samples is not useful for reaching conclusions about what is occurring downriver. Of the ten stations where killifish sampled, the two downriver depositional stations – Frankfort Flats and Fort Point Cove – provide probative data to the question presented in this case. *See* Joint Ex. 42 App. A-4. Mercury concentrations in killifish tissue at Frankfort Flats and Fort Point Cove were significantly higher and, in most instances twice as high, as killifish samples taken from the Kennebec River or the killifish samples taken from the river in the area of the plant site. *See* Joint Ex. 42 App. A-4. Frankfort Flats and Fort Point Cove also had correspondingly high concentrations of mercury in the sediment. *See* Joint Ex. 42 App. A-4. According to the biomagnification figure published by the MDEP, a predator fish, such as a bass, feeding off killifish in Frankfort Flats would accumulate methylmercury to a concentration of 12.5 ppm. *See* Defendant's Ex. 533 at 5; Tr. 5A at 32-33. Consumption of a bass containing that much methylmercury would be hazardous to higher-order predators, including human beings. *See* Tr. 5A at 33.

d. Lobsters

In 1995 and 1996, tests were conducted on lobster meat and lobster hepatopancreas, or tomalley, from locations in the Penobscot River. The data suggest that mercury in the meat of lobsters is low relative to lobster in other areas of the state. *See* Joint Ex. 41. However, the data reveal high mercury concentrations in Penobscot lobster tomalley. *See* Joint Ex. 41 at 21. In 1995, the tomalley from the sample of lobsters collected from Verona Island had the second highest mean concentrations of all the areas sampled in Maine, and, in 1996, the highest mean concentrations were found in

Fort Point Cove. *See* Joint Ex. 41 at 21; Plaintiffs' Ex. 149; Defendant's Ex. 363. Lobster tomalley is eaten by predators, including human beings. *See* Tr. 1B at 28; Tr. 9 at 32-33.

e. Blue Mussels

Blue mussels in the upper Penobscot Bay were tested for mercury.¹⁴ MDEP testing found concentrations of 0.65 ppm in mussels from Sandy Point and tests conducted by Dr. Livingston on samples from upper Penobscot Bay showed mean mercury concentrations of 0.56 ppm. *See* Joint Ex. 41 at 20; Joint Ex. 5 at 7. These levels were above background levels and the second highest among the areas studied. *See* Tr. 3C at 12, 15-17; Joint Ex. 5 at 7. Mussel samples taken from near Pickering Island in Penobscot Bay contained higher concentrations than did samples from other areas tested. *See* Joint Ex. 360 at 2; Tr. 7A at 23. Overall, the Penobscot Bay blue mussel mercury concentrations are among "the higher levels reported for mussels from Maine estuaries that drain urban and industrial areas," Joint Ex. 41 at 20, and very high compared with mussels elsewhere in Maine and the United States. *See* Tr. 1C at 17-20. These levels are of concern not only because of the threat of biomagnification occurring in higher order animal predators, but because of the large number of blue mussels harvested each year for human consumption. *See* Tr. 9 at 37-39; Tr. 1C at 17-18; Plaintiffs' Ex. 132 at 51, App. C.

f. Cormorants

Cormorants are piscivorous birds that consume fish from the Penobscot River. Penobscot cormorant blood and feathers were tested to determine mercury concentrations. The cormorant data are the only actual mercury measurements from the

¹⁴ The Penobscot River was not tested for blue mussel mercury concentrations because the mussels do not live in the river north of Sandy Point.

top of the Penobscot food web. *See* Tr. 9 at 44. MDEP tested ten cormorant chicks at each of eight stations along the Maine coast. The results showed a decreasing gradient in feathers and blood mercury concentrations from west to east, with one anomalously high level of mercury in the cormorants located near Flat Island in Penobscot Bay. *See* Joint Ex. 41 at 24. Indeed, the sample from Flat Island registered the highest levels of mercury in cormorants measured in Maine. *See* Joint Ex. 41 at 24. The available data suggests that cormorants consuming fish from the Penobscot estuary have greater exposure to mercury than do birds that feed in other Maine estuaries and that mercury may reach potentially unsafe levels in some species of piscivorous birds feeding and nesting in the Penobscot estuary. *See* Tr. 4C at 10-11.

g. Osprey and Eagles

Ospreys and eagles, like cormorants, are piscivorous birds at the top of the Penobscot estuary food web. CDM commissioned a wildlife survey to determine, among other things, the breeding success rate of osprey along the Penobscot. A partial wildlife survey was conducted for the latter part of the 2000 season, and another survey was conducted during the 2001 season. The 2000 survey results are not conclusive of breeding success because the observations took place only in the latter part of the season with no determination of how many nests failed. *See* Tr. 2C at 28, 66; Tr. 7A at 49-50; Defendant's Ex. 52 at 144-47; Tr. 7B at 23. The 2001 survey demonstrated a breeding success rate of 0.67 for osprey, below a level necessary to sustain the population.¹⁵ *See* Plaintiffs' Ex. 200; Joint Ex. 50 at 4-6, 15-18, Table 4, Table 5. In addition, the Penobscot osprey breeding success rate for 2001 was less than half of that observed on

¹⁵ The results of the 2001 wildlife survey were not disclosed to MDEP, EPA, or others until sometime after trial began in this case. *See* Tr. 3B at 61; Tr. 4C at 49; Tr. 6A at 111-12; Tr. 7A at 56-57.

the Kennebec River. *See* Plaintiffs' Ex. 200; Defendant's Ex. 52 at 144-47. The 2001 wildlife survey demonstrated that eagles nesting in the Penobscot estuary at a level barely necessary to sustain the population. *See* Plaintiff's Ex. 200. No blood and feather data were collected from the birds as part of either survey. Nevertheless, because mercury can impair reproduction the breeding success of osprey and eagles is possibly reflective of the harm caused by mercury on birds at the top of the food web as well as another indicator of the overall health of the ecosystem. *See* Tr. 7A at 51; Joint Ex. 42 at 2; Tr. 9 at 49.

h. Verona Island

During both July and August of 2000, Mallinckrodt's wildlife survey concluded that there was an unexpectedly limited amount of wildlife activity on the east side of Verona Island, in the lower river. *See* Tr. 2C at 41-42; Joint Ex. 42 Appendix F at 10. Along a stretch of approximately three miles, the survey observed no cormorants or other water birds on the water, no shore birds on the flats, and few shoreline plants, fish, or shellfish. *See* Tr. 2C at 43-46, 48; Tr. 7A at 58-60; Joint Ex. 42 App. F at 10; Joint Ex. 50 at 12. No other stretch along the Penobscot River had so little wildlife activity. *See* Tr. 2C at 52. The inactivity was unexpected, in part, because the area is designated as a Class A habitat by the State of Maine – an area of significance to wildlife. Tr. 2C at 46-48. While the inactivity "was not as pronounced in 2001," the area was less active than a comparable habitat in the Kennebec River. Tr. 3A at 7-9; Joint Ex. 50 at 12. Dr. Livingston concluded that the significance of the Verona Island observations is "another signal that something is going on that is possibly related to the mercury distribution in the system." Tr. 9 at 51.

3. Conclusion

After hearing the testimony at trial and carefully reviewing the exhibits admitted in evidence, the Court concludes that the methylmercury downriver of the plant, resulting, in part, from Mallinckrodt's actions at the plant site, may present an imminent and substantial endangerment to public health and the environment. *See* Tr. 3C at 36-37; Tr. 4B at 13-14. The Court found the testimony of Dr. Robert Livingston, Plaintiffs' aquatic biologist, particularly credible and persuasive. The evidence clearly demonstrated that the Penobscot River is contaminated with mercury through the mouth of the River and into the Bay. *See* Tr. 4B at 52-53. Reliable evidence further established that mercury levels are elevated in Penobscot downriver sediments, Joint Exs. 42 App. C-1, 44, that mercury is methylating downriver, Tr. 7B at 95, and that such methylmercury is bioavailable, entering biota, and biomagnifying throughout the food web. *See* Joint Ex. 29 at 17; Joint Ex. 32 at 1. As a result, dangerously high levels of mercury may be present in Penobscot fish and other sea food consumed by the public. These elevated body burdens of mercury may also present an imminent and substantial endangerment to the environment.

The scientific literature concerning the effects of mercury in an aquatic system teaches that methylation is a continuous process that can go on for decades or longer, creating the most severe adverse impacts downstream from the original mercury source. *See* Plaintiffs' Ex. 32; Tr. 1A at 47; Tr. 1B at 3-6; Tr. 9 at 53-54. The greatest downstream danger is presented in areas where methylation occurs; it is methylmercury that bioconcentrates and biomagnifies. *See* Tr. 1B at 4-6; Tr. 9 at 10-12; Joint Ex. 15 at 11. Of particular importance to the Court's conclusion is the data concerning the

Frankfort Flats area, which receives drainage from a marsh system and may be the principal area where methylmercury is entering the Penobscot system. *See* Tr. 1C at 10; Tr. 7B at 108; Tr. 9 at 11-12. Frankfort Flats data showed the highest sediment mercury concentrations, sediment toxicity to benthos, and the highest concentrations of mercury in killifish. *See* Tr. 9 at 54. Birds that occupy higher trophic levels in the food web feed in the marsh areas near Frankfort Flats and the limited survey results demonstrated impaired reproduction of these birds. *See* Tr. 9 at 54.

Although the scientific literature reveals that the effects resulting from the methylmercury exposure are sublethal, they clearly endanger reproduction, development, and overall health of the public and the environment. Eliminating the source of mercury is insufficient to solve the problem because the mercury is already in the system and methylmercury is being generated in the sediments downriver. Tr. 1C at 32; Tr. 3C at 25-26. Downriver areas where mercury is methylating, such as marshes, will continue to supply methylmercury to the lower river unaffected by remediation at the site. Tr. 1B at 3-6; Tr. 1C at 32-33; Tr. 4C at 56-57; Tr. 3B at 15-16; Tr. 9 at 10-11, 70-71, 73-74. Consequently, this methylmercury continually accumulating and biomagnifying in the food web creates a reasonable medical concern for public health and a reasonable scientific concern for the environment downriver of the plant site. The Court will, therefore, order that Defendant Mallinckrodt be responsible for the cost of undertaking a scientific study of mercury contamination downriver of the plant site in the Penobscot River.

B. Standing

Having discussed the predicate facts, the Court will now address Mallinckrodt's standing arguments. MPA and the NRDC have brought this action on behalf of their members. In order for an organization to have standing to bring a RCRA suit on behalf of its members, it is necessary to establish that: "(a) its members would otherwise have standing to sue in their own right; (b) the interests it seeks to protect are germane to the organization's purpose; and (c) neither the claim asserted nor the relief requested requires the participation of individual members in the lawsuit." *International Union, United Automobile, Aerospace & Agricultural Implement Workers v. Brock*, 477 U.S. 274, 282, 106 S. Ct. 2523, 2529, 91 L. Ed. 2d 228 (1986) (quoting *Hunt v. Washington State Apple Advertising Comm'n*, 432 U.S. 333, 343, 97 S. Ct. 2434, 2441, 53 L. Ed. 2d 383 (1977)). To fulfill the first prong of this test, demonstrating individual standing for the organization's members, Plaintiffs must show that (1) the individual has personally suffered an actual or threatened injury from the defendant's allegedly illegal conduct; (2) the injury may be fairly traced to this conduct; and (3) a favorable decision will redress the harm. *See Valley Forge Christian College v. Americans United for Separation of Church and State, Inc.*, 454 U.S. 464, 472, 102 S. Ct. 752, 758, 70 L. Ed. 2d 700 (1982) (quotations and citations omitted).

Mallinckrodt challenges MPA and NRDC's standing, arguing that there is no connection between the members' injuries and the conduct of Mallinckrodt. Specifically, Mallinckrodt asserts that Plaintiffs do not have standing to sue because their injuries are not fairly traceable to its mercury discharges. Relying on the testimony of the individual

members, Plaintiffs counter that there is a substantial likelihood that the members' injuries are fairly traceable to Mallinckrodt's conduct.

Discussing the fairly traceable prong, courts have held that plaintiffs need not prove to a scientific certainty that a defendant's waste caused the precise harm suffered by the plaintiffs. *See Public Interest Research Group of New Jersey, Inc. v. Powell Duffryn Terminals, Inc.*, 913 F.2d 64, 72 (3rd Cir. 1990), *cert. denied*, 498 U.S. 1109, 111 S. Ct. 1018, 112 L. Ed. 2d 1100 (1991) (discussing the Clean Water Act the court stated that the "likelihood may be established by showing that a defendant has 1) discharged some pollutant in concentrations greater than allowed by his permit, 2) into a waterway in which the plaintiffs have an interest that is or may be adversely affected by the pollutant, and that 3) this pollutant causes or contributes to the kinds of injuries alleged by the plaintiffs."). A plaintiff's injury is "fairly traceable" to the defendant's conduct when there is a "substantial likelihood" that the conduct caused the harm. *NRDC v. Texaco Ref. & Mktg., Inc.*, 2 F.3d 493, 505 (3rd Cir. 1993)(citing *Powell Duffryn*, 913 F.2d at 72). Traceability "does not mean that plaintiffs must show to a scientific certainty that defendant's effluent ... caused the precise harm suffered by the plaintiffs." *Friends of the Earth, Inc. v. Gaston Copper Recycling Corp.*, 204 F.3d 149, 161 (4th Cir. 2000) (quoting *NRDC v. Watkins*, 954 F.2d 974, 980 n.7 (4th Cir. 1992)). The "fairly traceable" standard is "not equivalent to a requirement of tort causation," a plaintiff "must merely show that a defendant discharges a pollutant that causes or contributes to the kinds of injuries alleged" in the area of concern. *Gaston Copper*, 204 F.3d at 161 (internal quotation marks and citation omitted).

At trial, Nancy Galland, Richard Judd, Jill Reymore, and Stephen Woods, members of MPA and/or the NRDC living on or near the Penobscot River, testified about the impact that the mercury in the river has on their lives. *See* Tr. 5A at 40, 56-57, 67, 73; Tr. 5B at 4, 9; Tr. 6A at 1-2, 11-12. All of these individuals testified that they do not eat fish or shellfish from the Penobscot River or Bay because they are concerned that the fish have dangerous levels of mercury that may harm their health. *See* Tr. 5A at 48-51, 69; Tr. 5B at 6-8; Tr. 6A at 6-7. They also refrain from fishing, swimming, or boating on the Penobscot because of the mercury contamination. *See* Tr. 5A at 48-50, 55-56, 69-71; Tr. 5B at 7-8; Tr. 6A at 5-7, 10. In addition, Ms. Galland testified that when she moved to Stockton Springs she hoped to harvest blue mussels to supplement her income as well as her diet. *See* Tr. 5A at 47-48. After learning of the mercury present in the river, she has not followed through with those plans. *See* Tr. 5A at 47-48. Ms. Galland further testified that she feels "robbed, of my rights to use" the Penobscot River and Bay. *See* Tr. 5A at 58.

This testimony, coupled with the findings detailed above regarding the dangers of mercury deposited in the river by Mallinckrodt, establishes by a preponderance of evidence that the individual member Plaintiffs have suffered actual injury that is fairly traceable to Mallinckrodt's conduct. The parties stipulated that the plant under Mallinckrodt's ownership and operation was a source of tons of mercury-laden waste to the Penobscot River estuary. *See* Joint Ex. 64. Mercury released from the plant by Mallinckrodt has migrated downriver, where it is methylating and entering the food web. These injuries experienced by members of the MPA and the NRDC are fairly traceable to Mallinckrodt because there is a substantial likelihood that its conduct caused or, at the

very least, is contributing to Plaintiffs' diminished use and enjoyment of the Penobscot River and Bay. *See Vermont Agency of Natural Res. v. United States ex rel. Stevens*, 529 U.S. 765, 771, 120 S. Ct. 1858, 146 L. Ed. 2d 836 (2000).

Mallinckrodt also challenges the Plaintiffs' standing on the basis that it was not proven at trial that the requested relief – the proposed independent river study and remediation of the mercury – will redress their harms. Specifically, Mallinckrodt argues that the study may conclude that remediation of the lower river is unnecessary. A "reduced use of a waterway out of reasonable fear and concern of pollution," however, constitutes an injury in fact that may be redressed. *See Gaston Copper*, 204 F.3d 159 (citing *Friends of the Earth, Inc. v. Laidlaw Envtl. Servs. (TOC), Inc.*, 528 U.S. 167, 181-84, 120 S. Ct. 693, 145 L. Ed. 2d 610 (2000)). The individual members testified that they do not use the Penobscot in various ways because they believe it to be contaminated with mercury. The individual members relied on multiple sources of information, including the MDEP, to support their conclusion about the safety of using the River or consuming the fish and shellfish in the River and Bay. Tr. 5A at 42, 44-46, 53-55, 67-69; Tr. 5B at 4-6; Tr. 6A at 3-4. If the proposed study is completed and establishes that the Penobscot River and Bay are safe to use, then the members' concerns will be redressed.

The Court also finds that Plaintiffs have satisfied the other two prongs of the organizational standing test. That is, the interests at stake in this litigation are germane to the purposes of MPA and NRDC as set forth in *Hunt v. Washington State Apple Adver. Comm'n.*, 432 U.S. at 343. *See* Joint Ex. 65 ¶ 20. Finally, the relief MPA and NRDC seek does not require the individual participation of the organizations' members because Plaintiffs do not seek relief for any individual. *See* Complaint at prayer for relief ¶ 2; *see*

also Laidlaw Env'tl. Servs. (TOC), Inc., 528 U.S. at 181, 120 S. Ct. 693, 145 L. Ed. 2d 610. The Court finds, therefore, that the organizational Plaintiffs' have standing to bring their RCRA claims against Mallinckrodt.

C. Mallinckrodt's Affirmative Defenses

1. Primary Jurisdiction

This ground has been thoroughly ploughed before, and the Court will not burden the record further with another recitation of the applicable law. *See* Recommended Decision of December 14, 2001 (Docket No. 71), affirmed by Order of February 18, 2002 (Docket No. 91); Recommended Decision of November 1, 2000 (Docket No. 9), affirmed by Order of January 8, 2001 (Docket No. 18). Relying on Dr. Finkelstein's testimony at trial, Mallinckrodt now asserts that any cleanup effort in the lower river would "likely [be] technically unfeasible." Tr. 3B at 14. Plaintiffs disagree, pointing out that before the study is complete and informed remediation discussions occur, no one can guess what might be involved in, or result from, a cleanup.

The Court does not find that the opinion of a single agency employee on the potential for cleanup downriver is conclusive on the issue of primary jurisdiction. What is relevant to the primary jurisdiction inquiry is whether the actions of this Court are in conflict with any agency action. At this time, there is clearly no conflict between this Court's order requiring study of the lower river and any agency action. No agency proceedings have been initiated or orders issued regarding the remediation of mercury contamination downriver. There is a total absence of any evidence in this record indicating that any administrative agency is going to take an active interest in the lower Penobscot River anytime in the future. Moreover, this Court's decision ordering a

downriver study places the case far from any remediation plan where agency determinations relative to the plant, or otherwise, may impact the remedial action that may ultimately be ordered by this Court with respect to downriver areas. Although primary jurisdiction concerns could arise in the future if the agencies decide that cleanup options for the lower river are impracticable or risky, the Court is not aware that any formal conclusion by an authorized agency has been reached.

2. Causation Defenses

Mallinckrodt's Answer raises two causation-based defenses: that Mallinckrodt was not the proximate, or legal, cause of Plaintiffs' injuries and that Plaintiffs' injuries result from the actions of third parties that constitute intervening and superseding causes. *See* Mallinckrodt's Answer (Docket No. 20) at 11-12. Specifically, Mallinckrodt argues that Plaintiffs failed to establish that the imminent and substantial endangerment was caused by its activities. Plaintiffs respond, asserting that Mallinckrodt contributed to the mercury waste entering the Penobscot estuary and, thus, it is responsible for the harm suffered by Plaintiffs.

Under RCRA, Plaintiffs must establish only that Mallinckrodt released waste "of a type that could contribute to" the endangerment that may exist. *Prisco v. A & D Carting Corp.*, 168 F.3d 593, 609 (2nd Cir. 1999). The stipulations of the parties and the evidence adduced at trial contradict Mallinckrodt's causation defenses. While some mercury in the Penobscot River derives from general atmospheric deposition, Penobscot sediments downriver of the plant contain, on average, five times the mercury concentrations of sediments in the Kennebec River. *See* Tr. 7B at 19. The evidence was clear that Mallinckrodt has been a dominant source of mercury in the Penobscot River.

See Tr. 8A at 24-25; Tr. 3B at 26-29. The record is replete with evidence establishing that Mallinckrodt released mercury into the river that contributed to the endangerment. Thus, Mallinckrodt was a legal cause of the injury in this case. Moreover, where the cause of the endangerment is indivisible, as it is here, RCRA liability is joint and several. *See United States v. Conservation Chem. Co.*, 619 F. Supp. 162, 199 (W.D. Mo. 1985). Therefore, the tort doctrine of intervening/superseding cause is also inapplicable to this case.

3. Laches

This Court has also previously addressed Mallinckrodt's arguments with respect to its laches defense. *See* Recommended Decision on Mallinckrodt's Motion for Summary Judgment on the Basis of Laches (Docket No. 70), affirmed by Order of February 18, 2002 (Docket No. 90). The arguments raised in Mallinckrodt's Post-Trial Brief are a rehash of the arguments already presented. *See* Mallinckrodt's Post-Trial Brief (Docket No. 138) at 47-48. No evidence presented at trial persuades the Court that its previously considered decision on the laches defense should be altered.

III. Conclusion

Accordingly, the Court **FINDS** that Mallinckrodt, Inc. has violated RCRA, 42 U.S.C. § 6972(a)(1)(B), with respect to the downriver portion of the Penobscot River south of the plant site and is liable to fund the cost of a necessary independent study to determine if remediation of the conditions existing in the area south of the plant in the Penobscot River is required and/or feasible and, if so, the precise content of the appropriate remediation plan. The Court **ORDERS** that the parties confer and make genuine, good-faith efforts to agree on a specific plan for an independent study to

determine: (1) the extent of the existing harm to the Penobscot River and Bay south of the plant site, (2) the need for a remediation plan, if any, and (3) the elements of, and schedule for, completion of such a remediation plan. By August 30, 2002, the parties shall propose an order delineating the scope of the independent study, including a discrete time schedule for completion of all stages of the study. If the parties cannot agree, the Court **ORDERS** that each party submit its own proposed plan for such study by August 30, 2002. The Court will then consider the submissions, confer with counsel, hear oral argument and, if necessary, hold further evidentiary hearings on all questions so generated.

It is **FURTHER ORDERED** that Mallinckrodt's Rule 52(c) Motion for Judgment as a Matter of Law be, and it is hereby, **DENIED**.

The Court hereby **ENTERS** judgment against Defendant Holtrachem Manufacturing Company, LLC, on its default, to be jointly and severally liable with Defendant Mallinckrodt, Inc. for the funding of the independent study.

The Court retains jurisdiction of the case for the consideration and granting, as appropriate, of any further relief it finds necessary and appropriate.

GENE CARTER
District Judge

Dated at Portland, Maine this 29th day of July, 2002.

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