

UNITED STATES DISTRICT COURT
FOR THE DISTRICT OF MAINE

MAINE PEOPLE'S ALLIANCE and)
NATURAL RESOURCES DEFENSE)
COUNCIL, INC.,)
)
Plaintiffs,)
)
v.)
)
HOLTRACHEM MANUFACTURING)
COMPANY, LLC and)
MALLINCKRODT US LLC,)
)
Defendants.)

Case No. 1:00-cv-00069-JAW

PLAINTIFFS' POST-TRIAL REPLY BRIEF

TABLE OF CONTENTS

TABLE OF AUTHORITIES..... ii

INTRODUCTION..... 1

ARGUMENT 1

I. Mercury Contamination in the Penobscot Endangers Human Health and Harms Wildlife 1

 A. Sediment Mercury Concentrations Far Exceed Background Levels..... 1

 B. Mercury in Penobscot Species Poses Unacceptable Human Health Risks 2

 C. Mercury Contamination Harms Penobscot Wildlife 6

 1. Mercury contamination harms songbirds in Mendall Marsh 6

 2. Mercury concentrations harm Penobscot fish 9

II. Even Where Recovery Is Occurring, Mercury Contamination in the Penobscot Ecosystem Will Persist for Many Decades11

III. The Court Should Order an Immediate Investigation of Active Remedies.....12

 A. There Is Sufficient Information to Pursue Remediation Now.....12

 1. The mobile pool should be one focus of remedial efforts13

 2. Reducing total mercury in sediment should reduce methylmercury in biota.....14

 3. Mallinckrodt does not justify its request for more delay15

 4. Dr. Whipple supports the prompt pursuit of active remedies15

 B. The Remedial Process Should Consider All Options16

 C. The Court Should Retain Control Over Remedy Work.....18

IV. The Equities Compel Pursuit of Active Remedies Now.....19

CONCLUSION20

TABLE OF AUTHORITIES

CASES

Maine People’s Alliance v. Mallinckrodt, Inc.,
471 F.3d 277 (1st Cir. 2006)1, 2, 3, 19

United States v. E.I. Dupont de Nemours & Co.,
432 F.3d 161 (3rd Cir. 2005)19

United States v. Price,
688 F.2d 204 (3d Cir. 1982)19

RULES

Fed. R. Civ. P. 26 (a)(2)(B)(i)2, 10

INTRODUCTION

Mercury contamination in the Penobscot is severe, persistent, and harmful. Natural recovery, to the extent it is occurring, will take many decades. Mercury concentrations continue to increase in some locations, and the contamination appears to be spreading into the heart of the Penobscot lobster fishery. In light of this, the Study Panel unanimously recommends that the Court order pursuit of active remedies by independent experts.

In opposition, defendant proposes further study that will result in continued delay. Mallinckrodt's post-trial brief omits mention of the unprecedented methylation rates in Mendall Marsh and the fact that mercury contamination is spreading into sensitive areas of the ecosystem. Mallinckrodt does not once cite RCRA, the statute that governs this case, and which the First Circuit held places "a Congressional thumb on the scale in favor of remediation." *Maine People's Alliance v. Mallinckrodt, Inc.*, 471 F.3d 277, 297 (1st Cir. 2006).

The Court should adopt the Study Panel's recommendation and order an immediate, independent investigation of all possible remedies to accelerate ecosystem recovery.

ARGUMENT

I. Mercury Contamination in the Penobscot Endangers Human Health and Harms Wildlife

A. Sediment Mercury Concentrations Far Exceed Background Levels

Mallinckrodt argues that the river is less contaminated than the Study Panel suggests. Def.'s Post-Trial Br. 2-5. That is not true. Dry weight sediment mercury concentrations in the Upper Estuary are ten to 20 times the levels in relevant background locations. PX 61; Pls.' Post-Trial Br. 8-10, 12-13. Carbon-normalized concentrations are six to seven times background in intertidal sediments, and nine times background in wetland sediments. Tr. 1024-25 (Bodaly). By any measure, sediment mercury in the Upper Estuary

is severely elevated. Tr. 242, 404 (Rudd). Moreover, Mallinckrodt ignores the critical fact that methylation rates in Mendall Marsh are astonishingly high. PX 57; PX 58; Pls.' Post-Trial Br. 10-12. This is one of the most significant findings of the Court-ordered study. It is methylmercury, not total mercury, that harms living organisms. Pls.' Post-Trial Br. 7-8.

Citing Dr. Connolly, defendant avers that the Penobscot is less contaminated than the typical site where active remediation is being considered. Def.'s Post-Trial Br. 5. There is no evidence in the trial record that would permit a comparison between the Penobscot and any such site. Mallinckrodt's references to PCB- and dioxin-contaminated sites are inapposite. For sites with mercury contamination, we do not know whether methylation rates are comparable to those in the Penobscot, or whether mercury is spreading toward the center of a vital commercial fishery. Pls.' Post-Trial Br. 36-37. In addition, Dr. Connolly did not draw this comparison in his expert reports or during his pre-trial deposition. JX 45; JX 46; PX 162. This underscores both the weakness and impropriety of Mallinckrodt's belated argument. *See Fed. R. Civ. P. 26 (a)(2)(B)(i)* (prior to trial, party expert must disclose "all opinions the witness will express and the basis and reasons for them").

B. Mercury in Penobscot Species Poses Unacceptable Human Health Risks

The Court's implementing order contemplated that the Study Panel would assess "whether mercury within the study site presently poses an unacceptable risk to human health." JX 2 at 5. A straightforward comparison to the Maine action level and the EPA reference dose shows that it does.¹

¹ Mallinckrodt cites the First Circuit to imply that plaintiffs have the higher burden of proving whether "in actuality, mercury contamination in the lower Penobscot adversely affects . . . human health." Def.'s Post-Trial Br. 10, 15 (quoting *Maine People's Alliance*, 471 F.3d at 282). This mischaracterizes the opinion. The quoted passage describes the study

Mercury concentrations in lobsters, black ducks, eels, and rock crabs all exceed the Maine standard for safe human consumption, in some cases by a large margin. Pls.' Post-Trial Br. 15-16. The state action level is a limit that "pregnant women would be well-advised not to exceed." Tr. 572 (Whipple). Mallinckrodt claims the action level is just designed to "signal the need for further inquiry." Def.'s Post-Trial Br. 62. But the state took prompt action to prevent human exposure to Penobscot foods, based on the exceedances measured here. The Department of Inland Fisheries and Wildlife warned pregnant and nursing women and young children not to consume duck from Mendall Marsh. PX 67. The Department of Marine Resources (DMR) closed a portion of the lobster and crab fishery in the lower Penobscot. PX 84.

Defendant attempts to discount the fishery closure by relying on language from a Frequently Asked Questions page on the DMR website. DX 575 at 1. Mallinckrodt nowhere mentions the formal document that permanently closes the fishery, in which the agency states: "This regular rulemaking would make permanent the emergency rulemaking [PX 83] . . . that was *necessary in order to protect public health* due to the risk of mercury contamination in lobsters and crabs found in the mouth of the Penobscot River." PX 84 at 1, 10 (emphasis added). In its rule-making fact sheet, prepared pursuant to Maine law, DMR states: "The rule is expected to protect public health by ensuring that lobsters which may contain levels of mercury above the Maine Center for Disease Control and Prevention action levels for the most sensitive populations are not available for consumption." *Id.* at 10. The language in the formal legal documents announcing and governing the closure, as

plan first proposed to the district court; it says nothing about plaintiffs' burden of proof at the remedy stage. 471 F.3d at 282.

well as the act of closure itself, are unambiguous: Lobsters and crabs in the closure area are off limits to protect people from the dangers of consuming them.

Citing only Dr. Bolger, Mallinckrodt asserts that the state fishery closure and black duck warning were “policy call[s]” and not related to health risk. Def.’s Post-Trial Br. 15. But Dr. Bolger testified he did not have “an informed opinion” about the fishery closure, and he is not “aware of all the factors” that formed the basis for the black duck warning. Tr. 2421-22, 2425. The testimony Mallinckrodt cites about “policy call[s]” refers to a guidance issued by FDA that is unrelated to the Maine fishery closure or black duck warning. Def.’s Post-Trial Br. 15 (citing Tr. 2374, 2436 (Bolger)).

Mallinckrodt argues that the Court should disregard the state action level in favor of higher limits developed by Dr. Keenan for this litigation. Def.’s Post-Trial Br. 14, 21. The Study Panel rejected this approach, and for good reason. Tr. 487 (Whipple: “[I]t would be completely insensible for the Study Panel to . . . try to reinvent our own standard.”), 936 (Bodaly: “I didn’t feel we could have any justification” to deviate from the state action level). The Court should decline Mallinckrodt’s invitation to write new state policy for evaluating the health risks of mercury exposure.

Defendant contends that the Maine action level is exceeded in many freshwater lakes, and therefore using the action level as a basis for remediation would mean remediating everywhere. Def.’s Post-Trial Br. 14-15. Mallinckrodt offers no evidence about those water bodies, including what (if any) edible species are present; their importance to the surrounding community; the presence of large, local mercury point sources; or their prospects for natural recovery—all factors that affect the propriety of ordering relief.

Finding that Mallinckrodt's pollution has created an unacceptable risk in the Penobscot in no way informs the need for remediation at unidentified sites outside this litigation.

The EPA reference dose, expressed as a safe ingestion rate, provides a second, related measure for assessing unacceptable risk. According to Dr. Whipple, the reference dose is the "fundamental standard of protection . . . that we think is the guidance we all need to follow." Tr. 485-86. As Dr. Grandjean reported and Dr. Whipple confirmed, the exposure for someone who eats contaminated Penobscot lobsters, eels, and ducks at a given rate would be well above the reference dose. PX 146; Tr. 565-67, 623 (Whipple).

Mallinckrodt contends that mercury contamination in Penobscot foods is no worse than what might be found in some species available at supermarkets. Def.'s Post-Trial Br. 11-12. This argument is a distraction. First, Mallinckrodt confuses availability with safety; those other fish may—and, according to FDA, *do*—pose their own consumption risks. Mallinckrodt fixates on albacore tuna, which contains mercury concentrations on par with the levels in Upper Estuary lobster. *Id.* at 16. However, FDA warns women of childbearing age to strictly *limit* their consumption of albacore tuna because of the health risks. JX 84 at 2; DX 1225 at 2. Similarly, Mallinckrodt equates mercury levels in Penobscot duck and eel to those in orange roughy. Def.'s Post-Trial Br. 11. But FDA is considering adding orange roughy to the list of species that people should *never* eat. DX 1223 at 3 (noting that mercury concentrations in orange roughy "are higher than nearly all other commercial fish").

Second, Mallinckrodt ignores the many commercial fish with vastly lower mercury concentrations than Penobscot foods. When compared to the top 20 most consumed seafood species, Penobscot lobsters have substantially more mercury than every single one, *except* for the species subject to FDA's limit-your-consumption advice; eels and black

ducks have more mercury than all 20. PX 174; DX 1225 at 5-7. The average mercury level in Penobscot lobsters from the Upper Estuary is approximately 30 times higher than in shrimp, tilapia, and scallops; 15 times higher than in salmon, catfish, and sardines; and three times higher than in light tuna. PX 174. Rather than provide an unbiased comparison, Mallinckrodt cherry-picks a handful of high-mercury commercial species in an attempt to argue that Penobscot lobsters do not stand out.²

Finally, Mallinckrodt argues that Penobscot mercury pollution presents no health concern because there are purportedly “net benefits” from eating contaminated fish. Def.’s Post-Trial Br. 16-17. Dr. Bolger concedes, however, that mercury contamination diminishes the benefits a consumer would otherwise derive from eating fish. Tr. 2405. And as Dr. Grandjean testified, consumers should not be forced to accept mercury contamination as the price to pay for eating seafood. Tr. 871.

C. Mercury Contamination Harms Penobscot Wildlife

1. Mercury contamination harms songbirds in Mendall Marsh

Mallinckrodt contends that the only appropriate way to measure harm is to conduct a formal ecological risk assessment. Def.’s Post-Trial Br. 24-25. The Court did not order the panel to conduct such an assessment. Instead, Special Master Calkins ruled that the Study Panel was free to determine an appropriate methodology for assessing harm. PX 10 at 10.

The Study Panel determined effects on wildlife by reference to toxicity levels established in the scientific literature. This is common practice in ecosystem investigations.

² Mallinckrodt also asserts that mercury in Penobscot lobsters is within the range reported in lobsters elsewhere. Def.’s Post-Trial Br. 11. Mallinckrodt disregards the state’s finding that Maine lobsters in the closed area have mercury levels six times higher than do lobsters from outside the contaminated zone. *See* PX 84; Tr. 809 (Grandjean).

Tr. 1449-50 (Wiener), 2129 (Driscoll); *see also* PX 112 at 3 (Dr. Connolly: ecological risk “can be based . . . on tissue concentrations documented to cause population level impacts at other sites”); Tr. 2907 (Dr. Henry agreeing). Given the astronomical blood mercury levels in Nelson’s sparrows and red-winged blackbirds in Mendall Marsh, even defendant “cannot rule out the possibility of adverse effects on reproductive success.” Def.’s Post-Trial Br. 38. Still, it maintains that a field study is necessary to determine whether or to what extent there is actual harm. *Id.* at 38-42. The trial evidence provides ample basis for the Court to find that mercury is causing significant adverse effects on these two songbird populations, and that a field toxicity study is unnecessary. Pls.’ Post-Trial Br. 22-28.

The scientific literature shows that a blood mercury level of 1.2 ug/g inhibits reproduction in 20 percent of an invertivorous bird population. Pls.’ Post-Trial Br. 23. Dr. Evers testified that when exposures in a species exceed that level, called the EC₂₀, the population may collapse. Tr. 1881-82. The blood mercury levels of Penobscot songbirds dwarf the EC₂₀. JX 6-14 at 14-59; JX 10 App. 2. Mercury levels in Nelson’s sparrows are ten to 15 times higher than at any site in North America, and red-winged blackbirds have the highest blood mercury ever reported, at more than ten times the threshold. Pls.’ Post-Trial Br. 24. Blood mercury in some birds exceeds the level associated with reproductive impairment in *90 percent* of the population: a “very substantial” adverse effect. Tr. 1903-04 (Evers).

Mallinckrodt contends that studies of invertivorous tree swallows “suggest that mercury has no effects below 3ppm [ug/g].” Def.’s Post-Trial Br. 35. But Dr. Evers took these tree swallow studies into account when he developed his EC₂₀, and he ultimately placed greater weight on more recent research on Carolina wrens. JX 6-2 App. 2-2 at 17-18,

25, 29. Mallinckrodt's contention that tree swallows provide a "more relevant comparison" for songbirds in Mendall Marsh—because tree swallows and the Mendall Marsh birds are migratory—omits half the story. Def.'s Post-Trial Br. 35. The tree swallows and Mendall Marsh birds have different diets; tree swallows, unlike Carolina wrens, Nelson's sparrows, and red-winged blackbirds, "do not feed on spiders or other terrestrial predatory insects." *Compare* JX 64 at 2, with JX 6-16 at 16-58 to 16-59. Songbirds that eat spiders and other high-mercury prey are especially vulnerable. Tr. 1877-78 (Evers).

Mallinckrodt takes issue with the Jackson study of Carolina wrens. Def.'s Post-Trial Br. 36-37; *see also* Pls.' Post-Trial Br. 24, 26 (addressing criticisms). The Jackson study was designed, carried out, and reported by Dr. Evers and other top researchers. Tr. 1911-12 (Evers). It underwent peer review and was published in a respected scientific journal. Tr. 1902 (Evers). While Mallinckrodt asserts the study is "not ready for prime time," Def.'s Post-Trial Br. 37, multiple federal agencies disagree: EPA, the U.S. Fish and Wildlife Service, and the National Oceanic and Atmospheric Administration are all using the Jackson study to inform their injury and risk assessment decisions. Tr. 1910 (Evers).

In setting her screening level at 3 to 4 ug/g, Dr. Henry did not consider studies showing that lower mercury exposures produce substantial reproductive impairment in more mercury-tolerant piscivores. *See* Pls.' Post-Trial Br. 25-26. Dr. Henry is not a wildlife biologist; Dr. Evers is. Tr. 2811 (Henry), 1867-68 (Evers). She relied on only a fraction of the 98 bird studies Dr. Evers considered in recommending his population-effects threshold to the panel. *See* JX 53 at 30-34; JX 6-2 App. 2-2 at 23-39; Tr. 2861-62 (Henry)

Mallinckrodt now asserts that "the only way to know if a specific population is being harmed is by conducting site-specific studies of that population." Def.'s Post-Trial Br. 24.

Defendant could have requested such studies earlier, but it did the opposite: It asked the panel to *delete* bird and fish toxicity studies from its Phase I study plan, and did not object to the omission of such studies in the panel's Phase II plan. PX 149 at 7-2, 7-3; Pls.' Post-Trial Br. 27-28. Field toxicity tests are not routinely conducted at other contaminated sites, and Dr. Henry conceded that "reasonable scientists" could decide they are not necessary here. Tr. 2798, 2911. No witness other than those retained by Mallinckrodt testified that field toxicity studies are a prerequisite to the pursuit of active remedies in the Penobscot. *See, e.g.*, Tr. 97-99 (Rudd), 506 (Whipple), 1450 (Wiener); JX 33 at 58-62 (Bridges). Despite Mallinckrodt's contrary claim, Dr. Fisher and Dr. Evers both agree with the panel that the data already collected justify active remediation. Tr. 722-23, 751 (Fisher), 1933 (Evers).

2. Mercury concentrations harm Penobscot fish

The Study Panel's targets for fish health in the Penobscot—500 ng/g for predator fish and 50 ng/g for prey fish—have been endorsed through independent peer review. Pls.' Post-Trial Br. 28-29; Tr. 1441-44 (Wiener). The only predator fish sampled in the Penobscot, eel, exceeds the first target, and mean mercury concentrations in three species of prey fish exceed the second target at most locations. Pls.' Post-Trial Br. 29-30.

The use of a prey fish value to assess risk to predator fish is not "novel and untested." Def.'s Post-Trial Br. 27. The same approach is being used by government regulators to assess risk to fish across Canada. Tr. 1529-30 (Wiener); JX 99 at 2. Nor is a prey fish target of 50 ng/g too low to be useful in the Penobscot. Def.'s Post-Trial Br. 32. The same species of prey fish that exceed the target in the contaminated Upper Estuary are at or below the target in the estuary's lower reaches. Tr. 2009-10 (Kopec). And while Dr. Wiener testified that the predator fish target is "at a level that's commonly found in fish

throughout North America,” Def.’s Post-Trial Br. 29, Mallinckrodt leaves out the next sentence in Dr. Wiener’s testimony: “[T]here have been a number of studies showing adverse impacts” from exposure at that level. Tr. 1514.

Mallinckrodt substitutes higher targets—again derived by Dr. Keenan for this case—to conclude there is no threat to fish populations. Dr. Keenan’s central error was to combine mercury levels high enough to kill fish and impair growth with the far lower levels that cause significant reproductive harm. Tr. 1480 (Wiener). Dr. Wiener testified that such an approach is “not scientifically valid,” JX 99 at 1, and produces a number with “virtually no value,” Tr. 1480-81. Mallinckrodt responds that Dr. Keenan conducted a “sensitivity analysis,” not disclosed prior to trial, to show that his targets do not depend on inclusion of mortality studies. Def.’s Post-Trial Br. 30; *see* Tr. 2545-46 (Keenan) (“I didn’t report it, but I did go through that, um, sensitivity analysis.”). Not only is this opinion inadmissible, Fed. R. Civ. P. 26(a)(2)(B)(i), it does not answer the criticism: Both “[m]ortality *and* growth are insensitive to methylmercury exposure and accordingly are not appropriate endpoints for assessing the effects of mercury pollution on fish.” JX 99 at 2 (emphasis added).

Dr. Keenan used an additional manipulation to set higher fish targets, by retaining the highest reported effects values from certain studies but excluding the lowest values from the same studies. *Compare* JX 55 App. E Tbl. E-1, *with* JX 76 at 4; *see also* Tr. 2543, 2570-71, 2584-85 (Keenan). Mallinckrodt makes no attempt to reconcile the three self-contradictory explanations Dr. Keenan offered for this at deposition and trial. *See* Pls.’ Post-Trial Br. 31 & n.9. Instead, Mallinckrodt generally avers that Dr. Keenan followed the methodology published in a paper by Beckvar et al. *See* Def.’s Post-Trial Br. 29. But the Beckvar paper states that it relied only on “paired-effect and no-effect numbers, thereby

ensuring that the threshold for adverse effect from each study was bounded.” JX 101 at 2096. Dr. Keenan conceded he did not do the same. *E.g.*, Tr. 2557-60, 2572-73, 2725-26.

II. Even Where Recovery Is Occurring, Mercury Contamination in the Penobscot Ecosystem Will Persist for Many Decades

Mallinckrodt gives short shrift to the Court’s second major question: How long will harmful mercury contamination in the Penobscot persist into the future? To the extent recovery is occurring, it will take many decades. Tr. 1685, 1688, 1749 (Santschi); Pls.’ Post-Trial Br. 34-36. In many locations, recovery is not occurring at all; instead, contamination is increasing. Tr. 500 (Whipple), 1345 (Yeager); JX 48 at 19-20.

Mallinckrodt claims that the recovery period for the entire estuary is 15 years, purporting to rely on Dr. Connolly’s calculations. Def.’s Post-Trial Br. 7-8. This number comes from Dr. Connolly’s assessment of the Mendall Marsh sediment cores only, but he admitted that this rate does not apply to the Orland River or to the estuary and bay downstream. Tr. 3491-93. Nor does Dr. Santschi believe that the Mendall Marsh recovery rate applies to the entire system, as defendant misreports. Def.’s Post-Trial Br. 7. Dr. Santschi explicitly rejected this argument. Tr. 1743-44. Mallinckrodt thus offers no evidence to contest Dr. Santschi’s projected half times of 77 years in the Orland River and 78 years in the lower estuary. JX 6-6 at 6-14. Mallinckrodt also neglects to mention that it will take three or four half times to reach the Study Panel’s sediment target in Mendall Marsh. That results in a recovery time of roughly 66 to 88 years in the marsh, Tr. 140 (Rudd), 575 (Whipple), or 45 to 60 years using Dr. Connolly’s numbers, *see* Tr. 3495-96 (Connolly). And Dr. Connolly’s half time for Mendall Marsh is itself suspect, because it is based on only a small subset of sediment cores and data points within those cores. Pls.’

Post-Trial Br. 39-40. Defendant offers no response to Dr. Santschi's criticisms of how that number was derived.

Mallinckrodt downplays Dr. Connolly's use of biota trends and USGS data to predict the rate of recovery, arguing that "he looked at this information only as an additional line of evidence to support his conclusions." Def.'s Post-Trial Br. 8. In his expert report, Dr. Connolly relied on both biota trends and USGS data without any such qualification. JX 45 at 21, 30-32, 34-35. His use of short-term biota trends lacks scientific validity, and by his own admission may be misleading. Pls.' Post-Trial Br. 42-44. As for the USGS data, Dr. Connolly conceded on cross-examination that it cannot be used at all. *Id.* at 40-41; Tr. 3459.

Finally, Mallinckrodt does not contest that mercury contamination in some locations, including the lower estuary and the Orland River, is "getting worse, not better." Tr. 1345 (Yeager); *see also* Pls.' Post-Trial Br. 36-37. The recovery rate in those areas, which comprise more than a quarter of the sites that were analyzed, is currently projected to be "infinity." Tr. 1699 (Santschi); JX 48 at 19-20. Many of these locations have high surface mercury concentrations—up to ten times greater than the Study Panel's targets. Pls.' Post-Trial Br. 36 n.11. Of particular concern, the increasing mercury in the southern estuary is approaching the center of an important commercial lobster fishery. Tr. 500 (Whipple); JX 6-22 at 22-2. Mallinckrodt's brief is silent on this crucial point.

III. The Court Should Order an Immediate Investigation of Active Remedies

A. There Is Sufficient Information to Pursue Remediation Now

Despite identifying a handful of open questions, the Study Panel unanimously recommends that the Court order the pursuit of active remediation now. Tr. 30 (Rudd), 538 (Whipple), 751 (Fisher); JX 6-21. The panel endorses "further focused study" to ensure the

practical feasibility of a remedy, JX 6-21 at 21-4, which can be undertaken while the remedial investigation process is underway, Tr. 178 (Rudd); Pls.' Post-Trial Br. 57-58.

1. The mobile pool should be one focus of remedial efforts

The mobile sediment pool identified by Dr. Geyer explains the slow rate of recovery in the Penobscot estuary. Tr. 30, 128 (Rudd); Pls.' Post-Trial Br. 37-39, 55-56. Mallinckrodt points to purported uncertainties about the mobile pool to argue that a remedial investigation is premature, and refers to rough modeling conducted by Mr. Reed Harris, one of the scientists retained by the Study Panel. Def.'s Post-Trial Br. 42-44. Mr. Harris conducted a "coarse" computer simulation based on Dr. Geyer's estimates of the size of the mobile pool, and projected a mobile pool "turnover rate" of five to ten years. JX 36 at 41; JX 6-18 at 18-29. Because this simulated turnover rate does not equal the recovery half time calculated by Dr. Santschi, Mallinckrodt concludes that "other mechanisms" besides the mobile pool, apparently including "sources not amenable to remediation," must be "delaying recovery of the system." Def.'s Post-Trial Br. 42-43.

Dr. Geyer rejected this use of his data and testified that Mr. Harris's computer model "is not a very powerful approach from a data analysis point of view." Tr. 1262. Dr. Geyer instead concluded that the mobile pool provides an explanation for the multi-decadal recovery half times observed in the sediment cores. Tr. 1270. For his part, Mr. Harris offered six possible explanations for the difference between his turnover rate and Dr. Santschi's half times, *see* JX 6-18 at 18-29 to 18-30, none of which suggests that "the mobile pool is not controlling recovery of the system," Def.'s Post-Trial Br. 43. Mallinckrodt also ignores Dr. Turner's conclusion that there are no substantial ongoing sources of mercury that would interfere with active remediation in the lower river. Pls.' Post-Trial Br. 56.

2. Reducing total mercury in sediment should reduce methylmercury in biota

Defendant claims there is no proof that reducing total mercury in sediments will reduce mercury levels in Penobscot fish and wildlife. Def.'s Post-Trial Br. 55-57. To the contrary, the Study Panel found strong evidence of a direct link between mercury in sediment and mercury in biota. Pls.' Post-Trial Br. 51-55; Tr. 56-59 (Rudd).

There is a "very strong" correlation between total mercury and methylmercury in sediments "all up and down the system." Tr. 57 (Rudd). Dr. Vlassopoulos did not and could not disagree, because he looked at only one small subset of the data the Study Panel reviewed to reach that conclusion. Pls.' Post-Trial Br. 54. Defendant quotes Dr. Driscoll to say it is "possible" that reducing total mercury in Mendall Marsh would not reduce methylmercury in the marsh. Def.'s Post-Trial Br. 56. Although Dr. Driscoll agreed it is "within the realm of possibility" that could occur at a "given site," Tr. 2208, he said it is unlikely to be true across the Mendall Marsh. He testified that "if you reduce the total mercury concentrations in the surface sediments of the marsh, I find it very likely that there would be reductions in . . . methylmercury concentrations in the surface sediments in the marsh, as well." Tr. 2244.

Methylmercury production in sediments is the source of most methylmercury in Penobscot biota. Pls.' Post-Trial Br. 52-53. Average total mercury in sediment explained 99 percent of the average methylmercury concentrations in lobsters. Tr. 236-39 (Rudd); JX 87 at 39. The Study Panel similarly found that "total mercury is the main driver of methylmercury in bird blood." Tr. 234-35 (Rudd); JX 87 at 37 Tbl. 3. Reducing mercury in sediment should therefore reduce methylmercury in lobsters, birds, and other species of concern. Tr. 59 (Rudd), 933 (Bodaly).

3. Mallinckrodt does not justify its request for more delay

In lieu of remediation, Mallinckrodt proposes a general monitoring program and further study of Nelson's sparrows, the size of the mobile pool, and mercury in the Orland River. Def.'s Post-Trial Br. 66-67. It identifies no specific end to this inquiry, and there is no guarantee that any of the further study it advocates will lead, or lead promptly, to a decision on remedy. Mallinckrodt claims to offer a "less burdensome, more cost-effective remedy," Def.'s Post-Trial Br. 65 (internal quotation marks omitted), but in fact it offers no remedy at all. For example, Mallinckrodt's proposed next steps would leave unaddressed the lobster contamination problem, which is a primary public health threat the Study Panel identified. The experts the Court appointed have found they have enough information to move forward now, with contemporaneous, targeted study to help plan and implement active remedies. Pls.' Post-Trial Br. 44-46, 57-58.

4. Dr. Whipple supports the prompt pursuit of active remedies

Mallinckrodt distorts Dr. Whipple's testimony to obscure his opinion that Penobscot mercury contamination poses unacceptable risks that should be redressed promptly. After a number of out-of-context quotations, defendant concludes: "His testimony is significant because it demonstrates that in light of the lack of evidence of a human health risk in the Penobscot, the complexity of the system, and the nonexistence of an obvious remedy, there is no basis for moving forward with immediate consideration of remedial alternatives." Def.'s Post-Trial Br. App. A at A-33. This is close to the opposite of what Dr. Whipple said.

He testified that the Penobscot is one of the best understood estuaries anywhere in terms of mercury contamination, Tr. 476; that there is too much mercury in lobsters in the northern part of the study area, Tr. 497-99; that he is concerned that mercury is spreading

deeper into the heart of the commercial lobster fishery, Tr. 500; that to assess risk to human health it would be “completely insensible” to reinvent the reference dose, as Mallinckrodt asks the Court to do, Tr. 486-87; that birds in Mendall Marsh have “way too much mercury” in them, Tr. 505; that he disfavors the field toxicity studies Mallinckrodt now proposes, Tr. 476-77, 506-10; and that natural attenuation is occurring too slowly to leave the system alone, Tr. 511.

He said the panel focused on “whether the mercury concentrations in the system were high enough to cause environmental harm or human health risk,” and “the answer to that is yes.” Tr. 574. He thinks the Penobscot estuary “is simply too contaminated for too long to believe it’s going to clean itself effectively in any reasonable period of time, and these concentrations . . . are really high enough that they are dangerous.” Tr. 539. Thus, “we strongly recommend that we go ahead to look at the feasibility” of “active remediation,” Tr. 538, by convening experts “to exhaustively look at -- at ideas that might work,” Tr. 585.

Mallinckrodt nominated Dr. Whipple to the Study Panel. Tr. 464-65. His trial testimony contradicts every essential element of Mallinckrodt’s litigation defense.

B. The Remedial Process Should Consider All Options

Mallinckrodt suggests that all remedies have been considered and that none is workable. Def.’s Post-Trial Br. 64-67. But the Study Panel did not conduct a comprehensive review of remediation options; that was outside its expertise. Tr. 525 (Whipple); Pls.’ Post-Trial Br. 4-5, 46-47. The panel instead proposed preliminary ideas for further consideration. Tr. 151-52 (Rudd), 524-25 (Whipple), 752 (Fisher). The panel’s 2009 remediation workshop helped identify these initial concepts, but did not resemble the full remedial investigation the panel now recommends. Tr. 164-65 (Rudd), 526-27 (Whipple).

Nor did Mallinckrodt survey possible remedies; it simply sought to undermine the draft ideas suggested by the Study Panel. Tr. 3164 (Glaza), 3497 (Connolly). Every member of the panel believes that remediation experts should now evaluate all possible options. Pls.' Post-Trial Br. 46-47.³

The Study Panel's initial options merit further evaluation. *See, e.g.*, Pls.' Post-Trial Br. 47 (targeted removal of contaminated sediments); JX 6-21 at 21-9 (seeding portions of estuary with clean sediments to dilute mercury concentrations); Pls.' Post-Trial Br. 48 (applying activated carbon to reduce methylmercury in pore water in Mendall Marsh and limit uptake by organisms). None of defendant's criticisms justifies eliminating these options from consideration prematurely. Mallinckrodt expands its opposition to "bank-to-bank" dredging to include all "large-scale" dredging, without explaining what that term means. Def.'s Post-Trial Br. 46. Several witnesses testified that dredging may be an effective and viable way to remove contaminated sediments. Tr. 160, 180-81, 295 (Rudd), 1214-15, 1271 (Geyer); JX 33 at 171-73 (Bridges). Defendant similarly argues that "large-scale" capping should be excluded from consideration. Def.'s Post-Trial Br. 47. Dr. Driscoll testified, however, that capping is a "proven technology" that should be on the table, Tr. 2168, and Dr. Bridges did not disagree, JX 33 at 188-89. Mallinckrodt also understates the effectiveness of activated carbon in Penobscot field trials. Def.'s Post-Trial Br. 55. Dr. Gilmour found that it was effective over the entire two-year duration of the study, Tr. 1600, and it can be applied more than once if its effectiveness declines over time, Tr. 1628-29.

³ Mallinckrodt implies that plaintiffs have the burden of proposing a comprehensive remedial solution at this stage. Def.'s Post-Trial Br. 57. An appropriate feasibility study involves a large group of experts across multiple disciplines, including regulatory agencies. Tr. 3197-3200 (Glaza), 2169-70 (Driscoll). Plaintiffs lack the authority to conduct such a study unilaterally.

C. The Court Should Retain Control Over Remedy Work

Citing a 1990 EPA guidance under CERCLA, Mallinckrodt argues that its own consultants, not experts appointed by the Court, should be entrusted with further work the Court may order. Def.'s Post-Trial Br. 67-68. Plaintiffs oppose this. The 1990 guidance does not apply to RCRA, and its irrelevance is confirmed by the fact that Mallinckrodt never offered it into evidence or even included it among the 1,229 documents on its exhibit list at trial. In any event, the facts of this case trump any general guidance. Mallinckrodt has for more than four decades avoided responsibility for the pollution it created. Some of that avoidance was deliberate. Pls.' Post-Trial Br. 61-62. After presiding over the liability trial, Judge Carter chose not to entrust Mallinckrodt with responsibility for carrying out the Court-ordered study. The expert testimony during the remedy trial confirms the wisdom of Judge Carter's decision: The Study Panel answered only to the Court and produced high-quality science. It would be inappropriate for the Court to entrust the substance of further remedy work to a party that has fought for more than 40 years to avoid any remedy at all.

Mallinckrodt is correct that there were some false starts during the nine-year study. Def.'s Post-Trial Br. 68 & n.30. That is customary in a complex scientific undertaking like this. Tr. 1131 (Bodaly). Mallinckrodt itself is no stranger to false starts. Perhaps the principal argument it advanced in its pre-trial expert disclosures was that upstream paper mills, not its chlor-alkali plant, accounted for most of the mercury in the lower Penobscot. Two of the eight experts Mallinckrodt designated before the remedy trial opined solely on this issue. JX 42 (Bigham); JX 57 (Vaillancourt). The argument encompassed more than 150 pages of text and figures in defendant's expert reports and supplements, and was the subject of more than 500 pages of deposition testimony. PX 160; PX 162; PX 166. Many

hundreds of hours of attorney and expert witness time were spent on this detour, until Mallinckrodt abruptly abandoned the argument during trial. JX 108.

The Third Circuit's decision in *United States v. E.I. Dupont de Nemours & Co.*, 432 F.3d 161 (3rd Cir. 2005) (en banc), does not support Mallinckrodt's bid to take over remedy proceedings here. First, Mallinckrodt neglects to disclose it is citing the dissent in that case. Def.'s Post-Trial Br. 67. Second, the case concerns cost recovery in an action under a different statute, CERCLA, not the question of who should be responsible for overseeing remedy proceedings in a RCRA citizen suit. *Dupont*, 432 F.3d at 162.

IV. The Equities Compel Pursuit of Active Remedies Now

Mallinckrodt asserts that the equities disfavor the relief plaintiffs seek. Def.'s Post-Trial Br. 62-64. Defendant describes the four-part framework for reviewing requests for injunctions, but never mentions the First Circuit's admonition that "the operation of that framework is inevitably colored by the nature of the case and the purposes of the underlying environmental statute (here, RCRA)." *Maine People's Alliance*, 471 F.3d at 296. In enacting RCRA, Congress sought "to eliminate any risks posed by toxic waste." *Id.* at 287 (quoting *United States v. Price*, 688 F.2d 204, 214 (3d Cir. 1982)). In affirming defendant's violation of RCRA, the First Circuit referred to Congress's intention "to invoke the broad and flexible equity powers of the federal courts in instances where hazardous wastes threaten [] human health." *Id.* at 287 (quoting *Price*, 688 F.2d at 211). Accordingly, RCRA places "a congressional thumb on the scale in favor of remediation." *Id.*

Defendant asserts that "irreparable injury of the type the Court directed the Study Panel to look for has been effectively ruled out with respect to human health and most biota." Def.'s Post-Trial Br. 62. The Court itself disagreed. In 2008, after Phase I of the study,

Judge Carter directed the panel to proceed to Phase II, finding that the data already gathered had “established . . . that mercury (Hg) deposited in the Penobscot River in significant quantities and to substantial negative effect from the HoltraChem site” endangered both wildlife and human beings. PX 5 at 2. The purposes of Phase II were to determine the rate of natural recovery and whether remediation could accelerate recovery. PX 8 at 5. There would have been no reason to proceed to Phase II had the Court not found that harm and risk of harm were sufficient to constitute “the type [of injury] the Court directed the Study Panel to” explore. Def.’s Post-Trial Br. 62.

Mallinckrodt characterizes plaintiffs’ fact witnesses as “sincere and well intentioned.” *Id.* at 64. Their testimony is also *probative*, demonstrating that Mallinckrodt’s actions (dumping up to 12 metric tons of mercury into the river) and deliberate inaction (failing to take responsibility for cleaning it up) hurts people in profound ways. Kenneth Wyman unwittingly fed tainted food to his family, neighbors, and customers, which understandably “sickened [him] to the core.” Tr. 1841; Pls.’ Post-Trial Br. 63. The mercury Mallinckrodt deposited in the river diminishes the spiritual experience of Butch Phillips and the Penobscot Nation, a tribe that has lived on the river for 500 generations. Tr. 1851-54, 1859. The Penobscot River is a public resource that means a great deal to a great many people. Mallinckrodt did not present a single citizen of Maine to testify that leaving the river alone is in the public interest. The Court is bound to consider the public interest in exercising its equitable discretion. Pls.’ Post-Trial Br. 62-65.

CONCLUSION

Plaintiffs urge the Court to order an immediate, independent investigation of active remedies to accelerate recovery of the Penobscot ecosystem.

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that on September 30, 2014, I electronically filed Plaintiffs' Post-Trial Reply Brief with the Clerk of Court using the CM/ECF system, which will send notification of such filing to all counsel of record in the above-captioned matter.

I hereby certify that on September 30, 2014, I mailed the document by United States Postal Service to the following non-registered participant:

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