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UNITED STATES DISTRICT COURT
FOR THE NORTHERN DISTRICT OF CALIFORNIA
AT SAN FRANCISCO

FOOD & WATER WATCH, et al., Plaintiffs, vs. U.S. ENVIRONMENTAL PROTECTION AGENCY, et al. Defendants.	Civ. No. 17-CV-02162-EMC **PLAINTIFFS' CLOSING BRIEF**

INTRODUCTION

This Court is confronted with precisely the scenario that Congress had in mind when it enacted the Citizen Petition provision of TSCA: an EPA that has let "bureaucratic lethargy" undermine the appropriate enforcement of TSCA's "vital authority" for safeguarding public health. *Food & Water Watch, Inc. v. EPA*, 291 F. Supp. 3d 1033, 1048 (N.D. Cal. 2017) (citations omitted). EPA has known since 2006 that its safe drinking water standards for fluoride are unsafe, but has failed to lower these standards in the 17 years since the National Academies of Science advised it to do so. *Undisputed Fact Nos. 20-21*. EPA's bureaucratic lethargy has been evident throughout this litigation, with the Agency demonstrating time and again its unwillingness to evaluate the science on fluoride through the normal risk assessment framework it uses to protect Americans from other toxic chemicals. *ECF No. 421 at 198:20-199:13*. In its rebuttal, EPA goes so far as to pretend that the hazard level for fluoride neurotoxicity could be as high as "infinity." Congress understood that there is a time and place when a court order under Section 21 is needed to "force EPA's hand." *Food & Water Watch*, 291 F. Supp. 3d at 1048. That time is now.

HAZARD IDENTIFICATION

A. The Standard. A neurotoxic hazard exists if neurotoxicity is **associated** with the chemical. *ECF No. 421* at 5:5-6. Proof of causality is not necessary for a hazard determination, *id.* at 5:10-11, but EPA does scrutinize the association to assess its confidence that the association is not an artifact of confounding, or other sources of bias, *id. at 57:13-22.* **EPA does not provide separate confidence determinations for "high dose" and "low dose" studies**; instead, EPA makes a single confidence determination for the hazard data as a whole. *Id. at 210:20-25 & 58:5-18*. Generally, if EPA has **medium confidence** in the hazard, it proceeds to the quantitative dose response analysis. *Barone Trial Tr. (ECF No. 397) at 495:5-8.*

B. The Key Evidence on Hazard. The weight of evidence clearly supports an association between fluoride and reduced IQ, as detailed in two **systematic reviews**[1] sponsored by the US and Canadian governments. *ECF No. 421 at 169:17-170:10*. According to NTP, "Reported associations between higher fluoride exposure and lower children's IQ are consistent in the **vast majority** of studies of both low and high quality." *Trial Ex. 69 at 65 (emphasis added)*. **Ninety-five percent** of the studies that met NTP's

[1] EPA has defined the term "weight of the evidence" under the Amended TSCA to mean "a systematic review method." *40 C.F.R. § 702.33; Henry Trial Tr. (ECF No. 244) at 944:13-945:20 (June 16, 2020).*

inclusion criteria for its meta-analysis (i.e., 52 of the 55 studies) "reported an inverse association" between fluoride and IQ. *Trial Ex. 68 at NIEHS_000388*. According to RSI, "The available evidence demonstrated a **moderate to strong magnitude (strength) of association** between fluoride and neurocognitive effects with **consistent** evidence across studies for the impact on childhood IQ." *Trial Ex. 129 at 129.022*.

The NTP and RSI scrutinized the association to assess if it can be explained by other factors, with the RSI doing a full Bradford Hill analysis. *Trial Ex. 67 at 47-55; Trial Ex. 131 at 1431-47*. NTP's and RSI's analyses were **much more thorough than EPA's weight-of-evidence analyses under TSCA**. *ECF No. 421 at 56:16-57:5; Trial Ex. 96 at 326* (EPA's weight-of-evidence analysis for PCE neurotoxicity).

According to NTP, "The consistency in direction of the association in the studies with heterogeneity in methods of exposure and outcome assessment in 5 different countries and accounting for a wide variety of covariates **all serve to rule out the possibility that there is a common factor other than fluoride exposure that can account for this outcome**." *Trial Ex. 69 at 66 (emphasis added); see also Barone Trial Tr. (ECF No. 418) at 1428:12-21* (concurring that, above 1.5 mg/L, "there's some degree of confidence that bias is not attributing to the relationship between fluoride and association with IQ decrements"). According to RSI, the causality of the association is supported by four Bradford Hill factors (strength, consistency, temporality, and dose-response). *Trial Ex. 129 at 129.022, Trial Ex.131 at 1431-47*.

In short, the collective evidence demonstrates (A) an **association** between fluoride and IQ, and (B) ***at least* moderate confidence** that this association is real and not spurious. *See e.g., Trial Ex. 69 at 276* ("a spurious association is unlikely"); *Grandjean Trial Tr. (ECF No. 417) at 335:23-336:5* ("definitely" a hazard); *Thiesssen Trial Tr. (ECF No. 401) at 825:3-6* (confidence is greater than moderate); *Ibarluzea Designations (ECF No. 404) at 9:15-10:1 (111:7-112:3)* (fluoride is a neurotoxin and the epidemiological studies are "definitely" consistent in finding adverse neurodevelopmental effects at higher doses).

C. Re: EPA's Rebuttal on Hazard. At trial, Dr. Barone and Dr. Savitz focused their confidence determinations on the low-dose studies. *ECF No. 421 at 57:24-26 & 119:5-9*. But, by EPA's own admission, this is not how EPA conducts hazard assessments under TSCA. *Id. at 210:20-25*. Sensing this fundamental error, EPA's rebuttal takes aim at the higher-dose studies, and resorts to the following:

Disavowing Its Own Expert's Opinions. EPA disputes each of the following hazard opinions that

Dr. Barone swore to under oath: (A) fluoride interferes with the functions of the brain in animals, *ECF No. 421 at 6:14-19*; (B) the animal data supports the biological plausibility of fluoride causing neurotoxic effects in humans, *id. at 45:21-25*; and (C) NTP's Monograph establishes Hazard ID, *id at 13:12-15*.

Disregarding Adverse Data. EPA asks this Court to ignore or disregard a broad swath of hazard data. First, EPA asks the Court to disregard most of the studies that NTP reviewed, including **high quality** studies, because they were not conducted on human beings living in North America. *Id. at 14:11-15:2 & 17:9-19.* Second, EPA asks the Court to treat Cantoral (2021), Dewey (2023), Godebo (2023), and Till (2020) as "null" studies despite the strong conclusions to the contrary by the scientists who conducted them. *Id. at 35:14-16* (Godebo); *id. at 92:27-28* (Cantoral); *id. at 95:24* (Dewey); *id. at 213:3-4* (Till).

Cherry Picking. EPA repeatedly cherry-picks from NTP's eTables 4 and 5 to question whether fluoride is associated with reduced IQ, but never once acknowledges NTP's own conclusions on the "**best model fit**" for these analyses, which are set forth in eFigures 17 & 18. *Id. at 26:15-27:2, 54:5-9; Trial Ex. 68 at NIEHS_000389* (identifying the best fits); *id. at 000462-463* (showing the best fits); *see also Trial Ex. 69 at 324* (stating "there was no obvious threshold" in the *non-linear* dose-response analysis in eFigure 17). EPA repeatedly relies on subsets of NTP's dose-response analysis which involve 3 to 7 studies, *ECF No. 421 at 52:23-26*, *54:9-11*, *26:21-23*, *183:12-16*, while elsewhere telling the Court that NTP's regression slopes analysis (which looks at studies with individual-level data) is of little value because it "only" included 9 to 12 studies, *id. at 28:18-21.* Further, in its zeal to exploit non-significant findings from eTables 4 and 5, EPA claims the non-linear urinary models are of **"comparable fit"** to the linear model, *id. at 26:15-19 & 26:23-25,* despite previously stating that a comparable fit requires the AIC score to be "within 3 points," *id. at 152:10-11.* EPA fails to disclose that most of NTP's non-linear urinary models have AIC scores >3 points higher than the linear models. *Trial Ex. 68 at NIEHS_000457* (non-linear AIC scores **3.9 to 11.5 points higher**); *id. at NIEHS_000460* (non-linear AIC scores **2.6 to 5.4 points higher**).

POINTS OF DEPARTURE (POD)

A. The Standard. EPA generally uses **medium or high-quality** studies to derive a point of departure, with the following order of preference: BMCL > NOAEL > LOAEL. *ECF No. 421 at 5:12-14 & 17-20.* Where the data is not amenable to a BMCL, NOAEL, or LOAEL, EPA has flexibility to "use

some other type of approach." *Id. at 137:15-28.*

B. Key Evidence on the BMCL: Dr. Grandjean's BMCL was derived from birth cohort studies that, by EPA's own admission, are **high quality studies**. *Id. at 47:14-18*. The number of children included in Dr. Grandjean's 2023 analysis (n=1,599) exceeds the number of children (n=1,333) that were included in Dr. Lanphear's pooled analysis on lead and IQ that EPA selected as the critical study for its air regulation. *Id. at 83:15-21*; *Lanphear Trial. Decl. ¶ 5.* Grandjean (2023) used a linear model, as well as a *non-linear* model that tested for the presence of a threshold at or below 0.75 mg/L. *Trial Ex. 119 at 119.009*.

C. Re: EPA's Rebuttal on BMCL. EPA criticizes Dr. Grandjean's selection of the linear model in his 2022 analysis because the AIC score was 1.3 points higher than the squared model. *ECF No. 421 at 49:12-14*. However, in its own risk evaluation of HBCD, EPA selected a BMDL model that did *not* have the lowest AIC score; but was within the 3-point margin for a comparable fit. *Id at 152:9-23.* Second, EPA points to the fact that Dr. Grandjean's various models produced BMCL values that differ by a factor of 9. *Id. at 50:14-23*. However, EPA's BMDLs for HBCD differed by a factor of 70. *Id. at 144:14-17*. Third, EPA superficially argues that a piecewise linear model is not a "non-linear" model because it has the word "linear" in its name. *Id. at 25:14-21*. In fact, piecewise analyses address the key *consequential* issue for *non-linearity* in risk assessment: i.e., is there a threshold and at what exposure? *See Barone Trial Tr. (ECF No. 418) at 1420:18-1421:9*. If human exposures exceed or are too close to the threshold, a risk exists—irrespective of the precise shape of the curve. *See generally ECF No. 395 at 70:16-71:4.* Importantly, both of Dr. Grandjean's BMCL studies found that adding assumptions of a threshold (i.e., "breakpoints") did *not* materially improve the fit of the model. *Trial Ex. 119 & Trial Ex. 124.*

D. Key Evidence on NTP-Based LOAEL. EPA has stated that the POD should be based on the weight of the evidence, *ECF No. 421 at 135:21-23 & 169:12-16*, which EPA defines as a **systematic review** method, *id. at 169:17-19*. EPA admits that NTP's systematic review is a **high-quality** review. *Id. at 12:24-13:4*. NTP's high-quality, weight-of-the-evidence analysis concluded with **moderate confidence** that total fluoride exposures approximating 1.5 mg/L fluoride are associated with reduced IQ. *Trial Ex. 67 at xiii*. Based on this, RSI selected 1.5 mg/L as an alternative POD to the BMCL. *Trial Ex. 129 at 129.025.*

E. Re: EPA's Rebuttal on NTP-Based LOAEL. EPA suggests that the existing data offers no

insight into whether the hazard level is ~2 mg/L or "**infinity**," *ECF No. 421 at 52:16-20, 54:13-14,* despite NTP's and RSI's conclusions to the contrary, and despite the large volume of data finding effects below 4 mg/L. *Trial Ex. 67 at xiii; Trial Ex. 129 at 129.022; Grandjean Trial Tr. (ECF No. 417) at 301:7-23 & 313:4-9.* EPA does not cite any studies to *credibly* justify an inference of equipoise between 2 mg/L and "infinity." Instead, EPA resorts to extreme cherry-picking from NTP's dose-response analysis, as discussed above. *Supra at 3:10-23.* This post-trial attack on the higher dose data is devoid of credibility.

EXPOSURE & RISK

A. Exposure Assessment. In its rebuttal, EPA makes the important concession that pregnant women with 95th percentile water intake ingest more fluoride from fluoridated water (0.7 mg/l) than over 50% of women living in areas with 1.5 mg/L. *ECF No 421 at 177:1-8*. This is coherent with, and further substantiates, the finding from the MADRES and MIREC cohorts that the 95th percentile *urinary* fluoride level in fluoridated areas exceeds what is typically seen in 1.5 mg/L areas. *Id. at 174:3-10*. While EPA argues that the contribution from fluoridated water to urinary fluoride cannot be precisely estimated, *id. at 175:7-8*, it concedes **"community water fluoridation is a major driver"** of the urinary fluoride level, *ECF No. 427 at 1549:4-6*, as was found in Till's study of 1,500+ women, *ECF No. 421 at 175:21-176:2*.

B. Risk Characterization. The key fact in the risk characterization remains that all of the credible points of departure for fluoride neurotoxicity are within a factor of 10 of the exposures generated by the condition of use (water fluoridation), and thus less than the **minimum Benchmark MOE of 10.** EPA seeks to erase this problem by denying that 10 is the minimum Benchmark MOE. *Id. at 190:14-191:7*. EPA's denial, however, is at odds with its own expert, Dr. Barone, who agreed that 10 is the minimum Benchmark MOE for the current evidence on fluoride neurotoxicity. *Barone Trial Tr. (ECF No. 418) at 1425:4-22*.

C. Risk Determination. EPA has made many risk determinations where it had medium confidence in the hazard data, *Undisputed Fact 39, Trial Ex. 88 at 5-6,* but now implies that high confidence may be needed for fluoride, *ECF No.421 at 210:9-18.* If this point was intended, it runs counter to EPA's admission "there is no justification" for holding fluoride to a "higher burden." *Id. at 4:9-12.* NTP's determination of **moderate confidence** is thus sufficient, particularly since **EPA admits fluoridation is exposing millions of susceptible individuals** and that this fact weighs in favor of a risk determination. *Id. at 208:11-209:12*.

March 15, 2024

Respectfully submitted,

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CERTIFICATE OF SERVICE

I hereby certify that a true and correct copy of the foregoing was served by Notice of Electronic Filing this 15th day of March, 2024, upon all ECF registered counsel of record using the Court's CM/ECF system.

/s/ Michael Connett
MICHAEL CONNETT