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MEMO

Superfund Records Center
SITE: New Bedford
BREAK: 4.9
OTHER: 46605

Date: October 23, 1996

From: David Dickerson DAD

To: File

Subject: ROD 2 PCB Limits, New Bedford Harbor Superfund Site

As a result of the October 11, 1996 site memo regarding copper and the proposed ROD 2 treatment plant discharge limitations, new issues were raised regarding the proposed PCB limits. This memo summarizes the relevant issues and existing information regarding instream PCBs, and proposes an approach similar to the copper TMDL approach for reducing instream and fish tissue PCB concentrations over time to acceptable levels.

1. <u>Instream PCB Levels are Above Chronic but Below Acute Criteria for Protection of Marine Life</u>

The average instream total PCB (particulate plus dissolved) concentration at the Coggeshall Street bridge for the one year period ending in September 1995 was **0.31 ug/l** (n=108, std. dev. = 0.16), a full order of magnitude above the marine chronic water quality criteria (WQC) of 0.03 ug/l . See Figure 1 attached. As opposed to the instream copper situation, however, the instream PCB levels are more than one order of magnitude lower than the acute PCB WQC of 10 ug/l.

2. <u>The ROD 1 and Proposed ROD 2 PCB Effluent Limits are Technology/Background-Based</u>

Further research into the basis of the ROD 1 PCB effluent limits shows that these limits were based on a 0.6 ug/l PCB average background level from the pilot dredging study. The state DEP had argued for compliance with background levels as an "ARAR" during the ROD 1 design process (i.e., a general policy to not make the existing water quality degradation worse as a result of remedial activities). As I understand it, factors of 1.19x and 2.13x were applied to the "Long Term Average" 0.6 ug/l level per applicable permit writing guidance to come up with the 0.71 and 1.3 ug/l monthly average and daily maximum ROD 1 discharge limits. Since the updated background level is now 0.31 ug/l, it would be appropriate per the same "don't make the cure worse than the disease" approach to base the ROD 2 limits on this new information. Performance data from the ROD 1 plant indicates that individual Arochlors could be treated down to at least a level of 0.25 ug/l. The degree to which the ROD 1 treatment process could treat lower than this level is unknown, however, since the detection level used for individual Arochlors during ROD 1 operations was 0.25 ug/l.

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The ROD 1 and proposed ROD 2 treatment process includes advanced methods for removing organic pollutants. This process employs, in sequential fashion, initial settling, equalization, flocculation, secondary settling, sand filtration, micro-filtration and UV/oxidation. It is possible that the ROD 2 treatment performance would be better than that achieved during ROD 1. Since the destruction efficiency of UV/oxidation is described as being based on percent removal (and residence time), and since the influent PCB levels will likely be lower than during ROD 1, it follows that effluent PCB levels would also be lower (assuming all other treatment parameters being equal). It is unclear what additional unit processes could be added to such a treatment train if significantly lower effluent limits are imposed.

3. <u>The TMDL Approach Applied to PCBs</u>

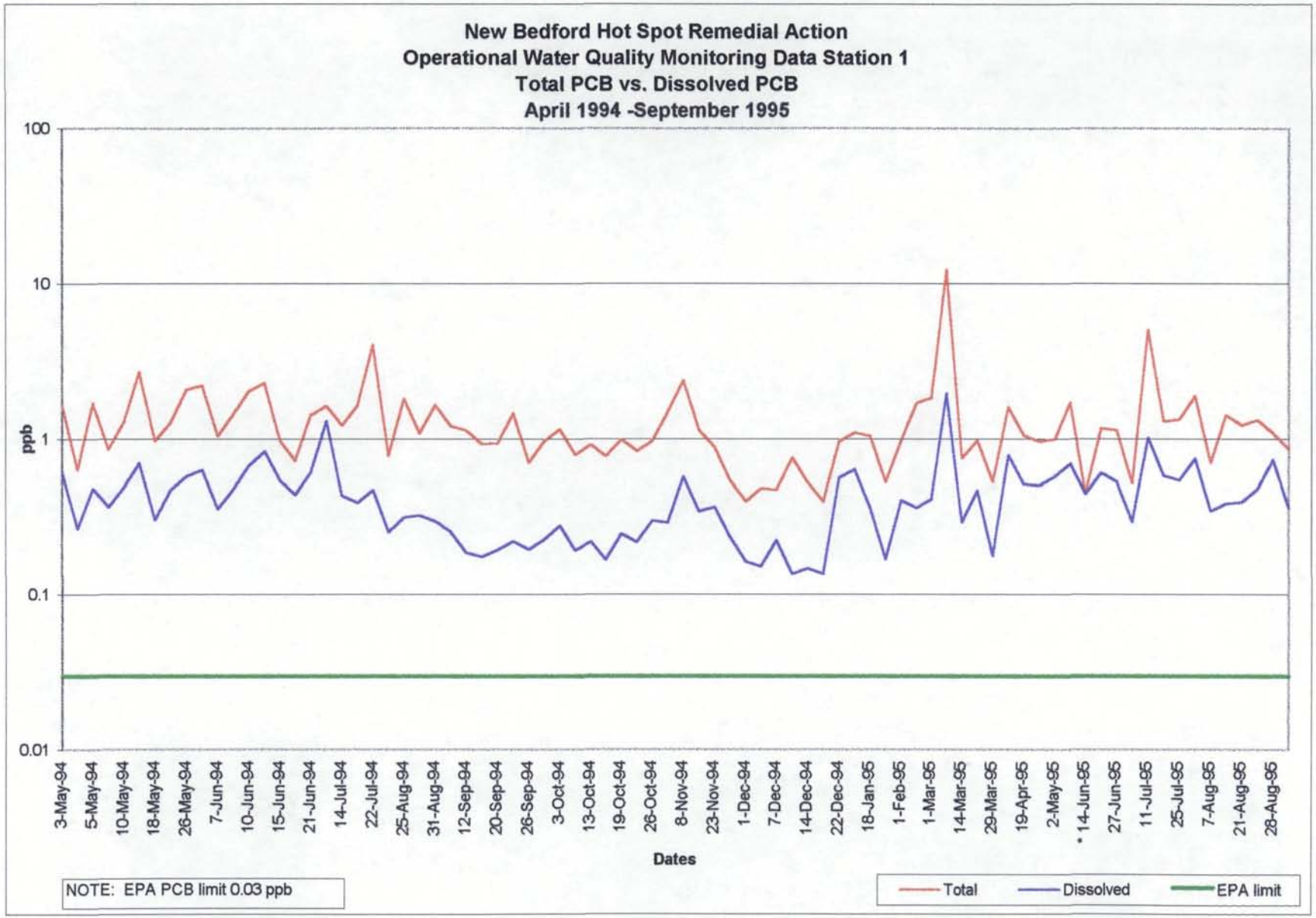
The same "progress over time" concepts that apply to the instream copper situation as outlined in the 10/21/96 memo also apply, if not more so, to instream PCBs. The exceedances of PCB WQC is very clearly a result of the sediment non-point source contamination, with instream PCB data showing a clear gradient consistent with the sediment PCB gradient. We also have computer modeling which concludes that the 0.03 ug/l chronic WQC level could be reached throughout the harbor approximately ten years after completion of the proposed ROD 2 dredging. Thus removal of the contaminated sediments is the necessary prerequisite for compliance with the chronic WQC criteria. The obvious difference between the PCB and copper situations is that while other copper point sources exist, no other PCB point sources exist.

Similar calculations to those presented in the 10/21/96 memo show that almost 13,000 times more PCB mass (577,000 lb v. 45 lb) would be removed as a result of dredging than would be discharged (see Attachment 1). To put this 45 lb of PCB mass discharged over 7-8 years in perspective, we know from the ROD 1 flux monitoring that about 0.5 pounds of PCBs flux seaward in the water column at the Coggeshall Street bridge <u>every day</u>. Thus what we propose to discharge over 7-8 years currently occurs naturally (or should I say unnaturally) in about 3 months.

4. <u>The Proposed Remedy Will Reduce Seafood Tissue PCBs to Acceptable Levels Over Time</u>

One of the new issues raised was whether the health-based WQC (0.000045 ug/l per individual Arochlor) should be applied in this case, since the waterbody is designated as fishable. Application of these health-based criteria <u>at this point in time</u> doesn't appear to be a wise use of limited resources, since we would theoretically be protecting against unsafe seafood consumption in an area where fishing is already banned (the state DPH enacted various fishing restrictions in 1979, including a complete ban on fishing or shellfishing north of the hurricane barrier). The discharge of PCBs at these health-based WQC levels

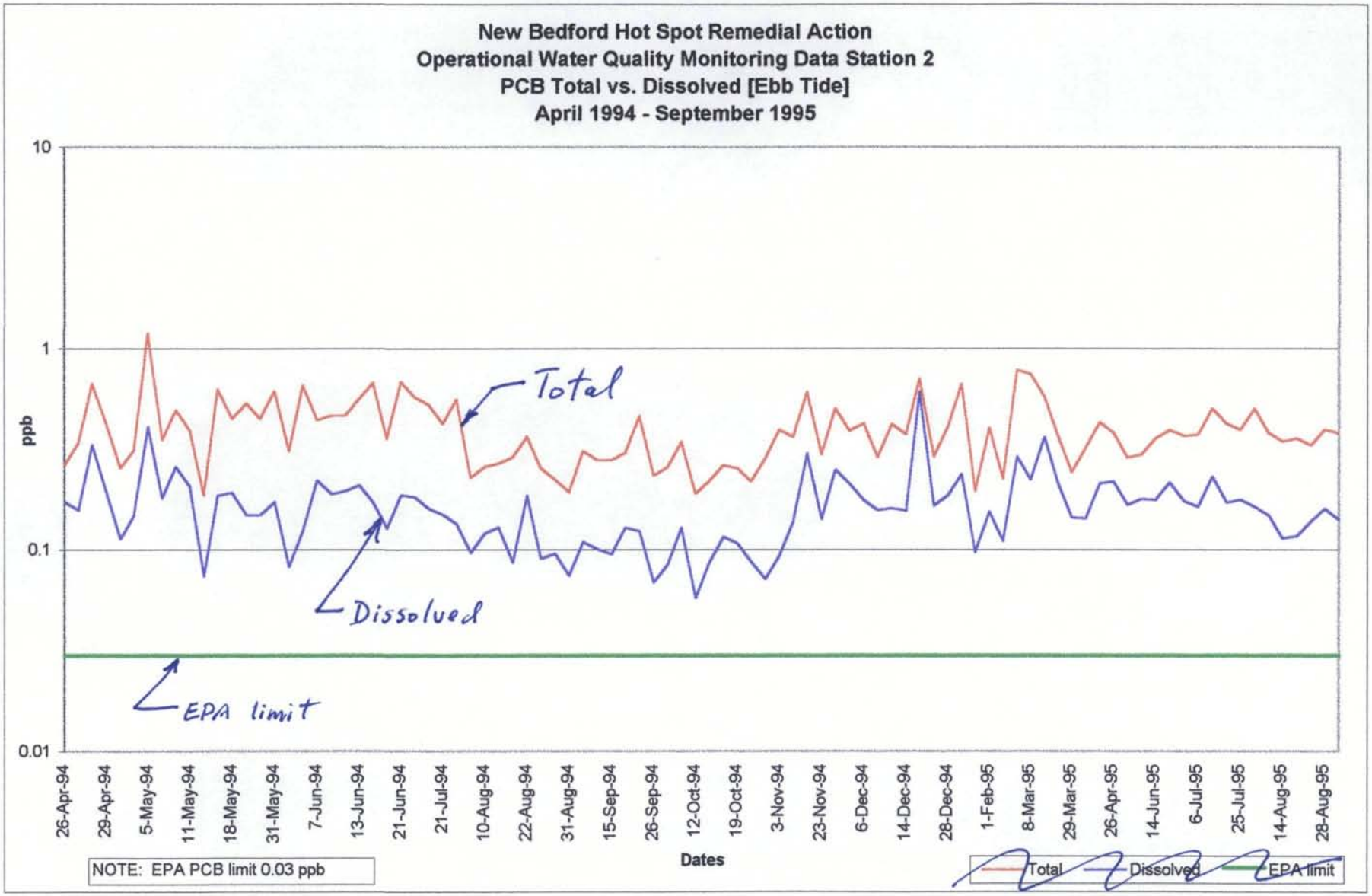
would not on their own enable the fishing ban to be lifted. One benefit of the proposed remedy, however, is to reduce fish tissue PCB levels to acceptable levels over time so that the fishing ban could eventually be lifted. Estimates of depuration rates vary per specie, but site-specific computer modelling predicts that many commercially important species will be well below FDA criteria ten years after dredging.



* No flood data 14-Jun-1995

pcbdata1.xls

FIGURE 1



pcbdta2a.xls

Attachment 1

Mass of PCBs Removed per ROD 2

1. Upper Hbr

~~1. 0-12"~~

- use 378 ppm geometric mean from Tbl 3-1 FS

$$Mass_{PCB} = \frac{378\ \mu g}{g} \left| \frac{g}{10^6\ \mu g} \right| \frac{kg}{10^3\ g} \left| \frac{528{,}000\ yd^3}{} \right| \frac{1.4\ tons}{yd^3} \left| \frac{2000\ lb}{ton} \right| \frac{453.6\ g}{lb} \left| \right.$$

$$= \underline{\underline{253{,}000\ kg}} \quad (558{,}000\ lb)$$

2. Lower Harbor

- use 149 ppm geo. mean (Tbl 3-1)
- 48,000 cy

$$Mass_{PCB} = \frac{149\ \mu g}{g} \left| \frac{48 \cdot 10^3\ yd^3}{} \right| \frac{1.4\ tons}{yd^3} \left| \frac{2 \cdot 10^3\ lb}{ton} \right| \frac{453.6\ g}{lb} \left| \frac{g}{10^6\ \mu g} \right| \frac{kg}{10^3\ g}$$

$$= \underline{9{,}080\ kg} \quad (20{,}000\ lb)$$

3. Total Mass PCBs Removed by Dredging

$$253{,}000 + 9{,}080 = \underline{\underline{262{,}080\ kg}} \quad (577{,}000\ lb)$$

4. $Mass_{PCBs}$ Discharged From Tmt Plants

- 2 MGD, 0.25 ppb DL, 7 years

× 7 Aroclors @ ½ DL = 0.875

$$Mass_{PCB} = \frac{2 \cdot 10^6\ gal}{day} \left| \frac{7 \cdot 365\ day}{} \right| \frac{0.875\ \mu g}{l\ \cancel{kg}} \left| \frac{kg}{10^9\ \mu g} \right| \frac{4.546\ l}{gal} \left| \right.$$

20.3 kg 44.66 lb

× 12,910

× ~~[illegible]~~