

CMA

EXHIBIT A

COMMENTS ON WATER QUALITY CRITERIA

EPA APPENDIX B AND APPENDIX B-1

(Fed. Reg. March 15, 1979, p 15926ff)

CMA 049420

APPENDIX B - Guidelines for Deriving Water Quality Criteria for the Protection of Aquatic Life and Its Uses

1.0 GENERAL COMMENTS

We previously submitted comments on the proposed guidelines as they appeared in the Federal Register (43 FR 21506 May 18, 1978 and 43 FR 29028 July 5, 1978) and we are pleased to hear that these comments will be addressed by EPA at some later date. However, we are concerned that the proposed Water Quality Criteria (WQC) numbers as they appear in Appendix A are based on the guidelines in their original form. Since we have serious reservations about the statistical manipulation as developed in the May 18 document,

(expressed in our letter of August 2, 1978) we have equally serious reservations about the WQC numbers as they appear in Appendix A. We reaffirm the CMA position stated in the August 2, 1978 submission. Also attached as an addendum are general comments prepared by our consultant. Further, we support the position expressed by the American Petroleum Institute in its August 2, 1978 submission to the Agency (Attachments I-III of CMA Exhibit A).

We trust that the Agency firmly believes in their statement that the Water Quality Criteria are not "cast in concrete". As the guidelines change, so will the resultant numbers.

Adjusted toxicity numbers should not be used if the appropriate experimental numbers are available. In addition, acute toxicity should not be used to derive a chronic number. This reaffirms the statement in the guidelines that if chronic values are not available the chronic numbers cannot be derived using the methodology.

2.0 EXAMPLE

We will illustrate our concern with the data manipulation, with a detailed examination of Table 8 in the May 18th Federal Register. This is a new comment on the proposed guidelines and the reason we were not able to develop this comment before is that the data was not available until recently.

Table 8 is an attempt to compare acute toxicities of various chemicals to a range of invertebrate organisms in both freshwater and saltwater. Referring to Table 8 which is located on page 21516 of 43 FR, May 18, 1978, we notice that the first part of the Table deals with identified chemicals and a list of numbers. The numbers presumably are the comparable acute toxicity value for various species of invertebrates. Since no mention is made of the medium it is assumed that the results are a mixture of values obtained for fresh and marine water. The data for Toxaphene (fourth from the bottom) will be examined. The acute toxicities of 16, 1.4 and 4.4 were taken from Schimmel et al., Arch. Environ. Contam. Toxicol., 5, 353 (1974).

The value of 16 ug/L represents the 96 hour EC50 for reduction of shell growth for oysters while the 1.4 and 4.4 represent the 96 hour LC50 for pink shrimp and grass shrimp. The values of 10,24 and 180 were taken from an EPA report (EPA 600/3-77-069, June 1977) and represent a 48 hour EC50 for Daphnids and a 96 hour LC50 for Scud and Midge, respectively. In this one set of data the Agency has mixed freshwater and saltwater species as well as a combination of EC50's ranging from reduction of shell growth in oysters to lethality. There is no mention of what the 48 hour EC50 on Daphnids represents. Without further clarification of this Table it is impossible to believe the results that are generated. Certainly, the data on Toxaphene does not represent comparable acute values as the Table is represented.

Continuing the examination of Table 8, we come to the bottom of p 21516 to the section called "All values from Reference 42". This looks like a series of random numbers and presumably is a series of chemicals acting on a range of invertebrate species and if we believe the reference they are all saltwater species. How many chemicals are represented? Since 82 sets of data were summarized and there are 26 and 25 in the other two sections of Table 8, we would conclude that there are 31 sets of saltwater species. However, the summary on p 21517 indicates 34 sets, so once again we are confused and skeptical about the conclusions from the analysis.

Additionally, on page 21517 (the top left hand column) there are twenty-five sets of paired values taken from reference 37. The summary of these results has now been made available and the chemicals associated with each pair of numbers were identified along with the species tested. The first number in each pair was the 48 hour LC50 for the water flea (freshwater species) while the second number is the 96 hour LC50 for Mysid Shrimp (a saltwater species). Thus, the Table represents two species from two different media. In a later version of this same data set we have discovered the following errors:

1. The pair 487, 8.59 as reported in the May 18 guidelines is the data for 1,3 dichloropropane and should be 282, 10.3.
2. The pair 32.5, 0.04 is for fluoranthene and should be 325, 0.04.
3. There are several other minor errors which should be corrected from the more recent data as reported by Bionomics in EPA Contract 68-01-4646. Finally, the report by Bionomics should be made available and subjected to peer review before the data is used for establishing regulatory guidelines.

The summary portion of Table 8 is the attempt by the Agency to use the above data to derive a factor that will protect 95% of the invertebrate species. There is no way of knowing what 25 sets of data were used to arrive at the factor of 21.3 for freshwater species. The only group of 25 is the data from Bionomics and since this represents both fresh and saltwater species it would be invalid.

3.0 SPECIFIC COMMENTS

In selecting final criteria in Section XIV p 15973, reference to flavor impaired should be deleted as it is covered under health guidelines. Furthermore, we recommend that the word "avoidance" should be changed to behavioral effects."

The formulation of water quality criteria for beryllium, cadmium and lead which take into account the influence of water hardness on toxicity recognizes scientific reality. The mathematical slopes derived by EPA and obtained from the relationship between hardness and acute toxicity cannot be used to represent the relationship between hardness and measures of chronic toxicity. This comment also applies to EPA's practice of using slopes calculated on the basis of fish toxicity data to determine relationships between hardness and invertebrate toxicity. EPA acknowledges that ... "Since data of the right kind may not be available to determine whether such a statistically significant relationship exists for both acute and chronic toxicity to both fish and invertebrates, extrapolations from one species to another, assumptions and judgments may have to be used instead of statistical tests." (p 15971-15972)

However, these assumptions must be tested before establishing water quality criteria.

4.0 SUMMARY

Until the Tables in the May 18 Federal Register are clarified, the safety factors so derived must be suspect, and should not be used in deriving a Water Quality Criteria. In conclusion, while the concept being developed by the Agency for deriving aquatic WQC is most important, the methodology itself needs a great deal of work before it can be accepted.

Finally, we recognize that the data base associated with some chemicals is much more complete than others. Accordingly, a criterion number derived from the better data is much more reliable. Some indication of the reliability should be mentioned in each document. Without the appropriate confidence interval the criteria could be badly misused in the standard setting operation.

EPA APPENDIX B-1

• These are alternate procedures for generating the proper numbers that are required in the guidelines. We will comment on them as they are listed on p 15974.

1. We do not feel that unpublished data should be used in developing such an important number as a WQC. Acceptance of this procedure is bad science and can only lead to unacceptable regulations.
2. A. We do not accept the assumption that a 24 hour average concentration can be estimated by multiplying the Final Acute Value by 0.44. It is unreasonable that a value based on 96 hour LC50 will be smaller than an experimentally determined chronic number. The chronic value should be the basis for a 24 hour average.

B. A great deal of Structure Activity Analysis would have to be done before a procedure based on extrapolation could be used to generate missing data. While structure activity relations are useful there are many examples where only a minor change in structure can and does lead to major changes in toxicity.

C. Since we disagree with assumptions 2A and 2B, it follows that we do not believe the guidelines can be used with this alternate procedure.
3. A. If the Final Fish Chronic value for a chemical is determined experimentally then the same experimental procedure can be used on other chemicals. We do not believe that extrapolations or interpolations to structurally similar chemicals can be made at this time.

B. Once again, we believe that more structure activity studies must be made before the credibility of this assumption is accepted.

C. Similar to 2C above.
4. This appears to be reasonable.