Additional Comments on Technical Deficiencies on the Guidance on the Development of Regional Toxic Hot Spot Cleanup Plans

G. Fred Lee & Associates

27298 E. El Macero Dr.
El Macero, California 95618-1005
Tel. (530) 753-9630 • Fax (530) 753-9956
e-mail gfredlee@aol.com
web site: http://members.aol.com/gfredlee/gfl.htm

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John Caffrey, Chairman
State Water Res Control Board
PO Box 100
Sacramento, CA 95812-0100

Dear Chairman Caffrey and Members of the Board:

On Saturday, August 22, 1998 I received Craig J. Wilson's letter transmitting the "Revised Water Quality Control Policy for Guidance on the Development of Regional Toxic Hot Spot Cleanup Plans." I have critically reviewed this Revised Toxic Hot Spot Cleanup Plan guidance and find that it still does not adequately and reliably address fundamental technical issues that must be addressed to develop technically valid, cost-effective designation and ranking of toxic hot spots and clean-up plans for toxic hot spots in the state's waters regulated by the BPTCP. The primary issue is still the same as that which I have raised in my previous comments, namely, the inappropriate/inadequate use of chemical information in this guidance. This situation can readily result in large-scale expenditures of public and private funds in misdirected efforts toward toxic hot spot remediation and the imposition of additional NPDES permit discharge limits because a particular discharger(s) is alleged, through the guidance provided, to be responsible for a toxic hot spot.

Specific Comments on Issues that Need to Be Addressed Before Adoption of this Guidance

Page 1, second paragraph, states that the FED contains summaries of public comments and staff responses. As discussed in my previous comments on the final FED, the approach used by the State Board staff in addressing comments is significantly deficient and unreliable in many areas.

Page 1, second paragraph, states that the guidance was peer reviewed, however, a critical review of the peer review process shows that it was not an interactive, properly

conducted peer review of key issues, such as how chemical information is incorporated into the guidance.

Page 1, last paragraph, mentions the July 8, 1998 meeting with the Department of Pesticide Regulations staff. On page 3, it states that the SWRCB and the RWQCB Cleanup Plan shall be consistent with the Management Agency Agreement between SWRCB and DPR. I attended the July 8 meeting. Further, I have watched closely over the past several years how the MAA is being implemented and find that there are significant problems with this implementation in effectively beginning to control the aquatic life toxicity associated with the use of certain pesticides in the state. At the July 8 meeting, the DPR staff admitted that there were significant problems in the implementation of the MAA. In some areas, such as urban pesticides aquatic life toxicity management, no implementation has occurred. The State Water Resources Control Board and regional boards need to move ahead to implement programs for the control of aquatic life toxicity due to pesticides from both agricultural and urban sources.

On page 1, under the "Whereas" section, it states *"The SWRCB determined that the adoption of the proposed Policy will not have a significant adverse effect on the environment."* Contrary to this statement, the adoption of the guidance in this Policy could readily have a significant adverse impact on the environment through misdirecting funds for toxic hot spot clean-up and NPDES- permitted discharge control to inadequately defined problem areas. Such situations could result in there being inadequate funds to address the real significant problems. Also, this guidance as currently formulated will almost certainly lead to substantial Superfund-like litigation because of the inadequacies of the guidance in addressing the chemical(s) responsible for a toxic hot spot and the sources of the chemical(s) that cause the toxic hot spot.

Page 2, Item 10, mentions the scientific peer review by the University of California scientists. As pointed out previously and again herein, this peer review was not an appropriately conducted peer review where there was an opportunity for experts in the field to address on an interactive basis the reliability of the information provided to the peer reviewers and the adequacy of the peer reviewers' comments in addressing fundamental technical issues that should be resolved in an appropriate, true peer review arena. The peer review conducted was superficial and inadequate.

One of the issues not addressed in this statement is the tremendous costs that would have to be borne by the state associated with toxic hot spot remediation and chemical constituent control. As discussed previously in my comments, the WRCB in accord with the Porter-Cologne requirements should develop an economic analysis of the potential for funds to be misdirected to control of chemical constituents that have been improperly identified based on the guidance provided as the cause of a toxic hot spot. Without this information, the public is not being provided with a reliable assessment of the technical validity and the associated costs for implementation of the BPTCP. This Policy sets in motion a State Water Resources Control Board sediment Superfund - Aquafund that needs to be critically examined with respect to cost. This is an area that

OAL needs to address and should cause the Policy to be returned to the State Board for a proper economic analysis.

Page 5, third paragraph, under "Introduction," states *"Any site-specific variance from the Policy shall be approved by the SWRCB Executive Director."* I urge again that this approval be conducted under a public review process.

Page 6, items 2 and 3, could be interpreted to mean that the regional boards are simply to restate the definitions presented in the Policy for toxic hot spots and ranking criteria. It is important that the regional boards specifically designate the components of the designation and ranking criteria that are applicable to a particular site and provide and in-depth analysis of the adequacy of the information available to reliably designate and rank a toxic hot spot.

Page 6, item 4 "Monitoring Approach," still contains inadequate guidance on the issue of chemical information where it states *"The first step is to screen sites using toxicity tests, benthic community structure, or measures of chemicals in sediments or tissues."* The measures of chemicals in sediments is an unreliable tool to designate a toxic hot spot. A toxic hot spot must be toxic. Just because it contains elevated concentrations of some chemical or group of chemicals that are at some other location toxic should not be used to conclude that at this particular location the presence of these chemicals is a cause of toxicity. Toxicity should be measured directly.

Also, the same technical deficiencies apply to chemical constituents in sediments serving as a source of a hazardous chemical that bioaccumulates in aquatic life. Chemical concentrations in sediments cannot be used to define sources. Site-specific studies need to be conducted to determine whether the constituents in a sediment are, in fact, available to bioaccumulate. The State Board staff are persisting with obviously technically invalid approaches in addressing these issues which could cost the public hundreds of millions to possibly billions of dollars in misdirected funds.

Page 7, under "Reason for Listing," states *"The value given shall be the appropriate trigger value(s) in the definition of a Toxic Hot Spot..."* The trigger value should not be a chemical concentration but should be based on actually measured toxicity or excessive bioaccumulation. The Regional Board should acknowledge that the exceedance of a water quality criteria/standard/objective while required to be considered in designating toxic hot spots is not necessarily a reliable basis for designating toxic hot spots since the US EPA criteria and state standards/objectives based on these criteria assume worst-case conditions which are rarely applicable to ambient water conditions. The exceedance of a worst-case-based criterion/standard/objective for potentially toxic constituents can readily occur without there being toxicity. An example of this situation is Cu in San Francisco Bay and various heavy metals in urban area stormwater runoff.

Page 7, item E, states *"The RWQCB shall also list which chemicals are present at sufficiently high levels to be of concern."* This, again, is technically invalid guidance

since it opens the door for regional water quality control board staff to use Long and Morgan values or MacDonald values or AETs or some other contrived system which attempts to relate total concentrations to adverse impacts. Such an approach has been known for over 20 years to be technically invalid. Also, what the State Board staff called NAS values should not be used for designating and/or ranking toxic hot spots. They are not reliable. The regional water quality control boards should be required to use properly conducted TIE type investigations to determine whether a constituent present in sediments is, in fact, responsible for aquatic life toxicity or excessive bioaccumulation. This should be directed toward a true cause and effect and not an obviously technically invalid "association" such as those that are an outgrowth from Long and Morgan and MacDonald's co-occurrence approaches.

Page 8, under 6A, mentions *"...and the mix of chemicals present as well as any available information on toxicity..."* The issue is not the mix of chemicals, but the mix of chemicals that are in chemical forms that could be adverse to the aquatic life or other beneficial uses.

In this same paragraph, mention is made of determining the "volume" of sediments. Again, total concentrations of a constituent of concern should not be used since it is well known that the availability of chemical constituents in sediments can readily change with depth. Chemical constituents which in surface sediments of a few centimeters might be available, while those at depth could readily be unavailable/non-toxic. The reverse could also occur. Because of this there is need for a site-specific investigation to determine the area/depth where toxic - available forms of constituents are present in assessing the magnitude of the remediation program that is needed for a particular toxic hot spot.

Page 8, item 6B, first paragraph, requires the regional boards to list potential dischargers based on "mix of chemicals." Again, mix of chemicals based on total concentrations is an unreliable approach. A particular urban stormwater discharger may discharge chemical constituents which are potentially toxic, however, the forms and the characteristics of the constituents in the discharge, and the characteristics of the receiving waters cause these constituents to be non-toxic, non-available. A prime example of this is Pb and Cu discharged from urban area and highway stormwater runoff into marine waters. The Pb and Cu can occur at elevated concentrations in these systems, yet be inert in the receiving waters, column and sediments.

Page 8, item 6B, third paragraph, indicates that the section concerned with the regional boards and State Board assuming the role of leadership to initiate clean-up for orphan sites, i.e. where there is no Responsible Party designated, now leaves the situation open as to how orphan sites are going to be addressed.

Page 9, item 6D, third paragraph, uses the term "pollutant." This term is also used at many locations in this draft guidance. Any use of the term "pollutant" should be in strict accord with the Porter-Cologne definition of "pollutant," i.e. a constituent that impairs uses. That is not the way the term is used in this guidance, however. It is used

here as often being synonymous with "chemical constituent" which can readily lead to inappropriate designation and ranking of toxic hot spots.

Page 9, item 6D, last paragraph, states *"...the RWQCBs shall work with responsible parties to determine the appropriate and reasonable cleanup or remediation level."* It should be understood that the public should be part of that process.

Page 10, item 6E, still calls for the regional boards to make estimates of clean-up plan costs based on cost estimates provided in the generic guidance. This approach is not valid. Costs of clean-up should not be estimated until the proper engineering evaluation has been conducted. Inadequately developed cost estimates can readily mislead regional boards, the public, responsible parties, etc. into incorrect assessments of the true costs of clean-up.

Page 11, "Specific Definition of a Toxic Hot Spot," first paragraph, includes new wording that indicates that publicly-owned treatment works, industrial facilities, power generating facilities, agricultural land, storm drains, etc. are not toxic hot spots. It is unclear as to why it was felt necessary to include this statement. These various named items are not waters of the state. This does not mean, however, that discharges from these facilities or areas could not be the cause of a toxic hot spot.

Page 11, under "Candidate Toxic Hot Spot," item 1, states *"The site exceeds water or sediment quality objectives for toxic pollutants..."* As discussed previously and herein and as is well-known in the field, exceedance of a water quality criterion/standard/objective is not a valid basis for judging aquatic life toxicity. Actual toxicity measurements should be made to determine if the constituents which cause the exceedance are, in fact, in a toxic form.

Page 11, item 1, second paragraph, there is technically invalid guidance provided where it states that it *"...requires chemical measurement of water or sediment, or measurement of toxicity..."* The focus should be on toxicity, not chemical measurements since chemical measurements are unreliable for designating toxic hot spots.

Page 11, item 2, continues with the State Board staff's toxicity "associated" with toxic pollutants. If this were truly the case, it would require that the constituents be, in fact, found to be toxic; however, the wording should be changed to "potentially toxic pollutants" to recognize that with few exceptions, most of the chemical constituents in aquatic sediments, including those that are potentially toxic, are in non-toxic forms.

Page 12, second paragraph from item 2 of the previous page, states that *"Toxic pollutants should be present in the media at concentrations sufficient to cause or contribute to toxic responses in order to satisfy this condition."* Again, this is another instance of the staff's persisting with technically invalid approaches of calling toxic constituents "pollutants." The staff is also persisting with the invitation to use Long and Morgan type co-occurrence-based values, rather than proper chemical measurements associated with toxicity tests in a TIE type investigation, to determine whether

constituents in sediments are, in fact, in toxic forms. The staff's guidance will lead to inappropriate designation and ranking of toxic hot spots.

Page 12, item 3, persists with listing the so-called National Academy of Science (NAS) values. As discussed in previous comments, the NAS values only exist in the eyes of State Water Resources Control Board staff. They are not recognized by the National Academy of Science as valid values for determining excessive concentrations of chemical constituents in aquatic organism tissue. The statement is made in item 3 about the tissue toxic pollutant levels collected which exceed FDA and NAS values. No mention is made of the most important criteria for judging excessive levels, namely the US EPA screening values. These are the values that should be used, not FDA and certainly never NAS values.

Again in that same paragraph, the phrase "associated with sediment" is technically invalid if the association is based on total concentrations. It should be based on available concentrations of constituents in sediments that can, in fact, be bioaccumulated.

Page 12, Item 3, "Shellfish," Mussel Watch concentration data should not be used to determine excessive concentrations in tissue. Actual tissue measurements of edible organisms must be the basis for that assessment since Mussel Watch data are dependent on a variety of factors that are not necessarily related to the bioaccumulation that occurs in native organisms.

Page 13, item 4, again the staff use "associated with" toxic pollutants, rather than "caused by" toxic pollutants. Throughout this guidance, cause and effect must be the foundation for association, not the total concentration approach that is advocated by the staff. Many of the parameters listed on page 13, such as histopathology, can readily give inappropriate assessments of impacts caused by particular chemicals. These assessments are best characterized as biomarkers which are interesting and show exposure, but not necessarily adverse impacts on the organisms.

Page 14, "Ranking Criteria," "Aquatic Life Impacts," changes the words "preponderance of" to "substantial" where also "weight of evidence" is deleted. Now the impact on aquatic life is to be based only substantial information. This puts the ranking criteria for impacts on aquatic life even more nebulous in that no longer is the weight-of-evidence required. Simply all that is needed is some, what can be highly arbitrary, substantial information on such things as sediment chemistry, toxicity, etc. Again, as discussed previously, the State Board staff use the term "chemistry" when they mean "chemical composition." "Chemistry" involves the chemical reactions, i.e. definition of those species which are, in fact, toxic.

Page 15, second paragraph, again "preponderance of" is changed to "substantial." I have previously provided detailed comments on the problems with the ranking criteria and will not repeat them here, such as on page 16, Table 1 which still continues the so-called "NAS Recommended Guidelines." Those guidelines were never recommended

guidelines that would be used for regulatory purposes and certainly, since they were developed over 30 years ago and there is vast additional information developed since that time, they should be deleted from all State Board and regional board regulatory activities.

Beginning on page 17, "Toxic Hot Spot Remediation Methods" lists costs which are copied out of a National Resource Council publication. As discussed previously, while this publication is valid with respect to providing general guidance, it is not adequate, nor necessarily reliable, for addressing site-specific situations. It should be used as the starting point for a proper engineering evaluation. This section should have been deleted and the NRC publication be listed as a reference.

The same applies to the remediation costs section beginning on page 33. Again, these costs are not necessarily reliable for site-specific situations.

Detailed back-up information to these comments has been provided in my previous comments, all of which are available as downloadable files from my web site (http://members.aol.com/gfredlee/gfl.htm).

If there are questions about these additional comments, please contact me.

Sincerely yours,

G. Fred Lee

G. Fred Lee, PhD, DEE

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Reference as: "Lee, G.F., 'Additional Comments on Technical Deficiencies on the Guidance on the Development of Regional Toxic Hot Spot Cleanup Plans,' submitted to J. Caffrey, State Water Res Control Board, Sacramento, CA (1998)."