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June 2, 1999

Comments on Consolidated Hot Spot Cleanup Plan

Water Resources Control Board
901 P Street
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Dear Board Members:

Please find attached Dr. Anne Jones-Lee and my comments on the Draft Functional Equivalent Document Consolidated Toxic Hot Spots Cleanup Plan Dated April 1999. Unfortunately again, we are finding that the State Water Board Staff are continuing to provide the Board with technically invalid approaches for designating and ranking toxic hot spots as well as providing inadequate/unreliable guidance on toxic hot spot remediation. The April 1999 draft FED covering the Consolidated Hot Spots Cleanup Plan provides documentation of the unreliable guidance that the State Water Board adopted as BPTCP Policy. As discussed previously prior to adoption of this Policy, the State Board Staff's recommended approach of designating toxic hot spots based on toxicity, excessive bioaccumulation, and/or exceedance of a water quality criterion/objective that is "associated" with an elevated concentration of a chemical constituent is fundamentally flawed.

The staff and Board have persisted in ignoring the vast literature that has been developed over the past 30 years on how chemical constituents in sediments impact aquatic life within or associated with a sediment. It has been repeatedly documented through millions of dollars of research that there is no relationship between the total concentration of a constituent in sediments and the impact of this constituent on aquatic life/water quality. It is well documented in the professional literature through publications of many individuals and groups that the impact of a constituent in sediments on aquatic life is controlled primarily by the concentration of sediment bulk parameters that interact with the constituent of concern to detoxify/immobilize this constituent. The State Board BPTCP staff and Board through adoption of the BPTCP Policy last fall have ignored the basic aquatic chemistry and toxicology that must be incorporated into a technically valid toxic hot spot identification and ranking.

This inadequate sloppy science has generated a significant number of unreliable toxic hot spot cleanup plans that arose out of the unreliable information that was provided by the State Board staff and Board through the BPTCP Policy to the Regional Boards on designating toxic hot spots that utilizes an "association" between the total concentration of a measured constituent in sediments and a "toxic"

response. It is obvious upon examination of the cleanup plans developed by the Regional Boards that many of these “associated” “pollutants” that are used to identify the cause of the toxic hot spot and have been used to identify Principal Responsible Parties (PRP’s) as sources of the associated constituents, that the associated constituent could not be the cause of the aquatic life toxicity that is found in the sediments that have been designated as a toxic hot spot. Repeatedly, the Regional Board cleanup plans list “aquatic life toxicity” as a basis for a toxic hot spot designation; yet list “associated” “pollutants” in the sediments that are of concern because of their tendency to bioaccumulate in edible aquatic life to excessive levels that are a threat to humans who use the organism as food. It has been well known for many years that constituents that accumulate in sediments that tend to bioaccumulate in higher trophic level organisms are rarely toxic to the aquatic life that live in the sediments. This situation means that a number of the so-called toxic hot spots listed by the Regional Boards in their cleanup plans are in error with respect to designating the hot spot through inappropriate association of the constituent responsible for the toxic hot spot.

In the attached comments, we have recommended that the State Water Board and the Regional Boards start over with respect to properly designating and ranking hot spots. It is time for the State Board to admit that previous State Boards and this State Board have made serious errors over the past nine years in allowing the BPTCP staff to spend millions of dollars per year of BPTCP fee funds in inappropriately developed and implemented and now reported studies that are now serving as a basis for the Consolidated Plan. Further, the State Board now needs to admit that the adoption of the BPTCP Policy last fall was an error since the Board did not require that this Policy provide guidance on how to properly determine whether a constituent in sediment at elevated concentrations is responsible for the adverse impact used to designate a toxic hot spot.

Rather than using 1960’s level aquatic chemistry as recommended by the State Board staff in the Policy that was adopted by the State Board, guidance should have been provided in the Policy on how the Regional Boards should determine the constituents responsible for the site characteristic that causes the site to be considered as a toxic hot spot. As we have discussed in previous comments submitted to the State Board, there are well-established techniques for determining whether a constituent in sediments that occurs in elevated concentrations is a likely cause of aquatic life toxicity, altered organism assemblages or serves as a significant source of bioaccumulatable chemicals in higher trophic level organisms.

As part of starting over in the BPTCP, the State Board must obtain competent advice on aquatic chemistry issues that are used to associate chemical constituents in sediments with water quality impacts. Further, the State Board must not allow its BPTCP staff to ignore this advice as was done in connection with SPARC member recommendations on how to associate the presence of chemical sediments with an impact.

The State Water Resources Control Boards’ adoption of the proposed Consolidated Hot Spot Cleanup Plan will set in motion substantial justified litigation by PRP’s which will likely, to a considerable extent, be based on the inappropriate approach recommended in the BPTCP Policy for designating toxic hot spots and the associated constituents responsible. This inappropriate designation of hot spots leads to

potential PRP's having a justified basis for asking the courts for relief from being named as a PRP and/or having their NPDES permit or WDR modified because they discharge a constituent that occurs at the toxic hot spot in elevated concentrations. Because of this inappropriate Policy the Regional Boards will have to devote substantial amounts of their already limited resources to this litigation where the outcome will in many instances certainly be that the designation of toxic hot spots in accord with the BPTCP Policy was based on inadequate/sloppy science.

These issues are not being raised for the first time now. Many of them were raised in the early 1990's in comments submitted to the State Board on the approaches that were being adopted by the BPTCP staff. It was obvious then that this program was in serious trouble. Unfortunately, the prediction about the program failing to achieve meaningful results have proven to be true. There is no way to easily salvage this situation except through starting over in which the emphasis must be on proper designation of toxic hot spots and the associated constituents responsible. The 1960's level sloppy science involving the use of the total concentrations of a constituent as a basis for designating a toxic hot spot should not be allowed. It is well known that elevated concentrations of constituents of potential concern in sediments can and should be used as a basis for conducting further studies to determine whether the constituent of potential concern is in a toxic/available form and is primarily responsible for the "toxic" characteristics of the site.

The negative comments on the approaches used by the State Board BPTCP staff and now Board in developing and now implementing the BPTCP Policy should not be interpreted to mean that the authors find that there is no need for a valid BPTCP. There is need for a reliable, well-funded program to identify true, significant toxic hot spots in the state's waters. Associated with this identification should be a proper determination of the constituents responsible for the toxic hot spot characteristics, such as aquatic life toxicity, excessive bioaccumulation, or altered organism assemblages. Further, reliable studies should be done to determine the source of the constituents responsible for toxic hot spots. This was the intent of the original BPTCP legislation. Unfortunately, this program, as formulated and implemented by the State Water Resources Control Board BPTCP staff adopted what were recognized at the time, technically invalid approaches for achieving the Legislature's objectives of the program.

Previously we have provided detailed comments on the significant technical problems with the way in which the Water Resources Control Board BPTCP staff conducted the BPTCP. Beginning in the spring of 1998 detailed comments were provided on the then-draft Policy proposed by the State Board BPTCP staff. These comments are available in the BPTCP section of our web site, <http://members.aol.com/gfredlee/gfl.htm>. The April 1990 Draft Functional Equivalent Document for the Consolidated Toxic Hot Spots Cleanup Plan suffers from the same highly significant technical problems that prevailed throughout this program.

Please do not allow the State Board BPTCP staff to provide their typical superficial response to these as well as comments submitted by others. If there is any doubt on the part of the State Water Board members about the appropriateness of these comments, please have the issues peer reviewed in a full public

interactive peer review process. This peer review should not be conducted by a single individual(s) selected by the State Board staff to support their position, but should involve the development of a peer review panel consisting of at least three knowledgeable individuals in aquatic chemistry/toxicology. The selection of the peer reviewers for the peer review panel should be a public process where the peer reviewers are knowledgeable and will take the time to fully review the pertinent information on the topic. They should review not only the Board's BPTCP staff's discussion of issues, but also the comments made by others on the lack of validity of the staff's approach.

The peer review panel should present the preliminary results of their reviews in a public meeting where the public has the opportunity to question and comment on the adequacy of the review. The reviewers then should be given the opportunity to make revisions in their review based on any new information obtained and develop a final review which is then submitted to the Board where again the public would have the opportunity to comment on its adequacy. Adoption of this approach will enable the Board to fully understand the serious errors that have been made in the development of many of the regional toxic hot spot cleanup plans with respect to associating the constituents responsible for the toxic hot spot. This issue is of such importance to appropriate spending of remediation funds for toxic hot spots to justify this type of comprehensive review.

As in the past, we would be happy to answer questions on our comments. Also, we are interested in working with the State Board in properly formulating and implementing a BPTCP Policy that will in a technically valid and cost effective manner identify and remediate significant toxic hot spots in the state's waters.

Sincerely yours,

G. Fred Lee

G. Fred Lee, PhD, DEE

enclosure

**Comments on Draft Functional Equivalent Document
Consolidated Toxic Hot Spots Cleanup Plan, Dated April 1999
Developed by the Division of Water Quality, State Water Resources Control Board**

Submitted by
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June 2, 1999

These comments discuss significant technical deficiencies associated with the State Water Board's BPTCP staff's FED for the Consolidated Toxic Hot Spot Cleanup Plan.

Failure to Conform to CEQA Requirements

On Page 4 a discussion is presented about how the FED must comply with CEQA requirements. This FED falls far short of complying with the CEQA requirements in providing a reliable, **full disclosure** discussion of the consequences of following the BPTCP implementation Policy adopted by the State Board in the fall of 1998, with respect to causing the people of California to spend large amounts of money inappropriately for toxic hot spot remediation and through additional treatment of wastewater discharges/stormwater runoff that could arise from failing to properly identify the source of the constituents responsible for a true toxic hot spot.

As discussed in previous comments, the State Board staff, and unfortunately the State Board, adopted a Policy that allows a technically invalid approach to be used to determine the constituents responsible for a toxic hot spot and to identify the source of the constituents from existing point source dischargers, where this identification could lead to an existing NPDES permit- holder having to provide additional treatment in the name of preventing additional/new toxic hot spots. As has been pointed out by the authors repeatedly over the past several years in comments to the State Water Resources Control Board, the State Board staff's proposed approach for identification of the constituents responsible for toxic sediments, which relies on "association" with total concentrations of constituents, is obviously fundamentally flawed and ignores 30 years of high-quality research that has been done by competent individuals on the relationship between the presence of chemical constituents in sediments and their impact on aquatic life.

The State Board staff and the Board have now created a California aquatic Superfund-Aquafund which, unless this is corrected immediately so that proper use of chemical information is made in identification of the constituents responsible for a toxic hot spot and the sources of the constituents that cause toxic hot spots, the public and private interests in California could be spending many millions to tens of millions of dollars unnecessarily to comply with the current BPTCP Policy. These issues should have been discussed in a properly developed FED that complies with CEQA requirements for full disclosure.

Inappropriate Designation of Toxic Hot Spots Based on Exceedance of Water Quality Objectives

Page 6, mid-page, begins a discussion of toxic hot spot identification. As is discussed previously, and is well recognized, one of the basic parameters in the original legislation for toxic hot spot identification, namely “(3) exceed SWRCB or RWQCB-adopted water quality or sediment quality objectives,” is fundamentally flawed when US EPA worst-case-based water quality criteria are used as a basis for this assessment. Those familiar with how US EPA water quality criteria and state standards based on these criteria are developed know that these criteria are designed to be worst-case-based, where they may be applicable to Lake Superior but certainly are not applicable to most other waters in the United States. To designate that a toxic hot spot based on exceedance of a water quality objective of this type, where no toxicity measurements are made to confirm that the exceedance represents a toxic condition, is technically invalid and strongly contrary to the public’s interest in establishing a basis for a wise expenditure of public funds. This issue was recognized early by the State Board staff and others as a problem with how the original regulation was established, and it was pointed out to the State Water Resources Control Board. However, the State Water Resources Control Board did not go back to the legislature to correct this problem.

Inappropriate Approach for Determining the Cause of a Toxic Hot Spot

Page 6, under Toxic Hot Spot Investigation, second paragraph, last sentence states,
“The BPTCP efforts continue this work by focusing on measures of effects (such as toxicity) with the associated pollutants.”

This sentence goes to the very heart of the fundamentally flawed approach that the State Board staff and Board adopted. The issue is not whether toxicity is associated with an elevated concentration of a constituent in toxic sediments; it should be one that the constituent is responsible for the toxicity, i.e., cause and effect. It has been known since the 1960s that the “association” approach is technically invalid. What should have been said is “caused by” a pollutant, where proper studies are done to determine whether a particular constituent present in sediments is, in fact, responsible for the toxicity measured. This is one of the most significant fundamental problems with the BPTCP program.

Inadequate BPTCP Data Collection for the Funds Available

The top of Page 7 presents a discussion of the studies that have been done in the BPTCP that have generated data. While substantial data have been generated, the actual production of reliable and adequate data in this program has fallen far short of what it should have been if the program had been properly planned and implemented. While the State Board staff, under pressure of the BPTCP Advisory Committee, indicated that it was the staff’s policy not to make available information on how the funds were or are now being expended in the program, i.e., the expenditure of public and private funds collected as fees has never been made available for public review. Such a review would show that the program has been mismanaged by the BPTCP staff. This problem was pointed out early to the State Water Resources Control Board and, while the former Board Chairman, Maughan, indicated early in the program that the BPTCP program would be conducted in the full public review arena, in fact it has been conducted without adequate technical review.

There is need to conduct a detailed audit of how the fee funds that were collected by the State Water Resources Control Board were actually used. What were the expenditures? How much of the funds were wasted on inappropriate studies should now be defined. Developing a public discussion of these issues will help insure that the next time programs of this type are undertaken the State Board, they are conducted under full public peer review, including a detailed, year-by-year accounting of how funds were spent, and what reliable information was generated by the expenditures. Further, annual reports must be provided to the Board and public for their review. These issues were called for early in the program by members of the public. The State Board BPTCP staff were able to conduct this program largely without public review during its first five years. By the time that some essentially non-technical public review became involved in the mid-1990s, the program was already so mismanaged that there was little hope of achieving its initial objectives in a meaningful way.

For example, the State Board staff made an arbitrary decision not to include bioaccumulation studies, yet this is obviously one of the most important issues that should have been addressed in the BPTCP. Further, the State Board staff's decision to not include true cause-and-effect studies to determine the constituents responsible for actual toxicity, where appropriate sediment chemistry investigations would be conducted to identify the toxic components in the sediments, was another highly significant error on the part of the staff. This has left the Regional Boards with massive data gaps that will have to be filled before the BPTCP remediation program can be properly implemented.

Flawed Ranking Criteria

Page 7 presents a brief discussion of Ranking Criteria. The authors have provided detailed discussions of the fundamental flaws with many of the ranking criteria that were adopted by the State Board staff for ranking toxic hot spots. The discussion of these issues is available from the authors' website in the BPTCP section. As discussed, many of these are inappropriate for characterizing the significance of the presence of chemical constituents in sediments as they impact the beneficial uses of waters.

Failure to Achieve Development of Sediment Quality Objectives

Page 7 briefly discusses Sediment Quality Objectives. However, there is no discussion presented on the issues of the flawed approach that the State Board staff adopted against recommendations of an advisory panel for developing sediment quality objectives. Finally, after several years, the State Board staff had to announce that they had given up on their sediment quality objectives development. While they tried to blame this on insufficient fee collections, as discussed previously, the problem was not fee collection, it was due to mismanagement of the program by the State Board staff.

Inadequate Oversight of BPTCP

Beginning at the bottom of Page 8, under Program Organization, there is a discussion of the reviews of the activities of the BPTCP. This discussion does not present the actual situation that developed in connection with these reviews. For example, the Scientific Planning and Review Committee (SPARC) made a number of comments on the inappropriate approaches that were being used for associating chemical constituents with toxicity. The State Board staff, however, chose to ignore the recommendations

of the SPARC and proceeded with a technically invalid approach for designating constituents responsible for toxic hot spots.

The BPTCP Advisory Committee made a decision early in their deliberations not to become involved in the details of the technical issues associated with the BPTCP. A request was made of this committee to appoint a subcommittee to address the significant technical problems that were evident in the way the State Board staff was carrying out the BPTCP. The BPTCP Advisory Committee chose not to accept this recommendation, with the result that this committee never fulfilled its responsibilities of critically reviewing the approaches developed by the State Board staff, which became part of the BPTCP Policy for designating, ranking, and associating toxic hot spots with chemical constituents.

Unreliable Guidance Provided to Regional Boards

Beginning on Page 11 is a description of the Consolidated Toxic Hot Spot Cleanup Plan. On Page 25, under the topic *RWQCB Listing and Ranking of Candidate Toxic Hot Spots*, the third paragraph states,

“Did each RWQCB correctly evaluate and use the definition of a toxic hot spot and rank sites using the approved ranking criteria? Should the SWRCB adopt the lists of candidate toxic hot spots and the ranking matrices as developed by the RWQCBs?”

The following paragraph states,

“It appears that for the most part the RWQCBs have used the definition of a candidate toxic hot spot correctly.”

This discussion should include mention of the fact that a number of the Regional Water Quality Control Boards have used criteria for designating and ranking toxic hot spots which are not technically valid. These issues are discussed further in a subsequent section of these comments. While the Regional Board staff have, in general, followed the guidance provided by the State Board staff in the Policy, this guidance contains a number of technically invalid approaches that cause sites to be designated and/or ranked as toxic hot spots of a high priority that are not technically valid.

Review of Toxic Hot Spot Designation and Ranking

Beginning on Page 26 and continuing for the next several pages is a listing of candidate toxic hot spots identified in the regional toxic hot spot plans. A review of this listing shows the obvious technically invalid approach that has been used for associating a toxic hot spot designation with a “pollutant.”

In the Canada de la Huerta Shell Hercules Gas Plant Site it states that the reason for listing includes sediment and water toxicity and sediment chemistry, where the pollutant listed is PCBs. Those who understand elementary aspects of PCB chemistry and toxicology know that PCBs rarely cause aquatic life toxicity. In almost all situations PCBs are of concern in sediments because the sediments serve as a source of PCBs that bioaccumulate to excessive concentrations in edible aquatic organisms. Further, “sediment chemistry,” which is used by the State Board staff incorrectly to mean sediment composition, is not a reliable parameter for designating a toxic hot spot. High concentrations of PCBs can, in fact, occur in sediments in non-toxic forms, dependent on the presence of detoxification constituents in the sediments.

This issue has not been reliably addressed by the Regional Water Quality Control Board.

Under the Humboldt Bay Eureka listing, the reason given for the listing is bioassay toxicity and the pollutants are lead, silver, antimony, zinc, methoxychlor, and PAHs. This is a grab bag approach in which constituents with elevated concentrations are listed as pollutants causing the aquatic life toxicity. While the sediments are toxic, the cause - constituents responsible for the toxicity - have not been identified. A proper study of any of the constituents listed as “pollutants” could readily show that none of these is responsible for the toxicity found.

The Los Angeles Inner Harbor Dominguez listing human health and aquatic life impacts lists DDT, PCBs, PAH, cadmium, copper, lead, mercury, zinc, dieldrin, and chlordane as pollutants. Again, this is a grab bag approach in which a number of constituents with elevated concentrations are designated as pollutants without properly determining whether the constituents are in toxic/available forms. While DDT and PCBs, mercury, dieldrin and chlordane are of concern in sediments because of their potential to bioaccumulate, the issue that has to be addressed is whether the fish associated with this area have elevated critical concentrations for impacting human health. Unless this kind of evaluation is made, the human health designation could readily be in significant error.

Further, with respect to cadmium, copper, lead and zinc as being responsible for aquatic life impacts, again the kinds of studies needed to determine whether these metals are in toxic/available forms in these sediments have not been done. All of these metals would tend to be detoxified by sediment sulfides. Unfortunately, the BPTCP program was so poorly managed that a number of the study areas did not include acid volatile sulfide measurements, even though these were well established at the time as critical measurements for determining whether heavy metals are potentially toxic in a sediment.

The same kind of inappropriate designation and listing, as well as pollutants responsible, occurs in the Los Angeles Outer Harbor Cabrillo Pier. This situation also occurs in the Lower Newport Bay Rhine Channel. The sediments are toxic. However, while the constituents listed are present in elevated concentrations, no studies have been done to determine whether these elevated concentrations are in toxic/available forms.

The Moss Landing Harbor and Tributaries listing includes aquatic life and human health concerns based on “sediment chemistry,” “toxicity,” “bioaccumulation,” and exceedances of “NAS” and /or FDA guidelines. This listing lists pesticides, PCBs, nickel, chromium and TBT as “pollutants.” An inappropriate approach has been used for designating a listing where exceedance of an NAS value is used. As discussed in detail in previous comments, the so-called NAS (National Academy of Science) values are not credible values for determining excessive concentrations of constituents. Further, pesticides, PCBs, nickel, chromium and TBT have not been properly identified as pollutants. They are constituents present in the sediments that need to be investigated as to whether they are real pollutants, i.e., impair the beneficial uses of the waterbody in which the sediments are located.

Mugu Lagoon/Calleguas Creek tidal prism, Eastern Arm, Main Lagoon, Western Arm reason for listing is aquatic life impacts. However, pollutants are listed as DDT, PCBs, metals, chlordane and chlorpyrifos. There are significant legitimate questions as to whether chlorpyrifos is responsible for aquatic life toxicity when it is present in sediments. Chlorpyrifos tends to bind tightly to sediments and is not likely in a toxic form. Chlordane, DDT and PCBs are not likely to be toxic in sediments. They are of concern because they tend to bioaccumulate. With respect to the metals, site-specific studies need to be done to determine if the metals are in a toxic form. These kinds of studies have not been done.

The same kind of situation occurs for the San Diego Bay Seventh St. Channel Paleta Creek Naval Station. While sediment toxicity and benthic community impacts are appropriate reasons for listing a toxic hot spot, unless the studies have been done to show that chlordane, DDT, PAHs and “total chemistry” are responsible for this toxicity or benthic community impacts, the pollutants listed are inappropriately selected. With respect to total chemistry, it is well-known that Long & Morgan ERM and MacDonald PEL values are not reliable assessments of the cause of toxicity in sediments. These issues have been discussed in detail in previous comments, yet the State Board staff, through the BPTCP Policy, have lead the State Board down a technically invalid path which used co-occurrence-based values to designate pollutants. Even the most elementary understanding of aquatic chemistry and toxicology shows that this approach is technically invalid.

The San Francisco Bay Castro Cove lists aquatic life impacts due to mercury, selenium, PAHs and dieldrin. Again, certainly for mercury, the concern is bioaccumulation and not aquatic life impacts. It is likely that that is also true for dieldrin. With respect to selenium and PAHs, the studies have not been done to properly designate these constituents as pollutants for these sediments. The actual constituents responsible for the aquatic life impacts have not been determined.

Beginning on Page 31, there are a number of “moderate ranked” sites. The same kinds of problems prevail throughout the moderately ranked sites and low ranked sites as discussed above for the high ranked sites. For constituents that are of concern because of their bioaccumulation, it is inappropriate to list constituents that are primarily of concern because of the potential to bioaccumulate as a cause of aquatic life impacts. These are not aquatic life impacts but human health impacts, through human consumption of fish and other aquatic life that contain excessive concentrations, because the constituents tend to accumulate in aquatic life to excessive levels. For metals and toxic organics, again the problem is not elevated concentrations or exceedance of an ERM or PEL value for constituents in the sediments. The issue is whether the constituents in the sediments are in toxic/available forms. Because of the inappropriate guidance provided by the State Board staff in developing the BPTCP Policy, the Regional Boards have been lead astray to designate the cause of sediment toxicity or altered aquatic organism assemblages based on an association that is obviously technically invalid.

Fundamentally, the Regional Boards, using the ill-advised State Board BPTCP staff-developed Policy, have, in a number of instances, designated and ranked toxic hot spots based on inappropriate criteria. Further, and most importantly, they have designated constituents responsible for the toxic hot spot

based on fundamentally flawed approaches that, almost certainly, have, in many cases, attributed a toxic hot spot to a group of constituents that are not responsible for the characteristics of the toxic hot spots that appropriately caused its designation.

Need to Start Over in Designating and Ranking Toxic Hot Spots

Overall, the State Board and Regional Boards need to start over with respect to designating and ranking toxic hot spots. First, no sediment or water column location should be designated as a toxic hot spot unless, in fact, it is toxic or a likely source of constituents which are accumulating in edible fish tissue above credibly based regulatory agency critical concentrations for consumption of the fish as human food. All of the elevated concentration in sediments, co-occurrence-based excessive concentrations, NAS values, etc. must be removed as a basis for designating a toxic hot spot.

Appropriate Use of Exceedance of Water Quality Objectives

With respect to exceedance of a water quality objective, those situations which are mandated by the inappropriate regulatory approach set forth in the original regulations should be categorized as areas that need confirmation based on actual toxicity measurements. If the exceedance of a copper water quality criterion such as in San Francisco Bay occurs without a concomitant toxicity due to copper, then the Bay should not be listed as a toxic hot spot due to the excessive concentrations of copper above water quality objectives. There is need to immediately inform the legislature that they must change the designation of the toxic hot spots so that the exceedance of a water quality criterion/ objective represents a situation that deserves further attention through appropriate measurements to determine whether there is a real toxic hot spot. This exceedance in itself should not and cannot be used to reliably designate a toxic hot spot.

Need for Evaluation of the Water Quality Significance of Sediment Toxicity

At this time there is no reliable basis provided for ranking toxic hot spots. The State Board BPTCP staff guidance must be recognized as being technically invalid and should not be used for ranking toxic hot spots. There is a substantial research effort needed to understand what toxicity in sediments means to the beneficial uses of a waterbody. As discussed by Lee, G.F. and Jones-Lee, A., "Evaluation of the Water Quality Significance of the Chemical Constituents in Aquatic Sediments: Coupling Sediment Quality Evaluation Results to Significant Water Quality Impacts," In: WEFTEC '96, Surface Water Quality and Ecology I & II, Vol 4, pp 317-328, Proc. Water Environ. Fed. Annual Conference (1996), many aquatic sediments are naturally highly toxic, yet the overlying waterbodies have highly productive fisheries. To assume, as is being done, that the presence of toxicity in sediments means that the beneficial uses of the overlying waters within the waterbody are significantly impaired is fundamentally flawed. There is far too much evidence to indicate that that approach represents a technically invalid assessment of what sediment toxicity means to beneficial uses of waterbodies of concern to the public.

All of the assessment through the BPTCP staff and State Board Policy of the constituents responsible based on elevated concentrations of a constituent in sediments is fundamentally flawed and must be discarded as unreliable. Before any true toxic hot spot situation is designated as being caused by a particular constituent or group of constituents, studies need to be done to determine whether the

constituents of potential concern are, in fact, responsible for the adverse impacts or aquatic life toxicity.

Suggested Approach

Once the Regional Boards have compiled a proper listing of toxic hot spots which reflects conditions of significant aquatic life toxicity, significant sources of bioaccumulatable chemicals that are accumulating in fish and other edible aquatic organisms of concern, and/or significantly altered aquatic life organism assemblages associated with the sediments or water column of a waterbody, and there has been a proper investigation of what is the cause of this “toxic hot spot,” then the State Board should develop a consolidated set of toxic hot spots and the associated plans to clean up these hot spots.

For large waterbodies, such as San Francisco Bay, where higher trophic level organisms, such as edible fish, have excessive concentrations of a constituent, studies need to be done in various parts of the Bay to determine if less mobile organisms, such as benthic invertebrates, present in or upon the sediments of a particular region have significantly elevated concentrations of the bioaccumulatable chemical of concern. This approach helps identify a toxic hot spot for a bioaccumulatable chemical such as the chlorinated hydrocarbon pesticides, PCBs, dioxins and mercury.

A key part of this process should be the requirement that the Regional Water Quality Control Boards make a significant effort to estimate the beneficial use improvement of a waterbody in terms of public perceivable beneficial use characteristics that will occur as a result of implementation of the cleanup plan. The current approach of assuming that tens to hundreds of thousands, as well as millions, of dollars spent in cleaning up a particular toxic hot spot will significantly improve the beneficial uses of a waterbody that are perceivable by the public as an appropriate expenditure of their funds should be terminated in favor of developing toxic hot spot cleanup plans and their implementation based on those situations where the public will agree that their funds have been spent wisely in addressing toxic hot spot issues. As it is being developed now under this current ill-advised BPTCP staff-recommended Policy that was adopted by the State Board last fall, the public will likely look back on this Board’s BPTCP Policy as an inappropriately formulated policy that is leading to massive expenditure of public funds with little or no improvement in the beneficial uses of the receiving waters for which the cleanup programs have been implemented.

If the State Board allows the current BPTCP State Board staff’s recommended approach to prevail, the Regional and State Boards will find themselves in endless justified litigation based on technically invalid policy that was adopted by the State Board to designate and rank toxic hot spots, and especially to “associate” a toxic hot spot with a particular constituent or group of constituents.

It is important to note that not all of the Regional Boards follow technically invalid approaches. For example, in the Central Valley Region diazinon and chlorpyrifos were appropriately designated as the cause of toxic hot spots within the Central Valley waters, where *Ceriodaphnia* toxicity was identified. Further, the excessive mercury within edible fish taken from the Sacramento River watershed, Delta and San Francisco Bay is an appropriate designation of a toxic hot spot. Clearly mercury, at some locations, is responsible. However, whether the toxic hot spot designation for excessive mercury is the source of the

mercury that is accumulating within edible fish tissue remains to be demonstrated. It could readily be that elevated mercury concentrations in sediments are not the source of the mercury that is bioaccumulating in fish to excessive levels within the waterbody.

Starting over to properly identify toxic hot spots and then reliably determining through appropriately conducted cause-and-effect studies involving toxicity investigation evaluations, biouptake studies, etc., the State Water Resources Control Board would take the BPTCP program from its current highly technically invalid basis to one that has considerable technical merit that should be supported by the public as a credible approach for designating and remediating true toxic hot spots.

As discussed in a subsequent section, the State and Regional Water Quality Control Boards also need to start over with respect to developing remediation programs for properly identified toxic hot spots. Once a toxic hot spot has been identified, then an assessment should be made of the significance of this toxic hot spot to the beneficial uses of the waterbody in which it is located. The mere presence of toxicity or the sediments serving as the source of constituents that could impair the beneficial uses of the waters is not sufficient justification to cause the public to spend large amounts of funds in toxic hot spot remediation. As discussed in previous comments and herein, many waterbodies have toxic sediments due to natural causes and still have excellent fisheries. The coupling between toxicity and impairment of beneficial uses is poorly understood. It is an area that needs to be investigated at a number of locations in order to ensure to a reasonable degree that funds spent for toxic hot spot remediation are being used in a technically valid, cost effective manner to address real significant water quality problems of concern to the public.

Non-qualifying Sites

Page 33, Table 5 lists Site Identified by RWQCBs that Does Not Qualify as a Toxic Hot Spot, where a North Coast, Bodega Bay, Spud Point Marina was listed as a toxic hot spot based on “bioassay toxicity,” with the pollutants “unknown.” The statement, “*Pollutants associated with sediment toxicity are not identified.*” given as a reason for not listing the toxic sediments as a toxic hot spot represents the ultimate in technically invalid approaches for appropriate implementation of the BPTCP legislation. The concern should be whether or not a particular waterbody or part of a waterbody is a toxic hot spot. Listings should occur independent of whether there is an association with some elevated concentration of a constituent. As discussed, and as will be documented as proper studies are done, many of the so-called “pollutants” which are “associated” with a toxic hot spot because of their elevated concentrations will likely be found to be of limited significance as a cause of the toxic hot spot characteristics. This situation is another of the fundamentally flawed approaches that the State Board has adopted in appropriately protecting the water resources of the state from aquatic life toxicity and excessive bioaccumulation.

Inadequate Provisions for Removing Toxic Hot Spot Listings

Page 37, under ***Issue 5: Removing locations from and reevaluating the list of known toxic hot spots***, states in the second paragraph under Issue Description, “*The concern raised concerning delisting was that sites that have been remediated should no longer be listed in the Consolidated Toxic Hot Spots Cleanup Plan. If a site is remediated*

presumably the site is no longer a toxic hot spot.”

In addition to the concern about remediated sites being eligible for delisting, concern was raised in discussions about inappropriately classified sites. The poor quality science used in site classification, and especially designation of constituents responsible, will result in a significant number of inappropriate classifications and designations. A procedure needs to be developed to remove sites from the toxic hot spot list where this type of situation occurs.

Modification of NPDES Permits

Page 40, *Issue 6: Guidance on reevaluating waste discharge requirements in compliance with Water Code Section 13395* fails to provide a discussion of one of the key issues that needs to be considered, namely, the appropriateness and reliability of designating a particular source of constituents that have been listed to be a cause of a toxic hot spot. The “association” approach is obviously technically invalid and will require that proper studies be conducted at many sites to identify the real source of the constituents that have been shown to be the cause of the toxic hot spot.

The 1960s-level aquatic chemistry that has been used by the BPTCP staff, which ignores the fact that chemical constituents from various sources exist in a variety of chemical forms, only some of which are toxic/available in certain types of waterbodies, cannot and will not be allowed to prevail in identifying sources of constituents that should have their NPDES permits or waste discharge requirements modified in order to prevent future development of a toxic hot spot.

Unreliable Estimates of Remediation Costs

Table 6 on Page 46, presents the “Range of Costs to Remediate Toxic Hot Spots, Funding Potentially Recoverable from Dischargers and Unfunded Amount.” As was discussed in our previous comments, the State Board staff suggested approach for estimating cost, which was incorporated into the Policy, is a non-credible approach that should not have been used. In order to reliably estimate the cost of remediation of a toxic hot spot, far more reliable information has to be available at most of the candidate sites than is available in the Consolidated Plans. Table 6 is a hodgepodge of information that has little or no reliability and should be removed from the Consolidated Plans. Presenting this information to the legislature will almost certainly become recognized as a serious error on the part of the State Board. The off-the-cuff, non-engineering approaches to complex engineering problems, such as appropriate remediation of contaminated sediments, have no place in developing information for the legislature that is to be used to try to generate funds for contaminated sediment clean-up.

When the senior author made the comment at the last BPTCP Advisory Committee meeting about the lack of engineering in estimating cost of site remediation, C. Wilson commented that millions of dollars of studies have been conducted at some sites. This kind of comment reflects his lack of understanding of engineering. Those who understand these issues know that studies of the type that have been done are not engineering studies designed for remediation purposes.

Unreliability of Mass-based Pollutant Trading

Page 49, Item 8. lists Mass-based Permit Offset System (Trading credits). The unreliability of this

approach has been discussed in a subsequent section of these comments.

Unreliable Information on BPTCP Accomplishments

Page 52, under Item 2. at the top of the page, states,

“The existing BPTCP has effectively identified toxic hot spots in several enclosed bays and estuaries in California.”

That statement is unreliable. They have identified areas with toxicity. They have not properly identified toxic hot spots where the cause of the toxicity has been reliably determined.

The SWRCB should be required to discuss the significant technical limitations of the information that is being presented to the legislature on the number of known toxic hot spots, their relative rank, estimated funding, and the need to create a program to fund cleanup. The legislature and the people of California are entitled to know the significant problems that exist in these Consolidated Plans with respect to proper identification of toxic hot spots, their cause, sources of constituents responsible and the costs for their remediation.

Discussion of the Characteristics of Toxic Hot Spots

Pages 54 through 257 present a discussion of various toxic hot spots that have been identified under the BPTCP. A critical review of these will show that for many of them there is an inadequate information base to assess the water quality significance of the toxic hot spot in impairing the beneficial use of a waterbody in which the toxic hot spot is located. Further, with few exceptions, the “association” approach used involving elevated concentrations of constituents as a cause of the toxic hot spot is likely to be highly unreliable.

Inadequate Assessment of Environmental Benefits

Beginning on Page 258 is a discussion of environmental benefits of the proposed Consolidated Toxic Hot Spot Cleanup Plan. The BPTCP staff state in paragraph two,

“Quantitative information on the benefits derived from remediation are generally not available to make a specific assessment of the economic and biological benefits of remediation.”

Basically, these proposed plans, if implemented as proposed, are trapping the California public into multimillion dollar expenditures without having an adequate information base to justify these expenditures. Not only has the inappropriately developed BPTCP Policy failed to properly determine the constituents responsible for aquatic life toxicity or the sources of constituents responsible for excessive bioaccumulation and toxicity, but also there is no understanding of how remediation/removal of the designated constituents from a particular location will impact the beneficial use of a waterbody of concern to the public. Before embarking on the state of California’s aquatic Superfund-Aquafund, a substantial program should be undertaken to determine what benefits, if any, in the designated beneficial uses of the state’s waters will occur as a result of the implementation of the proposed cleanup plans.

Page 262 begins a discussion of Potential Adverse Environmental Effects of the Proposed

Consolidated Toxic Hot Spots Cleanup Plan. The State Board BPTCP staff, however, have failed to discuss one of the most important consequences of adoption of the proposed cleanup plan, namely the diversion of funds that could be used for environmental restoration to address real, significant water quality impairments of concern to the public. There is only a limited amount of money available for environmental restoration. These funds should be used in the most technically valid, cost-effective manner to address highly significant problems that affect the public's use of the state's water resources. Throwing money at toxic hot spot remediation without having an adequate, reliable database/understanding of what will be achieved as a result of the expenditures for remediation in terms of improved designated beneficial uses of the waters in which the remediation takes place, is strongly contrary to the public's interest and wise use of environmental management funds available.

Failure to Reliably Discuss Potential Adverse Impacts of Remediation

Page 276 mentions landfill disposal of the contaminated sediments. It fails to discuss, however, that today's Subtitle D landfills that are permitted under current Water Resources Control Board Policy will, with very few exceptions, cause groundwater pollution where the disposal takes place. Constituents which are not mobile or available in aquatic sediments can become mobile in upland and landfill disposal situations. These issues are well-known and should have been discussed.

Unreliable Information on Impact on Urban Stormwater Management

Page 298, under Storm Water/Urban Runoff states,

"To date, the efforts of the municipalities subject to MS4 permits have been focused on implementation of BMPs to reduce pollutants, rather than on treatment of storm water to remove pollutants."

This is an inappropriate statement of issues, in that the primary issue of concern in urban stormwater runoff is the definition of what is a pollutant, especially with respect to chemical constituents in urban area and highway stormwater runoff. These issues have been extensively discussed in the publications developed by the authors in the Stormwater section of their web site, <http://members.aol.com/gfredlee/gfl.htm>. Unlike the BPTCP program, the stormwater program requires that real pollutants be identified before large amounts of public funds are spent trying to control them.

Page 299, in the fourth paragraph, states,

"The proposed Consolidated Toxic Hot Spots Cleanup Plan makes no changes in the existing storm water program at the SWRCB and RWQCBs or the way in which BMPs, BAT, or BCT would be implemented, and any of these measures can be developed through a watershed process."

That is an incorrect assessment of the impact of BPTCP on the state of California population regulated through NPDES stormwater runoff permits. With some Regional Boards, either on their own initiative or through the pressure of environmental groups having or proposing to use BPTCP toxic hot spot policy to designate impaired waterbodies, including the use of the technically invalid Long & Morgan co-occurrence-based ERM or MacDonald PEL values, stormwater management agencies - the public - face a situation in which they may be spending large amounts of funds unnecessarily in order to remediate toxic hot spots

in which sediments are toxic and have elevated concentrations of constituents present in the stormwater runoff. However, under the current sloppy science that is being used in the BPTCP program, where there is no need to properly identify whether a constituent at an elevated concentration is the cause of toxicity, the public could be trapped into spending very large amounts of money unnecessarily, where they would be treating stormwater runoff to remove particulate heavy metals, where these heavy metals have been found to be non-toxic in the runoff waters and would be expected, based on their aquatic chemistry, to remain non-toxic in the receiving water column and sediments. It is predicted that the BPTCP program as currently implemented will have a profound adverse impact on stormwater management agencies and the public through inappropriate incorporation of NPDES-permitted stormwater runoff with stormwater management agencies as principal responsible parties for toxic hot spots.

Unreliable Information on Point Source Discharges

Page 300, under Point Source Discharges, suffers from the same kinds of problems as discussed throughout these comments, namely point source dischargers could be trapped in the current BPTCP program into spending large amounts of money as responsible parties remediating contaminated sediments that contain the same constituents in their discharge as present in a toxic hot spot. However, there is no requirement that a proper study be done to relate the presence of a constituent in a contaminated sediment designated as a toxic hot spot to a constituent in a discharge that is responsible for the toxic hot spot impact.

Inappropriate Summary of Adverse Impacts

Table 23, beginning on Page 304, lists some of the staff's conclusions on Potentially Significant Adverse Impacts and Mitigation Measures. It appears that those who developed this table did not proofread it, since the last item on Page 304 has been cut off. Also, it appears that whoever developed this table has limited understanding of the environmental impacts of dredging and dredged sediment disposal. For example, Page 305 on Dredging, Disposal under Environmental Factor, Geology and Groundwater, only discusses destabilization and pilings. There is no mention of groundwater pollution, which can be a significant factor associated with dredged sediment disposal in landfills of the type that are allowed in California today.

On Page 306 under Disposal listing leaching of pollutants into groundwater, states, "*Dry sediments in areas where impermeable liner or membrane blocks leaching.*" This reflects a lack of understanding of both the chemistry of dredged sediments and the ability of the impermeable liners of the type used today to prevent leaching. First of all, the drying of dredged sediments often leads to low pH conditions which mobilize metals upon contact with water. Today's so-called membranes, which are assumed to be liners, only postpone when groundwater pollution occurs. They do not prevent it.

The section on dredging and dredged sediment management and their impacts needs to be rewritten by somebody who understands these issues. The authors have conducted several million dollars in research on behalf of the Corps of Engineers and others on these issues. They have extensive publications on the topic, including a review chapter in the Dredging Engineering Handbook edited by J. Herbich and

published by McGraw Hill (1991). An updated version of their chapter is available from their web site, which will be published in the second edition of the Dredging Engineering Handbook.

Inadequate Reference Listing

Beginning on Page 318 there is a list of references. A critical review of these references will show that the BPTCP staff have again biased their writings by only listing references that support their position on issues. There is considerable literature on these issues that should have been referenced that has previously been brought to the State Board BPTCP staff's attention through previous comments on the BPTCP program and draft documents.

Comments on Draft Functional Equivalent Document, Appendix A, Consolidated Toxic Hot Spots Cleanup Plan Volume I: Policy, Toxic Hot Spots Lists and Findings, Dated April 1999

Lack of Appropriate Guidance

Page 1, Introduction, second paragraph states,

“This plan is applicable, in its entirety, to point and nonpoint source discharges to the waters of the State that can be reasonably determined by the RWQCBs to contribute to or cause the pollution at toxic hot spots.”

As discussed over the years and herein, the State Water Resources Control Board has failed to provide the RWQCBs with appropriate guidance on how to reliably determine the sources of constituents that cause or contribute to pollution at a toxic hot spot. First, the definition of toxic hot spots that has been used does not necessarily conform to the Porter-Cologne requirements of pollution, namely impairment of beneficial uses. Second, the “association” approach, where elevated concentrations of constituents in sediments, irrespective of whether they are in a toxic/available form, are used to determine the “cause” of the toxic hot spot and the source of the constituents that are the “cause” from point and nonpoint sources. The approaches advocated have been well-known for over 20 years to be technically invalid. This approach will lead to inappropriate designation of constituents as being responsible for the toxic hot spot, as well as the designation of principal responsible parties to pay for the cleanup of the contaminated sediments that are declared toxic hot spots based on the current Policy-recommended approaches of “association.”

Inappropriate Mass-based Permit Pollutant Trading

On the bottom of Page 4 is listed “Mass-based Permit Offset System (Trading Credits),” which states,

“A mass-based permit offset system is a tool used to ensure that the largest controllable ongoing sources of pollutants and most cost-effective approaches are used to reduce the discharge of pollutants.”

Once again, the BPTCP staff have failed to incorporate post-1960 level aquatic chemistry, toxicology and water quality into guidance. Mass-based permit offset systems (trading credits) are a fundamentally flawed approach for most situations where they have and will likely be used. This approach ignores the well-known fact that chemical constituents that are potential pollutants exist in a variety of chemical forms, only some of which are toxic/available. While such systems are bureaucratically simple to administer, they

almost certainly will result in inappropriate expenditure of public in the name of water pollution control, which will have little or no impact on the beneficial uses of a waterbody. To assume, as is done in these systems, that all copper from all sources in all waterbodies is equally toxic/available is at best naive and obviously in error.

Porter-Cologne defines pollutants as constituents that impair the beneficial uses of waterbodies. The trading of pollutants, therefore, must be based not on the total concentration, irrespective of whether the constituents being traded are in toxic/available forms, but on real pollutants, i.e., the constituents that impair the overall beneficial uses of a waterbody. Further, as discussed by Lee, G.F. and Jones-Lee, A., "Aquatic Chemistry/Toxicology in Watershed-Based Water Quality Management Programs," In: Proc. Watershed '96 National Conference on Watershed Management, Water Environment Federation, Alexandria, VA, pp. 1003-1006 (1996), pollutant trading must carefully evaluate local near-field effects and far-field effects. Pollutant trading is only valid if the impacts of the constituents (pollutants) are far-field, i.e., located away from the source, where removal of constituents from one source will have no impact on the near-field pollution, but only impacts far-field, which is also impacted by the same pollutant from another source.

While in the second paragraph on Page 5 mention is made of considering the chemical form of the pollutant discharged, this consideration must be based on a careful evaluation of whether the constituent discharged is, in fact, a pollutant, becomes a pollutant in the receiving waters for the discharge, or remains a pollutant in the receiving waters for a sufficient period of time to impair the beneficial uses of a waterbody.

Reevaluation of WDRs

The bottom of Page 6, last paragraph, states,

"RWQCBs shall begin reevaluation of WDRs associated with high priority known toxic hot spots within 120 days after final approval of the Consolidated Toxic Hot Spots Cleanup Plan."

While it is our understanding that this requirement is part of the original legislation, as has been discussed a number of times in the BPTCP Advisory Committee meetings, this requirement could cause significant disruption of Regional Board activities where staff must devote significant time to fulfilling this requirement without having the resources to undertake it in a meaningful way.

The Bottom of Page 6 and top of Page 7, first numbered item states,

"The RWQCBs shall submit a priority list to the SWRCB presenting the reevaluation as follows:

- 1. The list of WDRs associated with each known toxic hot spot that can reasonably be expected to cause or contribute to the creation and maintenance of the known toxic hot spot."*

Because of the inappropriate approach that was used by the State Board staff in developing guidance to the Regional Boards on how they are to evaluate the cause of a toxic hot spot and the source of the constituents responsible, Regional Boards will find themselves in an extremely difficult situation of now

having to properly identify the cause of a toxic hot spot, i.e., the constituents actually responsible, and the source of these constituents. As discussed in previous comments, with the current inappropriate guidance this situation can readily result in the implementation of the BPTCP program cleanup plans becoming mired in litigation which will even further erode the ability of Regional Boards to fulfill their mandated responsibilities because of the staff time and resources that will have to be devoted to this litigation. Potential principal responsible parties, whether public or private, will certainly not allow the sloppy science that is associated with the BPTCP Policy in identifying causes of toxic hot spots and the source of the constituents to cause them to have to spend millions to tens of millions of dollars cleaning up a site. They will have few alternatives but to take the matter to the courts to receive relief from the sloppy science that exists in the State Board-adopted Policy that does not require cause and effect to be established in designating and ranking toxic hot spots and the identification of sources of constituents responsible for toxic hot spots.

Delisting

On the bottom of Page 7 is a listing of items that can be incorporated in a petition to remove a toxic hot spot from the plan. A review of the bulleted items shows that again the State Board staff have provided inadequate guidance. The most likely reason for removing a toxic hot spot, namely inappropriate designation, must be added to this list. Further, PRPs that are named should be able to petition the Regional Board and the State Board to have them removed as a source of constituents that causes a toxic hot spot.

Inadequate or Unreliable Guidance

Beginning on Page 8 and continuing for the next several pages is a presentation of the same materials that have been presented previously as part of adopting the Policy concerned with toxic hot spot identification and ranking. Detailed comments on the unreliability of the State Board staff's guidance have been provided previously. The key issues are summarized below.

Candidate Toxic Hot Spot Definition 1. states,

“The site exceeds water or sediment quality objectives for toxic pollutants that are contained in appropriate water quality control plans or exceeds water quality criteria promulgated by the U.S. Environmental Protection Agency (U.S. EPA).”

This approach is not a valid basis for establishing a toxic hot spot. US EPA water quality criteria and many Regional Board Basin Plan requirements are designed to be protective under worst-case-based conditions. This, in turn, results in many exceedances of water quality standards/objectives which are administrative exceedances related to how the criteria were developed. As discussed by Lee, G.F. and Jones-Lee, A., “Appropriate Use of Numeric Chemical Water Quality Criteria,” Health and Ecological Risk Assessment, 1:5-11 (1995), Letter to the Editor, Supplemental Discussion, 2:233-234 (1996), water quality criteria should be used as indicators of potential problems, not as strict regulatory limits as is set forth in the BPTCP legislation/Policy.

Page 9, Item 3 perpetuates the inappropriate use of National Academy of Sciences (NAS) values for protection of human health and wildlife. This is a well-known fundamental flaw in the BPTCP Policy that is perpetuated throughout the program, even though documentation has been provided which shows that there are no National Academy of Sciences values that are applicable to regulating constituents in aquatic life tissue today.

Page 10, first paragraph, discusses the use of “deployed” animals for determination of excessive bioaccumulation, as part of designating a toxic hot spot. There is substantial literature, some of which has been referenced in previous correspondence on this issue, that shows that deployed organisms are not necessarily reliable to assess the bioaccumulation of potentially hazardous chemicals in edible aquatic life of concern to humans who use the organisms as food. There are a well-known variety of factors that influence the accumulation of hazardous chemicals in aquatic life which are not adequately or reliably addressed in the current programs that use deployed organisms, such as Mussel Watch.

Page 11, under the listing of issues that represent impairment associated with toxic pollutants, is the “Histopathology.” As discussed previously, and is well-known in the field, histopathology is often not a reliable indicator of impairment of an organism. Further, it is often very difficult to associate the cause of abnormalities to specific chemicals from specific sources.

Page 12, under Aquatic Life Impacts, states,

“For aquatic life, site ranking shall be based on an analysis of the substantial information available. The measures that shall be considered are: sediment chemistry, sediment toxicity, biological field assessments (including benthic community analysis), water toxicity, toxicity identification evaluations (TIEs), and bioaccumulation.”

The State Board staff have misled the Board into believing that “sediment chemistry”, by which they really mean sediment chemical characteristics, is an inappropriate tool for assessing aquatic life impacts. Those who are familiar with the elements of aquatic chemistry know that there is frequently no relationship between the composition of sediments, as measured by the total concentrations of constituents present, and their impacts on aquatic life, associated with the sediments.

**Comments on Draft Functional Equivalent Document, Appendix B,
Consolidated Toxic Hot Spots Cleanup Plan
Volume II: Regional Cleanup Plans, Dated April 1999**

A review of the various regional cleanup plans presented in this volume shows that inadequate evaluations have been conducted to properly associate sediment toxicity to the cause of the toxicity, the role that the constituents that are identified in these sediments play in creating the toxic hot spot, conditions that cause it to be listed as toxic, a source of bioaccumulatable chemicals, or as a cause of altered aquatic organism assemblages. Further, a number of toxic hot spot regional plans have an inadequate database to properly identify the source of the constituents that are responsible for the toxic hot spot.

While, for some sites, such as those located immediately adjacent to an industrial discharge, where there are no other discharges, including municipal stormwater runoff or other inputs to the area, then there can be reasonable certainty that the toxicity of the site is due to constituents from that discharge. However, to identify the constituents actually responsible for toxicity requires additional work beyond the superficial approach that was used in most cases by the Regional Boards following State Board BPTCP guidance. The basic problem is that the multimillion-dollar, almost ten-year data collection effort conducted by the State Board BPTCP staff was not properly developed to generate the data needed to implement the BPTCP program.