STATE WATER RESOURCES CONTROL BOARD
RESOLUTION NO. 94-73

AUTHORIZATION TO THE EXECUTIVE DIRECTOR
TO NEGOTIATE AND EXECUTE AN
INTERAGENCY RESEARCH AGREEMENT WITH THE
DEPARTMENT OF FISH AND GAME FOR THE
BAY PROTECTION AND TOXIC CLEANUP PROGRAM

WHEREAS:

1. The Bay Protection and Toxic Cleanup Program (BPTCP) was established by the State Water Resources Control Board (SWRCB) to implement the requirements of Section 13390 et seq. of the Water Code which includes the development of surveillance and monitoring programs for enclosed bays and estuaries of the State.

2. The seven coastal Regional Water Quality Control Boards (RWQCB) and the SWRCB will implement regional monitoring for the BPTCP through this interagency agreement.

3. The SWRCB, the National Oceanic and Atmospheric Administration (NOAA), and the U.S. Environmental Protection Agency's (USEPA) Environmental Monitoring and Assessment Program (EMAP) have entered into a one-year Cooperative Agreement to investigate sediment contamination and biotoxicity in FY 1994-95.

4. The California Department of Fish and Game (DFG) has been the primary contractor for the research activities required by the BPTCP for the past three Fiscal Years (FY 1991-92 through FY 1993-94).

5. The new contract shall be a three-year Task Order Contract.

6. The combined BPTCP and Cooperative Agreement programs have a total of $1,782,000 in laboratory services in FY 1994-95 through FY 1996-97.

THEREFORE BE IT RESOLVED THAT:

1. The SWRCB authorize the Executive Director or his designee to negotiate and execute an interagency agreement with the DFG to perform laboratory services and research for the BPTCP.

2. The contract shall be three years in duration and implemented through tasks orders.

3. The funding for FY 1994-95 through FY 1996-97 is subject to the availability of funds from BPTCP annual fees, NOAA, and USEPA, and it shall not exceed a total of $1,782,000.

CERTIFICATION

The undersigned Administrative Assistant to the Board does hereby certify that the foregoing is a full, true, and correct copy of a resolution duly and regularly adopted at a meeting of the State Water Resources Control Board held on August 18, 1994.

Maureen Marché

Maureen Marché
Administrative Assistant to the Board

AUG 0 9 1994

STAFF REPORT
BY THE
DIVISION OF WATER QUALITY
STATE WATER RESOURCES CONTROL BOARD

INTERAGENCY AGREEMENT WITH THE DEPARTMENT OF FISH AND GAME TO SUPPORT THE MONITORING AND RESEARCH ACTIVITIES OF THE BAY PROTECTION AND TOXIC CLEANUP PROGRAM

INTRODUCTION

The Bay Protection and Toxic Cleanup Program (BPTCP) was initiated by the State Water Resources Control Board (SWRCB) in April 1990. As part of the legislated requirements of the program, the BPTCP has begun implementation of regional monitoring programs, development of a consolidated database, and identification of toxic hot spots. Laboratory services are required to implement these program activities.

The purpose of this staff report is to present: (1) the BPTCP monitoring program requirements, (2) the scope of laboratory services that will be provided by the contractor, and (3) the specific tasks to be completed under the contract. SWRCB approval is required for this interagency agreement due to the size of the contract commitments associated with this effort (in excess of $1.7 million dollars over three years).

BACKGROUND

Legislation enacted in 1989 (and amended in 1994) added Chapter 5.6, Bay Protection and Toxic Cleanup, to the California Water Code (Section 13390 et seq.). Requirements of Section 13390 et seq. of the Water Code include directing the SWRCB and the seven coastal California Regional Water Quality Control Boards (RWQCBs) to develop ongoing monitoring and surveillance programs for the enclosed bays and estuaries of California (Section 13392.5). The primary purpose of the monitoring and surveillance programs is to identify toxic hot spots. These programs will require significant field and laboratory support.

In FY 1989-90 and FY 1990-91, the BPTCP was supported by funds from the Hazardous Waste Control Account. Since FY 1991-92 the BPTCP has been funded through fees collected from dischargers to enclosed bays, estuaries, and the ocean.

To help support the work required by the California Water Code, the SWRCB has entered into a Cooperative Agreement with the National Oceanic and Atmospheric Administration (NOAA) and the U.S. Environmental Protection Agency's (USEPA) Environmental

Monitoring and Assessment Program (EMAP) to investigate bioeffects associated with pollutants in Southern California inshore and marine sediments. The funding provided by NOAA and USEPA will augment the monitoring funds available from BPTCP fees.

The BPTCP has prepared a report on the status of the program through March 1993 (SWRCB, 1993).

MONITORING PROGRAM IMPLEMENTATION

Each coastal RWQCB is required by the Water Code to develop a monitoring and surveillance program for enclosed bays and estuaries. Each region has developed regional monitoring plans that will continue to be implemented through a laboratory interagency agreement. This agreement will be a task order contract because the precise number of samples to be collected and the variety of analyses to be performed are not known at this stage.

Monitoring Program Objectives

Section 13392.5 requires, in part, that each RWQCB shall, in consultation with the SWRCB, develop a monitoring program that is composed of at least the following components:

1. Guidelines to promote standardized analytical methodologies and consistency in data reporting; and

2. Additional monitoring and analyses that are needed to develop a complete toxic hot spot assessment for each enclosed bay and estuary.

The four objectives of BPTCP regional monitoring are:

1. Identify locations in enclosed bays, estuaries, or the ocean that are toxic hot spots;

2. Determine the extent of biological impacts in portions of enclosed bays and estuaries not previously sampled (areas of unknown condition);

3. Confirm the extent of biological impacts in enclosed bays and estuaries that have been previously sampled; and

4. Assess the relationship between toxic pollutants and biological effects.

Biological Methods

The scientific methods that are available for identifying toxic hot spots have both advantages and disadvantages. No single test or measurement of biological response is without some type of limitation. The challenge for the BPTCP is to select the most-supported, cost-effective, and available combination of methods that will provide scientifically defensible analyses of the impacts at a site. The advantages and disadvantages of toxicity testing, bioaccumulation, biomarkers, and benthic community analysis are presented in Tables 1 through 4, respectively.

The best bioassessment methodology would be the combination of an array of tests that exploits several exposure routes. Although biomarkers and community impacts can be difficult to interpret, these methods hold significant promise and are worthy of further development because they offer insights into environmental impacts not available using toxicity testing alone. Although bioaccumulation in and of itself is unlikely to qualify many sites as toxic hot spots, this method should be pursued for the supporting information it provides in a weight-of-evidence approach.

A combination of community analysis and toxicity testing will form the basis for a weight-of-evidence approach. The analysis of community composition will provide a direct assessment of impacts and an opportunity to identify "indicator" species (i.e., species that mark the presence of either pollutant impacts or unpolluted conditions). The combination of an array of toxicity testing endpoints including lethality and critical life stages will allow the evaluation of a variety of effects. The use of several different organisms ensures a greater opportunity to identify problem conditions than reliance on a single organism. By integrating community measurements and toxicity tests, the weight-of-evidence diminishes the possibility for false claims that pollutants are producing unwanted effects when, in fact, they are not. Individual toxicity testing methods or suites of toxicity tests to predict community level effects can also be evaluated.

Methods for bioaccumulation measurement in tissue have undergone extensive development for the State Mussel Watch Program and are mentioned in the section on chemistry methods (next section). Other bioassessment methods (i.e., biomarkers) are largely in the developmental stage.

Table 1

Advantages and Disadvantages of Toxicity Tests
(Adapted from MacDonald et al., 1992)

Advantages	Disadvantages
Provides quantifiable information about the potential for biological effects at a site.	Not designed to mimic natural exposure, so may be difficult to relate directly to actual responses at a site.
Indirect indicator of bioavailability of pollutants contaminants.	Response not necessarily directly related to specific pollutants.
Response not restricted by predetermined list of pollutants.	If test organisms do not naturally occur at the site it may be difficult to relate effects on these organisms to organisms occurring naturally at the site.
Indicates potential effects to sensitive species or to species of particular concern.	Tests are difficult to perform correctly by inexperienced laboratories.
Performed under controlled test conditions (i.e., minimizes variability).	These tests are not surrogates for determining natural changes in population diversity.
Not dependent on the presence of any particular in-situ population.	Not appropriate for contaminants that cause subtle effects over long periods, or for those where the major concern lies in their potential to bioaccumulate.
Spatial resolution of toxicity test results is better than for most other assessment approaches.	May observe toxicity in unexpected places (i.e., clean sites) due to unknown or unquantified factors.
Many toxicity tests have well-developed and widely accepted protocols.	Results may conflict between tests on different media or different species.
Tests are quick and relatively inexpensive.	

Table 2

Advantages and Disadvantages of Bioaccumulation Monitoring
(Adapted from MacDonald et al., 1992)

Advantages	Disadvantages
Direct measure of bioavailability.	Relationship between body burdens and biological effects uncertain.
Integrates contamination levels over time.	High natural variability between individuals and between species.
Concentrates chemicals from water allowing easier and less expensive analyses.	No direct relationship between body burdens and environmental levels for some contaminants due to bioregulation or metabolism.
Potential for determining human exposure and health risk through consumption of bioaccumlatory organisms.	Difficult to associate contamination in mobile species to species resident in areas of environmental contamination.
	Uptake of one contaminant may be inhibited by the presence of other contaminants.
	Rates of biological processes may be reduced by contamination thus reducing rates of bioaccumulation.

Table 3

Advantages and Disadvantages of Biomarker Monitoring
(Adapted from MacDonald et al., 1992)

Advantages	Disadvantages
Measures actual biological responses to contaminants and pollutants.	Little history of use at contaminated sites.
May integrate patchy temporal exposure.	No existing USEPA or other accepted protocols.
Demonstrates effects on indigenous organisms.	No absolute measure of unacceptable response.
Assesses a variety of severity levels.	Responses may be caused by natural factors.
Measures more sensitive responses than bioassessment methods.	Requires experienced other expert investigators.
Selective for particular pollutant or class of pollutants.	Not always a known relationship between response and significant ecological effects.
Selective for a particular species of concern.	Responses may take years to develop or disappear (after remediation).
May be cheaper than higher level ecological studies.	Not yet feasible for all groups of organisms or contaminants.
	Few commercial laboratories can perform the tests.

Table 4

Advantages and Disadvantages of Benthic Community Analysis
(Adapted from MacDonald et al., 1992)

Advantages	Disadvantages
Direct measurement of environmental impacts.	Very costly.
Response not restricted by predetermined list of pollutants.	Pollutant effects difficult to distinguish from naturally occurring conditions (such as sediment texture, temperature, and storm effects).
Can distinguish population changes.	Requires expert investigators.
Direct measure of actual exposure.	Sampling and handling may bias measurements. Interpretation of community structure may be very complex.

Guidelines to promote standardized analytical methodologies are required by statute; details are contained in the BPTCP Quality Assurance Project Plan (QAPP) (Stephenson et al., 1994). The set of toxicity tests used by or acceptable to the BPTCP is presented in Table 5. This list will be modified as new methods become available and as existing methods are improved. Elutriate tests are not included in the draft QAPP at this time because the program has not used this type of test for monitoring. If and when elutriate tests become needed they will be added to the QAPP.

Screening Sites and Confirming Toxic Hot Spots

In order to identify known toxic hot spots a two-tier process has been developed. The first tier is a screening step where a suite of toxicity tests is used at a site. Sediment grain size, total organic carbon (TOC) and H_2S concentration are measured to differentiate pollutant effects found in screening tests from natural factors. Chemical analyses (metals and organics) will be performed on a subset of the screening samples.

If effects are found at sites by these screening steps, the sites will be retested to confirm the effects. In the confirmation step measurements will be replicated and compared to reference sites. Chemical measurements (metals, organics, TOC, H_2S) and other factors (e.g., sediment grain size) will be measured. Measurements of benthic community structure and, perhaps, bioaccumulation will also be made.

A Battery of Screening Tests

Selecting a battery of toxicity screening tests can improve cost-effectiveness by expanding the range of potential impacts to be evaluated. Although recurrent toxicity must be demonstrated to qualify a site as a "known" toxic hot spot, the degree of certainty for each of the measurements does not necessarily have to be equivalent. The cost of confirming toxicity at a site can be prohibitively high, especially if it includes a large number of field replicates and extensive reference site testing. The screening tests should allow for a relatively rapid lower cost assessment of the site.

Table 5

Screening Tests for
Toxic Hot Spot Identification

Test Organism	Type	End Point
Rhepoxynius, Eohaustorius (Amphipod)	Bedded sediment	Survival
Haliotus, Mytilus, Crassostrea	Overlying water	Shell development
Strongylocentrotus (Sea urchin)	Sediment pore water	Fertilization, development, and/or anaphase aberration
Neanthes (Polychaete worm)	Bedded sediment	Survival and growth

The battery of toxicity tests for enclosed bay and estuarine water requires a selective design. First, test organisms should be chosen which are adequately (but not excessively) sensitive to the pollutants expected to be present. Similarly, test systems should be selected to reflect the media (bedded sediment or pore water) thought to be contaminated. A variety of endpoints should be included to ensure that less subtle, non-lethal effects such as changes in form, function, behavior, and reproductive success are evaluated. Additionally, a mix of phyla or trophic levels should be tested since different toxicants can exert their influence at many different points in the food web.

Beyond these basic concerns, administrative and developmental issues will also influence the test choices. Tests should have a written protocol, should be in or beyond the interlaboratory comparison stage, and should be widely used. Reasonable cost and short term test duration are important factors. Finally, preference should be given to tests which have been given regulatory status in federal or statewide water quality control plans and which are capably conducted by accessible contractors.

Site Selection

Regional Monitoring Designs

Three somewhat different designs are used in BPTCP monitoring. Six of the coastal RWQCBs have used a design (summarized in Table 5 and Table 6) that combines toxicity testing, chemical analysis, and benthic community analysis in a two-phased screening/confirmation framework (Table 7).

The Central Valley RWQCB, with jurisdiction over the Sacramento-San Joaquin Delta, has designed its program to respond to Delta conditions and to the water quality problems characteristic of that area. Fresh water toxicity testing combined with water chemistry (metals and pesticides) constitutes the main program components. Sediment toxicity testing could be added to the monitoring design at a later stage.

Table 6

Types of Data Collected in Regional Monitoring Programs for the Identification of Toxic Hot Spots

Type of Data	Screening	Confirmation
Toxicity testing	Suite of 4 tests (see Table 5)	Repeat of positives
Field replicates	None	Three
Lab replicates	Five	Five
Reference sites	None	Several
Physical analysis	Grain size	Grain size
Chemical analyses	Ammonia, hydrogen sulfide, TOC, pesticides, PCB, PAH, TBT, metals	Ammonia, hydrogen sulfide, TOC, pesticides, PCB, PAH, TBT, metals
Benthic community analysis	None	Five replicates
Bioaccumulation	None	Occasionally (sites with no pre-existing bioaccumulation data)

Table 7

Sequence of Tasks for Designating Toxic Hot Spots

1. Select toxicity screening sites.
2. Sample screening sites.
3. Conduct battery of four toxicity screening tests; analyze for hydrogen sulfide, ammonia, TOC, and grain size.
4. Determine whether quality assurance requirements have been met.
5. Report on Items 3 and 4.
6. Select and match hits and potential reference sites for ammonia, hydrogen sulfide, and grain size.
7. Conduct metals and organic chemical analysis on subset of screening sites from Item 6.
8. Determine whether quality assurance requirements have been met.
9. Report on Items 7 and 8.
10. Select sites and toxicity tests for confirmation and reference sites.
11. Sample confirmation and reference sites.
12. Conduct subset of the battery of toxicity tests which were screening hits; analyze for hydrogen sulfide, TOC, and conduct benthic community analysis.
13. Conduct metals and organic chemical analyses.
14. Determine whether quality assurance requirements have been met.
15. Report on Items 12 through 15.
16. Conduct statistical and other analyses to determine whether sites qualify as toxic hot spots.

Four different categories of sites have been identified for sampling in the BPTCP monitoring program: (1) potential toxic hot spots, (2) high risk sites, (3) stratified random sites, and (4) reference sites. Potential toxic hot spots are the highest priority sites because some indication already exists that these sites have a pollution-related problem. These data are usually chemical contamination of mussel tissue, data documenting water and sediment toxicity, measurements of metals or organic chemicals in sediments, and, occasionally, biological impairment. These sampling efforts are typically point estimates.

There are many other sites that are considered "high risk" even though we have no monitoring information to support this contention. High risk sites are locations where a nearby activity (such as marinas, storm drains, and industrial facilities) are thought to be associated with a certain risk of toxicity. The measurements at high risk sites are either point estimates or selected probabilistically.

When little is known about the quality of a waterbody segment, the BPTCP will employ a stratified, random sampling approach. These random sites will be useful in determining the quality of larger areas in the State's enclosed bays and estuaries. This probabilistic approach will allow the BPTCP to make better estimates of percentage of waterbodies that are impacted. The BPTCP will use the techniques used by the USEPA's EMAP.

The fourth type of site is reference sites. Locating reference sites requires identification and testing of a variety of potential reference sites encompassing the expected range of grain size, TOC, and other characteristics. Existing data sets that describe chemical contamination, grain size, and TOC at marine and estuarine sites are reviewed. Since these sources yield an insufficient number of sites, fine-grained areas presumed to be relatively free of contamination are also examined. These sites may likewise prove to be rare, so sites with some increased likelihood of contamination, but experiencing low energy tidal flushing, will also be sampled. Sites with previous indication of no contamination, and those lacking sediment toxicity will also be sampled. Finally, random selection of sites (as described above) may prove useful in locating reference sites.

Toxicity Screening

The four toxicity tests that will be used initially for screening are listed in Table 5. If these tests are not suitable for the program, some will either be dropped or replaced. For example, some investigators question the value of the urchin fertilization test, but no other reproductive test is currently available to

replace it. Consequently, it will be dropped from the screening battery of tests only if the data firmly demonstrate that it is ineffective. A replacement test might be the urchin development test, since it would serve to validate the urchin genotoxicity test as well as screen for non-genetic developmental toxicity.

All tests will include controls which are conducted in media known to exert minimal stress on test organisms. Both positive (toxicant present) and negative (toxicant absent) controls are often used to ensure that test organisms are responding within expected limits.

The screening step begins with the collection of a single field sample from each site (Table 7, Steps 1 and 2). Five laboratory replicates are required to accommodate statistical comparison with the control. Although the lack of field replicates restricts statistical comparisons with other sites, this approach allows the BPTCP to test more locations for toxicity within the allocated funding. Ammonia and hydrogen sulfide analyses are then performed on the media of all tests (Table 7, Step 3) to determine their relative contribution to any observed toxic affects. Grain size and TOC values are determined on all sediment samples to evaluate the presence of naturally occurring toxicity.

All these data, along with an assessment of quality assurance (QA) performance, are then reviewed by program staff. Toxicity hits and potential reference sites are selected and matched for ammonia, hydrogen sulfide, grain size, and TOC. A subset of the sites is selected for analysis of metals and organics after conducting confirmation testing (Table 7, Steps 4-9). Toxicity at a site with low levels of naturally occurring toxicity will be presumed to result from metals and organics. These sites will be revisited for confirmation.

Confirmation (i.e., Qualification as Known Toxic Hot Spots)

With the identification and sampling of acceptable reference sites, all screening sites (Table 7, Steps 10 and 11) with at least one positive test result will be revisited to evaluate both the recurrent nature of the toxicity and impacts on the benthic community. This may require repeat testing of potential toxic hot spots to ensure that toxicity is present or absent. Confirmation testing is more intensive because of (1) addition of field replicates (three to a site); (2) comparison to reference sites (unless water toxicity is the focus); and (3) benthic community analysis.

For each positive toxicity test at a screening site, confirmation will be performed for the same test. Benthic analysis will also be performed and added to an ever-enlarging nearshore benthic community database which will be periodically evaluated to determine whether impacted and nonimpacted sites can be distinguished (Table 7, Step 12). When either recurrent toxicity is demonstrated with a positive confirmation test or benthic impacts are suspected, chemical analysis will also be performed (Table 7, Step 13). Careful review of all quality assurance procedures will be conducted and, upon approval, will be followed by statistical analysis of the data. Compared to screening, this analysis will be more comprehensive and will include measures of field variability in toxicity, benthic data, and reference site conditions.

Once both toxicity and benthic impacts have been confirmed through comparison with an appropriate reference site and appear to be due to human-causes the site will be declared a known toxic hot spot. When toxicity is present but benthic impacts are lacking, careful analysis will be performed to determine whether the two results are in conflict (e.g., the test organism may not be an important component of the benthos). Similarly, when toxicity is not demonstrated but benthic impacts are observed, careful review will be conducted to determine whether the same explanation prevails or whether some factor other than toxicants may be responsible. Further characterization of the site (such as areal extent, range of effects, and source determination) will be described in the remediation plan and is not intended under this phase of the program except in rare circumstances.

LABORATORY SERVICES

Several options were available to the BPTCP in selecting a contractor for the laboratory services contract, such as a State agency, State Universities, local government agency, or private contractor. State law requires the SWRCB to select contractors in this order. Further, the option of selecting multiple contractors was also considered.

The primary selection criteria for a contractor or contractors were: (1) extensive experience with sediment, water, and tissue chemistry; (2) extensive experience with developing and conducting toxicity testing; (3) a well-established QA/QC program which includes established round-robin testing with research and regulatory laboratories, (4) an extensive knowledge of sampling in the enclosed bays and estuaries of California, and (5) comparative costs (including overhead).

The California Department of Fish and Game (DFG) was selected in 1990 as the primary contractor for the existing laboratory services contract. The DFG staff will serve as Project Manager, and provide the QA/QC officer for the program. Under the management of DFG, trace organics, toxicity analyses, and benthic community analysis will be performed by the University of California at Santa Cruz (UCSC) at the Long Marine Laboratory, Granite Canyon Laboratory and Moss Landing Marine Laboratory, respectively. Additional subcontractors may be added by DFG as new tests or activities are required by the program.

The selection of DFG was based on their knowledge and experience working with pollution studies in the bays and estuaries of California. Their trace metals laboratory and contract laboratories at the UCSC and University of California at Davis (UCD) have many years of experience working with pollution-related investigations and are well respected for their work in their respective fields of study. Further, DFG has several years of experience managing multidisciplinary projects including BPTCP monitoring over the past 2 1/2 years.

The BPTCP proposes to initiate a new three-year task order contract with DFG. The three-year contract term is the most efficient and cost-effective approach to managing and conducting the contract. This approach will allow DFG to work continually on the project for three full years without contract interruption. Further, the approach will provide sufficient security to allow DFG to add additional resources to the program when necessary.

CONTRACT TASKS

The following tasks will be addressed in the proposed contract:

A. NOAA/EMAP/SWRCB Cooperative Agreement will focus on measuring bioeffects associated with sediment bound pollutants in Southern California coastal inshore marine waters. Data collected during the investigation will aid the SWRCB in identifying toxic hot spots, provide general information on the relationships between pollutants and biological impacts, and provide data useful for development of sediment quality objectives. The subtasks of this element include:

   (1) Field collection
   (2) Method evaluation
   (3) Sediment toxicity
   (4) Sediment chemistry
   (5) Benthic community analysis

B. BPTCP Regional Monitoring Implementation

DFG will be responsible for the collection and analysis of all BPTCP samples necessary to implement regional monitoring. Sampling procedures and techniques used by DFG will be those established in the QAPP. The subtasks of this element include:

(1) Field collection: DFG will be responsible for the collection of all BPTCP field samples.

(2) Toxicity Testing: DFG will provide toxicity measurements for sediment and water samples collected from marine, estuarine, and freshwater locations. These tests will include:

- o amphipod toxicity tests
- o bivalve embryo and larval tests
- o polychaete growth test
- o echinoderm sperm test

(3) Chemistry Tests: Chemical analyses will be performed on bulk sediments to determine the concentration of pollutants present. Analytical methods to be used are those presented in the BPTCP QAPP. Analyses to be performed under this task include:

- o synthetic organics
- o PAHs
- o heavy metals
- o TBT
- o normalizing parameters (e.g., total organic carbon)

(4) Tissue Chemistry: Analysis of tissue from selected test species will provide important data on the link between presence and uptake of pollutants. Analytical procedures described in the BPTCP QAPP include analyses for:

- o synthetic organics
- o PAHs
- o heavy metals

(5) Analysis of Biological Samples: Another approach of the BPTCP Monitoring Program will be to examine the structure and composition of benthic communities in the areas of investigation. This approach may be used, when necessary, to field-verify results from toxicity testing or when deemed necessary by the investigators to characterize the difference between impacted and non-impacted areas.

(6) Reports: DFG will submit to the BPTCP comprehensive reports that provide all laboratory data collected and a preliminary discussion of the results of the various tests performed.

PROJECT FUNDING

The proposed program will extend for a period of three years and will comprise the NOAA/EMAP/SWRCB Cooperative Agreement and Regional Monitoring Programs. As presently proposed, the Monitoring Programs will be extended for three years while the EMAP/SWRCB Cooperative Agreement will be initially funded for the first year only.

1. NOAA/EMAP/SWRCB Cooperative Agreement Investigation

   The Cooperative Agreement for FY 1994-95 will be funded by three sources. NOAA will provide $110,000, and EMAP will provide $150,000. The State match for these grants will come from BPTCP annual fees identified in 2, below.

2. Regional Monitoring

   Monitoring Plans will be funded for three years. In the first year (FY 1994-95) $574,000 will be allocated from BPTCP fees. Funding for FY 1995-96 and FY 1996-97 will be $474,000 for each year from the BPTCP fees.

   The total funding for the three-year contract will be $1,782,000. The contract will not exceed $834,000 for FY 1994-95, and $474,000 each for FY 1995-96 and FY 1996-97.

REFERENCES

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