STATE OF CALIFORNIA—THE RESOURCES AGENCY PETE WILSON, *Governor*

DEPARTMENT OF FISH AND GAME
1416 NINTH STREET
O. BOX 944209
ACRAMENTO, CA 94244-2090

Steve Ritchie, Acting Executive Director
CALFED Bay-Delta Program
1416 Ninth Street, Suite 1155
Sacramento, California 95814

January 10, 2000

Subject: Amendment Request to USBR Cooperative Agreement No. 99FC200241; CALFED Directed Action #99-B06—*An Assessment of Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed.*

Dear Sir,

This letter is to request an augment in funding for the CALFED grant entitled "*An Assessment of Ecological and Human Health Impacts of Mercury in the Bay-Delta Watershed*". Mercury has been designated a contaminant of concern in the CALFED water quality common program because of its presence at elevated concentrations in long-lived game fish in the Central Valley and in the Bay-Delta Estuary. These concentrations have resulted in the posting of human health advisories recommending limited or no consumption of selected size classes of sportfish. The fish tissue concentrations may also represent a hazard to piscivorous wildlife. Concern has been expressed that a number of anthropogenic activities in the basin, including some of those of CALFED, may act to increase the bioaccumulation of mercury in the estuarine food chain and to exacerbate the public health and potential wildlife problem. CALFED awarded a grant to a consortium of governmental agencies and university experts to develop a better understanding of mercury cycling in the Central Valley and Estuary and to recommend management options to CALFED and to regulatory agencies for the control of mercury.

In August a panel of international mercury experts was assembled to critique the proposed study plan. Curricula Vitae are available upon request for the external Scientific Review Committee experts. The consensus of the experts was that all the proposed work was essential but that a number of tasks needed to be expanded considerably and others added if the study was to accomplish its intended goal. A summary of the Science Review Committee's recommendations for improving the study are included as Attachment One.

The CALFED mercury investigators met several times and developed the attached set of proposals (Attachment Two) to address the Science Review Committee's key recommendations. Because of the large amount of money involved, the proposed additional work was prioritized as "*Critically Needed*", "*Highly Recommended*" and "*Worthwhile*" for achieving the projects goals. The *Critically Needed* category includes augmentation requests for additional QA/QC, modeling and increased project

E-032991

management (Table 1). The cost to fully fund this category is $412,788 (11% of the original budget). The *Highly Recommended* category includes a request for additional funding for more individual fish tissue contamination work, sediment studies of historical mercury deposition, oxygen and sulfide concentrations, and speciation, diagenesis and bioavailability of mercury from mine tailing (Table 2). The requested funding here is $290,458 (8% of the original budget). Finally, the *Worthwhile* category included significantly more work in each of the high priority categories mentioned above and also studies of atmospheric deposition of mercury, diurnal variation in methyl mercury concentrations in water, and studies of mercury speciation and mineralogy of the bed and suspended sediments transported away from mine sites (Table 3). Funding needed here is $763,734 (20% of the original budget). Specific costs detailing this information are shown within the proposals themselves (Attachment Two).

In summary, an internationally recognized panel of mercury experts was convened as required by the CALFED grant to review the proposed study plan. The consensus of the experts was that the basic study design was good but that additional work was needed in several key areas. Proposals are included to accomplish this work. Please call either Mark Stephenson (831-633-0253) or Chris Foe (916-255-3113) if you have questions.

Sincerely,

Mark Stephenson

Mark Stephenson,
Project Manager

Chris Foe

Chris Foe, Ph.D.
Project Investigator

Table 1. Augmentation request for the most critically needed additional work. The total augmentation request is for $412,788 or 11% of the project.

P.I. Team	Requested Change in Scope of Work	Funding Request	Comments/Rationale
Frontier Geosciences	QA/QC oversight w/DFG 5% external QA duplicate sample analyses SJSUF overhead for pass-thru	$71,330 $42,458 $6,500	This work is project-wide and was deemed of most critical significance for funding by both the Science Review Committee and all Project PI's
Larry Walker Associates	Phase 1 Modeling Work	$38,000	Must be able to assist PI's in developing their task-specific numeric models within six months
DFG	Signif. increased project management duties, including more frequent communications and meetings; longer duration project period, integration and standardization of data for interpretive reports, QAPP preparation, greatly increased QA/QC internal oversight/coparticipation, integrate all PI reports & produce interpretive integrated reports, logistics coord., mgmt of 16 subcontracts (much higher than original), database development and management, & additional. funding for Sci Rev Comm work (55K)	$199,500 $55,000	Explanation of DFG Project Mgmt personnel increase: a) Increase Max Puckett from 0.5 to 1.0 PY Cost = $51,000/yr x 3yrs = $ 153,000 total increase b) Increase Mark Stephenson time from 0.3 to 0.45 PY Cost = $15,500/yr x 3yrs = $ 46,500 total increase c) Scientific Review Committee augment = $55,000 With augment the cost of project management will have been increased from 7 to 10% of total project costs
TOTAL REQUEST		$412,788	

E-032993

Table 2. Augmentation request for the highly recommended category of additional work. The total augmentation request is for $290,458 or 8 percent of the project.

P.I. Team	Requested Change in Scope of Work	Funding Request	Comments/Rationale
San Francisco Estuary	Greatly expanded analyses of individual	$78,769	This work would allow the PI's to model the flow of mercury
Institute	fish (approximately 34% of the additional funds),		through a complex food web to the sports fish and
	inclusion of many additional sportish species		fish eating birds that have high levels of mercury.
	(17%), methyl mercury analysis in lower trophic		With enough data the model could be used to
	level species (19%), expanded analyses of		predict the effects of remediation on the levels of
	trophic position (3%), inclusion of an indicator		mercury in sports fish and fish eating birds.
	species (10%), the increased sampling costs		
	associated with collecting more species (10%),		
	& increased costs associated w/coordination,		
	analysis, & reporting on the expanded study (7%)		
Texas A+M University	Historical Hg deposition	$38,231	The historical deposition of mercury is important
	High resolution Oxygen and Sulfide in sed cores	$53,458	in determining how much mercury will be released
			to the environment if the surface sediments erode.
			Sediment oxygen and sulfide concentrations may be
			important in our understanding of net methylation rates.
UC Davis	Task 5A augment	$26,000	Additional samples will be analyzed to obtain
	Task 5B augment:	$13,000	accurate loading data in the Cache Creek area
Frontier Geosciences	Speciation, Diagenisis, and Bioavail of Mine Tailings		Speciation of mercury is important because there are
	Solid Phase Speciation	$32,000	many species and each behaves chemically and
	20 samples split for EXAFS	$15,000	biologically in a unique way. Remediation efforts
	Subcontracted analysis for grain size	$12,000	may be more effective if they target the right species.
	Suspended Matter Speciation	$22,000	Mine tailings may be traced if a method of
			determining cinnibar can be developed. The "easilly"
			methylatable form of mercury may be useful
			to determine because it is probably the species that
			is the precursur to the methylation process.
Total		$290,458	

Table 3. Augmentation request for the worthwhile category of additional work. The total augmentation request is for $763,734 or 20% of the project

P.I. Team	Requested Change in Scope of Work	Funding Request	Comments/Rationale
San Francisco Estuary Institute	Greatly expanded analyses of individual fish (approximately 34% of the additional funds), inclusion of many additional sportish species (17%), methyl mercury analysis in lower trophic level species (19%), expanded analyses of trophic position (3%), inclusion of an indicator species (10%), the increased sampling costs associated with collecting more species (10%), & increased costs associated w/coordination, analysis, & reporting on the expanded study (7%)	$123,734	The rationale for this study is the same as the SFEI study in Table 2. The two studies differ only in the amount of effort involved. The consensus of the PI's was that this study rated slightly lower than the reduced effort study in Table 2 mainly because of cost.
Texas A+M University	Historical Hg deposition	$73,500	The rationales for first two studies are the same as the
	High resolution Oxygen and Sulfide in sed cores	$75,000	TAMU study in Table 2. The two studies on Hg
	Atmospheric deposition of Hg	$24,300	deposition and Oxygen and Sulfide determinations differ between Table 2 and 3 only in effort. The studies in Table 3 are double the effort of those in Table 2. The consensus of the PI's was these two studies rated slightly lower than the reduced effort studies in Table 2 mainly because of cost. The Atmospheric deposition study was only rated worthwhile because similar monitoring effort is underway in Bay area and much of the data may be applicable to the Central Valley.
Frontier Geosciences (FGS)	Speciation, Diagenisis, and Bioavail of Mine Tailings		The rationale for the first 4 studies are the same as the
	Solid Phase Speciation	$74,000	FGS studies in Table 2. Most of these studies differ
	20 samples split for EXAFS	$30,000	only in the amount of effort and are approximately
	Subcontracted analysis for grain size	$12,000	double the effort of the FGS studies in Table 2.
	Aqueous Speciation	$36,000	The consensus of the PI's was that
	Suspended Matter Speciation	$22,000	these studies rated slightly lower than the reduced
	Porewater and Hgo in water samples + travel	$36,000	effort studies in Table 2 mainly because of cost. A few of the studies such as Aqueous Speciation and Porewater and Hgo in water samples and travel were rated slightly lower by the PI's because of cost.
USGS	Diurnal variations in MeHg	$90,200	None of these studies are listed in Table 2. The
	Speciation, mineralogy of bed & suspended sediments	$82,000	consensus of the PI's was that these proposals rated
	Restore 5th sampling event	$85,000	"worthwhile" mainly because of cost.
TOTAL		$763,734	