Los Angles Region Contaminated Sediments Task Force
Sediment Thresholds Subcommittee
December 3, 2002

Attendees: Jack Gregg (CCC), David Moore (MEC), Michael Lyons (LARWQCB), Carlos Baldenegro (POLA), Kathy Anderson (Corps), Steve Cappellino (Anchor), Steve Bay (SCCWRP), Doris Vidal (SCCWRP), Steven John (EPA).

Sediment Quality Guidelines Development Project: Phase 2.

Phase 2: Objectives:

- Select a group of candidate guidelines best suited for the objectives of the CSTF.
- Document the performance of these SQGs when applied to the southern California data in the CSTF database.

Phase 2: Tasks:

- Summarize SQG approaches (accomplished).
- Select subset of SQGs for analysis (accomplished).
- Apply SQGs to CSTF data (all southern California data).
- Compare performance in predicting toxicity.
- Select candidate(s) for further consideration.

Selected SQGs:

- ERMq; EqP; organics; AET; Consensus; SQG Q-1.

SQG Characteristics:

- Different subsets of chemicals (in some case, only organics, etc).
- Thresholds (determine the way detection limits are treated.

Guideline	# of Organics	# of Metals
ERMq	15	9
AET	44	10
EqP	43	0
Consensus	2(4)	0(9)
SQG Q-1	4	5

Data Screening:

- Toxicity data for 4 marine amphipod species
- Studies with control survival >85%;
- Studies with water ammonia below test thresholds;
- Studies with complete chemistry data;
- Excludes records exceeding minimum SQG-specific detection limits.

Ammonia:

- Ammonia data was available for only 29% of the samples;
- Examined relationship between ammonia water and TOC – no clear trend found;

- Excluded data with ammonia exceeding EPA (1994) criteria (<0.4mg/L for unionized ammonia);
- Retained all other data.

Chemistry Completeness:

- ERMq – only studies with at least 10 ERM metals or PAHs were included;
- AET – only studies with data for at least 10 AET metals or PAHs;
- EqP – only studies having data for at least 10 EqP PAHs.

Detection Limits:

- Criteria: <0.2 of ERM or EqP values; < low AET values;
- Many samples did not meet the criteria for some chemicals;
- Treat high detection limits analytes as unmeasured on sample specific basis.

Analysis dataset:

Guideline	# of Studies	# of Records
ERMq	55	1178
AET	56	1450
EqP org	24	770

Performance Analysis:

- Applied provisional Level I and II thresholds to the dataset;
- Tabulated number toxic and nontoxic above and below threshold;
- Toxic defined as significantly different (✂=0.05) and <80% of control;
- Calculated efficiency, sensitivity, specificity;
- Receiver Operation Characteristic (ROC) curve analysis.

Provisional Thresholds:

	Level I	Level II	
Guideline	Effects Unlikely	Effects Likely	Source
ERMq	Mean ERMq <0.1	Mean ERMq >/=1.5	Long and MacDonald (2002)
AET	Exceedance of any Screening Level Criterion	Exceedance of any Clean-up Level Criterion	WAC Sediment Mgmt Stds.
EqP	Sum Chronic EqP TU<1	Sum Acute EqP TU>2	EPA (2001)

Results Classification:

	Toxic	A False -	B True +
Toxicity Results			
	Nontoxic	C True -	D False +
		No Hit	Hit

SQG Prediction

Efficiency:

- Level I efficiency (Nontoxicity): Percentage of samples predicted to be nontoxic with no observed effects. % Nontoxicity Eff. = (C/A+C)x100.
- Level II Efficiency (Toxcity): Percentage of samples predicted to be toxic with observed effects. % Toxicity Eff. = (B/B+D)x100.

	Toxic	A	B
	Nontoxic	C	D
		No Hit	Hit

ERMq Results:

	Level I (0.1)	Level II (0.5)
Toxicity Efficiency	44%	25%
Toxicity Sensitivity	95%	4%
Nontoxicity Efficiency	84%	61%
Nontoxicity Specificity	27%	100%

ROC (Receiver Operatory Characteristics) Curve:

- Used to assess the effectiveness of medical diagnostic tests;
- Classified data as toxic/nontoxic
- Sorted data based on ERMq or EqP sum;
- Calculated false positive (1-specificity) and true positive (sensitivity) rates and plotted data;
- Area under curve indicates discriminatory power of SQG.
- By this analysis for these data ERMq and EqP with poor discriminatory powers.

TAC Comments:

- High level of interest in the database and results;
- Treat missing ammonia and high detection limit data as unmeasured;
- Phthalates and chlorinated benzenes should be measured in future studies;
- Analysis method for AETs should be revised;
- Examine spatial and chemical-specific factors that may influence the results.

Next Steps – Phase 2:

- Incorporate subsurface data into the analyses;
  Revise AET values and analysis methods according to WA DOE recommendations;
- Analyze ERMs with/without DDTs
- Complete analyses for all 5 SQGs.

Next Steps – Phase 3:

- Objective – Investigate regional differences in the data;
- Compare chemical-toxicity relationships with national NOAA database;
- Examine species-specific and spatial factors;
- Compare ERM performance with national database.

Next Steps – Phase 5:

- Objective – Investigate alternative SQG approaches;
- Distribute RFP before end of December;
- Award contract by mid-February.

Database prepared for public distribution on SCCWRP and CSTF websites.

Next CSTF Sediment Thresholds Subcommittee Meeting: January 28, 2003, 10am-12pm, Port of Los Angeles.