Table 18-7 Individual Station Characteristics, Summary Statistics, and 95% Lower Predictive Limits for Control Adjusted Amphipod Survival (%), Bivalve Development (% Normal), and Urchin Fertilization (%) in the Reference Pool

Station	Amphipod Survival	Bivalve Development[1]	Urchin Fertilization
CP 2231	76		66
CP 2238	90		36
CP 2243	84		97
CP 2433	84		100
CP 2441	82		102
SY 2231	84	93	99
SY 2243	92	66	92
SY 2433	96	101	79
SY 2441	95	70	90
2235	71		
2241	98		
2242	92		
2243	96		
2256	100		
2257	91		
2258	92		
2260	73		
2265	85		
N	18	4	9
Minimum	71	66	36
Maximum	100	101	102
Mean	88	82.5	85
Std Dev	8.4	17.1	22
RSD	10%	21%	26%
95% PL	72.9	37.4	41.9

SCCWRP and U.S. Navy, 2005b

1. The 95% lower predictive limit for bivalve development is calculated using the same methodology described in SCCWRP and U.S. Navy, 2005b. The supporting calculation is provided in the Appendix to Section 18.

Similar to the chemistry line-of-evidence, the sediment toxicity ranking method employed a semi-quantitative assessment of the data that reflected both the presence and magnitude of toxicity. The category ranking criteria for sediment toxicity are summarized below and depicted in Figure 18-2. A comparison of the toxicity test results at each Shipyard Sediment Site station to the Reference Pool 95% lower prediction limits is shown in Table 18-8.

Figure 18-2 Toxicity Lines of Evidence

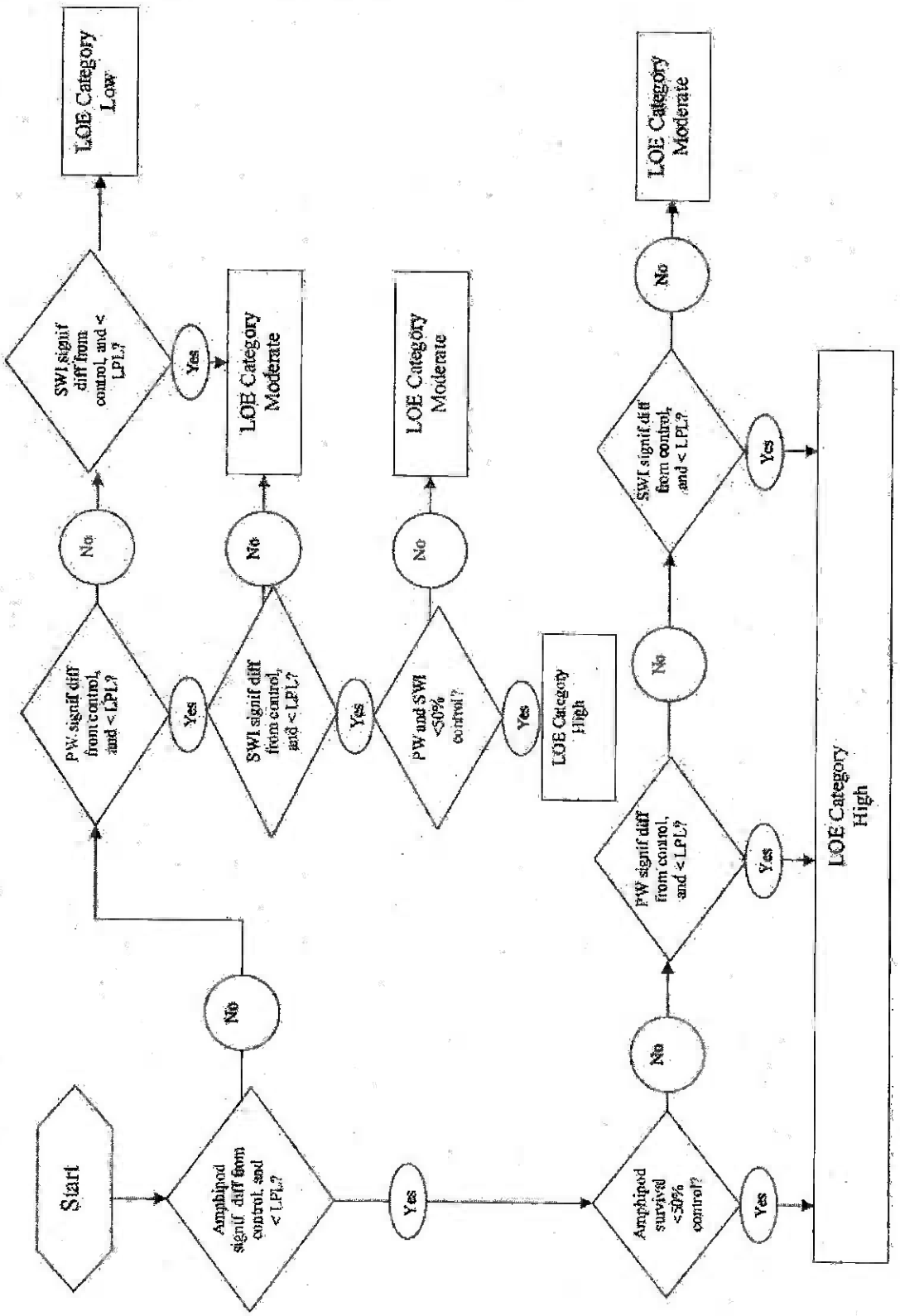

Table 18-8 Comparison of the Toxicity Data from the Shipyard Sediment Site Stations to the Reference Pool 95% Lower Predictive Limit

Site	Station	Amphipod Survival (95% LPL = 73%)[1]	Urchin Fertilization (95% LPL = 42%)[1]	Bivalve Development (95% LPL = 37%)[1]
NASSCO	NA01	80	86	49
	NA03	84	84	94
	NA04	80	88	84
	NA05	89	95	94
	NA06	78	103	74
	NA07	74	102	88
	NA09	88	99	**1**
	NA11	**70**	101	80
	NA12	82	89	**15**
	NA15	97	88	93
	NA16	90	84	**3**
	NA17	95	88	80
	NA19	89	72	**2**
	NA20	90	78	80
	NA22[2]	95	111	**2**
BAE Systems	SW02	88	103	85
	SW03	92	103	88
	SW04	94	108	63
	SW08	91	103	93
	SW09	88	100	85
	SW11	77	89	83
	SW13	92	99	**28**
	SW15	92	103	**9**
	SW17	95	96	**16**
	SW18	74	83	64
	SW21	91	102	67
	SW22	90	104	**1**
	SW23	91	107	**16**
	SW25	86	103	**10**
	SW27	73	91	**22**

1. Toxicity values less than the 95% lower prediction limit values are bold faced and shaded.
2. NA22 was omitted from this analysis because it falls within an area that is being evaluated as part of the TMDLs for Toxic Pollutants in Sediment at the Mouth of Chollas Creek TMDL and is not considered part of the Shipyard Sediment Site for purposes of the CAO.

The toxicity ranking criteria was originally developed for the sediment quality site assessment work for the mouth of Chollas Creek and Paleta Creek TMDLs (SCCWRP and U.S. Navy, 2005b). The criteria were developed by SCCWRP, U.S. Navy, and the San Diego Water Board; with input from NRTAs, non-governmental environmental groups, Port, and the City of San Diego.

The low, moderate, and high toxicity ranking criteria are based on the following five key assumptions (SCCWRP and U.S. Navy, 2005b):

1. Toxic effects at Shipyard Sediment Site sample stations are classified as low or none when the results of all three toxicity tests were not significantly different from their controls or they had a statistically lower level of toxicity than observed at the Reference Condition sample stations;

2. The presence of significant toxicity in any one test was sufficient to classify a Shipyard Sediment Site sample station as moderately toxic. The three toxicity tests were given equal weight for classifying a sample station as moderately toxic;

3. If amphipod survival is less than 50 percent and significantly different from the control and Reference, a high rank of sediment toxicity was justified;

4. Toxic effects at Shipyard Sediment Site sample stations are classified as high when both of the sublethal toxicity tests measured a greater level of toxicity than the Reference Condition sample stations; and

5. The amphipod toxicity test result is given greater weight for the high toxicity category because the acute survival endpoint of this test was assumed to have a higher degree of association with ecological impacts than either the urchin fertilization or bivalve development tests. The sea urchin fertilization and bivalve embryo development test results are given less weight because these are sublethal critical life stage tests that are more susceptible to confounding factors, and their association with ecological impacts is less certain.

The toxicity line of evidence category ranking from the SCCWRP and U.S. Navy (2005b) report are presented below and in Figure 18-2. The same toxicity ranking criteria from the SCCWRP and U.S. Navy (2005b) report were used to evaluate the sediment toxicity data from the Shipyard Sediment Site investigation. The toxicity line-of-evidence results for each Shipyard Sediment Site station are depicted in Table 18-9.

Low Toxicity: Toxic effects are classified as low or none when results of all three bioassays were not significantly different from their controls or they have a statistically lower level of toxicity than observed at the Reference Condition sample stations.

Moderate Toxicity: Toxic effects are classified as moderately toxic if any one of the bioassay results is statistically different from its control and was less than the Reference Condition. Additionally, it is required for amphipod survival to have been greater than 50 percent, regardless of the result relative to controls or the Reference Condition.

High Toxicity: Toxic effects are classified as highly toxic when any one of the following criteria is met:

1. If survival of amphipods at a station is less than 50 percent and is statistically different than controls and statistically less than the Reference Condition sample stations.

2. If the amphipod test together with any one of the other bioassays both has a result that is statistically different from control and is statistically less than the Reference Condition sample stations.

3. If both the pore water and sediment-water interface test results are less than 50 percent of the control values and are statistically less than the controls and the Reference Condition sample stations.

To determine the likelihood of impairment (Likely, Possible, or Unlikely) in the overall weight of evidence, each line of evidence ranking (Low, Moderate, or High) is put into the Weight-of-Evidence Analysis framework described in Section 18.5 below.

Table 18-9 Toxicity Line-of-Evidence Results

Station	Amphipod Survival			Urchin Fertilization			Bivalve Development			LOE Category
	Different from Control	< 95% LPL	< 50% Control	Different from Control	< 95% LPL	< 50% Control	Different from Control	< 95% LPL	< 50% Control	
NA01	Yes	No	No	Yes	No	No	Yes	No	No	**Low**
NA03	No	No	No	Yes	No	No	No	No	No	**Low**
NA04	Yes	No	No	Yes	No	No	Yes	No	No	**Low**
NA05	Yes	No	No	No	No	No	No	No	No	**Low**
NA06	Yes	No	No	No	No	No	No	No	No	**Low**
NA07	Yes	No	No	No	No	No	No	No	No	**Low**
NA09	Yes	No	No	No	No	No	Yes	Yes	Yes	**Moderate**
NA11	Yes	Yes	No	No	No	No	No	No	No	**Moderate**
NA12	Yes	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**
NA15	No	No	No	Yes	No	No	No	No	No	**Low**
NA16	Yes	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**
NA17	No	No	No	Yes	No	No	Yes	No	No	**Low**
NA19	No	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**
NA20	Yes	No	No	Yes	No	No	Yes	No	No	**Low**
NA22[1]	No	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**
SW02	Yes	No	No	No	No	No	No	No	No	**Low**
SW03	No	No	No	No	No	No	Yes	No	No	**Low**
SW04	No	No	No	Yes	No	No	Yes	No	No	**Low**
SW08	Yes	No	No	No	No	No	Yes	No	No	**Low**
SW09	No	No	No	No	No	No	Yes	No	No	**Low**
SW11	Yes	No	No	Yes	No	No	No	No	No	**Low**
SW13	Yes	No	No	No	No	No	Yes	Yes	Yes	**Moderate**
SW15	No	No	No	No	No	No	Yes	Yes	Yes	**Moderate**
SW17	No	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**

Station	Amphipod Survival			Urchin Fertilization			Bivalve Development			LOE Category
	Different from Control	95% LPL	50% Control	Different from Control	95% LPL	50% Control	Different from Control	95% LPL	50% Control	
SW18	No	No	No	Yes	No	No	Yes	No	No	**Low**
SW21	Yes	No	No	No	No	No	No	No	No	**Low**
SW22	Yes	No	No	No	No	No	Yes	Yes	Yes	**Moderate**
SW23	No	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**
SW25	Yes	No	No	No	No	No	Yes	Yes	Yes	**Moderate**
SW27	Yes	No	No	Yes	No	No	Yes	Yes	Yes	**Moderate**

1. NA22 was omitted from this analysis because it falls within an area that is being evaluated as part of the TMDLs for Toxic Pollutants in Sediment at the Mouth of Chollas Creek TMDL and is not considered part of the Shipyard Sediment Site for purposes of the CAO.

18.4. Benthic Community Ranking Criteria

The low, moderate, and high potential for benthic community degradation classifications used in the benthic community line-of-evidence were determined by comparing the benthic community structure indices at each Shipyard Sediment Site station to the thresholds developed for the Bight '98 Benthic Response Index for Embayments (BRI-E) (Ranasinghe et al., 2003) and to the Reference Pool described in Section 17 of this Technical Report:

- Benthic Response Index for Embayments – The BRI-E was developed by SCCWRP as a screening tool to discriminate between disturbed and undisturbed benthic communities in Southern California embayments, such as San Diego Bay. In order to give BRI-E values an ecological context and facilitate their interpretation and use for evaluation of benthic community condition, a reference threshold and four thresholds of response were defined by SCCWRP (Table 18-10). The reference threshold is defined as a value toward the upper end of the range of index values of samples taken at sites that had minimal known anthropogenic influence. The other four thresholds (Response Levels 1, 2, 3 and 4) involved defining levels of deviation from the reference condition. These thresholds are based upon a determination of the index values, above which species, or groups of species, no longer occurred along the pollution gradient.

Table 18-10 Characterization, Definition and BRI-E Thresholds for Levels of Benthic Community Condition

Level	Definition for Bays	BRI-E Threshold
Reference		< 31
Response Level 1	> 5% of reference species absent	31 to 42
Response Level 2	> 25% of reference species absent	42 to 53
Response Level 3	> 50% of reference species absent	53 to 73
Response Level 4	> 80% of reference species absent	> 73

(Ranasinghe et al., 2003)

- **Reference Sediment Quality Conditions** – Four metrics were used to assess the benthic community structure: (1) Total abundance – the total number of individuals identified in each replicate sample, (2) Total taxa richness – the total number of distinct taxa identified in each replicate, (3) Shannon-Weiner Diversity Index – a measure of both the number of species and the distribution of individuals among species; higher values indicate that more species are present or that individuals are more evenly distributed among species, and (4) BRI-E – a quantitative index that measures the condition of marine and estuarine benthic communities by reducing complex biological data to single values. A key step in the benthic community line-of-evidence is to determine whether there are statistically significant differences between the benthic community structures observed at the site and the benthic community structure observed at the Reference Pool using the four metrics described above. The statistical procedure used in the Shipyard Sediment Site investigation to identify these differences consisted of the 95% lower predictive limit for total abundance, # of Taxa, and Shannon-Weiner Diversity index. A 95% upper predictive limit was used for the BRI-E. The 95% predictive limit computes a single threshold value for each benthic community metric in the Reference Pool (e.g., total abundance) from which each site station metric result is compared. Although multiple comparisons are made to the Reference Pool, the San Diego Water Board made a decision to not correct for multiple comparisons so that the Shipyard Site/Reference comparisons would be more conservative and protective. The 95% lower predictive limits for the four benthic community metrics and 95% upper predictive limit for BRI-E are shown in Table 18-11.

Table 18-11 Individual Station Characteristics, Summary Statistics, and 95% Lower Predictive Limits for Abundance, Number of Taxa, Shannon-Weiner Diversity Index and BRI-E in the Reference Pool

Station	Abundance	# Taxa	S-W Diversity	BRI-E	BRI-E Level
CP 2231					
CP 2238	419	32	2.6	60.3	III
CP 2243	691	41	2.3	55.1	III
CP 2433	421	57	2.8	22.8	Reference
CP 2441	476	66	2.9	30.0	Reference
SY 2231					
SY 2243	989	78	2.5	45.1	II
SY 2433	441	77	2.6	16.8	Reference
SY 2441	506	108	2.8	19.9	Reference
2235	551	29	2.1	42.1	II
2241	1526	44	2.3	34.7	I
2242	1117	28	1.8	36.6	I
2243	966	47	2.7	36.4	I
2256	237	28	2.7	37.9	I

Station	Abundance	# Taxa	S-W Diversity	BRI-E	BRI-E Level
2257	503	37	2.3	38.1	I
2258	826	36	2.3	43.2	II
2260	2263	49	1.8	39.1	I
2265	1543	48	2.4	26.7	Reference
N	16	16	16	16	
Minimum	237	28	1.8	17	
Maximum	2263	108	2.9	60	
Mean	842	50	2.4	37	
Std dev	544	22	0.3	12	
RSD	65%	44%	14%	32%	
95% PL	239	22	1.8	57.7	

SCCWRP and U.S. Navy, 2005b

The benthic community ranking criteria was originally developed for the sediment quality site assessment work for the mouth of Chollas Creek and Paleta Creek TMDLs (SCCWRP and U.S. Navy, 2005b). SCCWRP, U.S. Navy, and the San Diego Water Board developed the criteria with input from NRTAs, non-governmental environmental groups, the Port, and the City of San Diego.

The BRI-E threshold scores evidence are weighed higher because: (1) they are a comprehensive measure of benthic community health developed specifically for bays and harbors in Southern California, (2) the indices remove much of the subjectivity associated with interpreting the benthic community structure data, and (3) the indices provide a simple means of communicating complex benthic community structure data to the public and regulatory managers. The category ranking criteria for benthic community composition is depicted in Figure 18-3. A comparison of the benthic community metrics at each Shipyard Sediment Site station to the Reference Pool 95% prediction limits is shown in Table 18-12. The benthic community line-of-evidence results for each Shipyard Sediment Site station using the Reference Pool comparison are shown in Table 18-13 and the supporting calculations are provided in the Appendix for Section 18.

Figure 18-3 Benthic Community Lines of Evidence Characteristics

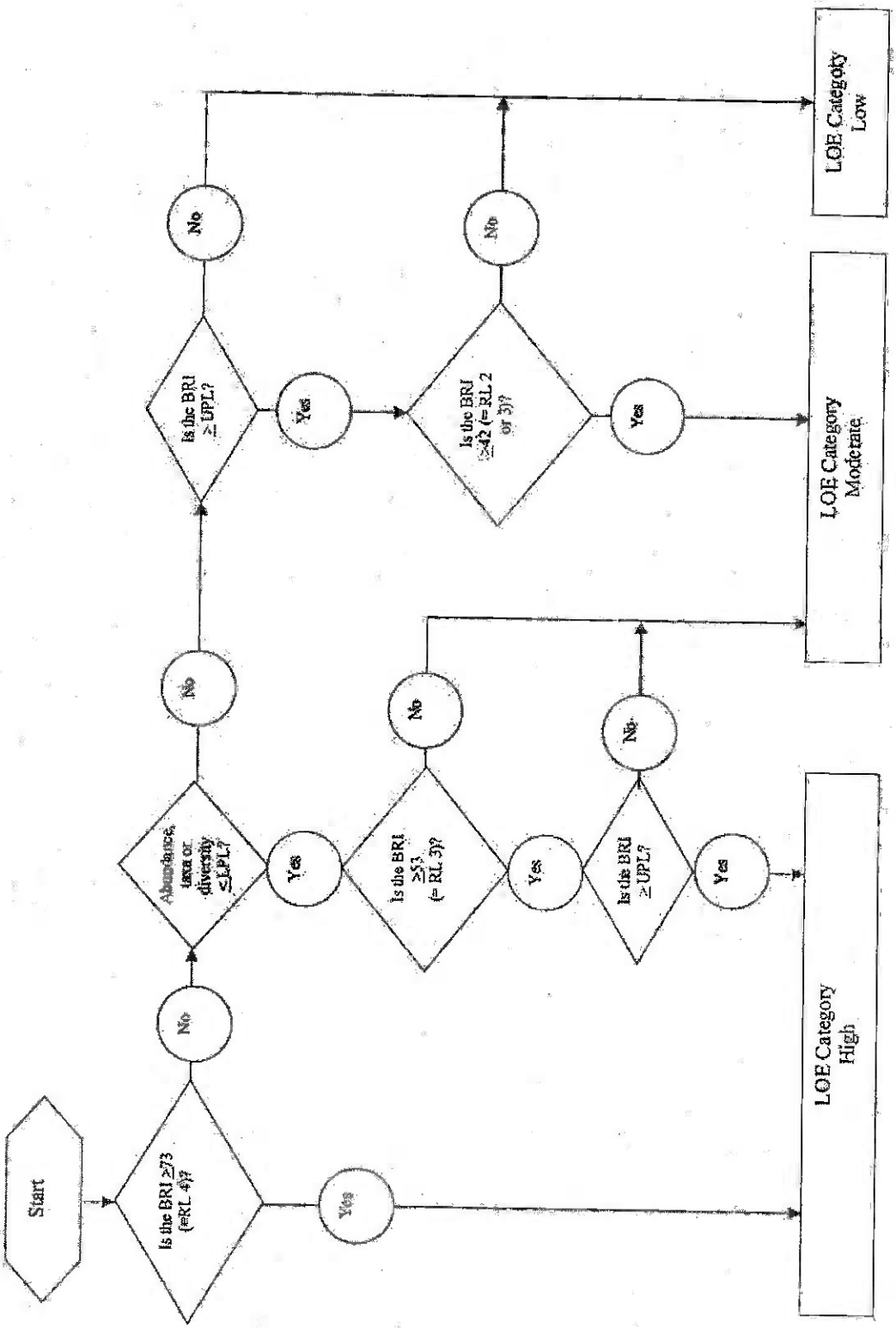

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Table 18-12 Comparison of the Benthic Community Metrics Data from the Shipyard Sediment Site Stations to the Reference Pool 95% Predictive Limits

Site	Station	BRI (95% UPL = 57.7)	Abundance[1] (95% LPL = 239)	# Taxa[1] (95% LPL = 22)	S-W Diversity (95% LPL = 1.8)
NASSCO	NA01	42.2	447	33	2.8
	NA03	45.5	492	40	3.0
	NA04	49.6	285	25	2.5
	NA05	44.4	569	35	2.4
	NA06	54.4	611	37	2.7
	NA07	44.6	475	43	3.0
	NA09	51.1	862	44	2.6
	NA11	46.0	604	33	2.4
	NA12	42.6	538	37	2.7
	NA15	51.0	306	26	2.3
	NA16	48.0	522	33	2.6
	NA17	55.3	418	33	2.7
	NA19	46.7	828	43	2.7
	NA20	54.0	412	**22**	2.3
	NA22[2]	51.6	**107**	**15**	2.2
BAE Systems	SW02	52.1	976	39	2.4
	SW03	49.9	361	31	2.8
	SW04	41.1	3,175	36	**1.6**
	SW08	41.5	2,457	41	2.4
	SW09	53.2	572	39	2.7
	SW11	42.4	777	44	2.9
	SW13	43.6	742	53	3.2
	SW15	37.8	806	59	3.1
	SW17	45.7	621	30	2.4
	SW18	39.5	829	42	2.8
	SW21	53.2	315	24	2.4
	SW22	55.1	363	26	2.4
	SW23	50.0	316	27	2.6
	SW25	41.3	611	40	2.8
	SW27	42.9	927	48	2.9

1. For the BRI-E, index scores greater than the 95% upper prediction limit are bold faced and shaded. For the abundance, # taxa, and S-W diversity metrics, metric scores less than or equal to their respective 95% lower prediction limits are bold faced and shaded.

2. NA22 was omitted from this analysis because it falls within an area that is being evaluated as part of the TMDLs for Toxic Pollutants in Sediment at the Mouth of Chollas Creek TMDL and is not considered part of the Shipyard Sediment Site for purposes of the CAO.

Table 18-13 Benthic Community Line-of-Evidence Results

Station	Benthic Response Index				Abundance	# Taxa	S-W Diversity	LOE
	≥ 73	≥ 53	≥ 42	≥ 95% UPL	≤ 95% LPL	≤ 95% LPL	≤ 95% LPL	Category
NA01	No	No	Yes	No	No	No	No	**Low**
NA03	No	No	Yes	No	No	No	No	**Low**
NA04	No	No	Yes	No	No	No	No	**Low**
NA05	No	No	Yes	No	No	No	No	**Low**
NA06	No	Yes	Yes	No	No	No	No	**Low**
NA07	No	No	Yes	No	No	No	No	**Low**
NA09	No	No	Yes	No	No	No	No	**Low**
NA11	No	No	Yes	No	No	No	No	**Low**
NA12	No	No	Yes	No	No	No	No	**Low**
NA15	No	Yes	Yes	No	No	No	No	**Low**
NA16	No	No	Yes	No	No	No	No	**Low**
NA17	No	No	Yes	No	No	No	No	**Low**
NA19	No	No	No	No	No	No	No	**Low**
NA20	No	No	Yes	No	No	Yes	No	**Moderate**
NA22[1]	No	No	Yes	No	Yes	Yes	No	**Moderate**
SW02	No	No	Yes	No	No	No	No	**Low**
SW03	No	No	No	No	No	No	No	**Low**
SW04	No	Yes	Yes	No	No	No	Yes	**Moderate**
SW08	No	No	Yes	No	No	No	No	**Low**
SW09	No	No	Yes	No	No	No	No	**Low**
SW11	No	No	No	No	No	No	No	**Low**
SW13	No	No	Yes	No	No	No	No	**Low**
SW15	No	No	No	No	No	No	No	**Low**
SW17	No	No	No	No	No	No	No	**Low**
SW18	No	No	No	No	No	No	No	**Low**
SW21	No	No	Yes	No	No	No	No	**Low**
SW22	No	No	Yes	No	No	No	No	**Low**
SW23	No	No	Yes	No	No	No	No	**Low**
SW25	No	No	Yes	No	No	No	No	**Low**
SW27	No	No	Yes	No	No	No	No	**Low**

1. NA22 was omitted from this analysis because it falls within an area that is being evaluated as part of the TMDLs for Toxic Pollutants in Sediment at the Mouth of Chollas Creek TMDL and is not considered part of the Shipyard Sediment Site for purposes of the CAO.

The low, moderate, and high ranking benthic community health classification criteria are based on the following two key assumptions (SCCWRP and U.S. Navy, 2005b):

- The assumption is made that no, or a low degree of benthic community degradation is present when the station BRI is Response Level 1 (< RL 2) or is statistically similar to the Reference Condition; and
- A high degree of benthic community degradation at a station is assumed to be present at BRI Response Levels (RLs) greater than 3 or when other indicators also show benthic community structure impacts.

The benthic community structure line of evidence category ranking from the SCCWRP and U.S. Navy (2005b) report are presented below and in Figure 18-3 of this report. The same ranking criteria from the SCCWRP and U.S. Navy (2005b) report are used to evaluate the benthic community indices from the Shipyard Sediment Site investigation.

Low Degree of Benthic Community Degradation: Benthic community degradation at each station is classified as none or a low if the BRI RL is less than 2 and when abundance, number of taxa, and the Shannon-Weiner Diversity Index are all statistically similar to the Reference Condition.

Moderate Degree of Benthic Community Degradation: The benthic community is classified as moderately degraded at stations exhibiting a BRI RL 2 or 3 and is statistically greater degradation than the Reference Condition, or, if any one of the other benthic community metrics is below the 95% PL established by the Reference Condition.

High Degree of Benthic Community Degradation: The benthic community is classified as highly degraded at stations with a BRI greater than RL 3. The benthic community is also classified as highly degraded at stations with BRI RL 2, the results are statistically greater than Reference Condition, and at least one of the other benthic community metrics is below the 95 percent PL established by the Reference Condition.

To determine the likelihood of benthic community impairment (Likely, Possible, or Unlikely), each line of evidence ranking (Low, Moderate, or High) is put into the Weight-of-Evidence Analysis framework described in Section 18 below.

18.5. Weight-of-Evidence Criteria

The ~~classification results for the~~ three lines of evidence (LOE) assessments for sediment chemistry, toxicity, and benthic community described in DTR Sections 18.2, 18.3 and 18.4, respectively, ~~comprising the Triad of data are~~ were integrated into an overall weight-of-evidence (WOE) ~~evaluation~~ assessment ~~that focuses on identifying~~ to identify the likelihood that ~~the health of~~ the benthic community is adversely impacted at a given Shipyard Sediment Site station due to the presence of CoPCs in the sediment. This ~~evaluation~~ WOE assessment follows the general principles of the "Sediment Quality Triad Approach" described in a U.S. EPA compendium of "scientifically valid and accepted methods" used to assess sediment quality (U.S. EPA, 1992a). Potential

combinations of the rankings for individual LOE were assessed and assigned a relative overall likelihood of benthic community impairment using three categories "Unlikely", "Possible" and "Likely" similar to the WOE approach described in "Sediment Assessment Study for the Mouth of Chollas and Paleta Creek, Phase 1 Final Report, May 2005" (SCCWRP and U.S. Navy, 2005b).

~~Three categories are used to describe the overall likelihood of impairment at each Shipyard Sediment Site station: "Unlikely," "Possible," and "Likely." These categories are assigned to each Shipyard Sediment Site station based on the potential combinations of the low, moderate, and high classifications of impairment for each previously described line of evidence in this section. For example, a station with a "High" classification for sediment chemistry, toxicity, and benthic community would indicate that it is "Likely" that the benthic community is adversely impacted. The framework used to interpret the various combinations is shown in Table 18-14 below, and is based on the consideration of four key elements as described in "*Sediment Assessment Study for the Mouth of Chollas and Paleta Creek, Phase 1 Final Report, May 2005*" (SCCWRP and U.S. Navy, 2005b).~~

The WOE framework used to interpret the various combinations is shown in Table 18-14, and is based on the consideration of four key elements:

- Level of confidence or weight given to the individual line of evidence
- Whether the line of evidence indicates there is an effect
- Magnitude or consistency of the effect
- Concurrence among the various lines of evidence.

The three categories of impairment are described below:

Unlikely - A station was classified as "Unlikely" if the individual LOE provided no evidence of biological effects due to elevated CoPCs (relative to the reference condition) at the site. This category was assigned to all stations with a "Low" chemistry LOE ranking, regardless of the presence of biological effects, because there was no evidence that effects were related to site-specific contamination. Similarly, stations having a "Moderate" ranking for chemistry and a "Low" ranking for biological effects were also classified as "Unlikely." The category of "Unlikely" does not mean that there was no impairment, but that the impairment was not clearly linked to site related chemical exposure.

Possible - A station was classified as "Possible" when there was a lack of concurrence among the LOE, which indicates less confidence in the interpretation of the results. This category was assigned to stations with moderate chemistry and a lack of concurrence among the biological effects LOE (i.e., effects present in only one of two LOE). Intermediate chemistry rankings have less certainty for predicting biological effects. The lack of concurrence between the toxicity and benthic community measures indicates a lower degree of confidence that the biological effects observed were due to CoPCs at the site; and that these effects could have been caused by other factors (e.g., physical disturbance or natural variations in sediment characteristics). The category of "Possible" represents situations where impairment was indicated, but there was less confidence in the reliability of the results. Of the three categories listed, stations in this group

would be more likely to change their category as a result of natural variability, changes in the composition of the reference stations used for comparison, or to differences in the criteria used to classify each LOE.

Likely - A station was classified as "Likely" if there was a high level of agreement between observed biological effects and elevated CoPCs at the site. Concurrence among the three LOE (i.e., the presence of moderate or high rankings for chemistry, toxicity, and benthic community) always resulted in a classification of likely impairment. This classification was also assigned when the chemistry LOE was "High" and biological effects were present in either the toxicity or benthic community LOE.

For example, a station with a "High" ranking for chemistry, toxicity and benthic community would indicate a "High" likelihood of site-specific aquatic life impairment because each LOE indicates an effect, the magnitude of the effect is consistently high, and there is clear concurrence among the LOE. Alternatively, a station with a "Low" ranking for chemistry, and moderate or high rankings for toxicity and benthic community would indicate unlikely site-specific aquatic life impairment from site CoPCs, because there is no concurrence with site CoPCs. This does not mean that there is no impairment, but that the impairment is not clearly linked to site related chemical exposure.

The WOE framework in Table 18 -14 was used to interpret the MLOE results and is consistent with other published WOE frameworks. The results of the WOE ~~weight of of evidence results~~ assessment for each Shipyard Sediment Site station are presented in Table 18-1 ~~above~~.

Table 18-14 Weight-of-Evidence Analysis Framework for the Aquatic Life Impairment Assessment

Sediment Chemistry[1]	Toxicity[2]	Benthic Community[3]	Relative Likelihood of Benthic Community Impairment[4]
High	High	High	Likely
High	High	Moderate	
High	Moderate	High	
Moderate	High	High	
High	High	Low	
High	Low	High	
High	Moderate	Moderate	
Moderate	High	Moderate	
Moderate	Moderate	High	
Moderate	Moderate	Moderate	
High	Moderate	Low	
High	Low	Moderate	
Moderate	High	Low	
Moderate	Low	High	
Moderate	Moderate	Low	Possible
Moderate	Low	Moderate	
High	Low	Low	
Low	High	High	Unlikely
Low	High	Moderate	
Low	Moderate	High	
Low	Moderate	Moderate	
Low	Low	High	
Low	High	Low	
Low	Low	Moderate	
Low	Moderate	Low	
Moderate	Low	Low	
Low	Low	Low	

1. Relative likelihood that the contaminants present in the sediment is adversely impacting organisms living in or on the sediment (i.e., benthic community).
2. Relative likelihood of toxic effects based on the combined toxic response from three tests: amphipod survival, sea urchin fertilization, and bivalve development.
3. Relative likelihood of benthic community degradation based on four metrics: total abundance, total number of species, Shannon-Wiener Diversity Index, and the Benthic Response Index.
4. Relative likelihood that the health of the benthic community is adversely impacted based on the three lines of evidence: sediment chemistry, toxicity, and benthic community.

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN THE MATTER OF:	
TENTATIVE CLEANUP AND ABATEMENT	Order No. R9-2011-001

VIDEOTAPED

DEPOSITION OF TOM ALO

VOLUME II PAGES 211 THROUGH 410

FEBRUARY 17, 2011

SAN DIEGO, CALIFORNIA

REPORTED BY: JULIE A. MCKAY, CSR NO. 9059

the process to evaluate each leg of the triad, there is a -- the first step is comparing to sort of a threshold. And the threshold that we used for the sediment quality guidelines for the sediment chemistry leg were ERM for metals, consensus midrange effects concentrations for PAHs and PCBs and the sediment quality guideline quotient for the chemical mixtures. 09:14 09:14

Q. At the end of the first paragraph, the bold beginning sediment quality guidelines, do you see the final sentence of that paragraph beginning "SQGs are helpful"? 09:15

A. I'm sorry. I see it. Okay.

Q. So SQGs are helpful in determining whether marine sediment contaminants warrant further assessment or at a level that requires no further evaluation. 09:15

Do you agree with that statement?

A. Yes.

Q. So in order to screen sediment chemistry and try to determine whether some type of further analysis was warranted at those stations, you looked at the SQGs and compared NASSCO station data to those numbers. 09:15

Correct?

A. Correct.

Q. So the presence of a chemical concern by itself may indicate impairment of aquatic life but does not 09:16

necessarily mean that there is impairment. Correct? 09:16

A. Correct.

Q. A professor explained this to me once as the copper wire test. So, if you have a fish tank and you put a copper wire in, the fish may swim around it like 09:16 any other structure in the fish tank. But if you put a different type of copper in, like copper sulfate, all the fish may die. So he explained to me the form of the substance is very important in determining the aquatic life impairment. Is that correct? 09:16

A. Correct.

Q. So the purpose of this sediment chemistry analysis is to determine whether there's that potential effect, it's more like the copper sulfate or it's more like the copper wire? 09:16

A. Right.

Q. So, if I understand the triad process correctly, once we have triggered our further analysis, we then move on to the other two legs of the triad. We look at the toxicity and the benthic community analysis 09:17 to determine whether those chemicals of concern are actually causing aquatic impairment. Correct?

A. Correct. But you don't necessarily have to start with sediment chemistry, stepwise. You can start with toxicity. It doesn't matter because at the end you 09:17

combine the three legs of the triad. 09:17

Q. For the triad approach, do you agree that the biologically based lines of evidence are the most important since they measure the actual direct impacts on what we're trying to protect? 09:17

MR. CARRIGAN: Vague.

MR. RICHARDSON: I'll rephrase it.

MR. CARRIGAN: Okay.

BY MR. RICHARDSON:

Q. Do you agree, Mr. Alo, that the biologically based lines of evidence are the most important in the triad analysis since they are the direct measures of what is being protected? 09:18

A. Yes, I agree that the biological information is one of the most important. But, again, the triad analysis considers all three legs combined to make a decision and not just, you know, focusing in on toxicity, focusing in on the benthic community results. 09:18

MR. RICHARDSON: Okay. Court Reporter, ask you to mark this as Exhibit 1121. 09:18

(Exhibit 1121 marked for identification.)

BY MR. RICHARDSON:

Q. Mr. Alo, I'm handing you an article from the Journal of Human and Ecological Risk Assessment, dated 2002, titled "Weight of Evidence Framework for Assessing 09:19

Sediment or Other Contamination." 09:19

Do you see that?

A. Yes, I do.

Q. Mr. Alo, I refer you to Page 1685 of the document, the very last paragraph. 09:19

Can you read that paragraph and let me know when you are ready to discuss it.

A. You said the last paragraph?

Q. The last paragraph on Page 1685.

A. Okay. 09:19

Q. Mr. Alo, are you familiar with the authors of this article from Wright State University, Miami University, Virginia Tech, and others?

A. I'm familiar with Peter Chapman from EVS Environmental Consultants if it's the same Peter Chapman that I know. 09:20

Q. Okay. And do you recognize Peter Chapman as -- strike that.

Do you know who developed the multiple lines of evidence approach for aquatic life impairment? 09:20

A. No, I don't.

Q. Mr. Alo, in reading this last paragraph, "The biologically based line of evidence are the most important since they are direct measures of what is being protected," as the authors of this study and in 09:21

your own expertise as a sediment toxicologist, would you agree with the authors in that statement? 09:21

A. Yes, I would agree with them.

Q. Mr. Alo, looking at Page 18-3 of the DTR, for the sediment chemistry analysis you compared sediment chemical concentrations for each station at the NASSCO site to the reference conditions. Correct? 09:21

A. Correct.

Q. And then determined the relative potential for adverse effects as being low, moderate, or high. 09:21

Is that correct?

A. That's correct.

Q. Why are there only three possible results for this category?

A. In the -- as stated in DTR is that we worked with multiple stakeholders on this; namely, SCCWRP, the Navy, Spawar. We also worked with the natural resource trustee agencies. That would be NOAA, Fish and Wildlife, Fish and Game. And it was a decision based on the entire group that it was reasonable to use the three classifications of low, moderate, and high. 09:22 09:22

Q. Okay. Mr. Alo, let's go to that development of these lines of evidence. On Page 18-11 of the DTR, the very last sentence refers to how these criteria were developed. And I believe you mentioned that they were 09:23

and it would still be deemed to have low impairment? 09:25

MR. CARRIGAN: Misstates the document.

BY MR. RICHARDSON:

Q. Is that correct?

MR. CARRIGAN: I'm sorry. Misstates the 09:25
document. Misstates the witness's testimony.

You can answer.

THE WITNESS: Again, the flowchart will, as you -- as you move through the diamonds within the flowchart and the decisions that are made within that 09:25
flowchart, you will either come up with a high, a low, or a moderate.

BY MR. RICHARDSON:

Q. Okay. Mr. Alo, I'm not trying to be a tricky question here. It's a very simple question. 09:25

If we have a sediment chemistry result at the shipyard and we compare that to reference and they're identical, would there be no impairment compared to reference or would there be low impairment compared to reference under this methodology? 09:26

A. Under this methodology, you would get a low impairment.

Q. Great. Thank you.

Mr. Alo, what's the justification for that?

A. I'd have to refer back to this flow diagram. 09:26

whenever I refer to NASSCO site, I'll refer to NASSCO site except for the NA22 site. Do you understand? 10:00

A. Yes, I do.

Q. Was there significant variability in the data for the bivalve development test at the shipyard site? 10:00

A. I don't recall. I'd have to look at the replicates for toxicity test to see if there was variability.

Q. Was there significant variability in the bivalve test at reference? 10:01

A. Again, I would have to go back into the data to see if there was any variance with the replicates.

Q. Would you agree that a test that has significant variability, both at reference and at a site being studied, would be suspect? 10:01

MR. CARRIGAN: Incomplete hypothetical. Vague.

THE WITNESS: Potentially, yes.

BY MR. RICHARDSON:

Q. Isn't the bivalve test more susceptible to confounding factors than the other tests -- than the -- strike that. I'm sorry. Let me start over. 10:01

Isn't the bivalve test more susceptible to confounding factors and its association with ecological receptors less certain than the amphipod survival test?

A. I would agree with that. 10:02

BY MR. RICHARDSON: 10:27

Q. I have added the row below the double line as protected as reference background question mark.

Do you see that?

A. I see that. 10:27

Q. Mr. Alo, what I've tried to do is analyze for all the seven direct lines of evidence for NA06 how the station compares to reference conditions.

Do you see that?

A. Yes. 10:27

Q. I have the LPLs and the UPLs for each of the relevant multiple lines of evidence for toxicity and benthic community described here.

Do you see that?

A. Yes, I do. 10:27

Q. Do you agree, Mr. Alo, that for each of these tests, based on all the seven lines of evidence, none are different than the background reference conditions? Correct?

A. Correct. 10:28

Q. Would you agree that, based on these seven direct tests, that there is no impairment to aquatic life at NA06?

A. No. I would have to take a look at the sediment chemistry leg and again go through the 10:28

flowchart to determine aquatic life impairment. 10:28

Q. I understand. What I'm asking you, though, is a very different question. I'm asking you: Looking exclusively as these seven lines of evidence, these seven direct lines of toxicity and benthic community 10:28 evidence related to NA06, is there any difference compared to reference?

A. No.

Q. Mr. Alo, would you -- this may make it easier for us to go through these -- if you would label on the 10:29 bottom right A, B, C, D, and E.

A. Just right here?

Q. Yes, just -- oh, yeah.

I'm sorry. You're double-sided. Yeah, on the back of the double side put "B." 10:29

A. Okay.

Q. Easier to refer to which document we're looking at. So the next one should be labeled "B" now, and it's the Station NA09.

Do you see that? 10:29

A. Yes, I do.

Q. Mr. Alo, would you agree that six of the seven lines of evidence indicate that NA09 is not significantly different than the background reference conditions? 10:30

A. Yes. 10:30

Q. Do you agree that the only test that's different than background reference conditions is the bivalve development?

A. Yes. 10:30

Q. Mr. Alo, because six of the seven lines of direct evidence support the conclusion that there is no significant difference from reference, wouldn't you agree that there is not a significant aquatic life impairment at NA09? 10:30

MR. CARRIGAN: Vague. Incomplete hypothetical.

THE WITNESS: Not aquatic life impairment, but significant difference from reference.

BY MR. RICHARDSON:

Q. For the one test? 10:30

A. For the one test.

Q. Okay. I'm asking you overall, Mr. Alo, with seven lines of evidence, my understanding -- I guess we should back up.

My understanding is the purpose of multiple lines of evidence is to look for congruency. Right? So where you have six direct lines of evidence indicating that there's no difference than reference conditions and only one line of evidence to suggest there may be impact, would you agree that there's not a significant 10:30 10:31

impact to aquatic life impairment at Station NA09? 10:31

MR. CARRIGAN: Vague.

THE WITNESS: No. I'm going to always turn back to the -- our triad approach that we use to determine aquatic life impairment. I simply can't just 10:31 go by, you know, toxicity and benthic community. I need to consider the third leg in making a decision on aquatic life impairment.

BY MR. RICHARDSON:

Q. And we'll definitely talk about the third leg. 10:31 I'm not asking you to provide an opinion now on your methodology using the chemistry line of evidence also. I'm asking solely based on this data where six lines of direct evidence show that there's not a significant difference in the reference, wouldn't you agree that 10:31 there's not a significant difference from reference?

A. Yes.

Q. The next one, NA15, which should be labeled "C" on your page. Correct?

A. Correct. 10:32

Q. This is Station NA15, and for all seven lines of direct evidence of toxicity and benthic community would you agree that there is no difference than background reference conditions?

A. Yes. 10:32

Q. Similar to NA06, based on these seven lines of evidence, would you agree that there is no impairment to aquatic life at NA15? 10:32

A. Significant difference.

Q. Is there any difference compared to reference for these seven lines of evidence? 10:32

A. No, there isn't.

Q. Okay. The next page is NA17. It should be labeled now as "D." Is that correct?

A. "D." 10:32

Q. Okay. For NA17 would you agree that all seven direct lines of evidence demonstrate there's no differences between NA17 and reference conditions with respect to toxicity and benthic community?

A. Correct. 10:33

Q. Would you also agree that, based on these seven lines of evidence, there's is no impairment to aquatic life at NA17?

A. Significant difference.

Q. Is there any, based on these seven lines of evidence, is there any at all difference? 10:33

A. No, there isn't.

Q. Next slide is NA19, should be labeled as "E." Correct?

A. Yes. 10:33

Q. Would you agree that six of the seven direct lines of evidence of toxicity and benthic community analysis for NA19 are the same as background conditions? 10:33

A. Correct.

Q. Would you agree that there's one test that was significantly different than reference conditions? 10:33

A. Yes.

Q. And that was the bivalve test?

A. Correct.

Q. So, based on these seven lines of evidence, six of which show no difference compared to reference conditions, would you agree that there is not a significant aquatic life impairment at NA19? 10:34

A. Significant difference to reference.

Q. There is no significant difference? 10:34

A. No significant difference.

Q. Okay. Thank you.

So, Mr. Alo, the significant differences that were observed for these tests -- I'm sorry -- the significant differences that were observed for two of the stations that we reviewed, the only significant differences that we saw in all five of these stations related to the bivalve development tests. Correct? 10:34

A. Correct.

MR. RICHARDSON: Mr. Alo, I've tried to 10:35

MR. CARRIGAN: Overbroad. Lacks foundation. Calls for speculation.

You can answer if you have an opinion.

THE WITNESS: I wouldn't know. I would have to go collect the samples. 11:31

BY MR. RICHARDSON:

Q. Other than the consensus of the group that you identified previously that did not involve industry, what is the basic rationale for using a minimum of a low impairment for the different lines of evidence? 11:31

A. The low impairment you said? Is -- I don't recall what the underlying rationale was. It was just the three categories that we all decided upon as a group.

Q. And you recognize that the State Water Board promulgated sediment quality objectives that do include a nontoxic category. Correct? 11:32

A. Correct.

Q. And that the State did adopt a no-effect level for the benthos. Correct? 11:32

A. Correct.

Q. But, in the methodology that's presented in the DTR, the lowest category is low?

A. That's correct.

Q. And the basis for that is solely the 11:32

development by the group that you mentioned previously? 11:32

A. That's correct.

Q. Mr. Alo, doesn't that minimum level of low impairment introduce an inherent bias into the analysis?

MR. CARRIGAN: Calls for a legal conclusion. 11:32

THE WITNESS: It could.

BY MR. RICHARDSON:

Q. It could?

A. Yeah.

Q. I want to talk about the bivalve test and, 11:32
specifically, the bivalve test that was conducted in connection with the study that was reported by Exponent in 2003. Okay?

A. Okay.

Q. Are you aware of any standard protocol, an ASTM 11:33
method or any other published scientific article, that describes the bivalve test that was used in that study?

A. I'm not aware of any.

Q. Are you aware of any criticisms of using this type of bivalve test for this study? 11:33

A. No, I'm not aware of any.

Q. At the time that this study plan was being developed, do you recall any criticisms of the test?

A. No, I don't recall other than, you know, the confounding factors issue. 11:33

Correct? 11:50

A. Correct.

Q. So for many of the stations that we looked at there, indeed for all of the benthic community stations, the categorization is no significant differences 11:50 compared to reference. Correct?

A. Correct.

Q. So, Mr. Alo, can you explain how we can have a possible likelihood of benthic community impairment when both the toxicity and benthic community variables under 11:51 seven different tests are not in any way different than the background reference conditions?

MR. CARRIGAN: Vague.

You can answer

THE WITNESS: Mainly due to the sediment 11:51 chemistry leg that we see it triggered a high category, but yet I do understand the low low. And so, therefore, because of that high is that further evaluation is required.

BY MR. RICHARDSON: 11:51

Q. Okay. And would that further evaluation include looking at the toxicity and benthic community results?

A. Yeah, among other things.

Q. Okay. Are you aware of any other interpretive 11:51

framework published anywhere or any other agency documents where there is possible impairment in a circumstance where there's high chemistry but no toxicity and no benthic community impairment? 11:51

A. It's been a while, but not that I'm aware of. 11:52

Q. How would the weight-of-evidence framework change if you created a "no" category for both toxicity and benthic community assessment?

MR. CARRIGAN: Incomplete hypothetical. Vague.

THE WITNESS: Difficult to answer that question. Would change probably a lot of these results that we see here by adding a fourth category. 11:52

BY MR. RICHARDSON:

Q. I'm sorry. Could you repeat that?

A. It would be difficult to answer that question only because, if we added that fourth category, a lot of this would kind of change. 11:52

Q. Okay.

A. And, myself, I wouldn't be able to provide that opinion. I would need a group of others to help out. 11:53

Q. Okay. And those others that would help out, would it include someone from the State Board that's an expert on sediment quality?

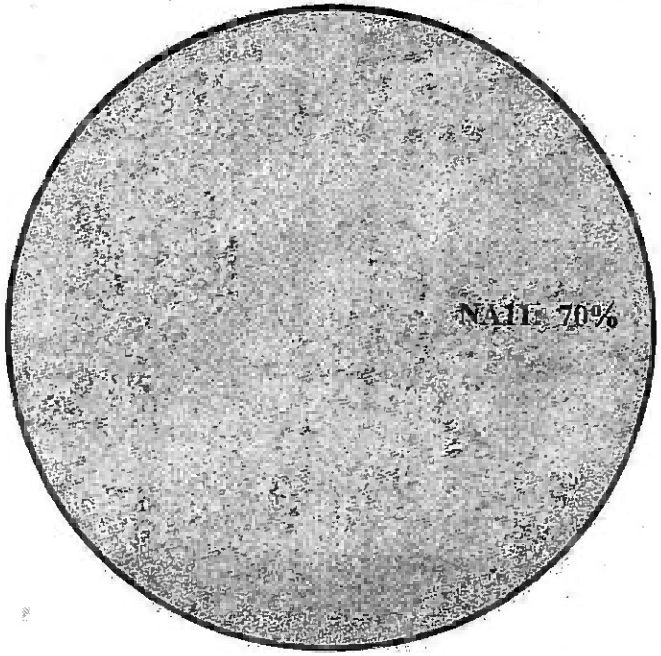
A. Yes.

MR. CARRIGAN: Calls for speculation. 11:53

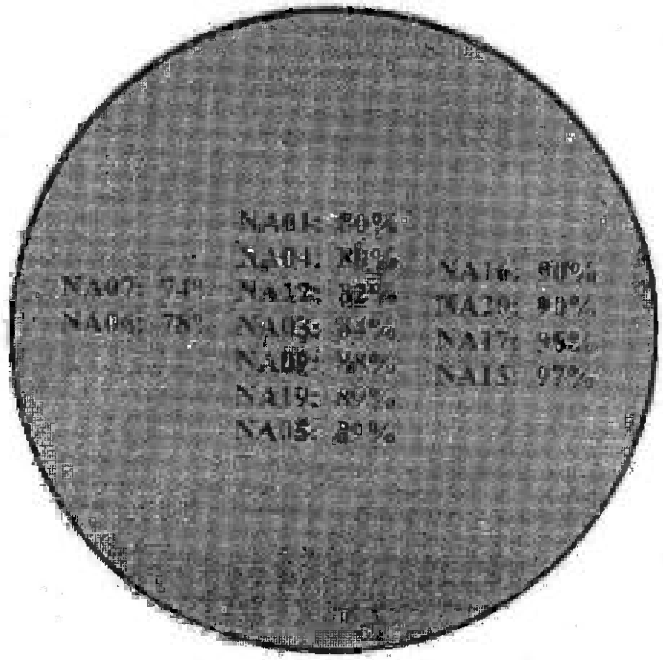
Amphipod Survival Results for All NASSCO Stations

Reference/Background = 73%
(95% LPL)

Not As Protective As Reference/Background



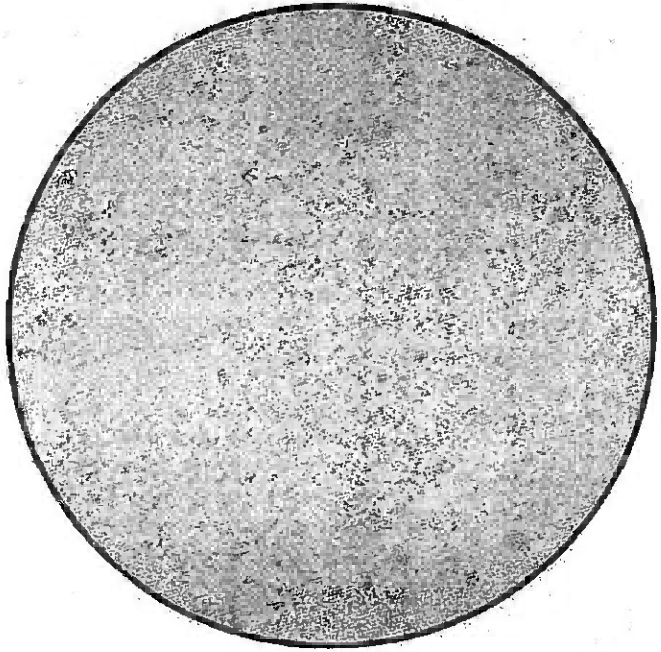
As Protective As Reference/Background



Urchin Fertilization Results for All NASSCO Stations

Reference Background
12%
(95% UPL)

Not As Protective As Reference Background

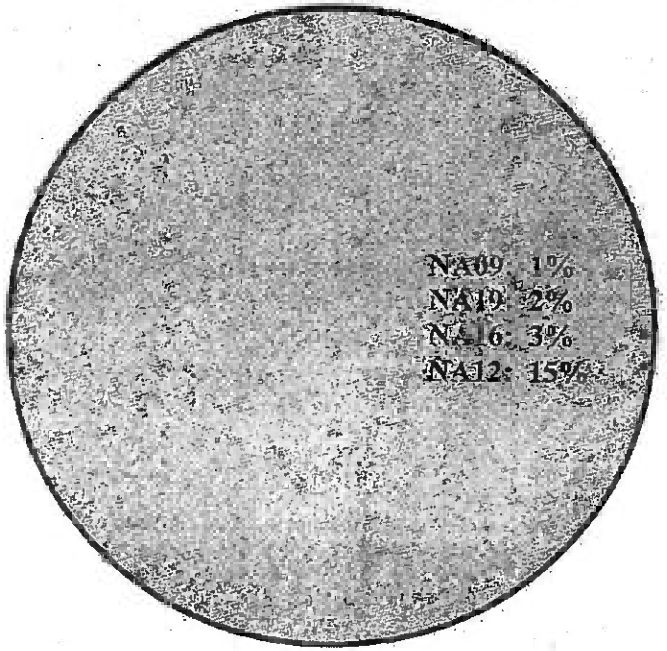


As Protective As Reference Background

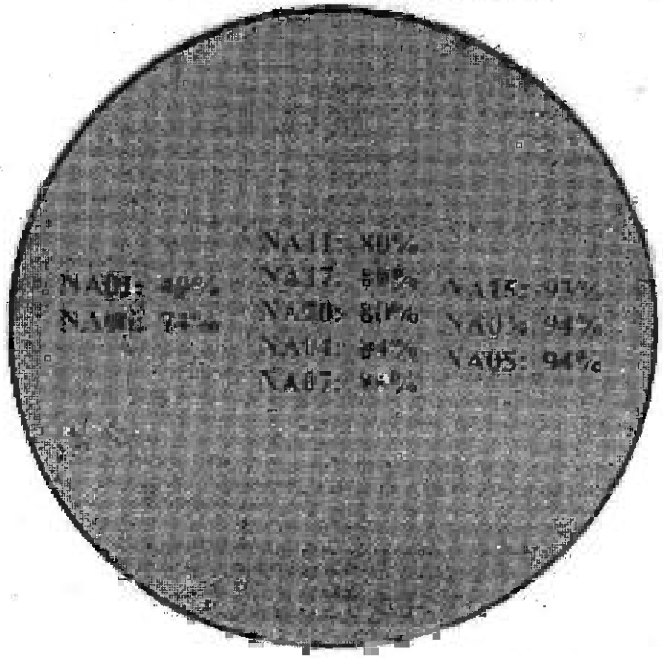
Bivalve Development Results for All NASSCO Stations

Reference/Background
37%
(95% LPL)

Not As Protective As Reference/Background



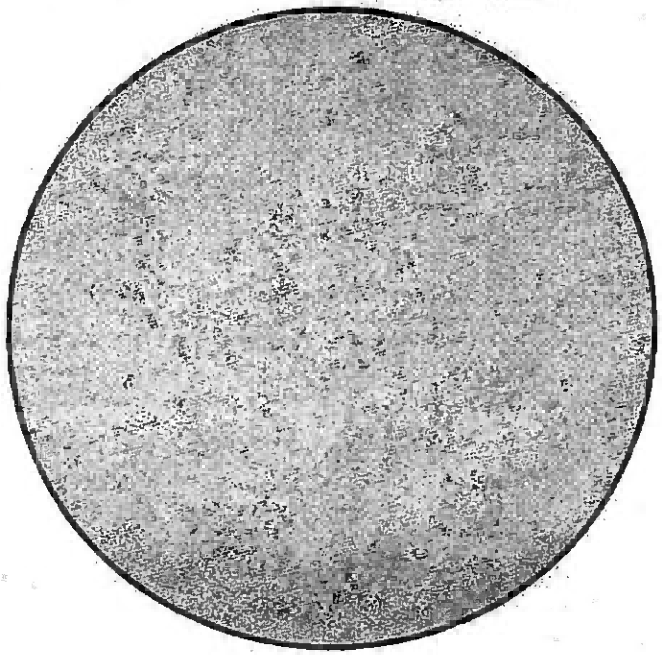
As Protective As Reference/Background



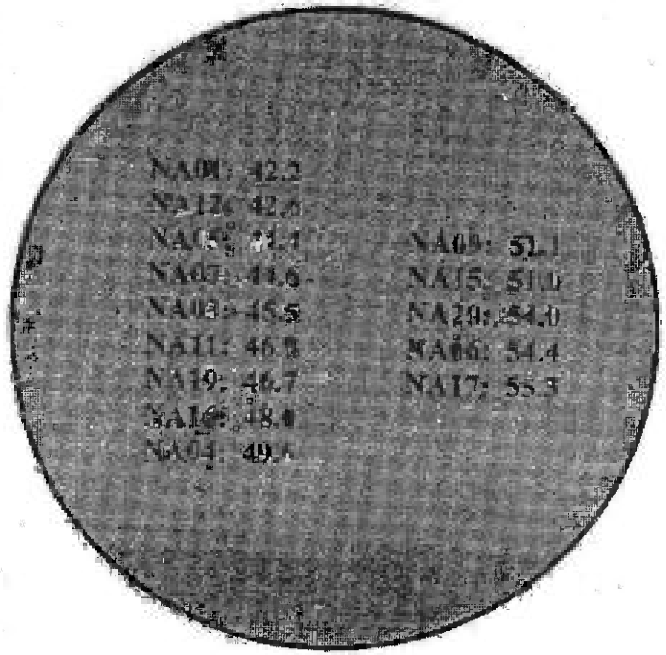
BRI Results for All NASSCO Stations

Reference Background
(9.2 ug/g fPL)

Not As Protective As Reference Background



As Protective As Reference Background



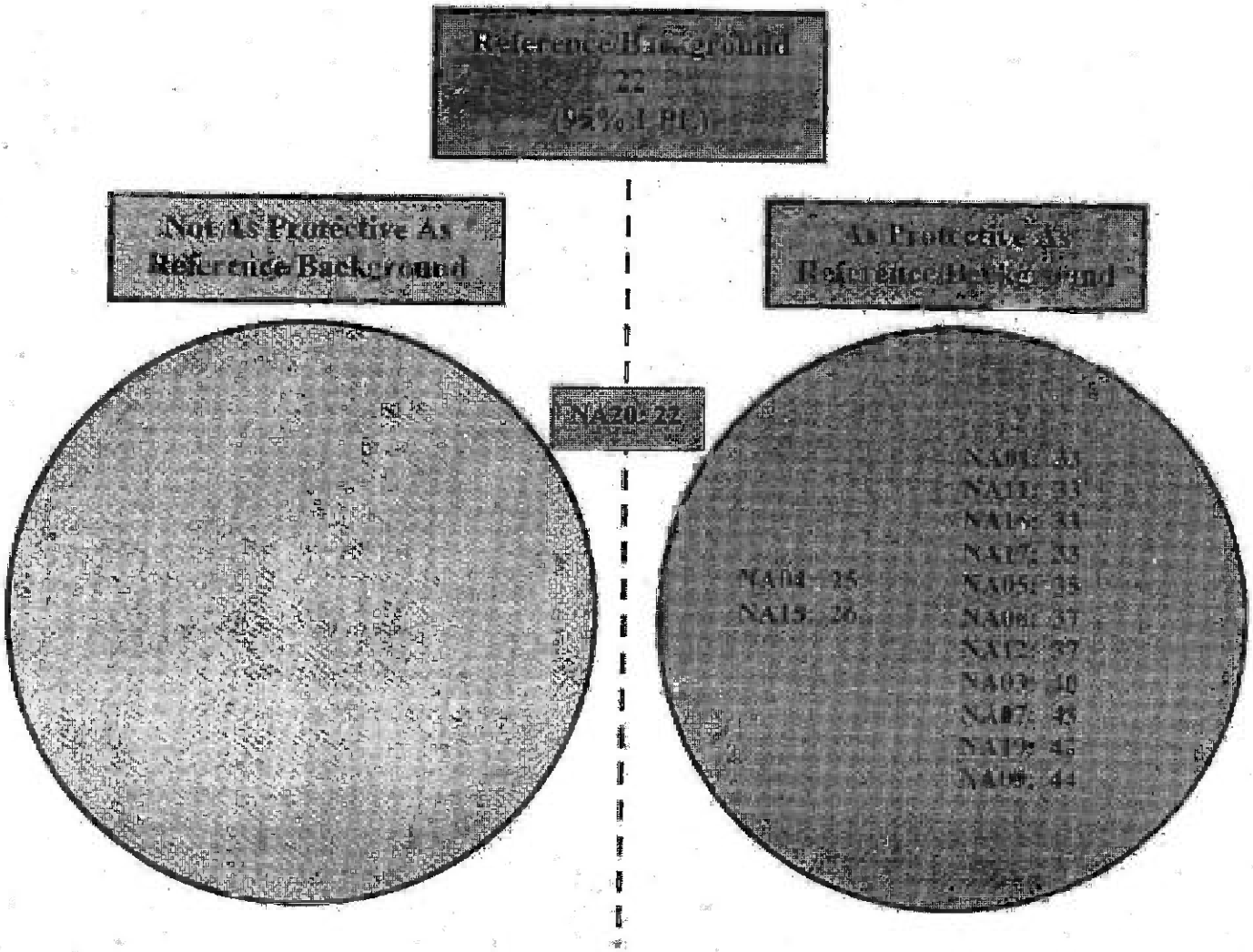
Abundance Results for All NASSCO Stations

Reference Background
[illegible]

Not As Protective As Reference/Background	As Protective As Reference/Background
	NA04: 285
	NA15: 306
	NA26: 412
	NA17: 418
	NA01: 447
	NA07: 475
	NA03: 492
	NA16: 522
	NA12: 528
	NA05: 560
	NA11: 604
	NA06: 611
	NA19: 828
	NA09: 862

4

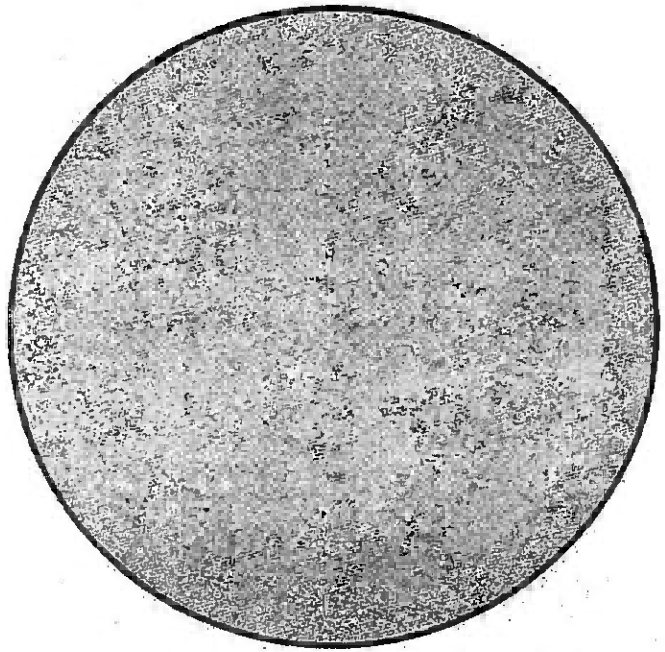
Number Taxa Results for All NASSCO Stations



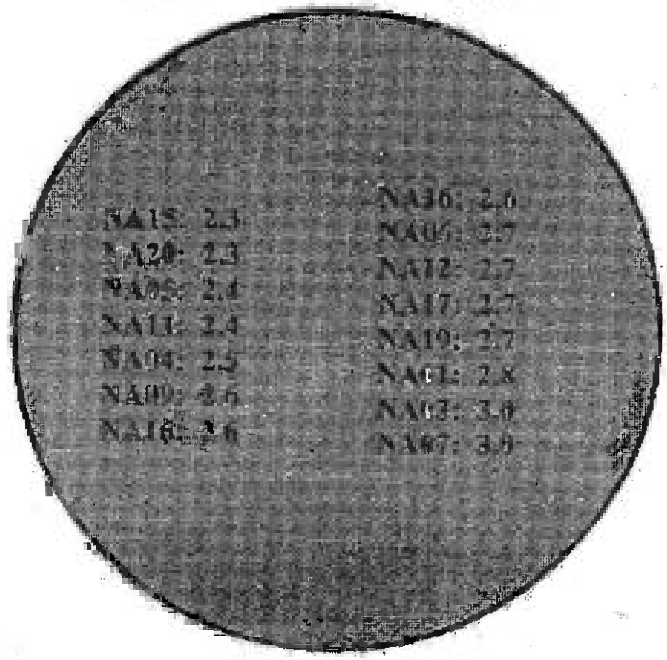
S-W Diversity Results for All NASASCO Stations

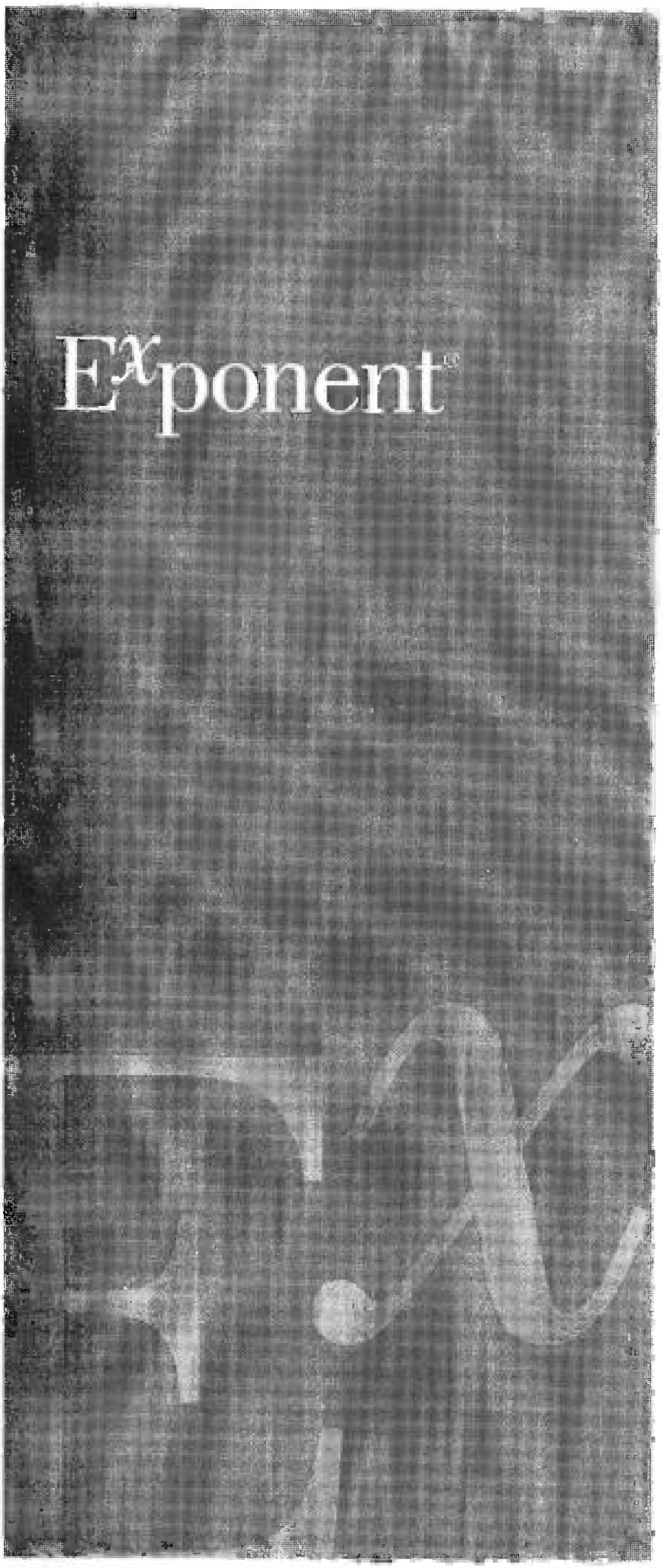
Reference Background
is
(95% LPL)

Not As Protective As Reference Background



As Protective As Reference Background





Evaluation of Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2011-0001 for the NASSCO Shipyard Sediment Site

Expert Report of
Thomas C. Ginn, Ph.D.

R-139

Exponent

Evaluation of Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2011-0001 for the NASSCO Shipyard Sediment Site

Prepared for

Latham and Watkins
601 West Broadway
Suite 1800
San Diego, CA 92101-3375

Prepared by

Thomas C. Ginn, Ph.D.

Exponent
1040 East Park Ridge Drive
Sedona, AZ 86336

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Doc. no. PH10719.000 0201 0311 TG11

Before I discuss my specific criticisms of the Staff's approach and present my interpretation of the available data, it must be emphasized that a WOE approach in general represents an appropriate assessment strategy and is consistent with standards of practice and EPA policy for sediment assessments. WOE assessments have been conducted at sediment sites throughout the U.S. since the early 1980s. Although WOE approaches are common, they vary widely based on the overall decision framework, how the lines of evidence are integrated, and how the final decisions are made. As will be demonstrated in subsequent sections of this report, the WOE approach described in the DTR appears to be an unconventional assessment method developed specifically for this case, which bears little resemblance to the standards of practice for sediment quality assessments. Little or no scientific basis is provided by the Staff to justify their deviation from standard data interpretation methods, resulting ultimately in arbitrary cleanup levels with no risk basis.

A fundamental problem with the Staff's WOE approach is the framework that concludes that adverse effects on benthic macroinvertebrates are "possible" when there is no significant sediment toxicity and no adverse effects on benthic macroinvertebrates (see Table 18-14 of DTR). In these cases, the conclusion of "possible" effects is driven by the characterization of "high" for sediment chemistry. In such cases where chemical and biological indicators disagree, rather than prematurely concluding that effects on benthic macroinvertebrates are "possible," the investigator should evaluate the reason for the difference between chemical and biological indicators of effect, especially because this situation may result from low bioavailability of sediment chemicals The Staff even recognizes this situation in Section 15.1 of the DTR: "For example, sediment chemistry provides unambiguous measurements of pollutant levels in marine sediment, but provides inadequate information to predict biological impact." In Section 16 of the DTR, a citation to Long (1989) is provided which states: "Although the sediment chemistry, toxicity, and benthic community data should be complementary, the degree of impairment implied by each line of evidence may not be in complete agreement because they measure different properties of the surficial sediment." Notwithstanding these explicit acknowledgements at a theoretical level, the DTR assessment places an unwarranted emphasis on sediment chemistry data in the WOE approach.

Summary of Triad Assessment

A critical step in Triad assessments is the final integration of the three LOEs into a single assessment of sediment quality at a sampling station. In the relatively rare case where all individual LOEs indicate the same condition, MLOE interpretation is straightforward. The difficulty and primary challenge of MLOE assessments is interpreting differences in individual LOE indicators. The challenge with weight of evidence approaches then becomes how much weight to give which evidence. Longstanding EPA guidance on sediment assessment explicitly recognizes this fact: "The use of complementary assessment methods can provide a kind of independent verification of the degree of sediment contamination if the conclusions of the different approaches agree. If the conclusions differ, that difference indicates a need for caution in interpreting the data since some unusual site-specific circumstances may be at work" (U.S. EPA 1992).

The analyses presented here demonstrate that the Staff has not adequately considered what circumstances may exist at NASSCO that lead to divergent Triad LOEs. Rather, they appear to be operating under the assumption that elevated sediment chemistry is always indicative of risk, regardless of what the site-specific biological indicators show. Elevated chemistry is typically the trigger for a Triad investigation, and is therefore present at virtually all sites where Triad data are collected. Sediment chemistry is the most readily measurable attribute of contamination and possible risk, but it can be used only to infer the potential for risk, not demonstrate it. It is relevant to risk only in that Triad studies are ordinarily performed only where chemical concentrations are believed to be predictive of exposure, and measurement of the chemical concentrations can provide confirmation and explanation of any adverse effects observed in the biological legs of the Triad. Biological indicators, including toxicity tests and community data, directly measure the important attributes that chemical concentrations are assumed to be responsible for. According to regulatory guidance, when biological and chemical indicators diverge, greater weight should be placed on the biological over the chemical LOEs: "some legs of the SQT [sediment quality triad] are given more weight than others. In general, toxicity/benthos are given a higher weight than sediment …." (U.S. EPA 1992). In this case, the Staff has inappropriately chosen to weight chemistry and some marginal toxicity results over biology.

The need for independent evaluation of Triad LOEs is explicitly recognized in the DTR, even if it is not apparent in their decision framework. "As noted by U.S. EPA (1992a), there is no single method that will measure all contaminated sediment effects at all times and to all biological organisms. For example, sediment chemistry provides unambiguous measurements of pollutant levels in marine sediment, but provides inadequate information to predict biological impact" (RWQCB 2010, section 15.1). The DTR acknowledges that the benthic macroinvertebrate data are important in confirming whether there are adverse effects *in situ*: "This benthic data provides confirmatory evidence concerning the potential impacts that contaminated sediment is having on the resident benthic community" (RWQCB 2010, section 16.1), but does not appear to use benthic macroinvertebrate data as a primary LOE in the assessment. The report goes on to conclude that effects on benthic macroinvertebrates are "likely" or "possible" when the Staff's own analyses of the NASSCO data show no adverse effects on benthic macroinvertebrates beyond the two stations near the mouth of Chollas Creek. Therefore, the benthic macroinvertebrate data were not confirmatory of the sediment chemistry data, but rather showed that benthic macroinvertebrates were not adversely affected by the elevated chemical concentrations for all but one small part of the shipyard near Chollas Creek. The benthic macroinvertebrate data were confirmatory, however, for most of the sediment toxicity data, especially the ecologically-relevant and sensitive amphipod test. Given these results, the Staff should have questioned the interpretation of the sediment chemistry data and looked for causal explanations for the Triad results. Based on the presentations in the DTR, they apparently did not conduct such an evaluation, but continued to apply their biased framework to erroneously conclude that impairment of benthic macroinvertebrate communities was "likely" at stations NA19 and NA22 (see Table 2).

Since development of the Triad approach, many authors have presented logical decision frameworks for the interpretation of Triad results. Recently Bay and Weisberg (2008) presented a framework for using BPJ to assess sediment sites in California (Figure 6). Their framework is much more detailed than the simplified decision framework used in the DTR (Table 18-14) and represents a considerable advancement over the simplified DTR approach. Although I do not agree with all of the decision endpoints specified in Bay and Weisberg (2008), their framework is much more logical for certain MLOE results. For example, the DTR characterizes a station

with "high" chemistry and no significant toxicity or benthic effects as Possible, while Bay and Weisberg (2008) show that these results are inconclusive. Similarly, the DTR characterizes a station with "moderate" chemistry, "moderate" toxicity, and no benthic effects as Possibly Impacted, while Bay and Weisberg (2008) would characterize this station as Likely Unimpacted. As discussed previously, the SQOs for enclosed bays and estuaries characterize a station as likely unimpacted with "high" chemistry, "reference" benthic community conditions and "low" sediment toxicity. Therefore, the DTR decision framework consistently biases the interpretive framework in the direction of impacts by overemphasizing elevated chemistry even though toxicity or benthic effects may be minimal or comparable to reference conditions. Moreover, the DTR decision framework is clearly inconsistent with other published frameworks, including the Part 1 SQOs for California enclosed bays and estuaries.

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CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN THE MATTER OF:

TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001

DEPOSITION OF DAVID GIBSON

San Diego, California

MARCH 11, 2011

REPORTED BY BRIDGET L. MASTROBATTISTA

REGISTERED MERIT REPORTER, CSR NO. 7715

and the amphipod survival test are common in sediment sites, correct?

A They are very commonly used, yes.

Q And those are also included within the State sediment quality objectives, correct?

A I believe that they are, yes.

Q This direct line of evidence of toxicity, should this direct line of evidence of toxicity be given more weight than chemistry?

A As a biologist, I would say yes because the reaction of the organism itself is a better indicator of the true risk than the chemistry alone; but they do have to both be considered together.

Q Okay. So sometimes we have chemistry that's not bioavailable, correct?

A That's correct. Yes.

Q Do you agree that sediment conditions, other than concentrations of pollutants, can result in toxicity responses that are different from reference values?

A Yes, I would expect that.

Q For example, sediment particle size --

A Yes.

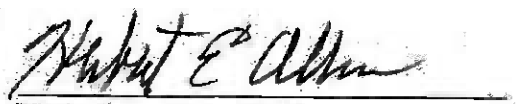
Q -- could be a factor?

A (Witness nods head.)

Importance of Bioavailability for Risk Assessment of Sediment Contaminants at the NASSCO Site – San Diego Bay

Expert Report

Prepared by
Herbert E. Allen, Ph. D.*
41 Conshohocken State Road
The Fairmont – Unit 609
Bala Cynwyd, PA 19004



Herbert E. Allen, Ph.D.

Prepared for:

NASSCO
2798 Harbor Drive
San Diego, CA 92113

Latham & Watkins LLP
600 West Broadway, Suite 1800
San Diego, CA 92101

March 11, 2011

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* Professor Emeritus and Director
Center for the Study of Metals in the Environment
Department of Civil and Environmental Engineering
University of Delaware
Newark, DE 19716

Summary and Conclusions

The total concentration of a chemical in sediment is not necessarily predictive of adverse biological effects. High concentrations of a chemical do not always lead to a high biological effect and low concentrations of a chemical do not always lead to a low biological effect. The degree to which the chemical is available to organisms (bioavailable) must be integrated into the assessment to achieve a valid prediction of the potential effect of the chemical. The Tentative Cleanup and Abatement Order (California Regional Water Quality Control Board - San Diego Region, 2010a) is deficient in not considering the bioavailability of chemicals in the sediments.

Consider this simple example. Take two pint containers filled with water and place a fish in each. Add 100 grams of copper wire to one container and 1 gram of copper in the form of copper sulfate to the other. The fish in the container to which copper sulfate was added will quickly die, but the fish in the container with the copper wire will not, despite the much greater amount of copper present. If 6 grams of the chemical EDTA is then added to the container with the copper sulfate and another fish is introduced to the container, the new fish will not die. EDTA is a widely used complexing agent that finds application in foods and personal care products, such as shampoos, as well as in industrial applications. It chemically reacts with metals to form stable compounds that resist precipitation. After the addition of the EDTA to the solution containing the copper sulfate, the copper concentration has not changed; there has simply been a change in the chemical form of the copper. Clearly, the form of the chemical is paramount in controlling the effect.

To evaluate the biological effect it is important to consider bioavailability of both metals and organic compounds in addition to the chemical's total concentration. Bioavailability is the fraction of the total concentration that reaches the biological receptor site and is able to interact and cause beneficial or adverse effects. This report considers a number of chemicals that have been measured in sediment or pore water (the water contained within the settled particles), and their bioaccumulation in organisms exposed to sediments from the NASSCO Shipyard. Based on an analysis of the data, and in using scientific

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN RE THE MATTER OF)
)
TENTATIVE CLEANUP AND ABATEMENT)
ORDER NO. R9-2011-0001)
)
)
)

VIDEOTAPED DEPOSITION OF DAVID BARKER

Volume I, Pages 1 - 208

San Diego, California

March 1, 2011

Reported By: Anne M. Zarkos, RPR, CRR,
CSR No. 13095

not effect the biological receptor. Except I guess there is a caveat to that. Some biological receptors eat the sediment. So whether it's -- even though it's bound to the sediment particle. 12:03:01 12:03:10 12:03:14 12:03:17

Q. Okay. So if it's not bioavailable, the organism does not uptake that chemical? 12:03:19 12:03:27

A. Yes. 12:03:30

Q. But if it is bioavailable, then it may cause harm? 12:03:32 12:03:35

A. That's correct. 12:03:35

Q. And isn't it true that even if the -- the organism uptakes the sediment where a pollutant is adhered to it, it still does not mean the pollutant will be bioavailable to that organism; correct? 12:03:37 12:03:39 12:03:44 12:03:47

A. That's true. 12:03:50

Q. A professor once explained this to me as -- as an aquarium. So imagine an aquarium, and you have fish swimming around, and you have copper wire. And you drop the copper wire in the tank, and the fish swim around it and have a great time. 12:03:53 12:03:55 12:04:00 12:04:03 12:04:08

But if you take a different form of copper, such as copper sulfate, in the same amount and put it in a fish tank, it may have a harmful impact -- 12:04:10 12:04:12 12:04:15

A. Right. 12:04:18

Q. -- on the fish, may actually kill the fish even. 12:04:18

A. Right. 12:04:21

Q. And so by looking at bioavailability, we're trying to find out whether it's the copper wire form or the copper sulfate form; correct? 12:04:23 12:04:25 12:04:29

A. That's correct, yes. 12:04:31

Q. So the form of a substance is very important in determining whether that chemical can cause impairment; correct? 12:04:32 12:04:35 12:04:39

A. Yes. 12:04:39

Q. Can you define for me "bioaccumulation"? 12:04:41

A. It's -- I would have to refer to the definition in the -- in the DTR. But it refers to the concentration of a contaminant in a biological organism as a result of its uptake of the contaminant. 12:04:46 12:04:50 12:04:56 12:05:01

Q. So would you agree it's sort of the degree to which these chemicals enter the -- the aquatic food web? 12:05:03 12:05:05

A. Yes. 12:05:11

Q. So why do we care if a chemical is bioaccumulating in an organism? 12:05:12 12:05:15

A. Well, the chemical could bioaccumulate to levels that would be harmful to the organism or harmful to other receptors that might consume the organism. 12:05:19 12:05:22 12:05:27

Q. Great. Thank you. 12:05:36

And last definition for you. 12:05:37

A. Okay. 12:05:41

IV. MONITORED NATURAL ATTENUATION JUSTIFIED

STATE WATER RESOURCES CONTROL BOARD

RESOLUTION NO. 92-49

File Number: 03-0284.051

(As Amended on April 21, 1994 and October 2, 1996)

POLICIES AND PROCEDURES FOR INVESTIGATION AND CLEANUP AND ABATEMENT OF DISCHARGES UNDER WATER CODE SECTION 13304

WHEREAS:

1. California Water Code (WC) Section 13001 provides that it is the intent of the Legislature that the State Water Resources Control Board (State Water Board) and each Regional Water Quality Control Board (Regional Water Board) shall be the principal state agencies with primary responsibility for the coordination and control of water quality. The State and Regional Water Boards shall conform to and implement the policies of the Porter-Cologne Water Quality Control Act (Division 7, commencing with WC Section 13000) and shall coordinate their respective activities so as to achieve a unified and effective water quality control program in the state;

2. WC Section 13140 provides that the State Water Board shall formulate and adopt State Policy for Water Quality Control;

3. WC Section 13240 provides that Water Quality Control Plans shall conform to any State Policy for Water Quality Control;

4. WC Section 13304 requires that any person who has discharged or discharges waste into waters of the state in violation of any waste discharge requirement or other order or prohibition issued by a Regional Water Board or the State Water Board, or who has caused or permitted, causes or permits, or threatens to cause or permit any waste to be discharged or deposited where it is, or probably will be, discharged into the waters of the state and creates, or threatens to create, a condition of pollution or nuisance may be required to clean up the discharge and abate the effects thereof. This section authorizes Regional Water Boards to require complete cleanup of all waste discharged and restoration of affected water to background conditions (i.e., the water quality that existed before the discharge). The term waste discharge requirements includes those which implement the National Pollutant Discharge Elimination System;

5. WC Section 13307 provides that the State Water Board shall establish policies and procedures that its representatives and the representatives of the Regional Water Boards shall follow for the oversight of investigations and cleanup and abatement activities resulting from discharges of hazardous substances, including:

a. The procedures the State Water Board and the Regional Water Boards will follow in making decisions as to when a person may be required to undertake an investigation to determine if an unauthorized hazardous substance discharge has occurred;

short time;

3. Require the discharger to extend the investigation, and cleanup and abatement, to any location affected by the discharge or threatened discharge;

4. Where necessary to protect water quality, name other persons as dischargers, to the extent permitted by law;

5. Require the discharger to submit written workplans for elements and phases of the investigation, and cleanup and abatement, whenever practicable;

6. Review and concur with adequate workplans prior to initiation of investigations, to the extent practicable. The Regional Water Board may give verbal concurrence for investigations to proceed, with written follow-up. An adequate workplan should include or reference, at least, a comprehensive description of proposed investigative, cleanup, and abatement activities, a sampling and analysis plan, a quality assurance project plan, a health and safety plan, and a commitment to implement the workplan;

7. Require the discharger to submit reports on results of all phases of investigations, and cleanup and abatement actions, regardless of degree of oversight by the Regional Water Board;

8. Require the discharger to provide documentation that plans and reports are prepared by professionals qualified to prepare such reports, and that each component of investigative and cleanup and abatement actions is conducted under the direction of appropriately qualified professionals. A statement of qualifications of the responsible lead professionals shall be included in all plans and reports submitted by the discharger;

9. Prescribe cleanup levels which are consistent with appropriate levels set by the Regional Water Board for analogous discharges that involve similar wastes, site characteristics, and water quality considerations;

B. The Regional Water Board may identify investigative and cleanup and abatement activities that the discharger could undertake without Regional Water Board oversight, provided that these investigations and cleanup and abatement activities shall be consistent with the policies and procedures established herein.

III. The Regional Water Board shall implement the following procedures to ensure that dischargers shall have the opportunity to select cost-effective methods for detecting discharges or threatened discharges and methods for cleaning up or abating the effects thereof. The Regional Water Board shall:

A. Concur with any investigative and cleanup and abatement proposal which the discharger demonstrates and the Regional Water Board finds to have a substantial likelihood to achieve compliance, within a reasonable time frame, with cleanup goals and objectives that implement the applicable Water Quality Control Plans and Policies adopted by the State Water Board and Regional Water Boards, and which implement permanent cleanup and abatement solutions

which do not require ongoing maintenance, wherever feasible;

B. Consider whether the burden, including costs, of reports required of the discharger during the investigation and cleanup and abatement of a discharge bears a reasonable relationship to the need for the reports and the benefits to be obtained from the reports;

C. Require the discharger to consider the effectiveness, feasibility, and relative costs of applicable alternative methods for investigation, and cleanup and abatement. Such comparison may rely on previous analysis of analogous sites, and shall include supporting rationale for the selected methods;

D. Ensure that the discharger is aware of and considers techniques which provide a cost-effective basis for initial assessment of a discharge.

1. The following techniques may be applicable:

a. Use of available current and historical photographs and site records to focus investigative activities on locations and wastes or materials handled at the site;

b. Soil gas surveys;

c. Shallow geophysical surveys;

d. Remote sensing techniques;

2. The above techniques are in addition to the standard site assessment techniques, which include:

a. Inventory and sampling and analysis of materials or wastes;

b. Sampling and analysis of surface water;

c. Sampling and analysis of sediment and aquatic biota;

d. Sampling and analysis of ground water;

e. Sampling and analysis of soil and soil pore moisture;

f. Hydrogeologic investigation;

E. Ensure that the discharger is aware of and considers the following cleanup and abatement methods or combinations thereof, to the extent that they may be applicable to the discharge or threat thereof:

1. Source removal and/or isolation;

2. In-place treatment of soil or water:

unit is equipped with features that will ensure full and complete containment of the waste for the treatment or storage period); and

c. If cleanup and abatement involves actions other than removal of the waste, such as containment of waste in soil or ground water by physical or hydrological barriers to migration (natural or engineered), or in-situ treatment (e.g., chemical or thermal fixation, or bioremediation), the Regional Water Board shall apply the applicable provisions of Chapter 15, to the extent that it is technologically and economically feasible to do so; and

3. Implement the applicable provisions of Chapter 16 for investigations and cleanup and abatement of discharges of hazardous substances from underground storage tanks;

G. Ensure that dischargers are required to clean up and abate the effects of discharges in a manner that promotes attainment of either background water quality, or the best water quality which is reasonable if background levels of water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible; in approving any alternative cleanup levels less stringent than background, apply Section 2550.4 of Chapter 15, or, for cleanup and abatement associated with underground storage tanks, apply Section 2725 of Chapter 16, provided that the Regional Water Board considers the conditions set forth in Section 2550.4 of Chapter 15 in setting alternative cleanup levels pursuant to Section 2725 of Chapter 16; any such alternative cleanup level shall:

1. Be consistent with maximum benefit to the people of the state;

2. Not unreasonably affect present and anticipated beneficial use of such water; and

3. Not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards; and

H. Consider the designation of containment zones notwithstanding any other provision of this or other policies or regulations which require cleanup to water quality objectives. A containment zone is defined as a specific portion of a water bearing unit where the Regional Water Board finds, pursuant to Section III.H. of this policy, it is unreasonable to remediate to the level that achieves water quality objectives. The discharger is required to take all actions necessary to prevent the migration of pollutants beyond the boundaries of the containment zone in concentrations which exceed water quality objectives. The discharger must verify containment with an approved monitoring program and must provide reasonable mitigation measures to compensate for any significant adverse environmental impacts attributable to the discharge. Examples of sites which may qualify for containment zone designation include, but are not limited to, sites where either strong sorption of pollutants on soils, pollutant entrapment (e.g. dense non-aqueous phase liquids [DNAPLS]), or complex geology due to heterogeneity or fractures indicate that cleanup to applicable water quality objectives cannot reasonably be achieved. In establishing a containment zone, the following procedures, conditions, and restrictions must be met:

1. The Regional Water Board shall determine whether water quality objectives can reasonably

be achieved within a reasonable period by considering what is technologically and economically feasible and shall take into account environmental characteristics of the hydrogeologic unit under consideration and the degree of impact of any remaining pollutants pursuant to Section III.H.3. The Regional Water Board shall evaluate information provided by the discharger and any other information available to it:

a. Technological feasibility is determined by assessing available technologies, which have been shown to be effective under similar hydrogeologic conditions in reducing the concentration of the constituents of concern. Bench-scale or pilot-scale studies may be necessary to make this feasibility assessment;

b. Economic feasibility is an objective balancing of the incremental benefit of attaining further reductions in the concentrations of constituents of concern as compared with the incremental cost of achieving those reductions. The evaluation of economic feasibility will include consideration of current, planned, or future land use, social, and economic impacts to the surrounding community including property owners other than the discharger. Economic feasibility, in this Policy, does not refer to the discharger's ability to finance cleanup. Availability of financial resources should be considered in the establishment of reasonable compliance schedules;

c. The Regional Water Board may make determinations of technological or economic infeasibility after a discharger either implements a cleanup program pursuant to III.G. which cannot reasonably attain cleanup objectives, or demonstrates that it is unreasonable to cleanup to water quality objectives, and may make determinations on the basis of projection, modeling, or other analysis of site-specific data without necessarily requiring that remedial measures be first constructed or installed and operated and their performance reviewed over time unless such projection, modeling, or other analysis is insufficient or inadequate to make such determinations;

2. The following conditions shall be met for all containment zone designations:

a. The discharger or a group of dischargers is responsible for submitting an application for designation of a containment zone. Where the application does not have sufficient information for the Regional Water Board to make the requisite findings, the Regional Water Board shall request the discharger(s) to develop and submit the necessary information. Information requirements are listed in the Appendix to this section;

b. Containment and storage vessels that have caused, are causing, or are likely to cause ground water degradation must be removed or repaired, or closed in accordance with applicable regulations. Floating free product must be removed to the extent practicable. If necessary, as determined by the Regional Water Board, to prevent further water degradation, other sources (e.g., soils, nonfloating free product) must be either removed, isolated, or managed. The significance and approach to be taken regarding these sources must be addressed in the management plan developed under H.2.d.;

c. Where reasonable, removal of pollutant mass from ground water within the containment zone may be required, if it will significantly reduce the concentration of pollutants within the

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN RE THE MATTER OF)
)
TENTATIVE CLEANUP AND ABATEMENT)
ORDER NO. R9-2011-0001)
)
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VIDEOTAPED DEPOSITION OF DAVID BARKER

Volume II, Pages 209 - 430

San Diego, California

March 2, 2011

Reported By: Anne M. Zarkos, RPR, CRR,

CSR No. 13095

proven remediation strategy." 10:34:22

A. Let's see. We're on -- 10:34:26

Q. Page 30-1. 10:34:27

A. Okay. Hold on. 10:34:28

Q. The very last paragraph. 10:34:30

A. All right. 10:34:31

Q. I think I gave you a courtesy copy earlier. 10:34:32

A. Okay. Let me see if I can locate that. Hang on a second. 10:34:35 10:34:39

Q. Whatever is easier. 10:34:40

A. Okay. I'll just find it here. 30-1. And we are in the -- 10:34:41 10:34:45

Q. Very last paragraph, full -- full paragraph. 10:34:53

A. Okay. Let me just check that. 10:34:54

MR. RICHARDSON: Yeah. 10:34:56

MS. TRACY: Kelly, what page are you on? 10:34:57

MR. RICHARDSON: Page 30-1 of the DTR. 10:34:59

MS. TRACY: Thank you. 10:35:00

MR. RICHARDSON: And I'm in the last full paragraph. 10:35:03 10:35:04

THE WITNESS: Okay. I see that. 10:35:16

BY MR. RICHARDSON: 10:35:23

Q. Okay. So it says that the natural recovery among other alternatives are readily employable and proven remediation strategies. Do you agree with that? 10:35:23 10:35:26 10:35:29

A. Yes. 10:35:33

Q. Why does the Cleanup Team believe that natural recovery is a proven technology? 10:35:34 10:35:36

A. It's a strategy -- sometimes at contaminated sediment sites, it's -- a determination is made it's -- that it's better to control the source of the problem and just -- and not disturb the contaminants and let natural processes take care of any environmental effects associated with it. And it's -- not all sediment sites are cleaned up. Some are just documented but just left in place. 10:35:39 10:35:44 10:35:51 10:36:02 10:36:08 10:36:13 10:36:20 10:36:26

Q. So sometimes the remedy itself might cause more environmental problems than simply allowing -- 10:36:28 10:36:30

A. Yes. 10:36:33

Q. -- the natural attenuation? 10:36:33

A. Yes. As we've discussed, for example, when sites are dredged, benthic communities are destroyed in the process. 10:36:35 10:36:38 10:36:43

Q. And there's resuspension and air emissions and traffic issues and other things; correct? 10:36:43 10:36:46

A. Yes. Yes, that's correct. 10:36:48

Q. In your position at the Regional Board, have you been involved in any sediment remediation projects in which natural recovery was employed? 10:36:50 10:36:51 10:36:55

A. Yes. Yes, I have. 10:37:04

discussed it in -- in very broad terms. They didn't get into subtle discussions about situations where source control was less than 100 percent obtained. Source control -- I mean, there's different scenarios. Source control efforts can be underway and coordinated with a decision to remediate and -- and have that -- and have that -- the result from that be that the site was not recontaminated. So yeah. 10:57:43 10:57:53 10:58:00 10:58:07 10:58:10 10:58:14 10:58:19 10:58:23

Q. An inability to control the off-site sources, though, shouldn't be a reason to favor one remedy over another, should it? 10:58:32 10:58:36 10:58:39

MR. CARRIGAN: Vague. Incomplete hypothetical. 10:58:41

THE WITNESS: The -- oh. The inability to control off-site sources. In one -- in one way of thinking, it would be the same consideration. Are these off-site sources, whatever remedy is selected, going to re-deposit contaminants at a site where they accumulate to levels that would present the need for another remedial action. So from that perspective, the analysis would be -- would be the same. 10:58:43 10:58:45 10:58:55 10:59:01 10:59:04 10:59:09 10:59:12 10:59:19

I don't know if you would view -- I guess one could view the possibility of disturbances at a site as being a -- kind of an off-site type factor that would say, you know, that would factor into a monitored natural recovery in a way that -- and it might not be as relevant 10:59:26 10:59:30 10:59:35 10:59:43 10:59:46

for another remedial method. 10:59:55

BY MR. RICHARDSON: 10:59:59

Q. Okay. I'm just -- I don't quite understand that. So -- 11:00:00 11:00:02

A. Yeah. 11:00:04

Q. If we have off-site sources that are continuing to contaminate a site, it will continue to contaminate the site whether we do natural recovery, dredging, capping, or any other remedy; right? 11:00:04 11:00:06 11:00:09 11:00:12

A. Right. That's correct. Yeah. 11:00:14

Q. I'm having trouble understanding how that could influence a decision on which remedy to select. 11:00:15 11:00:18

A. Oh, you're having trouble where there are off-site sources? 11:00:22 11:00:25

Q. Why that would favor any type of dredging. For example -- I'll give you an example. If you dredge the site and there's recontamination, then you may simply have to dredge it again. 11:00:32 11:00:34 11:00:36 11:00:40

A. Yes. 11:00:41

Q. So that would be an ineffective remedy and you'd have remedy failure. 11:00:41 11:00:45

A. Yeah. 11:00:46

Q. So if you choose capping, as is the case with Convair Lagoon, where sources weren't controlled and there's additional pollution on top of the cap, there's 11:00:47 11:00:50 11:00:53

further remediation necessary. 11:00:56

A. Yes. 11:00:58

Q. In monitored natural attenuation those pollutants would continue to add to the area that we're trying to naturally attenuate; correct? 11:00:59 11:01:02

A. Yes. 11:01:05

Q. So to me that, factor doesn't support any of the remedies that could be implemented at a site; correct? 11:01:05 11:01:07

MR. CARRIGAN: Vague. 11:01:11

THE WITNESS: Other than, say, for example, from just a contaminant level viewpoint, where you dredge and remove contaminants from a site and then that mass of contaminants is out of the system, recontamination might occur at -- at a -- at some rate, where -- but the marine environment might be less stressed in that scenario because a certain mass of pollutants was removed. 11:01:14 11:01:19 11:01:25 11:01:30 11:01:39 11:01:48 11:01:54

And yes, source contaminants are still coming into the site, but there's a lower -- they're accumulating at lower levels, if you're kind of following what I'm trying to describe. 11:01:58 11:02:01 11:02:05 11:02:09

Q. I think so. 11:02:11

A. Okay. 11:02:12

Q. So if there's natural attenuation occurring at a rate that has the capacity to assimilate the additional pollution that comes on site, then it would not disfavor 11:02:13 11:02:15 11:02:19

natural attenuation; correct? 11:02:23

A. Yes, that's -- yes. 11:02:25

Q. Okay. DTR page 30-3 again, in that same 11:02:28

paragraph at the -- near the end states that, "Natural 11:02:34

recovery processes are active at the site, but the 11:02:37

natural recovery may not be fully effective in all areas 11:02:41

of the Shipyard Sediment Site." 11:02:44

A. Yeah. 11:02:46

Q. Do you see that? 11:02:46

A. Let's see. Hang on. 11:02:47

Q. It's in the same paragraph we've been 11:02:51

discussing. 11:02:53

A. Okay. Yeah. There, I guess that's referring to 11:02:53

site characteristics. There could be parts of the site 11:03:05

that are in quiet areas of the site, not as subject to 11:03:08

physical disturbances, and other areas where there's a 11:03:14

lot of physical disturbance. 11:03:18

Q. Okay. So natural recovery would be more likely 11:03:23

to occur in areas where there's less of the physical 11:03:26

disturbances? 11:03:28

A. Right. 11:03:29

Q. I'll hand you a courtesy copy of the portion of 11:03:36

the Tentative Cleanup & Abatement Order. 11:03:39

A. Okay. 11:03:44

Q. We're looking at Attachment 2 to the order. 11:03:44

A. Okay. 11:03:46
Q. The polygons targeted for remediation. 11:03:48
A. Yes. 11:03:51
Q. The statement that -- in the DTR that some areas 11:03:53
of the site may not have -- strike that. 11:03:58
The natural recovery may not be occurring in 11:04:07
certain areas of the site. 11:04:10
A. Yeah. 11:04:12
Q. Could you mark on the diagram where you believe 11:04:16
natural recovery is not occurring? 11:04:19
A. I don't know that I could. I could -- I would 11:04:22
be -- I could point to areas where there's a potential 11:04:31
for it to not be occurring. The area over in 11:04:33
Chollas Creek where, I think, there's testing of vessel 11:04:41
engines in that area -- 11:04:51
Q. If I can pause, Mr. Barker, are there any areas 11:04:54
where you know natural attenuation is not occurring? 11:04:58
A. No, no. I don't think we've -- we've not 11:05:01
studied it in that level of detail. So no. 11:05:05
Q. Very fair. So if I could ask you, then, the 11:05:08
areas that you believe may not be having natural 11:05:11
attenuation occur. 11:05:14
A. Okay. 11:05:16
Q. Could you mark -- as you describe them, could 11:05:16
you mark them on the diagram so I can follow along with 11:05:19

correct? 02:03:24

A. Yes, that's correct. 02:03:25

Q. And this data that we're seeing on Exhibit 1228, page E, is consistent with that finding, isn't it, where we see a 72 percent reduction in TBT over the course of seven years? 02:03:26 02:03:29 02:03:35 02:03:39

A. Yeah. Yes. It -- it indicates that trend is -- that that might be the reason for that trend there, yes. Could be other reasons, but maybe that's a primary reason. 02:03:40 02:03:46 02:03:50 02:03:53

Q. Okay. Looking at this data collectively, we sample the total of five stations in the 2009 testing; correct? 02:03:54 02:03:58 02:04:02

A. Yes. 02:04:02

Q. The post remedial SWAC numbers for at least these five areas have been met for three of the CoCs; correct? 02:04:08 02:04:12 02:04:16

MR. CARRIGAN: At the five stations? 02:04:23

MR. RICHARDSON: At the five stations, right. 02:04:25

THE WITNESS: Let's see. So -- so far we examined tributyltin and copper, mercury, PCBs. And one of those was not below the level, I think. And the other three were, yeah. 02:04:27 02:04:28 02:04:39 02:04:44

BY MR. RICHARDSON: 02:04:46

Q. Okay. So of the two that were not, copper, the 02:04:47

goal is 159. And we are at 167. 02:04:49

A. Yeah. 02:04:53

Q. Which seems marginally above the goal? 02:04:54

A. Right. 02:04:56

Q. And then the second one is mercury at .8, when the cleanup level is .7 or .68, which again seems marginally above the goal; correct? 02:04:57 02:04:59 02:05:03

A. Uh-huh. 02:05:06

Q. Was that yes? 02:05:06

A. Yes. 02:05:07

Q. And then the remaining three are all below the alternative cleanup levels; correct? 02:05:07 02:05:10

A. Yes. 02:05:13

Q. Yesterday we discussed Exhibit 1206, which was the directive of the Regional Board to conduct the assessment at the shipyard site that ultimately resulted in the 2001/2002 test data; correct? 02:05:22 02:05:31 02:05:36 02:05:39

A. Correct. 02:05:42

Q. And in that study, if you recall from our discussion yesterday, it required an evaluation of the potential natural processes that could support a no action alternative, including dispersal of contaminants by natural processes and natural detoxification of contaminated sediments, restricting access to the site, monitoring of water sediments and organisms. 02:05:43 02:05:46 02:05:50 02:05:57 02:06:02 02:06:04 02:06:08

A. 2A -- okay. 02:16:46

Q. I'll give you a minute to read it and refresh your recollection. 02:16:51 02:16:53

A. Okay. 02:16:58

Q. Okay. So this states that, "The Regional Water Board shall prescribe cleanup levels which are consistent with appropriate levels set by the Regional Water Board for analogous discharges that involve similar waste, site characteristics, and water quality considerations." Do you see that? 02:16:59 02:17:01 02:17:06 02:17:09 02:17:12 02:17:16

A. Yes. 02:17:17

Q. So in essence, would you agree that Resolution 92-49 requires the Regional Boards to treat similar sites similarly? 02:17:18 02:17:20 02:17:24

MR. CARRIGAN: Calls for a legal conclusion. 02:17:28

THE WITNESS: It suggests that that -- it should be a goal, yes. 02:17:33 02:17:35

BY MR. RICHARDSON: 02:17:37

Q. This is back to the consistency purpose of 92-49; right? 02:17:37 02:17:39

A. Right. 02:17:42

Q. Did the Cleanup Team follow Resolution 92-49 when it evaluated what cleanup levels to set for the site? 02:17:43 02:17:46 02:17:50

A. Yes, pretty much yes. The -- in evaluating 02:17:57

Q. -- for NASSCO and Southwest Marine, dated February 17, 1999. Do you see that? 03:00:01 03:00:04

A. Yes. 03:00:07

Q. Do you recall this document? 03:00:07

A. Yes, I do. 03:00:08

Q. Did you work on the preparation of this document? 03:00:09 03:00:10

A. Let's see. I -- I had staff under my supervision that was working on it, yes. 03:00:11 03:00:21

Q. Would you look at page -- Bates page last three numbers 257. 03:00:30 03:00:34

A. 257. Okay. 03:00:35

Q. The very last full paragraph. 03:00:37

A. Yes. I see that. 03:00:40

Q. The staff report notes that it was appropriate to apply cleanup levels developed for Campbell site to the NASSCO and Southwest Marine sites. 03:00:43 03:00:45 03:00:48

A. Yes. 03:00:50

Q. And that it's based on similarities between physical, biological, and chemical conditions. 03:00:51 03:00:53

A. Yes. 03:00:56

Q. At Campbell and NASSCO. 03:00:56

A. Yes. 03:00:58

Q. And the fact that Campbell Shipyard is physically located in San Diego Bay just north of NASSCO? 03:01:00 03:01:02

A. Yes. 03:01:08
Q. Do you see the bullets under that paragraph? 03:01:09
A. Yep. 03:01:14
Q. Where it notes, "Campbell and NASSCO are comparable in terms of site activities, waste materials, and matrices"? 03:01:15 03:01:17 03:01:20
A. Yes. 03:01:22
Q. That Campbell and NASSCO are similar -- sorry -- the same hydrodynamic and biogeographic zones. 03:01:23 03:01:24
A. Yes. 03:01:29
Q. And that Campbell and NASSCO are influenced by a similar suite of pollutants from off site? 03:01:29 03:01:31
A. Yes. 03:01:34
Q. On page 658. 03:01:36
MR. CARRIGAN: 258? 03:01:45
MR. RICHARDSON: Sorry. Two -- 258. Page 258. 03:01:46
MR. CARRIGAN: The very next page. 03:01:49
MR. RICHARDSON: The very next page. 03:01:50
BY MR. RICHARDSON: 03:01:53
Q. The very last sentence of the first paragraph, do you see that? It begins "it is appropriate." 03:01:54 03:02:00
A. The very last sentence of the first. 03:02:09
Q. Yeah, the first paragraph discusses Shelter Island Boatyard. 03:02:09 03:02:10
A. Yeah. I got it. 03:02:14

Q. The very last paragraph says it's appropriate to apply the Shelter Island Boatyard mercury cleanup levels, 4.2 milligrams per kilogram, to the NASSCO site. 03:02:14 03:02:14 03:02:18

A. Yes. 03:02:22

Q. And then it lists the explanations for that. 03:02:22

A. Yes. Okay. 03:02:24

Q. Do you see that? 03:02:25

A. Yes, I do. 03:02:26

Q. And the boatyards are similar to the shipyards in terms of site activities, waste materials, and matrices? 03:02:26 03:02:30 03:02:30

A. Yes. 03:02:31

Q. The boatyards and shipyards are both in San Diego Bay? 03:02:32 03:02:34

A. Uh-huh. 03:02:35

Q. And that the data from the 11 stations used to derive Shelter Island Boatyard mercury level is comparable to the 15 stations used to derive the Campbell cleanup levels? 03:02:35 03:02:39 03:02:39 03:02:44

A. Yes. 03:02:45

Q. Do you agree that the analysis in these last two pages we've been discussing was the -- your staff's attempt to comply with the provisions of 92-49 that similar sites be treated similarly? 03:02:48 03:02:51 03:02:55 03:03:00

A. Yes. And it was kind of an attempt to also 03:03:03

expedite cleanup of the site by taking advantages of a biological study, effect study done at one site and weighing the benefits of just applying those results at another site and obtaining a -- a quicker cleanup in the process. 03:03:11 03:03:18 03:03:26 03:03:29 03:03:34

Q. Okay. We'll come back to that. 03:03:36

A. Okay. 03:03:38

Q. Would you agree that the cleanup levels for the shipyard site are significantly lower than the levels established for Campbell and Shelter Island? 03:03:40 03:03:43 03:03:55

MR. CARRIGAN: Vague. 03:03:59

THE WITNESS: If I could just examine that -- 03:04:00

MR. RICHARDSON: It will be Exhibit 8 to Exhibit 1210. 03:04:05 03:04:07

THE WITNESS: That big spreadsheet. 03:04:08

MR. RICHARDSON: Yeah. 03:04:09

MR. CARRIGAN: I keep thinking I have that out. 03:04:10

THE WITNESS: Okay. 03:04:12

MR. CARRIGAN: Oh, there it is. 03:04:24

THE WITNESS: Okay. Got it. All right. Cleanup levels at Campbell, yes, they are -- they are -- the proposed levels at the shipyard site are more stringent than the Campbell levels, yes. 03:04:26 03:04:33 03:04:44 03:04:49

BY MR. RICHARDSON: 03:04:51

Q. Okay. I'll introduce this as 1231. 03:04:55

between Campbell and the NASSCO site as to the appropriate application of the AETs revisited in the 2005 tentative CAO? 03:16:16 03:16:20 03:16:25

A. I don't recall that it was. I think it was back in 2001 when we issued the investigative order, we basically let go of that concept as a viable option. 03:16:26 03:16:32 03:16:38

Q. And that was let go also in the first release of the Cleanup Team's Draft Technical Report in 2008; correct? 03:16:42 03:16:45 03:16:49

A. Yes. 03:16:50

Q. However, in the current CAO and DTR, there is a discussion of AETs; correct? 03:16:53 03:16:56

A. Yes, there is. 03:16:59

Q. So the DTR has used the apparent effects threshold approach developed for the Campbell Shipyard Site but with site-specific NASSCO data; correct? 03:17:00 03:17:04 03:17:07

A. Yes. I just caveat my answer. Along with another sediment chemistry threshold methodology referred to as SSMEQ and along with employment of a conservative, I guess, safety factor for the advance -- or excuse me -- adverse effects threshold, yeah. Yeah. 03:17:12 03:17:17 03:17:26 03:17:32 03:17:38

Q. So the LAET you're referring to, the lowest apparent effects threshold, you mentioned conservative factors. So the DTR used the LAET model but put some level of additional conservatism in it? 03:17:42 03:17:46 03:17:49 03:17:54

A. Absolutely, yes. 03:17:58

Q. And what was that conservatism? 03:18:00

A. It applied a 60 percent of -- of the -- whatever the calculated LAET value was for a chemical that was 60 percent of that was -- it had a safety factor of 60 percent multiplied, times to further reduce it. 03:18:03 03:18:07 03:18:14 03:18:18

Q. Okay. So if my understanding is correct, at the Campbell shipyard they used an apparent effects threshold. 03:18:25 03:18:27 03:18:30

A. Yes. 03:18:30

Q. We used the lowest apparent effects threshold, which is the lowest number that -- 03:18:31 03:18:33

A. Yes. 03:18:35

Q. -- there is an apparent effect. 03:18:35

A. Yes. 03:18:36

Q. And then we took a 40 percent safety buffer below that and used that as our measure of protectiveness? 03:18:36 03:18:41 03:18:43

A. A 60 percent. 03:18:44

Q. So it's 60 percent of that number. It's 40 percent below the lowest number; correct? 03:18:45 03:18:47

A. Okay. Yes. 03:18:50

Q. And that -- both the SSMEQ and that LAET approach are reliable predictors of likely benthic impairment; correct? And I'd refer you to page 32-34 of 03:18:51 03:18:57 03:19:03

CALIFORNIA REGIONAL WATER QUALITY CONTROL BOARD

SAN DIEGO REGION

IN RE THE MATTER OF)
)
TENTATIVE CLEANUP AND ABATEMENT)
ORDER NO. R9-2011-0001)
)
)
)

DEPOSITION OF DAVID BARKER

Volume IV, Pages 680 - 953

San Diego, California

March 10, 2011

Reported By: Anne M. Zarkos, RPR, CRR,
CSR No. 13095

Q. Besides the Hunter's Point site, there were no other sites outside of San Diego Bay that you looked at as potentially similar sites? 04:58:01 04:58:03 04:58:07

A. We took an interest in the Hudson River PCB cleanup that's underway. But not with an angle towards adopting findings from that and incorporating them into this analysis. 04:58:09 04:58:12 04:58:23 04:58:27

Q. Mr. Barker, I'm going to hand you a excerpt from Master Exhibit 1. It's page 15 of -- of Master Exhibit 1. And it just has the tentative cleanup levels chart that shows the surface weighted average concentrations for the contaminants of concern that have been set in the tentative cleanup & abatement order for the shipyard site. 04:58:32 04:58:35 04:58:39 04:58:45 04:58:50 04:58:53 04:58:56

A. Yes. 04:58:57

Q. Do you see that? 04:58:57

A. Yes. 04:58:58

Q. And I'm just going to briefly run through a couple other EPA records of decision that address similar contaminants and ask you to compare them to that table. 04:59:01 04:59:03 04:59:07

A. Okay. 04:59:11

Q. I'd like to mark as Barker Exhibit 1284 a EPA Superfund record of decision for Commencement Bay in Pierce County, Washington dated September 30th, 1989. 04:59:15 04:59:27 04:59:34

(Exhibit 1284 was marked.) 04:59:38

MR. CARRIGAN: This is a Superfund site, Counsel? 04:59:46 04:59:48

MR. WATERMAN: Yeah. 04:59:49

MR. CARRIGAN: Okay. Let the record reflect. 04:59:49

BY MR. WATERMAN:

Q. Mr. Barker, is that what you've got in front of you? 04:59:55 04:59:57

A. Yes, it is. 04:59:58

Q. Can you turn to the very last page where it says "Table 5." 04:59:59 05:00:01

A. Yes. 05:00:08

Q. And in Table 5, there are three types of contaminants that are similar to those that are listed in Table 2 of Master Exhibit 1. In the very first set of contaminants which was metals, do you see that on the top of Barker Exhibit 1284? 05:00:11 05:00:13 05:00:18 05:00:25 05:00:30

A. Yes. 05:00:36

Q. Do you see the "Copper" line item? 05:00:38

A. Yes, I do. Yes, I do. 05:00:41

Q. Says 390 PPM, or 390 milligrams per kilogram dry weight? 05:00:43 05:00:52

A. Mine says 390L. 05:00:53

Q. Right. Do you see that there? 05:00:55

A. Yes. 05:00:57

Q. Comparing that to Table 2, what is the copper 05:00:58

concentration for -- or the copper SWAC for the shipyard site? 05:01:01 05:01:08

A. One -- 159 milligrams per kilogram. 05:01:12

Q. So roughly half that of what's in Commencement Bay? 05:01:16 05:01:19

A. Yes. 05:01:23

Q. Looking down Table 5, do you see the "High Molecular Weight PAH" line item? 05:01:24 05:01:27

A. Yes. 05:01:32

Q. And what does that read? 05:01:33

A. 17,000 milligrams per kilogram. 05:01:36

Q. And looking at Table 2 of Master Exhibit 1, what is the HPAHs' -- or SWAC there? 05:01:40 05:01:42

A. It is 2,451 micrograms per kilogram. 05:01:49

Q. Roughly seven times lower; is that right? 05:01:54

A. I think even -- I mean, the units are -- are different. If I'm reading this right, the high molecular weight in Table 5 is 17,000 milligrams per kilogram. And the HPAH level in the tentative cleanup order is 2,451 micrograms per kilogram. So it's -- which would be, I guess, 2.4 milligrams per kilogram. So the 17,000 would be many times higher. 05:02:10 05:02:13 05:02:21 05:02:26 05:02:33 05:02:39 05:02:46

Q. Mm-hmm. Looking at the "PCB" line item for total PCBs. 05:02:47 05:02:57

A. Yes. Okay. 05:03:00

Q. Can you do that comparison? 05:03:03
A. Yes. It looks like it's 1,000 milligrams per kilogram. I'm a little troubled by this letter "B" by it. I don't know what those letters -- 05:03:08 05:03:13 05:03:19
Q. The footnotes are on the very back page. 05:03:23
A. Okay. I see. 05:03:26
Q. "B" stands for benthic. 05:03:27
A. Okay. So yeah. The total PCBs in Table 5 is 1,000 milligrams per kilogram. And in the cleanup order there are 194 micrograms per kilograms of PCBs, many times more stringent. 05:03:29 05:03:33 05:03:39 05:03:45
Q. And I'd like to introduce as Barker Exhibit 1285. 05:03:49 05:03:51
(Exhibit 1285 was marked.) 05:03:52
BY MR. WATERMAN: 05:03:52
Q. This is the EPA Superfund record of decision for the Puget Sound Naval Shipyard complex? 05:04:03 05:04:08
A. Yes. 05:04:14
Q. Dated June 13th, 2000? 05:04:19
A. Yes. 05:04:21
Q. We're just going to do the same type of comparison we just did. I'd like you to look at -- 05:04:26 05:04:27
MR. CARRIGAN: This is another Superfund site? 05:04:31
MR. WATERMAN: Another Superfund site. 05:04:33
MR. CARRIGAN: NASSCO is not a Superfund site, 05:04:35

Volume 2

Exhibits in Support of:

Petition of San Diego Regional Water Quality Control Board Cleanup and Abatement Order No. R9-2012-0024 and Resolution No. R9-2012-0025

Attachment C

NASSCO'S REPLY COMMENTS ON THE SAN DIEGO REGIONAL WATER QUALITY CONTROL BOARD CLEANUP TEAM'S SEPTEMBER 15, 2010 TENTATIVE CLEANUP AND ABATEMENT ORDER NO. R9-2011-0001, DRAFT TECHNICAL REPORT, AND SHIPYARD ADMINISTRATIVE RECORD

Submitted by: Date: June 23, 2011

LATHAM & WATKINS LLP
600 West Broadway, Suite 1800
San Diego, California 92101-3375
Tel: (619) 236-1234
Fax: (619) 696-7419
Kelly E. Richardson, Esq.
kelly.richardson@lw.com

On Behalf of Designated Party:

NATIONAL STEEL AND SHIPBUILDING COMPANY

Kelly E. Richardson
619.238.2876
Kelly.Richardson@lw.com

600 West Broadway, Suite 1800
San Diego, California 92101-3375
Tel: +1.619.236.1234 Fax: +1.619.696.7419
www.lw.com

LATHAM & WATKINS LLP

June 23, 2011

File No. 048876-0002

VIA EMAIL AND MESSENGER

Mr. Frank Melbourn
California Regional Water Quality Control Board
San Diego Region
9174 Sky Park Court, Suite 100
San Diego, CA 92123-4353

Re: NASSCO's Reply Comments on the Tentative Cleanup and Abatement Order No. R9-2011-0001 and Draft Technical Report

Dear Mr. Melbourn:

Attached please find a summary of NASSCO's reply comments concerning Tentative Cleanup and Abatement Order No. R9-2011-0001 ("TCAO"), and the accompanying Draft Technical Report ("DTR") for the Shipyard Sediment Site ("Site").[1]

As discussed in NASSCO's Initial Comments, the TCAO is already extremely conservative, and provides for an extensive cleanup to levels unprecedented at similar sites in San Diego Bay and California. In fact, areas of the Site that pose little or no risk to human health or the environment are nonetheless slated for remediation, at significant cost to the responsible parties. Given that the TCAO is already exceedingly conservative, there is no justifiable basis for expanding the cleanup footprint further, as certain parties have suggested.[2]

To the contrary, substantial evidence demonstrates that the TCAO represents a ***more protective approach than is required***, particularly in light of the lack of significant impacts observed at the Site. Substantial evidence supports monitored natural attenuation, following

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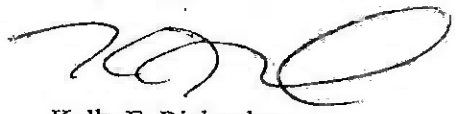
1 These comments are not exhaustive, and NASSCO reserves the right to make additional arguments in its briefings, and at the hearing before the Regional Board on the TCAO.

2 Unfortunately, parties submitted comments in the TCAO proceedings that focus on allocation issues. Rather than addressing the merits of the order, those parties appear to be posturing for the allocation litigation.

source control, as an appropriate remedy for the Site, which would achieve the Regional Board's cleanup goals in a reasonable time consistent with other sediment remediation in San Diego Bay.

Accordingly, the Regional Board should not expand the footprint, and rather, should consider monitored natural attenuation to achieve the cleanup goals specified in the TCAO.

Very truly yours,



Kelly E. Richardson
of LATHAM & WATKINS LLP

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ATTACHMENTS

A. Exponent, Critique of Comments and Untimely Expert Evidence Offered by the Environmental Health Coalition and Coastkeeper, City of San Diego, San Diego Unified Port District, San Diego Gas & Electric, and the U.S. Navy (June 23, 2011).

B. Exponent, Critique of the U.S. Navy's Apportionment Report (June 23, 2011).

C. Declaration T. Michael Chee In Support of NASSCO's Response to Comment On Tentative Cleanup and Abatement Order No. R9-2011-0001 (June 23, 2011).

D. San Diego Unified Port District, Jurisdictional Urban Runoff Management Program (May 2008).

E. Karen Richardson, GIS Gives Port a Common Operating Picture, ArcUser (Winter 2010).

F. Exponent, Summary of Need to Remediate NASSCO Stations, REVISED (June 23, 2011).

LATHAM & WATKINS LLP

I. NATIONAL STEEL AND SHIPBUILDING COMPANY'S ("NASSCO'S") REPLY TO COMMENTS BY THE ENVIRONMENTAL HEALTH COALITION / SAN DIEGO COASTKEEPER ("EHC/COASTKEEPER")[3,4]

EHC/Coastkeeper Comment No. 1: The law requires cleanup to background except where evidence in the record demonstrates that alternative cleanup levels greater than background water quality are appropriate.

The Porter-Cologne Act establishes the framework pursuant to which the San Diego Regional Water Quality Control Board ("Regional Board") may ***reasonably*** protect water quality in California. Cal. Water Code §§ 13000 et seq. To the extent EHC/Coastkeeper suggest that the Water Code sets forth a rebuttable presumption of cleanup to background in all cases, EHC/Coastkeeper misstate the law.

I. The Water Code Recognizes That Beneficial Uses Are Not Unreasonably Affected By All Changes To Chemical Concentrations In Sediments

A. The Water Code Allows Dischargers To Clean Up Or Abate The Effects Of Wastes

EHC/Coastkeeper misstates the applicable legal standard to the extent that they suggest the California Water Code sets forth a rebuttable presumption of cleanup to background in all cases. Rather, the California Water Code Section 13304 requires a discharger to "clean up ***or abate the effects*** of the waste . . . ." (emphasis added). Although the statute is often misquoted by using the conjunctive "and" in place of the disjunctive "or" (for example, when referring to a "cleanup and abatement order"), the legislature's deliberate use of the disjunctive word "or" in the statute makes clear that wastes need not be cleaned up if the effects can be abated. Accordingly, the plain language of Section 13304 supports the conclusion that a cleanup under Section 13304 can be based on abating the effects of the waste, without remediating to background chemical levels.

In fact, the express language of the statute indicates that cleanup levels above background are acceptable if the sediment does not unreasonably affect beneficial uses, and therefore fails to

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3 San Diego Coastkeeper and Environmental Health Coalition Technical Comments, Legal Argument, and Evidence on the Tentative Cleanup and Abatement Order No. R9-2011-001 and Draft Technical Report for the San Diego Bay Shipyard Sediment Site (May 26, 2011) ("EHC/Coastkeeper Comments").

4 With respect to comments relying on the Expert Report of Donald D. MacDonald entitled "Review and Evaluation of Tentative Clean-Up and Abatement Order (No. R9-2011-001) for the Shipyard Sediment Site, San Diego Bay, San Diego, California", ("March 2011 MacDonald Report") submitted in this matter on March 11, 2011, NASSCO incorporates by reference BAE Systems San Diego Ship Repair, Inc.'s ("BAE's") Comments Regarding TCAO/DTR No. R9-2011-0001 ("BAE Initial Comments") submitted on May 26, 2011 critiquing the same.

constitute either "pollution" or a "nuisance." Specifically, the Regional Board's jurisdiction under Section 13304 is triggered where a discharge "creates, or threatens to create, a condition of pollution or nuisance," and it is on this basis that the Regional Board has issued the instant Tentative Cleanup And Abatement Order No. R9-2011-0001 ("TCAO"). Cal. Wat. Code § 13304; TCAO, at ¶ 1 (alleging conditions of contamination and nuisance that adversely affect aquatic-life, aquatic-dependent wildlife, and human health beneficial uses). As discussed in NASSCO's Comment Nos. 10 and 11 (NASSCO's Comments on the San Diego Regional Water Quality Control Board Cleanup Team's September 15, 2010 Tentative Cleanup and Abatement Order No. R9-2011-0001, Draft Technical Report, and Shipyard Administrative Record, May 26, 2011, "NASSCO's Initial Comments"), the Water Code recognizes that beneficial uses are not unreasonably impaired by all changes to chemical concentrations in sediments, and that certain concentrations may be above background conditions, yet not constitute a state of "pollution" or "nuisance."

B. The Water Code Implicitly Recognizes That Industrial Discharges Are Permissible As Long As They Do Not Unreasonably Impair Other Beneficial Uses

The California Water Code also implicitly recognizes that industrial uses, including industrial discharges, are acceptable uses of water bodies as long as discharges from those facilities do not unreasonably impair other beneficial uses. If this were not so, permits for the discharge of ***any*** wastewater would be denied since there is at least some impact on waters associated with any discharge. Interpreting the statute to require cleanup to background sediment chemistry regardless of the effect of the contaminants on beneficial uses ignores these realities, reads the word "unreasonably" out of the definition of pollution, and effectively imposes a "zero discharge" requirement on all industrial dischargers—an obviously unreasonable result. ("Pollution" means an "alteration of the quality of the water of the state by waste to a degree which ***unreasonably*** affects . . . beneficial uses"). Cal. Wat. Code § 13050(l) (emphasis added).[5] Similarly, the legislative history of the Porter-Cologne Act confirms that the Regional Boards must balance economic and water quality interests, and that, although "waste disposal and assimilation are not included in the definition of beneficial uses, . . . they are recognized as part of the necessary facts of life, to be evaluated and subject to reasonable consideration and action by regional boards." See Recommended Changes in Water Quality Control, Final Report of the Study Panel to the California State Water Quality Control Board, Prepared for the California Legislature, March 1969, at Appendix A, at 21. See also, id. at 7 (requiring balancing

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[5] Notably, other Regional Boards have not invoked State Water Board Resolution No. 92-49 ("Resolution 92-49") to require that sediment must be cleaned to background. See San Diego Regional Board Order Nos. 88-86, 88-78, 89-31, 94-100, 94-101, 94-102, 95-21, 97-63, 99-06, 2001-303, R9-2002-72. See also In the Matter of the Petition of Environmental Health Coalition and Eugene Sprofera, Order No. WQ 92-09, State Water Resources Control Board, September 17, 1992 ("Paco Terminals"). Instead, the Regional Board calibrated cleanup levels to be protective of beneficial uses, regardless of whether that level was at background concentrations or above.

of interests); id. at Appendix A at 26 ("[I]t would be very confusing to refer to waste disposal, dispersion and assimilation as any kind of beneficial uses of water. However, this omission is not intended to question the obvious facts that ultimately the residual substances remaining after treatment of wastes must, in most instances, reach waters of the state, and economic benefits to a waste discharger ... relate inversely to the cost of treatment. These economic values are recognized in paragraph 2 of Section 13000.").

C. The Water Code Mandates That Regional Boards Use The Most Cost-Effective Methods For Cleaning Up Or Abating The Effects Of Contamination Or Pollution

Finally, California Water Code Section 13307, which authorizes the California State Water Quality Control Board ("State Board") to adopt policies for Regional Boards to follow in the oversight of cleanup and abatement activities, mandates that the State Board's policies "shall include . . . [p]rocedures for identifying and utilizing the most cost-effective methods . . . for cleaning up or abating the effects of contamination or pollution." Cal. Wat. Code § 13307(a)(3). Thus, taken together, California Water Code Sections 13304 and 13307 allow for the abatement of the effects of past discharges on water quality in the most cost-effective manner. Rather, the key inquiry is whether beneficial uses at the Site are unreasonably affected by the elevated sediment chemistry observed at the Site and/or whether site conditions (1) are injurious to health, indecent or offensive to the senses, or obstructs the free use of property, so as to interfere with the comfortable enjoyment of life or property; (2) affect at the same time an entire community or neighborhood, or any considerable number of persons, although the extent of the annoyance or damage inflicted upon individuals may be unequal; and (3) occur during, or as the result of, the treatment or disposal of wastes. Cal Wat. Code §§ 13050(l)-(m). As discussed extensively in NASSCO's Initial Comments, Site sediments do not pose any unacceptable risk to aquatic life, aquatic-dependent wildlife, or human health, and do not unreasonably affect beneficial uses.

II. The Regional Board Must Consider The Totality Of Factors Affecting Water Quality In Selecting The Cleanup Levels Under Resolution 92-49, Including Economic And Technological Feasibility

As discussed below, the Regional Board must consider the totality of factors affecting water quality in selecting alternative cleanup levels under State Water Resources Control Board Resolution 92-49 ("Resolution 92-49").

A. Resolution 92-49 Requires Alternative Cleanup Levels To Be Protective Of Beneficial Uses, But Grants The Regional Board Substantial Discretion In Determining Alternative Cleanup Levels

To the extent that the Regional Board finds—despite substantial evidence to the contrary—that site conditions do create a condition of pollution or nuisance, the plain terms of Resolution 92-49 do not require cleanup to background unless it is both technologically and economically feasible (i.e., cost-effective) to do so. Specifically, Resolution 92-49 provides that the Regional Board "shall . . . ensure that discharges are required to clean up and abate the effects of discharges in a manner that promotes attainment of ***either*** background water quality ***or*** **the best water quality** ***which is reasonable if background levels of water quality cannot be***

restored, considering all demands being made and to be made on those waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible. . . ."

The State Board has described the analysis required by Resolution 92-49 as follows:

> Resolution 92-49 directs the RWQCBs to ensure that water affected by an unauthorized release attains either background water quality or the best water quality which is reasonable if background water quality cannot be restored, considering all demands being made and to be made on those waters and the total values involved,, beneficial and detrimental, economic and social, tangible and intangible; in approving any alternative cleanup levels less stringent than background . . . any such cleanup level shall (1) be consistent with the maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial use of such water; and (3) not result in water quality less stringent than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards.

Resolution 92-49, at III.G. See also, In the Matter of the Petition of Unocal Corporation, State Board Order No. WQ 98-12, at 2 (quoting Resolution 92-49); In the Matter of the Petition of Landis Incorporated, State board Order No. WQ 98-13, at 2 (same); In the Matter of the Petition of Unocal Corporation, Order No. 99-10, at 2; In the Matter of the Petition of Chevron Pipe Line Company, State Board Order No. WQ 2002-0002; In the Matter of the Petition of Environmental Health Coalition and Eugene Sprofera, Order No. WQ 92-09, at 4.

Further, the text of Resolution 92-49 requires an analysis of cost-effectiveness and technological and economic feasibility in determining cleanup levels. See Resolution 92-49, at 6-7 ("The Regional Water Board shall . . . ensure that dischargers shall have the opportunity to select cost-effective methods for . . . cleaning up or abating the effects [of wastes discharged and] . . . require the discharger to consider the effectiveness, feasibility, and ***relative costs*** of applicable alternative methods for investigation, cleanup and abatement.") (emphasis added).

B. There Is Substantial Evidence In The Record That Cleanup To Background Is Infeasible, Beneficial Uses At The Site Are Not Impaired, And Monitored Natural Attenuation Will Achieve Cleanup Goals

As discussed in NASSCO's Initial Comments, active remediation is not economically or technologically feasible within the meaning of Resolution 92-49; rather, monitored natural attenuation is the appropriate remedial alternative considering the demands being made and to be made on the waters at the Site, and the total values involved—beneficial and detrimental, economic and social, and tangible and intangible. To the extent the regulatory scheme requires cleanup to background unless economically and technologically infeasible, there exists substantial evidence in the record demonstrating that (1) beneficial uses at the site are not impaired, (2) monitored natural attenuation will achieve the cleanup goals articulated in the

TCAO in the most cost-effective manner, and (3) cleanup to background is not feasible, both economically and technologically.

III. EHC/Coastkeeper Misstates The Requirements Of Resolution 92-49

Citing Resolution 92-49, EHC/Coastkeeper argues that Section 2550.4 of the California Code of Regulations requires that cleanup levels must be set to background water quality, unless the Regional Board analyzes economic and technological feasibility on a pollutant-by-pollutant basis, and determines that cleanup to background is either economically or technologically infeasible on a pollutant-by-pollutant basis. Tellingly, Resolution 92-49 has been in existence for decades; yet, no Regional Board, State Board, or court appears to have ever interpreted it in the manner EHC/Coastkeeper now suggest.

This is because, under Resolution 92-29, the Regional Board "may prescribe an alternative cleanup level less stringent than background sediment chemistry concentrations if attainment of background concentrations is technologically or economically infeasible – as long as the less stringent cleanup level is protective of beneficial uses." Draft Technical Report ("DTR"), at 32-3. Additionally, the State Board grants substantial discretion to Regional Boards in setting alternative cleanup levels under Resolution 92-49. In sum, Resolution 92-49 is intended to ensure that any alternative cleanup levels are protective, and that cleanups are cost-effective. Requiring constituent-by-constituent economic and technological feasibility analyses would make no sense considering the practicalities of sediment cleanup, and would be contrary to the Regional Board's obligation to take into account "the resources, both financial and technical, available to the person[s] responsible for the discharge" in overseeing investigations and cleanups under Resolution 92-49..

A. Section 2550.4 Does Not Require Alternative Cleanup Levels, or Economic And Technological Feasibility Analyses To Be Conducted On A Constituent-By-Constituent Bases

Citing Resolution 92-49, EHC/Coastkeeper argues that Section 2550.4 of the California Code of Regulations governs the setting of alternative cleanup levels for the Site, and requires the Regional Board to select concentration limits for each constituent subject to remediation. Resolution 92-49, at III.G. ("[I]n approving any alternative cleanup levels less stringent than background, apply Section 2550.4 of Chapter 15 . . .; any such alternative cleanup level shall: (1) be consistent with maximum benefit to the people of the state; (2) not unreasonably affect present and anticipated beneficial use of such water; and (3) not result in water quality less than that prescribed in the Water Quality Control Plans and Policies adopted by the State and Regional Water Boards."). As discussed below, Section 2550.4 does not operate to require constituent-by-constituent analysis in this cleanup.

1. Chapter 15 Was Not Designed As General Guidance For Sediment Remediation, And Is Only Applicable To The Extent "Feasible" According To The Plain Terms Of Resolution 92-49

Chapter 15, including Section 2550.4, was not designed as general guidance for sediment remediation; rather it sets forth detailed siting, construction, monitoring, and closure

requirements for existing and new waste treatment, storage, and disposal facilities. Thus, Chapter 15 provides technical criteria for establishing water quality protection standards, monitoring programs, and corrective action programs for releases from waste management units, much of which is inapplicable to sediment remediation.

The explicit terms of Resolution 92-49 also provides that "discharges subject to [Water Code] Section 13304 ***may*** include discharges of waste to land; such discharges ***may*** cause, or threaten to cause, conditions of soil or water pollution or nuisance that are analogous to conditions associated with migration of waste or fluid from a waste management unit." In such cases, Resolution 92-49 provides that the Regional Board should implement the provisions of Chapter 15, only to the extent applicable to cleanup and abatement, as follows:

> (a) If cleanup and abatement involves corrective action at a waste management unit regulated by waste discharge requirements issued under Chapter 15 the Regional Water Board shall implement the provisions of that chapter;
>
> (b) If cleanup and abatement involves removal of waste from the immediate place of release and discharge of the waste to land for treatment, storage or disposal, the Regional Water Board shall regulate the discharge of the waste through waste discharge requirements issued under Chapter 15, provided that the Regional Water Board may waive waste discharge requirements under WC Section 13269 if the waiver is not against the public interest (e.g if the discharge is for short-term treatment or storage, and if the temporary waste management unit is equipped with features that will ensure full and complete containment of the waste for the treatment or storage period); and
>
> (c) If cleanup and abatement involves actions other than removal of the waste, such as containment of waste in soil or ground water by physical or hydrological barriers to migration (natural or engineered), or in-situ treatment (e.g. chemical or thermal fixation or bioremediation), the Regional Water Board shall apply the applicable provisions of Chapter 15 to the extent that it is technologically and economically feasible to do so.

Resolution 92-49, at III.F.

However, because Chapter 15 was developed to address releases from hazardous waste management units, not to articulate goals for the remediation of sediment, the State Board recognizes that Chapter 15 applies to cleanups only to the extent "feasible."

Here, there is no basis for analogizing the Site to a waste management unit, particularly since the site sediments were found not pose risks to aquatic, aquatic-dependent wildlife, or human health beneficial uses in an extensive and unparalleled sediment investigation, conducted with substantial oversight from the Regional Board. Moreover, cleanup and abatement actions are explicitly exempted from the provisions of Section 2550.4, provided that "remedial actions

intended to contain such wastes at the place of release shall implement applicable provisions of [Chapter 15] ***to the extent feasible***." 23 Cal. Code Regs. §2511.

Additionally, Chapter 15 also provides that "alternatives to construction or prescriptive standards contained in this chapter may be considered. Alternatives shall . . . be approved where the discharger demonstrates that (1) the construction or prescriptive standard is not feasible as provided in subsection (c) of this section, and (2) there is a specific engineered alternative that (A) is consistent with the performance goal addressed by the particular construction or prescriptive standard; and (B) affords equivalent protection against water quality impairment."). In fact, Chapter 15 itself provides that it is not feasible to comply with a prescriptive standard in Chapter 15 if it "(1) is unreasonably and unnecessarily burdensome and will cost substantially more than alternatives which meet the criteria [described above]; or (2) is impractical and will not promote the attainment of applicable performance standards. Regional Boards shall consider all relevant technical and economic factors including, but not limited to, present and projected costs of compliance . . ." 23 Cal. Code Regs. §2510.

Application of Chapter 15, including the requirements of Section 2550.4, in the manner EHC/Coastkeeper suggests is clearly not "feasible." Id.; 23 CCR § 2511; Resolution 92-29, at III.F. First, it is impractical to conduct distinct analyses of alternative cleanup levels for each individual pollutant where substantial evidence demonstrates that secondary pollutants are co-located with primary pollutants and will be remediated to protective levels in a common footprint. Similarly, conducting economic and technological feasibility analyses on a pollutant-by-pollutant basis is economically infeasible, and nonsensical given the engineering realities of dredging.

2. The Regional Boards Have Substantial Discretion To Select Alternative Cleanup Levels, Provided That They Are Protective

As discussed above, Section 2550.4 relates to waste discharge and monitoring requirements for hazardous waste management units, and in-situ containment of wastes, to the extent "feasible"; however, even to the extent that the Regional Board must apply these requirements in approving alternative cleanup levels, the applicable requirements pertain, at best, to water quality monitoring with respect to in situ remediation of waste discharges. As discussed above, Section 2550.4 addresses concentration limits in the context of waste discharge and monitoring requirements, and is intended only to ensure that alternative cleanup levels set above background levels are adequately protective. This understanding is confirmed by State Water Resources Control Board guidance, which states that

> Resolution 92-49 is flexible and permits a regional board to set alternative cleanup levels less stringent than background concentrations if attainment of background concentrations is infeasible. Any such alternative cleanup level may not unreasonably affect beneficial uses and must comply with all applicable Water Quality Control Plans and Policies. The Resolution allows for consideration of adverse impacts of any cleanup itself as well as natural attenuation if cleanup goals can be met in a reasonable time.

State Water Resources Control Board Memorandum From Craig Wilson To John Robertus (February 22, 2002), at SAR097571- 81) ("Wilson Memo"). Notably, although the Wilson Memo references Section 2550.4, it makes no direct mention of any requirement to set alternative cleanup levels, or analyze economic or technological feasibility, on a constituent-by-constituent basis. Id. In fact, it provides that the Regional Board has "substantial" discretion in setting alternative cleanup levels, and notes that Resolution 92-49 requires alternative cleanup levels less stringent than background to "be consistent with maximum benefit to people of the state" and requires consideration of "all demands being made and to be made on the waters and the total values involved, beneficial and detrimental, economic and social, tangible and intangible." Wilson Memo, at SAR097579. Further, this determination is to be "made on a case-by-case basis, and is based on considerations of reasonableness under the circumstances at the site." Id. Thus, to the extent that Section 2550.4 is applicable to the cleanup and abatement of sediment contamination, EHC/Coastkeeper clearly misinterprets Section 2550.4 as requiring alternative cleanup levels (and the concomitant economic and technological feasibility analyses) to be conducted on a pollutant by pollutant basis.

Rather, Section 2550.4 addresses concentration limits in the context of waste discharge and monitoring requirements, and is intended only to ensure that alternative cleanup levels set above background levels are adequately protective. That is, to the extent applicable to cleanup levels, Section 2550.4 simply requires the Regional Board to (1) set alternative cleanup levels at the lowest level that are economically and technologically feasible, and (2) ensure that concentrations of contaminants at such levels "do not pose a substantial present or potential hazard to human health or the environment" (i.e., ensures that the cleanup level is protective of beneficial uses). Here, the Regional Board has set excessively conservative cleanup levels that are protective of human health and the environment, which, if anything, will require the parties to expend much more than is economically feasible, at considerable expense to the parties named on the TCAO. See, e.g., NASSCO and Southwest Marine Detailed Sediment Investigation, Exponent (October 2003) ("Exponent Report"), at 19-13; Deposition of David Barker ("Barker Depo"), at 204:21 – 206:6.

Additionally, in selecting the alternative cleanup levels, the Regional Board has expressly considered the applicable requirements of Resolution 92-49 and California Code of Regulations Section 2550.4. TCAO, at ¶ 32; DTR, at 32-1 – 32-2. In doing so, the Regional Board set alternative levels on a constituent-specific basis for both primary COCs and secondary COCs. Primary COCs are those associated with the greatest exceedance of background, and the highest magnitude of potential risk at the Site. Cleanup levels for primary COCs, were set using the post-remedial SWAC as a concentration limit. TCAO, at ¶ 32. Secondary COCs, which are associated with lower exceedances of background, were also extensively and individually evaluated, and were found to be highly correlated with Primary COCs and thus adequately addressed in the common footprint. The Regional Board also assessed risk to wildlife receptors under projected post-remedial conditions, and confirmed that the alternative cleanup levels adequately protect aquatic-dependent wildlife and human health beneficial uses. DTR, at § 32. By contrast, EHC/Coastkeeper has provided no credible evidence that concentrations below the proposed alternative cleanup levels, but above background, pose "substantial present or potential hazard to human health or the environment."

3. EHC/Coastkeeper Has Cited No Precedent Supporting Its Novel Interpretation Of Resolution 92-49

Finally, we are aware of no cleanups where the Regional Board has required separate alternative cleanup level or feasibility analyses for each and every constituent involved, particularly where distinct constituents are correlated, as here. Nor has EHC/Coastkeeper pointed to any State Board or court decisions supporting its novel interpretation of Resolution 92-49.

IV. Conclusion

For the foregoing reasons, Resolution 92-49 does not require constituent-by-constituent analysis of alternative cleanup levels, or economic or technological feasibility, and EHC/Coastkeeper's comment is without merit.

[NASSCO Comment No. 262, TCAO, at ¶¶ 31, 32, DTR, at §§ 31, 32]

EHC/Coastkeeper Comment No. 2: Cleanup to a pollutant level greater than background conditions is only allowed if the Regional Board makes two findings.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 1, and 10-15.

[NASSCO Comment No. 263, TCAO, at ¶¶ 31, 32, DTR, at §§ 31, 32]

EHC/Coastkeeper Comment No. 3: Alternative cleanup levels must be a concentration limit set on a constituent-by-constituent basis and must meet requirements in State Water Board Order 92-49.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 1, above.

[NASSCO Comment No. 264, TCAO, at ¶¶ 31, 32; DTR, at §§ 31, 32, Appendices 31, 32]

EHC/Coastkeeper Comment No. 4: The Regional Board's findings must be supported by evidence in the record.

I. Assessment Of Impacts To Beneficial Uses And Economic Feasibility Analysis Under Resolution No. 92-49 Support Monitored Natural Attenuation As The Appropriate Remedy

EHC/Coastkeeper correctly notes that an agency's findings must be supported by the weight of the evidence in the record. EHC/Coastkeeper Comments, at 3. However, EHC/Coastkeeper's specific contentions that the alternative cleanup levels set by the Regional

Board are insufficiently protective, and the corresponding implication that cleanup to background is technologically and economically feasible, are without merit.

In fact, considering that the results of the sediment investigation showed that "aquatic life, aquatic-dependent wildlife, and human health beneficial uses are at approximately 95 percent of ideal conditions, and active remedial alternatives will result in improvements that are minimal—on the order of only a percent or so"—***any*** active remediation, including cleanup to background, is economically infeasible.[6] Exponent Report, at 19-13; Barker Depo, at 204:21 – 206:6 ("Q: So, solely for [the economic feasibility] step of the equation, if you have a negligible – negligible benefit on one side, I assume that there – anything more than a negligible cost would mean it's not economically feasible. A. Right. . . . Q. If there's absolutely no benefit of an incremental reduction in cleanup, then there's no cost that would justify that, correct? . . . A: That type of scenario would – could support an alternative cleanup level to background. I don't know if that's what you're asking. But that is a point where the board could make a decision that no further cleanup could be required."). **[NASSCO Comment No. 265, TCAO, at ¶¶ 30, 31, 32, DTR, at §§ 30, 31, 32, Appendices 31, 32]**

II. EHC/Coastkeeper's Contention That Additional Cleanup, Beyond The TCAO Footprint, Is Economically Feasible Is Without Merit

Resolution 92-49 defines the term "economic feasibility" as follows:

> Economic feasibility is an objective balancing of the incremental benefit of attaining further reductions in the concentrations of constituents of concern as compared with the incremental cost of achieving those reductions. The evaluation of economic feasibility will include consideration of current, planned, or future land use, social, and economic impacts to the surrounding community including property owners other than the discharger. Economic feasibility, in this Policy, does not refer to the discharger's ability to finance the cleanup. Availability of financial resources should be considered in the establishment of reasonable compliance schedules.

Resolution 92-49, at III.H.1.b. Additionally, as discussed in the DTR, analyzing economic feasibility involves "estimating the costs to remediate constituents of concern at a site to background and the costs of implementing other alternative remedial levels. An economically feasible cleanup level is one where the incremental cost of further reductions in primary COCs outweighs the incremental benefits." DTR, at 31-1.

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[6] Additionally, there is evidence in the record that cleanup to background is technologically infeasible. Barker Depo, at 246:11 – 248:3 (describing dredging of the volume of sediments required to reach background levels as "an expensive challenge" and noting that "the board has not had regulatory experience with dealing with that volume of material . . . .").

A. The Record Is Clear That Cleanup To Background Is Economically Infeasible

EHC/Coastkeeper erroneously states that the record does not support a finding that cleanup to background is economically infeasible. Under Resolution 92-49, determining economic feasibility requires an objective balancing of the incremental benefit of attaining further reduction in the concentrations of primary COCs as compared with the incremental cost of achieving those reductions. Further, Resolution 92-49 explicitly provides that "[e]conomic feasibility . . . does not refer to the discharger's ability to finance cleanup;" rather, an economically feasible cleanup level is one where the incremental cost of further reductions in primary COCs outweighs the incremental benefits. Resolution 92-49, at III.H.

The DTR analysis compared incremental benefits of further cleanup, expressed in terms of exposure reduction to target receptors, with the incremental cost of achieving those benefits, and determined that the degree of exposure reduction does not justify the incremental cost of such reductions, beyond approximately $33 million. DTR, at 31-2 - 31-3. This analysis is consistent with the requirements of Resolution 92-49, and is supported by evidence in the record. DTR, at § 31, Appendix 31. Moreover, as discussed above, due to the generally favorable site conditions, ***any*** active remediation is economically infeasible under the terms set forth in Resolution 92-49. Exponent Report, at 19-13. In fact, it is well-known that cleanup of sediment to background levels in San Diego Bay is economically infeasible: to date, because of economic infeasibility, none of the sediment site in San Diego Bay have been remediated to background conditions. Cleanup Team's Responses and Objections To Designated Party BAE's First Set Of Requests for Admission, Admission Nos. 44 – 46 (admitting that it is economically and technologically infeasible to remediate the Site to background, and that the Regional Board ***has never required remediation to background sediment quality levels for any other site within the San Diego Bay***).

The record contains no evidence that cleanup to background is economically feasible; in fact, EHC/Coastkeeper has not even provided evidence that cleanup to the alternative cleanup levels is economically feasible, let alone evidence supporting its position that cleanup to background levels is feasible. **[NASSCO Comment No. 266, TCAO, at ¶ 31, DTR, at § 31, Appendix 31]**

B. No Other Sediment Sites In San Diego Bay Have Been Remediated To Background

Moreover, EHC/Coastkeeper cannot point to a single sediment site in San Diego Bay that has been remediated to background levels; rather the consensus is clear, and the Regional Board's Sediment Site Cleanup Team ("Cleanup Team") admits, that cleanup to background is technologically and economically infeasible. See, e.g., Cleanup Team's Responses and Objections To Designated Party NASSCO's Second Set of Requests For Admissions, at RFAs 18- 21 (admitting that it is economically and technologically infeasible to require remediation to background sediment quality levels (as defined by Resolution 92-49), and admitting that the

Regional Board has never required remediation to background sediment quality levels at any other site in San Diego Bay).

[NASSCO Comment No. 267, CAO at ¶¶ 31, 32, DTR, at §§ 31, 32, Appendices 31, 32]

C. The Alternative Cleanup Levels Were Selected Based On An Overly Conservative Interpretation Of Chemistry And Biological Data, Not Economic Feasibility

EHC/Coastkeeper erroneously states that the economic feasibility analysis was the primary basis for the selection of the alternative cleanup levels; however, this is a patently false statement. The selection of alternative cleanup levels was based on the Regional Board's analyses of many factors, including), including individual station and Sitewide chemistry data, biological data (i.e., toxicity tests, benthic community analysis, SPI data), technical feasibility, and specific beneficial use objectives, in addition to economic feasibility. Further, based on these criteria, the selected cleanup levels are excessively conservative, as discussed extensively in NASSCO's Initial Comments.

Thus, contrary to EHC/Coastkeeper's assertions, the economic feasibility analysis was not intended to select a specific remedial scenario, and was not the primary basis for selection of any specific scenario. Rather, the analysis was intended to determine whether a point of diminishing returns on invested resources was apparent in the cost-benefit relationship, and then identify the most cost-effective level of effort—assuming that areas of higher contamination were preferentially selected for removal (as is typical). Accordingly, EHC/Coastkeeper's statement that "the economic feasibility analysis drives the entire cleanup" is incorrect. In actuality, the final selection of a remedial footprint in the DTR was based on simultaneous consideration of many factors (as is legally required under Resolution 92-49), including individual station and Sitewide chemistry data, biological data (i.e., toxicity tests, benthic community analysis, SPI data), technical feasibility, and specific beneficial use objectives, in addition to economic feasibility. In fact, considering the results of these analyses, the proposed cleanup is extremely conservative, as discussed in NASSCO's Initial Comments. **[NASSCO Comment No. 268, CAO at ¶¶ 31, 32, 33, DTR, at §§ 31, 32, 33, Appendices 31, 32, 33]**

EHC/Coastkeeper's assertion that "the economic feasibility analysis in Section 31 determined the alternative cleanup levels" is a mischaracterization of the analysis in the DTR, which contains highly conservative analyses of individual station and Sitewide chemistry data, biological data (including toxicity tests, benthic community analysis, and SPI data), technical feasibility, and specific beneficial use objectives, in addition to economic feasibility.

D. The DTR Conservatively Estimated The Costs Of Cleanup To Alternative Cleanup Levels

The DTR states that criteria including "total cost, volume of sediment dredged, exposure pathways of receptors to contaminants, short- and long-term effects on beneficial uses (as they fall into the broader categories of aquatic life, aquatic-dependent wildlife, and human health), effects on the shipyards and associated economic activities, effects on local businesses and

neighborhood quality of life, and effects on recreational, commercial, or industrial uses of aquatic resources." DTR, at 31-1. EHC/Coastkeeper suggests that "benefits to human health, wildlife, aquatic-dependent wildlife, and other beneficial uses from removing pollutants" were not "quantified"; however, the economic feasibility analysis does quantify benefits in terms of exposure reduction. Further, using reasonable assumptions, such a quantification would not justify any active remediation. Extensive scientific investigation conducted at the shipyards, including the sediment quality investigation upon which the findings and conclusions of the TCAO are purportedly based, indicates that beneficial uses at the site are not unreasonably impaired and that active remediation would "result in improvements that are minimal—on the order of only a percent or so." Exponent Report, at 19-13. **[NASSCO Comment No. 269, CAO at ¶¶ 31, 32, DTR, at §§ 31, 32, Appendices 31, 32]**

Yet, active remediation, including the remediation described in the TCAO, would destroy existing mature and thriving benthic communities at the Site, and result in significant negative impacts to NASSCO and the surrounding community, including but not limited to (1) the potential to jeopardize the integrity of slopes and structures at the leasehold, (2) disruption of vital ship repair and construction activities that could result in delays or contractual breaches with the U.S. Navy and other customers, (3) increased truck traffic, (4) diesel emissions from trucks and heavy equipment, (5) noise, (6) accident risks, (7) transportation of large volumes of contaminated sediment through neighborhoods, and (8) the need to establish large staging areas for dewatering activities. Exponent Report, at §§ 18.2, 18.4; Barker Depo, at 306:22 – 307:21. Taking all of these factors into account suggests that the alternate cleanup levels are not economically feasible, and certainly do not weigh in favor of further cleanup. **[NASSCO Comment No. 270, CAO at ¶¶ 31, 32, DTR, at §§ 31, 32, Appendices 31, 32]**

E. Cleanup Levels Below The Proposed Alternative Cleanup Levels Are Not Justified Given The Favorable Site Conditions, And Are Economically Infeasible Regardless Of Whether The Eleven Cost Scenarios Are Analyzed Independently, Or In Groups Of Six

As discussed in NASSCO's Initial Comments, the alternative cleanup levels are overly conservative, based on a series of excessively cautious assumptions concerning potential impacts to aquatic life, aquatic-dependent wildlife, and human health. The proposed economic feasibility analysis is similarly overly conservative, and requires cleanup well beyond the point at which the incremental benefits are justified by the incremental costs of further cleanup, considering that it has been demonstrated that monitored natural attenuation will ensure that the (excessively conservative) alternative cleanup levels are met within a reasonable time. Thus, any cleanup beyond the point identified in the DTR is similarly economically infeasible, given the favorable conditions observed at the Site. This is so regardless of whether cleanup scenarios are assessed independently, or in groups of six, as discussed below.

The economic feasibility analysis was a theoretical exercise designed for a single purpose – to provide an incremental cost-benefit analysis for the full spectrum of cleanup possible at the Shipyard Site, including cleanup to background conditions. Eleven scenarios were evaluated based upon the Cleanup Team's best professional judgment that eleven data points would be sufficient to establish a cost-benefit relationship. Additionally, the analysis required that each

scenario represent a comparable incremental increase in the level of remedial effort necessary; thus, because 11 divides evenly into 66 (whereas 10 or 12 or 15 does not), using 11 data points facilitated assurance that each scenario represented a comparable incremental increase in level of effort. As described in the DTR, the Regional Board ordered all 66 polygons according to their composite SWAC ranking, which it determined was the best single metric for comparing relative Chemicals of Concern ("COC") levels.[7] Each scenario was defined to be incrementally larger than the previous scenario by six polygons. Scenario 1 included the six most contaminated polygons (based on composite SWAC ranking), Scenario 2 included the 12 most contaminated polygons, Scenario 3 the 18 most contaminated polygons, etc. Scenario 11 included the entire Shipyard Site (66 polygons). This "worst first" approach provides a rational and direct manner in which to assess incremental net benefits of the full spectrum of potential cleanup effort. **[NASSCO Comment No. 271, CAO at ¶ 31, DTR, at ¶ 31, Appendix 31]**

Resolution 92-49 requires economic feasibility to be considered in setting appropriate cleanup levels, and requires the Regional Board to use best professional judgment in evaluating the point at which the incremental benefits of further cleanup are no longer justified by the incremental costs. Thus, selection of the point at which incremental benefits no longer justify incremental costs is primarily a policy decision, requiring best professional judgment, not a simple mathematical determination.

Here, however, regardless of whether the 11 hypothetical cost scenarios are grouped into five ranges or presented as 11 independent calculations, the underlying cost-benefit relationship is the same. In fact, EHC/Coastkeeper's Figure 1, which depicts the eleven cost scenarios graphed individually, illustrates the same trend that is apparent in DTR Figure 31-1, and lends credence to Regional Board's determination that cleanup to background is economically infeasible. Specifically, under both scenarios, the benefit per dollar spent is relatively high and flat for the first three scenarios, but decreases dramatically with the additional cleanup associated with scenario 4 (i.e., above $33 million total cost), suggesting that cleanup above $33 million total cost is not economically feasible, given the minimal incremental benefits. In fact, cleanup beyond the economically feasible point as defined in the DTR results in an exposure reduction of

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[7] As described in the DTR, the sediment chemistry data used to calculate SWAC values for the economic feasibility analysis were the same data set used to assess all aspects of risk and beneficial use impairment at the Shipyard Site. Contrary to EHC/Coastkeeper's assertions, there are no "pollution reduction assumptions," other than the assumption that remediated areas under all scenarios will eventually equilibrate to background COC concentrations. Exposure reduction, as defined in the DTR, is simply the reduction in Sitewide SWAC that results from complete remediation of any specified area. It is an objective value, calculated mathematically from sediment chemistry data alone, and is not dependent on any given exposure scenario or assumptions. The exposure scenarios evaluated in both the human and aquatic-dependent wildlife risk assessments in the DTR are generally proportional to the Sitewide SWAC, therefore SWAC reduction is an appropriate metric for general conclusions about reduction of exposure and risk to human and wildlife receptors.

less than 7 percent per $10 million spent after $33 million; less than 4 percent after $45 million; and zero at $185 million. DTR, at 32-40. Exposure reductions of merely a few percentage points do not justify the expenditure of tens of millions of dollars, and would clearly violate Resolution 92-49's economic feasibility provisions. **[NASSCO Comment No. 272, CAO at ¶ 31, DTR, at § 31, Appendix 31]**

Moreover, the Cleanup Team's analysis is based on chemical concentrations only. If the best measure of water quality is used (i.e., direct measurements of toxicity and benthic community analyses at NASSCO), then there is ***no*** incremental benefit of dredging ***any*** areas at NASSCO; thus, the economically feasible remedy is natural attenuation. **[NASSCO Comment No. 273, CAO at ¶ 31, DTR, at § 31, Appendix 31]**

III. EHC/Coastkeeper's Proposed Constituent-By-Constituent Economic Feasibility Analysis And Is Not Required By Resolution 92-49, And Is Technically Invalid

As discussed in NASSCO's Response to EHC/Coastkeeper Comment No. 1, above, there is no requirement in Resolution 92-49 that requires a constituent-by-constituent economic feasibility analysis. Moreover, EHC/Coastkeeper's proposed constituent-by-constituent economic feasibility analysis is not scientifically valid.

EHC/Coastkeeper asserts that averaging the pollutant reduction concentration for the five primary COCs, as was done in the DTR masks variability in pollutant exposure reduction for individual pollutants, and suggests that, when pollutants are analyzed individually, progression from cost scenario 6 ($69.5 million-$85.3 million) to cost scenario 7 ($85-$101.6 million) results in "more than 20% exposure reduction in mercury." However, EHC/Coastkeeper's proposed constituent-by-constituent reanalysis of the economic feasibility data merely illustrates that the five COCs are not identically distributed across the site, without addressing the issue of net remedial cost-benefit. Attachment A, Exponent, Critique of Comments and Untimely Expert Evidence Offered by the Environmental Health Coalition and Coastkeeper, City of San Diego, San Diego Unified Port District, San Diego Gas & Electric, and the U.S. Navy (June 23, 2011) ("Exponent Critique"), at 2. It also confirms that incremental benefits generally decrease with increasing cost. Id. **[NASSCO Comment No. 274, CAO at ¶ 31, DTR, at § 31, Appendix 31]**

Of particular concern, EHC/Coastkeeper's proposed reanalysis also obfuscates the net benefits, leading to absurd results and illustrating why this analysis is a poor standalone basis for selecting a remedy (something it was never intended to do). Specifically, EHC/Coastkeeper's proposed analysis fails to recognize that the mercury SWAC achieved in scenario 7 is actually well below the site-specific reference concentration (i.e., background UPL) for mercury. Id. Under current conditions, the mercury SWAC at the shipyard is not highly elevated relative to background (only 1.2x background UPL prior to any remediation), and very quickly approaches background as the highest composite SWAC polygons are remediated. Accordingly, at scenario 6, mercury is essentially at background. Under scenarios 7 to 11, the mercury SWAC is predicted to be below background, because the remaining unremediated stations all have mercury concentrations below the background UPL (see Figure 1, below). Scenarios 9 and 10 actually predict a rise in mercury SWAC with continued remediation, because areas with mercury levels below background are being dredged and the dredged area is assumed to

equilibrate to the higher background level after remediation. As a result, the apparent "reduction" in mercury exposure from scenario 6 to scenario 7 actually produces no benefit to the public relative to the reference condition (defined as 100% exposure reduction), at a cost of more than $16 million. **[NASSCO Comment No. 275, CAO at ¶ 31, DTR, at § 31, Appendix 31]**

EHC/Coastkeeper Comment No. 5: The Order's conclusion that cleanup to background water quality levels is economically infeasible is arbitrary and capricious and not supported by substantial evidence in the record.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above.

EHC/Coastkeeper Comment No. 6: The economic feasibility analysis arbitrarily assessed costs in six-polygon groups.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above.

EHC/Coastkeeper Comment No. 10: There is no explanation in the economic feasibility analysis why polygons identified with a "depth to clean" as the undefined term "sur" have differing "dredging depth[s]."

The term "sur" indicates polygons in which only surface chemistry is available (i.e., from the upper 2 centimeters of sediment). In most cases, a 3-foot dredging depth was assumed, with an additional one-foot overdepth allowance, representing the minimum practicable thickness of dredging.

There are four exceptions to this assumption, involving cases where immediately adjacent polygons had better-defined depths to clean material. These cases are as follows: (1) the dredging depth at polygons SW13 and SW16 were assumed to be 5 feet because of their position adjacent to SW08 (dredged to 6 feet based on sediment core) and SW17 (dredged to 7 feet based on sediment core); (2) the dredging depth at polygon SW05 was assumed to be 5 feet because of its position adjacent to SW04 and SW02 (both dredged to 5 feet based on sediment cores); (3) the dredging depth at polygon NA15 was assumed to be 7 feet because of its position between NA09 (dredged to 9 feet based on sediment core) and NA17 (dredged to 5 feet based on sediment core).

[NASSCO Comment No. 276, DTR, at 31; Appendix 31; Table A31-2]

EHC/Coastkeeper Comment No. 11: DTR Appendix 31 Table A31-2 groups the economic feasibility results together in an arbitrary manner.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 4, above.

EHC/Coastkeeper Comment No. 12: DTR Figure 31-1 would have looked different if results had been presented for each of the eleven cost scenarios.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above.

EHC/Coastkeeper Comment No. 13: The DTR incorrectly summarizes cumulative exposure reduction percentages per $10 million spent.

EHC/Coastkeeper argues that the cumulative exposure reduction calculations provided in the Cleanup Team's discovery response to EHC/Coastkeeper contradicts the assertion in the DTR that "exposure reduction drops below 7 percent per $10 million after $33 million, below 4 percent after $45 million, and drops to zero at $185 million." DTR, at 32-40. However, in doing so, EHC/Coastkeeper blatantly ignores the distinction between incremental and cumulative costs and benefits.

Consistent with Resolution 92-49, Section 31.2 of the DTR clearly states that the economic feasibility analysis is based on a comparison of incremental costs and benefits, and the conclusion presented is also clearly labeled as having an incremental cost basis, not cumulative. This is appropriate given that an economic feasibility analysis conforming to Resolution 92-49 must determine the point at which additional remediation no longer produces an additional benefit that is sufficient to justify the associated additional expense of such remediation.

[NASSCO Comment No. 277, CAO at ¶ 31, DTR, at § 31, Appendix 31]

EHC/Coastkeeper Comment No. 14: The economic feasibility was not determined on a constituent-by-constituent basis.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above.

EHC/Coastkeeper Comment No. 15: The economic feasibility data was not presented in a scaled manner.

The analysis presented in EHC/Coastkeeper Comments, Figure 3 differs only in form from that presented in EHC/Coastkeeper Comments, Figure 2. It contains no additional information, other than the inclusion of background as a reference point. Consistent with the bar

chart, a slope change in the plotted figure (i.e., a decrease in benefit per unit cost) can be seen at approximately $33 million total cost. The benefit/cost ratio generally continues to decrease with costs above this point.

[NASSCO Comment No. 278, CAO at ¶ 31, DTR, at § 31, Appendix 31]

EHC/Coastkeeper Comment No. 16: The DTR's economic feasibility conclusions based on DTR Figure 31-1 are arbitrary and capricious.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above. As discussed in those responses, there is substantial technical and logical support that the DTR actually conservatively estimates the point at which the incremental costs of further cleanup outweigh the incremental benefits.

EHC/Coastkeeper Comment No. 17: The conclusion that the alternative cleanup levels are the lowest levels economically achievable is arbitrary and capricious and not supported by the evidence.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above Within the meaning of Resolution 92-49, "economically achievable" and "economically feasible" are specific terms of art referring to the requirement that the Regional Board engage in "an objective balancing of the incremental benefit of attaining further reduction in the concentrations of primary COCs as compared with the incremental cost of achieving those reductions." DTR, at 31-1. Resolution 92-49 explicitly states that these terms "do not refer to the dischargers' ability to finance the cleanup." Id.

As discussed above, applying Resolution 92-49, there is ample evidence in the record demonstrating that cleanup to background is economically infeasible, and the alternative cleanup levels are overly-conservative and economically infeasible. Exponent Report, at 19-13, Barker Depo, at 204:21 – 206:6. EHC/Coastkeeper has cited no evidence in the record to support the contention that lower cleanup levels are economically feasible.

[NASSCO Comment No. 279, CAO at ¶¶ 31, 32, DTR, at §§ 31, 32, Appendices 31, 32]

EHC/Coastkeeper Comment No. 18: The economic feasibility analysis fails to demonstrate that the chosen alternative cleanup levels represent the "best water quality" based on all demands.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 4, above.

EHC/Coastkeeper Comment No. 19: The Order fails to meet legal requirements for cleanup to pollutant levels greater than background.

In selecting the alternative cleanup levels, the Regional Board expressly considered the requirements of Resolution 92-49 and California Code of Regulations Section 2550.4. TCAO, at ¶ 32; DTR, at 32-1 – 32-2. In doing so, the Regional Board set alternative levels on a constituent by constituent basis for primary COCs, using the post-remedial SWAC as a concentration limit. TCAO, at ¶ 32. Primary COCs are those associated with the greatest exceedance of background, and the highest magnitude of potential risk at the Site. Secondary COCs, which are associated with lower exceedances of background, are highly correlated with Primary COCs and are likewise addressed in the common footprint. The Regional Board also assessed risk to wildlife receptors under projected post-remedial conditions, and confirmed that the alternative cleanup levels adequately protect aquatic-dependent wildlife and human health beneficial uses. DTR, at § 32. By contrast, EHC and Coastkeeper have provided no credible evidence that concentrations below the proposed alternative cleanup levels, but above background, pose "substantial present or potential hazard to human health or the environment."

After implementing the SWAC approach, it is true that some sediment concentrations at the surface will exceed the post-remedial SWAC threshold, and some will be below it; however, such an approach is acceptable under Resolution 92-49 since natural processes can be relied on to reduce concentrations below the alternative cleanup level within a reasonable time. Because monitored natural attenuation is already occurring at the Site, deposition of clean sediment in the excavated areas and other natural recovery processes would lower the SWAC further in the years following sediment removal, and all concentrations are expected to meet the alternative cleanup level within a reasonable time. See NASSCO's Initial Comments, at 39-41 (citing substantial evidence that monitored natural attenuation is occurring).

EHC/Coastkeeper also suggests that the 120% of background trigger level for additional dredging could lead to site-wide pollutant concentrations above the alternative clean-up levels. However, the 120% trigger simply recognizes natural variability in sediment chemical concentrations. As stated in Section 34 of the DTR, "environmental data has natural variability which does not represent a true difference from expected values." DTR, at 34-1 (emphasis added). The 120% trigger is thus intended only to prevent additional unnecessary dredging due to natural variability, and does not represent "a process by that [sic] allows the remediated areas to be 20% more polluted than background pollutant levels," as EHC/Coastkeeper suggests. Further, the details concerning the application of this trigger level will be proposed and reviewed thoroughly for technical adequacy in conjunction with the development of the Remediation Monitoring Plan.

[NASSCO Comment No. 280, CAO at ¶¶ 32, 33, 34, DTR, at §§ 32, 33, 34, Appendix 32]

EHC/Coastkeeper Comment No. 20: The site-wide alternative cleanup levels were calculated based on remediating to background pollutant levels.

It is correct that post-remedial SWAC calculations were completed with the assumption that the SWAC inside the footprint would be remediated to the background UPL concentrations derived in Section 29 of the DTR. DTR, at 32-12. However, it should be noted that in reality, the SWAC within the footprint following remediation may well be less than the background UPL, or result in chemical concentrations below background in certain areas.

In order to calculate a Sitewide post-remedial SWAC for any scenario or reason, it is necessary to assume an average COC concentration for the remediated area. Attachment A, Exponent Critique, at 3. Background was selected as a conservative (i.e., more protective) alternative to lower values, even though the site data clearly show that areas with individual COC concentrations below the background UPL currently exist at the Site, which suggests that concentrations are likely to be even lower following remediation. Thus, EHC/Coastkeeper's concern that the post-remedial SWAC is not protective is invalid.

[NASSCO Comment No. 281, CAO at ¶ 32, DTR, at § 32, Appendix 32]

EHC/Coastkeeper Comment No. 21: The remediation monitoring fails to require remedial areas to achieve background levels.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 19, above.

[NASSCO Comment No. 282, CAO at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 22: The "120% of background" could lead to site-wide pollutant concentrations above the Alternative Clean-up Levels.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 19, above.

[NASSCO Comment No. 283, CAO at ¶ 34, Directive A.2.a, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 23: The Regional Board cannot approve the Order and DTR with the 120% of background second-pass rule because it fails to ensure that Alternative Cleanup Levels will not be exceeded.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 19, above.

[NASSCO Comment No. 284, CAO at ¶ 34, Directive A.2.a, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 24: The "120% of background" decision rule violates the Order's corrective action directive.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 19, above.

[NASSCO Comment No. 285, CAO at ¶ 34, Directive A.2.a; A.2.c, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 25: The "120% of background" decision rule for a second dredging pass is ambiguous.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 19, above.

[NASSCO Comment No. 286, CAO at ¶ 34, Directive A.2.a, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 26: The Post Remedial Monitoring fails to evaluate whether Alternative Cleanup Levels are achieved.

The post-remedial monitoring plan is the most extensive ever adopted by the Regional Board for a Site not involving a sediment cap. Deposition of David Gibson ("Gibson Depo"), at 133:17 – 135:7 (describing the post-remedial monitoring plan as "extensive" and unprecedented in scope). Further, the assertion that the post-remedial monitoring plan "considers the remedy 'successful' at pollutant concentrations greater than the alternative cleanup levels" is misleading. Rather, when measuring post-remedial sediment conditions, it is necessary to take into account the natural variability in the data collected when determining whether the alternative cleanup levels have been met. Gibson Depo, at 133:17 – 135:7. The trigger concentrations were thus developed appropriately, recognizing the reality that measurements of sediment chemical concentrations always are associated with some degree of error. Thus, trigger concentrations were set to "represent the surface-area weighted average concentration expected after cleanup, accounting for the variability in measured concentrations throughout the area" in recognition that "it is critical to account for the variability of the predicted post-remedial SWAC." DTR, at 34-7.

[NASSCO Comment No. 287, CAO at ¶ 34, Order Directive D, DTR at § 34, Appendix 34]

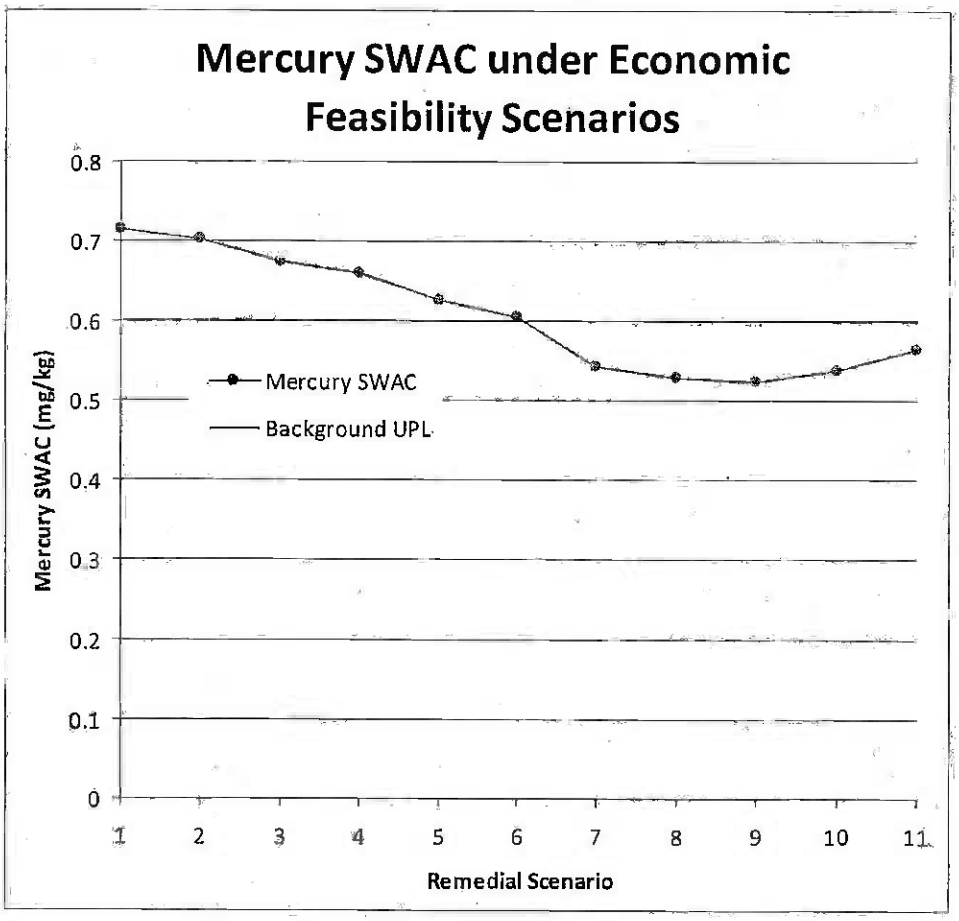
EHC/Coastkeeper Comment No. 27: The Order sets the "Remedial Goals" as compliance with "Trigger Concentrations" above the Alternative Cleanup Levels - and in some cases ABOVE existing pollutant levels.

As described in the DTR, post-remedial trigger concentrations seek to account for random variation that is inherent in any sampling data. DTR, at 34-7. It has been determined that a post-remedial SWAC concentration equivalent to the trigger concentration is statistically

indistinguishable from the target post-remedial SWAC, given the number of samples that make up the SWAC. Attachment A, Exponent Critique, at 4.

EHC/Coastkeeper's assertion that the cleanup can be completed without removing any mercury from the Site is misleading, and takes the post-remedial trigger out of the context in which it is to be used. While the trigger concentration for mercury (0.78 mg/kg) is higher than the pre-remedial Sitewide SWAC (0.72 mg/kg), it is much lower than the concentration in the remedial footprint. As noted above (see response to Comment No. 14), the mercury SWAC at the Site is not highly elevated (1.2x background), and average mercury levels do not presently pose a significant risk to any receptor. The primary cleanup goal with respect to mercury is to remove isolated areas of elevated mercury, not to lower the Sitewide SWAC. Elevated mercury is limited to a few areas, and these areas have been targeted by the DTR recommended cleanup. Eight of the 10 polygons with the highest surface concentrations of mercury are included in the proposed footprint (see DTR Table 33-4), with concentrations ranging from 4.5 to 1.2 mg/kg. The post-remedial monitoring program will ensure that these target areas are remediated, and verify that the target Sitewide mercury SWAC (which is only slightly lower than the pre-remedial SWAC) is achieved within reasonable statistical precision. Id.

Figure 1:



[NASSCO Comment No. 288, CAO at ¶¶ 33, 34, Order Directive D, DTR at §§ 33, 34, Appendices 33, 34]

EHC/Coastkeeper Comment No. 28: The Post Remedial Monitoring program will mask ongoing pollutant problems.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 64-65, 68.

Compositing samples over the entire site is a meaningful way to analyze and assess average concentrations across the site. Sitewide average concentration (in the form of SWAC) is the basis for specifying the alternative cleanup levels, and is the appropriate basis on which to assess cleanup success. Attachment A, Exponent Critique, at 4.

The stratification scheme described in the DTR is intended to provide interpretive information concerning the spatial distribution of COC concentrations throughout the Site, and will document, not mask, the true spatial extent of COC concentrations throughout the Site. Id.

Similarly, the subsampling and replication framework described in Section D of the TCAO is an appropriate method to assess whether the alternative cleanup levels were achieved and the remediation was successful. Id. Collecting replicates is useful to provide an estimate of variances in the compositing process, and will improve the estimates of the COC concentrations in each of the polygon groups and facilitate evaluation of remedy effectiveness. Id.

[NASSCO Comment No. 289, CAO at ¶ 34, Directive D, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 29: The Post Remedial Monitoring program fails to require samples from each polygon at the site.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 28, above.

In addition to composited average concentrations at areas across the Site, post-remedial toxicity testing will be conducted at a specified number of stations within the remedial footprint, to assess that organisms with a small home range are protected (see DTR Section 34.2.3).

[NASSCO Comment No. 290, CAO at ¶ 34, Directive D.1.c, DTR at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 30: Compositing surface sediment into six polygon groups during Post Remedial Monitoring will mask the true extent of contamination remaining at the Shipyard Sediment Site.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 28 and 32.

[NASSCO Comment No. 291, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 31: The "success" of the clean-up will rely heavily on data from polygons that were not dredged.

Sitewide SWAC values are being used to assess the cleanup success. It is necessary to determine SWAC values in order to evaluate whether the remedial goals expressed in the alternative cleanup levels have been met, and SWAC measurements necessarily include data from areas outside the remedial footprint. Attachment A, Exponent Critique, at 5.

[NASSCO Comment No. 292, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 32: The Post Remedial Monitoring program's six sampling areas are arbitrary.

The six sampling areas were defined in a systematic and rational manner. Attachment A, Exponent Critique, at 5. Site stations were pooled into zones of each shipyard with similar size, bathymetry, distance from shore, and COC concentration. Id. All polygons within a group are either contiguous or in close proximity. Id.

[NASSCO Comment No. 293, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 33: The Post Remedial Monitoring plan's requirement to test replicate sub-samples of composited sediment samples tests how good the lab is, not the variability of pollutants remaining at the Site.

The described replication is not intended to assess variability in the site chemistry or conditions. As described in the DTR, "The three replicate sub-samples of composite samples provide an estimate of variances in the compositing process" (DTR, page 34-5). This is an important quality control check on the post-remedial monitoring procedure. Attachment A, Exponent Critique, at 5.

[NASSCO Comment No. 294, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 34: The Post Remedial Monitoring plan will not provide the data to verify whether the remediation has been effective in protecting human health and aquatic-dependent wildlife.

The post-remedial monitoring plan is designed to verify that remedial objectives (i.e., post-remedial SWAC values) have been met, and is among most extensive ever imposed in any sediment cleanup in San Diego Bay. Gibson Depo, at 133:17 – 135:7. It has been determined by the Regional Board Staff and demonstrated in the DTR that these objectives are protective of beneficial uses. Further, as NASSCO discussed extensively in its initial comments, there is substantial evidence that the remedial objectives, which are much lower than previous cleanups as similar sites in San Diego Bay, are overly conservative.

[NASSCO Comment No. 295, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 35: The sub-sampling approach will not provide Regional Board staff with the information necessary to determine whether remediation has been effective at protecting human health or aquatic-dependent wildlife.

This comment is addressed in NASSCO's Response to EHC/Coastkeeper Comment No. 33, above.

[NASSCO Comment No. 296, CAO at ¶ 34, Directive D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 36: Failure to assure that the Alternative Cleanup Levels are met through the remediation process renders the cleanup illegal.

As discussed in rebuttal to other comments herein, the TCAO does not fail to assure that the alternative cleanup levels are met through the remediation process. First, it is necessary to assume an average COC concentration for the remediated area in order to calculate a sitewide post-remedial SWAC. Attachment A, Exponent Critique, at 5. The fact that the post-remedial SWAC calculations were completed with the assumption that the SWAC inside the footprint will be remediated to the background concentrations derived in Section 29 of the DTR is a conservative (i.e., protective) assumption, since it is likely that the SWAC within the remedial footprint following the remediation will be less than the background UPL. Id.

Second, the 120% background trigger for a second dredging pass is not a "failure to assure the alternative cleanup levels are met." Rather, this is a means of accounting for the natural variability in sediment conditions in determining whether the alternative cleanup levels have been met. Gibson Depo, at 133:17 – 135:7 (confirming that there is natural variability in the data collected, and that the purpose of post-remedial monitoring is to ensure the cleanup standard has been met); Id. If such variability is not accounted for, additional dredging could be triggered even though the post-remedial SWAC has been met. Accordingly, "it is critical to account for the variability of the predicted post-remedial SWAC" and trigger concentrations must be set to "represent the surface-area weighted average concentration expected after cleanup, accounting for the variability in measured concentrations throughout the area." DTR, at 34-7. The trigger concentrations were thus developed appropriately, recognizing the reality that measurements of sediment chemical concentrations always are associated with some degree of error.

[NASSCO Comment No. 297, CAO at ¶ 34, Directive D.6, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 37: The proposed cleanup fails to require the best water quality reasonable.

Resolution 92-49 authorizes the Regional Board to set cleanup levels above background, where background conditions cannot be restored considering economic and other factors. DTR, at 36-7. Any determination of "the best water quality reasonable" must therefore include an economic feasibility analysis; for the reasons discussed above, the Regional Board's analysis is overly conservative, and monitored natural attenuation is the only economically feasible remedy, given the minimal incremental benefit associated with active remediation versus monitored natural attenuation. Exponent Report, at 19-13; Barker Depo, at 204:21 – 206:6.

EHC/Coastkeeper argues that the proposed cleanup fails to require the best water quality reasonable for the following reasons: (1) narrative alternative cleanup levels for aquatic life cannot ensure that beneficial uses will not be unreasonably affected at the Site; (2) the footprint is too small; and (3) the remedial and post-remedial monitoring are insufficient. Each of these erroneous assertions is addressed in reply to EHC/Coastkeeper Comment Nos. 38 – 77, below.

[NASSCO Comment No. 298, CAO at ¶¶ 32, 33, Directives A, B.1.1, D, DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 38: The Alternative Clean-up Levels cannot ensure that fish and benthic invertebrate beneficial uses will not be unreasonably affected at the Shipyard Sediment Site.

Benthic invertebrate communities are protected by inclusion of "likely impacted" Triad stations in the proposed remedial footprint, and application of protective site-specific chemistry benchmarks (SS-MEQ and LAET), as well as additional safety buffers, to assess non-Triad stations. Attachment A, Exponent Critique, at 6. Moreover, a detailed statistical comparison of histopathology (i.e., incidence of lesions) in fish captured at the Site with reference area fish has already indicated that there are no significant adverse effects in Site fish as a result of observed chemistry concentrations. Exponent Report, at §§ 8.2, 9.3.4.

[NASSCO Comment No. 299, TCAO, at ¶ 32, Directives A.2.a, A.2.c, DTR, at § 32]

EHC/Coastkeeper Comment No. 39: The Order and DTR fail to include numeric clean-up levels for benthic invertebrates and fish.

EHC/Coastkeeper suggests that the alternative cleanup levels will not be protective of benthic invertebrates and fish, when in fact, the TCAO and DTR are highly protective of both benthic invertebrates and fish.

EHC/Coastkeeper relies primarily on the conclusions in the March 2011 MacDonald Report, which is currently subject to a motion for exclusion due to Mr. MacDonald's unethical conduct during the discovery process (including destruction of evidence). Mr. MacDonald's report acknowledges that "reliance on multiple lines of evidence is generally recommended for assessing contaminated sediments," but claims that the cleanup levels are not protective of aquatic life based on several invalid criticisms, including: (1) SS-MEQ, which is the metric Mr. MacDonald refers to as being used to evaluate sediment chemistry data in the non-triad samples, is not effects-based; (2) the reference pool used to evaluate the results of the amphipod test is invalid because it included several survival values below 80%; and (3) reference pools for the bivalve and echinoderm toxicity tests were invalid because the bivalve reference pool included only four stations and the echinoderm reference pool included two samples with fertilization rates below 70%.

All three of these critiques are invalid. First, Mr. MacDonald's assertion that SS-MEQ does not provide an effects-based tool for predicting adverse effects on benthic communities is incorrect, as the SS-MEQ was specifically developed to be a site-specific, effects-based assessment tool. DTR, at § 32.5.2. It was developed using all six of the "likely" impaired stations that were found at the Site under the DTR's effects-based triad analysis, and is therefore directly analogous to the manner in which Long, et al. (1995) developed ERM values. Attachment A, Exponent Critique, at 6. Further, the predictive reliability of SS-MEQ was evaluated, and a threshold of 0.9 selected, using the site-specific effects determinations for the 30

triad stations, as well as the five supplemental triad stations sampled at the Site. Accordingly, there is no scientific basis for asserting that SS-MEQ is not effects-based. Id. Additionally, using SS-MEQ rather than SQGQ1 to assess impacts on benthic communities is justifiable because the SQGQ1 is based on generic sediment quality values that do not explicitly consider site-specific conditions, whereas SS-MEQ is based on chemical and biological data collected at the Site. Id.

Second, Mr. MacDonald's criticisms of the reference pool as it relates to the amphipod toxicity test are unfounded. The reference pool for the Site was selected by the Regional Board to comply with EPA guidance, as well as methods commonly used by environmental practitioners in assessing sediment. DTR, at § 17.2 (summarizing EPA guidance documents for reference pool selection). Applicable guidance states that reference areas should reflect the habitat conditions and background levels of chemical contamination that would exist at a study site in the absence of site-related sediment contamination. Attachment A, Exponent Critique at 7. Reference conditions should incorporate levels of chemical contamination or biological responses that are considered representative of the general conditions of a water body removed. Thus, the DTR appropriately sought to select reference areas "consistent with the San Diego Water Board's goal of establishing a reference condition that represents contemporary bay-wide ambient background contaminant levels that could be expected to exist in the absence of the Shipyard Sediment Site discharges and some level of natural variability in toxicity and benthic communities that could exist due to factors other than sediment contamination." Id. If, as Mr. MacDonald suggests, reference stations with amphipod survival of less than 80% were excluded, the analysis would ignore the full range of responses that occur in valid reference areas in San Diego Bay, and bias the analysis to in favor of a pre-conceived notion concerning what the minimum level of survival in reference areas should be. Notably, sediment management standards from other jurisdictions recognize that amphipod survival in reference areas may be as low as 75%. See BAE Initial Comments (citing Washington State Sediment Management Standards (Ecology 1995); Phillips et al. (2001)).

Third, Mr. MacDonald's criticisms of the reference pools for the remaining toxicity tests are also unjustified. In addition to the above discussion concerning the selection of reference pools, the results of the DTR bivalve and echinoderm tests were the same as those found by Exponent, using a different reference pool and different statistical procedures (analysis of variance vs. reference envelope). Id. Accordingly, these results demonstrate that the statistical results for both tests are robust, since they were the same under two different methods of analysis. Id.

Lastly, Mr. MacDonald's criticisms focus on the toxicity results for reference stations to the exclusion of other factors involved in selection of the reference pool; however, additional information, such as chemistry and benthic community information, was also used to select the reference pool.

[NASSCO Comment No. 300, TCAO, at ¶¶ 17, 29, 32, Directives A.2.a, A.2.c, DTR, at § 17, 29, 32, Appendices 17, 32]

EHC/Coastkeeper Comment No. 40: Failure to include numeric cleanup levels to protect fish is particularly egregious, as no information was presented in the Order or the DTR on how the potential for adverse effects on fish were explicitly considered.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 60.

EHC/Coastkeeper erroneously states that the TCAO and DTR provide no information concerning the potential for adverse effects on fish at the Site. However, the DTR contains detailed analyses assessing impacts to spotted sand bass, including fish histopathology analysis and PAH metabolite analysis in fish bile, as well as evaluations of chemistry data and indirect impacts to fish via the benthic community. Exponent Report, at §§8.2, 8.3, 9.3.4, 9.3.5. As discussed in NASSCO's Initial Comments, empirical data were collected at the Site and evaluated for effects on spotted sand bass, and unacceptable risks were not found. Exponent Report, at §§8.2, 8.3, 9.3.4, 9.3.5. The Regional Board also conducted an independent analysis, based on the data collected by Exponent, extensively evaluating the potential effects of sediment contamination on fish at the Site, and concluded that no effects could be conclusively attributed to contaminant exposure at the Site. DTR, at A15.1, A15.2. Because no adverse effects on fish were detected, numeric cleanup levels for fish are not necessary. Attachment A, Exponent Critique, at pp. 7-8. Moreover, even though there are no demonstrated adverse effects on fish, the TCAO conservatively requires remediation of "all areas determined to have sediment pollutant levels likely to adversely affect the health of the benthic community," which would also protect benthic fish. TCAO, at Table 2; Attachment A, Exponent Critique, at 8.

[NASSCO Comment No. 301, TCAO, at ¶¶ 15, 32, Directives A.2.a, A.2.c, DTR, at §§ 15, 32, Appendices 15, 32]

EHC/Coastkeeper Comment No. 41: The lines of evidence developed to assess benthic invertebrate communities are likely to be minimally protective as they rely on comparisons to a reference pool that included samples that would not meet criteria for negative control samples.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 59-60.

Consistent with California Water Code Section 13304 and State Water Board Resolution, a reference pool should represent San Diego Bay conditions absent Shipyard Sediment Site discharges. That is, an appropriate reference pool for benthic community assessment should include all stressors and conditions that could affect the benthic community, with the exception of site-related chemical contamination. Attachment A, Exponent Critique, at 8. The DTR correctly states that the reference pool is intended to distinguish between pollution effects at the Site, and those found generally in the surrounding water body. DTR, at 17-2. Meeting criteria for negative laboratory controls is not a criterion for reference selection. Id. Attachment A, Exponent Critique, at __. The presence of all non-Site related stressors, including background chemical contamination, are part of the reference condition. Id.

[NASSCO Comment No. 302, TCAO, at ¶¶ 14-19, 32, Directives A.2.a, A.2.c, DTR, at §§ 14-19, 32, Appendices 15, 17, 18, 19, 32]

EHC/Coastkeeper Comment No. 42: The Proposed Remedial Footprint is too small to ensure that the remaining pollutant levels will not unreasonably affect present and anticipated beneficial uses of San Diego Bay.

Size of the remedial footprint is irrelevant to the assessment of beneficial uses or remediation to mitigate beneficial use impairment. Attachment A, Exponent Critique, at 8. The only relevant consideration is whether residual sediment chemicals are protective of beneficial uses, as determined by exposure assessment on an appropriate spatial scale. Id. At many sites, remedial goals can be achieved through the selective removal of hot spot contamination. Id.

Further, there is ample evidence set forth in NASSCO's Initial Comments demonstrating that the cleanup is excessively conservative, and that site conditions do not warrant any remediation beyond monitored natural attenuation, which is already occurring.

[NASSCO Comment No. 303, TCAO, at ¶¶ 32, 33, Attachment 2, DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 43: Problems with the development of the Proposed Remedial Footprint results in a cleanup that achieves less than the best water quality reasonable.

EHC/Coastkeeper states that the following five factors relating to the development of the footprint result in a cleanup that achieves less than the best water quality reasonable: (1) an insufficient number of samples were collected to accurately determine the nature and extent of contamination at the Site, given the variability of contaminants; (2) ranking the polygons using the SWAC value fails to consider potential adverse effects on human health or the environment, and ignores certain contaminants; (3) the footprint excludes 15 polygons with higher chemistry than the least-contaminated polygon in the proposed footprint; (4) the thresholds used to determine whether polygons are "Likely" impacted are problematic, including the use of SS-MEQ and 60% LAET; and (5) the DTR does not adequately consider potential adverse effects on fish with small home ranges.

First, as discussed in NASSCO's Initial Comments, Site conditions are generally favorable, and any active remediation will result in only minimal benefits. Second, under Resolution 92-49, the Regional Board is required to consider economic feasibility in setting alternative cleanup levels; an expanded footprint would not be consistent with the requirements of Resolution 92-49 given the fact that only minimal benefits, if any, would be achieved, at substantial cost to the parties named to the TCAO. Third, for the reasons discussed below, these comments are without scientific merit, and do not support an expanded footprint.

[NASSCO Comment No. 304, TCAO, at ¶¶ 32, 33, DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 44: An insufficient number of samples were collected to accurately determine the nature and extent of contamination at the 148-acre Shipyard Site, given the variability of contaminants at the site.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 30.

EHC/Coastkeeper suggests that an insufficient number of samples were collected to accurately determine the nature an extent of contamination at the Site; however the sediment investigation by Exponent, upon which the DTR analyses are based, was conducted with substantial oversight from the Regional Board and has been described by Regional Board Staff ("Staff") as "the most extensive sediment investigation even conducted for a site in San Diego Bay," if not California. Barker Depo, at 80:2 – 80:22; 82:3 – 82:4, 83:14 – 83:23. See also DTR, at 13-2 – 13-3 (summarizing Staff and stakeholder involvement in the sediment investigation); Exponent Report, at 1-2 – 1-4 (summarizing the directives and guidance provided by Staff throughout the planning and execution of the sediment investigation and Exponent Report. Staff confirmed that approximately 65 stations were sampled, including 30 triad stations, 35 non-triad stations, with sediment chemistry and benthic community profiling data collected. Barker Depo, at 80:2 – 80:22. Staff did not recall collecting 30 or more triad stations for any other sediment matter in San Diego Bay. Id. Further, Staff described the study as "detailed" and "very thorough." Id., at 82:3 – 82:4, 82:14 – 83:23.

The Site assessment approach, including the sample types, number, and density were all thoroughly vetted by Board Staff prior to implementation in 2001. The DTR analyzes data collected from 60 stations throughout the Site, distributed consistent with the manner in which most investigations are designed at sediment sites. Stations were distributed with the highest density near sources where the highest COC concentrations would be expected, and with lower densities in areas further removed from potential sources, where contaminants would be expected to be more widely dispersed by winds, waves, and tides. In fact, Mr. MacDonald described exactly this type of distribution scheme when he suggested that "to address concerns regarding spatial variability in sediment chemistry, investigators frequently design sediment sampling programs to provide a high density of samples in the vicinity of point sources discharges." March 2011 MacDonald Report, at 10. Given the extensive and unparalleled scope of the sediment investigation, including the number of stations sampled, the contention that an insufficient number of stations were analyzed is unsupportable.

[NASSCO Comment No. 305, TCAO, at ¶¶ 13, 32, DTR, at §§ 13, 32, Appendix 32]

EHC/Coastkeeper Comment No. 45: Ranking the polygons from most- to least-contaminated using the Composite Surface Weighted Average Concentration (SWAC) Value fails to consider the potential adverse effects on human health or the environment.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 31-32.

EHC/Coastkeeper states, without explanation, that ranking polygons from most to least contaminated using the composite SWAC value fails to consider the potential adverse effects on human health or the environment, citing to MacDonald who reiterates the same unsupported conclusion. EHC/Coastkeeper has provided no credible evidence that the proposed TCAO is not protective of human health or the environment.

[NASSCO Comment No. 306, TCAO, at ¶¶ 32, 33, DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 46: The Proposed Remedial Footprint arbitrarily excludes 15 polygons that are more contaminated - from a sediment chemistry standpoint - than the least-contaminated polygon in the Proposed Remedial Footprint.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 43, 57.

[NASSCO Comment No. 307, TCAO, at ¶ 33, DTR, at § 33, Appendix 33]

EHC/Coastkeeper Comment No. 47: The thresholds the DTR uses to determining [sic] whether polygons that are "Likely" impacted are problematic.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 64-65, 68.

[NASSCO Comment No. 308, TCAO, at ¶ 32, DTR, at § 32, Appendix 32]

EHC/Coastkeeper Comment No. 48: The Proposed Remedial Footprint excludes eight polygons that, under the DTR's own methodology, should have been included.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 54-55.

[NASSCO Comment No. 309, TCAO, at ¶¶ 32, 33, Attachment 2; DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 49: The Proposed Remedial Footprint improperly excludes NA22.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 55.

EHC/Coastkeeper states that the inclusion of NA22 within the area being evaluated as part of the TMDLs for Toxic Pollutants in Sediment at the Mouth of Chollas Creek is an insufficient basis for excluding it from the instant cleanup. NASSCO incorporates by reference the comments previously submitted by BAE on this issue. BAE Initial Comments, at 42:23 –

43:13. The TCAO and DTR are clear that the Regional Board made an informed administrative decision to exclude NA22 from consideration as part of the Shipyard Sediment Site for purposes of the TCAO. TCAO, at ¶ 33; DTR, at 33-3.

Although the triad weight-of-the-evidence analysis categorized NA22 as "Likely" impaired, this designation was based upon "Moderate" chemistry, toxicity, and benthic community results for each of the three legs of the triad. DTR, at 33-4 (citing Table 18-1). However, NA22 is an area where propeller testing occurs routinely, suggesting that the observed benthic condition may be the result of physical impacts, rather than site contaminants. DTR, at 33-4. Additional sampling in connection with the TMDL proceeding may clarify the cause of the potential impairment, and permit the Regional Board to make a more fully informed decision concerning what, if any, remediation is required. Because there is expected to be substantially more data available to evaluate the cause of observed impacts to NA22 following the completion of the TMDL proceedings than is presently available, the Regional Board's decision to exclude NA22 from the current cleanup is reasonable.

[NASSCO Comment No. 310, TCAO, at ¶ 33, Attachment 2; DTR, at § 33, Appendix 33]

EHC/Coastkeeper Comment No. 50: The Proposed Remedial Footprint excludes - NA01, NA04, NA07, NA16, SW06, SW18 and SW29 - which pose unacceptable risks to fish and the benthic community.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 54, 57.

[NASSCO Comment No. 311, TCAO, at ¶¶ 32, 33, Attachment 2; DTR, at §§ 32, 33, Appendices 32, 33]

EHC/Coastkeeper Comment No. 51: The Remediation Monitoring is insufficient to assess remedial activities' impacts on water quality, to evaluate the effectiveness of remedial measures, or to identify the need for further dredging to achieve clean-up goals at the Shipyard Sediment Site.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 62-63.

[NASSCO Comment No. 312, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 52: The water quality component of the Remediation Monitoring program fails to provide safeguards to ensure data collected reveals actual water quality conditions.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 62, 64-65.

[NASSCO Comment No. 313, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 53: The Remediation Monitoring program allows the Dischargers to measure compliance with ambiguous water quality monitoring goals through modeling, which will not provide data of actual conditions sufficient to determine whether dredging is violating water quality standards.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 66.

[NASSCO Comment No. 314, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 54: The Remediation Monitoring allows Dischargers to abandon daily water quality monitoring if no samples exceed water quality targets for three days in a row. Abandoning daily monitoring is problematic because it [sic] the variability in turbidity or dissolved oxygen levels is not associated primarily with operation of the dredge.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 315, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 55: The Remediation Monitoring fails to specify the numeric "water quality standards" that must be complied with during remediation.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 62.

[NASSCO Comment No. 316, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 56: The Remediation Monitoring fails to require dischargers to take all the samples from down-current locations.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 64..

[NASSCO Comment No. 317, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 57: The Remediation Monitoring fails to define the "construction area."

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 64.

[NASSCO Comment No. 318, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 58: The Remediation Monitoring mandates that samples be collected 10 feet deep instead of the depth with the highest level of monitored variables.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 319, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 59: The Remediation Monitoring fails to require that water samples need to be collected long enough after dredging commences for the day to give the plume time to reach the sampling location.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 320, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 60: The Remediation Monitoring fails to specify which best management practices should be employed to reduce or eliminate resuspended sediments from being [sic] traveling to other areas, harming water quality or recontaminating adjacent areas.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 321, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 61: The sediment component of the Remediation Monitoring program fails to require data collection to confirm Cleanup Levels are achieved.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 322, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 62: The Order and DTR provide inconsistent sampling requirements; the Order requires that samples be collected deeper than the upper 5cm, while the DTR requires that samples be collected deeper than the upper 10cm.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 66.

[NASSCO Comment No. 323, TCAO, at ¶ 34, Directive A.2.a, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 63: Vagueness in the monitoring requirements permits Discharges to collect only one sample from each polygon, which is insufficient given the sediment chemistry variability within polygons.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 324, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 64: Vagueness in the monitoring requirements allows sediment sampling to target the historic sampling locations, leaving other locations within the remedial footprint unsampled and ignoring elevated contaminant levels that may occur in those unsampled areas.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 65.

[NASSCO Comment No. 325, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 65: The DTR explains a sampling protocol that requires the sampling team to visually examine each sediment sample and try to identify "undisturbed sediments." These sampling procedures are inappropriate and will be nearly impossible for sampling teams to follow consistently.

The final sampling procedures will be proposed and reviewed for technical adequacy as part of the Remediation Monitoring Plan.

[NASSCO Comment No. 326, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 66: The DTR explains that a sand cap would be necessary at times, but the Remediation Monitoring fails to explain what those criteria are and who would make such determination.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 66.

[NASSCO Comment No. 327, TCAO, at ¶ 34, Directive B.1.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 67: The Post Remedial Monitoring program is poorly designed and will not require data collection to accurately evaluate post-remediation conditions.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 67-73.

[NASSCO Comment No. 328, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 68: Post Remedial Monitoring excludes NA22 wholesale from the Post Remedial Monitoring plan, even though NA22 is part of the Site. NA22 must be included in any Post Remedial Monitoring because it is a part of the Shipyard Sediment Site.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 42, 55, 57. NASSCO also incorporates its response to EHC/Coastkeeper Comment No. 49, concerning the bases for excluding NA22 from the Site for purposes of the TCAO.

[NASSCO Comment No. 329, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 69: The approach to evaluating post-remedial conditions is likely to underestimate sediment toxicity because the DTR relied on inappropriate thresholds.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 34-36.

[NASSCO Comment No. 330, TCAO, at ¶ 34, Directive D.1.c, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 70: Requiring sediment samples to be collected at only five sampling stations to evaluate benthic community conditions is inadequate because it will provide data on only about eight percent of the polygons at the Sediment Shipyard Site.

As stated in the DTR, "The purpose of assessing benthic community conditions as part of post-remedy monitoring is to demonstrate the remediation will successfully create conditions that would be expected to promote re-colonization of a healthy benthic community" DTR, at 34-8. There is no intention nor need to re-evaluate the benthic community at the entire Site. Attachment A, Exponent Critique, at 9. The DTR further states "The intent of these benthic community measurements is to track the degree to which the benthic community re-colonizes the area and will not be used to evaluate the success of the remedy" DTR, at 34-11.

[NASSCO Comment No. 331, TCAO, at ¶ 34, Directive D.1.c, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 71: The Post Remedial Monitoring plan should be expanded to provide a more robust basis for evaluating exposure of benthic invertebrates to contaminants at the site and for assessing sediment toxicity, and include testing from appropriate reference sites.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 73.

[NASSCO Comment No. 332, TCAO, at ¶ 34, Directive D.1.c, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 72: The Post Remedial Monitoring program's bioaccumulation requirements are insufficient.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 69-70, 72.

[NASSCO Comment No. 333, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 73: Because the bioaccumulation criteria are not effects-based, they will not be useful for determining if conditions at the Shipyard Sediment Site will be unreasonably affecting San Diego Bay beneficial uses two years, five years, or ten years after the completion of remedial actions.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 70.

Additionally, EHC/Coastkeeper mischaracterizes the intent of the bioaccumulation testing. As stated in the DTR, "The goals of bioaccumulation testing are to show decreasing bioaccumulation over time such that at two years post-remediation, the average of stations

sampled shows bioaccumulation levels below what was measured in the Shipyard Report (Exponent, 2003) and that this decreasing trend continues at year five post-remediation and, if determined necessary, at year ten post-remediation" DTR, at 34-6. This is not an effects-based assessment, but a bioavailability assessment.

[NASSCO Comment No. 334, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 74: Reducing bioaccumulation levels below the pre-remedial levels would not ensure that aquatic organisms utilizing habitats at the site would have tissue concentrations of contaminants of concern low enough to support beneficial uses.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 6, 70, 72.

[NASSCO Comment No. 335, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 75: The Order fails to include rules specifying what actions the Dischargers must take if sediment chemistry results for the post-remediation sediment samples exceed the thresholds included in the Order.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 73-76.

[NASSCO Comment No. 336, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 76: The Order fails to include rules specifying what actions the Dischargers must take if toxicity to one or more species is observed during the Post Remedial sampling and testing.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 71, 73.

[NASSCO Comment No. 337, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 77: The Order does not list the triggers that will be used for evaluating sediment chemistry for benthic exposure.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 74.

[NASSCO Comment No. 338, TCAO, at ¶ 34, Directive D.1, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 78: The DTR incorrectly claims that the Proposed Remedial Footprint "captures 100 percent of triad 'Likely' ... impacted stations."

EHC/Coastkeeper claims that the DTR incorrectly claims that the proposed remedial footprint "captures 100 percent of Triad "Likely" . . . impacted stations" because the proposed remedial footprint excludes NA22. As discussed above in NASSCO's Response to EHC/Coastkeeper Comment No. 49, the Regional Board made a rational decision to address NA22 as part of the TMDL process, so that additional information concerning the cause of impairment at NA22 could be gathered. This decision was explained thoroughly in the DTR, which clearly states that NA22 "is not considered part of the Shipyard Sediment Site for purposes of the CAO." DTR, at 18-2, 18-11, 18-16, 18-19, 18-23, 18-24, 32-32, § 33.1.1. The decision to exclude NA22 is well within the Regional Board's discretion, and does not render untrue the statement that the proposed remedial footprint "captures 100 percent of Triad "Likely" . . . impacted stations" since for purposes of the TCAO, NA22 was expressly not included in the definition of the Site.

[NASSCO Comment No. 339, TCAO, at ¶¶ 18, 33, DTR, at §§ 18, 33, Appendices 18, 33]

EHC/Coastkeeper Comment No. 79: The DTR claims that the ranking process "used Triad data and site-specific median effects quotient (SS-MEQ)," but the Excel file used to create the worst-to-least contaminated ranking only includes the SS-MEQ and not Triad data.

The economic feasibility analysis relied on the composite SWAC ranking to determine remedial order, not the Triad data or SS-MEQ values.

[NASSCO Comment No. 340, TCAO, at ¶¶ 31, 33, DTR, at §§ 31, 33, Appendices 31, 33]

EHC/Coastkeeper Comment No. 80: The Order incorrectly concludes that "clean-up of the remedial footprint will restore any injury, destruction, or loss of natural resources." The San Diego Regional Board does not have authority to conduct natural resource damage assessments because only the Natural Resources Trustees have authority to conduct natural resource damage assessments and to draw conclusions regarding injury to natural resources and the effectiveness of remedial actions in terms of restoring natural resource values.

The Regional Board is empowered to "coordinate with the state board and other regional boards, as well as other state agencies with responsibility for water quality, with respect to water quality control matters, including the prevention and abatement of water pollution and nuisance." Cal. Wat. Code § 13225(a). Additionally, as EHC/Coastkeeper has pointed out, under Resolution 92-49, the Regional Board must ensure that constituents at concentrations below the alternative cleanup levels "will not pose a substantial present or potential hazard to human health or the environment," and must also weigh factors including "the current and potential uses of

surface waters in the area" and "the potential damage to wildlife [and] vegetation . . . caused by exposure to waste constituents."

The Regional Board has extensively evaluated many of the types of effects that could constitute injury to natural resources at the Site, including exceedances of sediment quality guidelines, sediment toxicity, bioaccumulation, fish histopathology, and risks to wildlife from contaminated prey. Moreover, many of these analyses were developed cooperatively with input from designated Natural Resource Trustees, including U.S. Fish and Wildlife Service, California Department of Game, and the National Oceanographic and Atmospheric Administration. The Regional Board's statement simply articulates that the cleanup of the remedial footprint at the Site will improve environmental conditions such that natural resources, including those evaluated in detail in connection with the Site investigation and cleanup (i.e., benthic macroinvertebrates, fish, and aquatic-dependent wildlife) will benefit from cleanup. Accordingly, it is appropriate and reasonable for the Regional Board to consider whether the cleanup will be protective of natural resources, including whether it will restore any injury, destruction, or loss of natural resources.

[NASSCO Comment No. 341, TCAO, at ¶¶ 32, 36, DTR, at §§ 32, 36]

EHC/Coastkeeper Comment No. 81: The DTR repeatedly refers to "65" polygons, even though there are a total of 66 polygons in the Shipyard Sediment Site.

As noted above, station NA22 was specifically excluded from consideration for cleanup because it is being addressed as part of the Mouth of Chollas Creek TMDL determination, currently being undertaken by the Regional Board. Thus the total number of stations was reduced from 66 to 65 for purposes of determining the need for remediation.

[NASSCO Comment No. 342, TCAO, at ¶¶ 31-34, DTR, at §§ 31-34]

EHC/Coastkeeper Comment No. 82: The Order and DTR must require that the remediation achieve the Alternative Clean-up Levels.

EHC/Coastkeeper agree that the proposed Site-Wide Alternative Cleanup Levels are reasonable, but argue that the alternative cleanup levels are not maximum pollutant concentrations because the "120% of background" second-dredging pass and the "Trigger Concentrations" allow the pollutant levels at the Site to exceed the Alternative Cleanup Levels following remediation.

As discussed in NASSCO's Response to EHC/Coastkeeper Comment No. 1, EHC/Coastkeeper misstate the standards for cleanup under Resolution 92-49. Further, as discussed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 19 and 20, the 120% trigger simply recognizes natural variability in sediment chemical concentrations, which does not represent a true difference from expected values. Accordingly, the 120% trigger serves to prevent unnecessary dredging due to natural variability, and is not a mechanism for allowing the remediated areas to be remain more polluted than background.

[NASSCO Comment No. 343, TCAO, at ¶ 34, Directives B.1, D, DTR, at § 34]

EHC/Coastkeeper Comment No. 83: The Regional Board should make an independent finding of what level of cleanup is economically feasible based on all the evidence in the record regarding economic feasibility.

EHC/Coastkeeper argue that the economic feasibility analysis presented in the DTR is flawed, and suggests that the Regional Board should "independently evaluate the economic feasibility analysis and determine at what point, if any, benefits of additional remediation become 'negligible' and above which no further remediation should be required." As discussed in NASSCO's Response to EHC/Coastkeeper Comment Nos. 5 through 18, the economic feasibility analysis in the DTR is overly conservative. Thus the Regional Board has already "independently evaluate[d] the economic feasibility analysis and determine[d] at what point, if any, benefits of additional remediation become 'negligible' and above which no further remediation should be required."

Further, EHC/Coastkeeper, without any credible basis or economic feasibility analysis of its own, "urge[s] the Regional Board to set this level well above the $33 million level set in DTR § 31." The Regional Board should decline to replace the present analysis, based on the unsupported urgings of EHC/Coastkeeper. To the extent that the Regional Board does revise its economic feasibility analysis, applying Resolution 92-49, the Regional Board should reach the conclusion that only monitored natural attenuation is feasible, in light of the minimal benefits of active remediation as discussed in the Exponent Report, and the Cleanup Team's admissions that, under Resolution 92-49, the Regional Board could decide that no further cleanup is required if there is no benefit to an incremental cleanup measure. Moreover, one member of the Cleanup Team has admitted that, based on his 20-plus years of experience doing cost estimates and then going out and implementing remediation, the actual cost of remediation often exceeds pre-remediation estimates by as much as an order of magnitude, providing further evidence that the true point at which the incremental benefit is no longer justified by the incremental cost has already been exceeded under the DTR's economic feasibility analysis in the DTR. See Deposition of Craig Carlisle ("Carlisle Depo"), at 190:16 – 191:5. Thus, the TCAO and DTR analyses are already overly conservative, both in terms of protection of beneficial uses and the feasibility analyses; accordingly, no further cleanup is warranted.

[NASSCO Comment No. 344, TCAO, at ¶¶ 31, 32, DTR, at §§ 31, 32, Appendices 31, 32]

EHC/Coastkeeper Comment No. 84: The Proposed Remedial Footprint should be enlarged by eight polygons.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 54-57.

[NASSCO Comment No. 345, TCAO, at ¶¶ 31-33, Attachment 2, DTR, at §§ 31-33, Appendices 31-33]

EHC/Coastkeeper Comment No. 85: The monitoring requirements should be strengthened to ensure the best water quality reasonable.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 63-65.

[NASSCO Comment No. 346, TCAO, at ¶ 34, Directives B, D, DTR, at § 34, Appendix 34]

EHC/Coastkeeper Comment No. 86: Additional trigger concentrations and triggers for Benthic invertebrates should be added to ensure the best water quality reasonable.

NASSCO agrees with BAE's comments on this topic, and incorporates those comments herein. See BAE Initial Comments, at 63-65.

[NASSCO Comment No. 347, TCAO, at ¶ 34, Directive D.6, DTR, at § 34, Appendix 34]

II. NASSCO'S REPLY TO COMMENTS BY THE UNITED STATES NAVY ("NAVY")

U.S. Navy Comment No. 1: The RWQCB's allegation that significant contaminants from Naval Base San Diego migrated to the Shipyard Sediment Site, either through discharges to Chollas Creek, resuspension of sediments through propeller wash, or via tidal currents is unfounded.

In its comments on the TCAO and DTR, the Navy attempts to downplay its responsibility for sediment contamination that arises from storm water discharges from Naval Base San Diego ("NBSD"), both into Chollas Creek and directly into the San Diego Bay. U.S. Navy's Comments and Evidentiary Submission (May 26, 2011) ("Navy Comments"). The Navy asserts that:

> [T]he Navy's contribution to contaminant loading in Chollas Creek is negligible as demonstrated by the small relative portion of the Chollas Creek contaminant loading in the Bay that can be attributed to the Navy stormwater discharges, the portion of the solids loading from the Creek that is likely deposited at the shipyard sediment site, the observed spatial gradients of contamination in the area, and the relative chemical signatures of bottom sediments in the area.

Id. at Comment No. 1. The Navy bases its statement on an Apportionment Report, presented as Appendix B to its comments, which estimates that the "potential release to the CAO site from this source is likely to be smaller than 0.08% and is considered to be negligible for all practical purposes." Navy Comments, Appendix B, Apportionment Report at 22.

This Apportionment Report, along with a number of other attachments to the Navy Comments, should be excluded because they constitute untimely expert reports. See NASSCO's Joinder In BAE's Motions to Exclude Untimely Expert Evidence Submitted By the San Diego Unified Port District and San Diego Gas & Electric, and Motion to Exclude the Untimely Expert Evidence Submitted by the United States Navy.

In addition to being untimely, the Navy's estimate of negligible liability is flawed in a number of respects. First, although the Navy does not specifically acknowledge this point, it essentially agrees with the DTR's accounting of the Navy's contribution to copper, zinc, and lead loading to the mouth of Chollas Creek from storm water discharges, copper leaching from Navy ship hulls, and zinc leaching from cathodic protection. For example, the Navy relies on storm water monitoring results for COCs from 2001 that show that the Navy is responsible for a higher percentage of copper and zinc discharges to Chollas Creek than was presented in the DTR. Compare Navy Comments, Appendix B at 17, Fig. 8 (Navy contribution of 7.5% copper, 6.5% zinc, and ~2% lead) with DTR at 10-90 (Navy contribution 5% copper, 4% zinc, and 2% lead). Furthermore, while the DTR also notes that copper leaching from Navy ship hull coatings and zinc leaching from cathodic protection, in addition to storm water contributions, brings the Navy's pollutant contributions to the mouth of Chollas Creek significantly to "approximately

40% of the copper load, 2% of the lead load, and 18% of the zinc load" (DTR at 10-90), the Apportionment Report concludes that "information needed to calculate a total mass loading of copper and zinc from Navy vessels in the Chollas Creek Channel is not available." Navy Comments, Appendix B, Apportionment Report at 22.

Second, the Navy underestimates its own storm water contamination sources to the Site by completely omitting any analysis of Outfalls 161 through 171, which are located immediately adjacent to the area where Chollas Creek discharges to the Bay. DTR, 10-27. The DTR states, "[a]vailable U.S. Navy studies (Katz et al., 2003; Chadwick et al., 1999) indicate that pollutants from Chollas Creek outflows, and from NBSD in general (including resuspended sediment), can be conveyed to the Shipyard Sediment Site via storm water flows, tidal currents, and ship movements." Id.

Third, the Navy Apportionment Report relies heavily on the concept of trapping efficiency, which attempts to describe the amount of sediment and particulate contaminants that are retained near the mouth of Chollas Creek compared to what is exported into the Bay. To estimate trapping efficiency, the Navy relied on model-predicted trapping efficiencies based on two storm events in February and March 2006, respectively. Navy Comments, Appendix B, Apportionment Report at 19, Table 2.

The critical problem with this argument is that the solids in the Navy's storm water runoff are exactly the finer-grained (silt and clay) solids that are largely not retained in the mouth of Chollas Creek. Roger et al. (1998) as cited in Pitt et al. (2004)[8] showed that the majority of sediment transported by stormwater runoff from a roadway was less than 50 μm in diameter. Li et al. (2005)[9] also report that particle sizes from paved roadways were generally in the 10-50 μm diameter range. Although these studies are for roadways, they provide some indication as to expected particle sizes of stormwater-transported sediment that might be expected from paved or impervious surfaces and that these sediments are usually fine grained. Additionally, because the Navy's property is relatively flat lying (i.e., low slope) and therefore runoff would be lower-energy the runoff would be expected to suspend and transport predominantly fine particles.[10] Alternatively, the steeper slopes (see Weston 2006; p. 47) in the upland portions of the Chollas Creek Watershed would tend to supply a larger and more significant proportion of any coarse grained sediments to Chollas Creek. It is also important to note that of the three Navy storm water outfalls in Chollas Creek, two are near the mouth of the creek, but one is located in the

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8 Pitt, R., D. Williamson, J. Voorhees and S. Clark. 2004. Review of historical street dust and dirt accumulation and washoff data. In Effective Modeling of Urban Water Systems, Monograph 13. W. James, K.N. Irvine, E.A. McBean and R.E. Pitt, eds.

9 Li, Y., S.-L. Lau, M.Kayhanian, and M.K. Stenstrom. 2005. Particle size distribution in highway runoff. Journal of Environmental Engineering, September 2005: 1267-1276.

10 Land in the Navy's property slopes between 0-1 degree based on information in Weston Solutions, 2006. Chollas Creek TMDL Source Loading, Best Management Practices and Monitoring Strategy Assessment. Final Report for City of San Diego, San Diego, CA. (Weston Solutions 2006; p. 47).

outer portion of Chollas Channel, well beyond (bayward of) the area of Chollas Creek where sediment trapping occurs.

While most sand-sized particles and some silt does settle out before reaching the Bay and the Site, the finer-grained particles, which carry most of the adsorbed COC load, do not. It is important to consider that most of the particles in the runoff from the Navy property are likely finer-grained than the storm water arriving from the Chollas Creek watershed. Furthermore, one of the three Navy storm water outfalls is located closer to the Bay and Site in the outer portion of the Chollas Channel. Because little trapping of the smaller particles that carry the adsorbed contaminants in storm water actually takes place in Chollas Creek, a reduction of the Navy's allocation is not appropriate. Attachment B, Exponent, Critique of the U.S. Navy's Apportionment Report (June 23, 2011) ("Apportionment Critique"), at 5.

In addition, the Navy relies on two storm events late in the rainy season, and not on early fall "first flush" rainfall events when the highest amount of accumulated contaminants from the dry season would flush into the Bay. It does not account for the intensity of the storm event, despite the fact that more powerful storms with higher rainfall rates can be expected to carry more contaminant-loaded particles from Chollas Creek further into the Bay, and to volatilize previously deposited contaminants from the mouth of Chollas Creek and push them further into the Bay.

From this flawed basis, the Navy calculates that its contribution to contaminant loadings at the Site would be less than 0.08%, "assuming that contaminants are distributed equally among the different particle sizes." Navy Comments, Appendix B, Apportionment Report at 19. Yet the assumption that contaminants are distributed equally among different particle sizes directly contradicts the Navy's finding that because "smaller particles contain proportionally higher contaminant loads . . . contaminant loading from the creek to the [Site] is affected by dispersion and fate of the ***smaller suspended particles***." Id. (emphasis added). Even before taking into account the flaws in Table 2 identified above, the Navy admits that 1% to 2.2% of the smallest particles (silt) are deposited at the Site during storm events. Id. In fact, this percentage should be higher.

Finally, the Navy's calculation that its contribution to contaminant loadings would be less than 0.08% can only be replicated with fuzzy math. To reach that calculation, the Navy assumes 8% responsibility for COC loading to Chollas Creek times 1% deposition rate of contaminated particles to the Site (0.08 * 0.01 = 0.0008, or 0.8%). Yet as described above, the Apportionment Report does not disturb the DTR's conclusion that the Navy's pollutant contributions to the mouth of Chollas Creek are "approximately 40% of the copper load, 2% of the lead load, and 18% of the zinc load" because the Navy relies on essentially the same COC estimate from Chollas Creek and has no competing data for hull and cathodic protection leaching. DTR at 10-90. So multiplying by 8% for all COCs dramatically understates the Navy's responsibility for copper and zinc, and, as also stated above, the 1% deposition rate for contaminated particles at the Site is skewed low due to the Navy's use of flawed data and unreasonable assumption that contaminants are distributed equally among the different particle sizes.

Furthermore, the Navy argues that that modeled patterns of contaminant transport show that concentration gradients decrease with distance away from the mouth of Chollas Creek and thus do not support the assertion that contamination from Chollas Creek is impacting sediment at the Site. This may be true for the sand-sized sediments that are deposited near the mouth and in the channel. However, Figure 11 of the Navy's report clearly shows transport and deposition of silt and clay, the most important size fractions with respect to COC transport, in the Site. For the same reasons noted above, a reduction of the Navy's allocation is not appropriate.

Spatial Gradients (Figure 12)

The Navy presents Figure 12 showing cadmium concentrations plotted against zinc concentrations, in other words the concentration ratios, for sediments from the Chollas Creek area and the Site. They argue that the ratios should be similar if the Chollas Creek sediments are a significant source of contaminants to the Site. The Navy's Figure 12 indeed shows that the plotted points for the Chollas Creek sediment and the Site sediment fall on different trend lines.

The Navy does not report exactly which data points were used in their analysis, or if they were analyses of surface or subsurface samples, except to say that the data are from SCCWRP and SPAWAR 2005[11] and Exponent 2001[12]. Similar plots are presented below from contemporaneous surface sediment samples.

Chollas Creek sediment samples[13] are from the top 2 cm, taken in July/Aug 2001 (SCCWRP and SPAWAR 2005). Site stations[14] data are from Exponent collected in 2001 and 2002. Figure 1 is a plot of cadmium and zinc concentrations similar to the Navy's Figure 12. However, these samples of surface sediment collected within a year of each other do not show a clear difference. The data points for Chollas and Site (NASSCO) samples show significant overlap in cadmium – zinc ratios, which indicates that Chollas Creek is indeed a source of COCs to the Site.

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11 Southern California Coastal Water Research Project (SCCWRP) and Space and Naval Warfare Systems Center, San Diego, U.S. Navy (SPAWAR). 2005. Sediment assessment study for the mouths of Chollas and Paleta Creek, San Diego. Phase 1 final report. May 2005.

12 The source of the Navy's data from "Exponent (2001)" is not clear. We do not have a record of this document as it is cited in the Navy's references. Additionally, this document (as cited by the Navy) is not found as a reference in the DTR. The closest document we have is Exponent. 2001. Technical Memorandum 1 Phase 1 sediment chemistry data for the NASSCO and Southwest Marine detailed sediment investigation. Prepared for NASSCO and Southwest Marine, October 2001.

13 Stations C01–C14.

14 Stations NA13, NA14, NA22, NA25, NA30, and NA31.

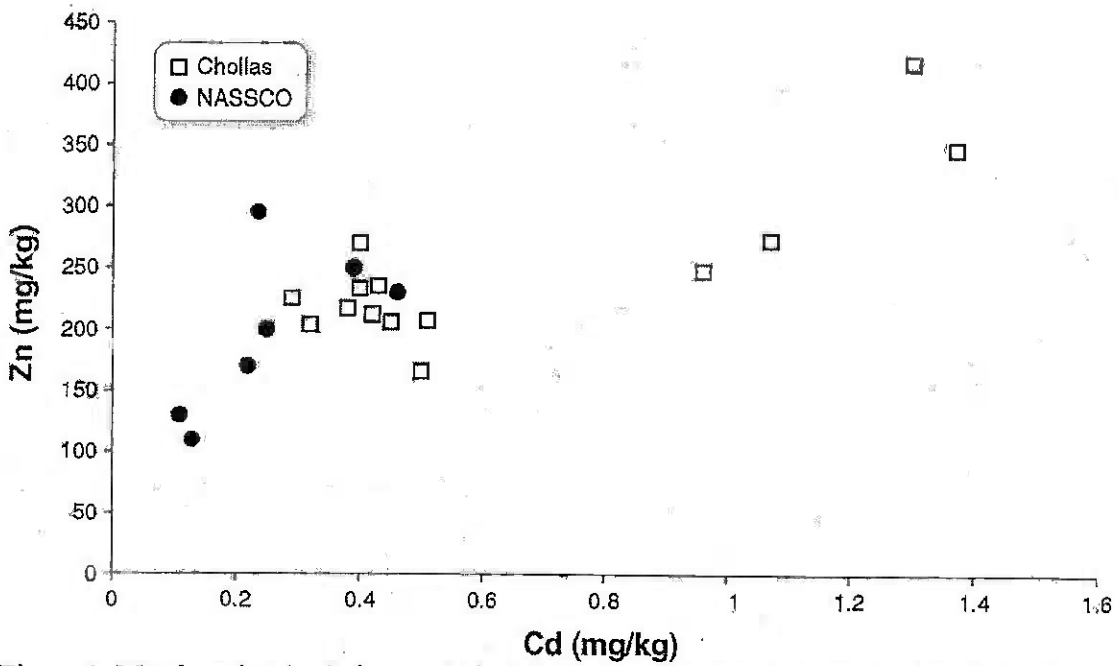

Figure 1 Metals ratios (cadmium and zinc) for sediments from Chollas Creek and Site.

A more relevant comparison is a comparison of copper and zinc ratios because they are both significant COCs in the Chollas Creek and the Site area, whereas cadmium is not as significant a COC. The ratios of copper and zinc are shown in Figure 2. In this case, copper – zinc ratios for Chollas Creek show a wide spread distribution. There is also significant overlap with the copper – zinc ratios for Site sediments which indicate, contrary to the Navy's argument, that Chollas Creek sediments are a source of copper and zinc to the Site.

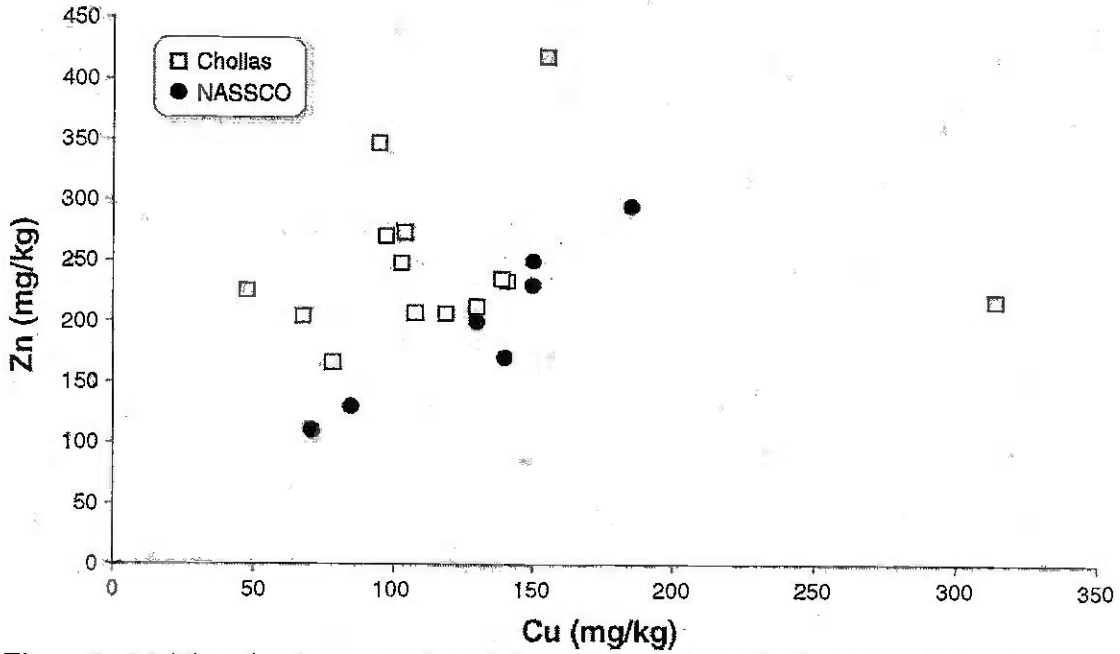

Figure 2. Metals ratios (copper and zinc) for sediments from Chollas Creek and Site.

The Navy also notes that concentrations of copper and zinc are higher in Site sediments than in the Chollas Creek sediments. It states that this suggests that leachate from Navy vessels in the Chollas Creek region is not a significant source of copper and zinc in the Site sediments. This conclusion is misleading because even though the concentrations are higher in Site sediments this should not detract from the fact that there is a gradient of copper and zinc from the Chollas Creek sediments in the direction of the Site. Sources in the Chollas Creek area may not be the largest sources of copper and zinc to the Site sediment, but they are still a significant source.

Given the above, the Navy's contributions from the Navy 28th Street Landing Station ("28th Street") and storm water discharges to Chollas Creek are not "negligible," as the Navy argues. The Navy's apportionment determined in the TCAO should not be reduced. Attachment B, Apportionment Critique, at 9.

[NASSCO Comment No. 348, TCAO, at ¶ 10, DTR, at § 10]

U.S. Navy Comment No. 2: The RWQCB's allegation that historical Navy operations at the 28th Street Mole Pier contributed to the contamination at the Shipyard Sediment Site is unfounded, and the Navy's 2004 comment submission on this subject incorrectly assumed that shipyard operations were part of the Navy leasehold.

The Historical Document Review submitted by the Navy does not provide any evidence that the Navy's activities at the NASSCO leasehold did not result in discharges of contaminants of concern to the Site. Accordingly, it does not serve as a basis for rebutting DTR Findings 10.4.2, 10.6, and 10.10.

The principle finding in the Historical Document Review is that "[t]he 2004 Navy Technical Report (Navy 2004) had previously associated many of the activities in the shipbuilding area with the Navy operated 28th Street Shore Boat Landing facility. However, this review indicates that these facilities were operated by the Lynch Shipbuilding Company and later by National Marine Terminal Incorporated." Navy Comments, Appendix A, Navy Historical Document Review, at 5-1.

Yet this conclusion does not contradict the findings in the DTR, which states that the "U.S. Navy concluded that the industrial activities it conducted on NASSCO's present day leasehold were limited to maintenance of small boat launches," and that the "U.S. Navy acknowledged the possibility that discharges from their boat launch maintenance operations on the north side of 28th Street Pier to the Shipyard Sediment Site may have occurred." DTR at 10-12. This is so because the Navy does not dispute that it operated a small boat launch facility at 28th Street, and the Historical Document Review does not present any evidence that contradicts the DTR's finding that discharges from those operations to the Shipyard Sediment Site may have occurred.

The Navy Apportionment Report also includes an analysis of the contribution of the Navy's facilities at 28th Street. The Navy presents historical evidence to clarify the extent of Navy facilities at that time. However, faced with a general lack of data, the Navy falls back to estimating its contribution from 28th Street based on the surface areas and periods of operation of the BAE, NASSCO, and 28th Street. The surface areas and periods of operation were multiplied by the Navy to obtain acre-years for each facility and then calculate the percentage of the total acre-years for each facility, which becomes the allocation that each facility.

This approach is completely irrelevant to contaminants in sediments near 28th Street because it presumes that all storm water-related COCs, derived from surface runoff, from the entire surfaces of the BAE and NASSCO facilities contributed to the small area near 28th Street (near the two sediment core locations), which they did not. Even if this were appropriate, the Navy biases the result further by limiting its area of contribution to just 28th Street (one acre) and disregarding the area of the rest of the NBSD. Finally, consideration of storm water runoff only from surfaces ignores inputs from historical point sources that were likely much more significant before implementation of both federal and state clean water point source permitting programs under the Clean Water Act and Porter-Cologne Act. Accordingly, the Navy's conclusion regarding its historical contribution from 28th Street is not credible and should not be considered. Attachment B, Apportionment Critique, at 3.

[NASSCO Comment No. 349, TCAO, at ¶ 10, DTR, at § 10]

III. NASSCO'S REPLY TO COMMENTS BY THE CITY OF SAN DIEGO ("CITY")[15]

City Comment No. 1.0: Studies cited in DTR Section 4.3.1 do not support the DTR's statements regarding Chollas Creek's influence on the chemicals of concern in shipyard sediments.

The City alleges that the Schiff, 2003[16], Chadwick, 1999[17], and Katz, 2003 [sic][18] studies provide insufficient support for the allegations in the DTR § 4.3.1 that Chollas Creek impacts COCs at the Site because the studies did not provide their underlying data. City Comments, Comment No. 1.0 at 1. Yet the City has claimed no attempt to contact the authors of the studies to obtain the data they needed, despite the fact that the April 2008 DTR cited the same studies. See DTR (April 4, 2008), at 4-3. The City also speculates, without basis, that the Katz, 2003 study, which was prepared by a Navy entity, could be biased because the Navy is a party. City Comments, Comment No. 1.0 at 2. This type of speculation ignores that it is extremely common for potentially liable parties to prepare scientific and engineering studies for use by regulatory agencies in making determinations about remediation, and if given credence, would call into question virtually the entire body of environmental science. Furthermore, the City's comments implicitly recognize that those three studies cited support the conclusion that Chollas Creek impacts the NASSCO site.

[NASSCO Comment No. 350, TCAO, at ¶ 4, DTR, at § 4]

City Comment No. 1.1: Purple sea urchin fertilization tests (Schiff 2003) cited at DTR Section 4.7.1.3 do not support the conclusion that Chollas Creek has contributed toxic effects or constituents of concerns to the site sediments.

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15 City of San Diego Comment to Draft Technical Report for Tentative CAO No. R9-2011-0001, submitted May 26, 2011 ("City Comments").

16 Schiff, K., S. Bay and D. Diehl, 2003. Stormwater Toxicity in Chollas Creek and San Diego Bay, California. Environmental Monitoring and Assessment 81: 119-132, 2003. 2003 Kluwer Academic Publishers. Printed in the Netherlands.

17 Chadwick B., J. Leather, K. Richter, S. Apitz, D. Lapota, D. Duckworth, C. Katz, V. Kirtay, B. Davidson, A., Patterson, P. Wang, S. Curtis, G. Key, S. Steinert, G. Rosen, M. Caballero, J. Groves, G. Koon, A Valkirs, K., Meyers-Schulte, M. Stallard, S. Clawson, R. Streib Montee, D. Sutton, L. Skinner, J. Germano, and R. Cheng. 1999. Sediment Quality Characterization - Naval Station San Diego Final Summary Report. U.S. Navy Technical Report 1777.

18 The resource the City is commenting on was actually generated in 2004. See Katz, C.N., Carlson-Blake, A. and Chadwick, D.B. 2004. Poster: Spatial and Temporal Evolution of Stormwater Plumes Impacting San Diego Bay. U.S. Navy, Marine Environmental Quality Branch, SPAWAR, San Diego, CA.

Comment No. 1.1 argues that Schiff, 2003 does not stand for the proposition that COCs are transported on storm water plumes from Chollas Creek to the Site. City Comments, Comment No. 1.1 at 4. First, it is important to note that storm water plumes from Chollas Creek are known to reach well into the inner shipyard at NASSCO, including polygons slated for remediation. Attachment C, Declaration of T. Michael Chee In Support of NASSCO's Response to Comments on Tentative Cleanup and Abatement Order No. R9-2011-0001 ("Chee Dec.") Second, It is true that Schiff, 2003 notes that observed storm water plumes "formed relatively thin lenses 1 to 3 m, floating on top of the more dense bay water." Id., quoting Schiff, 2003. However, the City's logical jump from this observation to a conclusion that Schiff, 2003 cannot stand as evidence that COCs are transported to the sediment of the Site has no merit because how the thick the storm water plume was does not say anything about whether contaminated sediment in the plume settled out of the plume and down into the Site sediments.

[NASSCO Comment No. 351, TCAO, at ¶ 4, DTR, at § 4.7]

City Comment No. 1.2: The DTR's reliance on Schiff (2003) is misplaced, as the Schiff (2003) plume studies are not supported by adequate data, do not take into account the hydrodynamic processes that affect the fate and transport of sediments from Chollas Creek into San Dego [sic] Bay, and therefore overstate toxicity in the Chollas freshwater plume.

The same type of speculation seen in City Comment 1.0 can be seen in Comment No. 1.2 (Schiff, 2003 plume maps "are ***not likely based*** directly on any data collected" from the shoreline, although "it is impossible to review since [sampling] locations are not provided"), and Comment No. 1.3 ("Doppler meters used to calibrate the hydrodynamic model [for Chadwick, 1999] were ***most likely placed*** outside of piers and ***probably could not show*** the effects of the piers on waters between them"). City Comments, Comment No. 1.2 at 5 (emphasis added); Comment No. 1.3 at 6 (emphasis added); Without more, the City's speculative comments do not constitute substantial evidence.

[NASSCO Comment No. 352, TCAO, at ¶ 4, DTR, at § 4.7]

City Comment No. 1.3: The hydrodynamic model reported in Chadwick (1999) lacks important information influencing fate and transport and therefore may be overstating impacts from Chollas Creek.

See NASSCO's Comment No. 352, Reply to City Comment No. 1.2. The City also complains that hydrodynamic modeling in Chadwick 1999 could have been better, principally because the study modeled Chollas Creek discharges during storm events using a half sine wave function, but creek discharges could be longer than one-half tidal cycles. City Comments, Comment No. 1.3 at 7. Even if this is true (the City provides no evidence for the point that storm events commonly last longer than one-half tidal cycles), the City provides no more sophisticated model itself, and has not shown that any potential inaccuracies would critically impair the Regional Board's reliance on Chadwick 1999.

[NASSCO Comment No. 353, TCAO, at ¶ 4, DTR, at § 4.7]

City Comment No. 1.4: Measured Chollas Creek discharge data as referenced in Katz (2003) are insufficient for drawing conclusions that Chollas discharges have significantly impacted shipyard sediments.

The City states that measured Chollas Creek discharge data as referenced in Katz, 2003 are insufficient for drawing conclusions that Chollas Creek discharges have significantly impacted shipyard sediment. To support its comment, the City points out that COC loadings were measured at two points on Chollas Creek on a flow-weighted basis, while COC loadings from the three stormwater outfalls on the Navy's property adjacent to Chollas Creek were collected on a time-proportional basis. The City concludes that because of this difference, comparisons of concentrations or mass loading should not be made.

It is important to note that the City's criticism does not affect one's ability to draw conclusions regarding the impact of Chollas Creek discharges on shipyard sediments. The poster prepared by Katz, 2003 also presents data in Figure 5 that characterize the plume emanating from Chollas Creek toward the Shipyard Site. It is this plume that potentially affects shipyard sediments. The City does not comment on this aspect of the Katz, 2003 poster. Accordingly, the City's comment has no merit with respect to conclusions of impact of Chollas Creek on the Shipyard Site. Attachment A, Exponent Critique, at 9.

[NASSCO Comment No. 354, TCAO, at ¶¶ 4, 30 DTR, at §§ 4.7, 30]

City Comment No. 2.0: The DTR's conclusions that discharges from SW9 have contributed to elevated levels of constituents of concern observed in shipyard sediments are not supported by adequate data.

Comment Nos. 2.0 and 3.0 contend that the DTR lacks "reliable data" to assert that the City is discharging COCs through storm water outfalls SW4 and SW9. City Comments, Comment Nos. 2.0 and 3.0 at 10-14. The City bases this claim on the fact that there is no monitoring data available from either SW4 or SW9 to indicate specific quantities of COCs in the runoff. Id.

As noted in the DTR, urban runoff itself is classified as a "waste" under the California Water Code § 13050(d). DTR at 11-8; see also Cal. Water Code §§ 13392 (State and Regional Boards to coordinate with Departments of Public Health and Fish & Game to develop "new programs to reduce urban and agricultural runoff"); 13396.7(a) (commissioning a study to determine adverse health effects of urban runoff on swimmers at urban beaches). In fact, the DTR includes substantial evidence that urban runoff in San Diego contains COCs at the Site, including "total suspended solids (TSS), sediment (due to anthropogenic activities), pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., copper, lead, zinc, and cadmium), petroleum products and polynuclear aromatic hydrocarbons (PAHs and HPAHs), synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus fertilizers), oxygen-demanding substances (decaying vegetation, animal waste), and trash." DTR

at 11-8; see also 4-10 (San Diego County Municipal Copermittees 2002-2003 Urban Runoff Monitoring Final Report submitted by the City indicating that "elevated levels of zinc, copper, and lead are present in the urban runoff outflow discharged from Chollas Creek into San Diego Bay").

Furthermore, the DTR demonstrates that samples taken in the SW4 catch basin, and laterals entering the catch basin, "indicate the presence of both PCBs and PAHs entering and exiting the municipal storm drain system catch basin . . . ." DTR at 4-16. Far from suffering from a lack of evidence, the DTR has presented substantial evidence that San Diego urban runoff contains relevant COCs, but simply did not take the extra step to quantify the amount of COCs that actually are present in storm water flows as they exit the SW4 and SW9 outfalls.

Notably, the City's comments ***do not allege*** that storm water discharges from SW4 and SW9 ***do not contain*** relevant COCs, and the City presents no affirmative evidence to show that they do not. Instead, the City attempts to skirt the issue by simply claiming that the DTR does not provide sufficient support.

Finally, as also noted in the DTR, "[i]n the absence of such direct evidence, the San Diego Water Board may consider relevant direct or circumstantial evidence in determining whether a person shall be required to clean up waste and abate the effects of a discharge or a threat of a discharge under CWC section 13304." DTR at 10-13, citing State Resolution 92-49, § I.A (directing the Regional Boards to use "any relevant evidence, whether direct or circumstantial", when determining whether a party should be required to investigate or cleanup a discharge of waste). Accordingly, even if storm water sampling data from SW4 and SW9 is unavailable, it is proper for the Regional Board to consider and rely on other direct and circumstantial evidence that leads to the conclusion that the City's storm water discharges have contaminated the NASSCO shipyard.

[NASSCO Comment No. 355, TCAO, at ¶¶ 4, 30 DTR, at §§ 4.4, 4.7, 30]

City Comment No. 3.0: There are no data indicating that SW4 has contributed significantly to elevated levels of constituents of concern observed in shipyard sediments.

See NASSCO'S Comment No. 355, Reply to City Comment No. 2.0.

[NASSCO Comment No. 356, TCAO, at ¶¶ 4, 30 DTR, at §§ 4.4, 4.7, 30]

IV. NASSCO'S REPLY TO SAN DIEGO GAS & ELECTRIC ("SDG&E")[19]

As a preliminary matter, NASSCO objects to SDG&E's submission of an untimely expert report by Jason Conder. The Discovery Plan dated February 18, 2010, the Order Reopening Discovery dated October 27, 2010, and the Third Amended Order of Proceedings in the instant action all make clear that expert reports were due March 11, 2011. Accordingly, the Conder Expert Report should be rejected by the Regional Board. Moreover, in Dr. Conder's analysis submitted on March 11, 2011, he concludes that "the Site remedy footprint should be restricted to the areas with TU values greater than one," which produced a footprint requiring remediation only of NA19 and NA22. However, in his untimely expert submission on May 26, he reaches an entirely different conclusion, and recommends a footprint containing six additional NASSCO polygons.

As discussed below, Dr. Conder's approach is scientifically and technically invalid. Moreover, it reaches clearly absurd results, as it fails to recommend remediation of polygons near the shoreline (e.g., along the ways and graving dock) where the highest levels of contamination would be expected, and instead focuses on remediating polygons in the middle of the Bay and underneath the floating dry-dock.

SDG&E Comment No. 1.1: DTR's Benthic beneficial use impairment is critically flawed and should be replaced with a causal approach to adequately identify risk.

SDG&E advocates replacing the triad study with a putative "causal" and self-serving approach to benthic risk evaluation proposed by SDG&E's expert witness, Jason Conder. While it is true that a Triad study cannot, by itself, establish specific chemical causality of observed adverse effects on benthic organisms, a Triad study that demonstrates the absence of adverse effects as a function of exposure to sediment chemicals is clear indication that there is no causal linkage between any measured chemical contamination and benthic impacts, at the exposure levels observed. Attachment A, Exponent Critique, at 10.

The alternative aquatic life BUI analysis put forward by Dr. Conder in the subject memorandum is based on a novel method of analysis proposed in his expert report critiquing the DTR aquatic life beneficial use impairment (BUI) assessment, submitted earlier this year (Conder 2011). However, the proposal currently being reviewed goes well beyond the original application and conclusions reached by Conder (2011). Conder (2011) re-evaluated the DTR findings of impaired benthic community at the Shipyard Site, and concluded that a much smaller remedial footprint was justified than that proposed in the DTR (Conder 2011, Figure 3). In contrast, the present analysis by Conder is a de novo re-assessment of benthic BUI for the entire Shipyard Site, and concludes that a remedial footprint much larger than the one proposed in the DTR is warranted based solely on benthic BUI (see subject memorandum, Figure 3). While the

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[19] Environ's Technical Comments on Draft Technical Report for Tentative Cleanup and Abatement, Order No. R9-2011-0001, for the Shipyard Sediment Site San Diego Bay, San Diego, CA (CRWQCB, 2010) and Associated Administrative Record, submitted May 26, 2011 on behalf of San Diego Gas & Electric ("Conder Expert Report").

scope of the current analysis is clearly different from the one contained in Conder (2011), the discrepancy between the two sets of recommendations with regard to remediation is not explained or justified in any way.

Furthermore, the theoretical approach advocated in the comment does not establish the site-specific causality that is suggested to be necessary, because it does not evaluate the presence of a site-specific exposure-response relationship or of co-occurrence of exposure with adverse effects. Id. Rather, the toxic unit approach infers causality at the Site from a theoretical equilibrium model of exposure, combined with an assumed causal relationship developed from laboratory exposure data collected to assess water column toxicity rather than sediment toxicity. Id. As a result, the proposed alternative approach would ignore available site-specific information about the presence or absence of an exposure-response relationship at the Site, and would rely instead on a theoretical causal relationship that may not be relevant under conditions or to receptors found at the Site. Id. Proper interpretation of synoptic chemistry data, sediment toxicity testing (using three different organisms), and benthic community analysis are a far better basis from which to infer causality than a simple comparison of Site chemistry data to literature benchmarks for aqueous toxicity. Id. Furthermore, the comment ignores the fact that a site-specific causal assessment metric, the apparent effects threshold (AET), was developed from the Triad study data and incorporated into the DTR approach for non-Triad stations (see response to comment no. 3 below). Id.

In summary, the proposed alternative approach would do nothing to improve understanding of causality in the assessment of benthic impacts at the Shipyard Site, and would in fact be misleading and inferior to the DTR approach in this regard. Id. The alternative approach advocated would, at most, be appropriate only as a screening tool for potential BUI if Site-specific biological information was unavailable. Id. Any characterization of aquatic life BUI based on the proposed alternative approach would be seriously flawed, and unnecessary, since extensive site-specific biological information exists for the Site. Id.

[NASSCO Comment No. 357, TCAO, at ¶ 14-19, DTR, at §§ 14-19]

SDG&E Comment No. 1.2: Triad approach flawed as it lacks scientifically valid consideration of COCs.

This comment is erroneous and invalid. SDG&E claims that the toxic unit approach is scientifically superior to the SQGQ1 chemistry evaluation solely because it includes TBT. However, SDG&E blatantly ignores existing site specific information and previous analyses showing that there is no exposure-response relationship between TBT in sediments or pore water and adverse effects. Id. The comment mischaracterizes the significance of TBT as a risk driver at the Shipyard Site, and fails to mention the extensive consideration and evaluation of TBT that has taken place during the last decade of assessment of sediment chemicals at the Shipyard Site. In fact, the possibility of an exposure-response relationship for TBT in both sediment and pore water was specifically investigated and addressed during the Detailed Sediment Investigation, and the lack of such a relationship for TBT is well-documented in the public record. Across the range of TBT concentrations measured in sediments at the 30 Sitewide Triad stations (38 - 3,250

µg/kg), there are no significant correlations between sediment concentration and toxicity from any of the three tests performed, or total abundance or species richness. Exponent Report, at Table 9-1. Furthermore, the relationship between sediment TBT levels and pore water TBT levels, while significant, is non-linear, a finding that contradicts the fundamental assumptions of the equilibrium partitioning model upon which the proposed toxic unit assessment approach for pore water is based. Exponent Report, at 5-4. In addition, the regressions of pore water and sediment concentrations for most other primary COCs (copper, mercury, and PCBs) were found to have positive y-intercepts, indicating that those substances would be expected to be found in pore water, even if absent in sediment. Attachment A, Exponent Critique, at 11.This finding also contradicts the assumption of thermodynamic equilibrium, indicating that an equilibrium partitioning approach to estimate concentrations of these substances in pore water is inappropriate at the Shipyard Site, and will yield incorrect results. Id.

Other fundamental assumptions of SDG&E's toxic units approach are contradicted and revealed to be false by Site-specific empirical data. This is readily apparent in the poor predictive performance of the toxic unit calculations themselves. The SDG&E alternative chemistry analysis, as summarized in Table 19, predicts toxicity to benthic organisms at nine Triad stations (of 30 total) where sediments were tested and found to be non-toxic in all three of the standard bioassays performed: NA04, NA05, NA06, NA15, NA17, SW08, SW09, SW18, SW21. Furthermore, no evidence of benthic community disturbance was found at any of these nine stations. With a false positive rate of 30 percent, it is difficult to defend the relevance of the toxicity unit thresholds to the Site, let alone justify claims that the method is a rigorously causal approach. Id.

An examination of the toxicological basis of the putative risk-driving benchmarks in the alternative assessment further reveals the lack of relevance and poor scientific justification for selection of these thresholds as sediment toxicity benchmarks. The threshold values for copper and TBT, the two substances that drive the toxic unit method's erroneous predictions of widespread toxicity in Shipyard sediments, are both ambient water quality final chronic values (FCV), developed by U.S. EPA for assessment of toxicity to aquatic organisms living in the water column. Ambient water quality values in general have no direct relevance to pore water concentrations, only surface water concentrations. Attachment A, Exponent Critique at 12. Even most burrowing benthic infauna actively irrigate their burrows with overlying surface water, and are not continually immersed in pore water. Id. The very reliance on toxicity data from aquatic immersion exposures presumes that exposure is primarily driven by passive diffusion from sediment to pore water to organisms, a poor assumption for sediment exposure. Id. Given that the sediments and pore water at the Shipyard Site are generally not in equilibrium (see discussion above), active pathways such as dietary exposure and direct contact are likely to be more important than passive diffusion, and these pathways are heavily dependent on bioavailability of sediment constituents (a consideration the toxic units approach completely ignores). Id.

Finally, the data upon which saltwater FCV criteria are based are primarily from acute toxicity tests of water column species (adjusted downward to estimate chronic values), and may not have high relevance to benthic invertebrate species. Id. For example, the three most sensitive species driving the TBT FCV calculation are mysid shrimp, copepods, and Chinook

salmon, all water column species that poorly represent the benthic community at the Shipyards (see USEPA 2003, Table 3). Id. For all of these reasons, the use of a generic water column exposure benchmark is inferior to the use of thresholds derived from Site-specific sediment exposure bioassays that more accurately reflect Site exposure conditions and pathways (i.e., AETs). Id.

In summary, SDG&E's proposed alternative assessment method is scientifically flawed and clearly inferior to the DTR approach, notwithstanding the repeated claims to the contrary made in SDG&E's comments. Under SDG&E's proposal, tenuous, theoretical relationships are misrepresented as factual, even though readily available Site-specific data prove that key basic assumptions upon which they are based are scientifically invalid. Id. These erroneous assumptions include:

- Exposure-response relationships exist for primary COCs in sediments and sediment toxicity at the Shipyard Site
- Sediments are at equilibrium with pore water at the Shipyard Site
- Equilibrium partitioning accurately predicts pore water concentrations at the Shipyard Site
- Exposure to pore water is continuous and is the most important pathway of exposure for benthic organisms
- Selected literature benchmarks of aquatic toxicity accurately predict benthic toxicity of Shipyard sediments when compared to estimated or measured pore water concentrations

Id.

[NASSCO Comment No. 358, TCAO, at ¶ 16, 18, DTR, at §§ 16, 18, Appendix 18]

SDG&E Comment No. 1.3: Non-triad approach fails to address causal connection between COCs and Benthic risk and 60% is arbitrary and without scientific support.

This comment is erroneous and invalid. The metrics comprising the non-triad approach provide valuable causal information, and are scientifically supported. Attachment A, Exponent Critique at 13.

The AET is a direct causal metric that relates individual sediment contaminant exposure to statistically meaningful adverse effects. Id. Under the DTR approach, causal relationships were developed between COC exposure and seven separate empirical measures of adverse effects on benthic macroinvertebrates: amphipod survival, echinoderm fertilization, bivalve larval development, total abundance, number of taxa present, benthic response index (BRI), and Shannon-Weiner diversity index. As a highly protective, site-specific benchmark of exposure, the lowest adverse effect threshold (LAET) was selected from this suite of seven effects, and a

40 percent safety factor was added to result in the 60% LAET value. Although the AET does not, by itself, prove causality, it provides valuable site-specific causal information on individual substances. Id. The AET is both chemical-specific, and entirely reliant on site-specific empirical data. Accordingly, use of the AET provides unequivocal evidence that exposure for that specific substance at that sediment concentration does not cause adverse effects. Id.

Furthermore, the SS-MEQ is an integrated index of multiple chemical exposure that quantitatively relates exposure at any non-Triad station to the exposure level at which evidence of impairment was observed in the Triad stations. Id. While chemical causality can only be inferred from the SS-MEQ analysis rather than measured directly, the same is true of the toxic unit method's reliance on literature effect thresholds, and the SS-MEQ has the advantage of being based on Site-specific data, for multiple lines of evidence. Id. The proposed alternative approach would substitute a generic, theoretical causal assessment approach for an empirical, site-specific causal assessment approach, resulting in an inferior aquatic life BUI assessment. Id.

With regard to the proposed toxic unit assessment approach, SDG&E claims to incorporate a causal analysis, and concludes erroneously that there is a causal relationship of theoretical benthic effects with TBT. However, SDG&E's analysis does not follow any identifiable causal analysis framework, and instead relies on a purely theoretical analysis of causal relationships based on water quality criteria and theoretical sediment pore water concentrations. Id. SDG&E's analysis therefore erroneously prioritizes tenuous theoretical relationships over both site-specific empirical data on measured concentrations of substances, and multiple lines of evidence of effects that use actual biological data for the site. Id.

Given the above, SDG&E appears to be unaware of criteria for determining causation, and the use of these criteria in causal analysis frameworks that are available in the scientific literature. Authors from EPA have recently summarized available information on causal analyses and recommended a framework to ensure that the Agency's approach is appropriate and defensible (Suter et al., 2010)[20]. Key steps in the process include a clear identification of alternative causes, and an identification of the strength of evidence for each of the alternative causes. Important causal evidence for a site study includes:

- Spatial/temporal co-occurrence of measured biological effects with candidate stressors
- Stressor response relationships that document an increasing level of effect with increasing exposure to the candidate substance
- Field and Laboratory experiments that increase or decrease exposure and measure biological response

The authors stress the importance of including all potential applicable methods for causal analysis into a consistent framework. See also, Attachment A, Exponent Critique, at 13-14.

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20 Suter, G.W., Norton, S.B., and S.M. Cormier. 2010. The Science and Philosophy of a Method for Assessing Environmental Causes. Human and Ecol. Risk Assess. 16: 19–34

All of the aforementioned evidence for causality was available as part of the shipyard sediment studies using a Triad approach. Notwithstanding this evidence, SDG&E embarked on a independent assessment of causation using a novel theoretical approach that ignores all of the other available data. This represents a scientifically flawed assessment that is inconsistent with the current standards of practice in environmental investigations and frameworks established by the U.S. EPA and published in the available scientific literature.

[NASSCO Comment No. 359, TCAO, at ¶ 32, DTR, at § 32, Appendix 32]

SDG&E Comment No. 1.4: The Toxic Unit approach used to derive the proposed footprint shown in Figure 1 is superior to the SQG-based evaluation used in part to identify polygons for remediation by MacDonald (2009, 2011) because the latter approach relies on empirical SQGs that suffer from the same weaknesses as the SQGQ1, SS-MEQ, and 60% LAET approaches (lack of chemical causality between concentrations and effects). The Toxic Unit approach is also a more scientifically-rigorous chemical line of evidence than the approach Spadaro et al. (2011) used to derive an alternate footprint to address Aquatic Life BUI in the BAE portion of the Site.

This comment is invalid, as described in NASSCO's Response to SDG&E Comment No. 3. A standard tenet of environmental Site assessment is that Site-specific empirical data are more reliable and preferred for remedial decision-making purposes than use of generic benchmarks, and should be preferentially used for site characterization. Attachment A, Exponent Critique, at 14 (citing USEPA 1989, USEPA1997). The toxic unit approach is not Site-specific, and is therefore far less scientifically valid than the DTR approach, which relies on both direct causal analysis and inferences drawn from empirical Site-specific observation to establish the presence or absence of biological impacts and causality with regard to aquatic life BUI. Id. The toxic units approach relies completely on theoretical exposure estimates and generic benchmarks, and is little more than a screening approach. Id.

[NASSCO Comment No. 360, TCAO, at ¶ 32, DTR, at § 32, Appendix 32]

SDG&E Comment No. 1.5: [T]he Toxic Unit approach detailed in Conder (2011a) is considered to be a more scientifically defensible sediment chemistry-only approach compared to the SS-MEQ and 60% LAET evaluation. It also includes all five relevant primary Site COCs, in contrast to the Triad sediment chemistry line of evidence, which omits TBT. The Toxic Unit approach should be adopted for use in sediment chemistry line of evidence approaches for the CRWQCB (2010) Triad and Non-Triad Data approaches, and thus should be used for deriving a remedial footprint in conjunction with other considerations regarding technical and economic feasibility in a manner consistent with the approaches discussed in CRWQCB (2010).

Whereas the toxic unit approach is, in fact, a chemistry-only assessment approach, the same is not true of the DTR non-Triad station assessment. The LAET is a direct function of the empirical exposure-response relationship for individual COCs, and the SS-MEQ is correlated with a state of apparent impairment determined by a multiple line of evidence assessment of

aquatic life BUI. Attachment A, Exponent Critique at 14-15. Unlike the toxic unit approach, both DTR metrics incorporate site-specific measurements of sediment toxicity and benthic community disturbance, and therefore incorporate critical Site-specific elements of exposure, such as bioavailability of COCs in sediments. Attachment A, Exponent Critique at 15.

Furthermore, the toxic unit approach relies on an implicit assumption that SDG&E does not acknowledge or test, even though it is readily testable. The approach presumes that there is a measureable exposure-response relationship between sediment or pore water contaminant levels and adverse effects on benthic organisms under Site conditions. Such a presumption may be reasonable for screening chemistry data in the absence of Site-specific biological data, but not at a Site where a Triad study has been performed. Id. At this Site, whether or not an exposure-response relationship exists for any sediment chemical can actually be determined. As Table 9-1 from the Exponent Report shows, none of the primary COC concentrations in sediments, are significantly correlated with any adverse effect. Note that this kind of analysis is one of the key criteria used in the EPA analysis of causation (Suter et al., 2010), which was ignored by SDG&E.

While the alternative remedial proposal put forward by SDG&E includes elimination of some polygons from the remedial footprint on the basis of a lack of BUI for humans and aquatic dependent wildlife receptors, seven additional polygons are added to the DTR footprint, due to alleged benthic BUI. A station-by-station review of the Site-specific data available for these polygons illustrates the lack of scientific validity in the SDG&E aquatic life BUI assessment. Id.

> Station NA10:
> Based on relatively low chemistry, and a lack of evidence for benthic impacts, NA10 was properly excluded from the proposed remedial footprint in the DTR.
>
> - Primary COCs are relatively low:
> - Composite SWAC ranking = 54 of 66 polygons
> - Copper (160 mg/kg) ranking = 48 of 66 polygons
> - Mercury (0.58 mg/kg) ranking = 51 of 66 polygons
> - HPAH (1,800 µg/kg) ranking = 54 of 66 polygons
> - PCB (160 µg/kg) ranking = 54 of 66 polygons
> - TBT (91 µg/kg) ranking = 44 of 66 polygons
> - Chemistry is below conservative biological benchmarks:
> - No exceedances of 60% LAETs
> - SS-MEQ = 0.35
> - No direct evidence of impacts to benthic community:
> - Non-Triad Station
> - SPI data indicate Stage III successional stage present.
>
> Attachment A, Exponent Critique at 15
>
> Station NA11:
> There are no highly elevated COPC levels at this station. There are no clear impacts to the benthic community. None of the four benthic community indicators evaluated is significantly different from reference conditions. Only one of the three toxicity tests (amphipod survival) was slightly lower than

reference. Due to a lack of high chemistry and no clear indication of benthic impacts, NA11 was properly excluded from the proposed remedial footprint in the DTR.

- Primary COCs are relatively low:
  - Composite SWAC ranking = 49 of 66 polygons
  - Copper (180 mg/kg) ranking = 43 of 66 polygons
  - Mercury (0.85 mg/kg) ranking = 34 of 66 polygons
  - HPAH (2,800 µg/kg) ranking = 44 of 66 polygons
  - PCB (190 µg/kg) ranking = 45 of 66 polygons
  - TBT (38 µg/kg) ranking = 56 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs
  - SS-MEQ = 0.42

- No clear indication of impacts to benthic community:
  - Triad Station: "Possible" benthic impacts
  - DTR chemistry score = moderate
    - SQGQ1 is less than 1.0. Only 1 chemical exceeds both DTR SQG and UPL.
  - DTR toxicity score = moderate
    - Amphipod test scored slightly below reference LPL. Bivalve and urchin tests scored above reference LPLs.
  - DTR benthic disturbance score = low
    - No evidence of disturbance. BRI is below reference UPL. Abundance, # taxa, and diversity index are all above reference LPL.
  - SPI data indicate Stage I and III successional stages present.

Attachment A, Exponent Critique at 15-16.

Station NA18:
Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA18 was properly excluded from the proposed remedial footprint in the DTR.

- Primary COCs are relatively low:
  - Composite SWAC ranking = 39 of 66 polygons
  - Copper (230 mg/kg) ranking = 31 of 66 polygons
  - Mercury (0.79 mg/kg) ranking = 37 of 66 polygons
  - HPAH (2,400 µg/kg) ranking = 49 of 66 polygons
  - PCB (350 µg/kg) ranking = 32 of 66 polygons
  - TBT (210 µg/kg) ranking = 19 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs
  - SS-MEQ = 0.56

- No direct evidence of impacts to benthic community:
  - Non-Triad station
  - No SPI data

Attachment A, Exponent Critique at 16.

Station NA21:
Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA21 was properly excluded from the proposed remedial footprint in the DTR.

- Only TBT is relatively high:
  - Composite SWAC ranking = 41 of 66 polygons
  - Copper (150 mg/kg) ranking = 50 of 66 polygons
  - Mercury (0.51 mg/kg) ranking = 58 of 66 polygons
  - HPAH (2,100 µg/kg) ranking = 50 of 66 polygons
  - PCB (177 µg/kg) ranking = 51 of 66 polygons
  - TBT (410 µg/kg) ranking = 12 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs (including TBT)
  - SS-MEQ = 0.50

- No direct evidence of impacts to benthic community:
  - Non-Triad Station
  - No SPI data

Attachment A, Exponent Critique at 17.

Station NA27:
Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA27 was properly excluded from the proposed remedial footprint in the DTR.

- Primary COCs are relatively low:
  - Composite SWAC ranking = 36 of 66 polygons
  - Copper (390 mg/kg) ranking = 10 of 66 polygons
  - Mercury (1.20 mg/kg) ranking = 10 of 66 polygons
  - HPAH (2,800 µg/kg) ranking = 44 of 66 polygons
  - PCB (210 µg/kg) ranking = 40 of 66 polygons
  - TBT (100 µg/kg) ranking = 42 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs
  - SS-MEQ = 0.69

- No direct evidence of impacts to benthic community:
  - Non-Triad Station
  - No SPI data

Attachment A, Exponent Critique at 17.

Station NA28:
Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA28 was properly excluded from the proposed remedial footprint in the DTR.

- Primary COCs are relatively low:
  - Composite SWAC ranking = 42 of 66 polygons
  - Copper (290 mg/kg) ranking = 14 of 66 polygons
  - Mercury (0.89 mg/kg) ranking = 31 of 66 polygons
  - HPAH (3,400 µg/kg) ranking = 36 of 66 polygons

- PCB (180 µg/kg) ranking = 47 of 66 polygons
- TBT (90 µg/kg) ranking = 45 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs
  - SS-MEQ = 0.55

- No direct evidence of impacts to benthic community:
  - Non-Triad Station
  - No SPI data

Attachment A, Exponent Critique at 17-18.

Station SW34:
Based on relatively low chemistry, and the lack of evidence of benthic impacts, NA28 was properly excluded from the proposed remedial footprint in the DTR.

- Only copper is relatively high:
  - Composite SWAC ranking = 48 of 66 polygons
  - Copper (320 mg/kg) ranking = 12 of 66 polygons
  - Mercury (0.75 mg/kg) ranking = 40 of 66 polygons
  - HPAH (1,400 µg/kg) ranking = 57 of 66 polygons
  - PCB (130 µg/kg) ranking = 58 of 66 polygons
  - TBT (38 µg/kg) ranking = 56 of 66 polygons

- Chemistry is below conservative biological benchmarks:
  - No exceedances of 60% LAETs (including copper)
  - SS-MEQ = 0.55

- No direct evidence of impacts to benthic community:
  - Non-Triad Station
  - No SPI data

Attachment A, Exponent Critique at 18.

In summary, the Site-specific data do not support the allegation that any of the seven additional polygons proposed for remediation by SDG&E exhibit aquatic life BUI or should be remediated. Id.

[NASSCO Comment No. 361, TCAO, at ¶¶ 18, 32, 33, DTR, at §§ 18, 32, 33, Appendices 18, 32, 33]

SDG&E Comment No. 2.0: DTR's Section 31 economic feasibility analysis fails to consider costs to reduction in Benthic risk exposure and should be revised.

The comment correctly notes that the DTR economic feasibility analysis measured benefit based on exposure reduction for receptors that average exposure over the entire site. However, it must be noted that benefits to the benthic community must be assessed on a point by point basis, and cannot be represented by an area weighted average concentration metric. Attachment A, Exponent Critique, at 18. The remedy proposed in the DTR directly addressed all areas identified as likely to impact aquatic life due to sediment contamination. No areas of likely benthic impacts were omitted from the DTR remediation footprint due to economic feasibility concerns.

[NASSCO Comment No. 362, TCAO, at ¶ 31, DTR, at § 31, Appendix 31]

SDG&E Comment No. 2.2, 2.3 : A revised economic feasibility analysis is shown in Figure 2, based on calculations shown in Tables 20 and 21. In this revised economic feasibility analysis, the percent exposure reduction for all three BUIs is considered via calculation of a composite percent exposure reduction based on SWACs for aquatic-dependent wildlife and human health (as in CRWQCB (2011)) and the area exhibiting aquatic life BUI, as based on a Toxic Unit approach for the sediment chemistry line of evidence (Figure 3; Conder, 2011a). The Toxic Unit approach is a causal chemical exposure modeling to account for bioavailability of chemicals to benthic invertebrates and predict potential chemical risk. It was used as a replacement approach for the flawed SQGQ1 approach used in the CRWQCB (2010) Triad sediment chemistry line of evidence in order to re-classify Triad stations. It was also used as a replacement approach for the flawed SS-MEQ and 60% of the LAET calculations used in the Non-Triad Data Approach. Both the revised Triad and Non-Triad Data approaches were used to identify polygons for Aquatic Life BUI (Figure 3). Economic feasibility was also calculated using a footprint designated to address Aquatic Life BUI only (Figure 4). The approach ranked polygons exhibiting Aquatic Life BUI by the highest Toxic Unit result multiplied by the area of the polygon (Table 22). Remedial cost was estimated for five increments according to approximate cost rates suggested by Table A31-1 (Table 23). This approach is more technically-defensible because Aquatic Life BUI is the most likely BUI exhibited at the Site and modeling of human health and ecological risk to aquatic-dependent wildlife is flawed. A revised economic feasibility approach should be adopted by CRWQCB to enable a complete and accurate evaluation of economic feasibility for any propose remedial footprint for the protection of BUIs at the Site.

As noted in NASSCO's reply to the preceding comment, the toxic unit approach does not represent an improvement over the DTR approach to assessment of aquatic life BUI. It is flawed and inappropriate for use in characterizing BUI at the Site. In fact, the SDG&E approach represents a large step backward in that it reverts to a preliminary screening analysis based on an unsubstantiated theoretical relationship in lieu of using the rich, site-specific, empirical database for the shipyard site. Any economic feasibility analysis based on this assessment approach will

be similarly flawed. Furthermore, the use of reduction in Sitewide SWAC as the metric of benefit for benthic invertebrate species is inappropriate. Attachment A, Exponent Critique, at 19. Unlike mobile human and wildlife receptors, which spatially average exposure over relatively large areas, benthic invertebrate communities are largely sessile, and must be assessed on a station-by-station basis. Id. Sitewide average sediment conditions are not meaningful in measuring aquatic life BUI or BUI mitigation, and the alternative economic feasibility analysis presented is therefore invalid. Id.

[NASSCO Comment No. 363, TCAO, at ¶ 18, 31, 32, DTR, at §§ 18, 31, 32, Appendix 31]

V. NASSCO'S REPLY TO COMMENTS BY THE SAN DIEGO UNIFIED PORT DISTRICT ("PORT")[21]

Port Comment No. 1: Dr. Johns agrees with the process used to identify the polygons for the remedial footprint and has concluded that the factors used to select "worst first" polygons are consistent with the findings.

The Declaration of Expert D. Michael Johns In Support of the San Diego Unified Port District's Submission of Comments, Evidence, and Legal Argument ("Johns Dec") (Port Comments, Exhibit 3) constitutes untimely expert evidence that should have been submitted to the record on or before March 11, 2011. Accordingly, it must be excluded from the record. See NASSCO's Joinder In BAE's Motions to Exclude Untimely Expert Evidence Submitted By the San Diego Unified Port District and San Diego Gas & Electric, and Motion to Exclude the Untimely Expert Evidence Submitted by the United States Navy.

Furthermore, even if Dr. John's Declaration is accepted into the record, his conclusions should be given no weight for the reasons set forth in NASSCO's Comment Nos. 380-384, Replying to Port Comment Nos. 17 - 21. Attachment A, Exponent Critique, at 20-25.

[NASSCO Comment No. 364, TCAO, at ¶ 33, Attachment 2, DTR, at §§ 1.2, 1.4.2.1, 1.5.2, 33, Appendix 33]

Port Comment No. 2: Dr. Johns also agrees that the Shipyard sediment contamination has contributed to the impairment of beneficial uses in San Diego Bay and likely continues to harm human health and environmental resources. (Exhibit "3" [Dr. Johns Declaration], ¶5(a)-(d).)

See NASSCO's Comment No. 364, Replying to Port Comment No. 1.

[NASSCO Comment No. 365, TCAO, at ¶ 1, DTR, at §§ 1.2, 1.4.2.1, 1.5.2]

Port Comment No. 3: Dr. Johns has concluded that the contaminants are bioaccumulating in biota relevant to human health and that exposed fish and shellfish can migrate offsite, spreading the reach of the contamination throughout the San Diego Bay and potentially to those who consume the exposed fish and shellfish. (Exhibit "3" [Dr. Johns Declaration], ¶6(a)-(d).)

See NASSCO's Comment No. 364, Replying to Port Comment No. 1.

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21 San Diego Unified Port District's Submission of Comments, Evidence and Legal Argument, Tentative Cleanup and Abatement Order R9-2011-0001 and Related Draft Technical Report, submitted May 26, 2011 ("Port Comments").

[NASSCO Comment No. 366, TCAO, at ¶ 15, 19, 25-28, DTR, at §§ 15, 19, 25-28, Appendices 15, 19, 27, 28]

Port Comment No. 4: Likewise, the shipyard activities are likely exposing and/or redistributing legacy contaminants that create an ongoing source of San Diego Bay contamination. (Exhibit "3" [Dr. Johns Declaration], ¶ 7(a)-(d).)

See NASSCO's Comment No. 364, Replying to Port Comment No. 1.

[NASSCO Comment No. 367, TCAO, at ¶ 2, 3, 5, 6, 10, DTR, at §§ 2.3, 3.3, 5.4, 6.4, 10.4, 10.5]

Port Comment No. 5: While some parties may claim that the remediation cannot go forward unless the Chollas Creek outfall area is included within the remedial footprint or otherwise addressed because of recontamination concerns, the Port's designated fate and transport expert has concluded that any interim resedimentation from Chollas Creek discharges will not adversely impact the remediation efforts at the Shipyards. (Exhibit "2" [Port Expert Designation]; Exhibit "4" [Dr. Poon Declaration], ¶¶ 13-15.)

The Declaration of Expert Ying Poon, D.Sc. In Support of the San Diego Unified Port District's Submission of Comments, Evidence and Legal Argument ("Poon Dec") (Port Comments, Exhibit 4) constitutes untimely expert evidence that should have been submitted to the record on or before March 11, 2011. Accordingly, it must be excluded from the record. See NASSCO's Joinder In BAE's Motions to Exclude Untimely Expert Evidence Submitted By the San Diego Unified Port District and San Diego Gas & Electric, and Motion to Exclude the Untimely Expert Evidence Submitted by the United States Navy.

Furthermore, even if Dr. Poon's Declaration is accepted into the record, his conclusions should be given no weight because the model upon which they are based has not been submitted to the record or provided to the Designated Parties. Accordingly, his conclusions must be viewed as unsupported. See NASSCO's Comment Nos. 385-389, Replying to Port Comment No. 22 - 26. See Attachment A, Exponent Critique, at 26-29.

Finally, it is a basic concept of site cleanup that implementing measures to control the source of contaminants and to verify that control has been accomplished should proceed actual remediation. See Deposition of Steven Bay ("Bay Depo.") at 209:1-9 (September 27, 2010); Bay Depo, Ex. 106, Sediment Assessment Study for the Mouths of Chollas and Paleta Creek, San Diego (May 2005), at 6, Figure 2-2 (indicating that "Cleanup Implementation" should occur after "TMDL Implementation," which includes "Implement Source Control" and "Verify Source Reduction"). Accordingly, even if Dr. Poon's Declaration is accepted into the record and his testimony considered by the Regional Board, his assertion that remediation can proceed prior to controlling storm water contaminant discharge to the Site contradicts basic tenets of site cleanup procedure.

[NASSCO Comment No. 368, TCAO, at ¶ 30, 33, DTR, at § 30, 33, Appendix 33]

Port Comment No. 6: To the extent the CUT would designate the Port as a primary discharger because of perceived non-cooperation grounded in the Port's withdrawal from a voluntary mediation process that it suggested, such a position would be an inappropriate basis for Port primary liability as a matter of law. On the contrary, the Port's commitment to the above principles is reflected its long history of cooperating with the Regional Board in efforts to remediate sites at which the Port is a landlord . . . .

The DTR does not suggest that the Port was named as a primary discharger "because of perceived non-cooperation grounded in the Port's withdrawal from a voluntary mediation . . .", however, the Port provides no legal authority why a failure to cooperate would not be a relevant factor in naming the Port to the TCAO. DTR at 11-1 – 11-5.

[NASSCO Comment No. 369, TCAO, at ¶ 11, DTR, at § 11]

Port Comment No. 7: The DTR acknowledges that "[i]n the event the Port District's tenants, past and present, have sufficient financial resources to clean up the Shipyard Sediment Site and comply with the Order, then the San Diego Water Board may modify its status to secondarily responsible party in the future." (DTR §11.2, at pp. 11-4 to 11-5.) This anticipated modification is appropriate and should be implemented because there is substantial evidence of the Port District's tenants' abilities to fund the Order. . . . the CUT bears an initial burden of establishing through evidence the facts necessary to conclude that the Port's tenants do not have adequate assets to fund the cleanup efforts. Yet, no such evidence has ever been presented.

It is premature for the Regional Board to determine whether the Port's tenants, past and present, have sufficient financial resources to cleanup the Site, since those costs have not yet been determined with specificity and work has not yet begun. Until work progresses on the cleanup, it is reasonable for the Regional Board not to distinguish between primarily and secondarily liable parties. See In re Wenwest, Inc., State Water Resources Control Board Order No. WQ 92-13, at 3 n.2.

[NASSCO Comment No. 370, TCAO, at ¶ 11, DTR, at §§ 11.1, 11.2]

Port Comment No. 8: In fact, the evidence establishes beyond question that the Port's tenants have adequate assets to fund the cleanup efforts. . . . Additionally, the Port's tenants have lease and permit terms obligating the tenants to defend and indemnify the Port against this type of liability. (See, e.g., SAR 159273, 159289 at ¶21 [NASSCO Lease]; . . .)

Whether a landlord's lease includes an indemnity clause is not determinative as to whether the landlord should be named primarily or secondarily liable. See In re Wenwest, Inc., State Water Resources Control Board Order No. WQ 92-13, at 7-9 (whether lease includes indemnity clause not included as a factor in determining landlord liability).

Accordingly, it is irrelevant to the Regional Board's decision to name the Port as primarily liable at this time whether the lease agreement includes indemnity language. Finally, it bears mention that the Port only cites to NASSCO's lease for the period from January 1, 1995 to December 31, 2040, and not to any prior leases with NASSCO, which contain materially different language with respect to NASSCO's and the Port's obligations to one another.

[NASSCO Comment No. 371, TCAO, at ¶ 11, DTR, at §§ 11.1, 11.2]

Port Comment No. 9: Additionally, based on its review of relevant documents, the Port believes that NASSCO has hundreds of millions of dollars of historic liability coverage that would be potentially applicable to the remediation and monitoring efforts. (Exhibit "12" [Summary of NASSCO Historic Liability Insurance].)

The information in Port Comments, Exhibit 12 (Summary of NASSCO Historic Liability Insurance) was submitted by the Port in breach of a Protective Order entered in Case No. 09 CV 2275-AJB (BGS) in the United States District Court, Southern District of California, regarding the allocation of costs for the cleanup of the Shipyard Sediment Site. The Protective Order prohibited the Port from publicly disclosing any information, including insurance policies, that was designated as "protected" information by NASSCO, or from using "protected" information for any purpose other than prosecuting or defending the federal court lawsuit. NASSCO is presently contesting the Port's publication of NASSCO's insurance information in a motion pending before Mr. Timothy Gallagher, the Discovery Referee. For these reasons, NASSCO believes that the insurance information in Port Comments, Exhibit 12 is not properly before the Regional Board, and NASSCO may seek the withdrawal or removal of Exhibit 12 from the administrative record following Mr. Gallagher's ruling on NASSCO's motion.

[NASSCO Comment No. 372, TCAO, at ¶ 11, DTR, at §§ 11.1, 11.2]

Port Comment No. 10: The Port's tenants are currently cooperating with the Regional Board. Although the tenants have been proposing a remedial approach that differs in some respects from the remedial approach proposed by the CUT, the process is "proceeding cooperatively." (Exhibit "5" [Barker Deposition], Vol. III, 489:20-490:14.)

It is premature for the Regional Board to determine whether the Port's tenants, past and present, are cooperating with the Regional Board as work has not yet begun. Until work progresses on the cleanup, it is reasonable for the Regional Board not to distinguish between primarily and secondarily liable parties. See In re Wenwest, Inc., State Water Resources Control Board Order No. WQ 92-13, at 3 n.2.

Furthermore, as presented in NASSCO's Initial Comments, NASSCO maintains that monitored natural attenuation is the proper remedy for the Site. This position differs materially from the TCAO and DTR under consideration by the Regional Board.

[NASSCO Comment No. 373, TCAO, at ¶ 11, DTR, at §§ 11.1, 11.2]

Port Comment No. 11: There is no evidence of Port non-cooperation.

See NASSCO's Comment No. 369, Replying to Port Comment No. 6.

[NASSCO Comment No. 374, TCAO, at ¶ 11, DTR, at §§ 11.1, 11.2]

Port Comment No. 12: The Port does not own or operate SW4 or SW9 outfall or the MS4 facilities leading to these outfalls. . . . Rather, the contention is that the Port is "responsible for controlling pollutants into and from its own MS4 system" and that "the Port District cannot passively allow pollutants to be discharged through its MS4 and into another Copermittees' MS4s, like the City of San Diego." (Exhibit "17" [CUT Discovery Response Excerpts], Responses to Special Interrogatories Nos. 28, 30. [emphasis in the original].) Yet, neither the DTR nor the administrative discovery responses identify what part of the MS4 owned or operated by the Port would ultimately lead to SW4 or SW9, much less how such MS4 facilities have discharged pollutants to SW4 or SW9.

The Port's comments do not allege that storm water discharges from SW4 and SW9 do not contain relevant COCs, and the Port presents no affirmative evidence to show that they do not. Instead, like the City, the Port attempts to skirt the issue by simply claiming that the DTR does not provide sufficient support.

In fact, the Port's own most recent Jurisdictional Urban Runoff Management Program ("JURMP") document admits that the Port MS4 facilities have the potential to generate pollutants, including bacteria, gross pollutants, metals, nutrients, oil and grease, organics, pesticides, sediment, and trash. Attachment D, San Diego Unified Port District, Jurisdictional Urban Runoff Management Program (May 2008) ("2008 Port JURMP") Table 6-2 at 6-4. The JURMP goes on to state that the "MS4 receives pollutants generated by motor vehicles, namely, heavy metals, oil and grease, and other toxic pollutants from engine exhaust, brake linings, and leaking fluids. Waste liquids, such as oil and paint, can also be illegally dumped into conveyance system structures. Illegal connections can be made to the MS4 and potentially introduce a wide variety of pollutants to the system. Street curbs and gutters, stormwater inlets, culverts and channels typically collect litter discarded in urban areas. As such, all of these pollutants can reach the MS4 with each rainfall event, and in turn, be carried to receiving water bodies." Id. at 6-7. It also admits that "[u]rban runoff also appears to be a significant contributor to the creation and persistence of Toxic Hot Spots in San Diego Bay," including "the mouth of Chollas Creek . . . ." Id. at 1-6 – 1-7. This evidence substantiates the Regional Board's conclusion that the Port is a discharger based on its historical storm water discharges to the Site.

Furthermore, the Port's JURMP indicates that the Port has a sophisticated GIS map of its storm drains, which is not publicly available but could easily have been used by the Port to generate the necessary information to demonstrate whether the Port's MS4s connect to SW4 and/or SW9. See Attachment D, 2008 Port JURMP Table 6-2 at 6-4; Attachment E, Karen Richardson, GIS Gives Port a Common Operating Picture, ArcUser (Winter 2010) at 33

("PortGIS Utilities is the central clearinghouse for the port's utilities data, including . . . storm drain . . . lines"). Accordingly, it is unfair for the Port to assert that the DTR and TCAO are insufficient because they do not specify what part of the Port's MS4 system connects to SW4 and/or SW9 when that information is uniquely in the possession of the Port itself.

[NASSCO Comment No. 375, TCAO, at ¶ 11, DTR, at §§ 11.3.1, 11.4]

Port Comment No. 13: The DTR contains no evidence that Port discharges from its MS4 are contributing to the Shipyard Sediment Site contamination.

See NASSCO's Comment No. 375, 377, Replying to Port Comment No. 12 and 14.

[NASSCO Comment No. 376, TCAO, at ¶ 11, DTR, at §§ 11.3 – 11.6]

Port Comment No. 14: The TCAO and DTR fail to provide evidentiary support for the conclusion that SW4 and SW9 have discharged contaminants to San Diego Bay and the Shipyard Sediment Site. In fact, the DTR acknowledges that "no monitoring data is available" for either SW4 or SW9. (DTR §§11.6.4, at p. 11-13 [SW4]; 11.6.5, at p. 11-15 [SW9].)

The Port contends that there is "no [e]vidence" that storm water outfalls SW4 and SW9 are discharging contaminants to the Site. The Port bases this claim on the fact that there is no monitoring data available from either SW4 and SW9 to indicate specific quantities of COCs in the runoff.

The Port's claim that there is "no [e]vidence" goes too far because, as noted in the DTR, urban runoff itself is classified as a "waste" under the California Water Code § 13050(d). DTR at 11-8; see also Cal. Water Code §§ 13392 (State and Regional Boards to coordinate with Departments of Public Health and Fish & Game to develop "new programs to reduce urban and agricultural runoff"); 13396.7(a) (commissioning a study to determine adverse health effects of urban runoff on swimmers at urban beaches). In fact, the DTR includes substantial evidence that urban runoff in San Diego contains COCs at the Site, including "total suspended solids (TSS), sediment (due to anthropogenic activities), pathogens (e.g., bacteria, viruses, protozoa), heavy metals (e.g., copper, lead, zinc, and cadmium), petroleum products and polynuclear aromatic hydrocarbons (PAHs and HPAHs), synthetic organics (e.g., pesticides, herbicides, and PCBs), nutrients (e.g., nitrogen and phosphorus fertilizers), oxygen-demanding substances (decaying vegetation, animal waste), and trash." DTR at 11-8; see also 4-10 (San Diego County Municipal Copermittees 2002-2003 Urban Runoff Monitoring Final Report submitted by the City indicating that "elevated levels of zinc, copper, and lead are present in the urban runoff outflow discharged from Chollas Creek into San Diego Bay").

Furthermore, the DTR demonstrates that samples taken in the SW4 catch basin, and laterals entering the catch basin, "indicate the presence of both PCBs and PAHs entering and exiting the municipal storm drain system catch basin . . . ." DTR at 4-16. Far from suffering from a lack of evidence, the DTR has presented substantial evidence that San Diego urban runoff

contains relevant COCs, but simply did not take the extra step to quantify the amount of COCs that actually are present in storm water flows as they exit the SW4 and SW9 outfalls.

Notably, the Port's comments ***do not allege*** that storm water discharges from SW4 and SW9 ***do not contain*** relevant COCs, and the Port presents no affirmative evidence to show that they do not. Instead, like the City, the Port attempts to skirt the issue by simply claiming that the DTR does not provide sufficient support.

Furthermore, the Port's citation to Natural Resources Defense Council v. County of Los Angeles, 636 F.3d 1235 (9th Cir. 2011) ("NRDC"), is unavailing with respect to allocating responsibility for storm water contamination to sediment to the Port. This is so because NRDC is a case under the Clean Water Act concerning whether a NPDES permittee was guilty of violating NPDES permit limits. Here, the issue is not whether the Port violated NPDES permit limits, but rather, whether the Port discharged COCs to the Site that have contaminated sediment. In fact, the DTR does not allege that the Port has violated its NPDES permit, but rather, that the Port has discharged storm water containing contaminants to San Diego Bay, and that the "urban storm water containing waste that has discharged from the on-site and off-site MS4 has contributed to the accumulation of pollutants in the marine sediments at the Shipyard Sediment Site to levels, that cause, and threaten to cause, conditions of pollution, contamination, and nuisance by exceeding applicable water quality objectives for toxic pollutants in San Diego Bay." DTR at 11-1 – 11-2. As noted above, the Port fails to allege that storm water discharges from SW4 and SW9 do not contain relevant COCs.

Finally, as also noted in the DTR, "[i]n the absence of such direct evidence, the San Diego Water Board may consider relevant direct or circumstantial evidence in determining whether a person shall be required to clean up waste and abate the effects of a discharge or a threat of a discharge under CWC section 13304." DTR at 10-13, citing State Water Resources Control Board Resolution 92-49, Policies and Procedures for the Investigation and Cleanup and Abatement of Discharges under Water Code Section 13304, § I.A (directing the Regional Boards to use "any relevant evidence, whether direct or circumstantial", when determining whether a party should be required to investigate or cleanup a discharge of waste). Accordingly, even if storm water sampling data from SW4 and SW9 is unavailable, it is proper for the Regional Board to consider and rely on other direct and circumstantial evidence that leads to the conclusion that the Port's storm water discharges have contaminated the NASSCO shipyard.

[NASSCO Comment No. 377, TCAO at ¶ 11, DTR, at §§ 11.6.4, 11.6.5]

Port Comment No. 15: Even if there was adequate evidence that SW4 and SW9 are discharging pollutants, there are no monitoring or test results establishing that there have been discharges from the Port's MS4 facilities into the City MS4 facilities that lead to the outfalls at SW4 and SW9. . . . In fact, the Port has only very limited MS4 facilities that lead to SW4 and no MS4 facilities leading to SW9.

See NASSCO's Comment No. 377, Replying to Port Comment No. 14.

[NASSCO Comment No. 378, TCAO, at ¶ 11, DTR, at §§ 11.3 – 11.6]

Port Comment No. 16: Finally, even if SW9 was discharging some contaminants, this would not be a proper basis for liability. . . . The Port's designated expert, Dr. Ying Poon, has done extensive fate and transport modeling analysis and confirmed that any discharges from Chollas Creek would not result in any significant deposit, accumulation or resedimentation of the Shipyard Sediment Site. (Exhibit "2" [Port Expert Designation]; Exhibit "4" [Dr. Poon Declaration], ¶¶13-15.) This extensive modeling contradicts the assumption in the TCAO that, based on the erroneous Exponent Report approach, Chollas Creek flows result in the settling of contaminated sediment at the Shipyard Sediment Site. In the absence of any substantial evidence that SW9 discharges are transporting contaminants to the Shipyard Sediment Site, the Port cannot be liable based upon these alleged discharges.

See NASSCO's Comment No. 377, Replying to Port Comment No. 14. In addition, the Port overstates the results of its expert, Dr. Ying Poon, with respect to SW9.[22] In its comments, the Port claims that Dr. Poon's analysis shows that discharges "from Chollas Creek would not result in any significant deposit, accumulation or resedimentation of the [Site]." Port Comments at 19, citing Port Comments, Exhibit 4, Poon Dec, ¶¶ 13-15. Yet the Poon Dec states that "it is unlikely that Chollas Creek would be a major source of contaminants . . .", but in fact, confirmed that Chollas Creek would be a source of sedimentation at the Site. Id.

[NASSCO Comment No. 379, TCAO, at ¶ 11, DTR, at § 11.6.5]

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22 NASSCO notes that the Port has not yet provided the Regional Board or the Designated Parties with Dr. Poon's hydrodynamic and water quality numerical model (the Bay Model), the result of which Dr. Poon summarizes in his declaration. *See* Port Comments, Exhibit 4, Poon Dec. at ¶ 7.

Port Comment No. 17 (Exhibit No. 3, Declaration of Expert Michael Johns, ¶ 5): It is my opinion that there is sufficient evidence that the Shipyard Site sediment contamination has contributed to the impairment of beneficial uses in San Diego Bay and likely continues to harm human health and environmental resources for the following reasons:

a. Sediment contaminants in Site sediments are present, bioavailable, and, for a number of the contaminants, bioaccumulative.

b. Fish and shellfish collected at the Site have accumulated contaminants at concentrations predicted to harm seafood consumers (i.e., recreational and subsistence fishers).

c. Although fishing and shellfish harvesting do not occur on the Site because of security restrictions, there are nearby public access points and the fish and shellfish that have accumulated contaminants are mobile.

d. Shipyard activities at the Site periodically disturb contaminated sediments, creating an ongoing source of legacy contaminants and impacting beneficial uses in the Bay.

None of Dr. Johns' four assertions regarding human wildlife exposure and risk constitute scientifically valid evidence of existing or likely future beneficial use impairment from Site sediment contamination for the following reasons:

¶ 5.a. "Sediment contaminants are present, bioavailable, and bioaccumulative." Although this statement is supported by available data in the DTR in a qualitative sense, the presence, bioavailability, and bioaccumulative potential of chemicals do not, in and of themselves, constitute a human health risk or beneficial use impairment. Impairment cannot be assessed without a quantitative assessment of exposure and toxicity, which Dr. Johns does not provide.

¶ 5.b. "Fish and shellfish at the site contain harmful levels of contaminants to human anglers." This conclusion requires an exposure and toxicity assessment. Because Dr. Johns does not provide any such assessment, it appears he is relying solely on the Tier II human health risk assessment contained in the DTR, which is critically flawed. See Exponent, Evaluation of Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2011-0001 for the NASSCO Shipyard Sediment Site, Expert Report of Thomas C. Ginn, Ph.D. (March 11, 2011) ("Ginn 2011"); Chemrisk, Brent Finley, Ph.D., Expert Opinion Letter Regarding the Draft Technical Report for Tentative Cleanup and Abatement Order No. R9-2011-0001 (March 11, 2011) ("Finley 2011"). The DTR Tier II human health risk assessment for both recreational and subsistence anglers assumes a highly unrealistic fractional intake from the Site of 100 percent. A quantitative assessment with more realistic assumptions concerning fractional intake, conducted in a manner consistent with regulatory guidance and precedents, would conclude that no unacceptable risk for human anglers exists. Ginn 2011 at 92-98; Finley 2011 at 23-28, 36-51.

¶ 5.c. "The mobility of fish and lobsters indicates a risk to anglers who fish outside the Site boundaries." No quantitative exposure analysis is presented to substantiate this claim, and no analysis of off-site angler exposure is contained in the DTR. Site-related contaminants carried by motile fish and lobsters to areas frequented by anglers can only pose a risk to human consumers if they are caught and consumed in sufficient quantity and frequency to exceed chemical-specific toxicity thresholds. Without data to support this claim, it is purely speculative, and without scientific basis. Furthermore, the Ginn and Finley expert reports document that there is no risk to recreational or subsistence anglers. Ginn 2011 at 76-100; Finley 2011 at 7-51.

¶ 5.d. "Shipyard activities disturb sediments, creating beneficial use impairment throughout the Bay." While it is likely, and Site-specific data support the notion that a certain degree of vertical mixing and resuspension of buried sediments takes place within the Shipyard leasehold in areas where vessel movements and engine testing take place, there is no analysis of any kind presented to support Dr. Johns' assertion of Bay-wide impacts. The DTR does not contain any quantitative analysis of sediment transport beyond the site boundaries, and Dr. Johns does not claim to have performed any such analysis or present any evidence that would support his allegation of beneficial use impairment beyond the Shipyard Site boundaries.

Attachment A, Exponent Critique, at 20-21.

[NASSCO Comment No. 380, TCAO, at ¶ 2, 3, 5, 6, 10, 19, 25-28, DTR, at §§ 2.3, 3.3, 5.4, 6.4, 10.4, 10.5, 19, 25-28, Appendices 19, 27, 28]

Port Comment No. 18 (Exhibit No. 3, Declaration of Expert Michael Johns, ¶ 6): It is my opinion that COCs are bioaccumulating in biota for the following reasons:

a. **Laboratory exposures to site-collected sediments established that statistically significant accumulations of selected contaminants (arsenic, copper, lead, mercury, zinc, TBT, total PCBs, and high molecular weight PAHs) occur in clams that are in direct contact with and ingest contaminated sediments, providing evidence that Site sediments contribute to the contaminant residues in the tissues of benthic organisms.**

b. **Benthic organisms are an important component of marine food webs and are a major component of the diet for both the sand bass and spiny lobster as well as many other fish, invertebrate and bird species.**

c. **Many of the fish and shellfish that prey upon contaminated benthic organisms within the Site can be consumed by people, are highly mobile and can migrate off the Site throughout large portions of San Diego Bay. These mechanisms contribute to the transfer of contaminants from the sediment to higher order receptors (including those relevant to human exposure) outside of the Site. The life histories of sand bass and spiny lobster, the two species targeted for human health evaluation at the Site, involve migration over large portions of San Diego Bay?**

d. **PCBs are bioaccumulative, and cleanup is necessary for incremental improvement in the beneficial use of San Diego Bay by recreational and subsistence fishers.**

Dr. Johns enumerates four reasons to believe that Shipyard Site sediment contaminants are bioaccumulating in biota. While the Site-specific data and the analyses contained in the DTR do support the generic conclusion that some bioaccumulation of COCs occurs, nothing put forward in this comment supports his assertion that bioaccumulation results directly in beneficial use impairment. Such a conclusion could only be supported by a quantitative exposure and toxicity assessment for higher trophic order consumer species, and Dr. Johns apparently relies solely on the food web associated risk assessments presented in the DTR. The flaws inherent in the DTR Tier II human health assessment are described in Ginn 2011. See Ginn 2011 at 79-94. The DTR Tier II aquatic dependent wildlife risk assessment is similarly flawed. This is so because all wildlife exposure calculations in the DTR were based on a highly unrealistic assumption of 100 percent area use for all receptors and exposure scenarios, and included inappropriate toxicity reference values for lead. See Ginn 2011 at 59-64, 71-73.

A quantitative risk assessment using realistic exposure and toxicity assumptions, performed and interpreted in accordance with regulatory guidance and precedent would conclude that no unacceptable risk for wildlife exists. See Ginn 2011 at 59-78. Accordingly, there is no justification for remediation to protect human or wildlife receptors on the basis of food web mediated exposure.

Attachment A, Exponent Critique, at 21-22.

[NASSCO Comment No. 381, TCAO, at ¶ 19, 25-28, DTR, at §§ 19, 25-28, Appendices 19, 27, 28]

Port Comment No. 19 (Exhibit No. 3, Declaration of Expert Michael Johns, ¶ 7): It is my opinion that Site activities likely expose and/or redistribute legacy contaminants and create an ongoing source to San Diego Bay based on the following:

a. Site activities contribute to the release and potential transport of sediment-bound and dissolved contaminants in San Diego Harbor.

b. While legacy contaminants can be buried over time by natural sedimentation, subsurface contaminants can be exposed through vessel maneuvering, engine testing, and other Site activities.

c. Resuspension of bottom sediments can increase the bioavailability of contaminants (e.g., contaminants can temporarily partition to the water prior to settling back to the bottom) and serve to locally redistribute contaminants.

d. This physical reworking of the sediments in areas impacted by Site contaminants creates an ongoing source to San Diego Bay and continues to impact beneficial uses through the mechanisms discussed above.

Dr. Johns cites four reasons to believe that physical disturbance and resuspension of Site sediments is taking place. As noted above, a certain degree of vertical mixing and resuspension of buried sediments is possible in certain areas of the Shipyard Sediment Site where vessel movements and engine testing take place. This factor has been acknowledged since the early stages of the Sitewide Sediment Investigation. See Exponent Report, Table 4-2. However, the shipyard activities and Site conditions described by Dr. Johns have been ongoing for several decades, and any effects on exposure due to them are already factored into current contaminant distributions, and the existing exposure and risk assessments. As noted above, the DTR Tier II risk assessments, when adjusted for more realistic and scientifically defensible exposure assumptions, indicate no unacceptable risk for human anglers or aquatic dependent wildlife. See Ginn 2011 at 59-78. Therefore, nothing in Dr. Johns description of physical conditions at the Site substantiates or supports his assertion of impaired beneficial use at the Shipyard or in San Diego Bay. Attachment A, Exponent Critique, at 22-23.

[NASSCO Comment No. 382, TCAO, at ¶ 2, 3, 5, 6, 10, 18, 19, 30, 32, DTR, at TCAO, at ¶ 2, 3, 5, 6, 10, 18, 19, 30. 32, Appendices 18, 19, 32]

Port Comment No. 20 (Exhibit No. 3, Declaration of Expert Michael Johns, ¶ 8): In my opinion, the process used by the Water Board to identify areas requiring remedial actions (e.g., use of polygons to define the remedial footprint) was appropriate. In using the polygons, the Water Board recognized that species such as fish and spiny lobster are mobile and that exposure to Site contaminants can occur site-wide rather than only at a single location. In developing the proposed remedial footprint, the Water Board correctly addressed impairment to more sedentary species, such as the organisms that form the benthic community. The factors used by the Water Board to select "worst first" polygons are consistent with my findings.

No response necessary. Dr. Johns' views on the appropriateness of the Regional Board's methodology has no bearing on whether the proper outcome was reached. Attachment A, Exponent Critique, at 23.

[NASSCO Comment No. 383, TCAO, at ¶ 32, 33, DTR, at 32, 33, Appendices 32, 33]

Port Comment No. 21 (Exhibit No. 3, Declaration of Expert Michael Johns, ¶ 9): It is my opinion that the remedial footprint contemplated by the DTR will adequately address risks posed by contaminated sediments within the Site in accordance with the Water Board's responsibility to protect the beneficial uses of waters of the state pursuant to California Water Code section 13304, with the following caveats:

a. **Polygon SW29 - Only a portion of this polygon was included in the proposed remedial action footprint; the remaining area will be the subject subsequent action by the Water Board. Having reviewed additional data collected from within the boundaries of the SW29 polygon (i.e., split sample data from the samples collected by SDG&E under Order No. R9-2004-0026), I found that total PCB concentrations measured in samples represent some of the highest found within the Site. In addition polygon SW29 is at the edge of the study area and represents an unbounded area of higher concentrations of total PCBs. Because ofthese factors (i.e., high PCB concentrations not bounded by sediment data showing lower concentrations), the portion of polygon SW29 not currently included in the remedial footprint warrants subsequent action.**

b. **Polygon NA23 -The DTR acknowledges the high ranking of this polygon using the "worst first" analysis but concludes that it is technically infeasible to dredge because doing so would adversely affect Pier 12, the tug boat pier, and the riprap shoreline, as well as undermine the sediment slope for the floating dry dock sump. However, other areas in which dredging is not feasible are currently included in the remedial action footprint. Alternative remedial technologies proposed in these latter areas include capping and backfill. The constraints that precluded dredging in polygon NA23 (e.g., inaccessibility of sediment under piers) appear to have been overcome for these other areas. Therefore, the decision not to include polygon NA23 in the remedial action footprint on the basis of technical feasibility should be re-evaluated.**

Dr. Johns' comment with respect to polygon SW29 suggests that remedial action should occur at all areas of polygon SW29 not included in the DTR remedial footprint due to PCB concentrations that are "...some of the highest found within the Site" and because the polygon is near the edge of the study area. However, he presents no analysis that suggests the proposed remedial footprint is insufficient to protect beneficial uses, nor does he explicitly assert that PCBs (or any other COC) concentrations at polygon SW29 pose an unacceptable risk or beneficial use impairment that requires remediation to mitigate. He apparently is suggesting that the remedial footprint be expanded solely on the basis of relative chemistry – only one leg of the triad analysis – and not on the basis of biological effects or receptor exposure. The spatially-weighted average exposure approach for assessing food web risks, and the weight of evidence approach for assessing risk to aquatic life, both of which Dr. Johns apparently agrees with, support the protectiveness of the DTR proposed remedial footprint, even given the extreme assumptions of the DTR exposure analyses for humans and wildlife.

Furthermore, Dr. Johns' comment with respect to polygon NA23 appears to be premised on the notion that "inaccessibility of sediment under piers" is the primary reason why dredging is infeasible at polygon NA23.

In fact, remediation of polygon NA23 is significantly more problematic than the remediation of other polygons, including those where sediment is inaccessible due to the presence of an overwater pier, due to the unique combination of conditions at NA23.

Specifically, NA23 is comprised largely of steep and lengthy slopes, which are located immediately adjacent to the pile-supported structure of Pier 12 and the armored shoreline, and which leave little to no room in which to establish a stabilizing offset distance. NASSCO's Initial Comments, Attachment D, Anchor QEA Technical Memorandum at 2 (May 26, 2011). These sloping areas are inclined at up to approximately 3H:1V (close to the sediment's natural angle of repose) and encompass 30 to 40 feet of vertical relief, making them among the steepest and highest in relief of any slopes at the shipyard site. Id. In such situations, dredging on any part of the slope must be accompanied by dredging to a similar extent all the way up the slope in order to maintain overall slope stability; otherwise, undredged areas higher up would quickly collapse into dredged areas below. Id. at 2-3.

However, since the upper portions of the slopes at NA23 are adjacent to Pier 12 and the armored shoreline slope, removal of material would lessen the stability of these features, and necessitate significant structural improvements to prevent catastrophic collapse of these features. Id. at 2-3. Elsewhere on the project site, such a scenario can be mitigated by installing a rock buttress alongside the structure of slope, so that it will be less likely to be undermined or weakened. Id. at 3. At polygon NA23, however, there is limited to no room in which to add such a feature, and in any event, situating one at the top of a dredged slope would be inherently unstable due to the fact that there is insufficient room to maintain a stabilizing offset distance. Id.

Thus, the unique set of conditions found at NA23, including the (1) steep slopes, (2) presence of adjoining features, and (3) limited ability to counteract the destabilizing influence of dredging along those features, renders remediation of NA23 technically infeasible.

Finally, Dr. Johns provides no biological or risk basis for concluding that NA23 should be added to the remediation footprint. The available data for Station NA23 suggest the opposite in fact (see summary below). Based on relatively low chemistry, and the lack of toxicity, benthic impacts from sediment contamination at NA23 are not considered likely. This area is known to be periodically disturbed by raising and lowering of the large floating dry dock, and it is likely that the single benthic community indicator that was outside reference conditions (total abundance) is due to physical disturbance. Accordingly, NA23 was properly excluded from the proposed remedial footprint in the DTR.

Station NA23
Primary COCs are relatively low:

- Composite SWAC ranking = 31 of 66 polygons
- Copper ranking = 11 of 66 polygons