

# Responses to Comments on the TCAO/DTR

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On behalf of BAE Systems



## Comment 1: The Shipyard Stations were Inadequate to Address Nature and Extent

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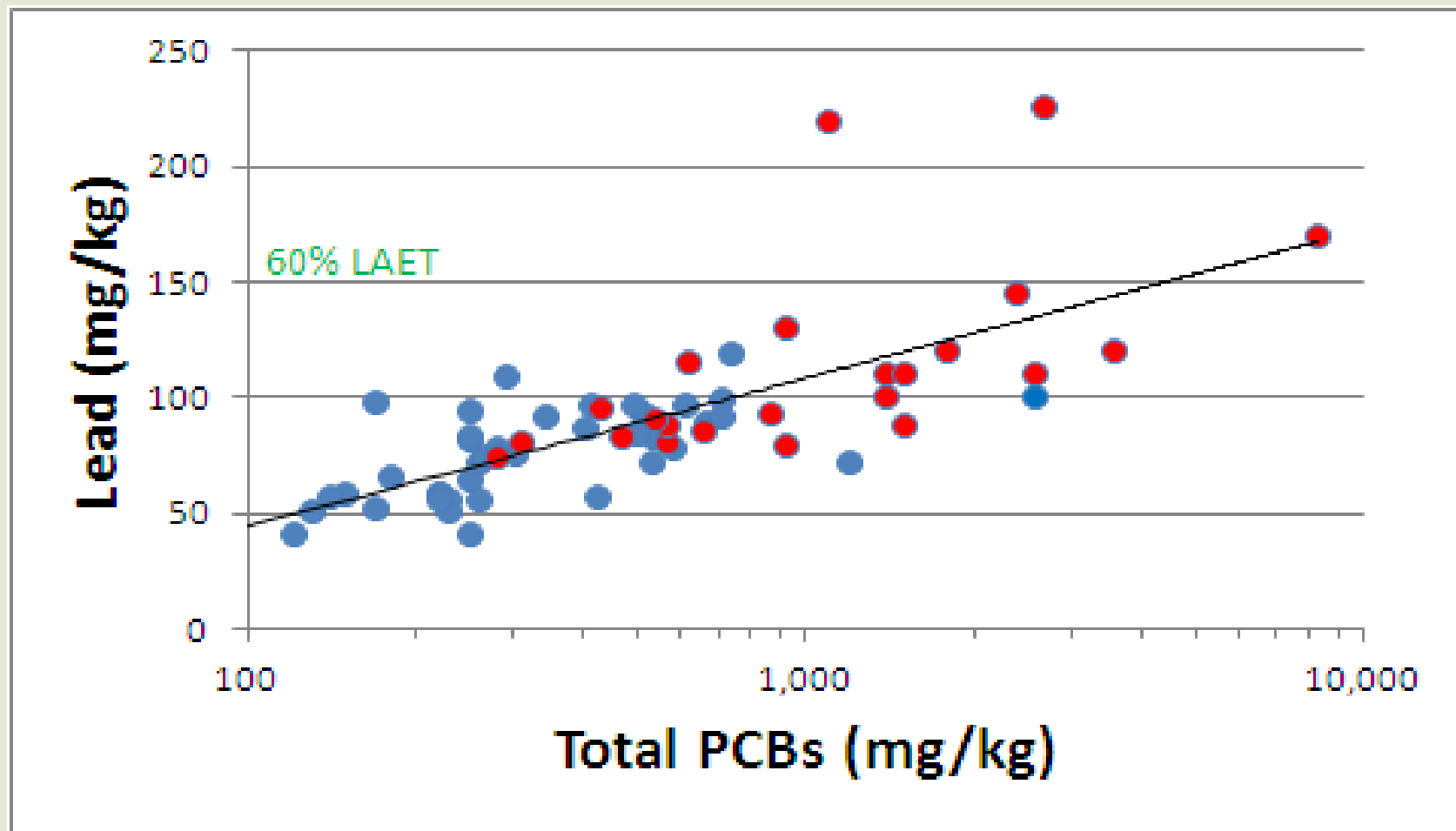
- Stations were distributed according to the standard practice for sediment quality assessments:
  - Dense near sources
  - Less dense away from sources
- At the BAE Site:
  - 63% of stations were within the pier line
  - 37% were outside the pier line
- The station allocation strategy was subsequently confirmed by sediment chemical concentrations.

## Comment 2: Lead and Zinc Exceed Toxicity Thresholds and are not Adequately Addressed

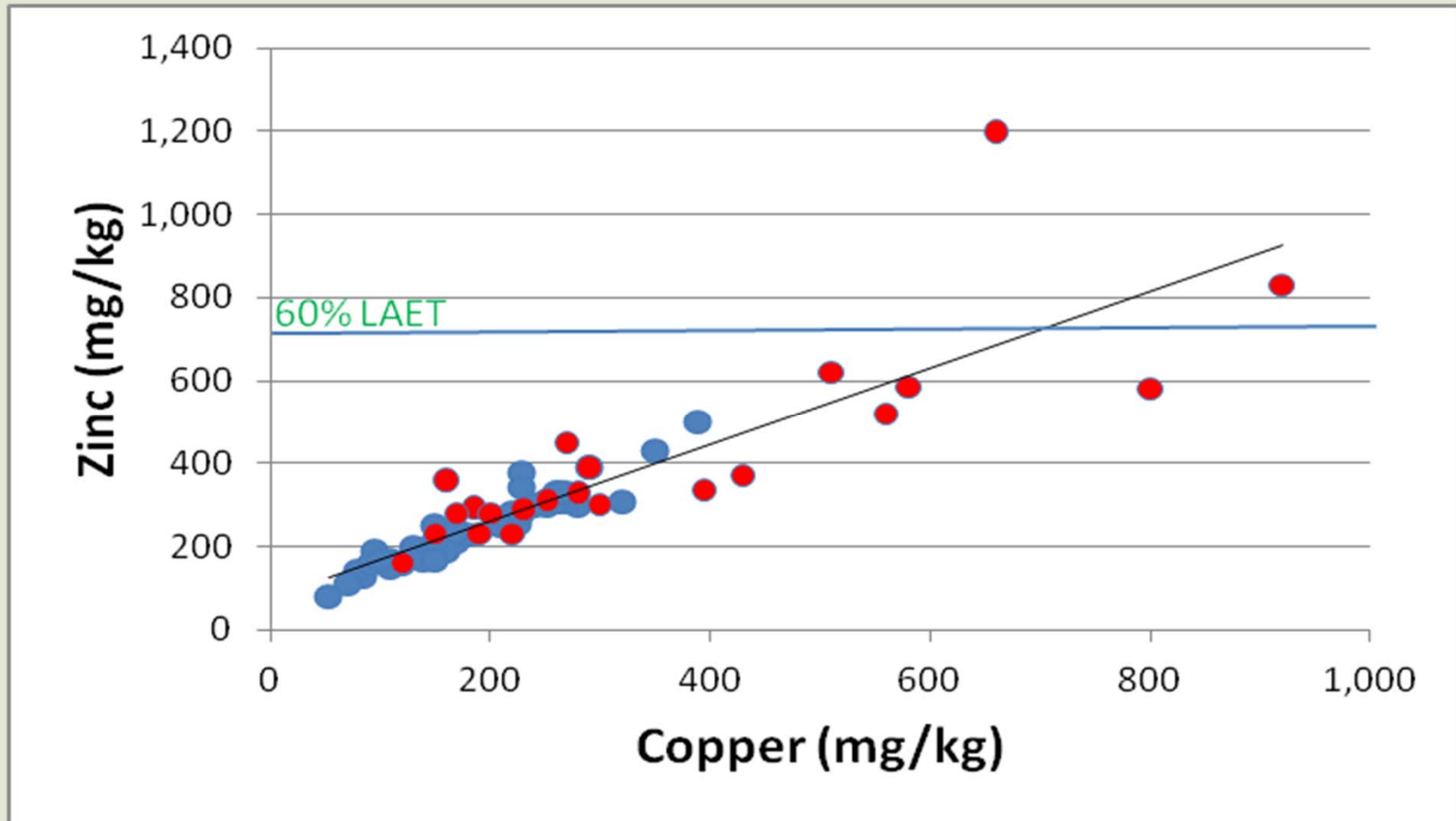
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- The 60% LAETs for lead and zinc were not exceeded outside the remedial footprint.
- Lead and zinc were statistically correlated with the Primary COCs (Table 29-4 of the DTR).
- Post-remediation monitoring will provide a safety net to ensure that no unacceptable residual effects occur.

# Correlation between Lead and Total PCBs



# Correlation between Zinc and Copper (Excluding SW04)



## Comment 3: 15 polygons with Composite SWACs >5.5 are not in the Remedial Footprint

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- Composite SWAC Ranking Values were only one LOE evaluated for inclusion in the footprint
- Inclusion was based on MLOEs:
  1. Composite SWACs for primary COCs
  2. Highest concentrations of primary COCs
  3. Likely impaired stations
  4. SS-MEQs

## Examples of polygons with Composite SWACs >5.5 that are not in the Remedial Footprint

- **Polygon SW03 (SWAC = 6.2)**
  1. 7 Triad biological indicators: Not likely impaired
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.63 < 0.9$
- **Polygon SW11 (SWAC = 5.7)**
  1. 7 Triad biological indicators: Not likely impaired
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.54 < 0.9$
- **Polygon SW18 (SWAC = 6.7)**
  1. 7 Triad biological indicators: Not likely impaired
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.62 < 0.9$

## Comment 4: The SS-MEQ is not an Effects-Based Tool

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- The SS-MEQ was developed using the 6 triad stations where biological effects were found.
- The SS-MEQ was calculated in a manner similar to how Long et al. (1995) calculated the effects-based ERMs.
- Accuracy of the SS-MEQ threshold of 0.9 was tested using the site-specific effects data.

Long, E.R., D.D. MacDonald, S.L. Smith, and F.D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19: 81-97.



## Comment 5: The SS-MEQ Threshold of 0.9 is not Reliable

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- Measures of predictive reliability show:
  - Accurate prediction of stations not likely impaired - 100%
  - Less reliable prediction of likely impaired stations - 38%
- **Conclusion:** The DTR's inclusion of all polygons with SS-MEQs greater than 0.9 in the remediation footprint errs on the side of being overly conservative.

## Comment 6: The 60% LAETs are Unreliable Because They Exceed ERMs

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- Effects-Range Medians (ERMs) are inappropriate for site-specific use:
  - Based on a national database that ignores bioavailability
  - Not updated since 1993 (i.e., 18 years)
- 60% LAETs are appropriate as site-specific values:
  - Based on chemistry/biology data from the Shipyard Site
  - Address true chemical bioavailability at the Site

## The ERMs are Strictly Screening Values

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The developers of the ERMs cautioned that "*the numerical guidelines should be used as informal screening tools in environmental assessments. They are not intended to preclude the use of toxicity tests or other measures of biological effects" (Long et al. 1995).*

Long, E.R., MacDonald D.D., S. L. Smith, and F. D. Calder. 1995. Incidence of adverse biological effects within ranges of chemical concentrations in marine and estuarine sediments. *Environmental Management* 19: 81-97.

# Examples of Data Sets Outside Southern California used to Calculate the ERMs

- **West Coast**

- Burrard Inlet, BC
- Commencement Bay, WA
- Eagle Harbor, WA
- Duwamish River, WA
- Oakland Harbor, CA
- San Francisco Bay, CA

- **Northeast**

- Halifax Harbor, NS
- Massachusetts Bay, MA
- Norwalk River, CT
- Long Island Sound, NY
- New York Harbor, NY
- Raritan Bay, NJ

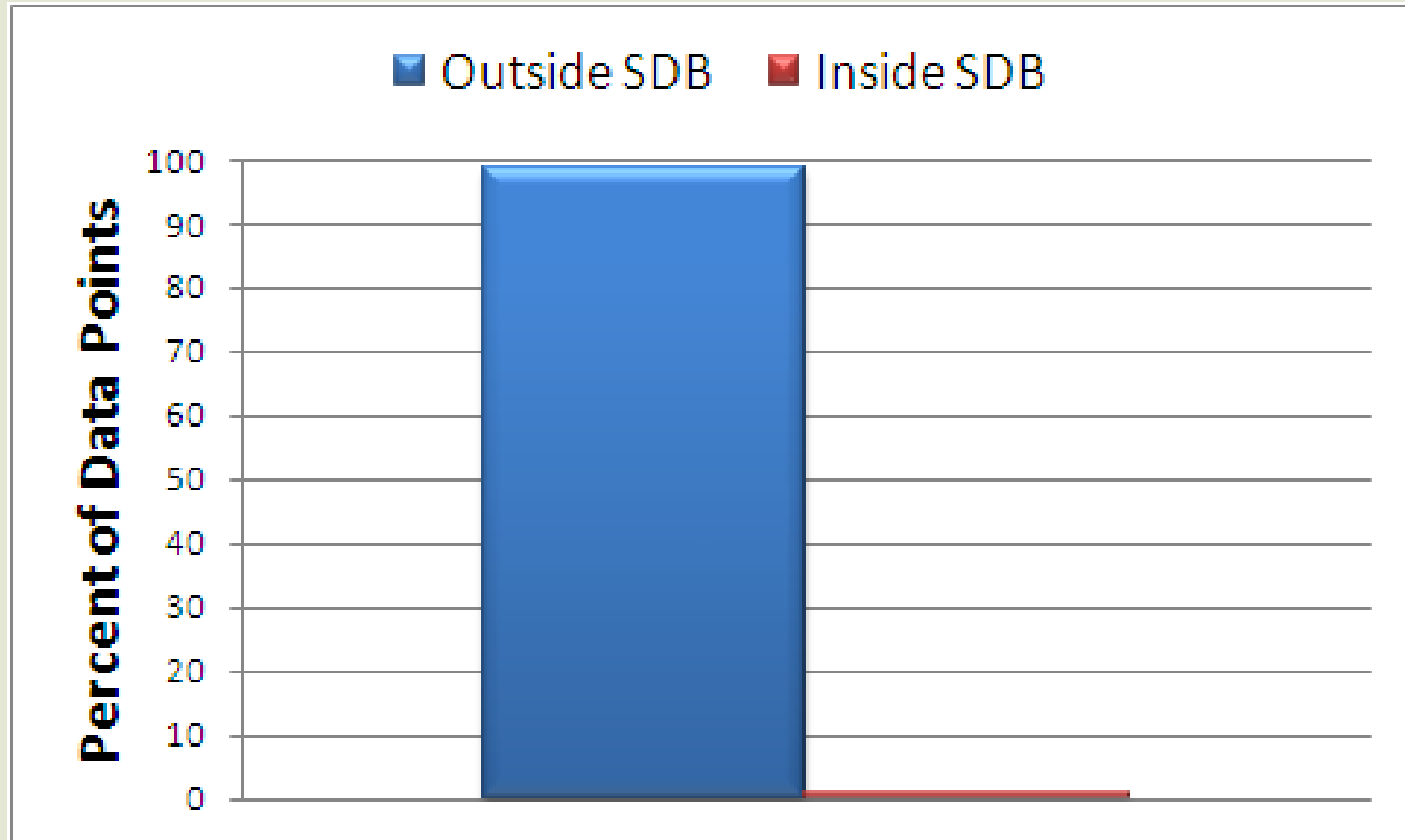
- **Southeast**

- Baltimore Harbor, MD
- Chesapeake Bay, VA
- Wilmington Harbor, NC
- Charleston Harbor, SC
- Brunswick Harbor, GA
- Tampa Bay, FL
- Miami River, FL

- **Gulf Coast**

- Bayou Casotte, MS
- Freeport Harbor, TX
- Houston Ship Channel, TX
- Galveston Harbor, TX
- Sabine-Neches Waterway, TX

# Data Points Within San Diego Bay used to Calculate the ERM's



## Comment 7: Inclusion of Reference Stations with Amphipod Survival less than 80% is Invalid

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- Reference areas were selected using EPA guidance:
  1. They were not affected by the study site
  2. They reflect background levels of chemical contamination and biological conditions
- Reference areas were carefully selected in the DTR using MLOEs:
  1. Distance from sources
  2. Sediment chemistry and toxicity
  3. Benthic macroinvertebrate communities

## Comment 8: The Remedial Footprint is not Protective of Fish from Exposure to PCBs

- Based on theoretical modeling with many uncertainties:
  1. Based on gobies (do not reside at the study site - CDFG)
  2. Toxicity value from tropical freshwater zebra fish
  3. Sediment accumulation factor from spotted sand bass
  4. Lipid content from a goby
- No uncertainty analysis was conducted for the modeling (i.e.,  $U_1 + U_2 + U_3 + U_4 = ?$ )
- Most importantly, the results of the Shipyard Site fish study that found no effects for over 250 spotted sand bass were disregarded.

## Comment 9: Chemical Concentrations at most Stations Indicate Moderate to High Exposure

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- Concentration does not equal true exposure.
- Bioavailability is critical:
  - Metals: reduced by acid volatile sulfide
  - Organic compounds: reduced by organic carbon
- Bioavailability at the Shipyard Site was also addressed by the site-specific sediment toxicity tests and benthic community evaluations.



## Comment 10: Polygons SW06, SW18, and SW29 Should be Included in the Remedial Footprint

- **Polygon SW06:**
  1. 7 Triad biological indicators: Not likely impaired
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.63 < 0.9$
- **Polygon SW18:**
  1. 7 Triad biological indicators: Not likely impaired
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.62 < 0.9$
- **Polygon SW29:**
  1. 7 Triad biological indicators: Not evaluated
  2. 60% LAETs for primary COCs: No exceedances
  3. SS-MEQ:  $0.71 < 0.9$

## Conclusions Regarding the TCAO/DTR Comments

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- The 10 comments on the TCAO/DTR are incorrect:
  - They ignore important site-specific conditions such as chemical bioavailability and fish pathology data.
  - They focus on single lines of evidence (e.g., Composite SWAC Ranking Values) rather than MLOEs.
  - They erroneously characterize the reliability and protectiveness of the site-specific 60% LAETs and SS-MEQ.
  - They are based on a hypothetical fish model with numerous uncertainties that are not quantified, and therefore disregarded.