

DEPARTMENT OF TOXIC SUBSTANCES CONTROL

REGION 2

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TREASURE ISLAND

SSIC NO. 5090.3.A



March 14, 1995

Commanding Officer
Western Division
Attn: Mr. Ernesto Galang, Code 1813
Naval Facilities Engineering Command
900 Commodore Drive
San Bruno, California 94066-0720

COMMENTS TO NAVY RESPONSE TO AGENCY COMMENTS ON THE DRAFT REVISED
PROPOSED APPROACH TO ESTABLISHING BACKGROUND AND AMBIENT LEVELS
IN SOILS, NAVAL STATION TREASURE ISLAND (FEBRUARY 8, 1995)

Dear Mr. Galang:

The Navy's responses to agency comments on the Draft Revised Proposed Approach to Establishing Background and Ambient Levels in Soils have been reviewed by James Frampton, Ph.D., of the Department's Office of Scientific Affairs. Dr. Frampton still has concerns about the Navy's responses to recommendations that were made by DTSC. A copy of his memorandum is enclosed.

If you have any questions regarding this letter, or would like to make arrangements to discuss these issues with Dr. Frampton, please contact me at (510) 540-3818.

Sincerely,

Handwritten signature of Mary Rose Cassa in cursive.

Mary Rose Cassa, R.G.
Engineering Geologist
Office of Military Facilities

enclosure

cc: Mr. Michael Bessette
California Regional Water Quality Control Board
San Francisco Bay Region
2101 Webster Street, Suite 500
Oakland, California 94612

Ms. Rachel Simons [H-9-2]
U. S. EPA, Region 9
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Admin Record (3 copies)

Jim Sullivan

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DEPARTMENT OF TOXIC SUBSTANCES CONTROL

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M E M O R A N D U M

TO: Mary Rose Cassa
Site Mitigation, Region 2
700 Heinz Ave., Bldg. F, Second Floor
Berkeley, California 94710

FROM: James A. Frampton, Ph.D, Soil Science Research Program Specialist II (Soil) Office of Scientific Affairs (OSA)
P. O. Box 806
Sacramento, California 95812-0806

DATE: March 6, 1995

SUBJECT: Naval Station Treasure Island: Establishing background and ambient levels of inorganics in soil and fill - further comments
MPC; 02; PCA: 14740; Site-WP: 200231/45

Per your request request, I have reviewed the following document: "Navy Response to Agency Comments on the Draft Revised Proposed Approach to Establishing Background and Ambient Levels in Soils," dated February 8, 1995, by PRC Environmental, Inc. (PRC) for the U. S. Department of the Navy (Navy). The original draft document titled "Revised Approach to Establishing Background and Ambient Levels in Soils" was reviewed previously by this reviewer (see November 10, 1994 memorandum). For background information, one should refer to the Navy's original draft document and agency comments on this document. 8-11-94

This memorandum focusses upon DTSC recommendations that were challenged by the Navy.

Response to DTSC comment 1:

The Navy wrongly assumes that DTSC intends to use background levels of metals at Yerba Buena Island (YBI) as cleanup standards. This was never stated. DTSC only recommended a method for determining sample size for the Wilcoxon rank sum test, which was one of the two comparison tests proposed by the Navy (see p. 10 of August 11 report).

The Navy apparently misunderstands the meaning of "cleanup standard" as it is used in the EPA document (U.S. EPA, 1994) referenced in comment 1. Cleanup standard does not mean cleanup level in this EPA document, but rather a critical value to which the computed statistic Z_{rs} is compared when



conducting the Wilcoxon rank sum test.

Based upon the Navy's comparison of the two methods for estimating sample size, the EPA method (U.S. EPA, 1989) for normally distributed populations and Noether's method (U.S. EPA, 1994) for populations with unspecified distributions, DTSC will accept the Navy's request to use the method for normally distributed populations. It should be noted that the approximating equation recommended in the 1989 EPA document was first published by Guenther (1981) and was inadvertently not referenced by the EPA.

Response to DTSC comment 1, cont'd:

The Navy wrongly assumes that DTSC intended to use PRG or ER-L values as cleanup levels at Treasure Island (TI). This was never stated. DTSC only recommended a statistical test, a one sample t-test, for comparing an average site soil element concentration level to its PRGs or ER-L values.

(The Navy had not proposed a specific statistical comparison test.) If average element concentrations at a site are not significantly less than their PRGs, then further assessment of possible risks posed by that site may be warranted. Please be advised that U.S. EPA Region IX California modified PRGs are acceptable to DTSC as screening values at military facilities within California **only** under conditions specified by DTSC (see memorandum from Michael Wade, OSA, to Ken Smith, Chief Office of Military Facilities, DTSC, dated October 28, 1994). Also see "Response to DTSC comment 5. ✓

Response to DTSC comment 3:

DTSC did not mean to suggest that the Navy assumes data sets will be normally distributed. Rather, comment 3 referred to Section 3.1.2 on determining number of samples. In this section, the referenced EPA method (U.S. EPA, 1989, pp. 114-115) estimates sample size using an approximation formula originally published by Guenther (1981) which assumes that the distributions are **normal**. This reference was inadvertently not cited in the EPA document. It should also be noted that Guenther makes no assumption concerning the coefficient of variation. However, Guenther did assume that the **variances were similar** and that **sample sizes were equal**. Noether's equation makes no such limiting assumptions! The EPA has just substituted D for Z_p , the quantile of order p, in Guenther's formula where

$$Z_p = (\mu_s - \mu_b) / \sigma$$

where μ_s and μ_b are the site mean and background mean,

respectively, and σ is the variance. Since D equals the minimum detectable relative difference (MDRD) divided by the coefficient of variation (CV) (see U.S. EPA, 1989, p. 104 and p. 115) where $MDRD = (\mu^s - \mu^p)(100\%)/\mu^p$ and $CV = \mu^p(100\%)/\sigma$, the relationship^s between D and z_p^p can easily be shown.

DTSC would also recommend the Lilliefors test to test for normality of a data set rather than relying on the coefficient of variation, which says nothing about the shape of the distribution. In its report (p. 10), the Navy states that "the selection of the appropriate test will be based upon the **observed distribution** of a given chemical-specific data set" (emphasis added). For observational purposes, cumulative probability plots using normal probability paper should be constructed for each data set. The Lilliefors test is cited by Gilbert (1987) and is available in the SYSTAT statistics package (SYSTAT, Inc, Evanston, IL).

DTSC apologizes for any misunderstanding that comment 3 may have caused.

Response to DTSC comment 4:

Regarding the comparison of site analytical data to literature values, DTSC's comment still holds. The CLP "total" digestion method is a misnomer. The CLP digestion method for inorganics is based upon the digestion of a waste or soil with nitric acid (EPA Method 3050). It is well known in geochemistry that silicate minerals are resistant to attack by nitric acid. Total element analysis are normally done directly on pulverized samples by emission spectrographic analysis or by X-ray fluorescence analysis, by wet digestion with hydrofluoric acid in combination with other acids, or by fusion with sodium (or potassium) carbonate at 900°C followed by digestion in hydrochloric acid followed by analysis of solubilized elements by various analytical techniques.

Response to DTSC comment 5:

Except for reference to ER-L values, the original language of comment 5 of the November 10 memorandum is DTSC policy and should not have been changed. It should have stated that "U.S. EPA Region IX California modified PRGs (August 1, 1994) are acceptable to DTSC as screening values under conditions specified by DTSC (see attached DTSC memorandum)." DTSC will defer to the RWQCB for policy on the use of NOAA's ER-L values.

Mary Rose Cassa
March 6, 1995
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If you would like to further discuss these issues prior to the Remedial Project Manager's team meeting, please contact me at 916-327-2522.

Reviewed by: Michael Wade, Ph.D. *Deputy Chief for Michael Wade*
OSA Military Facilities Liaison

REFERENCES:

- Gilbert, R. O. 1987. Statistical methods for environmental pollution monitoring. Van Nostrand Reinhold Company, New York.
- Guenther, W. C. 1981. Sample size formulas for normal theory T tests. The American Statistician 35(4):243-244.
- U.S. Environmental Protection Agency. 1989. Soil sampling quality assurance user's guide. Second edition. Environmental Monitoring Systems Laboratory, Las Vegas, Nevada (EPA/600/8-89/046).
- U.S. Environmental Protection Agency. 1994. Statistical methods for evaluating the attainment of cleanup standards. Volume 3: Reference-based standards for soils and solid media. Office of Policy, Planning, and Evaluation, Washington, D.C., February 1994 (EPA 230-R-94-004).