



Minnesota Pollution Control Agency

November 16, 1995

**CERTIFIED MAIL
RETURN RECEIPT REQUESTED**

Mr. David Cabiness, Code 1862
Commanding Officer
Southern Division
Naval Facilities Engineering Command
P.O. Box 190010
North Charleston, South Carolina 29419-9010

RE: Naval Industrial Reserve Ordnance Plant

Dear Mr. Cabiness:

The Minnesota Pollution Control Agency (MPCA) staff has reviewed the letter report from you dated October 18, 1995, regarding estimates of contaminated soils in Operable Unit 2 (Letter Report). The Letter Report is for the Naval Industrial Reserve Ordnance Plant Site and was submitted pursuant to the MPCA staff letter, dated August 30, 1995, and the Federal Facility Agreement, dated March 27, 1991, between the MPCA, the U.S. Environmental Protection Agency, and the U.S. Navy.

The Letter Report is hereby approved as modified pursuant to Attachment 1 to this letter.

If you have any questions regarding this letter, please contact me at (612) 296-7818.

Sincerely,

David N. Douglas
Project Manager
Response Unit 1
Site Response Section
Ground Water and Solid Waste Division

DND:ch

cc: Sidney Allison, Navy, Southern Division
Thomas Bloom, U.S. Environmental Protection Agency

TDD (for hearing and speech impaired only): (612)282-5332

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Attachment 1
Letter Report Regarding Estimated Contaminated Soil Volumes,
dated October 18, 1995

This report estimates the volumes of soil with concentrations of carcinogenic polyaromatic hydrocarbons (cPAHs) and chlorinated volatile organic compounds (VOCs) that exceed soil clean-up numbers established for Operable Unit 2 (OU2) soils. The Minnesota Pollution Control Agency (MPCA) staff generated these clean-up numbers to protect the ground water from further VOC contamination and risk to human health from cPAHs, requesting that Navy calculate in approximate terms the volume of soil with levels of these contaminants exceeding these limits.

Estimates of soil volumes are difficult due to the limited amount of data available upon which to base accurate calculations. This is particularly true for the cPAH data from the Site. However, the estimations of soil volumes given in this report are unaccompanied by representative calculations that support the conclusions, so the numerical estimates given on the maps are not reproducible. Nonetheless, the MPCA staff generally agree with the estimates of the volumes of VOC contaminated soil that exceed model-derived clean-up numbers. However, the MPCA staff has arrived at different estimates for the cPAH soil volumes as per the following reasoning:

1. Volume estimates of cPAH contaminated soil:

a. Clean-up goal of 5 parts per million (ppm) (unrestricted use scenario):

Number of samples exceeding 5 ppm: 9

Assumed area of contamination surrounding each boring: 5 feet (10 foot diameter assumed by Navy).

Depth of contamination: Navy assumes in the report that the depth of the contamination extends to ground water, or 20 feet, which may be an overestimate of the extent of the cPAH contamination. Soil boring logs appear to indicate that the depth of the fill associated with the contamination likely extends to no more than approximately eight feet. Therefore, MPCA staff has used an estimate of eight feet in the volume estimate:

$$\begin{aligned} \text{Volume} &= \pi r^2 (\text{depth}) \\ \text{Volume, } yd^3 &= \frac{\pi (5 \text{ ft})^2 (8 \text{ ft})}{27 \text{ ft} / yd^3} \\ &= 23.3 yd^3 \end{aligned}$$

per boring. In OU2 Area A, nine borings are included in the estimation:

$$(9)(23.3 yd^3) = 209 yd^3$$

Following the same reasoning, Areas D and E contain roughly 23 and 46 yd³, respectively, of soil exceeding the cPAH clean-up numbers, giving:

$$209+23+46 = 278 \text{ yd}^3 \text{ soil, total.}$$

- b. **Clean-up goal of 12 ppm (industrial use scenario):** Six soil borings in Area A exceed the 12 ppm clean-up goal. Following the same reasoning as in 1.a. above, 139 yd³ of soil exceed this concentration. Site D had no borings indicating an exceedence of 12 ppm, whereas Site E had one boring. The estimate of the total soil volume is therefore 163 yd³.
- c. **Clean-up goal of 20 ppm (good vegetative cover scenario):** Three soil borings at Area A exceed the 20 ppm clean-up goal, leading to an estimate of about 70 yd³ of soil contaminated with cPAH.

Because the Navy has not presented any data showing that cPAH soil contamination extends to the water table (rather the Navy previously estimated that the contamination extends no lower than approximately eight feet, which is consistent with the Navy's contention that cPAH-contaminated soil was used for fill), the Navy shall use the MPCA staff estimates in all future reports where these estimates are necessary, e.g., the OU3 Feasibility Study.

- 2. **Volume estimates of VOC contaminated soil:** The six circular areas shown on Figure 1 indicate that the total area of soil in question is approximately 18,800 ft². Calculating the volumes as detailed in 1.a. above gives 376,300 ft³, or roughly 13,900 yd³ of VOC contaminated soil that exceed the clean-up numbers. This is fairly close agreement with the 12,000 yd³ estimated by Navy.

The Navy shall use either its estimates or the MPCA staff estimates of VOC contaminated soil in OU2 in all future reports where these estimates are necessary, e.g., the OU3 Feasibility Study.