



UNITED STATES ENVIRONMENTAL PROTECTION AGENCY
REGION 5
77 WEST JACKSON BOULEVARD
CHICAGO, IL 60604-3590

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NSWC CRANE
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REPLY TO THE ATTENTION OF

May 5, 1999

DW-8J

Ms. Christine Freeman
Environmental Protection Dept. Code 095
Naval Surface Warfare Center
300 Highway 361
Crane, Indiana 47522

RE: 30% Soil Loading Batch Report
Approval to Begin 30% or 35%
Loading Rate at the Bioremediation
Facility
Naval Surface Warfare Center
Crane, Indiana

Dear Ms. Freeman:

The United States Environmental Protection Agency (U.S. EPA) Region 5 Office and the Office of Research and Development (ORD) Cincinnati Office have both reviewed the U.S. Navy's Naval Surface Warfare Center Final 30% Soil Loading Batch Report, dated January 1999, with additional information submitted April 7, 1999. We are hereby approving the Final Report. The review comments from ORD are attached for your information.

We are pleased to approve the increase in the soil loading rate from 25% to 30%. Our ORD Office brought up some concerns about high temperature occurrences during the treatment process and suggested increasing soil loading to maintain better temperature controls. Therefore, the Region is willing to take some risk involved in the project and allow up to a 35% soil loading rate to be approved for the facility, based on the 30% soil testing results. The U.S. Navy should decide and document for the record what the exact soil loading will be between 30-35%. Please be aware that the pilot piles required for Rockeye and the Ammunition Burning Grounds should address these rates also when they

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occur. And, the U.S. Navy is also required to comply with the goals and management under the approved work plans with this increased rate.

We hope that this review process has helped to expedite the cleanup of explosive contaminated soils at the Naval Surface Warfare Center – Crane Division. If you have any questions regarding this matter, please contact me at (312) 886-6146.

Sincerely,



Carol Witt-Smith
Corrective Action Expert
WMB, IL/IN/MI Section

CC: NSW Core Team: Tom Brent, NSW
Doug Johnson, CAAA
Phil Keith, NSW
E.P. Johns, SOUTHDIV
Bill Gates, SOUTHDIV

NSWC Project Team: Michelle Timmerman, IDEM
Allen Debus, WMB
Carl Potter, ORD
Trish Erickson, ORD
Bob Leduc, Toltest
Alan Fosdick, MK
B. Venky Venkatesh, MK

NSWC Management Team: Jim Ferro, SOUTHDIV
Jim Hunsicker, NSW
Hak Cho, WMB
Tom Linson, IDEM

Enclosure: ORD Review

Filename: 30%approval.usn

DATE: May 6, 1999

SUBJECT: Review of NSWC Crane Site 30% Soil Loading Batch Report

FROM: Carl L. Potter, Ph.D.
Treatment and Destruction Branch,
Land Remediation and Pollution Control Division

TO: Trish Erickson
Site Management Support Branch
Land Remediation and Pollution Control Division

I have reviewed the Batch Report on 30% Soil Loading for the Naval Surface Warfare Center (NSWC) Crane Site (Site) in Crane, IN (Batch Report). I reviewed the information with respect to potential application of compost mixtures with 30% soil content for remediation of explosives contaminated soil. I concur with the Batch Report's conclusion that compost windrows with 30% soil content offers significant advantage over windrows with only 25% soil.

The Site is contaminated primarily with the explosive compounds 2,4,6-trinitrotoluene (TNT) cyclotrimethylenetrinitramine (RDX), and cyclotetramethylenetetranitramine (HMX), and their degradation products. No cleanup goals were reported for explosives in soil other than 90% reduction in explosives concentrations.

A large body of research exists that has proven windrow composting to be effective for bioremediation of explosives contaminated soil. The objective of The Batch Report was to verify that windrow composting using 30% soil can be as effective in removal of explosive compounds as windrows containing only 25% soil. The Batch Report compared explosives degradation in a 60 cubic yard compost windrow with 30% soil (Windrow N-30%) to that in a windrow with 25% soil (Mix 7B), discussed in a separate report (Full Scale Bioremediation Windrow S-001, Batch Report) included with the technical material.

According to the report, Industrial Cleanup Goals were reached in Windrow N-30% on Day 10 and Residential Cleanup Goals were reached by Day 20. The report failed to state what those cleanup goals were. Contaminant reduction goals (90% reduction) were achieved by Day 10. Mix 7B was reported to meet Industrial Cleanup Goals by Day 7. Day 7 data were not reported for Windrow N-30%; data were only collected on Days 5 and 10 for Windrow N-30%. Even if cleanup goals aren't met until Day 10 (as opposed to Day 7), 30% soil loading would still appear to offer great advantage over 25% loading due to economy of greater soil throughput in windrows with 30% soil.

During the first few weeks of composting, temperature inside Windrow N-30% routinely exceeded 65°C. The report stated that this temperature was readily reduced to within optimum temperature range through aeration or moisture addition. However, I don't believe that scenario meets optimum conditions. In compost remediation of contaminated soils, temperature in excess of 65°C kills or inactivates microorganisms. Even though the temperature may only exceed 65°C for a few hours per day, optimum bioremediation conditions may be lost as a result of injury to the microbial population.

Windrow N-30% obviously contained an active compost reaction based on temperature and oxygen-consumption data. Data presented in the Batch Report suggest that this Windrow could have supported more than 30% soil. In fact, a higher percent soil content might be advisable to avoid harmful temperature excursions above 65°C. Perhaps 35%, or even 40%, soil could be treated in a windrow. Higher soil content would dilute the compost reaction mixture and ought to reduce the maximum temperature attained during composting. This might help maintain temperature within the optimal range (40°C to 60°C) for greater sustained microbial activity and faster biodegradation of explosive compounds. This would also have the economic advantage of increased soil throughput as described in the Batch Report.

In summary, I agree with the Batch Report's conclusion that compost windrows with 30% soil content provide significant advantage over windrows with only 25% soil. In fact, data presented in the report suggest to me that higher soil content (35% or 40%) might even provide greater advantage than 30% soil content.