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NSWC CRANE
5090.3a

DEPARTMENT OF THE NAVY
CRANE DIVISION
NAVAL SURFACE WARFARE CENTER
300 HIGHWAY 361
CRANE, INDIANA 47522-5000

IN REPLY REFER TO:

5090
Ser 095/0010
01 FEB 2000

U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Illinois, Indiana, and Michigan Section
Attn: Mr. Peter Ramanauskas (DW-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center (NAVSURFWARCENDIV Crane) submits the response to comments and replacement pages for inclusion in the approved December 1999 Quarterly Interim Progress Report (IPR) (March 26, 1999 through August 31, 1999) for Full Scale Bioremediation Facility Operations. Enclosure (2) is the required certification statement.

NAVSURFWARCENDIV Crane point of contact is Ms. Christine D. Freeman, Code 09511, telephone 812-854-4423.

Sincerely,

JAMES M. HUNSICKER, DIRECTOR
ENVIRONMENTAL PROTECTION DEPARTMENT
BY DIRECTION OF THE COMMANDER

Encl:
(1) December 1999 Quarterly IPR Response to Comments/Replacement Pages
(2) Certification Statement

Copy to:
ADMINISTRATIVE RECORD
SOUTHNAVFACENGCOM (Code 1864)
TOLTEST Crane

Comments on the June and October 1999 Quarterly Interim Progress Reports
For Full-Scale Operations Bioremediation of Explosives Contaminated Soil
Naval Surface Warfare Center
Crane, Indiana

Comment 1:

The October 1999 report differs from the June 1999 report in presenting explosives concentration results for windrows 47 through 50. Please explain the differences in the Day 0 concentrations for these windrows; also, the differences in Day Last for windrow 48.

Resolution 1:

The report values have been corrected. Note that the Day Last for Windrow 48 was 17, not 6 as reported in the June report.

Comment 2:

There are a some reference errors in the October 1999 report. Page 3, Section 2.2, erroneously refers to post-excavation samples being discussed in Section 1.3. Page 7, Section 3.3, erroneously refers to Day Last analytical data being discussed in Section 2.4.

Resolution 2:
The reference on Page 3 to Section 1.3 has been changed to Section 2.3. The reference on Page 7 to Section 2.4 has been changed to Section 3.4.

Comment 3:

Page 6, Section 3.3, states field screening is performed weekly to monitor RDX levels within each windrow. What about TNT?

Resolution 3:
An explanation has been inserted into the text in this section.

Enclosure (1)

ppm, RDX ranged from non-detect to 600 ppm, and TNT ranged from non-detect to 174 ppm.

Pre-excavation sampling has been completed in six grids at Building No. 168. Explosives compounds were detected as follows: HMX ranged from non-detect to 92 ppm, RDX ranged from non-detect to 10,400 ppm, and TNT ranged from non-detect to 16,600 ppm.

Pre-excavation sampling has been completed in six grids at Building No. 171. Explosives compounds were detected as follows: HMX ranged from non-detect to 33 ppm, RDX ranged from non-detect to 18 ppm, and TNT ranged from non-detect to 3230 ppm.

Pre-excavation sampling has been completed in thirty grids at Building No. 173. Explosives compounds were detected as follows: HMX ranged from non-detect to 618 ppm, RDX ranged from non-detect to 11,600 ppm, and TNT ranged from non-detect to 1,750 ppm.

Pre-excavation sampling has been completed in eight grids at Building No. 2501. Explosives compounds were detected as follows: HMX ranged from non-detect to 250 ppm, RDX ranged from non-detect to 6490 ppm, and TNT ranged from non-detect to 1 ppm.

2.2 In-Process Excavation Soil Sampling

In-process excavation soil sampling is performed to assist the field crew in planning excavation activities. Field screening test kits are used for testing TNT and RDX levels in the in-process soil samples to provide quick analytical results.

All grids from which post-excavation samples were obtained (discussed in section 2.3 below) were first sampled and screened for RDX. When RDX screening indicates that remaining contamination is below industrial levels, then post-excavation samples are obtained.

2.3 Post-Excavation Soil Sampling

Post-excavation soil sampling (i.e., confirmation samples) is performed to provide confirmation that the excavation meets established industrial clean-up goals. Confirmation samples are analyzed for SWMU-specific compounds by an off-site analytical laboratory.

3.0 COMPOSTING OPERATIONS

Treatment of explosive-compounds contaminated soil by composting involves microbial degradation of explosive-compounds by optimizing the availability of organic material, temperature, moisture content, pH, and oxygen. The composting operation process description is provided in Section 5.0 of the approved *Full-Scale Operational Plan* [MK, 1998a].

This section provides details of procurement and delivery of amendments, quantity of amendments used in the treatment operations, construction and treatment of windrows, and analytical data interpretation.

3.1 Amendments

The compost mix used in full-scale operations consists of 25% soil, 15% chicken manure, and 60% straw by volume.

Straw deliveries have been received by the project satisfying all of the bulk straw order. A large stockpile of straw is available to satisfy composting needs into winter.

Chicken manure continues to be trucked to the Biofacility on an as-needed basis. Contract quantities of chicken manure are sufficient to support operations.

3.2 Quantity of Amendments Used

The following summarizes the amendments received during this reporting period.

- Chicken manure received this period: 4,691.25 tons
  Cumulative received for full-scale: 10,018.25 tons

- Straw received this period: 2,612.4 tons
  Cumulative received for full-scale: 5,588.4 tons

3.3 Windrow Construction and Treatment

Field screening has been performed at least weekly to monitor RDX levels within each windrow. Field screening of treated compost for TNT is not completed since RDX is a better indicator of contaminant degradation than TNT. Final compost samples are collected once the field test kits indicated RDX levels are below industrial clean-up goals. The day that final compost samples are collected for off-site laboratory confirmation analysis is referred to as Day Last.

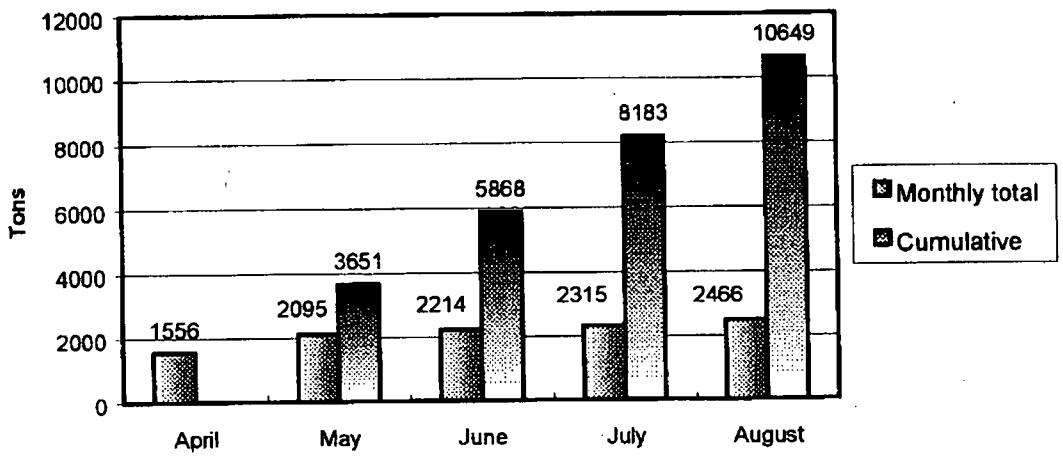
Fifty-four windrows (windrows 47 through 100) achieved Day Last status during this quarter (i.e. analytical results were received before the end of the quarter). Windrows 47 through 50 were constructed by Morrison Knudsen prior to this quarter and reached

Day Last status in this quarter. Windrows 51 through 106 were constructed in this quarter by TolTest, but Day Last status was only reached in this quarter through windrow 100. All windrows reported in this quarter achieved residential or industrial clean-up levels for explosive compounds. Analytical data regarding windrows that achieved Day Last status during this period are discussed in Section 3.4. All windrows up through windrow 101 were composed with soil from Mine Fill A. Windrow N-102 contained 14 loads of Mine Fill A soil and 3 loads of Mine Fill B soil. Windrow S-103 was the first windrow to contain all Mine Fill B soil.

Actual performance of remediation continues to be significantly ahead of the originally planned schedule. This is primarily due to the relatively short bio-degradation period. The average number of days between Day Zero and Day Last for this quarter was 8 days. The details of the progress of windrows are included as Table 2.0.

The total amount of soil processed in windrows 51 through 100 was 10,649 tons (based on 232 tons of soil in a full size windrow). Graph 2.0 charts the progress of composting operations.

GRAPH 2.0
NSWC CRANE BIOFACILITY SOIL PROCESSED VOLUMES



3.4 Analytical Data Interpretation and Validation

Table 3 provides this quarter's laboratory analytical results for HMX, RDX, and TNT. All windrow results represent an average of 15 individual data points (five cross sections, three sample locations per cross section). Day Zero and Day Last results are given for each windrow, demonstrating the effectiveness of the bio-degradation process.

All data associated with windrow monitoring was verified, and at least 10% of the samples were validated, and compared with field and laboratory quality control (QC) sample data to assess the data's usability for supporting full-scale operations. Data was verified by reviewing chain-of-custody forms, sample preservation records, analytical holding times, requested turnaround times, sample data in comparison to QC data, and reporting requirements. In addition, more than 10% of the data was validated using the validation procedures specified in Section 9.2.2 of the *QAPP*.

Analytical results for the trip blanks, field blanks, equipment rinsates, and field duplicates were evaluated to identify potential sources of error introduced during sampling, transportation and storage. Field QC performed with the monitoring of Windrow No. 47 through Windrow No. 100 during this quarter have been performed according to the requirements defined in the *QAPP*.

Laboratory QC consists of method blank, sample matrix spike (MS), sample matrix spike duplicate (MSD), surrogate, laboratory control sample (LCS), and laboratory control sample duplicate (LCSD) analyses to evaluate laboratory accuracy and precision. Laboratory quality control was performed consistent with the requirements of the QAPP. Method blanks, LCS, LCSD, and surrogates were acceptable in almost every analytical batch. MS and MSD data was generally acceptable. In some of the Day Zero data, consistent elevated MS and MSD recoveries of RDX and HMX are often seen in the analytical data because of the high levels of these compounds initially present in the sample. The Day Zero samples often require dilutions to bring the concentration of RDX and HMX to a quantifiable level. This dilution which occurs after spiking of the sample, dilutes the concentration of the spiking solution to a low level which cannot often be distinguished from the variability of the sample itself. Day Last data did not show similar interferences because initial concentrations were low in comparison to the concentration of spiking solution added to the sample. Other MS and MSD recoveries, which did not meet the established criteria in the *QAPP*, include recoveries for tetryl. This compound often suffers from degradation, which results in low recovery of the compound in the MS and MSD. However, based upon the undetectable levels of tetryl found in these samples and the relation of the analytical reporting limits to the industrial and residential clean-up levels, the data is determined to be acceptable to show that clean-up goals have been successfully met.

Based on technical review of the field and laboratory QC data, analyses were performed within acceptable accuracy and precision requirements specified in the *QAPP*. The confirmation data meets the project's data quality objectives and are therefore considered usable to support full-scale operations. Table 4 provides the average explosive compound levels for Day Zero and Day Last for the laboratory results received this quarter. Table 5 lists the clean up goals for HMX, RDX and TNT. All windrows to date have met the project objective industrial clean-up goals and 41 of the windrows processed this quarter have meet residential clean-up objectives.

TABLE 3.0
EXPLOSIVE COMPOUNDS ANALYTICAL DATA

	Windrow No. 47		Windrow No. 48		Windrow No. 49		Windrow No. 50	
	Day 0	Day 13	Day 0	Day 17	Day 0	Day 10	Day 0	Day 9
HMX	8.28	2.13	14.1	2.37	9.51	2.1	15.7	2.6
RDX	49.6	1.46	88.2	2.15	50.9	1.4	97.7	2.8
TNT	2.74	0.27	6.32	0.28	3.65	0.32	6.47	0.25

	Windrow No. 51		Windrow No. 52		Windrow No. 53		Windrow No. 54	
	Day 0	Day 14	Day 0	Day 11	Day 0	Day 11	Day 0	Day 12
HMX	19	2.2	20	3	8	3	24	2.1
RDX	142	1.2	111	2	60	7.7	172	1.1
TNT	8	0.25	1.4	0.3	20	5.8	8	0.2

	Windrow No.55		Windrow No.56		Windrow No.57		Windrow No.58	
	Day 0	Day 9	Day 0	Day 7	Day 0	Day 9	Day 0	Day 9
HMX	11	2.1	7	2	11	2.2	9	2.1
RDX	76	1.4	45	2.6	58	1.9	57	1
TNT	9	0.3	5	6.9	16	4.3	8	0.3

	Windrow No.59		Windrow No.60		Windrow No.61		Windrow No.62	
	Day 0	Day 8	Day 0	Day 8	Day 0	Day 8	Day 0	Day 6
HMX	5	2	4.1	2.1	5	2.1	5	2.2
RDX	49	2.8	44	4.9	48	3.5	43	6.5
TNT	18	0.4	27	0.4	15	4.2	24	0.8

	Windrow No.63		Windrow No.64		Windrow No.65		Windrow No.66	
	Day 0	Day 8	Day 0	Day 8	Day 0	Day 8	Day 0	Day 11
HMX	3	2.2	4	2.6	4	2.1	3	2
RDX	23	3.4	40	12.1	35	4.9	29	1.9
TNT	63	1.6	14	1.7	7	1.2	11	0.3

	Windrow No.67		Windrow No.68		Windrow No.69		Windrow No.70	
	Day 0	Day 7	Day 0	Day 10	Day 0	Day 7	Day 0	Day 7
HMX	4	2.1	6	2.2	4	2.2	4	2.2
RDX	32	4.2	48	2.9	18	6.9	34	3.2
TNT	8	1.4	9	3.8	7	2	5	0.4

	Windrow No.71		Windrow No.72		Windrow No.73		Windrow No.74	
	Day 0	Day 9	Day 0	Day 8	Day 0	Day 6	Day 0	Day 8
HMX	17	2.2		2.2		2.3		2.1
RDX	102	0.9		1.8		2.9		1.4
TNT	48	22.5		0.3		5.9		0.4

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Ser 095/0010

01 FEB 2000

The letter Ser 095/0010 was for the submittal of response to comments and replacement pages for the March through August 1999 Full-Scale Bioremediation Interim Progress Reports dated October 99. The replacement pages have been incorporated into the previously submitted reports on 12/08/99.

I certify under penalty of law that this document and all attachments were prepared under my direction or supervision in accordance with a system designed to assure that qualified personnel properly gather and evaluate the information submitted. Based on my inquiry of the person or persons who manage the system, or those persons directly responsible for gathering the information, the information submitted is, to the best of my knowledge and belief, true, accurate, and complete. I am aware that there are significant penalties for submitting false information, including the possibility of fine and imprisonment for knowing violations.

James M. Hanson

SIGNATURE

DIRECTOR, ENVIRONMENTAL PROTECTION DEPARTMENT
BY DIRECTION OF THE COMMANDER

TITLE

01 FEB 2000

DATE

Enclosure (2)