



DEPARTMENT OF THE NAVY

CRANE DIVISION
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NSWC CRANE
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U.S. Environmental Protection Agency, Region V
Waste, Pesticides, & Toxics Division
Waste Management Branch
Corrective Action Section
Attn: Mr. Peter Ramanauskas (DW-8J)
77 West Jackson Blvd.
Chicago, IL 60604

Dear Mr. Ramanauskas:

Crane Division, Naval Surface Warfare Center (NSWC Crane) submits, for your review and approval, two copies of the draft Second Quarter 2001 Quarterly Interim Progress Report (IPR) for April 1 through June 30, 2001 as enclosure (1). Enclosure (2) is the required certification statement.

NSWC 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

Encls:

- (1) IPR 2nd QUARTER 2001 (APR - JUN 2001)
- (2) Certification Statement

Copy to:

Administrative Record
IDEM (D. Griffin)

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TOLTEST Crane (w/o encls)

**Naval Facilities Engineering Command
Naval Surface Warfare Center
Crane, Indiana**

**Full-Scale Operations
Soils Bioremediation Facility**

**Quarterly Interim Progress Report
2nd Quarter 2001
April 1 – June 30**

Revision 0

TOLTEST, INC.

QUARTERLY INTERIM PROGRESS REPORT

2nd Quarter 2001

April 1 – June 30

Revision 0

**FULL-SCALE OPERATIONS
SOILS BIOREMEDIATION FACILITY
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA**

**ENVIRONMENTAL JOB ORDER CONTRACT
CONTRACT NO. N68950-96-D-0052
TOLTEST PROJECT NUMBER 37324.01**

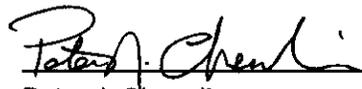
Submitted to:

**OFFICER IN CHARGE OF NAVFAC CONTRACTS
NAVAL SURFACE WARFARE CENTER
CRANE, INDIANA**

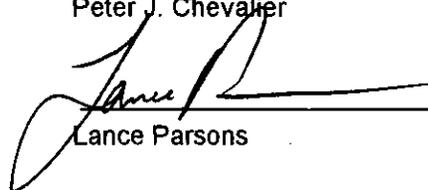
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EXECUTIVE SUMMARY

This interim progress report has been prepared by ToITest, Inc. (ToITest) for Southern Division, Naval Facilities Engineering Command. This report documents the progress at the Bioremediation Facility (Biofacility) for treatment of explosives-contaminated soil at the Naval Surface Warfare Center (NSWC) Crane, Indiana. On March 27, 1999, ToITest assumed responsibility for the excavation and treatment of contaminated soil at the Biofacility. This report summarizes the work actions performed from April 1 through June 30, 2001 pursuant to the requirements of the approved *Full-Scale Operational Plan* and the *Quality Assurance Project Plan*. Full-scale bioremediation operations started in April 1998. All interim measures work actions have been performed in accordance with approved plans.

The scope of work includes initial site characterization by sampling and analysis, excavation and screening of explosives-contaminated soil, transportation of screened soil for treatment to the Biofacility, process monitoring and confirmatory sampling of the compost windrows, and disposal of treated soil.

All initial characterization sampling at Mine Fill A (MFA) and Mine Fill B (MFB) has been completed. Initial characterization samples were obtained from 7 grids at Rockeye (RKI). All results were below cleanup goals. Post-excavation samples were obtained from six grids at RKI. All results were below cleanup goals.

A total of 869.55 tons of screened soil from RKI were transported to the Biofacility during this reporting period.

A total of 5 new windrows were constructed during this reporting period: 202 through 205 and the Control windrow for RKI toxicity testing. All windrows (except for the Control) achieved Day Last status during this period. The soil source for the Control windrow was found to contain PCBs, therefore its use as a Control windrow was discontinued. A new soil source for the Control windrow will be located and analyzed prior to forming the next Control windrow.

A total of 711.3 tons of contaminated soil from RKI was treated during this time period, all to residential cleanup goals.

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FIGURES

- Figure 1: Rockeye Grid Location Map
- Figure 2: MFB Windrow Location Map

1.0 INTRODUCTION

This interim progress report has been prepared by TolTest for the Southern Division, Naval Facilities Engineering Command to document the progress of the full-scale bioremediation operation of explosives-contaminated soil at NSWC Crane, Crane, Indiana. It summarizes the work actions performed by TolTest during the period April 1 through June 30, 2001 pursuant to the requirements of the approved *Full-Scale Operational Plan* (OP) [MK, 1998a] and the *Quality Assurance Project Plan* (QAPP) [MK, 1998b]. Full-scale bioremediation operations started in April 1998. TolTest assumed responsibility on March 27, 1999 from Morrison Knudsen Corp. (now Washington Group International, WGI) after the completion of their contract.

NSWC Crane, located in southwestern Indiana, provides support for equipment shipboard weapons systems, and ordnance. This site also supports Crane Army Ammunition Activity, which includes production and renovation, storage, shipment, and demilitarization and disposal of conventional ammunition. Explosive-compounds contaminated soils resulting from the above operations have been identified at four solid waste management units (SWMUs): Ammunition Burning Ground (ABG, SWMU-03/10); Rockeye Munitions Facility (RKI, SWMU-10/15); Mine Fill A (MFA, SWMU-12/14); and Mine Fill B (MFB, SWMU-13/14). No work has been performed at ABG pending the outcome of a risk assessment study.

On-site bioremediation of the high-explosives contaminated soil utilizing a windrow composting process has been selected as the preferred treatment alternative for the Interim Measures at these four SWMUs.

The scope of work includes initial site characterization by sampling and analysis, excavation and screening of explosives-contaminated soil, transportation of screened soil for treatment at the Biofacility, process monitoring, confirmatory sampling, disposal of treated soil, and site restoration. All of this work at MFA has been completed and has been included in the Interim Measures Report for MFA prepared by WGI.

2.0 EXCAVATION SITE ACTIVITIES

Work activities at the excavation site may include in-process sampling and screening, pre and post-excavation sampling, soil excavation, soil screening, and vegetation establishment. Fieldwork activities are performed in accordance with procedures included in the *Full-Scale OP* [MK, 1998a] and the *QAPP* [MK, 1998b]. Final drawings showing grid locations, post-excavation sample locations, and extent of excavation will be included in the Interim Measures Report for Bioremediation.

2.1 Pre-Excavation Soil Sampling

Pre-excavation sampling is performed to provide initial site characterization and delineate the extent of contamination. The horizontal boundaries of contamination are influenced by the presence of buildings, roads, railroad tracks, and grids with either no detectable levels of contaminants or levels that are below the cleanup goals. To date, no metals or VOCs have been detected above cleanup action levels in any sample.

A minimum of three soil samples are normally obtained from each grid. Explosive compounds and metals analyses are completed on composite samples obtained from zero to 12-inches in depth and 24 to 36-inches in depth. On occasion, the presence of rock or other obstacles prohibit the deeper composite sample from being obtained. Analysis for volatile organic compounds (VOCs) is completed on grab samples obtained at 12-inches.

2.1.1 MFA & MFB

Pre-excavation soil sampling at MFA and MFB is complete.

2.1.2 RKI

Pre-excavation sampling was completed in grids 29 through 35. All of these grids are in ditches which accept drainage water from the area of excavation behind and adjacent to Building 2733. All explosives were either non-detect or were detected at levels below residential cleanup goals. Figure 1 illustrates the location of these grids.

2.2 In-Process Excavation Soil Sampling

Field screening of in-process excavation soil samples was completed on samples from RKI grids 8 through 12 and 14. Excavation was stopped and post-excavation samples were

Field screening of in-process excavation soil samples was completed on samples from RKI grids 8 through 12 and 14. Excavation was stopped and post-excavation samples were obtained when screening results indicated that the level of explosives in the soil was below cleanup goals. Excavation was completed in grid 16 also but no screening samples were obtained because the presence of utility lines and support footers for the overhead walkway prevented further excavation of contaminated soil regardless of the results of field screening.

2.3 Post-Excavation Soil Sampling

Post-excavation samples were obtained from RKI grids 8 – 12 and 14. Analytical results indicate that levels of explosives remaining in the soil are below industrial cleanup goals in all grids. Figure 1 illustrates the location of these grids. Post-excavation samples from grid 16 will be obtained at a later date.

2.4 Soil Excavation and Screening

A total of 869.55 tons of contaminated soil from RKI were screened and delivered to the Biofacility in this reporting period: 500.33 tons in April; 221.96 tons in May; and 147.26 tons in June. Full-scale operations soil excavation quantities can be found in Table 1.0.

3.0 COMPOSTING OPERATIONS

Treatment of high-explosives contaminated soil by composting involves microbial degradation of the explosives 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 OP* [MK, 1998a].

3.1 Amendments

The compost mix used in full-scale operations consists of 25% soil, 15% chicken manure, and 60% straw by volume. A sufficient volume of straw has been delivered to satisfy the straw requirements for processing the remaining soil from MFB and RKI. Chicken manure continues to be delivered to the Biofacility on an as-needed basis in quantities sufficient to support operations.

3.2 Windrow Construction and Treatment

Field screening is 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. The process schedule for windrows processed in this reporting period is included as Table 2.

Windrows 202 through 205 and the Control windrow for RKI toxicity testing were formed in this reporting period. Windrows 202 through 205 were all formed with RKI soils. The Control windrow was formed with borrow source soil obtained from the straw storage field immediately to the south of the Biofacility. The Control windrow was formed before the analytical results were received from the laboratory. Results indicated that PCBs were detected in the soil at 9.3 ppm for Aroclor 1254 and 15 ppm for Aroclor 1260. Processing of the windrow was continued until the data could be properly validated and submitted to the Navy and EPA for review. Upon review of the data, the EPA stated that this windrow would not be acceptable as a control windrow for toxicity testing due to the presence of PCBs. A new borrow source will be identified and tested before the next control windrow is formed.

Windrow M-202 was the pilot-scale windrow for RKI processing and was formed with 15 tons of contaminated soil. Samples for off-site laboratory analysis were obtained on Day 0, Day 5, and

Day 10. Day 5 results were below residential cleanup goals but Day 10 samples were also obtained to ensure that no pockets of contamination remained in the windrow. Processing of the windrow was continued until results of Day 10 analyses were received. Day 10 results were also below residential cleanup goals.

Day 0 samples were obtained from windrows 203, 204, and 205 to determine which had the highest levels of explosives contamination on the day they were formed. As shown in Table 3, windrow 204 had the highest Day 0 level of contamination (based on RDX levels) and was therefore the windrow chosen for RKI toxicity testing. Samples for toxicity analysis were obtained at the same time that the normal Day Last samples were obtained. Samples were sent to Aqua Survey, Inc. for earthworm and Microtox analysis, to Pure Earth Environmental Labs for pathogen analysis, and to Southwest Labs for TCLP and SPLP explosives analysis.

Analytical results for Day Last samples from windrows 203, 204, and 205 were below residential cleanup goals. Table 4 provides this quarter's average laboratory analytical results for HMX, RDX, and TNT, and the regulatory cleanup goals. Table 5 provides the average Day Last explosive compound levels for the windrows listed in Table 4.

The total amount of soil processed in this reporting period (windrows 202 – 205) was 711.3 tons.

3.3 Analytical Data Interpretation and Validation

All windrow results (except M-202) represent an average of 15 individual data points (five cross sections, three sample locations per cross section). Windrow M-202, the RKI pilot-scale windrow, was sampled at only 4 cross sections, as per pilot-scale work plan requirements. Day Last results for each windrow demonstrates 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 windrows has 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 every analytical batch. Day Last data did not show interference with spiking solutions because initial concentrations were low in comparison to the concentration of spiking solution added to the sample. Comparing 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.

4.0 DISPOSITION OF TREATED SOIL AND SITE RESTORATION

Treated soil (compost) is transported back to the SWMU of origination either to the temporary staging area, the permanent storage areas, or used as backfill in the open excavations. Disposal activity is shown in Table 2. Site restoration (seeding, mulching, and watering) has been or will be implemented at all areas where ToITest has backfilled treated soil.

Two of the six windrows staged at MFB (windrows 135 & 181) were sampled in this reporting period to determine if degradation had occurred over time such that residential cleanup goals had been achieved (these windrows originally met industrial cleanup goals). Average results of this analysis is given in Table 6. Windrow 135 was moved to the Permanent Storage Area at MFB as shown on Figure 2. Windrow 181 had not been moved as of the end of this reporting period.

5.0 STATUS OF VARIOUS REPORTS

The Supplemental Toxicity Report for toxicity sampling carried out in November of 2000 is under review by EPA. The Pilot-Scale Treatability Report for Rockeye Soils is being written and will be submitted at a later date. The Full-Scale Bioremediation Windrow M-203, Batch Report is being written and will be submitted at a later date. The Toxicity Report for Rockeye Soils has not been started pending receipt of the toxicity testing from the off-site laboratories and completion of the Control windrow.

6.0 QUALITY CONTROL

Quality control inspections included excavation site operations, composting operations, sampling activities, field test kit analyses, and facility maintenance. Quality control checks were performed at required intervals using the field inspection checklists provided in Appendix F of the approved *Full-Scale OP* [MK, 1998a]. Copies of all inspection records are maintained at the Biofacility office.

During this period, 161 individual items were verified and no deficiencies were identified. Immediate actions were taken to correct any minor findings observed.

7.0 SAFETY AND INDUSTRIAL HYGIENE

7.1 General Safety

During this period 3,991.0 man-hours were expended by TolTest. There were no OSHA recordable injuries. The project has a cumulative total of 61,055.5 man-hours by the end of this reporting period.

Twelve formal safety inspections were performed during this quarter. No significant findings of an imminent or serious nature were found. Immediate actions were taken to correct any minor findings observed. Daily informal walk-around safety inspections reinforced and improved the workers safety performance.

7.2 Industrial Hygiene Sampling

Airborne monitoring for ammonia was performed during this reporting period, however no explosives monitoring was conducted due to the low volume of work at the Biofacility. Previous sampling events have indicated that elevated ammonia levels are encountered during the early stages of a windrows' life cycle. The chicken manure amendment is the primary contributor to ammonia concentrations. Full-face air purifying respirators with ammonia cartridges are worn during windrow formation and during composting activities when ammonia levels are 25 ppm (TLV) or above. Ammonia is typically localized near each pile and is significantly affected by natural ventilation of the building, moisture in the windrow, and turning of the windrow. Levels of ammonia detected at the time of monitoring were below 25 ppm with an average of approximately 15 ppm.

Previous sampling events have indicated that airborne explosives compounds do not pose a significant health hazard.

No wipe sampling for explosive residues was performed at the Biofacility during this reporting period due to the low volume of work performed at the facility. Previous sampling events have indicated that explosives contamination is not detected outside the exclusion zone when the proper decontamination procedures are followed.

No noise monitoring was performed during this quarter. Prior monitoring has concluded that associates are required to wear hearing protection while working around heavy equipment, which is when noise levels are likely to exceed 85 dBA during a weighted network steady state, or 140 dBA impulse, regardless of the duration of exposure.

8.0 FACILITY MAINTENANCE AND REPAIRS

- Began installation of gutters, downspouts, and sub-surface drainage pipes on the three compost buildings in accordance with FC03-FCR-FS030 Rev 0.
- Two tires were replace on the skid-steer loader.
- Replaced missing teeth on the SCARAB.
- Repaired the seal around the discharge pipe in Retention Pond 2.
- Repaired the engine covers on the soil screener.
- Installed new protective covers on the conveyor.
- Adjusted track tension on the Komatsu dozer.
- Decontaminated the SCARAB and cleaned the engine.

9.0 REFERENCES

MK, 1998a. *Full-Scale Operational Plan for Soils Bioremediation Facility, NSWC Crane, Crane, Indiana*. Delivery Order Number 0009, Contract Number N62467-93-D-1106. Prepared by Morrison Knudsen Corporation, Environmental Services Group. Revision 2, March 12, 1998.

MK, 1998b. *Quality Assurance Project Plan for Full-Scale Operations, Soils Bioremediation Facility, NSWC Crane, Crane, Indiana*. Delivery Order Number 0009, Contract Number N62467-93-D-1106. Prepared by Morrison Knudsen Corporation, Environmental Services Group. Revision 2, March 12, 1998.

TABLES

TABLE 1.0
FULL-SCALE OPERATIONS SOIL EXCAVATION QUANTITIES
April through June 2001
Quantity (Tons)

Period	Mine Fill A	Mine Fill B	Rockeye	Cumulative
Previously reported	21,045.39	20,317.17	16.45	41,379.01
April	0.00	0.00	500.33	41,879.34
May	0.00	0.00	221.96	42,101.30
June	0.00	0.00	147.26	42,248.56
Reporting Period Total	0.00	0.00	869.55	869.55
Site Total	21,045.39	20,317.17	886.00	

**TABLE 2
 WINDROW PROCESS SCHEDULE**

Windrow #	Start Date	Day Zero	Day Last	Lab Results Received	Complete Unload	Ton Processed	Soil Qty Ton Processed	Processed to Residential or Industrial Levels	Compost Disposal Location	Grid Disposal Locations
M-132*	12/27/99	12/27/99	3/27/01	4/3/01	4/3/01	232.1	PR	Residential	PPA	Na
S-133*	12/28/99	12/28/99	3/28/01	4/3/01	4/9/01	232.1	PR	Residential	PPA	Na
M-134*	12/29/99	12/29/99	3/29/01	4/4/01	4/17/01	232.1	PR	Residential	PPA	Na
S-135*	1/3/00	1/4/00	4/5/01	4/11/01	4/16/01	232.1	PR	Residential	PPA	Na
M-181*	8/8/00	8/9/00	6/14/01	6/21/01	Na	232.1	PR	Residential	TSA	Na
M-202	4/10/01	4/10/01	4/20/01	4/26/01	Nm	15	33,042.4	Residential	Nm	Na
M-203	5/29/01	5/30/01	6/18/01	6/24/01	Nm	232.1	33,274.5	Residential	Nm	Na
S-204	5/29/01	5/31/01	6/25/01	7/2/01	Nm	232.1	33,506.6	Residential	Nm	Na
M-205	6/6/01	6/7/01	6/28/01	7/9/01	Nm	232.1	33,738.7	Residential	Nm	Na
RKI Control	6/11/01	6/11/01	Na	Na	Nm	Na	Na	Na	Nm	Na

* Resampled windrows

PR = Previously Reported and accounted for

PPA = Permanent Placement Area

TSA = Temporary Storage Area

Na = not applicable

Nm = not moved from the Biofacility in this reporting period

TABLE 3
AVERAGE EXPLOSIVE COMPOUNDS DAY ZERO ANALYTICAL DATA (ppm)

WINDROW #	DAY #	HMX	RDX	TNT
M-202	0	153.0	33.3	9.2
M-203	0	126.4	41.0	5.9
S-204	0	142.1	47.0	6.6
M-205	0	64.5	27.2	1.9

TABLE 4
AVERAGE EXPLOSIVE COMPOUNDS DAY LAST ANALYTICAL DATA (ppm)

WINDROW #	DAY #	HMX	RDX	TNT
M-202	10	44.3	0.7	0.5
M-203	19	4.4	0.5	0.5
S-204	25	3.5	0.5	0.5
M-205	22	5.4	0.5	0.5
CLEANUP GOALS	Residential	3,300	4	15
	Industrial	34,000	17	64

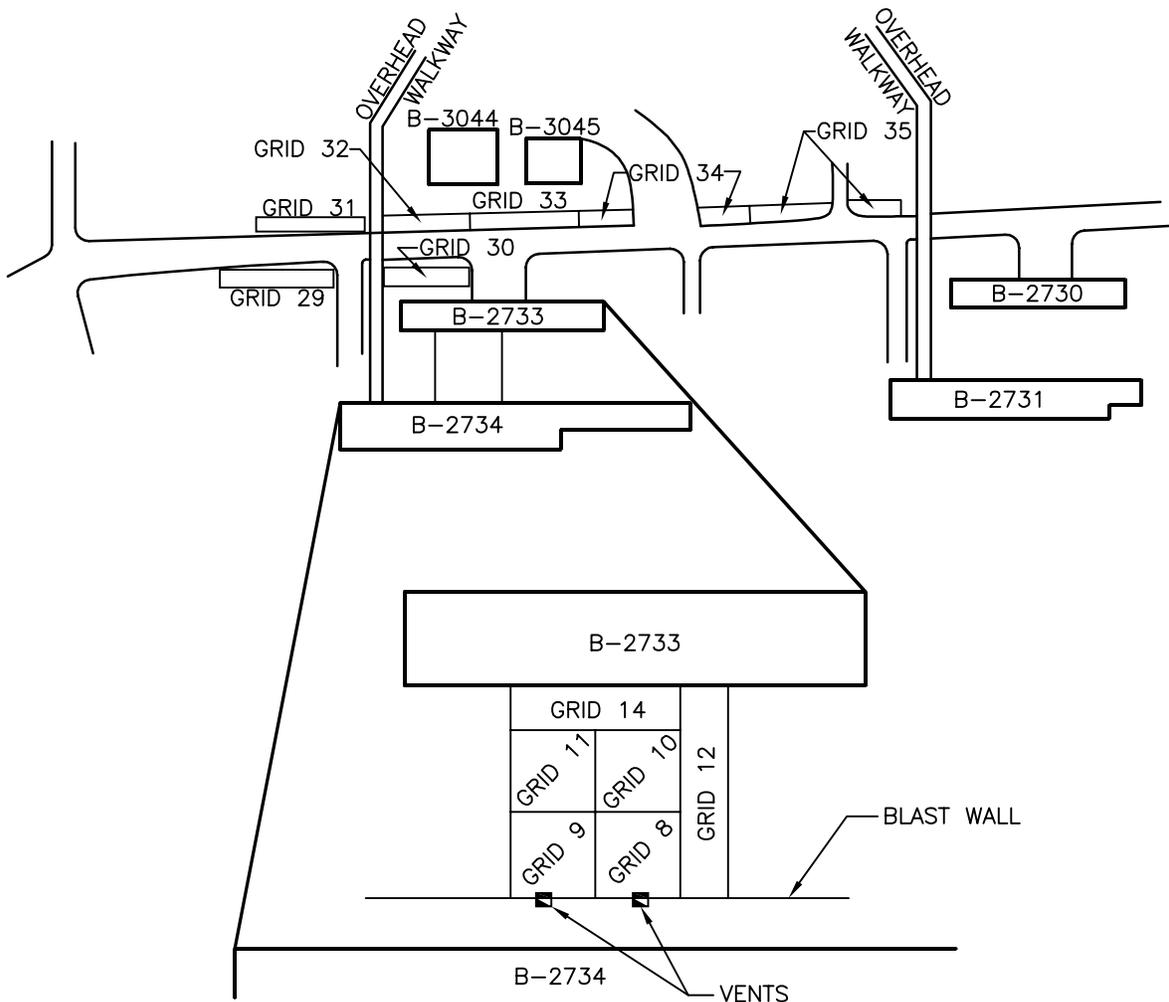
TABLE 5
AVERAGE DAY LAST EXPLOSIVE COMPOUNDS LEVELS

	ppm
HMX	14.4
RDX	0.6
TNT	0.5

WINDROW #	DAY #	HMX	RDX	TNT
132	455	0.4	0.4	0.8
133	455	0.5	1.6	0.6
134	455	0.3	0.6	0.6
135	456	0.4	0.7	0.5
181	318	0.5	0.8	0.6

FIGURES:

**ROCKEYE GRID LOCATION MAP
&
MFB WINDROW LOCATION MAP**



**FIGURE 1.0
ROCKEYE GRID LOCATION MAP**

NSWC CRANE, INDIANA

PREPARED FOR
**NAVAL FACILITIES ENGINEERING COMMAND
NSWC CRANE, INDIANA**

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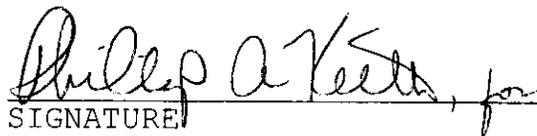
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040101-063001 QUARTERLY REPORT

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SIGNATURE

DIRECTOR, ENVIRONMENTAL PROTECTION DEPARTMENT
BY DIRECTION OF THE COMMANDER
TITLE

8/14/01
DATE