



Quarterly Interim Progress Report
October - December 1998

Full-Scale Operations
Bioremediation Of Explosives-Contaminated Soil
NSWC Crane
Crane, Indiana

Unit Identification Code: N00164
Contract No. N62467-93-D-1106

April 1999 (Revised March 2000)

**Southern Division
Naval Facilities Engineering Command
North Charleston, South Carolina
29419-9010**

EXECUTIVE SUMMARY

This interim progress report has been prepared by Morrison Knudsen Corporation (MK) for Southern Division, Naval Facilities Engineering Command. This is the third quarterly report that has been prepared to document the progress of the full-scale bioremediation operation of explosives-contaminated soil at Naval Surface Warfare Center (NSWC) Crane, Crane, Indiana. It summarizes the work actions performed during October through December 1998 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.

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 and confirmatory sampling; and disposal of treated soil.

All initial characterization sampling at Mine Fill "A" (MFA) is now complete. Initial characterization sampling at Mine Fill "B" (MFB), in support of a construction project by others, indicated the presence of TNT. Results of initial characterization sampling at Ammunition Burning Ground (ABG), in support of another construction project by others, did not require any immediate excavation activity. In process and post excavation sampling for several grids in MFA has been completed, indicating that industrial clean-up goals have been achieved.

A total of 3,131 cubic yards of screened soil was transported to the Biofacility during this reporting period. This quantity continues the improved productivity experienced with the new screener. The project team is well on its way towards building a screened soil stockpile sufficient to continue uninterrupted compost operations through the winter months.

Amendment supplies have been secured to continue compost operations through next spring. Straw is on hand and available, while the chicken manure supplier is under contract and manure is trucked to the project on an as needed basis.

A total of fourteen windrows were constructed during this reporting period. Fifteen windrows reached Day Last during this period. A total of 3,174 cubic yards of contaminated soil was reduced to residential clean up levels for explosive compounds contamination during the reporting period. Windrow processing is now four months ahead of schedule.

A total of 6,175 cubic yards (thirteen windrows) of completed compost was returned to MFA and staged for future use. Backfill activity was released to start at the direction of the Navy in December. A total of 4,868 cubic yards (eleven windrows) were placed in open excavation areas.

All interim measures work actions have been performed in accordance with the approved plans.

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ACRONYMS

| | |
|----------------------------|--|
| ABG | Ammunition Burning Ground |
| CAAA cfu/m ³ | Crane Army Ammunition Activity colony forming units per cubic meter |
| EPD | Environmental Protection Division |
| FCR | Field Change Request |
| HMX | cyclotremethylenetetranitramine |
| LCS | laboratory control sample |
| LCSD | laboratory control sample duplicate |
| LOQ | limit of quatitation |
| MFA | Mine Fill "A" |
| MFB | Mine Fill "B" |
| MK | Morrison Knudsen Corporation |
| MS | matrix spike |
| MSD | matrix spike duplicate |
| NSWC | Naval Surface Warfare Center |
| OSHA | Occupational Safety and Health Administration |
| PEL | permissible exposure limit |
| PID | photoionization detector |
| ppm | parts per million |
| QAPP | Quality Assurance Project Plan |
| QC | quality control |
| RDX | cyclotrimethylene trinitramine |
| SWMU | solid waste management unit |
| TLV | Threshold Limit Value |
| TNT | 2,4,6-trinitrotoluene |
| U.S. EPA | United States Environmental Protection Agency |

This interim progress report has been prepared by Morrison Knudsen Corporation (MK) for Southern Division, Naval Facilities Engineering Command. This is the third quarterly report that has been prepared to document the progress of the full-scale bioremediation operation of explosives-contaminated soil at Naval Surface Warfare Center (NSWC) Crane, Crane, Indiana. It summarizes the work actions performed during October through December 1998 pursuant to the requirements of the approved *Full-Scale Operational Plan* [MK, 1998a] and the *Quality Assurance Project Plan* [MK, 1998b]. Full-scale bioremediation operations started in April 1998.

NSWC Crane, located in southwestern Indiana, provides support for equipment shipboard weapons systems, and ordnance. This site also supports Crane Army Ammunition Activity (CAAA), 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 (SWMU-10/15); Mine Fill "A" (MFA) – (SWMU-12/14); and Mine Fill "B" (MFB) – (SWMU-13/14).

On-site bioremediation of the explosive-compounds contaminated soil utilizing a windrow composting process has been selected as the preferred treatment alternative for the Interim Measures (IM) 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 and confirmatory sampling; and disposal of treated soil.

1.0 EXCAVATION

During this reporting period field work activities were conducted at MFA. Work activities at the excavation site included: *in-process sampling, post-excavation sampling, soil excavation, and screening.* Specifics for each SWMU site are discussed below.

All field work activities were performed in accordance with procedures included in the *Full-Scale Operational Plan* [MK, 1998a] and the *Quality Assurance Project Plan (QAPP)* [MK, 1998b].

Drawings that show the sampling and excavation grids of various locations were provided in the previous report. Final drawings will be included in the Interim Measures Report for Bioremediation. Representative photographs of the excavation activities are provided in Appendix A.

1.1 Pre-Excavation Sampling

Pre-excavation sampling is performed to provide initial site characterization to delineate excavation efforts and to establish that clean-up goals have been achieved if no

excavation is required. Pre-excavation samples are analyzed for SWMU-specific compounds by an off-site analytical laboratory.

A minimum of three soil samples was obtained from each grid for characterization of the soil prior to excavation. Explosive compounds and metals analysis was completed on composite samples obtained from zero to 12-inches in depth and 24 to 36-inches in depth. Volatile analysis was completed on grab samples obtained at 12-inches. Additional samples were obtained for volatile analysis based on photoionization detector (PID) screening.

1.1.1 Mine Fill "A"

The horizontal boundaries of explosive constituents have been delineated by buildings, roads, railroad tracks, and grids with either no detectable levels of the respective constituent or levels below those requiring clean-up action. To date, no metals or volatile compounds have been detected above clean-up action levels in any sample.

1.1.2 Mine Fill "B"

Contaminated soil detected in Grid No. 94 at Building No. 165 has been excavated and transported to Biofacility Building No. 1 for storage.

Pre-excavation sampling is complete around Building No. 2500. No explosives compounds were detected in any grid above residential clean-up goals.

Pre-excavation sampling has been completed in six grids at Building No. 168. The explosives compounds were detected as follows: HMX ranged from non-detect to 107 ppm; RDX ranged from non-detect to 10,400 ppm; and TNT ranged from non-detect to 16,600 ppm. Explosives compounds were below residential levels in Grid No. 39.

Pre-excavation sampling has been completed in eighteen grids at Building No. 2501 (results have not yet been received for three of these grids). Explosives compounds were detected as follows: HMX ranged from non-detect to 4,090 ppm; RDX ranged from non-detect to 16,100 ppm; and TNT ranged from non-detect to 4,290 ppm. Explosives compounds were below residential levels in Grid Nos. 51 and 52.

Pre-excavation sampling has been completed in ten grids at Building No. 173. Explosives compounds were detected as follows: HMX ranged from non-detect to 11,100 ppm; RDX ranged from 2.5 ppm to 32,000 ppm; and TNT ranged from non-detect to 8,960 ppm.

1.2 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 analysis results.

1.2.1 Mine Fill "A"

In-process excavation soil sampling and field screening for explosive compounds has been accomplished on Grid Nos. 9, 13, 122, 123, 127, 134, 200 and 201 at Building Nos. 153/154. Field screening indicated that TNT and RDX contamination were still present in the soil after the first layer of contaminated soil was excavated in Grid Nos. 9, 127, 134, 200 and 201. Subsequent excavation and screening indicate that contamination levels are below industrial clean-up goals.

1.3 Post-Excavation Soil Sampling

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

1.3.1 Mine Fill "A"

Post-excavation soil characterization subsequent to contaminated soil removal has been accomplished on Grid Nos. 1-18, 122-134, 132-139, 142, and 200-203 at Building Nos. 153/154, and Grid Nos. 10-12, 43, 45, 48-59, 62-67, 70, 143, 149-151, 153, 182, and 183 at Building Nos. 158/159. Explosive compounds were detected above industrial clean-up goals in Grid Nos. 2-5, 17, 126-128, 134, 200, 202, and 203 at Building No. 153 and Grid Nos. 10-12, 56, 58, 59, 62-65, 149, and 150 at Building No. 158.

As-built drawings for Buildings 152, 158/159, and 153 are included in Appendix C. These drawings show the excavation depths and final post-excavation sample locations.

1.3.2 Mine Fill "B"

No post-excavation soil characterization has been initiated at MFB.

1.4 Soil Excavation and Screening

Soil excavation continued at MFA around buildings 152, 153/154, and 158/159. A total of 3,131 cubic yards of soil were excavated and screened during this reporting period. To date, 9,702 cubic yards of soil have been excavated and screened versus 9,000 cubic yards planned. The new screener continues to process soil at a higher rate than originally planned. Production during this quarter was 3,131 cubic yards versus 2,000 cubic yards planned. A substantial stockpile of screened soil is on hand to continue uninterrupted compost operations throughout the winter.

The planned and actual screened soil quantities are shown in Figure 1. Table 1 entitled "Full-Scale Operations Soil Excavations and Screening at MFA" included in Appendix B provides the production data.

2.0 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. 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.

2.1 Amendments

The compost mix used in the 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 but 600 tons of the bulk straw order. The remaining deliveries are scheduled to begin in January. A large stockpile of straw is available to satisfy composting needs into next spring. The additional 600 tons will assure the project has sufficient straw on hand to support operations until the 1999 harvest is available in June.

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

2.2 Quantity of Amendments Used

The following summarizes the amendments used during this reporting period.

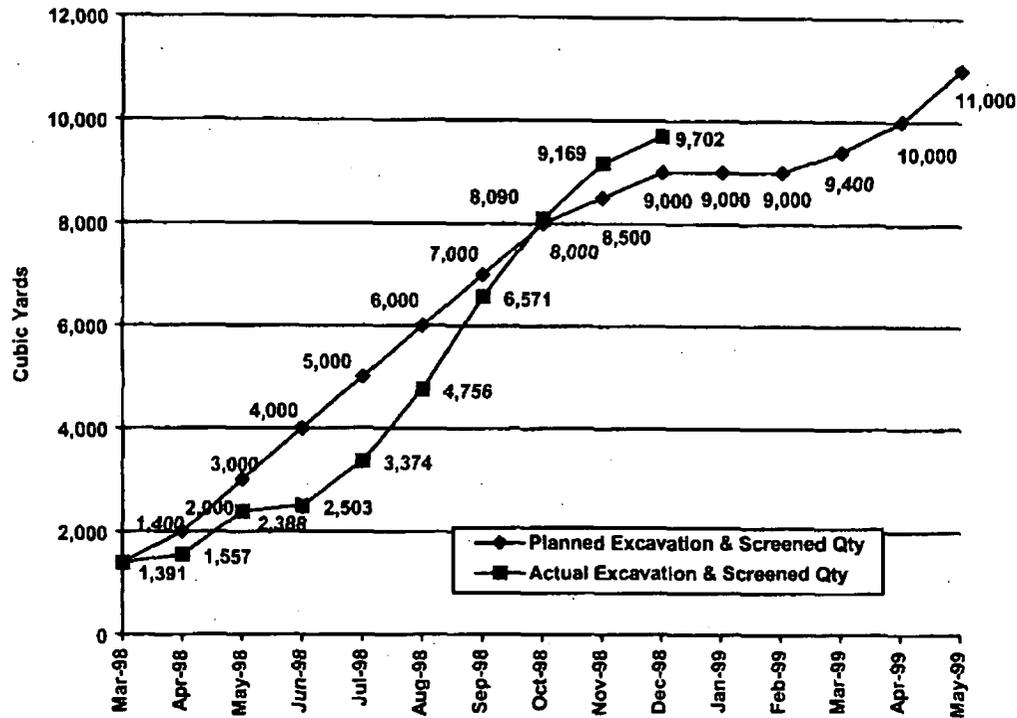
- Chicken manure received this period: 1,492 tons
Cumulative received for full-scale: 4,128 tons

- Chicken manure used this period: 1,798 yd³
Cumulative used for full-scale: 4,503 yd³

- Straw received this period: 0 tons
Cumulative received for full-scale: 2,976 tons

- Straw used this period: 7,023 yd³
Cumulative used for full-scale: 17,733 yd³

FIGURE 1
NSWC CRANE MFA - SOIL EXCAVATION AND SCREENING VOLUMES
(cumulative values)



2.3 Windrow Construction and Treatment

Field screening has been performed at least weekly to monitor the RDX and TNT levels. Final compost samples were collected once the field test kits indicated RDX and TNT readings were below detectable levels. The day that the final compost samples are collected for off-site laboratory confirmation analysis is referred to as Day Last.

Fifteen windrows achieved Day Last status during the third quarter of full-scale operations. Thirty-six windrows achieved Day Last status since the beginning of full-scale operations. One additional windrow was constructed towards the end of the reporting period. Laboratory results have been received for windrows one through 33. MK and the off-site laboratory handle Day Last laboratory data on a priority basis. The time between Day Last sample collection and receipt of analytical data varies from windrow to windrow. Lately, the duration has ranged from seven to 14 days with an average time of approximately 10 days. Residential clean-up levels for explosive compounds were achieved for all windrows completing Day Last during this reporting period, except for windrows 28, 30, 35 and 36. Analytical data regarding windrows achieving Day Last during this period are discussed in Section 2.4.

Windrow processing performance continues significantly ahead of schedule. This is primarily due to the relatively short bio-degradation period. The average duration between Day Zero and Day Last for the first twenty-one windrows is ten days. The schedule planned this period to be thirty days. MK continues to closely monitor the bioremediation of the windrows with the use of available data including field test kits. Windrows reaching clean-up goals are sampled for Day Last laboratory analysis. The details of the progress of windrows are included as Table 2, Appendix B.

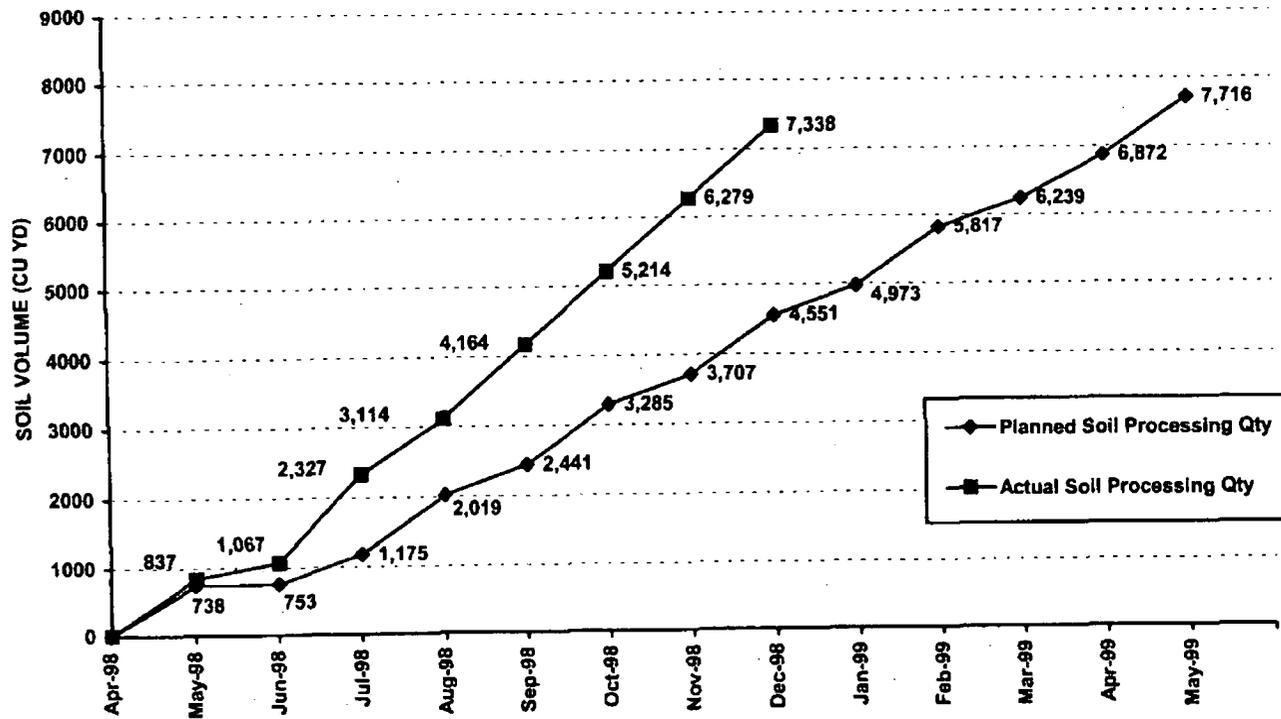
Operations remediated 3,174 cubic yards of contaminated soil during the third quarter. Cumulative operations since the beginning of full-scale have remediated 7,338 cubic yards of contaminated soil versus 4,551 cubic yards planned. Figure 2 charts the progress of composting operations.

2.4 Analytical Data Interpretation and Validation

Table 3 (see Appendix B) provides this quarter's laboratory analysis 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.

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

FIGURE 2
NSWC CRANE BIOFACILITY SOIL PROCESSED VOLUMES
(cumulative values)



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. 22 through Windrow No. 36 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 due to the high levels of these compounds initially present in the sample. 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 (see Appendix B) provides the average explosive compound levels for Day Zero and Day Last for the laboratory results received this quarter. Table 5 (see Appendix B) lists the clean up goals for HMX, RDX and TNT. All windrows to-date have met the project objective of meeting the industrial clean-up goals. In addition, most of the windrows processed this quarter also meet residential clean-up objectives. Windrows 28, 30, 35, and 36 are the only windrows where residential levels were not obtained for RDX. The bio-degradation has been efficient, and residential goals are readily being achieved.

3.0 DISPOSAL OF TREATED SOIL

Treated soil compost has been transported back to MFA either to the temporary staging area or used as backfill. The disposal activity to date is shown in Table 6, Appendix B. Representative photographs of backfill operations are provided in Appendix A.

4.0 BACKFILLING AND SITE RESTORATION

Backfill activities were conducted at MFA during this period after approval from United States Environmental Protection Agency (U.S. EPA), Region 5. Backfill operations are listed in Table 6, Appendix B.

5.0 STATUS OF VARIOUS REPORTS

Various MK generated reports have been drafted and are undergoing review and approval as discussed below.

A. Initial Batch Performance

The report confirms the performance of the full-scale compost operation, based on windrow S-001, as compared to pilot-scale testing and recommends continuance of full-scale operations. The Navy is reviewing this report.

B. 30% Soil Demonstration

This report summarizes the windrow composting operation using 30% soil loading. The results indicate that a 30% soil loading meet the performance and remedial goals established for this project. Navy comments are being incorporated.

C. Toxicity Report

The report concludes that treated compost is suitable for use as a top dressing for general land application and does not contain leachable contaminants. The Microtox® and earthworm toxicity results conclude that bioremediated explosive compounds-contaminated soil is no more toxic than non-contaminated soil, which has been subjected to similar windrow composting activities. The Navy is reviewing this report.

D. Audit Demonstration Report

The report recommends against the use of the Wiley Mill/Riffle splitter at the site prior to laboratory testing. The report also recommends that the current practice of using the field test kits as an indicator prior to laboratory testing be continued. The Navy is reviewing this report.

E. MFB Excavation Plan

This plan provides methods and controls for excavation, screening, transportation, and storage of explosive compounds-contaminated soils from MFB. This document is under review by the Navy and the U.S. EPA.

F. Pilot-Scale Treatability Test Report

The results of the pilot-scale testing of bioremediation of explosive compounds-contaminated soils at NSWC Crane are documented in this report. This document is under review by the Navy and the U.S. EPA.

G. Full-Scale QAPP Revision No. 3

This revision incorporates the standard operating procedures of our next off-site laboratory. This document is under review by the Navy and the U.S. EPA.

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 Operational Plan* [MK, 1998a]. Copies of all inspection records are maintained at the Biofacility office.

7.0 SAFETY AND INDUSTRIAL HYGIENE

7.1 General Safety

During this period 10,112 man-hours were expended. One Occupational Safety and Health Administration (OSHA) recordable injury occurred during this period. An employee fell on left hip while repositioning a decon pad liner. Employee sustained a contusion to his left hip with no lost or restricted days. This brings the project to a cumulative total of 140,339 man-hours without an OSHA recordable injury. No first aid cases to report during this 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 worker safety performance.

7.2 Industrial Hygiene Sampling

During this period total dust, airborne explosive compounds, and ammonia monitoring were performed.

Ammonia samples were taken at the Biofacility by colorimetric methods. Sampling indicates ammonia levels greater than the occupational exposure limits of 50 ppm permissible exposure limit (PEL) and 25 ppm (TLV). During windrow construction, and during the first three to five days of the windrow life cycle, sixteen grab samples and two personal samples were taken. The chicken manure amendment is the primary contributor to the ammonia concentrations. Full-face air purifying respirators with ammonia cartridges were worn during windrow formation and during the first five to seven days of the windrow life cycle. Ammonia is localized near each pile and is

significantly affected by natural ventilation of the building, moisture in windrow, and turning of windrow. The maximum ammonia level detected was 72 ppm. The average maximum for a new windrow is approximately 49 ppm.

Airborne explosive compounds dust sampling was also performed at the Biofacility. Three area samples and four personal samples were taken. Results of all samples were far below any occupational exposure limits for applicable explosive compounds.

Nuisance dust measurements, using a laser dust monitor, were taken during activities that have the greatest potential to generate dust. During these activities water is used to prevent and suppress any dust that could be generated. The average dust level detected was 0.772 mg/m³. The maximum dust level detected was 1.22 mg/m³ during loading activities. All dust samples were well below the 10 mg/m³ non-respirable limit and the 3 mg/m³ respirable limit.

A total of ten wipe samples were taken to identify any spread of explosive compounds contamination out of work zones. Samples were taken in the clothing change, shower, laboratory, office, and lunch areas. No occupational exposure limit exists for explosive compounds contamination. However, an administration control level of 1 ppm has been established for this project. Wipe sample results are not available at this time.

In summary, monitoring during this period indicates no airborne explosive compounds hazard and adequate dust controls. Ammonia monitoring indicates respiratory protection is warranted during the first three to five days of the windrow life cycle. Wipe sampling for explosive compounds, coupled with aggressive housekeeping activities, are required to prevent any detectable spread of explosive compounds outside work zones.

8.0 FACILITY MAINTENANCE AND REPAIRS

There were no significant repairs made to the facility during this period. Routine maintenance and housekeeping activities were performed.

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.

Appendix A
Representative Project Photographs



Roll FS-12, Log#14: Backside Berm of Bldg. 168, Mine Fill "B" – Rock Removal at Sampling Locations



Roll FS-12, Log#17: Excavator Removing Stones to Allow Access at Sampling Locations at Bldg. 172, Mine Fill "B"



Roll FS-13, Log#11: Pre-Excavation Sampling Activities at Bldg. 171, Mine Fill "B"



Roll FS-12, Log#11: Pre-Excavation Sampling Activities at Bldg. 171, Mine Fill "B"



Roll FS-13, Log#4: Backfill and Grading Activities at Bldg. 153/154, Mine Fill "A"

Appendix B
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**TABLE 1
FULL-SCALE OPERATIONS SOIL EXCAVATION AND SCREENING AT MFA**

| PLANNED QUANTITY (cu. yds.) | | ACTUAL QUANTITY (cu. yds.) | | VARIANCE QUANTITY (cu. yds.) | | |
|--------------------------------|--------|-------------------------------|--------|---------------------------------|--------|--------|
| Period | Period | Cum | Period | Cum | Period | Cum |
| Nov 97-Mar 98 | 1,400 | 1,400 | 1,391 | 1,391 | -9 | -9 |
| Apr-98 | 600 | 2,000 | 166 | 1,557 | -434 | -443 |
| May-98 | 1,000 | 3,000 | 831 | 2,388 | -169 | -612 |
| Jun-98 | 1,000 | 4,000 | 115 | 2,503 | -885 | -1,497 |
| Jul-98 | 1,000 | 5,000 | 871 | 3,374 | -129 | -1,626 |
| Aug-98 | 1,000 | 6,000 | 1,382 | 4,756 | 382 | -1,244 |
| Sep-98 | 1,000 | 7,000 | 1,815 | 6,571 | 815 | -429 |
| Oct-98 | 1,000 | 8,000 | 1,519 | 8,090 | 519 | 90 |
| Nov-98 | 500 | 8,500 | 1,079 | 9,169 | 579 | 669 |
| Dec-98 | 500 | 9,000 | 533 | 9,702 | 33 | 702 |
| Jan 99-Mar 99 | 400 | 9,400 | | | | |
| Apr-99 | 600 | 10,000 | | | | |

**TABLE 2
OPERATIONS SCHEDULE**

| Windrow No. | Schedule | Start Date | Complete | Day Zero | Day Last | Lab Results | Complete Unload | Qty Soil Processed | Cumulative Soil Qty |
|-------------|----------|------------|----------|----------|----------|-------------|-----------------|--------------------|---------------------|
| | Actual | | Load | | | | | | |
| 1 | Schedule | 4/13/98 | 4/15/98 | 4/15/98 | 5/15/98 | 5/30/98 | 6/11/98 | 211 | 211 |
| 1 | Actual | 4/13/98 | 4/15/98 | 4/15/98 | 5/11/98 | 5/29/98 | 6/24/98 | 211 | 211 |
| 2 | Schedule | 4/15/98 | 4/17/98 | 4/17/98 | 5/17/98 | 6/1/98 | 6/11/98 | 211 | 422 |
| 2 | Actual | 4/15/98 | 4/17/98 | 4/17/98 | 5/8/98 | 5/29/98 | 6/25/98 | 211 | 422 |
| 3 | Schedule | 4/20/98 | 4/22/98 | 4/22/98 | 5/22/98 | 6/6/98 | 6/30/98 | 211 | 633 |
| 3 | Actual | 4/20/98 | 4/22/98 | 4/22/98 | 5/7/98 | 5/29/98 | 6/26/98 | 215 | 637 |
| 4 | Schedule | 4/22/98 | 4/24/98 | 4/24/98 | 5/24/98 | 6/8/98 | 6/30/98 | 105 | 738 |
| 4 | Actual | 4/22/98 | 4/24/98 | 4/24/98 | 5/8/98 | 5/29/98 | 6/30/98 | 200 | 837 |
| 30% | Schedule | 4/27/98 | 4/27/98 | 4/27/98 | 6/26/98 | 7/11/98 | 7/13/98 | 15 | 753 |
| 30% | Actual | 4/27/98 | 4/27/98 | 4/27/98 | 6/26/98 | 7/13/98 | 9/1/98 | 20 | 857 |
| Control | Schedule | 4/27/98 | 4/27/98 | 4/27/98 | 5/27/98 | 6/17/98 | 6/28/98 | | Clean soil used |
| Control | Actual | 4/24/98 | 4/24/98 | 4/24/98 | 5/20/98 | 6/21/98 | 9/1/98 | | |
| 5 | Schedule | 6/15/98 | 6/17/98 | 6/17/98 | 7/17/98 | 8/1/98 | 8/3/98 | 211 | 964 |
| 5 | Actual | 6/1/98 | 6/3/98 | 6/3/98 | 6/18/98 | 7/2/98 | 7/2/98 | 210 | 1067 |
| 6 | Schedule | 6/17/98 | 6/19/98 | 6/19/98 | 7/19/98 | 8/3/98 | 8/5/98 | 211 | 1175 |
| 6 | Actual | 6/15/98 | 6/17/98 | 6/17/98 | 7/1/98 | 7/13/98 | 7/14/98 | 210 | 1277 |
| 7 | Schedule | 7/1/98 | 7/3/98 | 7/3/98 | 8/2/98 | 8/17/98 | 8/19/98 | 211 | 1386 |
| 7 | Actual | 6/22/98 | 6/24/98 | 6/24/98 | 7/7/98 | 7/15/98 | 7/16/98 | 210 | 1487 |
| 8 | Schedule | 7/3/98 | 7/5/98 | 7/5/98 | 8/4/98 | 8/19/98 | 8/21/98 | 211 | 1597 |
| 8 | Actual | 6/29/98 | 7/1/98 | 7/1/98 | 7/9/98 | 7/23/98 | 7/24/98 | 210 | 1697 |
| 9 | Schedule | 8/4/98 | 8/6/98 | 8/6/98 | 8/27/98 | 9/11/98 | 9/13/98 | 211 | 1808 |
| 9 | Actual | 7/6/98 | 7/8/98 | 7/8/98 | 7/16/98 | 7/27/98 | 7/28/98 | 210 | 1907 |
| 10 | Schedule | 8/6/98 | 8/8/98 | 8/8/98 | 8/29/98 | 9/13/98 | 9/15/98 | 211 | 2019 |
| 10 | Actual | 7/15/98 | 7/17/98 | 7/17/98 | 7/27/98 | 8/6/98 | 8/7/98 | 210 | 2117 |
| 11 | Schedule | 8/20/98 | 8/22/98 | 8/22/98 | 9/12/98 | 9/27/98 | 9/29/98 | 211 | 2230 |
| 11 | Actual | 7/20/98 | 7/22/98 | 7/22/98 | 7/31/98 | 8/12/98 | 8/14/98 | 210 | 2327 |
| 12 | Schedule | 8/22/98 | 8/24/98 | 8/24/98 | 9/14/98 | 9/29/98 | 10/1/98 | 211 | 2441 |
| 12 | Actual | 7/27/98 | 7/28/98 | 7/28/98 | 8/4/98 | 8/13/98 | 8/17/98 | 52 | 2379 |

TABLE 2 (continued)

| Windrow No. | Schedule | Start Date | Complete | Day Zero | Day Last | Lab | Complete Unload | Qty Soil Processed | Cumulative Soil Qty |
|-------------|----------|------------|----------|----------|----------|----------|-----------------|--------------------|---------------------|
| | Actual | | Load | | | Results | | | |
| 13 | Schedule | 9/14/98 | 9/16/98 | 9/16/98 | 10/7/98 | 10/22/98 | 10/24/98 | 211 | 2652 |
| 13 | Actual | 8/3/98 | 8/4/98 | 8/4/98 | 8/11/98 | 8/21/98 | 8/24/98 | 120 | 2499 |
| 14 | Schedule | 9/16/98 | 9/18/98 | 9/18/98 | 10/9/98 | 10/24/98 | 10/26/98 | 211 | 2863 |
| 14 | Actual | 8/4/98 | 8/6/98 | 8/6/98 | 8/14/98 | 8/24/98 | 8/26/98 | 210 | 2709 |
| 15 | Schedule | 9/30/98 | 10/2/98 | 10/2/98 | 10/23/98 | 11/7/98 | 11/9/98 | 211 | 3074 |
| 15 | Actual | 8/10/98 | 8/12/98 | 8/12/98 | 8/19/98 | 8/31/98 | 9/4/98 | 200 | 2909 |
| 16 | Schedule | 10/2/98 | 10/4/98 | 10/4/98 | 10/25/98 | 11/9/98 | 11/11/98 | 211 | 3285 |
| 16 | Actual | 8/13/98 | 8/15/98 | 8/15/98 | 8/21/98 | 9/4/98 | 9/8/98 | 205 | 3114 |
| 17 | Schedule | 10/25/98 | 10/27/98 | 10/27/98 | 11/17/98 | 12/2/98 | 12/4/98 | 211 | 3496 |
| 17 | Actual | 8/24/98 | 8/26/98 | 8/26/98 | 9/2/98 | 9/16/98 | 9/17/98 | 205 | 3319 |
| 18 | Schedule | 10/27/98 | 10/29/98 | 10/29/98 | 11/19/98 | 12/4/98 | 12/6/98 | 211 | 3707 |
| 18 | Actual | 8/26/98 | 8/28/98 | 8/28/98 | 9/3/98 | 9/16/98 | 9/18/98 | 210 | 3529 |
| 19 | Schedule | 11/10/98 | 11/12/98 | 11/12/98 | 12/3/98 | 12/18/98 | 12/20/98 | 211 | 3918 |
| 19 | Actual | 9/8/98 | 9/9/98 | 9/9/98 | 9/16/98 | 9/23/98 | 9/25/98 | 215 | 3744 |
| 20 | Schedule | 11/12/98 | 11/14/98 | 11/14/98 | 12/5/98 | 12/20/98 | 12/22/98 | 211 | 4129 |
| 20 | Actual | 9/10/98 | 9/11/98 | 9/11/98 | 9/18/98 | 9/25/98 | 9/28/98 | 210 | 3954 |
| 21 | Schedule | 12/5/98 | 12/7/98 | 12/7/98 | 12/28/98 | 1/12/99 | 1/14/99 | 211 | 4340 |
| 21 | Actual | 9/16/98 | 9/18/98 | 9/18/98 | 9/25/98 | 10/5/98 | 10/6/98 | 210 | 4164 |
| 22 | Schedule | 12/7/98 | 12/9/98 | 12/9/98 | 12/30/98 | 1/14/99 | 1/16/99 | 211 | 4551 |
| 22 | Actual | 9/21/98 | 9/23/98 | 9/23/98 | 10/14/98 | 10/16/98 | 10/26/98 | 210 | 4374 |
| 23 | Schedule | 12/21/98 | 12/23/98 | 12/23/98 | 1/13/99 | 1/28/99 | 1/30/99 | 211 | 4762 |
| 23 | Actual | 9/28/98 | 9/30/98 | 9/30/98 | 10/13/98 | 10/22/98 | 10/23/98 | 210 | 4584 |
| 24 | Schedule | 12/23/98 | 12/25/98 | 12/25/98 | 1/15/99 | 1/30/99 | 2/1/99 | 211 | 4973 |
| 24 | Actual | 9/30/98 | 10/2/98 | 10/2/98 | 10/12/98 | 10/21/98 | 10/22/98 | 210 | 4794 |
| 25 | Schedule | 1/15/99 | 1/17/99 | 1/17/99 | 2/7/99 | 2/22/99 | 2/24/99 | 211 | 5184 |
| 25 | Actual | 10/6/98 | 10/8/98 | 10/9/98 | 10/16/98 | 10/28/98 | 10/29/98 | 210 | 5004 |
| 26 | Schedule | 1/17/99 | 1/19/99 | 1/19/99 | 2/9/99 | 2/24/99 | 2/26/99 | 211 | 5395 |
| 26 | Actual | 10/22/98 | 10/23/98 | 10/24/98 | 10/30/98 | 11/12/98 | 11/14/98 | 210 | 5214 |

TABLE 2 (continued)

| Windrow No. | Schedule Actual | Start Date | Complete Load | Day Zero | Day Last | Lab Results | Complete Unload | Qty Soil Processed | Cumulative Soil Qty |
|-------------|-----------------|------------|---------------|----------|----------|-------------|-----------------|--------------------|---------------------|
| 27 | Schedule | 1/31/99 | 2/2/99 | 2/2/99 | 2/23/99 | 3/10/99 | 3/12/99 | 211 | 5606 |
| 27 | Actual | 10/26/98 | 10/28/98 | 10/28/98 | 11/4/98 | 11/12/98 | 11/14/98 | 220 | 5214 |
| 28 | Schedule | 2/2/99 | 2/4/99 | 2/4/99 | 2/25/99 | 3/12/99 | 3/14/99 | 211 | 5817 |
| 28 | Actual | 10/28/98 | 10/30/98 | 10/30/98 | 11/6/98 | 11/20/98 | 11/23/98 | 210 | 5644 |
| 29 | Schedule | 2/25/99 | 2/27/99 | 2/27/99 | 3/20/99 | 4/4/99 | 4/6/99 | 211 | 6028 |
| 29 | Actual | 11/2/98 | 11/4/98 | 11/4/98 | 11/12/98 | 11/24/98 | 11/24/98 | 210 | 5854 |
| 30 | Schedule | 2/27/99 | 3/1/99 | 3/1/99 | 3/22/99 | 4/6/99 | 4/8/99 | 211 | 6239 |
| 30 | Actual | 11/16/98 | 11/17/98 | 11/18/98 | 11/30/98 | 12/8/98 | 12/9/98 | 215 | 6069 |
| 31 | Schedule | 3/13/99 | 3/15/99 | 3/15/99 | 4/5/99 | 4/20/99 | 4/22/99 | 211 | 6450 |
| 31 | Actual | 11/18/98 | 11/19/98 | 11/20/98 | 11/30/98 | 12/8/98 | 12/10/98 | 210 | 6279 |
| 32 | Schedule | 3/15/99 | 3/17/99 | 3/17/99 | 4/7/99 | 4/22/99 | 4/24/99 | 211 | 6661 |
| 32 | Actual | 11/23/98 | 11/24/98 | 11/25/98 | 12/2/98 | 12/9/98 | 12/11/98 | 211 | 6490 |
| 33 | Schedule | 4/7/99 | 4/9/99 | 4/9/99 | 4/30/99 | 5/15/99 | 5/17/99 | 211 | 6872 |
| 33 | Actual | 11/30/98 | 12/2/98 | 12/2/98 | 12/8/98 | 12/18/98 | 12/22/98 | 211 | 6701 |
| 34 | Schedule | 4/9/99 | 4/11/99 | 4/11/99 | 5/2/99 | 5/17/99 | 5/19/99 | 211 | 7083 |
| 34 | Actual | 12/9/98 | 12/10/98 | 12/11/98 | 12/18/98 | | | 215 | 6916 |
| 35 | Schedule | 4/23/99 | 4/25/99 | 4/25/99 | 5/16/99 | 5/31/99 | 6/2/99 | 211 | 7294 |
| 35 | Actual | 12/11/98 | 12/13/98 | 12/13/98 | 12/22/98 | | | 211 | 7127 |
| 36 | Schedule | 4/25/99 | 4/27/99 | 4/27/99 | 5/18/99 | 6/2/99 | 6/4/99 | 211 | 7505 |
| 36 | Actual | 12/13/98 | 12/15/98 | 12/15/98 | 12/28/98 | | | 211 | 7338 |

TABLE 2 (continued)

| Windrow No. | Schedule Actual | Start Date | Complete Load | Day Zero | Day Last | Lab Results | Complete Unload | Qty Soil Processed | Cumulative Soil Qty |
|-------------|-----------------|------------|---------------|----------|----------|-------------|-----------------|--------------------|---------------------|
| 37 | Schedule | 5/18/99 | 5/20/99 | 5/20/99 | 5/30/99 | 6/14/99 | 6/16/99 | 211 | 7716 |
| 37 | Actual | 12/28/98 | 12/30/98 | 12/30/98 | | | | | |
| 38 | Schedule | 5/20/99 | 5/22/99 | 5/22/99 | 6/1/99 | 6/16/99 | 6/18/99 | 211 | 7927 |
| 38 | Actual | | | | | | | | |
| 39 | Schedule | 6/3/99 | 6/5/99 | 6/5/99 | 6/15/99 | 6/30/99 | 7/2/99 | 211 | 8138 |
| 39 | Actual | | | | | | | | |
| 40 | Schedule | 6/5/99 | 6/7/99 | 6/7/99 | 6/17/99 | 7/2/99 | 7/4/99 | 211 | 8349 |
| 40 | Actual | | | | | | | | |
| 41 | Schedule | 6/17/99 | 6/19/99 | 6/19/99 | 6/29/99 | 7/14/99 | 7/16/99 | 211 | 8560 |
| 41 | Actual | | | | | | | | |
| 42 | Schedule | 6/19/99 | 6/21/99 | 6/21/99 | 7/1/99 | 7/16/99 | 7/18/99 | 211 | 8771 |
| 42 | Actual | | | | | | | | |
| 43 | Schedule | 7/3/99 | 7/5/99 | 7/5/99 | 7/15/99 | 7/30/99 | 8/1/99 | 211 | 8982 |
| 43 | Actual | | | | | | | | |
| 44 | Schedule | 7/5/99 | 7/7/99 | 7/7/99 | 7/17/99 | 8/1/99 | 8/3/99 | 211 | 9193 |
| 44 | Actual | | | | | | | | |
| 45 | Schedule | 7/17/99 | 7/19/99 | 7/19/99 | 7/29/99 | 8/13/99 | 8/15/99 | 211 | 9404 |
| 45 | Actual | | | | | | | | |
| 46 | Schedule | 7/19/99 | 7/21/99 | 7/21/99 | 7/31/99 | 8/15/99 | 8/17/99 | 211 | 9615 |
| 46 | Actual | | | | | | | | |
| 47 | Schedule | 8/2/99 | 8/4/99 | 8/4/99 | 8/14/99 | 8/29/99 | 8/31/99 | 211 | 9826 |
| 47 | Actual | | | | | | | | |
| 48 | Schedule | 8/4/99 | 8/6/99 | 8/6/99 | 8/16/99 | 8/31/99 | 9/2/99 | 211 | 10037 |
| 48 | Actual | | | | | | | | |

All soil quantities are in cubic yards.

TABLE 2 (continued)

| Windrow No. | Schedule | Start Date | Complete | Day Zero | Day Last | Lab | Complete Unload | Qty Soil Processed | Cumulative Soil Qty |
|-------------|----------|------------|----------|----------|----------|----------|-----------------|--------------------|---------------------|
| | Actual | | Load | | | Results | | | |
| 49 | Schedule | 8/16/99 | 8/18/99 | 8/18/99 | 8/28/99 | 9/12/99 | 9/14/99 | 211 | 10248 |
| 49 | Actual | | | | | | | | |
| 50 | Schedule | 8/18/99 | 8/20/99 | 8/20/99 | 8/30/99 | 9/14/99 | 9/16/99 | 211 | 10459 |
| 50 | Actual | | | | | | | | |
| 51 | Schedule | 9/1/99 | 9/3/99 | 9/3/99 | 9/13/99 | 9/28/99 | 9/30/99 | 211 | 10670 |
| 51 | Actual | | | | | | | | |
| 52 | Schedule | 9/3/99 | 9/5/99 | 9/5/99 | 9/15/99 | 9/30/99 | 10/2/99 | 211 | 10881 |
| 52 | Actual | | | | | | | | |
| 53 | Schedule | 9/15/99 | 9/17/99 | 9/17/99 | 9/27/99 | 10/12/99 | 10/14/99 | 211 | 11092 |
| 53 | Actual | | | | | | | | |
| 54 | Schedule | 9/17/99 | 9/19/99 | 9/19/99 | 9/29/99 | 10/14/99 | 10/16/99 | 211 | 11303 |
| 54 | Actual | | | | | | | | |
| 55 | Schedule | 10/1/99 | 10/3/99 | 10/3/99 | 10/13/99 | 10/28/99 | 10/30/99 | 211 | 11514 |
| 55 | Actual | | | | | | | | |
| 56 | Schedule | 10/3/99 | 10/5/99 | 10/5/99 | 10/15/99 | 10/30/99 | 11/1/99 | 211 | 11725 |
| 56 | Actual | | | | | | | | |
| 57 | Schedule | 10/15/99 | 10/17/99 | 10/17/99 | 10/27/99 | 11/11/99 | 11/13/99 | 211 | 11936 |
| 57 | Actual | | | | | | | | |
| 58 | Schedule | 10/17/99 | 10/19/99 | 10/19/99 | 10/29/99 | 11/13/99 | 11/15/99 | 211 | 12147 |
| 58 | Actual | | | | | | | | |
| 59 | Schedule | 10/31/99 | 11/2/99 | 11/2/99 | 11/12/99 | 11/27/99 | 11/29/99 | 211 | 12358 |
| 59 | Actual | | | | | | | | |
| 60 | Schedule | 11/2/99 | 11/4/99 | 11/4/99 | 11/14/99 | 11/29/99 | 12/1/99 | 211 | 12569 |
| 60 | Actual | | | | | | | | |

**TABLE 3
EXPLOSIVE COMPOUNDS ANALYTICAL DATA**

| | Windrow No. 22 | | Windrow No. 23 | | Windrow No. 24 | | Windrow No. 25 | |
|------------|----------------|--------|----------------|--------|----------------|--------|----------------|-------|
| | Day 0 | Day 21 | Day 0 | Day 23 | Day 0 | Day 10 | Day 0 | Day 7 |
| HMX | 31.3 | 2.06 | 59.2 | 4.48 | 36.4 | 2.57 | 17.8 | 2.54 |
| RDX | 182 | 2.32 | 511 | 3.26 | 238 | 1.95 | 117 | 3.02 |
| TNT | 2.53 | 0.26 | 6.65 | 0.25 | 3.97 | 0.45 | 2.04 | 0.24 |

| | Windrow No. 26 | | Windrow No. 27 | | Windrow No. 28 | | Windrow No. 29 | |
|------------|----------------|-------|----------------|-------|----------------|--------|----------------|-------|
| | Day 0 | Day 6 | Day 0 | Day 7 | Day 0 | Day 21 | Day 0 | Day 7 |
| HMX | 15.4 | 2.36 | 15.3 | 1.86 | 24.1 | 2.81 | 18.6 | 2.67 |
| RDX | 73.5 | 2.34 | 46.0 | 1.68 | 195 | 5.88 | 59.9 | 2.29 |
| TNT | 0.47 | 0.99 | 27.9 | 0.38 | 24.5 | 1.48 | 0.93 | 1.49 |

| | Windrow No.30 | | Windrow No.31 | | Windrow No.32 | | Windrow No.33 | |
|------------|---------------|--------|---------------|--------|---------------|-------|---------------|-------|
| | Day 0 | Day 20 | Day 0 | Day 10 | Day 0 | Day 7 | Day 0 | Day 6 |
| HMX | 23.8 | 2.09 | 12.9 | 2.17 | 13.0 | 1.66 | 10.5 | 2.02 |
| RDX | 189 | 4.93 | 64.7 | 3.67 | 92.9 | 2.96 | 57.7 | 2.78 |
| TNT | 14.7 | 0.25 | 12.1 | 0.25 | 34.1 | 0.25 | 13.9 | 0.69 |

| | Windrow No.34 | | Windrow No.35 | | Windrow No.36 | |
|------------|---------------|-------|---------------|-------|---------------|--------|
| | Day 0 | Day 7 | Day 0 | Day 9 | Day 0 | Day 13 |
| HMX | 18.1 | 3.10 | 19.2 | 3.71 | 26.0 | 2.75 |
| RDX | 107 | 3.15 | 167 | 6.24 | 232 | 4.21 |
| TNT | 49.8 | 1.46 | 12.3 | 0.53 | 29.0 | 0.25 |

NOTES: All results in ppm

**TABLE 4
AVERAGE EXPLOSIVE COMPOUNDS LEVELS**

| | Day 0 | Day Last |
|------------|--------------|-----------------|
| HMX | 22.8 | 2.59 |
| RDX | 155 | 3.38 |
| TNT | 15.6 | 0.61 |

(All results in ppm)

**TABLE 5
EXPLOSIVE COMPOUNDS CLEAN-UP LEVELS**

| | Clean-Up Goals (ppm) | |
|------------|-----------------------------|-------------------|
| | Residential | Industrial |
| HMX | 3,300 | 34,000 |
| RDX | 4 | 17 |
| TNT | 15 | 64 |

**TABLE 6
COMPLETED COMPOST DISPOSAL**

| Windrow | Soil Source | Soil Quantity | Day Zero | Day Last | Process Duration | Level Attained | Compost Quantity | Date Disposed | Compost Disposal Location |
|---------|-------------|---------------|----------|----------|------------------|----------------|------------------|---------------|---------------------------|
| 1 | MFA | 211 | 4/15/98 | 5/11/98 | 26 | Residential | 475 | 6/24/98 | West Berm Bldg. 159 |
| 2 | MFA | 211 | 4/17/98 | 5/8/98 | 21 | Residential | 475 | 6/25/98 | West Berm Bldg. 159 |
| 3 | MFA | 215 | 4/22/98 | 5/7/98 | 15 | Residential | 475 | 6/26/98 | MFA staging area |
| 4 | MFA | 200 | 4/24/98 | 5/8/98 | 14 | Residential | 475 | 6/30/98 | West Berm Bldg. 159 |
| 30% | MFA | 20 | 4/27/98 | 6/26/98 | 60 | Residential | 45 | 9/1/98 | MFA staging area |
| 5 | MFA | 210 | 6/3/98 | 6/18/98 | 15 | Residential | 475 | 7/2/98 | MFA staging area |
| 6 | MFA | 210 | 6/17/98 | 7/1/98 | 14 | Residential | 475 | 7/14/98 | MFA staging area |
| 7 | MFA | 210 | 6/24/98 | 7/7/98 | 13 | Residential | 475 | 7/16/98 | West Berm Bldg. 159 |
| 8 | MFA | 210 | 7/1/98 | 7/9/98 | 8 | Residential | 475 | 7/24/98 | MFA staging area |
| 9 | MFA | 210 | 7/8/98 | 7/16/98 | 8 | Residential | 475 | 7/28/98 | MFA staging area |
| 10 | MFA | 210 | 7/17/98 | 7/27/98 | 10 | Residential | 475 | 8/7/98 | West Berm Bldg. 159 |
| 11 | MFA | 210 | 7/22/98 | 7/31/98 | 9 | Residential | 475 | 8/14/98 | MFA staging area |
| 12 | MFA | 52 | 7/28/98 | 8/4/98 | 7 | Residential | 118 | 8/17/98 | South of Bldg. 157 |
| 13 | MFA | 120 | 8/4/98 | 8/11/98 | 7 | Residential | 271 | 8/24/98 | MFA staging area |
| 14 | MFA | 210 | 8/6/98 | 8/14/98 | 8 | Residential | 475 | 8/26/98 | MFA staging area |
| 15 | MFA | 200 | 8/12/98 | 8/19/98 | 7 | Residential | 475 | 9/4/98 | Steam Line Bldg. 2793 |
| 16 | MFA | 205 | 8/15/98 | 8/21/98 | 6 | Residential | 475 | 9/8/98 | MFA staging area |
| 17 | MFA | 205 | 8/26/98 | 9/2/98 | 7 | Residential | 475 | 9/17/98 | MFA staging area |
| 18 | MFA | 210 | 8/28/98 | 9/3/98 | 6 | Residential | 475 | 9/18/98 | MFA staging area |
| 19 | MFA | 215 | 9/9/98 | 9/16/98 | 7 | Residential | 475 | 9/15/98 | MFA staging area |
| 20 | MFA | 210 | 9/11/98 | 9/18/98 | 7 | Residential | 475 | 9/28/98 | Steam Line Bldg. 2793 |
| 21 | MFA | 210 | 9/18/98 | 9/25/98 | 7 | Residential | 475 | 10/6/98 | MFA staging area |
| 22 | MFA | 210 | 9/23/98 | 10/14/98 | 21 | Residential | 475 | 10/27/98 | MFA staging area |
| 23 | MFA | 210 | 9/30/98 | 10/13/98 | 13 | Residential | 475 | 10/23/98 | MFA staging area |

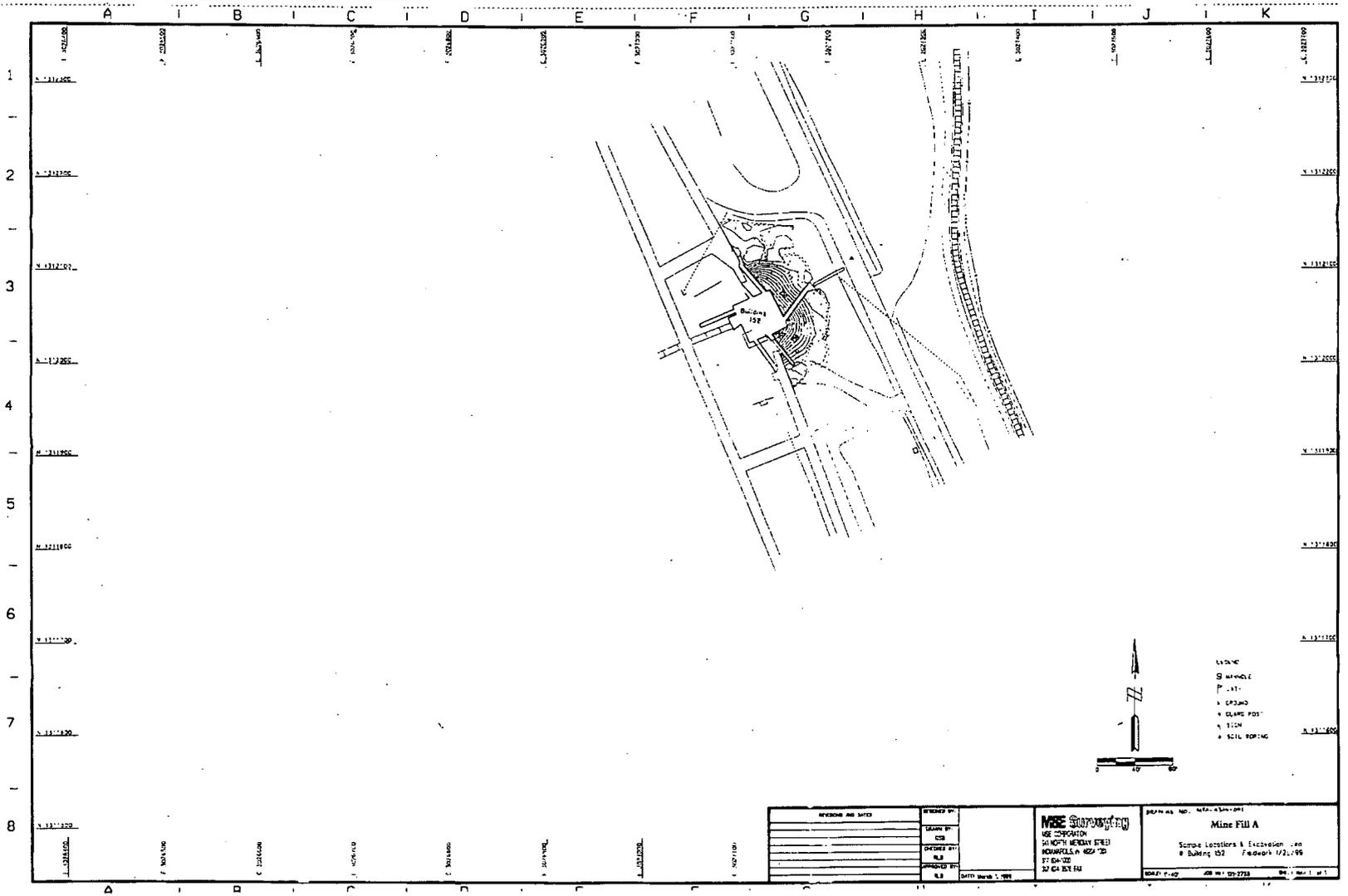
**TABLE 6
COMPLETED COMPOST DISPOSAL (continued)**

| Windrow | Soil Source | Soil Quantity | Day Zero | Day Last | Process Duration | Level Attained | Compost Quantity | Date Disposed | Compost Disposal Location |
|---------|-------------|---------------|----------|----------|------------------|----------------|------------------|---------------|---------------------------|
| 24 | MFA | 210 | 10/2/98 | 10/12/98 | 10 | Residential | 475 | 10/22/98 | MFA staging area |
| 25 | MFA | 210 | 10/9/98 | 10/16/98 | 7 | Residential | 475 | 10/29/98 | MFA staging area |
| 26 | MFA | 210 | 10/24/98 | 10/30/98 | 6 | Residential | 475 | 11/14/98 | MFA staging area |
| 27 | MFA | 220 | 10/28/98 | 11/4/98 | 7 | Residential | 475 | 11/14/98 | MFA staging area |
| 28 | MFA | 210 | 10/30/98 | 11/6/98 | 7 | Industrial | 475 | 11/23/98 | East Berm Bldg. 159 |
| 29 | MFA | 210 | 11/4/98 | 11/12/98 | 8 | Residential | 475 | 11/24/98 | MFA staging area |
| 30 | MFA | 215 | 11/18/98 | 11/30/98 | 12 | Industrial | 475 | 12/9/98 | West Berm Bldg. 159 |
| 31 | MFA | 210 | 11/20/98 | 11/30/98 | 10 | Residential | 475 | 12/10/98 | MFA staging area |
| 32 | MFA | 211 | 11/25/98 | 12/2/98 | 7 | Residential | 475 | 12/11/98 | MFA staging area |
| 33 | MFA | 211 | 12/2/98 | 12/8/98 | 6 | Residential | 475 | 12/22/98 | North/East Bldg. 157 |
| 34 | MFA | 215 | 12/11/98 | 12/18/98 | 7 | | | | |
| 35 | MFA | 211 | 12/13/98 | 12/22/98 | 9 | | | | |
| 36 | MFA | 211 | 12/15/98 | 12/28/98 | 13 | | | | |
| 37 | MFA | 211 | 12/28/98 | | | | | | |
| 38 | | | | | | | | | |
| 39 | | | | | | | | | |
| 40 | | | | | | | | | |

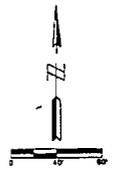
NOTE: Process duration is in days.
 All quantities are in cubic yards.
 Level attained is for explosive compounds.

Appendix C
As-Built Drawings for Mine Fill A

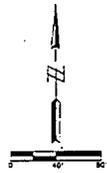
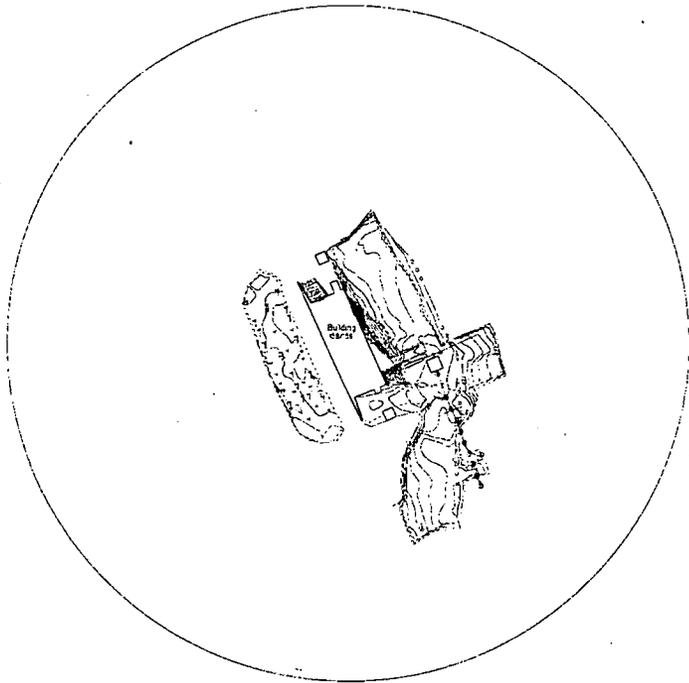
| | |
|---------------------------|--|
| Drawing No. MFA-4324-001: | Mine Fill A, Building 152, Final Post-Excavation Sample Locations and Excavation Elevations |
| Drawing No. MFA-4324-002: | Mine Fill A, Building 158/159, Final Post-Excavation Sample Locations and Excavation Elevations |
| Drawing No. MFA-4324-003: | Mine Fill A, Building 153, Final Post-Excavation Sample Locations and Excavation Elevations |



- WATER
- BUILDING
- ROAD
- CROSSING
- ELEVATION POST
- TOWER
- SOIL BORING

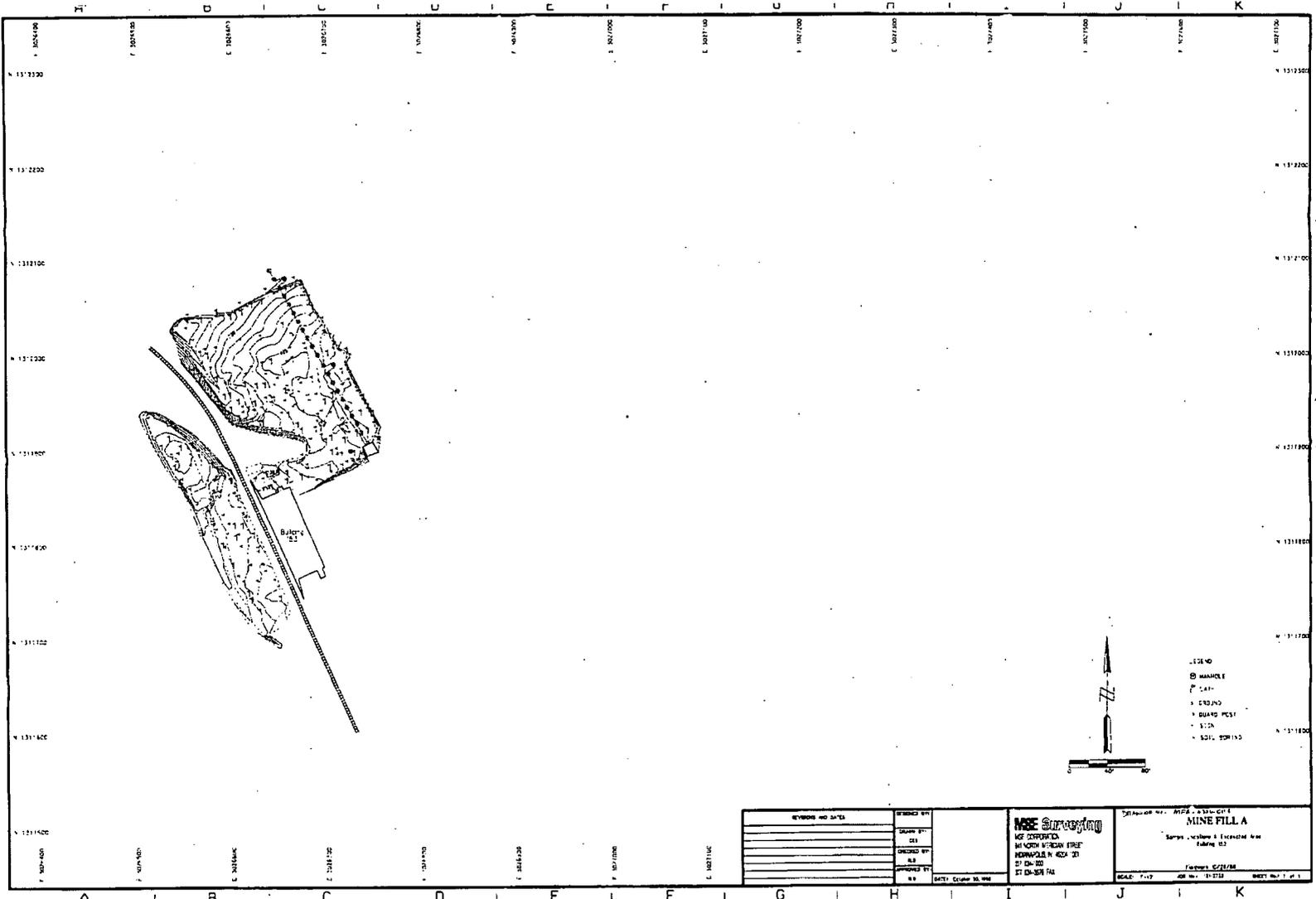


| | | | | |
|---|--|---|---|--|
| REVISIONS AND DATES _____ _____ _____ _____ _____ _____ _____ _____ | | DRAWN BY: _____ CHECKED BY: _____ APPROVED BY: _____ DATE: March 1, 1991 | MSE SOLUTIONS 34 NORTH WENDAY STREET NEWARK, NJ 07102 973-641-1100 87 64 151 FAX | PROJECT NO. 88-034-001 Mine Fill A Scrape Locations & Excavation Log @ Building 152 February 17/2, 1991 SHEET # 107 JOB # 88-034-001 DWG. # 107-1 |
|---|--|---|---|--|

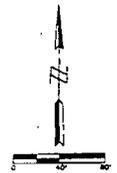


- 100' N
- 100' W
- 100' E
- 100' S
- 100' NE
- 100' SE
- 100' SW
- 100' NW

| | | | |
|--|-----------------------------------|--------------------------------------|--|
| MINE FILL A Sample SECTION 3 EXISTING MINE 02/24/24 | REVISIONS AND DATES | DESIGNED BY | DRAWING NO. MFM-4314-001A Mid-States ENGINEERING 330 E New York St., Suite 300 Indianapolis, IN 46204 (317) 634-6424 Phone (317) 634-3278 Fax |
| | CHECKED BY APPROVED BY DATE | DRAWN BY CO CHECKED BY DATE | |
| SCALE: 1" = 40' JOB NO.: 02-2275 SHEET NO.: 1 OF 3 | | | |



- DIRT ROAD
- ⊗ MANHOLE
- BENCH
- △ ELEVATION
- ▭ GUARD POST
- SLOPE
- ELEV. SPOTTING



| | | | | |
|--|--|---|---|--|
| REVISIONS AND DATES _____ _____ _____ _____ _____ | | DRAWN BY CBI CHECKED BY ALB APPROVED BY K.S. DATE: October 30, 1982 | <p> MSE SURVEYING MGE CORPORATION 80 NORTH WINDYBROOK DRIVE BIRMINGHAM, AL 35243 205-988-8800 FT. DA-504 744 </p> | TITLE: MINE FILL A <p style="text-align: center;"> MINE FILL A Sample, Volume 1 Excavated Area Station 02 </p> <p style="text-align: right;"> February 12, 1983 SHEET No. 1 of 1 </p> |
|--|--|---|---|--|