CDM Camp Dresser & McKee

CLASS A-3 RESPONSE ACTION OUTCOME
AND
RELEASE ABATEMENT MEASURE COMPLETION REPORT

BUCKLEY & MANN INC., NORFOLK, MASSACHUSETTS

BUREAU OF WASTE SITE CLEANUP SITE NUMBER 3-0173

August 2001

Section 1 contains BWSC Forms 104, 106 and 113 with original signatures.

Prepared for:

Buckley and Mann, Inc.

Site: 17 Lawrence Street, Norfolk, MA

3-173

Prepared by:

Camp Dresser & McKee Inc.

One Cambridge Place

50 Hampshire Street

Cambridge, Massachusetts 02139

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Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-106

RELEASE & UTILITY-RELATED ABATEMENT MEASURE (RAM & URAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 and 310 CMR 40.0462 - 0465 (Subpart D)

Release Tracking Number: 3 - 0173

A. SITE LOCATION:

Site Name: (optional) Buckley and Mann, Inc.

Street: 17 Lawrence Street

Location Aid: Bush Pond

City/Town: Norfolk

ZIP Code: 02056-0000

☑ Check here if a Tier Classification Submittal has been provided to DEP for this Release Tracking Number.

Related Release Tracking Numbers That This RAM or URAM Addresses:

B. THIS FORM IS BEING USED TO: (check all that apply)

☐ Submit a **RAM Plan** (complete Sections A, B, C, D, E, F, J, K, L and M).

☐ Check here if this RAM Plan is an update or modification of a previously approved written RAM Plan. Date Submitted:

☐ Submit a **RAM Status Report** (complete Sections A, B, C, E, J, K, L and M).

☑ Submit a **RAM Completion Statement** (complete Sections A, B, C, D, E, G, J, K, L and M).

☐ Confirm or Provide **URAM Notification** (complete Sections A, B, H, K, L and M).

☐ Submit a **URAM Status Report** (complete Sections A, B, C, E, J, K, L and M).

☐ Submit a **URAM Completion Statement** (complete Sections A, B, C, D, E, I, J, K, L and M).

You must attach all supporting documentation required for each use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

C. SITE CONDITIONS:

☑ Check here if the source of the Release or Threat of Release is known.

If yes, check all sources that apply: ☐ UST ☐ Pipe/Hose/Line ☐ AST ☐ Drums ☐ Transformer ☐ Boat ☐ Tanker Truck ☐ Vehicle ☑ Other Specify: Bldg debris, coal ash, and textile plant waste

Identify Media and Receptors Affected: (check all that apply) ☐ Air ☐ Groundwater ☐ Surface Water ☐ Sediments ☑ Soil ☐ Wetlands ☐ Storm Drain ☐ Paved Surface ☐ Private Well ☐ Public Water Supply ☐ Zone 2 ☐ Residence ☐ School ☐ Unknown ☐ Other Specify:

Identify Release and/or Threat of Release Conditions at Site: (check all that apply)

☐ 2 and 72 Hour Reporting Condition(s) ☑ 120 Day Reporting Condition(s) ☐ Other Condition(s)

Describe: Metals, PAH, and TPH from building debris, coal ash and textile plant

RAMs may be conducted concurrently with an IRA only with written DEP approval
URAMs may not be conducted if any 2 or 72 Hour conditions exist at the site.

Identify Oils and Hazardous Materials Released: (check all that apply) ☐ Oils ☐ Chlorinated Solvents ☑ Heavy Metals ☐ Others Specify: PAH and TPH

D. DESCRIPTION OF RESPONSE ACTIONS: (check all that apply)

☐ Assessment and/or Monitoring Only

☑ Excavation of Contaminated Soils

☐ Re-use, Recycling or Treatment

◯ On Site ◯ Off Site Est. Vol.: _____ cubic yards

Describe: _____

☐ Store ◯ On Site ◯ Off Site Est. Vol.: _____ cubic yards

☐ Deployment of Absorbent or Containment Materials

☐ Temporary Covers or Caps

☐ Bioremediation

☐ Soil Vapor Extraction

☐ Structure Venting System

☐ Product or NAPL Recovery

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SECTION D IS CONTINUED ON THE NEXT PAGE.

Massachusetts Department of Environmental Protection **BWSC-106**
Bureau of Waste Site Cleanup

RELEASE & UTILITY-RELATED ABATEMENT MEASURE (RAM & URAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 and 310 CMR 40.0462 - 0465 (Subpart D)

Release Tracking Number: 3 - 0173

D. DESCRIPTION OF RESPONSE ACTIONS (continued):

- [x] Landfill [x] Cover [ ] Disposal Est. Vol.: 315 cubic yards
- [ ] Removal of Drums, Tanks or Containers
  - Describe:
- [ ] Removal of Other Contaminated Media
  - Specify Type and Volume:
- [x] Other Response Actions Describe: On-site consolidation and covering of 4,550 cy soil
- [ ] Groundwater Treatment Systems
- [ ] Air Sparging
- [ ] Temporary Water Supplies
- [ ] Temporary Evacuation or Relocation of Residents
- [ ] Fencing and Sign Posting

See 310 CMR 40.0442 for limitations on the scope and type of RAMs.
See 310 CMR 40.0464 for performance standards for URAMs.

[ ] Check here if this RAM or URAM involves the use of Innovative Technologies. DEP is interested in using this information to aid in creating an Innovative Technologies Clearinghouse.

Describe Technologies:

E. TRANSPORT OF REMEDIATION WASTE:

(if Remediation Waste has been sent to an off-site facility, answer the following questions)

Name of Facility: Chemical Waste Management- Turnkey Facility

Town and State: Rochester, NH

Quantity of Remediation Waste Transported to Date: 315 Tons (no change from previous Status Reports))

F. RAM PLAN:

[ ] Check here if this RAM Plan received previous oral approval from DEP as a continuation of a Limited Removal Action (LRA).

Date of Oral Approval:

[ ] If a RAM Compliance Fee is required, check here to certify that the fee has been submitted. You **MUST** attach a photocopy of the payment. See 310 CMR 40.0444(2) to learn when a fee is not required.

[ ] Check here if the RAM Plan is proposed for a Transition Site. If this is the case, you may need to attach an LSP Evaluation Opinion prior to undertaking the RAM, if not previously provided. See 310 CMR 40.0600 for further information about Transition Sites.

G. RAM COMPLETION STATEMENT:

[ ] If a RAM Compliance Fee is required in connection with submission of the RAM Completion Statement, check here to certify that the fee has been submitted. You **MUST** attach a photocopy of the payment. You owe this fee when submitting a RAM Completion Statement if you received oral approval of a RAM that continued an LRA, and have NOT previously submitted a RAM Plan and accompanying fee.

If any Remediation Waste will be stored, treated, managed, recycled or reused at the site following submission of the RAM Completion Statement, you must submit a Phase IV Remedy Implementation Plan, along with the appropriate transmittal form, as an attachment to the RAM Completion Statement.

H. URAM NOTIFICATION:

Identify Location Type: (check all that apply) [ ] Public Right of Way [ ] Utility Easement [ ] Private Property

Identify Utility Type: (check all that apply) [ ] Sanitary/Combined Sewerage [ ] Water [ ] Drainage [ ] Natural Gas [ ] Telephone [ ] Steam Lines [ ] Telecommunications [ ] Electric [ ] Other Specify:

[ ] Check here if you provided DEP with previous oral notification of this URAM. Date of Oral Notice:

[ ] Check here if the property owner was NOT contacted prior to initiation of the URAM. If this is the case, you must attach an explanation of why the owner was not contacted, including the date and time when contact ultimately occurred.

[ ] Check here if this URAM will occur in connection with the construction of new public utilities. If this is the case, document the nature and extent of encountered contamination, the scope and expense of necessary mitigation and the benefits and limitations of project alternatives.

With the exception stated below, the person undertaking the URAM must provide the name and license number of an LSP engaged or employed in connection with the URAM:

LSP Name: LSP License Number:

LSP information is not required if the URAM is limited to the excavation and/or handling of not more than 100 cubic yards of soil contaminated by Oil, or not more than 20 cubic yards of soil contaminated either by a Hazardous Material or a mixture of a Hazardous Material and Oil.

Massachusetts Department of Environmental Protection **BWSC-106**
Bureau of Waste Site Cleanup

RELEASE & UTILITY-RELATED ABATEMENT MEASURE (RAM & URAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 and 310 CMR 40.0462 - 0465 (Subpart D)

Release Tracking Number: 3 - 0173

I. URAM COMPLETION STATEMENT:

[ ] Check here if this URAM was limited to the excavation and/or handling of not more than 100 cubic yards of soil contaminated by Oil, or not more than 20 cubic yards of soil contaminated by either a Hazardous Material or a mixture of a Hazardous Material and Oil.

If any Remediation Waste will be stored, treated, managed, recycled or reused at the site following submission of the URAM Completion Statement, you must submit either a Release Abatement Measure (RAM) Plan or a Phase IV Remedy Implementation Plan, along with the appropriate transmittal form, as an attachment to the URAM Completion Statement.

J. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this transmittal form, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B of this form indicates that a **Release Abatement Measure Plan** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B of this form indicates that a **Release Abatement Measure Status Report** or a **Utility-Related Abatement Measure Status Report** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) is (are) being implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

> *if Section B of this form indicates that a **Release Abatement Measure Completion Statement** or a **Utility-Related Abatement Measure Completion Statement** is being submitted*, the response action(s) that is (are) the subject of this submittal (i) has (have) been developed and implemented in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000, (ii) is (are) appropriate and reasonable to accomplish the purposes of such response action(s) as set forth in the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (iii) complies(y) with the identified provisions of all orders, permits, and approvals identified in this submittal;

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

[ ] Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

LSP Name: Robert A. Dangel LSP #: 7798 Stamp:

Telephone: 617-452-6267 Ext.:

FAX: (optional) 617-452-8267

Signature:

Date: 8/20/01 8/20/01

COMMONWEALTH OF MASSACHUSETTS ROBERT A. DANGEL No. 7798 REGISTERED LICENSED SITE PROFESSIONAL

COMMONWEALTH OF MASSACHUSETTS WILLIAM R. SWANSON No. 6406 REGISTERED LICENSED SITE PROFESSIONAL

An LSP Opinion is not required for a Utility-Related Abatement Measure Notification.

An LSP Opinion is not required for a URAM Completion Statement if the URAM is limited to the excavation and/or handling of not more than 100 cubic yards of soil contaminated by Oil, or not more than 20 cubic yards of soil contaminated either by Hazardous Material or a mixture of Hazardous Material and Oil.

K. PERSON UNDERTAKING RAM OR URAM:

Name of Organization: Buckley and Mann Inc.

Name of Contact: Richard Mann Title: Owners

Street: 11 Northwood Drive

City/Town: Walpole State MA ZIP Code: 02081-0000

Telephone: 508-668-9146 Ext.: FAX: (optional)

[ ] Check here if there has been a change in person undertaking the RAM or URAM.

Massachusetts Department of Environmental Protection **BWSC-106**
Bureau of Waste Site Cleanup

RELEASE & UTILITY-RELATED ABATEMENT MEASURE (RAM & URAM) TRANSMITTAL FORM

Pursuant to 310 CMR 40.0444 - 0446 and 310 CMR 40.0462 - 0465 (Subpart D)

Release Tracking Number: 3 - 0173

L. RELATIONSHIP TO SITE OF PERSON UNDERTAKING RAM or URAM: (check one)

☑ RP or PRP Specify: ◉ Owner ○ Operator ○ Generator ○ Transporter Other RP or PRP: _____

☐ Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)

☐ Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))

☐ Any Other Person Undertaking RAM or URAM Specify Relationship: _____

M. CERTIFICATION OF PERSON UNDERTAKING RAM OR URAM:

I, Richard Mann, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: _____ Title: Owner
(signature)

For Buckley and Mann, Inc. Date: 8/20/01
(print name of person or entity recorded in Section K)

Enter address of person providing certification, if different from address recorded in Section K:

Street: N/A

City/Town: _____ State: _____ ZIP Code: _____

Telephone: _____ Ext. _____ FAX: (optional) _____

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE.

Massachusetts Department of Environmental Protection
Bureau of Waste Site Cleanup

BWSC-113

Release Tracking Number: 3 - 0173

ACTIVITY & USE LIMITATION (AUL) TRANSMITTAL FORM

Pursuant to 310 CMR 40.1056 and 40.1070 - 40.1084 (Subpart J)

A. LOCATION OF DISPOSAL SITE AND PROPERTY SUBJECT TO AUL:

Disposal Site Name: Buckley and Mann, Inc.

Street: 17 Lawrence Street Location Aid: Bush Pond

City/Town: Norfolk ZIP Code: 02056-0000

Address of property subject to AUL, if different than above. Street:

City/Town: ZIP Code:

☑ Check here if this Disposal Site is Tier Classified.

If the Disposal Site subject to the AUL is also subject to a Tier I Permit, provide the Permit Number:

Related Release Tracking Numbers affected by this AUL:

B. THIS FORM IS BEING USED TO: (check one)

☑ Submit a certified copy of a **Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1074 (complete all sections of this form).

☐ Submit a certified copy of an **Amended Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1081(4) (complete all sections of this form).

☐ Submit a certified copy of a **Termination of a Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1083(3) (complete all sections of this form).

☐ Submit a certified copy of a **Grant of Environmental Restriction**, pursuant to 310 CMR 40.1071, (complete all sections of this form).

☐ Submit a certified copy of an **Amendment of Environmental Restriction**, pursuant to 310 CMR 40.1081(3) (complete all sections of this form).

☐ Submit a certified copy of a **Release of Environmental Restriction**, pursuant to 310 CMR 40.1083(2) (complete all sections of this form).

You must attach all supporting documentation for the use of form indicated, including copies of any Legal Notices and Notices to Public Officials required by 310 CMR 40.1400.

C. AUL INFORMATION:

Date AUL was recorded and/or registered with Registry of Deeds and/or Land Registration Office:

Name of Registry of Deeds and/or Land Registration Office where AUL was recorded and/or registered:

Book and Page Number and/or Document Number of recorded and/or registered AUL:

D. PERSON SUBMITTING AUL TRANSMITTAL FORM:

Name of Organization: Buckley and Mann, Inc.

Name of Contact: Richard Mann Title: Owner

Street: 11 Northwood Drive

City/Town: Walpole State: MA ZIP Code: 02081-0000

Telephone: 508-668-9146 Ext.: FAX: (optional)

E. OWNER OF PROPERTY, IF NOT PERSON SUBMITTING AUL TRANSMITTAL FORM:

Provide a mailing address for the owner of the property if that person is not submitting the AUL Transmittal Form. Provide addresses for additional owners on an attachment.

Name of Organization: (same)

Name of Contact: Title:

Street:

City/Town: State: ZIP Code:

Telephone: Ext.: FAX: (optional)

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Massachusetts Department of Environmental Protection **BWSC-113**
Bureau of Waste Site Cleanup

ACTIVITY & USE LIMITATION (AUL) TRANSMITTAL FORM

Pursuant to 310 CMR 40.1056 and 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 - 0173

F. RELATIONSHIP TO DISPOSAL SITE OF PERSON SUBMITTING AUL TRANSMITTAL FORM: (check one)

- [x] RP or PRP Specify: (x) Owner ( ) Operator ( ) Generator ( ) Transporter Other RP or PRP: _____
- [ ] Fiduciary, Secured Lender or Municipality with Exempt Status (as defined by M.G.L. c. 21E, s. 2)
- [ ] Agency or Public Utility on a Right of Way (as defined by M.G.L. c. 21E, s. 5(j))
- [ ] Any Other Person Submitting AUL Relationship: Specify _____

G. CERTIFICATION OF PERSON SUBMITTING AUL TRANSMITTAL FORM:

I, Richard Mann, attest under the pains and penalties of perjury (i) that I have personally examined and am familiar with the information contained in this submittal, including any and all documents accompanying this transmittal form, (ii) that, based on my inquiry of those individuals immediately responsible for obtaining the information, the material information contained in this submittal is, to the best of my knowledge and belief, true, accurate and complete, and (iii) that I am fully authorized to make this attestation on behalf of the entity legally responsible for this submittal. I/the person or entity on whose behalf this submittal is made am/is aware that there are significant penalties, including, but not limited to, possible fines and imprisonment, for willfully submitting false, inaccurate, or incomplete information.

By: _____ Title: Owner
(signature)

For: Buckley and Mann, Inc. Date: 8/20/01
(print name of person or entity recorded in Section D)

Enter address of person providing certification, if different from address recorded in Section D:
Street: _____

City/Town: _____ State: _____ ZIP Code: _____

Telephone: _____ Ext.: _____ FAX: (optional) _____

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY RETURN THE DOCUMENT AS INCOMPLETE. IF YOU SUBMIT AN INCOMPLETE FORM, YOU MAY BE PENALIZED FOR MISSING A REQUIRED DEADLINE, AND YOU MAY INCUR ADDITIONAL COMPLIANCE FEES.

CLASS A-3 RESPONSE ACTION OUTCOME AND RELEASE ABATEMENT MEASURE COMPLETION REPORT BUCKLEY & MANN INC., NORFOLK, MASSACHUSETTS

BUREAU OF WASTE SITE CLEANUP SITE NUMBER 3-0173

1.0 OWNERSHIP

This report documents the basis for a Class A-3 Response Action Outcome (RAO) and Release Abatement Measure Completion Report (RAM) under the Massachusetts Contingency Plan (MCP) for the Buckley & Mann Inc. (B&M) site in Norfolk, Massachusetts. The Revised RAM Plan for this site was submitted to Department of Environmental Protection (DEP) in November 1997.

The owner and responsible party for the remediation work is:

Richard Mann and Stephen Mann
Buckley & Mann, Inc.
11 Northwood Drive
Walpole, MA 02081

Appendix A provides a list of B&M's previous MCP submittals to the DEP and/or the Norfolk Conservation Commission, with a brief abstract for each major report.

2.0 AREA SUBJECT TO THIS RESPONSE ACTION OUTCOME

The 143 acre B&M property is currently unused, but may be developed for recreational, residential or other use in the future. Only a small portion of the property was used in past industrial activities. The remainder is undeveloped. **Figure 1** shows the site location, and **Figure 2** shows B&M property.

This RAO applies to approximately two acres of the site occupied by a former landfill, two acres occupied by former wastewater treatment Lagoons #1 and #2, one acre occupied by the former Carbonizer Lagoon, and approximately seven acres of adjacent land between the Tail Race and the Mill River, as shown on **Figure 3**. The RAO includes reliance on an Activity and Use Limitation (AUL) for the former landfill Area #10, which has been covered with three feet of clean sand to control future exposure to contaminated soil exceeding MCP S-1 and S-2 Method 1 standards. The AUL has also been extended to former wastewater treatment Lagoons #1 and #2, although residual soil contaminants in these Lagoons are present at concentrations less than MCP S-1 standards.

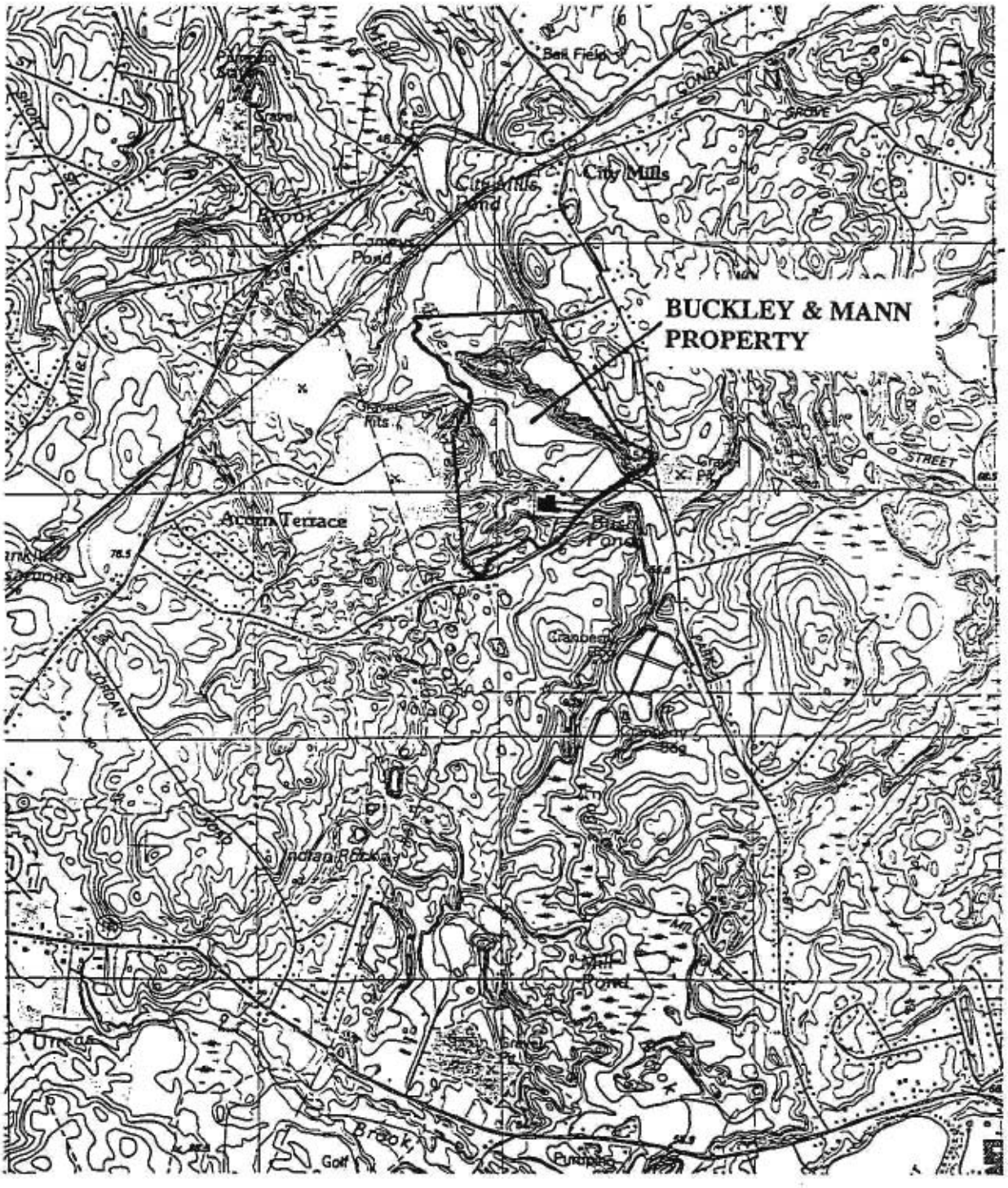
No oil or hazardous material release has been reported for the large, undeveloped, forested portion of the site, or for the area around the factory and support buildings at B&M. Consequently, no soil samples from these areas were analyzed for contaminants and these areas are not included under this RAO.

The status of the existing buildings is projected to change within the next two years, with demolition of some structures, possible rehabilitation of others, and removal or replacement of broken pavement. Evaluation of soil samples from the building area may be appropriate subsequent to completion of such work, or prior to any property transfer.

Figure 4 shows the AUL boundary with overlays for other regulatory jurisdictions:

- Town of Norfolk Wetland Protection District Number 5
- Limit of Federal Emergency Management Administration 100 Year Flood Plain
- Massachusetts [deed] Restricted Inland Wetland Number 5 [Norfolk]

FIGURE 1
SITE LOCATION PLAN



FRANKLIN, MASSACHUSETTS–RHODE ISLAND

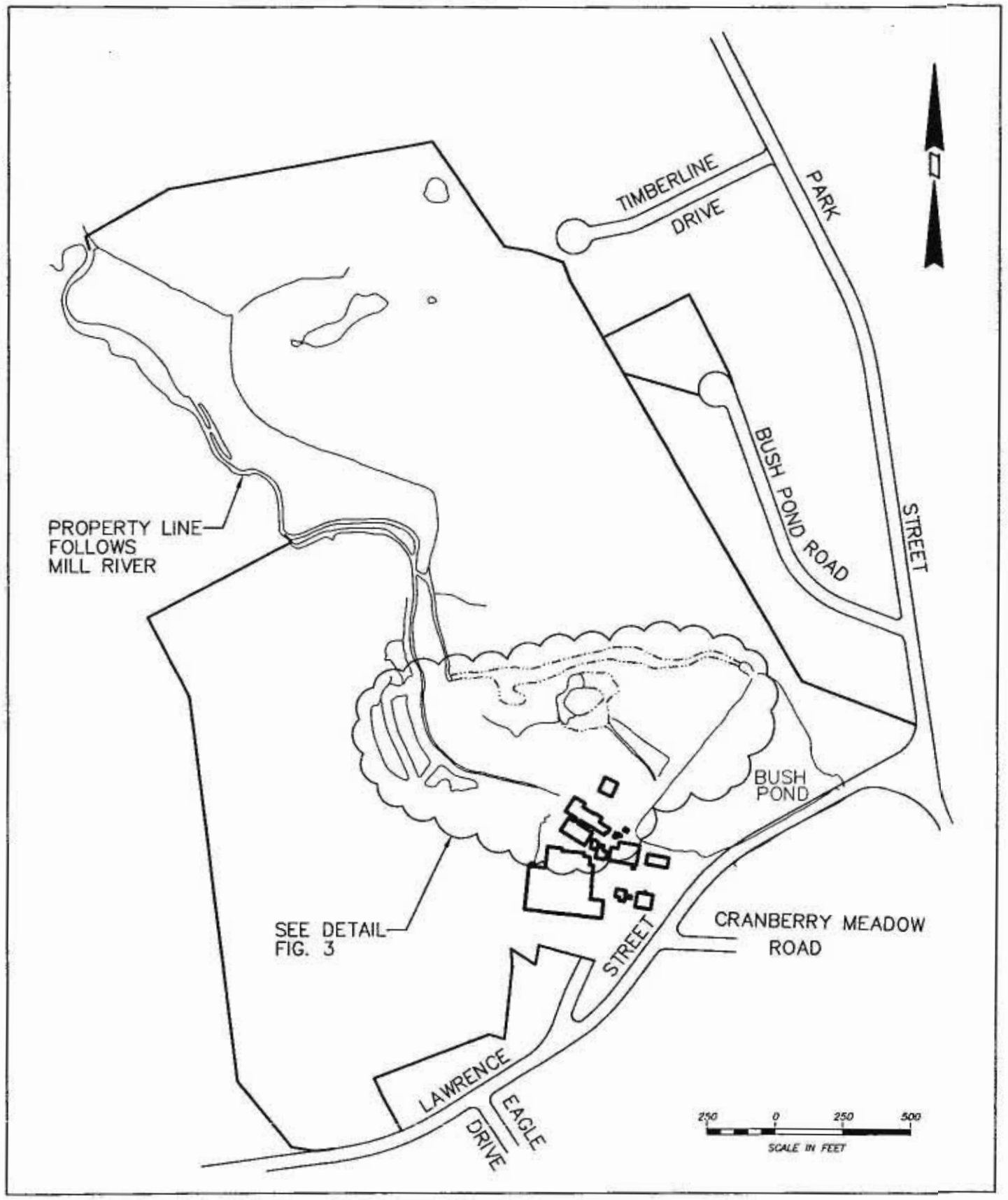
42071-A3-TM-025

1987

SCALE 1:25 000

1 CENTIMETER ON THE MAP REPRESENTS 250 METERS ON THE GROUND

CONTOUR INTERVAL 3 METERS



NOTES FOR FIGURES 3 AND 4

1. THE PROPERTY LINES SHOWN ON THESE PLANS HAVE BEEN TAKEN FROM A PLAN ENTITLED "PLAN OF LAND IN NORFOLK, MASS." LATEST REVISION DATE APRIL 19, 1990 BY STAVINSKI ENGINEERING ASSOCIATES, INC.
2. THE TOPOGRAPHY AND DETAILS SHOWN ON THIS PLAN HAS BEEN OBTAINED FROM AERIAL PHOTOGRAPHY WITH A FLIGHT DATE OF APRIL 16, 1990. PHOTOGRAMETRIC SERVICES HAVE BEEN PROVIDED BY COL-EAST, INC. OF NORTH ADAMS, MASSACHUSETTS. SUPPLEMENTARY DATA SUCH AS MONITORING WELL LOCATIONS AND ELEVATIONS TAILRACE ELEVATIONS, LOCATIONS AND ELEVATIONS OF LAGOON SPOILS, ETC. HAS BEEN OBTAINED OBTAINED FROM AN ACTUAL FIELD SURVEY PERFORMED DURING NOVEMBER AND DECEMBER 1994.
3. THE SPOT ELEVATIONS SHOWN WITHIN THE TAIL RACE ARE BOTTOM ELEVATIONS. THEY WERE OBTAINED BY PROJECTING A SURVEYORS ROD THROUGH THE SOFT SEDIMENTS IN THE TAILRACE UNTIL A FIRM RESISTANCE WAS ENCOUNTERED.
4. THE LOCATION OF STATE INLAND DEED RESTRICTED WETLANDS NO'S 4 & 5 ARE BASED ON THE PLANS FILED WITH THE WETLAND ORDER. THE APPLICABLE PLAN IS RECORDED AS PLAN NO. 205A OF 12 OF 1978 IN DEEDS BOOK 5447, PAGE 614.
5. THE LOCATION OF THE TOWN OF NORFOLK WETLAND PROTECTION DISTRICT NO. 5 IS BASED ON MAPPING SHOWN ON NORFOLK ASSESSOR'S PLOTS ON FILE WITH THE NORFOLK TOWN CLERK.
6. THE LIMIT OF THE FEMA 100 YEAR FLOOD PLAIN HAS BEEN SHOWN BASED ON DATA SHOWN ON THE FIRM FLOOD INSURANCE RATE MAP COMMUNITY PANEL NO. 255217 0005C REVISION DATED AUGUST 19, 1985 AND DATA PRESENTED IN "FLOOD HAZARD ANALYSES TOWN OF NORFOLK, MASSACHUSETTS" BY THE SOIL CONSERVATION SERVICE, U.S. DEPARTMENT OF AGRICULTURE, DATED MARCH 1973.
7. BASE MAP PREPARED BY NORWOOD ENGINEERING CO., INC. ISSUE DATE 1/3/95.

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: RAD
DRAWN BY: GZ
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: 8/01

CDM Camp Dresser & McKee

BUCKLEY & MANN PROPERTY
NORFOLK, MASSACHUSETTS

RAO REPORT

PROPERTY BOUNDARY

PROJECT NO. 1121-25944
FILE NAME:

SHEET NO.
FIGURE 2

Q:\CAM_JRW\DANGEL\F10-2.DWG

TAIL RACE

MILL RIVER

WETLAND

RAO LINE ON SOUTH BANK OF MILL RIVER

MILL RIVER

MILL RIVER

RAO LINE ON TOP OF DAM

AUL

AUL

LAGOON 2

LAGOON 3

SUBAREA "A"

CARBONIZER LAGOON

CARBONIZER LAGOON TRENCH

BUSH POND

TAIL RACE

LAGOON 1

"B"

CONC. PAD

ZONE LINE

LEGEND:

LANDFILL CONSOLIDATION AREA

2001 AUL BOUNDARY

2001 RAO BOUNDARY

50 0 50 100

SCALE IN FEET

LAWRENCE STREET

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: DAD
DRAWN BY: GZ
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: 9/01

CDM Camp Dresser & McKee

BUCKLEY & MANN PROPERTY
NORFOLK, MASSACHUSETTS

RAO REPORT

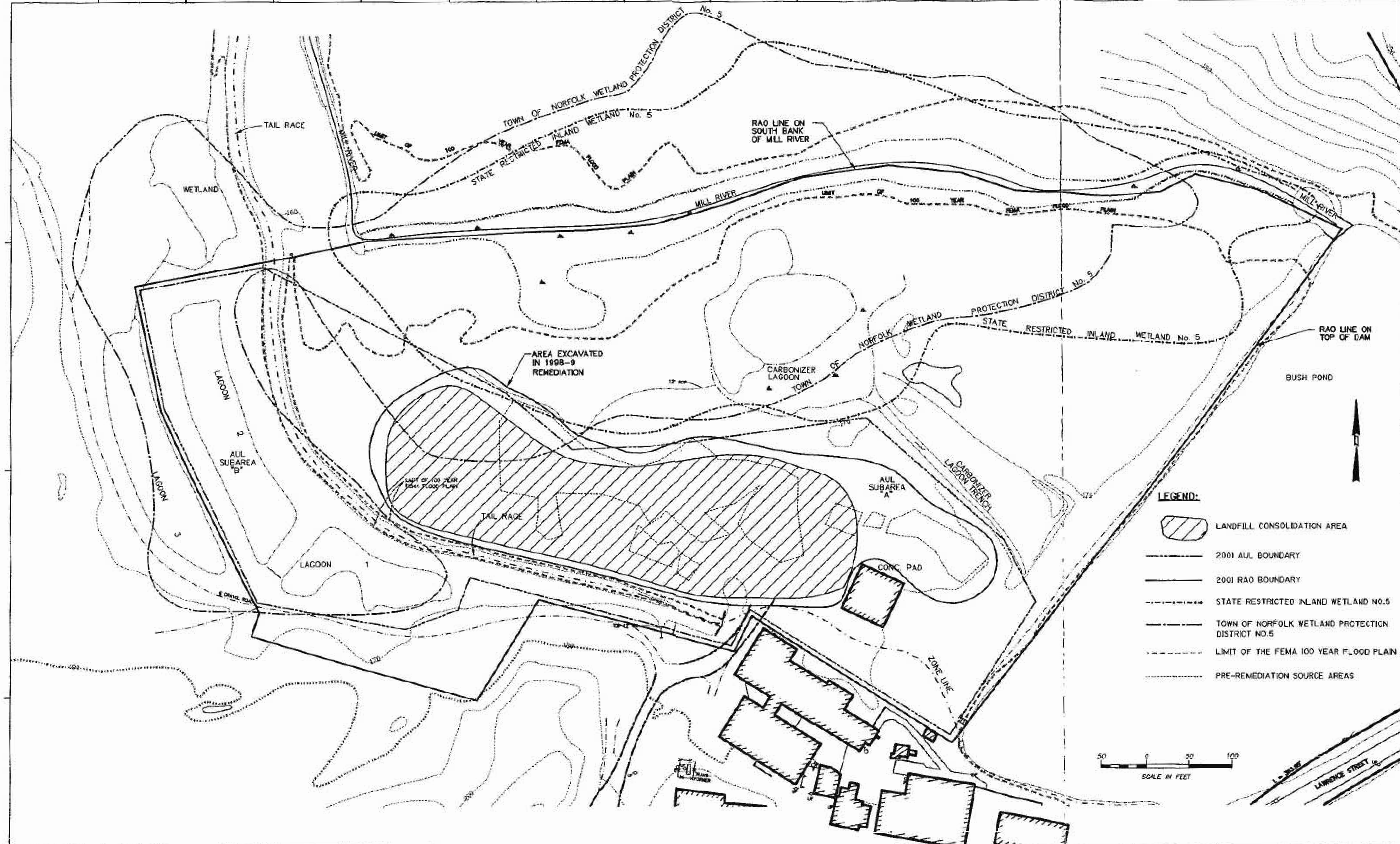
2001 AUL & RAO BOUNDARIES

PROJECT NO. 1121-25944
FILE NAME:

SHEET NO.

FIGURE 3

G:\CAM_PWP\DANGE\.VTG-3.DWG


TAIL RACE
MILL RIVER
TOWN OF NORFOLK WETLAND PROTECTION DISTRICT No. 5
STATE RESTRICTED INLAND WETLAND No. 5
LIMIT OF 100 YEAR FEMA FLOOD PLAIN
RAO LINE ON SOUTH BANK OF MILL RIVER
WETLAND
LAGOON 2
AUL SUBAREA "B"
LAGOON 3
LAGOON 1
AREA EXCAVATED IN 1998-9 REMEDIATION
CARBONIZER LAGOON
TOWN OF NORFOLK WETLAND PROTECTION DISTRICT No. 5
STATE RESTRICTED INLAND WETLAND No. 5
RAO LINE ON TOP OF DAM
BUSH POND
AUL SUBAREA "A"
CARBONIZER LAGOON TRENCH
CONC. PAD
ZONE LINE
LAWRENCE STREET
LEGEND:
LANDFILL CONSOLIDATION AREA
2001 AUL BOUNDARY
2001 RAO BOUNDARY
STATE RESTRICTED INLAND WETLAND NO.5
TOWN OF NORFOLK WETLAND PROTECTION DISTRICT NO.5
LIMIT OF THE FEMA 100 YEAR FLOOD PLAIN
PRE-REMEDIATION SOURCE AREAS
50 0 50 100
SCALE IN FEET

Q:\CAM_IHW\DANIEL\FIG-4.DWG

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: DAJ
DRAWN BY: GZ
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: 8/01

CDM Camp Dresser & McKee

BUCKLEY & MANN PROPERTY
NORFOLK, MASSACHUSETTS

RAO REPORT

PROPERTY PLAN WITH OVERLAYS

PROJECT NO. 1121-25944
FILE NAME:
SHEET NO.
FIGURE 4

3.0 MCP CLASSIFICATION OF SOIL AND GROUNDWATER

The surface soil at B&M is S-1, based on a future exposure condition with the property in residential or recreational use.

The groundwater at B&M is GW-1, because the property is within the Zone II drainage established by the Town of Franklin for public water supply wells west of the Mill River, approximately 1.5 miles downstream to the north. Also, there is no public water supply serving the property or the abutting properties.

There were two active wells on the B&M property prior to termination of manufacturing operations in 1994, although there has been no groundwater use since then. The B&M wells and individual wells on neighboring residential properties are up gradient of the area subject to this RAO.

The groundwater is also GW-3, as are all groundwaters eventually discharging to surface water.

4.0 SITE HISTORY

B&M manufactured textile products at its facility northwest of the junction of Park and Lawrence Streets in Norfolk for over 90 years. In 1994, production was moved to Canton, Massachusetts.

B&M operated a Carbonizer process through the 1940s to reclaim wool from used garments. The raw material was conveyed through acid vapor to char the cotton threads on the seams, zippers, buttons, etc., and facilitate separation of the wool. The wool was neutralized, rinsed, and reused. Solid residue consisting of fiber and fasteners was discarded on site in Area #10 ([1]). Wastewater was discharged through the Carbonizer Trench (Area #9) to the Carbonizer Lagoon (Area #11) for settling and facultative biological treatment. The Carbonizer business declined after the 1940s and the facility was demolished in 1965.

B&M operated a dyehouse until 1986. The dyehouse discharged approximately 40,000 gallons per week to Lagoons #1 and #2 for settling and facultative biological treatment. The effluent from these shallow lagoons, operated in series, percolated into the ground adjacent to the Tail Race, a manmade brook parallel to the Mill River.

Lagoon #1 was built prior to 1950. The bottom was dredged once, prior to 1975, to improve percolation. Approximately 100 cubic yards of lagoon bottom soil with rag fragments from this operation was stockpiled just south of the lagoon (Area #3). By 1980, this material had the appearance of clean sand with fragments of decayed rags.

After the dyehouse operations ceased in 1986, the trench leading from the dyehouse to Lagoon #1 was excavated to remove leaves, textile fiber and some of the underlying soil. Approximately 130 cubic yards of this material were stockpiled south of Lagoon #1 (Area #6). The trench was filled with clean sand.

Lagoons #2 and #3 were constructed in 1978. Lagoon #2 received the overflow from Lagoon #1. Lagoon #3 never received wastewater, but served as a diversion for a groundwater spring fed from the hill to the south.

Underground storage tanks, which contained No. 2 oil, No.6 oil and diesel fuel, were removed between 1986 and 1993. There was no indication from soil staining or field instruments that a release had occurred from these tanks. There are no other analytical data or information suggesting that gasoline, diesel or any other type of fuel release occurred on the site.

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1. The term Area # refers to the individual remediation areas identified for characterization, as described in Appendix B.

5.0 GEOLOGY AND HYDROGEOLOGY OF THE SITE

The Mill River and the parallel Tail Race (on the B&M property) drain the surface runoff from the surrounding low hills. The hills are rhyolite and shale bedrock overlain by glacial till and stratified drift. The unconsolidated overburden depth exceeds 70 feet on the surrounding hills.

Bedrock was encountered at 10 feet below grade adjacent to the Tail Race in MW-3A, installed in May1986. The bedrock was reported to be Rhyolite-Quartz Alkali Feldspar mineral, some plagioclase and mafic minerals, with tightly-closed, 1/8-inch, silt-filled fractures.

The groundwater flow direction is toward the Mill River (and the Tail Race). The B&M lagoons are in the bottom of the Mill River valley, near the Tail Race and the River, where groundwater discharges to the surface water. In all measurement pairs, the static water level in the bedrock well MW-3A was higher than in the adjacent MW-3, completed in the overburden.

6.0 SUMMARY OF PRE-REMEDIATION SITE ASSESSMENTS

A complete description of the manufacturing operations, characterization data, and site conditions is included in the *Site Assessment and Remediation Status Report and Release Abatement Measures Plan Support Document*, submitted to DEP in April 1996. The pre-remediation, site assessment data from that report was used to focus subsequent work on the contaminants of concern, and eliminate from further consideration contaminants either absent from the site, or present in concentrations less than MCP Standards.

Soil, groundwater and surface water data were collected during several characterization programs, from 1986 through 2000. Table A-1 in Appendix A provides a list of the samples and analyses. The primary contaminants of concern were chromium, lead, and polycyclic aromatic hydrocarbons (PAHs) in soil, and traces of PAH in shallow groundwater directly contacting dye carrier compound residues in bottom soils of Lagoons #1 and #2. Concentrations of all contaminants were low compared to MCP Upper Concentration Limits.

No volatile organic compounds, such as solvents or fuel-related components have been detected in *groundwater* or *soil* at B&M. Traces of dye carrier volatile hydrocarbons in dyehouse wastewater and Lagoon #1 *surface water* were found prior to and in 1986, when the Lagoons were removed from wastewater service, at concentrations less than MCP GW-1 reportable concentrations. PCB has not been detected at B&M, except at trace concentrations (well below MCP S-1 standards) in *soil/sediment* samples from the Carbonizer Lagoon and Carbonizer Trench. Carbonizer Lagoon data are summarized in Appendix C.

In October 1995, 23 test pits were completed with a backhoe and soil samples were analyzed from 15 of the pits, selected as those most likely to be contaminated, based on visual appearance. Soil samples from an additional 5 pits, excavated by hand, were also analyzed. **Figure D-1** (in Appendix D) shows the sample locations and Tables D-1 through D-4 in Appendix D summarize the results, for:

- D-1 Soil from the bottom of Lagoon #1
- D-2 Soil from the bottom of Lagoon #2
- D-3 Soil consolidated in Area #10 during the 1998 and 1999 remediation work
- D-4 Soil disposed of off-site based, on relatively high metals concentrations.

Analyses from 1986 and 1995 showed that soils in the bottom of former dyehouse wastewater treatment Lagoons #1 and #2 contained of naphthalene and methylnaphthalene at concentrations slightly higher than the MCP Method 1 S-1/GW-1 standards.

7.0 1998 REMEDIATION WORK

7.1 Summary

The Release Abatement Measure (RAM) was completed in two phases, May-June 1998 and June 1999. In September 1999, compost, lime, fertilizer and hydroseed were applied to develop a grass cover and prevent erosion. The RAM consisted of the following major components:

- site clearing;
- excavation and onsite consolidation (in Area #10) of contaminated soils, Carbonizer spoils, coal ash, building demolition debris, and wastewater lagoon residues;
- offsite disposal of unsuitable material; and
- installation of a cover system.

The work followed the RAM Plan, except that the thickness of the clean sand cover was increased in most areas to approximately three feet, instead of the two feet originally planned. Also, a small volume of material tentatively marked for off-site disposal, rather than on-site consolidation, was retained on-site, as described in Section 7.6 of this report.

B&M contracted with Fleet Environmental Services, Inc. to perform the work. Fleet subcontracted the excavating, hauling, and grading operations to G. Lopes Construction Inc. Camp Dresser & McKee Inc. (CDM) provided resident engineering services during the entire project. The work began May 11, 1998 and was substantially complete on June 24, 1998.

7.2 Site Clearing

Existing vegetation was cleared from within the approximate limits of Areas #3, #5, #6, #10, and the sand borrow area. Tree trunks, limbs, and brush less than approximately 8 inches in diameter were chipped on site, and stored in a pile outside of the work area. Trunks greater than 8 inches were shipped off site for commercial sale by Dan Reed Logging Co. All tree stumps were removed from the work areas and were shipped off site for chipping/recycling by New England Recycling (a subsidiary of G. Lopes Construction).

The siltation barrier was installed immediately after clearing, as the perimeter could not be accessed through the thick vegetation prior to clearing. The hay bale siltation barrier was installed around the southern, western, and northern limits of Area #10 (consolidation area), as originally planned. Area #10 is adjacent to the tailrace to the south and wetlands to the north, and falls within a wetlands buffer zone.

7.3 Material Consolidation

Material that had previously been deposited in Area #10 during the lifespan of the B&M facility included Carbonizer spoils, coal ash, building demolition debris, textile processing wastes, and

abandoned equipment. The majority of material had been placed in piles of varying sizes on the north side of a former cart road that ran the length of Area #10, and extended to an area northeast of the elevated concrete pad. Debris was also scattered to the south of the cart road in Area #10. Material deposited in Areas #3, #5, and #6 consisted of soil excavated from Lagoon #1 and from the former dyehouse trench to Lagoon #1.

The material in Area #10 was excavated and moved using a tracked excavator, front end loader, and a bulldozer in a manner that allowed visual inspection of the debris and separation of material that was deemed unsuitable for onsite consolidation. The work was sequenced so that all material piled above the base grade of Area #10 was moved and inspected at least once. After each section of Area #10 was cleared down to the base grade, CDM surveyed each section to determine and record the excavation subgrade elevations. This information was used to develop quantity estimates of the volume of material moved during the work. In areas where unsuitable material, like timbers and equipment, extended to a lower elevation, the excavation was continued to remove that material from Area #10.

This process of moving and visually inspecting material was performed over the entire limits of Area #10. Once the subgrade of a section of Area #10 had been surveyed and inspected, material judged to be suitable to remain on site was pushed back and graded within the limits of the final consolidation area. Material located in Area #10 but outside the consolidation area, such as the area northeast of the concrete pad, was pushed, inspected, and graded within the limits of the consolidation area. Material located in Areas #3, #5, and #6 was excavated, trucked, and graded in the consolidation area in Area #10.

The consolidated material was then graded to a thickness of approximately three feet. CDM surveyed the entire consolidation area to determine the limits and elevations and to develop quantity estimates. Based on the survey data, CDM estimates that 4,550 cubic yards of material from Areas #3, #5, #6, and #10 was placed in the consolidation.

The material encountered in Area #10 during this process did not differ substantially from the characterization provided by the 1995 test pits. The material consisted predominantly of soil, building demolition debris (brick, concrete, wood, piping, asphalt shingles, etc.), coal ash, textile debris, and abandoned equipment. The majority of this material was judged, based on visual inspection, suitable to remain on site within the consolidation area, except as discussed in Section 6.4 below.

All the material excavated from Areas #3, #5, and #6 (predominantly soil with some textile fiber) was judged suitable to remain on site, and was placed in the consolidation area in Area #10.

All textile processing equipment debris, large timbers, and concrete blocks were segregated and stockpiled out of the work area. This material will be disposed of coincident with demolition of the buildings, at a later date.

7.4 Offsite Disposal

7.4.1 Test Pit 10 Material

As determined during previous investigations, material in the vicinity of Test Pit 10 in Area #10 was designated for off-site disposal, based on relatively high chromium (1,900 ppm) and lead (5,000 ppm) concentrations. This material was visually distinct from surrounding material due to its reddish color. The soil had been stained red from oxidized metal shavings. This material was excavated from Area #10, stockpiled on a polyethylene liner outside the work area, and covered with polyethylene on June 12, 1998. Nine trailers transported a total of 314.75 tons of this material under an MCP Bill of Lading (BOL) for disposal at the Waste Management Turnkey Facility, Rochester, New Hampshire, on June 23, 1998. The original copy of the BOL was submitted to DEP on July 24, 1998.

7.4.2 Drums

During the course of material excavation and inspection in Area #10, remnants of two steel drums partially filled with crystalline material were uncovered. B&M identified the contents of one drum as a granular plasticizer. CDM determined that the material was not readily water soluble.

B&M identified the contents of the other drum as either sodium carbonate or boric acid (or sodium borate). Test showed that material contained no boron, and evolved gas (carbon dioxide) on acidification, and was therefore identified as sodium bicarbonate/carbonate.

The contents of these drums was turned over to B&M for disposal.

7.4.3 Transite Panels

On May 12, 1998, after a portion of the site was cleared, a small pile of corrugated Transite panel scraps was discovered within the western end of Area #10. These 12 to 18 inches long pieces were trimmings from original installation of Transite panel building siding used on site. The panels were believed to be asbestos-containing material. Additional Transite panels were discovered on the concrete pad at the east end of Area #10 on May 15, 1998. CDM made verbal notification to DEP on May 13, 1998 and Fleet filed an asbestos removal notification form with DEP on May 15, 1998. Fleet removed and disposed of the Transite panels on June 2, 1998. A total of approximately 4 cubic yards of Transite was removed from the site for disposal at Kelly Run Landfill, operated by United Waste Systems in Elizabeth, PA.

7.5 Cover Installation

After the consolidated material placed in Area #10 had been graded, a 70-mil non-woven geotextile fabric was placed over the entire limits of the material. The fabric delineates the top of

the consolidated material and serves as a separation layer between the material and the clean sand cover. Approximately 8,000 square yards of #4551 geotextile fabric, manufactured by Amoco Fabrics and Fibers Co. and supplied by A.H. Harris & Sons, Inc., was installed over the consolidation area.

The RAM Plan and construction specifications required a two foot, clean sand cover over the geotextile fabric. After the work was bid, CDM learned that the DEP had established a policy to require three feet of clean fill over contaminated soils. Consequently, a field change was made to increase the thickness of clean sand layer to three feet. CDM estimates that approximately 6,000 cubic yards of clean sand from the on-site source was placed over the consolidated material in Area #10. The clean sand placed over the consolidated material was graded to shed stormwater, with a crown running east-west. The 6,000 cubic yards includes sand placed in a one foot layer over the area northeast of the concrete pad (outside the limits of the consolidation area), after debris from this area had been moved to the consolidation area.

CDM evaluated the survey data for the base, fill surface elevation and cover surface elevations to calculate volumes, as a basis for paying Franklin Environmental. This computer aided evaluation suggested that portions of consolidation area cover were thinner than three feet. CDM subsequently excavated twenty test holes by hand, and confirmed that area around the route used to haul sand onto the cover was thin, with a estimated cover shortfall of 2,000 cubic yards. The additional sand, from the on-site source, was installed in 1999 (see Section 8), to complete the uniform three foot cover prior to spreading topsoil and hydroseeding.

7.6 Variances from the RAM Plan

The RAM Plan included provisions for the offsite disposal of material contained in 14 drums from Areas #4 and #7. These drums contained soil scraped from Lagoon #1 in 1988 and reportedly had the possibility of containing some dye paste mixed with the soil. The RAM Plan called for disposal of the soil as non-hazardous waste and the dye paste as hazardous waste.

No dye paste was discovered on inspection of the drum contents. The material in the drums consisted primarily of sand and decomposed leaves, and was similar to material located in Area #5. Considering the appearance and relatively small quantity (approximately 2 to 3 cubic yards), this material was placed in the Area #10 under the fabric and sand cover.

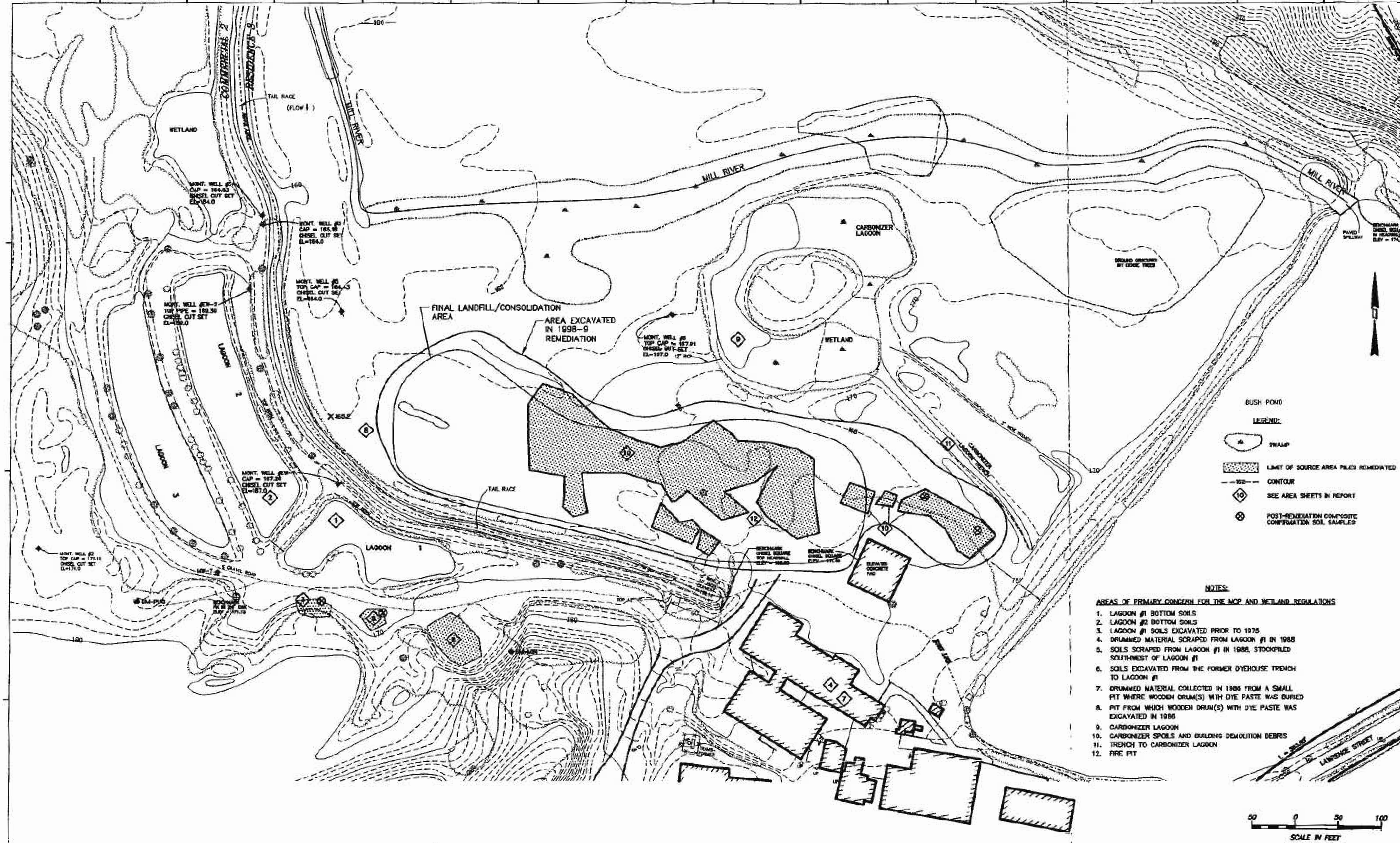
8.0 1999 REMEDIATION- RAM PLAN COMPLETION

In late 1998, a site inspection discovered some rag-containing soil on the west side of Area #3, west of Lagoon #1. In September 1999, G. Lopes Construction Inc. moved 50 to 100 cubic yards of this soil from Area #3 to Area #10, and placed this material at the same grade elevation as the material consolidated in May 1998, under geotextile and under the sand cover.

As part of the same project, an additional 2,000 cubic yards of sand was spread over consolidation Area #10 . The additional sand, from the on-site source, was installed to complete the uniform three foot cover. Lime, fertilizer, 500 cubic yards of Type I (MA DEP definition) compost, and hydroseed were applied to establish a grass cover over Area #10.

Figure 5 shows the completed consolidation area in Area #10, and the location of confirmatory soil samples in remediated areas.

Q:\CAM_IHW\DANIEL\FIG-5.DWG



NOTES:

AREAS OF PRIMARY CONCERN FOR THE MCP AND WETLAND REGULATIONS

1. LAGOON #1 BOTTOM SOILS
2. LAGOON #2 BOTTOM SOILS
3. LAGOON #1 SOILS EXCAVATED PRIOR TO 1975
4. DRUMMED MATERIAL SCRAPED FROM LAGOON #1 IN 1988
5. SOILS SCRAPED FROM LAGOON #1 IN 1986, STOCKPILED SOUTHWEST OF LAGOON #1
6. SOILS EXCAVATED FROM THE FORMER DYEHOUSE TRENCH TO LAGOON #1
7. DRUMMED MATERIAL COLLECTED IN 1986 FROM A SMALL PIT WHERE WOODEN DRUM(S) WITH DYE PASTE WAS BURIED
8. PIT FROM WHICH WOODEN DRUM(S) WITH DYE PASTE WAS EXCAVATED IN 1986
9. CARBONIZER LAGOON
10. CARBONIZER SPOILS AND BUILDING DEMOLITION DEBRIS
11. TRENCH TO CARBONIZER LAGOON
12. FIRE PIT

50 0 50 100
SCALE IN FEET

REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: RAD
DRAWN BY: GZ
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: 8/01

CDM Camp Dresser & McKee

BUCKLEY & MANN PROPERTY
NORFOLK, MASSACHUSETTS
RAO REPORT

POST-REMIDIATION SOIL SAMPLES
AND REMAINING MONITORING WELL LOCATIONS

PROJECT NO. 1121-25944
FILE NAME:
SHEET NO.
FIGURE 5

9.0 GROUNDWATER QUALITY

9.1 1998 Groundwater Sampling and Analyses

In May 1998, just prior to the start of remediation work, CDM sampled groundwater monitoring wells MW-1, MW-2, MW-3, MW-3A, MW-4, MW-5, MW-6 and EW-2 in/or near Area #10 and Lagoons # 1 and #2. The samples had high turbidity from silt, and aliquots for metals analysis were filtered in the field prior to preservation with acid. The field data also showed high iron concentrations, based on rust discoloration in many samples. Well EW-1 was filled with silt and could not be sampled.

Groundwater elevation measurements confirmed that the static head in bedrock well MW-3A was higher than the adjacent shallow well MW-3 in the unconsolidated overburden. This shows that groundwater from the surrounding hills discharges to the Mill River and the Tail Race, and that the area around the Lagoons is not a recharge zone.

Table E-1 in Appendix E summarizes the groundwater analytical data and the elevation data. The complete laboratory reports are also included in Appendix E. The original May 26, 1998 laboratory report was revised in October 1998 at CDM's request, to include non-detect concentrations for Polycyclic Aromatic Hydrocarbons (PAH) in the range applicable for comparison to MCP Method 1 standards. These lower non-detect concentrations were obtained by further review of the original electronic data files from the analytical instruments.

The PAH and metals concentrations were below the applicable MCP GW-1 and GW-3 standards.

Wells MW-3, MW-4 and MW-6 had Chemical Oxygen Demand (COD) concentrations of 190, 190, and 340 mg/L. These samples were subsequently tested for Total Organic Carbon (TOC), to determine whether the COD was attributable to iron or organic compounds. The TOC concentrations, at 14, 17 and 24 mg/L, showed that approximately 20 percent of the COD was attributable to organic compounds, with the remainder likely attributable to iron. Considering that the areas around these shallow wells are wetlands, the organic component is likely decayed plant material.

Monitoring wells MW-1 and MW-4, located in Area #10, were destroyed during the 1998 remediation work.

9.2 *October and December 2000 Lagoons #1 and #2 Groundwater*

Shallow groundwater was collected from Lagoons #1 and #2 to determine whether residual dye carrier PAH compounds in soil at the bottom of the Lagoons was contaminating groundwater.

Appendices G and H include the complete memoranda on Lagoon groundwater, field data and laboratory reports for the October and December 2000 sampling programs, respectively.

9.2.1 October 2000 Lagoon Sampling and Analyses for PAH

The October 2000 groundwater samples were collected from seepage into shallow pits, to obtain water directly in contact with the soil (source material) in the bottom of the Lagoons. Prior analyses of soils from the Lagoons showed traces of dye carrier compounds, in the form of Polycyclic Aromatic Hydrocarbons (PAH). The October groundwater samples were decanted to remove some suspended solids prior to extraction, but the samples were not filtered or otherwise treated to remove suspended solids. Hence, these turbid samples represented the *upper bound* of what could be considered groundwater contamination. The October PAH analyses, summarized in Appendix G Table G-1 showed that:

- The Lagoon #1 A/B groundwater sample contained 16 µg/L 2-methylnaphthalene, slightly above the MCP Method 1 GW-1 10 µg /L standard. The Lagoon #1 C/D groundwater sample contained less than 10 µg /L standard, but the sum of the 1-methyl and 2-methyl naphthalene exceeded the 10 µg /L limit. The concentrations of these compounds in groundwater from Lagoon #2 were below the standard.

- The concentrations of other Base Neutral extractable compounds in groundwater from Lagoons #1 and #2 were below their respective MCP Method 1 standards and in nearly all cases, below the 0.14 or 0.2 µg/L detection limit.

- 1,1-Biphenyl, found in soil at 1.6 to 2.6 mg/kg in three of four samples (less than 0.59 mg/kg in the fourth sample) exceeded the MCP Method 1 S-1/GW-1 standard of 1 mg/kg. Biphenyl was not reported in the groundwater samples because this compound was not on the target list for the SIM procedure at the time of the analyses.

Visual examination of the samples showed that much of the suspended solids in these samples was of plant origin, including root hairs, stem and leaf debris. This is consistent with the condition of the Lagoons. Lagoon #1 collects leaf litter, and Lagoon #2 has substantial grass and other plant growth, as well as leaf litter. Test pits excavated in Lagoon #2 show layers of peat and the Lagoon was probably constructed in a wetland.

9.2.2 December 2000 Lagoon Sampling and Analysis Program Objectives and Procedures

The December program was designed to:

- Resample, for additional data
- Determine whether the methylnaphthalenes and biphenyl in groundwater were soluble or attached to suspended solids, and
- If appropriate, establish the basis for a MCP Method 2 S-1 Standard for methylnaphthalenes and biphenyl, based on actual soluble component data for the leaching component of the Standard.

CDM's experience from other projects is that sparingly soluble compounds (like PAH and PCB) adsorb on filter media such as polymeric membranes and paper, and this causes erroneously low concentrations to be reported. Coagulation with alum and settling (or centrifugation) does not cause as great a "low" bias. For the B&M samples, CDM coagulated and settled the waters, and then decanted the samples to remove the suspended solids, as described in the attached memorandum. The procedure was based work by Dr. Scott Weber at SUNY Buffalo, and Director of the NYS Center for Hazardous Waste Management, published as "Relationship between PCB Desorption Equilibrium, Kinetics, and Availability during Land Biotreatment," *Environmental Science and Technology*, 2000, 34 (12), 2542.

Samples were kept in glass bottles chilled on ice during this procedure, although the samples were not preserved with acid to less than pH 2. Acid pH would have prevented formation of an insoluble alum floc (aluminum salts are soluble at low pH). Potential for biodegradation in the preparation of these samples was not a factor because PAH compounds degrade slowly even under favorable conditions with moderate temperature and adequate nutrients, which were absent.

9.2.3 December 2000 Results

The December groundwater samples were collected from the same or immediately adjacent locations as the October 2000 samples. The December samples, after coagulation, settling and decant, were analyzed for PAH compounds by Method 8270 SIM (gas chromatography with selective ion mass spectroscopy detector to reach low detection limits) and for the larger universe of Base/Neutral Extractable compounds by Method 8270 C (gas chromatography with mass spectroscopy detector).

The results are summarized in Appendix H Table H-1. None of the analytes were found at concentrations exceeding the MCP GW-1 standards, demonstrating that the compounds found in October 2000 were associated with suspended solids in the samples.

Based on these results, the Method 1 S-1/GW-1 standard for biphenyl, which exceeded that standard in the October 2000 soil samples, may be adjusted under Method 2 to reflect that the biphenyl is not leaching to groundwater. The biphenyl concentration in the soils, at not more than 2.6 mg/kg, is well below the 1,000 mg/kg S-1 standards based on direct contact exposure.

10.0 SOIL QUALITY

10.1 Confirmation Samples Outside the Area #10 Covered Consolidation Area

In accordance with the RAM Plan, CDM collected soil samples from the undisturbed subgrades in areas from which the contained material was removed. One composite sample was collected from each of Areas #3, #5, and #6, and two samples were collected from the area north and east of the concrete pad in Area #10. All of these areas are outside the limits of the consolidation area. The five samples were analyzed for lead, chromium, zinc, and PAHs. The results, summarized in Appendix F Table F-1, show that concentrations were all less than the MCP S-1/GW-1 and S-1/GW-3 standards.

10.2 Soil Under the Cover in the Area #10 Consolidation Area

Table D-3 in Appendix D shows 1995 soil data representative of the base/neutral compounds and metals concentrations consolidated under the cover in Area #10, as well as a weighted average based on volumes represented by each sample. The averages for several PAH compounds and lead exceed MCP S-1 and S-2 standards. The Total Petroleum Hydrocarbon (TPH) concentrations exceeded the current (2001) MCP S-1 standards, although the TPH test has since been replaced by the Extractable Petroleum Hydrocarbon (EPH) procedure. The concentrations of the compounds exceeding MCP S-1 and S-2 standards are well below the MCP Upper Concentration Limits.

Because these average concentrations exceed the MCP Method 1 S-1 and S-2 standards, B&M has imposed an Activity and Use Limitation on the covered consolidation area in Area #10.

10.3 Soil in Lagoons #1 and #2

Soil samples from the October 1995 Characterization Study, summarized in Appendix D Tables D-1 and D-2 showed that metals concentrations in the Lagoon soils were below MCP S-1/GW-1 and S-1/GW-3 standards, and that naphthalene and methylnaphthalene slightly exceeded the S-1/GW-1 limits. The 1995 Total Petroleum Hydrocarbon (TPH) concentrations also exceeded the current (2001) MCP S-1 standards, although the TPH test has since been replaced by the Extractable Petroleum Hydrocarbon (EPH) procedure.

Lagoon #1 and #2 were resampled in October 2000 for base/neutral extractable compounds (including PAH) and Extractable Petroleum Hydrocarbons. The results are summarized in Appendix G, Tables G-2 and G-3, along with the complete laboratory reports. Only one PAH compound, biphenyl, exceeded MCP S-1/GW-1 standards. The biphenyl concentrations ranged from 1.6 to 2.6 mg/kg, relative to the 1.0 mg/kg standard.

The EPH ranges were below the MCP S-1/GW-1 standards. Analytical methods have evolved over the last 15 years and consequently, results from prior analyses are not strictly comparable to

the October 2000 results. Nevertheless, the data suggest a gradual decline in the concentration of the PAH, and EPH (and TPH) target compounds in the soil. This was anticipated, based on CDM experience at other sites and bench scale degradation tests conducted at B&M in the late 1980s.

The MCP S-1/GW-1 standard for biphenyl is based on lower of limits for a direct contact exposure to the soil, and for leaching into groundwater. The biphenyl S-1 limit for direct human-contact exposure is 1,000 mg/kg. Hence, the potential for leaching to groundwater is the controlling factor. To determine whether biphenyl, at 1.6 to 2.6 mg/kg could be a potential source of groundwater contamination, CDM analyzed a second set of groundwater samples from Lagoons #1 and #2 in December 2000, as described in Section 8. The results showed that pore water in the Lagoons, in equilibrium with the residual dye carrier compounds in the Lagoon soils, does not contain *soluble* biphenyl or other PAH at concentrations exceeding MCP GW-1 standards. Trace contamination associated with particulate matter would not migrate with the groundwater. This MCP Method 2 approach shows that the residual dye carrier compound concentrations in the Lagoon soils have achieved a condition of No Significant Risk.

Although an Activity and Use Limitation (AUL) is not required for the Lagoons, B&M has elected to apply an AUL to control future excavation in the area. Future excavation in the Lagoons is unlikely in any event, as the area is within the buffer zone for the Tail Race and hence subject to Massachusetts and Norfolk wetlands regulations. The Lagoons are also zoned within the Town of Norfolk Wetlands Protection District #5.

10.4 Carbonizer Lagoon Area

The 3 foot wide by 300 foot long Carbonizer Trench (Area #11) and a parallel trench drain to the one acre Carbonizer Lagoon (Area #9). The Lagoon, plus approximately seven contiguous acres, are in low, flat land north of the Bush Pond Dam. The area is bound on the south by the toe of the dam, on the east by the Mill River, and on the west by the Area #10 consolidation area and the Tail Race. Most of this land has wetland forest or meadow vegetation, hydric soils and lies in both the Town of Norfolk Wetlands Protection District #5 and the Massachusetts Restricted Inland Wetland Number 5 [in Norfolk]. The boundaries of the Norfolk and Massachusetts restricted areas are indefinite because they were created from overlays on aerial photographs, not by ground survey.

Appendix C Table C-1 shows the soil/sediment data collected in the Carbonizer Lagoon and the Carbonizer Lagoon Trench. The data show that one of four samples contained lead at concentration exceeding the MCP S-1/GW-1 standard, but that the average was below the standard. All other metals concentrations in the samples were at concentrations less than the MCP S-1/GW-1 standard. The TPH concentrations, at 860 and 1,300 mg/kg, in the two samples collected in 1992 exceed the MCP standards, and are two to three times a local background concentration from a Bush Pond soil/sediment sample collected upstream of the B&M property (see Section 11).

The October 2000 EPH analyses from Lagoons #1 and #2 showed that approximately 85 percent of the EPH greater than detection limits was aliphatic compounds, and most of this was in the C19 to C36 range, with a MCP standard of 2,500 mg/kg. This is consistent with the presence of natural plant material, like plant waxes in these soils mixed with leaf litter and plant roots. For preliminary evaluation, the Carbonizer Lagoon and Trench soil/sediment TPH measured in 1992 can be converted to a total EPH (for all fractions) because volatile compounds are absent. Applying the Lagoon #1 and #2 EPH fraction percentages to the Carbonizer TPH totals, the aromatic and aliphatic fractions in the Carbonizer samples would be 162 mg/kg and 918 mg/kg (total for both EPH aliphatic ranges). These are below the respective MCP S-1/GW-1 EPH standards.

Visual inspection, and the absence of groundwater contamination in MW-6 just down gradient of the Carbonizer Lagoon, show that the other seven acres have not been adversely impacted by the former industrial operations.

CDM recommends no further remediation action for the residual TPH in the Carbonizer areas because:

- There is no indication that contamination is migrating from this area, and the TPH measured in 1992 may be naturally occurring plant waxes,
- Any remediation would be to achieve background concentration, not to remove source material or reduce concentrations below the Upper Concentration Limit. There would be little or no environmental benefit to a remediation project in this area.
- The area is in restricted wetlands, more than 5,000 square of wetlands would be destroyed or severely damage to access any contaminated soil/sediment.

11.0 FEASIBILITY OF APPROACHING BACKGROUND CONCENTRATIONS

The MCP, at Section 40.1020(3), requires an evaluation of the feasibility of reducing concentrations of contaminants to background levels, considering technological and benefit-cost factors.

11.1 Background Concentrations

The B&M site is not in an urban area. Nevertheless, the soil excavated in Area #10 as part of the 1998 remediation work had the appearance of urban fill, with coal ash, debris from former on-site building demolition, and rag and fastener (buttons, zippers, etc.) waste.

Background samples from three locations with different soil characteristics were reported in the April 1996 "Site Assessment and Remediation Status Report and Release Abatement Measures Plan Support Document". These samples were collected from:

- Mineral soil,
- Loam south of Lagoons #1 and #2 (BM-PUG), and
- Bush Pond shore soil/sediment from a location upstream and on the opposite side of Lawrence Street from the B&M plant (BM-ORGO). This background sample may have been influenced by run-off from Lawrence Street or atmospheric deposition of soot or ash from the former coal fired boiler house at B&M.

Appendix F Table F-1 shows MCP Method 1 S-1 and S-2 standards, DEP unofficial urban and non-urban background concentrations, site specific background concentrations for samples collected at B&M, and data for the post remediation samples collected from Areas #3, #5, #6 and #10 (not under the cover). The Table shows that soil chromium concentrations exceed background in several areas. Appendix D Tables D-1 and D-2 show that a few PAH compounds exceed background concentration in Lagoons #1 and #2.

11.2 Technological Feasibility

Additional soil excavation and removal to reduce on-site residual semivolatile compound and metal concentrations to background is technologically feasible, although with adverse impact on wetlands for the Carbonizer Lagoon area. The volume of material which would have to be removed is estimated as follows:

· Area #10:	> 6,000 cubic yards
· Lagoons #1 and #2:	>10,000 cubic yards
· Carbonizer Lagoon area	>10,000 cubic yards
TOTAL	>26,000 cubic yards

11.3 Benefit-Cost Analysis

The cost for the remediation work completed in 1998 and 1999 was approximately $160,000, exclusive of engineering and Licensed Site Professional Services. The incremental cost to excavate and haul this material to a local landfill for daily cover, at $30 per cubic yard (excavation, transportation and replacement from on-site clean sand), would be approximately $780,000 for 26,000 cubic yards.

CDM concludes that the potential environmental benefits of reducing contaminant concentrations to background do not justify the costs, considering that:

- There is no indication that contamination is migrating from this area.
- Any remediation would be to achieve background concentration, not to remove source material or reduce concentrations below the Upper Concentration Limit. There would be little or no environmental benefit to a remediation project in this area.
- The landfill area (Area #10) was completely excavated and inspected in 1998. No buried oil or hazardous materials hot spots were found, except for the Test Pit 10 soil, which was disposed of at an off-site licensed landfill.
- The upper limit of the volume of soil which would have to be removed to reach undisturbed, clean native soil in Area #10 is not known. Based on observations during the 1995 test pit program, and also during the 1998 excavation, some parts of Area #10 contained urban-fill-like material to depths greater that the average used for the 6,000 cubic yard estimate.
- Part of the area is in restricted wetlands, more than 5,000 square of wetlands would be destroyed or severely damage to access any contaminated soil/sediment.
- The Area #10 consolidation area exposure point has been eliminated by implementation of an Activity and Use Limitation.

12.0 DESCRIPTION OF THE RESPONSE ACTION OUTCOME

12.1 Boundaries

Figure 3 shows the boundaries of the area subject to this Response Action Outcome, as described in Section 1. The Activity and Use Limitation boundary, within the RAO area, were established with a ground survey. Corner point markers (iron rods) were set along the southwestern part of the AUL are, to delineate the boundary between the Area #10 consolidation area and the former manufacturing area excluded from this RAO.

12.2 Activity and Use Limitation (AUL)

BWSC Form 1075 and the AUL Opinion report are included in Appendix I, as recorded at the Norfolk Land Court on August 20, 2001. The Land Court registration stamp provides the location at Certificate 15475, Registration Book 774, Page 153.

APPENDIX A

PREVIOUS MCP SUBMITTALS TO THE DEP AND NORFOLK CONSERVATION COMMISSION

TABLE A-1
SUMMARY OF SAMPLING AND ANALYSES PROGRAMS AT BUCKLEY & MANN INC.

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

All reports prepared by Camp Dresser & McKee Inc., Cambridge, MA

TABLE A-1
SUMMARY OF SAMPLING ANALYSIS PROGRAMS AT BUCKLEY MANN

Location	Sample ID	Remediation Area #	Mo-Yr	No. of Samples	Groundwater	Surface Water	Soil	Metals	Semi-Volatiles	PAH	TPH	EPH	TCLP Metals	VOC	Other
FIRST SITE ASSESSMENT, PRE-REMEDIATION															
Tail Race at culvert exit	SW-1		May-86	1		X		1	1					1	Misc.
Lagoon #2	SW-2		May-86	1		X		1	1					1	Misc.
Lagoon #1	SW-3		May-86	1		X		1						1	Misc.
Mill River, below Tail Race junction.	SW-4		May-86	1		X		1						1	Misc.
Bush Pond	SW-5		May-86	1		X		1						1	Misc.
Upgradient water table well	MW-2		May-86	1	X			1	1					1	Misc.
Water table well N of Lagoon #2	MW-3	2	May-86	1	X			1	1					1	Misc.
Bedrock well N of Lagoon #2	MW-3A	2	May-86	1	X			1	1					1	Misc.
Water table well near empty drum	MW-4	10	May-86	1	X			1						1	Misc.
Water table well between Tail Race & Mill River	MW-5	10	May-86	1	X			1	1					1	Misc.
Water table well NW of Carbonizer Lagoon	MW-6	9	May-86	1	X			1						1	Misc.
Bedrock well at 25 Lawrence St	GW-1		May-86	1	X			1	1					1	Misc.
Bedrock well at B&M buildings	GW-2		May-86	1	X			1	1					1	Misc.
Dug well at B&M buildings	GW-3		May-86	1	X			1	1					1	Misc.
Soil near empty drum	SS-1	10	May-86	1			X	1							Misc.
Soil pile W of Lagoon #1	SS-2	3	May-86	1			X	1							Misc.
Soil core in Lagoon #2	SS-3	2	May-86	1			X	1							Misc.
Soil core in Lagoon #1	SS-4	1	May-86	2			X	1	1						Misc.
Soil core, Carbonizer Lagoon	SS-5	9	May-86	2			X	1							Misc.
STATUS CHECK ON TPH DEGRADATION IN THE LAGOONS															
Lagoon #1 soil		1	Aug-91	1			X	Cr			1				
Lagoon #2 soil		2	Aug-91	4			X	Cr			4				
Soil scraped from the surface of Lagoon #1		5	Aug-91	1			X	Cr			1				
SUPPLEMENTAL SITE ASSESSMENT, PRE-REMEDIATION															
Carbonizer washtub area	#1	10	May-92	1			X	1	1		1		1		PCB
Carbonizer Lagoon	#2	9	May-92	1			X	1	1		1		1		PCB
Carbonizer Lagoon Trench	#3	11	May-92	1			X	1	1		1		1		PCB
Carbonizer "fire pit"	#4	12	May-92	1			X	1	1		1		1		PCB

TABLE A-1
SUMMARY OF SAMPLING ANALYSIS PROGRAMS AT BUCKLEY MANN

Location	Sample ID	Remediation Area #	Mo-Yr	No. of Samples	Groundwater	Surface Water	Soil	Metals	Semi-Volatiles	PAH	TPH	EPH	TCLP Metals	VOC	Other
SOIL CHARACTERIZATION PRIOR TO REMEDIATION, IDENTIFICATION OF SOILS FOR OFF SITE DISPOSAL															
Lagoon #1 bottom soil		1	Oct-95				X	3	3		3		1	3	PCB/PEST
Lagoon #2 bottom soil (2 depths in each test pit)		2	Oct-95				X	6	6		6		1	6	
Lagoon #1 soil excavated prior to 1975		3	Oct-95				X	1	1		1		1	1	
Drummed material scraped from Lagoon #1 in 1988		4	Oct-95				X	2	2		2		2		PCB/PEST
Soil scraped from Lagoon #1 in 1988, stockpiled southwest of Lagoon #1		5	Oct-95				X	1	1		1		1	1	
Soil excavated from the former dyehouse trench to Lagoon #1		6	Oct-95				X	1	1		1		1	1	
Carbonizer spoils, coal ash and debris disposal		10	Oct-95				X	6	6		6		5	6	
Fire pit		12	Oct-95				X	1	1		1		1	1	PCB/PEST
Background (3 types of soils)			Oct-95				X	3	2		2				
GROUNDWATER RECHARACTERIZATION, JUST PRIOR TO REMEDIATION															
Water table well at NE corner of Lagoon #2	EW-2	2	May-98	1	X			X		X					COD
Water table well in Area 10	MW-1	10	May-98	1	X			X							COD, TOC
Upgradient water table well	MW-2		May-98	1	X			X							COD
Water table well N of Lagoon #2	MW-3	2	May-98	1	X			X		X					COD, TOC
Bedrock well N of Lagoon #2	MW-3A	2	May-98	1	X			X		X					COD
Water table well near empty drum	MW-4	10	May-98	1	X			X							COD, TOC
Water table well between Tail Race & Mill River	MW-5	10	May-98	1	X			X							COD
Water table well NW of Carbonizer Lagoon	MW-6	9	May-98	1	X			X							COD, TOC
SOILS CHARACTERIZATION IN REMEDIATED AREAS OUTSIDE OF THE AREA #10 COVER															
Area #3	BM-03	3	Sep-98				X	1		1					
Area #5	BM-05	5	Sep-98				X	1		1					
Area #6	BM-06	6	Sep-98				X	1		1					
Area #10-1, south of covered area	BM-A10-01	10	Sep-98				X	1		1					
Area #10-1, south of covered area	BM-A10-02	10	Sep-98				X	1		1					

TABLE A-1
SUMMARY OF SAMPLING ANALYSIS PROGRAMS AT BUCKLEY MANN

Location	Sample ID	Remediation Area #	Mo-Yr	No. of Samples	Groundwater	Surface Water	Soil	Metals	Semi-Volatiles	PAH	TPH	EPH	TCLP Metals	VOC	Other
RECHARACTERIZATION OF SOILS AND GROUNDWATER IN LAGOONS #1 AND #2, TOTAL PAH INCLUDING SOLUBLE AND ADSORBED TO TSS															
Lagoon #1	GW-1-AB	1	Oct-00		X					1					
Lagoon #1	GW-1-CD	1	Oct-00		X					1					
Lagoon #2	GW-2-AB	2	Oct-00		X					1					
Lagoon #2	GW-2-CD	2	Oct-00		X					1					
Lagoon #1	LS-1-AB	1	Oct-00				X			1		1			
Lagoon #1	LS-1-CD	1	Oct-00				X			1		1			
Lagoon #2	LS-2-AB	2	Oct-00				X			1		1			
Lagoon #2	LS-2-CD	2	Oct-00				X			1		1			
RECHARACTERIZATION OF GROUNDWATER IN LAGOONS #1 AND #2, SOLUBLE PAH ONLY															
Lagoon #1	GW-1-AB	1	Dec-00		X				1	1					
Lagoon #1	GW-1-CD	1	Dec-00		X				1	1					
Lagoon #2	GW-2-AB	2	Dec-00		X				1	1					
Lagoon #2	GW-2-CD	2	Dec-00		X				1	1					

APPENDIX B

FINAL REMEDIATION AREA STATUS SHEETS FOR BUCKLEY & MANN, INC., NORFOLK, MA

AREA #

1. Lagoon #1 bottom soil
2. Lagoon #2 bottom soil
3. Lagoon #1 soil excavated prior to 1975
4. Drummed material scraped from Lagoon #1 in 1988
5. Soil scraped from Lagoon #1 in 1988, stockpiled southwest of Lagoon #1
6. Soil excavated from the former dyehouse trench to Lagoon #1
7. Drummed material collected in 1986 from a small pit where wooden drum(s) with dye paste were buried
8. Pit from which wooden drum(s) with dye paste were excavated in 1986 (A small area within Area 10)
9. Carbonizer Lagoon
10. Carbonizer spoils and old building demolition debris
11. Trench to Carbonizer Lagoon
12. Fire pit (A small area within Area 10)

Note: The **Description** heading refers to the condition prior to any remediation under the RAM Plan.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #1 DISPOSITION

Identification Lagoon #1 bottom soil

Description Former facultative lagoon for dyehouse wastewater.

Lagoon #1 is seasonally filled with water and has an active frog population. There is 1 to 2 inches of a tan sand and gravel layer on the bottom of the lagoon underlain by similar sand and gravel containing black organic solids with a faint anaerobic and petroleum odor. Leaf litter has accumulated in some areas of the lagoon.

Area 11,500 ft^2 +/-

Depth The maximum water depth in Lagoon #1 is approximately 2 feet in Spring. In dry seasons, standing water covers 25 percent of the Lagoon, at a depth of less than 1 foot.

Water percolates through the bottom of Lagoon #1 and an embankment to the Tail Race, which has a water surface elevation approximately 6 feet lower than the water elevation in Lagoon #1. The depth of the faint anaerobic zone underlying the lagoon is probably less than 2 to 4 feet, based on the lower elevation and proximity of the Tail Race.

Wetlands Lagoon #1 is within the 100 foot buffer zone for the Tail Race, and therefore, under the jurisdiction of the NCC. The Lagoon is in Norfolk Wetland Protection District No. 5.

MCP Criteria The sand and gravel in the bottom of Lagoon #1 were placed there as part of lagoon construction and are not a naturally occurring sediment. Although the soil is under water, the MCP Method 1 No Significant Risk criteria for soil may be used to evaluate human health risk.

For MCP Method 1, soil is categorized based on the soil depth, potential presence or absence of children and adults, and the frequency and intensity of the potential exposure. The frequency and intensity of contact with submerged soil would be low. The soil within 3 feet of the lagoon bottom would be in category S-1, and soil greater than 3 feet below the bottom would be S-2. The ground water would be in categories GW-1 as a potential drinking water source and GW-3 for discharge to surface water.

Final Disposition A Method 1 risk assessment for groundwater and Method 2 risk assessment for soil shows that the Lagoon meets the condition of No Significant Risk in its current state. The Method 2 risk assessment was used to adjust the Method 1 leaching component for methylnaphthalene and biphenyl.

Lagoon #1 is included under the Activity and Use Limitation as a precaution to require proper soil management in the case of future excavation.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA # 3 DISPOSITION

Identification	Lagoon #1 soil excavated prior to 1975
Description	Tan sandy soil with fiber/rag content, piled 50 feet south of Lagoon #1
Volume	Estimated at 100 to 200 cubic yards
Depth	4 to 8 feet, piled above grade
Wetlands	Not applicable
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work.
Final Disposition	This material was placed in the consolidation area under the fabric and sand cover in Area #10.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA # 4 DISPOSITION

Identification	Drummed material scraped from Lagoon #1 in 1988
Description	Tan sand mixed with anaerobic solids and, when originally collected, a trace of a blue, oily pigment.
Volume	10 55-gallon drums
Depth	Not applicable
Wetlands	Not applicable
MCP Criteria	Not applicable
Final Disposition	The RAM Plan included a provision for off-site disposal of material contained in 14 55-gallon drums filled with soils from Areas #4 and 7. The soils were thought to contain some dye paste and the RAM Plan called for disposal of the soil as non-hazardous waste and any dye paste as hazardous waste. The drums were individually emptied onto a plastic sheet for inspection. The material in the drums consisted of soil and decomposed leaves, similar to the material from Area #5, with no dye paste. Consequently, the 2 to 3 cubic yards of material from the drums was placed in the consolidation area under the fabric and sand cover in Area #10, rather than disposed of off-site.

BUCKLEY & MANN, INC. , NORFOLK, MA

REMEDIATION AREA #5 DISPOSITION

Identification	Soil scraped from Lagoon #1 in 1988, stockpiled 50 feet south of Lagoon #1
Description	Tan sandy soil with black, Faint petroleum odor with anaerobic solids and faint petroleum odor when originally collected. The odor was not noticeable in 1998.
Volume	8 cubic yards
Depth	1 to 2 feet
Wetlands	Not Applicable
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work.
Final Disposition	This material was placed in the consolidation area under the fabric and sand cover in Area #10.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #6 DISPOSITION

Identification	Soil excavated from the former dyehouse trench to Lagoon #1.
Description	Tan sandy soil with minor fiber/rag content, stockpiled 100 feet southeast of Lagoon #1
Volume	130 cubic yards
Depth	1 to 3 feet, piled above grade
Wetlands	Not applicable
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work.
Final Disposition	This material was placed in the consolidation area under the fabric and sand cover in Area #10.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA # 7 DISPOSITION

Identification	Drummed material collected in 1986 from a 6 foot square pit where wooden drums with dye paste had been buried
Description	Dye paste
Volume	Approximately four 55-gallon drums
Depth	Not applicable
Wetlands	Not applicable
MCP Criteria	Not applicable
Final Disposition	The RAM Plan included a provision for off-site disposal of material contained in 14 55-gallon drums filled with soils from Areas #4 and #7. The soils were thought to contain some dye paste and the RAM Plan called for disposal of the soil as non-hazardous waste and any dye paste as hazardous waste. The drums were individually emptied onto a plastic sheet for inspection. The material in the drums consisted of soil and decomposed leaves, similar to the material from Area #5, with no dye paste. Consequently, the 2 to 3 cubic yards of material from the drums was placed in the consolidation area under the fabric and sand cover in Area #10, rather than disposed of off-site.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #8 DISPOSITION

Identification	Pit from which wooden drum(s) with dye paste was excavated in 1986. Subset of Area #10.
Description	Small pit, backfilled by B&M after the bulk of the contamination was removed and drummed
Area	Approximately 6' by 6'
Depth	Less than 6'
Wetlands	Buffer zone
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work.
Final Disposition	This area was completely excavated as part of the Area #10 work. No evidence was found of dye paste. The soil from around the location was retained under the fabric and sand cover in Area #10.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #9 DISPOSITION

Identification	Carbonizer Lagoon
Description	The Lagoon was an impoundment for the former Carbonizer process (discontinued prior to 1965) rinse water, and is now a pond/wetland adjacent to the Mill River. An earthen dike separates the Lagoon from the Mill River. The lagoon bottom contains leaf litter, and fine organic sediments, as well as extensive wetland plants.
Area	Approximately 1 acre
Depth	Water depth 0 to 3 feet seasonally, with the deeper water on the west side.
Wetlands	The Lagoon is in a Deed Restricted Inland Wetlands and also in Norfolk Wetland Protection District No. 5.
Contaminants	TPH, lead and zinc, lesser amounts of chromium. Individual sediment samples analyzed for chromium and zinc were below the S-1 criteria. For lead, the average was below the S-1 criteria, although 1 of 3 samples for lead was above the criteria. The sample analyzed for TPH exceeded the S-1, but met the S-2 criteria. (See below on the applicability of the criteria.) A sample tested in 1992 by TCLP metals was not hazardous waste by characteristic.
MCP Criteria	Because the bottom material in the Carbonizer Lagoon contains a significant percentage of organic matter and is located in a wetland, the material is sediment, rather than soil, and hence not directly comparable to MCP Method 1 standards.
Final Disposition	A Method 3 environmental risk assessment could be conducted for the Trench and the former Carbonizer Lagoon (Area #11). But, the contaminant concentrations are low, no waste discharged to the area for over 35 years, and the areas are visually-normal vegetated wetlands. Any remediation would cause severe disruption to these wetlands for little or no environmental gain and would be contrary to DEP policy discouraging work in wetlands solely to reduce contaminant concentrations to background. Hence, further action under the MCP in Areas #9 and #11 is inappropriate.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA # 10 DISPOSITION

Identification	Carbonizer spoils, coal ash and old building demolition debris
Description	Waste material from the Carbonizer process, including buttons, zippers, and other fasteners, fiber/cloth scrap, and some metal and wood machinery parts. Coal ash and building debris, including wood, block, roofing and metals.
Volume/Area	Approximately 2,200 cubic yards of material in irregular piles in a 500 foot long band with wetlands to the north and the manufacturing area and Tail Race to the south. The total volume is approximately 6,000 cubic yards, including the material below the average grade.
Depth	Piles range from 2 to 6 feet high.
Wetlands	Most of the area is within the 100 foot wetlands buffer zone. Approximately 2,400 square feet of the area appear to be within Norfolk Wetlands Protection District No. 5.
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work. Area #10 is subject to a post-remediation Activity and Use Limitation (filed with this report) and the contaminated soil is under a geotextile and 3 feet of sand cover. The soil is now S-2.
Final Disposition	This area was completely excavated as part of the Area #10 work. Large objects, such as timbers, construction debris, equipment, etc. were removed. A total of 315 cubic yards of soil contaminated with metals above predetermined limits were shipped off site for landfill disposal. The remaining soil from Area #10 was consolidated area under the fabric and sand cover in Area #10. Grass was established on the cover subsequent to application of Type 1 compost, lime, fertilizer and hydroseed.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #11 DISPOSITION

Identification	Trench to Carbonizer Lagoon
Description	Shallow trench leading from near the toe of the west end of the Bush Pond dam to the south end of the Carbonizer Lagoon.
Area	Approximately 3 feet wide and 260 feet long.
Depth	The trench is approximately 3 feet deep with less than one foot of water, but is in an area with groundwater close to the surface
Wetlands	The trench is in the wetlands mapped by CDM.
Contaminants	TPH, lead and potentially zinc. Individual sediment samples analyzed for chromium and lead were below the S-1 criteria. For TPH, one of two samples was below the S-1 criteria, and the other was below the S-2 criteria. Two samples tested in 1992 by TCLP metals were not hazardous waste by characteristic.
MCP Criteria	Because the bottom material in the Carbonizer Lagoon Trench contains a significant percentage of organic matter and is located in a wetland, the material is sediment, rather than soil, and hence not directly comparable to MCP Method 1 standards.
Final Disposition	A Method 3 environmental risk assessment could be conducted for the Trench and the former Carbonizer Lagoon (Area #9). But, the contaminant concentrations are low, no waste discharged to the area for over 35 years, and the areas are visually-normal vegetated wetlands. Any remediation would cause severe disruption to these wetlands for little or no environmental gain and would be contrary to DEP policy discouraging work in wetlands solely to reduce contaminant concentrations to background. Hence, further action under the MCP in Areas #9 and #11 is inappropriate.

BUCKLEY & MANN, INC., NORFOLK, MA

REMEDIATION AREA #12 DISPOSITION

Identification	Fire pit. Subset of Area #10.
Description	Shallow excavation where trash and residues from the Carbonizer process were burned.
Area	Estimated at 1,000 to 2000 ft^2
Depth	Estimated at less than 2 feet
Wetlands	The Fire Pit site is within the 100 foot buffer zone for the Tail Race.
MCP Criteria	The material was accessible and therefore S-1 prior to the remediation work.
Final Disposition	This area was completely excavated as part of the Area #10 work. The soil from around the location was retained in the consolidation area under the fabric and sand cover in Area #10.

APPENDIX C

CARBONIZER AREA

MAY 1992 SOIL AND SEDIMENT SAMPLES LABORATORY REPORT
AND
SUMMARY OF MAY 1986 AND MAY 1992 DATA

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

NOTE:
Refer to the drawing in Appendix D for sample locations.

TABLE C-1
SUMMARY OF MAY 1986 AND MAY 1992 SOIL AND SEDIMENT DATA
CARBONIZER LAGOON AND TRENCH
BUCKLEY MANN, INC. NORFOLK, MA

Parameter	Regulatory limit (See Note)		Carbonizer Lagoon, Areas #9 and #11				Average
			Sample # SS-5 Carbonizer Lagoon May-86	Sample # SS-5A Carbonizer Lagoon May-86	Sample # 2 Carbonizer Lagoon May-92	Sample # 3 Trench to Carbonizer Lagoon May-92	
Metals, mg/kg dry weight							
Ag	100	S-1/GW-1MCP	5.7	<1	<2	<2	<2
As	30	S-1/GW-1MCP	4.7	2.7	1.7	12	5.3
Ba	1,000	S-1/GW-1MCP			46	140	93
Cd	30	S-1/GW-1MCP	18	2.9	4.4	18	11
Cr	1,000	S-1/GW-1MCP	450	62	73	<2	146
Hg	20	S-1/GW-1MCP			0.86	0.46	0.7
Pb	300	S-1/GW-1MCP	670	88	130	74	241
Se	400	S-1/GW-1MCP	0.97	0.44	<1	<1	<1
Zn	2,500	S-1/GW-1MCP	920	260			590
TCLP metals, mg/L in the extract							
Ag	5.0	RCRA			<0.5	<0.5	
As	5.0	RCRA			<2	<2	
Ba	100	RCRA			<1	<1	
Cd	1.0	RCRA			<0.2	<0.2	
Cr	5.0	RCRA			<0.5	<0.5	
Hg	0.2	RCRA			<0.002	<0.002	
Pb	5.0	RCRA			<0.5	<0.5	
Se	1.0	RCRA			<0.5	<0.5	
Petroleum Hydrocarbons, mg/kg dry weight							
TPH (Predates EPH)					860	1,300	
Polychlorinated Biphenyls (PCB), mg/kg dry weight							
Aroclor 1221	2	S-1/GW-1MCP			<0.048	<0.048	
Aroclor 1232	2	S-1/GW-1MCP			<0.048	<0.048	
Aroclor 1242/1016	2	S-1/GW-1MCP			<0.048	<0.048	
Aroclor 1248	2	S-1/GW-1MCP			<0.048	<0.048	
Aroclor 1254	2	S-1/GW-1MCP			0.29	<0.048	
Aroclor 1260	2	S-1/GW-1MCP			0.39	<0.048	
Solids, % dry weight					74.7	17.3	

Notes:
The MCP standards are for soil, and are not directly applicable to the sediment in the Carbonizer Lagoon.
This table does not include the two 1992 samples which were consolidated in the Area #10 landfill, although the original laboratory report with these data are included in this Appendix.

Buckley & Mann
INCORPORATED
ESTABLISHED 1901

12 May 1992

Mr. Robert Dangle
Camp Dresser & McKee Inc.
10 Cambridge Center
Cambridge, MA 02142

Dear Bob:

We have sent you four samples for analysis. These represent areas which Steve and I determined would cover the possible variations in the carbonizer areas. The samples are as follows:

Sample #1 - Carbonizer washtub discharge containing buttons, buckles, zippers and fibers not fully carbonized.
We took two surface samples and two at 18" depth. All buttons except 1 or 2 were from surface sample.
Estimated area - 20' x 40'.

Sample #2 - Carbonizer lagoon sample.
Two samples taken from the edge of the carbonizer lagoon.
There is growth in the lagoon.

Sample #3 - Trench leading from carbonizer washtub discharge to the carbonizer lagoon.
Sampled surface of trench which has 1" to 2" of flowing water leeching in from Mill Pond. The surface has a reddish (ferrous) color in a thin layer. Under the aqueous layer is a thick layer of decayed (black) leaf, then sand.
Trench about 8' x 300'

Sample #4 - Disposal Area near the carbonizer.
Took five samples at a depth of 18". Contains old brick, glass and other rubbish. This area was burned periodically.
Area closed approximately 1965.
The disposal area covered a circle of 30' to 40' in diameter.

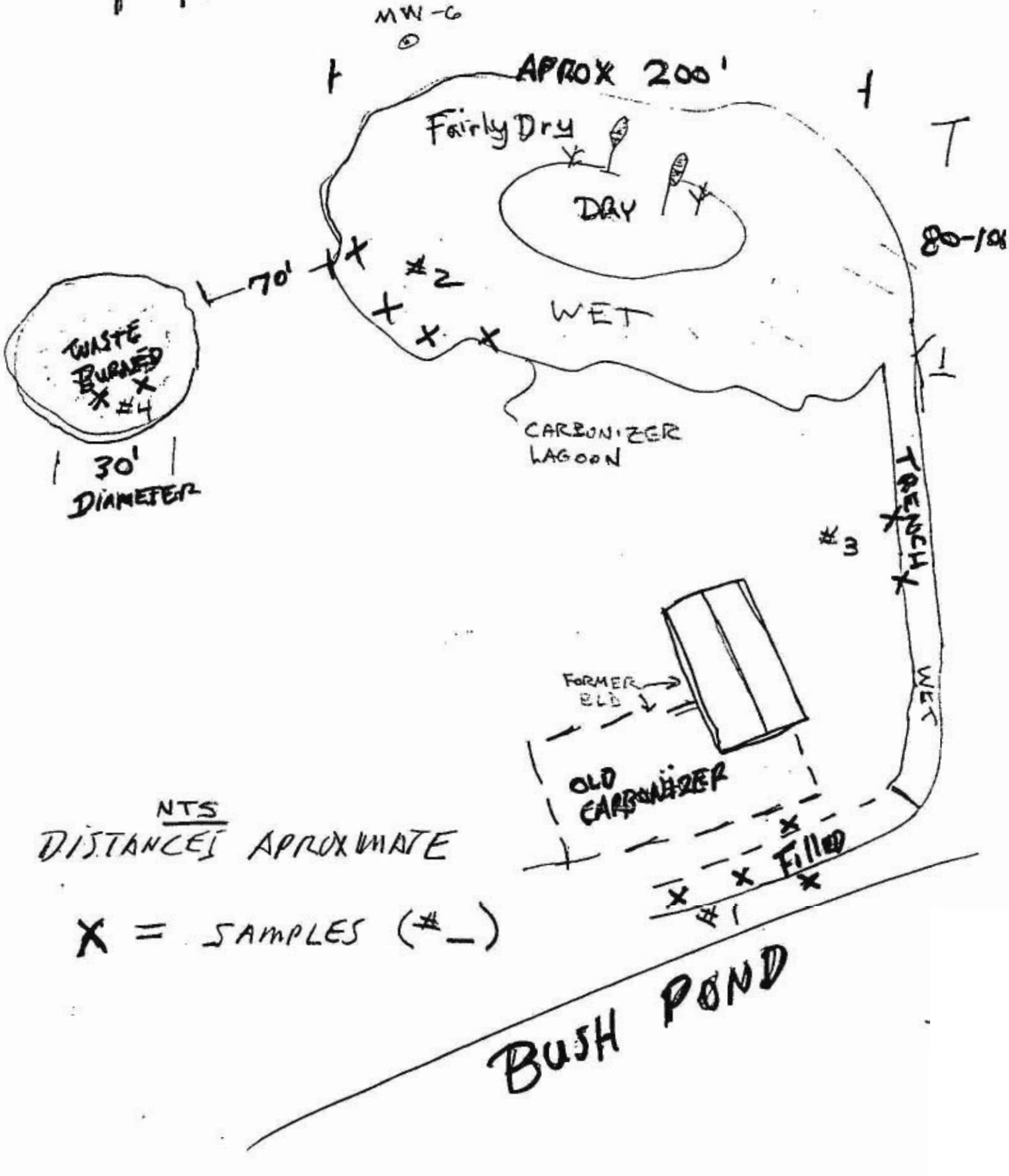
Please give us a call when you determine the test procedure recommended.

Very truly yours,

Richard D. Mann
RDM/lvp

Factory: 17 Lawrence Street, Norfolk, Massachusetts 02056 | Mail: Box 409, Franklin, Massachusetts 02038
Telephone: (508) 528-0695 | Telex: 4931680 | Fax: (508) 528-1361

5/30/92



NTS

DISTANCES APPROXIMATE

X = SAMPLES (#_)

CDM
environmental engineers, scientists,
planners, & management consultants

CAMP DRESSER & McKEE INC.
Laboratory Services

Riverside Technology Center
840 Memorial Drive
Cambridge, Massachusetts 02139
617 354-4448

15-Jun-1992

TASK NO: 920528-08
JOB NO: 9961-521-01-LAB

CERTIFICATE OF LABORATORY ANALYSIS

CAMP DRESSER & McKEE INC.
RIVERSIDE TECHNOLOGY CENTER
840 MEMORIAL DRIVE
CAMBRIDGE, MA 02139
(617) 354-4448

MASS. CERTIFICATION I.D. MA012

CLIENT:	BUCKLEY & MANN
REPORT TO:	Bob Dangel Camp Dresser & McKee 10 Cambridge Center Cambridge MA 02142
REFERENCE/P.O. #:	1121-6-RT-GEAD
DATE SAMPLES COLLECTED:	27-May-1992
DATE SAMPLES RECEIVED:	28-May-1992
SAMPLE DESCRIPTIONS:	SEE ATTACHED SHEET

The undersigned hereby attest to the fact that the information contained in this report is, to the best of their knowledge complete and accurate.

James F. Occhialini 6/17/92
James F. Occhialini DATE
Laboratory Manager/Principal Scientist

Peter T. Maynard 6/17/92
Peter T. Maynard DATE
Assistant Laboratory Manager

CERTIFICATION OF LABORATORY ANALYSIS (cont.)

17-Jun-1992

SAMPLE #	CLIENT I.D.	SAMPLE TYPE
92-01608	#1	Soil
92-01609	#2	Soil
92-01610	#3	Soil
92-01611	#4	Soil

SAMPLE DESCRIPTIONS:

Sample #1 - Brown, loose, loam-like, slightly sandy; homogeneous [88.1% solids]

Sample #2 - Wet clumps, brown; non-homogeneous, contains some sticks, stones and fibrous material (plant roots, hair, or rope) [74.7% solids]

Sample #3 - Sample contains free liquid, brown, oily appearance; dark black slurry; contains sticks and other material [17.3% solids]

Sample #4 - Dry brown, loose; non-homogeneous; contains stones, brick, glass and tar-like solids; contains fibrous material (possibly rope) [83.0% solids]

CDM ANALYTICAL LABORATORY

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)
EPA SW846 Method 1311 as revised in Federal Register June 29, 1990

Project:	BUCKLEY & MANN	Client ID:	#4
Task:	92052808	CDM ID:	92-01611
		Batch:	L920609MET
Matrix: TCLP Extract		Prepared:	06/09/1992
Units: mg/l		Analyzed:	06/09/1992

ANALYTE	REPORTING LIMIT	MCC	ANALYTICAL RESULT	CORRECTION FACTOR (*)	CORRECTED RESULT
Arsenic	2.0	5.0	ND	1.25	ND
Barium	1.0	100	1.9	1.18	1.6
Cadmium	0.20	1.0	ND	1.18	ND
Chromium	0.50	5.0	ND	1.18	ND
Lead	0.50	5.0	2.5	1.10	2.3
Mercury	0.002	0.20	ND	1.08	ND
Selenium	0.50	1.0	ND	1.28	ND
Silver	0.50	5.0	ND	0.67	ND

MCC = Maximum concentration of contaminants.

ND = Not detected at specified detection limit.

(*) – Correction factor based on recovery of analyte added to sample batch type.

Approved by: _____ Date: _____

CDM ANALYTICAL LABORATORY

TOXICITY CHARACTERISTIC LEACHING PROCEDURE (TCLP)
EPA SW846 Method 1311 as revised in Federal Register June 29, 1990

Project:	BUCKLEY & MANN	Client ID:	TCLP BLANK
Task:	92052808	CDM ID:	L920609METB1
		Batch:	L920609MET
Matrix: TCLP Extract		Prepared:	06/09/1992
Units: mg/l		Analyzed:	06/09/1992

ANALYTE	REPORTING LIMIT	MCC	ANALYTICAL RESULT	CORRECTION FACTOR (*)	CORRECTED RESULT
Arsenic	2.0	5.0	ND	1.25	ND
Barium	1.0	100	ND	1.18	ND
Cadmium	0.20	1.0	ND	1.18	ND
Chromium	0.50	5.0	ND	1.18	ND
Lead	0.50	5.0	ND	1.10	ND
Mercury	0.002	0.20	ND	1.08	ND
Selenium	0.50	1.0	ND	1.28	ND
Silver	0.50	5.0	ND	0.67	ND

MCC = Maximum concentration of contaminants.

ND = Not detected at specified detection limit.

(*) – *Correction factor based on recovery of analyte added to sample batch type.*

Approved by: DC

Date: 12/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 8080
PCB 8080 QC - BLANK

Batch #: S920601PCB
Lab ID: S920601PCBB1
Matrix: Soil
Units: mg/kg dry

Prepared: 06/01/1992
Analyzed: 06/03/1992

	QC LIMIT	CDM METHOD BLANK S920601PCBB1
AROCLOR 1016/1242	0.050	N.D.
AROCLOR 1221	0.050	N.D.
AROCLOR 1232	0.050	N.D.
AROCLOR 1248	0.050	N.D.
AROCLOR 1254	0.050	N.D.
AROCLOR 1260	0.050	N.D.

N.D. - Not Detected at specified detection limit.

Approved By: L. L. Date: 6/16/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 8080

Batch #: S920601PCB
Matrix: Soil
Units: ug

Prepared: 06/01/1992

	SURROGATE ADDED	SURROGATE RESULT	% REC	QC LIMIT RECOVERY
92-01584-02				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.82	82	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160
92-01586-02				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.88	88	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160
92-01586-DUP				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.84	84	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160
92-01587-02				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.72	72	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160
92-01589-02				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.84	84	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160
92-01608-01				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	1.0	100	30-130
DECACHLOROBIPHENYL	1.0	64	6400*	60-160
92-01609-01				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.93	93	30-130
DECACHLOROBIPHENYL	1.0	31	3100*	60-160
92-01610-01				

(*) - Elevated surrogate recovery due to matrix interference.

N.D. - Not Detected at specified detection limit.

Approved By: L.L. Date: 6/16/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 8080

Batch #: S920601PCB
Matrix: Soil
Units: ug

Prepared: 06/01/1992

	SURROGATE ADDED	SURROGATE RESULT	% REC	QC LIMIT RECOVERY
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.51	51	30-130
DECACHLOROBIPHENYL	1.0	2.0	200*	60-160
92-01611-01				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.80	80	30-130
DECACHLOROBIPHENYL	1.0	3.1	310*	60-160
S920601PCBB1				
2,4,5,6-TETRACHLORO-m-XYLENE	1.0	0.65	65	30-130
DECACHLOROBIPHENYL	1.0	1.2	120	60-160

(*) - Elevated surrogate recovery due to matrix interference.

N.D. - Not Detected at specified detection limit.

Approved By: L. L. Date: 6/16/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - BLANK

Batch #: S920605
Lab ID: S920605METB1
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/08/1992

	QC LIMIT	CDM METHOD BLANK S920605METB1
barium	10.	N.D.
cadmium	1.0	N.D.
chromium	2.0	N.D.
copper	2.0	N.D.
lead	5.0	N.D.
nickel	2.0	N.D.
silver	2.0	N.D.

N.D. - Not Detected at specified detection limit.

Approved By: _____ Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - DUPLICATE

Batch #: S920605
Lab ID: 92-01616METDU
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/08/1992

	QC LIMIT	SAMPLE RESULT	DUPLICATE RESULT	% RPD
beryllium	1.0	N.D.	N.D.	N/A
cadmium	1.0	1.3	1.1	21
chromium	2.0	30	30	0.28
copper	2.0	24	20	20
lead	5.0	48	23	70
nickel	2.0	22	17	27
silver	2.0	6.0	4.5	28
zinc	2.0	94	82	14

.D. - Not Detected at specified detection limit.
N/A - Not Applicable

Approved By: _____ Date: 6/5/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - QCS

Batch #: S920605
Lab ID: S920605METQC
Matrix: Aqueous
Units: ug/l

Prepared: 06/05/1992
Analyzed: 06/08/1992

	QC EXPECTED CONCENTRATION	% REC S920605METQC
barium	5.0	100
beryllium	250	95
cadmium	250	94
chromium	500	99
copper	500	94
lead	500	100
nickel	500	97
silver	500	83
zinc	500	100

N.D. - Not Detected at specified detection limit.

Approved By: DE

Date: 6/19/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS QC - BLANK

Batch #: S920605TPH
Lab ID: S920605TPHB1
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/08/1992

	QC LIMIT	CDM METHOD BLANK S920605TPHB1
Pet. Hydrocarbon,IR	25	N.D.

N.D. - Not Detected at specified detection limit.

Approved By: _____ Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 418.1
TOTAL PETROLEUM HYDROCARBONS QC - DUP

Batch #: S920605TPH
Lab ID: 92-01528-DUP-TPH
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/08/1992

	QC LIMIT	SAMPLE RESULT	DUPLICATE RESULT	% RPD
Pet. Hydrocarbon,IR	25	N.D.	N.D.	N/A

N.D. - Not Detected at specified detection limit.
N/A - Not Applicable

Approved By: _____ Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - BLANK

Batch #: S920605MET
Lab ID: S920605METB1
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/10/1992

	QC LIMIT	CDM METHOD BLANK S920605METB1
As	0.50	N.D.
Sb	2.0	N.D.
Se	1.0	N.D.
Tl	2.0	N.D.

N.D. - Not Detected at specified detection limit.

Approved By: [signature] Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - BLANK

Batch #: S920605MET
Lab ID: S920605METB2
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/10/1992

	QC LIMIT	CDM METHOD BLANK S920605METB2
As	0.50	N.D.
Se	1.0	N.D.

N.D. - Not Detected at specified detection limit.

Approved By: DE

Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - DUPLICATE

Batch #: S920605MET
Lab ID: 92-01616-DUP
Matrix: Soil
Units: mg/kg dry

Prepared: 06/05/1992
Analyzed: 06/10/1992

	QC LIMIT	SAMPLE RESULT	DUPLICATE RESULT	% RPD
As	0.50	3.8	3.0	23
Sb	2.0	N.D.	N.D.	N/A
Se	1.0	N.D.	N.D.	N/A
Tl	2.0	N.D.	N.D.	N/A

.D. - Not Detected at specified detection limit.
N/A - Not Applicable

Approved By: DE

Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - QCS

Batch #: S920605MET
Lab ID: S920605METQ1
Matrix: Aqueous
Units: ug/l

Prepared: 06/05/1992
Analyzed: 06/10/1992

	QC EXPECTED CONCENTRATION	% REC S920605METQ1
As	500	100
Sb	250	110
Se	250	70
Tl	250	110

N.D. - Not Detected at specified detection limit.

Approved By: DL

Date: 6/15/92

CDM ANALYTICAL SERVICES LABORATORY
QUALITY CONTROL REPORT

METHOD: EPA 6010/7000
TRACE METALS QC - QCS

Batch #: S920605MET
Lab ID: S920605METQ2
Matrix: Aqueous
Units: ug/l

Prepared: 06/05/1992
Analyzed: 06/10/1992

	QC EXPECTED CONCENTRATION	% REC S920605METQ2
As	500	96
Se	250	76

N.D. - Not Detected at specified detection limit.

Approved By: _____ Date: 6/15/92

CHAIN OF CUSTODY RECORD

Camp Dresser & McKee, In
Analytical Services Laboratory

CDM

PROJECT NAME Buckley & Mann
DELIVERY DATE 5-28-92
CDM CONTACT ~~[illegible]~~ Bob Dangel

PROJECT NUMBER 1121-6-RT-GEAP
TURNAROUND TIME/DUE DATE STANDARD
TASK NO. 920528-08 9961-521

PAGE ____ OF ____
FIELD LOG BOOK REFERENCE NO. ____

SAMPLE IDENTIFICATION	DATE	TIME	SAMPLE TYPE	ABN	VOA	PCB/PCB	RCRA METALS	TPH	TCLP Metals				NO. OF CONT.	REMARKS	CDM SAMPLE NO.
#1						✓	✓	✓	✓				2		92-01608
#2						✓	✓	✓	✓				2		1609
#3						✓	✓	✓	✓				2		1610
#4						✓	✓	✓	✓				2		1611

DW 6/5/92

								VOA VIAL	COMMENTS (SPECIAL INSTRUCTIONS, ETC.)
		✓	→	→	→			GLASS BOTTLE	
								PLASTIC BOTTLE	
		NONE	→	→	→			PRESERVATIVE	
		500ml	→	→	→			CONTAIN VOLUME	

Sampled & Relinquished By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

Received By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

Relinquished By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

Received By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

Relinquished By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

Received By:
SIGN: ____
PRINT: ____
FIRM: ____
DATE: ____ TIME: ____

PRESERVATION KEY:

A - SAMPLE CHILLED
B - ACIDIFIED WITH
C - SAMPLE FILTERED
D - HCL
E - H_2SO_4
F - HNO_3
G - NaOH
H - NaTHIOSULFATE

ACCELERATED TAT ____
SURCHARGE: ____ %

Samples Received In Good Condition? YES ☑ NO ☐
Samples Received Chilled & Properly Preserved? YES ☑ NO ☐
Evidence Samples Were Tampered With? YES ☐ NO ☑

Received for Laboratory by: (SIGN)
____ (____ / ____)

APPENDIX D

LABORATORY REPORT
OCTOBER 1995 PREREMEDIATION SOIL CHARACTERIZATION, ALL AREAS

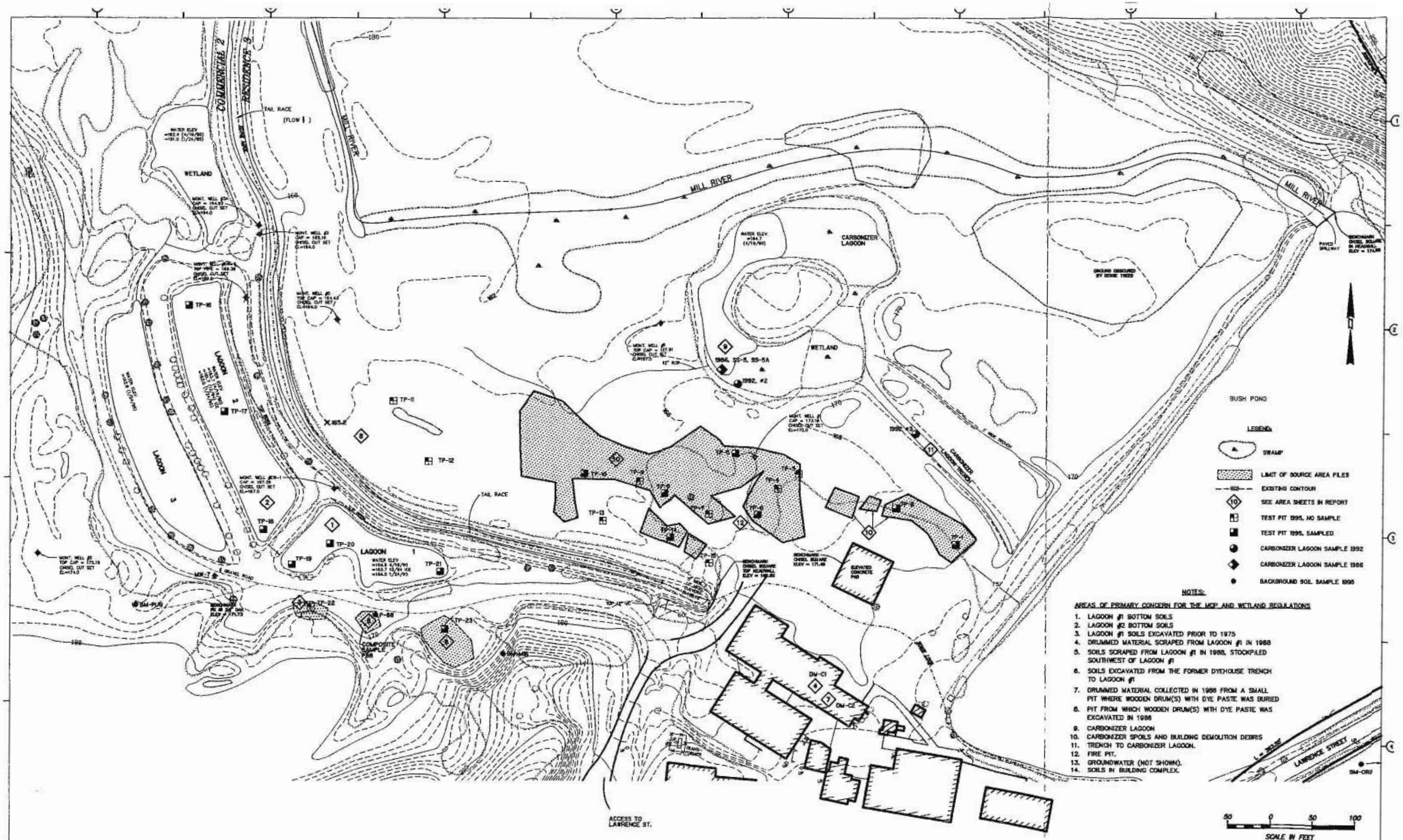
BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

NOTES:

Only the summary sheets are included with this RAO report. Refer to the 1996 *Site Assessment and Remediation Status Report and Release Abatement Measure Plan Support Document, Appendix*, for the original laboratory report.

The tables in this Appendix D have been updated from the 1996 report to:

- Incorporate changes in the MCP Method 1 standards adopted after1996
- Reorganize the data to into groups showing material removed from the site and material consolidated in Area #10,
- Provide a weighted average of the PAH and metals concentrations for the material consolidated in Area #10, based on estimated volumes.



REV. NO.	DATE	DRWN	CHKD	REMARKS

DESIGNED BY: RAV
DRAWN BY: GZ
SHEET CHK'D BY:
CROSS CHK'D BY:
APPROVED BY:
DATE: 9/01

CDM Camp Dresser & McKee

BUCKLEY & MANN PROPERTY
NORFOLK, MASSACHUSETTS
RAO REPORT

1986, 1992 & 1995
SOIL SAMPLE LOCATIONS

PROJECT NO. 1121-25944
FILE NAME:
SHEET NO.
FIGURE D-1

Q:\CAM_JHW\DANGEL\FIG-D-1.DWG

Table D-1
SOIL

Buckley & Mann

Lagoon #1 Soil Data [1,2]

(Samples collected October 25-26, 1995. All Results in mg/kg unless otherwise noted.)

	MCP Method 1 Standards				Lagoon #1 (Area #1)			Average Concentration Lagoon #1
	S-1/GW-1	S-1/GW-3	S-2/GW-1	S-2/GW-3	BM-TP19-L1-N1	BM-TP20-L1-C1	BM-TP21-L1-S1	
Volatile Organic Compounds[3]								
Acetone	3.0	60	3.0	60	< 0.061	< 0.59	< 0.058	ND
1,4-dichlorobenzene	2.0	40	2.0	60	0.028	0.032	0.12	0.060
Chlorobenzene	8.0	40	8.0	40	< 0.0030	< 0.029	0.020	ND
1,3-dichlorobenzene	100	100	200	500	0.0055	< 0.029	0.022	ND
1,2-dichlorobenzene	100	100	200	500	0.020	0.17	0.047	0.079
Ethylbenzene	80	500	80	500	< 0.0030	0.038	0.026	0.021
Tetrachloroethene	0.50	200	0.50	300	< 0.0030	0.035	0.018	0.018
Total Xylenes	500	500	800	1,000	< 0.0030	0.29	0.13	0.14
Acid/Base Neutral Compounds[3]								
Carbazole	NL	NL	NL	NL	< 0.77	< 1.9	< 0.37	ND
2-methylnaphthalene	4.0	500	4.0	1,000	**9.2**	**33**	**4.3**	**16**
Naphthalene	4.0	100	4.0	1,000	2.9	**9.2**	1.1	**4.4**
Acenaphthene	20	1,000	20	2,500	1.6	6.1	1.5	3.1
Acenaphthylene	100	100	100	1000	< 0.39	< 0.96	< 0.19	ND
Fluorene	400	900	400	2,000	0.69	1.5	0.77	1.0
Anthracene	1,000	1,000	2,500	2,500	< 0.39	< 0.96	< 0.19	ND
Fluoranthene	1,000	1,000	2,000	1,000	< 0.39	< 0.96	< 0.19	ND
Hexachlorobenzene	0.70	0.70	0.80	0.80	< 0.39	< 0.96	< 0.19	ND
Phenanthrene	700	100	700	100	< 0.39	< 0.96	0.35	ND
1,2,4-trichlorobenzene	100	400	100	800	5.4	11	1.1	5.8
Dibenzofuran	NL	NL	NL	NL	1.3	3.8	0.93	2.0
Diethylphthalate	100	0.70	100	0.70	< 0.39	< 0.96	< 0.96	ND
Bis(2-ethylhexyl)phthalate	100	200	100	300	< 0.39	< 0.96	< 0.96	ND
Benzo(a)anthracene	0.70	0.70	1.0	1.0	< 0.39	< 0.96	< 0.96	ND
Chrysene	7.0	7.0	10	10	< 0.39	< 0.96	< 0.96	ND
Pyrene	700	700	1,000	2,000	< 0.39	< 0.96	< 0.96	ND
Benzo(b)fluoranthene	0.70	0.70	1.0	1.0	< 0.39	< 0.96	< 0.96	ND
Benzo(k)fluoranthene	7.0	7.0	10	10	< 0.39	< 0.96	< 0.96	ND
Benzo(g,h,i)perylene	1,000	1,000	2,500	2,500	< 0.39	< 0.96	< 0.96	ND
Benzo(a)pyrene	0.70	0.70	0.70	0.70	< 0.39	< 0.96	< 0.96	ND
Indeno(1,2,3-cd)pyrene	0.70	0.70	1.0	1.0	< 0.39	< 0.96	< 0.96	ND
Dibenzo(a,h)anthracene	0.70	0.70	0.70	0.70	< 0.39	< 0.96	< 0.96	ND
TPH (Predates EPH)	200	800	200	2,000	**350**	**940**	**300**	**530**
Metals								
Silver	100	100	200	200	< 2.0	< 2.0	< 2.0	ND
Arsenic	30	30	30	30	1.1	0.79	0.65	0.85
Barium	1,000	1,000	2,500	2,500	15	23	13	17
Cadmium	30	30	80	80	< 1.0	< 1.0	< 1.0	ND
Chromium	1,000	1,000	2,500	2,500	150	64	49	88
Mercury	20	20	60	60	< 0.30	< 0.30	< 0.30	ND
Lead	300	300	600	600	< 10	< 10	< 10	ND
Selenium	300	300	2,500	2,500	< 1.0	< 1.0	< 1.0	ND

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed (i.e., MCP Standards or Soil Reuse Levels)
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol. Detection limits were not used in the calculation of the average concentration.
3. Only those compounds detected in at least one sample are listed.

Table D-2
SOIL

Buckley & Mann

Lagoon #2 Soil Data [1,2]

(Samples collected October 25-26, 1995. All Results in mg/kg unless otherwise noted.)

	MCP Method 1 Standards				Lagoon #2 (Area #2)						Average Concentration Lagoon #2
	S-1/GW-1	S-1/GW-3	S-2/GW-1	S-2/GW-3	BM-TP16-L2-NOR1	BM-TP16-L2-NOR2	BM-TP17-L2-C1	BM-TP17-L2-C2	BM-TP18-L2-S1	BM-TP18-L2-S2	
Volatile Organic Compounds[3]											
Acetone	3.0	60	3.0	60	< 0.055	< 0.055	0.11	< 0.060	< 0.056	0.14	0.042
1,4-dichlorobenzene	2.0	40	2.0	60	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	0.0097	0.0016
Chlorobenzene	8.0	40	8.0	40	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	< 0.0014	ND
1,3-dichlorobenzene	100	100	200	500	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	0.011	ND
1,2-dichlorobenzene	100	100	200	500	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	0.0028	ND
Ethylbenzene	80	500	80	500	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	< 0.0014	ND
Tetrachloroethene	0.50	200	0.50	300	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	< 0.0014	ND
Total Xylenes	500	500	800	1,000	< 0.0027	< 0.0027	< 0.0036	< 0.0032	< 0.0028	< 0.0014	ND
Acid/Base Neutral Compounds[3]											
Carbazole	NL	NL	NL	NL	< 1.8	< 0.36	< 2.3	< 0.41	< 0.37	< 0.73	ND
2-methylnaphthalene	4.0	500	4.0	1,000	2.5	1.5	< 1.1	< 0.20	< 0.18	4.6	1.4
Naphthalene	4.0	100	4.0	1,000	< 0.89	0.23	< 1.1	< 0.20	< 0.18	1.0	0.21
Acenaphthene	20	1,000	20	2,500	1.5	0.87	< 1.1	< 0.20	< 0.18	1.7	0.43
Acenaphthylene	100	100	100	1000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Fluorene	400	900	400	2,000	< 0.89	0.52	< 1.1	< 0.20	< 0.18	0.69	0.20
Anthracene	1,000	1,000	2,500	2,500	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Fluoranthene	1,000	1,000	2,000	1,000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Hexachlorobenzene	0.70	0.70	0.80	0.80	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Phenanthrene	700	100	700	100	< 0.89	0.32	< 1.1	< 0.20	< 0.18	< 0.36	ND
1,2,4-trichlorobenzene	100	400	100	800	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	0.54	ND
Dibenzofuran	NL	NL	NL	NL	0.93	0.71	< 1.1	< 0.20	< 0.18	0.79	0.41
Diethylphthalate	100	0.70	100	0.70	< 0.89	0.22	< 1.1	< 0.20	< 0.18	< 0.36	ND
Bis(2-ethylhexyl)phthalate	100	200	100	300	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Benzo(a)anthracene	0.70	0.70	1.0	1.0	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Chrysene	7.0	7.0	10	10	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Pyrene	700	700	1,000	2,000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Benzo(b)fluoranthene	0.70	0.70	1.0	1.0	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Benzo(k)fluoranthene	7.0	7.0	10	10	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Benzo(g,h,i)perylene	1,000	1,000	2,500	2,500	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Benzo(a)pyrene	0.70	0.70	0.70	0.70	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Indeno(1,2,3-cd)pyrene	0.70	0.70	1.0	1.0	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
Dibenzo(a,h)anthracene	0.70	0.70	0.70	0.70	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	ND
TPH (Predates EPH)	200	800	200	2,000	92	60	1,400	27	190	540	380
Metals											
Silver	100	100	200	200	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	ND
Arsenic	30	30	30	30	0.71	< 0.25	1.7	< 0.25	< 0.25	0.54	0.49
Barium	1,000	1,000	2,500	2,500	31	31	54	21	14	20	29
Cadmium	30	30	80	80	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ND
Chromium	1,000	1,000	2,500	2,500	37	15	540	11	58	43	117
Mercury	20	20	60	60	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	< 0.30	ND
Lead	300	300	600	600	< 10	< 10	< 10	< 10	< 10	< 10	ND
Selenium	300	300	2,500	2,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ND

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed (i.e., MCP Standards or Soil Reuse Levels)
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol. Detection limits were not used in the calculation of average concentration.
3. Only those compounds detected in at least one sample are listed.

Table D-3
SOIL

Buckley & Maan
October 1995 Test Pit Investigation Results
Test Pit Data for Soil Consolidated in Area #10[1,2]
(Samples collected October 25-26, 1995. All Results in mg/kg unless otherwise noted.)

	MCP Method 1 Standards				Area #10	Area #10	Area #10	Area #10 (#12)	Area #10	Area #10	Area #3	Area #5	Area #6	Area #4 (Drum Material)		Weighted Average Concentration (ND not counted)
	S-1/GW-1	S-1/GW-3	S-2/GW-1	S-2/GW-3	BM-TP1-PD	BM-TP2-BT	BM-TP5-MW1	BM-TP6-FP	BM-TP8-KS	BM-TP15-SD	BM-TP22-P75	BM-COMP-P88	BM-TP23-WD	BM-DM-C1	BM-DM-C2	Total volume [4]
Estimated volume represented by this sample, cubic yards					250	250	1,700	600	1,700	1,000	300	11	190	1.5	1.5	6,004
Volatile Organic Compounds[3]																
Acetone	3.0	60	3.0	60	< 0.068	< 0.0700	< 0.064	< 0.062	< 0.060	< 0.058	< 0.058	< 0.063	< 0.056	NA	NA	ND
1,4-dichlorobenzene	2.0	40	2.0	60	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
Chlorobenzene	8.0	40	8.0	40	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
1,3-dichlorobenzene	100	100	200	500	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
1,2-dichlorobenzene	100	100	200	500	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
Ethylbenzene	80	500	80	500	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
Tetrachloroethene	0.50	200	0.50	300	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
Total Xylenes	500	500	800	1,000	< 0.0034	< 0.0035	< 0.0032	< 0.0031	< 0.0030	< 0.0029	< 0.0029	< 0.0032	< 0.0028	NA	NA	ND
Acid/Base Neutral Compounds[3]																
Carbazole	NL	NL	NL	NL	2.9	< 1.8	< 0.83	< 0.38	2.3	< 0.38	< 0.38	< 2.1	< 0.37	< 8.8	< 3.5	0.77
2-methylnaphthalene	4.0	500	4.0	1,000	< 0.43	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	130	44	ND
Naphthalene	4.0	100	4.0	1,000	0.45	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	12	4.0	ND
Acenaphthene	20	1,000	20	2,500	1.7	< 0.92	< 0.42	< 0.19	0.74	< 0.19	< 0.19	1.9	0.52	35	18	0.29
Acenaphthylene	100	100	100	1000	< 0.43	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	ND
Fluorene	400	900	400	2,000	1.8	< 0.92	< 0.42	< 0.19	0.89	< 0.19	< 0.19	< 1.0	< 0.19	18	8.0	0.33
Anthracene	1,000	1,000	2,500	2,500	4.5	< 0.92	< 0.42	< 0.19	3.0	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	1.04
Fluoranthene	1,000	1,000	2,000	1,000	13	0.99	< 0.42	0.19	16	0.34	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	5.23
Hexachlorobenzene	0.70	0.70	0.80	0.80	< 0.43	< 0.92	0.62	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	ND
Phenanthrene	700	100	700	100	16	1.30	< 0.42	< 0.19	11	0.29	< 0.19	< 1.0	< 0.19	7.6	3.8	3.89
1,2,4-trichlorobenzene	100	400	100	800	< 0.43	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	1.3	0.48	35	16	ND
Dibenzofuran	NL	NL	NL	NL	1.1	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	23	9.8	ND
Diethylphthalate	100	0.70	100	0.70	0.48	< 0.92	< 0.42	0.31	< 0.70	< 0.19	< 0.19	< 1.0	0.21	< 4.4	2.0	ND
Bis(2-ethylhexyl)phthalate	100	200	100	300	< 0.43	< 0.92	< 0.42	< 0.19	< 0.70	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	3.7	ND
Benzo(a)anthracene	0.70	0.70	1.0	1.0	6.7	< 0.92	< 0.42	< 0.19	10	0.20	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	3.14
Chrysene	7.0	7.0	10	10	6.5	< 0.92	< 0.42	< 0.19	10	0.25	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	3.14
Pyrene	700	700	1,000	2,000	14	< 0.92	< 0.42	0.20	15	0.35	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	4.91
Benzo(b)fluoranthene	0.70	0.70	1.0	1.0	6.3	< 0.92	< 0.42	< 0.19	13	0.27	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	3.99
Benzo(k)fluoranthene	7.0	7.0	10	10	2.1	< 0.92	< 0.42	< 0.19	4.4	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	1.33
Benzo(g,h,i)perylene	1,000	1,000	2,500	2,500	3.6	< 0.92	< 0.42	< 0.19	7.3	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	2.22
Benzo(a)pyrene	0.70	0.70	0.70	0.70	5.4	< 0.92	< 0.42	< 0.19	9.1	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	2.80
Indeno(1,2,3-cd)pyrene	0.70	0.70	1.0	1.0	2.9	< 0.92	< 0.42	< 0.19	5.9	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	1.79
Dibenzo(a,h)anthracene	0.70	0.70	0.70	0.70	0.93	< 0.92	< 0.42	< 0.19	1.8	< 0.19	< 0.19	< 1.0	< 0.19	< 4.4	< 1.8	0.55
TPH (Predates EPH)	200	800	200	2,000	74	4100	830	38	630	25	550	< 25	2,700	5,100	6,000	711
Metals																
Silver	100	100	200	200	< 2.0	4.1	22	< 2.0	3.6	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	< 2.0	7.4
Arsenic	30	30	30	30	3.7	6.9	12	3.6	9.3	6.4	4.3	2.4	9.6	17	10	8.4
Barium	1,000	1,000	2,500	2,500	44	100	590	50	290	150	22	24	26	31	25	287
Cadmium	30	30	80	80	< 1.0	4.5	21	< 1.0	8.2	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	8.5
Chromium	1,000	1,000	2,500	2,500	23	310	1,800	23	340	59	890	1,100	480	1,300	920	694
Mercury	20	20	60	60	2.2	1.3	0.36	1.0	0.44	< 0.30	0.33	< 0.30	< 0.30	< 0.30	< 0.30	0.4
Lead	300	300	600	600	83	300	800	240	750	120	23	20	20	23	16	501
Selenium	300	300	2,500	2,500	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	< 1.0	ND

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed (i.e., MCP Standards or Soil Reuse Levels)
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol. Detection limits were not used in the calculation of the average concentration.
3. Only those compounds detected in at least one sample are listed.
4. The volume shown here includes material at greater depth below grade in Area 10 than counted in the MCP transmittal forms.

Table D-4
SOIL

Buckley & Mann

Test Pit Data for Soil Shipped for Off Site Disposal [1,2]

(Samples collected October 25-26, 1995. All Results in mg/kg unless otherwise noted.)

	MCP Method 1 Standards				Area #10
	S-1/GW-1	S-1/GW-3	S-2/GW-1	S-2/GW-3	BM-TP10-RB
Estimated volume represented by this sample, cubic yards					Total volume 300
Volatile Organic Compounds[3]					
Acetone	3.0	60	3.0	60	< 0.060
1,4-dichlorobenzene	2.0	40	2.0	60	< 0.0030
Chlorobenzene	8.0	40	8.0	40	< 0.0030
1,3-dichlorobenzene	100	100	200	500	< 0.0030
1,2-dichlorobenzene	100	100	200	500	< 0.0030
Ethylbenzene	80	500	80	500	< 0.0030
Tetrachloroethene	0.50	200	0.50	300	< 0.0030
Total Xylenes	500	500	800	1,000	< 0.0030
Acid/Base Neutral Compounds[3]					
Carbazole	NL	NL	NL	NL	< 0.48
2-methylnaphthalene	4.0	500	4.0	1,000	< 0.24
Naphthalene	4.0	100	4.0	1,000	< 0.24
Acenaphthene	20	1,000	20	2,500	< 0.24
Acenaphthylene	100	100	100	1000	< 0.24
Fluorene	400	900	400	2,000	< 0.24
Anthracene	1,000	1,000	2,500	2,500	< 0.24
Fluoranthene	1,000	1,000	2,000	1,000	< 0.24
Hexachlorobenzene	0.70	0.70	0.80	0.80	**3.3**
Phenanthrene	700	100	700	100	< 0.24
1,2,4-trichlorobenzene	100	400	100	800	< 0.24
Dibenzofuran	NL	NL	NL	NL	< 0.24
Diethylphthalate	100	0.70	100	0.70	0.39
Bis(2-ethylhexyl)phthalate	100	200	100	300	< 0.24
Benzo(a)anthracene	0.70	0.70	1.0	1.0	< 0.24
Chrysene	7.0	7.0	10	10	< 0.24
Pyrene	700	700	1,000	2,000	< 0.24
Benzo(b)fluoranthene	0.70	0.70	1.0	1.0	< 0.24
Benzo(k)fluoranthene	7.0	7.0	10	10	< 0.24
Benzo(g,h,i)perylene	1,000	1,000	2,500	2,500	< 0.24
Benzo(a)pyrene	0.70	0.70	0.70	0.70	< 0.24
Indeno(1,2,3-cd)pyrene	0.70	0.70	1.0	1.0	< 0.24
Dibenzo(a,h)anthracene	0.70	0.70	0.70	0.70	< 0.24
TPH (Predates EPH)	200	800	200	2,000	130
Metals					
Silver	100	100	200	200	< 2.0
Arsenic	30	30	30	30	**34**
Barium	1,000	1,000	2,500	2,500	**1,300**
Cadmium	30	30	80	80	20
Chromium	1,000	1,000	2,500	2,500	**1,900**
Mercury	20	20	60	60	1.7
Lead	300	300	600	600	**5,000**
Selenium	300	300	2,500	2,500	1.2

Legend
NA, Not Analyzed
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed (i.e.,
2. If a compound was not detected in a sample, then the detection limit is Detection limits were not used in the calculation of the average conce
3. Only those compounds detected in at least one sample are listed.

APPENDIX E

LABORATORY REPORT
MAY 1998 GROUNDWATER CHARACTERIZATION JUST PRIOR TO REMEDIATION

Refer to Figure D-1 in Appendix D for Monitoring Well Locations

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

TABLE E-1
BUCKLEY MANN INC.
GROUNDWATER ANALYSES
Samples collected on 7 May 1998

Well #	CDM Lab # 98-040XX	pH	Conductivity ms/cm	DO mg/L	Turbidity NTU	PAH ug/L (See note)	Chromium ug/L	Lead ug/L	Zinc ug/L	TOC mg/L	COD mg/L	Groundwater elev., Ft
EW-2	56	6.4	0.113	8.4	496	< 0.7	< 0.85	< 0.68	30		< 5	162.23
1	57	6.0	0.085	1.7	520		1.4	< 0.68	49	9.7	35	166.27
2 (Upgradient)	58	6.3	0.086	9.1	999		< 0.85	< 0.68	< 12		15	164.90
2 (Duplicate)	62						2.2	1.4	< 12		12	
3	55	6.2	0.113	6.7	999	< 0.7	32	< 0.68	220	14	190	159.31
3A (Bed Rock)	54	6.5	0.133	7.4	386	< 0.7	< 0.85	< 0.68	< 12		< 5	161.16
4	59	6.4	0.039	8.4	570		2.4	< 0.68	< 12	17	190	162.03
5	60	6.6	0.220	7.7	999		< 0.85	< 0.68	< 12		< 5	160.87
6	61	6.5	0.223	1.5	999		5.3	3.7	13	24	340	163.89

MCP GW-1	See note	100	15	2,000
MCP GW-3	See note	2,000	30	900

Notes:
The reporting limits for PAH compounds in CDM's May 26, 1998 laboratory report were too high to allow direct comparison to MCP Method 1 standards. At CDM's direction, the laboratory reexamined the original GC/MS data set and established lower reporting limits. These new limits are contained in the October 1, 1998 version of the report, for both PAH compounds and metals. The revised reporting limits for PAH compounds in groundwater samples ranged from 0.3 (benzo(a)pyrene) to 0.69 ug/L.
The MCP limits for PAH compounds in GW-1 groundwater range from 0.2 ug/L to 2,000 ug/L. GW-3 limits are typically 1 to 3 orders of magnitude higher.
The GW-1 limit for naphthalene and 2-methyl naphthalene, the PAH compounds found in B&M Lagoon #1 soils, are 20 and 10 ug/L, respectively.
The field record and consequently, the laboratory reports, inadvertently switched the identification of wells 3 and 3A. This summary table corrects the error.

BUCKLEY & MANN

5/7/98

WELL SAMPLING

[illegible]

E. [illegible]

[illegible]

EJ:

* MONITORING WELL NO. 1 MW-1

CUT LOCK OFF

3" STICKUP

2" PVC

FROM TOP OF STEEL:

6.89' DEPTH TO WATER

15.79' BOTTOM OF WELL

PURGE VOL.	pH	COND (mS/cm)	TURB.	DO (mg/l)	TEMP (°C)	TIME
1	5.96	0.113	490	2.39	8.5	10:05
2	5.87	0.087	419	2.35	8.0	10:07
3	6.00	0.085	517	1.66	7.7	10:09

- FILTERED METALS *MW-01-01
- COLLECTED PAH, COD, METALS SAMPLE 10:10
- DEPTH TO WATER AFTER SAMPLING 6.93'
- LEFT TUBING IN WELL, NEW LOCK

• MONITORING WELL NO. 2

CUT OFF LOCK

3" STEEL / 2" PVC - NO TUBING

FROM TOP OF STEEL:

DEPTH TO WATER: 10.29'

DEPTH TO BOTTOM: 17.88'

PURGE #	pH	COND	TURB	DO	TEMP	TIME
1	6.93	0.093	999	10.45	8.6	12:39
2	6.70	0.090	999	10.30	8.4	12:41
3	6.26	0.096	·	9.11	8.2	12:44

* COLLECTED PAH, METALS, COD SAMPLES @ 12:45

FILTERED METALS MW-02-01

* COLLECTED DUPLICATE SAMPLE MW-12-01

LEFT TUBING IN WELL, NEW PADLOCK

• MONITORING WELL EW-1

2½" STEEL CASING
1½" PVC

WELL DRY

BOTTOM OF WELL @ 5.78'

KEPT EXISTING TUBING INSIDE

• MONITORING WELL EW-2

2½" STEEL / 1¼ PVC ⇒ NO CAP
⅛" TUBING INSIDE
FROM TOP OF STEEL:
DEPTH TO WATER: 7.16'
DEPTH TO BOTTOM: 19.04'

PURGE #	pH	COND.	ORP	DO	TEMP	TIME
1	6.39	0.110	999	9.03	10.2	3:14
	(BLACKISH/BROWN WATER)					
2	6.42	0.113	922	8.60	9.7	3:15
	(BROWN)					
3 & *	6.37	0.113	496	8.39	9.6	3:18

* COLLECTED PAH, METALS, COD SAMPLE EW-02-01
FILTERED METALS (3:20)

LEFT TUBING IN → NO CAP

MW-3 IS OVERBURDEN WELL

• MONITORING WELL NO. 3

3" STEEL / 2" PVC / 1/8" TUBING - STAINED BLACK

FROM TOP OF STEEL:
DEPTH TO WATER: 5.32'
DEPTH TO BOTTOM: 5.98'

*OBSTRUCTIONS IN WELL
AFTER SAMPLING: DEPTH TO WATER 7.3' BOTTOM = 12'

PURGE #	pH	COND	TURB	DO	TEMP	TIME
1	6.23	0.146	[illegible]	6.74	11.9	3:50
2	6.17	0.113	999	6.72	12.0	3:55

(PURGED DRY)

* COLLECTED SAMPLE MW-03~~X~~-01 3:56
METALS (FILTERED), PAH, COD

MW-3A IS BEDROCK WELL

• MONITORING WELL NO. 3A

3" STEEL / 2" PVC - 1/8" TUBING
CUT LOCK

FROM TOP OF STEEL:
DEPTH TO WATER: 4.0'
DEPTH TO BOTTOM: 27.0'

PURGE #	pH	COND	TURB	DO	TEMP	TIME
1	6.27	0.130	440	8.58	9.9	4:10
2	6.43	0.131	380	8.36	9.6	4:13
3	6.49	0.133	386	7.39	9.4	4:16

* COLLECTED SAMPLE MW-03A-01 (4:17)
METALS (FILTERED), PAH, COD

LEFT TUBING, NEW LOCK

• MONITORING WELL NO. 4

CUT OFF LOCK
3" STEEL / 2" PVC. 1/8" TUBING TRASHED
FROM TOP OF STEEL
DEPTH TO WATER: 4.41'
DEPTH TO BOTTOM: 6.38'

PURGE #	pH	COND.	TURB	DO	TEMP.	TIME
1	6.43	0.039	570	8.40	10.8	11:30

(PURGED DRY - ¾ GAL.)

DARK REDDISH BROWN WATER

* COLLECTED SAMPLES FOR METALS, PAH, COD
FILTERED METALS MW-04-01 (11:45)
OBSTRUCTION IN HOLE, DEPTH TO BOTTOM
AFTER SAMPLING 12.0'

LEFT TUBING IN WELL, NOT PADLOCK

• MONITORING WELL NO. 5

CUT LOCK
3" STEEL / 2" PVC 1/8" TUBING TRASHED

FROM TOP OF STEEL:
DEPTH TO WATER: 3.56'
DEPTH TO BOTTOM: 12.55'

PURGE #	pH	COND	TURB	DO	TEMP	TIME
1	6.34	0.226	999	6.76	9.4	11:50
	(BROWN)					
2	6.46	0.228	999	8.04	8.6	11:55
3	6.59	0.220	999	7.70	8.6	11:59

* COLLECTED PAH, COD, METALS @ 12:00
FILTERED METALS MW-05-01

DEPTH TO WATER AFTER SAMPLING: 6.3'

LEFT TUBING IN WELL, NOT PADLOCK

MONITORING WELL #6

CUT OFF LOCK
3" STICK UP
2" PVC - ½" TUBING INSIDE - TRASHED
FROM TOP OF STEEL:
DEPTH TO WATER = 4.02'
BOTTOM OF WELL = 12.26'

PURGE #	pH	COND.	TURB	DO	TEMP	TIME
1	6.38	0.219	999	2.90	9.02	10:45
	(WATER GREY-FINES)					
2	6.48	0.219	999	3.43	8.70	10:47
	(WATER BROWN)					
3	6.51	0.223	999	1.52	9.5	10:55

~~[illegible]~~

SAMPLED PAH, COD, METALS 10 55
FILTERED METALS MW-06-01
LEFT TUBE IN WELL / NEW PADLOCK

Client: Buckley & Mann Inc.

Project: Stage 1 Remediation

SDG: 980511-563

Date: 10/1/98

NOTES:

1) SEE 5/26/98 REPORT* FOR SIGNATURES

2) MW-3 IS ACTUALLY MW3A AND MW-3A IS ACTUALLY MW-3

3) SEE 5/26/98 REPORT* FOR CHAIN OF CUSTODY PAGE

* ALSO IN THIS APPENDIX

CDM Laboratory
Riverside Technology Center
840 Memorial Drive
Cambridge, MA 02139
phone (617) 354-4448 - fax (617) 354-0764

Laboratory Report

SDG #:	980511-563	**Print Date:**	10/1/98
Client:	Buckley & Mann Inc.	**Client Contact:**	Bob Dangel
Project:	Stage 1 Remediation	**Address:**	Camp Dresser & McKee 10 Cambridge Center Cambridge, MA 02142

Project Narrative

Attached please find the analytical results for this sample delivery group. Please refer to the Sample List Report for sample identification. All associated quality control information is summarized following the analytical results for all samples.

No significant deviations or anomalies were encountered during the preparation or analysis of these samples unless as noted below.

*

THIS IS THE "MDL REPORT" VERSION OF THIS PREVIOUSLY SUBMITTED REPORT: WITH SAMPLE RESULTS REPORTED DOWN TO THE DETECTION LIMIT. *

The undersigned hereby attest to the fact that the information contained in this report is, to the best of their knowledge, complete & accurate.

LABORATORY MANAGEMENT REVIEW: _____

LABORATORY QA/QC REVIEW: _____

AZ DOH #AZ0553, CO DPHE (RECIPROCITY), CT DPH #0682, LA DOHH, MA DEP M-MA012, ME DHS (RECIPROCITY), NH DES #2509, NY ELAP #11330, NC DEHNR #553, PA DEP #68-469, RI DOH #48,VA DGS/DCLS #00046, EPA ICR MA001

SAMPLE LIST REPORT

Client Sample ID	Date Collected	Received Date	Lab Sample ID	Matrix Type
MW-01-01	05/07/98	05/11/98	98-04057	AQUEOUS
MW-06-01	05/07/98	05/11/98	98-04061	AQUEOUS
MW-04-01	05/07/98	05/11/98	98-04059	AQUEOUS
MW-05-01	05/07/98	05/11/98	98-04060	AQUEOUS
MW-02-01	05/07/98	05/11/98	98-04058	AQUEOUS
MW-12-01	05/07/98	05/11/98	98-04062	AQUEOUS
EW-02-01	05/07/98	05/11/98	98-04056	AQUEOUS
MW-03A-01	05/07/98	05/11/98	98-04055	AQUEOUS
MW-03-01	05/07/98	05/11/98	98-04054	AQUEOUS

SINGLE COMPONENT MDL ANALYTICAL REPORT

SDG#: 980511-563

Component Name:	COD	**EPA Method #:**	HACH 8000	**Matrix:**	AQUEOUS
Analytical Batch:	I980513/8000_AQUE/34	**Analyst:**	DEVLINHA	**Units:**	mg/L
Reviewed By - Date:	GOTTSHALLDL - 5/13/98				

Client Sample ID	Lab Sample ID	MDL	Result	Qualifier	Dilution Factor
MW-03-01	98-04054	5	N.D.		1
MW-03A-01	98-04055	5	190		1
EW-02-01	98-04056	5	N.D.		1
MW-01-01	98-04057	5	35		1
MW-02-01	98-04058	5	15		1
MW-04-01	98-04059	5	190		1
MW-05-01	98-04060	5	N.D.		1
MW-06-01	98-04061	5	340		1
MW-12-01	98-04062	5	12		1

8270B_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 8270B	**Preparation Batch ID:**	P980520/3510_8270/48
SDG #:	980511-563	**Prep. Analyst:**	ELSDENGF
Client Sample ID:	MW-03-01		
Lab Sample ID:	98-04054	**Analytical Batch ID:**	I980520/8270B_AQU/56
Matrix:	AQUEOUS	**Analyst:**	ELSDENGF
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Acenaphthene	0.46	N.D.	
Acenaphthylene	0.37	N.D.	
Anthracene	0.47	N.D.	
Benz(a)anthracene	0.45	N.D.	
Benzo(b)fluoranthene	0.47	N.D.	
Benzo(k)fluoranthene	0.5	N.D.	
Benzo(g,h,i)perylene	0.64	N.D.	
Benzo(a)pyrene	0.3	N.D.	
Chrysene	0.65	N.D.	
Dibenz(a,h)anthracene	0.44	N.D.	
Fluoranthene	0.6	N.D.	
Fluorene	0.46	N.D.	
Indeno(1,2,3-cd)pyrene	0.58	N.D.	
2-Methylnaphthalene	0.51	N.D.	
Naphthalene	0.44	N.D.	
Phenanthrene	0.37	N.D.	
Pyrene	0.69	N.D.	

Surrogate	% Recovery	Accep. Range
2-Fluorobiphenyl	87.23	43 - 116
4-Terphenyl-d14	94.44	33 - 141
Nitrobenzene-d5	83.35	35 - 114

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/20/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-03-01		
Lab Sample ID:	98-04054	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	N.D.	
Lead	0.68	N.D.	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

8270B_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 8270B	**Preparation Batch ID:**	P980520/3510_8270/48
SDG #:	980511-563	**Prep. Analyst:**	ELSDENGF
Client Sample ID:	MW-03A-01		
Lab Sample ID:	98-04055	**Analytical Batch ID:**	I980520/8270B_AQU/56
Matrix:	AQUEOUS	**Analyst:**	ELSDENGF
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Acenaphthene	0.46	N.D.	
Acenaphthylene	0.37	N.D.	
Anthracene	0.47	N.D.	
Benz(a)anthracene	0.45	N.D.	
Benzo(b)fluoranthene	0.47	N.D.	
Benzo(k)fluoranthene	0.5	N.D.	
Benzo(g,h,i)perylene	0.64	N.D.	
Benzo(a)pyrene	0.3	N.D.	
Chrysene	0.65	N.D.	
Dibenz(a,h)anthracene	0.44	N.D.	
Fluoranthene	0.6	N.D.	
Fluorene	0.46	N.D.	
Indeno(1,2,3-cd)pyrene	0.58	N.D.	
2-Methylnaphthalene	0.51	N.D.	
Naphthalene	0.44	N.D.	
Phenanthrene	0.37	N.D.	
Pyrene	0.69	N.D.	

Surrogate	% Recovery	Accep. Range
2-Fluorobiphenyl	91.36	43 - 116
4-Terphenyl-d14	92.8	33 - 141
Nitrobenzene-d5	87.06	35 - 114

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/20/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	EW-02-01		
Lab Sample ID:	98-04056	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	N.D.	
Lead	0.68	N.D.	
Zinc	12	30	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-01-01		
Lab Sample ID:	98-04057	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	1.4	
Lead	0.68	N.D.	
Zinc	12	49	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-02-01		
Lab Sample ID:	98-04058	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	N.D.	
Lead	0.68	N.D.	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-04-01		
Lab Sample ID:	98-04059	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	2.4	
Lead	0.68	N.D.	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-05-01		
Lab Sample ID:	98-04060	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	N.D.	
Lead	0.68	N.D.	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-06-01		
Lab Sample ID:	98-04061	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	5.3	
Lead	0.68	3.7	
Zinc	12	13	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS MDL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-12-01		
Lab Sample ID:	98-04062	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MDL	Calculated Raw Result	Qualifiers
Chromium	0.85	2.2	
Lead	0.68	1.4	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

PREPARATION INFORMATION REPORT

SDG #: 980511-563

Preparation Batch ID: P980520/3510_8270/48

Preparation ID: 3510_8270B **EPA Method #:** EPA 3510

Batch Approved By: GOTTSHALLDL **Batch Approved On:** 5/20/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
MW-03-01	98-04054	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	
MW-03A-01	98-04055	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	
EW-02-01	98-04056	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	

Preparation Batch ID: P980522/3015/115

Preparation ID: 3015 **EPA Method #:** 3015

Batch Approved By: GOTTSHALLDL **Batch Approved On:** 5/22/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
MW-03-01	98-04054	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
		DUPLICATE	Final Volume	50	mL	
			Initial Volume	45	mL	
		MATRIX_SPIKE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-03A-01	98-04055	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
EW-02-01	98-04056	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-01-01	98-04057	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-02-01	98-04058	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-04-01	98-04059	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-05-01	98-04060	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-06-01	98-04061	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-12-01	98-04062	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	

HOLDTIME SUMMARY

Analysis: 6010A_AQUEOUS
Analysis Desc: ICP Metals
Required Preparation Holdtime: 180 days
Required Analytical Holdtime: 180 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98	05/18/98	05/19/98
MW-03A-01	98-04055	05/07/98	05/11/98	05/18/98	05/19/98
EW-02-01	98-04056	05/07/98	05/11/98	05/18/98	05/19/98
MW-01-01	98-04057	05/07/98	05/11/98	05/18/98	05/19/98
MW-02-01	98-04058	05/07/98	05/11/98	05/18/98	05/19/98
MW-04-01	98-04059	05/07/98	05/11/98	05/18/98	05/19/98
MW-05-01	98-04060	05/07/98	05/11/98	05/18/98	05/19/98
MW-06-01	98-04061	05/07/98	05/11/98	05/18/98	05/19/98
MW-12-01	98-04062	05/07/98	05/11/98	05/18/98	05/19/98

Analysis: 8000_AQUEOUS
Analysis Desc: Chemical Oxygen Demand
Required Preparation Holdtime: None
Required Analytical Holdtime: 28 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98		05/12/98
MW-03A-01	98-04055	05/07/98	05/11/98		05/12/98
EW-02-01	98-04056	05/07/98	05/11/98		05/12/98
MW-01-01	98-04057	05/07/98	05/11/98		05/12/98
MW-02-01	98-04058	05/07/98	05/11/98		05/12/98
MW-04-01	98-04059	05/07/98	05/11/98		05/12/98
MW-05-01	98-04060	05/07/98	05/11/98		05/12/98
MW-06-01	98-04061	05/07/98	05/11/98		05/12/98
MW-12-01	98-04062	05/07/98	05/11/98		05/12/98

Analysis: 8270B_AQUEOUS
Analysis Desc: Semivolatile analysis in waters
Required Preparation Holdtime: 7 days
Required Analytical Holdtime: 40 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98	05/15/98	05/19/98
MW-03A-01	98-04055	05/07/98	05/11/98	05/15/98	05/19/98
EW-02-01	98-04056	05/07/98	05/11/98	05/15/98	05/19/98

8000_AQUEOUS MDL BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	
Lab Sample ID:	B98-02755	**Prep Analyst:**	
EPA Number:	HACH 8000		
Units:	mg/L	**Analytical Batch ID:**	I980513/8000_AQUE/34
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MDL	Result	Qualifier
COD	5	N.D.	

8270B_AQUEOUS MDL BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980520/3510_8270/48
Lab Sample ID:	B98-02969	**Prep Analyst:**	ELSDENGF
EPA Number:	EPA 8270B		
Units:	ug/L	**Analytical Batch ID:**	I980520/8270B_AQU/56
Matrix:	AQUEOUS	**Analysis Analyst:**	ELSDENGF

Component Name	MDL	Result	Qualifier
2-Methylnaphthalene	0.51	N.D.	
Acenaphthene	0.46	N.D.	
Acenaphthylene	0.37	N.D.	
Anthracene	0.47	N.D.	
Benz(a)anthracene	0.45	N.D.	
Benzo(a)pyrene	0.3	N.D.	
Benzo(b)fluoranthene	0.47	N.D.	
Benzo(g,h,i)perylene	0.64	N.D.	
Benzo(k)fluoranthene	0.5	N.D.	
Chrysene	0.65	N.D.	
Dibenz(a,h)anthracene	0.44	N.D.	
Fluoranthene	0.6	N.D.	
Fluorene	0.46	N.D.	
Indeno(1,2,3-cd)pyrene	0.58	N.D.	
Naphthalene	0.44	N.D.	
Phenanthrene	0.37	N.D.	
Pyrene	0.69	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/20/98

6010A_AQUEOUS MDL BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
Lab Sample ID:	98-04467	**Prep Analyst:**	LESHINSKYA
EPA Number:	EPA 6010A		
Units:	ug/L	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analysis Analyst:**	LESHINSKYA

Component Name	MDL	Result	Qualifier
Chromium	0.85	N.D.	
Lead	0.68	N.D.	
Zinc	12	N.D.	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

8270B_AQUEOUS LFB/LFB DUPLICATE RPD REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980520/3510_8270/48
Lab Sample ID:	LFB98-02970	**Prep. Analyst:**	ELSDENGF
EPA Method #:	EPA 8270B		
Matrix:	AQUEOUS	**Analytical Batch ID:**	I980520/8270B_AQU/56
Units:	ug/L	**Analyst:**	ELSDENGF

Component Name	MRL	Spike Amount	% Analyte Recovery LFB	% Analyte Recovery LFBD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifiers
Acenaphthene	5.0	100.00	78.3			46 - 118		
Pyrene	5.0	100.00	80.8			26 - 127		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/20/98

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
Lab Sample ID:	LFB98-03057	**Prep. Analyst:**	LESHINSKYA
EPA Method #:	EPA 6010A		
Matrix:	AQUEOUS	**Analytical Batch ID:**	I980522/6010A_AQU/89
Units:	ug/L	**Analyst:**	LESHINSKYA

Component Name	MRL	Spike Amount	% Analyte Recovery LFB	% Analyte Recovery LFBD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifiers
Chromium	5.0	100.00	96.9			80 - 120		
Lead	5.0	100.00	98.2			80 - 120		
Zinc	20	100.00	99.7			80 - 120		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

6010A_AQUEOUS MS/MSD RPD REPORT

SDG #: 980511-563
Sample ID: 98-04054
Matrix: AQUEOUS

Preparation Batch ID: P980522/3015/115
Prep. Analyst: LESHINSKYA

Analytical Batch ID: I980522/6010A_AQU/89
Analyst: LESHINSKYA

Component Name	% Analyte Recovery MS	% Analyte Recovery MSD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifier
Chromium	110			80 - 120		
Lead	117			80 - 120		
Zinc	117			80 - 120		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

6010A_AQUEOUS MDL DUPLICATE SAMPLE REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
EPA Method #:	EPA 6010A	**Prep. Analyst:**	LESHINSKYA
Lab Sample ID:	98-04054		
Units:	ug/L	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analysis Analyst:**	LESHINSKYA

Component Name	MDL	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
Chromium	0.85	5.0	<5.0	<5.0	N/A	0 - 20	
Lead	0.68	5.0	<5.0	<5.0	N/A	0 - 20	
Zinc	12	20	<20	<20	N/A	0 - 20	

8000_AQUEOUS MDL DUPLICATE SAMPLE REPORT

SDG #:	980511-563	**Preparation Batch ID:**	
EPA Method #:	HACH 8000	**Prep. Analyst:**	
Lab Sample ID:	98-04057		
Units:	mg/L	**Analytical Batch ID:**	I980513/8000_AQUE/34
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MDL	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
COD	5	5.0	35	35	0	0 - 20	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/13/98

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Client: **Buckely & Mann Inc.**

Project: **Stage 1 Remediation**

SDG: **980511-563**

Date: **5/26/98**

NOTES

MW-3 IS ACTUALLY MW-3A

MW-3A IS ACTUALLY MW-3

CDM Laboratory
Riverside Technology Center
840 Memorial Drive
Cambridge, MA 02139
phone (617) 354-4448 - fax (617) 354-0764

Laboratory Report

SDG #:	980511-563	**Print Date:**	5/26/98
Client:	Buckely & Mann Inc.	**Client Contact:**	Bob Dangel
Project:	Stage 1 Remediation	**Address:**	Camp Dresser & McKee 10 Cambridge Center Cambridge, MA 02142

Project Narrative

Attached please find the analytical results for this sample delivery group. Please refer to the Sample List Report for sample identification. All associated quality control information is summarized following the analytical results for all samples.

No significant deviations or anomalies were encountered during the preparation or analysis of these samples unless as noted below.

The undersigned hereby attest to the fact that the information contained in this report is, to the best of their knowledge, complete & accurate.

LABORATORY MANAGEMENT REVIEW: Thomas F Occhialini

LABORATORY QA/QC REVIEW: Peter T May

AZ DOH #AZ0553, CO DPHE (RECIPROCITY), CT DPH #0682, LA DOHH, MA DEP M-MA012, ME DHS (RECIPROCITY), NH DES #2509, NY ELAP #11330, NC DEHNR #553, PA DEP #68-469, RI DOH #48, VA DGS/DCLS #00046, EPA ICR MA001

SAMPLE LIST REPORT

Client Sample ID	Date Collected	Received Date	Lab Sample ID	Matrix Type
MW-01-01	05/07/98	05/11/98	98-04057	AQUEOUS
MW-06-01	05/07/98	05/11/98	98-04061	AQUEOUS
MW-04-01	05/07/98	05/11/98	98-04059	AQUEOUS
MW-05-01	05/07/98	05/11/98	98-04060	AQUEOUS
MW-02-01	05/07/98	05/11/98	98-04058	AQUEOUS
MW-12-01	05/07/98	05/11/98	98-04062	AQUEOUS
EW-02-01	05/07/98	05/11/98	98-04056	AQUEOUS
MW-03A-01	05/07/98	05/11/98	98-04055	AQUEOUS
MW-03-01	05/07/98	05/11/98	98-04054	AQUEOUS

8270B_AQUEOUS ANALYSIS REPORT

Method #:	EPA 8270B	**Preparation Batch ID:**	P980520/3510_8270/48
SDG #:	980511-563	**Prep. Analyst:**	ELSDENGF
Client Sample ID:	MW-03-01		
Lab Sample ID:	98-04054	**Analytical Batch ID:**	I980520/8270B_AQU/56
Matrix:	AQUEOUS	**Analyst:**	ELSDENGF
Units:	ug/L		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Acenaphthene	5.0	<5.0	
Acenaphthylene	5.0	<5.0	
Anthracene	5.0	<5.0	
Benz(a)anthracene	5.0	<5.0	
Benzo(b)fluoranthene	5.0	<5.0	
Benzo(k)fluoranthene	5.0	<5.0	
Benzo(g,h,i)perylene	5.0	<5.0	
Benzo(a)pyrene	5.0	<5.0	
Chrysene	5.0	<5.0	
Dibenz(a,h)anthracene	5.0	<5.0	
Fluoranthene	5.0	<5.0	
Fluorene	5.0	<5.0	
Indeno(1,2,3-cd)pyrene	5.0	<5.0	
2-Methylnaphthalene	5.0	<5.0	
Naphthalene	5.0	<5.0	
Phenanthrene	5.0	<5.0	
Pyrene	5.0	<5.0	

Surrogate	% Recovery	Accep. Range
2-Fluorobiphenyl	87.23	43 - 116
4-Terphenyl-d14	94.44	33 - 141
Nitrobenzene-d5	83.35	35 - 114

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/20/98

6010A_AQUEOUS ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-03-01		
Lab Sample ID:	98-04054	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Chromium	5.0	<5.0	
Lead	5.0	<5.0	
Zinc	20	<20	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-05-01		
Lab Sample ID:	98-04060	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Chromium	5.0	<5.0	
Lead	5.0	<5.0	
Zinc	20	<20	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-06-01		
Lab Sample ID:	98-04061	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Chromium	5.0	5.3	
Lead	5.0	<5.0	
Zinc	20	<20	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

6010A_AQUEOUS ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980522/3015/115
SDG #:	980511-563	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	MW-12-01		
Lab Sample ID:	98-04062	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analyst:**	LESHINSKYA
Units:	ug/L		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Chromium	5.0	<5.0	
Lead	5.0	<5.0	
Zinc	20	<20	

Batch Approved By: GOTTSHALLDL **Batch Approval Date:** 05/22/98

SINGLE COMPONENT ANALYTICAL REPORT

SDG#: 980511-563

Component Name:	COD	**EPA Method #:**	HACH 8000	**Matrix:**	AQUEOUS
Analytical Batch:	I980513/8000_AQUE/34	**Analyst:**	DEVLINHA	**Units:**	mg/L
Reviewed By - Date:	GOTTSHALLDL - 5/13/98				

Client Sample ID	Lab Sample ID	MRL	Result	Dilution Factor	Qualifier
MW-03-01	98-04054	5.0	<5.0	1	
MW-03A-01	98-04055 shallow	5.0	190	1	
EW-02-01	98-04056	5.0	<5.0	1	
MW-01-01	98-04057	5.0	35	1	
MW-02-01	98-04058	5.0	15	1	
MW-04-01	98-04059	5.0	190	1	
MW-05-01	98-04060	5.0	<5.0	1	
MW-06-01	98-04061	5.0	340	1	
MW-12-01	98-04062	5.0	12	1	

PREPARATION INFORMATION REPORT

SDG #: 980511-563

Preparation Batch ID: P980520/3510_8270/48
eparation ID: 3510_8270B
EPA Method #: EPA 3510
atch Approved By: GOTTSHALLDL
Batch Approved On: 5/20/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
MW-03-01	98-04054	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	
MW-03A-01	98-04055	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	
EW-02-01	98-04056	SAMPLE	Final Volume	1.00	mL	
			Initial Volume	1000	mL	
			Surrogate Volume	1.00	mL	

Preparation Batch ID: P980522/3015/115
Preparation ID: 3015
EPA Method #: 3015
Batch Approved By: GOTTSHALLDL
Batch Approved On: 5/22/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
MW-03-01	98-04054	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
		DUPLICATE	Final Volume	50	mL	
			Initial Volume	45	mL	
		MATRIX_SPIKE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-03A-01	98-04055	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
EW-02-01	98-04056	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-01-01	98-04057	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-02-01	98-04058	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-04-01	98-04059	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-05-01	98-04060	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-06-01	98-04061	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	
MW-12-01	98-04062	SAMPLE	Final Volume	50	mL	
			Initial Volume	45	mL	

HOLDTIME SUMMARY

Analysis: 6010A_AQUEOUS
Analysis Desc: ICP Metals
Required Preparation Holdtime: 180 days
Required Analytical Holdtime: 180 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98	05/18/98	05/19/98
MW-03A-01	98-04055	05/07/98	05/11/98	05/18/98	05/19/98
EW-02-01	98-04056	05/07/98	05/11/98	05/18/98	05/19/98
MW-01-01	98-04057	05/07/98	05/11/98	05/18/98	05/19/98
MW-02-01	98-04058	05/07/98	05/11/98	05/18/98	05/19/98
MW-04-01	98-04059	05/07/98	05/11/98	05/18/98	05/19/98
MW-05-01	98-04060	05/07/98	05/11/98	05/18/98	05/19/98
MW-06-01	98-04061	05/07/98	05/11/98	05/18/98	05/19/98
MW-12-01	98-04062	05/07/98	05/11/98	05/18/98	05/19/98

Analysis: 8000_AQUEOUS
Analysis Desc: Chemical Oxygen Demand
Required Preparation Holdtime: None
Required Analytical Holdtime: 28 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98		05/12/98
MW-03A-01	98-04055	05/07/98	05/11/98		05/12/98
EW-02-01	98-04056	05/07/98	05/11/98		05/12/98
MW-01-01	98-04057	05/07/98	05/11/98		05/12/98
MW-02-01	98-04058	05/07/98	05/11/98		05/12/98
MW-04-01	98-04059	05/07/98	05/11/98		05/12/98
MW-05-01	98-04060	05/07/98	05/11/98		05/12/98
MW-06-01	98-04061	05/07/98	05/11/98		05/12/98
MW-12-01	98-04062	05/07/98	05/11/98		05/12/98

Analysis: 8270B_AQUEOUS
Analysis Desc: Semivolatile analysis in waters
Required Preparation Holdtime: 7 days
Required Analytical Holdtime: 40 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03-01	98-04054	05/07/98	05/11/98	05/15/98	05/19/98
MW-03A-01	98-04055	05/07/98	05/11/98	05/15/98	05/19/98
EW-02-01	98-04056	05/07/98	05/11/98	05/15/98	05/19/98

8000_AQUEOUS BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	
Lab Sample ID:	B98-02755	**Prep Analyst:**	
EPA Number:	HACH 8000		
Units:	mg/L	**Analytical Batch ID:**	I980513/8000_AQUE/34
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MRL	Result	Qualifier
COD	5.0	<5.0	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/13/98

8270B_AQUEOUS BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980520/3510_8270/48
Lab Sample ID:	B98-02969	**Prep Analyst:**	ELSDENGF
EPA Number:	EPA 8270B		
Units:	ug/L	**Analytical Batch ID:**	I980520/8270B_AQU/56
Matrix:	AQUEOUS	**Analysis Analyst:**	ELSDENGF

Component Name	MRL	Result	Qualifier
2-Methylnaphthalene	5.0	<5.0	
Acenaphthene	5.0	<5.0	
Acenaphthylene	5.0	<5.0	
Anthracene	5.0	<5.0	
Benz(a)anthracene	5.0	<5.0	
Benzo(a)pyrene	5.0	<5.0	
Benzo(b)fluoranthene	5.0	<5.0	
Benzo(g,h,i)perylene	5.0	<5.0	
Benzo(k)fluoranthene	5.0	<5.0	
Chrysene	5.0	<5.0	
Dibenz(a,h)anthracene	5.0	<5.0	
Fluoranthene	5.0	<5.0	
Fluorene	5.0	<5.0	
Indeno(1,2,3-cd)pyrene	5.0	<5.0	
Naphthalene	5.0	<5.0	
Phenanthrene	5.0	<5.0	
Pyrene	5.0	<5.0	

Batch Approved By: GOTTSHALLDL ***Batch Approved Date:*** *5/20/98*

6010A_AQUEOUS BLANK REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
Lab Sample ID:	98-04467	**Prep Analyst:**	LESHINSKYA
EPA Number:	EPA 6010A		
Units:	ug/L	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analysis Analyst:**	LESHINSKYA

Component Name	MRL	Result	Qualifier
Chromium	5.0	<5.0	
Lead	5.0	<5.0	
Zinc	20	<20	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

8000_AQUEOUS QUALITY CONTROL SAMPLE REPORT

SDG #: 980511-563
Lab Sample ID: QCS98-02756
Units: mg/L
Matrix: AQUEOUS

Preparation Batch ID:
Prep. Analyst:

Analytical Batch ID: I980513/8000_AQUE/34
Analysis Analyst: DEVLINHA

Component Name	MRL	QCS Result	% Analyte Recovery	Acceptable Range	Qualifier
COD	5.0	67	98.5	80 - 120	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/13/98

8000_AQUEOUS QUALITY CONTROL SAMPLE REPORT

SDG #: 980511-563
Lab Sample ID: QCS98-02757
Units: mg/L
Matrix: AQUEOUS

Preparation Batch ID:
Prep. Analyst:

Analytical Batch ID: I980513/8000_AQUE/34
Analysis Analyst: DEVLINHA

Component Name	MRL	QCS Result	% Analyte Recovery	Acceptable Range	Qualifier
COD	5.0	270	98.2	80 - 120	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/13/98

8270B_AQUEOUS LFB/LFB DUPLICATE RPD REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980520/3510_8270/48
Lab Sample ID:	LFB98-02970	**Prep. Analyst:**	ELSDENGF
EPA Method #:	EPA 8270B		
Matrix:	AQUEOUS	**Analytical Batch ID:**	I980520/8270B_AQU/56
Units:	ug/L	**Analyst:**	ELSDENGF

Component Name	MRL	Spike Amount	% Analyte Recovery LFB	% Analyte Recovery LFBD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifiers
Acenaphthene	5.0	100.00	78.3			46 - 118		
Pyrene	5.0	100.00	80.8			26 - 127		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/20/98

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
Lab Sample ID:	LFB98-03057	**Prep. Analyst:**	LESHINSKYA
EPA Method #:	EPA 6010A		
Matrix:	AQUEOUS	**Analytical Batch ID:**	I980522/6010A_AQU/89
Units:	ug/L	**Analyst:**	LESHINSKYA

Component Name	MRL	Spike Amount	% Analyte Recovery LFB	% Analyte Recovery LFBD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifiers
Chromium	5.0	100.00	96.9			80 - 120		
Lead	5.0	100.00	98.2			80 - 120		
Zinc	20	100.00	99.7			80 - 120		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

6010A_AQUEOUS DUPLICATE SAMPLE REPORT

SDG #:	980511-563	**Preparation Batch ID:**	P980522/3015/115
EPA Method #:	EPA 6010A	**Prep. Analyst:**	LESHINSKYA
Lab Sample ID:	98-04054		
Units:	ug/L	**Analytical Batch ID:**	I980522/6010A_AQU/89
Matrix:	AQUEOUS	**Analysis Analyst:**	LESHINSKYA

Component Name	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
Chromium	5.0	<5.0	<5.0	N/A	0 - 20	
Lead	5.0	<5.0	<5.0	N/A	0 - 20	
Zinc	20	<20	<20	N/A	0 - 20	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

8000_AQUEOUS DUPLICATE SAMPLE REPORT

SDG #:	980511-563	**Preparation Batch ID:**	
EPA Method #:	HACH 8000	**Prep. Analyst:**	
Lab Sample ID:	98-04057		
Units:	mg/L	**Analytical Batch ID:**	I980513/8000_AQUE/34
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
COD	5.0	35	35	0	0 - 20	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/13/98

6010A_AQUEOUS MS/MSD RPD REPORT

SDG #: 980511-563
Sample ID: 98-04054
Matrix: AQUEOUS

Preparation Batch ID: P980522/3015/115
Prep. Analyst: LESHINSKYA

Analytical Batch ID: I980522/6010A_AQU/89
Analyst: LESHINSKYA

Component Name	% Analyte Recovery MS	MSD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifier
Chromium	110			80 - 120		
Lead	117			80 - 120		
Zinc	117			80 - 120		

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 5/22/98

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Chain of Custody

CDM Analytical Laboratory 840 Memorial Drive, Cambridge, MA 02139 Phone: (617) 354-4448 Fax: (617) 354-0764

Field Log # Q#1377 Page 1 of 1

Client: BUCKLEY & MANN INC. Address: 17 LAWRENCE ST. SDG#: 980511-563

Project Name: STAGE 1 REMEDIATION NORFOLK, MA 02056 TAT: STANDARD

Project #: 1121-22308-GS.FIELD Phone: TAT Approved by:

Contact: MICHAEL GUIDICE x8008 Fax #: Lab Acct. #:

Report to: BOB DANGEL Bill to:

CLIENT SAMPLE ID	DATE	TIME	MATRIX S - Soil W - Water D - Drinking	# OF CONT.	CDM SAMPLE ID See Attached SDG DR for Aliquot #'s & CDM Bottle Id's	VOA: 524.2	VOA: 624/8240	VOA: 8260	VOA: Other	SEMI VOA: 525	SEMI VOA: 625/8270 A, B/N, AB/N	SEMI VOA: PAH	SEMI VOA: Other	MISC: PEST / PCB	MISC: TPH 418.1	MISC: PET ID	METALS: PP13	METALS: RCRA 8	METALS: Other PB, ZN	METALS: Filtered (Y/N)	OTHER: COD
MW-01-01	5/7/98	10:00	W	3	98-04057							⊗							X	Y	X
MW-02-01	5/7/98	12:45	W	3	98-04058							⊗							X	Y	X
MW-03-01 ★	5/7/98	4:15	W	3	98-04054							X							X	Y	X
MW-03X-01	5/7/98	4:00	W	3	98-04055							X							X	Y	X
MW-04-01	5/7/98	11:45	W	3	98-04059							⊗							X	Y	X
MW-05-01	5/7/98	12:00	W	3	98-04060							⊗							X	Y	X
MW-06-01	5/7/98	10:50	W	3	98-04061							⊗							X	Y	X
EW-02-01	5/7/98	3:15	W	3	98-04056							X							X	Y	X
MW-12-01	5/7/98	12:45	W	3	98-04062							⊗							X	Y	X

A - HCl	D - NaOH	P - Plastic	Container Type:									G						P		P
B - HNO_3	E - NaThio	G - Glass	Preservative:									—						B		C
C - H_2SO_4	F - Other	V - Vial	Volume:																		

Samples Received:
- Cooler Temperature: _____ °C
- Chilled/properly preserved? ☑ yes ☐ no
- In good condition? ☑ yes ☐ no
- Evidence of tampering? ☐ yes ☑ no

Instructions:
- Fax Results ☐
- State Forms ☐
- SMART Report ☐
- Disk Deliverable ☐
- (_____) TICS ☐

Sampled & Relinquished by:	Date	Time	Received by:	Date	Time
Michael Guidice	5/8/98	5:20	[signature]	5/8	5:05
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Shipper/Airbill#: Custody Seal#: Method of Shipment: ☐ Courier ☐ Airborne ☐ Fed-ex ☐ UPS ☒ Hand ☐ Other

NOTE: All samples submitted subject to Standard Terms & Conditions

Comments: METALS SAMPLES FILTERED IN FIELD

① - SAMPLE ANALYSIS CANCELED PER M. GUIDICE 5/8/98 JB

WAIT FOR ENTIRE ANALYSIS

Client: Buckley & Mann Inc.

Project: Stage 1 Remediation

SDG: 980529-700

Date: 6/11/98

CDM Laboratory
Riverside Technology Center
840 Memorial Drive
Cambridge, MA 02139
phone (617) 354-4448 - fax (617) 354-0764

Laboratory Report

SDG #:	980529-700	**Print Date:**	6/11/98
Client:	Buckley & Mann Inc.	**Client Contact:**	Bob Dangel
Project:	Stage 1 Remediation	**Address:**	Camp Dresser & McKee 10 Cambridge Center Cambridge, MA 02142

Project Narrative

Attached please find the analytical results for this sample delivery group. Please refer to the Sample List Report for sample identification. All associated quality control information is summarized following the analytical results for all samples.

No significant deviations or anomalies were encountered during the preparation or analysis of these samples unless as noted below.

This report contains TOC data for samples previously submitted and reported as CDM Laboratory report 980511-563.

BATCH NOTES

I980608/5310C_AQU/107

Blank value is slightly above MRL due to a reagent problem. Analysis continued because samples were at hold time and all sample concentrations were higher than 10X the blank.

The undersigned hereby attest to the fact that the information contained in this report is, to the best of their knowledge, complete & accurate.

LABORATORY MANAGEMENT REVIEW: _____

LABORATORY QA/QC REVIEW: _____

AZ DOH #AZ0553, CO DPHE (RECIPROCITY), CT DPH #0682, LA DOH#, MA DEP M-MA012, ME DHS (RECIPROCITY), NH DES #2509, NY ELAP #11330, NC DEHNR #553, PA DEP #68-469, RI DOH #48,VA DGS/DCLS #00046, EPA ICR MA001

SAMPLE LIST REPORT

Client Sample ID	Date Collected	Received Date	Lab Sample ID	Matrix Type
MW-01-01	05/07/98	05/29/98	98-04700	AQUEOUS
MW-06-01	05/07/98	05/29/98	98-04702	AQUEOUS
MW-04-01	05/07/98	05/29/98	98-04701	AQUEOUS
MW-03A-01	05/07/98	05/29/98	98-04699	AQUEOUS

SINGLE COMPONENT ANALYTICAL REPORT

SDG#: 980529-700

Component Name:	TOC	**EPA Method #:**	SM 5310C	**Matrix:**	AQUEOUS
Analytical Batch:	I980608/5310C_AQU/107	**Analyst:**	DEVLINHA	**Units:**	mg/L
Reviewed By - Date:	GOTTSHALLDL - 6/8/98				

Client Sample ID	Lab Sample ID	MRL	Result	Dilution Factor	Qualifier
MW-03A-01	98-04699	0.50	14	1	
MW-01-01	98-04700	0.50	9.7	1	
MW-04-01	98-04701	0.50	17	1	
MW-06-01	98-04702	0.50	24	1	

HOLDTIME SUMMARY

Analysis: 5310C_AQUEOUS
Analysis Desc: TOC / DOC

Required Preparation Holdtime: None
Required Analytical Holdtime: 28 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
MW-03A-01	98-04699	05/07/98	05/29/98		06/04/98
MW-01-01	98-04700	05/07/98	05/29/98		06/04/98
MW-04-01	98-04701	05/07/98	05/29/98		06/04/98
MW-06-01	98-04702	05/07/98	05/29/98		06/04/98

5310C_AQUEOUS BLANK REPORT

SDG #:	980529-700	**Preparation Batch ID:**	
Lab Sample ID:	B98-03466	**Prep Analyst:**	
EPA Number:	SM 5310C		
Units:	mg/L	**Analytical Batch ID:**	I980608/5310C_AQU/107
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MRL	Result	Qualifier
TOC	0.50	0.63	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 6/8/98

5310C_AQUEOUS QUALITY CONTROL SAMPLE REPORT

SDG #:	980529-700	**Preparation Batch ID:**	
Lab Sample ID:	QCS98-03467	**Prep. Analyst:**	
Units:	mg/L		
Matrix:	AQUEOUS	**Analytical Batch ID:**	I980608/5310C_AQU/107
		Analysis Analyst:	DEVLINHA

Component Name	MRL	QCS Result	% Analyte Recovery	Acceptable Range	Qualifier
TOC	0.50	5.7	93.8	80 - 120	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 6/8/98

5310C_AQUEOUS DUPLICATE SAMPLE REPORT

SDG #:	980529-700	**Preparation Batch ID:**	
EPA Method #:	SM 5310C	**Prep. Analyst:**	
Lab Sample ID:	98-04700		
Units:	mg/L	**Analytical Batch ID:**	I980608/5310C_AQU/107
Matrix:	AQUEOUS	**Analysis Analyst:**	DEVLINHA

Component Name	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
TOC	0.50	9.7	10	6.759	0 - 20	

Batch Approved By: GOTTSHALLDL **Batch Approved Date:** 6/8/98

Chain of Custody

CAM Analytical Laboratory — 840 Memorial Drive, Cambridge, MA 02139 — Pho (617) 354-4448 Fax. 17) 354-0764 — Field Log # Q# 1377 — Page of 1

Client: BUCKLEY + MANN, INC. — Address: — SDG#: 980529 - 700

Project Name: STAGE 1 REMEDIATION — TAT: STD

Project #: 1121-223CB - GS. FIELD — Phone: — TAT Approved by:

Contact: MIKE GUIDICE x 8SCB — Fax #: — Lab Accl. #:

Report to: BOB DANGEL — Bill to: x 8831

CLIENT SAMPLE ID	DATE	TIME	MATRIX S - Soil W - Water D - Drinking	# OF CONT.	CDM SAMPLE ID See Attached SDG DR for Aliquot #'s & CDM Bottle Id's	VOA: 524.2	VOA: 624/8240	VOA: 8260	VOA: Other	SEMI VOA: 525	SEMI VOA: 625/8270 A, B/N, ABN	SEMI VOA: PAH	SEMI VOA: Other	MISC: PEST / PCB	MISC: TPH 418.1	MISC: ~~NCP~~ TOC	METALS: PP13	METALS: RCRA 8	METALS: Other	METALS: Filtered (Y/N)	OTHER
MW-03A-01	5/7	1600	W		98-04699											X					OLD# 98-04055
MW-01-01		1000			98-04700											X					OLD# 98-04057
MW-04-01		1145			98-04701											X					OLD# 98-04059
MW-06-01		1050			98-04702											X					OLD# 98-04061

A - HCl; B - HNO_3; C - H_2SO_4; D - NaOH; E - NaThio; F - Other; P - Plastic; G - Glass; V - Vial

Container Type: / Preservative: / Volume:

Samples Received:
- Cooler Temperature: _____ °C
- Chilled/properly preserved? ☑ yes ☐ no
- In good condition? ☑ yes ☐ no
- Evidence of tampering? ☐ yes ☑ no

Instructions:
- Fax Results ☐
- State Forms ☐
- SMART Report ☐
- Disk Deliverable ☐
- (_____) TICS ☐

Sampled & Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Shipper/Airbill#: — Custody Seal#: — Method of Shipment: ☐ Courier ☐ Airborne ☐ Fed-ex ☐ UPS ☐ Hand ☒ Other

NOTE: All samples submitted subject to Standard Terms & Conditions

Comments: 1) LAB GENERATED CHAIN

2) RE-LOG OF 980511-563 FOR TOC

APPENDIX F

LABORATORY REPORT
SEPTEMBER 1998 SOIL CHARACTERIZATION IN REMEDIATED AREAS
OUTSIDE THE AREA #10 CONSOLIDATION AREA

Refer to Figure 5 for Sample Locations

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

TABLE F-1
BUCKLEY MANN INC
ANALYSIS OF SOIL SAMPLES FROM AREA REMEDIATED IN JUNE 1998
Samples from Areas #3, #5, #6 and #10 (outside of the 3-foot cover)

	MCP Method 1 Standards				Tentative DEP		Background Samples at B&M			Area #3 A3-01	Area #5 A5-01	Area #6 A6-01	Area #10 A10-01	Area #10 A10-02	Area #10 Average
	S-1/GW-1	S-1/GW-3	S-2/GW-1	S-2/GW-3			BM PUG	BM ORG	BM MIN	11-Sep-98	11-Sep-98	11-Sep-98	11-Sep-98	11-Sep-98	11-Sep-98
	mg/kg	mg/kg	mg/kg	mg/kg	Urban Background	Non-Urban Background	Loam south of B&M Lagoons	Bush Pond Sediment Upstream of B&M	Mineral Sand at B&M	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg	mg/kg
PAH Compounds										ND = < 0.22	ND = < 0.19	ND = < 0.19	ND = < 0.22	ND = < 0.19	
Acenaphthene	20	1,000	20	2,500	0.5		0.5	0.5	0.5	ND	ND	**0.53**	ND	ND	ND
Acenaphthylene	100	100	100	1,000	0.5		0.5	0.5	0.5	ND	ND	ND	ND	ND	ND
Anthracene	1,000	1,000	2,500	2,500	1.0		1.0	1.0	1.0	ND	ND	ND	0.26	0.33	0.30
Benzo(a)anthracene	0.7	0.7	1	1	2.0		2.0	2.0	2.0	ND	ND	ND	0.47	0.76	0.62
Benzo(b)fluoranthene	0.7	0.7	1	1	2.0		2.0	2.0	2.0	ND	ND	ND	0.25	0.42	0.34
Benzo(k)fluoranthene	7	7	10	10	1.0		1.0	1.0	1.0	ND	ND	ND	0.41	0.54	0.48
Benzo(g,h,i)perylene	1,000	1,000	2,500	2,500	1.0		1.0	1.0	1.0	ND	ND	ND	0.22	0.26	0.24
Benzo(a)pyrene	0.7	0.7	0.7	0.7	1.0		1.0	1.0	1.0	ND	ND	ND	0.44	0.65	0.55
Chrysene	7	7	10	10	2.0		2.0	2.0	2.0	ND	ND	ND	0.50	0.73	0.62
Dibenzo(a,h)anthracene	0.7	0.7	0.7	0.7	0.5		0.5	0.5	0.5	ND	ND	ND	ND	ND	ND
Fluoranthene	1,000	1,000	2,000	1,000	4.0		4.0	4.0	4.0	ND	ND	0.23	1.0	1.4	1.2
Fluorene	400	1,000	400	2,000	1.0		1.0	1.0	1.0	ND	ND	ND	ND	ND	ND
Indeno(1,2,3-cd)pyrene	0.7	0.7	1	1	1.0		1.0	1.0	1.0	ND	ND	ND	ND	0.26	ND
2-Methylnaphthalene	4	500	4	1,000	0.5		0.5	0.5	0.5	ND	ND	ND	ND	ND	ND
Naphthalene	4	100	4	1,000	0.5		0.5	0.5	0.5	ND	ND	ND	ND	ND	ND
Phenanthrene	700	100	700	100	3.0		3.0	3.0	3.0	ND	ND	ND	0.78	0.86	0.82
Pyrene	700	700	1,000	2,000	4.0		4.0	4.0	4.0	ND	ND	0.20	0.84	1.0	0.9
Metals															
Chromium	1,000	1,000	2,500	2,500	39	29	13		<1	**260**	**650**	**460**	29	**350**	**190**
Lead	300	300	600	600	570	99	65		<10	9.9	24	19	150	32	91
Zinc	2,500	2,500	2,500	2,500	340	116				64	120	57	180	83	132

Note:
Shaded cells with bold font highlight concentrations greater than DEP background concentrations and site background concentrations.

Client: Buckley & Mann Inc.

Project: Stage I remediation

SDG: 980915-1282

Date: 9/29/98

CDM Laboratory
Riverside Technology Center
840 Memorial Drive
Cambridge, MA 02139
phone (617) 354-4448 - fax (617) 354-0764

Laboratory Report

SDG #:	980915-1282	**Print Date:**	9/29/98
Client:	Buckley & Mann Inc.	**Client Contact:**	Bob Dangel
Project:	Stage I remediation	**Address:**	Camp Dresser & McKee 10 Cambridge Center Cambridge, MA 02142

Project Narrative

Attached please find the analytical results for this sample delivery group. Please refer to the Sample List Report for sample identification. All associated quality control information is summarized following the analytical results for all samples. No significant deviations or anomalies were encountered during the preparation or analysis of these samples unless as noted below.

SDG NOTE

Client notified about results via phone and has deferred further action (TCLP testing).

The undersigned hereby attest to the fact that the information contained in this report is, to the best of their knowledge complete & accurate.

LABORATORY MANAGEMENT REVIEW: Janet F. Oakley

LABORATORY QA/QC REVIEW: Peter T. Mayo-J

AZ DOH #AZ0553, CO DPHE (RECIPROCITY), CT DPH #0682, LA DOHH, MA DEP M-MA012, ME DHS (RECIPROCITY), NH DES #2509, NY ELAP #11330, NC DEHNR #553, PA DEP #68-469, RI DOH #48,VA DGS/DCLS #00046, EPA ICR MA001

8270B_SOIL ANALYSIS REPORT

Method #:	EPA 8270B	**Preparation Batch ID:**	P980923/3550_8270/85
SDG #:	980915-1282	**Prep. Analyst:**	CROWELLSD
Client Sample ID:	BM-A3-01		
Lab Sample ID:	98-07045	**Analytical Batch ID:**	I980923/8270B_SOI/118
Matrix:	SOIL	**Analyst:**	CROWELLSD
Units:	ug/Kg dry		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Acenaphthene	190	<190	
Acenaphthylene	190	<190	
Anthracene	190	<190	
Benz(a)anthracene	190	<190	
Benzo(b)fluoranthene	190	<190	
Benzo(k)fluoranthene	190	<190	
Benzo(g,h,i)perylene	190	<190	
Benzo(a)pyrene	190	<190	
Chrysene	190	<190	
Dibenz(a,h)anthracene	190	<190	
Fluoranthene	190	<190	
Fluorene	190	<190	
Indeno(1,2,3-cd)pyrene	190	<190	
2-Methylnaphthalene	190	<190	
Naphthalene	190	<190	
Phenanthrene	190	<190	
Pyrene	190	<190	

Surrogate	% Recovery	Accep. Range
2-Fluorobiphenyl	56.25	30 - 115
4-Terphenyl-d14	89.06	18 - 137
Nitrobenzene-d5	54.62	23 - 120

Batch Approved By: CROWELLSD **Batch Approval Date:** 09/24/98

8270B_SOIL ANALYSIS REPORT

Method #:	EPA 8270B	**Preparation Batch ID:**	P980923/3550_8270/85
SDG #:	980915-1282	**Prep. Analyst:**	CROWELLSD
Client Sample ID:	BM-A10-02		
Lab Sample ID:	98-07049	**Analytical Batch ID:**	I980923/8270B_SOI/118
Matrix:	SOIL	**Analyst:**	CROWELLSD
Units:	ug/Kg dry		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Acenaphthene	190	<190	
Acenaphthylene	190	<190	
Anthracene	190	330	
Benz(a)anthracene	190	760	
Benzo(b)fluoranthene	190	420	
Benzo(k)fluoranthene	190	540	
Benzo(g,h,i)perylene	190	260	
Benzo(a)pyrene	190	650	
Chrysene	190	730	
Dibenz(a,h)anthracene	190	<190	
Fluoranthene	190	1400	
Fluorene	190	<190	
Indeno(1,2,3-cd)pyrene	190	260	
2-Methylnaphthalene	190	<190	
Naphthalene	190	<190	
Phenanthrene	190	860	
Pyrene	190	1000	

Surrogate	% Recovery	Accep. Range
2-Fluorobiphenyl	77.58	30 - 115
4-Terphenyl-d14	85.52	18 - 137
Nitrobenzene-d5	81.70	23 - 120

Batch Approved By: CROWELLSD **Batch Approval Date:** 09/24/98

6010A_SOIL ANALYSIS REPORT

Method #:	EPA 6010A	**Preparation Batch ID:**	P980923/3051/139
SDG #:	980915-1282	**Prep. Analyst:**	LESHINSKYA
Client Sample ID:	BM-A10-02		
Lab Sample ID:	98-07049	**Analytical Batch ID:**	I980923/6010A_SOI/139
Matrix:	SOIL	**Analyst:**	LESHINSKYA
Units:	mg/Kg dry		
Dilution Factor:	1		

Component Name	MRL	Result	Qualifiers
Chromium	5.5	350	
Lead	5.5	32	
Zinc	22	83	

Batch Approved By: MAHANYWW **Batch Approval Date:** 09/28/98

PREPARATION INFORMATION REPORT

SDG #: 980915-1282

% Solids Results

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
BM-A3-01	98-07045		Percent Solids	87.1	%	
BM-A5-01	98-07046		Percent Solids	85.9	%	
BM-A6-01	98-07047		Percent Solids	89.2	%	
BM-A10-01	98-07048		Percent Solids	77.8	%	
BM-A10-02	98-07049		Percent Solids	88.6	%	

Preparation Batch ID: P980923/3051/139
Preparation ID: 3051 **EPA Method #:** EPA 3051
Batch Approved By: MAHANYWW **Batch Approved On:** 9/28/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
BM-A3-01	98-07045	SAMPLE	Final Volume	500	mL	
			Initial Weight	0.684	g	
BM-A5-01	98-07046	SAMPLE	Final Volume	500	mL	
			Initial Weight	0.645	g	
BM-A6-01	98-07047	SAMPLE	Final Volume	500	mL	
			Initial Weight	0.612	g	
BM-A10-01	98-07048	SAMPLE	Final Volume	500	mL	
			Initial Weight	0.582	g	
BM-A10-02	98-07049	SAMPLE	Final Volume	500	mL	
			Initial Weight	0.512	g	
		DUPLICATE	Final Volume	500	mL	
			Initial Weight	0.500	g	
		MATRIX_SPIKE	Final Volume	500	mL	
			Initial Weight	0.423	g	

Preparation Batch ID: P980923/3550_8270/85
Preparation ID: 3550_8270B **EPA Method #:** EPA 3550
Batch Approved By: CROWELLSD **Batch Approved On:** 9/24/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
BM-A3-01	98-07045	SAMPLE	Final Volume	1.00	mL	
			Initial Weight	30.4	g	
			Surrogate Volume	1.0	mL	
BM-A5-01	98-07046	SAMPLE	Final Volume	1.00	mL	
			Initial Weight	30.1	g	
			Surrogate Volume	1.0	mL	
BM-A6-01	98-07047	SAMPLE	Final Volume	1.00	mL	
			Initial Weight	30.1	g	
			Surrogate Volume	1.0	mL	
BM-A10-01	98-07048	SAMPLE	Final Volume	1.00	mL	
			Initial Weight	30.0	g	
			Surrogate Volume	1.0	mL	
BM-A10-02	98-07049	SAMPLE	Final Volume	1.00	mL	
			Initial Weight	30.1	g	

PREPARATION INFORMATION REPORT

SDG #: 980915-1282

Preparation Batch ID: P980923/3550_8270/85

Preparation ID: 3550_8270B **EPA Method #:** EPA 3550

Batch Approved By: CROWELLSD **Batch Approved On:** 9/24/98

Client Sample ID	Lab Sample ID	Aliquot Type	Prep. Component	Value	Units	Comments
			Surrogate Volume	1.0	mL	

HOLDTIME SUMMARY

Analysis: 6010A_SOIL
Analysis Desc: ICP Metals
Required Preparation Holdtime: 180 days
Required Analytical Holdtime: 180 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
BM-A3-01	98-07045	09/11/98	09/15/98	09/23/98	09/23/98
BM-A5-01	98-07046	09/11/98	09/15/98	09/23/98	09/23/98
BM-A6-01	98-07047	09/11/98	09/15/98	09/23/98	09/23/98
BM-A10-01	98-07048	09/11/98	09/15/98	09/23/98	09/23/98
BM-A10-02	98-07049	09/11/98	09/15/98	09/23/98	09/23/98

Analysis: 8270B_SOIL
Analysis Desc: Semivolatile analysis in soils
Required Preparation Holdtime: 14 days
Required Analytical Holdtime: 40 days

Client Sample ID	Lab Sample ID	Date Collected	Date Received	Date Prepared	Date Analyzed
BM-A3-01	98-07045	09/11/98	09/15/98	09/17/98	09/17/98
BM-A5-01	98-07046	09/11/98	09/15/98	09/17/98	09/17/98
BM-A6-01	98-07047	09/11/98	09/15/98	09/17/98	09/17/98
BM-A10-01	98-07048	09/11/98	09/15/98	09/17/98	09/17/98
BM-A10-02	98-07049	09/11/98	09/15/98	09/17/98	09/17/98

6010A_SOIL BLANK REPORT

SDG #:	980915-1282	**Preparation Batch ID:**	P980923/3051/139
Lab Sample ID:	B98-05954	**Prep Analyst:**	LESHINSKYA
EPA Number:	EPA 6010A		
Units:	mg/Kg dry	**Analytical Batch ID:**	I980923/6010A_SOI/139
Matrix:	SOIL	**Analysis Analyst:**	LESHINSKYA

Component Name	MRL	Result	Qualifier
Chromium	5.00	<5.0	
Lead	5.00	<5.0	
Zinc	20.00	<20	

Batch Approved By: MAHANYWW **Batch Approved Date:** 9/28/98

8270B_SOIL BLANK REPORT

SDG #:	980915-1282	**Preparation Batch ID:**	P980923/3550_8270/85
Lab Sample ID:	B98-05962	**Prep Analyst:**	CROWELLSD
EPA Number:	EPA 8270B		
Units:	ug/Kg dry	**Analytical Batch ID:**	I980923/8270B_SOI/117
Matrix:	SOIL	**Analysis Analyst:**	CROWELLSD

Component Name	MRL	Result	Qualifier
2-Methylnaphthalene	170.00	<170	
Acenaphthene	170.00	<170	
Acenaphthylene	170.00	<170	
Anthracene	170.00	<170	
Benz(a)anthracene	170.00	<170	
Benzo(a)pyrene	170.00	<170	
Benzo(b)fluoranthene	170.00	<170	
Benzo(g,h,i)perylene	170.00	<170	
Benzo(k)fluoranthene	170.00	<170	
Chrysene	170.00	<170	
Dibenz(a,h)anthracene	170.00	<170	
Fluoranthene	170.00	<170	
Fluorene	170.00	<170	
Indeno(1,2,3-cd)pyrene	170.00	<170	
Naphthalene	170.00	<170	
Phenanthrene	170.00	<170	
Pyrene	170.00	<170	

Batch Approved By: CROWELLSD **Batch Approved Date:** 9/24/98

6010A_SOIL QUALITY CONTROL SAMPLE REPORT

SDG #:	980915-1282	**Preparation Batch ID:**	P980923/3051/139
Lab Sample ID:	QCS98-05955	**Prep. Analyst:**	LESHINSKYA
Units:	mg/Kg dry		
Matrix:	SOIL	**Analytical Batch ID:**	I980923/6010A_SOI/139
		Analysis Analyst:	LESHINSKYA

Component Name	MRL	Spike Amount	QCS Result	% Analyte Recovery	Acceptable Range	Qualifier
Chromium	12.00	23.73	55	95.7	77 - 122.9	
Lead	12.00	34.98	69	81.1	73.4 - 127	
Zinc	48.00	406.26	1100	108.1	73.9 - 126.4	

Batch Approved By: MAHANYWW **Batch Approved Date:** 9/28/98

8270B_SOIL LFB/LFB DUPLICATE RPD REPORT

SDG #:	980915-1282	**Preparation Batch ID:**	P980923/3550_8270/85
Lab Sample ID:	LFB98-05963	**Prep. Analyst:**	CROWELLSD
EPA Method #:	EPA 8270B		
Matrix:	SOIL	**Analytical Batch ID:**	I980923/8270B_SOI/117
Units:	ug/Kg dry	**Analyst:**	CROWELLSD

Component Name	MRL	Spike Amount	% Analyte Recovery LFB	% Analyte Recovery LFBD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifiers
Acenaphthene	170.00	100.00	64.1			31 - 137		
Pyrene	170.00	100.00	69.1			35 - 142		

Batch Approved By: CROWELLSD **Batch Approved Date:** 9/24/98

6010A_SOIL DUPLICATE SAMPLE REPORT

SDG #:	980915-1282	**Preparation Batch ID:**	P980923/3051/139
EPA Method #:	EPA 6010A	**Prep. Analyst:**	LESHINSKYA
Lab Sample ID:	98-07049		
Units:	mg/Kg dry	**Analytical Batch ID:**	I980923/6010A_SOI/139
Matrix:	SOIL	**Analysis Analyst:**	LESHINSKYA

Component Name	MRL	Sample Result	Duplicate Result	RPD	Acceptable Range	Qualifier
Chromium	5.60	350	340	3.031	0 - 20	
Lead	5.60	32	31	3.978	0 - 20	
Zinc	22.00	83	82	1.556	0 - 20	

Batch Approved By: MAHANYWW **Batch Approved Date:** 9/28/98

6010A_SOIL MS/MSD RPD REPORT

SDG #: 980915-1282
Lab Sample ID: 98-07049
Matrix: SOIL

Preparation Batch ID: P980923/3051/139
Prep. Analyst: LESHINSKYA

Analytical Batch ID: I980923/6010A_SOI/139
Analyst: LESHINSKYA

Component Name	% Analyte Recovery MS	% Analyte Recovery MSD	RPD	% Rec. Accep. Range	RPD Accep. Range	Qualifier
Chromium	112			75 - 125		
Lead	93			75 - 125		
Zinc	92			75 - 125		

Batch Approved By: MAHANYWW **Batch Approved Date:** 9/28/98

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Laboratory Summary Report

Client: Buckley & Mann Inc.

SDG: 980915-1282

	Client Identifier	BM-A10-01	BM-A10-02	BM-A3-01	BM-A5-01	BM-A6-01
Analysis Name	Lab ID	98-07048	98-07049	98-07045	98-07046	98-07047
6010A_SOIL	Chromium	29	350	260	650	460
	Lead	150	32	9.9	24	19
	Zinc	180	83	64	120	57
8270B_SOIL	2-Methylnaphthalene	<220	<190	<190	<200	<190
	Acenaphthene	<220	<190	<190	<200	530
	Acenaphthylene	<220	<190	<190	<200	<190
	Anthracene	260	330	<190	<200	<190
	Benz(a)anthracene	470	760	<190	<200	<190
	Benzo(a)pyrene	440	650	<190	<200	<190
	Benzo(b)fluoranthene	250	420	<190	<200	<190
	Benzo(g,h,i)perylene	220	260	<190	<200	<190
	Benzo(k)fluoranthene	410	540	<190	<200	<190
	Chrysene	500	730	<190	<200	<190
	Dibenz(a,h)anthracen	<220	<190	<190	<200	<190
	Fluoranthene	1000	1400	<190	<200	230
	Fluorene	<220	<190	<190	<200	<190
	Indeno(1,2,3-cd)pyre	<220	260	<190	<200	<190
	Naphthalene	<220	<190	<190	<200	<190
	Phenanthrene	780	860	<190	<200	<190
	Pyrene	840	1000	<190	<200	200

Chain of Custody

CDM Analytical Laboratory | 840 Memorial Drive, Cambridge, MA 02139 | Phone: (617) 354-4448 | Fax: (617) 354-0764 | Field Log # _____ | Page 1 of 1

Client: BUCKLEY & MANN INC. | Address: 17 LAWRENCE ST. NORFOLK, MA 02056 | SDG#: 980915-1282

Project Name: STAGE I REMEDIATION | TAT: STANDARD

Project #: 1121-22308-GS. FIELD | Phone: | TAT Approved by:

Contact: MICHAEL GUIDICE x 8008 | Fax #: | Lab Acct. #:

Report to: SAME | Bill to:

CLIENT SAMPLE ID	DATE	TIME	MATRIX (S - Soil, W - Water, D - Drinking)	# OF CONT.	CDM SAMPLE ID (See Attached SDG DR for Aliquot #'s & CDM Bottle Id's)	VOA: 524.2	VOA: 624/8240	VOA: 8260	VOA: Other	SEMI VOA: 525	SEMI VOA: 625/8270 A, B/N, ABN	SEMI VOA: PAH	SEMI VOA: Other	MISC: PEST / PCB	MISC: TPH 418.1	MISC: PET ID	METALS: PP13	METALS: RCRA 8	METALS: Other Pb, Cr, Zn	METALS: Filtered (Y/N)	* OTHER: TCLP Pb	* OTHER: TCLP Cr
BM-A3-01	9/11	9:20	S	1	9807045							X							X		X	X
BM-A5-01	9/11	9:15	S	1	9807046							X							X		X	X
BM-AC-01	9/11	9:10	S	1	9807047							X							X		X	X
BM-A10-01	9/11	8:50	S	1	9807048							X							X		X	X
BM-A10-02	9/11	9:00	S	1	9807049							X							X		X	X
												G							G			
					Container Type:							—							—			
					Preservative:																	
					Volume:																	

A - HCl | D - NaOH | P - Plastic

B - HNO_3 | E - NaThio | G - Glass

C - H_2SO_4 | F - Other | V - Vial

Samples Received:
- Cooler Temperature: _____ °C
- Chilled/properly preserved? ☐ yes ☐ no
- In good condition? ☐ yes ☐ no
- Evidence of tampering? ☐ yes ☐ no

Instructions:
- Fax Results ☐
- State Forms ☐
- SMART Report ☐
- Disk Deliverable ☐
- (_____) TICS ☐

Relinquished by:	Date	Time	Received by:	Date	Time
Sampled & Relinquished by: Mark Menibus	9/14/98	4:40	Received by: R Kelly	9/14	1637
Relinquished by:	Date	Time	Received by:	Date	Time
Relinquished by:	Date	Time	Received by:	Date	Time

Shipper/Airbill#: | Custody Seal#: | Method of Shipment: ☐ Courier ☐ Airborne ☐ Fed-ex ☐ UPS ☐ Hand ☐ Other

NOTE: All samples submitted subject to Standard Terms & Conditions

Comments:

* ONLY RUN TCLP Pb AND/OR TCLP Cr IF TOTAL - FAILS MCP TRIGGER LEVELS

Buckley + Mann CDM-003

8 253

SDG# 980915-1282

APPENDIX G

REPORT ON
OCTOBER 2000 SOIL AND GROUNDWATER CHARACTERIZATION IN
LAGOONS #1 AND #2

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

CDM Camp Dresser & McKee Inc.

consulting
engineering
construction
operations

One Cambridge Place
50 Hampshire Street
Cambridge, Massachusetts 02139
Tel: 617 452-6000 Fax: 617 452-8000

November 3, 2000

Messrs. Richard and Stephen Mann
Buckley & Mann, Inc.
14 Bush Pond Road
Norfolk, Massachusetts 02056

Subject: Soil and Groundwater Analyses

Dear Dick and Steve:

Camp Dresser & McKee Inc. (CDM) is pleased to present the results of the recent soil and groundwater sampling and analyses for the Buckley & Mann, Inc. (B&M) property at 17 Lawrence Street, Norfolk, Massachusetts. CDM collected four soil and four groundwater samples from the former Dyehouse Wastewater Lagoons on October 3, 2000. The samples were analyzed by Alpha Analytical Laboratory for polyaromatic hydrocarbons and related "extractable" (under base-neutral conditions) parameters. These parameters were selected because comprehensive analyses in 1995 showed that concentrations of other constituents (metals, volatile organic compounds, etc.) were either absent (at analytical detection limits), or present at less than regulated limits.

MCP nomenclature and classifications

Under Massachusetts Contingency Plan (MCP) definitions, the groundwater at B&M is classified GW-1 and GW-3. The soil is classified S-1. CDM uses the term *soil*, rather than *sediment*, because the Lagoons are man-made and the bottoms were graded with sand and gravel during construction and in the case of Lagoon #1, subsequent maintenance. The soil on the bottom is not naturally deposited sediment like that found in ponds.

For this report, CDM used the standardized MCP Method 1 risk assessment procedure to evaluate the soil and groundwater data.

1. *Groundwater*

The groundwater is classified GW-1 because Wretham designated the entire Mill River watershed upgradient of the Town's wells as Zone II (potentially contributing to the well water), and because the B&M property is not serviced by public water, and may have residential water wells in the future. By MCP definition, all groundwater is also GW-3 because it eventually discharges to surface water.

2. *Soil*

The S-1 designation means that the soil is in within three feet of the surface and is accessible either now, or under foreseeable future conditions. The S-1/GW-1 soil standard includes consideration of both human exposure (direct contact) and leaching to

groundwater. The S-1/GW-3 soil standard is controlled more by potential for leaching of soluble components, but includes a 10 fold dilution for the leaching component prior to comparison with surface water quality standards.

3. ***"Unlisted" Chemicals***

The MCP requires consideration of all chemical residues present at the site. For complex mixtures like fuel (gasoline, diesel, etc.), MCP sets Method 1 standards for groups of similar compounds. This approach would also apply to the hydrocarbon dye carriers used at B&M prior to termination of dyeing operations in 1986. For the B&M site, the applicable fractions are:

- Aliphatic hydrocarbons with 9 to 18 carbons.
- Aliphatic hydrocarbons with 19 to 36 carbons (this fraction may record plant waxes from tree leaves, etc., as well as petroleum compounds).
- Aromatic hydrocarbons with 11 to 22 carbons.

Individual unlisted compounds must also be evaluated in some cases. CDM anticipates that a standard for 1-methylnaphthalene, found in the recent and previous analyses, would be similar to the MCP standard for 2-methylnaphthalene, or that the concentrations could be added and considered a single compound.

Sample Preparation and Analytical Methods

Soil samples were collected from hand dug pits in the Lagoons, as described in the attached field notes. Figure 1 shows the locations for each sample, and the extent of standing water in Lagoons at the time of sampling. Composite samples from equal volumes of pits A/B and C/D were made in each Lagoon.

Water from each test pit was bailed to waste prior to collecting samples of freshly infiltrated water. The groundwater samples all contained suspended solids (up to 10 percent of the volume of the bottle) and two remained turbid even after settling overnight. The laboratory was instructed to decant the samples and avoid extracting the portion with the suspended solids. The samples were not clarified by filtration, to avoid adsorbing sparingly soluble target PAH compounds on the filter paper. For these samples, with significant suspended solids (which also adsorb PAH), the results represent the upper bound of "soluble" PAH compounds.

After discussions with the laboratory, CDM elected to analyze the groundwater by Method 8270 SIM. The procedure involves extracting the sample with hexane, clean-up, and then analysis by gas chromatography with a mass spectrometer detector. The SIM ("selective ion mass spectroscopy") designation means that the detector is programmed to focus on selected masses, rather than scanning the entire mass range. This procedure improves sensitivity sufficiently to measure certain PAH compounds at concentrations

equal to (or less than) the MCP standards, although other compounds normally reported by the same method are not measured.

G-1

Analytical Results G-3

Tables ~~1~~ through ~~3~~ summarize the results for Groundwater, Lagoon #1 soils and Lagoon #2 soils, respectively.

1. ***Groundwater***

Methyl naphthalenes. The Lagoon #1 A/B sample contained 16 µg/L 2-methylnaphthalene, slightly above the 10 µg/L standard. The Lagoon #1 C/D sample contained less than 10 µg/L standard, but the sum of the 1-methyl and 2-methyl naphthalenes exceeded the 10 µg/L limit. The concentrations of these compounds in water from Lagoon #2 were below the standard.

Other PAH compounds. The concentrations of other compounds in this group were below their respective MCP standards. 1,1-Biphenyl, found in soil (see below), was not analyzed in the groundwater samples because this compound is not on the target list for the SIM procedure.

2. ***Soil***

Base neutral extractable compounds (including PAH) and Extractable Petroleum Hydrocarbons. The results show that traces of hydrocarbon dye carrier compounds remain in the Lagoons bottom soils. The soil concentration of biphenyl in three of four samples slightly exceeded the MCP S-1/GW-1 limit. The concentrations ranged from 1.6 to 2.6 mg/kg, relative to the 1.0 mg/kg standard. No other individual compound and none of the Extractable Petroleum Hydrocarbon ranges exceeded the MCP standards.

Analytical methods have evolved over the last 15 years and consequently, results from prior analyses are not strictly comparable to the October 2000 results. Nevertheless, the data suggest a gradual decline in the concentration of the target compounds in the soil. This was anticipated, based on experience at other sites and the bench scale degradation tests conducted at B&M in the late 1980s.

With an Activity and Use Limitation (AUL), to require proper management of any soil excavated from the Lagoons in the future, the soil concentrations are low enough to allow "closure" under the Massachusetts Contingency Plan. Future excavation in the Lagoons is unlikely in any event, as the Lagoons are close to the Tail Race and subject to Massachusetts and Town regulations under the provisions of the various Wetland laws. Closure with an AUL would be subject to resolution of the groundwater quality issue, as explained below.

Recommendation for Additional Groundwater Sampling

The MCP prohibits modification or exception to the GW-1 standard. Hence, consideration of contaminant dilution and/or exposure control to reduce the calculated risk are not allowed. Consequently, CDM recommends that a new set of groundwater samples, processed prior to analysis to completely remove suspended solids with their adsorbed PAH and other hydrocarbons. This would eliminate interference from compounds adsorbed on particulates, which do not move with the groundwater.

For these tests, CDM would process the samples, rather than relying on the laboratory to remove the suspended solids. The samples would be settled overnight, and decanted if clear. A small dose of alum coagulant would be added to samples which do not fully clarify, and then the samples would be resettled. If necessary, the samples would be centrifuged to allow decant of clear supernate for analysis.

A total of four clarified groundwater samples would be analyzed for the target PAH compounds by Method 8270 SIM, and for a complete base neutral extractable scan. The latter would include biphenyl.

Per our telephone conversation on November 1, 2000, CDM will proceed with the above sampling and analysis program.

Possible Outcomes for Groundwater

If the results from the groundwater resampling show that the concentrations of target compounds are less than the MCP Method 1 standards, no further work would be needed, other than the installation of an Activity and Use Limitation for future excavation of the soils. If the analyses find concentration above the Method 1 limits, CDM would recommend that the soils in the Lagoon(s) be excavated into wind-rows in the Lagoons and fertilized to accelerate aerobic biodegradation of the remaining hydrocarbons.

If you have any questions, please contact me at (617) 452-6267.

Very truly yours,

CAMP DRESSER & McKEE INC.

Robert A. Dangel
Licensed Site Professional

Approved:

William R. Swanson
Licensed Site Professional

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TABLE G-1
OCTOBER 2000 DATA

GROUNDWATER ANALYSES FROM FORMER DYEHOUSE WASTEWATER TREATMENT LAGOONS #1 AND #2
Settled and decanted, but not filtered samples. All results in ug/L.

	MCP Method 1 Standard		Lagoon 1	Lagoon 1	Lagoon 2	Lagoon 2
	GW-1	GW-3	GW-1-AB	GW-1-CD	GW-2-AB	GW-2-CD
Polynuclear Aromatic Compounds						
Acenaphthene	20	5000	17	8	6.8	1.1
2-Chloronaphthalene	NL	NL	0.54	<0.14	<0.12	<0.2
Fluoranthene	300	200	<0.2	<0.14	<0.12	<0.2
Naphthalene	20	6000	13	2.1	1.6	<0.2
Benzo(a)anthracene	1	3000	<0.2	<0.14	<0.12	<0.2
Benzo(a)pyrene	0.2	3000	<0.2	<0.14	<0.12	<0.2
Benzo(b)fluoranthene	1	3000	<0.2	<0.14	<0.12	<0.2
Benzo(k)fluoranthene	1	3000	<0.2	<0.14	<0.12	<0.2
Chrysene	2	3000	<0.2	<0.14	<0.12	<0.2
Acenaphthylene	300	3000	<0.2	<0.14	<0.12	<0.2
Anthracene	2000	3000	<0.2	<0.14	<0.12	<0.2
Benzo(ghi)perylene	300	3000	<0.2	<0.14	<0.12	<0.2
Fluorene	300	3000	1.1	1.2	1.8	<0.2
Phenanthrene	300	50	<0.2	0.2	<0.12	<0.2
Dibenzo(a,h)anthracene	0.5	3000	<0.2	<0.14	<0.12	<0.2
Indeno(1,2,3-cd)Pyrene	0.5	3000	<0.2	<0.14	<0.12	<0.2
Pyrene	200	3000	<0.2	<0.14	<0.12	<0.2
1-Methylnaphthalene	NL	NL	9.7	6.9	5	<0.2
2-Methylnaphthalene	10	3000	**16**	7.3	<0.12	<0.2
Perylene	200	3000	<0.2	<0.14	<0.12	<0.2
Benzo(e)Pyrene	NL	NL	<0.2	<0.14	<0.12	<0.2

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed MCP Standard.
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol.
3. Analyses by Method 8270, with selective ion mass spectroscopy to achieve lower detection limits for target PAH compounds

Samples collected from shallow test pits on October 2, 2000

TABLE G-2 OCTOBER 2000 DATA, COMPARISON TO EARLIER YEARS

SOIL ANALYSES FROM FORMER DYEHOUSE WASTEWATER TREATMENT LAGOON #1
BUCKLEY AND MANN, INC., NORFOLK, MA
All results in mg/kg

	MCP Method 1 Standards		1986 Data	1986 Data	1995 Data	1995 Data	1995 Data	2000 Data	2000 Data
	S-1/GW-1	S-1/GW-3	SS-4	SS-4A	BM-TP19-L1-N1	BM-TP20-L1-C1	BM-TP21-L1-S1	LS-1-AB	LS-1-CD
Acid/Base Neutral Compounds or Polynuclear Aromatic Compounds, depending on analytical date									
Carbazole	NL	NL			< 0.77	< 1.9	< 0.37		
2-methylnaphthalene	4.0	500	**11.5**	**13**	**9.2**	**33**	**4.3**	1.2	0.62
1-methylnaphthalene	NL	NL						< 1.1	0.65
Naphthalene	4.0	100	**10**	**8.7**	2.9	**9.2**	1.1	< 1.1	< 0.57
Acenaphthene	20	1,000			1.6	6.1	1.5	1.4	1.3
Acenaphthylene	100	100			< 0.39	< 0.96	< 0.19	< 1.1	< 0.57
Fluorene	400	1,000			0.69	1.5	0.77	< 1.1	0.7
Anthracene	1,000	1,000			< 0.39	< 0.96	< 0.19	< 1.1	< 0.57
Fluoranthene	1,000	1,000			< 0.39	< 0.96	< 0.19	< 1.1	< 0.57
Hexachlorobenzene	0.70	0.70			< 0.39	< 0.96	< 0.19		
Phenanthrene	700	100			< 0.39	< 0.96	0.35		
1,2,4-trichlorobenzene	100	400			5.4	11	1.1		
Dibenzofuran	NL	NL			1.3	3.8	0.93		
Diethylphthalate	100	0.70			< 0.39	< 0.96	< 0.96		
Bis(2-ethylhexyl)phthalate	100	200			< 0.39	< 0.96	< 0.96		
Benzo(a)anthracene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Chrysene	07	07			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Pyrene	700	700			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Benzo(b)fluoranthene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Benzo(k)fluoranthene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Benzo(g,h,i)perylene	1,000	1,000			< 0.39	< 0.96	< 0.96		
Benzo(a)pyrene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Indeno(1,2,3-cd)pyrene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
Dibenzo(a,h)anthracene	0.7	0.7			< 0.39	< 0.96	< 0.96	< 1.1	< 0.57
1,1-Biphenyl	1	100	**23**	**29**				**2.6**	**2.5**
Extractable Petroleum Hydrocarbons									
C9-C-18 Aliphatics	1,000	1,000						< 11.2	< 11.4
C19-C36 Aliphatics	2,500	2,500						24.4	13.3
C11-C22 Aromatics	200	800						< 11.2	< 11.4

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed MCP Standard.
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol.
3. Analyses by Method 8270

1986 Samples collected May 7, 1986
1995 Samples collected October 25-26, 1995.
2000 Samples collected October 2, 2000

TABLE G-3 OCTOBER 2000 DATA, COMPARISON TO EARLIER YEARS

SOIL ANALYSES FROM FORMER DYEHOUSE WASTEWATER TREATMENT LAGOON #2
BUCKLEY AND MANN, INC., NORFOLK, MA
All results in mg/kg

	MCP Method 1 Standards		1995 Data	1995 Data	1995 Data	1995 Data	1995 Data	1995 Data	2000 Data	2000 Data
	S-1/GW-1	S-1/GW-3	BM-TP16-L2-NOR1	BM-TP16-L2-NOR2	BM-TP17-L2-C1	BM-TP17-L2-C2	BM-TP18-L2-S1	BM-TP18-L2-S2	LS-2-AB	LS-2-CD
Acid/Base Neutral Compounds or Polynuclear Aromatic Compounds, depending on analytical date										
Carbazole	NL	NL	< 1.8	< 0.36	< 2.3	< 0.41	< 0.37	< 0.73		
2-methylnaphthalene	4.0	500	2.5	1.5	< 1.1	< 0.20	< 0.18	**4.6**	< 0.59	< 1.50
1-methylnaphthalene	NL	NL							< 0.59	< 1.50
Naphthalene	4.0	100	< 0.89	0.23	< 1.1	< 0.20	< 0.18	1.0	< 0.59	< 1.50
Acenaphthene	20	1,000	1.5	0.87	< 1.1	< 0.20	< 0.18	1.7	< 0.59	< 1.50
Acenaphthylene	100	100	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Fluorene	400	1,000	< 0.89	0.52	< 1.1	< 0.20	< 0.18	0.69	< 0.59	< 1.50
Anthracene	1,000	1,000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Fluoranthene	1,000	1,000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Hexachlorobenzene	0.70	0.70	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36		
Phenanthrene	700	100	< 0.89	0.32	< 1.1	< 0.20	< 0.18	< 0.36		
1,2,4-trichlorobenzene	100	400	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	0.54		
Dibenzofuran	NL	NL	0.93	0.71	< 1.1	< 0.20	< 0.18	0.79		
Diethylphthalate	100	0.70	< 0.89	0.22	< 1.1	< 0.20	< 0.18	< 0.36		
Bis(2-ethylhexyl)phthalate	100	200	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36		
Benzo(a)anthracene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Chrysene	07	07	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Pyrene	700	700	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Benzo(b)fluoranthene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Benzo(k)fluoranthene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Benzo(g,h,i)perylene	1,000	1,000	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36		
Benzo(a)pyrene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Indeno(1,2,3-cd)pyrene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
Dibenzo(a,h)anthracene	0.7	0.7	< 0.89	< 0.18	< 1.1	< 0.20	< 0.18	< 0.36	< 0.59	< 1.50
1,1-Biphenyl	1	100							< 0.59	**1.6**
Extractable Petroleum Hydrocarbons										
C9-C-18 Aliphatics	1,000	1,000							16.0	106
C19-C36 Aliphatics	2,500	2,500							31.0	644
C11-C22 Aromatics	200	800							< 11.8	157

Legend
ND, Not Detected
NL, Value Not Listed

Notes
1. Concentration in boxes exceeds at least one of the criteria listed MCP Standard.
2. If a compound was not detected in a sample, then the detection limit is shown next to the less-than symbol.
3. Analyses by Method 8270

1986 Samples collected May 7, 1986
1995 Samples collected October 25-26, 1995.
2000 Samples collected October3, 2000

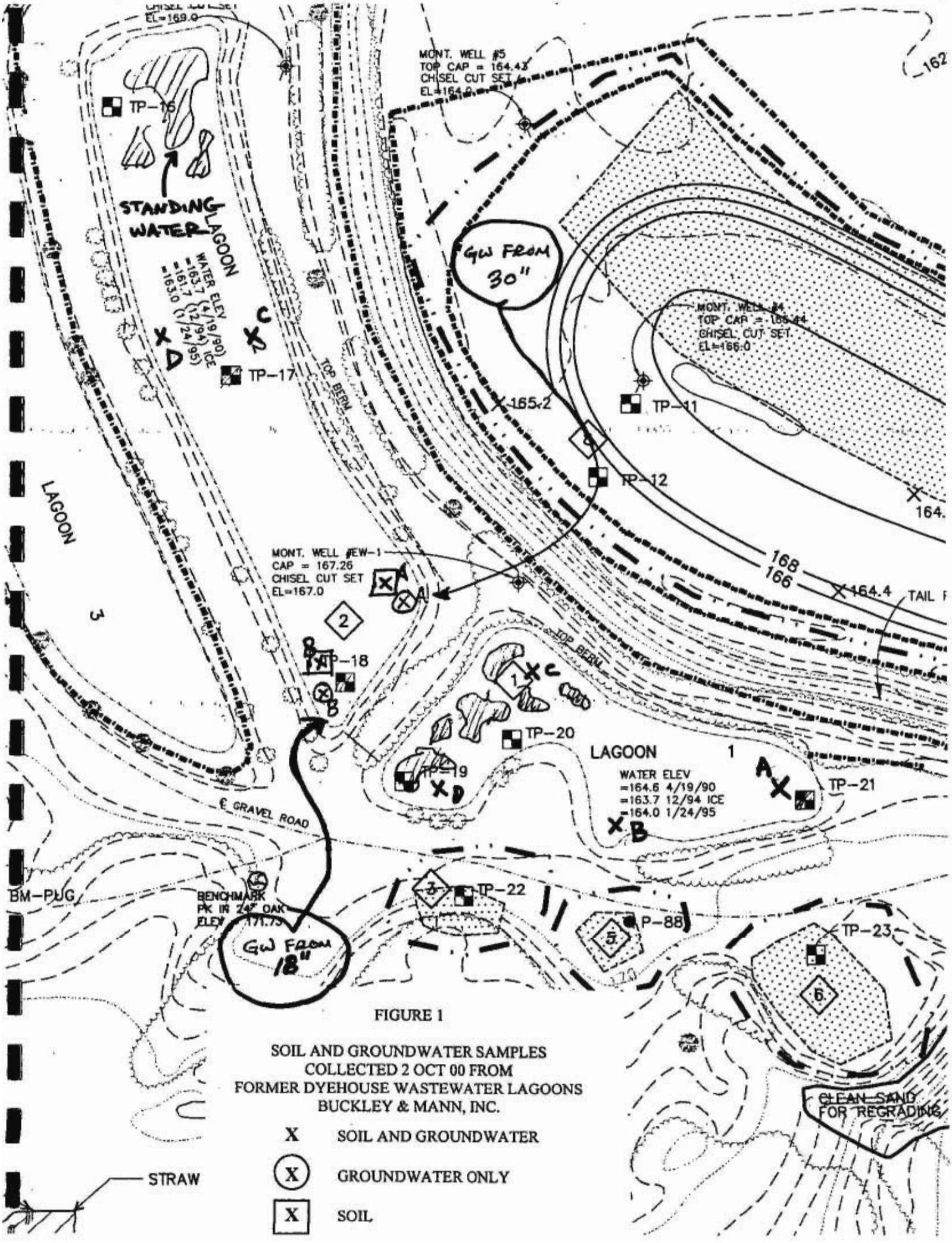

FIGURE 1

SOIL AND GROUNDWATER SAMPLES
COLLECTED 2 OCT 00 FROM
FORMER DYEHOUSE WASTEWATER LAGOONS
BUCKLEY & MANN, INC.

X SOIL AND GROUNDWATER

(X) GROUNDWATER ONLY

[X] SOIL

CDM Camp Dresser & McKee Inc.

Memorandum

To: *Robert Dangel*

From: *Brendan MacDonald*

Date: *October 3, 2000*

Subject: *Buckley & Mann; Lagoons 1 & 2 Sampling Event*

On October 2, 2000 CDM field personnel collected subsurface soil and groundwater samples from Lagoons 1 and 2. The following text describes the procedures utilized and the samples collected. The attached figure shows the sampling locations. The attached spreadsheet shows soil types encountered.

Subsurface Soil Sampling

Four soil samples (LS-1-A, LS-1-B, LS-1-C, LS-1-D) were collected from Lagoon 1. At each sampling location, holes were dug to 12" below ground surface using a shovel and, as necessary, a post-hole digger. Soil was collected with a stainless steel spoon from depths of 6" and 12" below ground surface (bgs). Sampling equipment was decontaminated (Alconox/DeI-DeI-MeOH-DeI) prior to sample collection at each location. Samples LS-1-A and LS-1-B were composited in a stainless steel bowl, placed in an amber glass jar, and renamed LS-1-AB. Samples LS-1-C and LS-1-D were composited in a stainless steel bowl, placed in an amber glass jar, and renamed LS-1-CD. Soil samples were sent to Alpha Analytical Laboratories for MADEP EPH "standard" analysis and PAH analysis via Method 8270C.

Four soil samples (LS-2-A, LS-2-B, LS-2-C, LS-2-D) were collected from Lagoon 2. At each sampling location, holes were dug to 12" below ground surface using a shovel and, as necessary, a post-hole digger. The soils encountered at LS-2-A and LS-2-B were dry, therefore the holes were dug further, to a depth of 18". Soil was collected with a stainless steel spoon from depths of 6" and 12" below ground surface (bgs) from LS-2-C and LS-2-D, and from depths of 6" and 18" below ground surface (bgs) from LS-2-A and LS-2-B. Sampling equipment was decontaminated (Alconox/DeI-DeI-MeOH-DeI) prior to sample collection at each location. Samples LS-2-A and LS-2-B were composited in a stainless steel bowl, placed in an amber glass jar, and renamed LS-2-AB. Samples LS-2-C and LS-2-D were composited in a stainless steel bowl, placed in an amber glass jar, and renamed LS-

2-CD. Soil samples were sent to Alpha Analytical Laboratories for MADEP EPH "standard" analysis and PAH analysis via Method 8270C.

Groundwater Sampling

Two composite groundwater samples (GW-1-AB and GW-1-CD) were collected from Lagoon 1. At each of the four soil sampling locations in Lagoon 1, groundwater entered the holes from the sides of the excavation. Standing groundwater was evacuated from each location with a pond sampler, and newly infiltrated groundwater was then collected with the sampler and placed in 1-liter amber glass bottles. Both of the bottles filled per composite sample GW-1-AB received ½-liter of groundwater each from both soil sampling locations LS-1-A and LS-1-B. Both of the bottles filled per composite sample GW-1-CD received ½-liter of groundwater each from both soil sampling locations LS-1-C and LS-1-D.
Two composite groundwater samples (GW-2-AB and GW-2-CD) were collected from Lagoon 2. At two of the four soil sampling locations in Lagoon 2, groundwater entered the holes from the sides of the excavation. The holes at locations LS-2-A and LS-2-B were moved towards the lagoon edges and redug as no groundwater had entered the excavations. LS-2-A was ultimately excavated to 2 feet 10 inches in order to collect groundwater, while LS-2-B was excavated to 2 feet. Standing groundwater was evacuated from each location with a pond sampler, and newly infiltrated groundwater was then collected with the sampler and placed in 1-liter amber glass bottles. Both of the bottles filled per composite sample GW-2-AB received ½-liter of groundwater each from both soil sampling locations LS-2-A and LS-2-B. Both of the bottles filled per composite sample GW-2-CD received ½-liter of groundwater each from both soil sampling locations LS-2-C and LS-2-D.

Sampling equipment was decontaminated (Alconox/DeI-DeI-MeOH-DeI) prior to sample collection at each location. All groundwater samples were sent to Alpha Analytical Laboratories, with a request to analyze (decanted water) for PAH at low concentrations via Method 8270C-SIM.

cc: Michael Guidice w/ attachments
Project File w/ attachments

SUBSURFACE SOIL SAMPLING IN LAGOONS 1 & 2 OCTOBER 2, 2000
BUCKLEY AND MANN, INC., NORFOLK, MASSACHUSETTS

	Subsurface Soil Sampling Locations									
	Lagoon 1				Lagoon 2					
Depth (bgs)	A	B	C	D	A	A*	B	B*	C	D
0	dk brn org SILT	dk brn org SILT	light brown	light brown	dk brn org SILT	dk brn org SILT	dk brn org SILT	dk brn org SILT	blk org PEAT	blk org PEAT
2"	tr leaves, dry	tr leaves, dry	fine to medium	fine to medium	tr leaves, dry	tr leaves, dry	tr leaves, dry	tr leaves, dry	tr org/grass	tr org/grass
4"	lt brn m to f S	lt brn m to f S	SAND	SAND		light brown		light brown	moist	moist
6"	tr f to m g	tr f to m g	trace	trace	lt brn m to f S	fine to medium	lt brn m to f S	fine to medium	lt brn m to f S	lt brn m to f S
8"			fine to medium	fine to medium	tr f to m g	SAND	tr f to m g	SAND	tr f to m g	tr f to m g
10"			gravel	gravel	light blue/grey	trace		trace		
12"	wet @ 2"	wet @ 2"	wet @ 2"	wet @ 2"	fine to medium	fine to medium	dry	fine to medium	wet @ 4"	wet @ 2"
14"					SAND	gravel		gravel		
16"					dense					
18'					dry					
20"										
22"								wet @ 22"		
24"										
26"										
28"										
30"										
32"										
34"						wet @ 34"				

* Associated groundwater sampling location; no soil sample collected from starred locations.

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65 NY:11148

CERTIFICATE OF ANALYSIS

Client: Camp Dresser & McKee, Inc.

Address: 1 Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

Attn: Bob Dangel

Project Number: 1121-25944-GS.LAGN

Site: BUCKLEY & MANN

Laboratory Job Number: L0008913

Invoice Number: 42392

Date Received: 04-OCT-00

Date Reported: 16-OCT-00

Delivery Method: Alpha

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L0008913-01	GW-1-AB	NORFOLK, MA
L0008913-02	GW-1-CD	NORFOLK, MA
L0008913-03	GW-2-AB	NORFOLK, MA
L0008913-04	GW-2-CD	NORFOLK, MA
L0008913-05	LS-1-AB	NORFOLK, MA
L0008913-06	LS-1-CD	NORFOLK, MA
L0008913-07	LS-2-AB	NORFOLK, MA
L0008913-08	LS-2-CD	NORFOLK, MA

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by: _____

Scott McLean - Laboratory Director

ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT

Laboratory Job Number: L0008913

Alpha Job L0008913

Polynuclear Aromatic Hydrocarbons

Please note that Alpha Samples L0008913-01 through -04 were decanted prior to extraction for the analysis of PAHs by EPA Method 8270C-SIM.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0008913-01
GW-1-AB
Sample Matrix: WATER

Date Collected: 02-OCT-2000
Date Received : 04-OCT-2000
Date Reported : 16-OCT-00

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 2-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
PAH by GC/MS SIM 8270M				1	8270C-M	06-Oct	13-Oct	MK
Acenaphthene	17.	ug/l	0.20					
2-Chloronaphthalene	0.54	ug/l	0.20					
Fluoranthene	ND	ug/l	0.20					
Naphthalene	13.	ug/l	0.20					
Benzo(a)anthracene	ND	ug/l	0.20					
Benzo(a)pyrene	ND	ug/l	0.20					
Benzo(b)fluoranthene	ND	ug/l	0.20					
Benzo(k)fluoranthene	ND	ug/l	0.20					
Chrysene	ND	ug/l	0.20					
Acenaphthylene	ND	ug/l	0.20					
Anthracene	ND	ug/l	0.20					
Benzo(ghi)perylene	ND	ug/l	0.20					
Fluorene	1.1	ug/l	0.20					
Phenanthrene	ND	ug/l	0.20					
Dibenzo(a,h)anthracene	ND	ug/l	0.20					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.20					
Pyrene	ND	ug/l	0.20					
1-Methylnaphthalene	9.7	ug/l	0.20					
2-Methylnaphthalene	16.	ug/l	0.20					
Perylene	ND	ug/l	0.20					
Benzo(e)Pyrene	ND	ug/l	0.20					
Surrogate Recovery								
Nitrobenzene-d5	81.0	%						
2-Fluorobiphenyl	78.0	%						
4-Terphenyl-d14	79.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0008913-02
GW-1-CD
Sample Matrix: WATER

Date Collected: 02-OCT-2000
Date Received : 04-OCT-2000
Date Reported : 16-OCT-00

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 2-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
PAH by GC/MS SIM 8270M				1	8270C-M	06-Oct	11-Oct	MK
Acenaphthene	8.0	ug/l	0.14					
2-Chloronaphthalene	ND	ug/l	0.14					
Fluoranthene	ND	ug/l	0.14					
Naphthalene	2.1	ug/l	0.14					
Benzo(a)anthracene	ND	ug/l	0.14					
Benzo(a)pyrene	ND	ug/l	0.14					
Benzo(b)fluoranthene	ND	ug/l	0.14					
Benzo(k)fluoranthene	ND	ug/l	0.14					
Chrysene	ND	ug/l	0.14					
Acenaphthylene	ND	ug/l	0.14					
Anthracene	ND	ug/l	0.14					
Benzo(ghi)perylene	ND	ug/l	0.14					
Fluorene	1.2	ug/l	0.14					
Phenanthrene	0.20	ug/l	0.14					
Dibenzo(a,h)anthracene	ND	ug/l	0.14					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.14					
Pyrene	ND	ug/l	0.14					
1-Methylnaphthalene	6.9	ug/l	0.14					
2-Methylnaphthalene	7.3	ug/l	0.14					
Perylene	ND	ug/l	0.14					
Benzo(e)Pyrene	ND	ug/l	0.14					
Surrogate Recovery								
Nitrobenzene-d5	93.0	%						
2-Fluorobiphenyl	86.0	%						
4-Terphenyl-d14	43.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0008913-08
LS-2-CD
Sample Matrix: SOIL

Date Collected: 02-OCT-2000
Date Received : 04-OCT-2000
Date Reported : 16-OCT-00

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 1-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Solids, Total	67.	%	0.10	30	2540G		10-Oct	MA
PNA's by GC/MS 8270				1	8270C	05-Oct	10-Oct	JA
Acenaphthene	ND	ug/kg	1500					
2-Chloronaphthalene	ND	ug/kg	1500					
Fluoranthene	ND	ug/kg	1500					
Naphthalene	ND	ug/kg	1500					
Benzo(a)anthracene	ND	ug/kg	1500					
Benzo(a)pyrene	ND	ug/kg	1500					
Benzo(b)fluoranthene	ND	ug/kg	1500					
Benzo(k)fluoranthene	ND	ug/kg	1500					
Chrysene	ND	ug/kg	1500					
Acenaphthylene	ND	ug/kg	1500					
Anthracene	ND	ug/kg	1500					
Benzo(ghi)perylene	ND	ug/kg	1500					
Fluorene	ND	ug/kg	1500					
Phenanthrene	ND	ug/kg	1500					
Dibenzo(a,h)anthracene	ND	ug/kg	1500					
Indeno(1,2,3-cd)pyrene	ND	ug/kg	1500					
Pyrene	ND	ug/kg	1500					
Benzo(e)pyrene	ND	ug/kg	1500					
Biphenyl	1600	ug/kg	1500					
Perylene	ND	ug/kg	1500					
1-Methylnaphthalene	ND	ug/kg	1500					
2-Methylnaphthalene	ND	ug/kg	1500					
Surrogate Recovery								
Nitrobenzene-d5	105.	%						
2-Fluorobiphenyl	86.0	%						
4-Terphenyl-d14	88.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0008913-08
LS-2-CD

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Extractable Petroleum Hydrocarbons				46	98-1	06-Oct	11-Oct	HL

Quality Control Information

Condition of sample received: Satisfactory
Sample temperature upon receipt: Received on Ice
Sample extraction method: Extracted Per the Method
Were all QA/QC procedures REQUIRED by the method followed? YES
Were all performance/acceptance standards for the required procedures achieved? YES
Were significant modifications made to the method as specified in Sect 11.3? NO
Please note to subtract the method blank from the stated result.
The normal acceptance range for the extraction surrogates, Chloro-octadecane and o-Terphenyl, is 40-140%.
The normal acceptance range for the fractionation surrogates, 2-Fluorobiphenyl and 2-Bromonaphthalene, is 40-140%.

C9-C18 Aliphatics	106.	mg/kg	14.9
C19-C36 Aliphatics	644.	mg/kg	14.9
C11-C22 Aromatics	157.	mg/kg	14.9

Surrogate Recovery

Chloro-Octadecane	76.0	%
o-Terphenyl	77.0	%
2-Fluorobiphenyl	105.	%
2-Bromonaphthalene	97.0	%

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH DUPLICATE ANALYSIS

Laboratory Job Number: L0008913

Parameter	Value 1	Value 2	RPD	Units
Extractable Petroleum Hydrocarbons for sample(s) 05-08 (L0008861-01, WG66721)				
C9-C18 Aliphatics	ND	ND	NC	mg/kg
C19-C36 Aliphatics	ND	ND	NC	mg/kg
C11-C22 Aromatics	ND	ND	NC	mg/kg
Surrogate Recovery				
Chloro-Octadecane	76.0	84.0	10	%
o-Terphenyl	70.0	76.0	8	%
2-Fluorobiphenyl	75.0	80.0	6	%
2-Bromonaphthalene	60.0	78.0	26	%

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH SPIKE ANALYSES

Laboratory Job Number: L0008913

Parameter	% Recovery
PAH by GC/MS SIM 8270M LCS for sample(s) 02-04 (WG66833)	
Acenaphthene	87
Pyrene	93
Surrogate Recovery	
Nitrobenzene-d5	85
2-Fluorobiphenyl	79
4-Terphenyl-d14	85
PNA's by GC/MS 8270 LCS for sample(s) 05-08 (WG66637)	
Acenaphthene	87
1,2,4-Trichlorobenzene	83
1,4-Dichlorobenzene	68
2,4-Dinitrotoluene	87
n-Nitrosodi-n-propylamine	75
Pyrene	82
Surrogate Recovery	
Nitrobenzene-d5	81
2-Fluorobiphenyl	83
4-Terphenyl-d14	82
Extractable Petroleum Hydrocarbons LCS for sample(s) 05-08 (WG66721)	
Naphthalene	73
Acenaphthene	84
Anthracene	75
Pyrene	79
Chrysene	70
Nonane (C9)	66
Tetradecane (C14)	92
Nonadecane (C19)	92
Eicosane (C20)	93
Octacosane (C28)	90
Surrogate Recovery	
Chloro-Octadecane	86
o-Terphenyl	94
2-Fluorobiphenyl	87
2-Bromonaphthalene	67

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH MS/MSD ANALYSIS

Laboratory Job Number: L0008913

Parameter	MS %	MSD %	RPD
PAH by GC/MS SIM 8270M for sample(s) 02-04 (L0008913-02, WG66833)			
Acenaphthene	89	85	5
Pyrene	88	88	0
PNA's by GC/MS 8270 for sample(s) 05-08 (L0008914-01, WG66637)			
Acenaphthene	85	85	0
1,2,4-Trichlorobenzene	84	83	1
1,4-Dichlorobenzene	80	79	1
2,4-Dinitrotoluene	100	94	6
n-Nitrosodi-n-propylamine	85	85	0
Pyrene	85	85	0

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0008913

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Blank Analysis for sample(s) 02-04								
PAH by GC/MS SIM 8270M				1	8270C-M	06-Oct	11-Oct	MK
Acenaphthene	ND	ug/l	0.20					
2-Chloronaphthalene	ND	ug/l	0.20					
Fluoranthene	ND	ug/l	0.20					
Naphthalene	ND	ug/l	0.20					
Benzo(a)anthracene	ND	ug/l	0.20					
Benzo(a)pyrene	ND	ug/l	0.20					
Benzo(b)fluoranthene	ND	ug/l	0.20					
Benzo(k)fluoranthene	ND	ug/l	0.20					
Chrysene	ND	ug/l	0.20					
Acenaphthylene	ND	ug/l	0.20					
Anthracene	ND	ug/l	0.20					
Benzo(ghi)perylene	ND	ug/l	0.20					
Fluorene	ND	ug/l	0.20					
Phenanthrene	ND	ug/l	0.20					
Dibenzo(a,h)anthracene	ND	ug/l	0.20					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.20					
Pyrene	ND	ug/l	0.20					
1-Methylnaphthalene	ND	ug/l	0.20					
2-Methylnaphthalene	ND	ug/l	0.20					
Perylene	ND	ug/l	0.20					
Benzo(e)Pyrene	ND	ug/l	0.20					
Surrogate Recovery								
Nitrobenzene-d5	86.0	%						
2-Fluorobiphenyl	85.0	%						
4-Terphenyl-d14	77.0	%						
Blank Analysis for sample(s) 01								
PAH by GC/MS SIM 8270M				1	8270C-M	06-Oct	13-Oct	MK
Acenaphthene	ND	ug/l	0.20					
2-Chloronaphthalene	ND	ug/l	0.20					
Fluoranthene	ND	ug/l	0.20					
Naphthalene	ND	ug/l	0.20					
Benzo(a)anthracene	ND	ug/l	0.20					
Benzo(a)pyrene	ND	ug/l	0.20					
Benzo(b)fluoranthene	ND	ug/l	0.20					
Benzo(k)fluoranthene	ND	ug/l	0.20					
Chrysene	ND	ug/l	0.20					
Acenaphthylene	ND	ug/l	0.20					
Anthracene	ND	ug/l	0.20					
Benzo(ghi)perylene	ND	ug/l	0.20					
Fluorene	ND	ug/l	0.20					
Phenanthrene	ND	ug/l	0.20					
Dibenzo(a,h)anthracene	ND	ug/l	0.20					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.20					
Pyrene	ND	ug/l	0.20					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0008913

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Blank Analysis for sample(s) 01								
PAH by GC/MS SIM 8270M continued				1	8270C-M	06-Oct	13-Oct	MK
1-Methylnaphthalene	ND	ug/l	0.20					
2-Methylnaphthalene	ND	ug/l	0.20					
Perylene	ND	ug/l	0.20					
Benzo(e)Pyrene	ND	ug/l	0.20					
Surrogate Recovery								
Nitrobenzene-d5	81.0	%						
2-Fluorobiphenyl	75.0	%						
4-Terphenyl-d14	48.0	%						
Blank Analysis for sample(s) 05-08								
PNA's by GC/MS 8270				1	8270C	05-Oct	10-Oct	JA
Acenaphthene	ND	ug/kg	500					
2-Chloronaphthalene	ND	ug/kg	500					
Fluoranthene	ND	ug/kg	500					
Naphthalene	ND	ug/kg	500					
Benzo(a)anthracene	ND	ug/kg	500					
Benzo(a)pyrene	ND	ug/kg	500					
Benzo(b)fluoranthene	ND	ug/kg	500					
Benzo(k)fluoranthene	ND	ug/kg	500					
Chrysene	ND	ug/kg	500					
Acenaphthylene	ND	ug/kg	500					
Anthracene	ND	ug/kg	500					
Benzo(ghi)perylene	ND	ug/kg	500					
Fluorene	ND	ug/kg	500					
Phenanthrene	ND	ug/kg	500					
Dibenzo(a,h)anthracene	ND	ug/kg	500					
Indeno(1,2,3-cd)pyrene	ND	ug/kg	500					
Pyrene	ND	ug/kg	500					
Benzo(e)pyrene	ND	ug/kg	500					
Biphenyl	ND	ug/kg	500					
Perylene	ND	ug/kg	500					
1-Methylnaphthalene	ND	ug/kg	500					
2-Methylnaphthalene	ND	ug/kg	500					
Surrogate Recovery								
Nitrobenzene-d5	101.	%						
2-Fluorobiphenyl	82.0	%						
4-Terphenyl-d14	84.0	%						
Blank Analysis for sample(s) 05-08								
Extractable Petroleum Hydrocarbons				46	98-1	06-Oct	10-Oct	HL
C9-C18 Aliphatics	ND	mg/kg	10.0					
C19-C36 Aliphatics	ND	mg/kg	10.0					
C11-C22 Aromatics	ND	mg/kg	10.0					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0008913

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATES PREP	DATES ANALYSIS	ID
Blank Analysis for sample(s) 05-08								
Extractable Petroleum Hydrocarbons continued				46	98-1	06-Oct	10-Oct	HL
C11-C22 Aromatics, Adjusted	ND	mg/kg	10.0					
Naphthalene	ND	mg/kg	0.500					
2-Methylnaphthalene	ND	mg/kg	0.500					
Acenaphthalene	ND	mg/kg	0.500					
Acenaphthene	ND	mg/kg	0.500					
Fluorene	ND	mg/kg	0.500					
Phenanthrene	ND	mg/kg	0.500					
Anthracene	ND	mg/kg	0.500					
Fluoranthene	ND	mg/kg	0.500					
Pyrene	ND	mg/kg	0.500					
Benzo(a)anthracene	ND	mg/kg	0.500					
Chrysene	ND	mg/kg	0.500					
Benzo(b)fluoranthene	ND	mg/kg	0.500					
Benzo(k)fluoranthene	ND	mg/kg	0.500					
Benzo(a)pyrene	ND	mg/kg	0.500					
Indeno(1,2,3-cd)Pyrene	ND	mg/kg	0.500					
Dibenzo(a,h)anthracene	ND	mg/kg	0.500					
Benzo(ghi)perylene	ND	mg/kg	0.500					
Surrogate Recovery								
Chloro-Octadecane	90.0	%						
o-Terphenyl	77.0	%						
2-Fluorobiphenyl	79.0	%						
2-Bromonaphthalene	71.0	%						

REFERENCES

1. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Update III, 1997.

30. Standard Methods for the Examination of Water and Wastewater. APHA-AWWA-WPCF. 18th Edition. 1992.

46. Method for the Determination of Extractable Petroleum Hydrocarbons (EPH), Massachusetts Department of Environmental Protection, (MADEP-EPH-98-1), January 1998.

GLOSSARY OF TERMS AND SYMBOLS

REF Reference number in which test method may be found.

METHOD Method number by which analysis was performed.

ID Initials of the analyst.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical, Inc., shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical, Inc. be held liable for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

attachment 1

Quality Control Acceptance Criteria

Volatile Organics by Method 8260B

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
1,2-Dichloroethane-d_4	75%	125%	75%	125%
4-Bromofluorobenzene	75%	125%	75%	125%
Toluene-d_8	75%	125%	75%	125%
Dibromofluoromethane	75%	125%	75%	125%

matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	percent recovery				duplicate and/or MSD	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
1,1-Dichloroethene	61%	145%	59%	172%	all target compounds	
Trichloroethene	71%	120%	62%	137%	20%	30%
Chlorobenzene	75%	130%	60%	133%		
Benzene	76%	127%	66%	142%		
Toluene	76%	125%	59%	139%		

Volatile Organics by Method 8021B

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
4-Bromochlorobenzene	70%	110%	70%	120%
4-Bromofluorobenzene	70%	110%	70%	120%

matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	percent recovery				duplicate and/or MSD	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
1,1-Dichloroethene	70%	130%	70%	130%	all target compounds	
Trichloroethene	70%	130%	70%	130%	20%	30%
Chlorobenzene	70%	130%	70%	130%		
Benzene	70%	130%	70%	130%		
Toluene	70%	130%	70%	130%		
Ethylbenzene	70%	130%	70%	130%		

Semi-Volatile Organics by Method 8270C (includes PAHs)

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
Nitrobenzene-d_5	23%	120%	23%	120%
Phenol-d_6	10%	120%	10%	120%
2-Fluorophenol	21%	120%	25%	120%
2-Fluorobiphenyl	43%	120%	30%	120%
p-Terphenyl-d_{14}	33%	120%	18%	120%
2,4,6-Tribromophenol	10%	120%	19%	120%

matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	percent recovery				duplicate and/or MSD	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
1,2,4-Trichlorobenzene	39%	98%	38%	107%	all target compounds	
Acenaphthene	46%	118%	31%	137%	40%	50%
2,4-Dinitrotoluene	24%	96%	28%	89%		
Pyrene	26%	127%	35%	142%		
N-Nitroso-di-n-propylamine	41%	116%	41%	126%		
1,4-Dichlorobenzene	36%	97%	28%	104%		
Pentachlorophenol	9%	103%	17%	109%		
Phenol	12%	110%	26%	90%		
2-Chlorophenol	27%	123%	25%	102%		
4-Chloro-3-methylphenol	23%	97%	26%	103%		
4-Nitrophenol	10%	80%	11%	114%		

attachment 1

Quality Control Acceptance Criteria

PCB/Pesticides by Method 8082/8081

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
2,4,5,6-Tetrachloro-m-xylene	40%	120%	40%	120%
Decachlorobiphenyl	40%	120%	40%	120%

matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	percent recovery				duplicate and/or MSD	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
Lindane	56%	123%	46%	127%	all target compounds	
Heptachlor	40%	131%	35%	130%	30%	50%
Aldrin	40%	120%	34%	132%		
Dieldrin	52%	126%	31%	134%		
Endrin	56%	121%	42%	139%		
4,4'-DDT	38%	127%	23%	134%		
Aroclor 1242/1016	40%	140%	40%	140%		
Aroclor 1260	40%	140%	40%	140%		

Volatile Petroleum Hydrocarbons (VPH) by MA DEP 98-1

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
2,5-Dibromotoluene	70%	130%	70%	130%

laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
all compounds	70%	130%	70%	130%	50%	50%

Extractable Petroleum Hydrocarbons (EPH) by MA DEP 98-1

surrogate spike % recovery	AQ Limits		Soil Limits	
	LCL	UCL	LCL	UCL
Chloro-octadecane	40%	140%	40%	140%
ortho-Terphenyl	40%	140%	40%	140%
2-Fluorobiphenyl (fractionation)	40%	140%	40%	140%
2-Bromonaphthalene (fractionation)	40%	140%	40%	140%

laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
all compounds	40%	140%	40%	140%	50%	50%

TPH (GC-FID) by Method 8100M

surrogate spike % recovery	AQ Limits		Soil Limits		duplicate	
	LCL	UCL	LCL	UCL	AQ Limits RPD	Soil Limits RPD
ortho-Terphenyl	40%	140%	40%	140%	40%	40%

TPH by Method 418.1

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
TPH	60%	140%	60%	140%	40%	40%

attachment 1

Quality Control Acceptance Criteria

Trace Metals by Method 6010B/7000 series

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
target analyte	75%	125%	70%	140%	20%	35%

Mercury by Method 7470A/7471A

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
mercury	70%	130%	60%	140%	35%	45%

Total Cyanide by Method 9010B

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
cyanide	80%	120%	65%	135%	30%	40%

Total Phenol by Method 9065

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
phenol	70%	130%	65%	135%	20%	30%

ALPHA Analytical Laboratories, Inc.

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CHAIN OF CUSTODY

№ 4987 Sheet 1 of 1

ALPHA Job #: L0008913

Date Rec'd in Lab: 10/4

Date Due: 10/12

Client Name: CAMP DRESSER & MCKEE

Client Address: ONE CAMBRIDGE PLACE CAMBRIDGE MA 02139

Phone #: 6174526267 FAX #: 6174528000

Project Name: BUCKLEY & MANN

Project Location: NORFOLK, MA

Project #: 1121-25744-GS.LIGN

Project Manager: BOB DANIGEL

Report To: BOB DANIGEL

Bill To: SAME @ CDM, ONE CAMBRIDGE PLACE CAMBRIDGE MA 02139

PO#:

- [x] Standard TAT
- [ ] RUSH TAT ____ (# DAYS)
- [ ] FAX Results
- [ ] State Forms
- [ ] Smart Report

Comments (Please note specific method, detection limit or reporting requirements.)

* FOR GW SAMPLES, DECANT AND EXTRACT SUPERNATE ONLY (NOT SETTLED SOILS)

ANALYSIS REQUEST

ALPHA Lab #	Sample ID	Matrix/Source *	Sampling Date	Sampling Time	Sampler's Initials	Solubles: Field Filtered? (Y/N)	8270C-SIM ; PAH-LVI	EPH; STANDARD MA DEP	8270C FOR PAH
8913-1	GW-1-AB *	GW	10/2/12		BCH		✓		
-2	GW-1-CD *	GW			BCH		✓		
-3	GW-2-AB *	GW			BCH		✓		
-4	GW-2-CD *	GW			BCH		✓		
-5	LS-1-AB	S			BCH			✓	✓
-6	LS-1-CD	S			BCH			✓	✓
-7	LS-2-AB	S			BCH			✓	✓
-8	LS-2-CD	S	↓		BCH			✓	✓

# of Containers:	2	1	1
Container Type: *	A	A	1
Preservative: *	A	A	1

	Date	Time
Transfers Accepted By:	10/3/12	1535
	10/4	1835
Transfers Relinquished By:		

All samples submitted are subject to Alpha's standard Terms and Conditions.

* See Reverse side for Matrix, Container, and Preservative Codes.

Form No.: 01-01

APPENDIX H

REPORT ON
DECEMBER 2000 GROUNDWATER CHARACTERIZATION IN
LAGOONS #1 AND #2

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

CDM Camp Dresser & McKee Inc.

Memorandum

To: *Files*

From: *Bob Dangel*

Date: *July 11, 2001*

Subject: *December 2000 B&M Groundwater Samples from Former Dyehouse Wastewater Lagoons #1 and #2*

Recapitulation of the October 2000 Sampling and Analyses for PAH

The October 2000 groundwater samples were collected from seepage into shallow pits, so as to obtain water directly in contact with the soil in the bottom of the Lagoons. Prior analyses of soils from the Lagoons showed traces of dye carrier compounds, in the form of Polycyclic Aromatic Hydrocarbons (PAH). The October groundwater samples were decanted to remove some suspended solids prior to extraction, but the samples were not filtered or otherwise treated to remove suspended solids. Hence, these turbid samples represented the upper bound of what could be considered "groundwater" contamination. The October PAH analyses showed that:

- The Lagoon #1 A/B groundwater sample contained 16 µg/L 2-methylnaphthalene, slightly above the MCP Method 1 GW-1 10 µg /L standard. The Lagoon #1 C/D groundwater sample contained less than 10 µg /L standard, but the sum of the 1-methyl and 2-methyl naphthalene exceeded the 10 µg /L limit. The concentrations of these compounds in groundwater from Lagoon #2 were below the standard.

- The concentrations of other Base Neutral extractable compounds in groundwater from Lagoons #1 and #2 were below their respective MCP Method 1 standards and in nearly all cases, below the 0.14 or 0.2 µg/L detection limit.

- 1,1-Biphenyl, found in soil at 1.6 to 2.6 mg/kg in three of four samples (less than 0.59 mg/kg in the fourth sample) exceeded the MCP Method 1 S-1/GW-1 standard of 1 mg/kg. Biphenyl was not analyzed in the groundwater samples because this compound was not on the target list for the SIM procedure at the time of the analyses.

Visual examination of the samples showed that much of the suspended solids in these samples was of plant origin, including root hairs, stem and leaf debris. This is consistent with the condition of the Lagoons. Lagoon #1 collects leaf litter, and Lagoon #2 has substantial grass and other plant growth, as well as leaf litter. Test pits excavated in Lagoon #2 show layers of peat and the Lagoon was probably constructed in a wetland area or perhaps received soils from construction of the Tail Race.

December 2000 Sampling and Analysis Program Objectives and Procedures

The December program was designed to:

- Resample, for additional data
- Determine whether the methylnaphthalenes and biphenyl in groundwater were soluble or attached to suspended solids, and
- If appropriate, establish the basis for a MCP Method 2 modification of the leaching component of the methylnaphthalenes and biphenyl Method 1 Standard, based on actual soluble component data.

CDM's experience from other projects is that sparingly soluble compounds (like PAH and PCB) adsorb on filter media such as polymeric membranes and paper, and this causes erroneously low concentrations to be reported. Coagulation with alum and settling (or centrifugation) does not cause as great a "low" bias. For the B&M samples, CDM coagulated and settled the waters, and then decanted the samples to remove the suspended solids, as described in the attached memorandum.

Samples were kept in glass bottles chilled on ice during this procedure, although the samples were not preserved with acid to less than pH 2. Acid pH would have prevented formation of an insoluble alum floc (aluminum salts are soluble at low pH). Potential for biodegradation in the preparation of these samples was not a factor because PAH compounds degrade slowly under even the favorable conditions with moderate temperature and adequate nutrients, which were absent.

Results

The December groundwater samples were collected from the same or immediately adjacent locations as the October 2000 samples. The December samples, after coagulation, settling and decant, were analyzed for PAH compounds by Method 8270 SIM (gas chromatography with selective ion mass spectroscopy detector to reach low detection limits) and for the larger universe of Base/Neutral Extractable compounds by Method 8270 C (gas chromatography with mass spectroscopy detector).

The results are summarized in Table H-1. None of the analytes were found at concentrations exceeding the MCP GW-1 standards, demonstrating that the compounds found in October 2000 were associated with suspended solids in the samples.

Based on these results, the Method 1 S-1/GW-1 standard for biphenyl, which exceeded that standard in the October 2000 soil samples, may be adjusted under Method 2 to reflect that the biphenyl is not leaching to groundwater. The biphenyl concentration in the soils, at not more than 2.6 mg/kg, is well below the 1,000 mg/kg S-1 standards based on direct contact exposure.

TABLE H-1
DECEMBER 2000 DATA

GROUNDWATER ANALYSES FROM FORMER DYEHOUSE WASTEWATER TREATMENT LAGOONS #1 AND #2
Settled with alum and decanted, but not filtered samples. All results in ug/L.

	MCP Method 1 Standard		Lagoon 1	Lagoon 1	Lagoon 2	Lagoon 2	DI Water
	GW-1	GW-3	GW-1-AB	GW-1-CD	GW-2-AB	GW-2-CD	GW-0-AB
Polynuclear Aromatic Compounds (Method 8270 C SIM)							
Acenaphthene	20	5,000	18	1.8	<0.21	<0.21	<0.21
2-Chloronaphthalene	NL	NL	<0.21	<0.22	<0.21	<0.21	<0.21
Fluoranthene	300	200	<0.21	<0.22	<0.21	<0.21	<0.21
Naphthalene	20	6,000	0.24	<0.22	<0.21	<0.21	<0.21
Benzo(a)anthracene	1	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Benzo(a)pyrene	0.2	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Benzo(b)fluoranthene	1	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Benzo(k)fluoranthene	1	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Chrysene	2	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Acenaphthylene	300	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Anthracene	2000	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Benzo(ghi)perylene	300	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Fluorene	300	3,000	0.21	<0.22	<0.21	<0.21	<0.21
Phenanthrene	300	50	<0.21	<0.22	<0.21	<0.21	0.34
Dibenzo(a,h)anthracene	0.5	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Indeno(1,2,3-cd)Pyrene	0.5	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Pyrene	200	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
1-Methylnaphthalene	NL	NL	0.67	0.36	<0.21	<0.21	<0.21
2-Methylnaphthalene	10	3,000	0.3	<0.22	<0.21	<0.21	<0.21
Perylene	200	3,000	<0.21	<0.22	<0.21	<0.21	<0.21
Biphenyl, 1,1-	400	50,000	2.2	<0.22	<0.21	<0.21	<0.21
Benzo(e)Pyrene	NL	NL	<0.21	<0.22	<0.21	<0.21	<0.21
Base Neutral Semi-Volatile Organic Compounds (Method 8270 C)							
Acenaphthene			16	ND	<5.2	<5.3	ND
All others			ND	ND	ND	ND	ND
Detection limit (varies by cmpd*)			5.3 to 21	5.4 to 21	5.2 to 21	5.3 to 21	5.3 to 21

Legend: ND = not detected. NL = no listing the the MCP. <0.XX = less than the stated detection limit.

PAH and Base Neutral extractable analyses by EPA Method 8270. For PAH, selective ion mass spectroscopy (SIM) was used to achieve lower detection limits.

Samples were collected from shallow test pits on 14 Dec 00, coagulated with alum (see text) on 15 Dec 00, settled for three days, decanted into fresh bottles with a peristaultic pump and then shipped to the laboratory on 18 Dec 00. Good clarity was achieved without filtration.

*The range of detection limits excludes n-Nitrosodimethylamine, which had a detection limit of 50 to 54 ug/L.

CDM Camp Dresser & McKee Inc.

Memorandum

To: *Robert Dangel*

From: *Brendan MacDonald*

Date: *January 11, 2001*

Subject: *Buckley & Mann; Lagoons 1 & 2 Resampling Event*

On December 13, 2000 CDM field personnel collected groundwater samples from former dyehouse wastewater Lagoons 1 and 2. The following describes how the samples were collected and processed. The attached figure shows the sampling locations.

The objective of this sampling round was to measure ***soluble*** PAH compounds in groundwater contacting the soil containing the "Source Material". This Source Material is residue from the dyehouse wastewater treatment operations, which ceased in 1986. For the December 2000 samples at Buckley & Mann, CDM used coagulation and settling to clarify the water prior to analysis, rather than filtration. Experience on other projects (with PCB contamination, which has similar water solubility to some PAH compounds) has shown that the paper filter media adsorbs sparingly soluble compounds and thereby causes artificially low reports on "soluble" concentrations. This problem is minimized by alum coagulation and settling (or centrifugation).

Groundwater Sample Collection

Two composite groundwater samples (GW-1-AB and GW-1-CD) were collected from Lagoon 1. At three of the four groundwater sampling locations (GW-1-B-002, GW-1-C-002, GW-1-D-002) in Lagoon 1, new holes were dug to 12"-18" below ground surface with a shovel. The holes were deep enough to intersect the shallow groundwater table and filled with groundwater from the sides of the excavation. The hole dug at GW-1-A-001, a location sampled in October 2000, was in a condition satisfactory for sampling in December, so a new hole was not needed.

Standing groundwater was evacuated from each location with a pond sampler, and newly infiltrated groundwater was then collected with the sampler and placed in 1-liter amber glass bottles. Two 1-liter bottles were filled at each location. Sampling equipment was decontaminated (Alconox/DeI-DeI-MeOH-DeI) prior to sample collection at each location. Decontamination procedures included a wash with Alconox in deionized water followed by a deionized water rinse, a methanol rinse, and a final deionized water rinse.

Both of the bottles filled for composite sample GW-1-AB-002 received ½-liter of groundwater each from both groundwater sampling locations GW-1-A-001 and GW-1-B-002. Both of the bottles filled for composite sample GW-1-CD-002 received ½-liter of groundwater each from both groundwater sampling locations GW-1-C-002 and GW-1-D-002.

Two composite groundwater samples (GW-2-AB and GW-2-CD) were collected from Lagoon 2. At each of the four groundwater sampling locations in Lagoon 2, groundwater was collected from the same locations visited during the October 2000 sampling event, although location GW-2-A-001 had to be dug an additional 6 inches before groundwater entered the hole from the sides of the excavation. Standing groundwater was evacuated from each location with a pond sampler, and newly infiltrated groundwater was then collected with the sampler and placed in 1-liter amber glass bottles. Two 1-liter bottles were filled at each location.

Both of the bottles filled for composite sample GW-2-AB-002 received ½-liter of groundwater each from both groundwater sampling locations GW-2-A-001 and GW-2-B-001. Both of the bottles filled for composite sample GW-2-CD-002 received ½-liter of groundwater each from both groundwater sampling locations GW-2-C-001 and GW-2-D-001.

Sample Preparation

Samples were delivered to the CDM Soils Laboratory on December 13, 2000. Upon visible inspection, varying degrees of turbidity were noted in the sample containers. A determination was made to allow the samples to settle on ice for one day, and subsequently a second day.

On December 15, a QC blank was prepared in the laboratory by filling two one-liter bottles with deionized water. A visual inspection of each of the samples was again performed; the observations of this inspection, as well as the subsequent inspections are included in attached Table A-1.

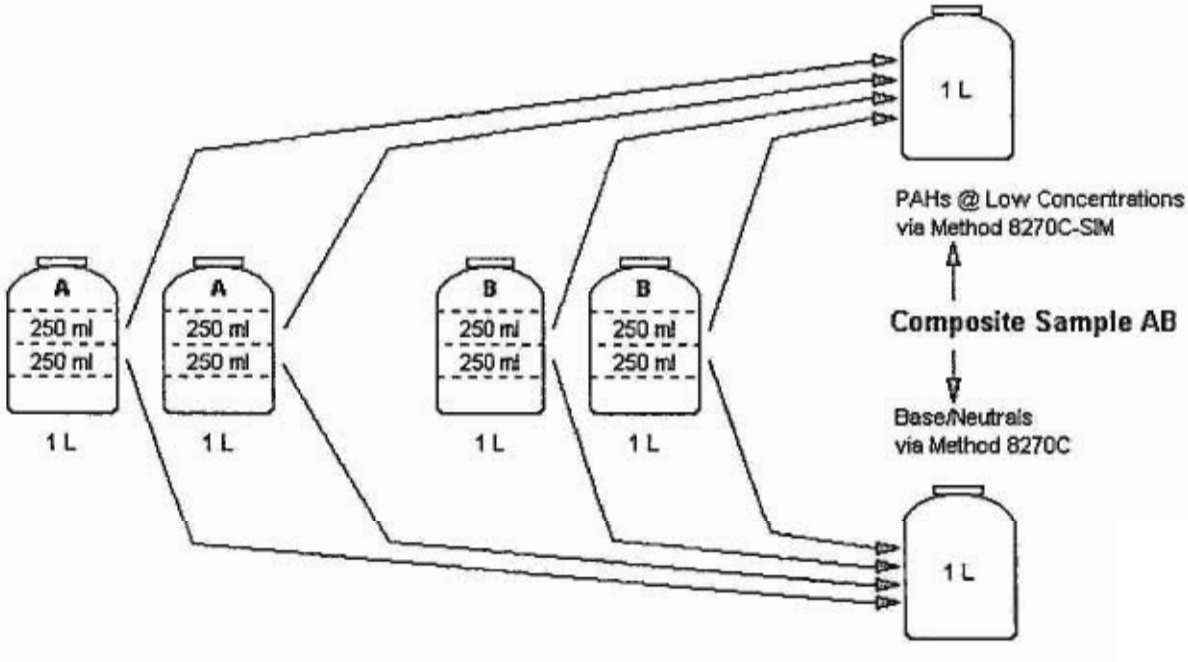
Sample Coagulation and Settling

Following the visual inspection of the samples, Bob Dangel of CDM determined that the amount of suspended and colloidal suspended solids in the samples should be lowered prior to laboratory analyses. This was achieved by adding aluminum sulfate (alum), a common water treatment coagulant and allowing the resulting floc to settle.

An alum solution (3.72 g Al/L) was prepared by combining 32 ml of a 54.2% $Al_2(SO_4)_3 18H_2O$ solution and 468 ml deionized water. One at a time, each bottle was dosed with 12 ml of the dilute alum stock solution, closed and mixed (via swirling and shaking motions) for five minutes. Following a settling period of 2.5 hours, visual observations of the samples were recorded (see Table A-1). Because not all of the samples were fully clarified, a second alum dose was added, the samples were remixed and allowed to settle again.

On December 18, following a second settling period of 64 hours on ice, the samples were reinspected (see Table A-1). All of the groundwater samples appeared much clearer than the previous Friday, and all were very clear except for GW-2-D and GW-2-C.

Supernate composite samples were then prepared from two 250 ml aliquots of groundwater from each 1-liter sample bottle, one for each of the two composite containers required. Samples were transferred using a peristaltic pump and Masterflex tubing with a J-shaped intake placed approximately ¾-inch below the sample surface. This avoided drawing settled solids into the decant. The J-shape was constructed by tying a small piece of Tygon tubing around a loop of Masterflex tubing.



All groundwater samples were sent to Alpha Analytical Laboratories, with a request to analyze (decanted water) for PAH at low concentrations via Method 8270C-SIM, and base/neutrals via Method 8270C.

Table A-1
Visual Observations of Sample Clarity

Lagoon	Resultant Composite Sample	Groundwater Sample Location	Initial Conditions	Following 1 Dosage	Following 2 Dosages
1	GW-1-AB	A-001	~ clear; some small floating particulates; veg. matter* & sediments on bottom	Clearer; some suspended solids floated, some sank	perfectly clear
		B-002	~ clear; few small floating particulates; veg. matter* & sediments on bottom	Clearer; some suspended solids floated, some sank	perfectly clear
	GW-1-CD	C-002	cloudy; little on bottom	Partially cloudy	perfectly clear
		D-002	~ clear; few small floating particulates; veg. matter* & sediments on bottom	Clearer; some suspended solids floated, some sank	perfectly clear
2	GW-2-AB	A-001	perfectly clear; sediments & trace veg. matter* on bottom	perfectly clear; sediments & trace veg. matter* on bottom	perfectly clear
		B-001	perfectly clear; sediments & trace veg. matter* on bottom	perfectly clear; sediments & trace veg. matter* on bottom	perfectly clear
	GW-2-CD	C-001	Clear; tiny floating particulates; black, very fluffy bottom	clearer	clear
		D-001	Cloudy; black, fluffy bottom	partially cloudy, yet clearer	clear; trace cloudiness

* veg. matter means root, stem and/or leaf fragments

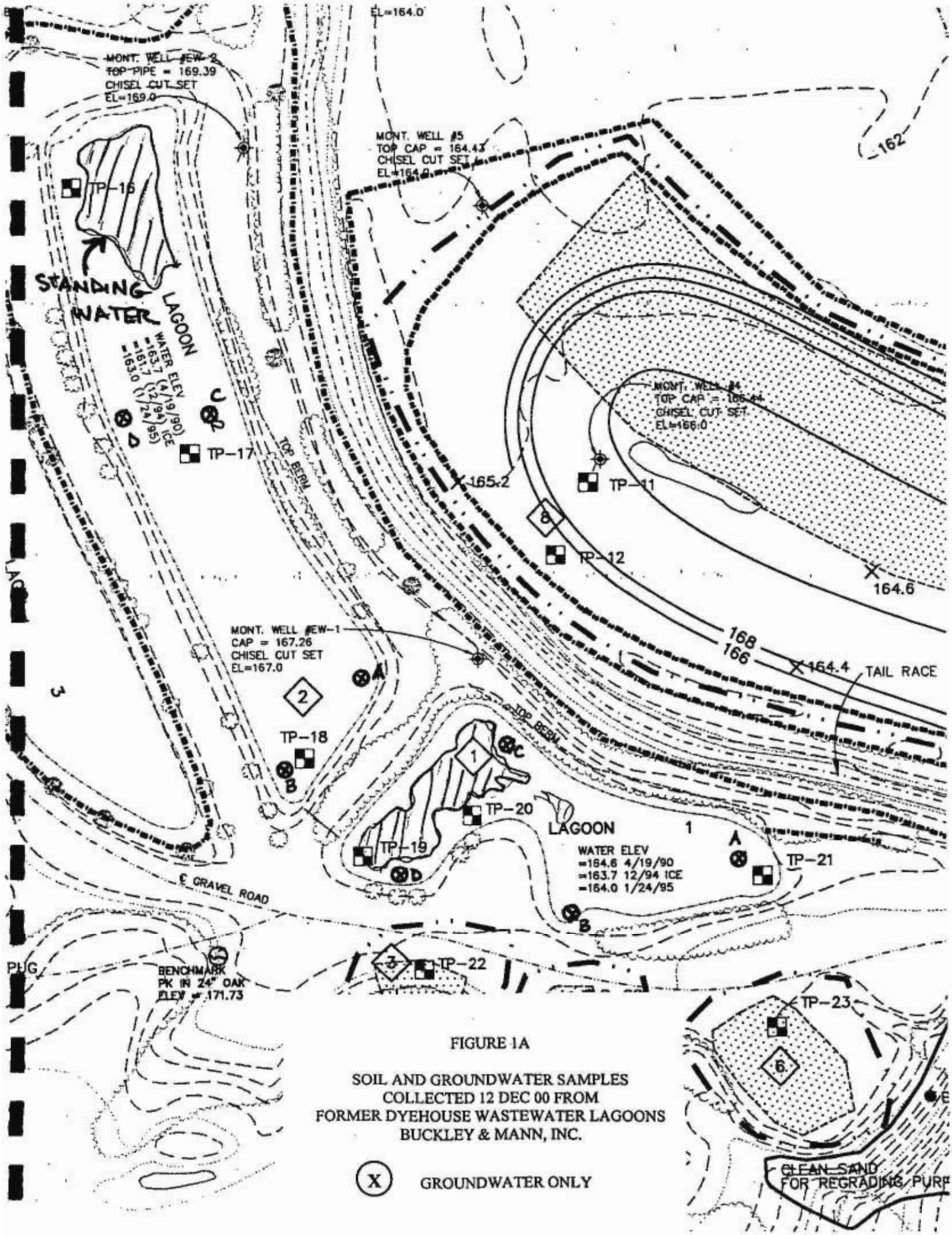


FIGURE 1A

SOIL AND GROUNDWATER SAMPLES
COLLECTED 12 DEC 00 FROM
FORMER DYEHOUSE WASTEWATER LAGOONS
BUCKLEY & MANN, INC.

(X) GROUNDWATER ONLY

ALPHA ANALYTICAL LABORATORIES

Eight Walkup Drive
Westborough, Massachusetts 01581-1019
(508) 898-9220

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65 NY:11148

CERTIFICATE OF ANALYSIS

Client: Camp Dresser & McKee, Inc.

Address: 1 Cambridge Place
50 Hampshire Street
Cambridge, MA 02139

Attn: Bob Dangel

Project Number:

Site: BUCKLEY & MANN

Laboratory Job Number: L0011726

Invoice Number: 46221

Date Received: 18-DEC-00

Date Reported: 23-JAN-01

Delivery Method: Alpha

ALPHA SAMPLE NUMBER	CLIENT IDENTIFICATION	SAMPLE LOCATION
L0011726-01	GW-2-AB	NORFOLK, MA
L0011726-02	GW-2-CD	NORFOLK, MA
L0011726-03	GW-0-AB	NORFOLK, MA
L0011726-04	GW-1-AB	NORFOLK, MA
L0011726-05	GW-1-CD	NORFOLK, MA

I attest under the pains and penalties of perjury that, based upon my inquiry of those individuals immediately responsible for obtaining the information, the material contained in this report is, to the best of my knowledge and belief, accurate and complete. This certificate of analysis is not complete unless this page accompanies any and all pages of this report.

Authorized by: Scott McLean

Scott McLean - Laboratory Director
This document electronically signed

ALPHA ANALYTICAL LABORATORIES
NARRATIVE REPORT

Laboratory Job Number: L0011726

Alpha Job L0011726

Report Submission

Please note that this report replaces the report issued on December 26, 2000. The report has been amended to include the results for Biphenyl as part of the PAHs by EPA Method 8270C-SIM on Alpha Samples L0011726-01 through -05.

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0011726-01
GW-2-AB
Sample Matrix: WATER

Date Collected: 18-DEC-2000 13:30
Date Received : 18-DEC-2000
Date Reported : 23-JAN-2001

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 2-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M				1	8270C-M	1219 11:30	1222 17:24	MK
Acenaphthene	ND	ug/l	0.21					
2-Chloronaphthalene	ND	ug/l	0.21					
Fluoranthene	ND	ug/l	0.21					
Naphthalene	ND	ug/l	0.21					
Benzo(a)anthracene	ND	ug/l	0.21					
Benzo(a)pyrene	ND	ug/l	0.21					
Benzo(b)fluoranthene	ND	ug/l	0.21					
Benzo(k)fluoranthene	ND	ug/l	0.21					
Chrysene	ND	ug/l	0.21					
Acenaphthylene	ND	ug/l	0.21					
Anthracene	ND	ug/l	0.21					
Benzo(ghi)perylene	ND	ug/l	0.21					
Fluorene	ND	ug/l	0.21					
Phenanthrene	ND	ug/l	0.21					
Dibenzo(a,h)anthracene	ND	ug/l	0.21					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.21					
Pyrene	ND	ug/l	0.21					
1-Methylnaphthalene	ND	ug/l	0.21					
2-Methylnaphthalene	ND	ug/l	0.21					
Perylene	ND	ug/l	0.21					
Biphenyl	ND	ug/l	0.21					
Benzo(e)Pyrene	ND	ug/l	0.21					
Surrogate Recovery								
Nitrobenzene-d5	68.0	%						
2-Fluorobiphenyl	74.0	%						
4-Terphenyl-d14	67.0	%						
BN SVOC's by GC/MS 8270				1	8270C	1219 11:30	1221 19:00	MK
Acenaphthene	ND	ug/l	5.2					
1,2,4-Trichlorobenzene	ND	ug/l	5.2					
Hexachlorobenzene	ND	ug/l	5.2					
Bis(2-chloroethyl)ether	ND	ug/l	5.2					
1-Chloronaphthalene	ND	ug/l	5.2					
2-Chloronaphthalene	ND	ug/l	5.2					
1,2-Dichlorobenzene	ND	ug/l	5.2					
1,3-Dichlorobenzene	ND	ug/l	5.2					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0011726-01
GW-2-AB

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
BN SVOC's by GC/MS 8270 continued				1 8270C	1219 11:30	1221 19:00	MK
1,4-Dichlorobenzene	ND	ug/l	5.2				
2,4-Dinitrotoluene	ND	ug/l	5.2				
2,6-Dinitrotoluene	ND	ug/l	5.2				
Azobenzene	ND	ug/l	5.2				
Fluoranthene	ND	ug/l	5.2				
4-Chlorophenyl phenyl ether	ND	ug/l	5.2				
4-Bromophenyl phenyl ether	ND	ug/l	5.2				
Bis(2-chloroisopropyl)ether	ND	ug/l	5.2				
Bis(2-chloroethoxy)methane	ND	ug/l	5.2				
Hexachlorocyclopentadiene	ND	ug/l	10.				
Hexachloroethane	ND	ug/l	5.2				
Isophorone	ND	ug/l	5.2				
Naphthalene	ND	ug/l	5.2				
Nitrobenzene	ND	ug/l	5.2				
NDPA/DPA	ND	ug/l	5.2				
n-Nitrosodi-n-propylamine	ND	ug/l	5.2				
Bis(2-ethylhexyl)phthalate	ND	ug/l	10.				
Butyl benzyl phthalate	ND	ug/l	5.2				
Di-n-butylphthalate	ND	ug/l	5.2				
Di-n-octylphthalate	ND	ug/l	5.2				
Diethyl phthalate	ND	ug/l	5.2				
Dimethyl phthalate	ND	ug/l	5.2				
Benzo(a)anthracene	ND	ug/l	5.2				
Benzo(a)pyrene	ND	ug/l	5.2				
Benzo(b)fluoranthene	ND	ug/l	5.2				
Benzo(k)fluoranthene	ND	ug/l	5.2				
Chrysene	ND	ug/l	5.2				
Acenaphthylene	ND	ug/l	5.2				
Anthracene	ND	ug/l	5.2				
Benzo(ghi)perylene	ND	ug/l	5.2				
Fluorene	ND	ug/l	5.2				
Phenanthrene	ND	ug/l	5.2				
Dibenzo(a,h)anthracene	ND	ug/l	5.2				
Indeno(1,2,3-cd)pyrene	ND	ug/l	5.2				
Pyrene	ND	ug/l	5.2				
Benzo(e)pyrene	ND	ug/l	5.2				
Biphenyl	ND	ug/l	5.2				
Perylene	ND	ug/l	5.2				
Aniline	ND	ug/l	10.				
4-Chloroaniline	ND	ug/l	5.2				
1-Methylnaphthalene	ND	ug/l	5.2				
2-Nitroaniline	ND	ug/l	5.2				
3-Nitroaniline	ND	ug/l	5.2				
4-Nitroaniline	ND	ug/l	5.2				
Hexachloropropene	ND	ug/l	52.				
Nitrosodi-n-butylamine	ND	ug/l	10.				
2-Methylnaphthalene	ND	ug/l	5.2				
1,2,4,5-Tetrachlorobenzene	ND	ug/l	21.				
Pentachlorobenzene	ND	ug/l	21.				

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0011726-03
GW-0-AB

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
BN SVOC's by GC/MS 8270 continued				1 8270C	1219 11:30	1221 20:22	MK
Phenacetin	ND	ug/l	11.				
Dimethoate	ND	ug/l	21.				
4-Aminobiphenyl	ND	ug/l	11.				
Pentachloronitrobenzene	ND	ug/l	11.				
Isodrin	ND	ug/l	11.				
p-Dimethylaminoazobenzene	ND	ug/l	11.				
Chlorobenzilate	ND	ug/l	21.				
3-Methylcholanthrene	ND	ug/l	21.				
Acetophenone	ND	ug/l	21.				
Nitrosodipiperidine	ND	ug/l	21.				
7,12-Dimethylbenz(a)anthracene	ND	ug/l	11.				
n-Nitrosodimethylamine	ND	ug/l	53.				
Surrogate Recovery							
Nitrobenzene-d5	76.0	%					
2-Fluorobiphenyl	87.0	%					
4-Terphenyl-d14	94.0	%					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0011726-04
GW-1-AB
Sample Matrix: WATER

Date Collected: 18-DEC-2000 14:30
Date Received : 18-DEC-2000
Date Reported : 23-JAN-2001

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 2-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M				1	8270C-M	1219 11:30	1222 19:40	MK
Acenaphthene	18.	ug/l	0.21					
2-Chloronaphthalene	ND	ug/l	0.21					
Fluoranthene	ND	ug/l	0.21					
Naphthalene	0.24	ug/l	0.21					
Benzo(a)anthracene	ND	ug/l	0.21					
Benzo(a)pyrene	ND	ug/l	0.21					
Benzo(b)fluoranthene	ND	ug/l	0.21					
Benzo(k)fluoranthene	ND	ug/l	0.21					
Chrysene	ND	ug/l	0.21					
Acenaphthylene	ND	ug/l	0.21					
Anthracene	ND	ug/l	0.21					
Benzo(ghi)perylene	ND	ug/l	0.21					
Fluorene	0.21	ug/l	0.21					
Phenanthrene	ND	ug/l	0.21					
Dibenzo(a,h)anthracene	ND	ug/l	0.21					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.21					
Pyrene	ND	ug/l	0.21					
1-Methylnaphthalene	0.67	ug/l	0.21					
2-Methylnaphthalene	0.30	ug/l	0.21					
Perylene	ND	ug/l	0.21					
Biphenyl	2.2	ug/l	0.21					
Benzo(e)Pyrene	ND	ug/l	0.21					
Surrogate Recovery								
Nitrobenzene-d5	69.0	%						
2-Fluorobiphenyl	74.0	%						
4-Terphenyl-d14	84.0	%						
BN SVOC's by GC/MS 8270				1	8270C	1219 11:30	1221 21:04	MK
Acenaphthene	16.	ug/l	5.3					
1,2,4-Trichlorobenzene	ND	ug/l	5.3					
Hexachlorobenzene	ND	ug/l	5.3					
Bis(2-chloroethyl)ether	ND	ug/l	5.3					
1-Chloronaphthalene	ND	ug/l	5.3					
2-Chloronaphthalene	ND	ug/l	5.3					
1,2-Dichlorobenzene	ND	ug/l	5.3					
1,3-Dichlorobenzene	ND	ug/l	5.3					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0011726-04
GW-1-AB

PARAMETER	RESULT	UNITS	RDL	REF METHOD	DATE PREP	DATE ANAL	ID
BN SVOC's by GC/MS 8270 continued				1 8270C	1219 11:30	1221 21:04	MK
1,4-Dichlorobenzene	ND	ug/l	5.3				
2,4-Dinitrotoluene	ND	ug/l	5.3				
2,6-Dinitrotoluene	ND	ug/l	5.3				
Azobenzene	ND	ug/l	5.3				
Fluoranthene	ND	ug/l	5.3				
4-Chlorophenyl phenyl ether	ND	ug/l	5.3				
4-Bromophenyl phenyl ether	ND	ug/l	5.3				
Bis(2-chloroisopropyl)ether	ND	ug/l	5.3				
Bis(2-chloroethoxy)methane	ND	ug/l	5.3				
Hexachlorocyclopentadiene	ND	ug/l	10.				
Hexachloroethane	ND	ug/l	5.3				
Isophorone	ND	ug/l	5.3				
Naphthalene	ND	ug/l	5.3				
Nitrobenzene	ND	ug/l	5.3				
NDPA/DPA	ND	ug/l	5.3				
n-Nitrosodi-n-propylamine	ND	ug/l	5.3				
Bis(2-ethylhexyl)phthalate	ND	ug/l	10.				
Butyl benzyl phthalate	ND	ug/l	5.3				
Di-n-butylphthalate	ND	ug/l	5.3				
Di-n-octylphthalate	ND	ug/l	5.3				
Diethyl phthalate	ND	ug/l	5.3				
Dimethyl phthalate	ND	ug/l	5.3				
Benzo(a)anthracene	ND	ug/l	5.3				
Benzo(a)pyrene	ND	ug/l	5.3				
Benzo(b)fluoranthene	ND	ug/l	5.3				
Benzo(k)fluoranthene	ND	ug/l	5.3				
Chrysene	ND	ug/l	5.3				
Acenaphthylene	ND	ug/l	5.3				
Anthracene	ND	ug/l	5.3				
Benzo(ghi)perylene	ND	ug/l	5.3				
Fluorene	ND	ug/l	5.3				
Phenanthrene	ND	ug/l	5.3				
Dibenzo(a,h)anthracene	ND	ug/l	5.3				
Indeno(1,2,3-cd)pyrene	ND	ug/l	5.3				
Pyrene	ND	ug/l	5.3				
Benzo(e)pyrene	ND	ug/l	5.3				
Biphenyl	ND	ug/l	5.3				
Perylene	ND	ug/l	5.3				
Aniline	ND	ug/l	10.				
4-Chloroaniline	ND	ug/l	5.3				
1-Methylnaphthalene	ND	ug/l	5.3				
2-Nitroaniline	ND	ug/l	5.3				
3-Nitroaniline	ND	ug/l	5.3				
4-Nitroaniline	ND	ug/l	5.3				
Hexachloropropene	ND	ug/l	53.				
Nitrosodi-n-butylamine	ND	ug/l	10.				
2-Methylnaphthalene	ND	ug/l	5.3				
1,2,4,5-Tetrachlorobenzene	ND	ug/l	21.				
Pentachlorobenzene	ND	ug/l	21.				

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

MA:M-MA-086 NH:200395-B/C CT:PH-0574 ME:MA086 RI:65

Laboratory Sample Number: L0011726-05
GW-1-CD
Sample Matrix: WATER

Date Collected: 18-DEC-2000 15:00
Date Received : 18-DEC-2000
Date Reported : 23-JAN-2001

Condition of Sample: Satisfactory

Field Prep: None

Number & Type of Containers: 2-Amber

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
PAH by GC/MS SIM 8270M				1	8270C-M	1219 11:30	1222 20:25	MK
Acenaphthene	1.8	ug/l	0.22					
2-Chloronaphthalene	ND	ug/l	0.22					
Fluoranthene	ND	ug/l	0.22					
Naphthalene	ND	ug/l	0.22					
Benzo(a)anthracene	ND	ug/l	0.22					
Benzo(a)pyrene	ND	ug/l	0.22					
Benzo(b)fluoranthene	ND	ug/l	0.22					
Benzo(k)fluoranthene	ND	ug/l	0.22					
Chrysene	ND	ug/l	0.22					
Acenaphthylene	ND	ug/l	0.22					
Anthracene	ND	ug/l	0.22					
Benzo(ghi)perylene	ND	ug/l	0.22					
Fluorene	ND	ug/l	0.22					
Phenanthrene	ND	ug/l	0.22					
Dibenzo(a,h)anthracene	ND	ug/l	0.22					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.22					
Pyrene	ND	ug/l	0.22					
1-Methylnaphthalene	ND	ug/l	0.22					
2-Methylnaphthalene	0.36	ug/l	0.22					
Perylene	ND	ug/l	0.22					
Biphenyl	ND	ug/l	0.22					
Benzo(e)Pyrene	ND	ug/l	0.22					
Surrogate Recovery								
Nitrobenzene-d5	79.0	%						
2-Fluorobiphenyl	77.0	%						
4-Terphenyl-d14	78.0	%						
BN SVOC's by GC/MS 8270				1	8270C	1219 11:30	1221 21:45	MK
Acenaphthene	ND	ug/l	5.4					
1,2,4-Trichlorobenzene	ND	ug/l	5.4					
Hexachlorobenzene	ND	ug/l	5.4					
Bis(2-chloroethyl)ether	ND	ug/l	5.4					
1-Chloronaphthalene	ND	ug/l	5.4					
2-Chloronaphthalene	ND	ug/l	5.4					
1,2-Dichlorobenzene	ND	ug/l	5.4					
1,3-Dichlorobenzene	ND	ug/l	5.4					

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
CERTIFICATE OF ANALYSIS

Laboratory Sample Number: L0011726-05
GW-1-CD

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
BN SVOC's by GC/MS 8270 continued				1	8270C	1219 11:30	1221 21:45	MK
1,4-Dichlorobenzene	ND	ug/l	5.4					
2,4-Dinitrotoluene	ND	ug/l	5.4					
2,6-Dinitrotoluene	ND	ug/l	5.4					
Azobenzene	ND	ug/l	5.4					
Fluoranthene	ND	ug/l	5.4					
4-Chlorophenyl phenyl ether	ND	ug/l	5.4					
4-Bromophenyl phenyl ether	ND	ug/l	5.4					
Bis(2-chloroisopropyl)ether	ND	ug/l	5.4					
Bis(2-chloroethoxy)methane	ND	ug/l	5.4					
Hexachlorocyclopentadiene	ND	ug/l	11.					
Hexachloroethane	ND	ug/l	5.4					
Isophorone	ND	ug/l	5.4					
Naphthalene	ND	ug/l	5.4					
Nitrobenzene	ND	ug/l	5.4					
NDPA/DPA	ND	ug/l	5.4					
n-Nitrosodi-n-propylamine	ND	ug/l	5.4					
Bis(2-ethylhexyl)phthalate	ND	ug/l	11.					
Butyl benzyl phthalate	ND	ug/l	5.4					
Di-n-butylphthalate	ND	ug/l	5.4					
Di-n-octylphthalate	ND	ug/l	5.4					
Diethyl phthalate	ND	ug/l	5.4					
Dimethyl phthalate	ND	ug/l	5.4					
Benzo(a)anthracene	ND	ug/l	5.4					
Benzo(a)pyrene	ND	ug/l	5.4					
Benzo(b)fluoranthene	ND	ug/l	5.4					
Benzo(k)fluoranthene	ND	ug/l	5.4					
Chrysene	ND	ug/l	5.4					
Acenaphthylene	ND	ug/l	5.4					
Anthracene	ND	ug/l	5.4					
Benzo(ghi)perylene	ND	ug/l	5.4					
Fluorene	ND	ug/l	5.4					
Phenanthrene	ND	ug/l	5.4					
Dibenzo(a,h)anthracene	ND	ug/l	5.4					
Indeno(1,2,3-cd)pyrene	ND	ug/l	5.4					
Pyrene	ND	ug/l	5.4					
Benzo(e)pyrene	ND	ug/l	5.4					
Biphenyl	ND	ug/l	5.4					
Perylene	ND	ug/l	5.4					
Aniline	ND	ug/l	11.					
4-Chloroaniline	ND	ug/l	5.4					
1-Methylnaphthalene	ND	ug/l	5.4					
2-Nitroaniline	ND	ug/l	5.4					
3-Nitroaniline	ND	ug/l	5.4					
4-Nitroaniline	ND	ug/l	5.4					
Hexachloropropene	ND	ug/l	54.					
Nitrosodi-n-butylamine	ND	ug/l	11.					
2-Methylnaphthalene	ND	ug/l	5.4					
1,2,4,5-Tetrachlorobenzene	ND	ug/l	22.					
Pentachlorobenzene	ND	ug/l	22.					

Comments: Complete list of References and Glossary of Terms found in Addendum I

Laboratory Sample Number: L0011726-05
GW-1-CD

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
BN SVOC's by GC/MS 8270 continued				1	8270C	1219 11:30	1221 21:45	MK
Phenacetin	ND	ug/l	11.					
Dimethoate	ND	ug/l	22.					
4-Aminobiphenyl	ND	ug/l	11.					
Pentachloronitrobenzene	ND	ug/l	11.					
Isodrin	ND	ug/l	11.					
p-Dimethylaminoazobenzene	ND	ug/l	11.					
Chlorobenzilate	ND	ug/l	22.					
3-Methylcholanthrene	ND	ug/l	22.					
Acetophenone	ND	ug/l	22.					
Nitrosodipiperidine	ND	ug/l	22.					
7,12-Dimethylbenz(a)anthracene	ND	ug/l	11.					
n-Nitrosodimethylamine	ND	ug/l	54.					
Surrogate Recovery								
Nitrobenzene-d5	86.0	%						
2-Fluorobiphenyl	90.0	%						
4-Terphenyl-d14	78.0	%						

Comments: Complete list of References and Glossary of Terms found in Addendum I

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH SPIKE ANALYSES

Laboratory Job Number: L0011726

Parameter	% Recovery
PAH by GC/MS SIM 8270M LCS for sample(s) 01-05 (WG72533)	
Acenaphthene	85
Benzo(b)fluoranthene	110
Benzo(k)fluoranthene	87
Pyrene	100
Surrogate Recovery	
Nitrobenzene-d5	79
2-Fluorobiphenyl	78
4-Terphenyl-d14	101
BN SVOC's by GC/MS 8270 LCS for sample(s) 01-05 (WG72716)	
Acenaphthene	96
1,2,4-Trichlorobenzene	86
1,4-Dichlorobenzene	66
2,4-Dinitrotoluene	120
Azobenzene	110
Bis(2-chloroisopropyl)ether	69
Isophorone	79
Nitrobenzene	95
n-Nitrosodi-n-propylamine	75
Benzo(b)fluoranthene	96
Benzo(k)fluoranthene	94
Pyrene	110
Surrogate Recovery	
Nitrobenzene-d5	70
2-Fluorobiphenyl	95
4-Terphenyl-d14	104

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH MS/MSD ANALYSIS

Laboratory Job Number: L0011726

Parameter	MS %	MSD %	RPD
PAH by GC/MS SIM 8270M for sample(s) 01-05 (L0011726-01, WG72533)			
Acenaphthene	95	85	11
Benzo(b)fluoranthene	55	48	14
Benzo(k)fluoranthene	47	42	11
Pyrene	100	90	11
BN SVOC's by GC/MS 8270 for sample(s) 01-05 (L0011726-01, WG72716)			
Acenaphthene	95	95	0
1,2,4-Trichlorobenzene	85	85	0
1,4-Dichlorobenzene	75	80	6
2,4-Dinitrotoluene	120	110	9
Azobenzene	110	100	10
Bis(2-chloroisopropyl)ether	80	85	6
Isophorone	95	95	0
Nitrobenzene	110	100	10
n-Nitrosodi-n-propylamine	95	85	11
Benzo(b)fluoranthene	48	45	6
Benzo(k)fluoranthene	46	44	4
Pyrene	100	95	5

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0011726

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-05								
PAH by GC/MS SIM 8270M				1	8270C-M	1219 11:30	1222 15:09	MK
Acenaphthene	ND	ug/l	0.20					
2-Chloronaphthalene	ND	ug/l	0.20					
Fluoranthene	ND	ug/l	0.20					
Naphthalene	ND	ug/l	0.20					
Benzo(a)anthracene	ND	ug/l	0.20					
Benzo(a)pyrene	ND	ug/l	0.20					
Benzo(b)fluoranthene	ND	ug/l	0.20					
Benzo(k)fluoranthene	ND	ug/l	0.20					
Chrysene	ND	ug/l	0.20					
Acenaphthylene	ND	ug/l	0.20					
Anthracene	ND	ug/l	0.20					
Benzo(ghi)perylene	ND	ug/l	0.20					
Fluorene	ND	ug/l	0.20					
Phenanthrene	ND	ug/l	0.20					
Dibenzo(a,h)anthracene	ND	ug/l	0.20					
Indeno(1,2,3-cd)Pyrene	ND	ug/l	0.20					
Pyrene	ND	ug/l	0.20					
1-Methylnaphthalene	ND	ug/l	0.20					
2-Methylnaphthalene	ND	ug/l	0.20					
Perylene	ND	ug/l	0.20					
Biphenyl	ND	ug/l	0.20					
Benzo(e)Pyrene	ND	ug/l	0.20					
Surrogate Recovery								
Nitrobenzene-d5	77.0	%						
2-Fluorobiphenyl	82.0	%						
4-Terphenyl-d14	98.0	%						
Blank Analysis for sample(s) 01-05								
BN SVOC's by GC/MS 8270				1	8270C	1219 11:30	1221 18:19	MK
Acenaphthene	ND	ug/l	5.0					
1,2,4-Trichlorobenzene	ND	ug/l	5.0					
Hexachlorobenzene	ND	ug/l	5.0					
Bis(2-chloroethyl)ether	ND	ug/l	5.0					
1-Chloronaphthalene	ND	ug/l	5.0					
2-Chloronaphthalene	ND	ug/l	5.0					
1,2-Dichlorobenzene	ND	ug/l	5.0					
1,3-Dichlorobenzene	ND	ug/l	5.0					
1,4-Dichlorobenzene	ND	ug/l	5.0					
2,4-Dinitrotoluene	ND	ug/l	5.0					
2,6-Dinitrotoluene	ND	ug/l	5.0					
Azobenzene	ND	ug/l	5.0					
Fluoranthene	ND	ug/l	5.0					
4-Chlorophenyl phenyl ether	ND	ug/l	5.0					
4-Bromophenyl phenyl ether	ND	ug/l	5.0					
Bis(2-chloroisopropyl)ether	ND	ug/l	5.0					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0011726

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-05								
BN SVOC's by GC/MS 8270 continued				1	8270C	1219 11:30	1221 18:19	MK
Bis(2-chloroethoxy)methane	ND	ug/l	5.0					
Hexachlorocyclopentadiene	ND	ug/l	10.					
Hexachloroethane	ND	ug/l	5.0					
Isophorone	ND	ug/l	5.0					
Naphthalene	ND	ug/l	5.0					
Nitrobenzene	ND	ug/l	5.0					
NDPA/DPA	ND	ug/l	5.0					
n-Nitrosodi-n-propylamine	ND	ug/l	5.0					
Bis(2-ethylhexyl)phthalate	300	ug/l	10.					
Butyl benzyl phthalate	ND	ug/l	5.0					
Di-n-butylphthalate	ND	ug/l	5.0					
Di-n-octylphthalate	ND	ug/l	5.0					
Diethyl phthalate	ND	ug/l	5.0					
Dimethyl phthalate	ND	ug/l	5.0					
Benzo(a)anthracene	ND	ug/l	5.0					
Benzo(a)pyrene	ND	ug/l	5.0					
Benzo(b)fluoranthene	ND	ug/l	5.0					
Benzo(k)fluoranthene	ND	ug/l	5.0					
Chrysene	ND	ug/l	5.0					
Acenaphthylene	ND	ug/l	5.0					
Anthracene	ND	ug/l	5.0					
Benzo(ghi)perylene	ND	ug/l	5.0					
Fluorene	ND	ug/l	5.0					
Phenanthrene	ND	ug/l	5.0					
Dibenzo(a,h)anthracene	ND	ug/l	5.0					
Indeno(1,2,3-cd)pyrene	ND	ug/l	5.0					
Pyrene	ND	ug/l	5.0					
Benzo(e)pyrene	ND	ug/l	5.0					
Biphenyl	ND	ug/l	5.0					
Perylene	ND	ug/l	5.0					
Aniline	ND	ug/l	10.					
4-Chloroaniline	ND	ug/l	5.0					
1-Methylnaphthalene	ND	ug/l	5.0					
2-Nitroaniline	ND	ug/l	5.0					
3-Nitroaniline	ND	ug/l	5.0					
4-Nitroaniline	ND	ug/l	5.0					
Hexachloropropene	ND	ug/l	50.					
Nitrosodi-n-butylamine	ND	ug/l	10.					
2-Methylnaphthalene	ND	ug/l	5.0					
1,2,4,5-Tetrachlorobenzene	ND	ug/l	20.					
Pentachlorobenzene	ND	ug/l	20.					
Phenacetin	ND	ug/l	10.					
Dimethoate	ND	ug/l	20.					
4-Aminobiphenyl	ND	ug/l	10.					
Pentachloronitrobenzene	ND	ug/l	10.					
Isodrin	ND	ug/l	10.					
p-Dimethylaminoazobenzene	ND	ug/l	10.					

ALPHA ANALYTICAL LABORATORIES
QUALITY ASSURANCE BATCH BLANK ANALYSIS

Laboratory Job Number: L0011726

Continued

PARAMETER	RESULT	UNITS	RDL	REF	METHOD	DATE PREP	DATE ANAL	ID
Blank Analysis for sample(s) 01-05								
BN SVOC's by GC/MS 8270 continued				1	8270C	1219 11:30	1221 18:19	MK
Chlorobenzilate	ND	ug/l	20.					
3-Methylcholanthrene	ND	ug/l	20.					
Acetophenone	ND	ug/l	20.					
Nitrosodipiperidine	ND	ug/l	20.					
7,12-Dimethylbenz(a)anthracene	ND	ug/l	10.					
n-Nitrosodimethylamine	ND	ug/l	50.					
Surrogate Recovery								
Nitrobenzene-d5	83.0	%						
2-Fluorobiphenyl	90.0	%						
4-Terphenyl-d14	102.	%						

REFERENCES

1. Test Methods for Evaluating Solid Waste: Physical/Chemical Methods. EPA SW-846. Update III, 1997.

GLOSSARY OF TERMS AND SYMBOLS

REF Reference number in which test method may be found.

METHOD Method number by which analysis was performed.

ID Initials of the analyst.

LIMITATION OF LIABILITIES

Alpha Analytical, Inc. performs services with reasonable care and diligence normal to the analytical testing laboratory industry. In the event of an error, the sole and exclusive responsibility of Alpha Analytical, Inc., shall be to re-perform the work at it's own expense. In no event shall Alpha Analytical, Inc. be held liable for any incidental consequential or special damages, including but not limited to, damages in any way connected with the use of, interpretation of, information or analysis provided by Alpha Analytical, Inc.

We strongly urge our clients to comply with EPA protocol regarding sample volume, preservation, cooling, containers, sampling procedures, holding times and splitting of samples in the field.

attachment 1

Quality Control Acceptance Criteria

Volatile Organics by Method 8260B

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
1,2-Dichloroethane-d_4	75%	125%	75%	125%	
4-Bromofluorobenzene	75%	125%	75%	125%	
Toluene-d_8	75%	125%	75%	125%	
Dibromofluoromethane	75%	125%	75%	125%	
matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	**percent recovery**				**duplicate and/or MSD**
	AQ Limits		**Soil Limits**		**AQ Limits RPD / Soil Limits RPD**
	LCL	UCL	LCL	UCL	
1,1-Dichloroethene	61%	145%	59%	172%	all target compounds
Trichloroethene	71%	120%	62%	137%	20% / 30%
Chlorobenzene	75%	130%	60%	133%	
Benzene	76%	127%	66%	142%	
Toluene	76%	125%	59%	139%	

Volatile Organics by Method 8021B

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
4-Bromochlorobenzene	70%	110%	70%	120%	
4-Bromofluorobenzene	70%	110%	70%	120%	
matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	**percent recovery**				**duplicate and/or MSD**
	AQ Limits		**Soil Limits**		**AQ Limits RPD / Soil Limits RPD**
	LCL	UCL	LCL	UCL	
1,1-Dichloroethene	70%	130%	70%	130%	all target compounds
Trichloroethene	70%	130%	70%	130%	20% / 30%
Chlorobenzene	70%	130%	70%	130%	
Benzene	70%	130%	70%	130%	
Toluene	70%	130%	70%	130%	
Ethylbenzene	70%	130%	70%	130%	

Semi-Volatile Organics by Method 8270C (includes PAHs)

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
Nitrobenzene-d_5	23%	120%	23%	120%	
Phenol-d_6	10%	120%	10%	120%	
2-Fluorophenol	21%	120%	25%	120%	
2-Fluorobiphenyl	43%	120%	30%	120%	
p-Terphenyl-d_{14}	33%	120%	18%	120%	
2,4,6-Tribromophenol	10%	120%	19%	120%	
matrix spike / matrix spike duplicate (MS/MSD) & lab control sample (LCS)	**percent recovery**				**duplicate and/or MSD**
	AQ Limits		**Soil Limits**		**AQ Limits RPD / Soil Limits RPD**
	LCL	UCL	LCL	UCL	
1,2,4-Trichlorobenzene	39%	98%	38%	107%	all target compounds
Acenaphthene	46%	118%	31%	137%	40% / 50%
2,4-Dinitrotoluene	24%	96%	28%	89%	
Pyrene	26%	127%	35%	142%	
N-Nitroso-di-n-propylamine	41%	116%	41%	126%	
1,4-Dichlorobenzene	36%	97%	28%	104%	
Pentachlorophenol	9%	103%	17%	109%	
Phenol	12%	110%	26%	90%	
2-Chlorophenol	27%	123%	25%	102%	
4-Chloro-3-methylphenol	23%	97%	26%	103%	
4-Nitrophenol	10%	80%	11%	114%	

attachment 1

Quality Control Acceptance Criteria

PCB/Pesticides by Method 8082/8081

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
2,4,5,6-Tetrachloro-m-xylene	40%	120%	40%	120%	
Decachlorobiphenyl	40%	120%	40%	120%	
matrix spike / matrix spike duplicate	**percent recovery**				**duplicate and/or MSD**
(MS/MSD) & lab control sample (LCS)	**AQ Limits**		**Soil Limits**		**AQ Limits Soil Limits**
	LCL	UCL	LCL	UCL	RPD RPD
Lindane	56%	123%	46%	127%	all target compounds
Heptachlor	40%	131%	35%	130%	30% 50%
Aldrin	40%	120%	34%	132%	
Dieldrin	52%	126%	31%	134%	
Endrin	56%	121%	42%	139%	
4,4'-DDT	38%	127%	23%	134%	
Aroclor 1242/1016	40%	140%	40%	140%	
Aroclor 1260	40%	140%	40%	140%	

Volatile Petroleum Hydrocarbons (VPH) by MA DEP 98-1

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
2,5-Dibromotoluene	70%	130%	70%	130%	
	percent recovery				**duplicate**
laboratory control sample (LCS)	**AQ Limits**		**Soil Limits**		**AQ Limits Soil Limits**
	LCL	UCL	LCL	UCL	RPD RPD
all compounds	70%	130%	70%	130%	50% 50%

Extractable Petroleum Hydrocarbons (EPH) by MA DEP 98-1

surrogate spike % recovery	AQ Limits		Soil Limits		
	LCL	UCL	LCL	UCL	
Chloro-octadecane	40%	140%	40%	140%	
ortho-Terphenyl	40%	140%	40%	140%	
2-Fluorobiphenyl (fractionation)	40%	140%	40%	140%	
2-Bromonaphthalene (fractionation)	40%	140%	40%	140%	
	percent recovery				**duplicate**
laboratory control sample (LCS)	**AQ Limits**		**Soil Limits**		**AQ Limits Soil Limits**
	LCL	UCL	LCL	UCL	RPD RPD
all compounds	40%	140%	40%	140%	50% 50%

TPH (GC-FID) by Method 8100M

surrogate spike % recovery	AQ Limits		Soil Limits		duplicate
	LCL	UCL	LCL	UCL	AQ Limits Soil Limits RPD RPD
ortho-Terphenyl	40%	140%	40%	140%	40% 40%

TPH by Method 418.1

matrix spike (MS)	percent recovery				duplicate
& laboratory control sample (LCS)	AQ Limits		Soil Limits		AQ Limits Soil Limits
	LCL	UCL	LCL	UCL	RPD RPD
TPH	60%	140%	60%	140%	40% 40%

attachment 1

Quality Control Acceptance Criteria

Trace Metals by Method 6010B/7000 series

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
target analyte	75%	125%	70%	140%	20%	35%

Mercury by Method 7470A/7471A

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
mercury	70%	130%	60%	140%	35%	45%

Total Cyanide by Method 9010B

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
cyanide	80%	120%	65%	135%	30%	40%

Total Phenol by Method 9065

matrix spike (MS) & laboratory control sample (LCS)	percent recovery				duplicate	
	AQ Limits		Soil Limits		AQ Limits	Soil Limits
	LCL	UCL	LCL	UCL	RPD	RPD
phenol	70%	130%	65%	135%	20%	30%

ALPHA Analytical Laboratories, Inc.

Eight Walkup Drive Westborough, MA 01581

PH: 508.898.9220 FAX: 508.898.9193 www.alphalab.com

CHAIN OF CUSTODY

№ 1235

Sheet 1 of 1

ALPHA Job #: 061726

Date Rec'd in Lab: 12/18

Date Due: 2/26

Client Name: CDM

Client Address: 1 Cambridge Place, Cambridge MA

Phone #: 6174526000 FAX #: 6174528000

Project Name: Bixley Mills

Project Location: Norfolk MA

Project #:

Project Manager: Bob Danger

Report To: Bob Danger

Bill To: Same

PO#:

☐ Standard TAT

☐ RUSH TAT____ (# DAYS)

☐ FAX Results

☐ State Forms

☐ Smart Report

Comments (Please note specific method, detection limit or reporting requirements.)

ANALYSIS REQUEST

ALPHA Lab #	Sample ID	Matrix/Source *	Sampling Date	Sampling Time	Sampler's Initials	Solubles: Field Filtered? (Y/N)	Target PAHs 8270 via SIM	B/N Ext's 8270C
061726-1	GW-2-AB	GW	12/18	1330	BCM		✓	✓
-2	GW-2-CD	GW	12/18	1345	BCM		✓	✓
-3	GW-0-AB	GW	12/18	1400	BCM		✓	✓
-4	GW-1-AB	GW	12/18	1430	BCM		✓	✓
-5	GW-1-CD	GW	12/18	1500	BCM		✓	✓
	# of Containers:						5	5
	Container Type: *						A	A
	Preservative: *						A	A

Transfers Accepted By: Date 12/18 Time 1610

Transfers Relinquished By: Date 12/18 Time 1835

All samples submitted are subject to Alpha's standard Terms and Conditions.

* See Reverse side for Matrix, Container, and Preservative Codes.

Form No.: 01-01

APPENDIX I

AUL FORM 1075
AUL OPINION
BWSC-114

AS RECORDED AT THE NORFOLK COUNTY LAND COURT

BUCKLEY & MANN INC., NORFOLK, MA. MCP SITE 3-0173

Form 1075

Notice of Activity and Use Limitation
M.G.L. 21E §6 and 310 CMR 40.0000

Disposal Site Name: Buckley & Mann Inc.

DEP Release Tracking No.(s): 3-0173

This Notice of Activity and Use Limitation ("Notice") is made as of this 17th day of August, 2001, by the, Buckley & Mann Inc., Richard Mann, President, 11 Northwood Drive, Walpole, , Massachusetts 02081, together with its successors and assigns (collectively "Owner").

WITNESSETH

WHEREAS, Buckley & Mann Inc., Norfolk County, Massachusetts, is the Owner in fee simple of that certain parcel of land located in Norfolk, Norfolk County, Massachusetts, with the buildings and improvements thereon ("Property").

WHEREAS, said parcel of land, which is more particularly bounded and described in Exhibit A, attached hereto and made a part hereof ("Property") is subject to this Notice of Activity and Use Limitation. The Property is shown on a plan registered in Norfolk County Land Registration Office, Certificate Of Title No. 154753, Book 774, Page 153.

WHEREAS, a portion of the Property ("Portion of the Property") is subject to this Notice of Activity and Use Limitation. The Portion of the Property is more particularly bounded and described in Exhibit A-1, and shown in plans Exhibit A-2 and Exhibit A-3, attached hereto and made a part hereof.

WHEREAS, the Property comprises part of a disposal site as the result of a release of oil and/or hazardous material. Exhibit B is a sketch plan showing the relationship of the Portion of the Property subject to this Notice of Activity and Use Limitation to the boundaries of said disposal site (to the extent such boundaries have been established). Exhibit B is attached hereto and made a part hereof; and

WHEREAS, one or more response actions have been selected for the Disposal Site in accordance with M.G.L. c. 21E ("Chapter 21E") and the Massachusetts Contingency Plan, 310 CMR 40.0000 ("MCP"). Said response actions are based upon (a) the restriction of human access to and contact with oil and/or hazardous material in soil and/or (b) the restriction of certain activities occurring in, on, through, over or under the Property. The basis for such restrictions is set forth in an Activity and Use Limitation Opinion ("AUL Opinion"), dated August 17, 2001, (which is attached hereto as Exhibit C and made a part hereof). **See also DEP Form BWSC-114, attached hereto as Exhibit D.**

NOW, THEREFORE, notice is hereby given that the activity and use limitations set forth in said AUL Opinion are as follows:

1A. Permitted Activities and Uses Set Forth in the AUL Opinion for the former landfill area east of the Tail Race, Subarea A. The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare, or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as the following activities and uses occur on the Property:

i) Passive and active recreational activities including, but not necessarily limited to, activity on the

grassed area for children, sitting on benches or sitting or lying on the ground surface;

ii) Maintenance of grassed areas, planting and seeding up to a depth of three feet below ground surface, installation of fencing with intrusion limited to driving of posts;

iii) Utility maintenance work either not involving soil excavation and removal, or involving soil excavation to a depth of no greater than three feet below ground surface;

iv) Emergency utility repair work, lasting no longer than eight consecutive hours and involving the excavation of no more than twenty (20) cubic yards of soil from depths of greater than three feet below ground surface. Such excavated soil must be returned to depth in its entirety at the conclusion of the repair work. The protective barrier layer, which includes a woven geotextile and three feet of overlying soils, must be replaced with a protective barrier layer of like and comparable construction, materials and specifications immediately following completion of the repair work. If soil removal from the site is to occur or the activity will occur for a duration greater than eight consecutive hours and/or more than twenty (20) cubic yards of soil from depths greater than three feet below ground surface are to be excavated, a Health and Safety Plan to address potential exposures and a Soil Management Plan must be developed;

(v) Non-invasive activities and uses which do not disturb or compromise the structural integrity of the protective barrier layer and the underlying contaminated soils; and

(vi) Such other activities or uses not listed above, but which as given in written or oral opinion by an LSP, shall present no greater risk of harm to health, safety, public welfare, or the environment than the activities and uses set forth in this paragraph.

1B. Permitted Activities and Uses Set Forth in the AUL Opinion for the former wastewater treatment lagoons west of the Tail Race, Subarea B. The AUL Opinion provides that a condition of No Significant Risk to health, safety, public welfare, or the environment exists for any foreseeable period of time (pursuant to 310 CMR 40.0000) so long as the following activities and uses occur on the Property:

(i) Passive recreational activities including, but not necessarily limited to, walking and bird watching;

(ii) Use of the lagoons as stormwater runoff storage ponds;

(iii) Utility maintenance lasting no longer than eight consecutive hours and involving the excavation of no more than twenty (20) cubic yards of soil. Such excavated soil must be returned to the lagoon at the conclusion of the repair work. If soil removal from the site is to occur or the activity will occur for a duration greater than eight consecutive hours and/or more than twenty (20) cubic yards of soil are to be excavated, a Soil Management Plan must be developed; and

(iv) Such other activities or uses not listed above, but which as given in written or oral opinion by an LSP, shall present no greater risk of harm to health, safety, public welfare, or the environment than the activities and uses set forth in this paragraph.

2A. Activities and Uses Inconsistent with the AUL Opinion for the former landfill area east of the Tail Race, Subarea A. Activities and uses which are inconsistent with the objectives of this Notice of

Activity and Use Limitation, and which, if implemented at the Property, may result in a significant risk of harm to health, safety, public welfare, or the environment or in a substantial hazard, are as follows:

(i) Excavation of soils at a depth of greater than three feet below ground surface, except as described in 1A (iv) above. Such non-emergency invasive subsurface activities, which may be part of utility repair or maintenance, or construction, cannot be performed without the involvement of an LSP, and must be conducted in accordance with the Massachusetts Contingency Plan and applicable DEP policies appropriate to the protection of human health and the environment.

(ii) Any activities and uses which may cause physical, chemical, or structural damage to the protective barrier layer in the designated AUL area, except those conducted in accordance with Obligation (i) of this Notice of AUL.

(iii) Any activities otherwise prohibited by Zoning, Bylaws, other regulatory programs, or deed restriction, unless permitted by the appropriate governmental body.

2B. Activities and Uses Inconsistent with the AUL Opinion for the former wastewater treatment lagoons west of the Tail Race, Subarea B. Activities and uses which are inconsistent with the objectives of this Notice of Activity and Use Limitation, and which, if implemented at the Property, may result in a significant risk of harm to health, safety, public welfare, or the environment or in a substantial hazard, are as follows:

(i) Excavation of soil, except as described in 1B (iii) above. Such non-emergency invasive subsurface activities, which may be part of utility repair or maintenance, or construction, cannot be performed without the involvement of an LSP, and must be conducted in accordance with the Massachusetts Contingency Plan and applicable DEP policies appropriate to the protection of human health and the environment.

ii) Any activities otherwise prohibited by Zoning, Bylaws, other regulatory programs, or deed restriction, unless permitted by the appropriate governmental body.

3A. Obligations and Conditions Set Forth in the AUL Opinion for the former landfill area east of the Tail Race, Subarea A. If applicable, obligations and/or conditions to be undertaken and/or maintained at the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

i) The performance of any activities including, but not limited to, excavation which could cause the removal, damage, and/or disturbance of the protective barrier layer and/or contaminated soil located beneath it without the prior development and implementation of a Health and Safety Plan and a Soil Management Plan in accordance with the guidelines discussed in the AUL Opinion attached hereto as Exhibit C to this Notice of AUL;

ii) The integrity of the protective barrier layer within the designated AUL area must be maintained and inspected on at least an annual basis to verify its ability to effectively prevent exposure(s) to underlying contaminated soil via dermal contact, ingestion, and/or inhalation; and

(iii) The contaminated soil must remain beneath the protective barrier within the designated AUL to prevent exposures via dermal contact, ingestion, and/or inhalation.

iv) The Property Owner will be solely responsible for compliance with this Notice of Activity and Use Limitation and the restrictions imposed herein.

3B. Obligations and Conditions Set Forth in the AUL Opinion for the former wastewater treatment lagoons west of the Tail Race, Subarea B. If applicable, obligations and/or conditions to be undertaken and/or maintained at the Property to maintain a condition of No Significant Risk as set forth in the AUL Opinion shall include the following:

i) The performance of any activities including, but not limited to, excavation which could cause the removal, damage, and/or disturbance of the soil located in the lagoons without the prior development and implementation of a Soil Management Plan in accordance with the guidelines discussed in the AUL Opinion attached hereto as Exhibit C to this Notice of AUL.

ii) The Property Owner will be solely responsible for compliance with this Notice of Activity and Use Limitation and the restrictions imposed herein.

4. Proposed Changes in Activities and Uses. Any proposed changes in activities and uses at the Property which may result in higher levels of exposure to oil and/or hazardous material than currently exist shall be evaluated by an LSP who shall render an Opinion, in accordance with 310 CMR 40.1080 *et seq.*, as to whether the proposed changes will present a significant risk of harm to health, safety, public welfare or the environment. Any and all requirements set forth in the Opinion to meet the objective of this Notice shall be satisfied before any such activity or use is commenced.

5. Violation of a Response Action Outcome. The activities, uses and/or exposures upon which this Notice is based shall not change at any time to cause a significant risk of harm to health, safety, public welfare, or the environment or to create substantial hazards due to exposure to oil and/or hazardous material with the prior evaluation by an LSP in accordance with 310 CMR 40.1080 *et seq.*, and without additional response actions, if necessary, to achieve or maintain a condition of No Significant Risk or to eliminate substantial hazards.

If the activities, uses and/or exposures upon which this Notice is based change without the prior evaluation and additional response actions determined to be necessary by an LSP in accordance with 310 CMR 40.1080 *et seq.*, the owner and operator of the Property subject to this Notice at the time that the activities, uses and/or exposures change, shall comply with the requirements set forth in 310 CMR 40.0020.

6. Incorporation Into Deeds, Mortgages, Leases and Instruments of Transfer. This Notice shall be incorporated either in full or by reference into all deeds, easements, mortgages, leases, licenses, occupancy agreements or any other instrument of transfer, whereby an interest in and/or a right to use the Property or a portion thereof is conveyed.

Owner hereby authorizes and consents to the filing and registration of this Notice, said Notice to become effective when executed under seal by the undersigned LSP, and registered with the appropriate Land Registration Office.

WITNESS the execution hereof under seal this 17TH day of AUGUST, 2001.

OWNER: Buckley & Mann Inc.

BY: _____
Richard Mann, President + Treasurer

COMMONWEALTH OF MASSACHUSETTS

Norfolk, SS Date: 17 August 2001

Then personally appeared the above named Richard Mann and acknowledged the foregoing to be ~~her~~ the free act and deed before me, of Buckley + Mann Inc Joseph A. Capezzuto, Notary
Joseph A. Capezzuto

Notary Public:
My Commission Expires: June 12, 2003

The undersigned LSP hereby certifies that he executed the aforesaid Activity and Use Limitation Opinion attached hereto as Exhibit C and made a part hereof and that in his Opinion, this Notice of Activity and Use Limitation is consistent with the terms set forth in said Activity and Use Limitation Opinion.

COMMONWEALTH OF MASSACHUSETTS
ROBERT A. DANGEL
No. 7798
REGISTERED
LICENSED SITE PROFESSIONAL

Date: 17TH Day of AUGUST 2001 _____
LSP Name
(LSP Seal)

COMMONWEALTH OF MASSACHUSETTS

Middlesex, SS Date:

Then personally appeared the above named Robert A. Dangel and acknowledged the foregoing to be his free act and deed before me, as Principal Scientist of Camp Dresser & McKee Inc.
Joseph A. Capezzuto, Notary
Joseph A. Capezzuto

Notary Public:
My Commission Expires: June 12, 2003

Upon recording, return to:
Richard Mann
11 Northwood Drive
Walpole, Massachusetts 02081

EXHIBIT A

DESCRIPTION OF LAND CONTAINING AREAS SUBJECT TO AUL

REFERENCE: *CERTIFICATE OF TITLE NO. 154753, BOOK 774. PAGE 153*

That certain parcel of land situated in the Town of Norfolk, in the County of Norfolk and the Commonwealth of Massachusetts, bounded and described as follows:

Southeasterly sixteen hundred eighty-five and 47/100 (1685.47) feet, and

Southwesterly sixty-five and 48/100 (65.48) feet by Lawrence Street;

Northwesterly by Old Lawrence Street, two hundred eleven and 43/100 (211.43) feet;

Southerly by land now or formerly of Thomas E. Buckley et al being in part by the end of Old Lawrence Street, two hundred fifteen and 60/100 (215.60) feet;

Easterly by land now or formerly of Thomas E. Buckley et al, seventy-four (74.00) feet;

Southwesterly one hundred seven and 67/100 (107.67) feet, and

Easterly three hundred thirty-seven and 85/100 (337.85) feet by land now or formerly of Paul Revell et al;

Southerly by land now or formerly of R. Gregory Lewallen et al, fifty-nine and 58/100 (59.58) feet;

Southeasterly by said land now or formerly of R. Gregory Lewallen et al and by land now or formerly of Horace Roy et al, four hundred fifty-five and 97/100 (455.97) feet;

Northeasterly by said land now or formerly of Horace Roy et al, two hundred twenty-two and 75/100 (222.75) feet;

Southerly by Lawrence Street, three hundred thirty and 76/100 (330.76) feet;

Southerly again ninety (90.00) feet, and

Southwesterly three hundred eighty-eight (388.00) feet, by land now or formerly of Barbara L. Pidgeon et al;

Westerly fourteen hundred seventy-five and 10/100 (1475.10) feet; and

Southwesterly three hundred ninety and 40/100 (390.40) feet by land now or formerly of S. M. Lorusso & Sons, Inc.;

Northerly by said land now or formerly of S. M. Lorusso & Sons, Inc., being in part by a line in Mill River, about five hundred twenty-eight (528) feet;

Southwesterly, Westerly and Northwesterly by the middle line of Mill River;

Northwesterly by land now or formerly James Foley et al being in part by a line in Mill River, about two hundred forty-two (242) feet;

Northerly by land now or formerly of James Foley et al, eleven hundred fourteen and 75/100 (1114.75) feet;

Northeasterly by land now or formerly of Robert T. Harrison et al, four hundred seventy-two and 46/100 (472.46) feet;

Northerly by said land now or formerly of Robert T. Harrison et al and by land now or formerly Wayne G. Bredvik et al, two hundred twenty-six and 77/100 (226.77) feet;

Northeasterly by lands of sundry adjoining owners, twenty-two hundred fifty-three and 63/100 (2253.63) feet.

EXHIBIT A-1

DESCRIPTION OF AREA SUBJECT TO AUL

That certain portion of a parcel of land, said parcel situated in the Town of Norfolk, in the County of Norfolk and the Commonwealth of Massachusetts, and Certificate of Title No. 154753, Book 774, Page 153, said portion being shown as the "AUL Area" on Exhibit A-2 and Exhibit A-3, and being more particularly bounded and described as follows:

The beginning point for said parcel is located N 38°37'24" W, three hundred nine and 50/100 (309.50) feet from the point of curvature in the northwesterly sideline of Lawrence Street, said curve having a radius of eight hundred fifty and 00/100 (850.00) feet; thence

Southwesterly two hundred seventy-five and 00/100 (275.00) feet;

Southeasterly fifty and 00/100 (50.00) feet;

Southwesterly three hundred four and 47/100 (304.47) feet;

Southeasterly forty-five and 00/100 (45.00) feet;

Southeasterly sixty-three and 43/100 (63.43) feet;

Southwesterly five hundred fifty-eight and 59/100 (558.59) feet;

Northerly one hundred forty-one and 30/100 (141.30) feet;

Northeasterly four hundred eleven and 59/100 (411.59) feet;

Northerly three hundred forty and 18/100 (340.18) feet;

Northeasterly two hundred ninety-one and 87/100 (291.87) feet;

Southeasterly one hundred eighty and 00/100 (180.00) feet.

EXHIBIT A-2
BUCKLEY & MANN INC.
ACTIVITY AND USE LIMITATION
AUGUST 2001

EXHIBIT A-2

I CERTIFY THAT THIS PLAN SHOWS THE PROPERTY LINES THAT ARE THE LINES OF EXISTING OWNERSHIPS, AND THE LINES OF STREETS AND WAYS SHOWN ARE THOSE OF PUBLIC OR PRIVATE STREETS OR WAYS ALREADY ESTABLISHED, AND THAT NO NEW LINES FOR DIVISION OF EXISTING OWNERSHIP OR FOR NEW WAYS ARE SHOWN.

DATE: AUGUST 15, 2001

REGISTERED LAND SURVEYOR

I CERTIFY THAT THIS PLAN HAS BEEN PREPARED IN CONFORMITY WITH THE RULES AND REGULATIONS OF THE REGISTERS OF DEEDS OF THE COMMONWEALTH OF MASSACHUSETTS.

DATE: AUGUST 15, 2001

REGISTERED LAND SURVEYOR

PLAN OF LAND
IN
NORFOLK, MA
SCALE: 1"= 150' AUGUST 15, 2001
TOOMEY-MUNSON & ASSOCIATES, INC.
CIVIL ENGINEERS & LAND SURVEYORS
88 ACCESS RD., UNIT 12, NORWOOD, MA 02062

REVISIONS

SHEET 1 OF 1

1344-01

EXHIBIT A-3
BUCKLEY & MANN INC.
ACTIVITY AND USE LIMITATION
AUGUST 2001

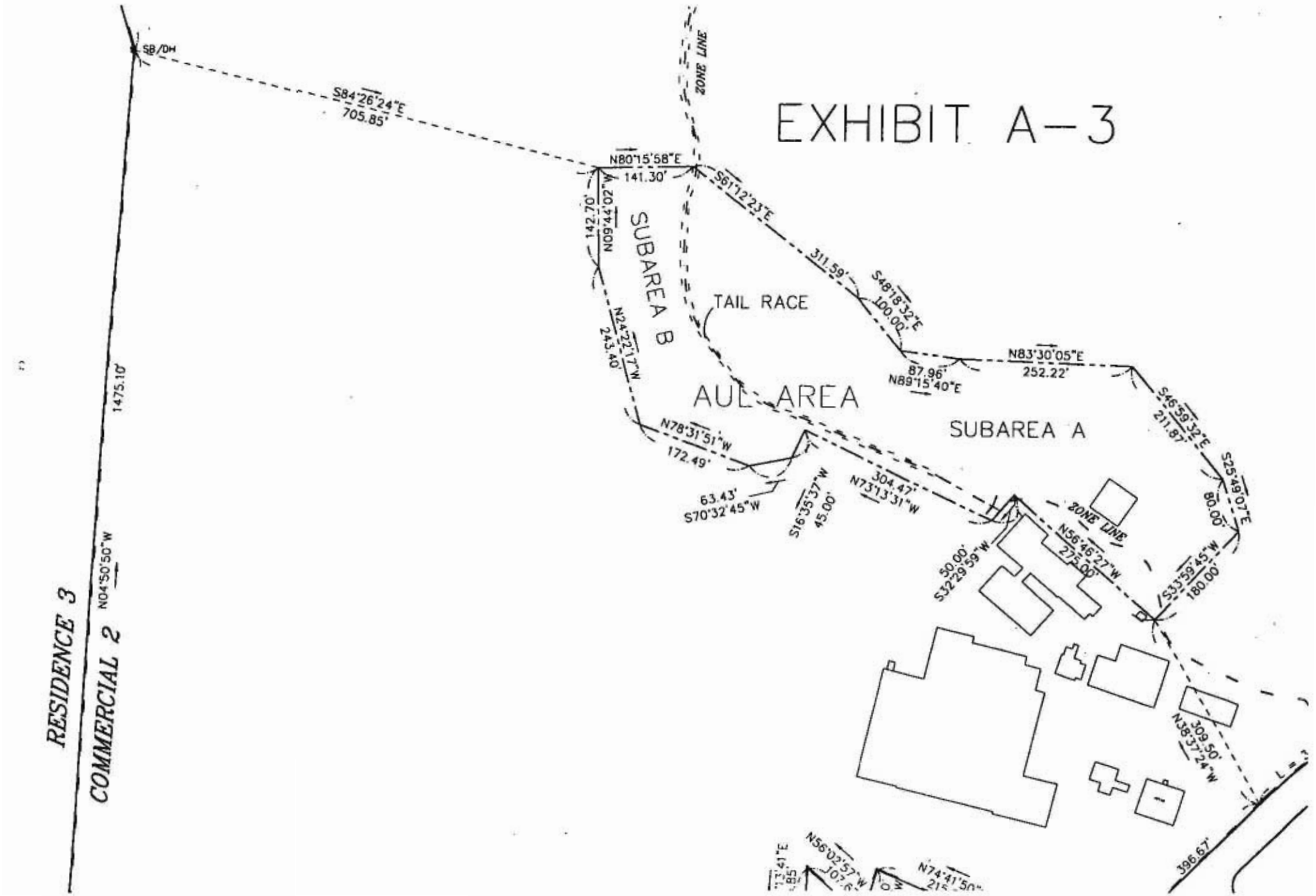
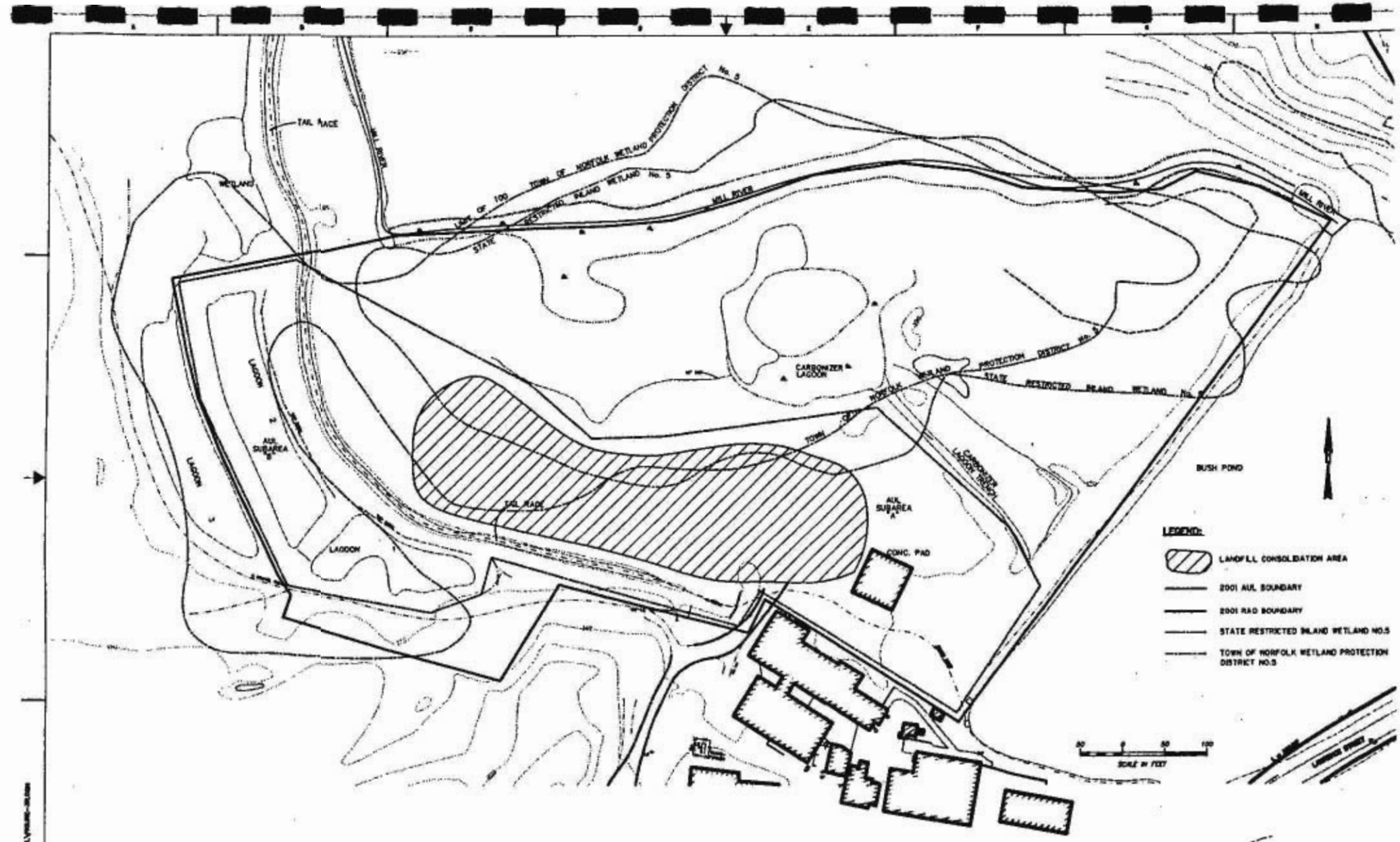


EXHIBIT A-3
SB/DH
S84°26'24"E
705.85'
ZONE LINE
N80°15'58"E
141.30'
S61°12'23"E
311.59'
S48°18'32"E
100.00'
N83°30'05"E
252.22'
S46°59'32"E
211.87'
S25°49'07"E
80.00'
S33°59'45"W
180.00'
N38°37'24"W
309.50'
396.67'
142.70'
N00°44'02"W
N24°22'17"W
243.40'
SUBAREA B
TAIL RACE
AUL AREA
SUBAREA A
87.96'
N89°15'40"E
N78°31'51"W
172.49'
63.43'
S70°32'45"W
S16°35'37"W
45.00'
304.47'
N73°13'31"W
ZONE LINE
N56°46'27"W
275.00'
50.00'
S32°29'59"W
1475.10'
N04°50'50"W
RESIDENCE 3
COMMERCIAL 2
N56°02'57"W
N74°41'50"

EXHIBIT B
BUCKLEY & MANN INC.
ACTIVITY AND USE LIMITATION
AUGUST 2001



CDM	BUCKLEY & MANN PROPERTY NORFOLK, MASSACHUSETTS RAO REPORT	EXHIBIT "B" SKETCH PLAN	FIGURE 3

EXHIBIT C

ACTIVITY AND USE LIMITATION OPINION

In accordance with the requirements of 310 CMR 40.1074, this Licensed Site Professional Opinion has been prepared to support a Notice of Activity and Use Limitation (AUL) for the property located north of Bush Pond, on a portion of the Buckley & Mann, Inc., (B&M) property at 17 Lawrence Street, Norfolk, MA 02056. As of the date of the Activity and Use Limitation (AUL) Opinion, the area subject to the AUL and southwest of the Tail Race is zoned Commercial 2 and the area northeast of the Tail Race (a manmade brook parallel to the Mill River) is zoned Residential 3 under the Town of Norfolk Bylaws. The area west of the Tail Race is also within the Town of Norfolk Wetland Protection District Number 5. The area subject to the AUL is unpaved, and has no buildings.

Site History

B&M manufactured textile products at its facility northwest of the junction of Park and Lawrence Streets in Norfolk for over 90 years, ending in 1994.

B&M operated a Carbonizer process through the 1940s to reclaim wool from used garments. The raw material was conveyed through acid vapor to char the cotton threads on the seams, zippers, buttons, etc., and facilitate separation of the wool. The wool was neutralized, rinsed, and reused. Solid residue consisting of fiber and fasteners was discarded in a landfill on the northeast side of the Tail Race. The Carbonizer business declined after the 1940s and the facility was demolished in 1965. Coal ash, building demolition debris and discarded textile machinery from on-site operations was also discarded in the landfill.

B&M operated a dyehouse until 1986. The dyehouse discharged approximately 40,000 gallons per week of wastewater to Lagoons #1 and #2, southwest of the Tail Race, for settling and facultative biological treatment. The effluent from these shallow lagoons percolated into the ground adjacent to the Tail Race.

The Mill River and the parallel Tail Race (on the B&M property) drain the surface runoff from the surrounding low hills. The B&M landfill area and the Lagoons #1 and #2 are in the bottom of the Mill River valley, near the Tail Race and the River, where groundwater discharges to the surface water.

At the request of the Massachusetts Division of Water Pollution Control, Department of Environmental Protection (DEP), an initial site assessment was completed in 1986 by Camp Dresser & McKee Inc. (CDM). The report concluded that groundwater contamination was limited to a shallow zone immediately under Lagoons # 1 and #2 and under the adjacent 30 foot wide earthen bank separating the Lagoons from the Tail Race. The contamination was primarily indicated by non-chemical-specific oxygen demand from dyehouse wastewater. Soil in the former landfill area was found to contain metals,

originating from textile fiber and scrap equipment, and Polycyclic Aromatic Hydrocarbons (PAH) from coal ash and Carbonizer spoils.

In 1992, B&M applied for and received a Waiver from direct Bureau of Waste Site Cleanup, Department of Environmental Protection (DEP), oversight under the Massachusetts Contingency Plan (MCP). The site identification number is 3-0173. *[Note: The MCP is the Commonwealth of Massachusetts's code of regulations for the notification, assessment and cleanup of disposal sites where a release of oil and/or hazardous materials has occurred.]* Under the 1993 revisions to the MCP, the site was classified Tier II, non-priority.

In October-November 1995, CDM completed a comprehensive site assessment program for the site. The 23 machine-dug test pits and 5 hand-dug test pits showed a mix of soil, coal ash, building demolition debris, buttons, and discarded textile machinery in the landfill area. None of the soil samples failed a TCLP test for hazardous waste characteristic. No Volatile Organic Compounds (VOC) were detected in the landfill areas, and the trace concentration of a few VOCs found in the former dyehouse wastewater treatment Lagoons were well below MCP No Significant Risk Criteria. Soil from several test pits in the landfill area exceeded the MCP Method 1 S-1 or S-2 standards for chromium, lead, and PAH compounds. Soil samples from the bottoms of Lagoons #1 and #2 contained naphthalene and methylnaphthalene at concentrations slightly greater than the Method 1 S-1 and S-2 standards. *[Note: The "MCP Method 1 Cleanup Standards", published in the MCP, refer to numerical standards for chemical contaminants in soil and groundwater. The soil standards are broken into three soil categories: S-1, S-2 and S-3. The S-1 Soil Standards are the most strict, or lowest, numerical values, derived to be protective of a residential exposure scenario by considering a receptor's incidental ingestion and dermal contact exposures to soil while gardening and playing. The S-2 and S-3 numerical standards are less strict and therefore higher, based on passive recreational and construction-related exposure scenarios, respectively.]*

In December 1997, B&M filed a Remedial Action Alternatives (Phase III) Report and a Release Abatement Measure (RAM) Plan with the DEP. The RAM plan called for on-site consolidation of contaminated soils, considering that:

- The presence of contaminated soils had not adversely impacted groundwater quality.
- The concentrations of metals and PAH compounds in soil slightly exceeded MCP Method 1 S-1 and S-2 limits in a few locations, with the exception of the immediate vicinity of Test Pit 10 in the landfill area. The Plan called for the Test Pit 10 material to be selectively excavated for off site disposal.
- The concentrations of metals and PAH compounds were far below MCP Upper Concentration Limits.
- The depth of the fill material in the landfill extended below the groundwater table and excavation for complete removal would have disrupted wetlands.

- The cost to consolidate the material on-site with a three foot cover of clean soil would be would be significantly less the excavation for off site landfill disposal or reuse as daily cover on an off site commercial landfill.
- An Activity and Use Limitation in the landfill area at B&M would be needed even if the bulk of the soil was disposed of off site, because the full depth of the material might not be recovered.

The work proposed under the RAM plan was completed in 1998 and 1999. The entire landfill area, estimated at 4,550 cubic yards, was excavated and inspected to visually verify there were no buried oil and or hazardous materials, other than the Carbonizer residue, coal ash and building demolition debris. Timbers, discarded textile machinery and oversized demolition debris was removed from the landfill for off site disposal as part of future improvements to other portions of the B&M property. Approximately 500 cubic yards of contaminated soil from near the former wastewater Lagoons #1 and #2 were moved to the landfill consolidation area. This entire area was then covered with goetextile and three feet of clean sand cover, and then stabilized with compost, lime fertilizer and hydroseed. Contaminated soil (315 tons) from near Test Pit 10 was removed from the site and disposed of in an off site, commercial landfill.

Concentrations of the target pollutants (PAH compounds, chromium, and lead) were less than the MCP Method 1 S-1 Standards in soil samples collected at the completion of work from remediated areas outside of the landfill consolidation area.

Soil and groundwater samples from the former dyehouse wastewater Lagoons #1 and #2 were collected and analyzed in October 2000. A second set of groundwater samples was collected and analyzed in December 2000. The groundwater samples were collected from shallow test pits to obtain water directly in contact with the residual contaminants in the soil. The October 2000 data showed that 1,1-biphenyl was present at concentrations slightly above MCP Method 1 S-1/GW-1 in three of four soil samples (1.6 to 2.6 mg/kg, compared to the 1 mg/kg Standard). Also, methylnaphthalene was present at a concentration slightly above MCP Method 1 GW-1 in one of four turbid, unfiltered groundwater samples (16 ug/L, compared to the 1 mg/kg Standard). *[Note: GW-1 Standards are for groundwater which may be used for human consumption.]* In the December 2000 tests, the groundwater samples were treated with alum to enhance settling of suspended solids and remove turbidity. The analytical results showed that the **soluble** 1,1-biphenyl, naphthalene, and/or methylnaphthalene concentrations were well below MCP Method 1 Standards. CDM used the data to establish MCP Method 2 Standards for these compounds, and showed that that residual concentrations pose No Significant Risk.

Complete details of the assessment and remediation work are included in the "*Class A-3 Response Action Outcome and Release Abatement Measure Completion Report*" prepared by CDM for B&M and submitted to the DEP in August 2001.

Reason for Activity and Use Limitation

A Method 1 Risk Characterization was conducted to evaluate the risk posed by contamination remaining in the soil at the site in the landfill area. Using the Method 1 approach, concentration of lead, chromium and PAH compounds remaining in the soil were compared to the MCP Method 1 Soil Standards to determine if the site poses a risk for current and future activities and uses.

The Method 1 Risk Characterization concluded that the landfill portion of the property, north and east of the Tail Race, poses No Significant Risk to health, safety, public welfare or the environment provided that the lead, chromium and PAH contaminated soil in the land fill remains isolated under the three foot protective cover. To ensure that uncontrolled exposure to the contaminated soil does not occur, and that a condition of No Significant Risk is maintained for future activities and uses, an AUL is require to restrict certain activities and uses of this portion of the property. The portion is shown as AUL Subarea A on Exhibit A-2, Exhibit A-3 (enlarged plan of the AUL area in Exhibit A-2) and Exhibit B (sketch plan).

The Method 1 and Method 2 Risk Characterization concluded the former dyehouse Lagoons #1 and #2 portion of the property, south and west of the Tail Race, poses No Significant Risk to health, safety, public welfare or the environment. Concentrations of PAH compounds and chromium were less than the Method 1 and Method 2 Risk Characterization for S-1 soils, but exceeded local background concentrations. B&M has established an AUL for Lagoons #1 and #2 to require that future excavation in the Lagoons be conducted with restrictions on the management of the excavated soils. This portion of the property is shown as AUL Subarea B on Exhibit A-2, Exhibit A-3 (enlarged plan of the AUL area in Exhibit A-2) and Exhibit B (sketch plan).

Permitted Site Activities and Uses

A. Former landfill area east of the Tail Race, Subarea A.

i) Passive and active recreational activities including, but not necessarily limited to, activity on the grassed area for children, sitting on benches or sitting or lying on the ground surface;

ii) Maintenance of grassed areas, planting and seeding up to a depth of three feet below ground surface, installation of fencing with intrusion limited to driving of posts;

iii) Utility maintenance work either not involving soil excavation and removal, or involving soil excavation to a depth of no greater than three feet below ground surface;

iv) Emergency utility repair work, lasting no longer than eight consecutive hours and involving the excavation of no more than twenty (20) cubic yards of soil from depths

of greater than three feet below ground surface. Such excavated soil must be returned to depth in its entirety at the conclusion of the repair work. The protective barrier layer, which includes a woven geotextile and three feet of overlying soils, must be replaced with a protective barrier layer of like and comparable construction, materials and specifications immediately following completion of the repair work. If soil removal from the site is to occur or the activity will occur for a duration greater than eight consecutive hours and/or more than twenty (20) cubic yards of soil from depths greater than three feet below ground surface are to be excavated, a Health and Safety Plan to address potential exposures and a Soil Management Plan must be developed;

(v) Non-invasive activities and uses which do not disturb or compromise the structural integrity of the protective barrier layer and the underlying contaminated soils; and

(vi) Such other activities or uses not listed above, but which as given in written or oral opinion by an LSP, shall present no greater risk of harm to health, safety, public welfare, or the environment than the activities and uses set forth in this paragraph.

B. Former wastewater treatment lagoons west of the Tail Race, Subarea B.

(i) Passive recreational activities including, but not necessarily limited to, walking and bird watching;

(ii) Use of the lagoons as stormwater runoff storage ponds;

(iii) Utility maintenance lasting no longer than eight consecutive hours and involving the excavation of no more than twenty (20) cubic yards of soil. Such excavated soil must be returned to the lagoon at the conclusion of the repair work. If soil removal from the site is to occur or the activity will occur for a duration greater than eight consecutive hours and/or more than twenty (20) cubic yards of soil are to be excavated, a Soil Management Plan must be developed; and

(iv) Such other activities or uses not listed above, but which as given in written or oral opinion by an LSP, shall present no greater risk of harm to health, safety, public welfare, or the environment than the activities and uses set forth in this paragraph.

Prohibited or Restricted Site Activities and Uses

A. Former landfill area east of the Tail Race, Subarea A.

(i) Excavation of soils at a depth of greater than three feet below ground surface, except as described in 1A (iv) above. Such non-emergency invasive subsurface activities, which may be part of utility repair or maintenance, or construction, cannot be performed without the involvement of an LSP, and must be conducted in accordance with the Massachusetts Contingency Plan and applicable DEP policies appropriate to the protection of human health and the environment.

(ii) Any activities and uses which may cause physical, chemical, or structural damage to the protective barrier layer in the designated AUL area, except those conducted in accordance with Obligation (i) of this Notice of AUL.

(iii) Any activities otherwise prohibited by Zoning, Bylaws, other regulatory programs, or deed restriction, unless permitted by the appropriate governmental body.

B. Former wastewater treatment lagoons west of the Tail Race, Subarea B.

(i) Excavation of soil, except as described in 1B (iii) above. Such non-emergency invasive subsurface activities, which may be part of utility repair or maintenance, or construction, cannot be performed without the involvement of an LSP, and must be conducted in accordance with the Massachusetts Contingency Plan and applicable DEP policies appropriate to the protection of human health and the environment.

ii) Any activities otherwise prohibited by Zoning, Bylaws, other regulatory programs, or deed restriction, unless permitted by the appropriate governmental body.

Obligations and Conditions Set Forth in the AUL Opinion

A. Former landfill area east of the Tail Race, Subarea A.

i) The performance of any activities including, but not limited to, excavation which could cause the removal, damage, and/or disturbance of the protective barrier layer and/or contaminated soil located beneath it without the prior development and implementation of a Health and Safety Plan and a Soil Management, as described in paragraph C (ii) below.

ii) The integrity of the protective barrier layer within the designated AUL area must be maintained and inspected on at least an annual basis to verify its ability to effectively prevent exposure(s) to underlying contaminated soil via dermal contact, ingestion, and/or inhalation; and

(iii) The contaminated soil must remain beneath the protective barrier within the designated AUL to prevent exposures via dermal contact, ingestion, and/or inhalation.

B. Former wastewater treatment lagoons west of the Tail Race, Subarea B

i) The performance of any activities including, but not limited to, excavation which could cause the removal, damage, and/or disturbance of the soil located in the lagoons without the prior development and implementation of a Soil Management Plan, as described in paragraph C (ii) below.

C. Former landfill area east of the Tail Race, Subarea A and former wastewater treatment lagoons west of the Tail Race, Subarea B

i) The Property Owner will be solely responsible for compliance with this Notice of Activity and Use Limitation and the restrictions imposed herein.

ii) Prior to the performance of any non-emergency intrusive subsurface activities within the AUL area including, but not limited to, excavation which may damage the structural integrity of the protective barrier layer in Subarea A, a written Health and Safety Plan and a written Soil Management Plan must be implemented in accordance with the following guidelines:

(a) The Health and Safety Plan must be prepared by a Certified Industrial Hygienist or other qualified professional familiar with worker health and safety procedures and requirements. The level of personal protection and engineering controls, dust mitigation measures and perimeter monitoring needed to prevent exposures to contaminated soils at depths beneath the protective barrier layer must be specified.

(b) The Soil Management Plan should be prepared by an LSP and must describe soil excavation, handling, storage, transport and disposal procedures, and must include a description of the engineering controls and air monitoring procedures needed to protect off-site receptors from exposures to fugitive dust and particulates and exposures to contaminated soil via dermal contact.

(c) On-site workers must be informed of the presence of contaminated soil and also informed of the requirements of the Health and Safety Plan and the Soil Management Plan. Copies of both plans must be available on-site during the course of any work which may disturb the protective barrier layer and/or the soil beneath it in the AUL area.

Robert A. Dangel, Licensed Site Professional

August 17, 2001
Date

Massachusetts Department of Environmental Protection **BWSC-114**
Bureau of Waste Site Cleanup

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 - 0173

COMPLETE THIS FORM AND ATTACH AS AN EXHIBIT TO THE AUL DOCUMENT TO BE RECORDED AND/OR REGISTERED WITH THE REGISTRY OF DEEDS AND/OR LAND REGISTRATION OFFICE.

A. LOCATION OF DISPOSAL SITE AND PROPERTY SUBJECT TO AUL:

Disposal Site Name: Buckley & Mann, Inc.

Street: 17 Lawrence Street Location Aid: Bush Pond

City/Town: Norfolk ZIP Code: 02056-0000

Address of property subject to AUL, if different than above. Street:

City/Town: ZIP Code:

B. THIS FORM IS BEING USED TO: (check one)

- [x] Provide the LSP Opinion for a **Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1074 (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amended Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1081(4) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Termination of a Notice of Activity and Use Limitation**, pursuant to 310 CMR 40.1083(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Grant of Environmental Restriction**, pursuant to 310 CMR 40.1071, (complete all sections of this form).
- [ ] Provide the LSP Opinion for an **Amendment of Environmental Restriction**, pursuant to 310 CMR 40.1081(3) (complete all sections of this form).
- [ ] Provide the LSP Opinion for a **Release of Environmental Restriction**, pursuant to 310 CMR 40.1083(2) (complete all sections of this form).

C. LSP OPINION:

I attest under the pains and penalties of perjury that I have personally examined and am familiar with this submittal, including any and all documents accompanying this submittal. In my professional opinion and judgment based upon application of (i) the standard of care in 309 CMR 4.02(1), (ii) the applicable provisions of 309 CMR 4.02(2) and (3), and (iii) the provisions of 309 CMR 4.03(5), to the best of my knowledge, information and belief,

> *if Section B indicates that a **Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1074(1)(b);

> *if Section B indicates that an **Amended Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Termination of a Notice of Activity and Use Limitation** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1083(3)(a);

> *if Section B indicates that a **Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1071(1)(b);

> *if Section B indicates that an **Amendment to a Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and (ii) complies with 310 CMR 40.1080(1) and 40.1081(1);

> *if Section B indicates that a **Release of Grant of Environmental Restriction** is being registered and/or recorded*, the Activity and Use Limitation that is the subject of this submittal (i) is being provided in accordance with the applicable provisions of M.G.L. c. 21E and 310 CMR 40.0000 and
(ii) complies with 310 CMR 40.1083(3)(a).

I am aware that significant penalties may result, including, but not limited to, possible fines and imprisonment, if I submit information which I know to be false, inaccurate or materially incomplete.

- [ ] Check here if the Response Action(s) on which this opinion is based, if any, are (were) subject to any order(s), permit(s) and/or approval(s) issued by DEP or EPA. If the box is checked, you MUST attach a statement identifying the applicable provisions thereof.

SECTION C IS CONTINUED ON THE NEXT PAGE.

EXHIBIT D

ACTIVITY & USE LIMITATION (AUL) OPINION FORM

Pursuant to 310 CMR 40.1070 - 40.1084 (Subpart J)

Release Tracking Number: 3 - 0173

C. LSP OPINION: (continued)

LSP Name: Robert A. Dangel LSP #: 7798 Stamp:

Telephone: 617-452-6267 Ext.:

FAX: 617-452-8267

LSP Signature:

Date: August 17, 2004

COMMONWEALTH OF MASSACHUSETTS
ROBERT A. DANGEL
No. 7798
REGISTERED
LICENSED SITE PROFESSIONAL

YOU MUST COMPLETE ALL RELEVANT SECTIONS OF THIS FORM OR DEP MAY FIND THE DOCUMENT TO BE INCOMPLETE.