US EPA RECORDS CENTER REGION 5
489504

VOLUME II

APPENDICES C-I

LAKE SALVAGE FACILITY SITE REMEDIATION
2527-2529 WEST LAKE STREET
CHICAGO, ILLINOIS
AUGUST 19, 1995

Prepared for

Litton Systems, Inc.
1725 Jefferson Davis Highway
Suite 601 Crystal Square Two
Arlington, Virginia 22202-3585

Prepared by:

Thomas C. Couture, P.E.
Michael J. Matilainen, CIH
Tighe & Bond, Inc.
53 Southampton Road
Westfield, Massachusetts 01085
Phone: (413) 562-1600

Tighe&Bond
Consulting Engineers
Environmental Specialists

APPENDIX C

APPENDIX C

APPENDIX C

Contractor Submittals for the Demolition and Site Remediation of the Lake Salvage Site

0168

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Brian Copple

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

© GOES 460-1/2

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August 15-19, 1988

Date(s) of Instruction

Instructor

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(066308*4*1) COPPLE, BRIAN
SSN#: 332-62-8116 D-O-B: 12/19/68
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8:00 AM - 4:30 PM, Mon-Fri
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(314) 349-6850

☐ Center for Evaluation & Rehabilitation
428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

The purpose of this form is to summarize the results of the physical examination. Call if further information is required.

PRE-PLACEMENT MEDICAL EXAMINATION

- ☒ Normal
- ☐ Cannot work due to physical condition
- ☐ May work with restricted activities, limited exposure, protective measures
- ☐ Delay placement pending further tests
- ☒ Begin work without restrictions pending lab or drug screen results
- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

- ☒ Examination normal
- ☒ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☒ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

94 8:17

TIME IN		EMPLOYEE SIGNATURE	DATE 12/6/94
10:47 am		Virgilio Villadey mp	12/6/94
TIME OUT	INITIALS	PHYSICIAN	DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0160

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Environmental Services, Inc.

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Curtis Copple

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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Riedel Environmental Services Inc.

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CURTIS COPPLE

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of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING & RESPONSE

April 27-May 1, 1987
Date(s) of Instruction

Michael D. Amy / David C. Pritchard
Instructor

LITHO IN U.S.A.

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(020446*4*1) COPPLE, CURTIS
SSN#: 330-56-8393 D-O-B: 02/25/63
0388000183 CENTRAL STATES ENVIRONMENTAL

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(314) 731-5609

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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

94 8 : 17

TIME IN		EMPLOYEE SIGNATURE: Curtis Copple	DATE: 12/6/94
TIME OUT	INITIALS	PHYSICIAN: Virginia Villadoy mp	DATE: 12/6/94

HL-025 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0167

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Elvin Copple

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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ELVIN COPPLE

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of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING & RESPONSE

Mike Ames Daniel C. Pritchard
Instructor

June 15-19, 1987
Date(s) of Instruction

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(020462*4*1)COPPLE, ELVIN
SSN#: 338-32-7797 D-O-B: 04/08/37
0388000183 CENTRAL STATES ENVIRONMENTAL

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8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

- ☑ Examination normal
- ☑ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☐ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

TIME IN		EMPLOYEE SIGNATURE	4/3/95 DATE
TIME OUT	INITIALS	PHYSICIAN Virgilio Villadiego FP	4/3/95 DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0164

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Environmental Services, Inc.

Certificate of Completion

presented to

Jeffrey K. Copple

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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Environmental Services, Inc.

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presented to

JEFFREY K. COPPLE

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS MATERIALS MANAGEMENT TRAINING

January 4, 1994

Date(s) of Instruction

Instructor

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(051743*4*1) COPPLE, JEFFREY K.
SSN#: 332-62-7935 D-O-B: 09/16/67
0388000183 CENTRAL STATES ENVIRONMENTAL

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8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

The purpose of this form is to summarize the results of the physical examination. Call if further information is required.

PRE-PLACEMENT MEDICAL EXAMINATION

- ☐ Normal
- ☐ Cannot work due to physical condition
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- ☐ Need follow-up _____

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- ☑ Examination normal
- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☑ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

30 MAR 95 10: 01
TIME IN

X Jeffrey K. Copple
EMPLOYEE SIGNATURE

3-30-95
DATE

TIME OUT
MAR 95 12: 01

INITIALS

Virginio Villadiego MCP
PHYSICIAN

3/30-95
DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0170

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Jim Duncan

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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Jim Duncan

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of the course of instruction entitled

29 CFR 1910.120 Forty Hour Hazardous Materials Handling & Response

April 25 - 28, 1994

Date(s) of Instruction

Debbie L. Loramis

Instructor

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(121287*1*1) DUNCAN, JAMES L.
SSN#: 341-52-7729 D-O-B: 05/01/61
0352000132 CENTRAL STATES ENVIRONMENTAL

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(314) 731-5609

CERTIFICATE OF EXAM

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PRE-PLACEMENT MEDICAL EXAMINATION

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- ☐ Cannot work due to physical condition
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- ☒ Begin work without restrictions pending lab or drug screen results
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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

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FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

TIME IN _____ EMPLOYEE SIGNATURE _____ DATE 4-6-94

TIME OUT _____ INITIALS _____ PHYSICIAN _____ DATE 4/6/94

PL-005 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0157

Central States Environmental Services, Inc.

Certificate of Completion

presented to

Dan Flannigan

in recognition of satisfactory completion of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994

Date(s) of Instruction

Philip R. Richardson

Philip R. Richardson Instructor

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0152

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DAN L. FLANNIGAN

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of the course of instruction entitled

29 CFR 1910.120 Forty Hour Hazardous Materials Handling & Response

April 25 - 28, 1994

Date(s) of Instruction

Philip R. Richardson

Instructor

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(137235*3*1) FLANNIGAN, DAN L.
SSN#: 347-46-8126 D-O-B: 11/03/50
0388000183 CENTRAL STATES ENVIRONMENTAL

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(314) 731-5609

CERTIFICATE OF EXAM

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FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

8:50
TIME IN

Dan L. Flannigan
EMPLOYEE SIGNATURE

4/6/95
DATE

TIME OUT

INITIALS

Virginia Vittorley rep
PHYSICIAN

4/6/95
DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0166

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Paul Freeman

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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Dale W. Hester

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29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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Central States

Environmental Services, Inc.

Certificate of Completion

presented to

DALE HESTER

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING AND RESPONSE

March 5-9, 1990

Date(s) of Instruction

Instructor

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FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

11 PR 95 [illegible]

TIME IN _____ EMPLOYEE SIGNATURE Dale Hester DATE

12 PR 95 12:23

TIME OUT _____ INITIALS _____ PHYSICIAN [signature] DATE 4/11/95

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0180

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Louis Hufstedler

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 40-Hr Hazardous Materials Handling & Response

April 6, 1995
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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LITHO IN U.S.A.

HealthLine®
CORPORATE HEALTH SERVICES

(209134*1*1) HUFSTEDLER, LOUIS W.
SSN#: 318-58-8494 D-O-B: 11/19/61
038000183 CENTRAL STATES ENVIRONMENTAL

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(314) 731-5609

CERTIFICATE OF EXAM

The purpose of this form is to summarize the results of the physical examination. Call if further information is required.

PRE-PLACEMENT MEDICAL EXAMINATION

- ☑ Normal
- ☐ Cannot work due to physical condition
- ☐ May work with restricted activities, limited exposure, protective measures
- ☐ Delay placement pending further tests
- ☑ Begin work without restrictions pending lab or drug screen results
- ☑ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

- ☐ Examination normal
- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☐ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

9:15 AM		Louis W. Hufstedler	4/4/95
TIME IN		EMPLOYEE SIGNATURE	DATE
		Virginia Villadsen MD	4/4/95
TIME OUT	INITIALS	PHYSICIAN	DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0179

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Jeff Koch

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 40-Hr Hazardous Materials Handling & Response

April 6, 1995
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

© GOES 460-1/2

LITHO IN U.S.A.

HealthLine®
CORPORATE HEALTH SERVICES

(209460*1*1) KOCH, JEFF
SSN#: 319-74-5369 D-O-B: 08/02/70
0388000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
7:00 AM - 9:00 PM, Mon-Fri
(314) 577-8060

☐ Corporate Health Center II
11745 Olive Street at Ballas
St. Louis, Missouri 63141
8:00 AM - 4:30 PM, Mon-Fri
(314) 567-5770

☒ Corporate Health Center III
2626 North Broadway
St. Louis, Missouri 63102
8:00 AM - 4:30 PM, Mon-Fri
(314) 241-5804

☐ Corporate Health Center IV
428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 895-2811

☐ Corporate Health Center V
1617 South 3rd Street
St. Louis, Missouri 63104
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8:00 AM - 4:30 PM, Mon-Fri
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(314) 731-5609

CERTIFICATE OF EXAM

The purpose of this form is to summarize the results of the physical examination. Call if further information is required.

PRE-PLACEMENT MEDICAL EXAMINATION

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PERIODIC MEDICAL EXAMINATION

- ☐ Examination normal
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- ☐ Further studies to be done
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- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

1 R 95 8:11

TIME IN		EMPLOYEE SIGNATURE: Jeff Koch	DATE: 4-7-95
TIME OUT	INITIALS	PHYSICIAN: Virginia Villadiego MD	DATE: 4/7/95

HL-035 (REV 7/91)

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(208855*1*1) LEE, DONALD R.
SSN#: 347-32-0909 D-O-B: 05/28/40
0389000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
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11745 Olive Street at Ballas
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8:00 AM - 4:30 PM, Mon-Fri
(314) 567-5770

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(314) 241-5804

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8:00 AM - 4:30 PM, Mon-Fri
(314) 895-2811

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St. Louis, Missouri 63104
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Fenton, Missouri 63026
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428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

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- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

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- ☑ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

R 95 B: 03

TIME IN _____ EMPLOYEE SIGNATURE Donald R. Lee DATE 3/31/95

TIME OUT _____ INITIALS _____ PHYSICIAN Virgilio Villadeza M.D. DATE 3/31/95

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0173

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Environmental Services, Inc.

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Donald Lee

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994

Date(s) of Instruction

Philip R. Richardson

Philip R. Richardson Instructor

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0159

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Kin A. Lindsey

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December 29, 1994
Date(s) of Instruction

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Philip R. Richardson, Instructor

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CORPORATE HEALTH SERVICES

(209483*1*1)LINDSEY, KIN
SSN#: 356-30-3713 D-O-B: 06/14/40
0388000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
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(314) 577-8060

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(314) 349-6850

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Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

The purpose of this form is to summarize the results of the physical examination. Call if further information is required.

PRE-PLACEMENT MEDICAL EXAMINATION

- ☐ Normal
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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

- ☑ Examination normal
- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☑ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

8:57		Kim A. Lindsey	4/7/95
TIME IN		EMPLOYEE SIGNATURE	DATE
95 11:25		Virginia Villadoga	4/7/95
TIME OUT	INITIALS	PHYSICIAN	DATE

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0177

Central States

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Certificate of Completion

presented to

Darnell Madison

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 40-Hr Hazardous Materials Handling & Response

April 6, 1995
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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Environmental Services, Inc.

Certificate of Completion

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Angie Obermeier

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994

Date(s) of Instruction

Philip R. Richardson

Philip R. Richardson Instructor

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0161

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Thomas W. Sanders

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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(002783*3*1) SANDERS, THOMAS
SSN#: 356-56-7796 D-O-B: 01/15/60
0388000183 CENTRAL STATES ENVIRONMENTAL

- ☐ Corporate Health Center I
  1212 South Grand Boulevard
  St. Louis, Missouri 63104
  7:00 AM - 9:00 PM, Mon-Fri
  (314) 577-8060
- ☐ Corporate Health Center II
  11745 Olive Street at Ballas
  St. Louis, Missouri 63141
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 567-5770
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  2626 North Broadway
  St. Louis, Missouri 63102
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 241-5804
- ☐ Corporate Health Center IV
  428 James McDonnell Boulevard
  Hazelwood, Missouri 63042
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 895-2811
- ☐ Corporate Health Center V
  1617 South 3rd Street
  St. Louis, Missouri 63104
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 421-2557
- ☐ Corporate Health Center VI
  1709 Gilsinn
  Fenton, Missouri 63026
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 349-6850
- ☐ Center for Evaluation & Rehabilitation
  428 James McDonnell Boulevard
  Hazelwood, Missouri 63042
  8:00 AM - 4:30 PM, Mon-Fri
  (314) 731-5609

CERTIFICATE OF EXAM

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PRE-PLACEMENT MEDICAL EXAMINATION

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- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☒ May wear respiratory protection
- ☐ Need follow-up _____

29 OCT 93 10:06

PERIODIC MEDICAL EXAMINATION

- ☐ Examination normal
- ☐ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☐ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

OCT 93 The employee has been advised of the above findings and recommendations.

TIME IN		EMPLOYEE SIGNATURE: Thomas W Sanders	DATE: 10-29-93
TIME OUT	INITIALS	PHYSICIAN: [illegible]	DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0158

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Gary T. Schwartz

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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Central States

Environmental Services, Inc.

Certificate of Completion

presented to

GARY SCHWARTZ

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING AND RESPONSE

August 15-19, 1988

Date(s) of Instruction

Instructor

LITHO IN U.S.A.

HealthLine®
CORPORATE HEALTH SERVICES

(016643*4*1) SCHWARTZ, GARY T
SSN#: 326-72-2793 D-O-B: 10/22/66
0388000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
7:00 AM - 9:00 PM, Mon-Fri
(314) 577-8060

☐ Corporate Health Center II
11745 Olive Street at Ballas
St. Louis, Missouri 63141
8:00 AM - 4:30 PM, Mon-Fri
(314) 567-5770

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2626 North Broadway
St. Louis, Missouri 63102
8:00 AM - 4:30 PM, Mon-Fri
(314) 241-5804

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428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 895-2811

☐ Corporate Health Center V
1617 South 3rd Street
St. Louis, Missouri 63104
8:00 AM - 4:30 PM, Mon-Fri
(314) 421-2557

☐ Corporate Health Center VI
1709 Gilsinn
Fenton, Missouri 63026
8:00 AM - 4:30 PM, Mon-Fri
(314) 349-6850

☐ Center for Evaluation & Reh...
428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

- ☐ Examination normal
- ☑ Examination revealed non-job related health condition(s) as indicated on exam report. These conditions were discussed with patient
- ☐ Further studies to be done
- ☑ May wear respiratory protection
- ☑ Need follow-up small bilateral inguinal hernia; small hydrocele of the cord — left side

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

The employee has been advised of the above findings and recommendations.

0 APR 95 8:05
TIME IN

Gary T Schwartz
EMPLOYEE SIGNATURE

4/10/95
DATE

11:35 AM
TIME OUT

INITIALS

Virgilio Villadeza MD
PHYSICIAN

4/10/95
DATE

...025 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0156

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

James L. Schwartz

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994

Date(s) of Instruction

Philip R. Richardson

Philip R. Richardson, Instructor

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"Imagineering a Cleaner World"

Riedel Environmental Services Inc.

Certificate of Completion

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J. L. SCHWARTZ

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING & RESPONSE

May 18-22, 1987	
Date(s) of Instruction	Instructor

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HealthLine®
CORPORATE HEALTH SERVICES

(025892*3*1) SCHWARTZ, JAMES L
SSN#: 355-30-5341 D-O-B: 02/19/37
0388000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
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8:00 AM - 4:30 PM, Mon-Fri
(314) 567-5770

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2626 North Broadway
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8:00 AM - 4:30 PM, Mon-Fri
(314) 241-5804

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Fenton, Missouri 63026
8:00 AM - 4:30 PM, Mon-Fri
(314) 349-6850

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Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

25 OCT 93

CERTIFICATE OF EXAM

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- ☒ May wear respiratory protection
- ☐ Need follow-up _____

PERIODIC MEDICAL EXAMINATION

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- ☐ May wear respiratory protection
- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☒ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

25 OCT 93 8:16

The employee has been advised of the above findings and recommendations.

TIME IN		EMPLOYEE SIGNATURE	DATE 10/25
TIME OUT	INITIALS	PHYSICIAN	DATE

HL-035 (REV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

0172

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Environmental Services, Inc.

Certificate of Completion

presented to

Douglas L. Shook

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 8-Hr Hazardous Materials Handling & Response Refresher

December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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presented to

DOUG SHOOK

in recognition of satisfactory completion
of the course of instruction entitled

HAZARDOUS MATERIALS HANDLING & RESPONSE

January 22-26, 1990

Date(s) of Instruction

Instructor

0186

Central States

Environmental Services, Inc.

Certificate of Completion

presented to

Michael Starr

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 40-Hr Hazardous Materials Handling & Response

April 6, 1995

Date(s) of Instruction

Philip R. Richardson

Philip R. Richardson Instructor

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Michael Wilcox

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December 29, 1994
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson, Instructor

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presented to

Jerry L. Willmore

in recognition of satisfactory completion
of the course of instruction entitled

29 CFR 1910.120 40-Hr Hazardous Materials Handling & Response

January 16 - 20, 1995
Date(s) of Instruction

Philip R. Richardson
Philip R. Richardson Instructor

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...RATE HEALTH SERVICES

(209118*1*1)WILLMORE, JERRY L.
SSN#: 356-44-9295 D-O-B: 02/14/50
0388000183 CENTRAL STATES ENVIRONMENTAL

☐ Corporate Health Center I
1212 South Grand Boulevard
St. Louis, Missouri 63104
7:00 AM - 9:00 PM, Mon-Fri
(314) 577-8060

☐ Corporate Health Center II
11745 Olive Street at Ballas
St. Louis, Missouri 63141
8:00 AM - 4:30 PM, Mon-Fri
(314) 567-5770

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2626 North Broadway
St. Louis, Missouri 63102
8:00 AM - 4:30 PM, Mon-Fri
(314) 241-5804

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428 James McDonnell Boulevard
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(314) 895-2811

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1617 South 3rd Street
St. Louis, Missouri 63104
8:00 AM - 4:30 PM, Mon-Fri
(314) 421-2557

☐ Corporate Health Center VI
1709 Gilsinn
Fenton, Missouri 63026
8:00 AM - 4:30 PM, Mon-Fri
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428 James McDonnell Boulevard
Hazelwood, Missouri 63042
8:00 AM - 4:30 PM, Mon-Fri
(314) 731-5609

CERTIFICATE OF EXAM

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PRE-PLACEMENT MEDICAL EXAMINATION

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PERIODIC MEDICAL EXAMINATION

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- ☐ Need follow-up _____

FITNESS FOR DUTY EXAMINATION

- ☐ Employee may resume normal duties on (date) _____
- ☐ Employee unable to resume normal duties. See exam report for details
- ☐ Need follow-up _____

APR 95 8:2

The employee has been advised of the above findings and recommendations.

TIME IN _____ EMPLOYEE SIGNATURE _____ DATE _____

OUT _____ INITIALS _____ PHYSICIAN Meredith Bryne MD DATE 4/4/95

EV 7/91)

PLEASE CALL YOUR HEALTHLINE PHYSICIAN FOR QUESTIONS OR PROBLEMS

CENTRAL STATES
ENVIRONMENTAL SERVICES, INC.
319 EAST SEVENTH STREET • P.O. BOX 684
CENTRALIA, IL 62801

RESPIRATOR FIT TEST RECORD

Employee: BRIAN COPPLE Date: 1/6/95

Social Security No. 332-62-8116 Facility _____ Job Title: ENGINEER

Respirator(s) selected:	mfr.	model	size
(1)	1/2 FACE MSA		LARGE
(2)	FULL FACE MSA		LARGE
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	1/2 MSA FACE		LARGE
(2)	FULL FACE MSA		LARGE

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☑ No

Comments: _____

Employee Signature: B. Copple Test Administered by: Philip Richardson

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CENTRALIA, IL 62801

RESPIRATOR FIT TEST RECORD

Employee: CURTIS COPPLE Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	1/2 FACE MSA		LARGE
(2)	FULL FACE MSA		LARGE
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions
- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	1/2 FACE MSA		LARGE
(2)	FULL FACE MSA		↓

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☑ No

Comments: _____

Employee Signature: Curt Copple Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: JEFFREY COPPLE Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	1/2 FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions
- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	1/2 FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☐ No

Comments: _____

Employee Signature: Jeff Copple Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: Jim Duncan Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	½ Face MSA		Med
(2)	Full Face MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	½ Face MSA		Med
(2)	Full Face MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☑ No

Comments: _____

Employee Signature: James L Duncan Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: DAN FLANNIGAN Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☐ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions
- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: Dan Flannigan Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: DALE HESTER Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	½ Face MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☑ Yes ☐ No

Comments: _____

Employee Signature: Dale Hester Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: LOUIS HUFSTEDLER Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

	mfr.	model	size
Respirator(s) selected: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☑ No

Comments: _____

Employee Signature: Louis Hufstedler Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee JEFF KOCH Date 1/6/95

Social Security No. _____ Facility _____ Job Title FCS

	mfr.	model	size
Respirator(s) selected: (1)	1/2 FACE MSA		MED
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	1/2 FACE MSA		MED
(2)	FULL FACE MSA		MED

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: Jeff Koch Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: Kin Lindsey Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	1/2 Face MSA		Large
(2)	Full Face MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	1/2 Face MSA		Large
(2)	Full Face MSA		"

Prescription eyeglass adapter required for full facepiece? ☑ Yes ☐ No

Comments: _____

Employee Signature: Kin Lindsey Test Administered by: [illegible]

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RESPIRATOR FIT TEST RECORD

Employee: THOMAS SANDERS Date: 1/6/05

Social Security No. _____ Facility _____ Job Title: PCS

	mfr.	model	size
Respirator(s) selected: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☑ passed ☐ failed Describe

Taste sensitivity test (check) ☑ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions
- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☑ No

Comments: _____

Employee Signature: Tom Sanders Test Administered by: [signature]

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CENTRALIA, IL 62801

RESPIRATOR FIT TEST RECORD

Employee GARY T. SCHWARTZ Date 1/6/95

Social Security No. _____ Facility _____ Job Title FCS

	mfr.	model	size
Respirator(s) selected: (1)	1/2 FACE MSA		MED
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	1/2 FACE MSA		MED
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: Gary T. Schwartz Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: BUD SCHWARTZ Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: OPERATOR

Respirator(s) selected:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: B. L. Schwartz Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: MIKE STARR Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

Respirator(s) selected:	mfr.	model	size
(1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

Respirator(s) Assigned:	mfr.	model	size
(1)	½ MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: Michael Starr Test Administered by: [signature]

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CENTRALIA, IL 62801

RESPIRATOR FIT TEST RECORD

Employee: MIKE WILCOX Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: PCS

	mfr.	model	size
Respirator(s) selected: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test: (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☐ Yes ☒ No

Comments: _____

Employee Signature: Mike Wilcox Test Administered by: [signature]

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RESPIRATOR FIT TEST RECORD

Employee: JERRY WILLMORE Date: 1/6/95

Social Security No. _____ Facility _____ Job Title: SR. ENGINEER

	mfr.	model	size
Respirator(s) selected: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"
(3)			
(4)			

Odor sensitivity test (check) ☒ passed ☐ failed Describe

Taste sensitivity test (check) ☒ passed ☐ failed

Conditions may affect respirator fit test (check)

- ☐ Beard Growth
  - ☐ 1-2 days
  - ☐ 3-7 days
  - ☐ Full Beard
- ☐ Sideburns
- ☐ Facial Scar
- ☐ Wrinkles
- ☐ Dentures Absent
- ☐ Ruptured Ear Drum

Pertinent Medical Conditions

- ☐ No Known Respiratory Problems
- ☐ No Known Cardiac Problems
- ☐ Other (Describe)

Respirator Fit Test Performed:	Respirator 1	2	3	4
Positive pressure				
Negative pressure	P	P		
Isoamyl Acetate				
Saccharin				
Irritant Smoke	P	P		

(P=passed, F=failed, N=not run)

	mfr.	model	size
Respirator(s) Assigned: (1)	½ FACE MSA		LARGE
(2)	FULL FACE MSA		"

Prescription eyeglass adapter required for full facepiece? ☒ Yes ☐ No

Comments: _____

Employee Signature: [signature] Test Administered by: [signature]

LAKE SALVAGE FACILITY
DEMOLITION AND CLEANING
CHICAGO, IL

SITE SECURITY

* Site security will be provided by United Security Services, Inc., Chicago, IL. Security will be maintained only at times when site personnel are not present at the site. Normal working hours will be 7:00 A.M.-5:00 P.M., Monday thru Friday. Security will be maintained 24-hours a day on the weekend.

* Site security personnel will not be required to be 40-HR Hazmat trained. The site security/office trailer will be staged in the "clean" zone, where security will assume their post. Also security will be on-site at times when there will be no work being performed at the site.

* Equipment and material will be staged and secured in safe locations upon the completion of daily work. Tighe and Bond, Litton Systems, and all site personnel will have access to CSES office trailer in order to secure any equipment or instrumentation that they wish to store or leave on-site.

* An additional form of site security will be maintained by a daily sign in sheet which will require each person on-site to sign in as well as all visitors to the site.

LAKE SALVAGE FACILITY
DEMOLITION AND CLEANING
CHICAGO, IL

EQUIPMENT LIST

* In addition to the required equipment per bid specifications, CSES plans to employ the following list of equipment:

1) Office trailer and Decon trailer
2) Tracked excavator (Incinerator demolition) or front-end loader
3) Bobcat loaders
4) HEPA-vacuums
5) Steam cleaner
6) Roll-off containers (provided by disposal/transport facility)
7) CSES will provide one-ton utility trucks which will be stocked with hand tools, etc. These vehicles will also be stocked with any emergency equipment necessary such as SCBA units, supplied air systems, and spill kits.
8) CSES will provide any additional monitoring equipment as deemed necessary such as PID, personal air monitors, LEL/O2/H2S/CO combination air monitors.

WORKER LICENSES

* All personnel are 40-HR Hazmat trained with annual updates. All worker licenses and refresher updates as well as each individual updated physical will be provided in a portfolio which will be maintained in the site office trailer.

* All personnel prior to sign in will first be required to familiarize themselves with the Site Specific Safety and Health Plan. A copy if this Plan will be kept in the site office trailer at all times.

* Each visitor to the site, prior to gaining entry must first sign in at the site trailer and then provide documentation pertaining to his or her Hazmat training along with current physical.

LAKE SALVAGE FACILITY
DEMOLITION AND CLEANING
CHICAGO, IL

SCHEDULE OF VALUES

* CSES plans to perform the select demolition and cleaning as outlined in the work plan in a timeframe of approximately two weeks. Once all confirmatory sampling has been received and reviewed, along with all disposal receipts and invoices, CSES will submit its final lump sum invoice as per submitted bid items barring any work change orders or any addenda to final work plan.

LAKE SALVAGE FACILITY
DEMOLITION AND CLEANING
CHICAGO, IL

FINAL PROCEDURE/WORK PLAN

CSES has broken the Lake Salvage Facility Site Remediation Work Plan into a series of tasks.

* TASK 1

-CSES will mobilize to site and perform a series of cleaning tests to determine which cleaning method will be the most feasible and economical. The cleaning tests that will be performed will be: HEPA-vacuum, power wash, chemical clean, and scarification. Three homogenous areas will be selected and equal areas of each will be gridded off in order to perform each individual test. Wipe samples will be taken after each cleaning test is performed. Once analytical results are reviewed, the most effective cleaning method will be selected and implemented once the select demolition and cleaning resume.

-Samples will be taken of each waste stream in order to profile waste material into the appropriate disposal facility.

-A sediment sample of the drain will be taken at this time in order to have a background reading of constituents which are already present.

* TASK 2

-CSES will mobilize a second time to complete the remediation. The site office trailer and decon trailer will be set up and all clean zones, contamination reduction zones, and "hot" zones will be established. All utilities will be terminated and capped. The drains will be sealed off and a water collection system for all rinse waters will be installed. The compactor will be removed and the pit will be sealed with a metal plate.

* TASK 3

-Demolition of the incinerators will occur. All demolition debris will be immediately loaded onto roll-off containers provided by Laidlaw. This material will be disposed of at a RCRA facility. These roll-offs will be loaded and removed from the site on the same day.

* TASK 4

-Litter and other debris will be loaded and transported and disposed. The tires on the site will be disposed of separately by a transport trailer provided by Laidlaw.

* TASK 5

-Selective building structure demolition with segregation and loading into predetermined

waste streams. Tasks 3,4, & 5 will occur concurrently.

* TASK 6

-Cleaning of walls and floors with selected method

* TASK 7

-Excavation of any soil, if needed. Also if any soil excavation occurs, clean backfill will be hauled in and site will be regraded and reseeded.

* TASK 8

-Encapsulate select areas after cleaning/decontamination.

* TASK 9

-Perimeter fence will be repaired and the remainder of the building will be secured and closed.

* TASK 10

-Demobilize from site

LAKE SALVAGE FACILITY
DEMOLITION AND CLEANING
CHICAGO, IL

HAZARDOUS WASTE HANDLING PLAN

-Waste at the Lake Salvage Site will be classified into one of four categories:

1) RCRA waste (Incinerator refractory and ash)
2) Non-Hazardous Waste (litter and trash)
3) Rinsate (if generated)
4) Non-Hazardous Building Demolition Debris

* RCRA waste will be disposed of at:

Laidlaw Environmental Services, Lambton Facility
4090 Tel Fer Road
Corunna, Ontario
EPA ID # MIT270019904

RCRA waste will be transported by:

Dart Trucking Company, Inc.
61 Railroad Street
Canfield, OH
EPA ID #OHD009865825

* Generator site address for this project:

Litton Systems, Inc.
Lake Salvage Facility
2527-29 W. Lake Street
Chicago, IL
EPA ID #IDD073114654

LAKE SALVAGE FACILITY
CLEANING AND DEMOLITION
CHICAGO, IL

MSDS SHEETS

CHEMICAL SOLUTIONS INTERNATIONAL

PCB's • Mercury • Nuclear • Heavy Metals • Pesticides

HEAVY METAL CLEANING SOLUTION (HMCS-101)

I. **HMCS-101** is specifically formulated to clean certain heavy metals from concrete, metal and plastic surfaces. Before using the product, all debris should be removed from the surface to be cleaned. Once this is accomplished, the following steps should be taken.

II. **Application Instructions** are as follows:

A. Apply **HMCS-101** by spraying, painting, etc., so that the chemical comes in contact with all surfaces to be cleaned. To clean pipe and tubing, fill it with the solution.

B. If possible, the surface should then be brushed to agitate the product to enhance cleaning. This will not be possible with pipe and tubing unless a pig is used.

C. Allow the material to be in contact with the surface to be cleaned for approximately 15 minutes. For highly contaminated surfaces or where there is heavy sludge in pipe or tubing, allow a set time of 20 to 25 minutes. For subsurface cleaning allow one (1) hour set time.

D. **HMCS-101** should then be removed with high pressure water or steam. If in an area where this is not possible, simply clean by applying water and wiping with absorbent cloths.

E. Effluent should be collected and disposed of in accordance with applicable State or Federal Regulations.

F. If more than one application is needed, repeat steps A. through E.

Note: For surfaces with minimum contamination levels **HMCS-101** may be diluted up to 5 to one with water. When cleaning pipe or tubing, the solution may be used more than once if the contamination level is low or it is run through a filtering system after each use.

HMIS CODE: Health 1, Flammability 0, Reactivity 0, Personal Protection B

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
Heavy Metal Plating Solution

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name CHEMICAL SOLUTIONS INTERNATIONAL CORP.	Emergency Telephone Number (713) 992-3031
Address (Number, Street, City, State, and ZIP Code) P.O. BOX 891185	Telephone Number for Information (713) 992-3031
Houston, TX 77289-1185	Date Prepared 10/90
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (optional)
LESS THAN 10 is a proprietary formulation which contains small amounts of mineral and organic acids and this product should be handled accordingly. Complies with OSHA 29 CFR XVIII-1910.1200 Section (i) "Trade Secrets". Contains no hazardous components under current OSHA definitions.				

Section III — Physical/Chemical Characteristics

Boiling Point	212°F	Specific Gravity (H_2O = 1)	1.06
Vapor Pressure (mm Hg.) Same as water		Melting Point	NA
Vapor Density (AIR = 1) Same as water		Evaporation Rate (Butyl Acetate = 1)	L1

Solubility in Water
Soluble in all ratios, pH is greater than 2.2

Appearance and Odor
Clear liquid with medium viscosity and lemon odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
None COC	NA		

Extinguishing Media
NA

Special Fire Fighting Procedures
NA

Unusual Fire and Explosion Hazards

HMIS CODE: Health 1, Flammability 0, Reactivity 0, Personal Protection B

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List): Heavy Metal Cleaning Solution

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name: CHEMICAL SOLUTIONS INTERNATIONAL CORP.	Emergency Telephone Number: (713) 992-3031
Address (Number, Street, City, State, and ZIP Code): P.O. BOX 891185	Telephone Number for Information: (713) 992-3031
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Solubility in Water: Soluble in all ratios, pH is greater than 2.2

Appearance and Odor: Clear liquid with medium viscosity and lemon odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used)	Flammable Limits	LEL	UEL
None COC	NA		

Extinguishing Media: NA

Special Fire Fighting Procedures: NA

Unusual Fire and Explosion Hazards

FIBERLOCK TECHNOLOGIES, INC.
630 Putnam Avenue
P.O. Box 432
Cambridge, MA 02139-0432
Tel. (617) 876-6020
FAX (617) 547-6934

L-B-C™

*Lead Barrier Compound**

Certifications:
- UL® Classified
- U.S.D.A. Approved
- DL Labs Approved
- State Certified

Independently Certified for:
- A.S.T.M. (Proposed Standard)
- E.P.A. Requirements
- H.U.D. Standards
- O.S.H.A. Standards
- Federal, state, local regulations

Specified by:
- Department of Defense (D.O.D.)
- Housing and Urban Development (H.U.D.)
- Industry (Industrial Hygienists)
- Schools, Hospitals and Public Health Officials.

L-B-C contains Bitrex®, a very bitter tasting anti-ingestion agent which is E.P.A. accepted and F.D.A. approved.

L-B-C is environmentally friendly and is certified non-toxic.

L-B-C resists fungus and mildew.

L-B-C is class "A" fire rated.

L-B-C can be used on interior and exterior surfaces.

L-B-C has ultraviolet (UV) protection.

Recommended Coverage:
- 7 Dry Mils (15 - 18 wet mils)
- 90 - 100 square feet per gallon
- Airless spray, roller, or brush.

Special note for airless spray application: Unlike most competitive products, L-B-C will yield the recommended dry film thickness in only one application. As a result, contractors purchase less encapsulant, and witness higher profits margins due to reduced labor costs.

Packaged in:
- 1 Gallon cans
- 5 Gallon pails
- 55 Gallon drums

Guaranteed for 20 years

Patent Pending

L-B-C provides maximum coverage with minimum thickness, for the most economical solution available.

L-B-C is a one step process.
- no mesh, scrim, or wire brush required
- one product meets all encapsulation needs.

L-B-C creates a flexible, impact - abrasion resistant barrier that resists aging and surface movement.

L-B-C cleans off tools and drippings with warm soapy water.

11/10/94

* Patent Pending

PRODUCT DATA

L-B-C™
LEAD BARRIER COMPOUND*

DESCRIPTION

Product No.: 5400; Color: Antique Linen

L-B-C is a elastomeric-thermoplastic water-based co-polymer; blended specifically to form a barrier to lead-based paint (LBP). It has been independently tested and approved by DL Laboratories in New York and certified by the Commonwealth of Massachusetts (No. DL-9977). L-B-C has also been classified by Underwriters Laboratories (UL®) and approved by the U.S. Department of Agriculture (U.S.D.A.). L-B-C and LEADMASTER, (also manufactured by Fiberlock Technologies, Inc.) are the only true encapsulants on the market today since they actually prevent the migration of lead to the surface, thus eliminating future lead dust contamination and potential liability. In addition, L-B-C meets or exceeds all projected standards; federal, state, local, ASTM, EPA, HUD, and OSHA, for encapsulation of surfaces containing such paint. L-B-C contains Bitrex®, a bitter tasting anti-ingestion agent which is EPA accepted and FDA approved. L-B-C is environmentally friendly and complies with all federal and state VOS/VOC requirements.

PROPERTIES

- Solids by weight: 54 ±2%; by volume: 42 ±2%
- Volatile: Water
- Average particle size: 0.2 microns
- Viscosity at 77°F: 120-130 Krebs Units
- Density @ 77°F: 10.1 ± 0.2 lbs./gal.
- Flash point: Non-combustible (water based).
- Odor: Virtually odorless.
- Shelf Life: @ 77°F, 36 months minimum, (in original factory sealed containers).
- Finish: Eggshell. 60° specular gloss 17 ±5
- Weight per gallon at 77°F: 10.2 lbs.
- Minimum dry film thickness: 7 mils
- Coverage:
  Airless Spray: 90 - 100 sq. ft./gal. (7 dry mils)
  Brush: 200 sq. ft./gal. (3-4 dry mils)
- Dry time @ 77°F:
  To touch: 1-2 hours
  Full cure: 12-24 days
- Fire rating ASTM E84-81a: Class "A"
  (Southwest Research Institute)
  Flame Spread: 0
  Fuel Contribution: 5
- Packaged: 1, 5, and 55 gallon containers

SURFACE PREPARATION

Consult all related local, state and federal regulations regarding work practices and personal protection to be used prior to surface preparation. Sanding, scraping and other surface preparation procedures can create toxic dust and hazardous waste. A HEPA (High Efficiency Particulate Air) vacuum should be used on all surfaces to remove hazardous dust and particles. Use MSHA/NIOSH approved or equivalent respiratory protection suitable for concentrations and types of air contaminants encountered. For detailed and specific information regarding proper surface preparation, refer to L-B-C specification.

Inspect all surfaces to be treated to insure they are clean, dry and free of all foreign matter including: dust, rust, grease, oil, mildew, glue size, calcimine, wax, soap, loose paint, etc. Patch and repair irregularities in surfaces with prepared vinyl paste or appropriate patching compound. Allow to dry and wet sand smooth. Use Power Block™ or any other approved stain blocking primer for surfaces which have been water damaged or discolored. For high gloss or newly painted surfaces, wet scour with a coarse scouring pad and Lead-Prep™ (I or II) or any other approved surface preparation treatment. Wear gloves and protective eye wear if using caustics.

*Patent Pending

FIBERLOCK TECHNOLOGIES, INC.
630 Putnam Avenue, P.O. Box 390432
Cambridge, MA 02139-0802 U.S.A.
Toll Free: 1-800-FIBERLK
Tel. (617) 876-8020
FAX (617) 547-6934

APPLICATION PROCEDURES FOR L-B-C, LEAD BARRIER COMPOUND

APPLICATION TOOLS

Apply L-B-C with a brush, roller, or airless spray equipment. Refer to the product application section below for more specific information on settings and which tools to select.

MIXING

Stir thoroughly. Do not dilute, thin, tint or mix with any other product.

PRODUCT APPLICATION

Apply liberally and uniformly with a polyester or nylon brush to woodwork and trim. Multiple coats may be necessary to achieve required, recommended or desired dry thickness. For best results when applying L-B-C with a roller, use a 3/8" - 1/2" nap. Let L-B-C dry before applying additional coats. L-B-C may be painted over to provide desired aesthetic finish.

L-B-C can be successfully applied in a one coat application with most airless spray equipment including Graco®, Wagner®, Titan®, Binks® and Hero®.

Recommended settings for airless spray equipment:

Pressure: 1800 - 2000 psi
Hose length: 50 - 100 feet
Hose diameter: 1/4 inch
Tip orifice size: 0.021" - 0.025" (ideal setting: 0.023")
Tip fan size: 521

CLEAN UP

Clean tools and drippings with warm soapy water before L-B-C dries. Dispose of all waste according to all existing local, state and federal regulations.

KEEP OUT OF REACH OF CHILDREN
FOR PROFESSIONAL USE ONLY
KEEP FROM FREEZING

Cautions:

Use with adequate ventilation to avoid over exposure. Although L-B-C contains no hazardous ingredients, wear a MSHA/NIOSH approved or equivalent respirator capable of filtering out the airborne spray mists which contain the bitter tasting anti-ingestion agent. Avoid contact with eyes and skin. Wash hands after using L-B-C. L-B-C will not protect occupants from ingestion of the encapsulated lead-based paint, if surface is damaged, broken or abraded. Surfaces coated with L-B-C must be inspected routinely. Damaged surfaces should be repaired and re-encapsulated immediately to prevent exposure to the lead hazard. Not recommended for use on friction surfaces or movable closures such as door and window jambs, since the coating thickness may alter clearances and affect proper operation. L-B-C is safe for the presence of children after it has fully cured.

Limited Warranty:

Fiberlock Technologies, Inc., warrants L-B-C for a minimum of twenty (20) years from the date that the product is applied to form an effective barrier from the hazards of the encapsulated lead-based paint. The warranty described in this paragraph, expressed or implied, is including but not limited to the implied warranties of salability and fitness for a particular purpose. User shall determine the suitability of L-B-C's use and assume any and all risks and liabilities which may arise in connection with the application of L-B-C. This warranty is extended only to the purchaser of L-B-C and does not apply to any damages which are a direct result of improper surface preparation and or application.

This warranty does not extend to, nor shall Fiberlock Technologies be liable for any damage resulting from any abuse to the encapsulated surface by tenants or occupants, improper maintenance, water damage, or other conditions beyond Fiberlock Technologies' control. Fiberlock Technologies' sole and only liability under this warranty shall be, at its option, either replace the product if proved defective or to refund the purchase price paid. Fiberlock Technologies shall not be held liable for any incidental damages, or for any consequential damages to property, or any losses of revenue which may have been caused by a defect or product failure. The purchaser of this product must notify Fiberlock at 630 Putnam Avenue, Cambridge, Massachusetts 02139 (617-876-8020) within forty five (45) days to advise of any suspected manufacturing defects. This warranty gives the purchaser specific legal rights and possible additional rights which may vary from State to State.

0606

FIBERLOCK TECHNOLOGIES, INC.
630 Putnam Avenue
P.O. Box 390432
Cambridge, MA 02139-0802
Tel. (617) 876-6020
FAX (617) 547-6934

Environmental Control and Containment Systems

Typical Questions asked about L-B-C™ Lead Barrier Compound

What is L-B-C?
It is an advanced formulation and blend of copolymers; consisting of acrylic resins, thermoplastic elastomers and thermosetting polymers.

The Acrylic resins such as numerous polymers including acrylic neoprene, acrylic acid, methacrylic acid, esters of these acids used in the production of synthetic rubbers and lightweight plastics.

The Thermoplastic elastomers such as chemical blends of high density Polyethylene / SBR rubber complex plus Polypropylene EPDM rubber complex.

The Thermosetting polymers such as Linear Low Density Polyethylene, Polystyrene, Polycarbonate, Polyurethane, Polyethylene, Teraphathialate, Polytetraflourothylene.

L-B-C also contains Calcium Carbonate, Titanium Dioxide, Propylene Glycol and Denatonium Benzoate.

What Makes L-B-C Different - From Other Encapsulants?
It's inherent lightweight, highly viscous formulation does not require heavy multiple coats to do the job. L-B-C's recommended 7 dry mil film thickness is 1/2 the recommended thickness of many other encapsulants. Other encapsulants place undue stress on lead-based paint systems because of the excessive weight necessary to achieve the higher recommended film thickness.

It's unique blend of acrylics, thermoplastic elastomers and thermosetting polymers give it all of the advantages of epoxies, urethanes and rubber with the characteristics and aesthetics of a superior, one-step, high quality paint.

It was formulated to meet the strictest standards any topical coating could be challenged with for virtually any performance hurdle or standard.

Are there any Certified Encapsulants?
Yes. The state of Massachusetts independently tested several products and has a list of certified products. To obtain a copy of the register of approved encapsulants call the Massachusetts Department of Health at: 617-522-3700. Both Fiberlock encapsulants (L-B-C and LeadMaster™) received certification. L-B-C has the highest coverage rate of all Massachusetts certified encapsulants.

Can L-B-C be Tinted?

The minimum requirement for a special color tint is 400 gallons. Because L-B-C is so thick, and because it is UL* classified, we do not recommend adding tint. L-B-C can be painted to achieve a desired color. Fiberlock will still honor the 20 year guarantee if a compatible, preferably 100% acrylic latex paint is applied over L-B-C. Fiberlock's other certified product, LeadMaster is available in 9 colors.

Can L-B-C be applied on exterior surfaces?

Yes! L-B-C has ultraviolet inhibitors. If L-B-C is applied over an exterior surface that is oil based, any subsequent paint applied over the L-B-C must be latex based. Oil based products expand and contract at different temperatures than latex products. The wide temperature fluctuations subject to exterior surfaces prohibit the "sandwiching" of oil and latex based products.

How is L-B-C Applied?

L-B-C can be brush, roller, or spray applied. Select the method most appropriate for each application.

Can A Home Owner Apply L-B-C?

Although home owners cannot, at this time, receive certification of abatement they can and will be buying a high degree of personal protection from lead based paint hazards by applying L-B-C, particularly if young children are present. A home owner that applies L-B-C in accordance with Fiberlock Technologies' written specifications is better off than a home owner that chooses to ignore the hazard altogether. There is speculation that Massachusetts will allow homeowners to apply encapsulants and receive proper notification of abatement from the state.

2/27/95

MATERIAL SAFETY DATA SHEET

(Essentially similar to OSHA form 174, Sept. 1985
For compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200)

SECTION I: PRODUCT IDENTITY:

L-B-C™ Lead Barrier Compound
#5400 Antique Linen

Manufacturer:
Fiberlock Technologies, Inc.
630 Putnam Avenue
Cambridge, MA 02139-0802

Date of Preparation: 10/20/94
Information Phone Number: (617) 876-8020
Emergency Phone Numbers:
Weekdays 617-876-8020
Weekends & Holidays (508) 887-5926 or
"CHEM-TEL" Emergency Contact Number
(800) 255-3924

SECTION II: HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components:	Common Names:	CAS No.:	OSHA PEL or ACGIH TLV:

None per the limits for reporting set forth in 29CFR 1910.1200 (1)

SECTION III: PHYSICAL/CHEMICAL CHARACTERISTICS (See Reference Notes)

Boiling points of Major Constituent(s):	Water-212°F
Specific Gravity (Water=1) lbs/gal:	10.4 lbs/gal
Vapor Pressure (mm Hg) at 100°C:	760 mm
Melting Point Water (Ice):	Above 32°F
Vapor Density (AIR=1):	Heavier
Evaporation Rate (Butyl Acetate=1):	Slower
Solubility in Water:	Complete
Appearance:	Liquid
Odor:	Slight odor

SECTION IV: FIRE AND EXPLOSION HAZARD DATA - Non-flammable

Flash Point: Non-combustible Flammable Limits: LEL: N/A UEL: N/A
DOT Hazard Class: Not Regulated Marking: "Keep from Freezing"

SECTION V: REACTIVITY DATA

Hazardous Polymerization: Will not occur
Stability: Stable
Incompatibility: Avoid Contact with: Strong oxidizing agents (e.g. nitric acid, permanganates)
Hazardous Decomposition Products: Some carbon monoxide

SECTION VI: HEALTH HAZARD DATA/TOXICITY DATA (See Note)

Route(s) of Entry: N/A Carcinogenicity?: NO

Health Hazards (Acute and Chronic):
EFFECTS OF OVEREXPOSURE: Inhalation: Vapors or spray mists may be slightly irritating to the eyes, nose, throat, and mucous membrane of the respiratory tract, producing symptoms of a headache and nausea in poorly ventilated areas. Skin Contact: Prolonged or repeated contact with coating may cause slight skin irritation. Eye Contact: Direct contact; inconsequential eye irritation. Ingestion: May cause nausea and intended expectoration. (2)
EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes and consult a physician. Skin Contact: Wash skin thoroughly with soap and water. If drenched, remove and wash clothing before reuse. Ingestion: If victim is conscious, give 2 glasses of water. Call a physician.

NOTES: (1) This product contains titanium dioxide pigment classified by ACGIH as a "nuisance dust". Exposure to spray mists or sanding dusts should be controlled to below 10 mg/m^3 through usage of NIOSH-approved dust filter respirators. (2) Contains 0.04% (Denatonium Benzoate NF - XVII) as an anti-ingestion agent — yields a very bitter taste.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Keep unnecessary people away. Floor may be slippery; use care to avoid falling. Dike and contain material with inert material (e.g. sand, earth). Transfer liquid to containers for recovery or disposal and solid diking material to separate containers for disposal. Keep spills and cleaning run-offs out of municipal sewers and open bodies of water.

WASTE DISPOSAL METHOD: The coating and any contaminated diking material should be thoroughly air dried and collected into drums. The drums should then be sealed and properly labeled with waste designation and landfill or incinerated according to current local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Maximum storage temperature 100 degrees Fahrenheit. Keep closure tight and container upright to prevent leakage. Precautionary Labeling: "Keep from Freezing".

OTHER PRECAUTIONS: Do not get in eyes. Avoid skin contact. Prevent prolonged or repeated breathing of vapors or spray mists. Do not handle until the manufacturer's safety precautions and label instructions have been read and understood. Avoid breathing sanding dust.

SECTION VIII: CONTROL MEASURES

RESPIRATORY PROTECTION: None required if good ventilation is maintained. Wear respirator (MSHA/NIOSH-approved or equivalent) suitable for concentrations and types of air contaminants encountered. Use approved chemical/mechanical filters designed to remove particulates in open and restricted ventilation areas. Use MSHA/NIOSH-approved airline type respirator or hood in confined areas.

VENTILATION: Sufficient ventilation, in pattern and volume, should be provided to keep the air contaminant concentration below applicable exposure limits. All application areas should be ventilated in accordance with OSHA regulation 29CFR Part 1910.94.

PROTECTIVE GLOVES: Impervious gloves should be worn if prolonged skin contact is likely. Use neoprene or rubber gloves to prevent prolonged skin contact.

EYE PROTECTION: Use safety eyewear including side shields, face shields, or chemical splash goggles (ANSI Z-87.1 or approved equivalent).

OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Use protective cream if prolonged skin contact is likely.

HYGIENIC PRACTICES: Wash hands before eating, smoking or using the washroom. Food or beverages should not be consumed anywhere this product is being applied.

REFERENCES:

1. Sax, N.I., "Dangerous Properties of Industrial Materials", 8th ed., Van Nostrand Reinhold Company Inc., N.Y., 1982.
2. American Conference of Governmental Industrial Hygienists, "TLV's and Biological Exposure Indices" for the current year (published annually).
3. U.S. Code of Federal Regulations (CFR) U.S. Dept. of Labor, No.29, Parts 1900 to 1910.1200. OSHA Communications Standard 29 CFR 1910.1200.
4. Sax, N.I., R.J. "Hazardous Chemicals Desk Reference", Van Nostrand Reinhold Co., Inc., N.Y., 1987.
5. Fire Protection Guide to Hazardous Materials, 10 ed., National Fire Protection Association, Quincy, MA, 1991.
6. Title III List of Lists, U.S. Environmental Protection Agency publication EPA 560/4-90-011, Jan. 1990.

Supplemental Information
to comply with New Jersey DOH Right-To-Know Labeling Law (N.J.A.C. 8:59 -5.1 & 5.2)

HMIS HAZARD RATING		
Health 1	Flammability 0	Reactivity 0
HAZARD INDEX		
0= Minimal, 1= Slight, 2= Moderate, 3= Serious, 4= Severe		

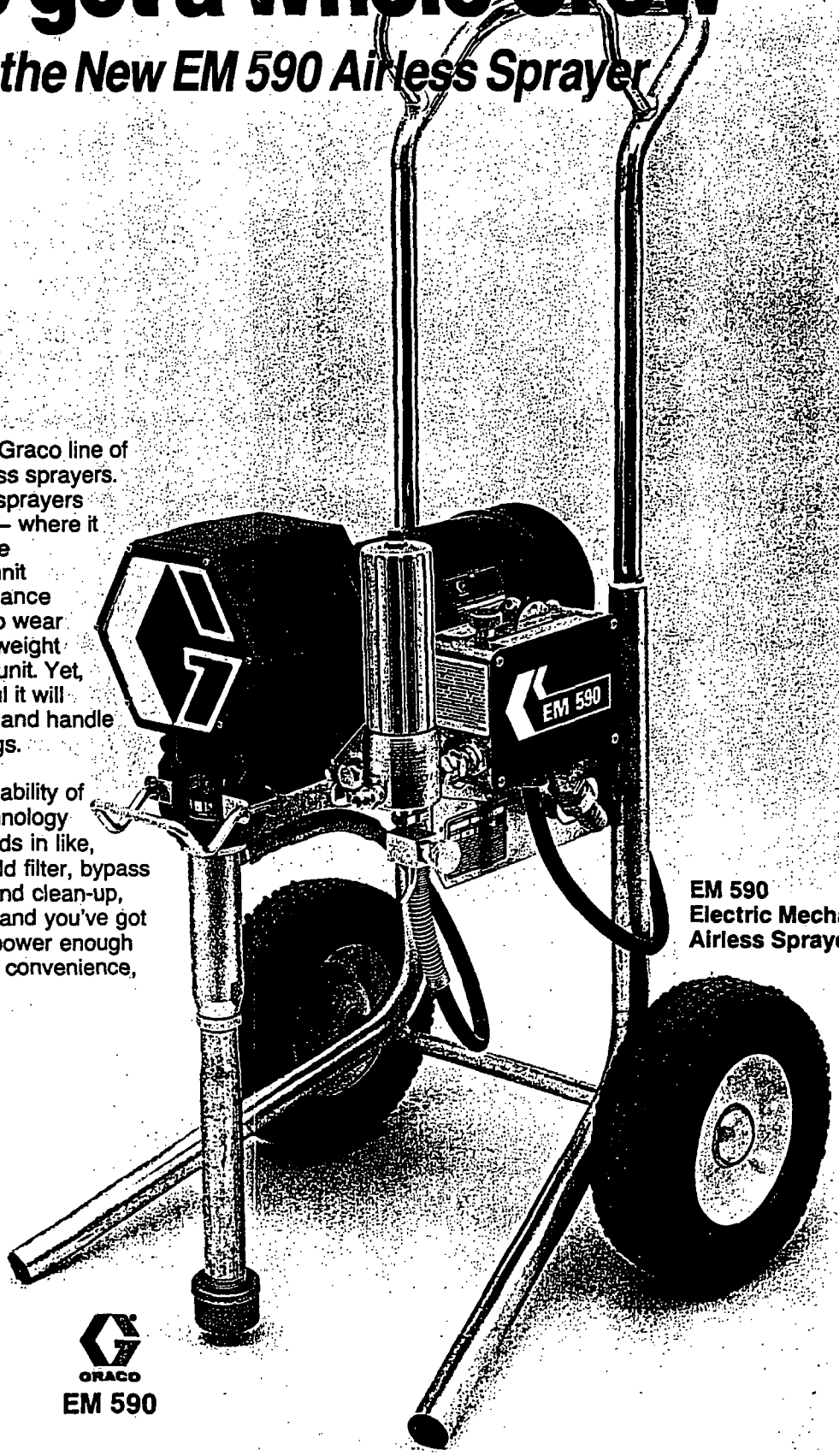
CAS No.:	Chemical Ingredients:
7732-18-5	Water
13463-67-7	[illegible]ium dioxide
Not Avail.	[illegible] inert extender*
Not Avail.	Pr[illegible] surfactant*
Not Avail.	Pr[illegible] Resin solids *

*contents partially u[illegible]wn

Just add a Painter and you've got a Whole Crew

GRACO

introducing the New EM 590 Airless Sprayer



EM 590
Electric Mechanical
Airless Sprayer

Powerful...
Portable...
Economical...

The latest addition to the Graco line of mechanically driven airless sprayers. The EM series of airless sprayers have proven their worth — where it counts on the job site. The EM 590 is a direct drive unit providing greater performance and fewer moving parts to wear or repair. The unit is lightweight and an ideal one painter unit. Yet, this sprayer is so powerful it will spray with tips up to .025 and handle most architectural coatings.

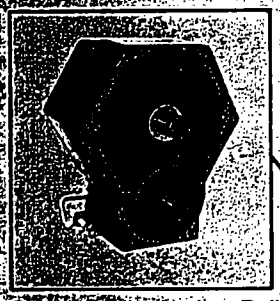
Add to this the known reliability of Graco's piston pump technology and the extras Graco builds in like, longer life motors, mainfold filter, bypass valve for easier priming and clean-up, reliable pressure control; and you've got the best of all worlds — power enough for the job combined with convenience, reliability and portability.

GRACO
EM 590

Convenient Features, Portable Operation

231-590 Complete unit includes: sprayer, 50 ft. x ¼ in. ID airless hose, 3 ft. whiphose, Flex gun, RAC IV Dripless Guard and SwitchTip of choice.

220-856 Sprayer only.
Order optional siphon hose accessory, 218-078.



Graco tough gearing. Built to last and lifetime lubrication means no maintenance of this part.

Motor life, gearing life, along with convenient features make the Graco EM 590 a better value.

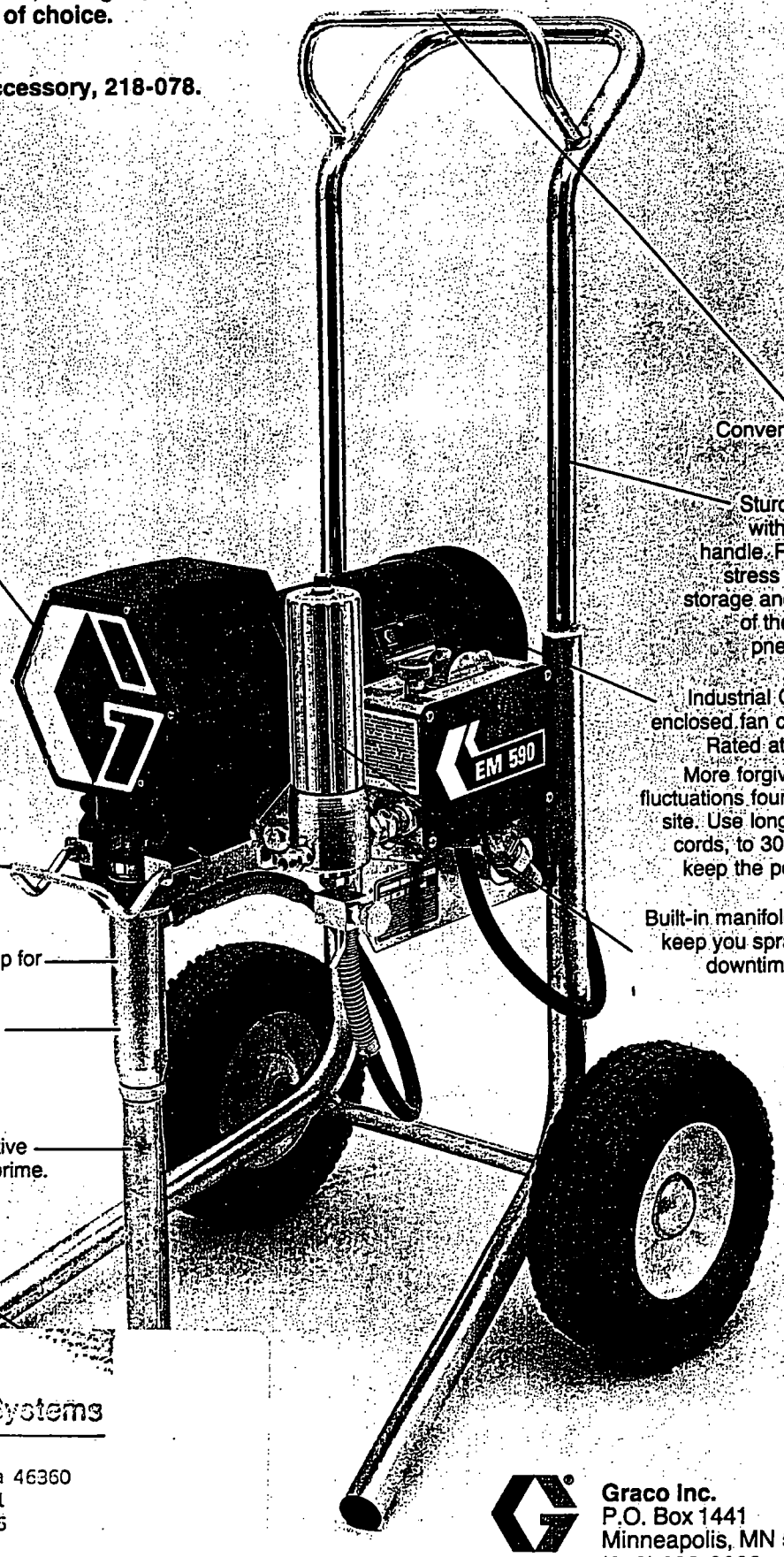
5 gallon pail hook. Added convenience — move your paint with the unit.

Nitralloy, hardened steel piston pump for longer life. Spray stains to hi-builds.

Graco's exceptional packing design extends the life of the packing 40-50% reducing maintenance cost and time.

Upright, Immersed Feed. More positive loading of the pump and an easier prime.

Inlet Screen.
Filters paint as you spray.



Hose rack.
Convenient storage of the hose.

Sturdy metal cart with telescoping handle. Reinforced at stress points. Easy storage and movement of the unit. Semi-pneumatic tires.

Industrial Grade, totally enclosed fan cooled motor. Rated at 2000 hours. More forgiving of power fluctuations found on the job site. Use longer extension cords, to 300 ft., and still keep the power flowing.

Built-in manifold filter. Helps keep you spraying without downtime from clogs.

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Minneapolis, MN 55440-1441
(612) 623-6000

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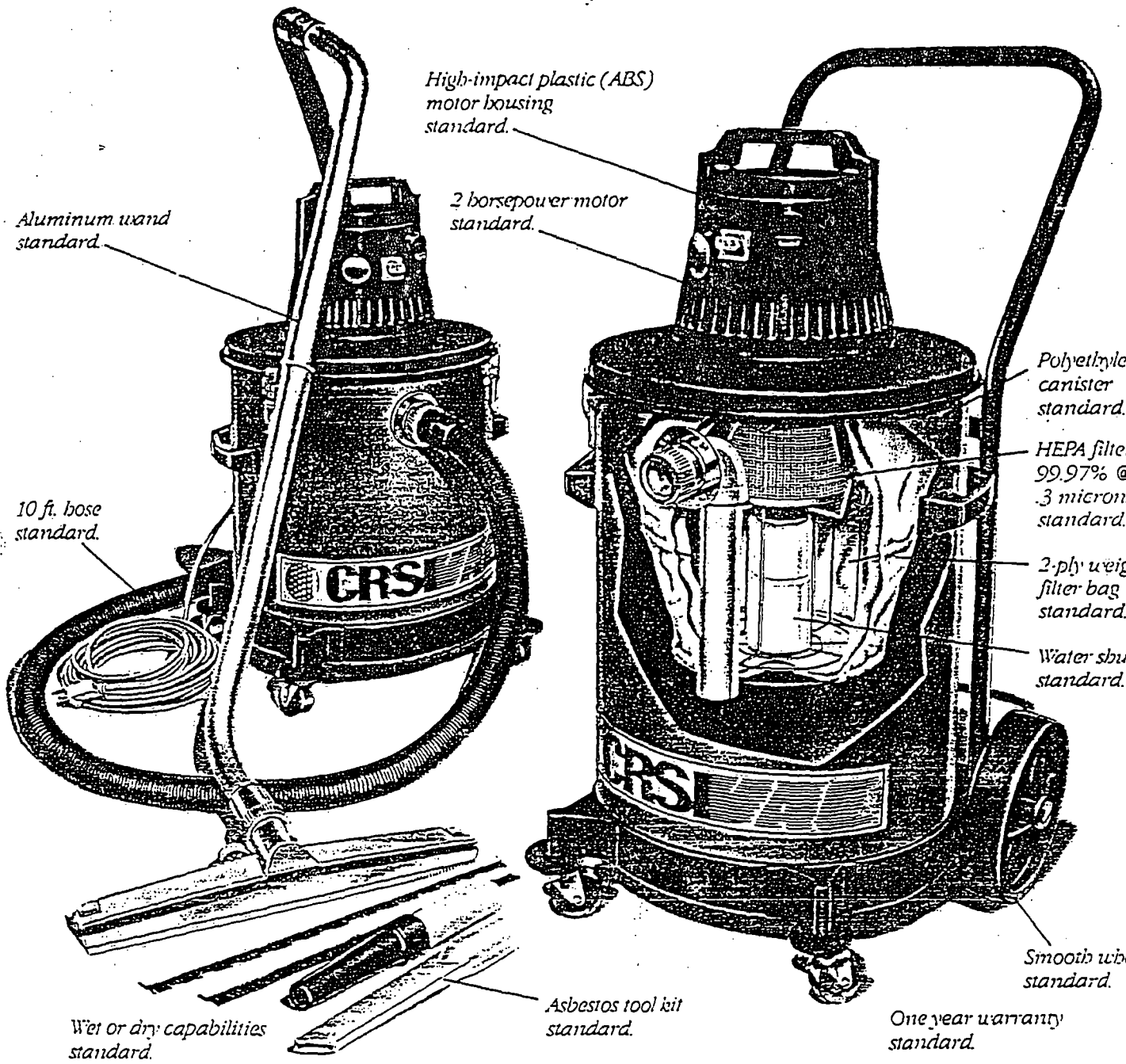
"...Standard."



CRSI sets the standard. Our two asbestos canister vacuums are equipped with significantly improved power heads over traditional models. Powered by 2-horsepower, 1270 watt* by-pass Lamb® motors, these polyethylene CRSI VACs are much stronger and more durable than stainless steel or metal built vacs. The CRSI VACs are built with a self-cleaning, three-stage, floating filter system, and automatic wet shut off. These and many other innovative features *are all standard.*

*CRSI Vacs deliver 107 CFM of air and 100 inches of water lift for a true 1270 watts of performance.

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Environmental Systems
A Subsidiary of Control Resource Industries, Inc.
670 Mariner Drive
Michigan City, Indiana 46360
Phone (219) 872-5591

CRSI VACUUM SPECIFICATIONS

Capacity	15 and 7-1/2 gallon
Electrical	115 Volt 9.1 amps
Construction	ABS and Polyethylene
Air Volume	107 cfm
Water Lift	100 inches
Filter Efficiency	99.97% @ .3 micron

Testing in accordance with mil spec. 282 and QAP-12 HEHF 41.

MSA

Powered Air-Purifying Respirator

Type A instructions

WARNING

THIS MANUAL MUST BE CAREFULLY READ BY ALL PERSONS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT. Like any complex piece of equipment, the Powered Air-Purifying Respirator (PAPR) from MSA will perform as designed only if it is used and serviced according to the instructions. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED, AND PERSONS WHO RELY ON THIS RESPIRATOR COULD SUSTAIN SEVERE RESPIRATORY INJURY OR DEATH.

The warranties made by Mine Safety Appliances Company with respect to the product are voided if the product is not installed, used, and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions.

Please read and observe the WARNINGS and CAUTIONS inside. We encourage our customers to write or call for a demonstration of this equipment prior to use or for any additional information relative to use or repairs.

Call 1-800-MSA-2222 during regular working hours, or 1-800-MSA-5555 after working hours or during emergencies.

Manufactured by

MINE SAFETY APPLIANCES COMPANY

PITTSBURGH, PENNSYLVANIA, U.S.A. 15230

(TAL 785 IL) REV. 0

485415

Contents & Important Notice

TABLE OF CONTENTS

IMPORTANT NOTICE FOR RESPIRATORY PROTECTION PROGRAM ADMINISTRATORS 2
DESCRIPTION 3
Limitations 3
Principle of Operation 3
Unpacking and Inspection 3
Preparation Before Use 3
Filter Removal and Battery Charging 4
WARNING 5
Reattaching the Battery Pack and Installing Filters . 5
WARNING 6
DONNING THE RESPIRATOR 7
WARNING 7
Donning the Support Belt 7
Donning the Comfo® and Comfo Welder's Facepiece 7
Donning the Ultravue® Facepiece 8
WARNING 8
Air-Tightness Test (Face-to-Facepiece Seal) 9
WARNING 9
Final Hook-up 9
USING THE RESPIRATOR 10
Service Time (Filters and Battery Pack) 10
In Case of Emergency 10
WARNING 10
Replacing the Filters and Battery Pack 10
WARNING 10
Decontamination 11
Removing the Respirator 11
Removing the Comfo and Comfo Welder's Facepiece 11
Removing the Ultravue Facepiece 11
MAINTAINING THE RESPIRATOR 12
WARNING 12
Cleaning and Sanitizing 12
WARNING 12
Component Inspection 12
WARNING 12
Respirator Storage 12
Accessories 12
Spare Parts List 14
Ordering Information 14
APPROVALS 16

IMPORTANT NOTICE
FOR RESPIRATORY PROTECTION
PROGRAM ADMINISTRATORS

1. An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and training in the use of equipment, inspection and maintenance of equipment, and medical surveillance. (See OSHA regulations, Title 29 CFR, Part 1910.134, Sub-part par. 1910.134 (b) (1).)
2. This respirator will perform as designed only if used and maintained according to the manufacturer's instructions. The Program Administrator and the users must read and understand these instructions before trying to use or service this product. We encourage our customers to write or call for information on this product before using it.
3. This respirator may be used only after proper instruction and training in its use as specified in OSHA regulations (Title 29 CFR, Part 1910.134, Subpart I, par. 1910.134 (b) (3)).
4. This respirator may not be worn in an atmosphere which is immediately dangerous to life or health or from which the wearer cannot escape without the aid of a respirator. Under no circumstances should the respirator be used as an underwater device.
5. Users must wear suitable protective clothing (see page 7) and precautions must be taken so that the respirator is not worn in atmospheres that may be harmful to the device (see page 10).
6. Do not alter, modify, or substitute any components without the approval of the manufacturer. Such alterations will void the NIOSH/MSHA approval.
7. Inspect the respirator regularly and maintain it according to the manufacturer's instructions. Repairs must only be made by properly trained personnel.

Description

DESCRIPTION

The Powered Air-Purifying Respirator (PAPR) is certified by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) as an air-purifying device designed for use in atmospheres not immediately dangerous to life or health:

> "Not immediately dangerous to life or health means any hazardous atmosphere which may produce physical discomfort immediately, chronic poisoning after repeated exposure, or acute adverse physiological symptoms after prolonged exposure (Title 30 CFR, Part 11, Subpart A, par. 11.3(z)).

The PAPR can be used with the Comfo® half facepiece, Comfo® Welder's half facepiece, and Ultravue® full facepiece. The Ultravue facepiece is available with an integral welder's lens or may be used with the clip-on welder's adapter (see page 14). All facepieces are available in small, medium or large. Rubber or silicone material may be selected.

The respirator consists of the following sub-assemblies:

- a motor-blower (with a flexible rubber breathing tube attached);
- a rechargeable nickel-cadmium battery pack;
- a set of 2 replaceable Type A filters;
- a tight-fitting facepiece (half or full, in small, medium, or large);
- a support belt;
- a battery charger;

The motor-blower, battery pack and filters are worn as an assembly on the support belt. The breathing tube connects the belt-mounted assembly to the facepiece.

A. Limitations

The PAPR is certified for wearer protection against dusts, fumes and mists which have a time-weighted average (TWA) of less than 2 million particles per cubic foot and dusts and mists containing asbestos. The PAPR also is permissible in methane-air atmospheres. PAPR filters do not remove poisonous gases or vapors from the air supply. No filter is designed for all substances. Therefore, you must know what the contaminant is, as well as its concentration, before selecting a respirator. This respirator does not supply oxygen. Do not use this respirator unless the surrounding air contains a minimum of 19.5 percent oxygen. The respirator may be used at temperatures between 0°F and 120°F, and may be worn under flame-retardant garments. If used below 40°F, a fully-charged battery will not operate the motor-blower for 7 continuous hours.

B. Principle of Operation

The motor-blower draws surrounding air through the filters which capture the contaminant. Filtered air passes through the breathing tube to the facepiece. Air pressure in the facepiece is higher than the surrounding air. This means that if a leak occurs, air will flow from inside the facepiece to the outside air. This is referred to as positive pressure. Air flow also provides wearer comfort.

The rechargeable nickel-cadmium battery pack supplies 4.5 volts (nominal) to the motor-blower. The battery is replaceable. A fully charged battery is designed to operate a minimum of 7 hours. Battery charging time is 16 hours.

The two replaceable filter cartridges which trap the particulate contaminant are 99.97% efficient against 0.3 micron DOP smoke.

C. Unpacking & Inspection

The PAPR consists of the following components:

- facepiece
- motor-blower, battery pack and filters (as a single assembly)
- support belt
- charger
- protective cover

CAUTION

Thoroughly inspect all components of the respirator before the device is used. Read and observe all NIOSH/MSHA approval limitations as they apply to using the PAPR.

1. Remove the facepiece, battery charger, support belt, and the protective cover from the box. Check for signs of shipping damage.
2. Remove the remaining assembly (motor-blower and attached breathing tube, the battery pack and the two filters). Check for shipping damage.

CAUTION

Do not drop the PAPR. The case may be damaged by impact. The blower may be loosened or the motor shaft may be bent. If the unit is dropped. check the case for cracks. Listen closely to the sound of the motor. If the blower sticks or rattles, or if air output is reduced, the entire motor-blower must be returned to MSA for repair.

D. Preparation Before Use

1. Filter Removal and Battery Charging

The battery pack must be fully charged for 16 hours before the respirator is first used. Use the standard charger (P/N 463471) or other recommended charger from MSA only. Other chargers may damage the battery due to internal wiring differences or incorrect charging rates.

PERMISSIBLE

HIGH-EFFICIENCY POWERED AIR-PURIFYING RESPIRATOR FOR ASBESTOS DUSTS AND MISTS

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

APPROVAL NO. TC-21C-354

ISSUED TO

MINE SAFETY APPLIANCES COMPANY, Pittsburgh, Pennsylvania, U.S.A

LIMITATIONS

Approved for respiratory protection against dust, fumes, and mists having a time-weighted average less than 2 million particles per cubic foot and asbestos-containing dusts and mists.
The manufacturer limits the respirator to use against asbestos-containing dusts and mists.
Not approved for radionuclides.
Not for use in atmospheres containing less than 19.5 percent oxygen.
Not for entry into atmospheres immediately dangerous to life or health.

CAUTION

Replace filters when the air flow falls below 4 cubic feet per minute.
In making renewals or repairs, parts identical with those furnished by the manufacturer under the pertinent approval shall be maintained.
Follow the manufacturer's instructions for changing filters.
This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, Occupational Safety and Health Administration, and other applicable regulations.

MSHA — NIOSH Approval TC-21C-354

Issued to Mine Safety Appliances Company, July 1, 1987

The approved Respirator consists of the following MSA parts: 7-727-1, 7-727-2, 7-727-3, 7-476-1, 7-476-2, 7-476-3, 7-250-1, 7-250-2, 7-250-3, 7-285-1, 7-285-2, or 7-285-3 facepiece; 463380 or 484082 motor-blower and hose assembly; 478782 (TC-21C-354) filters; 463239 battery and 463469 or 473902 belt.

PERMISSIBLE

HIGH-EFFICIENCY POWERED AIR-PURIFYING RESPIRATOR FOR ASBESTOS DUSTS AND MISTS

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

APPROVAL NO. TC-21C-355

ISSUED TO

MINE SAFETY APPLIANCES COMPANY, Pittsburgh, Pennsylvania, U.S.A

LIMITATIONS

Approved for respiratory protection against dust, fumes, and mists having a time-weighted average less than 2 million particles per cubic foot and asbestos-containing dusts and mists.
The manufacturer limits the respirator to use against asbestos-containing dusts and mists.
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Not for entry into atmospheres immediately dangerous to life or health.

CAUTION

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In making renewals or repairs, parts identical with those furnished by the manufacturer under the pertinent approval shall be maintained.
Follow the manufacturer's instructions for changing filters.
This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, Occupational Safety and Health Administration, and other applicable regulations.

MSHA — NIOSH Approval TC-21C-355

Issued to Mine Safety Appliances Company, July 1, 1987

The approved Respirator consists of the following MSA parts: 7-203-1, 7-203-2, 7-203-3, 7-361-1, 7-361-2, 7-361-3 facepiece; 463380 or 484082 motor-blower and hose assembly; 478782 (TC-21C-354) filters; 463239 battery and 463469 or 473902 belt.

MSA

PERMISSIBLE POWER ASSISTED RESPIRATOR

APPROVAL 2G-3374-2

MSHA

TESTED IN METHANE-AIR MIXTURE ONLY

WARNING: MSHA APPROVED FOR USE WITH 4.8 VOLT BATTERY MODULE PART NUMBER 463239 ONLY

FACTORY MUTUAL FM APPROVED

Intrinsically Safe for use in Class 1, Division 1, Groups C and D hazardous locations when used with MSA Battery Pack Part No. 463239. Any subsitution of components may impair intrinsic safety.

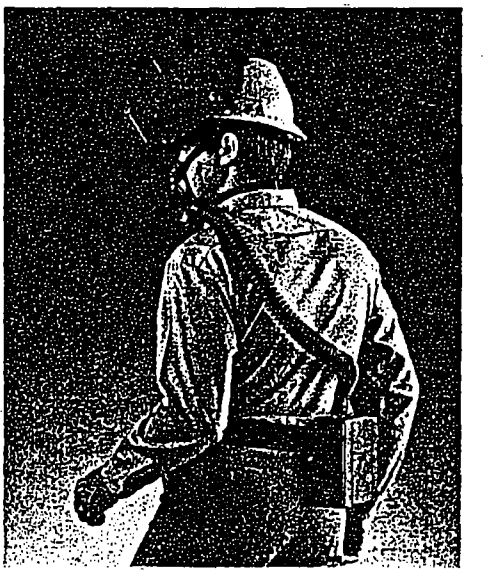
COMMONWEALTH OF PENNSYLVANIA

APPROVAL NO. BFE-911-83

MSA

Data Sheet
10-01-09

Powered Air Purifying Respirator



Application

The MSA Powered Air Purifying Respirator (PAPR) is approved for protection against dusts, fumes, and mists having a time-weighted average (TWA) less than 0.05mg/m³, and radionuclides. Its design makes the PAPR especially suited for asbestos, foundry and coke oven applications; it can be worn under heat-retardant clothing, comfortably.

Description

The Powered Air Purifying Respirator can be used with any of three types of MSA facepieces as shown above: Comfo® II, Welders Comfo, or Ultravue® facepiece. All three facepieces are available in small, medium, and large sizes and all have twin exhalation valves.

Major components of the Powered Air Purifying Respirator include: two high-efficiency filters with a total surface area of almost 500 square inches, enclosed in a rugged lightweight housing; a spring-type dual-latch filter retention mechanism; a sealed battery pack containing the on/off switch, four F-size 1.2-volt rechargeable nickel-cadmium batteries, circuit breaker, resistor, and connection for battery charger; blower assembly complete with belt (blower motor is a brushless 4.6-volt dc-type rated by manufacturer for 5,000-hour running time); and a 30-inch corrugated breathing tube that can be connected to a choice of MSA twin exhalation valve facepieces.

Features

- Compact design—total weight under 5 lb
- All plastic parts of high-impact polycarbonate
- Easily replaceable high-efficiency filters
- Filter retention system with spring-type, dual-latch filter retention mechanism
- Filter housing which acts as guard for battery pack; absorbs shock if assembly is dropped
- Quick-change battery packs matched for uniform charge capacity; minimum 4-hour battery life
- Realistic motor rating—5,000-hr running time
- Improved filter cover designed to draw most of air through bottom, minimizing chance of sharp object or spark penetration
- Standard leather belt or, for easier decontamination, an optional PVC (polyvinylchloride) belt
- Power transmission terminals recessed for safety
- Clear speaking—because of twin exhalation valves, voice is projected, not muffled
- Belt designed to permit positioning of unit anywhere on the belt without removal
- Can be used in nonpowered mode during temperature extremes or in emergencies
- Optional SO_2 odor-removal, high-efficiency filter cartridge, which is also effective against nuisance levels (below the Permissible Exposure Level) of sulfur dioxide.
- Optional 36-inch breathing tube

›rdering information

atalog numbers

53353	Powered Air Purifying Respirator with medium Welders Comfo Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube
53354	Powered Air Purifying Respirator with medium Comfo Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube
...65	Powered Air Purifying Respirator with medium Ultravue Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube
938	Facepiece, Welders Comfo, small
252	Facepiece, Welders Comfo, medium
2	Facepiece, Welders Comfo, large
01	Facepiece, Comfo, small
46	Facepiece, Comfo, medium
97	Facepiece, Comfo, large
348	Facepiece, Ultravue, small
1342	Facepiece, Ultravue, medium
1354	Facepiece, Ultravue, large
53380	Motor/Blower Module with breathing tube assembly
54659	Breathing Tube Assembly (30 inches long)
3256	Grommet, Filter
3284	Filter, replacement, Type H; packaged 36 per carton
53441	Battery Pack with charger
53469	Belt, leather (one size fits 34" to 48")
74073	Retrofit kit for spring-type, dual-latch filter retention mechanism

Accessories

471710	Nosecup, for small Ultravue Facepiece
471711	Nosecup, for medium Ultravue Facepiece
471712	Nosecup, for large Ultravue Facepiece
454819	Prescription Eyeglass Kit for Ultravue Facepiece
34337	Cleaner-Sanitizer (dispenser box of 12 2-oz pkgs)
464850	PAPR Flow Tester
468486	PAPR Field Test Unit
465784	Resistance Test for PAPR filter cartridge
473902	Belt, optional PVC (one size fits 34" to 48")
628173	Carrying Case only, for PAPR
473382	Filter, optional replacement Type H, also effective against SO_2, packaged 36 per carton
466911	Breathing Tube, 36 inches long

Special probed facepieces for quantitative fit testing

466246	Probed Facepiece Assembly, Comfo, small
466245	Probed Facepiece Assembly, Comfo, medium
466499	Probed Facepiece Assembly, Comfo, large
467904	Probed Facepiece Assembly, Welders Comfo, small
466244	Probed Facepiece Assembly, Welders Comfo, medium
467905	Probed Facepiece Assembly, Welders Comfo, large
471685	Probed Facepiece Assembly, Ultravue, small
466260	Probed Facepiece Assembly, Ultravue, medium
471686	Probed Facepiece Assembly, Ultravue, large

Approvals and standards

The MSA Powered Air Purifying Respirator has Approval TC 21C-186 from the National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA); the filters are covered separately by the same approval (TC 21C-186). The filters must be replaced every four hours or when the air flow drops below four cubic feet per minute. The respirator is approved by the Bureau of Mines as intrinsically safe. It has also received Factory Mutual Approval as intrinsically safe for Class I, Division 1, Groups C and D hazardous locations.

›te: This Data Sheet contains only a neral description of the Powered Air rifying Respirator and Accessories. While es and performance capabilities are scribed, under no circumstances should the ›ducts be used except by qualified, trained rsonnel and not until the instructions, ›els, or other literature accompanying them ve been carefully read and understood and : precautions therein set forth followed. ›ly they contain the complete and detailed

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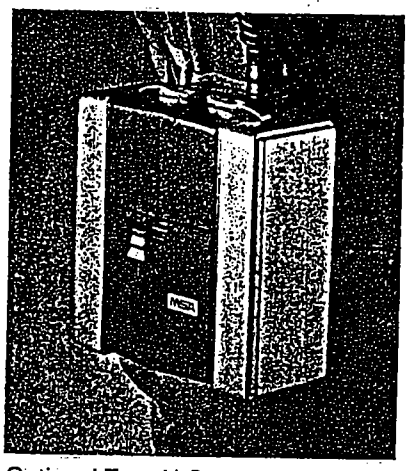
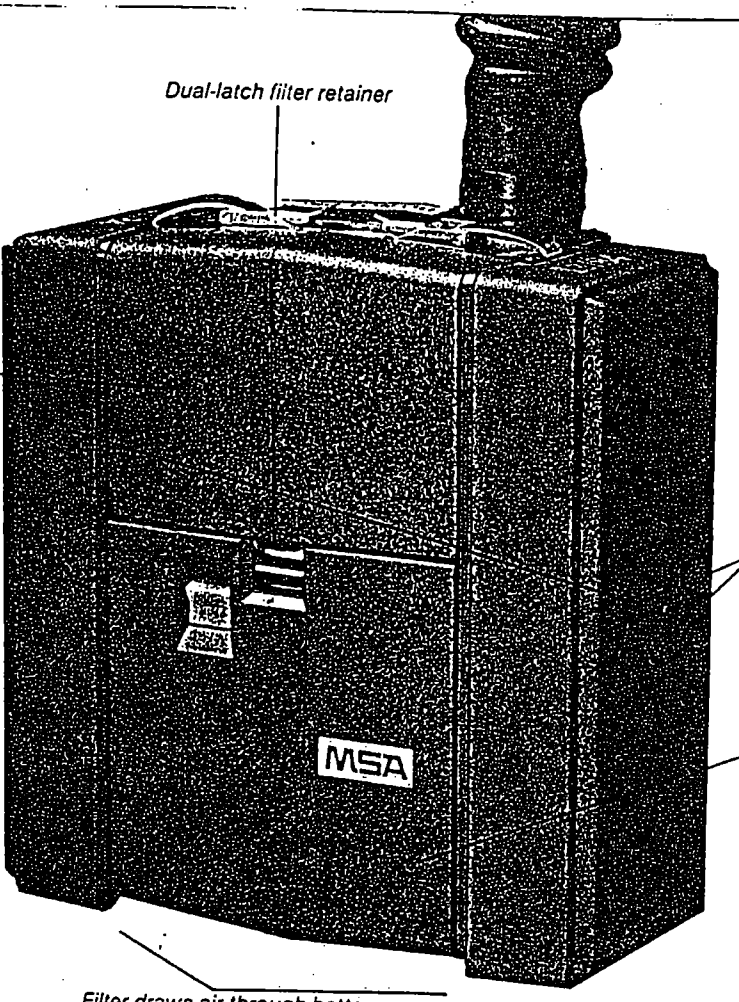
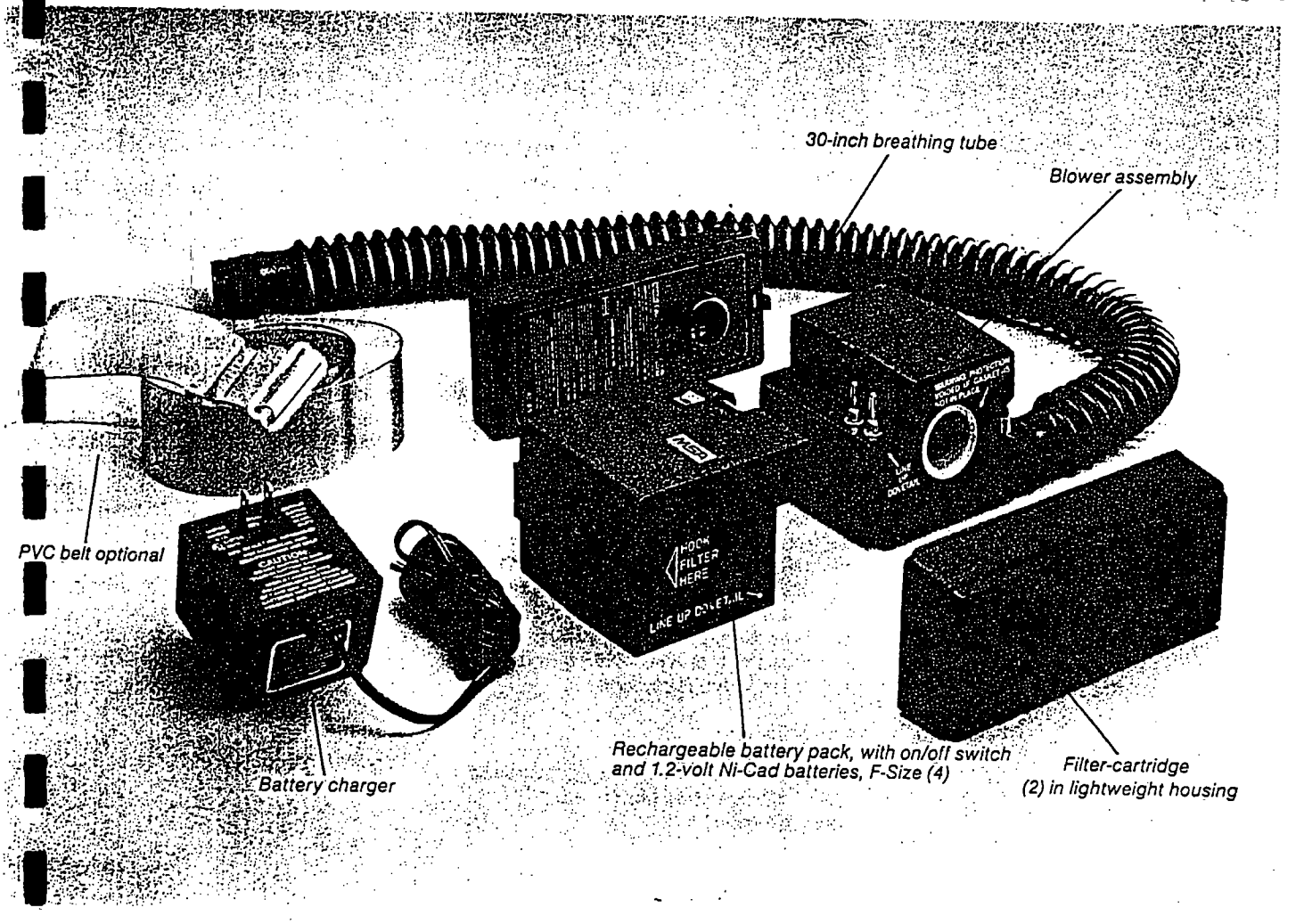
To reach MSA International, call (412) 273-5000 or Telex 812453.
Corporate Headquarters: P.O. Box 426, Pittsburgh, PA 15230 USA.

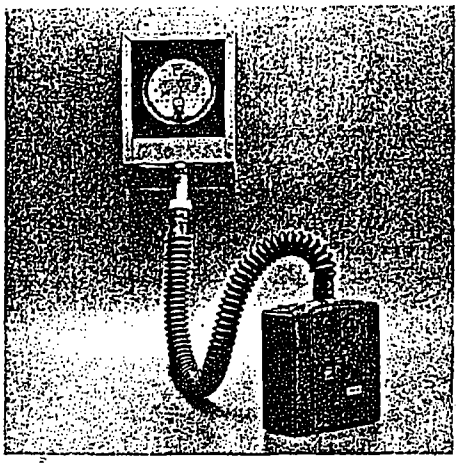


Optional Type H Cartridges (gray), which are also effective against sulfur dioxide, may also be used on the PAPR.



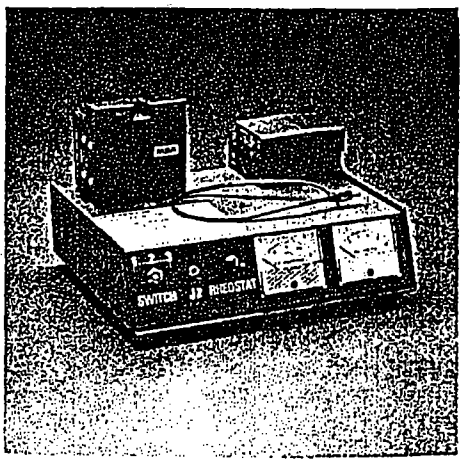


Accessories



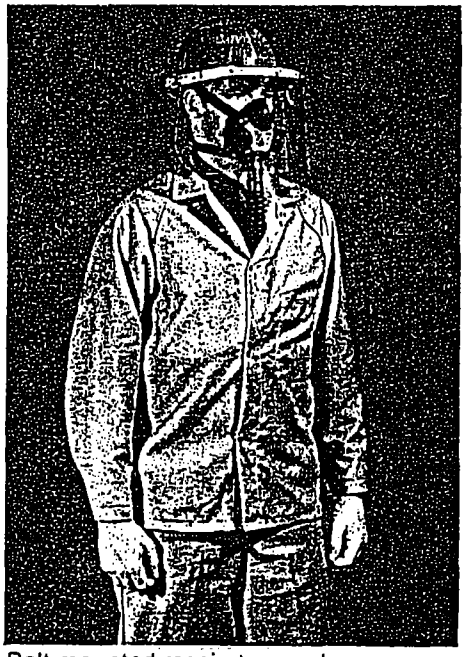
PAPR Flow Tester

The PAPR Flow Tester is a thin plate orifice meter for testing the volumetric flow rate delivered by an MSA Powered Air Purifying Respirator. The flow tester can be used to ensure that the PAPR is delivering the NIOSH required minimum flow of 4 cfm (115 Lpm). The tester reads "good" when the indicating needle is to the right of an adjustable indicator flag. The flow tester is housed in a painted steel case with a laminated glass cover. The flow tester must be mounted vertically during use.

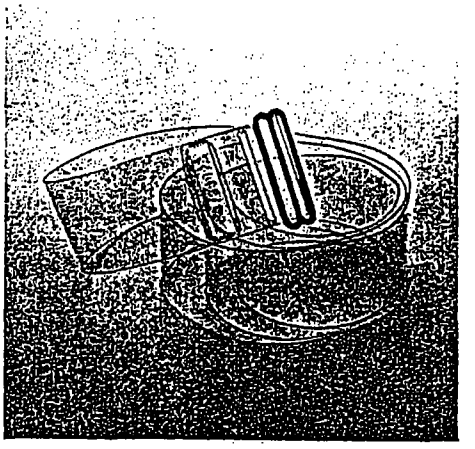


PAPR Field Test Unit

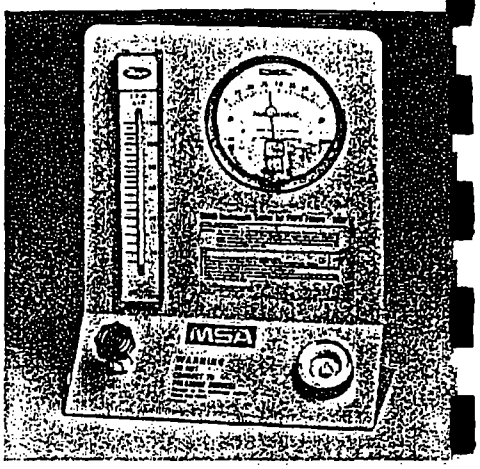
The Field Test Unit will quickly evaluate the electrical components of a Powered Air Purifying Respirator—the battery module, battery charger, and blower module. It will determine, when used by a trained technician, most electrical defects.



Belt-mounted respirator can be worn under flame-retardant garments to meet requirements for coke oven and foundry applications.



Optional polyvinylchloride (PVC) belt available for use where easy decontami-

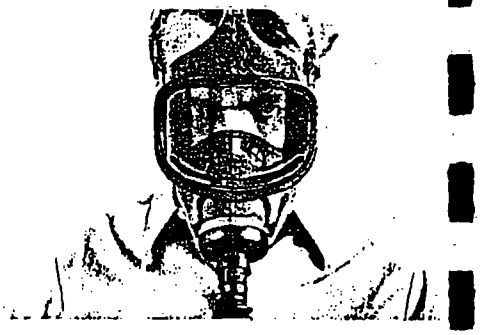


PAPR Filter Resistance Tester

The PAPR Filter Resistance Tester allows the user to measure and quantify the breathing resistance of the filter-cartridges used in an MSA Powered Air Purifying Respirator.

A magnehelic pressure gauge within the Filter Resistance Tester measures the pressure drop across the filter-cartridge. Thus, after a filter-cartridge is used, the user can measure the breathing resistance of the filter-cartridge and compare this value with the maximum breathing resistance allowed in NIOSH certification tests. If the filter-cartridge is below the allowable maximum, the filter-cartridge is still usable.

The Resistance Tester is intended for indoor use only. It requires a customer-supplied source of vacuum for operation. The tester measures only the pressure drop across the filter-cartridge; it will not detect damage to the filters or sealing surfaces which may cause high penetration.



Optional nosecup reduces possibility of lens fogging under low temperature and/or high-humidity conditions.

An optional spectacle kit accommodates

If necessary, the PAPR can also be worn comfortably under heat-retardant clothing.

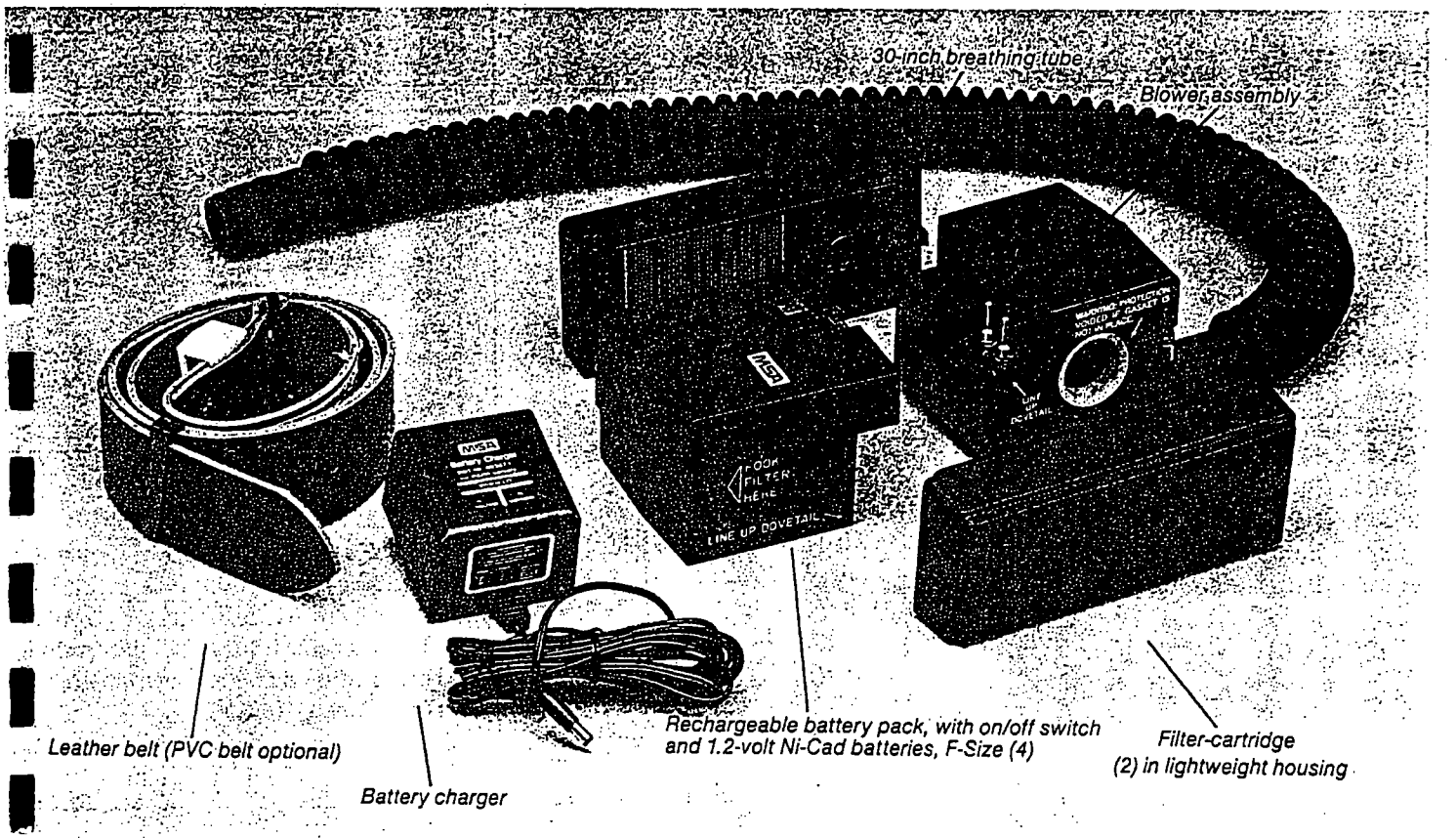
Major components of the Powered Air-Purifying Respirator include:

- 30-inch corrugated breathing tube that can be connected to any of three types of facepieces (shown at right): Comfo® II half facepiece, Welders Comfo, which allows the breathing tube to fit under the helmet and positions the tube over the back away from sparks, or Ultravue® full facepiece. All three facepieces are available in small, medium and large sizes made of black Hycar* or black silicon.
- Blower assembly motor (available either as a brushless 4.6-volt dc-type rated by manufacturer for 5,000 hour running time or as a 1,500 hour brush-type motor), with a spring-type dual-latch filter retention mechanism.
- Two high-efficiency filters with a total surface area of almost 500 square inches (enclosed in a rugged light-weight housing which acts as a guard for the battery pack and absorbs shock if assembly is dropped), and a filter cover designed to draw air through the bottom and minimize the chance of sharp object or spark penetration.
- Sealed battery pack containing the on/off switch (includes four F-size 1.2-volt rechargeable nickel-cadmium batteries, circuit breaker, resistor and connection for battery charger) and recessed transmission terminals for added protection

Also included with the 5,000 hour PAPR is a standard leather belt. A PVC (polyvinyl chloride) belt is standard on the 1,500 hour PAPR. The PVC belt is easy to decontaminate and permits positioning of the unit anywhere on the belt without removal.

PAPR can also be used in non-powered mode during temperature extremes, or in emergencies.

* Hycar is a registered trademark of B.F. Goodrich



ORDERING INFORMATION

Note: Every PAPR is shipped with durable protective cover to be used when the PAPR is exposed to large amounts of water, such as in asbestos decontamination showers.

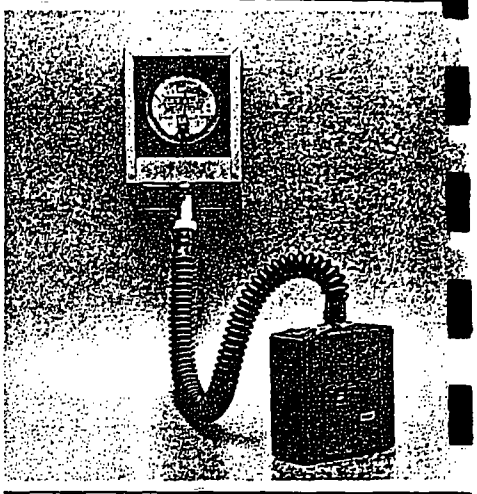
482701 Protective Cover (pkg of 5)
463353 Powered Air Purifying Respirator with medium Welders Comfo Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
463354 Powered Air Purifying Respirator with medium Comfo Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
463355 Powered Air Purifying Respirator with medium Ultravue Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
484110 PAPR with medium Hycar Ultravue Facepiece, complete with two filters, PVC belt, battery charger, 1,500-hour brush-type motor blower module, and breathing tube
463380 Motor/Blower Module, 5,000-hour H.E. brushless motor with breathing tube assembly
484082 Motor/Blower Module, 1,500- hour brush-type motor, with breathing tube
464659 Breathing Tube Assembly (30 inches long)
463256 Grommet, Filter
463284 Filter, replacement, Type H
463441 Battery Pack with charger
463239 Battery Pack only
463471 Battery Charger only
463469 Belt, leather (one size fits 34" to 48")
474073 Retrofit kit for spring-type, dual-latch filter retention mechanism

Comfo Facepieces:
465817 Small, black Hycar, elastic headband
480127 Small, black Hycar, cradle headband
480130 Small, black Silicone, cradle headband
94331 Medium, black Hycar, elastic headband
480122 Medium, black Hycar, cradle headband
480125 Medium, black Silicone, cradle headband
469130 Large, black Hycar, elastic headband
480132 Large, black Hycar, elastic headband
480135 Large, black Silicone, cradle headband

Comfo Welders Facepieces:
484201 Small, black Hycar, elastic headband
484204 Small, black Hycar, cradle headband
484203 Small, black Silicone, cradle headband
484195 Medium, black Hycar, elastic headband
484198 Medium, black Hycar, cradle headband
484197 Medium, black Silicone, cradle headband
484207 Large, black Hycar, elastic headband
484210 Large, black Hycar, cradle headband
484209 Large, black Silicone, cradle headband

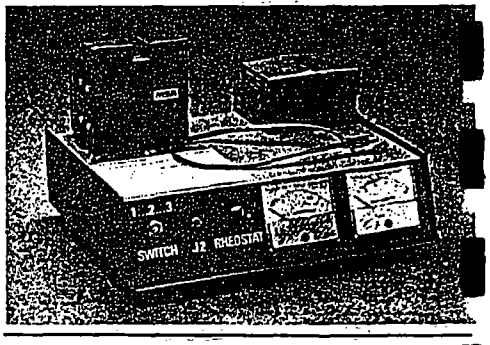
Ultravue Facepieces:
471218 Small, black Hycar
480251 Small, black Silicone
457126 Medium, black Hycar
480247 Medium, black Silicone
471230 Large, black Hycar
480255 Large, black Silicone
34337 Cleaner-Sanitizer (dispenser box of 12 2-oz packages)
473382 Filter, optional replacement Type H, also effective against nuisance levels of SO_2
466911 Breathing Tube, 36" long

ACCESSORIES



PAPR Flow Tester:
The PAPR Flow Tester is a thin plate orifice meter for testing the volumetric flow rate delivered by an MSA Powered Air Purifying Respirator. The flow tester can be used to ensure that the PAPR is delivering the NIOSH required minimum flow of 4 cfm (115 lpm). The tester reads "good" when the indicating needle is to the right of an adjustable indicator flag. The flow tester is housed in a painted steel case with a laminated glass cover. The flow tester must be mounted vertically during use.

464850 PAPR Flow Tester



PAPR Field Test Unit:
The Field Test Unit will quickly evaluate the electrical components of a Powered Air Purifying Respirator -- the battery module, battery charger and blower module. It will determine, when used by a trained technician, most electrical defects.

468486 PAPR Field Test Unit

POWERED AIR PURIFYING RESPIRATOR

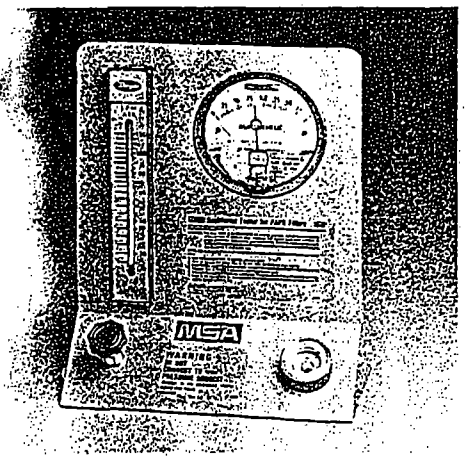
FEATURES

- Compact, lightweight design
- Available with brushless or brush-type motor
- Easily replaceable filters
- 5,000-hour motor rating (brushless motor)
- 1,500-hour motor rating (brush-type motor)
- Quick-change battery packs
- Eight-hour battery life
- Three types of facepieces
- All plastic parts of high-impact polycarbonate
- Optional Type H Cartridge is available for use against nuisance levels (below the Permissable Exposure Level) of sulfur dioxide..

DESCRIPTION

The MSA Powered Air Purifying Respirator (PAPR) is designed to filter particulates from the air. During operation, a battery-powered motor/blower pulls air through two filters and delivers a positive pressure of purified air to the facepiece.

PAPR is approved for respiratory protection against dusts, fumes and mists having a time-weighted average (TWA) less than 0.05 mg/m^3; asbestos-containing dusts and mists; and radionuclides. The MSA PAPR is especially suited for asbestos abatement work, foundry and coke oven work, as well as in nuclear applications.



PR Filter Resistance Tester

APR Filter Resistance Tester:
The PAPR Filter Resistance Tester llows the user to measure and quan-ify the breathing resistance of the er cartridges used in an MSA ered Air Purifying Respirator. magnahelic pressure gauge with-e Filter Resistance Tester mea-res the pressure drop across the lter-cartridge. Thus, after a filter artridge is used, the user can mea-ure the breathing resistance of the ter cartridge and compare this value ith the maximum breathing resis-ance allowed in NIOSH certification ests. If the filter cartridges fall below he allowable maximum, the filter car-ridge is still usable.

The Resistance Tester is intended or indoor use only. It requires a ustomer-supplied source of vacuum or operation. The tester measures nly the pressure drop across the lter cartridge; it will not detect dam-ge to the filters or sealing surfaces hich may cause high penetration.

5784	Resistance Test for PAPR filter cartridge

Optional Nosecup:
Optional nosecup reduces possibility of lens fogging under low temperature and/or high-humidity conditions.

471710	Nosecup, for small Ultravue Facepiece
471711	Nosecup, for medium Ultravue Facepiece
471712	Nosecup, for large Ultravue Facepiece

Optional Spectacle Kit:
An optional spectacle kit accommodates prescription lenses.

454819	Prescription Eyeglass Kit for Ultravue Facepiece

PVC (Polyvinylchloride) Belt:
Optional PVC belt for use where easy decontamination is desired.

473902	Belt, optional PVC (one size fits 34" to 48")

Special Probed Facepieces for Quantitive Fit Testing:

466246	Probed Facepiece Assembly, Comfo, small
466245	Probed Facepiece Assembly, Comfo, medium
466499	Probed Facepiece Assembly, Comfo, large
467904	Probed Facepiece Assembly, Welders Comfo, small
466244	Probed Facepiece Assembly, Welders Comfo, medium
467905	Probed Facepiece Assembly, Welders Comfo, large
471685	Probed Facepiece Assembly, Ultravue, small
466260	Probed Facepiece Assembly, Ultravue, medium
471686	Probed Facepiece Assembly, Ultravue, large

APPROVALS & STANDARDS

The MSA Powered Air Purifying Respirator has Approval TC 21C-186 from the National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA); the filters are covered separately by the same approval (TC 21C-186). The filters must be replaced when the air flow drops below 4 cubic feet per minute. The respirator is approved by the Bureau of Mines as intrinsically safe. It has also received Factory Mutual Approval as intrinsically safe for Class I, Division 1, Groups C and D, hazardous locations.

te: This Data Sheet contains only a general description of the wered Air Purifying Respirator and Accessories. While uses d performance capabilities are described, under no circum-nces should the products be used except by qualified, trained rsonnel, and not until the instructions, labels or other literature ompanying them have been carefully read and understood d the precautions therein set forth followed. Only they contain complete and detailed information concerning these products.

MSA
Offices and representatives in principal cities worldwide.
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Corporate Headquarters: P.O. Box 426, Pittsburgh, PA 15230 USA.

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Printed in U.S.A. 8719(L)

COMFO ELITE™ RESPIRATORS

10-00-04

FEATURES

- Sealing surface matches facial contours to distribute pressure evenly over face
- Improved cradle headband design allows the user to adjust facepiece while wearing
- Improved exhalation valve cover design and a new cartridge cover design aid in positive and negative fit testing
- Comfortable black silicone
- Small, medium and large sizes fit a wide variety of faces
- NIOSH/MSHA certified

DESCRIPTION

The Comfo Elite Respirator provides protection against a variety of respiratory hazards. The respirator uses chemical cartridges or aerosol filters, or a combination of the two, to remove specific contaminants from the inhaled air. The filters/cartridges are interchangeable among most other MSA Twin-Cartridge Respirators.

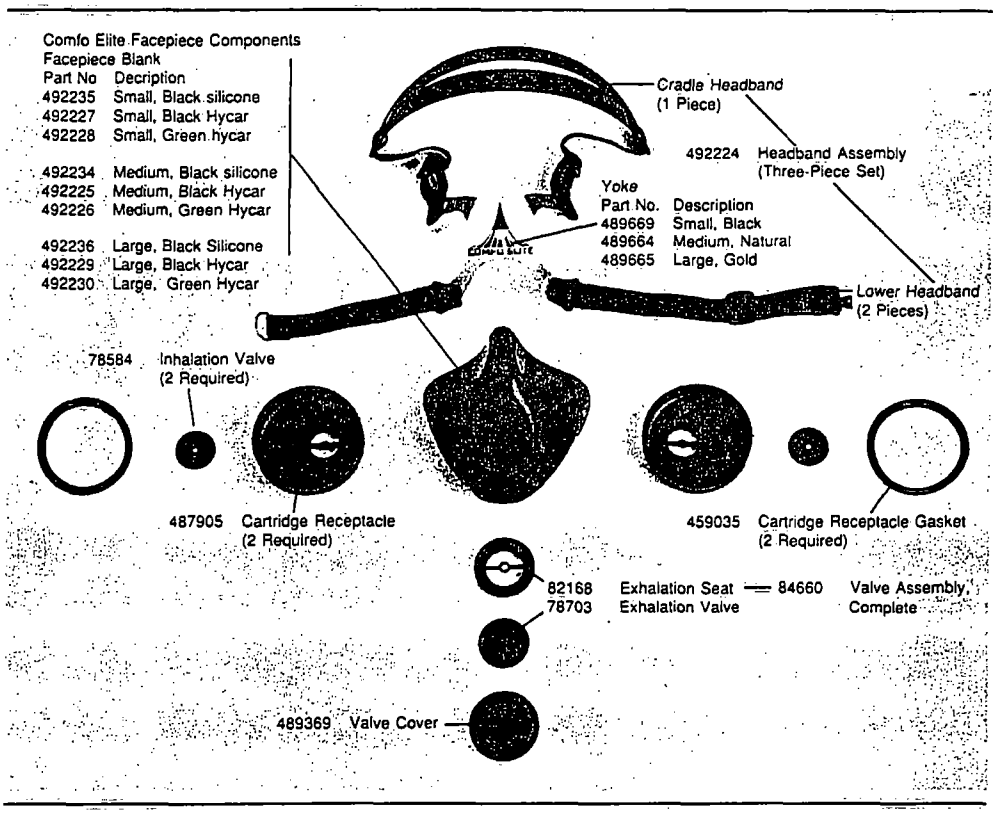
The Comfo Elite Respirator is available in standard black silicone, which has a unique sealing surface designed to reduce facepiece slippage, formulated to maximize comfort and minimize the possibility of skin irritation, yet are resistant to chemicals and facial oils. All come in small, medium and large sizes.

Facepieces

The Comfo Elite Respirator is eld to the face by four adjustable elastic straps attached to an aluminum yoke in the front. The top two traps are attached to two strips of lastic which form the cradle headband, which fits over the crown of he wearer's head. The bottom straps asten around the neck. The fit can be adjusted by moving the tension slides on the elastic material. The ew headband design allows adjustments to be made while the respirator is on the wearer. A large chin up aids positioning and stability.

ilters/Cartridges

There are 20 MSA Filter/ Cartridge combinations that protect gainst a wide variety of contaminants. The cartridges are made of metal, which is not only stronger han plastic, but allows for easier letection of damage. The cartridge holders securely retain the screw-in artridges and resist damage from mpact, corrosion and most chemicals. Color of each cartridge indicates the type of protection for which it is approved.



Four aerosol-type filters, six chemical-type cartridges and ten combination filter/cartridge-type respirators are all certified by NIOSH/MSHA under 30 CFR (Code of Federal Regulations), Part 11. See pages 4 to 5 for hazard information and maximum use concentrations. For protection against dusts and mists, prefilters (Type F) are available for chemical cartridges; because these are the same filters used in Type F Respirators, they can be interchanged --helping reduce replacement filter inventory.

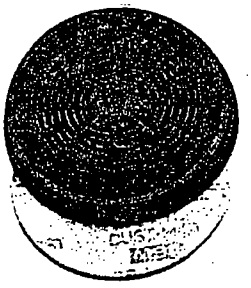
ORDERING INFORMATION

Select respirator style, material and size from table below. Order Filters/Cartridges separately, from table on next page. **Respirators meet various NIOSH/MSHA approvals when combined with appropriate cartridges or filters.**

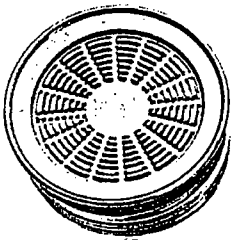
Respirator (less filters/cartridges)	**Size**			**TC Approval No.**
	Small	**Medium**	**Large**	
Comfo Elite Black Silicone	490492	490491	490493	21C-133 (Type F) 21C-134 (Type S) 21C-135 (Type H and Sparkfoe™ Type H)
Comfo Elite (bulk package, 36 per carton) Black Silicone	490488	490489	490490	23C-40 (GMA) 23C-41 (GMB) 23C-47 (GMC) 23C-43 (GMD) 23C-917 (GMF) 23C-157 (GMA-F) 23C-161 (GMA-H) 23C-156 (GMB-H) 23C-159 (GMC-H) 23C-160 (GMC-S) 23C-158 (GMD-H) 23C-923 (GMF-H) 23C-243 (GMI-H) 23C-79 (GMP) 23C-80 (Paint)

Filters/ Cartridges (Order from table on pages 4-5.)

Aerosol Filters

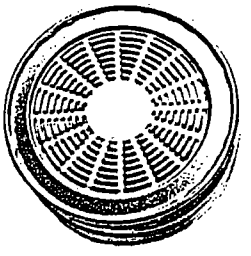


Type F Filter



Type S Filter

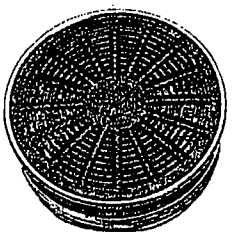
Type H Filter (magenta)



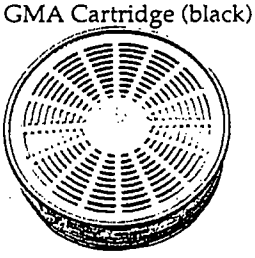
Sparkfoe Type H (magenta)

Chemical Cartridges

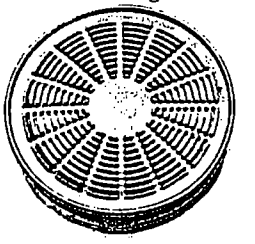
Protection extended to include dusts and mists by adding Type F filters and filter covers to the cartridges. Order **489353** (two required) and **459595** (pkg of 10).



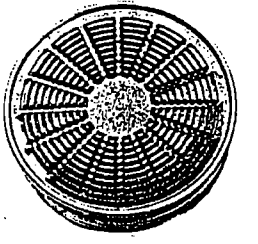
GMA Cartridge (black)



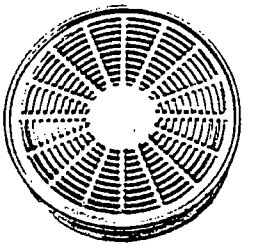
GMB Cartridge (white)



GMC Cartridge (yellow)

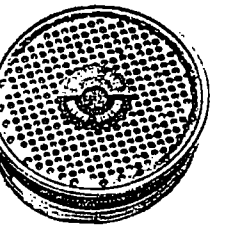


GMD Cartridge (green)



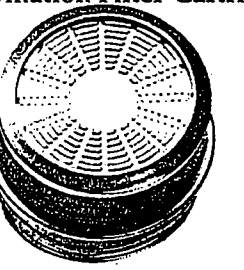
GMF Cartridge (olive)

Chemical Cartridges, Continued



Mersorb Mercury Indicator Cartridge (orange)

Combination Filter-Cartridges



GMA-F
GMA-H
GMB-H
GMC-S
GMC-H
GMD-H
GMF -H
GMI-H
GMP

Paint Filter

Filters/Cartridges

Respiratory Hazards	Protection Type	Part No.	NIOSH-MSHA Approval No.
Dusts and mists having a time-weighted average (TWA) not less than 0.05 mg/m³ or two million particles per cu. ft.[1]	Type F	459595 (box of 10) 459693 (ctn. of 100) 489353 Filter cover (2 required)	TC-21C-133
(1) Dusts, fumes and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft., and (2) radon daughters attached to dust, fumes and mists described above.	Type S	464034 (box of 10)	TC-21C-134
(1) Dusts, fumes and mists having a TWA less than 0.05 mg/m³, (2) asbestos-containing dusts and mists and (3) radionuclides.[1,5]	Type H	464035 (box of 10)	TC-21C-135
(1) Dusts, fumes and mists having a TWA less than 0.05 mg/m³, (2) asbestos-containing dusts and mists and (3) radionuclides.[1,5]	Sparkfoe Type H	465798 (box of 10)	TC-21C-135
(1) Not more than 1,000 ppm organic vapors by volume and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,3,4]	GMA	464031 (box of 10) 459595* (box of 10)	TC-23C-40 (cartridges separately) TC-21C-133 (filters separately)
(1) Chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,4]	GMB	464032 (box of 10) 459595* (box of 10)	TC-23C-41 (cartridges separately) TC-21C-133 (filters separately)
(1) Not more than 1,000 ppm organic vapors, chlorine chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,3,4]	GMC	464046 (box of 10) 459595* (box of 10)	TC-23C-47 (cartridges separately) TC-21C-133 (filters separately)
(1) Ammonia or methylamine and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,3,4]	GMD	464033 (box of 10) 459595* (box of 10)	TC-23C-43 (cartridges separately) TC-21C-133 (filters separately)
(1) Formaldehyde or not more than 1,000 ppm organic vapors; chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide, (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,3,4]	GMF	490173 (box of 10)	TC-23C-917
(1) Metallic mercury vapor and chlorine.	Mersorb	466204 (box of 10)	TC-23C-629 (approval limited to Belt-Mounted Respirator only)
(1) Not more than 1,000 ppm organic vapors and (2) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft.[2,3]	GMA-F	464023 (box of 10)	TC-23C-151
(1) Mists of paints, lacquers and enamels, (2) not more than 1,000 ppm organic vapors by volume, (3) pesticides, (4) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (5) asbestos-containing dusts and mists, (6) radionuclides and (7) any combination thereof. Not for use with urethane or other diisocyanate-containing paints[2,3,5]	GMA-H	464029 (box of 6)	TC-23C-155
(1) Chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide and escape only from hydrogen sulfide (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.[2,6]	GMB-H	464028 (box of 6)	TC-23C-150
(1) Not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen chloride, sulfur dioxide, and escape only from hydrogen sulfide, (2) pesticides, (3) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (4) asbestos-containing dusts and mists and (5) radionuclides.[2,3,5]	GMC-H	464027 (box of 6)	TC-23C-153

Filters/Cartridges (cont.)

Respiratory Hazards	Protection Type	Part No.	NIOSH-MSHA Approval No.
(1) Not more than 1,000 ppm organic vapors, chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide and escape only from hydrogen sulfide, (2) pesticides, (3) dusts, fumes and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. and (4) radon daughters attached to dusts, fumes and mists described above.[2,3]	GMC-S	**464026** (box of 6)	TC-23C-154
(1) Ammonia and methylamine, (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.[2,3,5]	GMD-H	**464030** (box of 6)	TC-23C-152
(1) Formaldehyde or not more than 1,000 ppm organic vapors; chlorine, chlorine dioxide, hydrogen chloride and sulfur dioxide, (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.[2,3,5]	GMF-H	**490174** (box of 6)	TC-23C-923
(1) Metallic mercury vapor and chlorine, (2) dusts, fumes and mists having a TWA less than 0.05 mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.[2,3,5]	Mersorb-H	**492924** (box of 6)	TC-23C-1046 (approval limited to Belt-Mounted Respirator only)
(1) Not more than 1,000 ppm organic vapors, (2) dusts, fumes and mists having a TWA less than 0.05% mg/m³, (3) asbestos-containing dusts and mists and (4) radionuclides.[2,3,5]	GMI-H	**464049** (box of 6)	TC-23C-243
(1) Pesticides, not approved for fumigants, (2) not more than 1,000 ppm organic vapors, (3) mists of paints, lacquers and enamels, (4) dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. and (5) any combination thereof. Not for use with urethane or other diisocyanate containing paints.[2,3]	GMP	**464025** (box of 6)	TC-23C-79
(1) Mists of paints, lacquers and enamels, (2) not more than 1,000 ppm organic vapors and (3) any combination thereof. Also approved against dusts and mists having a TWA not less than 0.05 mg/m³ or two million particles per cu. ft. Not for use with urethane or other diisocyanate-containing paints.[2,3]	Paint	**464031** GMA Cartridge (box of 10) **465667** Paint Prefilter (dispenser pkg. of 20) **489219** Cover for Prefilter (2 required)	TC-23C-40 (cartridges) TC-23C-80 (prefilters)

Notes:
*Also order **489353** Filter Cover (2 required)
1. Do not use in atmospheres containing less than 19.5 percent oxygen, in atmospheres containing toxic gases or vapors or in atmospheres immediately dangerous to life or health.
2. Do not use in atmospheres containing less than 19.5 percent oxygen, or in atmospheres immediately dangerous to life or health.
3. Do not wear for protection against organic vapors with poor warning properties or those which generate high heats of reaction with the sorbent material in the cartridge.
4. Protection extended to dusts and mists only by adding Type F filters and filter covers.
5. 99.97 percent effective against 0.3 micron DOP.

Warning: Chemical cartridge respirators should not be used for respiratory protection against these gaseous materials, regardless of concentration or time of exposure. This partial list is far from complete and is offered only as a guide to proper evaluation of the many contaminants found in industry. Contact MSA for further information on other specific materials.

Arsine
Bromine
Carbon monoxide
Diisocyanates
Dimethylaniline
Dimethyl sulfate
Hydrogen cyanide
Hydrogen fluoride
Hydrogen selenide
Methanol
Methyl bromide
Methyl chloride
Methylene chloride
Nickel carbonyl
Nitric acid
Nitro compounds:
Nitrobenzene
Nitrogen oxides
Nitroglycerin
Nitromethane
Ozone
Phosgene
Phosphine
Phosphorous trichloride
Stibine
Vinyl chloride

WARNING

ıemical cartridge respirators should not be used for respiratory protection ·ainst these gaseous materials, re- rdless of concentration or time of exposure. This partial list is far from complete and is offered only as a ; ıide to proper evaluation of the ...any contaminants found in industry. Contact MSA for further information (. other specific materials.

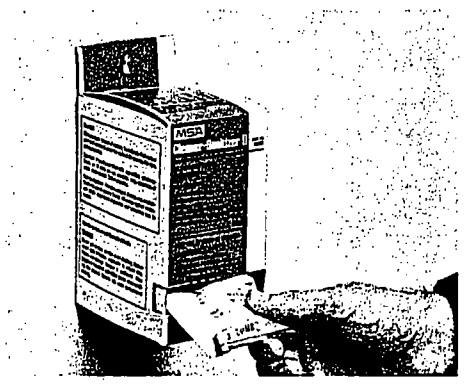
Arsine
Bromine
(ırbon monoxide
] isocyanates
Dimethylaniline
Γ methyl sulfate
] ·drogen cyanide
Hydrogen fluoride
Hydrogen selenide
] ·drogen sulfide
Methanol
Methyl bromide
] ethyl chloride
] ethylene chloride
Nickel carbonyl
N tric acid
] tro compounds:
Nitrobenzene
Nitrogen oxides
Nitroglycerin
Nitromethane
Ozone
] osgene
] osphine
Phosphorous trichloride
S bine
V ıyl chloride

ACCESSORIES

Carrying Pouch
Belt-mounted carrying pouch with Velcro† closures for use with Comfo Elite Respirator.

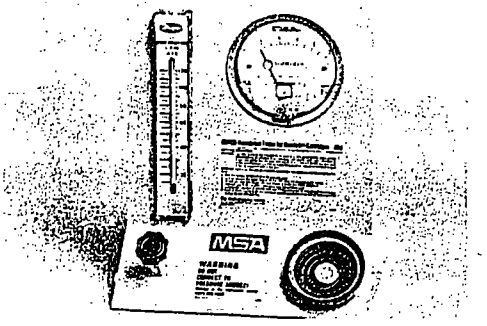
Part No.	Description
468730	Carrying Pouch for use with the Comfo Elite Respirator

† Registered trademark of Velcro, U.S.A.



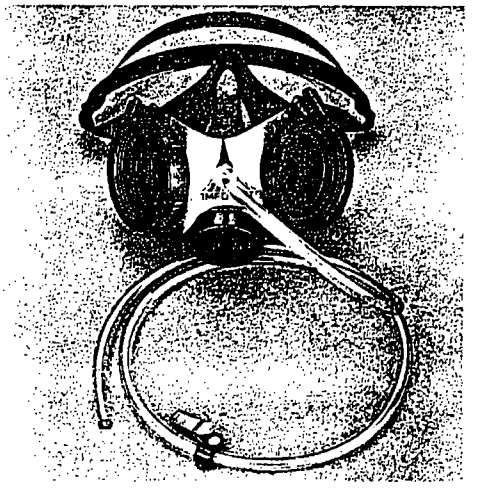
MSA Cleaner-Sanitizer II
To thoroughly clean and sanitize respirators and other safety equipment. (See Data Sheet 10-00-13.)

Part No.	Description
34337	Cleaner-Sanitizer II (dispenser box of 12 2-oz packets)



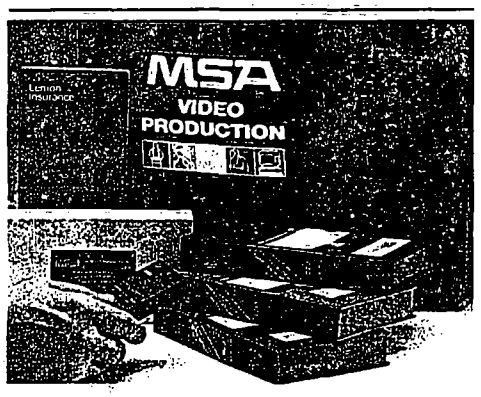
MSA Filter/Cartridge Resistance Tester
Allows user to measure and quantify breathing resistance of filters/cartridges used with the Comfo Elite, Back-Mounted, Belt-Mounted and Ultra-Twin Respirators.

Part No.	Description
465783	Resistance Tester



Special Test Respirators
The Probed Comfo Elite Respirator for quantitative fit testing.

Part No.	Description
491862	Small, silicone
491861	Small, Hycar
491860	Medium, silicone
491859	Medium, Hycar
491864	Large, silicone
491863	Large, Hycar



Training Aids
MSA offers VHS videotape training aids on the Comfo Elite Respirator and other MSA respirators.

The videotapes use an on-screen narrator detailing use and maintenance procedures. (Request Bulletin #9917-1.)

Part No.	Description
696836	"Proper Care and Use of the Comfo Elite Chemical Cartridge Respirator" Time: 27 mins; Rel. 1991
696837	"Proper Care and Use of the Comfo Elite Particulate Filter Respirator" Time: 26 mins; Rel. 1991

Quik Chek™ Adapter
For quantitative facepiece fit testing, this adapter easily attaches to the facepiece's exhalation valve, providing a connection point for the user's quantitative fit test probe. Use of the adapter eliminates the need to use special probed facepieces typically required for quantitative fit testing.

Part No.	Description
802710	Quik Chek Adapter
803196	Replacement kit with 25 sampling tubes.

Qualitative Fit Test Kit
Allows you to qualitatively check the fit of MSA respirators. The kits use isopentyl acetate (banana oil) as a testing agent. They are available in an inexpensive cardboard case or a durable Pelican case.*

Part No.	Description
801628	Qualitative Fit Test Kit, in cardboard case
801629	Qualitative Fit Test Kit, in Pelican case.

*Registered Trademark of Pelican Products Inc.

LAKE SALVAGE, CHICAGO
Health and Safety Plan

Tighe & Bond, Inc.

CENTRAL STATES
ENVIRONMENTAL SERVICES, INC

SITE HEALTH AND SAFETY PLAN

for

Phase II Site Activities
Lake Salvage Site
2527-29 West Lake Street
Chicago, Illinois

by

Tighe & Bond, Inc.
53 Southampton Road
Westfield, MA 01085
413-562-1600

October 1994

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
1.0	Purpose	1
2.0	Applicability	1
3.0	Site Control	1
4.0	General Personnel Protection Equipment (PPE)	2
5.0	Communication and Training	2
6.0	Decontamination	4
7.0	Emergency Procedures	6
8.0	Levels of PPE	9
9.0	Medical Monitoring	13
10.0	Air Monitoring	14

Appendix A - Site Hazard Summary/Forms 1-8

Form 1 - Site Hazard Summary
Form 2 - PPE by Task
Form 3 - PPE Description
Form 4 - Decontamination
Form 5 - Monitoring Equipment
Form 6 - Previous Monitoring Data
Form 7 - Health and Safety Guidelines
Form 8 - Documentation

Appendix B - Health & Safety Guidelines/MSD Sheets

Appendix C - Site Map

SITE SPECIFIC HEALTH AND SAFETY PLAN

1.0 Purpose - The purpose of this health and safety plan (HSP) is to provide standards for Tighe & Bond worker safety and protection during activities conducted at the Lake Salvage Site. Contractors working at the site should prepare their own health and safety plan which, at a minimum, should comply with requirements set forth in this plan. The plan outlines standards and mandatory procedures relative to physical and chemical hazards encountered at sites, communication, training, worker health monitoring, decontamination procedures and levels of personnel protection. Any questions concerning this information should be directed to Tighe & Bond Certified Industrial Hygienist, Mr. Michael J. Matilainen or Project Manager, Zen Kruczkowski, P.E., at 413-562-1600.

2.0 Applicability - This plan is applicable to all personnel working at sites where mandatory worker health and safety training is required by State or Federal agencies in accordance with 29 CFR 1910.120 Hazardous Waste Operations and Emergency Response (HAZWOPER). It is intended for use at sites where information regarding potential site hazards is available in the form of background research, personal communication with past or present property owners or workers, previous sampling results, etc. Activities to which this plan is applicable may include:

Phase II	-	Site Assessment (Sampling)
	-	Removal/disposal of residual ash and building demolition
	-	Inspection of Contractor activities

This plan does not cover specific procedures for entry into trenches deeper than 5 feet, test pit excavations or confined spaces. Project-specific attachments should be prepared and appended to the site hazard evaluation summary if those activities are planned. Work of this nature shall be performed in accordance with 29 CFR 1926.650 subpart P "Excavation, Trenching and Shoring", 29 CFR 1910.146 "Permit Required Confined Space Entry" and the Tighe & Bond "Employee Confined Space Entry Program".

This plan is applicable only when provided in conjunction with the mandatory site specific hazard evaluation (Appendix A), health and safety guidelines (Appendix B) and site map (Appendix C). Site specific information (hospital, emergency number, etc.) is located in (Appendix A).

3.0 Site Control - Work Zones - Specific work zones have been identified in Appendix A, Section D to control work site access and exposure. Whenever possible, efforts should be made to minimize potential exposures at the sites. These can include but are not limited to remote sampling/materials handling, positioning workers upwind of work activities and rotation of employees.

The Contractor shall establish its own system to control access to the site. This system shall incorporate work zones into the layout of the site. The work zones shall include the Support Zone, Contamination Reduction Zones, and Exclusion Zones (active intrusive

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work areas). The system shall assure that only authorized persons enter active intrusive work areas.

The Contractor shall restrict access and mark the outer limits of the active intrusive work areas with approved high visibility barrier tape or flagging and signs warning unauthorized personnel not to enter.

If various construction activities are concurrent, the Contractor shall establish a means of communication between the active work areas. The Contractor shall also establish a means of communication between workers within the same work area.

4.0 General Personnel Protection - Personal protective equipment and safety requirements must be appropriate to protect against the known or worst potential hazards on the site. Protective equipment should be selected based on the concentrations and possible routes of exposure to known or potential worst case substances. The levels of personnel protective equipment and upgrade requirements are generally described in Section 8 and 10 and more specifically defined on forms 2 and 3 (Appendix A).

It is anticipated that Level D or C protection and basic site safety measures will be sufficient at this site. Any conditions warranting upgrading the primary level of protection to Level B or A will be cause for all personnel to immediately leave the work site with subsequent implementation of the Contingency Plan. The site will be re-evaluated by the CIH and the work procedures will be modified as necessary to ensure appropriate health and safety procedures are implemented.

The specific respiratory protective device selected for Level C or D Modified protection shall be the device identified on each individual's respirator fit test, as described in Section 5.3. In general, respirators will be supplied with combination cartridges for organic vapors, dusts, mists, and acid gases and shall be approved by the Mine Safety and Health Administration and the National Institute for Occupational Safety and Health. In the event that site monitoring identifies the potential for exposure to other chemical substances (i.e. formaldehyde, ammonia), additional cartridges will be made available as necessary at the site.

5.0 Communications and Training - Workers at state and federally listed or recognized sites must be provided with adequate information and training to recognize and evaluate potential hazards. All persons entering the site will be required to read and understand this HSP and acknowledge by signing Form #8 (Appendix A). Training shall comply with applicable regulations including 29 CFR 1910.120 "HAZWOPER" and 29 CFR 1910.1200 "Hazard Communication Standard".

5.1 Communication - The Project Manager shall supply all on-site personnel with a site-specific hazard evaluation summary to be used in conjunction with this plan. The summary shall cover, at a minimum, the following topics:

a. A brief description of the history of the location with regards to health and environmental hazards.

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b. A description of the activities to which the hazard evaluation summary is applicable.

c. A description of any hazards which may be encountered, including:

1. Physical Hazards - terrain, traffic, equipment, severe weather (heat stress and frostbite), electrical hazards, noise.

2. Chemical Hazards - materials used and stored at the site, materials released at the site.

3. Biological Hazards - insects, plants, animals, pathogens, infectious materials.

d. A description of the levels of protection selected for the operation.

e. Equipment decontamination procedure if different from those specified herein.

f. Summary of emergency contacts for use in the event of fire, explosion, medical emergency or other emergency, including the location of the nearest telephone and an address and phone number to provide to emergency personnel.

g. A map showing the route to the nearest hospital.

h. A summary of available recent monitoring data and relevant chemical information.

i. If available, health and safety guidelines and Material Safety Data (MSD) sheets will be included in Appendix B for Tighe & Bond only. All other contractors should provide copies of MSD's to Tighe & Bond for inclusion in this plan.

5.2 Health and Safety Training - All contractor personnel shall have health and safety training as outlined in 29 CFR 1910.120(e). Copies of current training documentation for site workers will be available at the site. Documentation for Tighe & Bond employees will be maintained at a central location at the Tighe & Bond office.

5.3 Respirator Usage Training and Fit Testing - Prior to assignment to a site where respirator use may be required, employees will be provided with respirator training as outlined in 29 CFR 1910.134(e)(5). Respirator fit tests are to be conducted at 6 to 10 month intervals, or at any time when a condition that may change the fit of a respirator has occurred, such as change in weight, change in

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facial structure, extensive dental work, etc. All use of respirators shall comply with Tighe & Bond's written respiratory program.

6.0 Decontamination Procedures - A general summary of the decontamination procedures is presented on Form #4 (Appendix A). The following details this information.

6.1 Personnel Decontamination - If Level D protection is used, any disposable inner gloves or protective clothing should be sealed in a plastic bag and properly disposed of. Moisture resistant outer gloves and outer boots should be rinsed to remove gross contaminants, and then sealed in a plastic bag. Any further decontamination required should be performed at the laboratory. Disposable equipment should be used whenever possible.

If Level C/D modified or greater protection is used, personnel are required to follow the decontamination procedures listed below, as they apply to the gear being worn:

a) Wash boots thoroughly with clean water or an appropriate cleaning solution to remove gross contaminants.

b) Scrub down outer boots in decon solution and rinse with water.

c) Remove boots.

d) If wearing reusable rain gear, it should be cleaned in a similar manner as the boots.

e) Disposable Tyveks should be removed and placed in a plastic bag.

f) Remove outer gloves and wash in same manner as boots while wearing disposable inner gloves.

g) Use a new set of disposable gloves to clean additional equipment including hard hat, safety glasses, etc.

h) Remove respirator last and dispose of spent cartridges in a plastic bag.

i) If Contractor's employees are showering due to lead or asbestos exposure, all employees at the site shall utilize similar decontamination procedures. Otherwise, exposed personnel shall wash face and hands.

j) Decontamination wash and rinse water will be allowed to percolate into the ground or as specified.

6.2 Equipment Decontamination - Proper decontamination of all equipment is necessary to avoid transferring contaminants from the site, thereby increasing

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potential for exposure of on-site and off-site personnel. The measures described below should be followed prior to leaving all sites, as applicable to the equipment being used. Any variations from the procedures described below for reasons of worker health or safety must be approved by the Project Manager.

These measures are separate from, and may not be substituted for, other decontamination procedures associated with proper sampling protocol

a) Sampling equipment such as measuring tapes and bailer cords may be decontaminated at the sampling area. The equipment may be thoroughly rinsed with clean water or an appropriate cleaning solution and wiped dry with paper towels before leaving the work site. Alternatively, they may be wrapped in absorbent material and/or stored in plastic bags sealed to prevent contact with workers, vehicles, etc.

   If further field decontamination is required, rinse with water, then methanol, then distilled water. Contain methanol and properly dispose of.

b) The rinse water from this operation will be allowed to percolate into the ground or as specified.

6.3 Heavy Equipment Decontamination - Decontamination of drilling equipment including drill rigs, backhoes, drill rods, augers, etc., will take place at the site of each boring/monitoring well or test pit prior to moving to subsequent locations. Decontamination of such equipment will entail a thorough steam cleaning, or washing and rinsing of the equipment with high pressure water followed by air drying. In addition, the tires and undercarriages of vehicles exiting areas identified as having surficial hazardous materials will be sprayed with high pressure water and allowed to dry before leaving the contaminated area.

If necessary, the Contractor shall construct an approved decontamination pad within the Contamination Reduction Zone(s) for removing soil from all vehicles and equipment leaving the Exclusion Zone(s). The decontamination pad(s) shall include a high-pressure water wash area for equipment and vehicles. It shall be constructed of gravel over a vinyl liner. At the bottom center of the liner shall be a collection system for drainage of washwater into a sump at the side of the pad. The decontamination pad shall be constructed so that all water will flow towards the sump. The sump shall be constructed to accommodate a 55-gallon drum equipped with a submersible, float-activated pump. The washwater accumulating in the sump shall be pumped into temporary storage tanks. A designated clean area shall be established within the Contamination Reduction Zone(s) for performing equipment maintenance.

In general, any item taken into the Exclusion Zone will be assumed to be contaminated and shall be carefully inspected and decontaminated before the item leaves the area. All items shall be decontaminated to the satisfaction of the Engineer prior to leaving the area. All construction material shall be handled and

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brought on site in such a way as to minimize the potential for contaminants being carried off site. Separate, clearly-marked parking and delivery areas shall be established.

6.4 Containment and Disposal - Contaminated soil brought to the surface during any well installation or soil excavation activities with a total organic vapor concentration (TOV) greater than 10 ppm as registered by the field HNu or visually contaminated will be segregated into an area lined with 6 mil (minimum) polyethylene. The piles will be surrounded by an earth berm, and will be covered with 6 mil (minimum) polyethylene pending proper disposal or reuse.

Contaminated clothing and equipment shall be characterized and disposed of by the remediation contractor in conjunction with the owners waste disposal plan.

7.0 Emergency Procedures - Follow the site specific contingency plan shown on Form #1 (Appendix A) and employ the following general procedures during all work.

7.1 Inhalation Exposure

a) If warning signals such as: dizziness, nausea, headache, shortness of breath, burning sensation in the mouth, throat or lung or symptoms specific to hazard found at the site are apparent, the victim should leave the contaminated air space immediately. Have someone contact emergency services. Obtain health and safety information about potential contaminants such as MSD sheets.

b) If unconscious, the victim should be pulled out of the contaminated area immediately if they do not have any injuries which would prohibit moving them (i.e. spinal injury). The rescuers should make sure that the area is safe to enter. If the area can not be safely entered, attempt to ventilate this area. Do not attempt a rescue. Rescuers should make sure they are properly trained in First Aid and rescue and that they are wearing proper respiratory and protective equipment before attempting the rescue.

c) If the victim is no longer breathing, mouth-to-mouth resuscitation or some other form of artificial respiration should be administered by a person who is properly trained and certified in a location away from the contaminated area (if possible).

Medical attention should be obtained as soon as possible.

7.2 Skin Exposure - The skin should be washed with copious amounts of soap and water. If clothing is contaminated, it should be removed immediately and the skin washed thoroughly with running water. If a shower is available, it should be used immediately and clothes should be removed while showering. This procedure may be life-saving as certain highly toxic chemicals are rapidly absorbed through the skin.

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All contaminated parts of the body, including the hair, should be thoroughly decontaminated. It may be necessary to wash repeatedly.

7.3 Ingestion - A poison control center or emergency service should be contacted immediately to determine an appropriate course of action. If possible, have health and safety information on the poison available when you call for help. Vomiting should be induced except when the substance presents an aspiration hazard, such as from a petroleum product; or when the substance is strong acid or alkali. To induce vomiting, a tablespoon of salt or powdered mustard in a glass of warm water or syrup of ipecac from the First Aid Kit can be taken as an emetic.

Drinking plenty of water and placing a finger down the throat may also be effective in inducing vomiting. The treatment should be repeated until vomit is clear.

Medical attention should be obtained immediately.

7.4 Eyes - If a toxicant should get in the eyes, they should be washed with plenty of water. The eye itself should be held open, rotated, and flooded with water so that all surfaces are washed thoroughly. Washing should be continued for at least 15 minutes.

Medical attention should be obtained immediately.

7.5 Exposure to Heat or Cold - When working under severe weather conditions, personnel should be aware of the signs of heat stress, hypothermia and frostbite as well as the appropriate response actions.

Procedures to monitor, avoid, and treat heat/cold stress shall be established in accordance with "Occupational Safety and Health Guidance Manual for Hazardous Waste Site Activities," NIOSH/OSHA/USCG/EPA, October 1985; U.S. Dept. of Health and Human Services, Public Health Service, Centers for Disease Control, National Institute for Occupational Safety Health; Publication No. 85-115.

Field implementation of the Heat/Cold Stress Prevention Plan shall be performed by a person with current first aid/CPR certification who is trained to recognize symptoms of heat and cold stress.

a) Heat Stress - If a worker shows signs of heat stroke (dry, hot, red skin, high body temperature) or heat exhaustion (cool, moist, pale or red skin, dilated pupils, nausea, dizziness), the worker must be removed from the work area and cooled. Loosen clothing, elevate feet, and provide cool liquids. Heat stroke can be life threatening and requires rapid action and medical attention.

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b) Hypothermia - If a worker shows signs of hypothermia (shivering, impaired judgement, drowsiness, clumsiness) the worker must be removed from the work area and warmed gradually.

c) Frostbite - If a worker shows signs of frostbite (skin color changes to white or grayish-yellow then grayish-blue), the worker must be moved to a warm place. The affected area should be placed in warm (100-105°F) water. Do not rub or massage.

7.6 Stings and Bites - If still present, remove stinger with fingernail. Work the site with soap and water. Cover with bandage and apply ice. If severe allergic reactions appear (hives, itching, rash, nausea, vomiting, dizziness, swelling) seek medical attention immediately.

7.7 Emergency Equipment and First Aid Requirements - The Contractor shall provide the following equipment during all work at this site.

A. Fire Extinguisher: The type and number of fire extinguisher shall be determined by the Contractor. Inspection and maintenance shall be the responsibility of the Contractor. At least one 20-lb type ABC fire extinguisher shall be located at each entrance to each active work area with additional units located in on-site offices, and on each piece of heavy construction equipment such as dozers and compactors. These fire extinguisher shall be utilized for putting out equipment or personnel fires and not to be employed as sole fire fighting equipment for large site fire.

B. Emergency Eye Wash/Shower: Portable emergency eye wash/shower units shall be provided by the Contractor. These portable units shall be protected from freezing and shall be located close to each work area and at each equipment decontamination station. The emergency eye wash / shower units shall meet the requirements specified in ANSI Z358.1-1981.

C. First Aid Kits: The size and number of kits shall be sufficient for the maximum number of people on site at one time. The kits shall be equipped as per the recommendations of an occupational physician and shall be able to provide stabilization for patients requiring off-site treatment and general first aid. The first aid kit locations shall be specially marked and provided with adequate water and other supplies necessary to cleanse and decontaminate burns, wounds, or lesions.

D. On-Site Emergency Vehicle: The Contractor shall provide at all times while on-site work proceeds, a designated emergency vehicle which shall be used to transport injured personnel to the hospital for treatment. This vehicle shall at all times contain a map showing the route and written directions to the hospital.

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8.0 Levels of Personal Protection Equipment (PPE) - Selection of personal protective equipment shall be based on the potential toxicity or physical dangers associated with hazardous materials and possible routes of exposure. Based on known or anticipated hazards, personnel shall be required to wear a minimum of Level D protection. The adequacy of personal protection shall be confirmed through air monitoring conducted by the Site Health and Safety Officer (SHSO) as described in Section 10 and Form 5 (Appendix A). If the need to upgrade the level of personal protection arises, the SHSO shall provide his personnel with the appropriate equipment. PPE selection, evaluation, and re-selection is an on-going process directly related to the change in conditions as encountered at the site.

While this plan is not generally intended for use at sites where levels A or B are required, all four Levels (A through D) are described below. Additional information on specific types of PPE by task can be found on Forms #2 and #3 in Appendix A. Workers should leave the site pending further evaluation if conditions requiring Level A or Level B protection are observed or detected.

8.1 Level A - Level A protection should be worn when the highest available level of respiratory, skin, and eye contact protection is needed. While Level A provides the maximum available protection, it does not protect against all possible airborne or splash hazards. For example, suit material may be rapidly permeable to certain chemicals in high air concentrations or heavy splashes.

A. Personnel Protection Equipment

- Positive pressure self contained breathing apparatus (SCBA), OSHA\NIOSH approved, operated in the positive pressure demand mode.
- Totally encapsulated suit (boots and gloves attached).
- Gloves - inner (tight-fitting and chemical-resistant).
- Boots - chemical-protective, steel toe and shank. Depending on suit boot construction, worn over suit boot.
- Gloves - outer, chemical-resistant. Depending on suit construction, worn over suit gloves. May be replaced with tight-fitting, chemical-resistant gloves worn inside suit gloves.
- Underwear - cotton, "long-john" type (optional).
- Hard hat (under suit).
- Disposable protective suit, gloves and boots. Worn under or over encapsulating suit.

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- Coveralls (under suit).

- 2-way radio communications.

B. Criteria for Use

Use Level A:

1. When the type(s) and concentrations(s) of toxic substances are known to require the highest level of combined protection to the respiratory tract, skin, and eyes. These conditions would be:

   a) Atmospheres which are "immediately dangerous for life and health" (IDLH). IDLH's are detailed in the NIOSH/OSHA's "Pocket Guide to Chemical Hazards" and/or other references.

   b) Known atmosphere or potential situations that would affect the skin or eyes, or could be absorbed into the body through these surfaces in toxic quantities.

      - Potential situations are those where vapors may be generated or splashing may occur through site activities.

      - Standard reference books should be consulted to obtain concentrations hazards to skin, eyes, or mucous membranes.

      - Oxygen deficient atmospheres with above conditions.

2. At sites where the type(s) and/or potential concentration(s) of toxic substances are unknown.

   a) Unless there is information available to strongly indicate otherwise, the site should be presumed to present hazards to the respiratory system, skin, and eyes. Level A protection would provide the highest level of protection for the initial entry team.

   b) Enclosed areas such as confined spaces, railroad cars, ship holds, etc.

3. It is not anticipated that work will be done under conditions requiring Level A protection. If such conditions are encountered, operations will cease immediately and all personnel will

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immediately leave the area. Workers shall not re-enter the area until the contingency plan specifically appropriate for such conditions has been implemented, or until there is clear evidence that the conditions requiring Level A protection have abated.

8.2 Level B - Level B protection should be selected when the highest level of respiratory protection is needed, but exposure to the small unprotected areas of the body (i.e. neck and back of head) is unlikely, or where concentrations are known to be within acceptable exposure standards.

A. Personnel Protective Equipment

- Positive pressure SCBA, OSHA/NIOSH approved, operated in the positive pressure demand mode.
- Hooded, two-piece chemical-resistant suit.
- Gloves - outer, chemical-protective.
- Boots - outer (chemical-protective, steel toe and shank).
- 2-way radio communications.
- Hard hat.
- Face shield (optional).

B. Criteria for Use

Use Level B

1. When the type(s) and concentration(s) of hazardous substances are known to require the highest degree of respiratory protection; but a lower level of skin protection, i.e. in

   a) Atmospheres which are "immediately dangerous for life and health" (IDLH). Type(s) and concentration(s) of vapors in air do not present a hazard to the small, unprotected areas of the body.

   b) Atmospheres with concentrations of known substances greater than protection factors associated with full-face, "air purifying" respirators with appropriate cartridges.

   c) Atmospheres with less than 19.5 or greater than 23.5 percent oxygen; below 10 percent of the lower flammable limit or above the permissible exposure level.

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2. When a determination is made that potential exposure to the body parts not protected by a fully encapsulated suit (primarily neck, ears, etc.) is highly unlikely.

3. Normal drilling and sampling operations will cease if conditions are such that Level B protection would be required.

8.3 Level C - Level C protection should be selected when the types and concentrations of respirable materials are known, have adequate warning properties, or are reasonably assumed to be not greater than the protection factors associated with air-purifying respirators; and exposure to the few unprotected areas of the body (i.e., neck and back of head) is unlikely to cause harm. Continuous monitoring of site and/or individuals should be established.

A. Personnel Protective Equipment

- Half-face, or full-face, air-purifying respirator (OSHA/NIOSH approved).
- Chemical-resistant outer clothing.
- Gloves - inner (tight-fitting, chemical-resistant type or woven liners).
- Gloves -outer (chemical resistant).
- Hard hat (face shield optional).
- Boots - outer (chemical-protective).
- Safety glasses.

B. Criteria for Use

1. Site known to contain potentially hazardous materials resulting in air concentrations requiring a protection factor afforded by a full-face or half-face, air-purifying respirator (OSHA/NIOSH approved).

2. Well-documented, reliable history of site and patterns of prior entry.

3. No evidence to suspect acute or chronic toxicity to exposed skin.

4. Continuous air or personnel monitoring should occur while wearing Level C protection.

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8.4 Level D - Level D is the basic work uniform and should be worn for all site operations. Level D should be selected when performing environmental sampling involving dilute concentrations of contaminants on sites that have been characterized by previous analyses or research. Modified Level D shall include the use of respirators designated at Level C.

A. Personnel Protective Equipment

- Standard work clothing.
- Optional disposable chemical-resistant clothing appropriate for known or expected levels of contamination.
- Boots/Shoes - safety or chemical-resistant boots.
- Safety glasses or safety goggles available.
- Gloves - disposable latex or cotton.
- Optional moisture resistant outer gloves.
- Hard hat available for drilling operations.

B. Criteria for Use

1. No indication of airborne health hazards present.
2. No gross indication of airborne contaminants above background.

9.0 Medical Monitoring - All contractor personnel engaged in on-site activities shall be participants in a medical monitoring program similar to the following. As participants in this program, these individuals will have had recent physical examinations.

The primary goal of this medical monitoring program is to provide evaluation and ongoing surveillance of the health status of employees potentially exposed to toxic substances as a result of their work-related activities. An active health monitoring program for those employees potentially at risk is an important tool in evaluating the effects of chronic low-level exposures or acute exposures related to operations at hazardous waste sites. The effects of low-level exposures may not become apparent until years after the initial exposure.

This medical monitoring program includes laboratory testing, personnel medical history evaluation, physical examination, and specific systematic testing.

Each participant in this medical monitoring program undergoes a complete occupational history evaluation, and baseline physical examination including the following parameters:

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- Pulmonary Function Studies
- Complete Blood Count
- Chemical Blood Profile
- Urinalysis
- Chest X-Ray
- Electrocardiogram
- Specific parameters as necessary dependent upon exposure.

Following the establishment of each participant's baseline values for the above parameters, an annual re-evaluation is conducted to monitor potential changes due to work with hazardous materials.

In addition to this annual re-examination, provisions are made for specific post-exposure examinations in the event of a suspected exposure during a particular field event.

The program shall meet or exceed the minimum requirements established in OSHA standard 20 CFR 1910.120.

10.0 Air Monitoring - Real-time air monitoring at the work area and site perimeter will be required. The frequency of testing will be dependent upon the levels of contaminants detected during the Phase II assessment. Workers shall also be monitored to determine compliance with 29CFR 1910.1000 "Air Contaminants".

10.1 Real Time Monitoring - Real-time air monitoring shall be required of the Contractor during all intrusive and non-intrusive construction activities. Air monitoring instruments shall be calibrated regularly and all calibration and monitoring data shall be recorded in a field notebook. Each day, construction activities shall not begin until the instruments are checked out and background levels are determined and recorded.

Air shall be monitored for total volatiles (organic vapors) with a photoionization detector (HNu Model PI 101) or equivalent equipped with a standard probe containing a 10.2 eV lamp. Particulate matter shall be monitored with a particulate/aerosol monitor (MIE Model PDM-3 Miniram or equivalent).

Air monitoring action levels as shown below and appropriate responses shall be established by the Contractor and followed throughout intrusive and non-intrusive construction activities. All air monitoring results and field observations (i.e. wind speed, wind direction, humidity, precipitation, etc.) shall be recorded in a field notebook.

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A. Volatile Organic Compounds (VOC's) VOC's shall be monitored at the downwind perimeter of the Exclusion Zone daily at regular intervals. If total organic vapor levels exceed 5 parts per million (ppm) continuously above background, intrusive activities shall be stopped and corrective action taken.

B. Particulates Particulates shall be continuously monitored downwind of the Exclusion Zone with a portable particulate monitor having an alarm set at 0.15 milligrams per cubic meter (mg/m^3) or background. If downwind particulate levels, integrated over a period of 15 minutes, exceed 0.15 mg/m^3 or background, particulate levels upwind of the Exclusion Zone shall be measured. If the downwind particulate level is more than 0.10 mg/m^3 greater than the upwind particulate level, then all intrusive activities shall be stopped and corrective action taken.

Level C protection has been selected as the basic level of personal protection. However, the continuous air monitoring program will determine whether the level of protection may be downgraded or upgraded, as appropriate.

10.2 Worker Air Monitoring - Representative worker air monitoring shall be performed for each specific work operation. If airborne levels exceed one-half the permissible exposure levels established under various OSHA regulations; respiratory protection will be required in accordance with 29 CFR 1910.134.

C325\H&S\TEXT

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APPENDIX A

Site Hazard Summary
Forms #1 - 8

APPENDIX A
SITE HAZARD SUMMARY

Scope of Work: The Lake Salvage site in Chicago, Illinois was used as a metal scrap yard and wire reclamation facility. A full site assessment will be performed to determine areas of residual contamination. The areas of contamination will be identified, cleaned up and the building will be demolished. The following information addresses specific issues expected to be encountered during the project.

A. PHYSICAL HAZARDS

1. Building - The building is in an extremely deteriorated condition. Exercise caution in all areas of the facility.

2. Electrical - There are overhead electrical lines and utilities entering the facility. Notify local utilities for clearance.

3. Traffic - Exercise caution around heavy machinery. Maintain eye contact with operators at all times.

4. Overhead - Hard hats are required due to the condition of the building and proposed demolition activities.

5. Terrain - There is much debris over the facility. Exercise caution on walking surface to minimize trips, slips or falls. Use work boots to minimize foot injuries.

6. Confined Spaces - Enclosed spaces with poor ventilation require special work practices.

B. CHEMICAL HAZARDS

1. Materials Used or released at the site include asbestos, lead (paint and soil), dioxins, polychlorinated biphynels (PCB's).

2. Materials brought onto site during the work can include gasoline, oils, greases and other cleaning chemicals.

3. Confined Space areas can contain oxygen deficient atmospheres, combustible environments or toxic environments. (i.e. hydrogen sulfide) These can include test pits.

   Carbon monoxide may also be present when internal combustion engines are run in poorly ventilated areas.

FORM #1

EMERGENCY CONTACTS / CONTINGENCY PLAN

Telephone Availability:

____ available on site
_X_ available nearby at Pay phone at corner of Western and W. Lake.

City of Chicago, Illinois

Distance and Directions to Site from Nearest Main Road.

See Appendix C - Site Map.

Emergency Contact	Name	Phone #
Health & Safety Manager	Michael Matilainen CIH	413-562-1600
Project Manager	Zen Kruczkowski, P.E.	413-562-1600
Contractor Site Safety Coordinator	NA	NA
Client Contact	Ted Craver	(703) 413-3916
Environmental Agency (US EPA)	Fred Bartman	(312) 886-0776
Health Department	NA	NA
Fire Department	NA	911
CHEMTREC (call in the event of chemical release, fire, or explosion)	NA	1-800-424-9300

FORM #2 - PPE BY TASK

TASK DESCRIPTION		Type of Work	Personal Protective Equipment	
			Primary	Contingency
1	All Sampling (see attached site map)	(X)Intrusive ( )Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area
2	Remediation/Demolition/Decontamination	(X)Intrusive ( )Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area
3	Facilities Inspection	( )Intrusive (X)Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area

PERSONNEL AND RESPONSIBILITIES FOR PPE (include subcontractors)

NAME	FIRM	RESPONSIBILITIES	On Site?
Michael Matilainen CIH	T&B	Health and Safety	No
Zen Kruczkowski, P.E.	T&B	Site Supervision	Yes

C325\H&S\FORM-2

Revised: November 14, 1994

FORM #4 - DECONTAMINATION PROCEDURES

Personnel Decontamination *Summarize below or attach diagram;* Team members will remove their protective clothing in the following order: 1. Equipment drop 2. Boot cover 3. Outer glove removal 4. Hard hat removal 5. Coverall removal 6. Surgical glove removal 7. Respirator removal 8. Hand and face wash 9. Shower required if exposed to asbestos or lead 10. PPE Air Dry	Sampling Equipment Decontamination *Summarize below or attach diagram;* 1. Gross removal of dirt 2. Water rinse 3. Cleaning solution 4. Place in bag return to lab for final cleaning 5. If further in-field decontamination required 6. Steam cleaning (if applicable) 7. Tap water rinse 8. Methanol rinse 9. Distilled water rinse 10. Air Dry	Heavy Equipment Decontamination *Summarize below or attach diagram;* 1. Heavy equipment will be decontaminated by contractor prior to leaving the site 2. Steam cleaning, or high pressure washing 3. Water Rinse 4. Air Dry
Containment and Disposal Method Protective equipment will be disposed of through the contractor's and/or client's waste stream. Place equipment in plastic bags. Small amounts of uncontaminated wastewater allowed to percolate back into the ground.	Containment and Disposal Method Small amounts of uncontaminated waste water allowed to percolate back into the ground. Methanol to be contained and disposed of.	Containment and Disposal Method Control of fluids from decontamination of heavy equipment will be the responsibility of the contractor. If necessary based on Phase II work, supply vehicle washdown area. Contaminated soil cuttings from drilling operations to be stockpiled, covered and characterized for disposal/or reuse.

APPENDIX B

Health & Safety Guidelines
MSD Sheets

Occupational Health Guideline for Chlorodiphenyl (54% Chlorine)*

INTRODUCTION

This guideline is intended as a source of information for employees, employers, physicians, industrial hygienists, and other occupational health professionals who may have a need for such information. It does not attempt to present all data; rather, it presents pertinent information and data in summary form.

SUBSTANCE IDENTIFICATION

- Formula: $C_{12}H_5Cl_5$ (approximately)
- Synonyms: Polychlorinated biphenyl; PCB
- Appearance and odor: Pale yellow viscous liquid with a mild hydrocarbon odor.

PERMISSIBLE EXPOSURE LIMIT (PEL)

The current OSHA standard for chlorodiphenyl (54% chlorine) is 0.5 milligram of chlorodiphenyl (54% chlorine) per cubic meter of air (mg/m^3) averaged over an eight-hour work shift. NIOSH has recommended that the permissible exposure limit for polychlorinated biphenyls be reduced to 1.0 microgram per cubic meter of air averaged over a work shift of up to 10 hours per day, 40 hours per week, and that chlorodiphenyl (54% chlorine) be regulated as an occupational carcinogen. The NIOSH Criteria Document for Polychlorinated Biphenyls should be consulted for more detailed information.

HEALTH HAZARD INFORMATION

- **Routes of exposure**

Chlorodiphenyl (54% chlorine) can affect the body if it is inhaled, if it comes in contact with the eyes or skin, or if it is swallowed. It may be absorbed through the skin. Every effort should be made to prevent skin, eye, oral, or inhalation contact with this material.

- **Effects of overexposure**

Chlorodiphenyl (54% chlorine) may cause irritation of the eyes, nose, and throat, and an acne-like skin rash. It may also injure the liver, resulting in such effects as fatigue, dark urine, and yellow jaundice. Repeated skin contact with the liquid may cause skin irritation.

- **Reporting signs and symptoms**

A physician should be contacted if anyone develops any signs or symptoms and suspects that they are caused by exposure to chlorodiphenyl (54% chlorine). The production of liver tumors and adverse reproductive effects have been demonstrated in experimental animals following ingestion of polychlorinated biphenyls. The relevance to humans of some of these studies has not yet been established.

- **Recommended medical surveillance**

The following medical procedures should be made available to each employee who is exposed to chlorodiphenyl (54% chlorine) at potentially hazardous levels:

1. Initial Medical Examination:

—A complete history and physical examination: The purpose is to detect pre-existing conditions that might place the exposed employee at increased risk, and to establish a baseline for future health monitoring. Examination of the liver and skin should be stressed. Women in the work force should be advised of the potential adverse effects of chlorodiphenyl (54% chlorine) on the unborn child. Those who have borne children and work with chlorodiphenyl (54% chlorine) should be counseled concerning the advisability of nursing their offspring.

—Liver function tests: Chlorodiphenyl (54% chlorine) may cause liver damage. A profile of liver function should be obtained by utilizing a medically acceptable array of biochemical tests.

—Skin disease: Chlorodiphenyl (54% chlorine) is a defatting agent and can cause dermatitis on prolonged exposure. Persons with pre-existing skin disorders may be more susceptible to the effects of this agent.

2. Periodic Medical Examination: The aforementioned medical examinations should be repeated on an annual basis.

These recommendations reflect good industrial hygiene and medical surveillance practices and their implementation will assist in achieving an effective occupational health program. However, they may not be sufficient to achieve compliance with all requirements of OSHA regulations.

U.S. DEPARTMENT OF HEALTH AND HUMAN SERVICES
Public Health Service Centers for Disease Control
National Institute for Occupational Safety and Health

U.S. DEPARTMENT OF LABOR
Occupational Safety and Health Administration

made for the removal of chlorodiphenyl (54% chlorine) from the clothing. If the clothing is to be laundered or otherwise cleaned to remove the chlorodiphenyl (54% chlorine), the person performing the operation should be informed of chlorodiphenyl's (54% chlorine) hazardous properties.

- Non-impervious clothing which becomes contaminated with liquid chlorodiphenyl (54% chlorine) should be removed promptly and not reworn until the chlorodiphenyl (54% chlorine) is removed from the clothing.
- Employees should be provided with and required to use splash-proof safety goggles where liquid chlorodiphenyl (54% chlorine) may contact the eyes.

SANITATION

- Skin that becomes contaminated with liquid chlorodiphenyl (54% chlorine) should be promptly washed or showered with soap or mild detergent and water to remove any chlorodiphenyl (54% chlorine).
- Eating and smoking should not be permitted in areas where liquid chlorodiphenyl (54% chlorine) is handled, processed, or stored.
- Employees who handle liquid chlorodiphenyl (54% chlorine) should wash their hands thoroughly with soap or mild detergent and water before eating, smoking, or using toilet facilities.
- Areas in which exposure to chlorodiphenyl (54% chlorine) may occur should be identified by signs or other appropriate means, and access to these areas should be limited to authorized persons.

COMMON OPERATIONS AND CONTROLS

The following list includes some common operations in which exposure to chlorodiphenyl (54% chlorine) may occur and control methods which may be effective in each case:

Operation	Controls
Use as high-temperature transfer medium in chemical/food processing vessels and drying ovens	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as a dielectric in manufacture of transformers, capacitors, resistors, and other electrical apparatus	General dilution ventilation; local exhaust ventilation; personal protective equipment
Application and formulation as plasticizer, flame-retardant, and adhesive and weatherizer in spray surface coatings; manufacture and application of impregnants for cloth, paper, fiberboard, wood, and asbestos; manufacture and application of natural and synthetic waxes and polishes; manufacture and application of hot-melt and other adhesives	Process enclosure; general dilution ventilation; local exhaust ventilation; personal protective equipment
Use as non-flammable working fluid in vacuum pumps, hydraulic systems, and expansion systems	General dilution ventilation; local exhaust ventilation
Use during application of high-pressure, temperature, and moisture lubricants	Personal protective equipment
Use in compounding and processing of plastics for flame retardancy	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use in manufacture and application for use as pesticides and fungicides	Personal protective equipment
Use as an intermediate or raw material in further organic synthesis	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as sealer for gaskets of natural rubber and synthetics	General dilution ventilation; local exhaust ventilation; personal protective equipment
Use as adhesive release on tapes and ink release on carbonless duplicating paper; as a pigment carrier in dyeing polyesters and paper	Personal protective equipment

* SPECIAL NOTE

The International Agency for Research on Cancer (IARC) has evaluated the data on this chemical and has concluded that it causes cancer. See *IARC Monographs on the Evaluation of Carcinogenic Risk of Chemicals to Man*, Volume 7, 1974, and Volume 18, 1978.

RESPIRATORY PROTECTION FOR CHLORODIPHENYL (54% CHLORINE)

Condition	Minimum Respiratory Protection* Required Above 0.5 mg/m³
Vapor Concentration	
5 mg/m³ or less	Any supplied-air respirator with a full facepiece, helmet, or hood. Any self-contained breathing apparatus with a full facepiece.
Greater than 5 mg/m³** or entry and escape from unknown concentrations	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode. A combination respirator which includes a Type C supplied-air respirator with a full facepiece operated in pressure-demand or other positive pressure or continuous-flow mode and an auxiliary self-contained breathing apparatus operated in pressure-demand or other positive pressure mode.
Fire Fighting	Self-contained breathing apparatus with a full facepiece operated in pressure-demand or other positive pressure mode.
Escape	Any gas mask providing protection against pesticides. Any escape self-contained breathing apparatus.

*Only NIOSH-approved or MSHA-approved equipment should be used.

**Use of supplied-air suits may be necessary to prevent skin contact while providing respiratory protection from airborne concentrations of chlorodiphenyl (54% chlorine); however, this equipment should be selected, used, and maintained under the immediate supervision of trained personnel. Where supplied-air suits are used above a concentration of 5 mg/m³, an auxiliary self-contained breathing apparatus operated in positive pressure mode should also be worn.

4. HEALTH AND SAFETY PROGRAM PLAN

4.1 Overview and Organizational Responsibilities

Employee health and safety at hazardous work sites is one of the primary concerns on all Central States Environmental Services, Inc. (CSES) projects. CSES is proud of its health and safety record and is dedicated to maintaining the highest standards in health and safety. CSES has developed its safety policies to conform closely with those of U.S. EPA and Riedel Environmental Services, Inc.

With this goal in mind, CSES provides extensive employee training, health monitoring, and "state-of-the-art" protective equipment for all emergency response and remedial action personnel. Organizational responsibilities for the implementation of the Health and Safety Plan are described below.

Corporate Manager of Health and Safety

The Corporate Manager of Health and Safety will be responsible for the development and coordination of each site Health and Safety Plan. This plan will comply with the procedures contained in this document. Each site plan will address the specific hazards presented by that project and will include: medical surveillance, hazard assessment, personal protective equipment and clothing, training requirements, industrial hygiene monitoring, and field implementation audits.

Project Manager

The Project Manager will have overall responsibility for implementation of the site health and safety plan as it pertains to CSES and contractor personnel. This will include communicating site requirements to all personnel, field supervision and consultation with the Site Health and Safety Superintendent regarding appropriate changes to the health and safety plan. The Project Manager may delegate his authority to the Site Health and Safety Superintendent.

Site Health and Safety Superintendent

The Site Health and Safety Superintendent will be the first line supervisor responsible for ensuring that work crews comply with all site health and safety requirements. He will report all violations to the Project Manager immediately. In some instances, health and safety technicians will be utilized to provide first-line supervision of the Health and Safety Plan. This decision will be made by the Project Manager in conjunction with the Site Health and Safety Superintendent and the Corporate Health and Safety Manager.

Health Monitors

Heat stress is a major concern on some job sites. For this reason, qualified Health Monitors will be present when determined necessary by the Corporate Health and Safety Manager or Site Health and Safety Superintendent. CSES uses registered nurses or EMTs to monitor site personnel's health.

Pollution Cleanup Technicians (PCT)

PCTs will consist of Foremen, Operators, and Laborers. They will be responsible for understanding and complying with all site requirements. Health and Safety violations will not be tolerated. All health and safety violations will be reported immediately to the Health and Safety Superintendent or Project Manager.

Site Personnel Requirements

Prior to assignment of any cleanup project, all personnel must undergo introductory training and a comprehensive physical examination.

4.2 Training

All CSES personnel have completed a minimum of 40 hours of training in Hazardous Materials Evaluation and Response conducted by either Riedel Environmental Services, Inc. or CSES. This training includes:

Corrosives
Flammables
Toxicology
Reactives
EPA, DOT and OSHA Requirements
Shipping Regulations
Test Equipment
Protective Clothing
Respiratory Protection
Hands-on Usage of Appropriate Equipment
Contingency Planning

Continuing education and training is provided and required of all personnel in areas such as:

Respiratory Protection
Hazard Communication
DOT Regulations
Hazard Recognization, etc.

All employees also receive training in CPR and First Aid on an annual bases.

In addition, all on-site managers and supervisors will receive an additional 8 hours training on specialized items required by OSHA 1910.120(e)(3).

Site-specific training may be provided to temporary personnel hired for work on only one site. This training will cover site-specific hazards, personal protective equipment and required safe work practices. Course length and content will be developed to meet the requirements of 29 CFR 1910.120(e).

4.3 Physical Examination

All employees are required to undergo a complete baseline physical examination at their time of employment and annually thereafter. The parameters

included in the physical exams are developed with the input of a physician certified in occupational medicine and reflect the medical program recommendations included in the joint NIOSH/OSHA/USCG/EPA manual for safety and health at hazardous waste sites.

Comprehensive physical exams provide baseline information for monitoring employee health and assure that the employee is capable of wearing the required protective equipment and performing the sometimes strenuous work.

Follow-up physicals are provided on at least an annual basis.

4.4 Work Site Layout

CSES uses the same site layout and terminology as described in EPA's Standard Operating Safety Guides as outlined below:

The site shall be divided into three well-delineated zones as follows:

1. Exclusion Zone - This zone includes the actual areas of contamination. This zone has the highest inhalation exposure potential and/or presents a high probability of skin contact with hazardous materials.

2. Contamination Reduction Zone - This zone includes the areas immediately surrounding the Contamination Zone. This zone has the next highest inhalation hazard, but does not have a high probability of skin contact with hazardous materials. The Contamination Reduction Zone is initially a clean area and serves as a buffer between the Support and Exclusion Zones.

3. Support Zone - This zone covers all areas outside the Contamination Reduction Zone. Adverse exposure to chemicals is unlikely in the Support Zone.

CENTRAL STATES ENVIRONMENTAL SERVICES, INC.

EMPLOYEE PHYSICAL EXAMINATIONS POLICY

Personnel involved in hazardous material emergency response, remedial cleanup, or sampling may be exposed to an unknown variety of toxic substances. These may produce detrimental health effects. With early detection, the health effects may be successfully treated and permanent damage prevented.

A complete physical exam is mandatory to assure that employees are physically capable of wearing the required protective equipment and performing the necessary work in adverse conditions. The OSHA Hazardous Waste Operations and Emergency Response Standard (29 CFR 1910.120) also requires periodic medical monitoring of employees.

Every CSES employee who may have occasion to visit or work on a hazardous material site must have a complete baseline physical examination.

Employees must also receive follow-up physicals on an annual basis. Any employee who experiences a contamination incident (equipment failure, significant skin contact, etc.) may require an additional examination. The need for a contamination incident physical will be determined by the Health and Safety Coordinator responsible for the job.

Baseline examinations include parameters which will not be required on every follow-up exam. The examining physician will select appropriate tests for follow-up physicals based on the employee's exposure and work history for the previous exposure period. This may include consulting with the Regional Health and Safety Manager.

Employee Selection

CSES will ensure that all employees who may work on hazardous materials sites receive physicals. They will also determine when physicals will be given. These determinations should be based upon:

1) Job Classification
2) Exposure History
3) Contamination Incident (type of contaminant and degree of exposure)
4) Time since last Physical

Record Keeping

The Division Manager will be responsible for maintaining employee health records. Records must be reviewed to determine an employee's work capability. (The examining Physician will indicate if the employee has any work restrictions.) Employees' medical records will be located in such a manner that they are available for review if requested. Individual physical exam records will be maintained in the employee's personnel file.

OSHA requires that maintenance of medical records on exposed workers be for 30 years after they leave employment. They also require that records be available to the individual worker, their authorized representatives and OSHA

representatives.

Copies of physical exam results will be mailed to the Corporate Manager of Health and Safety. Employees will also have a record of exam dates on their training and physical exam record wallet card.

The manager for health, safety and training will coordinate the scheduling and record keeping for corporate officers and employees, as well as overview of regional records.

Clinic Selection

CSES will select appropriate clinics which are convenient for their location. The facilities selected must have the capability to provide the parameters as outlined above. Clinical Laboratories must be certified according to the Clinical Laboratory Improvement Act of 1967.

CENTRAL STATES ENVIRONMENTAL SERVICES, INC.

PARAMETERS FOR EMPLOYEE PHYSICALS

Baseline Physical

1. Complete medical/occupational questionnaire.
2. Complete physical exam by physician (including eardrum).
3. Vitals (height, weight, blood pressure, pulse, etc.).
4. EKG (resting and stress).
5. Vision test (glaucoma).
6. Pulmonary function tests.
7. Blood chemistry profile (SMAC) - typical profiles include:

Sodium	Bun	Total Protein
Potassium	Creatinine	Albumin
Chloride	Uric Acid	Globulin
CO_2	Cholesterol	Alkaline Phosphatase
Calcium	Triglycerides	LDH
Phosphorous	HDL/Cholesterol Ratio	SGOT
Glucose	Bilirubin (total & direct)	GGT or SGPT

8. Complete blood count with differential.
9. Urinalysis.
10. Chest x-ray (P/A and lateral).
11. Audiometric exam (annual audiograms will be required for employees in high noise jobs such as full time equipment operators).
12. PCB blood level.
13. Urine heavy metal screen (not 24 hour volume).
14. Blood lead level.
15. Zinc protoporphyrin.

Annual Physical

The annual physical exam will include the first nine parameters specified in the baseline physical. The examining physician may request additional tests based on the employee's exposure history (semen analysis, blood lead, cholinesterase, sputum cytology, etc.). The physician will inform the employee and Regional Health and Safety Personnel of the need for additional tests.

Contamination Exposure Physical

Physical examinations following a contamination incident will include the appropriate parameters as specified by the examining physician. Regional Health and Safety Personnel will provide the examining physician with information on contamination incidents and follow-up on examination results.

DOT Physical

All employees who operate vehicles which fall under the DOT regulations should receive appropriate documentation to meet these requirements at the time of their examination.

Fitness for Duty

Examining physicians will provide some sort of fitness for duty form stating that the employee is capable of wearing the required protective equipment and performing the necessary work.

4.5 Levels of Protection

CSES follows the levels of protection selection logic and terminology specified in EPA's Standard Operating Safety Guides.

Level A: Level A protection should be worn when the highest available level of respiratory, skin and eye contact protection is needed.

Equipment:

1. Positive Pressure SCBA (MSHA/NIOSH approved) operated in the positive pressure mode.
2. Totally Encapsulating Suit (Boots and Gloves attached).
3. Boots - chemical-protective, steel toe and shank. Depending on suit construction, may be worn over suit boot.
4. Gloves - outer, chemical resistant. Depending on encapsulating suit construction.
5. Gloves - inner (tight fitting and chemical resistant).
6. Disposable protective suit, gloves and boots (worn under or over encapsulating suit, optional).
7. Coveralls (under suit, optional).
8. Hard Hat (under suit, optional).
9. Underwear - cotton, long-john type (optional).
10. 2-way Radio Communications.

Criteria for Use: Level A protection shall be used for the following conditions and operations.

- Total vapor readings of unknown type vapors greater than 500 ppm above background as indicated on instruments, such as the HNu Photoionizer or Century Organic Vapor Analyzer (OVA).
- Gas or vapor clouds of toxic chemicals associated with a leak or spill.

CSES has fully encapsulated Level A suits readily available for emergency response and remedial action cleanup projects.

Level B: Level B protection is selected when the highest level of respiratory protection is needed, but exposure to the small unprotected areas of the body (i.e., neck, back and head) is unlikely, or where concentrations are known to be within acceptable exposure standards, or when the material does not present an extreme hazard through skin contact.

Equipment:

1. Positive Pressure SCBA (MSHA/NIOSH approved) operated in the positive pressure mode.

2. Hooded, two-piece chemical resistant suit.

3. Gloves - outer, chemical protective.

4. Gloves - inner (tight fitting and chemical resistant).

5. Boot Covers - outer (chemical protective, heavy rubber disposable, optional).

6. Boots - inner (chemical protective, steel toe shank).

7. 2-way Radio Communications.

8. Hard Hat (optional).

9. Face Shield (optional).

Criteria for Use: Level B protection shall be used for the following conditions and operations.

- Total vapor levels of unknown type that range from 5 ppm to 500 ppm above background as indicated on instruments, such as the HNu Photoionizer or Century Organic Vapor Analyzer (OVA), and the air is not suspected to contain high levels of toxic substances which adversely affect skin or eyes.

Level C: Level C protection shall be selected when the types and concentrations of respirable material are known and/or air monitoring of the site and individual work areas have not identified significant levels of airborne chemicals.

Equipment:

1. Full-face, air-purifying respirator (MSHA/NIOSH approved).

2. Chemical-resistant clothing.

3. Overalls and long-sleeved jacket or coveralls; hooded one or two-piece chemical splash suit (when applicable - hooded disposable coveralls).

4. Gloves - outer (chemical protective).

5. Gloves - inner (tight fitting and chemical resistant type).

6. Cloth Coveralls - fire resistant (inside chemical-protective clothing optional).

7. Escape Mask - (optional and site dependent).

8. Hard Hat - (face shield, optional).

9. Boot Covers - outer (chemical protective, heavy rubber, optional).

10. Boots - inner (chemical protective, steel toe and shank).

11. 2-way Radio Communications.

Criteria for Use: Level C protection may be utilized under the following conditions.

- Types of hazards are well known.
- Decontamination Assistants.
- Operation of the drum crusher.
- Total vapor reading of 1-5 ppm above background as indicated on instruments such as the HNu Photoionizer or Century Organic Vapor Analyzer (OVA).
- Operations inside the Contamination Reduction Zone may utilize Level C protection, except personnel engaged in equipment decontamination must wear clothing which will protect them from water spray.

Level D: Level D is the basic work uniform and should be worn only when operations are positively identified as presenting no toxic hazards to personnel.

Equipment:

1. Coveralls.

2. Boots/Shoes - safety or chemical protective, steel toed.

3. Safety Glasses or Safety Goggles.

4. Hard Hat (face shield, optional).

5. Gloves (optional).

Criteria for Use: Level D protection shall be utilized under the following conditions:

- Operating in the support area only.
- No indication above background on the HNu Photoionizer or Century Organic Vapor Analyzer (OVA).

Other Zones (non-hazardous)

Persons entering the site to engage in movement of non-hazardous materials may wear Level D protection as stipulated. However, Level D protection may not be worn during movement of hazardous materials.

4.6 Respiratory Protection

CSES provides a variety of respiratory protection equipment for site personnel. NIOSH/OSHA/EPA decision logic is used for proper selection of respiratory protective equipment. CSES uses only NIOSH approved respiratory protection equipment and provides extensive training on proper usage.

In addition, all personnel must be medically certified as being capable of wearing the required respirators. Personnel are fit-tested by several methods to ensure a proper respirator fit of the individual respirator selected.

The CSES written respirator program is designed to meet or exceed the OSHA requirements for respiratory protection. A copy of the program follows.

CENTRAL STATES ENVIRONMENTAL SERVICES, INC.

RESPIRATOR PROGRAM

Federal regulations and company concern require the development of a written respirator program. The following program has been developed in conjunction with Riedel Environmental Services, Inc. and will serve as a guide for all CSES locations. All employees who are assigned tasks requiring the wearing of respirators must be trained in the respirator program.

The CSES Site Health and Safety Superintendent (SHSS) will be responsible for maintaining the respirator program. Any questions concerning the program should be addressed to the SHSS.

Respirator Selection:

The Site Health and Safety Superintendent will be responsible for appropriate respirator selection. Only NIOSH approved respirators will be used. Respirators will be selected according to the contaminant types and levels which may be encountered.

Training:

No CSES employee will wear a respirator until he has been thoroughly and completely trained in proper respirator usage. These procedures have been developed by MSA. He must also be fit tested for the specific respirator. This training and fit testing will be documented and signed by the employee.

Fit Testing:

Every employee will be fit tested for the specific type of respirator in use. This fit testing will consist of exposure to a test atmosphere, such as irritant smoke, ammonia or isoamyl acetate. Additionally, the employee will be responsible for conducting a positive and negative fit test each time the respirator is donned.

Inspection, Cleaning and Maintenance:

Each employee will be responsible for his own respirator. Respirators will be inspected prior to and after usage. Respirators will be cleaned at the end of each shift. Employees are responsible for maintenance of their own individual air-purifying respirators.

Only employees who have completed the appropriate training courses may perform maintenance on supplied-air respirators. The SHSS should be consulted for any necessary information on respirators inspection, cleaning or maintenance.

Respirator Storage:

Respirators must be stored in a clean area which is not likely to be contaminated by the work in progress. When possible, respirators should be stored in a closed container, such as a plastic bag. Respirators should not be hung from their headbands for prolong times since this may shorten the life of

the respirator headband and decrease the respirator fit and effectiveness.

Respirators should not be stored in a bent or confined position. This can cause the respirator face seal to be permanently deformed so that a proper fit cannot be obtained.

Medical Examinations:

No CSES employee shall wear a respirator until he has been examined by a physician and determined to be physically able to wear respiratory protection. This examination and determination shall be documented in the employee's personnel file.

Work Area Surveillance:

The SHSS will be responsible for seeing that the work area is monitored to ensure that the respiratory protection equipment is adequate. Additional monitoring and industrial hygiene testing will be conducted and documented as the SHSS determines necessary.

Additional Considerations:

Employees cannot have any facial hair which prevents a good face seal. Employees will be clean shaven in the area of the respirator seal. NIOSH has determined that even a light stubble may adversely affect respirator fit.

Employees wearing glasses will be fitted with respirators with appropriate eyeglass holders.

No employee will enter any IDLH atmosphere without a safety watch. The safety watch will be equipped with the same level of personal protective equipment as the employee in the IDLH atmosphere. The employee and safety watch will maintain visual or audible contact at all times.

Figure 4-1

CENTRAL STATES ENVIRONMENTAL SERVICES, INC.

Respiratory Protective Equipment & Training

I have received training in the proper usage of the following respiratory protective equipment and in the company's written respiratory program.

Training has included (initial and date appropriate areas):

1. _____ Written Procedures
2. _____ Respirator Selection
3. _____ Respirator Limitations
4. _____ Fit Testing
5. _____ Cleaning
6. _____ Inspection
7. _____ Maintenance
8. _____ Storage
9. _____ Medical Requirements
10. _____ CSES Information Contacts (Supervision or SHSS)
11. _____ Wearing the Respirator in a Test Atmosphere

I have been trained and fitted with the following respirators (initial and date appropriate areas):

1. _____ MSA "Comfo II" Half-Face
2. _____ MSA "Ultra-Twin" Full-Face
3. _____ MSA Gas Mask (Type _____)
4. _____ MSA Model 401/"Ultralite"
5. _____ Scott "Presur-Pak" IIA SCBA
6. _____ MSA Model 401 with Hose Line SCBA
7. _____ Other (List)_____

_____

_____

I have been provided with a copy of the company's Respiratory Protection Program. _____.

I have read and understand this training form and know where to go or who to ask for additional information.

Signed _____ Date_____

4.7 Decontamination Procedures

CSES uses the decontamination practices outlined in EPA's Standard Operating Safety Guides.

On all remedial and most emergency cleanup projects, a Decontamination Trailer will be available for site personnel. Decontamination procedures will be documented in the site specific safety plan. The Site Health and Safety Superintendent or Project Manager will monitor decon procedures to ensure compliance as per OSHA 1910.120(k)(5).

Examples of site entry and decontamination procedures follow:

A decontamination unit will usually be positioned at the entrance to the Contamination Reduction Zone with a step-off area just inside the Contamination Reduction Zone. All personnel entering or leaving the Contamination Reduction Zone shall pass through this area to don or doff their protective equipment. Disposable booties may be provided for personnel entering the Contamination Reduction Zone.

1. Entering Contaminated Area
   a. Pickup clean underwear, booties, rain gear, clothes, chemical suits, respirators, air packs and boots when entering the clean side of the decontamination facility. All donning of clothing and equipment, taping, etc., is done at this point. Equipment contaminated from the preceding day is to be picked up in the contamination control area when exiting the decontamination facility.

   b. Proceed to contamination control area.

   c. Contamination Control Area

      Once you pass through the shower area, or cross the contamination control line, you are in the contamination control area. All clothing and equipment work into this area is considered to be contaminated. Personnel wishing to re-enter the clean area must undergo decontamination procedures.

      1. Decontaminated respirators, gloves, boots and rain gear are to be put on in this area.
      2. Prior to leaving this area, be sure that all personnel protective equipment is in good working condition.
      3. Conduct final inspection of taping and equipment.
      4. Proceed to work station on contaminated side.

2. Exiting Contaminated Area Procedures
   a. Before leaving the contaminated zone:

      1. Deposit all contaminated equipment at the equipment decontamination station. The equipment should be placed in barrels or on sheets of visqueen. The decontamination of contaminated equipment will take place at this point.

      2. Outer garments should be rinsed with decontamination solution and water at this point. All contaminated liquids may be recovered for treatment, depending on site location.

3. Enter contamination control area.

b. Contamination Control Area

1. Removal of contaminated outer-clothing and boots should be done here. Contaminated clothing should be placed in drums or plastic bags for disposal or decontamination.

2. Remove and deposit contaminated respirators or face pieces here in individual plastic bags. Each respirator should be clearly identified with the individual's name.

3. Remove underwear and inner gloves. Deposit in drums or plastic bags.

c. Enter Decon Trailer

1. Shower at this point. All resultant liquid should be retained and tested for contamination.

Exclusion Zone

Personnel in the Exclusion Zone must always wear the appropriate level of protective equipment.

NOTE: There may be specific areas of operation in the exclusion zone requiring a higher level of protection than that required for the general Exclusion Zone. (Example: Drum sampling requiring Level B protection in a general Level C zone).

No smoking, eating or drinking is allowed in the Exclusion Zone.

Contamination Reduction Zone

Levels of protection in the Contamination Reduction Zone may be less than that required in the Exclusion Zone but some level of protection will always be required.

A sub-area of the Contamination Reduction Zone may be established as a rest area. This rest area must be maintained as clean as possible since personnel may remove part of their protective clothing in this area. No smoking or eating is allowed in the general Contamination Reduction Zone.

Support Zone

Contaminated clothing, equipment or personnel are not allowed in the Support Zone. This zone must be maintained free of contamination.

All meals are eaten in the Support Zone after personnel have been decontaminated. "Break vans" may be used as mobile Support and Contamination Reduction Areas.

Smoking, eating and cosmetic application is allowed only in the Support Zone.

4.8 Confined Space Work Practices

Confined spaces present an increased hazard to cleanup personnel. CSES requires special training and procedures for confined space work. The CSES confined space work practices are based on recommendations from OSHA, ANSI, NFPA and NIOSH.

CSES defines a confined space as a work area with limited openings for entrance or egress, limited ventilation, and increased risks for hazardous atmospheres.

Confined spaces may include: tank cars, storage tanks, reaction vessels, ships holds, storm drains, utility vaults, ditches and trenches, silos, etc. While all of these confined spaces present increased hazards, they may all be worked safely if proper procedures are followed.

The key elements for a confined space program includes:

I. Pre-Entry Procedures

a. Work Space History - What has the confined space been used for or what previous cargoes has it contained? This includes not just the last cargo but several previous cargoes as well.

b. Securing the Work Space - All piping and valves leading the work space must be closed and blanked. Any machinery or electrical devices in the work space must be locked-out.

c. Space Testing - The confined space must be tested for flammables, toxics, and oxygen deficient atmospheres. Oxygen deficient atmospheres are any atmospheres that have less than 19.5% oxygen. Oxygen deficiency in confined spaces result in more fatalities than any other hazardous atmosphere.

d. Ventilation and Illumination - Adequate ventilation and lighting must be supplied. If flammables are present, the lighting and ventilating equipment must be explosion proof and properly grounded and bonded. Confined spaces must be properly ventilated during all entry and work.

e. Personal Protective Equipment - Appropriate respiratory protective equipment and body coverings are provided based on the nature of the hazard. If immediately dangerous to life or health (IDLH) atmospheres may be encountered, safety lines and harnesses must be used.

f. If flammable atmospheres are possible, all tools and equipment must be approved for explosive atmospheres and properly grounded and bonded. Employees must never enter an explosive atmosphere.

II. Access Control

a. Entry or Work Permit - An entry or work permit is posted at the confined space site and signed by the job supervisor. Copies of all permits should be retained through at least the duration of the confined space job. Permits should include atmospheric conditions, test results, ventilation requirements, work equipment and personal protective equipment required. No one shall enter the space without reviewing the permit. Permits should be updated at least daily or when conditions change.

(Examples of work permits are included in the Exhibit C of this section.)

b. Work Place Labeling/Posting - The confined space area should be clearly labeled and posted to warn all personnel of possible hazardous atmospheres. This posting should be easily viewed from a distance and is in addition to the entry/work permit (examples: DANGER, NO ENTRY, etc.).

III. Monitoring of the Work Area

a. Atmospheric Testing - Confined space atmospheres must be tested routinely throughout an operation to detect any change in conditions. Disturbance of scale or residue in the confined space may change conditions rapidly. All tests should be documented on the work permit.

b. Safety Superintendent or Responsible Person - Someone trained in confined space work must be designated to monitor the work and act as a safety watch at all times for the workers in the confined space. The monitor must have the same or higher level of personal protective equipment used by the confined space workers in the event that a rescue is necessary. A single entry incident could turn into multiple fatalities because improperly equipped rescuers attempt to aid an unconscious or injured worker in a confined space.

IV. Employee Training and Health

Confined space workers must be well trained in the following areas:

a. Emergency Procedures - Workers must have a complete contingency plan in the event of any emergency.

b. Personal Protective Equipment - Usage, limitations, etc.

c. CPR/First Aid

d. Communications - Visual or audible contact with safety watch at all times.

e. Health - Employees should be certified by physicians as to their capability to wear the required personal protective equipment and perform the required work.

CONFINED AREA ENTRY PERMIT

Job Description_____

_____

Location_____ Date_____ Time Issued_____
Time Expired_____

Employees Assigned_____ Time Entered_____ Time Exited_____

_____ Time Entered_____ Time Exited_____

_____ Time Entered_____ Time Exited_____

Have the following precautions been taken: Yes No

1. Were hazard testing and emergency procedures explained?
2. Was the area isolated?
How?_____

_____

3. Were all sources of spark (electric motors, electrical switches, internal combustion engines, etc.) shut down and locked-out before entry?
4. Was purging or ventilation required?
How?_____

_____

5. Are life lines and safety belts required by those entering?
6. Was rescue equipment tested?
7. Was the confined space atmosphere tested?

Sampling Equipment Used and Tests Conducted

Type	Time	Results	By Whm

8. Is retesting required?
When?_____

List safety equipment used_____

_____

_____

_____ Project Supervisor

_____ Hazardous Materials Chemist/ Health and Safety Superintendent

4.9 Heat Stress

Heat related illnesses are one of the major hazards faced by hazardous materials cleanup crews. The protective equipment required for handling hazardous substances defeats the body's natural cooling mechanism. If not properly monitored, body heat may escalate to dangerous levels.

The three primary heat related illnesses of concern are (listed in order of increasing seriousness):

1) Heat Cramps
2) Heat Exhaustion
3) Heat Stroke

While the first two conditions may be painful or uncomfortable, the third illness, heat stroke, is immediately life threatening.

CSES recognizes the gravity of heat related illnesses and requires appropriate actions to prevent and/or treat these conditions. The policy for heat related illnesses includes preventative measures and health monitoring as follows:

Preventative Measures

1. Training - All response personnel are trained in First Aid/CPR with specific training on heat related illness.

2. Employees are provided with balanced electrolyte solutions to replace fluids and lost electrolytes. Since the thirst mechanism is not triggered until 5% of body weight is lost, employees are encouraged to drink large quantities of liquids even though they do not feel thirsty.

3. The Health and Safety Superintendent monitors environmental conditions using guidelines established by the American Conference of Governmental Industrial Hygienists (ACGIH). Recognizing that these WBGT measures do not consider the wearing of impervious clothing, the rest schedule may be even greater than the ACGIH guidelines.

4. All rest breaks are taken out of the Exclusion Zone in a cooler, shaded rest area.

5. Cool compresses may be used on the head and neck and under the arms for increased cooling.

6. Cooling devices, such as vortex tubes or cooling vests, may be worn under protective clothing.

Medical Monitoring

1. CSES' policy requires medical monitoring of personnel when heat stress conditions exist.

2. Medical monitoring is performed by licensed EMTs or registered nurses.

3. Parameters monitored include:
   a. Body weight - beginning and end of shift (indication of fluid loss).
   b. Pulse, oral temperature, and blood pressure - Beginning and end of shift and breaks.

4. The Health Monitoring Technician or Site Safety Superintendent is responsible for determining work/rest periods. Guidelines established by NIOSH are:

Heart Rate (60-80 at rest)	90-100	105-110	110-120	120-130	130-140	140-150	<150-180
Work Time (Continuum)	>8 hr	8 hr	2 hr	1 hr	30 min	15 min	4-6 min

For unacclimatized workers, the lower pulse rate should be used for the first two weeks.

Recovery Heart Rate Monitoring

The pulse rate should be taken for the last 30 seconds of each of the first three minutes of rest. If the pulse rate at the end of the first minute is 100 or less and is reduced at least 10 beats per minute for the next two minutes, strain is not excessive.

Employees may monitor their own pulse rates at break periods.

4.10 Industrial Hygiene Monitoring

Proper industrial hygiene monitoring is essential for all hazardous materials or confined space work. CSES maintains the following types of industrial hygiene test instruments which are operated by trained personnel. The Safety Superintendent will determine which type of monitoring is necessary.

HNu - The HNu is a photoionization detector (PID) instrument which is used for general site survey work. The HNu can be used to monitor a wide variety of organic materials and some inorganic materials.

Since the HNu is not a qualitative instrument, it must be properly checked with a span gas prior to usage, and the operators must be trained in the instrument's limitations.

Organic Vapor Analyzer (OVA) - The OVA is a flame ionization detector (FID) field survey instrument used to monitor organic vapors. In the gas chromatography mode, the OVA can be used for some qualitative measurements.

Like the HNu, the OVA requires a trained operator who is familiar with the instrument's limitations and calibration procedures.

A comparison of the OVA and the HNu from the EPA'S Standard Operating Safety Guides is shown in Figure 4-2.

The OVA or HNu is used for initial site assessment to determine the level of protection required as follows:

Concentrations Above Background	Level of Protection
Background to 10 ppm	Level C
10 to 500 ppm	Level B
500 ppm or greater	Level A

If the specific contaminant is known, these values may be adjusted for a higher or lower level of protection.

Combustible Gas Indicators (CGI)

CSES uses a variety of CGIs for site evaluation whenever flammable materials are present or expected, and for any confined space work. CGIs must always be checked for calibration prior to usage.

CSES follows the NFPA guidelines and uses 10% of the LEL for a "stop work and evaluate" level.

CSES workers never enter a space in the flammable range (LEL to UEL).

Personnel Monitoring

CSES uses passive diffusion badges as well as personnel sample pumps to monitor employees' exposures.

Sample pumps are calibrated before and after each sampling period. Methods and collection media (filters, tubes, impinger solutions) used reflect guidelines established by the EPA or NIOSH.

Detector Tubes and Pumps

When the specific contaminate is known, the appropriate detector tube system may be selected. Detector tube pumps will be used to monitor CO on breathing air compressors. These tests will be documented.

Oxygen Meters

Oxygen monitoring is essential for any confined space work. CSES requires that oxygen levels be monitored prior to entry into any confined space, and throughout confined space work projects.

Figure 4-2
Comparison of the OVA and HNu

	OVA	HNu
Response	Responds to many organic gases and vapors.	Responds to many organic & some inorganic gases and vapors.
Application	In survey mode, detects total concentrations of gases and vapors. In GC mode, identifies and measures specific compounds.	In survey mode detects total concentrations of gases and vapors. Some identification of compounds possible if more than one probe is used.
Detector	Flame ionization detector (FID).	Photoionization detector (PID).
Limitations	Does not respond to inorganic gases and vapors. Kit available for temperature control.	Does not respond to methane. Does not detect a compound if probe has a lower energy than compound's ionization potential.
Calibration Gas	Methane	Benzene
Ease of Operation	Requires experience to interpret correctly, especially in GC mode.	Fairly easy to use and interpret.
Detection Limits	0.1 ppm (methane)	0.1 ppm (benzene)
Response Time	2-3 seconds (survey mode) for CH4.	3 seconds for 90% of total concentration of benzene.
Maintenance	Periodically clean and inspect particle filters, valve rings, and burner chamber. Check calibration & pumping system for leaks. Recharge battery after each use.	Clean UV lamp frequently. Check calibration regularly. Recharge battery after each use.
Useful Range	1-1000 ppm	0-2000 ppm
Service Life	8 hours; 3 hours with strip chart recorder.	10 hours; 5 hours with strip chart recorder.

High Volume Samplers

On some sites, high volume samplers may be used. These sample units will be calibrated and operated by trained and qualified personnel.

Documentation of Industrial Hygiene Measurements

All industrial hygiene measurements and calibrations will be logged in the field log book. Additionally, a log book will be maintained on the test instruments to record calibration and maintenance records.

4.11 Heavy Equipment Operation

Remedial cleanup often requires the usage of heavy construction equipment. This equipment may include cranes, fork-lifts, backhoes, drills, trucks and trenching equipment.

Only qualified operators will be allowed to operate this equipment. CSES will use the safe work guidelines included in the OSHA General Industry (29 CFR 1910) and Construction Industry Standards (29 CFR 1926).

General hazard conditions with these sites may include:

1. Swing Radius - All swing equipment such as cranes or backhoes will have the swing radius guarded to prevent employees from being struck by the rotating machinery.

2. Power Lines - When operating heavy equipment, such as cranes, near power lines, care will be taken to insure that the crane boom or rigging always maintains a distance of at least 10 feet from the power lines. Any underground utility lines must also be located and appropriate measures taken prior to any excavation work.

3. Trench Shoring - All trenches more than 5 feet in depth will be shored or have the sides laid back. All trenching and shoring will be inspected on a daily basis by the Health and Safety Superintendent.

4. Machine Guarding - All machinery on site will be properly guarded to prevent contact with rotating shafts, blades, gears, or in-running nip points.

5. Electrical Equipment - All electrical equipment will be properly grounded and class approved for the location. Ground fault interrupter devices or a daily monitored grounding program will be used.

6. Flammable Materials - When working with flammable materials, adequate ventilating and control of all ignition sources will be maintained. This may include:

   Non-sparking tools
   Explosion-proof equipment (intrinsically safe)
   Class-approved electrical equipment
   Grounding and bonding of static electricity sources
   No smoking or open lights
   No welding

4.12 General Work Practices

CSES teaches and follows these general safety work practices:

1. Safety Meetings - Daily safety meetings will be required and documented. These meetings will address the expected hazards to be encountered, protective equipment required, etc.

2. Buddy System - Whenever personnel are required to dress in Level A, B or C, the Buddy System will be used. Levels A and B will require an additional backup safety watch with protective equipment equal to or greater than the work team. All confined space work will require a backup man.

3. On-site Hygiene - Employees will not be allowed to smoke, eat or drink in the Exclusion Zone. Street clothes may not be worn into the Exclusion Zone and then home, without expressed approval by the site Health and Safety Officer.

4. Contingency and Response Plans will be developed for each site and included in the site safety plan. Examples are included in Chapter 4.13.

5. Employee Documentation - Documentation of employee training, physical examinations, exposures, and respirator fit testing will be maintained in the employee's personnel file; and will be available to the employee and any governmental agency, such as EPA or OSHA.

6. Site Safety Plans - Site specific safety plans will be developed and posted at all work sites. Requirements for site safety plans are described in Chapter 4.13.

7. Accident Investigation - The Project Manager will be responsible for ensuring that a comprehensive investigation is made of all lost time accidents or injuries. All serious "near-misses" must also be investigated. Copies of the investigation will be provided to the Corporate Health and Safety Manager.

8. Reporting of Accidents - All accidents/injuries will be reported immediately to the Site Safety Superintendent or Project Manager.

9. Communications - All employees will be trained in proper communication procedures while wearing their protective equipment. This may include hand signals or portable radio usage. Employees will also be instructed on proper response and communications for emergency conditions.

10. Site Security - Only authorized personnel will be allowed on work sites. Any other personnel must be approved by the Project Manager and also sign a "Hold Harmless" form (Figure 4-3).

Figure 4-3
Release/Hold Harmless Form

RELEASE/HOLD HARMLESS
CLEANUP SITE VISIT

I, the undersigned, am about to be conducted on an inspection tour of the premises of the site presently under the control of the U.S. EPA or CSES. I am being permitted to inspect at my request and not on any business of the above named organization or the cleanup contractor working at the site. I have been informed of the known hazards on site and also that there may be additional unknown hazards or materials. I have been informed of the procedures. I further understand that the cleanup process requires the moving of materials and other activities which could, in the event of an accident, result in my being exposed to chemicals or physically injured.

I do hereby release the U.S. EPA, Central States Environmental Services, Inc., and their agents and contractors, now and forever, from liability for any injuries or damages that may be incurred by me during, or as a result of my presence at the site on the date indicated below.

_____ _____
Date Signature

_____ _____
Date Signature

4.13 Site Safety Plan

A specific site safety plan will be developed for each remedial response job. A general plan will be utilized for emergency responses where time is not available for the development of a site specific plan. All employees will be instructed on the requirements and location of the site safety plan. A copy of the plan will remain on site as long as workers are present. The plan will be available for review by all CSES personnel and applicable governmental agencies (U.S.C.G., EPA, OSHA, local fire and police departments). Site safety plans will meet the requirements of OSHA CFR 1910.120(i).

Minimum requirements for a site safety plan are outlined in Figure 4-4.

Contingency plans have also been developed to deal with major pollution incidents that might occur during the cleanup process. An effort has been made to develop plans that are workable and, above all, safe. The plans stress the protection of the health and safety of the workers on site as well as the members of the surrounding community. Site specific contingency plans will be developed since all sites will not require all types (flammables, toxics, liquids, etc.) of contingency plans. All on-site personnel will be required to participate in periodic drills to ensure timely implementation of the contingency plan in case one of the corresponding events should occur. The frequency of these drills will be based upon site requirements.

Figure 4-4

LAKE SALVAGE FACILITY
SITE SAFETY PLAN

SITE DESCRIPTION: Date: April 6, 1995

Location: 2527-29 W. Lake St. Chicago, Ill.
Size/Area: 3 city lots, approx. 80'x240'
Topography: flat
Surrounding Population: urban
Weather/Wind: summer
Expected Hazards, Materials, etc.: See Appendix A (Site Hazard Summary)
Additional Information: See Form #1 (Emergency Contacts/Contingency Plan)

SITE ORGANIZATION/COORDINATOR:

EPA - On-Site Coordinator: Fred Bartman Phone: (312)886-0776
CSES - Project Manager: Jerry L. Willmore Phone: (618)532-4784
CSES - Health & Safety Superintendent: Brian Copple Phone: (312)455-8797
CSES - Hazardous Materials Chemist Phone:_____
CSES - QA/QC Officer: Brian Copple Phone: (312)455-8797
CSES - Field Clerk: Brian Copple Phone: (312)455-8797
CSES - Team Members: Cutis Copple Phone: (312)455-8797
Eight operators and labors Phone: (312)455-8797
Site Security: United Security
Media Contact: Doug Shook
Local Police Department: 911
Local Fire Department: 911

SITE OBJECTIVES:

Sample site waste streams and areas to be cleaned, test clean walls and floors, clean site to specification levels of lead and dioxin by limited demolition and selected clean up method and properly disposing of all materials.

SITE CONTROL:
United Security has been designated to coordinate access and security on site. All persons on site will be required to log into and out of the site at entry and egress.

Figure 4-4 continued.....

SITE LAYOUT:

Location and marking of the:

1. Support Zone: Northwest corner of 2529 W. Lake St. lot
2. Contamination Reduction Zone: Northwest corner of 2529 W. Lake St. lot
3. Exclusion Zone: rest of 2529 W. Lake St. lot and 2527&28 W. Lake St. lots

PERSONAL PROTECTIVE CLOTHING:

Exclusion Zone	See Form #2 (PPE by Task)	
Contamination Reduction Zone	Decon/Health Monitor, etc.	C

Specific Equipment Required for the Protection Levels identified

Level A - See Form #3 (PPE Description)
Level B - See Form #3 (PPE Description)
Level C - See Form #3 (PPE Description)

DECONTAMINATION PROCEDURES: See Form #4 (Decontamination Procedures)

COMMUNICATION PROCEDURES:

Chain of Command: Project Manager, Health & Safety Superintendent, Team members
Emergency Numbers: 911
Radio Channels: 2
Hand Signals_____
Emergency Alarm: Air horn
Buddy System: Work in pairs or more

ENVIRONMENTAL/PERSONAL MONITORING: See Form #5 (Monitoring Equipment)

SAFETY AND HEALTH RISK ANALYSIS: See Form #7 (Health and Safety Guidelines for Major Contaminates)

4.13.1 Contingency Plans

4.13.1.1 Toxic Vapor Release (TVR) Response Plan

In developing any contingency plan, care must be taken to cover any eventuality. However, when dealing with unknown materials as we are at many sites, it is not always possible. Since the types of chemicals which might be involved in a TVR incident are unknown, the complexion of the plan must reflect this aspect. Rapid response is still essential, but the primary consideration must be safety and containment rather than neutralization or treatment.

We do not anticipate that a toxic vapor release will occur during normal cleanup operations. However, judging from the type and condition of the containers present at the site, a TVR incident would more than likely occur by a combination of one of three mechanisms:

1. Accidental container rupture
2. *Accidental mixing of non-compatible materials*
3. A fire-activated incident involving toxic smokes

If there does not appear to be any large pressurized containers in evidence at the site, the likelihood that mechanism #1 alone would cause a significant event is remote. The primary danger from such an occurrence would be to the technicians involved in the container moving operation. Utilizing equipment designed specifically for this type of operation and keeping the personnel involved to a minimum will greatly reduce this danger.

An incident involving mechanism #2, or the accidental mixing of incompatible materials, although more likely to cause a TVR than any other mechanism, would also appear to represent limited danger to anyone other than those involved in the sampling and barrel moving operations. Any incident of this type would be limited to the amount of liquids contained in one or a few drums. The event would be relatively short in duration and the toxic vapors generated would be expected to dissipate rapidly. Since drum handling is to be kept to an absolute minimum, once the drums have been hazard classified, serialized, color coded and staged, the chances of an accidental mixing of incompatible materials is greatly reduced.

Mechanism #3, a fire-activated incident, represents the biggest danger for releasing large volumes of toxic vapors or fumes in the form of smoke. Since many toxic chemicals also have a flammable component, it is conceivable a fire could involve a substantial portion of the hazardous materials at a particular site. In view of this, every effort will be made to:

1. Minimize liquid transfer operations to keep the generation and build up of flammable vapors to a minimum.

2. Isolate all potential ignition sources by using only explosion-proof tools and equipment and maintaining motorized equipment in safe locations.

3. Use proper grounding and bonding techniques when transferring flammable liquids.

4. Post hazard areas to prevent smoking or other ignition sources from being used on site.

Even though every effort is to be made to prevent the build up of vapors which could ignite when contacted by an ignition source, such a concentration of vapors could take place. To ensure that this does not happen, the site will be monitored continually (at least hourly) with portable sensors capable of measuring the build up of toxic or flammable vapors. A build up of vapors (>10% LEL)

will be reported immediately to the Health and Safety Superintendent. The Health and Safety Superintendent will evaluate the situation and, if necessary, initiate part or all of the steps contained in the following Flammable/Toxic Vapor Release Response Plan.

4.13.1.2 Flammable/Toxic Vapor Release Response Plan

In the event that an accidental release of toxic or flammable vapors occur, initiate the following steps or procedures:

1. Sound the TVR alarm.
2. Evacuate the immediate and downwind areas immediately.
3. Notify the Project Manager and Safety Superintendent.
4. Dispatch TVR response equipment and personnel to the site of the release. All TVR response personnel will be clothed in Level A or Level B protection depending on the nature of the vapor.
5. Locate the deluge system in such a manner that a high pressure water fog or chemical foam can be brought to bear on vapors being generated from the release.
6. Determine the extent of the problem. Try to identify the vapors being released. A fire must be prevented at all costs.
7. If possible, without extreme danger to personnel, stop the release at the source.
8. If it is not possible to stop the TVR at the source, apply foam at the point of emission and continue to apply a fog curtain downwind of the source until the vapors dissipate and all generation has ceased.
9. If the TVR represents a potential threat to the lives or health of the surrounding community, implement evacuation procedures by notifying local fire and law enforcement personnel. Also notify the National Response Center, EPA Duty Officer, and CSES Dispatch.
   a. Fire Department: 911 and CHEMTREC 1-800-424-9300
   b. EPA Duty Officer - Fred Bartman
      Phone No.: (312)886-0776
   c. National Response Center
      Phone No.: 800-424-8802
   d. Police Department: 911
   e. CSES Dispatch: 1-800-367-3090/618-532-4784
10. If the citizen exposure is imminent, alert the local hospital St. Mary of Nazareth. Phone No.: (312)770-2000

11. If the injuries to response personnel occur, call an ambulance immediately.
    Phone No.: 911.
12. Once the TVR emergency is over, recover any contaminated materials or liquids and process for disposal.

13. Guidelines for notification of the National Response Center:

    The National Response Center must be notified if the incident results in:

    a. Death of a person(s).
    b. Injury requiring hospitalization of any person(s).
    c. Estimated damage to carrier or other property exceeding $50,000.
    d. Fire, breakage, spillage or suspected radioactive contamination involving a shipment of radioactive materials.
    e. Fire, breakage, spillage or suspected contamination involving a shipment of etiologic

agents.

Note: Incidents involving etiologic agents may be reported by phone to the Center for Disease Control (CDC). (404) 633-5313, instead of the Department of Transportation number. The CDC number appears on the Etiologic Agents label.

f. In the judgment of the Response Manager or carrier that there exists a situation which should be reported even though it does not meet one of the specific criteria listed above.

4.13.1.3 Fire and Explosion Response Plan

In any operation dealing with unknown hazardous materials, there is a potential for an explosion or fire. CSES has recognized that there is often a lag between notification and response from local fire departments. Since the first few minutes are extremely critical, it is our policy to maintain an onsite fire fighting capability. The capability is specifically designed to deal with chemical fires, and to bridge the gap from notification until the local fire department arrives.

In case of fire, response personnel would initiate the following fire and explosion response plan. Since response personnel do not fight fires on a regular basis, this plan would remain in effect only until the local fire department arrives on scene. Once professional fire fighting personnel arrives on the scene, the CSES personnel would remain at the disposal of the battalion chief.

FIRE AND EXPLOSION

In case of a fire or explosion, response personnel will initiate the following steps or procedures:

1. Sound the fire alarm.
2. Evacuate the area of all personnel working in the immediate vicinity.
3. Immediately notify the Health and Safety Superintendent or Response Manager.

The Health and Safety Superintendent or Response Manager will initiate the following steps or procedures:

1. Dispatch fire fighting equipment to the site of the incident. Fire/explosion response personnel will wear self-contained breathing apparatus and Level A or Level B protection as is necessary.
2. Notify the local fire department and CHEMTREC 1-800-424-9300
3. Evacuate all non-essential personnel from the site.

Under the direction of the Health and Safety Superintendent or Response Manager, response personnel will:

1. Isolate the fire to prevent spreading, if possible.
2. Attempt to put the fire out using methods compatible with the material which was ignited.
3. CSES personnel will not perform interior structural fire fighting or undertake operations regulated by OSHA's fire brigade standard (1910.156). The primary response of CSES personnel will be to leave the immediate fire area and then attempt to contain the fire from a remote location.

Response personnel will remain at the scene of the fire until the local fire department arrives. Once professional fire fighting personnel have arrived, response personnel will remain at the disposal of the battalion chief.

4.13.1.4 Liquid/Waste Spill Response Plan

The CSES mobile response unit will remain at the site throughout the project. This unit is equipped to handle any spill which might occur. The mobile response unit contains the materials and equipment necessary to deal with a wide range of hazardous materials. All spills, liquid or solid, will be contained and cleaned up immediately under the direction of the Technical Supervisor and Response Manager. Particular care will be taken to prevent further contamination of surface or groundwaters.

In the event of a hazardous material spill, site personnel will initiate the following liquid/soil waste spill response plan.

<u>On-Site</u>

1. Notify the Health and Safety Superintendent.
2. Contain and isolate the spill. Avoid contact with other drums. Avoid contact with water.
3. Identify the material. If hazard is known, classify under the direction of the Chief Chemist.
4. Implement cleanup procedures outlined by the Project Manager and Site Chemist.

Off-Site

1. Call CSES Emergency Hotline - 1-800-367-3090/618-532-4784.
2. The CSES Dispatcher will obtain the necessary information and dispatch the nearest mobile responder unit to the site of the spill.
3. The CSES Dispatcher will notify the Division Manager, and if applicable, contact the National Response Center (1-800-424-8802).

4.13.1.5 Medical Emergency Response Plan

Should any person visiting or working at the site receive severe contamination or injury, initiate the following medical emergency response plan.

1. If able, proceed to the nearest safety shower, rinse with copious amounts of water to remove gross contamination. Administer First Aid as required.

2. Escort or transport the person to the contamination control area. If able, commence designated decontamination procedures. If person is unconscious, remove contaminated clothing and equipment, continue to administer First Aid as required.

3. If further medical treatment is required:

    1. Call an ambulance, Phone No.: 911
    2. Notify the hospital, Phone No.: 911
    3. Fire Department Rescue Squad
    4. Sheriff's Department
    5. Notify CSES Dispatch 1-800-367-3090/618-532-4784.

NOTE: The Health and Safety Superintendent will accompany the injured person to the hospital to ensure prompt and proper medical attention.

4.14 CSES Employee Training

CSES recognizes that well-trained personnel are the foundation of a professional and successful organization. All CSES personnel have a Certificate of Completion through a 40 hour Course of Instruction. Hazardous Waste Materials Handling and Response by Riedel Environmental Services, Inc.

4.14.1 Training Plan

The training plan will rely heavily on the Riedel Environmental Services, Inc. training department. The majority of the CSES personnel have already received a 40 hour training course on hazardous materials handling and response. Remaining contractor personnel will be trained at the time of the contract award or at the time of employment.

4.14.2 Course Content

The 40 hour Hazardous Materials Handling and Response course instructed by Riedel Environmental Services, Inc. includes the following:

1. Introduction to Hazardous Materials
2. Toxicology
3. Flammables
4. Corrosives
5. Reactives
6. Respirators (Fit Testing, Selection, Limitations, etc.)
7. Personal Protective Clothing
8. EPA's Levels of Protection
9. Hands-on Usage of all Protective Equipment and Respirators
10. Hazard Classification (DOT, EPA, NFPA, OSHA)
11. Site Assessment & Layout:
    (Support Zone, Contamination Reduction Zone, Exclusion Zone)
12. Contingency Plans
13. Site Safety Plans
14. Traffic Control
15. News Media
16. Decontamination Procedures
17. Technical Equipment:
    - Combustible Gas Indicators
    - Oxygen Meters
    - Detector Tube Systems
    - HNu
    - Organic Vapor Analyzers
18. Personal Sample Equipment:
    - Passive Dosimeters
    - Personal Sample Pumps
19. Health Monitoring/Heat Stress
20. Pre & Pose Spill Responsibilities
21. Confined Work Space Practices
22. Hands-on Spill Simulation

In addition to the 40 hour course, employees also receive annual training on topics such as:

Physical Examinations - Need and Requirements
Respirators - Refresher and Re-fit Test
First Aid/CPR
Hazardous Materials Manifesting, Labeling, Placarding
Hands-on Training on Response Equipment:
- Pumps
- Radios
- Protective Clothing
- Oil Spill Equipment
- Sampling
- QA/QC Procedures

Outside seminars instructed by the EPA, DEQ, OSHA, and other private agencies are also attended by some field and management personnel.

APPENDIX A
SITE HAZARD SUMMARY

Scope of Work: The Lake Salvage site in Chicago, Illinois was used as a metal scrap yard and wire reclamation facility. A full site assessment will be performed to determine areas of residual contamination. The areas of contamination will be identified, cleaned up and the building will be demolished. The following information addresses specific issues expected to be encountered during the project.

A. PHYSICAL HAZARDS

1. Building - The building is in an extremely deteriorated condition. Exercise caution in all areas of the facility.

2. Electrical - There are overhead electrical lines and utilities entering the facility. Notify local utilities for clearance.

3. Traffic - Exercise caution around heavy machinery. Maintain eye contact with operators at all times.

4. Overhead - Hard hats are required due to the condition of the building and proposed demolition activities.

5. Terrain - There is much debris over the facility. Exercise caution on walking surface to minimize trips, slips or falls. Use work boots to minimize foot injuries.

6. Confined Spaces - Enclosed spaces with poor ventilation require special work practices.

B. CHEMICAL HAZARDS

1. Materials Used or released at the site include asbestos, lead (paint and soil), dioxins, polychlorinated biphynels (PCB's).

2. Materials brought onto site during the work can include gasoline, oils, greases and other cleaning chemicals.

3. Confined Space areas can contain oxygen deficient atmospheres, combustible environments or toxic environments. (i.e. hydrogen sulfide) These can include test pits.

   Carbon monoxide may also be present when internal combustion engines are run in poorly ventilated areas.

C. BIOLOGICAL HAZARDS

- Insects - mosquitos, ticks, cock roaches
- Poisonous Plants - none expected
- Animals - rodents
- Pathogens/infectious materials - Animal droppings

D. WORK ZONES - The following describe the Exclusion, Contamination Reduction and Support Zones.

- Exclusion Area within thirty feet of all excavation, drilling or heavy equipment work and area within the fence. It is expected that the contractor will repair the fence to ensure site security.
- Contamination Reduction Area between Exclusion and Support Zones at gate entrance.
- Support Zone A 40 foot by 40 foot area immediately adjacent the fenced area.

FORM #1

EMERGENCY CONTACTS / CONTINGENCY PLAN

Telephone Availability:

____ available on site
_X_ available nearby at Pay phone at corner of Western and W. Lake.

City of Chicago, Illinois

Distance and Directions to Site from Nearest Main Road.

See Appendix C - Site Map.

Emergency Contact	Name	Phone #
Health & Safety Manager	Michael Matilainen CIH	413-562-1600
Project Manager	Zen Kruczkowski, P.E.	413-562-1600
Contractor Site Safety Coordinator	NA	NA
Client Contact	Ted Craver	(703) 413-3916
Environmental Agency (US EPA)	Fred Bartman	(312) 886-0776
Health Department	NA	NA
Fire Department	NA	911
CHEMTREC (call in the event of chemical release, fire, or explosion)	NA	1-800-424-9300

Police Department (call in the event of injury, heat stress, frostbite, chemical exposure)	NA	746-6000 (non-emergency) 911 (emergency)
State Police	NA	NA
Poison Control Center (call in the event of poisoning by ingestion, inhalation, etc.)	NA	942-5969
Hospital (see map in Appendix C for best route to hospital)	St. Mary of Nazareth	770-2000

Be prepared to provide emergency personnel with the following:

- Phone number at site: Cellular phone will be on-site
- Address of site: 2527-29 West Lake Street, Chicago
- Nearest cross road: Western Avenue
- Hazard exposed to: _____
- Any vital signs (pulse, breathing, etc.) _____

CONTINGENCY PLAN:

Solo T&B representatives will not enter or remain in the work area unless accompanied by contractor or facility personnel. The buddy system will be maintained at all times. If site personnel observe hazards for which they have not prepared, they will withdraw from the area and notify the owner, engineer and the health and safety manager. Stay upwind and keep out of low lying areas. If possible, take immediate measures to control and contain releases within the area site boundaries. Allow no sparks (e.g. vehicle startups), smoking or flames in the hazard area. Keep unnecessary people away, isolate the area and deny entry.

T&B may rely on instruments operated by contractor personnel only upon T&B health and safety manager approval. If contractor directs a higher level of protection than this plan, T&B personnel will wear that level. T&B personnel may choose to wear more protection than that directed in this plan.

If T&B has no B-level supervisor on the site when air contaminant levels exceed those at which Level B is needed, T&B will leave the contaminated area.

FORM #2 - PPE BY TASK

TASK DESCRIPTION		Type of Work	Personal Protective Equipment	
			Primary	Contingency
1	All Sampling (see attached site map)	(X)Intrusive ( )Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area
2	Remediation/Demolition/Decontamination	(X)Intrusive ( )Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area
3	Facilities Inspection	( )Intrusive (X)Non-intrusive	( )A( )B(X)C( )D (X)Modified	( )A(X)B( )C( )D (X)Exit Area

PERSONNEL AND RESPONSIBILITIES FOR PPE (include subcontractors)

NAME	FIRM	RESPONSIBILITIES	On Site?
Michael Matilainen CIH	T&B	Health and Safety	No
Zen Kruczkowski, P.E.	T&B	Site Supervision	Yes

C325\H&S\FORM-2

FORM #3 - PPE DESCRIPTION

(Specify by task. Indicate type and/or material, as necessary. Group tasks if possible. Use copies of this sheet if needed)

TASKS: (X)1(X)2(X)3( )4( )5( )6( )7( )8
LEVEL: ( )A( )B( )C(X)D-(X)Modified
(X) Primary ( ) Contingency

Respiratory: (X) Not needed See Note
( ) SCBA, Airline:
(X) APR: Full/half face
(X) Cartridge: Dust/mist/organic vapor
( ) Escape Mask:
( ) Other:
Note: Respirators required only if above action levels.

Head and Eye: ( ) Not needed
(X) Safety Glasses: Powered Equipment
( ) Face Shield:
( ) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(X) Steel-Toe
( ) Rubber
(X) Overboots: Nitrile
( ) Steel Shank
(X) Leather

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
(X) Tyvek Coverall (optional)
(X) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
(X) Undergloves: (Surgical)
(X) Gloves: Nitrile
(X) Overgloves: Leather

Other:

*Hearing protection during drilling or high noise levels

TASKS: (X)1(X)2(X)3( )4( )5( )6( )7( )8
LEVEL: ( )A(X)B( )C( )D-(X)Modified
( ) Primary (X) Contingency

Respiratory: ( ) Not needed
(X) SCBA, Airline:
( ) APR:
( ) Cartridge:
( ) Escape Mask:
( ) Other:

Head and Eye: ( ) Not needed
(X) Safety Glasses:
( ) Face Shield:
(X) Goggles:
(X) Hard Hat:
( ) Other:

Boots: ( ) Not needed
(X) Steel-Toe
( ) Rubber
(X) Overboots: Nitrile
( ) Steel Shank
(X) Leather

Prot. Clothing: ( ) Not needed
( ) Encapsulated Suit:
( ) Splash Suit
( ) Apron:
(X) Tyvek Coverall
(X) Saranex Coverall
( ) Cloth Coverall:
( ) Other:

Gloves: ( ) Not needed
(X) Undergloves: (Surgical)
(X) Gloves: Nitrile
(X) Overgloves: Leather

Other:

*Contact CIH for contingency upgrade to Level B

FORM #4 - DECONTAMINATION PROCEDURES

Personnel Decontamination	Sampling Equipment Decontamination	Heavy Equipment Decontamination
Summarize below or attach diagram; Team members will remove their protective clothing in the following order: 1. Equipment drop 2. Boot cover 3. Outer glove removal 4. Hard hat removal 5. Coverall removal 6. Surgical glove removal 7. Respirator removal 8. Hand and face wash 9. Shower required if exposed to asbestos or lead 10. PPE Air Dry	*Summarize below or attach diagram;* 1. Gross removal of dirt 2. Water rinse 3. Cleaning solution 4. Place in bag return to lab for final cleaning 5. If further in-field decontamination required 6. Steam cleaning (if applicable) 7. Tap water rinse 8. Methanol rinse 9. Distilled water rinse 10. Air Dry	*Summarize below or attach diagram;* 1. Heavy equipment will be decontaminated by contractor prior to leaving the site 2. Steam cleaning, or high pressure washing 3. Water Rinse 4. Air Dry
Containment and Disposal Method Protective equipment will be disposed of through the contractor's and/or client's waste stream. Place equipment in plastic bags. Small amounts of uncontaminated wastewater allowed to percolate back into the ground.	Containment and Disposal Method Small amounts of uncontaminated waste water allowed to percolate back into the ground. Methanol to be contained and disposed of.	Containment and Disposal Method Control of fluids from decontamination of heavy equipment will be the responsibility of the contractor. If necessary based on Phase II work, supply vehicle washdown area. Contaminated soil cuttings from drilling operations to be stockpiled, covered and characterized for disposal/or reuse.

FORM #5 - MONITORING EQUIPMENT

MONITORING EQUIPMENT			
TASK AND INSTRUMENT	ACTION GUIDELINES		COMMENTS (When and how often?)
1,2,3 Combustible Gas Indicator	0-10% LEL >10% LEL	No explosion hazard Potential explosion hazard; notify CIH	( ) Not Needed (X) Continuous
1,2,3 Oxygen Deficiency Meter	>23.5% O_2 <19.5% O_2	Oxygen enriched; interrupt task/evacuate/CIH Oxygen deficient; interrupt task/evacuate/CIH	( ) Not Needed (X) Continuous
1,2,3 Hydrogen Sulfide Meter	> 10 ppm H_2S	Interrupt task/evacuate/notify CIH	( ) Not Needed (X) Continuous
1,2,3 Carbon Monoxide Meter	>25 ppm CO	Interrupt task/evacuate/notify CIH	As needed basis
1,2,3 Photoionization Detector Instrument eV Lamp: 10.2 Type: HNU	Specify:	5ppm above background (continuous): Level D Modified 50 ppm above background continuous in breathing zone: evacuate and upgrade to Level B - Notify CIH Retest and continue work in Level D if <5 ppm continuous above background	( ) Not Needed (X) Continuous
2 Miniram Dust Monitor Type PDM-3	Specify:	0.10 mg/m³ above background if over 0.15 mg/m³ over 15 minute period mg: Level D modified	( ) Not Needed (X) Continuous
2 Lead/other Air Pumps/Sampling Media	Specify: > 30 $\mu g/m^3$ - Lead	Lead action level or one-half the permissible levels exposure cited in various OSHA regulations and "Air Contaminants" (29 CFR 1910.1000): Level D Modified	Representative Tasks
( )1( )2( )3 Detector Tubes Type _____ Type _____	Specify:		(X) Not Needed at this time

Note: If team notices unusual odors, or irritation of the eye or throat, they will leave the area.

C325\H&S\FORM-5

FORM #7 - HEALTH AND SAFETY GUIDELINES FOR MAJOR CONTAMINANTS[1]

Known Contaminants	Highest Observed Concentration (units: ppm and media)	PEL/TLV ppm or mg/m3 (specify)	IDLH ppm or mg/m3 (specify)	WARNING SIGNS ppm or mg/m (specify)	MAIN SYMPTOMS/EFFECTS OF ACUTE EXPOSURE	PHOTO IONIZATION POTENTIAL (eV)
Lead	62 mg/l(s)	50 $\mu g/m^3$	700 mg/m^3	NA	Weakness, insomnia, abdominal pain, lead line	NA
Dioxin	156,000 pg/g(s)	NA	NA	NA	Chloracne - skin ailment	NA
PCB's	NA	0.5 mg/m^3	NA	NA	Chloracne - skin ailments	NA
Hydrogen Sulfide	NA	10 ppm	300 ppm	0.77 ppm	Eye, nose & throat irritation, headache, dizziness, upset stomach, fatigue	10.46
Carbon Monoxide	NA	35 ppm	1500 ppm	NA	Headache, rapid breathing, nausea, weakness, dizziness, mental confusion	14.01

NA - Not Available NE = None Established U = Unknown

S = Soil SW = Surface Water T = Tailings W = Waste TK = Tanks SD = Sediment
A = Air GW = Ground Water SL = Sludge D = Drums L = Lagoons OFF = Off-Site

Note: Other contaminants may be present at this site where incidental exposure may occur (gas, oil, grease for maintenance). Follow guidelines in Material Safety Data Sheets.

C325\H&S\FORM-7

FORM #8 - DOCUMENTATION

INSTRUCTIONS: Field personnel are required to receive a copy of the final health and safety plan (HSP), and to read, understand, and agree to the provisions of the plan. The Project Manager (PM) is responsible for distributing the HSP to personnel as they are assigned to the project. Personnel are required to sign this form indicating receipt of the HSP. The original of this form is maintained by the PM, and becomes part of the permanent project files. Copies of this form are to be sent to Michael J. Matalainen, CIH.

SITE NAME: Lake Salvage

LOCATION: 2527-29 West Lake Street, Chicago, Illinois

I have received a copy, read, understood, and agree to comply with the provisions of the above referenced HSP for work activities on this project.

PRINTED NAME/COMPANY	SIGNATURE	DATE

C325\H&S\FORM-8

DEMOLITION AND SITE REMEDIATION

LAKE SALVAGE FACILITY

CENTRAL STATES ENVIRONMENTAL SERVICES
HAZARDOUS WASTE HANDLING PLAN

a) DECONTAMINATION METHODS

Personnel decontamination and equipment decontamination are described Form #4 of the Site Health and Safety Plan

b) METHODS OF ON-SITE PRETREATMENT

There will be no on-site pretreatment performed.

c) METHODS OF TRUCK LOADING

All building demolition debris will be loaded directly onto Visqueen lined roll-off containers by means of a rubber tired loader. Material will be loaded immediately upon demolition. Stockpiling of debris will be kept to a minimum. If material is stockpiled, it will be placed on a layer of 6-mil Visqueen and covered with Visqueen at the end of each day.

d) METHODS OF TRANSPORTATION

All solid wastes will be transported off-site by means of roll-off containers. All liquid wastes will be collected in drums and transported off-site for disposal. Solid wastes will be transported by:

Dart Trucking Company, Inc.
61 Railroad Street
Canfield, Ohio
EPA ID# OHD009865825

Liquid wastes will be transported off-site by:

Central States Environmental Services
609 Airport Road
Centralia, Illinois
EPA ID#ILD025004276

e & f) METHODS OF DISPOSAL AND LOCATION AND NAME OF COMPANY

RCRA solid wastes will be disposed of at:

Laidlaw Environmental Services, Lambton Facility
4090 Tel Fer Road
Corunna, Ontario
EPA ID#MIT270019904

All other disposal locations will be determined following laboratory analytical

of each waste stream.

g) METHODS TO ENSURE NO ON-SITE SPILLAGE

All waste material will be handled with a layer of 6-mil Visqueen on the concrete surface. All liquid wastes generated will be immediately placed into DOT certified drums. In the event of any spill, it will be immediately removed and collected accordingly and disposed of as outlined by Waste Handling Plan. All wastes will be loaded onto disposal container immediately and transported off-site the same day if possible. Water will be used at a minimum during decontamination and cleaning.

h) DISPOSAL METHODS

Monday, April 10, Central States Environmental Services, Inc. will be on-site to perform cleaning tests. Representative samples will be taken at this time to profile all waste streams from these areas:

1) Incinerator Refractory & Ash;
2) Litter and Debris;
3) Building Demolition Debris.

Once analytical results have been received, the waste will be categorized into 1 of 3 categories:

1) RCRA Hazardous Waste
2) Non-Hazardous Building Demolition Debris
3) Non-Hazardous litter and debris

Once cleaning tests analytical have been received, Central States Environmental Services, Inc. will mobilize to site to perform cleaning and selective Demo. Having all waste streams profiled and approved prior to this second mobilization will expedite disposal and eliminate any stockpiling of any waste.

ADDENDUM #1

SITE SPECIFIC HEALTH & SAFETY PLAN

AIR MONITORING

Perimeter Monitoring

Perimeter air monitoring will be performed by Mike Malilainer of Tighe & Bond.

Personal Monitoring

Central States Environmental Services, Inc. (CSES) will randomly select one worker each day to wear a personal pump with cassette to monitor the air throughout the work area. These analytical results will be tabulated in the project completion report.

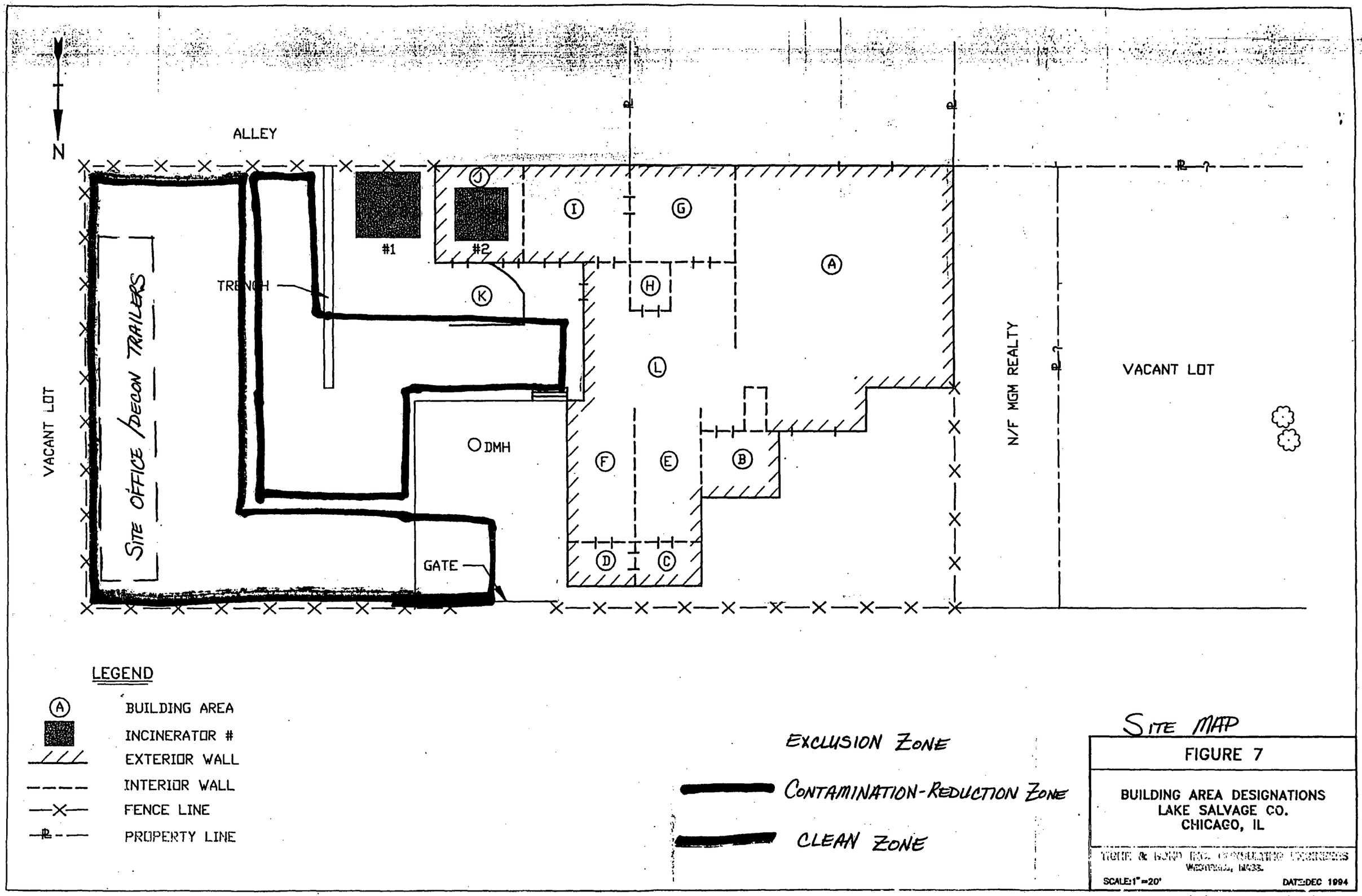

FIGURE 7

BUILDING AREA DESIGNATIONS
LAKE SALVAGE CO.
CHICAGO, IL

APPENDIX D

APPENDIX D

May 25, 1995 Remediation Progress Report

TABLE OF CONTENTS

SECTION	DESCRIPTION	PAGE
	Introduction	
1.0	Summary of Events	
	1.1 Previous Actions	
	1.2 Ash Removal	
	1.3 Contamination Assessment	
	1.4 Remediation Specifications	
	1.5 Cleaning Evaluation	
	1.6 Manhole Sampling	
	1.7 Remediation	
	1.8 Report	
	1.9 Other Regulatory Requirements	
2.0	Effectiveness of Removal Actions	
3.0	Difficulties Encountered	
4.0	Recommendations	
FIGURE A	Site Remediation/Soil Sampling Plan	
APPENDIX A	October 14, 1994 Phase I Bagged Ash Removal Memo	
APPENDIX B	January 1995 Project Manual for the Demolition and Site Remediation of the Lake Salvage Facility	
APPENDIX C	Contractor Submittals for the Demolition and Site Remediation of the Lake Salvage Site	
APPENDIX D	May 25, 1995 Remediation Progress Report	
APPENDIX E	August 1995 Contractor Closeout Report	
APPENDIX F	Tighe & Bond Inspection Information	
APPENDIX G	Analytical Data	
APPENDIX H	August 4, 1995 Remediation Progress Report	
APPENDIX I	Estimate of Costs	
APPENDIX J	Photos (In attached binder)	

Tighe&Bond
Consulting Engineers
Environmental Specialists

C-325-2-310 (1151)
May 25, 1995

Mr. Theodore F. Craver
Staff Vice President and Director of
Trade Regulation and Environmental Affairs
Litton Corporation
Law Department
1725 Jefferson Davis Highway
Suite 1601, Crystal Square Two
Arlington, Virginia 22202-3585

Re: Progress Report
April 10, 1995 Activities
Lake Salvage Site, Chicago, IL

Dear Mr. Craver:

On April 10, 1995, Tighe & Bond performed manhole sampling and oversaw the cleaning evaluation tests performed at the Lake Salvage site. We have just received the results from the contractor. The results of the field activities are detailed in Appendix A titled "Field Activities". The report includes the following appendices.

Appendix A - Field Activities
Appendix B - Laboratory Data
Appendix C - Revised Schedule

The purpose of this letter is to overview the results of these efforts and to provide a progress report as required in the consent order.

Cleaning Evaluation - The data from Table 1 show that after cleaning the lead levels were reduced below the site cleanup standard for an area without encapsulation. The residual dioxin levels remaining after alternative cleaning processes exceeded the cleanup standard for areas without encapsulation. Therefore, any contaminated surfaces which are left at the site will require encapsulation to meet the dioxin cleanup standard.

It appears that the cleanup methods were relatively uniform in their cleaning efficiencies. Therefore we would recommend the lowest cost method (vacuuming) be employed to decontaminate the facility followed by encapsulation (for components left at the facility).

Based on the above information, we have provided an estimate of costs for various scenarios of building demolition, vacuuming and encapsulation as shown in Table 2. It appears that the lowest cost scenarios are building demolition with some vacuuming and

Westfield Executive Park 53 Southampton Road Westfield, MA 01085-5308 Tel. 413-562-1600 Fax. 413-562-5317
Original printed on recycled paper.

encapsulation. Preliminary discussions with the contractor indicate the encapsulation costs may be reduced by half due to the additional volume. This reduced cost is reflected in the total lower cost shown in parentheses. We recommend that you authorize us to notify EPA that we are proposing Option C. We will then confirm with EPA that the buildings will be demolished and sent to a C&D landfill and the floors vacuumed and encapsulated.

Manhole Sampling - The manhole sampling shown in Table 3 indicates the loading dock manhole exceeded established site cleanup standards for lead and PCB's. A standard has not been established for dioxins at this particular location. Both manholes on the street had low levels of contaminants. Based on this data, we would recommend that only the on site storm drain be cleaned during the site remediation.

Again, please advise us accordingly and we will work with both the contractor and EPA to insure the work is done.

Schedule - The Contractor has provided us a schedule for proposed work activities which is shown in Appendix C. Please note the remediation aspect of the project was expected to start on June 5, 1995 but has been delayed by the contractor to June 12, 1995. The project will last approximately two weeks.

Background Sampling - We will perform background sampling in the lot adjacent to the facility during the remediation. We understand that the EPA is securing permission to enter the site.

Specification - A copy of the finalized specifications will be sent which includes all contracts, addendas, change orders etc. to date.

We trust this information provides a complete status update. Please contact the undersigned or Michael Matilainen CIH at 413-562-1600 if you should have any questions concerning this information and when you have decided on an appropriate course of action on the outlined topics.

Very truly yours,

TIGHE & BOND, INC.

Thomas C. Couture SCH

Thomas C. Couture, P.E.
Assistant Chief Engineer

lch\C325\LTR\MJM.C
cc: Fred Bartman, EPA
Larry Leuck, Ecology & Environment

TABLE 1

LAKE SALVAGE
CONTRACTOR WIPE SAMPLING TEST RESULTS
PERFORMED AFTER VARIOUS CLEANING OPERATIONS

Location Method	Dioxin (TCDD total)		Lead	
	Test Result	Cleanup[1] Standard	Test Result	Cleanup[1] Standard
	pg/cm²[2]	pg/cm²	ug/cm²[2]	ug/cm²
Floor Area 1 Chemical 1	6.5	2.67 (26.7)	12.40	13 (130)
Floor Area 1 Vacuum 1	6.3	2.67 (26.7)	7.19	13 (130)
Floor Area 1 Wash 1	9.3	2.67 (26.7)	2.06	13 (130)
Wall Area 3 Wash 3	10.0	2.67 (26.7)	0.118	13 (130)
Wall Area 3 Scarification 3	11.0	2.67 (26.7)	0.707	13 (130)
Wall Area 8 Vacuum 8	1.7	2.67 (26.7)	2.01	13 (130)
Wall Area 8 Chemical 8	2.1	2.67 (26.7)	0.345	13 (130)

Notes:

(1) Cleanup standard without parentheses are for areas without encapsulation whereas the cleanup standard with parentheses are for areas with encapsulation.

(2) pg/cm² - picrograms per square centimeter
ug/cm² - micrograms per square centimeter

TABLE 2

LAKE SALVAGE
REMEDIATION OPTIONS BASED
ON CLEANING PERFORMANCE TESTS

Options	Building Demolition	Remediation Method		Approximate Cost[1]
		Initial	Final	
A. Leave Buildings	None	Vacuum all Surfaces	Encapsulate all surfaces	$261,000 ($197,000)
B. Demolish Buildings and Clean All Areas	Yes	Vacuum all Surfaces	Encapsulate only Floor	$240,000 ($200,000)
C. Demolish Buildings and Clean Floor Only	Yes	Vacuum only Floor	Encapsulate only Floor	$230,000 ($190,000)

(1) Price shown in parentheses based on potential reduction of encapsulation cost from $4.35/SF to approximately $2.00/SF as price informally discussed with contractor due to increased square footage. Detailed cost breakdown tables follow this page.

TABLE 3

LAKE SALVAGE
TIGHE & BOND MANHOLE SAMPLING

Manhole # Location	Lead	PCB	Dioxin (TCDD Total)
MH 1 Loading Dock	2600 mg/kg	34,000 ug/kg	2400 pg/g
MH 2 East Side Lake Street	140 mg/kg	Not Detected	30 pg/g
MH 3 West Side Lake Street	290 mg/kg	Not Detected	12 pg/g
Cleanup Standard	**400 mg/kg**	**1000 mg/kg**	**(1)**

Notes:
(1) To be determined

Abbreviations:
mg/kg - milligrams per kilogram
ug/kg - micrograms per kilogram
pg/g - picrograms per gram

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OPTION A
LEAVE BUILDING

	Task	Units	Estimated Quantity	Unit Cost	Bid
1	Mobilization/demobilization	Lump Sum	1	$14,061.00	$14,061.00
2	Demolition of incinerators	Lump Sum	1	$19,806.00	$19,806.00
3	Remove & stockpile litter	Cubic Yards	20	$163.24	$3,264.80
4	Demolition/stockpiling of bldgs. to RCRA fac.	Cubic Yards	15	$169.60	$2,544.00
5	Demolition/stockpiling of bldgs. to demo. landfill	Cubic Yards	10	$112.36	$1,123.60
6	Sample collection & characterization	Lump Sum	1	$9,914.00	$9,914.00
7	Loading/transportation/disposal haz. wastes (RCRA)	Tons	50	$351.92	$17,596.00
8	Disposal of Demolition wastes to demo. landfill	Tons	10	$49.82	$498.20
9	Collection/disposal of liq. wastes to POTW	Gallons	0	$2.54	$0.00
10	Loading/disposal of litter to lined landfill	Tons	10	$171.72	$1,717.20
11	Clean–up tests wipe samples (dioxin & lead)	Each	8	$1,717.20	$13,737.60
12	Vacuum clean–up test	Each	2	$257.58	$515.16
13	Power wash clean–up test	Each	2	$257.58	$515.16
14	Chemical wash clean–up test	Each	2	$257.58	$515.16
15	Scarification test	Each	1	$257.58	$257.58
16	Vacuum decontamination	Square Feet	32,000	$0.89	$28,480.00
17	Power wash clean–up	Square Feet	0	$2.54	$0.00
18	Chemical clean–up	Square Feet	0	$3.55	$0.00
19	Scarification clean–up	Square Feet	0	$4.35	$0.00
20	Encapsulation	Square Feet	32,000	$4.35	$139,200.00
21	Disposal of liquid haz. wastes (RCRA fac.)	Tons	10	$351.92	$3,519.20
22	Loading/disposal of contaminated soil (RCRA fac.)	Tons	0	$270.30	$0.00
23	Installation of chain link fence	Linear Feet	100	$34.98	$3,498.00
24	Borrow	Cubic Yards	0	$29.36	$0.00
25	Topsoil	Cubic Yards	0	$28.14	$0.00
26	Seeding	Square Feet	0	$0.10	$0.00
	TOTAL				$260,762.66
20	Encapsulation Deduction	Square Feet	3,200	$2.00	$64,000.00
	ESTIMATED REVISED TOTAL				$196,762.66

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OPTION B
DEMOLISH BUILDINGS AND CLEAN ALL AREAS

	Task	Units	Estimated Quantity	Unit Cost	Bid
1	Mobilization/demobilization	Lump Sum	1	$14,061.00	$14,061.00
2	Demolition of incinerators	Lump Sum	1	$19,806.00	$19,806.00
3	Remove & stockpile litter	Cubic Yards	20	$163.24	$3,264.80
4	Demolition/stockpiling of bldgs. to RCRA fac.	Cubic Yards	0	$169.60	$0.00
5	Demolition/stockpiling of bldgs. to demo. landfill	Cubic Yards	300	$112.36	$33,708.00
6	Sample collection & characterization	Lump Sum	1	$9,914.00	$9,914.00
7	Loading/transportation/disposal haz. wastes (RCRA)	Tons	10	$351.92	$3,519.20
8	Disposal of Demolition wastes to demo. landfill	Tons	300	$49.82	$14,946.00
9	Collection/disposal of liq. wastes to POTW	Gallons	0	$2.54	$0.00
10	Loading/disposal of litter to lined landfill	Tons	10	$171.72	$1,717.20
11	Clean–up tests wipe samples (dioxin & lead)	Each	8	$1,717.20	$13,737.60
12	Vacuum clean–up test	Each	2	$257.58	$515.16
13	Power wash clean–up test	Each	2	$257.58	$515.16
14	Chemical wash clean–up test	Each	2	$257.58	$515.16
15	Scarification test	Each	1	$257.58	$257.58
16	Vacuum decontamination	Square Feet	32,000	$0.89	$28,480.00
17	Power wash clean–up	Square Feet	0	$2.54	$0.00
18	Chemical clean–up	Square Feet	0	$3.55	$0.00
19	Scarification clean–up	Square Feet	0	$4.35	$0.00
20	Encapsulation	Square Feet	20,000	$4.35	$87,000.00
21	Disposal of liquid haz. wastes (RCRA fac.)	Tons	10	$351.92	$3,519.20
22	Loading/disposal of contaminated soil (RCRA fac.)	Tons	0	$270.30	$0.00
23	Installation of chain link fence	Linear Feet	0	$34.98	$0.00
24	Borrow	Cubic Yards	150	$29.36	$4,404.00
25	Topsoil	Cubic Yards	0	$28.14	$0.00
26	Seeding	Square Feet	0	$0.10	$0.00
	TOTAL				$239,880.06
20	Encapsulation Reduction	Square Feet	20,000	$2.00	$40,000.00
	ESTIMATED REVISED TOTAL			$48,280.20	$199,880.06

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OPTION C
DEMOLISH BUILDINGS AND CLEAN FLOOR ONLY

	Task	Units	Estimated Quantity	Unit Cost	Bid
1	Mobilization/demobilization	Lump Sum	1	$14,061.00	$14,061.00
2	Demolition of incinerators	Lump Sum	1	$19,806.00	$19,806.00
3	Remove & stockpile litter	Cubic Yards	20	$163.24	$3,264.80
4	Demolition/stockpiling of bldgs. to RCRA fac.	Cubic Yards	0	$169.60	$0.00
5	Demolition/stockpiling of bldgs. to demo. landfill	Cubic Yards	300	$112.36	$33,708.00
6	Sample collection & characterization	Lump Sum	1	$9,914.00	$9,914.00
7	Loading/transportation/disposal haz. wastes (RCRA)	Tons	10	$351.92	$3,519.20
8	Disposal of Demolition wastes to demo. landfill	Tons	300	$49.82	$14,946.00
9	Collection/disposal of liq. wastes to POTW	Gallons	0	$2.54	$0.00
10	Loading/disposal of litter to lined landfill	Tons	10	$171.72	$1,717.20
11	Clean–up tests wipe samples (dioxin & lead)	Each	8	$1,717.20	$13,737.60
12	Vacuum clean–up test	Each	2	$257.58	$515.16
13	Power wash clean–up test	Each	2	$257.58	$515.16
14	Chemical wash clean–up test	Each	2	$257.58	$515.16
15	Scarification test	Each	1	$257.58	$257.58
16	Vacuum decontamination	Square Feet	20,000	$0.89	$17,800.00
17	Power wash clean–up	Square Feet	0	$2.54	$0.00
18	Chemical clean–up	Square Feet	0	$3.55	$0.00
19	Scarification clean–up	Square Feet	0	$4.35	$0.00
20	Encapsulation	Square Feet	20,000	$4.35	$87,000.00
21	Disposal of liquid haz. wastes (RCRA fac.)	Tons	10	$351.92	$3,519.20
22	Loading/disposal of contaminated soil (RCRA fac.)	Tons	0	$270.30	$0.00
23	Installation of chain link fence	Linear Feet	0	$34.98	$0.00
24	Borrow	Cubic Yards	150	$29.36	$4,404.00
25	Topsoil	Cubic Yards	0	$28.14	$0.00
26	Seeding	Square Feet	0	$0.10	$0.00
	TOTAL				$229,200.06
20	Encapsulation Reduction	Square Feet	20,000	$2.00	$40,000.00
	TOTAL			$48,280.20	$189,200.06

APPENDIX A

FIELD ACTIVITIES

C-325-2-310 (1151)

MEMORANDUM

TO: File
FROM: Michael Matilainen
DATE: 4/11/95
SUBJECT: April 10, 1995 Field Activities for the Lake Salvage Site

On April 10, 1995, Tighe & Bond's Environmental Scientist, Michael Matilainen CIH was on site at the Lake Salvage site in Chicago, Illinois. The purpose of this on-site inspection was to:

- Evaluate each type of cleaning method as proposed in the specifications and as bid on by Central States Environmental Services (CSES).
- Observe cleaning operations and wipe testing procedures performed by CSES.
- Perform manhole sampling of the manhole inside the site and two of the manholes on West Lake Street.

The purpose of this letter memo is to summarize the activities which were undertaken on April 10, 1995.

Tighe & Bond mobilized to the site on Sunday, April 9, 1995 to locate the site and to identify any potential problems with accessing the site. On April 10, 1995, Tighe & Bond arrived at the site at 0700 hours. An initial evaluation of the area was undertaken to determine how secure the site was. The front fences were relatively intact, however, the backside of the fence was found to be in disrepair.

At approximately 0730 hours, John Nordine of the company Ecology and Environment, Inc. arrived at the site. Mr. Nordine represents the U.S. EPA technical assistance team contractor. Discussions with Mr. Nordine overviewed the project requirements. At approximately 0800 hours, the Contractor States Central Environmental Services, Inc. arrived at the site. The following personnel were representing CSES - Engineering Technician, Brian Copple, Kurt Copple, Louis Hufstedler and Darnell Madison. The Contractor mobilized to the site in a large crew cab truck equipped with various hazardous materials abatement equipment, along with a 20 foot trailer carrying a steam Genny and water container.

At this time, Tighe & Bond asked the Contractor if all the employees were familiar with the Health & Safety Plan for the site: The Contractor affirmed they had. The Contractor was also advised that Level C personal protective equipment to include protective clothing and air purifying respirators would be the minimal protective equipment for the site. The Contractor proceeded to equip themselves with Level C protection and began to pry open the boards which were covering the access way to the site building. Upon entering the facility, Mr. Matilainen of Tighe & Bond performed ambient air sampling with the following instruments:

- Gastech - Four gas detector (Carbon Monoxide, Hydrogen Sulfide, Explosive Gas, Oxygen)
- HNu photoionizing detector 10.2 eV probe
- MIE Mini-ram PDM respirable particulate monitor

The purpose of these instruments was to monitor the levels of oxygen, explosive gases, carbon monoxide, hydrogen sulfide, volatile organic compounds, and respirable particulates during site activities. An evaluation of the site with these instruments did not indicate any positive meter responses except for areas where there were containerized materials. For example, a gasoline tank located in the corner of the facility near the pit contained detectable levels of hydrocarbons which are probably a result of residual gas in the tank. The Contractor was advised that the contractor should exercise caution in these areas of the site to prevent any explosion hazards.

In addition, the pit inside the building presented an unguarded open-sided trench which could be fallen into. The Contractor was also advised to provide barriers around this area. The Contractor placed tires around this area. The Contractor was also advised that some of the portions of the area may require shoring during the actual abatement activity and that the overhead power lines adjacent to the incinerator stacks would have to be taken out of service during the demolition of the incinerators.

Area #1 - The work activities began in the areas designated number 1 which was the room where the pit was located. This area had the highest dioxin levels found on the floor of the facility. In this area, the Contractor cleaned up the debris and the floor materials over an approximately 50 square foot area. The areas were subsequently brushed clean with the broom and prepared for the cleaning procedure. Three different methods were evaluated for cleaning in this area. One area was approximately 12′ x 9′ and was powerwashed with an approximately 3500 psi air compressed water stream. The second area was an area where a chemical was applied to the surface of the area and let set for approximately 1/2 hour. This area was approximately 9′ x 6′. The chemical cleaner appeared to be a citrus base material, but was not identified on the material safety data sheet. A third area, approximately 12′ x 2-1/2′ was vacuumed with a High Efficiency Particulate Air (HEPA) filter vacuum. Upon final cleaning of the area which was HEPA vacuumed (immediately adjacent to the pit), a sample was collected for both lead and dioxin. This was completed by wiping two 100 square centimeter areas with appropriate materials.

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Upon completion of the powerwash and citrus base cleaning, the 2 areas were both powerwashed to remove all residuals. Wipe sampling was then completed in each of these separate areas. The samples were designated as Area 1; Vacuum 1, Wash 1 and Chemical 1.

Based on visual evaluation of the cleaning method, it appeared that the powerwash was perhaps the fastest method not including cleanup of wastewater. The chemical cleaning method did provide further cleaning and removal of dirt from the surface. However, it was noted that the areas where the cleaner was used had a significant amount of dirt on the wipe gauze pad. Both of the areas powerwashed were allowed to dry before sampling. As an overall summary of the methods used in this area, the floor was very clean upon completion of the removal methods.

During the initial cleaning of this area, a significant amount of dust was being generated. The maximum concentration of dust was 0.51 milligrams per cubic meter of respirable dust in air. Based on this data, the Contractor was advised to wet down the material to minimize dust. This was achieved by spraying the powerwasher into the general air and providing a mist to keep the dust down. This method worked very well and kept levels down to 0.1 to 0.3 milligrams per cubic meter.

Carbon monoxide level alarms were triggered during the cleaning of Area #1 due to the engine driven compressor. The contractor moved the compressor into a ventilated area and the carbon monoxide levels subsided.

Area #8 - The second area tested was a red brick wall surface which had a residual white paint material on it and is as referred to as Area No. 8. Area 3 was located immediately adjacent to the concrete trough with sand in it. This was another area which was sampled during the initial testing and found to have relatively high dioxin levels. In Area 8, two locations were cleaned to determine the effectiveness of these operations. The areas were 2′ x 2′ and included a vacuum and a chemical test. The samples were located approximately where Area 8 was painted on the wall and approximately 3′ above the ground. Wipe sampling was again performed on both areas for both lead and dioxins. These samples were referred to as Area 8; Chemical 8 and Wash 8. As a general overall evaluation of this area, it appeared that the cleaning methods appeared to be satisfactory.

It should be noted that the surface of the brick was very rough and presented problems in terms of wipe sampling. That is, the wipe samples could not easily be wiped over the rough brick surface.

During both of the interior samplings, wastewater from the powerwash was collected by diking the areas with either sorbents or squeegees. The rinsate from the cleaning operations was sucked off the ground and placed into barrels.

Area #3 - Area 3 was the wall immediately adjacent to the incinerator and designated as sample location No. 3. Again, two areas were evaluated during this operation and

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included scarification and powerwash. The Contractor advised Tighe & Bond that they did not have any equipment to do scarification as described in the specifications. As a substitution for this scarification, the Contractor utilized wire brushes to effectively remove the concrete material from the surface. In general, the scarification was not considered typical of what would generally be considered a scarification process. However, the area was still wiped to determine the effectiveness of wire brushing. The powerwashing area and the wire brushed area were both sampled for lead and dioxins as previously described.

Cleanup - Upon completion of this work, the Contractor powerwashed and decontaminated all the equipment. They placed all protective equipment, clothing, tarps, etc. into one drum located inside the facility. In addition, there was a drum with rinsate water. These materials were placed inside the facility in field drums and characterization samples were reportedly taken by CSES for future disposal purposes.

Manhole Sampling - Three manholes were sampled by Tighe & Bond at the site on April 10, 1995. These included a manhole at the loading dock inside the site and the 2 manholes located on West Lake St. in front of the site. The purpose of the manhole sampling was to determine if samples taken from sediments inside the manhole had contaminants in them. The lids from each manhole were removed and samples were taken with stainless steel spoons of the material which was inside the manhole. It should be noted that there was a significant amount of rain during the sampling episode and that a fair amount of surface water runoff was entering the stormwater drains during the sampling period. The manholes were given the following designations:

- MH-1 - loading dock manhole
- MH-2 - manhole on east side of Lake St.
- MH-3 - manhole on west side of Lake St.

The approximate depth to bottom in each manhole was as follows:

- MH-1 - 5 feet
- MH-2 - 3 feet
- MH-3 - 3 feet

The samples were analyzed for lead, PCBs and dioxins. The lead and PCB samples were performed by Tighe & Bond's laboratory while the dioxin samples were performed by Quanterra Labs of California.

Waste Characterization - During the sampling activities, Laidlaw Environmental came to the site to provide guidance to CSES on disposal and sampling of materials. As a result of these discussions, it was determined that the tires would be disposed of by Laidlaw subcontractor, but that they would have to be decontaminated prior to removal from the site. This will have to be confirmed with Fred Bartman of the EPA. In addition, the waste firm required that samples be collected from each representative

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waste stream. Therefore, samples were taken by CSES from a number of different materials off of each incinerator, the litter inside the facility, and the ash which was found inside the site. According to CSES, the waste characterization analysis will be obtained prior to site mobilization so that the excavated and demolished materials can be loaded directly into a dumpster and not stockpiled at the site.

Soil Sampling - According to Mark Stanga, Litton's corporate attorney, soil samples were to be collected from the vacant lot of the West Side of the property. Mr. Stanga advised Tighe & Bond to perform the sampling during the site visit on April 10, 1995. However, weather conditions during the site visit were not suitable for surface soil sampling. In many of the areas on the vacant lot, there were actually puddles of standing water which would preclude any type of representative surface soil sampling. Phone conversations with Mr. Zen Kruczkowski of Tighe & Bond indicated that the soil sampling could be postponed until the remediation of the site which is scheduled in a couple of months. Therefore, the sampling was postponed until the remediation project begins. Mr. Nordine of the U.S. EPA team contractor was advised of this situation by Tighe & Bond and concurred with our decision regarding the soil sampling.

Project Completion - The Contractor worked directly through lunch and finished up working at the site at approximately 2:00 PM in the afternoon. All contractors and consultants left the site at around 2:15 PM and secured the site by boarding the building and locking the gate.

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APPENDIX B

LABORATORY DATA

Huntingdon

LEAD ANALYSIS RESULTS
EPA METHOD 6010

Sample Identification	Lead Concentration	Units	Percent Recovery
Method Blank	1.4		
Matrix Spike	--	--	100%
Area 1 Wash 1	206	ug/sample	
Area 1 Chem 1	1240	ug/sample	
Area 1 Vac 1	719	ug/sample	
Area 3 Scar 3	70.7	ug/sample	
Area 3 Wash 3	11.8	ug/sample	
Area 8 Vac 8	201	ug/sample	
Area 8 Chem 8	34.5	ug/sample	
Drain	13000	ug/g	

Date Analyzed: 4/24/95 & 4/25/95

Reference: EPA Test Methods for Evaluating Solid Waste, SW-846, November 1986, 3rd Edition.

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
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ent's Sample ID.....AREA 1 CHEM 1
Sample ID.....60235
lysis Date.....4/21/95 13:40
aname.....S50421F
ected By.....MJK
al Amount Extracted... 1.00 sample
oisture.....NA %
L Date.....3/23/95
L Filename.....S50421B
nod Blank ID.....BLANK-557
raction Date.....4/18/95

IVE MERS	CONC. ng/sample	LOD ng/sample	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
3-TCDF	1.0000 *	-----	2378-TCDF-13C....	2.00	68
AL TCDF	5.6000	-----	2378-TCDD-13C....	2.00	75
			12378-PeCDF-13C..	2.00	63
3-TCDD	0.0056	-----	23478-PeCDF-13C..	2.00	69
AL TCDD	0.4700	-----	12378-PeCDD-13C..	2.00	74
			123478-HxCDF-13C.	2.00	70
78-PeCDF	1.2000	-----	123678-HxCDF-13C.	2.00	66
78-PeCDF	0.5100	-----	234678-HxCDF-13C.	2.00	73
AL PeCDF	5.9000	-----	123789-HxCDF-13C.	2.00	74
			123478-HxCDD-13C.	2.00	85
78-PeCDD	ND	0.053	123678-HxCDD-13C.	2.00	76
AL PeCDD	0.1300	-----	1234678-HpCDF-13C	2.00	71
			1234789-HpCDF-13C	2.00	80
478-HxCDF	ND	1.700	1234678-HpCDD-13C	2.00	88
678-HxCDF	0.6800	-----	OCDD-13C.....	4.00	78
678-HxCDF	0.5000	-----			
789-HxCDF	0.3400	-----	1234-TCDD-13C....	2.00	NA
AL HxCDF	3.9000	-----	123789-HxCDD-13C.	2.00	NA
478-HxCDD	0.0450	-----	2378-TCDD-37Cl4..	0.20	74
678-HxCDD	0.1100	-----			
789-HxCDD	0.0670	-----			
AL HxCDD	1.0000	-----			
678-HpCDF	3.3000	-----			
789-HpCDF	0.7800	-----			
AL HpCDF	5.1000	-----			
678-HpCDD	0.8400	-----			
AL HpCDD	1.3000	-----			
	6.1000	-----			
	3.1000	-----			

Total 2378-TCDD Equivalence: 0.65 ng/sample
(Using ITE Factors/DB-5 Data)

lue may include contributions from other TCDF isomers.

= Concentration (Totals include 2378-substituted isomers.)
= Limit of Detection
= Not Detected
= Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
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Client's Sample ID.....AREA 1 VAC 1
TCT Sample ID.....60236
Analysis Date.....4/21/95 14:35
Filename.....S50421G
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF	0.640 *	-----	2378-TCDF-13C....	2.00	67
TOTAL TCDF	5.100	-----	2378-TCDD-13C....	2.00	74
			12378-PeCDF-13C..	2.00	62
2378-TCDD	0.015	-----	23478-PeCDF-13C..	2.00	68
TOTAL TCDD	0.450	-----	12378-PeCDD-13C..	2.00	69
			123478-HxCDF-13C.	2.00	66
12378-PeCDF	0.560	-----	123678-HxCDF-13C.	2.00	62
23478-PeCDF	0.500	-----	234678-HxCDF-13C.	2.00	66
TOTAL PeCDF	4.900	-----	123789-HxCDF-13C.	2.00	71
			123478-HxCDD-13C.	2.00	77
12378-PeCDD	ND	0.086	123678-HxCDD-13C.	2.00	73
TOTAL PeCDD	0.350	-----	1234678-HpCDF-13C	2.00	65
			1234789-HpCDF-13C	2.00	73
123478-HxCDF	ND	1.200	1234678-HpCDD-13C	2.00	80
123678-HxCDF	0.640	-----	OCDD-13C.....	4.00	74
234678-HxCDF	0.830	-----			
123789-HxCDF	0.310	-----	1234-TCDD-13C....	2.00	NA
TOTAL HxCDF	5.000	-----	123789-HxCDD-13C.	2.00	NA
123478-HxCDD	0.068	-----	2378-TCDD-37Cl4..	0.20	65
123678-HxCDD	0.150	-----			
123789-HxCDD	0.100	-----			
TOTAL HxCDD	1.500	-----			
1234678-HpCDF	3.600	-----			
1234789-HpCDF	0.680	-----			
TOTAL HpCDF	5.400	-----			
1234678-HpCDD	1.200	-----			
TOTAL HpCDD	2.000	-----			
OCDF	4.300	-----			
OCDD	3.600	-----			

Total 2378-TCDD Equivalence: 0.63 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
DL = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
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lient's Sample ID.....AREA 1 WASH 1
CT Sample ID.....60234
nalysis Date.....4/21/95 12:51
ilename.....S50421E
njected By.....MJK
otal Amount Extracted... 1.00 sample
Moisture.....NA %
CAL Date.....3/23/95
CAL Filename.....S50421B
ethod Blank ID.....BLANK-557
xtraction Date.....4/18/95

TIVE OMERS	CONC. ng/sample	LOD ng/sample	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
78-TCDF	0.570 *	-----	2378-TCDF-13C....	2.00	66
TAL TCDF	4.500	-----	2378-TCDD-13C....	2.00	72
			12378-PeCDF-13C..	2.00	65
78-TCDD	0.011	-----	23478-PeCDF-13C..	2.00	70
TAL TCDD	0.350	-----	12378-PeCDD-13C..	2.00	77
			123478-HxCDF-13C.	2.00	70
378-PeCDF	0.890	-----	123678-HxCDF-13C.	2.00	58
478-PeCDF	0.570	-----	234678-HxCDF-13C.	2.00	73
TAL PeCDF	5.100	-----	123789-HxCDF-13C.	2.00	78
			123478-HxCDD-13C.	2.00	88
378-PeCDD	ND	0.085	123678-HxCDD-13C.	2.00	72
TAL PeCDD	0.320	-----	1234678-HpCDF-13C	2.00	68
			1234789-HpCDF-13C	2.00	75
3478-HxCDF	1.900	-----	1234678-HpCDD-13C	2.00	87
3678-HxCDF	0.830	-----	OCDD-13C.....	4.00	83
4678-HxCDF	0.950	-----			
3789-HxCDF	0.410	-----	1234-TCDD-13C....	2.00	NA
TAL HxCDF	8.400	-----	123789-HxCDD-13C.	2.00	NA
3478-HxCDD	0.082	-----	2378-TCDD-37Cl4..	0.20	69
3678-HxCDD	0.190	-----			
3789-HxCDD	0.110	-----			
TAL HxCDD	1.700	-----			
34678-HpCDF	5.100	-----			
34789-HpCDF	1.100	-----			
TAL HpCDF	7.700	-----			
34678-HpCDD	1.500	-----			
TAL HpCDD	2.600	-----			
DF	8.100	-----			
DD	4.900	-----			

Total 2378-TCDD Equivalence: 0.93 ng/sample (Using ITE Factors/DB-5 Data)

'alue may include contributions from other TCDF isomers.

NC= Concentration (Totals include 2378-substituted isomers.)
D = Limit of Detection
= Not Detected
= Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 3 WASH 3
TCT Sample ID.....60237
Analysis Date.....4/21/95 15:24
Filename.....S50421H
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF	1.600 *	-----	2378-TCDF-13C....	2.00	33
TOTAL TCDF	6.900	-----	2378-TCDD-13C....	2.00	35
			12378-PeCDF-13C..	2.00	61
2378-TCDD	0.012	-----	23478-PeCDF-13C..	2.00	66
TOTAL TCDD	0.260	-----	12378-PeCDD-13C..	2.00	74
			123478-HxCDF-13C.	2.00	57
12378-PeCDF	2.100	-----	123678-HxCDF-13C.	2.00	56
23478-PeCDF	0.740	-----	234678-HxCDF-13C.	2.00	64
TOTAL PeCDF	6.700	-----	123789-HxCDF-13C.	2.00	65
			123478-HxCDD-13C.	2.00	72
12378-PeCDD	ND	0.037	123678-HxCDD-13C.	2.00	63
TOTAL PeCDD	0.360	-----	1234678-HpCDF-13C	2.00	63
			1234789-HpCDF-13C	2.00	63
123478-HxCDF	2.100	-----	1234678-HpCDD-13C	2.00	69
123678-HxCDF	0.740	-----	OCDD-13C.....	4.00	63
234678-HxCDF	0.400	-----			
123789-HxCDF	0.310	-----	1234-TCDD-13C....	2.00	NA
TOTAL HxCDF	6.300	-----	123789-HxCDD-13C.	2.00	NA
123478-HxCDD	0.025	-----	2378-TCDD-37Cl4..	0.20	30
123678-HxCDD	0.068	-----			
123789-HxCDD	0.031	-----			
TOTAL HxCDD	0.590	-----			
1234678-HpCDF	1.900	-----			
1234789-HpCDF	0.450	-----			
TOTAL HpCDF	3.000	-----			
1234678-HpCDD	0.260	-----			
TOTAL HpCDD	0.490	-----			
OCDF	2.400	-----			
OCDD	0.460	-----			

Total 2378-TCDD Equivalence: 1.0 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 3 SCAR 3
TCT Sample ID.....60238
Analysis Date.....4/21/95 16:13
Filename.....S50421I
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample	INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF	1.500 *	-----	2378-TCDF-13C....	2.00	44
TOTAL TCDF	6.700	-----	2378-TCDD-13C....	2.00	53
			12378-PeCDF-13C..	2.00	65
2378-TCDD	0.016	-----	23478-PeCDF-13C..	2.00	70
TOTAL TCDD	0.220	-----	12378-PeCDD-13C..	2.00	76
			123478-HxCDF-13C.	2.00	62
12378-PeCDF	1.600	-----	123678-HxCDF-13C.	2.00	63
23478-PeCDF	0.780	-----	234678-HxCDF-13C.	2.00	70
TOTAL PeCDF	5.900	-----	123789-HxCDF-13C.	2.00	78
			123478-HxCDD-13C.	2.00	73
12378-PeCDD	ND	0.043	123678-HxCDD-13C.	2.00	65
TOTAL PeCDD	0.360	-----	1234678-HpCDF-13C	2.00	75
			1234789-HpCDF-13C	2.00	87
123478-HxCDF	2.200	-----	1234678-HpCDD-13C	2.00	89
123678-HxCDF	0.910	-----	OCDD-13C.....	4.00	79
234678-HxCDF	0.660	-----			
123789-HxCDF	0.500	-----	1234-TCDD-13C....	2.00	NA
TOTAL HxCDF	7.600	-----	123789-HxCDD-13C.	2.00	NA
123478-HxCDD	0.045	-----	2378-TCDD-37Cl4..	0.20	43
123678-HxCDD	0.110	-----			
123789-HxCDD	0.059	-----			
TOTAL HxCDD	0.850	-----			
1234678-HpCDF	3.300	-----			
1234789-HpCDF	0.870	-----			
TOTAL HpCDF	5.400	-----			
1234678-HpCDD	0.510	-----			
TOTAL HpCDD	0.920	-----			
OCDF	5.400	-----			
OCDD	1.200	-----			

Total 2378-TCDD Equivalence: 1.1 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 8 VAC 8
TCT Sample ID.....60239
Analysis Date.....4/21/95 17:02
Filename.....S50421J
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.1700 *	-----
TOTAL TCDF	0.7300	-----
2378-TCDD	0.0038	-----
TOTAL TCDD	0.0210	-----
12378-PeCDF	0.2600	-----
23478-PeCDF	0.1200	-----
TOTAL PeCDF	1.2000	-----
12378-PeCDD	ND	0.011
TOTAL PeCDD	0.0640	-----
123478-HxCDF	0.3500	-----
123678-HxCDF	0.1400	-----
234678-HxCDF	0.1100	-----
123789-HxCDF	0.0740	-----
TOTAL HxCDF	1.2000	-----
123478-HxCDD	0.0053	-----
123678-HxCDD	0.0130	-----
123789-HxCDD	0.0094	-----
TOTAL HxCDD	0.1500	-----
1234678-HpCDF	0.4900	-----
1234789-HpCDF	0.1100	-----
TOTAL HpCDF	0.7800	-----
1234678-HpCDD	0.1100	-----
TOTAL HpCDD	0.2000	-----
OCDF	0.6600	-----
OCDD	0.5300	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	63
2378-TCDD-13C....	2.00	67
12378-PeCDF-13C..	2.00	86
23478-PeCDF-13C..	2.00	93
12378-PeCDD-13C..	2.00	90
123478-HxCDF-13C.	2.00	63
123678-HxCDF-13C.	2.00	63
234678-HxCDF-13C.	2.00	70
123789-HxCDF-13C.	2.00	74
123478-HxCDD-13C.	2.00	82
123678-HxCDD-13C.	2.00	68
1234678-HpCDF-13C	2.00	73
1234789-HpCDF-13C	2.00	81
1234678-HpCDD-13C	2.00	89
OCDD-13C.....	4.00	80
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	59

Total 2378-TCDD Equivalence: 0.17 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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TWIN CITY TESTING CORPORATION
*METHOD 8290 ANALYSIS RESULTS *
****
Client....CSE

Client's Sample ID.....AREA 8 CHEM 8
TCT Sample ID.....60240
Analysis Date.....4/21/95 18:21
Filename.....S50421K
Injected By.....MCH
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.3400 *	-----
TOTAL TCDF	3.8000	-----
2378-TCDD	0.0190	-----
TOTAL TCDD	0.2000	-----
12378-PeCDF	0.3300	-----
23478-PeCDF	0.1600	-----
TOTAL PeCDF	2.0000	-----
12378-PeCDD	ND	0.023
TOTAL PeCDD	0.1800	-----
123478-HxCDF	0.2800	-----
123678-HxCDF	0.1200	-----
234678-HxCDF	0.0960	-----
123789-HxCDF	0.0480	-----
TOTAL HxCDF	1.0000	-----
123478-HxCDD	0.0078	-----
123678-HxCDD	0.0200	-----
123789-HxCDD	0.0100	-----
TOTAL HxCDD	0.1500	-----
1234678-HpCDF	0.3200	-----
1234789-HpCDF	0.0610	-----
TOTAL HpCDF	0.4900	-----
1234678-HpCDD	0.0920	-----
TOTAL HpCDD	0.1700	-----
OCDF	0.3500	-----
OCDD	0.3200	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	24
2378-TCDD-13C....	2.00	28
12378-PeCDF-13C..	2.00	43
23478-PeCDF-13C..	2.00	47
12378-PeCDD-13C..	2.00	48
123478-HxCDF-13C.	2.00	36
123678-HxCDF-13C.	2.00	40
234678-HxCDF-13C.	2.00	42
123789-HxCDF-13C.	2.00	46
123478-HxCDD-13C.	2.00	47
123678-HxCDD-13C.	2.00	42
1234678-HpCDF-13C	2.00	39
1234789-HpCDF-13C	2.00	47
1234678-HpCDD-13C	2.00	50
OCDD-13C.....	4.00	48
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	25

Total 2378-TCDD
Equivalence: 0.21 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....DRAIN
TCT Sample ID.....60241
Analysis Date.....4/21/95 19:13
Filename.....S50421L
Injected By.....MCH
Total Amount Extracted...0.0170 kg
% Moisture..... 41.1 %
ICAL Date.....3/23/95
CCAL Filename.....S50420B
Method Blank ID.....BLANK-555
Extraction Date.....4/17/95

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg
2378-TCDF	ND	16000
TOTAL TCDF	55000	-----
2378-TCDD	200	-----
TOTAL TCDD	4700	-----
12378-PeCDF	20000	-----
23478-PeCDF	8400	-----
TOTAL PeCDF	71000	-----
12378-PeCDD	610	-----
TOTAL PeCDD	4000	-----
123478-HxCDF	ND	34000
123678-HxCDF	12000	-----
234678-HxCDF	9100	-----
123789-HxCDF	6100	-----
TOTAL HxCDF	74000	-----
123478-HxCDD	820	-----
123678-HxCDD	1800	-----
123789-HxCDD	1300	-----
TOTAL HxCDD	18000	-----
1234678-HpCDF	54000	-----
1234789-HpCDF	15000	-----
TOTAL HpCDF	87000	-----
1234678-HpCDD	12000	-----
TOTAL HpCDD	23000	-----
OCDF	90000	-----
OCDD	33000	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	56
2378-TCDD-13C....	2.00	62
12378-PeCDF-13C..	2.00	56
23478-PeCDF-13C..	2.00	58
12378-PeCDD-13C..	2.00	59
123478-HxCDF-13C.	2.00	49
123678-HxCDF-13C.	2.00	49
234678-HxCDF-13C.	2.00	56
123789-HxCDF-13C.	2.00	61
123478-HxCDD-13C.	2.00	58
123678-HxCDD-13C.	2.00	54
1234678-HpCDF-13C	2.00	54
1234789-HpCDF-13C	2.00	55
1234678-HpCDD 13C	2.00	61
OCDD-13C.....	4.00	53
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	INT

Total 2378-TCDD Equivalence: 9750 ng/kg
(Using TTE Factors/DB-5 Data)

All values are expressed on a dry weight basis.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable
INT = Interference

TCT Invoice Number....4411 95-60084

CommonwealthAnalytical

LITTON SYSTEMS INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

Attention: TED CRAVER

Work ID: LAKE SALVAGE
Project # C325_2_310

Workorder # 9504182

Authorized Signature

Peter A. Law
Laboratory Director

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of [illegible] & Bond, Inc.

Commonwealth Analytical

Workorder #9504182

Laboratory Results Prepared For :

LITTON SYSTEMS INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

Attention : TED CRAVER

Company : LITTON SYSTEMS INC.

Facility : ARLINGTON, VA 22202
Contact : MJM_CFR

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : LAKE SALVAGE
Taken : 04/10/95
Transported : MJM-T&B
Type : SOIL
PO # :

4/28/95 CFR
Certified by

Commonwealth Analytical

Workorder #9504182

Inorganic Results for MH-1

Matrix:SOIL

Collected on 04/10/95 12:30:00

	Analyte	Result	Units	Test Date	Analyst
01A	PERCENT SOLIDS	58.8	percent	04/13/95	RZ

Metal Results for MH-1

Matrix:SOIL

Collected on 04/10/95 12:30:00

	Analyte	Result	Units	Test Date	Analyst
01A	LEAD by ICP	26000	mg/kg, Dry Wgt	04/26/95	BG

Commonwealth Analytical

Workorder #9504182

Results for MH-1

PCB's

Matrix:SOIL

Collected on 04/10/95 12:30:00
Extracted on 04/20/95
Analyzed on 04/26/95 by MAG

Percent Solids: 58.8%

01A\PCBSWS

CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	3000
11104-28-2	PCB-1221	ND	3000
11141-16-5	PCB-1232	ND	3000
53469-21-9	PCB-1242	34000	3000
12672-29-6	PCB-1248	ND	3000
11097-69-1	PCB-1254	ND	3000
11096-82-5	PCB-1260	ND	3000

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9504182

Inorganic Results for MH-2

Matrix:SOIL

Collected on 04/10/95 12:45:00

	Analyte	Result	Units	Test Date	Analyst
02A	PERCENT SOLIDS	65.1	percent	04/13/95	RZ

Metal Results for MH-2

Matrix:SOIL

Collected on 04/10/95 12:45:00

	Analyte	Result	Units	Test Date	Analyst
02A	LEAD by ICP	140	mg/kg, Dry Wgt	04/26/95	BG

Commonwealth Analytical

Workorder #9504182

Results for MH-2

PCB's

Matrix:SOIL

Collected on 04/10/95 12:45:00
Extracted on 04/20/95
Analyzed on 04/23/95 by MAG

Percent Solids: 65.1%

02A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	30
	11104-28-2	PCB-1221	ND	30
	11141-16-5	PCB-1232	ND	30
	53469-21-9	PCB-1242	ND	30
	12672-29-6	PCB-1248	ND	30
	11097-69-1	PCB-1254	ND	30
	11096-82-5	PCB-1260	ND	30

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9504182

Inorganic Results for MH-3

Matrix:SOIL

Collected on 04/10/95 13:30:00

	Analyte	Result	Units	Test Date	Analyst
03A	PERCENT SOLIDS	69.8	percent	04/13/95	RZ

Metal Results for MH-3

Matrix:SOIL

Collected on 04/10/95 13:30:00

	Analyte	Result	Units	Test Date	Analyst
03A	LEAD by ICP	290	mg/kg, Dry Wgt	04/26/95	BG

Commonwealth Analytical

Workorder #9504182

Results for MH-3

PCB's

Matrix:SOIL

Collected on 04/10/95 13:30:00
Extracted on 04/20/95
Analyzed on 04/23/95 by MAG

Percent Solids: 69.8%

03A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	30
	11104-28-2	PCB-1221	ND	30
	11141-16-5	PCB-1232	ND	30
	53469-21-9	PCB-1242	ND	30
	12672-29-6	PCB-1248	ND	30
	11097-69-1	PCB-1254	ND	30
	11096-82-5	PCB-1260	ND	30

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Test Methodologies

Test: **LEAD by ICP**
Method 6010, Test Methods for Evaluating Solid Waste, EPA-SW846, 1986 Edition.

Test: **PCB's IN SOIL**
Test Methods for Evaluating Solid Waste, EPA SW-846, 1986 Edition.

Preparation	Method 3580-3550
Clean Up	Method 3660
Analysis	Modified Method 8080

Test: **PERCENT SOLIDS**
Method 160.3, Methods for Chemical Analyses of Water and Wastes, EPA-600/4-79-020, 1983 Revision.

nt: Litton Systems Inc. Job#/Proj. Manager: C325-2-310 / MJM

ress: 1725 Jefferson Davis Highway Work ID: Lake Salvage

Arlington, VA 22202 Contact: MIKE MATILANEN

ne: 703-562-1600 Collected by: MIKE MATILANEN

Workorder # 95084182 COC #

Shaded areas for office use

Requested Turn Around Time (✓)
ir. ☐ 1 wk. ☐ Other ☐
ir. ☐ 2 wk. ☑ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☑
Specify:

Special QA/QC? (✓)
Yes ☐ No ☑
Specify:

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
1. Solper
2. T. Pb
3. PCBSWS

le Type Codes
Wellwater W-Wastewater SW-Surfacewater LW-Labwater
Raw Water GW-Groundwater PW-Public Water SO-Soil
id SL-Sludge O-Oil A-Air Z-Other

Sample ID (Use one line per container; For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
MH-1	SO	4-10-95 1230	X		1	G							X				3	2					1		
MH-2	SO	4-10-95 1245	X		1	G							X				3	2					1		
MH-3	SO	4-10-95 1330	X		1	G							X				3	2					1		

	Date	Time		Date	Time
quished by: [signature]	4/11/95	16:35	Received by:		
quished by:			Received by:		
quished by:			Received by: Ria Haworth	4/11/95	16:35
hod of shipment: Via MJM			Laboratory: C/A		

Cooler #: 425
Temp. @ receipt: ice pk.
Preservation pH checked
By: N/A Date: —

f:\data\excel\COCJ-L.XLS rev.5/94

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

Quanterra Environmental Services

April 27, 1995
Lab ID: 081396

Michael Matilainin
Tighe and Bond
53 Southampton Road
Westfield, MA 01085

Dear Mr. Matilainin:

Enclosed is the report for the PCDD/PCDF analysis by Method 8290 of your three soil samples received at Quanterra Incorporated on 12 April 1995 under chain-of-custody.

Please note that the concentrations of some analytes in your sample "MH-1" exceeded the method calibration range. In most cases the concentration of these analytes are within the linear response range of the detector, and data quality is not adversely affected. A smaller aliquot of these samples with overrange analytes can be extracted and analyzed if requested. All qualified results are flagged appropriately on the data sheets.

In addition, note that some internal standard recoveries were above the method recommended goal of 135%. Quantitation by isotope dilution generally precludes any adverse effect on data quality due to elevated internal standard recoveries.

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique. For an analyte reported as 'Not Detected' the associated detection limit represents its maximum possible concentration. The method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

Soil, solid and waste samples are reported on an "as received" basis. No correction is made for moisture content.

All samples and extracts are retained for 30 days from the date of this report. If longer storage is required or you would like samples returned to you, please call with instructions.

Quanterra
Environmental Services

Results are on the attached data sheets.

If you have any questions, please feel free to call.

Sincerely,

Eric W. Redman
Senior Scientist
Advanced Technology Group

Terry A. Wilson
Program Administrator

TW/ct

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Tighe and Bond

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
081396-0001-MB	Method Blank	SOIL			12 APR 95
081396-0001-SA	MH-1	SOIL	10 APR 95	12:30	12 APR 95
081396-0002-SA	MH-2	SOIL	10 APR 95	12:45	12 APR 95
081396-0003-SA	MH-3	SOIL	10 APR 95	13:30	12 APR 95

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 081396-0001-MB
Matrix: SOIL
Authorized: 12 APR 95

Sampled: NA
Prepared: 13 APR 95

Received: NA
Analyzed: 19 APR 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.19	
2,3,7,8-TCDF	ND	pg/g	0.19	
PeCDFs (total)	ND	pg/g	0.31	
1,2,3,7,8-PeCDF	ND	pg/g	0.31	
2,3,4,7,8-PeCDF	ND	pg/g	0.27	
HxCDFs (total)	ND	pg/g	0.53	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.33	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.44	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.45	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.53	
HpCDFs (total)	ND	pg/g	0.44	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.44	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.34	
OCDF	ND	pg/g	1.2	
Dioxins				
TCDDs (total)	ND	pg/g	0.25	
2,3,7,8-TCDD	ND	pg/g	0.25	
PeCDDs (total)	ND	pg/g	0.27	
1,2,3,7,8-PeCDD	ND	pg/g	0.27	
HxCDDs (total)	ND	pg/g	0.58	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.58	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.55	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.55	
HpCDDs (total)	ND	pg/g	0.35	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.35	
OCDD	ND	pg/g	1.9	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara
Approved By: Adrian Messecar

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 081396-0001-MB
Matrix: SOIL
Authorized: 12 APR 95

Sampled: NA
Prepared: 13 APR 95

Received: NA
Analyzed: 19 APR 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	101
13C-2,3,7,8-TCDD	85
13C-1,2,3,7,8-PeCDF	99
13C-1,2,3,7,8-PeCDD	99
13C-1,2,3,4,7,8-HxCDF	123
13C-1,2,3,6,7,8-HxCDD	93
13C-1,2,3,4,6,7,8-HpCDF	109
13C-1,2,3,4,6,7,8-HpCDD	111
13C-OCDD	79

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara

Approved By: Adrian Messecar

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: MH-1
Lab ID: 081396-0001-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 22 APR 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	39000	pg/g	--	
2,3,7,8-TCDF	5600	pg/g	--	gE
PeCDFs (total)	46000	pg/g	--	
1,2,3,7,8-PeCDF	9300	pg/g	--	
2,3,4,7,8-PeCDF	4100	pg/g	--	
HxCDFs (total)	57000	pg/g	--	
1,2,3,4,7,8-HxCDF	13000	pg/g	--	E
1,2,3,6,7,8-HxCDF	7200	pg/g	--	
2,3,4,6,7,8-HxCDF	5900	pg/g	--	
1,2,3,7,8,9-HxCDF	950	pg/g	--	
HpCDFs (total)	60000	pg/g	--	
1,2,3,4,6,7,8-HpCDF	42000	pg/g	--	E
1,2,3,4,7,8,9-HpCDF	11000	pg/g	--	E
OCDF	88000	pg/g	--	E
Dioxins				
TCDDs (total)	2400	pg/g	--	
2,3,7,8-TCDD	93	pg/g	--	
PeCDDs (total)	4100	pg/g	--	
1,2,3,7,8-PeCDD	320	pg/g	--	
HxCDDs (total)	13000	pg/g	--	
1,2,3,4,7,8-HxCDD	700	pg/g	--	
1,2,3,6,7,8-HxCDD	1100	pg/g	--	
1,2,3,7,8,9-HxCDD	810	pg/g	--	
HpCDDs (total)	21000	pg/g	--	
1,2,3,4,6,7,8-HpCDD	12000	pg/g	--	E
OCDD	44000	pg/g	--	E

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara

Approved By: Adrian Messecar

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: MH-1
Lab ID: 081396-0001-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 22 APR 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery	
13C-2,3,7,8-TCDF	106	
13C-2,3,7,8-TCDD	93	
13C-1,2,3,7,8-PeCDF	147	m
13C-1,2,3,7,8-PeCDD	165	m
13C-1,2,3,4,7,8-HxCDF	129	
13C-1,2,3,6,7,8-HxCDD	104	
13C-1,2,3,4,6,7,8-HpCDF	66	
13C-1,2,3,4,6,7,8-HpCDD	76	
13C-OCDD	73	

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note E : Concentration exceeds calibration range.

Note m : Internal standard recovery is outside method recovery goal.

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara

Approved By: Adrian Messecar

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: MH-2
Lab ID: 081396-0002-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 21 APR 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	700	pg/g	--	
2,3,7,8-TCDF	130	pg/g	--	g
PeCDFs (total)	520	pg/g	--	
1,2,3,7,8-PeCDF	150	pg/g	--	
2,3,4,7,8-PeCDF	37	pg/g	--	
HxCDFs (total)	320	pg/g	--	
1,2,3,4,7,8-HxCDF	110	pg/g	--	
1,2,3,6,7,8-HxCDF	44	pg/g	--	
2,3,4,6,7,8-HxCDF	16	pg/g	--	
1,2,3,7,8,9-HxCDF	10	pg/g	--	
HpCDFs (total)	300	pg/g	--	
1,2,3,4,6,7,8-HpCDF	140	pg/g	--	
1,2,3,4,7,8,9-HpCDF	52	pg/g	--	
OCDF	330	pg/g	--	
Dioxins				
TCDDs (total)	30	pg/g	--	
2,3,7,8-TCDD	1.6	pg/g	--	@
PeCDDs (total)	6.0	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	2.4	
HxCDDs (total)	110	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	3.8	
1,2,3,6,7,8-HxCDD	7.8	pg/g	--	@
1,2,3,7,8,9-HxCDD	8.0	pg/g	--	@
HpCDDs (total)	1000	pg/g	--	
1,2,3,4,6,7,8-HpCDD	200	pg/g	--	
OCDD	2000	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara
Approved By: Adrian Messecar

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: MH-2
Lab ID: 081396-0002-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 21 APR 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	85
13C-2,3,7,8-TCDD	84
13C-1,2,3,7,8-PeCDF	90
13C-1,2,3,7,8-PeCDD	99
13C-1,2,3,4,7,8-HxCDF	131
13C-1,2,3,6,7,8-HxCDD	108
13C-1,2,3,4,6,7,8-HpCDF	58
13C-1,2,3,4,6,7,8-HpCDD	79
13C-OCDD	65

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Teri Vergara

Approved By: Adrian Messecar

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: MH-3
Lab ID: 081396-0003-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 19 APR 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	110	pg/g	--	
2,3,7,8-TCDF	12	pg/g	--	g
PeCDFs (total)	99	pg/g	--	
1,2,3,7,8-PeCDF	16	pg/g	--	
2,3,4,7,8-PeCDF	8.6	pg/g	--	@
HxCDFs (total)	91	pg/g	--	
1,2,3,4,7,8-HxCDF	17	pg/g	--	
1,2,3,6,7,8-HxCDF	12	pg/g	--	
2,3,4,6,7,8-HxCDF	8.3	pg/g	--	@
1,2,3,7,8,9-HxCDF	ND	pg/g	1.3	
HpCDFs (total)	120	pg/g	--	
1,2,3,4,6,7,8-HpCDF	65	pg/g	--	
1,2,3,4,7,8,9-HpCDF	12	pg/g	--	
OCDF	100	pg/g	--	
Dioxins				
TCDDs (total)	12	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.69	
PeCDDs (total)	ND	pg/g	5.1	
1,2,3,7,8-PeCDD	ND	pg/g	1.3	
HxCDDs (total)	52	pg/g	--	
1,2,3,4,7,8-HxCDD	ND	pg/g	2.3	
1,2,3,6,7,8-HxCDD	5.7	pg/g	--	@
1,2,3,7,8,9-HxCDD	5.6	pg/g	--	@
HpCDDs (total)	250	pg/g	--	
1,2,3,4,6,7,8-HpCDD	120	pg/g	--	
OCDD	1300	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Adrian Messecar

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: MH-3
Lab ID: 081396-0003-SA
Matrix: SOIL
Authorized: 12 APR 95

Sampled: 10 APR 95
Prepared: 13 APR 95

Received: 12 APR 95
Analyzed: 19 APR 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	104
13C-2,3,7,8-TCDD	85
13C-1,2,3,7,8-PeCDF	105
13C-1,2,3,7,8-PeCDD	116
13C-1,2,3,4,7,8-HxCDF	124
13C-1,2,3,6,7,8-HxCDD	103
13C-1,2,3,4,6,7,8-HpCDF	77
13C-1,2,3,4,6,7,8-HpCDD	79
13C-OCDD	63

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Adrian Messecar

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Quanterra Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Advanced Technology Group - High Resolution
Project: 081396

Category: 8290-HR-S C14-C18 D/F plus 2378-substituted isomers by Method 8290
Test: 8290-SW-S
Matrix: SOLID
QC Lot: 16 MAR 95-A QC Run: 21 MAR 95-A
Concentration Units: pg/uL

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) LCS	Accuracy(%) Limits
2,3,7,8-TCDF	10.0	10.0	100	60-140
1,2,3,7,8-PeCDF	25.0	25.4	102	60-140
2,3,4,7,8-PeCDF	25.0	25.9	103	60-140
1,2,3,4,7,8-HxCDF	25.0	26.3	105	60-140
1,2,3,6,7,8-HxCDF	25.0	27.3	109	60-140
2,3,4,6,7,8-HxCDF	25.0	27.1	108	60-140
1,2,3,7,8,9-HxCDF	25.0	26.2	105	60-140
1,2,3,4,6,7,8-HpCDF	25.0	24.3	97	60-140
1,2,3,4,7,8,9-HpCDF	25.0	24.8	99	60-140
OCDF	50.0	49.5	99	60-140
2,3,7,8-TCDD	10.0	10.1	101	60-140
1,2,3,7,8-PeCDD	25.0	23.6	94	60-140
1,2,3,4,7,8-HxCDD	25.0	25.2	101	60-140
1,2,3,6,7,8-HxCDD	25.0	25.1	100	60-140
1,2,3,7,8,9-HxCDD	25.0	23.6	94	60-140
1,2,3,4,6,7,8-HpCDD	25.0	24.4	98	60-140
OCDD	50.0	47.1	94	60-140
13C-2,3,7,8-TCDF	50.0	47.3	95	40-135
13C-1,2,3,7,8-PeCDF	50.0	36.7	73	40-135
13C-1,2,3,4,7,8-HxCDF	125	114	91	40-135
13C-1,2,3,4,6,7,8-HpCDF	125	77.9	62	40-135
13C-2,3,7,8-TCDD	50.0	42.3	85	40-135
13C-1,2,3,7,8-PeCDD	50.0	38.0	76	40-135
13C-1,2,3,6,7,8-HxCDD	125	113	90	40-135
13C-1,2,3,4,6,7,8-HpCDD	125	83.5	67	40-135
13C-OCDD	250	109	44	40-135

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

APPENDIX C

REVISED SCHEDULE

PROPOSED SCHEDULE
for
Demolition and Site Remediation of the Lake Salvage Facility

Central States Environmental Services, Inc., proposes a this schedule to clean and selectively demolish building structures at the Lake Salvage Facility:

Sunday - April 9, 1995

-Mobilize to the site with personnel and equipment.

Monday - April 10, 1995

-Cleaning tests are performed and confirmatory samples taken
-Sampling of the sediment of the drain systems.
-Waste streams sampling and characterization.

Saturday/Sunday - June 3/4, 1995

-Mobilize to the site with personnel and equipment.

Monday - June 5, 1995

-Set up office trailer and decon trailer.
-Facility utilities terminated and capped.
-The compactor removed and the hole sealed.
-Drains sealed off and a water collection system installed.

Tuesday - June 6, 1995

-Demolition of the incinerators, then load, transport and dispose of waste streams at predetermined sites.
-Litter/debris clean up and load, transport and dispose of waste streams at predetermined sites.

Wednesday - Wednesday - June 7 - 14, 1995
-Selective building structure demolition with segregation and load, transport and dispose of waste streams at predetermined sites.
-Cleaning of the selected walls with the selected method.
-Continue cleaning of the selected walls with the selected method.
-Cleaning of the floor with the selected method.

Thursday - June 15, 1995

-Any excavation of soil if needed.
-Back filling and reseeding as required.

PROPOSED SCHEDULE
for
Demolition and Site Remediation of the Lake Salvage Facility

Cont'd

Friday - June 16, 1995

-Repair perimeter fence and openings in the building structures.
-Demobilize from site with personnel and equipment.

APPENDIX E

APPENDIX E

Contractor Closeout Report

PROJECT COMPLETION REPORT

DEMOLITION AND REMEDIATION
Lake Salvage Facility
2527-29 W. Lake Street
Chicago, IL 60607

Prepared for:

Litton Industries
1725 Jefferson Davis Highway
Suite 1601, Crystal Square 2
Arlington, VA 22202-3585

and

Tighe & Bond, Inc.
53 Southampton Road
Westfield, MA 01085

Prepared by:
Central States Environmental Services, Inc.
609 Airport Road
Centralia, IL 62801

PROJECT BACKGROUND

Central States Environmental Services, Inc. (CSES) was awarded the bid for the demolition and site remediation of the Lake Salvage Facility located at 2527-29 West Lake Street, Chicago, IL 60607. The scope of work for the project was for the complete demolition of all building structures along with the demolition of two (2) incinerators on-site. Once the buildings and incinerators had been razed the entire site would be decontaminated and a protective encapsulant barrier would be left on the site.

Lake Salvage Facility operated as a scrap yard and wire reclamation facility until it closed in 1986. There is one concrete block building with a wooden roof on-site. The entire site is covered by concrete. There is a galvanized fence enclosing the north and west sides of the property. There is a wooden fence to the east separating Lake Salvage and a vacant lot. The south access to the site is a wooden fence which is in disrepair. There is also a city alley which runs along the south access to the site. At time of remediation, there are two abandoned cars in the alley. There is a loading dock on the north side of the property which faces Lake Street.

This demolition and site remediation was ordered pursuant to an Administrative Order dated September, 1994, by the United States Environmental Protection Agency (USEPA), Region V. Litton Industries had assumed responsibility for the remediation of this site. The contaminants of concern at this site were lead and dioxin. These constituents were found in various ash residuals and wipe samples of surface areas found at the site.

The scope of work will be divided into 3 phases: 1) initial cleaning tests; 2) site decontamination; 3) site demolition and encapsulation.

INITIAL CLEANING TESTS

Bid specifications requested for individual cleaning tests to be performed in order to determine the most effective and economical method of decontamination at Lake Salvage Facility. The four methods to be experimented to determine the best method were hepa-vacuuming, chemical decontamination, power washing, and scarification.

CSES crew of four arrived on site April 10, 1995 to perform these cleaning test evaluations. Also on site at that time were Mr. John Nordine of Ecology and Environment, Inc. Mr. Nordine represents the USEPA technical assistance team contractor. Litton Industries was represented by Mr. Mike Matilainen of Tighe & Bond, Inc. Tighe & Bond had been contracted by Litton to perform the Project Management for this project. Mike Matilainen would be the on-site Project Manager throughout the duration of this project.

All personnel signed in confirming their familiarity with the Site Specific Health and Safety Plan. All personnel then donned Level C protection and gain entry to the building. The structural integrity of the building was in question and all personnel were advised to exercise extreme caution. There was also a compactor pit which could be fallen into. CSES crew placed tires around this pit.

Throughout the course of work Mr. Matilainen performed ambient air sampling inside the entire building. The only areas of concern that were noted to CSES was an abandoned truck gasoline tank which exhibited detectable levels of hydrocarbons. Also, by mid-morning, high levels of carbon monoxide were detected. This was directly attributed to the fact that CSES was using a

mobilization so that there would not be any stockpiling at the site during the remediation phase of this project. Instead the material could be directly loaded onto a roll-off container for disposal. It was noted that the small amount of tires at the site would first have to be decontaminated prior to removal by a licensed tire recycler.

CSES also collected a sediment sample from within the manhole drain located at the bottom of the loading dock. This was taken as a background sample in order to ensure that this drain was not contaminated further during the actual remediation of this site.

RESULTS OF CLEANING TESTS

Wipe samples from cleaning tests were analyzed for lead and dioxin by Huntingdon Laboratories, St. Paul, MN. Analytical results are presented as Appendix A. It was evident that all cleaning tests performed reduced the lead and dioxin levels compared to those levels at time of initial testing. These were also below threshold levels previously established in the Project Manual bid specifications. Based upon conversations between Litton Industries, Tighe & Bond, and USEPA the most economical and efficient cleaning method selected was to hepa-vacuum all surfaces.

The proposed plan of action for the Lake Salvage Site was to hepa-vacuum all areas and raze all buildings at the site. This would be followed by a second hepa-vacuuming of the concrete floor and pad then apply an encapsulant to the surface. The plan was outlined in a Progress Report prepared by Mike Matilainen of Tighe & Bond dated May 25, 1995.

SITE DEMOLITION AND DECONTAMINATION

CSES mobilized to the site for a second time on June 12, 1995. First coarse of action was to establish area for both the site office trailer and decontamination trailer. Larry Lueck, Ecology and Environment, aided CSES crew in gaining access to the site. Workers donned Level C protection. A general cleanup of litter and rubbish was needed in order to allow the equipment and trailers access to the site. The office and decontamination trailers were both staged on the west side of the property. This area would later be established as the Clean Zone.

Fred Bartman, USEPA, arrived on site by mid morning. Mike Matilainen, Tighe & Bond, arrived shortly before noon. CSES Project Manager, Brian Copple, Larry Lueck, Bartman, and Matilainen had a brief meeting to discuss the schedule that had been established for this project. Today, CSES crew would just set up and establish site utilities and general cleanup of site. Fred Bartman did say that confirmatory samples would not have to be taken once this project was completed. It was also established that CSES had hired a private security company to secure the site after working hours as well as security 24 hours per day and 7 days a week.

By mid afternoon CSES crew had gained access to the building and had begun to remove the litter and the trash from within the building. This material was loaded directly onto a CSES roll-off container. The loose and residual dust was removed by a mist from a pressure washer. All trash and debris were removed in one roll-off container (40 cubic yards) and one end dump trailer (30 cubic yards). This will be taken to a regular sanitary landfill in Naperville, IL. Personal air sample today collected by worker Jim Duncan (Sample ID # LS-01). Analytical results from all personal air samples are presented in Appendix E.

On June 13 CSES began to raze the incinerators. Workers are again in Level C protection with full-face, air purifying respirators. Water is being used as dust suppressant while demolition is

gas powered air compressor on the interior of the building. Upon relocating this compressor outside the building, CO levels dropped to non-detectable levels inside the building.

CSES had previously selected 3 areas to perform cleaning test evaluations upon. This determination was based on prior wipe sampling results performed by Tighe & Bond. Based on the analytical results it was determined that these areas contained the greatest concentration of contamination. They were the "dirtiest". These areas are designated on the site map which is contained as Figure 1.

The first area was Area 1. Firstly, CSES personnel removed any loose debris and trash over an area of approximately 50 square feet. This area was gridded into 3 areas roughly 12 ft. x 12 ft. One 12 x 12 area was simply cleaned by means of a high pressure hot water wash. The second area was cleaned with a citrus based cleaner called Heavy Metal Cleaning Solution (HMCS-101), manufactured by Chemical Solutions, Houston, TX. The Material Safety Data Sheet (MSDS) for this material is located in Appendix H. This cleaner was poured liberally onto the surface at 100% concentration. Then it was aggressively scrubbed onto the surface and then allowed to set for approximately 30 minutes. Once this was allowed to set, the area was rinsed by a high pressure hot water rinse. All rinsate was collected by means of a wet dry vacuum and drummed for later disposal. The third gridded area was cleaned by means of a High Efficiency Particulate Air (HEPA) vacuum.

After the cleaning tests at Area 1 had been completed and the gridded areas were allowed to dry, a sample was collected for both lead and dioxin. This was accomplished with the use of a 100 square centimeter stainless steel template. (Sample IDs: Area1Vac1, Area1Wash1, Area1Chem1).

The second area tested was Area 8. This was a brick wall surface which during initial testing was found to have relatively high dioxin levels. Two cleaning tests were performed at this location. Two areas each 2 ft. x 2 ft. were gridded. A hepa-vacuum and chemical clean would be performed at this location. Once the chemical residual was washed and allowed to dry a wipe sample from each grid was taken for lead and dioxin. Due to the coarseness of this surface it presented a small problem in obtaining these wipe samples. (Sample IDs: Area8Vac8, Area8Chem8).

The third and last area that these cleaning methods were evaluated upon was Area 3. Area 3 was immediately adjacent to the incinerator. Power washing and scarification methods would be tested at this location. Scarification was accomplished by using wire brushes to remove the concrete surface. The gridded area here was simply the surface area of one concrete block (2 ft. x 3 ft.). Again, wipe samples were taken for both lead and dioxin from each cleaned area (Sample IDs: Area3Wash3, Area3Scar3).

Upon completion of work, all equipment utilized by CSES was decontaminated. All residues, personal protective equipment (PPE), and rinsate water were all placed into drums and appropriately labeled. These drums were then secured within the building.

CSES then collected samples from each representative waste stream. Mr. Phil Stephenson of Laidlaw Environmental Services came on site to aid in this waste characterization. The waste streams identified were: 1) incinerator ash and refractory; 2) block building demolition debris; 3) trash and litter. A sample from each waste stream was collected in order to determine the appropriate disposal method. This characterization would be obtained prior to the second

taking place. Incinerator braces are first cut by means of a torch and then are pulled over by a cable attached to the stack by a rubber tired front end loader. The stack to the west did not have any refractory or brick in it while the stack on the east had brick and refractory in about half of the stack. Once the incinerators were down, this material was stockpiled, adequately wetted and covered with visqueen over night.

There was a complication as to CSES receiving a demolition permit from the City of Chicago. A narrative is given of this complication in the Summary of Daily Logs presented in Appendix I.

Incinerator debris loadout began on June 14. Trucks from Dart Transport were on site that morning to begin loadout. All trucks were lined with 6 mil. Visqueen and loaded and weighed. Each truck received a manifest and proper placards were placed on each vehicle prior to leaving the site. Copies of Uniform Hazardous Waste Manifests are presented in Appendix C. Waste profile sheet and analytical results are presented in Appendix B. All truck weights along with corresponding manifests are tabulated in Table A . This waste had previously been profiled during the initial cleaning tests. The disposal facility for this waste was Laidlaw Environmental Services, Sarnia, Ontario, Canada (EPA ID # MIT270019904). This waste was first transported to Chem Met Services, Inc., Wyandotte, MI (EPA ID # MID096963194). There the trucks received new manifests to enter Canada. Only 3 trucks were on-site today. More trucks will be scheduled in for Saturday June 17.

Thursday June 15, the remainder of the compactor is cut off and dismantled. The compactor pit is then sealed with a metal plate. Scrap metal is being decontaminated by being rinsed with a pressure washer before being loaded onto roll-off for salvage.

The manhole drain in the loading dock is being cleaned out as well. Worker dons Level C protection along with a safety harness before entry. Confined space entry permit is filled out before worker gains access. Work area is really tight. Material is being removed by a means of a five-gallon bucket which is hoisted from the drain by a rope and then dumped into the bucket of a rubber tired loader. This sediment that is being cleaned out is stockpiled with the rest of the incinerator ash and refractory. Analytical results indicated this sediment contained high concentration of lead. At completion this manhole was approximately 10 feet deep.

Interior walls of the building are being hepa-vacuumed by remainder of crew. Work being accomplished in Level C protection. Hepa vacuums are equipped with a wand attachments with a bristle brush heads to vacuum any dust on interior walls and floors.

National Tire was on-site to pickup the tires at the site. The tires were simply rinsed off with a garden hose to remove the residual dust prior to loading. A count of the tires resulted in 403 passenger tires and 9 tractor-trailer tires. These will be used as a tire derived fuel for Wisconsin Power & Light. A receipt from National Tire can be found in Appendix F.

Friday June 16. USEPA representative Fred Bartman on site this morning. All pits and openings can be filled with crushed concrete blocks per instruction of Fred Bartman, USEPA. Fred also notes some incinerator ash along the alley on the south side of the property and along the fence to the east. CSES crew uses a backhoe to remove approximately 2" of material in the alley. This excavated soil will be stockpiled and disposed of with the remainder of the incinerator ash and refractory.

Building demolition begins. Workers using paper dust masks per direction of Mike Matilainen.

The wood roof and fiberglass insulation are very dusty despite the fact that water is still being used. Demolition of the building is very easily performed due to the poor structural integrity of the building. Building demolition debris is being segregated into two stockpiles. Wood roofing and conrete blocks. The wood roofing is being crushed and pulverized by means of backhoe bucket. This material is being loaded into CSES roll-off container for disposal at Greene Valley Landfill, Naperville, IL.

Saturday June 17. Mike Matilainen off site today. Transport trucks on-site. More incinerator ash and refractory will be loaded out today. Same procedure as before. Trucks are being lined with 6-mil Visqueen, loaded, weighed, covered, and placarded and manifested.

Building demolition continues today. Wooden roofing material is being chopped up with rear bucket of backhoe and loaded onto roll-off container.

Air sample results received from Huntingdon Laboratories. These results are presented in Appendix E. These results are below established levels. Use of air-purifying respirators (APR) provide adequate protection. All stockpiled incinerator ash and refractory will be covered with Visqueen prior to crew leaving site for weekend.

Monday June 19. Transport trucks on site again today. Load out of soil and incinerator ash / refractory. Building demolition continues with two CSES trucks being used to haul and dispose of construction and demolition debris.

Entire building is down by mid-afternoon. Fred Bartman, USEPA, on site today. Bartman is briefed on project status and expected completion date. Concrete on east side of property has been hepa-vacuumed and is prepared for encapsulation. L-B-C Lead Encapsulant is being applied straight. This material is not being diluted. It is liberally poured onto the concrete surface and applied to the surface with squeegees and brooms. An MSDS sheet for this encapsulant can be found in Appendix H. The approximate thickness of this material after it has dried is 4-5 mil.

Tuesday June 20. Hepa-vacuuming and encapsulation of concrete pad continues today. All pits and openings are being filled with crushed concrete building blocks. Final load of wood roofing being loaded and disposed today as well.

Larry Lueck and Mike Matilainen are collecting soil samples from the vacant lot on the west side of the Lake Salvage property.

More scrap metal is being hauled off for salvage after being rinsed. Galvanized fence on the north side of the property is being torn down and dismantled. Weight ticket receipts for all scrap metal that was salvaged can be found in Appendix F.

Hepa-vacuuming continuing on concrete pad surface. L-B-C Encapsulant being applied. Gravel is being hauled in by CSES to continue to fill low areas and to top dress the crushed block.

Wednesday June 21. Galvanized metal fence is down and dismantled. A. White, a local scrap iron hauler, was given the fence. A receipt was obtained for disposal. Remainder of concrete surfaces will be encapsulated by the end of the day. All material has been hauled off site and properly disposed. General cleanup of site will take place along with regrading the site.

CSES demobilized equipment and personnel from the site at the end of the day.

PROJECT SUMMARY

* INITIAL CLEANING TESTS

The initial cleaning tests performed indicated that all four cleaning tests performed (power washing, chemical cleaning, hepa-vacuuming, scarification) worked effectively to decontaminate the surfaces. The selected method for this cleanup and remediation was hepa-vacuuming.

* TRASH AND LITTER CLEANUP

A total of 78 cubic yards (23.62 tons) of trash and litter was collected and disposed of at this site.

* INCINERATOR ASH AND REFRACTORY DEMOLITION

A total of 148.92 tons of RCRA Hazardous Waste which included all incinerator ash and refractory were removed and disposed at the Lake Salvage Facility. This includes a small amount of soil excavation located in the south alley per USEPA direction. This total also includes all dust which was vacuumed by hepa-vacuums during building decontamination. This quantity also includes the sediment removed from the drain in the loading dock. Each load of material which was transported off site which gives corresponding weights and manifests numbers is tabulated in Table A.

* UTILITY CAPPING AND TERMINATION

All utilities had been previously capped and terminated prior to the commencement of any work. Contacts with the City of Chicago Water Department indicated that the service had been disconnected for sometime and that the service had been capped at the main which is located under Lake Street. Electric and phone service to the former site were serviced by over-head lines. These services had both been terminated at the service pole. The gas service to this facility had been cut off at the main on June 6, 1994 per conversation with Mr. Reardon with the People's Gas Company of Chicago. After CSES demobilized from the site there were still some pipes which were sticking out of the ground. CSES has since made arrangements to have these terminated below the ground surface.

*BUILDING DEMOLITION DEBRIS

A total of 402 cubic yards (134.49 tons) of building demolition debris was disposed of at Greene Valley Landfill, Naperville, IL. This material was categorized as a non-hazardous waste. The total volume of the building was calculated at 505 cubic yards. This total includes both the wood roofing material and the concrete block. Due to the fact that permission was given to use the concrete block as a filler for all voids and depressions in the concrete surface, it did not require disposal. The loading dock was filled with this crushed material. The volume of this loading dock was calculated at 103 cubic yards.

* ENCAPSULATION

A total surface area of 20,000 square feet of concrete was encapsulated with L-B-C Lead Encapsulant. This enitre area had previously been hepa-vacuumed prior to this application. After drying the layer of encapsulant was 4-6 mil thick.

* **CONFIRMATORY WIPE SAMPLES**

The initial work plan called for confirmatory wipe samples to be taken upon project completion but per USEPA instruction, these would not be necessary.

* **SITE RESTORATION**

Upon completion of all demolition and cleanup activities, the Lake Salvage Facility was vacuumed and encapsulated. All low areas, voids, and other depressions were filled with the crushed concrete block debris. These areas were then top dressed with CA-6 washed gravel. All perimeter fences were removed leaving the site completely leveled and vacant.

TABLE A

INCINERATOR ASH & REFRACTORY DISPOSAL
LAKE SALVAGE REMEDIATION

TRUCK #	MANIFEST	WEIGHT	DATE
DART 5400	LS-001	13.44 tons	6/14/95
DART 160	LS-002	15.82 tons	6/14/95
DART 9356	LS-003	10.78 tons	6/14/95
DART 9289	LS-004	20.12 tons	6/17/95
DART 9938	LS-005	22.16 tons	6/17/95
DART 9275	LS-006	20.57 tons	6/19/95
DART 9300	LS-007	23.39 tons	6/19/95
DART 9200	LS-008	22.64 tons	6/19/95
TOTALS		148.92 TONS *	

** This total includes 16.18 tons of excavated soil*

TABLE B
BUILDING DEBRIS WEIGHT TOTALS
LAKE SALVAGE REMEDIATION

TRUCK #	WEIGHT	YARDS	DATE
CSES 14	11.16 tons	36	6/16/95
CSES 14	12.09 tons	36	6/17/95
CSES 24	18.40 tons	42	6/17/95
CSES 24	10.33 tons	42	6/19/95
CSES 14	9.88 tons	36	6/19/95
CSES 24	10.63 tons	42	6/19/95
CSES 14	8.71 tons	36	6/19/95
CSES 14	11.01 tons	36	6/20/95
CSES 24	11.58 tons	42	6/20/95
CSES 14	18.68 tons	36	6/20/95
CSES 14	12.02 tons	36	6/21/95
TOTALS	134.49 TONS	402 CU. YDS.	

TABLE C

LITTER & TRASH TOTALS
LAKE SALVAGE REMEDIATION

TRUCK #	*WEIGHT*	*YARDS*	*DATE*
CSES 24	*10.3 tons*	*42*	*6/13/95*
CSES 14	*13.32 tons*	*36*	*6/13/95*
TOTALS	*23.62 TONS*	*78 CU. YDS*	

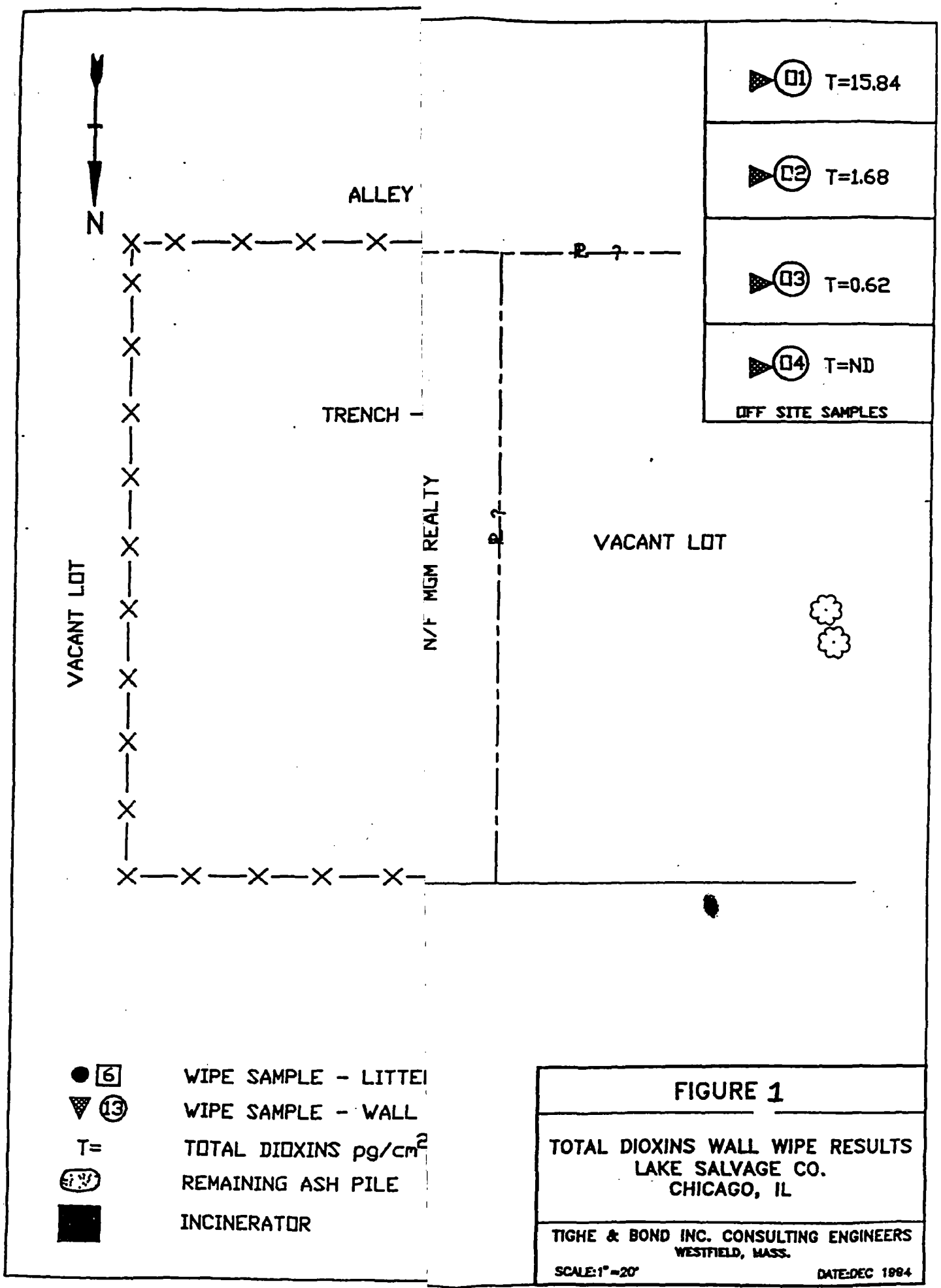

FIGURE 1

TOTAL DIOXINS WALL WIPE RESULTS
LAKE SALVAGE CO.
CHICAGO, IL

TIGHE & BOND INC. CONSULTING ENGINEERS
WESTFIELD, MASS.

SCALE:1"=20' DATE:DEC 1994

1/19/95 I:\MISC\C325BLG3

APPENDIX A

ANALYTICAL RESULTS
INITIAL CLEANING TESTS
LAKE SALVAGE REMEDIATION

Huntingdon

REPORT OF CHEMICAL ANALYSIS

Project: PCDD/PCDF/LEAD ANALYSES

Prepared for:

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REPORT OF: CHEMICAL ANALYSES

PROJECT: PCDD/PCDF/LEAD ANALYSES **DATE:** April 28, 1995

ISSUED TO: Central States Environmental Services
Attn: Mr. Brian Copple
609 Airport Road
Centralia, IL 62801

INVOICE NO: 4411 95-60084

INTRODUCTION

This report presents the results from the analyses performed on nine samples which were submitted by a representative of Central States Environmental Services. The samples were analyzed for the presence or absence of polychlorinated dibenzo-p-dioxins (PCDDs) and dibenzofurans (PCDFs) using a modified version of USEPA Method 8290 as described below. The wipe and solid samples were also analyzed for lead using USEPA Method 6010.

SAMPLE IDENTIFICATION

Client ID	Sample Type	Date Received	TCT ID
Area 1 Wash 1	Wipe	4/12/95	60234
Area 1 Chem 1	Wipe	4/12/95	60235
Area 1 Vac 1	Wipe	4/12/95	60236
Area 3 Wash 3	Wipe	4/12/95	60237
Area 3 Scar 3	Wipe	4/12/95	60238
Area 8 Vac 8	Wipe	4/12/95	60239
Area 8 Chem 8	Wipe	4/12/95	60240
Drain	Solid	4/12/95	60241
R-01	Liquid	4/14/95	60257

METHODOLOGY

PCDD/PCDF Wipe Sample Extraction

Each sample was spiked with $^{13}C_{12}$-labeled PCDD/PCDF internal standards (Table 1) and extracted for 18 hours with toluene in a Soxhlet extractor. The extract was quantitatively transferred to a Kuderna Danish concentrator, concentrated, and solvent exchanged to hexane. The hexane extract was then spiked with 2,3,7,8-TCDD-$^{37}Cl_4$ enrichment efficiency standard (Table 1) and processed through the analyte enrichment procedures described below.

PCDD/PCDF Solid Sample Extraction

A portion of the sample was spiked with $^{13}C_{12}$-labeled PCDD/PCDF internal standards (Table 1) and extracted for 18 hours with toluene in a Soxhlet extractor. The extract was quantitatively transferred to a Kuderna Danish concentrator, concentrated, and solvent exchanged to hexane. The hexane extract was then spiked with 2,3,7,8-TCDD-$^{37}Cl_4$ enrichment efficiency standard (Table 1) and processed through the analyte enrichment procedures described below. Moisture content was determined by taking a separate aliquot of the sample material to constant dry weight in an oven.

PCDD/PCDF Liquid Sample Extraction

A portion of the sample was diluted to 1-Liter with reagent water, spiked with $^{13}C_{12}$-labeled PCDD/PCDF internal standards (Table 1) and extracted with methylene chloride in a separatory funnel. The extract was quantitatively transferred to a Kuderna Danish concentrator, concentrated, and solvent exchanged to hexane. The hexane extract was then spiked with 2,3,7,8-TCDD-$^{37}Cl_4$ enrichment efficiency standard (Table 1) and processed through the analyte enrichment procedures described below.

PCDD/PCDF Analyte Enrichment

The extraction procedure often removes a variety of compounds, in addition to the PCDDs and PCDFs, from the sample matrix. Some of these compounds can directly interfere with the analyses while others can overload the capillary column causing degradation in chromatographic resolution or sensitivity. The analyte enrichment steps described below are used to remove interferences from the extracts.

Each extract was diluted to 100 mL with hexane, transferred to a separatory funnel, and washed with 1N sodium hydroxide, concentrated sulfuric acid, and aqueous sodium chloride (5% w/v) as needed. The hexane extract was quantitatively transferred to a liquid chromatography column containing alternating layers of silica gel, 40% concentrated sulfuric acid on silica gel, and 33% 1 N sodium hydroxide on silica gel. The column was eluted with 90 mL of hexane and the entire eluate was collected and concentrated, under ambient conditions, to a volume of 1 mL.

The extract was then fractionated on a liquid chromatography column containing 4 g of activated alumina. The column was eluted with 20 mL of hexane followed by 15 mL of 60% methylene chloride/hexane. The 60% methylene chloride/hexane fraction was concentrated to 1 mL under a stream of dry nitrogen and applied to the top of a chromatography column containing 1 g of 8% AX-21 activated carbon in silica gel. The column was eluted with two 2 mL portions of hexane, 2 mL of cyclohexane/methylene chloride (50:50 v/v) and cyclohexane/methanol/toluene (75:20:5 v/v) in the forward direction, and then with toluene in the reverse direction. The toluene fraction was collected, spiked with recovery standards (1,2,3,4-TCDD-$^{13}C_{12}$ and 1,2,3,7,8,9-HxCDD-$^{13}C_{12}$) and concentrated to a final volume of 20 uL.

PCDD/PCDF Analyses

The sample extracts were analyzed for the presence of PCDDs and PCDFs using combined capillary column gas chromatography/high resolution mass spectrometry (HRGC/HRMS). The instrumentation consisted of a Hewlett Packard Model 5890 gas chromatograph interfaced to a VG Model 70SE high resolution mass spectrometer. The capillary column was interfaced directly into the ion source of the mass spectrometer, thus providing the highest possible sensitivity while minimizing degradation of the chromatographic resolution.

The mass spectrometer was operated in the electron impact ionization mode at a mass resolution of 10,000-11,000 (M/ΔM, 10 percent valley definition). This resolution is sufficient to resolve most interferences, such as PCBs, thus providing the highest level of confidence that the detected levels of PCDD/PCDF were not false positives resulting from interferences. Typical operating parameters for the HRGC/HRMS analyses are summarized in Table 2.

The data were acquired by selected-ion-recording (SIR) using groups of ion masses similar to those described in USEPA Method 8290. The five groups corresponded to the tetrachlorinated through octachlorinated congener classes. Each group contained two ion masses for the PCDDs, two ion masses for the PCDFs, the corresponding ion masses from the two isotopically labeled internal standards, and the ion mass characteristic of the polychlorinated diphenylether (PCDE) which, if present, could cause false responses in the dibenzofuran channels.

Each group of ion masses also contained a lock mass which was used by the data system to automatically correct the mass focus of the instrument. The data system determined the centroid of the lock mass during each data acquisition cycle and corrected the mass focus of the analyte and internal standard ion masses to assure that the centers of the mass peaks were being monitored.

The criteria used to judge positive responses for a PCDD/PCDF isomer included:

* Simultaneous response at both ion masses of the PCDD or PCDF
* Signal-to-noise ratio equal to or greater than 2.5:1.0 for both ion masses
* Chlorine isotope ratio within 15% of the theoretical value
* Chromatographic retention time within +/- 2 seconds of the expected retention time
* Chromatographic retention times within elution windows determined from analyses of standard mixtures
* Absence of simultaneous response in the PCDF and PCDPE ion traces

A list of the exact ion masses monitored for the determination of PCDD/PCDF isomers and the PCDE interferences is presented in Table 3. Also included are the theoretical chlorine isotope ratios for the ten congener classes.

PCDD/PCDF Quantification and Calculations

The PCDD/PCDF isomers were quantified by comparison of their responses to the responses of the labeled internal standards. Relative response factors were calculated from analyses of standard mixtures containing representatives of each of the PCDD/PCDF congener classes at five concentration levels, and each of the internal standards at one concentration level, as shown in Table 4. The PCDD/PCDF response factors were calculated by comparing the sum of the responses from the two ion masses monitored for each chlorine congener class to the sum of the responses from the two ion masses of the corresponding isotopically labeled internal standard. The formula for the response factor calculation is:

$$Rf = \frac{An \times Qis}{Ais \times Qn}$$

where:

Rf = Response factor
An = Sum of integrated areas for native isomer
Qis = Quantity of labeled internal standard
Ais = Sum of integrated areas for labeled internal standard
Qn = Quantity of native isomer

The levels of PCDD/PCDF in the samples were quantified using the following equation:

$$C = \frac{An \times Qis}{Ais \times W \times Rf}$$

where:

C = Concentration of target isomer or congener class
An = Sum of integrated areas for the target isomer or congener class
Qis = Quantity of labeled internal standard added to the sample
Ais = Sum of integrated areas for the labeled internal standard
W = Sample amount
Rf = Response factor

PCDD/PCDF Quantification and Calculations (Cont.)

Each pair of ion mass peaks in the selected-ion-current chromatograms was evaluated manually to determine if it met the criteria for a PCDD or PCDF isomer. Areas of all peaks exhibiting correct ion ratios, having retention times within the correct windows, and having areas corresponding to concentrations in the range covered by the initial calibration were then summed for calculations of total congener concentrations.

A limit of detection (LOD) based on producing a signal that is 2.5 times the noise level, was calculated for each undetected 2,3,7,8-substituted isomer of any tetra through octa chlorinated congener class. The noise heights used to calculate the detection limits were measured at the retention time of the specific isomer. The formula used for calculating the LOD is:

$$LOD = \frac{Hn \times Qis \times 2.5}{His \times W \times Rf}$$

where:

LOD = Single isomer limit of detection
Hn = Sum of noise heights at native isomer retention time
Qis = Quantity of labeled internal standard
His = Sum of peak heights for labeled internal standard
W = Sample amount
Rf = Response factor

The recovery of the 2,3,7,8-TCDD-$^{37}Cl_4$ enrichment efficiency standard and each $^{13}C_{12}$-labeled internal standard, relative to either 1,2,3,4-TCDD-$^{13}C_{12}$ or 1,2,3,7,8,9-HxCDD-$^{13}C_{12}$, was calculated using the following equation:

$$\%R = \frac{Ais \times Qrs \times 100\%}{Rfr \times Ars \times Qis}$$

where:

%R = Percent recovery of labeled internal standard
Ais = Sum of integrated areas of labeled internal standard
Qrs = Quantity of recovery standard
Ars = Sum of integrated areas of recovery standard
Rfr = Response factor of the specific labeled internal standard relative to the recovery standard
Qis = Quantity of the labeled internal standard congener added to the sample

Quality Control for PCDD/PCDF Analyses

The performance of the sample processing steps and the instrumentation are monitored on a routine basis. The procedures and criteria are summarized below.

One method blank and one laboratory spike sample are typically prepared with each ten samples of any given matrix. The recoveries of the native PCDD/PCDF analytes in the laboratory spike samples generally range from 70 to 130%. Recoveries of selected analytes outside this range do not invalidate the data but provide information which is used by the laboratory to monitor recovery trends and to assure optimization of the method.

Internal standards are spiked into each sample prior to extraction in order to monitor the level of recovery which is achieved for each individual sample. Acceptable recoveries range from 40 to 135 percent for the internal standards unless a deviation is due to variation in instrument response as a result of analytical interferences.

The resolution of the mass spectrometer is verified prior to each analysis to be 10,000 or greater. Hardcopies of the reference peaks are printed at the beginning and end of each analysis day. The resolving power of the DB-5 chromatographic column is checked daily by analyzing a standard solution containing 2,3,7,8-TCDD and the adjacent TCDD isomers. DB-DIOXIN column resolution is checked daily by analyzing a standard solution containing 2,3,7,8-TCDF and the adjacent TCDF isomers. Acceptable performance is achieved when 2,3,7,8-TCDD or 2,3,7,8-TCDF is resolved from the adjacent isomers by a valley of 25% or less. The group times for the selected-ion-monitoring data acquisitions are also checked daily by analyzing the column performance mix which has been modified to contain the first and last eluting isomers of each congener class. In this way one is assured of collecting data representative of the total PCDD/PCDF content and that the 2,3,7,8-substituted isomers are suitably resolved.

REPORT OF: CHEMICAL ANALYSES

PROJECT: PCDD/PCDF/LEAD ANALYSES DATE: April 28, 1995

 INVOICE NO: 4411 95-60084

Quality Control for PCDD/PCDF Analyses (Cont.)

Initial calibrations are generated by analyzing standard solutions (see Table 4) containing target native and labeled PCDD/PCDF compounds. Response factors are calculated and averaged for each compound. These averages are used for quantification and for comparison to the daily continuing calibration. The relative standard deviation for each native compound must be 20% or less (30% or less for the labeled compounds) as specified in Method 8290. A continuing calibration standard is analyzed at the beginning and end of each 12-hour shift on days when initial calibrations are not performed. The initial calibration is considered to be valid when the response factors from the continuing calibration analysis agree to within +/- 20% (+/- 30% for the labeled compounds) of the averages from the initial calibration.

Lead Analyses

The wipe and solid samples were analyzed for lead content according to USEPA SW-846 Method 6010

RESULTS

The results from the analyses are presented in the following:

Appendix A - Chain of Custody Documentation
Appendix B - PCDD/PCDF Analysis Results
Appendix C - Lead Analysis Results

DISCUSSION

PCDD/PCDF Analyses

The recoveries of the isotopically-labeled PCDD/PCDF internal standards in the wipe, solid, and liquid sample extracts generally ranged from 42-93%, indicating levels of efficiency through the extraction and enrichment steps that are considered typical for these sample matrix types. Somewhat lower recoveries (24-50%) were obtained for the internal standards in sample "Area 8 Chem 8", and also for the tetra-chlorinated internal standards (24-35%) in "Area 3 Wash 3" and the associated laboratory blank and spike samples. Internal standard recoveries less than 40% were below the target range specified for Method 8290. However, since the quantifications of the native 2,3,7,8-substituted isomers were based on isotope dilution, the data were automatically corrected for variation in recovery and accurate values were obtained.

The samples were found to contain polychlorinated diphenylethers (PCDPEs), substances which can produce false positives for PCDFs. Those PCDFs exhibiting simultaneous responses in the PCDPE ion channels were omitted from the calculations due to the possibility that the furan was an artifact produced from the PCDPE. The detection limits for any affected 2,3,7,8-substituted isomers were therefore, elevated.

REPORT OF: CHEMICAL ANALYSES

PROJECT: PCDD/PCDF/LEAD ANALYSES DATE: April 28, 1995

 INVOICE NO: 4411 95-60084

DISCUSSION (Cont.)

The "Drain" sample contained interfering substances which obscured the response for the $^{37}Cl_4$-2,3,7,8-TCDD enrichment efficiency standard. Therefore, an accurate measurement of this standard in this sample could not be obtained.

A laboratory method blank was prepared and analyzed with each sample batch as part of our routine quality control procedures. The results, found at the beginning of Appendix B, show the blanks associated with the solid and wipe sample batches to contain trace background levels (8-43 picograms/isomer) of selected PCDDs and PCDFs. These were all below the instrument calibration ranges. The levels reported for the affected isomers in the samples were one or more orders of magnitude higher than the corresponding method blank levels, indicating that the sample processing steps did not contribute significantly to the levels reported for the actual samples.

A laboratory spike sample was prepared with each batch by extracting reagent matrix that had been fortified with native standard materials. The results, included at the end of Appendix B, show that the spiked native compounds were recovered at 80-126%, indicating a high degree of accuracy for these determinations.

Lead Analyses

The matrix spike prepared with the lead samples showed a recovery of 100%. The method blank, prepared from clean wipe gauze material, was found to contain lead at 1.4 ug/sample. The levels of lead found in the samples ranged from 8-9000 times higher than the level in the blank.

REMARKS

The sample extracts will be retained for a period of 60 days from the date of this report and then discarded unless other arrangements are made. The raw mass spectral data will be archived on magnetic tape for a period of not less than one year. Questions regarding the data contained in this report may be directed to the authors at the numbers provided below.

HUNTINGDON ENGINEERING & ENVIRONMENTAL, INC.

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SWH/CVS/lml

TABLE 1. Spike Levels of PCDD/PCDF Standards

Internal Standards	Spike Level (ng)
2,3,7,8-TCDF-$^{13}C_{12}$	2.0
2,3,7,8-TCDD-$^{13}C_{12}$	2.0
1,2,3,7,8-PeCDF-$^{13}C_{12}$	2.0
2,3,4,7,8-PeCDF-$^{13}C_{12}$	2.0
1,2,3,7,8-PeCDD-$^{13}C_{12}$	2.0
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	2.0
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	2.0
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	2.0
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	2.0
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	2.0
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	2.0
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	2.0
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	2.0
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	2.0
OCDD-$^{13}C_{12}$	4.0
Recovery Standards	
1,2,3,4-TCDD-$^{13}C_{12}$	2.0
1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	2.0
Enrichment Efficiency Standard	
2,3,7,8-TCDD-$^{37}Cl_4$	0.2

TABLE 2. High Resolution PCDD/PCDF Analyses
HRGC/HRMS Operating Parameters

Mass Resolution	10,000-11,000 (M/ΔM, 10% valley)
Electron Energy	32 electron volts
Accelerating Voltage	8,000 volts
Source Temperature	275°C
Preamplifier Gain	10^{-6} amp/volt
Multiplier Gain	~10^{5}
Chromatographic Column	60 M DB-5
Transfer Line Temperature	260°C
Injection Mode	Splitless
Carrier Gas	Helium
Carrier Flow Velocity	~30 cm/sec

TABLE 3. Exact Ion Masses Monitored for the Determination of PCDDs, PCDFs, and PCDPEs

Compound	Accurate Mass Mass 1	Accurate Mass Mass 2	Theoretical Ratio Mass 1/Mass 2
Tetra-CDDs	319.8965	321.8936	0.77
Tetra-CDFs	303.9016	305.8987	0.77
Hexa-CDPEs	375.8364		
Penta-CDDs	355.8546	357.8517	1.54
Penta-CDFs	339.8597	341.8567	1.54
Hepta-CDPEs	409.7974		
Hexa-CDDs	389.8156	391.8127	1.23
Hexa-CDFs	373.8207	375.8178	1.23
Octa-CDPEs	445.7555		
Hepta-CDDs	423.7766	425.7737	1.03
Hepta-CDFs	407.7817	409.7788	1.03
Nona-CDPEs	479.7165		
Octa-CDD	457.7377	459.7347	0.88
Octa-CDF	441.7428	443.7398	0.88
Deca-CDPE	513.6775		

CDDs = Chlorinated Dibenzo-p-dioxins
CDFs = Chlorinated Dibenzofurans
CDPEs = Chlorinated Diphenylethers

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TABLE 4. High Resolution Calibration Solutions

	Concentration (pg/uL)				
Native CDDs/CDFs	**CS1**	**CS2**	**CS3**	**CS4**	**CS5**
2,3,7,8-TCDD	0.5	2	10	40	200
2,3,7,8 TCDF	0.5	2	10	40	200
1,2,3,7,8-PeCDD	2.5	10	50	200	1000
1,2,3,7,8-PeCDF	2.5	10	50	200	1000
2,3,4,7,8-PeCDF	2.5	10	50	200	1000
1,2,3,4,7,8-HxCDD	2.5	10	50	200	1000
1,2,3,6,7,8-HxCDD	2.5	10	50	200	1000
1,2,3,7,8,9-HxCDD	2.5	10	50	200	1000
1,2,3,4,7,8-HxCDF	2.5	10	50	200	1000
1,2,3,6,7,8-HxCDF	2.5	10	50	200	1000
1,2,3,7,8,9-HxCDF	2.5	10	50	200	1000
2,3,4,6,7,8-HxCDF	2.5	10	50	200	1000
1,2,3,4,6,7,8-HpCDD	2.5	10	50	200	1000
1,2,3,4,6,7,8-HpCDF	2.5	10	50	200	1000
1,2,3,4,7,8,9-HpCDF	2.5	10	50	200	1000
OCDD	5.0	20	100	400	2000
OCDF	5.0	20	100	400	2000
Internal Standards					
2,3,7,8-TCDD-$^{13}C_{12}$	100	100	100	100	100
2,3,7,8-TCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,7,8-PeCDD-$^{13}C_{12}$	100	100	100	100	100
1,2,3,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100
2,3,4,7,8-PeCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,4,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100
1,2,3,6,7,8-HxCDD-$^{13}C_{12}$	100	100	100	100	100
1,2,3,4,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,7,8,9-HxCDF-$^{13}C_{12}$	100	100	100	100	100
2,3,4,6,7,8-HxCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,4,6,7,8-HpCDD-$^{13}C_{12}$	100	100	100	100	100
1,2,3,4,6,7,8-HpCDF-$^{13}C_{12}$	100	100	100	100	100
1,2,3,4,7,8,9-HpCDF-$^{13}C_{12}$	100	100	100	100	100
OCDD-$^{13}C_{12}$	200	200	200	200	200
Recovery Standards					
1,2,3,4-TCDD-$^{13}C_{12}$	100	100	100	100	100
1,2,3,7,8,9-HxCDD-$^{13}C_{12}$	100	100	100	100	100
Enrichment Efficiency Standard					
2,3,7,8-TCDD-$^{37}C1_4$	0.5	2	10	40	200

TABLE 5. 2,3,7,8-TCDD Equivalency Factors (TEFs) for the Polychlorinated Dibenzodioxins and Dibenzofurans

Number	Compound(s)	TEF
1	2,3,7,8-TCDD	1.00
2	1,2,3,7,8-PeCDD	0.50
3	1,2,3,6,7,8-HxCDD	0.1
4	1,2,3,7,8,9-HxCDD	0.1
5	1,2,3,4,7,8-HxCDD	0.1
6	1,2,3,4,6,7,8-HpCDD	0.01
7	OCDD	0.001
8	* Total - TCDD	0.0
9	* Total - PeCDD	0.0
10	* Total - HxCDD	0.0
11	* Total - HpCDD	0.0
12	2,3,7,8-TCDF	0.10
13	1,2,3,7,8-PeCDF	0.05
14	2,3,4,7,8-PeCDF	0.5
15	1,2,3,6,7,8-HxCDF	0.1
16	1,2,3,7,8,9-HxCDF	0.1
17	1,2,3,4,7,8-HxCDF	0.1
18	2,3,4,6,7,8-HxCDF	0.1
19	1,2,3,4,6,7,8-HpCDF	0.01
20	1,2,3,4,7,8,9-HpCDF	0.01
21	OCDF	0.001
22	* Total - TCDF	0.0
23	* Total - PeCDF	0.0
24	* Total - HxCDF	0.0
25	* Total - HpCDF	0.0

*Excluding the 2,3,7,8-substituted congeners.

Reference: 1989 ITEFs

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PHONE 612/659-7555

ACIV 600073

HAN 60084

Chuck Sueper 612 659-7520
TCT CONTACT

LAKE SALVAGE
PROJECT NAME

5546
CLIENT P.O. # / PROJECT NO.

CENTRAL STATES ENV. / P.O. BOX 684 / CENTRALIA, IL 62801
BILL TO (CO. NAME, ADDRESS)

CLIENT
REPORT TO

CENTRAL STATES ENVIRONMENTAL SERV.
CLIENT NAME

609 AIRPORT RD.
CLIENT ADDRESS (STREET NUMBER, SUITE, ETC.)

CENTRALIA, IL 62801
CLIENT ADDRESS (CITY, STATE, ZIP)

BRIAN COPPLE 618-532-4784
CLIENT CONTACT/ADDRESS IF DIFFERENT FROM ABOVE PHONE

BRIAN COPPLE [signature]
SAMPLED BY PRINT NAME/SIGNATURE

POSSIBLE HAZARD: YES X UNKNOWN ____ (COMMENT BELOW)

SAMPLE DISPOSAL: RETURN TO CLIENT ____ DISPOSAL BY LAB X
(ADDITIONAL CHARGES MAY BE ASSESSED)

TCT USE ONLY
PROJ. MGR.
PRIORITY
INVOICE #
JOB NAME
CUSTODY SEAL INTACT/NUMBER Y/N
TEMPERATURE OF CONTAINER 14°C
SAMPLE CONDITION INTACT *

PREPAY Y/N
CHECK NO.
CHECK AMOUNT

ANALYSES REQUEST

FILTERED (YES/NO)
PRESERVED (CODE)
REFRIGERATED (Y/N)

CODE A - NONE
B - HNO3
C - H_2SO_4
D - NaOH
E - HCl
F - ____

dioxin 8290
~~PCBS 8080~~

ITEM NO.	CLIENT SAMPLE ID.	MATRIX	DATE SAMPLED	TIME SAMPLED	dioxin 8290	~~PCBS 8080~~							NO. OF CONTAINERS	CONTAINER TYPE	TCT NO.
1	AREA 1 WASH 1	WIPE	4/10/95		X								1	8oz glass	60234
✓ 2	AREA 1 CHEM 1				X										60235
✓ 3	AREA 1 VAC 1				X										60236
✓ 4	AREA 3 WASH 3				X										60237
✓ 5	AREA 3 SCAR 3				X										60238
✓ 6	AREA 8 VAC 8				X										60239
✓ 7	AREA 8 CHEM 8				X										60240
✓ 8	DRAIN *	SOL			X										60241
9															
10															

Additional Comments	RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
DIOXIN CARRIER — HEXANE	[signature] / CSES	4/11/95	1645	[signature]	4/12/95	0930
* THIS SAMPLE CONTAINER HAD LEAKED SOMEWHAT. SWH 4/12/95						

* SEE REVERSE SIDE FOR INSTRUCTIONS

HC. 60-73 HAI F-C OD EC HPN 60084 TC. NO. 52028

corporation

737 PELHAM AVENUE
DOCK 4
ST. PAUL, MN 55114
PHONE 612/659-7555

Chuck Sueper 612 659-7520
TCT CONTACT

LAKE SALVAGE
PROJECT NAME

5546
CLIENT P.O. # / PROJECT NO.

CENTRAL STATES ENV. SERV / P.O. BOX 684 / CENTRALIA, IL 62801
BILL TO (CO. NAME, ADDRESS)

CLIENT
REPORT TO

CENTRAL STATES ENVIRONMENTAL
CLIENT NAME

609 AIRPORT ROAD
CLIENT ADDRESS (STREET NUMBER, SUITE, ETC.)

CENTRALIA, IL 62801
CLIENT ADDRESS (CITY, STATE, ZIP)

BRIAN COPPLE 618-532-4784
CLIENT CONTACT/ADDRESS IF DIFFERENT FROM ABOVE PHONE

BRIAN COPPLE [signature]
SAMPLED BY PRINT NAME/SIGNATURE

POSSIBLE HAZARD: YES ____ UNKNOWN ____ (COMMENT BELOW)

SAMPLE DISPOSAL: RETURN TO CLIENT ____ DISPOSAL BY LAB X
(ADDITIONAL CHARGES MAY BE ASSESSED)

TCT USE ONLY	
PROJ. MGR.	
PRIORITY	
INVOICE #	
JOB NAME	
CUSTODY SEAL INTACT/NUMBER Y/N	
TEMPERATURE OF CONTAINER	14°C
SAMPLE CONDITION	INTACT *

PREPAY Y/N	
CHECK NO.	
CHECK AMOUNT	

ANALYSES REQUEST

FILTERED (YES/NO)
PRESERVED (CODE)
REFRIGERATED (Y/N)

CODE A - NONE
B - HNO3
C - H_2SO_4
D - NaOH
E - HCl
F - ____

Lead

ITEM NO.	CLIENT SAMPLE ID.	MATRIX	DATE SAMPLED	TIME SAMPLED								NO. OF CONTAINERS	CONTAINER TYPE	TCT NO.
1	AREA 1 WASH 1 **	WIPE	4/10/95		X							1	8oz glass	
2	AREA 1 CHEM 1				X							1		
3	AREA 1 VAC 1				X							1		
4	AREA 3 SCAR 3				X							1		
5	AREA 3 WASH 3				X							1		
6	AREA 8 VAC 8				X							1		
7	AREA 8 CHEM 8				X							1		
8	DRAIN *	SOL			X							1		
9														
10														

Additional Comments

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
[signature] / CSES	4/11/95	1645	[signature] / HEE	4/12/95	0930

* THIS SAMPLE CONTAINER HAD LEAKED SOMEWHAT
RWH 4/12/95

** THE SECOND CONTAINER, WHICH CONTAINED HEXANE VAPORS, WAS MARKED FOR DIOXIN ANALYSIS RWH 4/12/95

corporation

737 PELHAM AVENUE
DOCK 4
ST. PAUL, MN 55114
PHONE 612/659-7555

Chuck Sweper 612 659-7520
TCT CONTACT

CENTRAL STATES ENVIRONMENTAL SERV
CLIENT NAME

509 AIRPORT RD.
CLIENT ADDRESS (STREET NUMBER, SUITE, ETC.)

CENTRALIA, IL 62801
CLIENT ADDRESS (CITY, STATE, ZIP)

BRIAN COPPLE 618-532-4784
CLIENT CONTACT/ADDRESS IF DIFFERENT FROM ABOVE PHONE

BRIAN COPPLE
SAMPLED BY PRINT NAME/SIGNATURE

PROJECT NAME 5546
CLIENT P.O. # / PROJECT NO.

BILL TO (CO. NAME, ADDRESS)

REPORT TO

TCT USE ONLY	
PROJ. MGR.	
PRIORITY	
INVOICE #	
JOB NAME	HPN 60084
CUSTODY SEAL INTACT/NUMBER Y/N	
TEMPERATURE OF CONTAINER	9°C
SAMPLE CONDITION	INTACT
PREPAY Y/N	
CHECK NO.	
CHECK AMOUNT	

ANALYSES REQUEST

FILTERED (YES/NO)
PRESERVED (CODE)
REFRIGERATED (Y/N)

CODE A - NONE
B - HNO3
C - H_2SO_4
D - NaOH
E - HCl
F - _____

POSSIBLE HAZARD: YES X UNKNOWN ____ (COMMENT BELOW)

SAMPLE DISPOSAL: RETURN TO CLIENT ____ DISPOSAL BY LAB X
(ADDITIONAL CHARGES MAY BE ASSESSED)

ITEM NO.	CLIENT SAMPLE ID.	MATRIX	DATE SAMPLED	TIME SAMPLED	Dioxin 8290	PCB 8080	NO. OF CONTAINERS	CONTAINER TYPE	TCT NO.
1	AREA 1 WASH 1	WIPE	4/10/95		X		1	8oz glass	
2	AREA 1 CHEM 1				X				
3	AREA 1 VAC 1				X				
4	AREA 3 WASH 3				X				
5	AREA 3 SCAR 3				X				
6	AREA 8 VAC 8				X				
7	AREA 8 CHEM 8				X				
8	DRAIN	SOL			X				
9									
10	R-01	LIQ	4/10/95		X		1	1L GLASS	60257

Additional Comments

DIOXIN CARRIER — HEXANE

NOTE HOLD TIME
PLEASE ADD TO C-of-C

RELINQUISHED BY / AFFILIATION	DATE	TIME	ACCEPTED BY / AFFILIATION	DATE	TIME
Brian Copple / CSES	4/11/95	1645			
[illegible]	4/11/95	1700	[illegible] / HSE	4/14/95	1030

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

TCT Sample ID.....BLANK-555
Analysis Date.....4/20/95 10:59
Filename.....S50420D
Injected By.....MJK
Total Amount Extracted...0.0100 kg
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50420B
Method Blank ID.....NA
Extraction Date.....4/17/95

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg
2378-TCDF	ND	0.88
TOTAL TCDF	ND	-----
2378-TCDD	ND	0.44
TOTAL TCDD	ND	-----
12378-PeCDF	1.10	-----
23478-PeCDF	ND	0.68
TOTAL PeCDF	1.10	-----
12378-PeCDD	ND	0.57
TOTAL PeCDD	ND	-----
123478-HxCDF	1.80	-----
123678-HxCDF	0.75	-----
234678-HxCDF	0.97	-----
123789-HxCDF	ND	1.20
TOTAL HxCDF	5.40	-----
123478-HxCDD	ND	0.70
123678-HxCDD	ND	0.78
123789-HxCDD	ND	0.59
TOTAL HxCDD	ND	-----
1234678-HpCDF	3.30	-----
1234789-HpCDF	0.94	-----
TOTAL HpCDF	4.20	-----
1234678-HpCDD	0.82	-----
TOTAL HpCDD	0.82	-----
OCDF	4.30	-----
OCDD	2.60	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	45
2378-TCDD-13C....	2.00	51
12378-PeCDF-13C..	2.00	60
23478-PeCDF-13C..	2.00	66
12378-PeCDD-13C..	2.00	67
123478-HxCDF-13C.	2.00	55
123678-HxCDF-13C.	2.00	56
234678-HxCDF-13C.	2.00	61
123789-HxCDF-13C.	2.00	69
123478-HxCDD-13C.	2.00	68
123678-HxCDD-13C.	2.00	56
1234678-HpCDF-13C	2.00	68
1234789-HpCDF-13C	2.00	71
1234678-HpCDD-13C	2.00	71
OCDD-13C.....	4.00	93
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	54

Total 2378-TCDD
Equivalence: 0.46 ng/kg
(Using ITE Factors/DB-5 Data)

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

TCT Sample ID.....BLANK-557
Analysis Date.....4/21/95 11:41
Filename.....S50421D
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....NA
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	ND	0.0077
TOTAL TCDF	ND	-----
2378-TCDD	ND	0.0160
TOTAL TCDD	ND	-----
12378-PeCDF	ND	0.0064
23478-PeCDF	ND	0.0075
TOTAL PeCDF	ND	-----
12378-PeCDD	ND	0.0074
TOTAL PeCDD	ND	-----
123478-HxCDF	ND	0.0024
123678-HxCDF	ND	0.0048
234678-HxCDF	0.0053	-----
123789-HxCDF	ND	0.0067
TOTAL HxCDF	0.0053	-----
123478-HxCDD	ND	0.0058
123678-HxCDD	ND	0.0064
123789-HxCDD	ND	0.0050
TOTAL HxCDD	ND	-----
1234678-HpCDF	ND	0.0023
1234789-HpCDF	ND	0.0046
TOTAL HpCDF	ND	-----
1234678-HpCDD	ND	0.0053
TOTAL HpCDD	ND	-----
OCDF	ND	0.0039
OCDD	0.0073	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	27
2378-TCDD-13C....	2.00	34
12378-PeCDF-13C..	2.00	56
23478-PeCDF-13C..	2.00	65
12378-PeCDD-13C..	2.00	66
123478-HxCDF-13C.	2.00	59
123678-HxCDF-13C.	2.00	61
234678-HxCDF-13C.	2.00	66
123789-HxCDF-13C.	2.00	74
123478-HxCDD-13C.	2.00	73
123678-HxCDD-13C.	2.00	58
1234678-HpCDF-13C	2.00	80
1234789-HpCDF-13C	2.00	96
1234678-HpCDD-13C	2.00	95
OCDD-13C.....	4.00	90
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	28

Total 2378-TCDD
Equivalence: 0.0005 ng/sample
(Using ITE Factors/DB-5 Data)

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

TCT Sample ID.....BLANK-561
Analysis Date.....4/27/95 11:23
Filename.....S50427C
Injected By.....DGP
Total Amount Extracted... 1.00 L
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50427B
Method Blank ID.....NA
Extraction Date.....4/24/95

NATIVE ISOMERS	CONC. ng/L	LOD ng/L
2378-TCDF	ND	0.0050
TOTAL TCDF	ND	-----
2378-TCDD	ND	0.0037
TOTAL TCDD	ND	-----
12378-PeCDF	ND	0.0069
23478-PeCDF	ND	0.0051
TOTAL PeCDF	ND	-----
12378-PeCDD	ND	0.0092
TOTAL PeCDD	ND	-----
123478-HxCDF	ND	0.0034
123678-HxCDF	ND	0.0079
234678-HxCDF	ND	0.0073
123789-HxCDF	ND	0.0081
TOTAL HxCDF	ND	-----
123478-HxCDD	ND	0.0100
123678-HxCDD	ND	0.0061
123789-HxCDD	ND	0.0055
TOTAL HxCDD	ND	-----
1234678-HpCDF	ND	0.0050
1234789-HpCDF	ND	0.0040
TOTAL HpCDF	ND	-----
1234678-HpCDD	ND	0.0056
TOTAL HpCDD	ND	-----
OCDF	ND	0.0044
OCDD	ND	0.0110

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	67
2378-TCDD-13C....	2.00	70
12378-PeCDF-13C..	2.00	75
23478-PeCDF-13C..	2.00	73
12378-PeCDD-13C..	2.00	70
123478-HxCDF-13C.	2.00	73
123678-HxCDF-13C.	2.00	69
234678-HxCDF-13C.	2.00	78
123789-HxCDF-13C.	2.00	81
123478-HxCDD-13C.	2.00	79
123678-HxCDD-13C.	2.00	77
1234678-HpCDF-13C	2.00	79
1234789-HpCDF-13C	2.00	69
1234678-HpCDD-13C	2.00	72
OCDD-13C.....	4.00	70
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	67

Total 2378-TCDD
Equivalence: 0.0000 ng/L
(Using ITE Factors/DB-5 Data)

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
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Client's Sample ID.....AREA 1 WASH 1
TCT Sample ID.....60234
Analysis Date.....4/21/95 12:51
Filename.....S50421E
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.570 *	-----
TOTAL TCDF	4.500	-----
2378-TCDD	0.011	-----
TOTAL TCDD	0.350	-----
12378-PeCDF	0.890	-----
23478-PeCDF	0.570	-----
TOTAL PeCDF	5.100	-----
12378-PeCDD	ND	0.085
TOTAL PeCDD	0.320	-----
123478-HxCDF	1.900	-----
123678-HxCDF	0.830	-----
234678-HxCDF	0.950	-----
123789-HxCDF	0.410	-----
TOTAL HxCDF	8.400	-----
123478-HxCDD	0.082	-----
123678-HxCDD	0.190	-----
123789-HxCDD	0.110	-----
TOTAL HxCDD	1.700	-----
1234678-HpCDF	5.100	-----
1234789-HpCDF	1.100	-----
TOTAL HpCDF	7.700	-----
1234678-HpCDD	1.500	-----
TOTAL HpCDD	2.600	-----
OCDF	8.100	-----
OCDD	4.900	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	66
2378-TCDD-13C....	2.00	72
12378-PeCDF-13C..	2.00	65
23478-PeCDF-13C..	2.00	70
12378-PeCDD-13C..	2.00	77
123478-HxCDF-13C.	2.00	70
123678-HxCDF-13C.	2.00	58
234678-HxCDF-13C.	2.00	73
123789-HxCDF-13C.	2.00	78
123478-HxCDD-13C.	2.00	88
123678-HxCDD-13C.	2.00	72
1234678-HpCDF-13C	2.00	68
1234789-HpCDF-13C	2.00	75
1234678-HpCDD-13C	2.00	87
OCDD-13C.....	4.00	83
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	69

Total 2378-TCDD
Equivalence: 0.93 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 1 CHEM 1
TCT Sample ID.....60235
Analysis Date.....4/21/95 13:40
Filename.....S50421F
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	1.0000 *	-----
TOTAL TCDF	5.6000	-----
2378-TCDD	0.0056	-----
TOTAL TCDD	0.4700	-----
12378-PeCDF	1.2000	-----
23478-PeCDF	0.5100	-----
TOTAL PeCDF	5.9000	-----
12378-PeCDD	ND	0.053
TOTAL PeCDD	0.1300	-----
123478-HxCDF	ND	1.700
123678-HxCDF	0.6800	-----
234678-HxCDF	0.5000	-----
123789-HxCDF	0.3400	-----
TOTAL HxCDF	3.9000	-----
123478-HxCDD	0.0450	-----
123678-HxCDD	0.1100	-----
123789-HxCDD	0.0670	-----
TOTAL HxCDD	1.0000	-----
1234678-HpCDF	3.3000	-----
1234789-HpCDF	0.7800	-----
TOTAL HpCDF	5.1000	-----
1234678-HpCDD	0.8400	-----
TOTAL HpCDD	1.3000	-----
OCDF	6.1000	-----
OCDD	3.1000	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	68
2378-TCDD-13C....	2.00	75
12378-PeCDF-13C..	2.00	63
23478-PeCDF-13C..	2.00	69
12378-PeCDD-13C..	2.00	74
123478-HxCDF-13C.	2.00	70
123678-HxCDF-13C.	2.00	66
234678-HxCDF-13C.	2.00	73
123789-HxCDF-13C.	2.00	74
123478-HxCDD-13C.	2.00	85
123678-HxCDD-13C.	2.00	76
1234678-HpCDF-13C	2.00	71
1234789-HpCDF-13C	2.00	80
1234678-HpCDD-13C	2.00	88
OCDD-13C.....	4.00	78
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	74

Total 2378-TCDD
Equivalence: 0.65 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 1 VAC 1
TCT Sample ID.....60236
Analysis Date.....4/21/95 14:35
Filename.....S50421G
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.640 *	-----
TOTAL TCDF	5.100	-----
2378-TCDD	0.015	-----
TOTAL TCDD	0.450	-----
12378-PeCDF	0.660	-----
23478-PeCDF	0.500	-----
TOTAL PeCDF	4.900	-----
12378-PeCDD	ND	0.086
TOTAL PeCDD	0.350	-----
123478-HxCDF	ND	1.200
123678-HxCDF	0.640	-----
234678-HxCDF	0.830	-----
123789-HxCDF	0.310	-----
TOTAL HxCDF	5.000	-----
123478-HxCDD	0.068	-----
123678-HxCDD	0.150	-----
123789-HxCDD	0.100	-----
TOTAL HxCDD	1.500	-----
1234678-HpCDF	3.600	-----
1234789-HpCDF	0.680	-----
TOTAL HpCDF	5.400	-----
1234678-HpCDD	1.200	-----
TOTAL HpCDD	2.000	-----
OCDF	4.300	-----
OCDD	3.600	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	67
2378-TCDD-13C....	2.00	74
12378-PeCDF-13C..	2.00	62
23478-PeCDF-13C..	2.00	68
12378-PeCDD-13C..	2.00	69
123478-HxCDF-13C.	2.00	66
123678-HxCDF-13C.	2.00	62
234678-HxCDF-13C.	2.00	66
123789-HxCDF-13C.	2.00	71
123478-HxCDD-13C.	2.00	77
123678-HxCDD-13C.	2.00	73
1234678-HpCDF-13C	2.00	65
1234789-HpCDF-13C	2.00	73
1234678-HpCDD-13C	2.00	80
OCDD-13C.....	4.00	74
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	65

Total 2378-TCDD
Equivalence: 0.63 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 3 WASH 3
TCT Sample ID.....60237
Analysis Date.....4/21/95 15:24
Filename.....S50421H
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	1.600 *	-----
TOTAL TCDF	6.900	-----
2378-TCDD	0.012	-----
TOTAL TCDD	0.260	-----
12378-PeCDF	2.100	-----
23478-PeCDF	0.740	-----
TOTAL PeCDF	6.700	-----
12378-PeCDD	ND	0.037
TOTAL PeCDD	0.360	-----
123478-HxCDF	2.100	-----
123678-HxCDF	0.740	-----
234678-HxCDF	0.400	-----
123789-HxCDF	0.310	-----
TOTAL HxCDF	6.300	-----
123478-HxCDD	0.025	-----
123678-HxCDD	0.068	-----
123789-HxCDD	0.031	-----
TOTAL HxCDD	0.590	-----
1234678-HpCDF	1.900	-----
1234789-HpCDF	0.450	-----
TOTAL HpCDF	3.000	-----
1234678-HpCDD	0.260	-----
TOTAL HpCDD	0.490	-----
OCDF	2.400	-----
OCDD	0.460	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	33
2378-TCDD-13C....	2.00	35
12378-PeCDF-13C..	2.00	61
23478-PeCDF-13C..	2.00	66
12378-PeCDD-13C..	2.00	74
123478-HxCDF-13C.	2.00	57
123678-HxCDF-13C.	2.00	56
234678-HxCDF-13C.	2.00	64
123789-HxCDF-13C.	2.00	65
123478-HxCDD-13C.	2.00	72
123678-HxCDD-13C.	2.00	63
1234678-HpCDF-13C	2.00	63
1234789-HpCDF-13C	2.00	63
1234678-HpCDD-13C	2.00	69
OCDD-13C.....	4.00	63
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	30

Total 2378-TCDD
Equivalence: 1.0 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 3 SCAR 3
TCT Sample ID.....60238
Analysis Date.....4/21/95 16:13
Filename.....S50421I
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	1.500 *	-----
TOTAL TCDF	6.700	-----
2378-TCDD	0.016	-----
TOTAL TCDD	0.220	-----
12378-PeCDF	1.600	-----
23478-PeCDF	0.780	-----
TOTAL PeCDF	5.900	-----
12378-PeCDD	ND	0.043
TOTAL PeCDD	0.360	-----
123478-HxCDF	2.200	-----
123678-HxCDF	0.910	-----
234678-HxCDF	0.660	-----
123789-HxCDF	0.500	-----
TOTAL HxCDF	7.600	-----
123478-HxCDD	0.045	-----
123678-HxCDD	0.110	-----
123789-HxCDD	0.059	-----
TOTAL HxCDD	0.850	-----
1234678-HpCDF	3.300	-----
1234789-HpCDF	0.870	-----
TOTAL HpCDF	5.400	-----
1234678-HpCDD	0.510	-----
TOTAL HpCDD	0.920	-----
OCDF	5.400	-----
OCDD	1.200	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	44
2378-TCDD-13C....	2.00	53
12378-PeCDF-13C..	2.00	65
23478-PeCDF-13C..	2.00	70
12378-PeCDD-13C..	2.00	76
123478-HxCDF-13C.	2.00	62
123678-HxCDF-13C.	2.00	63
234678-HxCDF-13C.	2.00	70
123789-HxCDF-13C.	2.00	78
123478-HxCDD-13C.	2.00	73
123678-HxCDD-13C.	2.00	65
1234678-HpCDF-13C	2.00	75
1234789-HpCDF-13C	2.00	87
1234678-HpCDD-13C	2.00	89
OCDD-13C.....	4.00	79
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	43

Total 2378-TCDD
Equivalence: 1.1 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....AREA 8 VAC 8
TCT Sample ID.....60239
Analysis Date.....4/21/95 17:02
Filename.....S50421J
Injected By.....MJK
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.1700 *	-----
TOTAL TCDF	0.7300	-----
2378-TCDD	0.0038	-----
TOTAL TCDD	0.0210	-----
12378-PeCDF	0.2600	-----
23478-PeCDF	0.1200	-----
TOTAL PeCDF	1.2000	-----
12378-PeCDD	ND	0.011
TOTAL PeCDD	0.0640	-----
123478-HxCDF	0.3500	-----
123678-HxCDF	0.1400	-----
234678-HxCDF	0.1100	-----
123789-HxCDF	0.0740	-----
TOTAL HxCDF	1.2000	-----
123478-HxCDD	0.0053	-----
123678-HxCDD	0.0130	-----
123789-HxCDD	0.0094	-----
TOTAL HxCDD	0.1500	-----
1234678-HpCDF	0.4900	-----
1234789-HpCDF	0.1100	-----
TOTAL HpCDF	0.7800	-----
1234678-HpCDD	0.1100	-----
TOTAL HpCDD	0.2000	-----
OCDF	0.6600	-----
OCDD	0.5300	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	63
2378-TCDD-13C....	2.00	67
12378-PeCDF-13C..	2.00	86
23478-PeCDF-13C..	2.00	93
12378-PeCDD-13C..	2.00	90
123478-HxCDF-13C.	2.00	63
123678-HxCDF-13C.	2.00	63
234678-HxCDF-13C.	2.00	70
123789-HxCDF-13C.	2.00	74
123478-HxCDD-13C.	2.00	82
123678-HxCDD-13C.	2.00	68
1234678-HpCDF-13C	2.00	73
1234789-HpCDF-13C	2.00	81
1234678-HpCDD-13C	2.00	89
OCDD-13C.....	4.00	80
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	59

Total 2378-TCDD Equivalence: 0.17 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
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Client's Sample ID.....AREA 8 CHEM 8
TCT Sample ID.....60240
Analysis Date.....4/21/95 18:21
Filename.....S50421K
Injected By.....MCH
Total Amount Extracted... 1.00 sample
% Moisture.....NA %
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	CONC. ng/sample	LOD ng/sample
2378-TCDF	0.3400 *	-----
TOTAL TCDF	3.8000	-----
2378-TCDD	0.0190	-----
TOTAL TCDD	0.2000	-----
12378-PeCDF	0.3300	-----
23478-PeCDF	0.1600	-----
TOTAL PeCDF	2.0000	-----
12378-PeCDD	ND	0.023
TOTAL PeCDD	0.1800	-----
123478-HxCDF	0.2800	-----
123678-HxCDF	0.1200	-----
234678-HxCDF	0.0960	-----
123789-HxCDF	0.0480	-----
TOTAL HxCDF	1.0000	-----
123478-HxCDD	0.0078	-----
123678-HxCDD	0.0200	-----
123789-HxCDD	0.0100	-----
TOTAL HxCDD	0.1500	-----
1234678-HpCDF	0.3200	-----
1234789-HpCDF	0.0610	-----
TOTAL HpCDF	0.4900	-----
1234678-HpCDD	0.0920	-----
TOTAL HpCDD	0.1700	-----
OCDF	0.3500	-----
OCDD	0.3200	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	24
2378-TCDD-13C....	2.00	28
12378-PeCDF-13C..	2.00	43
23478-PeCDF-13C..	2.00	47
12378-PeCDD-13C..	2.00	48
123478-HxCDF-13C.	2.00	36
123678-HxCDF-13C.	2.00	40
234678-HxCDF-13C.	2.00	42
123789-HxCDF-13C.	2.00	46
123478-HxCDD-13C.	2.00	47
123678-HxCDD-13C.	2.00	42
1234678-HpCDF-13C	2.00	39
1234789-HpCDF-13C	2.00	47
1234678-HpCDD-13C	2.00	50
OCDD-13C.....	4.00	48
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	25

Total 2378-TCDD
Equivalence: 0.21 ng/sample
(Using ITE Factors/DB-5 Data)

* Value may include contributions from other TCDF isomers.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*METHOD 8290 ANALYSIS RESULTS *
*******************************
 Client....CSE
```

Client's Sample ID.....DRAIN
TCT Sample ID.....60241
Analysis Date.....4/21/95 19:13
Filename.....S50421L
Injected By.....MCH
Total Amount Extracted...0.0170 kg
% Moisture..... 41.1 %
ICAL Date.....3/23/95
CCAL Filename.....S50420B
Method Blank ID.....BLANK-555
Extraction Date.....4/17/95

NATIVE ISOMERS	CONC. ng/kg	LOD ng/kg
2378-TCDF	ND	16000
TOTAL TCDF	55000	-----
2378-TCDD	200	-----
TOTAL TCDD	4700	-----
12378-PeCDF	20000	-----
23478-PeCDF	8400	-----
TOTAL PeCDF	71000	-----
12378-PeCDD	610	-----
TOTAL PeCDD	4000	-----
123478-HxCDF	ND	34000
123678-HxCDF	12000	-----
234678-HxCDF	9100	-----
123789-HxCDF	6100	-----
TOTAL HxCDF	74000	-----
123478-HxCDD	820	-----
123678-HxCDD	1800	-----
123789-HxCDD	1300	-----
TOTAL HxCDD	18000	-----
1234678-HpCDF	54000	-----
1234789-HpCDF	15000	-----
TOTAL HpCDF	87000	-----
1234678-HpCDD	12000	-----
TOTAL HpCDD	23000	-----
OCDF	90000	-----
OCDD	33000	-----

INTERNAL STANDARDS	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	56
2378-TCDD-13C....	2.00	62
12378-PeCDF-13C..	2.00	56
23478-PeCDF-13C..	2.00	58
12378-PeCDD-13C..	2.00	59
123478-HxCDF-13C.	2.00	49
123678-HxCDF-13C.	2.00	49
234678-HxCDF-13C.	2.00	56
123789-HxCDF-13C.	2.00	61
123478-HxCDD-13C.	2.00	58
123678-HxCDD-13C.	2.00	54
1234678-HpCDF-13C	2.00	54
1234789-HpCDF-13C	2.00	55
1234678-HpCDD-13C	2.00	61
OCDD-13C.....	4.00	53
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	INT

Total 2378-TCDD Equivalence: 9750 ng/kg
(Using ITE Factors/DB-5 Data)

All values are expressed on a dry weight basis.

CONC= Concentration (Totals include 2378-substituted isomers.)
LOD = Limit of Detection
ND = Not Detected
NA = Not Applicable
INT = Interference

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*   PCDD/PCDF SPIKE RESULTS   *
*******************************
     Client....CSE
```

TCT Sample ID.....SPIKE-556
Analysis Date.....4/20/95 09:43
Filename.....S50420C
Sample Injected By.....MJK
Total Amount Extracted.....0.0102 kg
% Moisture.....NA
ICAL Date.....3/23/95
CCAL Filename.....S50420B
Method Blank ID.....BLANK-555
Extraction Date.....4/17/95

NATIVE ISOMERS	Qs (ng)	Qm (ng)	% REC
2378-TCDF	0.20	0.22	108
2378-TCDD	0.20	0.19	94
12378-PeCDF	1.00	1.11	111
23478-PeCDF	1.00	1.07	107
12378-PeCDD	1.00	1.10	110
123478-HxCDF	1.00	1.05	105
123678-HxCDF	1.00	1.11	111
234678-HxCDF	1.00	1.06	106
123789-HxCDF	1.00	1.07	107
123478-HxCDD	1.00	1.10	110
123678-HxCDD	1.00	1.03	103
123789-HxCDD	1.00	1.15	115
1234678-HpCDF	1.00	1.11	111
1234789-HpCDF	1.00	1.16	116
1234678-HpCDD	1.00	1.06	106
OCDF	2.00	2.08	104
OCDD	2.00	2.52	126

INTERNAL STANDARD	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	43
2378-TCDD-13C....	2.00	49
12378-PeCDF-13C..	2.00	58
23478-PeCDF-13C..	2.00	60
12378-PeCDD-13C..	2.00	59
123478-HxCDF-13C.	2.00	59
123678-HxCDF-13C.	2.00	58
234678-HxCDF-13C.	2.00	66
123789-HxCDF-13C.	2.00	74
123478-HxCDD-13C.	2.00	67
123678-HxCDD-13C.	2.00	63
1234678-HpCDF-13C	2.00	67
1234789-HpCDF-13C	2.00	71
1234678-HpCDD-13C	2.00	77
OCDD-13C.....	4.00	92
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	50

Qs = Quantity Spiked
Qm = Quantity Measured
REC = Recovery (Expressed as Percent)
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*   PCDD/PCDF SPIKE RESULTS   *
*******************************
     Client....CSE
```

TCT Sample ID.....SPIKE-558
Analysis Date.....4/21/95 10:21
Filename.....S50421C
Sample Injected By.....MJK
Total Amount Extracted..... 1.00 sample
% Moisture.....NA
ICAL Date.....3/23/95
CCAL Filename.....S50421B
Method Blank ID.....BLANK-557
Extraction Date.....4/18/95

NATIVE ISOMERS	Qs (ng)	Qm (ng)	% REC
2378-TCDF	0.20	0.20	100
2378-TCDD	0.20	0.19	95
12378-PeCDF	1.00	1.01	101
23478-PeCDF	1.00	0.97	97
12378-PeCDD	1.00	0.96	96
123478-HxCDF	1.00	0.96	96
123678-HxCDF	1.00	0.95	95
234678-HxCDF	1.00	0.92	92
123789-HxCDF	1.00	0.95	95
123478-HxCDD	1.00	0.88	88
123678-HxCDD	1.00	0.91	91
123789-HxCDD	1.00	0.91	91
1234678-HpCDF	1.00	0.88	88
1234789-HpCDF	1.00	0.88	88
1234678-HpCDD	1.00	0.90	90
OCDF	2.00	1.79	90
OCDD	2.00	1.79	89

INTERNAL STANDARD	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	24
2378-TCDD-13C....	2.00	30
12378-PeCDF-13C..	2.00	48
23478-PeCDF-13C..	2.00	55
12378-PeCDD-13C..	2.00	61
123478-HxCDF-13C.	2.00	55
123678-HxCDF-13C.	2.00	60
234678-HxCDF-13C.	2.00	62
123789-HxCDF-13C.	2.00	65
123478-HxCDD-13C.	2.00	77
123678-HxCDD-13C.	2.00	63
1234678-HpCDF-13C	2.00	70
1234789-HpCDF-13C	2.00	75
1234678-HpCDD-13C	2.00	79
OCDD-13C.....	4.00	77
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	29

Qs = Quantity Spiked
Qm = Quantity Measured
REC = Recovery (Expressed as Percent)
NA = Not Applicable

TCT Invoice Number....4411 95-60084

A member of the HIH group of companies

Huntingdon

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*******************************
*TWIN CITY TESTING CORPORATION*
*   PCDD/PCDF SPIKE RESULTS   *
*******************************
     Client....CSE
```

TCT Sample ID.....SPIKE-562
Analysis Date.....4/27/95 12:56
Filename.....S50427D
Sample Injected By.....MJK
Total Amount Extracted..... 1.00 L
% Moisture.....NA
ICAL Date.....3/23/95
CCAL Filename.....S50427B
Method Blank ID.....BLANK-561
Extraction Date.....4/24/95

NATIVE ISOMERS	Qs (ng)	Qm (ng)	% REC
2378-TCDF	0.20	0.21	103
2378-TCDD	0.20	0.20	101
12378-PeCDF	1.00	1.00	100
23478-PeCDF	1.00	0.98	98
12378-PeCDD	1.00	1.01	101
123478-HxCDF	1.00	1.02	102
123678-HxCDF	1.00	0.98	98
234678-HxCDF	1.00	1.02	102
123789-HxCDF	1.00	1.04	104
123478-HxCDD	1.00	0.96	96
123678-HxCDD	1.00	1.00	100
123789-HxCDD	1.00	0.98	98
1234678-HpCDF	1.00	0.90	90
1234789-HpCDF	1.00	0.89	89
1234678-HpCDD	1.00	0.92	92
OCDF	2.00	1.59	80
OCDD	2.00	1.88	94

INTERNAL STANDARD	ng's ADDED	PERCENT RECOVERY
2378-TCDF-13C....	2.00	57
2378-TCDD-13C....	2.00	62
12378-PeCDF-13C..	2.00	65
23478-PeCDF-13C..	2.00	69
12378-PeCDD-13C..	2.00	70
123478-HxCDF-13C.	2.00	64
123678-HxCDF-13C.	2.00	55
234678-HxCDF-13C.	2.00	62
123789-HxCDF-13C.	2.00	71
123478-HxCDD-13C.	2.00	72
123678-HxCDD-13C.	2.00	61
1234678-HpCDF-13C	2.00	59
1234789-HpCDF-13C	2.00	69
1234678-HpCDD-13C	2.00	71
OCDD-13C.....	4.00	76
1234-TCDD-13C....	2.00	NA
123789-HxCDD-13C.	2.00	NA
2378-TCDD-37Cl4..	0.20	56

Qs = Quantity Spiked
Qm = Quantity Measured
REC = Recovery (Expressed as Percent)
NA = Not Applicable

TCT Invoice Number....4411 95-60084

Huntingdon

LEAD ANALYSIS RESULTS
EPA METHOD 6010

Sample Identification	Lead Concentration	Units	Percent Recovery
Method Blank (wipe)	1.4	ug/sample	
Matrix Spike (wipe)	--	--	100%
Area 1 Wash 1	206	ug/sample	
Area 1 Chem 1	1240	ug/sample	
Area 1 Vac 1	719	ug/sample	
Area 3 Scar 3	70.7	ug/sample	
Area 3 Wash 3	11.8	ug/sample	
Area 8 Vac 8	201	ug/sample	
Area 8 Chem 8	34.5	ug/sample	
Drain	13000	ug/g	

Date Analyzed: 4/24/95 & 4/25/95

Reference: EPA Test Methods for Evaluating Solid Waste, SW-846, November 1986, 3rd Edition.

APPENDIX B

WASTE PROFILE SHEETS
LAKE SALVAGE REMEDIATION

Chem Met Services, Inc.

18550 Allen Rd.
P.O. Box 2189
Wyandotte, MI 48192

Phone: (313) [illegible]
(800) [illegible]
FAX: (313) [illegible]
EPA ID: [illegible]

GENERATOR WASTE ANALYSIS FORM

BILLING NAME: Central States Environmental Serv.
Address: 609 Airport Road; P.O. Box 684
City: Centralia State: IL Zip: 62801
Contact: Brian Copple Phone: 618-532-4784 618-532-5615
WASTE GENERATOR EPA ID: IDD073144654
Name: Litton Systems, Inc. / Lake Salvage Facility
Address: 2527-29 W. Lake Street
City: Chicago State: IL Zip: 60608
Contact: Mark Stanga Phone: 703-413-3916 703-413-3970
GENERAL DESCRIPTION: Building demolition debris/
OF WASTE & PROCESS: Incinerator Ash & Refractory
QUANTITY: 30 ☐ Drums ☐ Tanks ☒ Roll Off ☐ Truck ☐ Bulk ☐ Other ☐ Other
MAJOR COMPONENTS: Fill (10,000 mg/kg) or greater of waste content. Total major and minor components must add up to 100%

COMPONENT OR ELEMENT	PERCENT CONCENTRATION
Incinerator Refractory	95%
Incinerator Ash	3%
Building Debris	2%

PHYSICAL STATE IN DRUM: ☐ Liquid ☐ Sludge % Solid 100 % Liquid

YES	NO		YES	NO		YES	NO	
☐	☒	Pumpable	☐	☒	Flammable	☐	☒	Reactive
☐	☒	Odiferous	☐	☒	Reflective	☒	☐	Toxic
☐	☒	Corrosive	☐	☒	Infectious	☐	☒	Odor
☐	☒	Explosive	☐	☒	Infectious	☐	☒	Coating Hazard
☐	☒	Flammable	>200°F Flash Point			pH 8.5		

IF D001 or D002, DOES IT CONTAIN FOUR CONSTITUENTS?
COMMENTS: ORGANIC ONLY ( ) YES ( ) NO ( )

☒ HAZARDOUS WASTE ☐ NON-HAZARDOUS WASTE
List all hazardous wastes, numbers, from R.C.R.A. and Michigan Act 64 rules.

I hereby certify that all information submitted in this and all attached documents are complete and accurate and that all known or suspected hazards have been disclosed.

X Mark Stanga — ENVIRONMENTAL AFFAIRS COUNSEL — 5-31-95
Generator Signature — Title — Date

EPA HW NUMBER	CONTAMINANT	REG. LEVEL (mg/l)	ANALYSIS
D001	Ignitable	>140°F <140°F	
D002	Corrosive	pH<2 or > 12.5	
D003	Reactive	Cyanide (mg/l)	
		Sulfide (mg/l)	
METAL CHARACTERISTICS:			
D004	Arsenic	5.0	
D005	Barium	100.0	1.3
D006	Cadmium	1.0	0.36
D007	Chromium	5.0	
D008	Lead	5.0	62.0
D009	Mercury	0.2	.0059
D010	Selenium	1.0	
D011	Silver	5.0	
D012	Copper	100.0	
D013	Zinc	1000.0	
ORGANIC CHARACTERISTICS:			
D014	Benzene	0.50	
D015	Lindane	0.4	
D016	Methoxychlor	10.0	
D017	Toxaphene	5.0	
D018	2,4-Dichlorophenoxyacetic Acid	10.0	
D019	2,4,5-TP (Silvex)	1.0	
D020	Endrin	0.02	
D021	Carbon Tetrachloride	0.5	
D022	Chlordane	0.03	
D023	Chlorobenzene	100.0	
D024	Chloroform	6.0	
D025	o-Cresol	200.0	
D026	m-Cresol	200.0	
D027	p-Cresol	200.0	
D028	Cresol	200.0	
D029	1,4-Dichlorobenzene	7.5	
D030	1,2-Dichloroethane	0.5	
D031	1,1-Dichloroethylene	0.7	
D032	2,4-Dinitrotoluene	0.13	
D033	Heptachlor	0.008	
D034	Hexachlorobutadiene	0.07	
D035	Hexachlorobenzene	0.5	
D036	Nitrobenzene	2.0	
D037	Pentachlorophenol	100.0	
D038	Pyridine	5.0	
D039	Tetrachloroethylene	0.7	
D040	Trichloroethylene	0.5	
D041	2,4,5-Trichlorophenol	400.0	
D042	2,4,6-Trichlorophenol	2.0	
D043	Vinyl Chloride	0.2	
....	PCB	50.0	

CHEM-MET INTERNAL USE ONLY LAB APPROVAL _____ Analysis I.D. _____
MA MATRIX MATRIX LIMITED LIMITED LIMITED OTHER _____
Hazard Class _____ Unit Code _____ Waste Code _____
☐ Approved ☐ Broker ☐ Required Authorization _____ Date _____
Description: _____
Comments: _____

[illegible]

☐ New ☐ Amendment

A. GENERATOR INFORMATION

Generator Name: Litton Systems, Inc.	Technical Contact: Mark Stanga
Facility Address: 2527-29 W. Lake Street	Telephone: (41?) 703-413-3906 Ext.
	Fax: (703) 413-3970
City/County: Chicago / Cook	Billing Name: Central States Environmental Services
State: Illinois Zip Code:	Billing Address: P.O. Box 684
USEPA ID#: IDD073114654	City: Centralia State: IL Zip Code: 62801
State ID#:	Attention: Tammie Taylor
	Telephone: 618 532-4784 Ext.

B. DOT Shipping Name: RQ, Waste Poisonous Solid, N.O.S. (Lead)
Hazard Class: 6.1
UN/NA No.: 2811 Packing Group: I RQ:

C. RCRA RCRA Non Hazardous/Exempt? ☐ Yes ☒ No Process Generating:
State Waste Codes: Commingled Waste ☐ Yes ☒ No
EPA Waste Codes: D008

D. BIENNIAL REPORT CODES
SIC Code:
Source Code: A
Form Code: B
Origin Code:
System Type: M

E. OTHER COMPONENTS

	No	Yes	Total ppm
PCBs	☒	☐	
Cyanides	☒	☐	
Sulfides	☒	☐	
Pesticides	☒	☐	
Phenolics	☒	☐	
Dioxins	☐	☒	156 ppb
Halogens	☒	☐	%

F. PHYSICAL CHARACTERISTICS OF WASTE

1. Infectious or Biological Waste? ☐ Yes ☒ No
2. NRC Regulated Radioactive? ☐ Yes ☒ No
3. Reactivity ☒ None ☐ Water Reactive ☐ Pyrophoric ☐ Shock Sensitive ☐ Cyanides ☐ DOT Explosive ☐ Sulfides ☐ Other

☐ Gas (Cylinder) ☒ Solid 100 %
☐ Aerosol ☐ Sludge %
☐ Lab-Pack ☐ Free Liquids %
100%

Layers: ☒ Single Layered ☐ Bi-layered ☐ Multi-layered
Viscosity: ☐ Low ☐ Medium ☐ High
Odor: ☐ None ☒ Mild ☐ Strong Describe:
Color/Appearance: Brown/Black

Weight
Density: lbs./gal. (U.S. liq) lbs./cu. foot
Dry Weight: ☐ <1.0% ☐ 5-20% ☐ 1-5% ☒ 20-100%

pH: ☐ N/A ☐ 0-2 ☒ 4.1-10 ☐ ≥12.5 ☐ 2.1-4 ☐ 10.1-12.4 Exact: 8.5

Flash Point (liquid only): ☐ <73°F ☐ 73-140°F ☐ 140-200°F ☐ >200°F ☒ N/A
Boiling Point: ☐ ≤95°F ☐ >95°F ☒ N/A

BTU/lb: Less than 5000

Dermal Toxicity LD50 (Mg/Kg): ☐ ≤40 ☐ >40, ≤200 ☐ >200, ≤1000 ☐ >1000
4. National pollutants for toxicity? ☐ Yes ☒ No
Oral Toxicity LD50 (Mg/Kg): ☐ ≤5 ☐ >5, ≤50
Solids: ☐ >50, ≤500 ☐ >500
Liquids: ☐ >50, ≤500 ☐ >500

5. Is this waste stored in vented drums? ☐ Yes ☒ No
6. Is this waste pumpable? ☐ Yes ☒ No
7. Is this waste polymerizable? ☐ Yes ☒ No
8. Is waste stream subject to the National Emission Standards for Benzene Waste Operations (40 CFR 61 Subpart FF)? ☐ Yes ☒ No
9. Is this waste regulated as an ozone depleting substance (40 CFR part 82)? ☐ Yes ☒ No
10. Does this waste contain scrap metal pieces greater than 2 inches in size? ☐ Yes ☒ No

G. METALS *
☐ NONE ☒ TCLP (MG/L) ☐ TOTAL (PPM)

	Reg. Limit	Below	Above	Range
Arsenic	5 mg/L	☐	☐	
Barium	100 mg/L	☒	☐	1.3
Cadmium	1 mg/L	☒	☐	0.36
Chromium	5 mg/L	☐	☐	
Copper		☐	☐	
Lead	5 mg/L	☐	☒	62
Mercury	0.2 mg/L	☒	☐	.0059
Nickel	134 mg/l	☐	☐	
Selenium	1 mg/L	☐	☐	
Silver	5 mg/L	☐	☐	
Zinc		☐	☐	
Others:				

* Sample Date 4/21/94

H. PHYSICAL/CHEMICAL CONSTITUENTS

Incinerator Refractory	95 %
Incinerator Ash	3 %
Building Debris	2 %
	%
	%
	%
	%
	%
	%
	%
	%
	100 %

(Attach All MSDS, Sample Analysis and Additional Info.)

I. ANTICIPATED VOLUME

Qty.	Container	Qty.	Container
☐	5 gl. pail	☐	Cubic Yard Box
☐	15 gl. carboy	☐	Small Truck
☐	30 gl. drum	☒ 3	Rolloff/Dump Trailer
☐	55 gl. drum	☐	Tanker
☐	85 gl. drum	☐	Other

Per: ☒ 1 Time ☐ Week ☐ Month ☐ Year ☐ Other

(?) Is this waste regulated as a Marine Pollutant (49 CFR 171.8)? ☐ Yes ☒ No

Generator's Certification:
I hereby certify that the above and attached description is complete and accurate to the best of my knowledge and ability to determine that no deliberate or willful omissions of composition properties exist and that all known or suspected hazards have been disclosed. I certify that the materials tested are representative of all material described by this profile.

Generator's Authorized Signature: [signature] Date: 4-26-95

MARK STANGA

* As defined by the TCLP (Method 1311), EP Toxicity is no longer acceptable.

Use of Generator's Knowledge is based upon the following (check one):

1)_____MSDS(s) (Please attach)

2)_____*_____Analysis (Please attach)

3)_____Other (Explain how determined, example: Not Present in Process Producing).

* Based on profile analytical results or waste previously disposed

"LISTED" Hazardous Wastes: Indicate if this waste also contains any listed hazardous wastes noted in 40 CFR 261.31, 261.32 and 261.33 by including the appropriate EPA Hazardous Waste code(s)

GENERATOR CERTIFICATION

I hereby certify that all information submitted on this form and all attached documents are true and accurate. In the event that this form is not fully completed, I authorize Laidlaw Environmental Services to conduct necessary testing at my expense to properly complete the form.

SIGNATURE: _____ DATE: 4-26-95

PRINT NAME: Mark Stanga _____ TITLE: Litton Systems

TC RULE CERTIFICATION/RECERTIFICATION FORM

Generator Name: Litton Systems, Inc. EPA ID: ILD073114654

Location: Lake Salvage 2527-29 W. Lake St. Chicago, IL

Profile #:

CHARACTERISTICS OF HAZARDOUS WASTE: Indicate if this waste contains any of the following characteristics based on criteria mandated by 40 CFR 261.21, 261.22, 261.23 and 261.24.

		Regulatory Threshold Level	(Check One) Yes	No	Scientific Data	Generator's Knowledge	Actual Value (ppm)
D001	Characteristic of Ignitability	<140F		X			
D002	Characteristic of Corrosivity	≤ or ≥12.5		X			
D003	Characteristic of Reactivity			X			

	Constituent	Regulatory Threshold Level, ppm	(Check One) Yes	No	Scientific Data	Generator's Knowledge	Actual Value (ppm)
D004	(Arsenic)	5.0		X			
D005	(Barium)	100.0		X			
D006	(Cadmium)	1.0		X			
D007	(Chromium)	5.0		X			
D008	(Lead)	5.0	X		X	X	52
D009	(Mercury)	0.2		X			
D010	(Selenium)	1.0		X			
D011	(Silver)	5.0		X			
D012	Endrin	0.02		X			
D013	Lindane	0.4		X			
D014	Methoxychlor	10.0		X			
D015	Toxaphene	0.5		X			
D016	2,4-D (2,4-Dichlorophenoxyacetic acid)	10.0		X			
D017	2,4,5-TP Silvex	1.0		X			
D018	Benzene	0.5		X			
D019	Carbon Tetrachloride	0.5		X			
D020	Chlordane	0.03		X			
D021	Chlorobenzene	100.0		X			
D022	Chloroform	6.0		X			
D023	o-Cresol	200.0		X			
D024	m-Cresol	200.0		X			
D025	p-Cresol	200.0		X			
D026	Cresol	200.0		X			
D027	1,4-Dichlorobenzene	7.5		X			
D028	1,2 Dichloroethane	0.5		X			
D029	1,1 Dichloroethylene	0.7		X			
D030	2,4-Dinitrotoluene	0.13					
D031	Heptachlor (and its hydroxide)	0.008					
D032	Hexachlorobenzene	0.13					
D033	Hexachlorobutadiene	0.5					
[illegible]	[illegible]	[illegible]					
D034	Hexachloroethane	3.0					
D035	Methyl ethyl ketone	200.0					
D036	Nitrobenzene	2.0					
D037	Pentachlorophenol	100.0					
D038	Pyridine	5.0					
D039	Tetrachloroethylene	0.7					
D040	Trichloroethylene	0.5					
D041	2,4,5-Trichlorophenol	400.0					
D042	2,4,6-Trichlorophenol	2.0					
D043	Vinyl Chloride	0.2					

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6665
FAX: 708/967-6735

LABORATORY REPORT

123872-A

Laidlaw Waste Systems
4002 S. Main Street
Rockford, IL 61102

Report Date: 6/12/95
Sample Received: 6/2/95

Project Name: Central States - Lake Salvage
Sample Description: Waste, Misc.
Sample No.: 20721

Acidity/Alkalinity	57000 as NH_4OH = 5.7%
Ash Content	73.6%
Total Cyanide	<5.00
Odor of Sample	None
Open Cup Flash Point	>180°F
Paint Filter	Pass
Physical Appearance	Paper, Brick, Plastic, Metal, Glass
Reactive Sulfide	381
Total Phenolics	<10.0
Total Solids	98.8%
Water Compatibility	No Reaction
pH (10% Solution)	11.1 (units)

	Total	TCLP
Arsenic	2.70	<0.200
Barium	150	<0.50
Cadmium	5.20	<0.02
Chromium	500	0.11
Lead	2100	<0.20
Mercury	<0.0300	<0.0100
Selenium	1.40	<0.200
Silver	<2.50	<0.20

All results expressed as ppm unless otherwise indicated.

Methods performed according to SW-846, "Test Methods for Evaluating Solid Waste".

The contents of this report apply to the sample analyzed. No duplication of this report is allowed except its entirety.

Gary W. Vigh

LABORATORY DIRECTOR

ENVIRONMENTAL MONITORING AND TECHNOLOGIES, INC.

8100 North Austin Avenue
Morton Grove, Illinois 60053-3203
708/967-6666
FAX: 708/967-6735

LABORATORY REPORT

123872

Laidlaw Waste Systems
4002 S. Main Street
Rockford, IL 61102

Report Date: 6/7/95
Sample Received: 6/2/95

Project Name: Central States - Lake Salvage
Sample Description: Waste, Misc.
Sample No.: 20721

Compounds	Concentration Found In Sample	Concentration Found In Blank	Adjusted Concentration	Method Detection Limit (MDL)	Regulatory Limit
1. Benzene	<0.25	<0.01	<0.25	0.01	0.50
2. Carbon Tetrachloride	<0.25	<0.01	<0.25	0.01	0.50
3. Chlorobenzene	<50.0	<0.01	<50.0	0.01	100.00
4. Chloroform	<3.0	<0.01	<3.0	0.01	6.00
5. o-Cresol	<100.0	<0.01	<100.0	0.01	200.00
6. m-Cresol	<100.0	<0.01	<100.0	0.01	200.00
7. p-Cresol	<100.0	<0.01	<100.0	0.01	200.00
Total Cresol	<100.0	<0.01	<100.0	0.01	200.00
8. 1,4-Dichlorobenzene	<3.75	<0.01	<3.75	0.01	7.50
9. 1,2-Dichloroethane	<0.25	<0.01	<0.25	0.01	0.50
10. 1,1-Dichloroethene	<0.35	<0.01	<0.35	0.01	0.700
11. 2,4-Dinitrotoluene	<0.07	<0.01	<0.07	0.01	0.13
12. Hexachlorobenzene	<0.07	<0.01	<0.07	0.01	0.13
13. Hexachloro-1,3 -butadiene	<0.25	<0.01	<0.25	0.01	0.50
14. Hexachloroethane	<1.50	<0.01	<1.50	0.01	3.00
15. Methyl Ethyl Ketone	<100.0	<0.01	<100.0	0.01	200.00
16. Nitrobenzene	<1.00	<0.01	<1.00	0.01	2.00
17. Pentachlorophenol	<50.00	<0.01	<50.0	0.01	100.00
18. Pyridine	<2.50	<0.01	<2.50	0.01	5.00
19. Tetrachloroethylene	<0.35	<0.01	<0.35	0.01	0.70
20. Trichloroethylene	<0.25	<0.01	<0.25	0.01	0.50
21. 2,4,5-Trichlorophenol	<200.00	<0.01	<200.00	0.01	400.00
22. 2,4,6-Trichlorophenol	<1.00	<0.01	<1.00	0.01	2.00
23. Vinyl Chloride	<0.10	<0.01	<0.10	0.01	0.20

All results expressed as ppm unless otherwise indicated.
Methods performed according to SW-846, "Test methods for Evaluating Solid Waste".

Analysis performed on Extract from TCLP.

The contents of this report apply only to the sample analyzed. No duplication of this report is allowed except in its entirety.

Leah E. Zeber

LABORATORY DIRECTOR

APPENDIX C

HAZARDOUS WASTE DISPOSAL MANIFESTS
LAKE SALVAGE REMEDIATION

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D D 0 7 3 1 4 4 6 5 4 — Manifest Document No.

2. Page 1 of

Information in the shaded area is not required by Federal law.

3. Generator's Name and Mailing Address
Litton Systems, Inc./Lake Salvage Facility
2527-29 W. Lake Street
Chicago, IL

4. Generator's Phone (703) 413-3916

A. State Manifest Document Number MI 4132961

B. State Generator's ID

5. Transporter 1 Company Name
Harold Hansen DART TRUCKING INC

6. US EPA ID Number

C. State Transporter's ID

D. Transporter's Phone 519/695-272

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem Met Services, Inc.
18550 Allen Road
Wyandotte, MI 48192

10. US EPA ID Number M I D 0 9 6 9 6 3 1 9 4

G. State Facility's ID MID096963194

H. Facility's Phone 313/282-9250

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	HM X RQ, Waste Poisonous Solid, N.O.S., (Lead), 6.1, UN2811, I	0 0 1	C M	12.5	-	D 0 0 8
b.						
c.						
d.						

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
a/ /
b/ /
c/ /
d/ /

15. Special Handling Instructions and Additional Information
In case of emergency refer to Guide #53

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determin to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes t present and future threat to human health and the environment; OR; if I am a small quantity generator, I have made a good faith effort to minimize my was generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name — Signature — Date Month Day Ye

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date Month Day Ye

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date Month Day Ye

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Date Month Day Ye

GENERATOR

TRANSPORTER

FACILITY

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

CHEMICAL CONSERVATION CORPORATION CHEM-MET SERVICES, INC. CHEMICAL CONSERVATION OF GEORGIA

LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name LITTON SYSTEMS, INC. Manifest No. LS007 Page 1 of

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A-I) in boxes at left of waste code.

[ ] This is a wastewater stream. [X] This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE A1 AT THE BOTTOM FOR CODES NOT FOUND HERE.

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Liquids (TOC≥ 10%)
[ ]	D001*	Other Ignitables (TOC <10%)
[ ]	D002*	
[ ]	D003	Reactive Sulfides 261.23(a)(5)
[ ]	D003	Explosives 261.23(a)(6)-(8)
[ ]	D003	Other Reactives 261.23(a)(1)
[ ]	D003	Water Reactive 261.23 (a)(2)-(4)
[ ]	D003	Reactive Cyanides 261.23(a)(5)
[ ]	D004	
[ ]	D005	
[ ]	D006	Cadmium non-batteries
[ ]	D006	Cadmium batteries
[ ]	D007	
[X]	D008	Lead non-batteries
[ ]	D008	Lead batteries
[ ]	D009	> 260 mg/kg with organics
[ ]	D009	> 260 mg/kg no organics
[ ]	D009	<260 mg/kg nonwastewater
[ ]	D009	<260 mg/kg wastewater
[ ]	D010	
[ ]	D011	
[ ]	D012*	Endrin
[ ]	D012*	Endrin aldehyde
[ ]	D013*	Alpha BHC
[ ]	D013*	Beta BHC
[ ]	D013*	Delta BHC
[ ]	D013*	Gamma BHC

M.L.I.	CODE
[ ]	D014*
[ ]	D015*
[ ]	D016*
[ ]	D017*
[ ]	D018*
[ ]	D019*
[ ]	D020*
[ ]	D021*
[ ]	D022*
[ ]	D023*
[ ]	D024*
[ ]	D025*
[ ]	D026*
[ ]	D027*
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[ ]	D036*
[ ]	D037*
[ ]	D038*
[ ]	D039*
[ ]	D040*
[ ]	D041*
[ ]	D042*
[ ]	D043*

M.L.I.	CODE
[ ]	F001
[ ]	F002
[ ]	F003
[ ]	F004
[ ]	F005

California List Constituents

Indicate the individual constituents likely to be present in each waste.

[ ]	Nickel
[ ]	Thallium
[ ]	Liquids with PCB's
[ ]	Wastes containing HOC's

M.L.I.	CONSTITUENTS	Total Concentration mg/kg
[ ]	Acetone	160
[ ]	Benzene	10
[ ]	n-Butyl alcohol	2.6
[ ]	Carbon disulfide	4.81 (TCLP)
[ ]	Carbon tetrachloride	5.6
[ ]	Chlorobenzene	[illegible]
[ ]	o,m,p Cresols	
[ ]	Cyclohexanone	
[ ]	o-Dichlorobenzene	
[ ]	Ethyl acetate	
[ ]	Ethylbenzene	
[ ]	Ethyl ether	[illegible]
[ ]	Isobutanol	170
[ ]	Methanol	0.75 (TCLP)
[ ]	Methylene chloride	30
[ ]	Methyl ethyl ketone	36
[ ]	Methyl isobutyl ketone	33
[ ]	Nitrobenzene	14
[ ]	Pyridine	16
[ ]	Tetrachloroethylene	5.0
[ ]	Toluene	10
[ ]	1,1,1 Trichloroethane	6.0
[ ]	1,1,2 Trichloroethane	6.0
[ ]	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
[ ]	Trichloroethylene	6.0
[ ]	Trichloromonofluoromethane	30
[ ]	Xylene(s) (total)	30
[ ]	2-Ethoxyethanol	INCIN
[ ]	2-Nitropropane	INCIN

* ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHEN THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED.

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste, support this certification.

Print Name MICHAEL MATHEWSON FOULTON Sign: [signature] Date 6/14/95

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE

ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D D 0 7 3 1 4 4 6 5 4 — Manifest Document No. 25 0 K

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Litton Systems, Inc./Lake Salvage Facility
2527-29 W. Lake Street
Chicago, IL

4. Generator's Phone (703) 413-3916

A. State Manifest Document Number MI 4132962

B. State Generator's ID

5. Transporter 1 Company Name
~~Harold Marcus~~ DART TRUCKING

6. US EPA ID Number HD 626 [illegible] I I 2 7 0 0 1 2 3 2 1

C. State Transporter's ID [illegible]

D. Transporter's Phone [illegible]

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID 216/533-964[illegible]

F. Transporter's Phone

9. Designated Facility Name and Site Address
Chem Met Services, Inc.
18550 Allen Road
Wyandotte, MI 48192

10. US EPA ID Number M I D 0 9 6 9 6 3 1 9 4

G. State Facility's ID MID096963194

H. Facility's Phone 313/282-9250

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER). HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.
a.	X	RQ, Waste Poisonous Solid, N.O.S., (Lead), 6.1, UN2811, I	001	CM	17	T	D008
b.	X						
c.							
d.							

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
a/ /
b/ /
c/ /
d/ /
T = TONS

15. Special Handling Instructions and Additional Information 24 HR EMERGENCY # 800-424-5053 (267)
In case of emergency refer to Guide #53

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determine to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes th present and future threat to human health and the environment; OR; if I am a small quantity generator, I have made a good faith effort to minimize my wast generation and select the best waste management method that is available to me and that I can afford.

GENERATOR

Printed/Typed Name [illegible] — Signature [illegible] — Date Month Day Ye [illegible]

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature [illegible] — Date Month Day Ye

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name — Signature — Date Month Day Ye

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name — Signature — Date Month Day Ye

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

CONSERVATION CORPOR. CHEM-MS SERVICES, INC. IN OF GEORGIA

LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name LITTON SYSTEMS, INC. Manifest No. 45006 Page 1 of

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A-I) in boxes at left of waste code

[ ] This is a wastewater stream. [X] This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE A1 THE BOTTOM FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Liquids (TCC≥ 10%)
[ ]	D001*	Other Ignitables (TCC <10%)
[ ]	D002*	
[ ]	D003	Reactive Sulfides 261.23(a)(5)
[ ]	D003	Explosives 261.23(a)(6)-(8)
[ ]	D003	Other Reactives 261.23(a)(1)
[ ]	D003	Water Reactive 261.23 (a)(2)-(4)
[ ]	D003	Reactive Cyanides 261.23(a)(5)
[ ]	D004	
[ ]	D005	
[ ]	D006	Cadmium non-batteries
[ ]	D006	Cadmium batteries
[ ]	D007	
[X]	D008	Lead non-batteries
[ ]	D008	Lead batteries
[ ]	D009	> 260 mg/kg with organics
[ ]	D009	> 260 mg/kg no organics
[ ]	D009	<260 mg/kg nonwastewater
[ ]	D009	<260 mg/kg wastewater
[ ]	D010	
[ ]	D011	
[ ]	D012*	Endrin
[ ]	D012*	Endrin aldehyde
[ ]	D013*	Alpha BHC
[ ]	D013*	Beta BHC
[ ]	D013*	Delta BHC
[ ]	D013*	Gamma BHC

M.L.I.	CODE
[ ]	D014*
[ ]	D015*
[ ]	D016*
[ ]	D017*
[ ]	D018*
[ ]	D019*
[ ]	D020*
[ ]	D021*
[ ]	D022*
[ ]	D023*
[ ]	D024*
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[ ]	D037*
[ ]	D038*
[ ]	D039*
[ ]	D040*
[ ]	D041*
[ ]	D042*
[ ]	D043*

M.L.I.	CODE
[ ]	F001
[ ]	F002
[ ]	F003
[ ]	F004
[ ]	F005

California List Constituents

Indicate the individual constituents likely to be present in each waste.

[ ]	Nickel
[ ]	Thallium
[ ]	Liquids with PCB's
[ ]	Wastes containing HOC's

	CONSTITUENTS	Total Compon mg/kg
[ ]	Acetone	160
[ ]	Benzene	10
[ ]	n-Butyl alcohol	2.6
[ ]	Carbon disulfide	4.81(TC
[ ]	Carbon tetrachloride	6.0
[ ]	Chlorobenzene	6.0
[ ]	o,m,p Cresols	5.5(aa)
[ ]	Cyclohexanone	0.75(TC
[ ]	o-Dichlorobenzene	6.0
[ ]	Ethyl acetate	33
[ ]	Ethylbenzene	10
[ ]	Ethyl ether	160
[ ]	Isobutanol	170
[ ]	Methanol	0.75(TC
[ ]	Methylene chloride	30
[ ]	Methyl ethyl ketone	36
[ ]	Methyl isobutyl ketone	33
[ ]	Nitrobenzene	14
[ ]	Pyridine	16
[ ]	Tetrachloroethylene	5.0
[ ]	Toluene	10
[ ]	1,1,1 Trichloroethane	6.0
[ ]	1,1,2 Trichloroethane	6.0
[ ]	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
[ ]	Trichloroethylene	6.0
[ ]	Trichloromonofluoromethane	30
[ ]	Xylene(s) (total)	30
[ ]	2-Ethoxyethanol	UNCIN
[ ]	2-Nitropropane	UNCIN

* ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHICH THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste, support this certification

Print Name MICHAEL WHITCAMB NEW FOR LITTON Sign [signature] Date 6/14/85

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No.: I D D 0 7 3 1 4 4 6 5 4 — Manifest Document No.: LS 0 0 3
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
Litton Systems, Inc./Lake Salvage Facility
2527-29 W. Lake Street
Chicago, IL

4. Generator's Phone (703) 413-3916

A. State Manifest Document Number: MI 4132963

B. State Generator's ID:

5. Transporter 1 Company Name: ~~Harold Marcus~~ DART TRUCKING

6. US EPA ID Number: OHD 0 9 4 8 6 5 6 2 5 — ~~M I T 2 7 0 0 1 2 3 2 1~~

C. State Transporter's ID: ~~MIT270012321~~

D. Transporter's Phone: ~~313/695-2721~~

7. Transporter 2 Company Name:

8. US EPA ID Number:

E. State Transporter's ID: 216/583-4641

F. Transporter's Phone:

9. Designated Facility Name and Site Address
Chem Met Services, Inc.
18550 Allen Road
Wyandotte, MI 48192

10. US EPA ID Number: M I D 0 9 6 9 6 3 1 9 4

G. State Facility's ID: MID096963194

H. Facility's Phone: 313/282-9250

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a.	X	RQ, Waste Poisonous Solid, N.O.S., (Lead), 6.1, UN2811, I	0 0 1	C M	1 5	T	D 0 0 8	H
b.								
c.								
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above: a/ / b/ / c/ / d/ /

T = TON

15. Special Handling Instructions and Additional Information
In case of emergency refer to Guide #53 — 800-535-5053 (SF7) 24 HR EMERGENCY #

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR; if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: [illegible] — Signature: [signature] — Date: Month Day Year: 06 11 93

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name: — Signature: — Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name: — Signature: — Date: Month Day Year

GENERATOR — TRANSPORTER — FACILITY

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

EPA Form 8700-22 (Rev. 9/88)

PR 5110 Rev. 10/

...HET SERVICES, INC. ...CAL CO. ...ORGI...

...DISPOS... ...ESTRICTION NOTIFIC... ...N FORM

Generator Name ...ON SYSTEMS, INC. Manifest No. LS00... 1 of ...

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A.I.) in boxes at left of waste code.

	This is a wastewater stream.		This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE AT THE BOTTOM FOR CODES NOT FOUND HERE

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Liquids (TCC≥ 10%)
	D001*	Other Ignitables (TCC <10%)
	D002*	
	D003	Reactive Sulfides 261.23(a)(5)
	D003	Explosives 261.23(a)(5)-(8)
	D003	Other Reactives 261.23(a)(1)
	D003	Water Reactive 261.23 (a)(2)-(4)
	D003	Reactive Cyanides 261.23(a)(5)
	D004	
	D005	
	D006	Cadmium non-batteries
	D006	Cadmium batteries
	D007	
	D008	Lead non-batteries
	D008	Lead batteries
	D009	> 200 mg/kg with organics
	D009	> 200 mg/kg no organics
	D009	<200 mg/kg nonwastewater
	D009	<200 mg/kg wastewater
	D010	
	D011	
	D012*	Endrin
	D012*	Endrin aldehyde
	D013*	Alpha BHC
	D013*	Beta BHC
	D013*	Delta BHC
	D013*	Gamma BHC

M.L.I.	CODE
	D014*
	D015*
	D016*
	D017*
	D018*
	D019*
	D020*
	D021*
	D022*
	D023*
	D024*
	D025*
	D026*
	D027*
	D028*
	D029*
	D030*
	D031*
	D032*
	D033*
	D034*
	D035*
	D036*
	D037*
	D038*
	D039*
	D040*
	D041*
	D042*
	D043*

M.L.I.	CODE
	F001
	F002
	F003
	F004
	F005

	CONSTITUENTS	Total Composition mg/kg
	Acetone	160
	Benzene	10
	n-Butyl alcohol	2.0
	Carbon disulfide	4.3 (TCC)
	Carbon tetrachloride	6.0
	Chlorobenzene	6.0
	o,m,p Cresols	5.6(ea)
	Cyclohexanone	0.75 (TCC)
	o, Dichlorobenzene	6.0
	Ethyl acetate	33
	Ethylbenzene	10
	Ethyl ether	160
	Isobutanol	170
	Methanol	0.75 (TCC)
	Methylene chloride	30
	Methyl ethyl ketone	36
	Methyl isobutyl ketone	33
	Nitrobenzene	14
	Pyridine	15
	Tetrachloroethylene	5.0
	Toluene	10
	1,1,1 Trichloroethane	6.0
	1,1,2 Trichloroethane	6.0
	1,1,2-Trichloro-1,2,2-Trifluoroethane	33
	Trichloroethylene	6.0
	Trichloromonofluoromethane	33
	Xylene(s) (total)	33
	2-Ethoxyethanol	INCIN
	2-Nitropropane	INCIN

California List Constituents

Indicate the individual constituents likely to be present in each waste.

	Nickel
	Thallium
	Liquids with PCB's
	Wastes containing HCC's

* ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHEN THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED.

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste supported by certification.

Print Name MIKE MATTLAINEN FOR LITTON Sign: [signature] Date 6/14/95

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type. Form Approved. OMB No. 2050-0039 Expires 9-30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D D 0 7 3 1 4 4 6 5 4 Manifest Document No. L15062
2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
LITTON SYSTEMS, INC./LAKE SALVAGE FACILITY
2527-29 W. LAKE STREET
CHICAGO, IL 60612
4. Generator's Phone ( ) 708-413-3916

A. State Manifest Document Number MI 4132964
B. State Generator's ID

5. Transporter 1 Company Name DART TRUCKING COMPANY, INC.
6. US EPA ID Number D H D 0 0 8 5 5 8 2 5
C. State Transporter's ID
D. Transporter's Phone 216-533-9841

7. Transporter 2 Company Name
8. US EPA ID Number
E. State Transporter's ID
F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEM-MET SERVICES, INC.
18550 ALLEN RD.
WYANDOTTE, MI 48192
10. US EPA ID Number M I D 0 9 6 9 6 3 1 9 4
G. State Facility's ID MI0096963194
H. Facility's Phone 313-282-9250

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM	12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/
a.	RQ, WASTE POISONOUS SOLID, N.O.S. (LEAD), 6.1, UN2811, I	X	001	CM	[illegible]	T	D008	F
b.								
c.								
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
T = TON
a/ /
b/ /
c/ /
d/ /

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY REFER TO GUIDE #53
EMERGENCY CONTACT # 1-800-535-5053 (567) INFOTRAC

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

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Printed/Typed Name: Brian Carter + Mr. Murmunen
Signature
Date: Month Day Ye

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date: Month Day Ye

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date: Month Day Ye

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Date: Month Day Ye

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

CHEMICAL CONSERVATION CORPORATION CHEM-MET SERVICES, INC. CHEMICAL CONSERVATION OF G

LAND DISPOSAL RESTRICTION NOTIFICATION FORM

Generator Name LITTON SYSTEMS, INC. Manifest No. MI 413 2964 Page 1 of

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A-I) in boxes at left of waste code.

[ ] This is a wastewater stream. [A] This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE A1 THE BOTTOM FOR CODES NOT FOUND HERE

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Liquids (TOC≥ 10%)
	D001*	Other Ignitables (TOC <10%)
	D002*	
	D003	Reactive Sulfides 261.23(a)(5)
	D003	Explosives 261.23(a)(6)-(8)
	D003	Other Reactives 261.23(a)(1)
	D003	Water Reactive 261.23 (a)(2)-(4)
	D003	Reactive Cyanides 261.23(a)(5)
	D004	
	D005	
	D006	Cadmium non-batteries
	D006	Cadmium batteries
	D007	
A	D008	Lead non-batteries
	D008	Lead batteries
	D009	> 260 mg/kg with organics
	D009	> 260 mg/kg no organics
	D009	<260 mg/kg nonwastewater
	D009	<260 mg/kg wastewater
	D010	
	D011	
	D012*	Endrin
	D012*	Endrin aldehyde
	D013*	Alpha BHC
	D013*	Beta BHC
	D013*	Delta BHC
	D013*	Gamma BHC

M.L.I.	CODE
	D014*
	D015*
	D016*
	D017*
	D018*
	D019*
	D020*
	D021*
	D022*
	D023*
	D024*
	D025*
	D026*
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	D035*
	D036*
	D037*
	D038*
	D039*
	D040*
	D041*
	D042*
	D043*

M.L.I.	CODE
	F001
	F002
	F003
	F004
	F005

	CONSTITUENTS	Total Composition mg/kg
	Acetone	160
	Benzene	10
	n-Butyl alcohol	2.0
	Carbon disulfide	4.[illegible]
	Carbon tetrachloride	6.0
	Chlorobenzene	6.0
	o,m,p Cresols	5.6(na)
	Cyclohexanone	0.7[illegible]
	o, Dichlorobenzene	6.0
	Ethyl acetate	3[illegible]
	Ethylbenzene	
	Ethyl ether	
	Isobutanol	
	Methanol	
	Methylene chloride	
	Methyl ethyl ketone	
	Methyl isobutyl ketone	33
	Nitrobenzene	14
	Pyridine	16
	Tetrachloroethylene	5.0
	Toluene	10
	1,1,1 Trichloroethane	6.0
	1,1,2 Trichloroethane	6.0
	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
	Trichloroethylene	6.0
	Trichloromonofluoromethane	30
	Xylene(s) (total)	30
	2-Ethoxyethanol	INCIN
	2-Nitropropane	INCIN

California List Constituents

Indicate the individual constituents likely to be present in each waste.

	Nickel
	Thallium
	Liquids with PCB's
	Wastes containing HOC's

ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHEN THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF A

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the w[illegible] support this certification.

Print Name Brian Copple for Mike Matthews Sign [signature] Date 6/17/85

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE

ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

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Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D D 0 7 3 1 4 4 6 5 4 — Manifest Document No. 1-1005

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
LITTON SYSTEMS, INC./LAKE SALVAGE FACILITY
2527-29 W. LAKE STREET, CHICAGO, IL 60612

4. Generator's Phone (708) 413-3916

A. State Manifest Document Number MI 4132965

B. State Generator's ID

5. Transporter 1 Company Name
ART TRUCKING COMPANY, INC.

6. US EPA ID Number O H D 0 0 9 8 6 5 8 2 5

C. State Transporter's ID

D. Transporter's Phone 216-533-9841

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEM-MET SERVICES, INC.
18550 ALLEN RD.
WYANDOTTE, MI 48192

10. US EPA ID Number M I D 0 9 6 9 6 3 1 9 4

G. State Facility's ID MID096963194

H. Facility's Phone 313-282-9250

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/T
a.	X	RQ, WASTE POISONOUS SOLID, N.O.S. (LEAD), 6.1, UN2811, I	001	CM	1	T	D008	H
b.								
c.								
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above

a/ /
b/ /
c/ /
d/ /

T = TON

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY REFER TO GUIDE #53

EMERGENCY CONTACT # 1-800-535-5053 (567)

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Printed/Typed Name: Brian Cope for Mr. Mahoney — Signature — Date: Month Day Year

GENERATOR

17. Transporter 1 Acknowledgement of Receipt of Materials — Printed/Typed Name — Signature — Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials — Printed/Typed Name — Signature — Date: Month Day Year

TRANSPORTER

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19. — Printed/Typed Name — Signature — Date: Month Day Year

FACILITY

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CHEMICAL CONSERVATION C... ...M-MET SERVICES, INC. ...HEMICAL ...N OF GEO...

L... DISPOS... RESTRICTION NOTIFICATION FOR

Generator Name LITTON SYSTEMS, INC. Manifest No. MI 41... Page 1

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/... exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A-I) in boxes at left of waste code

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	D002*	
	D003	Reactive Sulfides 261.23(a)(5)
	D003	Explosives 261.23(a)(6)-(8)
	D003	Other Reactives 261.23(a)(1)
	D003	Water Reactive 261.23 (a)(2)-(4)
	D003	Reactive Cyanides 261.23(a)(5)
	D004	
	D005	
	D006	Cadmium non-batteries
	D006	Cadmium batteries
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	D012*	Endrin aldehyde
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M.L.I.	CODE
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	D015*
	D016*
	D017*
	D018*
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	D035*
	D036*
	D037*
	D038*
	D039*
	D040*
	D041*
	D042*
	D043*

M.L.I.	CODE
	F001
	F002
	F003
	F004
	F005

M.L.I.	CONSTITUENTS	Total Compo... mg/kg
	Acetone	160
	Benzene	10
	n-Butyl alcohol	2.6
	Carbon disulfide	4.81(1...
	Carbon tetrachloride	6.0
	Chlorobenzene	6.0
	o,m,p Cresols	5.6(...
	Cyclohexanone	0.7...
	o Dichlorobenzene	6.0
	Ethyl acetate	33
	Ethylbenzene	10
	Ethyl ether	160
	Isobutanol	170
	Methanol	0.75(1...
	Methylene chloride	30
	Methyl ethyl ketone	36
	Methyl isobutyl ketone	33
	Nitrobenzene	14
	Pyridine	16
	Tetrachloroethylene	5.0
	Toluene	10
	1,1,1 Trichloroethane	6.0
	1,1,2 Trichloroethane	6.0
	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
	Trichloroethylene	6.0
	Trichloromonofluoromethane	30
	Xylene(s) (total)	30
	2-Ethoxyethanol	INCIN...
	2-Nitropropane	INCI...

California List Constituents

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	Nickel
	Thallium
	Liquids with PCB's
	Wastes containing HOC's

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M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis ... or through knowledge of the w... support this certification.

Print Name Brian Corp... Sign: [signature] 5/17/...

AIRTEN

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

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Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ID D 0 7 3 1 1 4 6 5 4 Manifest Document No. 2 3 0 0 H

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
LITTON SYSTEMS, LAKE SILVAGE FACILITY
5201-31 N LAKE STREET
CHICAGO, IL 60607

4. Generator's Phone (708) 413-3916

A. State Manifest Document Number MI 4216086

B. State Generator's ID

5. Transporter 1 Company Name
DART TRUCKING

6. US EPA ID Number
O H D O 0 7 1 9 4 7 5 5

C. State Transporter's ID OHD0065

D. Transporter's Phone 216-533-9041

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMMET SERVICES, INC.
15550 ALLEN ROAD
WYANDOTTE, MI 48192

10. US EPA ID Number
M I D 0 9 6 9 6 3 1 9 4

G. State Facility's ID MID096963194

H. Facility's Phone 313/282-4250

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER).	HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/A
a.	X	RQ, WASTE BATTERIES SOLID, N.O.S., (LEAD), 6.1, UN 2911, PG I	001	DM	1 1211	T	D008	
b.								
c.								
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
a/ /
b/ /
c/ /
d/ /

T = TON

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY REFER TO CONT #52 [illegible]

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Printed/Typed Name: BRIAN CARPENTER MR. MATTLAINEN
Signature: [signature]
Date: Month 6 Day 16 Year 92

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name:
Signature:
Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name:
Signature:
Date: Month Day Year

GENERATOR
TRANSPORTER
FACILITY

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EPA Form 8700-22 (Rev. 9/88)

PR 51
Rev. 1

CONSERVATION CORPORATION CHEM S, INC. CHEMICAL CONS

LAND DISPOSAL RES ON NOTIFICATION FORM

or Name LITTON SYSTEMS, INC. Manifest No. 15006 Page 1 of

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A.I.) in cases at left of waste code

	This is a wastewater stream.	X	This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE AT THE BOTTOM FOR CODES NOT FOUND HERE

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
	D001	Ignitable Liquids (TOC≥ 10%)
	D001*	Other Ignitables (TOC <10%)
	D002*	
	D003	Reactive Sulfides 261.23(a)(5)
	D003	Explosives 261.23(a)(6)-(8)
	D003	Other Reactives 261.23(a)(1)
	D003	Water Reactive 261.23 (a)(2)-(4)
	D003	Reactive Cyanides 261.23(a)(5)
	D004	
	D005	
	D006	Cadmium non-batteries
	D006	Cadmium batteries
	D007	
A	D008	Lead non-batteries
	D008	Lead batteries
	D009	> 200 mg/kg with organics
	D009	> 200 mg/kg no organics
	D009	<200 mg/kg nonwastewater
	D009	<200 mg/kg wastewater
	D010	
	D011	
	D012*	Endrin
	D012*	Endrin aldehyde
	D013*	Alpha BHC
	D013*	Beta BHC
	D013*	Delta BHC
	D013*	Gamma BHC

M.L.I.	CODE
	D014*
	D015*
	D016*
	D017*
	D018*
	D019*
	D020*
	D021*
	D022*
	D023*
	D024*
	D025*
	D026*
	D027*
	D028*
	D029*
	D030*
	D031*
	D032*
	D033*
	D034*
	D035*
	D036*
	D037*
	D038*
	D039*
	D040*
	D041*
	D042*
	D043*

M.L.I.	CODE
	F001
	F002
	F003
	F004
	F005

M.L.I.	CONSTITUENTS	Total Composition mg/kg
	Acetone	150
	Benzene	10
	n-Butyl alcohol	2.0
	Carbon disulfide	4.2 [illegible]
	Carbon tetrachloride	6.0
	Chlorobenzene	6.0
	o,m,p Cresols	5.6(ea)
	Cyclohexanone	[illegible]
	o-Dichlorobenzene	6.0
	Ethyl acetate	33
	Ethylbenzene	10
	Ethyl ether	160
	Isobutanol	170
	Methanol	0.75 [illegible]
	Methylene chloride	30
	Methyl ethyl ketone	36
	Methyl isobutyl ketone	32
	Nitrobenzene	14
	Pyridine	16
	Tetrachloroethylene	5.0
	Toluene	10
	1,1,1 Trichloroethane	6.0
	1,1,2 Trichloroethane	6.0
	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
	Trichloroethylene	6.0
	Trichloromonofluoromethane	30
	Xylene(s) (total)	30
	2-Ethoxyethanol	INCIN
	2-Nitropropane	INCIN

California List Constituents

Indicate the individual constituents likely to be present in each waste.

	Nickel
	Thallium
	Liquids with PCB's
	Wastes containing HOC's

* ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHEN THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste to support this certification.

Print Name Brian Copple for Mike Mathainer Sign: [signature] Date 06/19/95

DNR

MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE

ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

Failure to file is punishable under section 299.548 MCL or Section 10 of Act 136, P.A. 1969.

Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. I D D 0 7 3 1 4 4 6 5 4 Manifest Document No. L 5 0 0 7

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
UTICA SYSTEMS, LAKE SHORE FACILITY
3577 24 W LAKE
OAKLAND, IL 60007

4. Generator's Phone (708) 413-3946

A. State Manifest Document Number MI 4216087

B. State Generator's ID

5. Transporter 1 Company Name
DIRT TRUCKING

6. US EPA ID Number
O H D 0 0 4 1 6 5 4 0 5

C. State Transporter's ID

D. Transporter's Phone

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEMFIRST SERVICES, INC.
1550 ALLEN ROAD
WYANDOTTE, MI 48192

10. US EPA ID Number
M I D 0 7 6 1 6 3 1 6 4

G. State Facility's ID
MID076163164

H. Facility's Phone 313-282-9250

11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER). HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a.	X RQ, WASTE POISONOUS SOLID, N.O.S., (LEAD), 6.1, UN2811, PG I	001	DM	22	T	D008	N
b.							
c.							
d.							

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
T - TONS

a/ /
b/ /
c/ /
d/ /

15. Special Handling Instructions and Additional Information
24 HR EMERGENCY #
IN LIEU OF EMERGENCY REFERENCE GUIDE #53

16. GENERATOR'S CERTIFICATION: I hereby declare that the contents of this consignment are fully and accurately described above by proper shipping name and are classified, packed, marked, and labeled, and are in all respects in proper condition for transport by highway according to applicable international and national government regulations.

If I am a large quantity generator, I certify that I have a program in place to reduce the volume and toxicity of waste generated to the degree I have determined to be economically practicable and that I have selected the practicable method of treatment, storage, or disposal currently available to me which minimizes the present and future threat to human health and the environment; OR; if I am a small quantity generator, I have made a good faith effort to minimize my waste generation and select the best waste management method that is available to me and that I can afford.

Printed/Typed Name: BRIAN CONNOR for Mr. MACHINEN | Signature | Date: Month 04 Day 19 Year 94

17. Transporter 1 Acknowledgement of Receipt of Materials

Printed/Typed Name: NICK | Signature | Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials

Printed/Typed Name | Signature | Date: Month Day Year

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.

Printed/Typed Name | Signature | Date: Month Day Year

GENERATOR

TRANSPORTER

FACILITY

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

EPA Form 8700-22 (Rev. 9/88)

PR 5110 Rev. 11

L CONSER[illegible] CHEMICAL [illegible]VATION

LAND DI[illegible] [illegible]ON NOTIFICATION FO[illegible]

G. [illegible]tor Name LITTON SYSTEMS, INC. Manifest No. LS-007 Page _

The waste(s) indicated below does not meet the applicable treatment standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or RCRA 3004(d)(California List).

Indicate location of constituents on the manifest by inserting manifest line item (M.L.I.) identification (A.I.) in boxes at left of waste code

[ ] This is a wastewater stream. [X] This is a nonwastewater stream.

A. CHECK REGULATED CONSTITUENT(S) IN F001 THROUGH F005 WASTE(S). USE TABLE AT THE BOTTOM FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	SUBCATEGORY/CONSTITUENTS
[ ]	D001	Ignitable Liquids (TCC≥ 10%)
[ ]	D001*	Other Ignitables (TOC <10%)
[ ]	D002*	
[ ]	D003	Reactive Sulfides 261.23(a)(5)
[ ]	D003	Explosives 261.23(a)(6)-(8)
[ ]	D003	Other Reactives 261.23(a)(1)
[ ]	D003	Water Reactive 261.23 (a)(2)-(4)
[ ]	D003	Reactive Cyanides 261.23(a)(5)
[ ]	D004	
[ ]	D005	
[ ]	D006	Cadmium non-batteries
[ ]	D006	Cadmium batteries
[ ]	D007	
[X]	D008	Lead non-batteries
[ ]	D008	Lead batteries
[ ]	D009	> 260 mg/kg with organics
[ ]	D009	> 260 mg/kg no organics
[ ]	D009	<260 mg/kg nonwastewater
[ ]	D009	<260 mg/kg wastewater
[ ]	D010	
[ ]	D011	
[ ]	D012*	Endrin
[ ]	D012*	Endrin aldehyde
[ ]	D013*	Alpha BHC
[ ]	D013*	Beta BHC
[ ]	D013*	Delta BHC
[ ]	D013*	Gamma BHC

M.L.I.	CODE
[ ]	D014*
[ ]	D015*
[ ]	D016*
[ ]	D017*
[ ]	D018*
[ ]	D019*
[ ]	D020*
[ ]	D021*
[ ]	D022*
[ ]	D023*
[ ]	D024*
[ ]	D025*
[ ]	D026*
[ ]	D027*
[ ]	D028*
[ ]	D029*
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[ ]	D035*
[ ]	D036*
[ ]	D037*
[ ]	D038*
[ ]	D039*
[ ]	D040*
[ ]	D041*
[ ]	D042*
[ ]	D043*

M.L.I.	CODE
[ ]	F001
[ ]	F002
[ ]	F003
[ ]	F004
[ ]	F005

	CONSTITUENTS	Total Compound mg/kg
[ ]	Acetone	160
[ ]	Benzene	10
[ ]	n-Butyl alcohol	2.6
[ ]	Carbon disulfide	4.81(TC)
[ ]	Carbon tetrachloride	6.0
[ ]	Chlorobenzene	6.0
[ ]	o,m,p Cresols	5.6(ea)
[ ]	Cyclohexanone	0.75(TC)
[ ]	o, Dichlorobenzene	6.0
[ ]	Ethyl acetate	33
[ ]	Ethylbenzene	10
[ ]	Ethyl ether	160
[ ]	Isobutanol	170
[ ]	Methanol	0.75(TC)
[ ]	Methylene chloride	30
[ ]	Methyl ethyl ketone	36
[ ]	Methyl isobutyl ketone	33
[ ]	Nitrobenzene	14
[ ]	Pyridine	16
[ ]	Tetrachloroethylene	5.0
[ ]	Toluene	10
[ ]	1,1,1 Trichloroethane	6.0
[ ]	1,1,2 Trichloroethane	6.0
[ ]	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
[ ]	Trichloroethylene	6.0
[ ]	Trichlorofluoromethane	30
[ ]	Xylene(s) (total)	30
[ ]	2-Ethoxyethanol	INCIN
[ ]	2-Nitropropane	INCIN

California List Constituents

Indicate the individual constituents likely to be present in each waste.

[ ]	Nickel
[ ]	Thallium
[ ]	Liquids with PCB's
[ ]	Wastes containing HCC's

* ATTACH A UNIVERSAL TREATMENT STANDARDS (UTS) TABLE WHICH INDICATES CONSTITUENTS CONTAINED IN WASTE STREAMS HAVING THESE WASTE CODES, WHICH THE CORRESPONDING CONCENTRATION LEVELS SHOWN IN THE UTS TABLE HAVE BEEN EXCEEDED.

B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		
[ ]		[ ]		

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste supports the certification.

Print Name BRIAN CAPPLE for MIKE MATILAINEN Sign: [signature] Date 06/19/95

DNR
MICHIGAN DEPARTMENT OF NATURAL RESOURCES

DO NOT WRITE IN THIS SPACE
ATT. ☐ DIS. ☐ REJ. ☐ PR. ☐

Required under authority of Act 64, P.A. 1979, as amended and Act 136, P.A. 1969.

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Please print or type.

Form Approved. OMB No. 2050-0039 Expires 9-30-

UNIFORM HAZARDOUS WASTE MANIFEST

1. Generator's US EPA ID No. ID0713446454 Manifest Document No. 13604

2. Page 1 of 1

Information in the shaded areas is not required by Federal law.

3. Generator's Name and Mailing Address
LITTON SYSTEMS, LAKE SALVAGE FACILITY
2537-24 W. LAKE ST.
CHICAGO, IL 60607

4. Generator's Phone (703) 413-3916

A. State Manifest Document Number MI 4216085

B. State Generator's ID

5. Transporter 1 Company Name DART TRUCKING

6. US EPA ID Number OHD004865825

C. State Transporter's ID OHD004865825

D. Transporter's Phone 216-533-9241

7. Transporter 2 Company Name

8. US EPA ID Number

E. State Transporter's ID

F. Transporter's Phone

9. Designated Facility Name and Site Address
CHEM MET SERVICES, INC
16550 ALLEN ROAD
WYANDOTTE, MI

10. US EPA ID Number MID096196314

G. State Facility's ID MID096196314

H. Facility's Phone 313-282-9250

	11. US DOT Description (including Proper Shipping Name, Hazard Class, and ID NUMBER). HM		12. Containers No.	Type	13. Total Quantity	14. Unit Wt/Vol	I. Waste No.	N/H
a.	X	RQ, WASTE POISONOUS SOLID, N.O.S., (LEAD), 6.1, UN2811, PG-I	001	DM	212	T	D008	H
b.								
c.								
d.								

J. Additional Descriptions for Materials Listed Above

K. Handling Codes for Wastes Listed Above
T = TONS

a/ /
b/ /
c/ /
d/ /

15. Special Handling Instructions and Additional Information
IN CASE OF EMERGENCY REFER TO GUIDE #53, 24 HR EMERGENCY # 800-535-5053 (5-7) INFOTRAC

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GENERATOR

Printed/Typed Name: BRIAN CADDIE for Mike Matiuinen
Signature:
Date: Month 06 Day 17 Year 98

TRANSPORTER

17. Transporter 1 Acknowledgement of Receipt of Materials
Printed/Typed Name: DONNIE SAMELSON
Signature:
Date: Month Day Year

18. Transporter 2 Acknowledgement of Receipt of Materials
Printed/Typed Name
Signature
Date: Month Day Year

FACILITY

19. Discrepancy Indication Space

20. Facility Owner or Operator: Certification of receipt of hazardous materials covered by this manifest except as noted in Item 19.
Printed/Typed Name
Signature
Date: Month Day Year

ALL SPILLS MUST BE REPORTED TO THE MICHIGAN POLLUTION EMERGENCY ALERTING SYSTEM, IN MICHIGAN AT 1-800-292-4706 OR OUT OF STATE AT 517-373-7660 AND THE NATIONAL RESPONSE CENTER AT 1-800-424-8802 24 HOURS PER DAY.

EPA Form 8700-22 (Rev. 9/88)

PR 511C Rev. 10

VATION CORPORATION ... EM-MC ... CH... ...SERVATION OF GEO...

LAND DISP... REST... ...TIFICATION FORM

...LITTON SYSTEMS, INC. ... Manifest No. LS-008 Page 1 of ...

The waste(s) indicated below does not meet the applicable ... standards in 40 CFR 268 Subpart D and/or exceeds the applicable prohibition levels in 40 CFR 268.32 or ... 3004(d)(California List).

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	This is a wastewater stream	A	This is a nonwastewater stream.

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	D003	Explosives 261.23(a)(6)-(8)
	D003	Other Reactives 261.23(a)(1)
	D003	Water Reactive 261.23 (a)(2)-(4)
	D003	Reactive Cyanides 261.23(a)(5)
	D004	
	D005	
	D006	Cadmium non-batteries
	D006	Cadmium batteries
	D007	
A	D008	Lead non-batteries
	D008	Lead batteries
	D009	> 260 mg/kg with organics
	D009	> 260 mg/kg no organics
	D009	<260 mg/kg nonwastewater
	D009	<260 mg/kg wastewater
	D010	
	D011	
	D012*	Endrin
	D012*	Endrin aldehyde
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	D013*	Beta BHC
	D013*	Delta BHC
	D013*	Gamma BHC

M.L.I.	CODE
	D014*
	D015*
	D016*
	D017*
	D018*
	D019*
	D020*
	D021*
	D022*
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	D024*
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	D034*
	D035*
	D036*
	D037*
	D038*
	D039*
	D040*
	D041*
	D042*
	D043*

M.L.I.	CODE
	F001
	F002
	F003
	F004
	F005

	CONSTITUENTS	Total Cr... mg
	Acetone	160
	Benzene	10
	n-Butyl alcohol	2.0
	Carbon disulfide	4.8
	Carbon tetrachloride	6.0
	Chlorobenzene	
	o,m,p Cresols	
	Cyclohexanone	[illegible]
	o, Dichlorobenzene	6.0
	Ethyl acetate	33
	Ethylbenzene	10
	Ethyl ether	160
	Isobutanol	170
	Methanol	0.75 [illegible]
	Methylene chloride	30
	Methyl ethyl ketone	36
	Methyl isobutyl ketone	33
	Nitrobenzene	14
	Pyridine	16
	Tetrachloroethylene	5.0
	Toluene	10
	1,1,1 Trichloroethane	6.0
	1,1,2 Trichloroethane	6.0
	1,1,2-Trichloro-1,2,2-Trifluoroethane	30
	Trichloroethylene	[illegible]
	Trichloromonofluoromethane	33
	Xylene(s) (total)	30
	2-Ethoxyethanol	INCIN
	2-Nitropropane	INCIN

California List Constituents

Indicate the individual constituents likely to be present in each waste.

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	Thallium
	Liquids with PCB's
	Wastes containing HCC's

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B. ENTER WASTE CODE, AND SUBCATEGORY IF APPLICABLE, IN THE TABLE BELOW FOR CODES NOT FOUND ABOVE

M.L.I.	CODE	M.L.I.	CODE	SUBCATEGORY (IF ANY)

I certify under penalty of law that I personally have examined and am familiar with the waste through analysis and testing or through knowledge of the waste ... suspect this certification.

Print Name: Brian Copple for Mike Matilainen Sign. [signature] Date 06/10/95

APPENDIX D

DISPOSAL RECEIPTS
TRASH & LITTER/CONSTRUCTION & DEMOLITION DEBRIS
LAKE SALVAGE REMEDIATION

(DRIVER: PLEASE SIGN BELOW)

250720

REFERENCE NO. 250720

(PLEASE SIGN HERE)

John Garden

C&D DEBRIS

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	LAIDLAWD	JZ	10:59:25	06/16/95	

LAIDLAW WASTE SYSTEMS

CUSTOMER:
3851 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS: cses 14
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	30.00	
650	TONS	11.16	
	GROSS: 55860		
	TARE : 33540		
	NET : 22320		

COPY 2

Co[redacted]s [redacted]lop[redacted]
4100 Frontage Rd.
Hillside, IL 60162
Site No. 5

NO.: 00020324 DATE: 06/17/95

TRUCK ID: 9999CP1894
ACCOUNT NO.: 9999 CUSTOMER: Cash

MATERIAL CODE: 300 MATERIAL: Constr & Demo PRICE/TON:$ 37.00
NO. OF YARDS: 30

GROSS WT. (tons): 40.61
TARE WT. (tons): 22.21
NET WT. (tons): 18.40

NET WT. (tons): 18.40
PRICE/TON: $ 37.00
MIN. CHARGE: $

TOTAL PRICE:$ 680.80

YARD CLERK

DRIVER/AGENT

NOTES: CESC, INC 1-800-367-3090
Cash as per TCB

Hauler agrees and warrants that it is delivering *solid waste only* and does hereby indemnify operator for damages caused by delivery of *hazardous waste.*

(DRIVER: PLEASE SIGN BELOW)

256126

REFERENCE NO. 256126

(PLEASE SIGN HERE)

John Gardner

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JZ	7:23:10	06/17/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	30.00	
650	TONS	12.09	
	GROSS: 57720		
	TARE : 33540		
	NET : 24180		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

2562

REFERENCE NO.

(PLEASE SIGN HERE)

John Gardner

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JP	6:57:57	06/19/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	~~30.00~~	36
650	TONS	9.88	
	GROSS: 53300		
	TARE : 33540		
	NET : 19760		

fixed

COPY 2

(DRIVER: PLEASE SIGN BELOW)

250873

REFERENCE NO. 250873

(PLEASE SIGN HERE)

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
7251	LAIDLAWR	JF	7:25:41	06/19/95	

LAIDLAW WASTE SYSTEMS R/O LOOS

CUSTOMER:
3651 BLACKHAWK
ROLLING MEADOWS, IL
COMMENTS: cses 24
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
630	YARDS - ROLL OFF LO	~~40.00~~	42.00
655	TONS - ROLL OFF LOO	10.33	
	GROSS: 65480		
	TARE : 44820		
	NET : 20660		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

2564

REFERENCE NO.

(PLEASE SIGN HERE)

John Gerdu

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JF	10:59:12	06/19/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	36.00	
650	TONS	8.71	
	GROSS: 50960		
	TARE : 33540		
	NET : 17420		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

256684

REFERENCE NO. 256684

(PLEASE SIGN HERE)

John Gardner

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
7251	LAIDLAWR	JF	15:27:54	06/19/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS R/O LOOS
3651 BLACKHAWK
ROLLING MEADOWS, IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
630	YARDS - ROLL OFF LO	40.00	
655	TONS - ROLL OFF LOO	10.63	
	GROSS: 66080		
	TARE : 44820		
	NET : 21260		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

2567

REFERENCE NO. 2567

(PLEASE SIGN HERE)

John Gordon

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JP	7:01:44	06/20/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	36.00	
650	TONS	11.01	
	GROSS: 55560		
	TARE : 33540		
	NET : 22020		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

251299

REFERENCE NO. 251299

(PLEASE SIGN HERE)

John Gerder

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
7251	LAIDLAWR	JF	10:46:39	06/20/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS R/O LOOS
3651 BLACKHAWK
ROLLING MEADOWS. IL
COMMENTS: cdes14
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
630	YARDS - ROLL OFF LO	40.00	
655	TONS - ROLL OFF LOO	11.58	
	GROSS: 67840		
	TARE : 44680		
	NET : 23160		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

2570

REFERENCE NO.

(PLEASE SIGN HERE)

John Garda

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JR	13:14:41	06/20/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	36.00	
650	TONS	18.68	
	GROSS: 70900		
	TARE : 33540		
	NET : 37360		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

257208

REFERENCE NO. 257208

(PLEASE SIGN HERE)

Bldg. Demo

Jim CSES-14

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	CSES14	JF	7:05:38	06/21/95	

CUSTOMER: LAIDLAW WASTE SYSTEMS
3651 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS:
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
610	LOOSE YARDS	36.00	
650	TONS	12.02	
	GROSS: 57580		
	TARE : 33540		
	NET : 24040		

COPY 2

(DRIVER: PLEASE SIGN BELOW)

24997

REFERENCE NO. 24997

(PLEASE SIGN HERE)

John Gerdes

LITTER/TRASH

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
1857	LAIDLAWD	JZ	12:23:00	06/13/95	

LAIDLAW WASTE SYSTEMS

CUSTOMER:
3851 BLACKHAWK
ROLLING MEADOWS IL
COMMENTS: CSES 14
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
650	TONS GROSS: 60180 TARE : 33540 NET : 26640 30 Yard trailer	13.32	

COPY 2

(DRIVER: PLEASE SIGN BELOW)

249848

REFERENCE NO. 249848

(PLEASE SIGN HERE)

John Hardin

GREENE VALLEY LANDFILL
WASTE MANAGEMENT OF ILLINOIS
9 S. 610 GREENE ROAD
NAPERVILLE, IL 60540
(708)983-8770

CUSTOMER NO.	TRUCK NO.	INITIALS	TIME	DATE	BATCH NO.
7251	LAIDLAWR	JZ	8:20:46	06/13/95	

LAIDLAW WASTE SYSTEMS R/O LOOS

CUSTOMER: 3851 BLACKHAWK
ROLLING MEADOWS, IL
COMMENTS: CSES
GEO SRC:

MANIFEST NO.

PERMIT NO.

LOAD CODE	LOAD DESCRIPTION	LOAD QUANTITY	AMOUNT
630	YARDS - ROLL OFF LO	20.00 → 40.00	
655	TONS - ROLL OFF LOO	10.30	
	GROSS: 65480		
	TARE : 44880		
	NET : 20600		

COPY 2

APPENDIX E

PERSONAL AIR MONITORING ANALYTICAL
LAKE SALVAGE REMEDIATION

MAXIM
TECHNOLOGIES INC

REPORT OF: CHEMICAL ANALYSES

PROJECT: 5546 **DATE:** July 17, 1995

REPORTED TO: Central States Environmental
Attn: Mr. Brian Copple
609 Airport Road;P.O. Box 684
Centralia, IL 62801

LABORATORY NO: 4411 95-60202

INTRODUCTION

This report presents the results of the analyses of five samples received in June, 1995, from a representative of Central States Environmental. The scope of our services was to analyze the samples for lead content.

METHODOLOGY

Due to instrument difficulties and the rush turnaround times requested, samples LS-01 through LS-04 were analyzed at an outside laboratory. Sample LS-05 was analyzed by Maxim Technologies staff following Method 7082 with analysis by inductively coupled plasma.

RESULTS

The results are listed in the attached tables.

REMARKS

The samples were consumed in the analysis.

Maxim Technologies, Inc.

Charles Sueper

Charles Sueper,
Scientist

LEAD RESULTS

(All values are reported in μg/sample)

Client ID	Sample #	Concentration	MDL	Analysis Date
LS-01	60629	4	2	6/16/95
LS-02	60630	2	2	6/16/95
LS-03	60632	8	2	6/16/95
LS-04	60740	26	2	6/19/95
LS-05	60741	13	1	6/27-28/95

MDL = Method Detection Limit

Reference: Methods for Chemical Analysis of Water and Wastes, EPA-600/4-79-020, March 1983.

Huntingdon

ENGINEERING & ENVIRONMENTAL, INC.
737 PELHAM BLVD., DOCK 4
ST. PAUL, MN 55114
PHONE 612/645-3601

CHAIN-OF-CUSTODY RECORD

LAB NO. 58757

Chuck Snepes 612/659-7520
HUNTINGDON CONTACT

CENTRAL STATES ENVIRONMENTAL
CLIENT NAME

LAKE SALVAGE / LITTON INDUSTRIES
PROJECT NAME

609 AIRPORT ROAD ; P.O. BOX 684
CLIENT ADDRESS (STREET NUMBER, SUITE, ETC.)

5546
CLIENT P.O. # / PROJECT NO.

CENTRALIA, IL 62801
CLIENT ADDRESS (CITY, STATE, ZIP)

CENTRAL STATES ENVIRONMENTAL
BILL TO (CO. NAME, ADDRESS)

609 AIRPORT RD. ; CENTRALIA, IL 62801

BRIAN COPPLE 618.532.4784
CLIENT CONTACT/ADDRESS IF DIFFERENT FROM ABOVE PHONE

SAME
REPORT TO

BRIAN COPPLE
SAMPLED BY PRINT NAME/SIGNATURE

LAB USE ONLY
PROJ. MGR.
PRIORITY
TEMPERATURE OF CONTAINER
SAMPLE CONDITION

HUNTINGDON PROJECT NO.
60202

EXPECTED TURNAROUND TIME

POSSIBLE HAZARD: YES ____ NO X UNKNOWN ____ (COMMENT BELOW)

SAMPLE DISPOSAL: RETURN TO CLIENT ____ DISPOSAL BY LAB X
(ADDITIONAL CHARGES MAY BE ASSESSED)

ANALYSES REQUESTED: LEAD-BY TCLP

LAB SAMPLE NO.	ITEM NO.	CLIENT SAMPLE ID.	MATRIX	LEAD-BY TCLP	DATE SAMPLED	TIME SAMPLED	NO. & TYPE OF CONTAINERS
60629	1	*LS-01*	AIR	X	6/12/95		
60630	2	*LS-02*	AIR	X	6/13/95		
(A) 60632	3	*LS-03*			6/14/95		rec. 6/15/95
	4						
	5						
(A) 60740	6	*LS-04*			6/15/95		rec. 6/16/95
(A) 60741	7	LS-05			6/16/95		rec. 6/14/95
	8						
	9						
	10						

RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME	RELINQUISHED BY/AFFILIATION	DATE/TIME	ACCEPTED BY/AFFILIATION	DATE/TIME
[illegible]	6/13/95 1830	[illegible]	6/14/95 [illegible]				

ADDITIONAL COMMENTS:

* RUSH *
* 24-HR TAT *

CALL W/ RESULTS
312.455.8797

VSS-6-20-95

(A) Per Brian Copple 6/16/95 [illegible]

APPENDIX F

SCRAP METAL & TIRE DISPOSAL RECEIPTS
LAKE SALVAGE REMEDIATION

149547

Cozzi®

IRON & METAL, INC.
2232 South Blue Island Ave. • Chicago, Illinois 60608
Phones: (312) 254-1200 (312) 927-6611

[redacted] C.S.E.S.

[redacted] CSES

[redacted] 14

[redacted]

[redacted] DATE

32120 12:26 P.M. 21 JUN 95 > 50500

[redacted] 18380 12:26 P.M. 21 JUN 95

[redacted] 29220 12:57 P.M. 21 JUN 95 44580

[redacted] 15360 12:58 P.M. 21 JUN 95

5920

mail check to 7/10/95

[redacted] Lng

[redacted] 2

[redacted]

[redacted] 80

[redacted] 36.80

SHIPPER'S NET

Cozzi®

149522

IRON & METAL, INC.
2232 South Blue Island Ave. • Chicago, Illinois 60608
Phones: (312) 254-1200 (312) 927-6611

[redacted] 2

[redacted] 24

[redacted]

[redacted]

CUSTOMER: CENTRAL STATES ENVIRONMENTAL SERVICES

WEIGHT	TIME	DATE
37440	7:30 A.M.	21 JUN 95
GRS 24680	7:07 A.M.	21 JUN 95
TARE 29440	7:32 A.M.	21 JUN 95
NET 15340	7:34 A.M.	21 JUN 95

62400

44750

DEDUCTION: [illegible] CONCRETE

MATERIAL: UNP 12260 UNPSTL 12750

DEDUCTION:

NET WEIGHT: 170.40

PRICE: 80 90

[redacted] 170.40 [illegible]

PAID JUN 21 1995

Cozzi®

IRON & METAL, INC.
2232 South Blue Island Ave. • Chicago, Illinois 60608
Phones: (312) 254-1200 (312) 927-6611

149375

Central St. Elec. Commission

[redacted]

[redacted] 24

[redacted]

[redacted]

	WEIGHT	TIME	DATE
GRS	33840	2:17 P.M. 15 JUN 95	>54380
TARE	20540	2:19 P.M. 15 JUN 95	
NET	29080	2:10 P.M. 15 JUN 95	>44500
	15420	[illegible]	

DEDUCTION		MATERIAL	UNP
DEDUCTION	9880		
NET WEIGHT		PRICE	
SHIPPER'S NET	2000 CON		

[redacted]

JUN 15 1995

[redacted]

GENERAL IRON INDUSTRIES, INC.

1909 NORTH CLIFTON STREET
CHICAGO, ILLINOIS 60614
(312) 327-9600

No. M 24082

NAME A. white

G	15300	
T	11460	
N	3840	
ADJ		

DATE 6-21

MAN - - - ON - - - OFF

AMOUNT 134.40

JUN 21 1989

ICE

National Tire Services, Inc.
3215 Butler Avenue
South Chicago Heights, IL 60411-5504
Tel.# 708-709-2240 • Fax# 708-709-2246

"JOE"

DIVISION	01- Chgo
TICKET NO.	
DATE	6-14-95

Lake + western
Chgo, IL

SOLD TO: LAID LAW

BILL TO: 1-815-962-1132

TERMS	DRIVER	STATUS
	TONY Grillo	1x Deal

PART NO.	DESCRIPTION	QUANTITY	UNIT PRICE	EXTENDED AMO
700	Trailer			
1000	Passenger	403		
1100	Semi	9		
	Picked up on 6-14-95			

RECEIVED BY: Central States

QUANTITY TOTAL _____ AMOUNT _____

BRIAN COPPLE

ORIGINAL COPY

APPENDIX G

DAILY SIGN-IN SHEETS
LAKE SALVAGE REMEDIATION

DAILY SIGN-IN

DATE: 4/10/95

LAKE SALVAGE SITE REMEDIATION
CHICAGO, IL

NAME	COMPANY
1) Brent Copple	Central States
2) Curtis Copple	Central States
3) John Nordine	Ecology & Environment, Inc. TAT
4) MICHAEL MARLAINEN	TILHE & BOND
5) Lois Hefaneke	CENTRAL STATES
6) Darrell Madison	CENTRAL STATES
7)	
8)	
9)	
10)	

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

Daily Sign-In

Date: 7/12/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Angie O'Gurnier	CSES
3	Edwin Copple	CSES
4	[illegible]	CSES
5	John Gardner	CSES
6	Michael Mittelman	Tyke + Bond
7	Larry Lueck	Ecology & Environment, Inc
8	Fred Bartman	USEPA
9	Michael P. Stone	CSES
10	Jeff Koch	CSES
11	Keith Bottomy	CSES
12	Jim Duncan	CSES
13	Danny Wilkins	CSES
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Daily Sign-In

Date: 6/13/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Mikel Matelainen	Tighe + Bond.
3	Angie Obermeier	CSES
4	Fred Bartman	USEPA
5	LARRY LUECK	E&E TAT
6	[illegible]	CSES
7	[illegible]	CSES
8	Michael Stan	CSES
9	[illegible]	CSES
10	Keith Pelkany	CSES
11	Danny Willis	CSES
12	Jeff Koch	CSES
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Daily Sign-In

Date: 6/14/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Angie Obermeier	CSES
3	John Garden	CSES
4	Michael Matlaman	Tyler + Bond
5	[illegible]	CSES
6	Michael D Stone	CSES
7	[illegible]	CSES
8	[illegible]	CSES
9	[illegible]	CSES
10	Keith Bellamy	CSES
11	LARRY LUECK	E&E TAT
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Daily Sign-In

Date: 6/15/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Michael Mertelainen	Tighe & Bond
3	Angie Obermeier	CSES
4	Michael D Stern	CSES
5	Jeff Koch	CSES
6	Keith Bethany	CSES
7	[illegible]	CSES
8	[illegible]	CSES
9	John Garden	CSES
10	[illegible]	CSES
11	Danny Wilkins	CSES
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Daily Sign-In

Date: 6/16/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Jeff Koch	CSES
3	[illegible]	CSES
4	Keith Bethany	CSES
5	[illegible]	CSES
6	[illegible]	"
7	[illegible]	"
8	Michael Matelaurin	Tyler and Bond
9	Dany [illegible]	CSES
10	Angie Obermeier	CSES
11	John Gardner	CSES
12	[illegible]	CSES
13	Fred Bartman	USEPA
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Daily Sign-In

Date: 6/19/95

Lake Salvage Site Remediation
Chicago, Illinois

Name	Company
1	CSES
2	CSES
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Daily Sign-In

Date: 6/19/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	[illegible]	CSES
3	Jeff Koch	CSES
4	[illegible]	CSES
5	[illegible]	CSES
6	Michael Matilainen	Tyler + Bond
7	[illegible]	CSES
8	[illegible]	CSES
9	Amy Wilkins	CSES
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Daily Sign-In

Date: 6/20/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	Angie Obermeier	CSES
3	Mike McKilarian	Tighe + Bond
4	Jeff Kow	CSES
5	[illegible]	CSES
6	Danny [illegible]	"
7	[illegible]	CSES
8	[illegible]	CSES
9	[illegible]	"
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Daily Sign-In

Date: 6/21/95

Lake Salvage Site Remediation
Chicago, Illinois

	Name	Company
1	[illegible]	CSES
2	[illegible]	"
3	[illegible]	"
4	[illegible]	"
5	[illegible]	"
6	Angie Oberweis	CSES
7	Michael D Stair	"
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APPENDIX H

MSDS SHEETS
LAKE SALVAGE REMEDIATION

CHEMICAL SOLUTIONS INTERNATIONAL

PCB's • Mercury • Nuclear • Heavy Metals • Pesticides

HEAVY METAL CLEANING SOLUTION (HMCS-101)

I. **HMCS-101** is specifically formulated to clean certain heavy metals from concrete, metal and plastic surfaces. Before using the product, all debris should be removed from the surface to be cleaned. Once this is accomplished, the following steps should be taken.

II. **Application Instructions** are as follows:

A. Apply **HMCS-101** by spraying, painting, etc., so that the chemical comes in contact with all surfaces to be cleaned. To clean pipe and tubing, fill it with the solution.

B. If possible, the surface should then be brushed to agitate the product to enhance cleaning. This will not be possible with pipe and tubing unless a pig is used.

C. Allow the material to be in contact with the surface to be cleaned for approximately 15 minutes. For highly contaminated surfaces or where there is heavy sludge in pipe or tubing, allow a set time of 20 to 25 minutes. For subsurface cleaning allow one (1) hour set time.

D. **HMCS-101** should then be removed with high pressure water or steam. If in an area where this is not possible, simply clean by applying water and wiping with absorbent cloths.

E. Effluent should be collected and disposed of in accordance with applicable State or Federal Regulations.

F. If more than one application is needed, repeat steps A. through E.

Note: For surfaces with minimum contamination levels **HMCS-101** may be diluted up to 5 to one with water. When cleaning pipe or tubing, the solution may be used more than once if the contamination level is low or it is run through a filtering system after each use.

HMIS CODE: Health 1, Flammability 0, Reactivity 0, Personal Protection B

Material Safety Data Sheet

May be used to comply with OSHA's Hazard Communication Standard, 29 CFR 1910.1200. Standard must be consulted for specific requirements.

U.S. Department of Labor
Occupational Safety and Health Administration
(Non-Mandatory Form)
Form Approved
OMB No. 1218-0072

IDENTITY (As Used on Label and List)
Heavy Metal Cleaning Solution

Note: Blank spaces are not permitted. If any item is not applicable, or no information is available, the space must be marked to indicate that.

Section I

Manufacturer's Name CHEMICAL SOLUTIONS INTERNATIONAL CORP.	Emergency Telephone Number (713) 992-3031
Address (Number, Street, City, State, and ZIP Code) P.O. BOX 891185	Telephone Number for Information (713) 992-3031
Houston, TX 77289-1185	Date Prepared 10/90
	Signature of Preparer (optional)

Section II — Hazardous Ingredients/Identity Information

Hazardous Components (Specific Chemical Identity; Common Name(s))	OSHA PEL	ACGIH TLV	Other Limits Recommended	% (opt.)
LESS THAN 10 is a proprietary formulation which contains small amounts of mineral and organic acids and this product should be handled accordingly. Complies with OSHA 29 CFR XVIII-1910.1200 Section (i) "Trade Secrets". Contains no hazardous components under current OSHA definitions.				

Section III — Physical/Chemical Characteristics

Boiling Point	212°F	Specific Gravity (H_2O = 1)	1.06
Vapor Pressure (mm Hg.) Same as water		Melting Point	NA
Vapor Density (AIR = 1) Same as water		Evaporation Rate (Butyl Acetate = 1)	L1

Solubility in Water
Soluble in all ratios, pH is greater than 2.2

Appearance and Odor
Clear liquid with medium viscosity and lemon odor.

Section IV — Fire and Explosion Hazard Data

Flash Point (Method Used) None COC	Flammable Limits NA	LEL	UEL
Extinguishing Media NA			
Special Fire Fighting Procedures NA			
Unusual Fire and Explosion Hazards			

FIBERLOCK TECHNOLOGIES, INC.
630 Putnam Avenue
P.O. Box 432
Cambridge, MA 02139-0432
Tel. (617) 876-8020
FAX (617) 547-6934

L-B-C™

*Lead Barrier Compound**

Certifications:
- UL® Classified
- U.S.D.A. Approved
- DL Labs Approved
- State Certified

Independently Certified for:
- A.S.T.M. (Proposed Standard)
- E.P.A. Requirements
- H.U.D. Standards
- O.S.H.A. Standards
- Federal, state, local regulations

Specified by:
- Department of Defense (D.O.D.)
- Housing and Urban Development (H.U.D.)
- Industry (Industrial Hygienists)
- Schools, Hospitals and Public Health Officials.

L-B-C contains Bitrex®, a very bitter tasting anti-ingestion agent which is E.P.A. accepted and F.D.A. approved.

L-B-C is environmentally friendly and is certified non-toxic.

L-B-C resists fungus and mildew.

L-B-C is class "A" fire rated.

L-B-C can be used on interior and exterior surfaces.

L-B-C has ultraviolet (UV) protection.

Recommended Coverage:
- 7 Dry Mils (15 - 18 wet mils)
- 90 - 100 square feet per gallon
- Airless spray, roller, or brush.

Special note for airless spray application:
Unlike most competitive products, L-B-C will yield the recommended dry film thickness in only one application. As a result, contractors purchase less encapsulant, and witness higher profits margins due to reduced labor costs.

Packaged in:
- 1 Gallon cans
- 5 Gallon pails
- 55 Gallon drums

Guaranteed for 20 years

Patent Pending

L-B-C provides maximum coverage with minimum thickness, for the most economical solution available.

L-B-C is a one step process.
- no mesh, scrim, or wire brush required
- one product meets all encapsulation needs.

L-B-C creates a flexible, impact - abrasion resistant barrier that resists aging and surface movement.

L-B-C cleans off tools and drippings with warm soapy water.

* Patent Pending

11/10/94

PRODUCT DATA

L-B-C™
LEAD BARRIER COMPOUND*

DESCRIPTION

Product No.: 5400; Color: Antique Linen

L-B-C is a elastomeric-thermoplastic water-based co-polymer; blended specifically to form a barrier to lead-based paint (LBP). It has been independently tested and approved by DL Laboratories in New York and certified by the Commonwealth of Massachusetts (No. DL-9977). L-B-C has also been classified by Underwriters Laboratories (UL®) and approved by the U.S. Department of Agriculture (U.S.D.A.). L-B-C is unique in that it is the only true encapsulant on the market today since it actually prevents the migration of lead to the surface, thus eliminating future lead dust contamination and potential liability. In addition, L-B-C meets or exceeds all projected standards; federal, state, local, ASTM, EPA, HUD, and OSHA, for encapsulation of surfaces containing such paint. L-B-C contains Bitrex®, a bitter tasting anti-ingestion agent which is EPA accepted and FDA approved. L-B-C is environmentally friendly and complies with all federal and state VOS/VOC requirements.

PROPERTIES

- Solids by weight: 54 ±2%; by volume: 42 ±2%
- Volatile: Water
- Average particle size: 0.2 microns
- Viscosity at 77°F: 120-130 Krebs Units
- Density @ 77°F: 10.1 ± 0.2 lbs./gal.
- Flash point: Non-combustible (water based).
- Odor: Applied indoors, virtually odorless.
- Shelf Life: @ 77°F, 36 months minimum, (in original factory sealed containers).
- Finish: Eggshell. 60° specular gloss 17 ±5
- Weight per gallon at 77°F: 10.2 lbs.
- Minimum dry film thickness: 7 mils
- Coverage:
  Airless Spray: 90 - 100 sq. ft./gal. (7 dry mils)
  Brush: 200 sq. ft./gal. (3-4 dry mils)
- Dry time @ 77°F:
  To touch: 1-2 hours
  Full cure: 12-24 days
- Fire rating ASTM E84-81a: Class "A"
  (Southwest Research Institute)
  Flame Spread: 0
  Fuel Contribution: 5
- Packaged: 1, 5, and 55 gallon containers

SURFACE PREPARATION

Consult all related local, state and federal regulations regarding work practices and personal protection to be used prior to surface preparation. Sanding, scraping and other surface preparation procedures can create toxic dust and hazardous waste. A HEPA (High Efficiency Particulate Air) vacuum should be used on all surfaces to remove hazardous dust and particles. Use MSHA/NIOSH approved or equivalent respiratory protection suitable for concentrations and types of air contaminants encountered. For detailed and specific information regarding proper surface preparation, refer to L-B-C specification.

Inspect all surfaces to be treated to insure they are clean, dry and free of all foreign matter including; dust, rust, grease, oil, mildew, glue size, calcimine, wax, soap, loose paint, etc. Patch and repair irregularities in surfaces with prepared vinyl paste or appropriate patching compound. Allow to dry and wet sand smooth. Use Power Block™ or any other approved stain blocking primer for surfaces which have been water damaged or discolored. For high gloss or newly painted surfaces, wet scour with a coarse scouring pad and Lead-Prep™ (I or II) or any other approved surface preparation treatment. Wear gloves and protective eye wear if using caustics.

*Patent Pending

FIBERLOCK TECHNOLOGIES, INC.
630 Putnam Avenue, P.O. Box 390432
Cambridge, MA 02139-0802 U.S.A.
Toll Free: 1-800-FIBERLK
Tel. (617) 876-8020
FAX (617) 547-6934

APPLICATION PROCEDURES FOR L-B-C, LEAD BARRIER COMPOUND

APPLICATION TOOLS

Apply L-B-C with a brush, roller, or airless spray equipment. Refer to the product application section below for more specific information on settings and which tools to select.

MIXING

Stir thoroughly. Do not dilute, thin, tint or mix with any other product.

PRODUCT APPLICATION

Apply liberally and uniformly with a polyester or nylon brush to woodwork and trim. Multiple coats may be necessary to achieve required, recommended or desired dry thickness. For best results when applying L-B-C with a roller, use a 3/8" - 1/2" nap. Let L-B-C dry before applying additional coats. L-B-C may be painted over to provide desired aesthetic finish.

L-B-C can be successfully applied in a one coat application with most airless spray equipment including Graco®, Wagner®, Titan®, Binks® and Hero®.

Recommended settings for airless spray equipment:

Pressure: 1800 - 2000 psi
Hose length: 50 - 100 feet
Hose diameter: 1/4 inch
Tip orifice size: 0.021" - 0.025" (ideal setting: 0.023")
Tip fan size: 521

CLEAN UP

Clean tools and drippings with warm soapy water before L-B-C dries. Dispose of all waste according to all existing local, state and federal regulations.

KEEP OUT OF REACH OF CHILDREN
FOR PROFESSIONAL USE ONLY
KEEP FROM FREEZING

Cautions:
Use with adequate ventilation to avoid over exposure. Although L-B-C contains no hazardous ingredients, wear a MSHA/NIOSH approved or equivalent respirator capable of filtering out the airborne spray mists which contain the bitter tasting anti-ingestion agent. Avoid contact with eyes and skin. Wash hands after using L-B-C. L-B-C will not protect occupants from ingestion of the encapsulated lead-based paint, if surface is damaged, broken or abraded. Surfaces coated with L-B-C must be inspected routinely. Damaged surfaces should be repaired and re-encapsulated immediately to prevent exposure to the lead hazard. Not recommended for use on friction surfaces or movable closures such as door and window jambs, since the coating thickness may alter clearances and affect proper operation. L-B-C is safe for the presence of children after it has fully cured.

Limited Warranty:
Fiberlock Technologies, Inc., warrants L-B-C for a minimum of twenty (20) years from the date that the product is applied to form an effective barrier from the hazards of the encapsulated lead-based paint. The warranty described in this paragraph, expressed or implied, is including but not limited to the implied warranties of salability and fitness for a particular purpose. User shall determine the suitability of L-B-C's use and assume any and all risks and liabilities which may arise in connection with the application of L-B-C. This warranty is extended only to the purchaser of L-B-C and does not apply to any damages which are a direct result of improper surface preparation and or application.
This warranty does not extend to, nor shall Fiberlock Technologies be liable for any damage resulting from any abuse to the encapsulated surface by tenants or occupants, improper maintenance, water damage, or other conditions beyond Fiberlock Technologies' control. Fiberlock Technologies' sole and only liability under this warranty shall be, at its option, either replace the product if proved defective or to refund the purchase price paid. Fiberlock Technologies shall not be held liable for any incidental damages, or for any consequential damages to property, or any losses of revenue which may have been caused by a defect or product failure. The purchaser of this product must notify Fiberlock at 630 Putnam Avenue, Cambridge, Massachusetts 02139 (617-876-8020) within forty five (45) days to advise of any suspected manufacturing defects. This warranty gives the purchaser specific legal rights and possible additional rights which may vary from State to State.

MATERIAL SAFETY DATA SHEET

(Essentially similar to OSHA form 174, Sept. 1985
For compliance with OSHA's Hazard Communication Standard, 29CFR 1910.1200)

SECTION I: PRODUCT IDENTITY:

L-B-C® Lead Barrier Compound
#5400 Antique Linen

Manufacturer:
Fiberlock Technologies, Inc.
630 Putnam Avenue
Cambridge, MA 02139-0432

Date of Preparation: 11/5/93
Information Phone Number: (617) 876-8020
Emergency Phone Numbers:
Weekdays 617-876-8020
Weekends & Holidays (508) 887-5926 or
"CHEM-TEL" Emergency Contact Number
(800) 255-3924

SECTION II: HAZARDOUS INGREDIENTS/IDENTITY INFORMATION

Hazardous Components:	Common Names:	CAS No.:	OSHA PEL or ACGIH TLV:

None per the limits for reporting set forth in 29CFR 1910.1200 (1)

SECTION III: PHYSICAL/CHEMICAL CHARACTERISTICS (See Reference Notes)

Boiling points of Major Constituent(s):	Water-212°F
Specific Gravity (Water=1) lbs/gal:	10.4 lbs/gal
Vapor Pressure (mm Hg) at 100°C:	760 mm
Melting Point Water (Ice):	Above 32°F
Vapor Density (AIR=1):	Heavier
Evaporation Rate (Butyl Acetate=1):	Slower
Solubility in Water:	Complete
Appearance:	Liquid
Odor:	Slight odor

SECTION IV: FIRE AND EXPLOSION HAZARD DATA - Non-flammable

Flash Point: Non-combustible Flammable Limits: LEL: N/A UEL: N/A
DOT Hazard Class: Not Regulated Marking: "Keep from Freezing"

SECTION V: REACTIVITY DATA

Hazardous Polymerization: Will not occur
Stability: Stable
Incompatibility: Avoid Contact with: Strong oxidizing agents (e.g. nitric acid, permanganates)
Hazardous Decomposition Products: Some carbon monoxide

SECTION VI: HEALTH HAZARD DATA/TOXICITY DATA (See Note)

Route(s) of Entry: N/A Carcinogenicity?: NO

Health Hazards (Acute and Chronic):
EFFECTS OF OVEREXPOSURE: Inhalation: Vapors or spray mists may be slightly irritating to the eyes, nose, throat, and mucous membrane of the respiratory tract, producing symptoms of a headache and nausea in poorly ventilated areas. Skin Contact: Prolonged or repeated contact with coating may cause slight skin irritation. Eye Contact: Direct contact; inconsequential eye irritation. Ingestion: May cause nausea and intended expectoration. (2)
EMERGENCY AND FIRST AID PROCEDURES: Inhalation: Remove to fresh air. Eye Contact: Immediately flush eyes with plenty of water for at least 15 minutes and consult a physician. Skin Contact: Wash skin thoroughly with soap and water. If drenched, remove and wash clothing before reuse. Ingestion: If victim is conscious, give 2 glasses of water. Call a physician.

NOTES: (1) This product contains titanium dioxide pigment classified by ACGIH as a "nuisance dust". Exposure to spray mists or sanding dusts should be controlled to below 10 mg/m³ through usage of NIOSH-approved dust filter respirators. (2) Contains 0.04% (Denatonium Benzoate NF - XVII) as an anti-ingestion agent — yields a very bitter taste.

SECTION VII: PRECAUTIONS FOR SAFE HANDLING AND USE

STEPS TO BE TAKEN IN CASE MATERIAL IS RELEASED OR SPILLED: Keep unnecessary people away. Floor may be slippery; use care to avoid falling. Dike and contain material with inert material (e.g. sand, earth). Transfer liquid to containers for recovery or disposal and solid diking material to separate containers for disposal. Keep spills and cleaning run-offs out of municipal sewers and open bodies of water.

WASTE DISPOSAL METHOD: The coating and any contaminated diking material should be thoroughly air dried and collected into drums. The drums should then be sealed and properly labeled with waste designation and landfill or incinerated according to current local, state and federal regulations.

PRECAUTIONS TO BE TAKEN IN HANDLING AND STORING: Maximum storage temperature 100 degrees Fahrenheit. Keep closure tight and container upright to prevent leakage. Precautionary Labeling: "Keep from Freezing".

OTHER PRECAUTIONS: Do not get in eyes. Avoid skin contact. Prevent prolonged or repeated breathing of vapors or spray mists. Do not handle until the manufacturer's safety precautions and label instructions have been read and understood. Avoid breathing sanding dust.

SECTION VIII: CONTROL MEASURES

RESPIRATORY PROTECTION: None required if good ventilation is maintained. Wear respirator (MSHA/NIOSH-approved or equivalent) suitable for concentrations and types of air contaminants encountered. Use approved chemical/mechanical filters designed to remove particulates in open and restricted ventilation areas. Use MSHA/NIOSH-approved airline type respirator or hood in confined areas.

VENTILATION: Sufficient ventilation, in pattern and volume, should be provided to keep the air contaminant concentration below applicable exposure limits. All application areas should be ventilated in accordance with OSHA regulation 29CFR Part 1910.94.

PROTECTIVE GLOVES: Impervious gloves should be worn if prolonged skin contact is likely. Use neoprene or rubber gloves to prevent prolonged skin contact.

Eye Protection: Use safety eyewear including side shields, face shields, or chemical splash goggles (ANSI Z-87.1 or approved equivalent).

OTHER PROTECTIVE EQUIPMENT: Use disposable or impervious clothing if work clothing contamination is likely. Use protective cream if prolonged skin contact is likely.

HYGIENIC PRACTICES: Wash hands before eating, smoking or using the washroom. Food or beverages should not be consumed anywhere this product is being applied.

REFERENCES:

1. Sax, N.I., "Dangerous Properties of Industrial Materials", 6th ed., Van Nostrand Reinhold Company Inc., N.Y., 1984.
2. American Conference of Governmental Industrial Hygienists, "TLV's and Biological Exposure Indices" for the current year (published annually).
3. U.S. Code of Federal Regulations (CFR) U.S. Dept. of Labor, No.29, Parts 1900 to 1910.1200. OSHA Communication Standard 29CFR 1910.1200.
4. Sax, N.I., Lewis, R.J. "Hazardous Chemicals Desk Reference", Van Nostrand Reinhold Co., Inc., N.Y., 1987.

Supplemental Information
to comply with New Jersey DOH Right-To-Know Labeling Law (N.J.A.C. 8:59 -5.1 & 5.2)

HMIS	
HEALTH	1
FLAMMABILITY	0
REACTIVITY	0
PERSONAL	B

CAS No.:	Chemical Ingredients:
7732-18-5	Water
1317-65-3	Calcium carbonate
13463-67-7	Titanium dioxide
Not Available	*Latex resin solids
57-55-6	Propylene glycol

*Contents partially unknown

Just add a Painter and you've got a Whole Crew

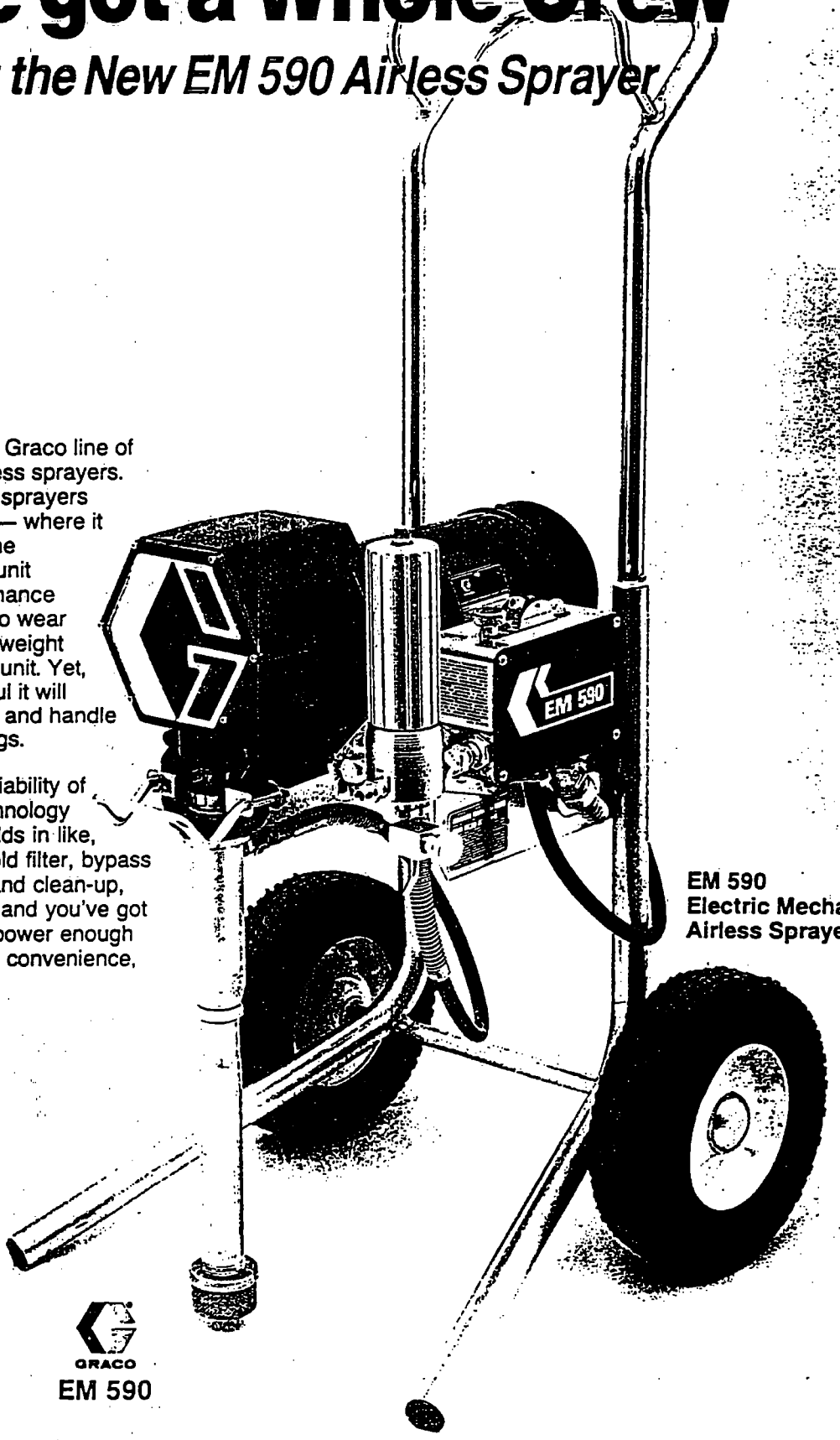
introducing the New EM 590 Airless Sprayer

GRACO

Powerful... Portable... Economical...

The latest addition to the Graco line of mechanically driven airless sprayers. The EM series of airless sprayers have proven their worth — where it counts on the job site. The EM 590 is a direct drive unit providing greater performance and fewer moving parts to wear or repair. The unit is lightweight and an ideal one painter unit. Yet, this sprayer is so powerful it will spray with tips up to .025 and handle most architectural coatings.

Add to this the known reliability of Graco's piston pump technology and the extras Graco builds in like, longer life motors, mainfold filter, bypass valve for easier priming and clean-up, reliable pressure control; and you've got the best of all worlds — power enough for the job combined with convenience, reliability and portability.



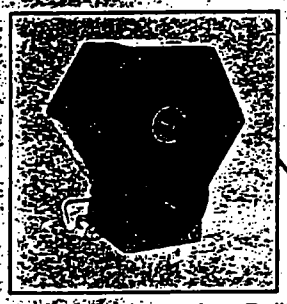
EM 590
Electric Mechanical
Airless Sprayer

GRACO
EM 590

Convenient Features, Portable Operation

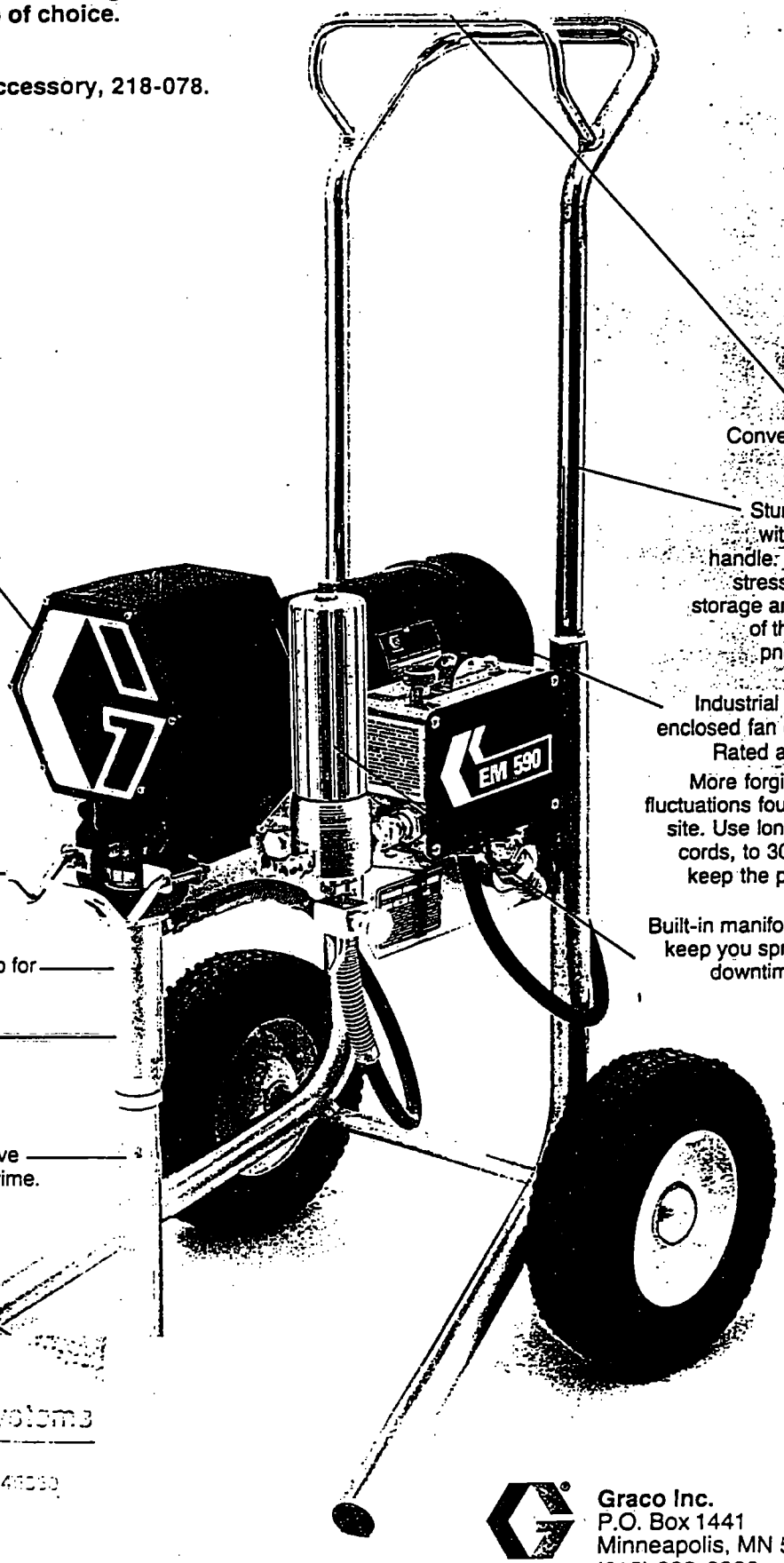
231-590 Complete unit includes: sprayer, 50 ft. x ¼ in. ID airless hose, 3 ft. whiphose, Flex gun, RAC IV Dripless Guard and SwitchTip of choice.

220-856 Sprayer only.
Order optional siphon hose accessory, 218-078.



Graco tough gearing. Built to last and lifetime lubrication means no maintenance of this part.

Motor life, gearing life, along with convenient features make the Graco EM 590 a better value.



Hose rack. Convenient storage of the hose.

Sturdy metal cart with telescoping handle. Reinforced at stress points. Easy storage and movement of the unit. Semi-pneumatic tires.

Industrial Grade, totally enclosed fan cooled motor. Rated at 2000 hours.

More forgiving of power fluctuations found on the job site. Use longer extension cords, to 300 ft., and still keep the power flowing.

Built-in manifold filter. Helps keep you spraying without downtime from clogs.

5 gallon pail hook. Added convenience — move your paint with the unit.

Nitralloy, hardened steel piston pump for longer life. Spray stains to hi-builds.

Graco's exceptional packing design extends the life of the packing 40-50% reducing maintenance cost and time.

Upright, Immersed Feed. More positive loading of the pump and an easier prime.

Inlet Screen.
Filters paint as you spray.

Distributed by:

CPS Environmental Systems

670 Mariner Drive
Michigan City, Indiana 46360
Phone (219) 872-5501
(800) 272-3766

Graco Inc.
P.O. Box 1441
Minneapolis, MN 55440-1441
(612) 623-6000

GRACO

Graco — We make equipment to help the painting contractor be more profitable.

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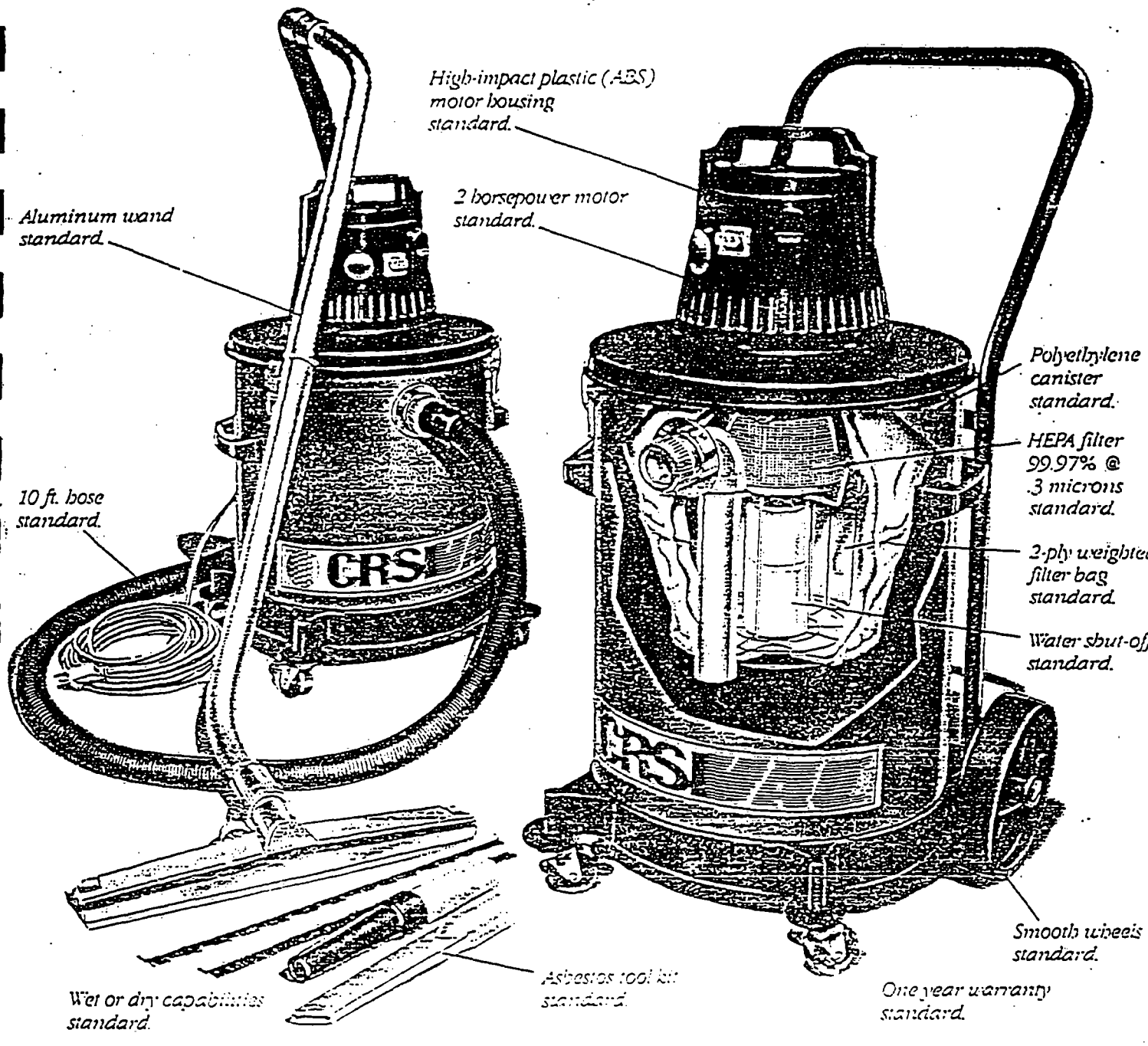
"...Standard."



CRSI sets the standard. Our two asbestos canister vacuums are equipped with significantly improved power heads over traditional models. Powered by 2-horsepower, 1270 watt* by-pass Lamb® motors, these polyethylene CRSI VACs are much stronger and more durable than stainless steel or metal built vacs. The CRSI VACs are built with a self-cleaning, three-stage, floating filter system, and automatic wet shut off. These and many other innovative features *are all standard.*

*CRSI Vacs deliver 107 CFM of air and 100 inches of water lift for a true 1270 watts of performance.

Control Resource Systems, Inc.

670 Mariner Drive, Michigan City, Indiana 46360
[illegible]

CRSI
Environmental Systems
A Subsidiary of Control Resource Industries, Inc.
670 Mariner Drive
Michigan City, Indiana 46360
Phone (219) 872-5591

CRSI VACUUM SPECIFICATIONS

Capacity	15 and 7-1/2 gallon
Electrical	115 Volt - 9.1 amps
Construction	ABS and Polyethylene
Air Volume	107 cfm
Water Lift	100 inches
Filter Efficiency	99.97% @ .3 micron

Testing in accordance with mil spec. 282 and QAP-12 HEHF 41.

MSA

Powered Air-Purifying Respirator

Type A instructions

WARNING

THIS MANUAL MUST BE CAREFULLY READ BY ALL PERSONS WHO HAVE OR WILL HAVE THE RESPONSIBILITY FOR USING OR SERVICING THE PRODUCT. Like any complex piece of equipment, the Powered Air-Purifying Respirator (PAPR) from MSA will perform as designed only if it is used and serviced according to the instructions. OTHERWISE, IT COULD FAIL TO PERFORM AS DESIGNED, AND PERSONS WHO RELY ON THIS RESPIRATOR COULD SUSTAIN SEVERE RESPIRATORY INJURY OR DEATH.

The warranties made by Mine Safety Appliances Company with respect to the product are voided if the product is not installed, used, and serviced in accordance with the instructions in this manual. Please protect yourself and your employees by following the instructions.

Please read and observe the WARNINGS and CAUTIONS inside. We encourage our customers to write or call for a demonstration of this equipment prior to use or for any additional information relative to use or repairs.

Call 1-800-MSA-2222 during regular working hours, or 1-800-MSA-5555 after working hours or during emergencies.

Manufactured by

MINE SAFETY APPLIANCES COMPANY

PITTSBURGH, PENNSYLVANIA, U.S.A. 15230

TAL 785 (L) REV. 0 485415

Contents & Important Notice

TABLE OF CONTENTS

IMPORTANT NOTICE FOR RESPIRATORY PROTECTION PROGRAM ADMINISTRATORS 2
DESCRIPTION 3
Limitations 3
Principle of Operation 3
Unpacking and Inspection 3
Preparation Before Use 3
Filter Removal and Battery Charging 4
WARNING 5
Reattaching the Battery Pack and Installing Filters 5
WARNING 6
DONNING THE RESPIRATOR 7
WARNING 7
Donning the Support Belt 7
Donning the Comfo® and Comfo Welder's Facepiece 7
Donning the Ultravue® Facepiece 8
WARNING 8
Air-Tightness Test (Face-to-Facepiece Seal) 9
WARNING 9
Final Hook-up 9
USING THE RESPIRATOR 10
Service Time (Filters and Battery Pack) 10
In Case of Emergency 10
WARNING 10
Replacing the Filters and Battery Pack 10
WARNING 10
Decontamination 11
Removing the Respirator 11
Removing the Comfo and Comfo Welder's Facepiece 11
Removing the Ultravue Facepiece 11
MAINTAINING THE RESPIRATOR 12
WARNING 12
Cleaning and Sanitizing 12
WARNING 12
Component Inspection 12
WARNING 12
Respirator Storage 12
Accessories 12
Spare Parts List 14
Ordering Information 14
APPROVALS 16

IMPORTANT NOTICE FOR RESPIRATORY PROTECTION PROGRAM ADMINISTRATORS

1. An adequate respiratory protection program must include knowledge of hazards, hazard assessment, selection of proper respiratory protective equipment, instruction and training in the use of equipment, inspection and maintenance of equipment, and medical surveillance. (See OSHA regulations, Title 29 CFR, Part 1910.134, Sub-part par. 1910.134 (b) (1).)
2. This respirator will perform as designed only if used and maintained according to the manufacturer's instructions. The Program Administrator and the users must read and understand these instructions before trying to use or service this product. We encourage our customers to write or call for information on this product before using it.
3. This respirator may be used only after proper instruction and training in its use as specified in OSHA regulations (Title 29 CFR, Part 1910.134, Subpart I, par. 1910.134 (b) (3)).
4. This respirator may not be worn in an atmosphere which is immediately dangerous to life or health or from which the wearer cannot escape without the aid of a respirator. Under no circumstances should the respirator be used as an underwater device.
5. Users must wear suitable protective clothing (see page 7) and precautions must be taken so that the respirator is not worn in atmospheres that may be harmful to the device (see page 10).
6. Do not alter, modify, or substitute any components without the approval of the manufacturer. Such alterations will void the NIOSH/MSHA approval.
7. Inspect the respirator regularly and maintain it according to the manufacturer's instructions. Repairs must only be made by properly trained personnel.

Description

DESCRIPTION

The Powered Air-Purifying Respirator (PAPR) is certified by the National Institute for Occupational Safety and Health (NIOSH) and the Mine Safety and Health Administration (MSHA) as an air-purifying device designed for use in atmospheres not immediately dangerous to life or health:

> "Not immediately dangerous to life or health means any hazardous atmosphere which may produce physical discomfort immediately, chronic poisoning after repeated exposure, or acute adverse physiological symptoms after prolonged exposure (Title 30 CFR, Part 11, Subpart A, par. 11.3(z)).

The PAPR can be used with the Comfo® half facepiece, Comfo® Welder's half facepiece, and Ultravue® full facepiece. The Ultravue facepiece is available with an integral welder's lens or may be used with the clip-on welder's adapter (see page 14). All facepieces are available in small, medium or large. Rubber or silicone material may be selected.

The respirator consists of the following sub-assemblies:

- a motor-blower (with a flexible rubber breathing tube attached);
- a rechargeable nickel-cadmium battery pack;
- a set of 2 replaceable Type A filters;
- a tight-fitting facepiece (half or full, in small, medium, or large);
- a support belt;
- a battery charger;

The motor-blower, battery pack and filters are worn as an assembly on the support belt. The breathing tube connects the belt-mounted assembly to the facepiece.

A. Limitations

The PAPR is certified for wearer protection against dusts, fumes and mists which have a time-weighted average (TWA) of less than 2 million particles per cubic foot and dusts and mists containing asbestos. The PAPR also is permissible in methane-air atmospheres. PAPR filters do not remove poisonous gases or vapors from the air supply. No filter is designed for all substances. Therefore, you must know what the contaminant is, as well as its concentration, before selecting a respirator. This respirator does not supply oxygen. Do not use this respirator unless the surrounding air contains a minimum of 19.5 percent oxygen. The respirator may be used at temperatures between 0°F and 120°F, and may be worn under flame-retardant garments. If used below 40°F, a fully-charged battery will not operate the motor-blower for 7 continuous hours.

B. Principle of Operation

The motor-blower draws surrounding air through the filters which capture the contaminant. Filtered air passes through the breathing tube to the facepiece. Air pressure in the facepiece is higher than the surrounding air. This means that if a leak occurs, air will flow from inside the facepiece to the outside air. This is referred to as positive pressure. Air flow also provides wearer comfort.

The rechargeable nickel-cadmium battery pack supplies 4.5 volts (nominal) to the motor-blower. The battery is replaceable. A fully charged battery is designed to operate a minimum of 7 hours. Battery charging time is 16 hours.

The two replaceable filter cartridges which trap the particulate contaminant are 99.97% efficient against 0.3 micron DOP smoke.

C. Unpacking & Inspection

The PAPR consists of the following components:

facepiece
motor-blower, battery pack and filters (as a single assembly)
support belt
charger
protective cover

CAUTION

Thoroughly inspect all components of the respirator before the device is used. Read and observe all NIOSH/MSHA approval limitations as they apply to using the PAPR.

1. Remove the facepiece, battery charger, support belt, and the protective cover from the box. Check for signs of shipping damage.
2. Remove the remaining assembly (motor-blower and attached breathing tube, the battery pack and the two filters). Check for shipping damage

CAUTION

Do not drop the PAPR. The case may be damaged by impact. The blower may be loosened or the motor shaft may be bent. If the unit is dropped. check the case for cracks. Listen closely to the sound of the motor. If the blower sticks or rattles, or if air output is reduced, the entire motor-blower must be returned to MSA for repair.

D. Preparation Before Use

1. Filter Removal and Battery Charging
   The battery pack must be fully charged for 16 hours before the respirator is first used. Use the standard charger (P/N 463471) or other recommended charger from MSA only. Other chargers may damage the battery due to internal wiring differences or incorrect charging rates.

PERMISSIBLE
HIGH-EFFICIENCY POWERED AIR-PURIFYING RESPIRATOR FOR ASBESTOS DUSTS AND MISTS

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

APPROVAL NO. TC-21C-354

ISSUED TO
MINE SAFETY APPLIANCES COMPANY, Pittsburgh, Pennsylvania, U.S.A

LIMITATIONS

Approved for respiratory protection against dust, fumes, and mists having a time-weighted average less than 2 million particles per cubic foot and asbestos-containing dusts and mists.
The manufacturer limits the respirator to use against asbestos-containing dusts and mists.
Not approved for radionuclides.
Not for use in atmospheres containing less than 19.5 percent oxygen.
Not for entry into atmospheres immediately dangerous to life or health.

CAUTION

Replace filters when the air flow falls below 4 cubic feet per minute.
In making renewals or repairs, parts identical with those furnished by the manufacturer under the pertinent approval shall be maintained.
Follow the manufacturer's instructions for changing filters.
This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, Occupational Safety and Health Administration, and other applicable regulations.

MSHA — NIOSH Approval TC-21C-354
Issued to Mine Safety Appliances Company, July 1, 1987

The approved Respirator consists of the following MSA parts: 7-727-1, 7-727-2, 7-727-3, 7-476-1, 7-476-2, 7-476-3, 7-250-1, 7-250-2, 7-250-3, 7-285-1, 7-285-2, or 7-285-3 facepiece; 463380 or 484082 motor-blower and hose assembly; 478782 (TC-21C-354) filters; 463239 battery and 463469 or 473902 belt.

PERMISSIBLE
HIGH-EFFICIENCY POWERED AIR-PURIFYING RESPIRATOR FOR ASBESTOS DUSTS AND MISTS

MINE SAFETY AND HEALTH ADMINISTRATION
NATIONAL INSTITUTE FOR OCCUPATIONAL SAFETY AND HEALTH

APPROVAL NO. TC-21C-355

ISSUED TO
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This respirator shall be selected, fitted, used, and maintained in accordance with Mine Safety and Health Administration, Occupational Safety and Health Administration, and other applicable regulations.

MSHA — NIOSH Approval TC-21C-355
Issued to Mine Safety Appliances Company, July 1, 1987

The approved Respirator consists of the following MSA parts: 7-203-1, 7-203-2, 7-203-3, 7-361-1, 7-361-2, 7-361-3 facepiece; 463380 or 484082 motor-blower and hose assembly; 478782 (TC-21C-354) filters; 463239 battery and 463469 or 473902 belt.

MSA

PERMISSIBLE POWER ASSISTED RESPIRATOR

APPROVAL 2G-3374-2 MSHA

TESTED IN METHANE-AIR MIXTURE ONLY

WARNING: MSHA APPROVED FOR USE WITH 4.8 VOLT BATTERY MODULE PART NUMBER 463239 ONLY

FACTORY MUTUAL FM APPROVED

Intrinsically Safe for use in Class 1, Division 1, Groups C and D hazardous locations when used with MSA Battery Pack Part No. 463239. Any subsitution of components may impair intrinsic safety.

COMMONWEALTH OF PENNSYLVANIA

APPROVAL NO. BFE-911-83

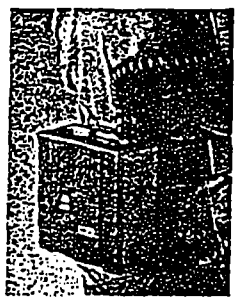
Powered Air Purifying Respirator

Application

The MSA Powered Air Purifying Respirator (PAPR) is approved for protection against dusts, fumes, and mists having a time-weighted average (TWA) less than 0.05mg/m³, and radionuclides. Its design makes the PAPR especially suited for asbestos, foundry and coke oven applications; it can be worn under heat-retardant clothing, comfortably.

Description

The Powered Air Purifying Respirator can be used with any of three types of MSA facepieces as shown above: Comfo® II, Welders Comfo, or Ultravue® facepiece. All three facepieces are available in small, medium, and large sizes and all have twin exhalation valves.



Major components of the Powered Air Purifying Respirator include: two high-efficiency filters with a total surface area of almost 500 square inches, enclosed in a rugged lightweight housing; a spring-type dual-latch filter retention mechanism; a sealed battery pack containing the on/off switch, four F-size 1.2-volt rechargeable nickel-cadmium batteries, circuit breaker, resistor, and connection for battery charger; blower assembly complete with belt (blower motor is a brushless 4.6-volt dc-type rated by manufacturer for 5,000-hour running time); and a 30-inch corrugated breathing tube that can be connected to a choice of MSA twin exhalation valve facepieces.

Features

- Compact design—total weight under 5 lb
- All plastic parts of high-impact polycarbonate
- Easily replaceable high-efficiency filters
- Filter retention system with spring-type dual-latch filter retention mechanism
- Filter housing which acts as guard for battery pack; absorbs shock if assembly is dropped
- Quick-change battery packs matched for uniform charge capacity; minimum 4-hour battery life
- Realistic motor rating—5,000-hr running time
- Improved filter cover designed to draw most of air through bottom, minimizing chance of sharp object or spark penetration
- Standard leather belt or, for easier decontamination, an optional PVC (polyvinylchloride) belt
- Power transmission terminals recessed for safety
- Clear speaking—because of twin exhalation valves, voice is projected, not muffled
- Belt designed to permit positioning of unit anywhere on the belt without removal
- Can be used in nonpowered mode during temperature extremes or in emergencies
- Optional SO_2 odor-removal, high-efficiency filter cartridge, which is also effective against nuisance levels (below the Permissible Exposure Level) of sulfur dioxide.
- Optional 36-inch breathing tube

dering information

talog numbers

3353 Powered Air Purifying Respirator with medium Welders Comfo Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube

3354 Powered Air Purifying Respirator with medium Comfo Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube

155 Powered Air Purifying Respirator with medium Ultravue Facepiece; complete with two filters, leather belt, battery charger, motor blower module, and breathing tube

38 Facepiece, Welders Comfo, small

52 Facepiece, Welders Comfo, medium

52 Facepiece, Welders Comfo, large

01. Facepiece, Comfo, small

6 Facepiece, Comfo, medium

7 Facepiece, Comfo, large

48 Facepiece, Ultravue, small

342 Facepiece, Ultravue, medium

354 Facepiece, Ultravue, large

380 Motor/Blower Module with breathing tube assembly

4659 Breathing Tube Assembly (30 inches long)

3256 Grommet, Filter

3284 Filter, replacement, Type H; packaged 36 per carton

3441 Battery Pack with charger

3469 Belt, leather (one size fits 34" to 48")

073 Retrofit kit for spring-type, dual-latch filter retention mechanism

Accessories

471710 Nosecup, for small Ultravue Facepiece

471711 Nosecup, for medium Ultravue Facepiece

471712 Nosecup, for large Ultravue Facepiece

454819 Prescription Eyeglass Kit for Ultravue Facepiece

34337 Cleaner-Sanitizer (dispenser box of 12 2-oz pkgs)

464850 PAPR Flow Tester

468486 PAPR Field Test Unit

465784 Resistance Test for PAPR filter cartridge

473902 Belt, optional PVC (one size fits 34" to 48")

628173 Carrying Case only, for PAPR

473382 Filter, optional replacement Type H, also effective against SO_2, packaged 36 per carton

466911 Breathing Tube, 36 inches long

Special probed facepieces for quantitative fit testing

466246 Probed Facepiece Assembly, Comfo, small

466245 Probed Facepiece Assembly, Comfo, medium

466499 Probed Facepiece Assembly, Comfo, large

467904 Probed Facepiece Assembly, Welders Comfo, small

466244 Probed Facepiece Assembly, Welders Comfo, medium

467905 Probed Facepiece Assembly, Welders Comfo, large

471685 Probed Facepiece Assembly, Ultravue, small

466260 Probed Facepiece Assembly, Ultravue, medium

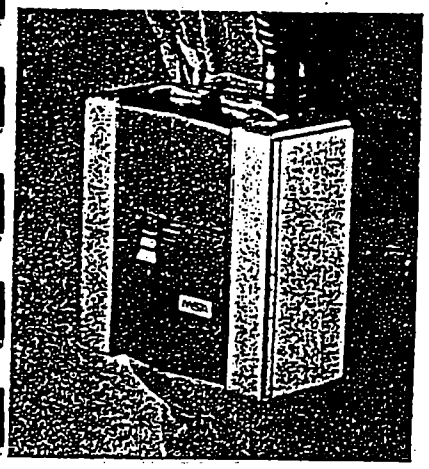
471686 Probed Facepiece Assembly, Ultravue, large

Approvals and standards

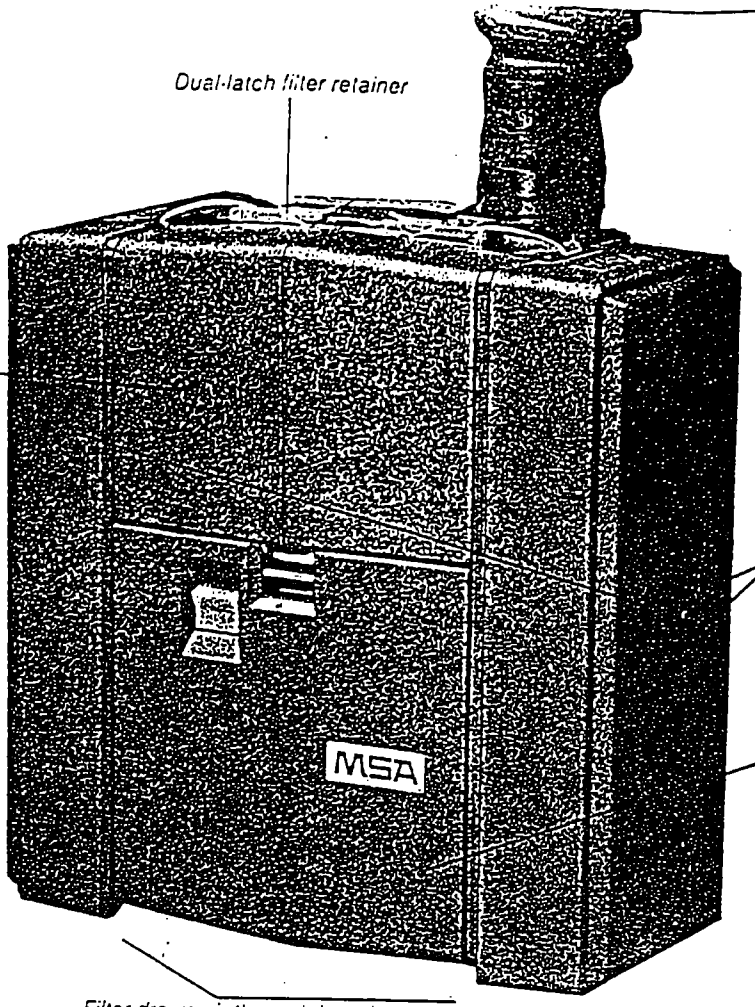
The MSA Powered Air Purifying Respirator has Approval TC 21C-186 from the National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA); the filters are covered separately by the same approval (TC 21C-186). The filters must be replaced every four hours or when the air flow drops below four cubic feet per minute. The respirator is approved by the Bureau of Mines as intrinsically safe. It has also received Factory Mutual Approval as intrinsically safe for Class I, Division 1, Groups C and D hazardous locations.

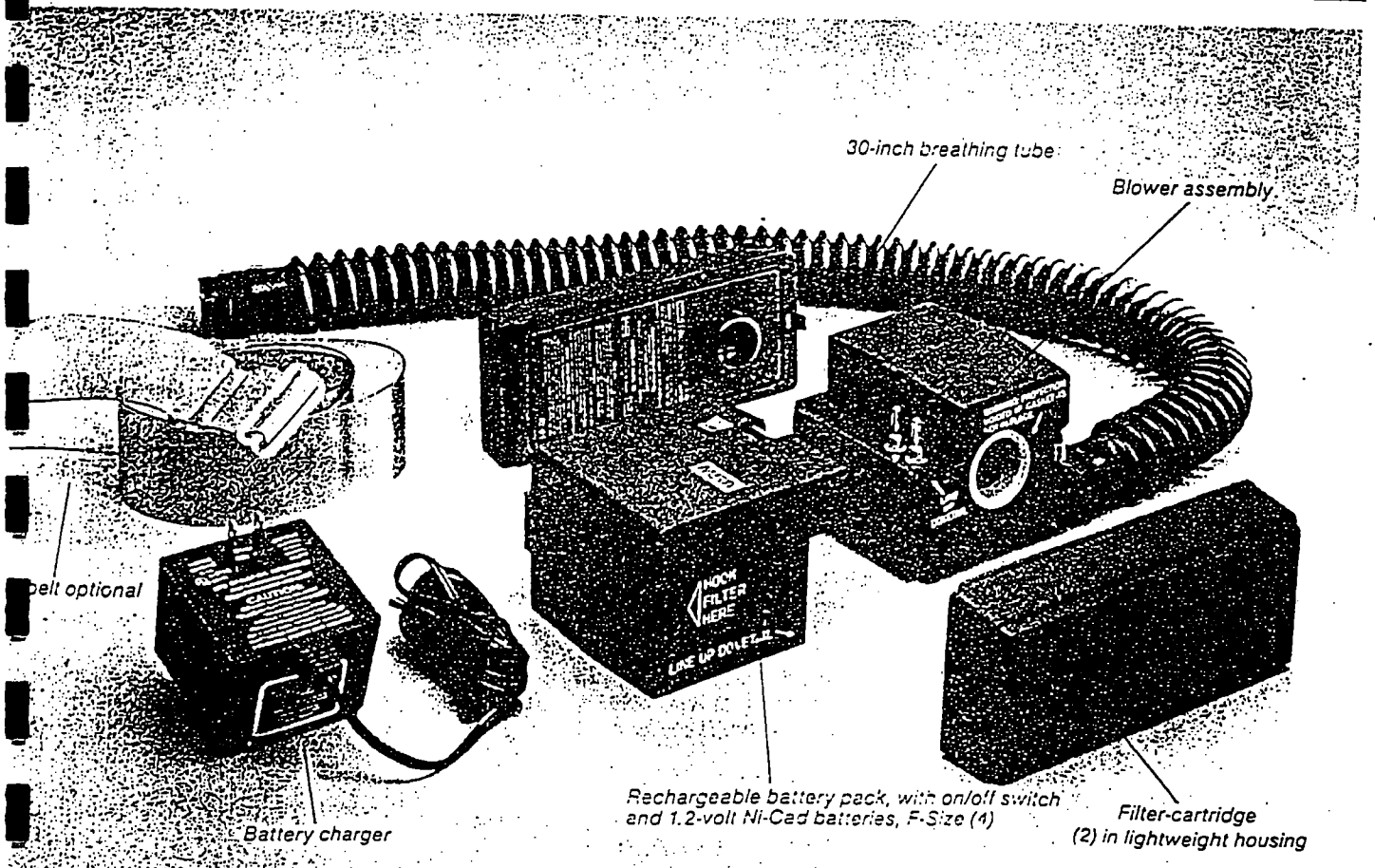
e: This Data Sheet contains only a eral description of the Powered Air fying Respirator and Accessories. While and performance capabilities are ribed, under no circumstances should the ucts be used except by qualified, trained onnel and not until the instructions, s, or other literature accompanying them have carefully read and understood and tions therein set forth followed. detailed

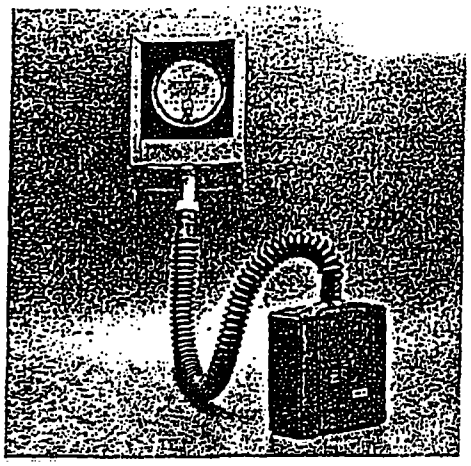
MSA
Offices and representatives in principal cities worldwide.
In U.S. call nearest stocking location toll free at 1-800-MSA-2222.
To reach MSA International, call (412) 273-5000 or Telex 812453.
Corporate Headquarters: P.O. Box 426, Pittsburgh, PA 15230 USA.



Optional Type H Cartridges (gray), which are also effective against sulfur dioxide, may also be used on the PAPR.

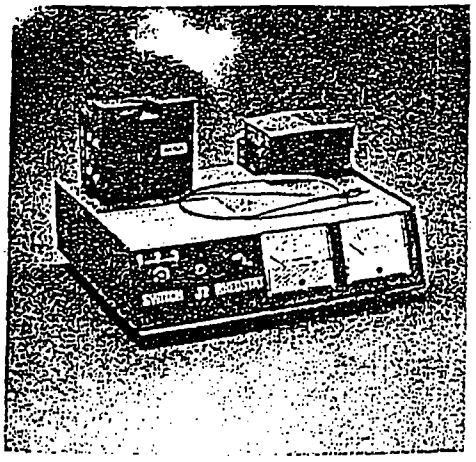






PAPR Flow Tester

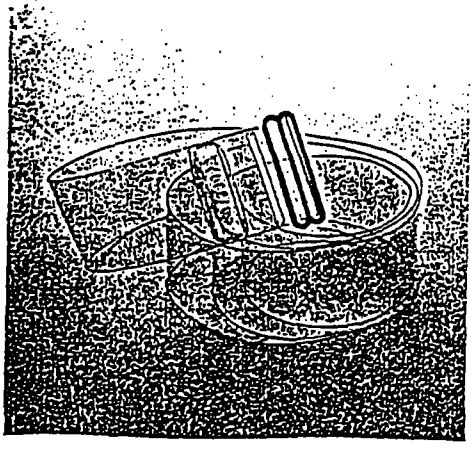
The PAPR Flow Tester is a thin plate orifice meter for testing the volumetric flow rate delivered by an MSA Powered Air Purifying Respirator. The flow tester can be used to ensure that the PAPR is delivering the NIOSH required minimum flow of 4 cfm (115 Lpm). The tester reads "good" when the indicating needle is to the right of an adjustable indicator flag. The flow tester is housed in a painted steel case with a laminated glass cover. The flow tester must be mounted vertically during use.



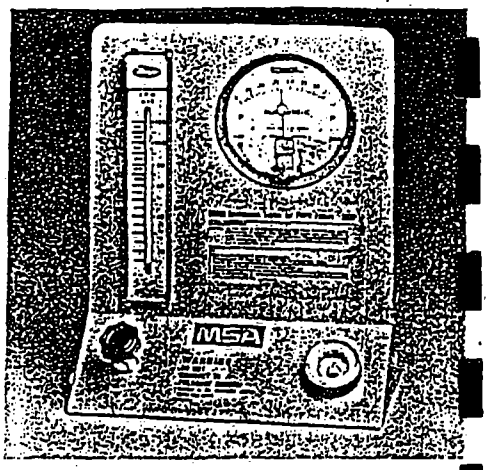
PAPR Field Test Unit

The Field Test Unit will quickly evaluate the electrical components of a Powered Air Purifying Respirator—the battery module, battery charger, and blower module. It will determine, when used by a trained technician, most electrical defects.

Belt-mounted respirator can be worn under flame-retardant garments to meet requirements for coke oven and foundry applications.



Optional polyvinylchloride (PVC) belt

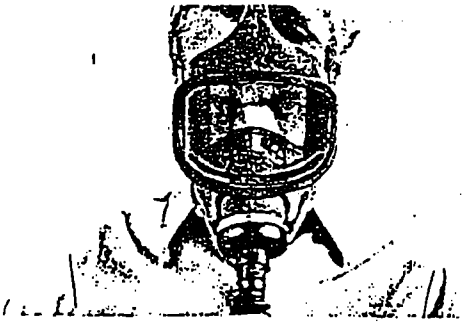


PAPR Filter Resistance Tester

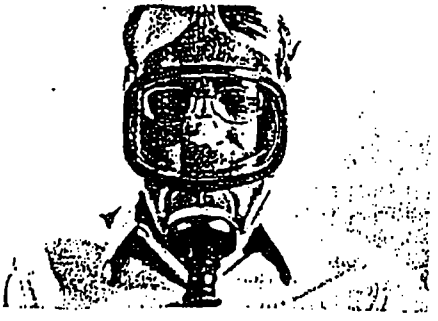
The PAPR Filter Resistance Tester allows the user to measure and quantify the breathing resistance of the filter-cartridges used in an MSA Powered Air Purifying Respirator.

A magnehelic pressure gauge within the Filter Resistance Tester measures the pressure drop across the filter-cartridge. Thus, after a filter-cartridge is used, the user can measure the breathing resistance of the filter-cartridge and compare this value with the maximum breathing resistance allowed in NIOSH certification tests. If the filter-cartridge is below the allowable maximum, the filter-cartridge is still usable.

The Resistance Tester is intended for indoor use only. It requires a customer-supplied source of vacuum for operation. The tester measures only the pressure drop across the filter-cartridge; it will not detect damage to the filters or sealing surfaces which may cause high penetration.



Optional nosecup reduces possibility of lens fogging under low temperature and/or high-humidity conditions.



[illegible] PAPR can also be [illegible] comfortably under heat-[illegible]rdant clothing.

[illegible]jor components of the Powered [illegible]urifyingRespirator include: [illegible]-inch corrugated breathing tube [illegible]an be connected to any of three [illegible] of facepieces (shown at right): [illegible]nfo® II half facepiece, Welders [illegible]fo, which allows the breathing [illegible]o fit under the helmet and [illegible]tions the tube over the back away [illegible] sparks, or Ultravue® full [illegible]ece. All three facepieces are [illegible]ble in small, medium and large [illegible]s made of black Hycar* or black [illegible].

[illegible]ver assembly motor (available [illegible]er as a brushless 4.6-volt dc-type [illegible]by manufacturer for 5,000 hour [illegible]ng time or as a 1,500 hour brush-[illegible] motor), with a spring-type dual-[illegible] filter retention mechanism.

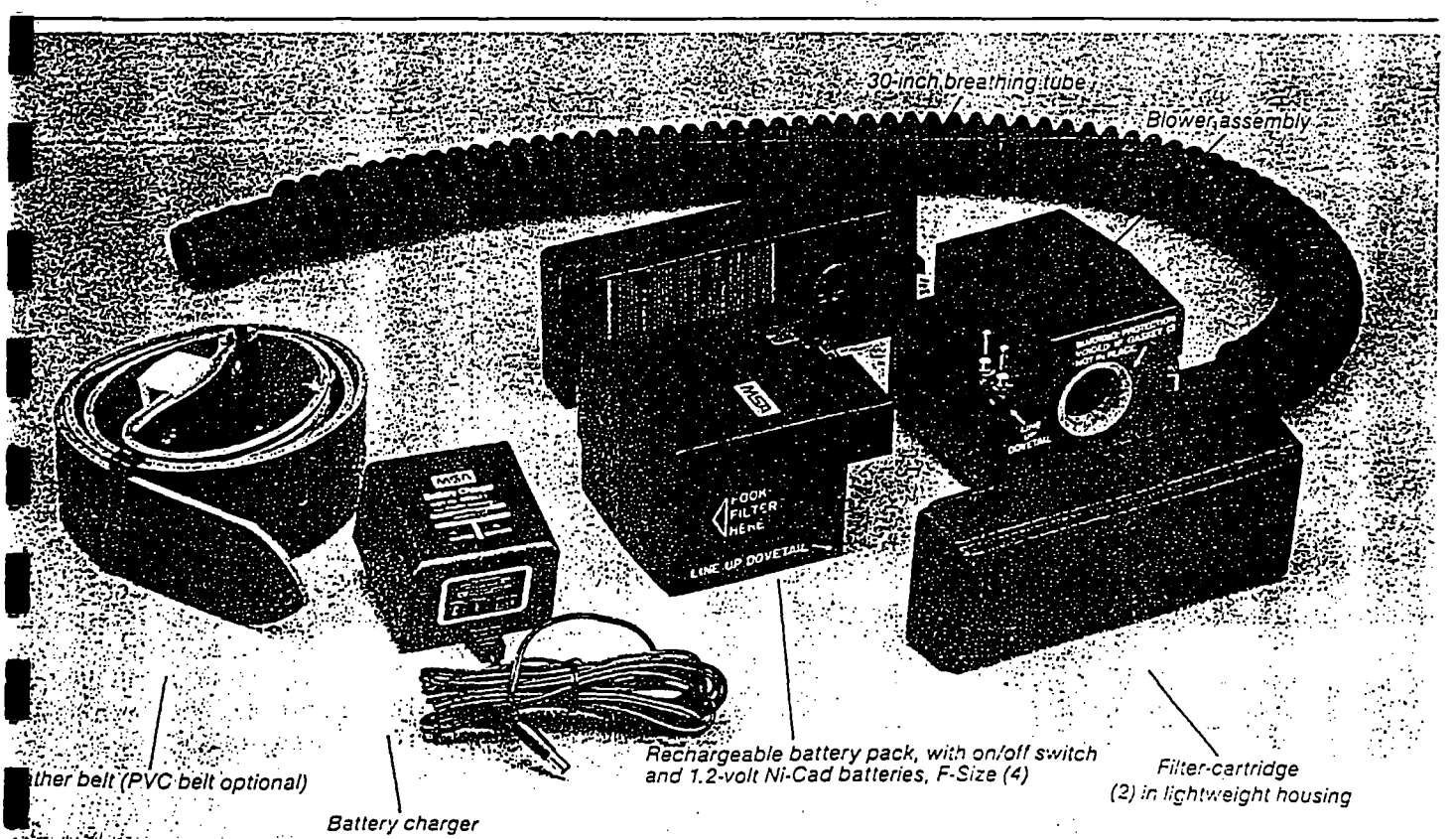
[illegible] high-efficiency filters with a [illegible] surface area of almost 500 square [illegible]es (enclosed in a rugged light-[illegible]t housing which acts as a guard [illegible]e battery pack and absorbs shock [illegible]sembly is dropped), and a filter [illegible] designed to draw air through [illegible]ttom and minimize the chance [illegible]arp object or spark penetration.

[illegible]ed battery pack containing the [illegible] switch (includes four F-size 1.2-volt rechargeable nickel-cadmium batteries, circuit breaker, resistor and connection for battery charger) and recessed transmission terminals for added protection

Also included with the 5,000 hour PAPR is a standard leather belt. A PVC (polyvinyl chloride) belt is standard on the 1,500 hour PAPR. The PVC belt is easy to decontaminate and permits positioning of the unit anywhere on the belt without removal.

PAPR can also be used in non-powered mode during temperature extremes, or in emergencies.

* Hycar is a registered trademark of B.F. Goodrich



ORDERING INFORMATION

Note: Every PAPR is shipped with durable protective cover to be used when the PAPR is exposed to large amounts of water, such as in asbestos decontamination showers.

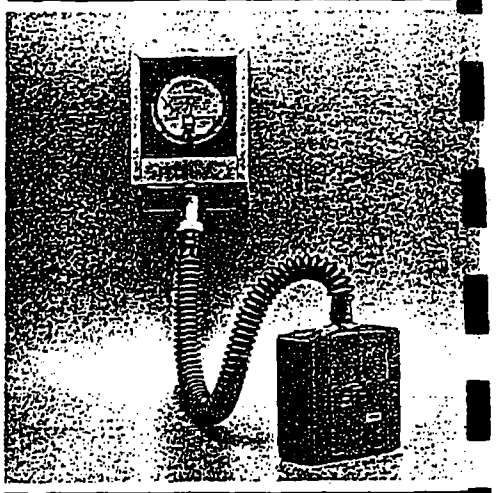
482701 Protective Cover (pkg of 5)
463353 Powered Air Purifying Respirator with medium Welders Comfo Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
463354 Powered Air Purifying Respirator with medium Comfo Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
463355 Powered Air Purifying Respirator with medium Ultravue Facepiece; complete with two filters, leather belt, battery charger, 5,000-hour H.E. brushless motor blower module and breathing tube
484110 PAPR with medium Hycar Ultravue Facepiece, complete with two filters, PVC belt, battery charger, 1,500-hour brush-type motor blower module, and breathing tube
463380 Motor/Blower Module, 5,000-hour H.E. brushless motor with breathing tube assembly
484082 Motor/Blower Module, 1,500- hour brush-type motor, with breathing tube
464659 Breathing Tube Assembly (30 inches long)
463256 Grommet, Filter
463284 Filter, replacement, Type H
463441 Battery Pack with charger
463239 Battery Pack only
463471 Battery Charger only
463469 Belt, leather (one size fits 34" to 48")
474073 Retrofit kit for spring-type, dual-latch filter retention mechanism

Comfo Facepieces:
465817 Small, black Hycar, elastic headband
480127 Small, black Hycar, cradle headband
480130 Small, black Silicone, cradle headband
94331 Medium, black Hycar, elastic headband
480122 Medium, black Hycar, cradle headband
480125 Medium, black Silicone, cradle headband
469130 Large, black Hycar, elastic headband
480132 Large, black Hycar, elastic headband
480135 Large, black Silicone, cradle headband

Comfo Welders Facepieces:
484201 Small, black Hycar, elastic headband
484204 Small, black Hycar, cradle headband
484203 Small, black Silicone, cradle headband
484195 Medium, black Hycar, elastic headband
484198 Medium, black Hycar, cradle headband
484197 Medium, black Silicone, cradle headband
484207 Large, black Hycar, elastic headband
484210 Large, black Hycar, cradle headband
484209 Large, black Silicone, cradle headband

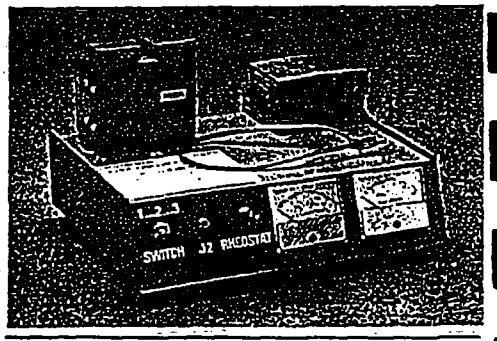
Ultravue Facepieces:
471218 Small, black Hycar
480251 Small, black Silicone
457126 Medium, black Hycar
480247 Medium, black Silicone
471230 Large, black Hycar
480255 Large, black Silicone
34337 Cleaner-Sanitizer (dispenser box of 12 2-oz packages)
473382 Filter, optional replacement Type H, also effective against nuisance levels of SO_2
466911 Breathing Tube, 36" long

ACCESSORIES



PAPR Flow Tester:
The PAPR Flow Tester is a thin plate orifice meter for testing the volumetric flow rate delivered by an MSA Powered Air Purifying Respirator. The flow tester can be used to ensure that the PAPR is delivering the NIOSH required minimum flow of 4 cfm (115 lpm). The tester reads "good" when the indicating needle is to the right of an adjustable indicator flag. The flow tester is housed in a painted steel case with a laminated glass cover. The flow tester must be mounted vertically during use.

464850 PAPR Flow Tester



PAPR Field Test Unit:
The Field Test Unit will quickly evaluate the electrical components of a Powered Air Purifying Respirator -- the battery module, battery charger and blower module. It will determine, when used by a trained technician, most electrical defects.

468486 PAPR Field Test Unit

POWERED AIR PURIFYING RESPIRATOR

10-01-09

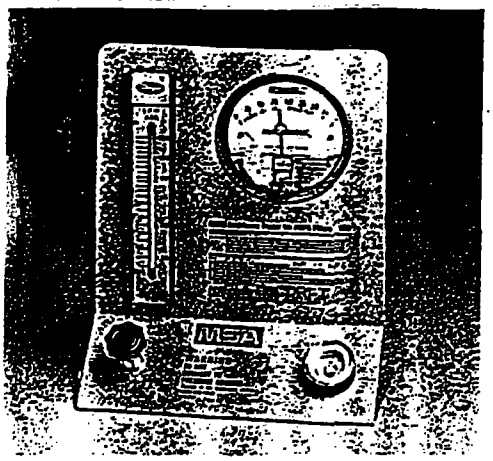
FEATURES

- Compact, lightweight design
- Available with brushless or brush-type motor
- Easily replaceable filters
- 5,000-hour motor rating (brushless motor)
- 1,500-hour motor rating (brush-type motor)
- Quick-change battery packs
- Eight-hour battery life
- Three types of facepieces
- All plastic parts of high-impact polycarbonate
- Optional Type H Cartridge is available for use against nuisance levels (below the Permissable Exposure Level) of sulfur dioxide.

DESCRIPTION

The MSA Powered Air Purifying Respirator (PAPR) is designed to filter particulates from the air. During operation, a battery-powered motor/blower pulls air through two filters and delivers a positive pressure of purified air to the facepiece.

PAPR is approved for respiratory protection against dusts, fumes and mists having a time-weighted average (TWA) less than 2.05 mg/m³; asbestos-containing dusts and mists; and radionuclides. The MSA PAPR is especially suited for asbestos abatement work, foundry and coke oven work, as well as in nuclear applications.



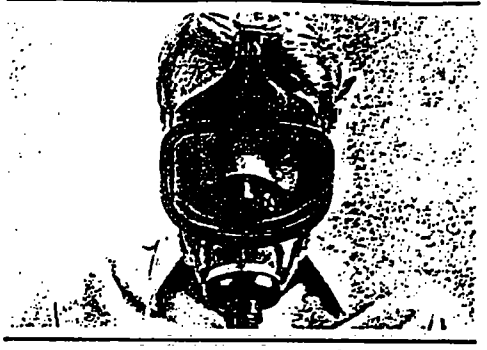
PAPR Filter Resistance Tester

PAPR Filter Resistance Tester:
The PAPR Filter Resistance Tester allows the user to measure and quantify the breathing resistance of the filter cartridges used in an MSA Powered Air Purifying Respirator.

A magnahelic pressure gauge within the Filter Resistance Tester measures the pressure drop across the filter-cartridge. Thus, after a filter cartridge is used, the user can measure the breathing resistance of the filter cartridge and compare this value with the maximum breathing resistance allowed in NIOSH certification tests. If the filter cartridges fall below the allowable maximum, the filter cartridge is still usable.

The Resistance Tester is intended for indoor use only. It requires a customer-supplied source of vacuum for operation. The tester measures only the pressure drop across the filter cartridge; it will not detect damage to the filters or sealing surfaces which may cause high penetration.

465784	Resistance Test for PAPR filter cartridge



Optional Nosecup:
Optional nosecup reduces possibility of lens fogging under low temperature and/or high-humidity conditions.

471710	Nosecup, for small Ultravue Facepiece
471711	Nosecup, for medium Ultravue Facepiece
471712	Nosecup, for large Ultravue Facepiece

Optional Spectacle Kit:
An optional spectacle kit accommodates prescription lenses.

454819	Prescription Eyeglass Kit for Ultravue Facepiece

PVC (Polyvinylchloride) Belt:
Optional PVC belt for use where easy decontamination is desired.

473902	Belt, optional PVC (one size fits 34" to 48")

Special Probed Facepieces for Quantitive Fit Testing:

466246	Probed Facepiece Assembly, Comfo, small
466245	Probed Facepiece Assembly, Comfo, medium
466499	Probed Facepiece Assembly, Comfo, large
467904	Probed Facepiece Assembly, Welders Comfo, small
466244	Probed Facepiece Assembly, Welders Comfo, medium
467905	Probed Facepiece Assembly, Welders Comfo, large
471685	Probed Facepiece Assembly, Ultravue, small
466260	Probed Facepiece Assembly, Ultravue, medium
471686	Probed Facepiece Assembly, Ultravue, large

APPROVALS & STANDARDS

The MSA Powered Air Purifying Respirator has Approval TC 21C-186 from the National Institute for Occupational Safety and Health (NIOSH) and Mine Safety and Health Administration (MSHA); the filters are covered separately by the same approval (TC 21C-186). The filters must be replaced when the air flow drops below 4 cubic feet per minute. The respirator is approved by the Bureau of Mines as intrinsically safe. It has also received Factory Mutual Approval as intrinsically safe for Class I, Division 1, Groups C and D, hazardous locations.

Note: This Data Sheet contains only a general description of the Powered Air Purifying Respirator and Accessories. While uses and performance capabilities are described, under no circumstances should the products be used except by qualified, trained personnel, and not until the instructions, labels or other literature accompanying them have been carefully read and understood and the precautions therein set forth followed. Only they contain the complete and detailed information concerning these products.

MSA
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APPENDIX I

DAILY LOGS
LAKE SALVAGE REMEDIATION

LAKE SALVAGE | DAILY LOG | JUNE 12, 1995 | 1/2

0700 CSES ON-SITE. CREW OF 10.

0730 LARRY ~~LUECK~~ ON SITE

0740 BEGIN BY GAINING ACCESS TO SITE AND GENERAL CLEANUP IN ORDER TO SET UP- TRAILERS. THIS WORK IS BEING DONE W/ WORKERS IN TYVEK SUITS.

TIRES ARE BEING STOCKPILED. TIRE SCRAPPER DUE IN TOMORROW A.M.

0800 JIM DUNCAN, PERSONAL PUMP. STARTED (LS-01)

1045 FRED BARTMAN, USEPA, ON- SITE

1115 MIKE MATILAINEN, TIGHE & BOND ON-SITE.

TRACTOR TRAILER, HAS RUN-OVER FIRE HYDRANT ON WEST SIDE. HYDRANT HAS BROKEN OFF AND WATER IS SEEPING OUT

1130 GAIN ENTRY TO INTERIOR OF BUILDING ON NORTHWEST FRONT. ROLL-OFF IS STAGED ACCORDINGLY. WORKERS DON LEVEL C PROTECTION. TRASH & DEBRIS WILL BE LOADED ACCORDINGLY AFTER HAVING DUST REMOVED. POWER WASHER IS USED TO ~~AS~~ SPRAY MIST INTO THE AIR TO SERVE AS DUST SUPPRESSANT

FRED BARTMAN SAID THAT NO CONFIRMATORY WIPES WILL NEED TO BE TAKEN.

1200 LUNCH BARTMAN, OFF-SITE

1230 BACK TO WORK

1300 PERMIT WAS NOT SECURED FOR TEMPORARY ELECTRICAL HOOK-UP. JOHN GARDEN WILL GO TO CHAMPAIGN TO PICK UP CSES GENERATOR TO RUN TRAILERS
AMERITECH ON-SITE.
PORT-A-LET WAS INSTALLED ONE-BLOCK TO FAR WEST. CALLED TO GET PERMISSION TO RELOCATE W/ CSES EQUIP

1340 MIKE M. INTO HOT ZONE
LITTER/DEBRIS STILL BEING PICKED UP. H_2O BEING USED AS DUST SUPPRESSANT. GETTING DUSTY
- Phil Stephenson (LAIDLAW) was contacted and will meet John Garden at the Holiday Inn Hillside parking lot to accompany him to the disposal facility for the 1st load.

LANDFILL HRS: M-F → 6-4
S → 6-11:30

1600 PERSONAL PUMP OFF
1630 UNITED SECURITY ON-SITE
1700 SECURED SITE AND LEFT

Ryan Copple 6/12/05

AMPAD 22-141 50 SHEETS 22-142 100 SHEETS 22-144 200 SHEETS

0700 CSES / TIGHE & BOND ON-SITE. LARRY LUECK, EC&E ON SITE
GENERATOR WILL BE SET UP TO SUPPLY POWER TO TRAILERS.
WORKERS DON LEVEL C (TYVEK, FULL FACE APR, BOOTIES, GLOVES)
0745 SAFETY MEETING. ADDRESSED BY BRIAN COPPLE.

1. BUILDING INTEGRITY
2. LAKE ST. TRAFFIC
3. HEAT ISSUE
4. INCINERATOR DEMO
5. DUST CONTROL

0800 KEITH BETHANY BUMPED FINGER ON ENDLOADER. CSES SUPERVISOR DOCTORED INJURY

[redacted] STARTED PERSONAL PUMP, MIKE STARR. (LS-02)
0830

0815 CALLED LAIDLAW, PECATONICA, CONCERNING TRUCKS FOR TOMORROW. ROLL-OFF W/ TRASH & LITTER COLLECTED YESTERDAY LEFT FOR LANDFILL @ 0700 PERSONALLY ACCOMPANIED BY PHIL STEPHENSON, LAIDLAW SALES REP.
CONCERN THIS A.M. IS NO DEMO PERMIT, MIKE M. FAXED COPY OF CSES LETTER DATED 6/9/95 TO LITTON & TIGHE & BOND.

0930 ROLL-OFF BACK FROM LANDFILL. TIRE TRAILER STILL NOT HERE. STILL LOADING TRASH / DEBRIS ON CSES END DUMP. DUST AND ASH ON INTERIOR BEING STOCKPILED ONTO HAZARDOUS PILE.

1000 FRED BARTMAN ON-SITE. IRWIN SIMKIN, ~~OWN~~ SON OF LAKE SALVAGE OWNER ON SITE. HE STATED THAT CITY ISSUED HIS FATHER A LETTER ASKING HIM TO TEAR BUILDING DOWN.

1030 PHIL STEPHENSON, LAIDLAW, ON-SITE.

1100 PHIL STEPHENSON, OFF-SITE. INFORMED US TIRE TRAILER HERE THURSDAY. BEGIN INCINERATOR STACK DISMANTLE.

TIRE DERIVED FUEL, FOR WISCONSIN POWER & LIGHT.

1145 LAFAYETTE ROBINSON, CITY ENVIRONMENTAL INSPECTOR, ON SITE TO DISCUSS POSSIBILITY OF EMERGENCY DEMOLITION PERMIT. FRED BARTMAN HAS LEFT SITE. CONTACT FRED VIA PAGER TO GET HIM BACK ON SITE

JIM DOYLE, CITY HALL, PERMITS, BUILDING DEPT.

JOE SCHUSLER

12:00 LUNCH

12:45 BACK TO WORK. ALL WORKERS SUIT UP WITH TYVEK AND FULL RESPIRATORS FOR THE INCINERATOR DEMOLITION.

13:15 THE FIRST INCINERATOR IS CUT WITH A TORCH BY WORKERS ON THE ROOF. THE INCINERATOR IS CUT AT THE BASE OF THE ROOFTOP AND PULLED DOWN BY THE JOHN DEERE 544. THERE IS ALOT OF DUST AS THE INCINERATOR IS BROUGHT DOWN. WATER IS SPRAYED INTO THE AIR TO KEEP AIR CONTAMINATION TO A MINIMUM

14:00 THE SECOND INCINERATOR IS BEING CUT IN ORDER TO BE BROUGHT DOWN. WATER IS STILL BEING USED TO CONTROL DUST

14:15 SECOND INCINERATOR IS DOWN. WORERS WILL DISMANTLE WITH METAL SAWS. BRIAN & FRED RETURN FROM CITY HALL. NO PERMIT NECESSARY

15:00 TRANSPORTER FOR HAZARDOUS WASTE (FROM INCINERATOR) HAS BEEN CHANGED TO:

DART TRUCKING, INC.
US EPA ID OHD009865825 EM.# = 800 535 5053 (567)
CONTACT: MARIE 216·533·9841

15:30 MARLYS, DISPATCHER FOR LAIDLAW, FAXED LAND BAN FORMS AND INDICATED THAT MANIFESTS WERE OVERNIGHTED TO THE HOLIDAY INN FOR THE DART TRUCKS ARRIVING TOMMOROW. FOUR DART TRUCKS HAVE BEEN SCHEDULED TO COME IN AT 8-10-12 & 2 ON WEDNESDAY, 14. A COPY OF THE AUTHORIZATION LETTER FROM THEODORE CRAVER TO MIKE MATILAINEN (TO SIGN FOR MANIFESTS) WAS ALSO SENT TO MARLYS, WITH LAIDLAW.

16:00 WORKERS CONTINUE TO STOCKPILE HAZARDOUS DEBRIS FROM INCINERATORS FOR THE DART TRUCKS COMING ON SITE TOMORROW

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

1700 LEAVE SITE. SECURITY ON SITE

6/13/95

AMPAD 22-141 50 SHEETS 22-142 100 SHEETS 22-144 200 SHEETS

FRED BARTMAN. ASH/SOIL WILL BE STOCKPILED SEPARATELY IN ORDER TO WEIGH MATERIAL @ LATER TIME FOR PAYMENT & MEASURE PURPOSES.

1330 MIKE M. OFF-SITE UNTIL MONDAY 1030. DEMO AND LOADOUT CONTINUING. WATER BEING USED TO CONTROL DUST. SITE WILL BE SECURED AFTER WORKING HOURS BY PUTTING BANNERGUARD, CAUTION TAPE AROUND PERIMETER. ANY QUESTIONABLE BUILDING WALL WILL BE RAZED PRIOR TO LEAVING THE SITE TODAY.
WORKERS ARE STILL IN LEVEL C, DUE TO DUST. THE WOOD ROOF & FIBERGLASS INSULATION ARE DUSTY. MIKE ADVISES THAT ANY STOCKPILED MATERIAL OVER THE WEEKEND TO BE COVERED w/ VISQUEEN. AS BUILDING IS BEING DEMO'D, ALL STEEL BEAMS, METAL ETC., ARE BEING SEGREGATED FROM SCRAP DISPOSAL

1400 BOTH CSES TRUCKS ARE LOADED w/ C&D LANDFILL FOR TOMORROW A.M. BUILDING IS COMING DOWN VERY EASILY.

1430 SECURED SITE. BANNER GUARD AROUND PERIMETER.

1730 SECURITY ON-SITE

6/16/95

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

0600 CSES TRUCKS LEFT FOR C&D LANDFILL.
AS CSES TRUCK w/ ROLL-OFF WAS MAKING TURN TO GET ON I-290 RAMP, THE ROLL-OFF TURNED OVER. IT OCCURED @ ~~CAPITOL~~ DEVELOPMENT CONGRESS, A BFI JUST 2 BLOCKS FROM ~~HOTEL~~ OTHER CSES TRUCK WAS TOLD TO CONTINUE TO NAPERVILLE. CSES CREW AIDED BY A FRONT END LOADER OPERATED BY THE LANDFILL, UPRIGHTED THE BOX BACK ONTO THE TRAILER. CSES ELECTED TO DUMP THE BOX @ THIS LANDFILL.

0730 CREW ON SITE. REST OF CREW STILL @ LANDFILL w/ ROLL-OFF. SECURITY GUARD OFF-SITE.

0800 DART TRUCKS ON SITE. LARRY LUECK ON-SITE.
MORE INCINERATOR ASH / REFRACTORY BEING LOADED
WORKERS IN LEVEL C PROTECTION USE WATER TO SUPPRESS DUST.

1010 DART TRUCKS OFF SITE. EACH TRUCK AS BEFORE WAS LINED, LOADED, WEIGHED, MANIFESTED & PLACARDED, AND TARPED

DART TRUCK 9289 MANIFEST LS-004 STATE MI 4132964

DART TRUCK 9938 MANIFEST LS-005 STATE MI 4132965

~~Some~~
SOME OIL WHICH WAS SOLIDIFIED INTO STOCKPILE THAT WAS LOADED ONTO DART TRUCK 9289, IS SLIGHTLY LEAKING FROM TAILGATE. CSES WORKERS SPREAD OIL DRY ABSORBANT ALONG INSIDE EDGE OF TAILGATE OF DUMP TRAILER. THIS HAS STOPPED THE LEAK. THE DRIVER, WES BESETER, IS SATISFIED AND DEPARTS SITE. OTHER TRUCK LEAVES AS WELL.

1030 DEMOLITION CONTINUES. BACKHOE BEING USED TO CHOP UP WOOD ROOFING MATERIAL. LOADER BEING USED TO LOAD ONTO TRAILER. THE MATERIAL IS BEING CRUSHED TO PIECES AS SMALL AS POSSIBLE. WORKERS IN DEMOLITION AREAS ARE USEING PAPER DUST MASKS. WATER BEING USED FOR DUST

1100 LARRY LUECK OFF-SITE

1130 MIKE M. CALLED TO CHECK IN. TOLD HIM BOTH DART TRUCKS WERE LOADED AND GONE. 4 MORE TO BE HERE MONDAY A.M.
TALKED TO JOSE VALDIVIA w/ EVC CONTRACTORS. THEY ARE SANDBLASTING AND PAINTING COLUMNS WHICH SUPPORT THE EL-TRACKS. A CONTAINMENT IS CONSTRUCTED AROUND 12 COLUMNS WHICH ACTS

AS AN ENCLOSURE. IT WAS AGREED BY MR. VALDIV AND CSES PROJ. MANAGER. BRIAN COPPLE TO NOT ENCLOS THE TWO COLUMNS DIRECTLY IN FRONT OF LOADING DOCK. THERE ARE STILL MORE TRUCKS THAT WILL BE LOADED MONDAY. AFTER MONDAY CSES WILL NOT REQUIRE ACCESS TO FRONT OF SITE SINCE ONLY DEMO WILL OCCUR.

1200 LUNCH

1230 BACK TO WORK DEMO OF BUILDING CONTINUES. AS DEMO PROGRESSES BUILDING MATERIAL IS SEGREGATED. WOOD ROOF IS STOCKPILED SEPARATELY FROM CONCRETE BLOCK. ALSO METAL BEAMS AND GALVANIZED PIPE IS STOCKPILED SEPARATELY FOR LATER DISPOSAL AS SCRAP. BUILDING IS REALLY IN POOR CONDITION AS THERE HAS BEEN NO DEFFICULTY IN THE DEMOLITION OF THE BUILDING

AIR SAMPLE RESULTS BACK FROM HUNTINGDON

LS-01	4 µg/FILTER
LS-02	2 µg/FILTER
LS-03	8 µg/FILTER

- ALL RESULTS BELOW ESTABLISHED LEVELS. APR RESPIRATORY PROTECTION ADEQUATE IN HOT ZONE.

1415 CREW BEGINS TO COVER INCINERATOR REFRACTORY PILE W/ VISQUEEN. CREW WILL BEGIN TO SECURE SITE AND LEAVE EARLY TODAY.

1445 SITE IS SECURED. BANNERGUARD AROUND PERIMETER.

1515 LEAVE SITE

6/17/95

0700 CSES ON-SITE / MIKE MATILAINEN, TIGHE & BOND ON-SITE LARRY LUECK E&E TAT ON-SITE. WORKERS DON LEVEL C

0730 SAFETY MEETING

0810 DART TRUCK ON-SITE / PERSONAL PUMP STARTED, JEFF KOCH (LS-03)

0945 2ND DART TRUCK ON-SITE

1015 3RD DART TRUCK ON SITE

1020 LOADING TRUCKS. WATER BEING USED TO SUPPRESS DUST. WIND IS SWIRLING TODAY. MIKE INSTRUCTS THAT RESPIRATORS MUST BE WORN IN ALL WORK AREAS TODAY, DUE TO WIND.

1100 1ST DART TRUCK LOADED

1200 LUNCH

1230 BACK TO WORK

1400 2ND DART TRUCK LOADED

1415 3RD DART TRUCK, BEING LEVELED AND OFF-LOADED TO BE LOADED LEGALLY ON WEIGHT. EACH TRUCK BEING WEIGHED AND MANIFESTED ACCOMPANIED BY LANDBANK. THERE IS ALREADY MORE MATERIAL THAN PREVIOUSLY ESTIMATED IN BID. WE'LL NEED MORE TRUCKS TOMORROW.

1500 DART ONLY SUPPLIED ROLL-OFFS WHICH WERE EXTREMELY HEAVY EMPTY WHICH IS GOING TO LIMIT AMOUNT OF MATERIAL WE CAN LOAD. ONE TRAILER HAS 2 BOXES ON IT. DART IS CONTACTED AND INFORMED OF SITUATION.
DART TRUCKS OFF SITE

DART TRUCK 5400 MANIFEST LS-001

DART TRUCK 160 MANIFEST LS-002 * 2 BOXES

DART TRUCK 9356 MANIFEST LS-003

1730 SECURED SITE. GUARD ON-DUTY

6/14/95

LAKE SALVAGE | DAILY LOG | THURSDAY, 15

0700 CSES ON SITE.
MIKE MATILAINEN ON SITE.
LARRY LUECK ON SITE.
WORKERS DON LEVEL C
0730 SAFETY MEETING CONDUCTED BY BRIAN COPPLE
WORKERS WILL START TO HEPA VAC
BUILDING INTERIOR TODAY.
PERSONAL AIR MONITOR STARTED ON
KEITH BETHANY.

0800 2 WORKERS WILL CLEAN OUT DRAIN IN LOADING DOCK.
DUST ON CONCRETE AROUND INCINERATOR STOCKPILE. 1 WORKER
BEGINNING TO CUT COMPACTOR OFF TO INSTALL PLATE.
REST OF CREW SWEEPING, VACUUMING INTERIOR.

0845 WORK PROCEEDS. HOT AGAIN TODAY. WORKERS ADVISED
ONCE AGAIN TO PACE THEMSELVES & TAKE BREAKS BY
DRINKING GATORADE

0930 COMPACTOR IS CUT OFF. THE DRAIN IS APPROXIMATELY
6 FEET DEEP. IT IS REALLY SLOPPY. SLUDGE/SLOP IS BEING
BUCKETED INTO FRONT BUCKET OF BACKHOE AND ADDED
TO HAZARDOUS WASTE STOCKPILE. TIRE RECYCLER WHO WAS
SUPPOSED TO BE HERE THIS A.M. STILL NOT HERE. CALLED
PHIL STEPHENSON W/ LAIDLAW TO FIND OUT.

1015 WORKERS BREAK.

1030 COMPACTOR AND OTHER SCRAP METAL BEING SPRAYED
OFF WITH WATER AND LOADED ONTO CSES ROLL-OFF.
FLOOR HAS BEEN SWEPT AND INTERIOR WALLS AND FLOORS
WILL NOW BE HEPA-VACUUMED

1230 LUNCH

1300 BACK TO WORK

1345 ELVIN & JOHN LEAVE W/ LOAD OF SCRAP METAL TO
COZZI IRON & METAL INC

1415 NATIONAL TIRE ON SITE TO PICK UP TIRES
LOCATED ON LOADING DOCK. TIRES ARE
ALL WASHED OFF BEFORE BEING LOADED
ONTO THE TRUCK.

1500 TIRES ARE LOADED (403 Passenger, 9 semi
tires).

1530 BREAK

1540 WORKERS BACK TO HEPA VACUUMING INTERIOR WALLS AND FLOORS. THIS METHOD IS WORKING VERY WELL. CONCRETE SURFACES ARE COMING VERY CLEAN.

1600 JOHN AND ELVIN BACK FROM COZZI METAL SCRAP. 9880 lbs UNLOADED.

1730 SECURED SITE. SECURITY ON-SITE

6/15/95

AMPAD 22-141 50 SHEETS 22-142 100 SHEETS 22-144 200 SHEETS

0700 CSES, MIKE MATILAINEN, LARRY LUECK on SITE. WORKERS DON LEVEL C. SAFETY MEETING CONDUCTED BY BRIAN COPPLE

0730 CSES PROJ. MAN. & MIKE MATILAINEN DON LEVEL C AND ENTER INTERIOR OF BUILDING FOR INSPECTION. MIKE NOTES SOME CRACKS IN CONCRETE FLOOR WHICH WILL REQUIRE FURTHER VACUUMING. A SMALL OFFICE STILL HAS DEBRIS ON FLOOR. THE ROOF IS IN DISREPAIR. WORKERS WILL USE 2"X4" TO SHORE THE ROOF PRIOR TO EGRESS BEFORE CLEANING. C&D DEMO DEBRIS WILL BE PLACED INTO PIT/RAMP TO ALLOW EASY ACCESS FOR LOADING. THE MANHOLE/DRAIN IS BEING FILLED W/ BLOCK DEBRIS. IT IS PROPOSED TO FILL IN LOADING DOCK W/ C&D MATERIAL. THIS WILL HAVE TO BE CLEARED AND APPROVED BY FRED BARTMAN, USEPA. 2 TRUCKS WILL BE HERE TOMORROW A.M. TO LOAD INCINERATOR STOCKPILE.

0910 JOHN GARDEN LEAVES W/ LOAD FOR NAPERVILLE C&D LANDFILL. HEPA VACUUMING CONTINUES ON INTERIOR. INTERIOR WALLS & FLOORS REALLY LOOK GOOD

0915 FRED BARTMAN, USEPA ON-SITE FRED SAYS THAT PIT/LOAD DOCK CAN BE FILLED W/ CONCRETE BLOCKS/C&D MATERIAL. FRED ALSO SHOWS SOME ADDITIONAL AREAS ON SOUTH PROPERTY AND ALLEY, WHICH WILL REQUIRE SOME EXCAVATION. THIS SOIL HAS INCINERATOR ASH ON TOP. THIS WILL BE INCLUDED W/ THE OTHER SOIL WHICH WAS REMOVED PREVIOUSLY. THIS SOIL GRAVEL WILL BE WEIGHED W/ ENDLOADER BUCKET SCALES.

0940 BARTMAN OFF-SITE.

1020 INTERIOR OF BUILDING VACUUMED SATISFACTORILY PER MIKE. LARRY LUECK AND MIKE BOTH SUITED UP AND WENT INSIDE. DEMOLITION OF BUILDING BEGINS. ALL PITS AND OPENINGS ON SITE WILL BE FILLED W/ CRUSHED BUILDING DEBRIS PER USEPA, FRED BARTMAN, DIRECTION.

1100 ADDITIONAL INCINERATOR ASH BEING REMOVED & STOCKPILED

1200 LUNCH
1230 BACK TO WORK

1300 INCINERATOR ASH BEING REMOVED IN SOUTHEAST CORNER OF PROPERTY. APPROXIMATELY 2" OF ASH/SOIL BEING REMOVED IN SOUTH CITY ALLEY PER USEPA DIRECTION,

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

* ADDENDUM TO DAILY LOG. *

PROJECT : LAKE SALVAGE
DATE : TUESDAY JUNE 13, 1995

FRED BARTMAN, USEPA, AND BRIAN COPPLE, CSES, VISIT CITY HALL IN ORDER TO CHECK ON POSSIBILITY OF OBTAINING AN EMERGENCY DEMOLITION PERMIT FROM THE CITY. CSES IS READY TO BEGIN DEMO. FIRST CONTACT @ CITY HALL IS JIM DOYLE. JIM STATES THAT IT COULD TAKE WEEKS TO GET A PERMIT. A WRECKER'S BOND WOULD BE REQUIRED. ALSO AN INSPECTOR WOULD HAVE TO COME OUT & ASSESS SITE. WE THEN TALKED TO JOHN KALIANIS, ASST. COMMISIONER. FRED STATED THIS SITE IS BEING REMEDIATED IN ACCORDANCE w/ AN USEPA CONSENT ORDER. MR. KALIANIS STATED THAT USEPA SUPERCEDES ANY AND ALL CITY OF CHICAGO AUTHORITY, THUS NO PERMIT WILL BE NECESSARY.

6/13/95
1500

LAKE SALVAGE | DAILY LOG | MONDAY 6/19

0630 TRUCKS LEAVE FOR C&D LANDFILL

0700 CREW ON SITE. LARRY LUECK, E&E, ON SITE

0800 DART TRUCK ON SITE. SOIL CONTAMINATED w/ ASH WILL BE WEIGHED OUT. THERE IS 32,360 LBS. OF SOIL CONTAMINATED w/ INCINERATOR ASH

0840 CSES TRUCKS BACK

0900 DART TRUCK 9275 LOADED AND OFF-SITE

MANIFEST LS-006

0910 2ND & THIRD DART TRUCKS ARRIVE

1000 MIKE M. ON SITE

1110 DART TRUCK 9300 LOAD AND OFF-SITE MANIFEST LS007
DART TRUCK 9200 LOADED AND OFF-SITE MANIFEST LS008

THE ASH CONTAMINATED SOIL WHICH WAS SEPARATELY STOCKPILED WAS LOADED AND WEIGHED INDIVIDUALLY IN DART TRUCK 9275. THE TOTAL TONNAGE WAS 16.18 TONS (32,360 LBS.) THERE IS A SEPARATE LINE ITEM FOR THIS MATERIAL IN THE UNIT COST BREAK DOWN ON THE BID.

12:00 LUNCH

12:30 BACK TO WORK. THE WATER AND GAS LINES LOCATED ON THE NORTH SIDE OF THE PROPERTY HAVE BEEN CAPPED AND ARE NOW BEING MARKED AS THE DEMOLITION CONTINUES. THEY ARE BEING MARKED WITH ORANGE FLUORESCENT PAINT.

1300 MORE C&D BEING LOADED. 2 MEN WILL BEGIN TO SWEEP AND HEPA VAC BEGINNING ON EAST SIDE OF LOT. EFFORT WILL BE MADE TO PREP CONCRETE SURFACE FOR ENCAPSULATION

1400 BUILDING IS ALMOST DOWN. DUST IS NOT MUCH OF A PROBLEM. PLENTY OF WATER BEING USED TO SUPPRESS DUST.

1500 ENTIRE BUILDING DOWN. THE WALL WHICH IS WEST OF LOADING DOCK IS KNOCKED DOWN INTO DOCK AS FILL

1530 FRED BARTMAN, USEPA ON SITE. FRED IS VERY PLEASED

w/ HOW PROJECT HAS PROGRESSED. FRED SAYS THAT PERIMETER FENCE CAN REMAIN BUT MIKE SAYS THAT FOR LIABILITY PURPOSES LITTON WANTS FENCE REMOVED. FRED WANTS PERIMETER POLICED, THERE IS STILL SOME EVIDENCE OF ASH. CSES SUPERVISOR AND MIKE MATILAINEN GIVE SUMMARY OF JOB TO DATE. AREA IN ALLEY WHERE SOIL WAS EXCAVATED WAS COMPLETED TO USEPA SATISFACTION. FRED OBSERVES ENCAPSULANT BEING APPLIED

1630 BARTMAN OFF-SITE. THE ENCAPSULANT WILL HAVE TO BE THINNED DOWN. IT IS TO THICK TO BE SPRAYED W/ AIRLESS SPRAYER @ A STRAIGHT 1:1. INSTEAD ~~IT~~ WILL JUST BE POURED ON SURFACE DIRECTLY AND APPLIED W/ SQUEEGIES. WE JUST WANTED TO SEE HOW THIS MATERIAL WOULD BE APPLIED. THE SMALL CRACKS & CREVICES IN THE CONCRETE WILL HAVE TO BE CLEANED MORE THOROUGHLY IN ORDER FOR ENCAPSULANT TO STICK TO SURFACE. THIS MATERIAL (ENCAPSULANT) IS A WHITE, LATEX-LIKE MATERIAL. IN 30 MINUTES IT HAS DRIED TO APPROXIMATELY A 4-5 MIL THICKNESS.

1700 SECURED & LEFT SITE

1720 UNITED SECURITY ON-SITE. CSES SUPERVISOR WAITED UNTIL GUARD WAS ON-SITE. CALLED UNITED SECURITY AND ASKED FOR GUARD TO ARRIVE @ 1700 HRS. CSES SUPERVISOR OFF-SITE

6/19/95

LAKE SALVAGE | DAILY LOG | TUESDAY JUNE 20

0680 CSES TRUCK LEAVES FOR LANDFILL
0700 CSES ON-SITE. MIKE M., T & B, L. LUECK, E & E, ON-SITE.

0715 REMAINDER OF WOOD ROOF BEING LOADED ONTO ROLL-OFF. CREW BEGINS TO SWEEP AND VACUUM CONCRETE IN ORDER TO PREPARE FOR ENCAPSULANT.
MIKE & LARRY ARE SOIL SAMPLING ON WEST VACANT LOT NEXT TO BUILDING.
0845 CSES TRUCK BACK FROM LANDFILL ROLL-OFF TAKEN TO LANDFILL
0900 LOADING DOCK PIT IS FULL OF CONCRETE BLOCKS. ALL PITS AND OPENINGS WILL BE FILLED WITH CRUSHED CONCRETE BLOCKS. SWEEPING AND HEPA-VACUUMING GOING VERY WELL

1030 2 LOADS OF ROCK ARE ORDERED TO TOP DRESS CRUSHED BLOCKS USED TO FILL DEPRESSIONS / PITS.

1100 CSES TRUCK BACK FROM LANDFILL. REMAINDER OF SCRAP IRON WILL BE LOADED AND HAULED OFF.

1200 LUNCH
1230 BACK TO WORK

1245 IRWIN SIMKIN HERE TOLD HIM TO BE HERE TOMORROW TO SALVAGE FENCE.

1415 2 TRUCKS W/ ROCK ON SITE. GRAVEL IS DUMPED OVER LOADING DOCK AREA. OSHA INSPECTORS ARE @ JOB SITE WHERE SANDBLASTING AND PAINTING ARE TAKING PLACE. 2ND ROCK TRUCK BRINGS DOWN ELECTRICAL LINES UNDER EL-TRACKS. THE LINES ARE NOT CONNECTED @ A LOCATION EAST OF HERE. DRIVER INFORMS CSES SUPERVISOR HE WILL REPORT INCIDENT WHEN HE GETS BACK TO TERMINAL. PICTURES ARE TAKEN TO DOCUMENT INCIDENT. ROCK WAS DELIVERED BY DONMAR TRUCK 90.

1430 CSES END DUMP BACK FROM LANDFILL

1530 TALKED TO OSHA INSPECTOR. THEY ARE NOT CONCERNED ABOUT OUR PROJECT. HOWEVER MIKE M. & CSES SUPERVISOR GIVE INSPECTOR A SHORT SYNOPSIS ON PROJECT HISTORY.

1700 BEGIN SECURING SITE. ALL C & D DEBRIS IN ADDITION TO LANDSCAPE (BRANCHES, ETC) ~~AN~~ SIDEWALK ARE LOADED.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

LAKE SALVAGE | DAILY LOG | WEDNESDAY JUNE 21 | 1

0630 CSES TRUCK LEAVES FOR COZZI INC.
0700 CRES ON SITE, MIKE M., Tighe & Bond ON SITE

0715 WORKERS CONTINUE TO COVER FILL AREAS WITH ROCK THAT WAS BROUGHT ON SITE YESTERDAY. LARRY LUECK, E&E ON SITE

0800 MORE L.B.C. ENCAPSULANT IS BEING SPREAD NEAR THE WEST PROPERTY LINE AS CONCRETE AREAS ARE HEPA VACUUMED. JOHN & ELVIN BACK FROM COZZI.
0830 THE FENCE BORDERING THE NORTH PROPERTY LINE IS BEGINNING TO COME DOWN.

0930 FENCE DOWN. WORKERS WILL CUT UP GALVANIZED METAL TO BE TAKEN OFF SITE. JOHN G. LEAVES FOR MATERIAL SERVICE CORP. TO PICK UP A LOAD OF GRAVEL TO TOP OFF THE REMAINING LOW AREAS OF THE LOT.

10:30 GALVANIZED METAL IS BEING LOADED ONTO CSES ROLLOFF. ALEX WHITE ON SITE TO RECEIVE A LOAD OF THE GALVANIZED SCRAP (contact #)

12:00 LUNCH. ELVIN LEAVES FOR COZZI WITH SCRAP FROM FENCE.
12:30 BACK TO WORK. THERE ARE STILL A FEW AREAS TO BE ENCAPSULATED. WORKERS WILL BEGIN TO DECON EQUIPMENT TO BE LOADED LATER THIS AFTERNOON.

1:15 JOHN G. RETURNS FROM MATERIAL SERVICE CORP. WITH GRAVEL. A. WHITE RETURNS TO SITE WITH WEIGHT TICKET FROM GENERAL IRON INDUSTRIES.

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

983-6410

APPENDIX F

Tighe & Bond Remediation Oversite Information

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/12/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CENTRAL STATES
Weather: CLEAR Fair Cloudy Rain Snow
Temp.: 75 °F. 1130 A.M. ____ °F. ____ P.M.
NE WIND 5 MPH

Project No.: C325-2-310 Contr. No.: ____
Location: Chicago IL.
Inspector: MATILAINEN Hrs.: 0700-1730

Description of Work Accomplished: 0700 Contractor reportedly on site. 1100 Hrs. Matilainen on site. Larry Leak (EFE), Fred Bartmen EPA on site at arrival. Discussed demo permit and fencing with EPA + EE, no issues raised. Bartmen said no wipes required after cleanup. Contractor moved litter outside and swept clean staging area. Went into site from 1300-1400 hrs. Had contractor barricade opening and wet materials. Contractor loaded one 40 cy of litter to Green Valley for delivery 6/13/95 AM. Fred Bartmen on site 1600 hrs. to 1700 hrs. Workers finished up at site at 1700 hrs. Security on-site 1700 hrs. See Attached air sampling results for the day.

Manpower and Equipment on Job:

EQUIPMENT	MANPOWER - BETHANY
Case Unloader, Office/Decon Trailer, Freight/Uren Rolloff trailer	C. COPPLE, B COPPLE, OBERMIER
3 Emergency Response Trucks, Roll off Box 40 CY	E COPPLE, ROCH, DUNCAN
Emergency Response Trailer, Suburban 1600-544,310 loaders	GARDENS, WILKEN, STARR

Site/Soil/Water Conditions: Site inside wet from watering of materials. W. Lake street very dry and dusty and contributing to overall dust conditions at site (high background)

Instructions or Directions Given to Contractor: Advised not to go under unsured pillars. Barricade opening at trenches

Problems, Delays, and Controversies on Orders: No Demolition permit. Fred Bartmen of EPA working on obtaining permission from City of Chicago. Fred Bartman notified City of Chicago of demolition and gave them our trailer # and names. Brian Copple will send us letter on demolition of building for documentation

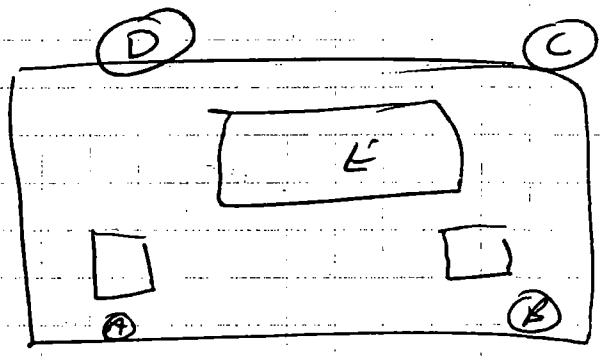
Materials or Equipment Received and Accepted: Equipment received at site for remediation as shown above.

Other Comments: Contractor advised to obtain necessary permits for demolition. Contractor is prepared to take responsibility for demolition and has prepared letter to that effect.
+ See sheet 1 attached for air sampling data

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. 6325 SHEET 1 OF 9
CLIENT Lake Salvage
SUBJECT Air Monitoring
PREPARED BY _____ DATE 6/12/95 CHECKED BY _____ DATE _____

6/12/95



5 MPH
NE

		Particulate	O_2	HNV	LEL	CO
1315 Hours	A *	0.5	19.5	0	0	0
	B	0.5	19.5	0	0	0
	C	0.5	19.5	0	0	0
	D	0.5	19.5	0	0	0
1700	Inside E	0.5-4.0	19.5	0	0	12
1545	A *	0.7	19.5	0	0	0
	B	0.6	19.5	0	0	0
	C	0.5	19.5	0	0	0
	D	0.5	19.5	0	0	0

* Backward

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/13/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: ~~Fair~~ CLEAR Cloudy Rain Snow
Temp.: 70 °F. 730 A.M. 84 °F. 1630 P.M.

Project No.: C325 Contr. No.:
Location: LAKE SALVAGE
Inspector: MATTHEW EN Hrs.: 0700-1715

Description of Work Accomplished: 0700 hours Contractor on site and preparing for work. Safety Meeting at 0745 - Cover lake st. traffic, noise generation, equipment, PPE, heat etc. Contractor cleaning up inside (HEPA) vacuuming. All litter removed inside. SE Corner being cleaned out of non contaminated building debris. Fuel Bowser on site 1015. Two drums of unknown material found in NW corner of site (one oil, one resin). One 20 CY Dumpster filled from site. 40 CY Roll off delivered and (10.3 tons). Building material test results came back non-haz - from Laidlaw. Truck going to recycling facility. 1145 City Environmental Inspector (Demo) on-site. Bartment tipple to City to get permit. 1500 hrs - both sides down. John Calimos (City of Chicago) said EPA suspended City demo permit. No permit necessary

Manpower and Equipment on Job: EQUIPMENT
CASE Loader, D-6 Dozer, 1 Dumpster, Office Trailer, 3 CY Trucks, Generator, CY Trailer, Greyhound Roll off, Suburban

PERSONNEL
CSES C. COPPLE, E. COPPLE, J. GARDEN, D. WILLIAMS, M. STARR, J. KOCH, J. DUNCAN, K. BETHANY, B. COPPLE, A. OBERMEIER, ETC CLERK

Site/Soil/Water Conditions:
Dusty road conditions from W. Lake St. Street sweeper used by Fence in AM.

Instructions or Directions Given to Contractor: Proceed with demolition with City and EPA approval -

Problems, Delays, and Controversies on Orders: Contractor required to have something in writing prior to demolition start. 0830 hours received CSES documentation of permit. FAXED to Ted Gauer, Pat Lowber and Mark Stange for review. Gave copy to Larry Leuck. Mark Stange called and said we could move ahead with demolition unless he called back

Materials or Equipment Received and Accepted: Pulled with the Contractor on demo permit
~~TWO LOADS STAGED @ 40 CY @ 10.30 TONS = LITTER~~
(2) ~~½ CTD, ½ LITTER~~

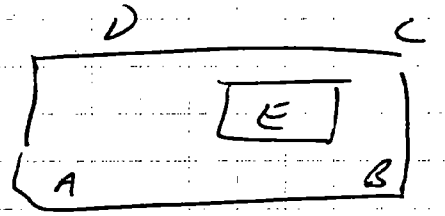
Other Comments: Contractor completed demolition of incinerators during delay and general site cleanup

See attached sheet 2 for air sampling data

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. LAKE SALVAGE SHEET 2 OF 9
CLIENT LITTON
SUBJECT AIR MONITORING
PREPARED BY MJM DATE 6/13/95 CHECKED BY _____ DATE _____

74°F AM
Wind
NE ↗ 5-10 mph



PM 1630
↗ NE 5 MPH
84°F

Location		Time	Hour	Part	~~KEL~~	O_2	CO
A		0945	0	0.7 *	0	0	0
B	Clean litter inside	0945	0	0.6	0	0	0
C		0945		0.5	0	0	0
D		0945	0	0.4	0	0	0
E		0945	0	0.7	0	0	0
A	Stack Demo	1415	0	0.6 *	0	0	0
B		↓	0	0.5	0	0	0
C			0	0.5	0	0	0
D			0	0.5	0	0	0
A	Incinerator Demo	1500	0	0.8 *	0	0	0
B		↓	0	0.6	0	0	0
C			0	0.6	0	0	0
D			0	0.6	0	0	0
A	Incinerator Demo	1630	0	0.6 *	0	0	0
B			0	0.5	0	0	0
C			0	0.6	0	0	0
D			0	0.4	0	0	0

* Backround.

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/14/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: Clear Fair Cloudy Rain Snow
Temp.: 72 °F. 0740 A.M. 88 °F. 1600 P.M.

Project No.: C325 Contr. No.:
Location: LAKE SALVAGE
Inspector: MATTHEWS Hrs.: 0700-

Description of Work Accomplished: 0700 Contractor set up scales. Dart Trucking on site 0815 and loading incinerator stacks. Two trucks arrived site. Problem with 2nd truck in that it had 2 rolloffs on a flat bed. Therefore it could only be loaded (2nd container) minimally. There was only ~5 CY in 2nd rolloff. Contractor working on incinerator cleanup all day to include soil cleanup and trench cleanup as directed by Fred Bartman EPA. 1540 hours - checked trench and air samples at trench. No major contaminants. Additional drums from inside loaded into hazwaste pile for disposal (1630 hrs). 1715 Contractor cleaned 2 troughs ~80 LF and 2 square areas ~2 inches deep ~250 SF. Sawed off stack in cement

Manpower and Equipment on Job:

EQUIPMENT	PERSONNEL
Case Unloader, Office Trailer, ER Trailer, Dean Trailer	C Coppee, E. Coppee, J Garden, D. Wilkens
3 ER Trucks, Freightliner Rolloff, Rolloff Box, Suburban	M Sturr, J Koch, J Duncan, K. Bethany
Generator, JD Endloader, 4 Cutoff saws, JD Backhoe	B Koppee, A Obermier, L Level (E&E)
	DART Trucking

Site/Soil/Water Conditions: Truckscale
Dusty road conditions on W. Lake st. Sewer construction activity on next block up wind of site.

Instructions or Directions Given to Contractor: Clean areas as instructed by EPA Fred Bartman

Problems, Delays, and Controversies on Orders: Contractor CSES had controversy over Rolloffs and trucking with Dart which caused some delays on project.

Materials or Equipment Received and Accepted: 0800 1st Truck 20 CY - 12.5 tons
0945 2nd Truck 2-20 CY (Only loaded 1.25) 17 tons
3rd Truck 20 CY - 15 tons

Other Comments: MTM - Parked on 737 off 1718 Flow 2 LPM During inspection.
SSN 628-52-4205 SAMPLE #4 Analyzed for lead, ~~[illegible]~~

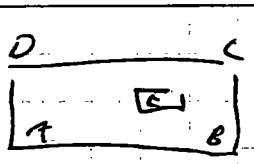
See Attached air sampling data Sheet #3

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. Lake Salvage SHEET 3 OF 9
CLIENT Litton
SUBJECT Air Sampling
PREPARED BY [illegible] DATE 6/14/95 CHECKED BY _____ DATE _____

AM 0745 72°F

SW ↓ 5-10 mph



PM

SW → 5-10 mph

Location	Time	PMV	Part.	LEL	O_2	CO
A	0915	0	0.6	0	0	0
B	↓	0	0.6	0	0	0
C *		0	0.5	0	0	0
D		0	0.6	0	0	0
A	1530	0	0.6	0	0	0
B	↓	0	0.6	0	0	0
C *		0	0.6	0	0	0
D	~~1530~~	0	0.6	0	0	0
E	1545	0	0.7	0	0	0

* Background

4 of 9

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/15/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: CLEAR Fair Cloudy Rain Snow
Temp.: 76 °F. 0805 A.M. 88 °F. 1600 P.M.

Project No.: C325 Contr. No.:
Location: LAKE SALVAGE
Inspector: MATILANEN Hrs.: 0700-1730

Description of Work Accomplished: 0800 Contractor cleaned out manhole and cutting off compactor. Workers HEPA vacuuming building + loading area. 1000 hrs have work continuing. Workers break due to heat. Contractor removing metal and washing prior to removal to recycler. Manhole cleaning complete at 1200 hrs. Manhole approximately 10' deep 4'ϕ. Approximately 1CY of sludge water disposed in nazwaste pile. P.M. Contractor loading out tank. Inside cleaning 1400 hours. Carbon monoxide levels high. Contractor moves generator away from doors. Levels ok. Tire guy on site. Removed 403 passenger + 9 semi tires. Washed prior to removal. (National Tire Service). All Areas HEPA vacuumed.

Manpower and Equipment on Job: Equipment
2 Hepa Vacs, Case Unloader, 3 ER Trucks, Subrumber Office, D-Con Trailer, ER Trailer, Generator, JD Backhoe

Employees
E. Copple, C. Copple, B. Copple, A. Obermier, D. Wilkins, J. Garden, M. Stan, K. Bethany, J. Roch, J. Duncan, L. Leuk (E+E)

Site/Soil/Water Conditions:
Site conditions dusty from W. Lake Street

Instructions or Directions Given to Contractor: If hazwaste goes on Monday 6/19, Contractor shall cover hazwaste with tarp. Interior site will be inspected on 6/16/95 AM.

Problems, Delays, and Controversies on Orders: No Problems

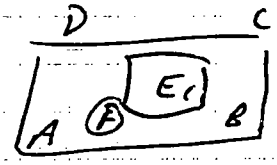
Materials or Equipment Received and Accepted: ① Removed ~40 CY steel to recycler
COZZI Iron + Metal Company 9880 lbs.
② National Tire Service 403 tires
9 semi.

Other Comments: See attached air sample 4

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. LAKE SALVAGE SHEET 4 OF 9
CLIENT LITTON
SUBJECT AIR SAMPLING
PREPARED BY MJM DATE 6/15/95 CHECKED BY _____ DATE _____

AM WEATHER
76°F 0805
West 0-5



PM WEATHER
S. West 5-10mph
88°F

Location	Time	HNU	Part	CEL	O_2	CO
A	0845	0	0.7	0	0	0
B *	0845 *	0	0.7	0	0	0
C *	0845	0	0.7	0	0	0
D	0845		0.7	0	0	0
E Cutting ⇒	0845 (~~Welding~~)	0	1.6	0	0	0
F	0745	0	0.6	0	0	0

Confined space entry maneuvers

A	1330	0	0.7	0	0	0
B *	↓	0	0.9	0	0	0
C *		0	0.8	0	0	0
D		0	0.7	0	0	0
E Cleaning	1345	0	0.7	0	0	20-50 *

CO from generator - Moved away from door → down to 10 ppm.

A	1540	0	0.7	0	0	0
B *	↓	0	0.7	0	0	0
C		0	0.6	0	0	0
D		0	0.5	0	0	0

* Background

5

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/16/95

Tighe & Bond Consulting Engineers 53 Southampton Road Westfield, MA 01085 413-562-1600	Contractor: CSES Weather: Clear Fair Cloudy Rain Snow Temp.: 75 °F. 0745 A.M. ____ °F. ____ P.M.	Project No.: C325 Contr. No.: ____ Location: LAKE SALVAGE Inspector: MATLA-MEN Hrs.: 0700-

Description of Work Accomplished: 0700 Went into work site. Require contractor to sure one room and clean 4 additional areas 1645 One load C+D litter out of site. 0930 Doug Schook (CSES) and Fred Bartman (EPA) on site. EPA determines bricks (HEPA vacuumed) can be used to fill trenches + loading dock. Mk'd by Mark Stunga (Lutton) and Tom Loubone (TAB). Manhole filled with rubble. Bartman wanted additional soil areas cleaned at in alleyway and behind incinerator. Contractor cleaning south alleyway of site and demolishing (1130) ~~Contractor finished building demolition and filling loading dock 1500 hours. Fred Bartman on-site (1630 hrs) Satisfied with work. Wants area around fence vacuumed~~

Manpower and Equipment on Job: Equipment: 3 HEPA vacs, 3 ER trailers, Case Unloader, JD Unloader, Suburban, D Con Office, ER Trailer, Generator, Water tank

Personnel: E. Copple, B. Copple, C. Copple, D. Wilkins, M Starr, J. Koch, J Duncan, K. Bethany, J. Garden, A Ouvrier, L. Leek (EZE)

Site/Soil/Water Conditions: Lake Street creating dusty backward conditions

Instructions or Directions Given to Contractor:

Problems, Delays, and Controversies on Orders:

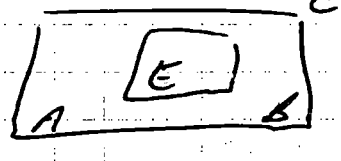
Materials or Equipment Received and Accepted: 1 load 36 CY C+D/Litter

Other Comments:

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. LAKE SALVAGE SHEET 5 OF 9
CLIENT LITTON
SUBJECT AIR SAMPLING
PREPARED BY [illegible] DATE 6/8/85 CHECKED BY _____ DATE _____

AM WEATHER SW
Temp 76°F
Wind SW 5-15



PM Weather
Temp. 68°F
Wind.
1300 hrs

	Time	Part	HAV	O_2	CO	LEL
A	0825	0.8	0	0	0	0
B	↓	0.7	0	0	0	0
C *		0.7	0	0	0	0
D		0.8				

CONFIRMATORY AIR SAMPLING INSIDE BUILDING

E SE	1020	0.8	0	0	0	0
SW	↓	0.8	0	0	0	0
NE		0.8	0	0	0	0
NW		0.8	0	0	0	0
Outside E		0.9	0	0	0	0

A	1250	0.7	0	0	0	0
B	↓	0.7	0	0	0	0
C		0.7	0	0	0	0
D		0.7	0	0	0	0
E		0.7	0	0	0	0

* Background.

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 1/17/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: Clear Fair Cloudy Rain Snow
Temp.: ~90 °F. ___ A.M. ___ °F. ___ P.M.
WIND SWIRLING FROM EAST

Project No.: C325 Contr. No.: ___
Location: LAKE SALVAGE
Inspector: MATTALAINEN Hrs.: 0600-1515

Description of Work Accomplished: 0600 CSES truck rolloff fell off of truck near Hillside Holiday Inn-Congress BFI landfill. Landfill operator and CSES loaded roll off onto truck. Load dumped at this landfill (BFI) instead of Vapeville. 0800 Contractor loading 2 loads of hazwaste off site by Dart Trucking. Brian Lopez discussed paint project of elevated line on W. Lake St with contractor. No work proposed immediately adjacent the site for containment. OSHA air sampling by contractor OK 4 ug, 2 ug, 4 ug / filter. Hazwaste pile covered with tarp prior to leaving site

Manpower and Equipment on Job:

Equipment	Personnel
Case Unloader, J.D. Endloader, FL. End dump, F.L. Rolloff, ER trucks, office/Decon Trailer, JD Backhoe, ER Trailer, Generator, Truck Scales, Hopkins, suburban	E. Copple, T. Gardner, C. Copple, P. Williams, J. Duncan, J. Koch, M. Stern, A. Obermier, K. Bethany, A. Copple, L. Leuk (EFE)

Site/Soil/Water Conditions: Dusty condition from construction on W. Lake street.

Instructions or Directions Given to Contractor: Showed contractor to check in on work. All things reported to be OK

Problems, Delays, and Controversies on Orders:

Materials or Equipment Received and Accepted: Two loads hazwaste to Canada 205, 21.5 tons
Two loads CFD to Vapeville + BFI
42CY @ 18.4 tons ↔ 18.4 tons @ 42 yds

Other Comments: No Air Samples

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/19/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: CLEAR Fair Cloudy Rain Snow
Temp.: 95 °F. 1030 A.M. ____ °F. ____ P.M.

Project No.: C325 Contr. No.: ____
Location: LAKE SALVAGE
Inspector: MJM Hrs.: 0700-1730

Description of Work Accomplished: 0700 Contractor on site demolishing building 0800 One hazwaste truck in, 0830 two hazwaste trucks in. 1200 Workers continuing segregation of masonry from steel + wood and sweep floor of building to minimize dust. 1400 Contractor nearing completion of demolition of building. Workers sweeping East side of lot in preparation for encapsulation. Contractor finished building demolition (1630) Fred Bartman on site - Wants area around fence vacuumed. Approves less samples of grid 50'x50' and overall performance of work. Contractor vacuuming + encapsulating

Manpower and Equipment on Job: Equipment: Case Unloader, JD Endloader, Truck Scales, 3 ER Trucks, F.L with end dump, F.L/Rolloff, Suburban, Generator, Office, D-Con Trailer, ER Trailer, Water Tank, JD Backhoe

Personnel: A. Obermier, A. Copple, C. Copple, E. Copple, J. Garden, D. Wilkins, J. Duncan, K. Bethany, J. Kock, M. Starr, Larry Leuk (E+E)

Site/Soil/Water Conditions: Dusty conditions from road work on W Lake Street. Construction activities include containment of Elevated structures on Lake St. By a painting contractor to include blasting + painting. Debris

Instructions or Directions Given to Contractor: leaking from containments

Problems, Delays, and Controversies on Orders:

Materials or Equipment Received and Accepted: Three hazwaste loads off site 21, 22, 22 tons
C+D Landfill ~~36 CY @ 11.61~~ 36 CY @ 8.71
~~42 CY @ 11.58~~ 42 CY @ 10.63
~~36 CY @ 18.68~~ 36 CY @ 9.88

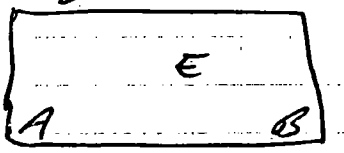
Other Comments: see Attached air sample sheet #7

Tighe&Bond
Consulting Engineers
Environmental Specialists

JOB NO. Lake Calvary SHEET 7 OF 9
CLIENT Litton
SUBJECT Air Sampling
PREPARED BY MJM DATE _____ CHECKED BY _____ DATE _____

AM WEATHER — NE 5-15 mph — 95°F

PM WEATHER — ~~NE~~ 10-15 mph — 97°F



		Time	Part.	HNU	O_2	CO	LEL
A	*	1030	0.8	0	0	0	0
B	*	↓	0.7	0	0	0	0
C	*	↓	0.8	0	0	0	0
D		↓	0.8	0	0	0	0
A	*	1345	0.9	0	0	0	0
B		↓	0.8	0	0	0	0
C		↓	0.9	0	0	0	0
D	*	↓	0.8	0	0	0	0

* Background

8

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/20/95

Tighe & Bond Consulting Engineers 53 Southampton Road Westfield, MA 01085 413-562-1600	Contractor: CSES Weather: CLEAR Fair Cloudy Rain Snow Temp.: 90 °F. 10 A.M. 95 °F. 2 P.M.	Project No.: C325 Contr. No.: Location: LAKE SALVAGE Inspector: MAM Hrs. 0700-1730

Description of Work Accomplished: 0700 Contractor on site. Loading out demolition waste, metal, and HEPA vacuuming. Tighe and Bond and E+E begin sampling (see attached) and finish up around 1100. E+E takes composite along the west area where site was graded (alleyway). Lancy Leuk will give us results. Donnan delivered two loads of gravel (3/4") to site. While unloading, truck hit overhead wire on elevated line. OSHA inspector on lead paint project came over to site and photographed trucks + line. Line was shut off. Donnan did not do anything about line. Contractor vacuuming + encapsulating

Manpower and Equipment on Job: Equipment
Fl. End Dump, F.L. Roll off, JD Endloader, Case, Unloader, 3 ER trucks, Suburban, Office Trailer, Toolbox, P-Con Trailer, 3 ER trailers, 2 HEPA's, Airless Sprayer Chop Saw

Personnel
L. Copple, E. Copple, D. Wilkins, J. Duncan, J. Garden, K. Bethany, M. Starr, J. Koch, A. Obermann, B. Copple, Lo Leuk E+E

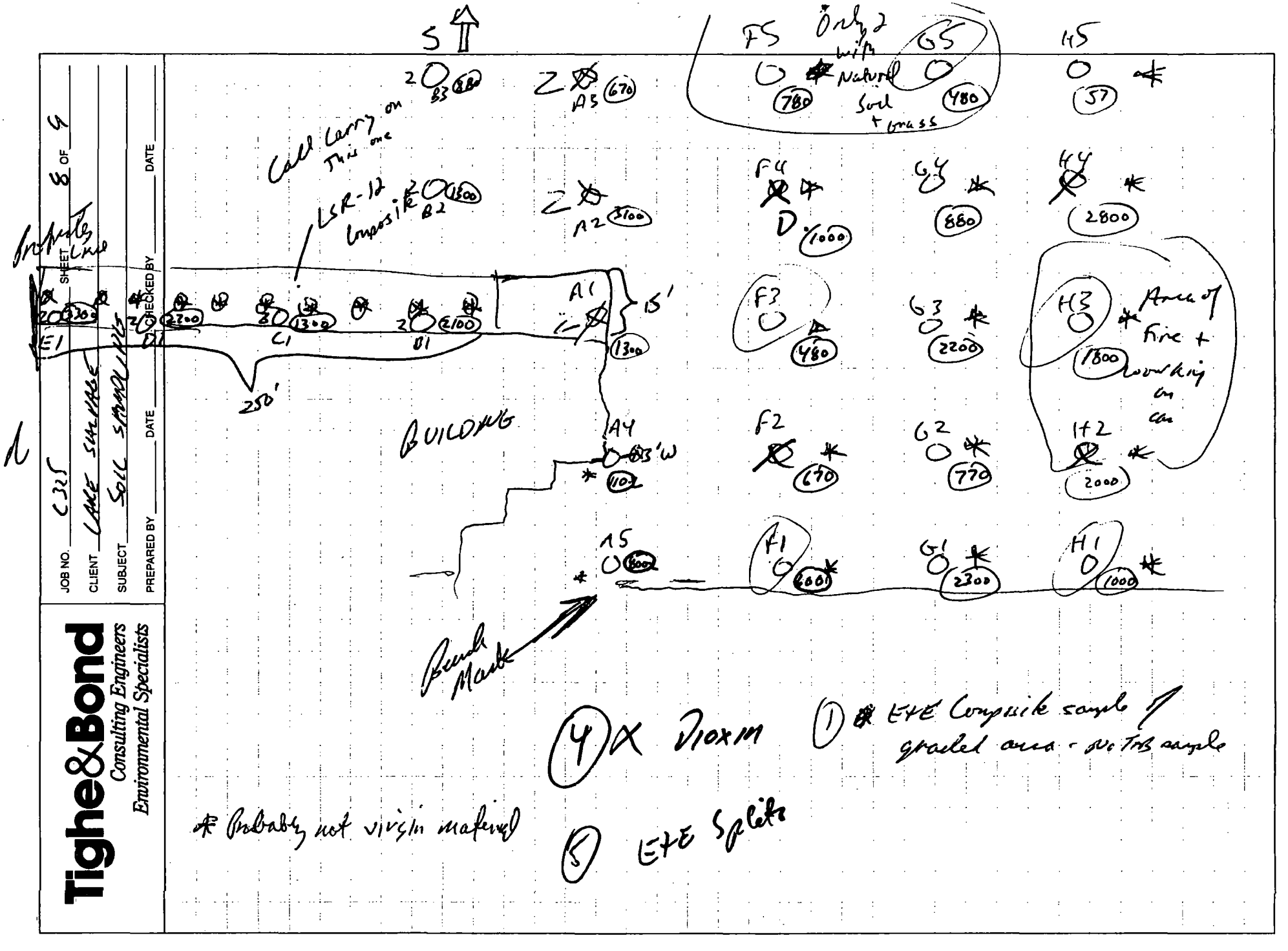
Site/Soil/Water Conditions:
Dusty conditions from W. Lake Street construction to include road replacement and elevated structure painting. Release of paint + blasting debris from painting containment

Instructions or Directions Given to Contractor: Contractor told to bring in cover for masonry fill areas, clean up ash areas as per EPA and remove fence

Problems, Delays, and Controversies on Orders: Contractor turned away Donnan trucking because they would not dump without payment. Two loads dropped and paid for.

Materials or Equipment Received and Accepted: C+D OUT 42 CY @ 11.58 IN 2 LOADS STONE
36 CY @ 18.68

Other Comments: - BUILDING TOWN - ALL WHITE OUT
NO AIR SAMPLING
- See attached Soil Sampling



JOB NO. C325
CLIENT LAKE SHAVAGE
SUBJECT SOIL SAMPLING
PREPARED BY ____ DATE ____
CHECKED BY ____ DATE ____
SHEET 8 OF 9

Tighe&Bond
Consulting Engineers
Environmental Specialists

TIGHE AND BOND

FIELD INSPECTION REPORT

Date 6/21/95

Tighe & Bond
Consulting Engineers
53 Southampton Road
Westfield, MA 01085
413-562-1600

Contractor: CSES
Weather: CLEAR Fair Cloudy Rain Snow
Temp.: ~85 °F. 800 A.M. ____ °F. ____ P.M.

Project No.: C325 Contr. No.: ____
Location: LAKE SALVAGE
Inspector: MATLAMEN Hrs.: 0700

Description of Work Accomplished: 0706 Contractor on site spreading gravel on exposed areas of fill and block, continuing HEPA vacuuming and encapsulation. Alex White Salvage truck in to pick up load of tin 1030 Fence down + being cut up. 1430 hours Contractor finishing loading of equipment and final grading of site. Went through estimates and pay items and agreed upon quantities with Brian Lopple of CSES. Walk through with L. Leuk + B. Lopple to evaluate site and final punchlist. One additional drum hazwaste ash from Fence as per EPA. Contractor finished up 1500 hrs

Manpower and Equipment on Job: Equipment
3 EP trucks, OR Trailers, Office/D-Con trailer
Generator, Case Uniloader, JD Endloader, JD Backhoe
Suburban, F.L. Enddump, F.L. Rolloff

Personnel
E. Lopple, C. Lopple, B. Lopple, D. Wilkins, J. Garden, A. Dormier
K. Bethany, J. Duncan, J. Koch, M. Stam
L. Leuk (EZE)

Site/Soil/Water Conditions:
Dusty conditions from Lake Street. Painting and sandblasting of elevated railway continuing. OSHA on site of painting operation performing inspection of work activities.

Instructions or Directions Given to Contractor:
Contractor directed to cap utilities and photodocument. Send pictures to TAB. Larry Leuk will visually confirm.

Problems, Delays, and Controversies on Orders:

Materials or Equipment Received and Accepted: One load tin (Alex White) 1 load stone
~3 CY @ 3840 lbs.

1 load Fence Metal

Other Comments:

APPENDIX G

Analytical Data

CommonwealthAnalytical

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention: TED CRAVER

Work ID: INITIAL SAMPLING ROUND
Project # C235_2_310

Workorder # 9412345

Authorized Signature

Peter A. Law 1/13
Laboratory Manager

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of Tighe & Bond, Inc.

Commonwealth Analytical

Workorder #9412345

Laboratory Results Prepared For :

LITTON SYSTEMS, INC. C235
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention : TED CRAVER

Company : LITTON SYSTEMS, INC.

Facility : ARLINGTON, VA 27202-3585
Contact : ZJK

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : INITIAL SAMPLING ROUND
Taken : 12/14/94-12/15/94
Transported : FED X
Type : WIPES
PO # :

1/11/95 CFR
Certified by

Commonwealth Analytical

Workorder #9412345

Results for W-01

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:30:00
Analyzed on 12/27/94 by SAS

01A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:21:55

Commonwealth Analytical

Workorder #9412345

Results for W-02

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:45:00
Analyzed on 12/27/94 by SAS

02A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:22:47

Commonwealth Analytical

Workorder #9412345

Results for W-03

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:50:00
Analyzed on 12/27/94 by SAS

03A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:23:39

Commonwealth Analytical

Workorder #9412345

Results for **W-04**

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 11:00:00
Analyzed on 12/28/94 by SAS

04A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:00:30

Commonwealth Analytical

Workorder #9412345

Results for W-F1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:20:00
Analyzed on 12/28/94 by SAS

05A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:01:22

Commonwealth Analytical

Workorder #9412345

Results for W-L1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:20:00
Analyzed on 12/28/94 by SAS

06A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:02:13

Commonwealth Analytical

Workorder #9412345

Results for W-L2

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:30:00
Analyzed on 12/28/94 by SAS

07A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:03:05

Commonwealth Analytical

Workorder #9412345

Results for W-L3

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:30:00
Analyzed on 12/28/94 by SAS

O&A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:03:56

Commonwealth Analytical

Workorder #9412345

Results for W-L4

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:40:00
Analyzed on 12/28/94 by SAS

09A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:05:40

Commonwealth Analytical

Workorder #9412345

Results for W-L5

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/28/94 by SAS

10A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:06:31

Commonwealth Analytical

Workorder #9412345

Results for W-L6

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/28/94 by SAS

11A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:07:23

Commonwealth Analytical

Workorder #9412345

Results for W-W1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:35:00
Analyzed on 12/28/94 by SAS

12A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:08:14

Commonwealth Analytical

Workorder #9412345

Results for W-W2

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:45:00
Analyzed on 12/28/94 by SAS

13A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:09:06

Commonwealth Analytical

Workorder #9412345

Results for W-W3

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

14A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:09:57

Commonwealth Analytical

Workorder #9412345

Results for W-W4

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

15A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:10:49

Commonwealth Analytical

Workorder #9412345

Results for W-W5

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

16A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:11:41

Commonwealth Analytical

Workorder #9412345

Results for W-W6

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

17A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:12:32

Commonwealth Analytical

Workorder #9412345

Results for W-W7

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:00:00
Analyzed on 12/30/94 by SAS

18A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:22:22

Commonwealth Analytical

Workorder #9412345

Results for W-W8

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/30/94 by SAS

19A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:23:14

Commonwealth Analytical

Workorder #9412345

Results for W-W9

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/31/94 by SAS

20A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:00:05

Commonwealth Analytical

Workorder #9412345

Results for W-W10

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/31/94 by SAS

21A\PCB_WI CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms per square centimeter.
Time Analyzed:00:57

Commonwealth Analytical

Workorder #9412345

Results for W-W11

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/29/94 by SAS

22A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:18:18

Commonwealth Analytical

Workorder #9412345

Results for W-W11 DUPLICATE

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/29/94 by SAS

Z3A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:19:01

Commonwealth Analytical

Workorder #9412345

Results for W-W12

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/29/94 by SAS

24A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms per square centimeter.
Time Analyzed:19:43

Commonwealth Analytical

Workorder #9412345

Results for W-W13

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/29/94 by SAS

25A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:20:26

Test Methodologies

Test: **PCB WIPE TEST**
Test Methods for Evaluating Solid Waste, EPA SW-846, 1986 Edition.
Preparation Method 3580.
Clean Up Method 3660.
Analysis Method 8080.

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway
Arlington, VA 27202-3585

Work ID: Initial Sampling Round
Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412-345

COC #

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. PCB wipes

Detection limit: 1 ug/cm^2

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
24A	10-012	WI	12/14/94 [illegible]	X		1	G							X												1
23A	10-011 duplicate	WI	12/14/94 [illegible]	X		1	G							X												1
01A	10-01	WI	12/14/94 [illegible]	X		1	G							X												1
02A	10-02	WI	12/15/94 [illegible]	X		1	G							X												1
03A	10-03	WI	12/15/94 [illegible]	X		1	G							X												1
04A	10-04	WI	12/15/94 [illegible]	X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	[illegible]			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30

Method of shipment: FedX

Laboratory: C/A

Cooler #: 17A L

Temp. @ receipt: ice

Preservation pH checked
By: N/A Date: 12-16-94

f:\data\excel\COCD-F.XLS rev.5/94

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 94/2-385 COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. PCB wipes

Detection limit: 1 ug/cm 2

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ✱ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container; For volatiles-one line/analysis)	Sample Type	Date Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other ___	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
	Trip Blank	WI		X		1	G							X												1
12A	10-101	WI	12/14/94 1:45 PM	X		1	G							X												1
13A	10-102	WI	12/14/94 1:45 PM	X		1	G							X												1
14A	10-103	WI	12/14/94 1:50 PM	X		1	G							X												1
15A	10-104	WI	12/14/94 1:50 PM	X		1	G							X												1
16A	10-105	WI	12/14/94 1:50 PM	X		1	G							X												1
17A	10-106	WI	12/14/94 1:50 PM	X		1	G							X												1
18A	10-107	WI	12/14/94 2:00 PM	X		1	G							X												1
19A	10-108	WI	12/14/94 2:00 PM	X		1	G							X												1
20A	10-109	WI	12/14/94 2:00 PM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	12:00 PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
				12	
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30
Method of shipment:			Laboratory: C/A		

Cooler #: 126

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: 12-16-94

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Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. | Job#/Proj. Manager: C235-2-310 / ZJK | Workorder # 9412345 | COC #

Address: 1725 Jefferson Davis Highway | Work ID: Initial Sampling Round | Shaded areas for office use

Arlington, VA 27202-3585 | Contact: Ted Craver

Phone: (703)413-3916 | Collected by: ZJK

Requested Turn Around Time (✓): 24 hr. [ ] 1 wk. [ ] Other [ ] 48 hr. [ ] 2 wk. [*] Specify:

Special Detection Limits?(✓): Yes [ ] No [ ] Specify:

Special QA/QC? (✓): Yes [ ] No [ ] Specify:

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. PCB wipes

Detection limit: 1 ug/cm²

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container; For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
21A	10-10	WI	12/14/94 2:10 pm	X		1	G							X												1
06A	10-L1	WI	12/14/94 2:20 pm	X		1	G							X												1
05A	10-F1	WI	12/14/94 2:25 pm	X		1	G							X												1
07A	10-L2	WI	12/14/94 2:35 pm	X		1	G							X												1
08A	10-L3	WI	12/14/94 2:40 pm	X		1	G							X												1
09A	10-L4	WI	12/14/94 2:45 pm	X		1	G							X												1
10A	10-L5	WI	12/14/94 2:45 pm	X		1	G							X												1
11A	10-LC	WI	12/14/94 2:50 pm	X		1	G							X												1
25A	10-H13	WI	12/14/94 2:50 pm	X		1	G							X												1
22A	10-H11	WI	12/14/94 2:45 pm	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[illegible]	12/15/94	[illegible]			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: Ken Haworth	12/16/94	8:30

Method of shipment:

Laboratory: C/A

Cooler #: 17L

Temp. @ receipt: 10C

Preservation pH checked

By: N/A Date: 12-16-94

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CommonwealthAnalytical

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention: TED CRAVER

Work ID: INITIAL SAMPLING ROUND
Project # C235_2_310

Workorder # 9412342

Authorized Signature

Peter A. Law 1/13
Laboratory Manager

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of Tighe & Bond, Inc.

Commonwealth Analytical

Workorder #9412342

Laboratory Results Prepared For :

LITTON SYSTEMS, INC. C235
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention : TED CRAVER

Company : LITTON SYSTEMS, INC.

Facility : ARLINGTON, VA 27202-3585
Contact : ZJK

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : INITIAL SAMPLING ROUND
Taken : 12/14/94-12/15/94
Transported : ZJK-T&B
Type : WIPES
PO # :

1/12/95 CPR
Certified by

Commonwealth Analytical

Workorder #9412342

Metal Results for W-01

Matrix:WIPE — Collected on 12/15/94 10:20:00

	Analyte	Result	Units	Test Date	Analyst
01A	LEAD by ICP	1.8	ug/cm2	12/30/94	VW

Metal Results for W-02

Matrix:WIPE — Collected on 12/15/94 10:45:00

	Analyte	Result	Units	Test Date	Analyst
02A	LEAD by ICP	2.7	ug/cm2	12/30/94	VW

Metal Results for W-03

Matrix:WIPE — Collected on 12/15/94 10:50:00

	Analyte	Result	Units	Test Date	Analyst
03A	LEAD by ICP	9.5	ug/cm2	12/30/94	VW

Metal Results for W-04

Matrix:WIPE — Collected on 12/15/94 11:00:00

	Analyte	Result	Units	Test Date	Analyst
04A	LEAD by ICP	5.8	ug/cm2	12/30/94	VW

Metal Results for W-F1

Matrix:WIPE — Collected on 12/14/94 13:00:00

	Analyte	Result	Units	Test Date	Analyst
05A	LEAD by ICP	25	ug/cm2	12/30/94	VW

Metal Results for W-L1

Matrix:WIPE — Collected on 12/14/94 12:30:00

	Analyte	Result	Units	Test Date	Analyst
06A	LEAD by ICP	2.4	ug/cm2	12/30/94	VW

Metal Results for W-L2

Matrix:WIPE — Collected on 12/14/94 13:00:00

	Analyte	Result	Units	Test Date	Analyst
07A	LEAD by ICP	0.76	ug/cm2	12/30/94	VW

Metal Results for W-L3

Matrix:WIPE — Collected on 12/14/94 13:15:00

	Analyte	Result	Units	Test Date	Analyst
08A	LEAD by ICP	0.81	ug/cm2	12/30/94	VW

Commonwealth Analytical

Workorder #9412342

Metal Results for W-L4

Matrix:WIPE — Collected on 12/14/94 13:20:00

	Analyte	Result	Units	Test Date	Analyst
09A	LEAD by ICP	1.2	ug/cm2	12/30/94	VW

Metal Results for W-L5

Matrix:WIPE — Collected on 12/14/94 13:30:00

	Analyte	Result	Units	Test Date	Analyst
10A	LEAD by ICP	2.7	ug/cm2	12/30/94	VW

Metal Results for W-L6

Matrix:WIPE — Collected on 12/14/94 13:30:00

	Analyte	Result	Units	Test Date	Analyst
11A	LEAD by ICP	1.7	ug/cm2	12/30/94	VW

Metal Results for W-W1

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
12A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W2

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
13A	LEAD by ICP	0.43	ug/cm2	12/30/94	VW

Metal Results for W-W3

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
14A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W4

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
15A	LEAD by ICP	0.86	ug/cm2	12/30/94	VW

Metal Results for W-W5

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
16A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W6

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
17A	LEAD by ICP	0.27	ug/cm2	12/30/94	VW

Metal Results for W-W7

Matrix:WIPE — Collected on 12/14/94 11:45:00

	Analyte	Result	Units	Test Date	Analyst
18A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W8

Matrix:WIPE — Collected on 12/14/94 11:45:00

	Analyte	Result	Units	Test Date	Analyst
19A	LEAD by ICP	1.9	ug/cm2	12/30/94	VW

Metal Results for W-W9

Matrix:WIPE — Collected on 12/14/94 12:00:00

	Analyte	Result	Units	Test Date	Analyst
20A	LEAD by ICP	1.1	ug/cm2	12/30/94	VW

Metal Results for W-W10

Matrix:WIPE — Collected on 12/14/94 11:50:00

	Analyte	Result	Units	Test Date	Analyst
21A	LEAD by ICP	0.76	ug/cm2	12/30/94	VW

Metal Results for W-W11

Matrix:WIPE — Collected on 12/14/94 12:00:00

	Analyte	Result	Units	Test Date	Analyst
22A	LEAD by ICP	0.17	ug/cm2	12/30/94	VW

Metal Results for W-W12

Matrix:WIPE — Collected on 12/14/94 12:15:00

	Analyte	Result	Units	Test Date	Analyst
23A	LEAD by ICP	0.11	ug/cm2	12/30/94	VW

Metal Results for W-W13

Matrix:WIPE — Collected on 12/14/94 12:30:00

	Analyte	Result	Units	Test Date	Analyst
24A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Commonwealth Analytical

Workorder #9412342

Test Methodologies

Test: **LEAD by ICP**
Method 6010, Test Methods for Evaluating Solid Waste, EPA-SW846, 1986 Edition.

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway
Arlington, VA 27202-3585

Work ID: Initial Sampling Round
Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg/cm²~~ 10 µg/cm²

14/10 1st ZJK

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
22	10-W11	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
23	10-W12	WI	12/14/94 12:15 PM	X		1	G							X												1
24	10-W13	WI	12/14/94 12:38 PM	X		1	G							X												1
06A	10-L1	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
05A	10-F1	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
07A	10-L2	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
08A	10-L3	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
09A	10-L4	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
10A	10-L5	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
11A	10-L6	WI	12/14/94 1:[illegible] PM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	12:[illegible] PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30

Method of shipment: Via Fed X

Laboratory: C/A

Cooler #: 22hr, 15hr

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: —

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Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg~~/cm^2

10 µg/cm^2

ZJK 12/16/94

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container. For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
01A	W-01	WI	12/15/94 12:00 AM	X		1	G							X												1
02A	W-02	WI	12/15/94 12:45 AM	X		1	G							X												1
03A	W-03	WI	12/15/94 12:[illegible] AM	X		1	G							X												1
04A	W-04	WI	12/15/94 11:[illegible] AM	X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
ZK	12/16/94	12:[illegible]			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30
Method of shipment: Via Fed X			Laboratory: C/A		

Cooler #: 22L, 15L

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: —

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CC: RH

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg~~/cm^2 10 µg/cm^2 12/14/94 ZJK

Requested Turn Around Time (✓): 24 hr. [ ] 1 wk. [ ] Other [ ] 48 hr. [ ] 2 wk. [*] Specify:

Special Detection Limits?(✓): Yes [ ] No [ ] Specify:

Special QA/QC? (✓): Yes [ ] No [ ] Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
12	10-W1	WI	12/14/94 11:15 AM	X		1	G							X												1
13	10-W2	WI	12/14/94 11:13 AM	X		1	G							X												1
14	10-W3	WI	12/14/94 11:15 AM	X		1	G							X												1
15	10-W4	WI	12/14/94 11:30 AM	X		1	G							X												1
16	10-W5	WI	12/14/94 11:30 AM	X		1	G							X												1
17	10-W6	WI	12/14/94 11:30 AM	X		1	G							X												1
18	10-W7	WI	12/14/94 11:45 AM	X		1	G							X												1
19	10-W8	WI	12/14/94 11:45 AM	X		1	G							X												1
20	10-W9	WI	12/14/94 12:30 PM	X		1	G							X												1
21	10-W10	WI	12/14/94 11:30 AM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
ZL	12/13/94	12:30 PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: Rick Hancock	Date: 12/16/94	Time: 8:30

Method of shipment: FedX

Laboratory: C/A

Cooler #:

Temp. @ receipt:

Preservation pH checked

By: Date:

f:\data\excel\COCD-F.XLS rev.5/94

CommonwealthAnalytical

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention: TED CRAVER

Work ID: INITIAL SAMPLING ROUND
Project # C235_2_310

Workorder # 9412347

Authorized Signature

Peter A. Law
Laboratory Manager

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of Tighe & Bond, Inc.

Commonwealth Analytical

Workorder #9412347

Laboratory Results Prepared For :

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention : TED CRAVER

Company : LITTON SYSTEMS, INC.

Facility : ARLINGTON, VA 27202-3585
Contact : ZJK

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : INITIAL SAMPLING ROUND
Taken : 12/15/94
Transported : FED X
Type : SOIL
PO # :

GJB 1-16-95

Certified by

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-A1

Matrix:SOIL

Collected on 12/15/94 08:30:00

	Analyte	Result	Units	Test Date	Analyst
01A	PERCENT SOLIDS	71.2	percent	12/19/94	RZ

Metal Results for SS-A1

Matrix:SOIL

Collected on 12/15/94 08:30:00

	Analyte	Result	Units	Test Date	Analyst
01A	LEAD by ICP	1300	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-A1

PCB's

Matrix:SOIL

Percent Solids: 71.2%

Collected on 12/15/94 08:30:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

01A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	20
	11104-28-2	PCB-1221	ND	20
	11141-16-5	PCB-1232	ND	20
	53469-21-9	PCB-1242	ND	20
	12672-29-6	PCB-1248	ND	20
	11097-69-1	PCB-1254	590	20
	11096-82-5	PCB-1260	ND	20

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-A2

Matrix:SOIL

Collected on 12/15/94 08:30:00

	Analyte	Result	Units	Test Date	Analyst
02A	PERCENT SOLIDS	88.1	percent	12/19/94	RZ

Metal Results for SS-A2

Matrix:SOIL

Collected on 12/15/94 08:30:00

	Analyte	Result	Units	Test Date	Analyst
02A	LEAD by ICP	3100	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-A2

PCB's

Matrix:SOIL

Percent Solids: 88.1%

Collected on 12/15/94 08:30:00
Extracted on 12/22/94
Analyzed on 01/03/95 by SAS

02A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	20
	11104-28-2	PCB-1221	ND	20
	11141-16-5	PCB-1232	ND	20
	53469-21-9	PCB-1242	ND	20
	12672-29-6	PCB-1248	ND	20
	11097-69-1	PCB-1254	ND	20
	11096-82-5	PCB-1260	ND	20

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-A3

Matrix:SOIL

Collected on 12/15/94 08:45:00

	Analyte	Result	Units	Test Date	Analyst
03A	PERCENT SOLIDS	81.2	percent	12/19/94	RZ

Metal Results for SS-A3

Matrix:SOIL

Collected on 12/15/94 08:45:00

	Analyte	Result	Units	Test Date	Analyst
03A	LEAD by ICP	670	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-A3

PCB's

Matrix:SOIL

Percent Solids: 81.2%

Collected on 12/15/94 08:45:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

03A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	30
	11104-28-2	PCB-1221	ND	30
	11141-16-5	PCB-1232	ND	30
	53469-21-9	PCB-1242	ND	30
	12672-29-6	PCB-1248	ND	30
	11097-69-1	PCB-1254	ND	30
	11096-82-5	PCB-1260	ND	30

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-B1

Matrix:SOIL

Collected on 12/15/94 08:50:00

	Analyte	Result	Units	Test Date	Analyst
04A	PERCENT SOLIDS	78.9	percent	12/19/94	RZ

Metal Results for SS-B1

Matrix:SOIL

Collected on 12/15/94 08:50:00

	Analyte	Result	Units	Test Date	Analyst
04A	LEAD by ICP	2100	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-B1

PCB's

Matrix:SOIL

Collected on 12/15/94 08:50:00
Extracted on 12/22/94
Analyzed on 01/03/95 by SAS

Percent Solids: 78.9%

04A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	500
	11104-28-2	PCB-1221	ND	500
	11141-16-5	PCB-1232	ND	500
	53469-21-9	PCB-1242	ND	500
	12672-29-6	PCB-1248	ND	500
	11097-69-1	PCB-1254	**14000**	500
	11096-82-5	PCB-1260	ND	500

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Inorganic Results for SS-B2

Matrix:SOIL

Collected on 12/15/94 08:50:00

	Analyte	Result	Units	Test Date	Analyst
05A	PERCENT SOLIDS	76.1	percent	12/19/94	RZ

Metal Results for SS-B2

Matrix:SOIL

Collected on 12/15/94 08:50:00

	Analyte	Result	Units	Test Date	Analyst
05A	LEAD by ICP	1300	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-B2

PCB's

Matrix:SOIL

Percent Solids: 76.1%

Collected on 12/15/94 08:50:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

05A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	20
	11104-28-2	PCB-1221	ND	20
	11141-16-5	PCB-1232	ND	20
	53469-21-9	PCB-1242	ND	20
	12672-29-6	PCB-1248	ND	20
	11097-69-1	PCB-1254	ND	20
	11096-82-5	PCB-1260	ND	20

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Inorganic Results for SS-B3

Matrix:SOIL

Collected on 12/15/94 08:55:00

	Analyte	Result	Units	Test Date	Analyst
06A	PERCENT SOLIDS	71.3	percent	12/19/94	RZ

Metal Results for SS-B3

Matrix:SOIL

Collected on 12/15/94 08:55:00

	Analyte	Result	Units	Test Date	Analyst
06A	LEAD by ICP	880	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-B3

PCB's

Matrix:SOIL

Percent Solids: 71.3%

Collected on 12/15/94 08:55:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

06A\PCBSWS

CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	20
11104-28-2	PCB-1221	ND	20
11141-16-5	PCB-1232	ND	20
53469-21-9	PCB-1242	ND	20
12672-29-6	PCB-1248	ND	20
11097-69-1	PCB-1254	ND	20
11096-82-5	PCB-1260	ND	20

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Inorganic Results for SS-C1

Matrix:SOIL

Collected on 12/15/94 09:00:00

	Analyte	Result	Units	Test Date	Analyst
07A	PERCENT SOLIDS	82.2	percent	12/19/94	RZ

Metal Results for SS-C1

Matrix:SOIL

Collected on 12/15/94 09:00:00

	Analyte	Result	Units	Test Date	Analyst
07A	LEAD by ICP	1300	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-C1

PCB's

Matrix:SOIL

Percent Solids: 82.2%

Collected on 12/15/94 09:00:00
Extracted on 12/22/94
Analyzed on 01/05/95 by SAS

07A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	200
	11104-28-2	PCB-1221	ND	200
	11141-16-5	PCB-1232	ND	200
	53469-21-9	PCB-1242	ND	200
	12672-29-6	PCB-1248	ND	200
	11097-69-1	PCB-1254	1800	200
	11096-82-5	PCB-1260	ND	200

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-D1

Matrix:SOIL

Collected on 12/15/94 09:00:00

	Analyte	Result	Units	Test Date	Analyst
08A	PERCENT SOLIDS	69.6	percent	12/19/94	RZ

Metal Results for SS-D1

Matrix:SOIL

Collected on 12/15/94 09:00:00

	Analyte	Result	Units	Test Date	Analyst
08A	LEAD by ICP	2200	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-D1

PCB's

Matrix:SOIL

Percent Solids: 69.6%

Collected on 12/15/94 09:00:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

08A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	60
	11104-28-2	PCB-1221	ND	60
	11141-16-5	PCB-1232	ND	60
	53469-21-9	PCB-1242	ND	60
	12672-29-6	PCB-1248	ND	60
	11097-69-1	PCB-1254	ND	60
	11096-82-5	PCB-1260	ND	60

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Inorganic Results for SS-E1

Matrix:SOIL

Collected on 12/15/94 09:15:00

	Analyte	Result	Units	Test Date	Analyst
09A	PERCENT SOLIDS	65.4	percent	12/19/94	RZ

Metal Results for SS-E1

Matrix:SOIL

Collected on 12/15/94 09:15:00

	Analyte	Result	Units	Test Date	Analyst
09A	LEAD by ICP	3300	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-E1

PCB's

Matrix:SOIL

Percent Solids: 65.4%

Collected on 12/15/94 09:15:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

09A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	60
	11104-28-2	PCB-1221	ND	60
	11141-16-5	PCB-1232	ND	60
	53469-21-9	PCB-1242	ND	60
	12672-29-6	PCB-1248	ND	60
	11097-69-1	PCB-1254	ND	60
	11096-82-5	PCB-1260	ND	60

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9412347

Inorganic Results for SS-O1

Matrix:SOIL

Collected on 12/15/94 10:30:00

	Analyte	Result	Units	Test Date	Analyst
10A	PERCENT SOLIDS	60.2	percent	12/19/94	RZ

Metal Results for SS-O1

Matrix:SOIL

Collected on 12/15/94 10:30:00

	Analyte	Result	Units	Test Date	Analyst
10A	LEAD by ICP	430	mg/kg, Dry Wgt.	01/13/95	BG

Commonwealth Analytical

Workorder #9412347

Results for SS-O1

PCB's

Matrix:SOIL

Percent Solids: 60.2%

Collected on 12/15/94 10:30:00
Extracted on 12/22/94
Analyzed on 12/31/94 by SAS

10A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	70
	11104-28-2	PCB-1221	ND	70
	11141-16-5	PCB-1232	ND	70
	53469-21-9	PCB-1242	ND	70
	12672-29-6	PCB-1248	ND	70
	11097-69-1	PCB-1254	**1800**	70
	11096-82-5	PCB-1260	ND	70

Verified by GJB

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Methodologies

Test: **LEAD by ICP**
Method 6010, Test Methods for Evaluating Solid Waste, EPA-SW846, 1986 Edition.

Test: **PCB's IN SOIL**
Test Methods for Evaluating Solid Waste, EPA SW-846, 1986 Edition.

Preparation	Method 3580-3550
Clean Up	Method 3660
Analysis	Modified Method 8080

Test: **PERCENT SOLIDS**
Method 160.3, Methods for Chemical Analyses of Water and Wastes, EPA-600/4-79-020, 1983 Revision.

Chain of Custody Form

C[redacted]nwea[redacted]alyti[redacted]
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412347

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Solper, Total Pb
2. PCBSWS

1. Pb detection limit: 10 mg/kg
2. Detection limit: 1 ug/kg

Requested Turn Around Time (✓): 24 hr. ☐ 1 wk. ☐ Other ☐ 48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓): Yes ☐ No ☐ Specify:

Special QA/QC? (✓): Yes ☐ No ☐ Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
10A ~~01A~~	SJ-C1	SO	12/15/94 10:30 AM	X		1	G							X				2	1							
02A	SS-E1	SO	12/15/94 9:15 AM	X		1	G							X				2	1							
	~~SJ-B3~~	SO	12/15/94 8:30 AM	X		1	G							X				2	1							
01A	SJ-A1	SO	12/15/94 8:30 AM	X		1	G							X				2	1							
02A	SJ-A2	SO	12/15/94 8:30 AM	X		1	G							X				2	1							
03A	SJ-A3	SO	12/15/94 8:45 AM	X		1	G							X				2	1							
04A	SJ-B1	SO	12/15/94 8:50 AM	X		1	G							X				2	1							
05A	SJ-B2	SO	12/15/94 8:50 AM	X		1	G							X				2	1							
06A	SJ-B3	SO	12/15/94 8:50 AM	X		1	G							X				2	1							
07A	SJ-C1	SO	12/15/94 9:30 AM	X		1	G							X				2	1							

RH 12-16-94

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	12:00			
			[signature]	12-16-94	8:30

Method of shipment: Fed X

Laboratory: C/A

Cooler #: 22L

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: 12-16-94

f:\data\excel\COCD-F.XLS rev.5/94

CC: RH

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Chain of Custody Form

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412 347

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Solper, Total Pb
2. PCBSWS

1. Pb detection limit: 10 mg/kg
2. Detection limit: 1 ug/kg

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container; For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
3A	[illegible]	SO	12/12/94 9:00 AM	X		1	G							X				2	1							
RH 2464	[illegible]	SO	12/12/94 9:15 AM	X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							
		SO		X		1	G							X				2	1							

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[illegible]	12/12/94	12:00 AM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [illegible]	12/16/94	8.30

Method of shipment: Fed X

Laboratory: C/A

Cooler #: 22L

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: 12-16-94

f:\data\excel\COCD-F.XLS rev.5/94

CommonwealthAnalytical

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention: TED CRAVER

Work ID: INITIAL SAMPLING ROUND
Project # C235_2_310

Workorder # 9412345

Authorized Signature

Peter A. Law
Laboratory Manager

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

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Commonwealth Analytical

Workorder #9412345

Laboratory Results Prepared For :

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention : TED CRAVER

Company : LITTON SYSTEMS, INC.

Facility : ARLINGTON, VA 27202-3585
Contact : ZJK

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : INITIAL SAMPLING ROUND
Taken : 12/14/94-12/15/94
Transported : FED X
Type : WIPES
PO # :

1/18/95 CAR
Certified by

Workorder Comments

REVISED REPORT

Commonwealth Analytical

Workorder #9412345

Results for W-01

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:30:00
Analyzed on 12/27/94 by SAS

01A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:21:55

Commonwealth Analytical

Workorder #9412345

Results for W-O2

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:45:00
Analyzed on 12/27/94 by SAS

02A\PCB_W1 CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:22:47

Commonwealth Analytical

Workorder #9412345

Results for W-O3

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 10:50:00
Analyzed on 12/27/94 by SAS

03A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:23:39

Commonwealth Analytical

Workorder #9412345

Results for W-O4

PCB WIPE TEST

Matrix:WIPE

Collected on 12/15/94 11:00:00
Analyzed on 12/28/94 by SAS

04A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:00:30

Commonwealth Analytical

Workorder #9412345

Results for W-F1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:20:00
Analyzed on 12/28/94 by SAS

05A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:01:22

Commonwealth Analytical

Workorder #9412345

Results for W-L1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:20:00
Analyzed on 12/28/94 by SAS

06A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:02:13

Commonwealth Analytical

Workorder #9412345

Results for W-L2

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:30:00
Analyzed on 12/28/94 by SAS

07A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:03:05

Commonwealth Analytical

Workorder #9412345

Results for W-L3

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:30:00
Analyzed on 12/28/94 by SAS

08A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:03:56

Commonwealth Analytical

Workorder #9412345

Results for W-L4

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:40:00
Analyzed on 12/28/94 by SAS

09A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:05:40

Commonwealth Analytical

Workorder #9412345

Results for W-L5

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/28/94 by SAS

10A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:06:31

Commonwealth Analytical

Workorder #9412345

Results for W-L6

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/28/94 by SAS

11A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:07:23

Commonwealth Analytical

Workorder #9412345

Results for W-W1

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:35:00
Analyzed on 12/28/94 by SAS

12A\PCB_W1 CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
12674-11-2	PCB-1016	ND	0.010
11104-28-2	PCB-1221	ND	0.010
11141-16-5	PCB-1232	ND	0.010
53469-21-9	PCB-1242	ND	0.010
12672-29-6	PCB-1248	ND	0.010
11097-69-1	PCB-1254	ND	0.010
11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:08:14

Commonwealth Analytical

Workorder #9412345

Results for W-W2

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:45:00
Analyzed on 12/28/94 by SAS

13A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:09:06

Commonwealth Analytical

Workorder #9412345

Results for W-W3

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

14A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:09:57

Commonwealth Analytical

Workorder #9412345

Results for W-W4

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

15A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:10:49

Commonwealth Analytical

Workorder #9412345

Results for W-W5

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

16A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms per square centimeter.
Time Analyzed:11:41

Commonwealth Analytical

Workorder #9412345

Results for W-W6

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 13:50:00
Analyzed on 12/28/94 by SAS

17A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:12:32

Commonwealth Analytical

Workorder #9412345

Results for W-W7

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:00:00
Analyzed on 12/30/94 by SAS

18A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:22:22

Commonwealth Analytical

Workorder #9412345

Results for W-W8

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/30/94 by SAS

19A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:23:14

Commonwealth Analytical

Workorder #9412345

Results for W-W9

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/31/94 by SAS

20A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:00:05

Commonwealth Analytical

Workorder #9412345

Results for W-W10

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:10:00
Analyzed on 12/31/94 by SAS

21A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by sas

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:00:57

Commonwealth Analytical

Workorder #9412345

Results for W-W11

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/29/94 by SAS

22A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms per square centimeter.
Time Analyzed:18:18

Commonwealth Analytical

Workorder #9412345

Results for **W-W11 DUPLICATE**

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:45:00
Analyzed on 12/29/94 by SAS

23A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:19:01

Commonwealth Analytical

Workorder #9412345

Results for W-W12

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/29/94 by SAS

24A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:19:43

Commonwealth Analytical

Workorder #9412345

Results for W-W13

PCB WIPE TEST

Matrix:WIPE

Collected on 12/14/94 14:50:00
Analyzed on 12/29/94 by SAS

25A\PCB_WI	CAS #	Compound	Result (ug/square cm)	Quantitation Limit (ug/square cm)
	12674-11-2	PCB-1016	ND	0.010
	11104-28-2	PCB-1221	ND	0.010
	11141-16-5	PCB-1232	ND	0.010
	53469-21-9	PCB-1242	ND	0.010
	12672-29-6	PCB-1248	ND	0.010
	11097-69-1	PCB-1254	ND	0.010
	11096-82-5	PCB-1260	ND	0.010

Verified by SAS

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the mimimum quantitation limit.
B = The compound was also detected in the blank.

Test Comments

All results reported in units of micrograms
per square centimeter.
Time Analyzed:20:26

Test Methodologies

Test: **PCB WIPE TEST**
Test Methods for Evaluating Solid Waste, EPA SW-846, 1986 Edition.
Preparation Method 3580.
Clean Up Method 3660.
Analysis Method 8080.

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412-345

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. PCB wipes

Detection limit: 1 ug/cm^2

Requested Turn Around Time (✓): 24 hr. [ ] 1 wk. [ ] Other [ ] 48 hr. [ ] 2 wk. [*] Specify:

Special Detection Limits?(✓): Yes [ ] No [ ] Specify:

Special QA/QC? (✓): Yes [ ] No [ ] Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
24A	10-01	WI	12/16/94 [illegible]	X		1	G							X												1
23A	10-01 duplicate	WI	12/16/94 [illegible]	X		1	G							X												1
01A	10-01	WI	12/16/94 12:30 AM	X		1	G							X												1
02A	10-02	WI	12/16/94 12:45 AM	X		1	G							X												1
03A	10-03	WI	12/16/94 12:50 AM	X		1	G							X												1
04A	10-04	WI	12/16/94 11:30 AM	X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	12:30 PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30

Method of shipment: FedX

Laboratory: C/A

Cooler #: 17A

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: 12-16-94

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Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. | Job#/Proj. Manager: C235-2-310 / ZJK | Workorder # 9412-345 | COC #

Address: 1725 Jefferson Davis Highway | Work ID: Initial Sampling Round

Arlington, VA 27202-3585 | Contact: Ted Craver

Phone: (703)413-3916 | Collected by: ZJK

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
1. PCB wipes
Detection limit: 1 ug/cm²

Requested Turn Around Time (✓): 24 hr. [ ] 1 wk. [ ] Other [ ] 48 hr. [ ] 2 wk. [*] Specify:

Special Detection Limits?(✓): Yes [ ] No [ ] Specify:

Special QA/QC? (✓): Yes [ ] No [ ] Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other ___	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
	Trip Blank	WI		X		1	G							X												1
12A	10-101	WI	12/14/94 1:45 PM	X		1	G							X												1
13A	10-102	WI	12/14/94 1:45 PM	X		1	G							X												1
14A	10-103	WI	12/14/94 1:50 PM	X		1	G							X												1
15A	10-104	WI	12/14/94 1:50 PM	X		1	G							X												1
16A	10-105	WI	12/14/94 1:50 PM	X		1	G							X												1
17A	10-106	WI	12/14/94 1:50 PM	X		1	G							X												1
18A	10-107	WI	12/14/94 2:00 PM	X		1	G							X												1
19A	10-108	WI	12/14/94 2:00 PM	X		1	G							X												1
20A	10-109	WI	12/14/94 2:00 PM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/16/94	11:00 PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
				13	
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30
Method of shipment:			Laboratory: C/A		

Cooler #: 176
Temp. @ receipt: ice
Preservation pH checked
By: N/A Date: 12-16-94

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Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412345 COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. PCB wipes

Detection limit: 1 ug/cm^2

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ✱ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container; For volatiles-one line/analysis)	Sample Type	Date Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
21A	10-10	WI	12/14/94 [illegible]	X		1	G							X												1
06A	10-L1	WI	12/14/94 [illegible]	X		1	G							X												1
07A	10-F1	WI	12/14/94 [illegible]	X		1	G							X												1
07A	10-L2	WI	12/14/94 [illegible]	X		1	G							X												1
08A	10-L3	WI	12/14/94 [illegible]	X		1	G							X												1
09A	10-L4	WI	12/14/94 [illegible]	X		1	G							X												1
10A	10-L5	WI	12/14/94 [illegible]	X		1	G							X												1
11A	10-L6	WI	12/14/94 [illegible]	X		1	G							X												1
25A	10-L13	WI	12/14/94 [illegible]	X		1	G							X												1
22A	10-L11	WI	12/14/94 [illegible]	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[illegible]	[illegible]	[illegible]			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: Ken Haworth	12/16/94	8:30

Method of shipment:

Laboratory: C/A

Cooler #: 17L

Temp. @ receipt: 1°C

Preservation pH checked

By: N/A Date: 12-16-94

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CommonwealthAnalytical

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention: TED CRAVER

Work ID: INITIAL SAMPLING ROUND
Project # C235_2_310

Workorder # 9412342

Authorized Signature

Peter A. Law
Laboratory Manager

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of Tighe & Bond, Inc.

Commonwealth Analytical

Workorder #9412342

Laboratory Results Prepared For :

LITTON SYSTEMS, INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 27202-3585

Attention : TED CRAVER

Company : LITTON SYSTEMS, INC.

Facility : ARLINGTON, VA 27202-3585
Contact : ZJK

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Peter A. Law
(413) 572-3200

Work ID : INITIAL SAMPLING ROUND
Taken : 12/14/94-12/15/94
Transported : ZJK-T&B
Type : WIPES
PO # :

1/18/95 CFR
Certified by

Workorder Comments

REVISED REPORT

Metal Results for W-O1

Matrix:WIPE — Collected on 12/15/94 10:20:00

	Analyte	Result	Units	Test Date	Analyst
01A	LEAD by ICP	1.8	ug/cm2	12/30/94	VW

Metal Results for W-O2

Matrix:WIPE — Collected on 12/15/94 10:45:00

	Analyte	Result	Units	Test Date	Analyst
02A	LEAD by ICP	2.7	ug/cm2	12/30/94	VW

Metal Results for W-O3

Matrix:WIPE — Collected on 12/15/94 10:50:00

	Analyte	Result	Units	Test Date	Analyst
03A	LEAD by ICP	9.5	ug/cm2	12/30/94	VW

Metal Results for W-O4

Matrix:WIPE — Collected on 12/15/94 11:00:00

	Analyte	Result	Units	Test Date	Analyst
04A	LEAD by ICP	5.8	ug/cm2	12/30/94	VW

Metal Results for W-F1

Matrix:WIPE — Collected on 12/14/94 13:00:00

	Analyte	Result	Units	Test Date	Analyst
05A	LEAD by ICP	25	ug/cm2	12/30/94	VW

Metal Results for W-L1

Matrix:WIPE — Collected on 12/14/94 12:30:00

	Analyte	Result	Units	Test Date	Analyst
06A	LEAD by ICP	2.4	ug/cm2	12/30/94	VW

Metal Results for W-L2

Matrix:WIPE — Collected on 12/14/94 13:00:00

	Analyte	Result	Units	Test Date	Analyst
07A	LEAD by ICP	0.76	ug/cm2	12/30/94	VW

Metal Results for W-L3

Matrix:WIPE — Collected on 12/14/94 13:15:00

	Analyte	Result	Units	Test Date	Analyst
08A	LEAD by ICP	0.81	ug/cm2	12/30/94	VW

Commonwealth Analytical

Workorder #9412342

Metal Results for W-L4

Matrix:WIPE — Collected on 12/14/94 13:20:00

	Analyte	Result	Units	Test Date	Analyst
09A	LEAD by ICP	1.2	ug/cm2	12/30/94	VW

Metal Results for W-L5

Matrix:WIPE — Collected on 12/14/94 13:30:00

	Analyte	Result	Units	Test Date	Analyst
10A	LEAD by ICP	2.7	ug/cm2	12/30/94	VW

Metal Results for W-L6

Matrix:WIPE — Collected on 12/14/94 13:30:00

	Analyte	Result	Units	Test Date	Analyst
11A	LEAD by ICP	1.7	ug/cm2	12/30/94	VW

Metal Results for W-W1

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
12A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W2

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
13A	LEAD by ICP	0.43	ug/cm2	12/30/94	VW

Metal Results for W-W3

Matrix:WIPE — Collected on 12/14/94 11:15:00

	Analyte	Result	Units	Test Date	Analyst
14A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W4

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
15A	LEAD by ICP	0.86	ug/cm2	12/30/94	VW

Metal Results for W-W5

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
16A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Commonwealth Analytical

Workorder #9412342

Metal Results for W-W6

Matrix:WIPE — Collected on 12/14/94 11:30:00

	Analyte	Result	Units	Test Date	Analyst
17A	LEAD by ICP	0.27	ug/cm2	12/30/94	VW

Metal Results for W-W7

Matrix:WIPE — Collected on 12/14/94 11:45:00

	Analyte	Result	Units	Test Date	Analyst
18A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Metal Results for W-W8

Matrix:WIPE — Collected on 12/14/94 11:45:00

	Analyte	Result	Units	Test Date	Analyst
19A	LEAD by ICP	1.9	ug/cm2	12/30/94	VW

Metal Results for W-W9

Matrix:WIPE — Collected on 12/14/94 12:00:00

	Analyte	Result	Units	Test Date	Analyst
20A	LEAD by ICP	1.1	ug/cm2	12/30/94	VW

Metal Results for W-W10

Matrix:WIPE — Collected on 12/14/94 11:50:00

	Analyte	Result	Units	Test Date	Analyst
21A	LEAD by ICP	0.76	ug/cm2	12/30/94	VW

Metal Results for W-W11

Matrix:WIPE — Collected on 12/14/94 12:00:00

	Analyte	Result	Units	Test Date	Analyst
22A	LEAD by ICP	0.17	ug/cm2	12/30/94	VW

Metal Results for W-W12

Matrix:WIPE — Collected on 12/14/94 12:15:00

	Analyte	Result	Units	Test Date	Analyst
23A	LEAD by ICP	0.11	ug/cm2	12/30/94	VW

Metal Results for W-W13

Matrix:WIPE — Collected on 12/14/94 12:30:00

	Analyte	Result	Units	Test Date	Analyst
24A	LEAD by ICP	<0.1	ug/cm2	12/30/94	VW

Test Methodologies

Test: **LEAD by ICP**
Method 6010, Test Methods for Evaluating Solid Waste, EPA-SW846, 1986 Edition.

Chain of Custody Form

53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway
Arlington, VA 27202-3585

Work ID: Initial Sampling Round
Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg/cm²~~ 10 µg/cm²

14/10 1st
ZJK

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
22	10-W11	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
23	10-W12	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
24	10-W13	WI	12/14/94 12:38 PM	X		1	G							X												1
26A	10-L1	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
25A	10-F1	WI	12/14/94 12:[illegible] PM	X		1	G							X												1
27A	10-L2	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
28A	10-L3	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
29A	10-L4	WI	12/14/94 1:[illegible] PM	X		1	G							X												1
30A	10-L5	WI	12/14/94 1:3[illegible] PM	X		1	G							X												1
31A	10-L6	WI	12/14/94 1:3[illegible] PM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/15/94	12:[illegible] PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/16/94	Time: 8:30

Method of shipment: Via Fed X

Laboratory: C/A

Cooler #: 22L, 15L

Temp. @ receipt: ICE

Preservation pH checked

By: N/A Date: —

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Chain of Custody Form

Co[redacted]wea[redacted]alytic[redacted]
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg~~/cm^2

10 µg/cm^2

ZJK 12/16/94

Requested Turn Around Time (✓)
24 hr. ☐ 1 wk. ☐ Other ☐
48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓)
Yes ☐ No ☐
Specify:

Special QA/QC? (✓)
Yes ☐ No ☐
Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
01A	10-01	WI	12/15/94 10:30 AM	X		1	G							X												1
02A	10-02	WI	12/15/94 10:45 AM	X		1	G							X												1
03A	10-03	WI	12/15/94 10:50 AM	X		1	G							X												1
04A	10-04	WI	12/15/94 11:00 AM	X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1
		WI		X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
ZK	12/15/94	11:00			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: Ken Howarth	Date: 12/16/94	Time: 8:30

Method of shipment: Via Fed X

Laboratory: C/A

Cooler #: 22L, 15L

Temp. @ receipt: ice

Preservation pH checked

By: N/A Date: —

f:\data\excel\COCD-F.XLS rev.5/94

cc: RA

Chain of Custody Form

53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems,Inc. Job#/Proj. Manager: C235-2-310 / ZJK

Address: 1725 Jefferson Davis Highway Work ID: Initial Sampling Round

Arlington, VA 27202-3585 Contact: Ted Craver

Phone: (703)413-3916 Collected by: ZJK

Workorder # 9412342

COC #

Shaded areas for office use

Analysis Requested

Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)

1. Pb wipes

Detection limit: ~~10 mg~~/cm^2

10 µg/cm^2
12/18/94
ZJK

Requested Turn Around Time (✓): 24 hr. ☐ 1 wk. ☐ Other ☐ 48 hr. ☐ 2 wk. ☒ Specify:

Special Detection Limits?(✓): Yes ☐ No ☐ Specify:

Special QA/QC? (✓): Yes ☐ No ☐ Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(✓)	Comp(✓)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
[illegible]	10-W1	WI	12/14/94 11:15 AM	X		1	G							X												1
17	10-W2	WI	12/14/94 11:13 AM	X		1	G							X												1
18	10-W3	WI	12/14/94 11:15 AM	X		1	G							X												1
[illegible]	10-W4	WI	12/14/94 11:30 AM	X		1	G							X												1
[illegible]	10-W5	WI	12/14/94 11:30 AM	X		1	G							X												1
[illegible]	10-W6	WI	12/14/94 11:30 AM	X		1	G							X												1
[illegible]	10-W7	WI	12/14/94 11:45 AM	X		1	G							X												1
[illegible]	10-W8	WI	12/14/94 11:45 AM	X		1	G							X												1
20	10-W9	WI	12/14/94 12:20 PM	X		1	G							X												1
21	10-W10	WI	12/14/94 11:50 AM	X		1	G							X												1

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	12/18/94	12:30 PM			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: [signature]	Date: 12/18/94	Time: 8:30
Method of shipment: FedX			Laboratory: C/A		

Cooler #:

Temp. @ receipt:

Preservation pH checked

By: Date:

f:\data\excel\COCD-F.XLS rev.5/94

Quanterra Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

January 25, 1995
Lab ID: 079414 Amended

Zen Kruczkowski
Tighe and Bond, Inc.
53 Southampton Road
Westfield, MA 01085

Dear Mr. Kruczkowski:

Enclosed is the amended report for the PCDD/PCDF analysis by Method 8290 of your twenty-five wipe samples received at Quanterra Incorporated on 16 December 1994 under chain of custody. Per your request, your wipe samples have been reported in units of pg/cm^2 using the area per wipe you provided.

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique. For an analyte reported as 'Not Detected' the associated detection limit represents its maximum possible concentration. The method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

All samples and extracts are retained for 30 days from the date of this report. If longer storage is required or you would like samples returned to you, please call with instructions.

Results are on the attached data sheets.

If you have any questions, please feel free to call.

Sincerely,

Eric W. Redman
Senior Scientist
Advanced Technology Group

For

Kathleen A. Gill
Program Administrator

KG/ne

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 079414-0001-MB
Matrix: WIPE Sampled: NA Received: NA
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.0062	
2,3,7,8-TCDF	ND	pg/cm2	0.0062	
PeCDFs (total)	ND	pg/cm2	0.024	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.023	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.024	
HxCDFs (total)	ND	pg/cm2	0.0064	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.0060	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.0060	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.0064	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0056	
HpCDFs (total)	ND	pg/cm2	0.023	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.020	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.023	
OCDF	ND	pg/cm2	0.016	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.019	
2,3,7,8-TCDD	ND	pg/cm2	0.011	
PeCDDs (total)	ND	pg/cm2	0.083	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.017	
HxCDDs (total)	ND	pg/cm2	0.019	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.019	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.017	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.017	
HpCDDs (total)	ND	pg/cm2	0.011	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.011	
OCDD	ND	pg/cm2	0.049	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar Approved By: Mark Bechthold

The cover letter is an integral part of this report.
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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 079414-0001-MB
Matrix: WIPE
Sampled: NA
Received: NA
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	80
13C-2,3,7,8-TCDD	68
13C-1,2,3,7,8-PeCDF	79
13C-1,2,3,7,8-PeCDD	78
13C-1,2,3,4,7,8-HxCDF	83
13C-1,2,3,6,7,8-HxCDD	82
13C-1,2,3,4,6,7,8-HpCDF	70
13C-1,2,3,4,6,7,8-HpCDD	75
13C-OCDD	63

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar
Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: Trip Blank
Lab ID: 079414-0001-TB
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.0059	
2,3,7,8-TCDF	ND	pg/cm2	0.0045	
PeCDFs (total)	ND	pg/cm2	0.026	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.025	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.026	
HxCDFs (total)	ND	pg/cm2	0.013	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.0097	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.012	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.013	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.012	
HpCDFs (total)	ND	pg/cm2	0.016	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.012	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.016	
OCDF	ND	pg/cm2	0.026	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.018	
2,3,7,8-TCDD	ND	pg/cm2	0.010	
PeCDDs (total)	ND	pg/cm2	0.080	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.016	
HxCDDs (total)	ND	pg/cm2	0.016	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.016	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.014	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.014	
HpCDDs (total)	ND	pg/cm2	0.011	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.011	
OCDD	ND	pg/cm2	0.084	

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ND = Not detected
NA = Not applicable

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Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: Trip Blank
Lab ID: 079414-0001-TB
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	84
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	81
13C-1,2,3,7,8-PeCDD	83
13C-1,2,3,4,7,8-HxCDF	77
13C-1,2,3,6,7,8-HxCDD	77
13C-1,2,3,4,6,7,8-HpCDF	65
13C-1,2,3,4,6,7,8-HpCDD	70
13C-OCDD	58

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-01
Lab ID: 079414-0002-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.022	g
2,3,7,8-TCDF	ND	pg/cm2	0.022	g
PeCDFs (total)	ND	pg/cm2	0.16	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.022	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.021	
HxCDFs (total)	ND	pg/cm2	0.10	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.039	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.017	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.011	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0094	
HpCDFs (total)	ND	pg/cm2	0.088	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.088	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.0089	
OCDF	ND	pg/cm2	0.085	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.029	
2,3,7,8-TCDD	ND	pg/cm2	0.0095	
PeCDDs (total)	ND	pg/cm2	0.081	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.015	
HxCDDs (total)	0.64	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.022	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.035	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.050	
HpCDDs (total)	6.3	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	1.0	pg/cm2	--	
OCDD	7.9	pg/cm2	--	

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-01
Lab ID: 079414-0002-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	88
13C-2,3,7,8-TCDD	80
13C-1,2,3,7,8-PeCDF	83
13C-1,2,3,7,8-PeCDD	86
13C-1,2,3,4,7,8-HxCDF	87
13C-1,2,3,6,7,8-HxCDD	86
13C-1,2,3,4,6,7,8-HpCDF	77
13C-1,2,3,4,6,7,8-HpCDD	83
13C-OCDD	77

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar
Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-02
Lab ID: 079414-0003-SA
Matrix: WIPE Sampled: 15 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.035	
2,3,7,8-TCDF	ND	pg/cm2	0.035	
PeCDFs (total)	ND	pg/cm2	0.049	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.024	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.025	
HxCDFs (total)	ND	pg/cm2	0.029	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.010	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.0081	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.0056	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0049	
HpCDFs (total)	ND	pg/cm2	0.028	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.028	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.0047	
OCDF	ND	pg/cm2	0.034	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.020	
2,3,7,8-TCDD	ND	pg/cm2	0.088	
PeCDDs (total)	ND	pg/cm2	0.080	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.014	
HxCDDs (total)	ND	pg/cm2	0.090	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.0068	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.010	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.019	
HpCDDs (total)	0.70	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.19	
OCDD	0.98	pg/cm2	--	@

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ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-02
Lab ID: 079414-0003-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 15 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	83
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	80
13C-1,2,3,7,8-PeCDD	83
13C-1,2,3,4,7,8-HxCDF	87
13C-1,2,3,6,7,8-HxCDD	86
13C-1,2,3,4,6,7,8-HpCDF	71
13C-1,2,3,4,6,7,8-HpCDD	79
13C-OCDD	70

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar
Approved By: Mark Bechthold

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-03
Lab ID: 079414-0004-SA
Matrix: WIPE Sampled: 15 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.016	
2,3,7,8-TCDF	ND	pg/cm2	0.016	
PeCDFs (total)	ND	pg/cm2	0.026	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.022	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.022	
HxCDFs (total)	ND	pg/cm2	0.017	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.017	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.0063	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.0067	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0059	
HpCDFs (total)	ND	pg/cm2	0.023	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.023	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.015	
OCDF	ND	pg/cm2	0.042	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.021	
2,3,7,8-TCDD	ND	pg/cm2	0.0077	
PeCDDs (total)	ND	pg/cm2	0.075	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.012	
HxCDDs (total)	ND	pg/cm2	0.019	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.015	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.013	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.014	
HpCDDs (total)	ND	pg/cm2	0.11	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.098	
OCDD	0.62	pg/cm2	--	@

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-03
Lab ID: 079414-0004-SA
Matrix: WIPE
Sampled: 15 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	87
13C-2,3,7,8-TCDD	78
13C-1,2,3,7,8-PeCDF	87
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,4,7,8-HxCDF	78
13C-1,2,3,6,7,8-HxCDD	79
13C-1,2,3,4,6,7,8-HpCDF	67
13C-1,2,3,4,6,7,8-HpCDD	73
13C-OCDD	65

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Adrian Messecar
Approved By: Mark Bechthold

The cover letter is an integral part of this report.
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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-04
Lab ID: 079414-0005-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 15 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.012	
2,3,7,8-TCDF	ND	pg/cm2	0.012	
PeCDFs (total)	ND	pg/cm2	0.018	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.011	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.011	
HxCDFs (total)	ND	pg/cm2	0.0082	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.0077	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.0077	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.0082	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0072	
HpCDFs (total)	ND	pg/cm2	0.034	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.034	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.015	
OCDF	ND	pg/cm2	0.034	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.025	
2,3,7,8-TCDD	ND	pg/cm2	0.0085	
PeCDDs (total)	ND	pg/cm2	0.084	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.012	
HxCDDs (total)	ND	pg/cm2	0.032	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.00089	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.00080	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.00082	
HpCDDs (total)	ND	pg/cm2	0.18	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.054	
OCDD	ND	pg/cm2	0.44	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy
Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-04
Lab ID: 079414-0005-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 15 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	86
13C-2,3,7,8-TCDD	76
13C-1,2,3,7,8-PeCDF	83
13C-1,2,3,7,8-PeCDD	84
13C-1,2,3,4,7,8-HxCDF	83
13C-1,2,3,6,7,8-HxCDD	83
13C-1,2,3,4,6,7,8-HpCDF	66
13C-1,2,3,4,6,7,8-HpCDD	72
13C-OCDD	61

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W1
Lab ID: 079414-0006-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 08 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.069	pg/cm2	--	g
2,3,7,8-TCDF	0.069	pg/cm2	--	g@
PeCDFs (total)	ND	pg/cm2	0.071	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.071	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.020	
HxCDFs (total)	ND	pg/cm2	0.061	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.061	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.018	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.017	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.015	
HpCDFs (total)	ND	pg/cm2	0.045	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.045	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.011	
OCDF	ND	pg/cm2	0.057	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.021	
2,3,7,8-TCDD	ND	pg/cm2	0.0077	
PeCDDs (total)	ND	pg/cm2	0.078	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.0080	
HxCDDs (total)	ND	pg/cm2	0.015	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.015	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.013	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.014	
HpCDDs (total)	ND	pg/cm2	0.015	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.015	
OCDD	ND	pg/cm2	0.12	

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ND = Not detected
NA = Not applicable

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W1
Lab ID: 079414-0006-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 08 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery	
13C-2,3,7,8-TCDF	95	g
13C-2,3,7,8-TCDD	84	
13C-1,2,3,7,8-PeCDF	87	
13C-1,2,3,7,8-PeCDD	85	
13C-1,2,3,4,7,8-HxCDF	91	
13C-1,2,3,6,7,8-HxCDD	87	
13C-1,2,3,4,6,7,8-HpCDF	76	
13C-1,2,3,4,6,7,8-HpCDD	80	
13C-OCDD	73	

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W2
Lab ID: 079414-0007-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.077	pg/cm2	--	g
2,3,7,8-TCDF	0.077	pg/cm2	--	g@
PeCDFs (total)	ND	pg/cm2	0.12	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.12	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.041	
HxCDFs (total)	ND	pg/cm2	0.14	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.14	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.041	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.016	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0066	
HpCDFs (total)	ND	pg/cm2	0.16	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.16	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.024	
OCDF	ND	pg/cm2	0.21	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.018	
2,3,7,8-TCDD	ND	pg/cm2	0.0091	
PeCDDs (total)	ND	pg/cm2	0.074	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.0077	
HxCDDs (total)	ND	pg/cm2	0.013	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.013	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.012	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.012	
HpCDDs (total)	ND	pg/cm2	0.020	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.017	
OCDD	ND	pg/cm2	0.11	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W2
Lab ID: 079414-0007-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 30 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery	
13C-2,3,7,8-TCDF	85	g
13C-2,3,7,8-TCDD	84	
13C-1,2,3,7,8-PeCDF	88	
13C-1,2,3,7,8-PeCDD	90	
13C-1,2,3,4,7,8-HxCDF	86	
13C-1,2,3,6,7,8-HxCDD	84	
13C-1,2,3,4,6,7,8-HpCDF	68	
13C-1,2,3,4,6,7,8-HpCDD	73	
13C-OCDD	60	

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W3
Lab ID: 079414-0008-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 31 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	4.7	pg/cm2	--	
2,3,7,8-TCDF	1.3	pg/cm2	--	g
PeCDFs (total)	13	pg/cm2	--	
1,2,3,7,8-PeCDF	3.5	pg/cm2	--	
2,3,4,7,8-PeCDF	1.1	pg/cm2	--	
HxCDFs (total)	9.0	pg/cm2	--	
1,2,3,4,7,8-HxCDF	4.8	pg/cm2	--	
1,2,3,6,7,8-HxCDF	1.3	pg/cm2	--	
2,3,4,6,7,8-HxCDF	0.44	pg/cm2	--	@
1,2,3,7,8,9-HxCDF	0.37	pg/cm2	--	@
HpCDFs (total)	6.9	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	4.1	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	1.2	pg/cm2	--	
OCDF	9.1	pg/cm2	--	
Dioxins				
TCDDs (total)	0.079	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.017	
PeCDDs (total)	ND	pg/cm2	0.17	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.032	
HxCDDs (total)	0.29	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.049	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.091	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.089	
HpCDDs (total)	0.92	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	0.51	pg/cm2	--	
OCDD	1.3	pg/cm2	--	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W3
Lab ID: 079414-0008-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 31 DEC 94

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	85
13C-2,3,7,8-TCDD	80
13C-1,2,3,7,8-PeCDF	86
13C-1,2,3,7,8-PeCDD	84
13C-1,2,3,4,7,8-HxCDF	89
13C-1,2,3,6,7,8-HxCDD	88
13C-1,2,3,4,6,7,8-HpCDF	74
13C-1,2,3,4,6,7,8-HpCDD	80
13C-OCDD	65

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W4
Lab ID: 079414-0009-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.0	pg/cm2	--	
2,3,7,8-TCDF	0.27	pg/cm2	--	g
PeCDFs (total)	2.1	pg/cm2	--	
1,2,3,7,8-PeCDF	0.55	pg/cm2	--	
2,3,4,7,8-PeCDF	0.26	pg/cm2	--	@
HxCDFs (total)	3.2	pg/cm2	--	
1,2,3,4,7,8-HxCDF	1.6	pg/cm2	--	
1,2,3,6,7,8-HxCDF	0.44	pg/cm2	--	@
2,3,4,6,7,8-HxCDF	0.38	pg/cm2	--	@
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.12	
HpCDFs (total)	4.9	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	3.1	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	0.66	pg/cm2	--	
OCDF	4.5	pg/cm2	--	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.042	
2,3,7,8-TCDD	ND	pg/cm2	0.025	
PeCDDs (total)	ND	pg/cm2	0.11	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.022	
HxCDDs (total)	0.56	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.051	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.081	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.10	
HpCDDs (total)	1.4	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	0.69	pg/cm2	--	
OCDD	2.3	pg/cm2	--	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W4
Lab ID: 079414-0009-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	76
13C-2,3,7,8-TCDD	85
13C-1,2,3,7,8-PeCDF	72
13C-1,2,3,7,8-PeCDD	87
13C-1,2,3,4,7,8-HxCDF	81
13C-1,2,3,6,7,8-HxCDD	89
13C-1,2,3,4,6,7,8-HpCDF	56
13C-1,2,3,4,6,7,8-HpCDD	69
13C-OCDD	66

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W5
Lab ID: 079414-0010-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.45	pg/cm2	--	
2,3,7,8-TCDF	0.23	pg/cm2	--	g
PeCDFs (total)	0.30	pg/cm2	--	
1,2,3,7,8-PeCDF	0.30	pg/cm2	--	@
2,3,4,7,8-PeCDF	ND	pg/cm2	0.082	
HxCDFs (total)	0.44	pg/cm2	--	
1,2,3,4,7,8-HxCDF	0.44	pg/cm2	--	@
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.12	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.056	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.032	
HpCDFs (total)	0.47	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	0.47	pg/cm2	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.13	
OCDF	0.62	pg/cm2	--	@
Dioxins				
TCDDs (total)	ND	pg/cm2	0.035	
2,3,7,8-TCDD	ND	pg/cm2	0.016	
PeCDDs (total)	ND	pg/cm2	0.064	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.019	
HxCDDs (total)	ND	pg/cm2	0.044	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.019	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.020	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.026	
HpCDDs (total)	ND	pg/cm2	0.093	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.093	
OCDD	ND	pg/cm2	0.39	

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ND = Not detected
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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W5
Lab ID: 079414-0010-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	72
13C-2,3,7,8-TCDD	77
13C-1,2,3,7,8-PeCDF	67
13C-1,2,3,7,8-PeCDD	84
13C-1,2,3,4,7,8-HxCDF	69
13C-1,2,3,6,7,8-HxCDD	76
13C-1,2,3,4,6,7,8-HpCDF	46
13C-1,2,3,4,6,7,8-HpCDD	59
13C-OCDD	57

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W6
Lab ID: 079414-0011-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.7	pg/cm2	--	
2,3,7,8-TCDF	0.34	pg/cm2	--	g
PeCDFs (total)	2.2	pg/cm2	--	
1,2,3,7,8-PeCDF	0.62	pg/cm2	--	
2,3,4,7,8-PeCDF	0.31	pg/cm2	--	@
HxCDFs (total)	2.5	pg/cm2	--	
1,2,3,4,7,8-HxCDF	1.6	pg/cm2	--	
1,2,3,6,7,8-HxCDF	0.40	pg/cm2	--	@
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.23	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.10	
HpCDFs (total)	2.6	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	1.8	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	0.44	pg/cm2	--	@
OCDF	2.1	pg/cm2	--	
Dioxins				
TCDDs (total)	0.073	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.020	
PeCDDs (total)	ND	pg/cm2	0.13	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.016	
HxCDDs (total)	ND	pg/cm2	0.22	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.037	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.057	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.072	
HpCDDs (total)	0.82	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	0.43	pg/cm2	--	@
OCDD	1.7	pg/cm2	--	

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ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W6
Lab ID: 079414-0011-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	72
13C-2,3,7,8-TCDD	73
13C-1,2,3,7,8-PeCDF	62
13C-1,2,3,7,8-PeCDD	79
13C-1,2,3,4,7,8-HxCDF	68
13C-1,2,3,6,7,8-HxCDD	76
13C-1,2,3,4,6,7,8-HpCDF	49
13C-1,2,3,4,6,7,8-HpCDD	62
13C-OCDD	60

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W7
Lab ID: 079414-0012-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.057	pg/cm2	--	g
2,3,7,8-TCDF	0.057	pg/cm2	--	g@
PeCDFs (total)	ND	pg/cm2	0.11	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.056	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.049	
HxCDFs (total)	ND	pg/cm2	0.17	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.17	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.053	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.051	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.015	
HpCDFs (total)	0.35	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	0.35	pg/cm2	--	@
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.068	
OCDF	ND	pg/cm2	0.42	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.021	
2,3,7,8-TCDD	ND	pg/cm2	0.019	
PeCDDs (total)	ND	pg/cm2	0.078	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.013	
HxCDDs (total)	ND	pg/cm2	0.063	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.020	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.015	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.016	
HpCDDs (total)	ND	pg/cm2	0.086	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.086	
OCDD	ND	pg/cm2	0.30	

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ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W7
Lab ID: 079414-0012-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	89
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	66
13C-1,2,3,7,8-PeCDD	80
13C-1,2,3,4,7,8-HxCDF	70
13C-1,2,3,6,7,8-HxCDD	75
13C-1,2,3,4,6,7,8-HpCDF	50
13C-1,2,3,4,6,7,8-HpCDD	61
13C-OCDD	58

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W8
Lab ID: 079414-0013-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	6.2	pg/cm2	--	
2,3,7,8-TCDF	1.4	pg/cm2	--	g
PeCDFs (total)	18	pg/cm2	--	
1,2,3,7,8-PeCDF	3.4	pg/cm2	--	
2,3,4,7,8-PeCDF	1.9	pg/cm2	--	
HxCDFs (total)	26	pg/cm2	--	
1,2,3,4,7,8-HxCDF	11	pg/cm2	--	
1,2,3,6,7,8-HxCDF	2.9	pg/cm2	--	
2,3,4,6,7,8-HxCDF	2.5	pg/cm2	--	
1,2,3,7,8,9-HxCDF	0.93	pg/cm2	--	
HpCDFs (total)	29	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	18	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	4.2	pg/cm2	--	
OCDF	26	pg/cm2	--	
Dioxins				
TCDDs (total)	0.51	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.027	
PeCDDs (total)	0.45	pg/cm2	--	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.093	
HxCDDs (total)	3.8	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.24	
1,2,3,6,7,8-HxCDD	0.36	pg/cm2	--	@
1,2,3,7,8,9-HxCDD	0.49	pg/cm2	--	@
HpCDDs (total)	6.0	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	3.2	pg/cm2	--	
OCDD	13	pg/cm2	--	

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ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W8
Lab ID: 079414-0013-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	73
13C-2,3,7,8-TCDD	75
13C-1,2,3,7,8-PeCDF	63
13C-1,2,3,7,8-PeCDD	77
13C-1,2,3,4,7,8-HxCDF	72
13C-1,2,3,6,7,8-HxCDD	75
13C-1,2,3,4,6,7,8-HpCDF	48
13C-1,2,3,4,6,7,8-HpCDD	59
13C-OCDD	55

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy
Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W9
Lab ID: 079414-0014-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	0.14	pg/cm2	--	g
2,3,7,8-TCDF	0.14	pg/cm2	--	g
PeCDFs (total)	0.63	pg/cm2	--	
1,2,3,7,8-PeCDF	0.35	pg/cm2	--	@
2,3,4,7,8-PeCDF	ND	pg/cm2	0.15	
HxCDFs (total)	1.7	pg/cm2	--	
1,2,3,4,7,8-HxCDF	1.0	pg/cm2	--	
1,2,3,6,7,8-HxCDF	0.28	pg/cm2	--	@
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.18	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.085	
HpCDFs (total)	2.1	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	1.4	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	0.37	pg/cm2	--	@
OCDF	1.9	pg/cm2	--	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.030	
2,3,7,8-TCDD	ND	pg/cm2	0.015	
PeCDDs (total)	ND	pg/cm2	0.081	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.020	
HxCDDs (total)	ND	pg/cm2	0.12	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.023	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.032	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.041	
HpCDDs (total)	ND	pg/cm2	0.22	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.22	
OCDD	0.71	pg/cm2	--	@

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W9
Lab ID: 079414-0014-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	93
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	68
13C-1,2,3,7,8-PeCDD	83
13C-1,2,3,4,7,8-HxCDF	75
13C-1,2,3,6,7,8-HxCDD	82
13C-1,2,3,4,6,7,8-HpCDF	56
13C-1,2,3,4,6,7,8-HpCDD	70
13C-OCDD	67

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W10
Lab ID: 079414-0015-SA
Matrix: WIPE — Sampled: 14 DEC 94 — Received: 16 DEC 94
Authorized: 16 DEC 94 — Prepared: 26 DEC 94 — Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	1.3	pg/cm2	--	
2,3,7,8-TCDF	0.24	pg/cm2	--	g
PeCDFs (total)	1.4	pg/cm2	--	
1,2,3,7,8-PeCDF	0.050	pg/cm2	--	@
2,3,4,7,8-PeCDF	ND	pg/cm2	0.023	
HxCDFs (total)	2.1	pg/cm2	--	
1,2,3,4,7,8-HxCDF	1.2	pg/cm2	--	
1,2,3,6,7,8-HxCDF	0.32	pg/cm2	--	@
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.24	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.10	
HpCDFs (total)	2.8	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	1.7	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	0.39	pg/cm2	--	@
OCDF	2.2	pg/cm2	--	
Dioxins				
TCDDs (total)	0.060	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.012	
PeCDDs (total)	ND	pg/cm2	0.095	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.024	
HxCDDs (total)	0.18	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.028	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.046	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.063	
HpCDDs (total)	0.67	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	0.35	pg/cm2	--	@
OCDD	1.4	pg/cm2	--	

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ND = Not detected
NA = Not applicable

Reported By: Clark Pickell — Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W10
Lab ID: 079414-0015-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 03 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	83
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	69
13C-1,2,3,7,8-PeCDD	82
13C-1,2,3,4,7,8-HxCDF	76
13C-1,2,3,6,7,8-HxCDD	82
13C-1,2,3,4,6,7,8-HpCDF	58
13C-1,2,3,4,6,7,8-HpCDD	71
13C-OCDD	71

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell
Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W11
Lab ID: 079414-0016-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.043	g
2,3,7,8-TCDF	ND	pg/cm2	0.043	g
PeCDFs (total)	ND	pg/cm2	0.053	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.053	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.029	
HxCDFs (total)	ND	pg/cm2	0.068	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.068	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.018	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.022	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.018	
HpCDFs (total)	ND	pg/cm2	0.092	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.092	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.025	
OCDF	ND	pg/cm2	0.15	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.019	
2,3,7,8-TCDD	ND	pg/cm2	0.012	
PeCDDs (total)	ND	pg/cm2	0.074	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.0077	
HxCDDs (total)	ND	pg/cm2	0.023	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.023	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.017	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.018	
HpCDDs (total)	ND	pg/cm2	0.023	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.023	
OCDD	ND	pg/cm2	0.16	

(continued on following page)

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W11
Lab ID: 079414-0016-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery	
13C-2,3,7,8-TCDF	75	g
13C-2,3,7,8-TCDD	73	
13C-1,2,3,7,8-PeCDF	59	
13C-1,2,3,7,8-PeCDD	73	
13C-1,2,3,4,7,8-HxCDF	70	
13C-1,2,3,6,7,8-HxCDD	76	
13C-1,2,3,4,6,7,8-HpCDF	57	
13C-1,2,3,4,6,7,8-HpCDD	71	
13C-OCDD	75	

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W12
Lab ID: 079414-0017-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.012	
2,3,7,8-TCDF	ND	pg/cm2	0.012	
PeCDFs (total)	ND	pg/cm2	0.029	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.029	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.029	
HxCDFs (total)	ND	pg/cm2	0.027	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.027	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.017	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.019	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.016	
HpCDFs (total)	ND	pg/cm2	0.040	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.040	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.014	
OCDF	ND	pg/cm2	0.082	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.017	
2,3,7,8-TCDD	ND	pg/cm2	0.010	
PeCDDs (total)	ND	pg/cm2	0.077	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.012	
HxCDDs (total)	ND	pg/cm2	0.022	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.022	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.017	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.017	
HpCDDs (total)	ND	pg/cm2	0.026	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.026	
OCDD	ND	pg/cm2	0.17	

(continued on following page)

ND = Not detected
NA = Not applicable

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Approved By: Mark Bechthold

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W12
Lab ID: 079414-0017-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	75
13C-2,3,7,8-TCDD	76
13C-1,2,3,7,8-PeCDF	64
13C-1,2,3,7,8-PeCDD	77
13C-1,2,3,4,7,8-HxCDF	71
13C-1,2,3,6,7,8-HxCDD	77
13C-1,2,3,4,6,7,8-HpCDF	56
13C-1,2,3,4,6,7,8-HpCDD	70
13C-OCDD	72

ND = Not detected
NA = Not applicable

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-W13
Lab ID: 079414-0018-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.023	
2,3,7,8-TCDF	ND	pg/cm2	0.023	
PeCDFs (total)	ND	pg/cm2	0.024	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.024	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.024	
HxCDFs (total)	ND	pg/cm2	0.015	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.015	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.011	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.013	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.010	
HpCDFs (total)	ND	pg/cm2	0.027	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.027	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.0091	
OCDF	ND	pg/cm2	0.037	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.018	
2,3,7,8-TCDD	ND	pg/cm2	0.0081	
PeCDDs (total)	ND	pg/cm2	0.076	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.012	
HxCDDs (total)	ND	pg/cm2	0.020	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.020	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.015	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.015	
HpCDDs (total)	ND	pg/cm2	0.017	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.017	
OCDD	ND	pg/cm2	0.12	

(continued on following page)

ND = Not detected
NA = Not applicable

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-W13
Lab ID: 079414-0018-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	80
13C-2,3,7,8-TCDD	80
13C-1,2,3,7,8-PeCDF	64
13C-1,2,3,7,8-PeCDD	78
13C-1,2,3,4,7,8-HxCDF	70
13C-1,2,3,6,7,8-HxCDD	75
13C-1,2,3,4,6,7,8-HpCDF	52
13C-1,2,3,4,6,7,8-HpCDD	67
13C-OCDD	64

ND = Not detected
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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L1
Lab ID: 079414-0019-SA
Matrix: WIPE — Sampled: 14 DEC 94 — Received: 16 DEC 94
Authorized: 16 DEC 94 — Prepared: 26 DEC 94 — Analyzed: 04 JAN 95

Sample Amount: 1 SAMPLE
Column Type: DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	34	pg/cm2	--	
2,3,7,8-TCDF	5.0	pg/cm2	--	g
PeCDFs (total)	27	pg/cm2	--	
1,2,3,7,8-PeCDF	4.0	pg/cm2	--	
2,3,4,7,8-PeCDF	3.2	pg/cm2	--	
HxCDFs (total)	24	pg/cm2	--	
1,2,3,4,7,8-HxCDF	9.1	pg/cm2	--	
1,2,3,6,7,8-HxCDF	2.6	pg/cm2	--	
2,3,4,6,7,8-HxCDF	2.3	pg/cm2	--	
1,2,3,7,8,9-HxCDF	0.80	pg/cm2	--	
HpCDFs (total)	25	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	15	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	3.1	pg/cm2	--	
OCDF	22	pg/cm2	--	
Dioxins				
TCDDs (total)	2.7	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.047	
PeCDDs (total)	1.1	pg/cm2	--	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.14	
HxCDDs (total)	7.1	pg/cm2	--	
1,2,3,4,7,8-HxCDD	0.30	pg/cm2	--	@
1,2,3,6,7,8-HxCDD	0.55	pg/cm2	--	
1,2,3,7,8,9-HxCDD	0.81	pg/cm2	--	
HpCDDs (total)	13	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	6.0	pg/cm2	--	
OCDD	29	pg/cm2	--	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L1
Lab ID: 079414-0019-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	80
13C-2,3,7,8-TCDD	81
13C-1,2,3,7,8-PeCDF	65
13C-1,2,3,7,8-PeCDD	80
13C-1,2,3,4,7,8-HxCDF	73
13C-1,2,3,6,7,8-HxCDD	78
13C-1,2,3,4,6,7,8-HpCDF	59
13C-1,2,3,4,6,7,8-HpCDD	73
13C-OCDD	77

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-F1
Lab ID: 079414-0020-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	97	pg/cm2	--	
2,3,7,8-TCDF	15	pg/cm2	--	g
PeCDFs (total)	120	pg/cm2	--	
1,2,3,7,8-PeCDF	24	pg/cm2	--	
2,3,4,7,8-PeCDF	10	pg/cm2	--	
HxCDFs (total)	110	pg/cm2	--	
1,2,3,4,7,8-HxCDF	49	pg/cm2	--	
1,2,3,6,7,8-HxCDF	13	pg/cm2	--	
2,3,4,6,7,8-HxCDF	11	pg/cm2	--	
1,2,3,7,8,9-HxCDF	3.4	pg/cm2	--	
HpCDFs (total)	110	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	66	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	18	pg/cm2	--	
OCDF	120	pg/cm2	--	
Dioxins				
TCDDs (total)	8.9	pg/cm2	--	
2,3,7,8-TCDD	0.19	pg/cm2	--	
PeCDDs (total)	6.6	pg/cm2	--	
1,2,3,7,8-PeCDD	0.51	pg/cm2	--	
HxCDDs (total)	23	pg/cm2	--	
1,2,3,4,7,8-HxCDD	1.0	pg/cm2	--	
1,2,3,6,7,8-HxCDD	1.9	pg/cm2	--	
1,2,3,7,8,9-HxCDD	2.4	pg/cm2	--	
HpCDDs (total)	34	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	18	pg/cm2	--	
OCDD	73	pg/cm2	--	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-F1
Lab ID: 079414-0020-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	75
13C-2,3,7,8-TCDD	77
13C-1,2,3,7,8-PeCDF	63
13C-1,2,3,7,8-PeCDD	82
13C-1,2,3,4,7,8-HxCDF	76
13C-1,2,3,6,7,8-HxCDD	87
13C-1,2,3,4,6,7,8-HpCDF	46
13C-1,2,3,4,6,7,8-HpCDD	62
13C-OCDD	66

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

ND = Not detected
NA = Not applicable

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 079414-0021-MB
Matrix: WIPE Sampled: NA Received: NA
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/cm2	0.0061	
2,3,7,8-TCDF	ND	pg/cm2	0.0061	
PeCDFs (total)	ND	pg/cm2	0.028	
1,2,3,7,8-PeCDF	ND	pg/cm2	0.028	
2,3,4,7,8-PeCDF	ND	pg/cm2	0.028	
HxCDFs (total)	ND	pg/cm2	0.0081	
1,2,3,4,7,8-HxCDF	ND	pg/cm2	0.0074	
1,2,3,6,7,8-HxCDF	ND	pg/cm2	0.0073	
2,3,4,6,7,8-HxCDF	ND	pg/cm2	0.0081	
1,2,3,7,8,9-HxCDF	ND	pg/cm2	0.0065	
HpCDFs (total)	ND	pg/cm2	0.015	
1,2,3,4,6,7,8-HpCDF	ND	pg/cm2	0.015	
1,2,3,4,7,8,9-HpCDF	ND	pg/cm2	0.074	
OCDF	ND	pg/cm2	0.028	
Dioxins				
TCDDs (total)	ND	pg/cm2	0.018	
2,3,7,8-TCDD	ND	pg/cm2	0.018	
PeCDDs (total)	ND	pg/cm2	0.082	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.016	
HxCDDs (total)	ND	pg/cm2	0.025	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.025	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.019	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.020	
HpCDDs (total)	ND	pg/cm2	0.017	
1,2,3,4,6,7,8-HpCDD	ND	pg/cm2	0.017	
OCDD	ND	pg/cm2	0.090	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 079414-0021-MB
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: NA
Prepared: 26 DEC 94

Received: NA
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	75
13C-2,3,7,8-TCDD	79
13C-1,2,3,7,8-PeCDF	59
13C-1,2,3,7,8-PeCDD	72
13C-1,2,3,4,7,8-HxCDF	78
13C-1,2,3,6,7,8-HxCDD	82
13C-1,2,3,4,6,7,8-HpCDF	69
13C-1,2,3,4,6,7,8-HpCDD	87
13C-OCDD	95

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L2
Lab ID: 079414-0021-SA
Matrix: WIPE Sampled: 14 DEC 94 Received: 16 DEC 94
Authorized: 16 DEC 94 Prepared: 26 DEC 94 Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	4.1	pg/cm2	--	
2,3,7,8-TCDF	0.74	pg/cm2	--	g
PeCDFs (total)	6.1	pg/cm2	--	
1,2,3,7,8-PeCDF	1.3	pg/cm2	--	
2,3,4,7,8-PeCDF	0.53	pg/cm2	--	
HxCDFs (total)	7.1	pg/cm2	--	
1,2,3,4,7,8-HxCDF	3.4	pg/cm2	--	
1,2,3,6,7,8-HxCDF	0.92	pg/cm2	--	
2,3,4,6,7,8-HxCDF	0.80	pg/cm2	--	
1,2,3,7,8,9-HxCDF	0.29	pg/cm2	--	@
HpCDFs (total)	9.3	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	5.8	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	1.4	pg/cm2	--	
OCDF	8.7	pg/cm2	--	
Dioxins				
TCDDs (total)	0.39	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.019	
PeCDDs (total)	ND	pg/cm2	0.26	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.042	
HxCDDs (total)	1.5	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.091	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.18	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.23	
HpCDDs (total)	4.1	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	2.0	pg/cm2	--	
OCDD	10	pg/cm2	--	

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L2
Lab ID: 079414-0021-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	82
13C-2,3,7,8-TCDD	72
13C-1,2,3,7,8-PeCDF	63
13C-1,2,3,7,8-PeCDD	76
13C-1,2,3,4,7,8-HxCDF	77
13C-1,2,3,6,7,8-HxCDD	82
13C-1,2,3,4,6,7,8-HpCDF	75
13C-1,2,3,4,6,7,8-HpCDD	96
13C-OCDD	111

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L3
Lab ID: 079414-0022-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	2.6	pg/cm2	--	
2,3,7,8-TCDF	0.75	pg/cm2	--	g
PeCDFs (total)	6.1	pg/cm2	--	
1,2,3,7,8-PeCDF	1.7	pg/cm2	--	
2,3,4,7,8-PeCDF	0.58	pg/cm2	--	
HxCDFs (total)	10	pg/cm2	--	
1,2,3,4,7,8-HxCDF	5.1	pg/cm2	--	
1,2,3,6,7,8-HxCDF	1.3	pg/cm2	--	
2,3,4,6,7,8-HxCDF	0.67	pg/cm2	--	
1,2,3,7,8,9-HxCDF	0.32	pg/cm2	--	@
HpCDFs (total)	14	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	8.2	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	2.8	pg/cm2	--	
OCDF	20	pg/cm2	--	
Dioxins				
TCDDs (total)	0.096	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.019	
PeCDDs (total)	ND	pg/cm2	0.16	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.030	
HxCDDs (total)	0.83	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.095	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.17	
1,2,3,7,8,9-HxCDD	ND	pg/cm2	0.23	
HpCDDs (total)	4.3	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	2.2	pg/cm2	--	
OCDD	11	pg/cm2	--	

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Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L3
Lab ID: 079414-0022-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	78
13C-2,3,7,8-TCDD	78
13C-1,2,3,7,8-PeCDF	59
13C-1,2,3,7,8-PeCDD	73
13C-1,2,3,4,7,8-HxCDF	63
13C-1,2,3,6,7,8-HxCDD	75
13C-1,2,3,4,6,7,8-HpCDF	62
13C-1,2,3,4,6,7,8-HpCDD	86
13C-OCDD	92

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

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POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L4
Lab ID: 079414-0023-SA
Matrix: WIPE
Sampled: 14 DEC 94
Received: 16 DEC 94
Authorized: 16 DEC 94
Prepared: 26 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	2.8	pg/cm2	--	
2,3,7,8-TCDF	0.83	pg/cm2	--	g
PeCDFs (total)	6.7	pg/cm2	--	
1,2,3,7,8-PeCDF	2.0	pg/cm2	--	
2,3,4,7,8-PeCDF	0.67	pg/cm2	--	
HxCDFs (total)	15	pg/cm2	--	
1,2,3,4,7,8-HxCDF	7.8	pg/cm2	--	
1,2,3,6,7,8-HxCDF	1.8	pg/cm2	--	
2,3,4,6,7,8-HxCDF	0.91	pg/cm2	--	
1,2,3,7,8,9-HxCDF	0.64	pg/cm2	--	
HpCDFs (total)	31	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	16	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	8.7	pg/cm2	--	
OCDF	110	pg/cm2	--	
Dioxins				
TCDDs (total)	0.085	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.011	
PeCDDs (total)	ND	pg/cm2	0.19	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.043	
HxCDDs (total)	1.7	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.12	
1,2,3,6,7,8-HxCDD	ND	pg/cm2	0.24	
1,2,3,7,8,9-HxCDD	0.31	pg/cm2	--	@
HpCDDs (total)	5.8	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	3.4	pg/cm2	--	
OCDD	21	pg/cm2	--	

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ND = Not detected
NA = Not applicable

Reported By: Clark Pickell
Approved By: Mark Bechthold

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L4
Lab ID: 079414-0023-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	83
13C-2,3,7,8-TCDD	82
13C-1,2,3,7,8-PeCDF	62
13C-1,2,3,7,8-PeCDD	72
13C-1,2,3,4,7,8-HxCDF	70
13C-1,2,3,6,7,8-HxCDD	79
13C-1,2,3,4,6,7,8-HpCDF	78
13C-1,2,3,4,6,7,8-HpCDD	100
13C-OCDD	104

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L5
Lab ID: 079414-0024-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	7.2	pg/cm2	--	
2,3,7,8-TCDF	1.5	pg/cm2	--	g
PeCDFs (total)	17	pg/cm2	--	
1,2,3,7,8-PeCDF	3.7	pg/cm2	--	
2,3,4,7,8-PeCDF	1.5	pg/cm2	--	
HxCDFs (total)	27	pg/cm2	--	
1,2,3,4,7,8-HxCDF	12	pg/cm2	--	
1,2,3,6,7,8-HxCDF	3.0	pg/cm2	--	
2,3,4,6,7,8-HxCDF	2.0	pg/cm2	--	
1,2,3,7,8,9-HxCDF	1.1	pg/cm2	--	
HpCDFs (total)	34	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	20	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	6.2	pg/cm2	--	
OCDF	47	pg/cm2	--	
Dioxins				
TCDDs (total)	0.51	pg/cm2	--	
2,3,7,8-TCDD	ND	pg/cm2	0.030	
PeCDDs (total)	ND	pg/cm2	0.42	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.083	
HxCDDs (total)	4.1	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.24	
1,2,3,6,7,8-HxCDD	0.47	pg/cm2	--	@
1,2,3,7,8,9-HxCDD	0.61	pg/cm2	--	
HpCDDs (total)	12	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	6.1	pg/cm2	--	
OCDD	38	pg/cm2	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell
Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L5
Lab ID: 079414-0024-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	80
13C-2,3,7,8-TCDD	81
13C-1,2,3,7,8-PeCDF	60
13C-1,2,3,7,8-PeCDD	71
13C-1,2,3,4,7,8-HxCDF	65
13C-1,2,3,6,7,8-HxCDD	72
13C-1,2,3,4,6,7,8-HpCDF	65
13C-1,2,3,4,6,7,8-HpCDD	86
13C-OCDD	91

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Mark Bechthold

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: W-L6
Lab ID: 079414-0025-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	16	pg/cm2	--	
2,3,7,8-TCDF	3.9	pg/cm2	--	g
PeCDFs (total)	34	pg/cm2	--	
1,2,3,7,8-PeCDF	8.5	pg/cm2	--	
2,3,4,7,8-PeCDF	2.5	pg/cm2	--	
HxCDFs (total)	33	pg/cm2	--	
1,2,3,4,7,8-HxCDF	15	pg/cm2	--	
1,2,3,6,7,8-HxCDF	3.7	pg/cm2	--	
2,3,4,6,7,8-HxCDF	1.9	pg/cm2	--	
1,2,3,7,8,9-HxCDF	1.3	pg/cm2	--	
HpCDFs (total)	28	pg/cm2	--	
1,2,3,4,6,7,8-HpCDF	17	pg/cm2	--	
1,2,3,4,7,8,9-HpCDF	5.0	pg/cm2	--	
OCDF	31	pg/cm2	--	
Dioxins				
TCDDs (total)	1.6	pg/cm2	--	
2,3,7,8-TCDD	0.054	pg/cm2	--	@
PeCDDs (total)	0.49	pg/cm2	--	
1,2,3,7,8-PeCDD	ND	pg/cm2	0.13	
HxCDDs (total)	4.3	pg/cm2	--	
1,2,3,4,7,8-HxCDD	ND	pg/cm2	0.22	
1,2,3,6,7,8-HxCDD	0.43	pg/cm2	--	@
1,2,3,7,8,9-HxCDD	0.59	pg/cm2	--	
HpCDDs (total)	7.0	pg/cm2	--	
1,2,3,4,6,7,8-HpCDD	3.8	pg/cm2	--	
OCDD	16	pg/cm2	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell
Approved By: Mark Bechthold

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: W-L6
Lab ID: 079414-0025-SA
Matrix: WIPE
Authorized: 16 DEC 94

Sampled: 14 DEC 94
Prepared: 26 DEC 94

Received: 16 DEC 94
Analyzed: 04 JAN 95

Sample Amount 1 SAMPLE
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	87
13C-2,3,7,8-TCDD	86
13C-1,2,3,7,8-PeCDF	62
13C-1,2,3,7,8-PeCDD	72
13C-1,2,3,4,7,8-HxCDF	72
13C-1,2,3,6,7,8-HxCDD	76
13C-1,2,3,4,6,7,8-HpCDF	71
13C-1,2,3,4,6,7,8-HpCDD	89
13C-OCDD	98

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Mark Bechthold

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Rev 230787

Quanterra Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

July 28, 1995
Lab ID: 079414, 081396, 082509

Michael Matilainen
Tighe and Bond
53 Southampton Road
Westfield, MA 01085

Dear Mr. Matilainen:

Enclosed are the Toxicity Equivalent results for Quanterra Project ID's 079414, 081396 and 082509 as requested.

If you have any questions, please feel free to call.

Sincerely,

Eric W. Redman
Senior Scientist
Advanced Technology Group

Terry A. Wilson
Program Administrator

TW/jk

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Tighe and Bond

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
079414-0001-MB	Method Blank	WIPE			16 DEC 94
079414-0001-TB	Trip Blank	WIPE	14 DEC 94	14:50	16 DEC 94
079414-0002-SA	W-01	WIPE	14 DEC 94	10:25	16 DEC 94
079414-0003-SA	W-02	WIPE	15 DEC 94	10:45	16 DEC 94
079414-0004-SA	W-03	WIPE	15 DEC 94	10:50	16 DEC 94
079414-0005-SA	W-04	WIPE	15 DEC 94	11:00	16 DEC 94
079414-0006-SA	W-W1	WIPE	14 DEC 94	13:35	16 DEC 94
079414-0007-SA	W-W2	WIPE	14 DEC 94	13:45	16 DEC 94
079414-0008-SA	W-W3	WIPE	14 DEC 94	13:50	16 DEC 94
079414-0009-SA	W-W4	WIPE	14 DEC 94	13:50	16 DEC 94
079414-0010-SA	W-W5	WIPE	14 DEC 94	13:50	16 DEC 94
079414-0011-SA	W-W6	WIPE	14 DEC 94	13:50	16 DEC 94
079414-0012-SA	W-W7	WIPE	14 DEC 94	14:00	16 DEC 94
079414-0013-SA	W-W8	WIPE	14 DEC 94	14:10	16 DEC 94
079414-0014-SA	W-W9	WIPE	14 DEC 94	14:10	16 DEC 94
079414-0015-SA	W-W10	WIPE	14 DEC 94	14:15	16 DEC 94
079414-0016-SA	W-W11	WIPE	14 DEC 94	14:45	16 DEC 94
079414-0017-SA	W-W12	WIPE	14 DEC 94	14:00	16 DEC 94
079414-0018-SA	W-W13	WIPE	14 DEC 94	14:50	16 DEC 94
079414-0019-SA	W-L1	WIPE	14 DEC 94	14:20	16 DEC 94
079414-0020-SA	W-F1	WIPE	14 DEC 94	14:20	16 DEC 94
079414-0021-MB	Method Blank	WIPE			16 DEC 94
079414-0021-SA	W-L2	WIPE	14 DEC 94	14:30	16 DEC 94
079414-0022-SA	W-L3	WIPE	14 DEC 94	14:30	16 DEC 94
079414-0023-SA	W-L4	WIPE	14 DEC 94	14:40	16 DEC 94
079414-0024-SA	W-L5	WIPE	14 DEC 94	14:45	16 DEC 94
079414-0025-SA	W-L6	WIPE	14 DEC 94	14:50	16 DEC 94
079414-0026-MB	Method Blank	SOIL			16 DEC 94
079414-0026-SA	SS-01	SOIL	15 DEC 94	10:30	16 DEC 94
079414-0027-SA	SS-E1	SOIL	15 DEC 94	09:15	16 DEC 94
079414-0028-SA	SS-B3	SOIL	15 DEC 94	08:50	16 DEC 94

Quanterra
Environmental Services

Toxicity Equivalents

The following results are based on EPA Toxicity Equivalence Factors (Method 8290 Table 10). For the first column of data (TEQ) zero is used for all ND results in calculating the toxicity equivalence. The second column of data (Maximum TEQ) is a maximum possible toxicity equivalent. The sample specific detection limits for ND results are used to calculate Maximum TEQs.

CAL ID:	CLIENT ID:	TEQ:	MAXIMUM TEQ:
082509-0001	F2	34 pg/g	41 pg/g
082509-0002	F4	61 pg/g	69 pg/g
082509-0003	H2	110 pg/g	110 pg/g
082509-0004	H4	27 pg/g	30 pg/g

Quanterra
Environmental Services

Toxicity Equivalents

The following results are based on EPA Toxicity Equivalence Factors (Method 8290 Table 10). For the first column of data (TEQ) zero is used for all ND results in calculating the toxicity equivalence. The second column of data (Maximum TEQ) is a maximum possible toxicity equivalent. The sample specific detection limits for ND results are used to calculate Maximum TEQs.

CAL ID:	CLIENT ID:	TEQ:	MAXIMUM TEQ:
079414-0027	SS-E1	190 pg/g	190 pg/g
079414-0028	SS-B3	24 pg/g	26 pg/g

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Tighe and Bond

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
081396-0001-MB	Method Blank	SOIL			12 APR 95
081396-0001-SA	MH-1	SOIL	10 APR 95	12:30	12 APR 95
081396-0002-SA	MH-2	SOIL	10 APR 95	12:45	12 APR 95
081396-0003-SA	MH-3	SOIL	10 APR 95	13:30	12 APR 95

Quanterra
Environmental Services

Toxicity Equivalents

The following results are based on EPA Toxicity Equivalence Factors (Method 8290 Table 10). For the first column of data (TEQ) zero is used for all ND results in calculating the toxicity equivalence. The second column of data (Maximum TEQ) is a maximum possible toxicity equivalent. The sample specific detection limits for ND results are used to calculate Maximum TEQs.

CAL ID:	CLIENT ID:	TEQ:	MAXIMUM TEQ:
082396-0001	MH-1	7000 pg/g	7000 pg/g
082396-0002	MH-2	66 pg/g	67 pg/g
082396-0003	MH-3	14 pg/g	16 pg/g

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Tighe and Bond

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
082509-0001-SA	F2	SOIL	20 JUN 95	09:00	21 JUN 95
082509-0001-MB	Method Blank	SOIL			21 JUN 95
082509-0002-SA	F4	SOIL	20 JUN 95	09:13	21 JUN 95
082509-0003-SA	H2	SOIL	20 JUN 95	10:21	21 JUN 95
082509-0004-SA	H4	SOIL	20 JUN 95	10:45	21 JUN 95

Quanterra
Environmental Services

Quanterra Incorporated
880 Riverside Parkway
West Sacramento, California 95605

916 373-5600 Telephone
916 372-1059 Fax

July 20, 1995
Lab ID: 082509
Purchase Order: C325-2-310 Lake Salvage Remediation

Michael Matilainen
Tighe and Bond
53 Southampton Road
Westfield, MA 01085

Dear Mr. Matilainen:

Enclosed is the report for the PCDD/PCDF analysis by Method 8290 of your four soil samples received at Quanterra Incorporated on 21 June 1995 under chain-of-custody.

All samples and extracts are retained for 30 days from the date of this report. If longer storage is required or you would like samples returned to you, please call with instructions.

Results are on the attached data sheets.

If you have any questions, please feel free to call.

Sincerely,

Eric W. Redman
Senior Scientist
Advanced Technology Group

Terry A. Wilson
Program Administrator

TW/ct

Quanterra
Environmental Services

CASE NARRATIVE

QUANTERRA PROJECT NUMBER 082509

General comments:

Detection limits for dioxins and furans are reported on a sample specific basis and all results are recovery corrected per the isotope dilution technique. For an analyte reported as 'Not Detected' the associated detection limit represents its maximum possible concentration. The method blank is a laboratory-generated sample which assesses the degree to which laboratory operations and procedures cause false-positive analytical results for your samples.

Please note that the concentration of OCDD in your samples "F4" and "H2" exceeds the method calibration range, as noted on the appropriate data sheet. The concentration is within the linear reaponse range of the detector and data quality should not be adversely affected.

There were no other anomalies associated with this report.

Quanterra
Environmental Services

SAMPLE DESCRIPTION INFORMATION
for
Tighe and Bond

Lab ID	Client ID	Matrix	Sampled Date	Sampled Time	Received Date
082509-0001-SA	F2	SOIL	20 JUN 95	09:00	21 JUN 95
082509-0001-MB	Method Blank	SOIL			21 JUN 95
082509-0002-SA	F4	SOIL	20 JUN 95	09:13	21 JUN 95
082509-0003-SA	H2	SOIL	20 JUN 95	10:21	21 JUN 95
082509-0004-SA	H4	SOIL	20 JUN 95	10:45	21 JUN 95

Quanterra
Environmental Services

Percent Water

Method CLP %WATER

Client Name: Tighe and Bond
Matrix: SOIL
Units: %

Received: 21 JUN 95
Authorized: 21 JUN 95

Lab ID	Client ID	Result	Reporting Limit	Date Prepared	Date Analyzed
082509-0001-SA	F2	4.8	0.10	NA	10 JUL 95
082509-0002-SA	F4	2.9	0.10	NA	10 JUL 95
082509-0003-SA	H2	2.6	0.10	NA	10 JUL 95
082509-0004-SA	H4	3.9	0.10	NA	10 JUL 95

ND = Not detected
NA = Not applicable

Reported By: Mike Flournoy

Approved By: Boyd Harling

The cover letter is an integral part of this report.
Rev 230787

Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 082509-0001-MB
Matrix: SOIL Sampled: NA Received: NA
Authorized: 21 JUN 95 Prepared: 10 JUL 95 Analyzed: 13 JUL 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	ND	pg/g	0.16	
2,3,7,8-TCDF	ND	pg/g	0.16	
PeCDFs (total)	ND	pg/g	0.52	
1,2,3,7,8-PeCDF	ND	pg/g	0.52	
2,3,4,7,8-PeCDF	ND	pg/g	0.45	
HxCDFs (total)	ND	pg/g	0.22	
1,2,3,4,7,8-HxCDF	ND	pg/g	0.13	
1,2,3,6,7,8-HxCDF	ND	pg/g	0.16	
2,3,4,6,7,8-HxCDF	ND	pg/g	0.18	
1,2,3,7,8,9-HxCDF	ND	pg/g	0.22	
HpCDFs (total)	ND	pg/g	0.20	
1,2,3,4,6,7,8-HpCDF	ND	pg/g	0.13	
1,2,3,4,7,8,9-HpCDF	ND	pg/g	0.20	
OCDF	ND	pg/g	0.30	
Dioxins				
TCDDs (total)	ND	pg/g	0.38	
2,3,7,8-TCDD	ND	pg/g	0.38	
PeCDDs (total)	ND	pg/g	3.5	
1,2,3,7,8-PeCDD	ND	pg/g	0.36	
HxCDDs (total)	ND	pg/g	0.49	
1,2,3,4,7,8-HxCDD	ND	pg/g	0.49	
1,2,3,6,7,8-HxCDD	ND	pg/g	0.41	
1,2,3,7,8,9-HxCDD	ND	pg/g	0.46	
HpCDDs (total)	ND	pg/g	1.5	
1,2,3,4,6,7,8-HpCDD	ND	pg/g	0.96	
OCDD	ND	pg/g	11	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Andre Algazi

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: Method Blank
Lab ID: 082509-0001-MB
Matrix: SOIL
Authorized: 21 JUN 95

Sampled: NA
Prepared: 10 JUL 95

Received: NA
Analyzed: 13 JUL 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	96
13C-2,3,7,8-TCDD	97
13C-1,2,3,7,8-PeCDF	108
13C-1,2,3,7,8-PeCDD	106
13C-1,2,3,4,7,8-HxCDF	90
13C-1,2,3,6,7,8-HxCDD	93
13C-1,2,3,4,6,7,8-HpCDF	100
13C-1,2,3,4,6,7,8-HpCDD	108
13C-OCDD	115

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Andre Algazi

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Quanterra Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: F2
Lab ID: 082509-0001-SA
Matrix: SOIL Sampled: 20 JUN 95 Received: 21 JUN 95
Authorized: 21 JUN 95 Prepared: 10 JUL 95 Analyzed: 13 JUL 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	260	pg/g	--	
2,3,7,8-TCDF	33	pg/g	--	g
PeCDFs (total)	290	pg/g	--	
1,2,3,7,8-PeCDF	44	pg/g	--	
2,3,4,7,8-PeCDF	23	pg/g	--	
HxCDFs (total)	160	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	48	y
1,2,3,6,7,8-HxCDF	25	pg/g	--	
2,3,4,6,7,8-HxCDF	23	pg/g	--	
1,2,3,7,8,9-HxCDF	9.3	pg/g	--	@
HpCDFs (total)	230	pg/g	--	
1,2,3,4,6,7,8-HpCDF	170	pg/g	--	
1,2,3,4,7,8,9-HpCDF	38	pg/g	--	
OCDF	250	pg/g	--	
Dioxins				
TCDDs (total)	26	pg/g	--	
2,3,7,8-TCDD	ND	pg/g	0.94	
PeCDDs (total)	13	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	2.9	
HxCDDs (total)	130	pg/g	--	
1,2,3,4,7,8-HxCDD	6.0	pg/g	--	@
1,2,3,6,7,8-HxCDD	15	pg/g	--	
1,2,3,7,8,9-HxCDD	14	pg/g	--	
HpCDDs (total)	540	pg/g	--	
1,2,3,4,6,7,8-HpCDD	290	pg/g	--	
OCDD	2800	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Andre Algazi

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Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: F2
Lab ID: 082509-0001-SA
Matrix: SOIL
Authorized: 21 JUN 95

Sampled: 20 JUN 95
Prepared: 10 JUL 95

Received: 21 JUN 95
Analyzed: 13 JUL 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	96
13C-2,3,7,8-TCDD	91
13C-1,2,3,7,8-PeCDF	111
13C-1,2,3,7,8-PeCDD	113
13C-1,2,3,4,7,8-HxCDF	98
13C-1,2,3,6,7,8-HxCDD	95
13C-1,2,3,4,6,7,8-HpCDF	89
13C-1,2,3,4,6,7,8-HpCDD	103
13C-OCDD	122

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: F4
Lab ID: 082509-0002-SA
Matrix: SOIL Sampled: 20 JUN 95 Received: 21 JUN 95
Authorized: 21 JUN 95 Prepared: 10 JUL 95 Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	290	pg/g	--	
2,3,7,8-TCDF	40	pg/g	--	g
PeCDFs (total)	260	pg/g	--	
1,2,3,7,8-PeCDF	58	pg/g	--	
2,3,4,7,8-PeCDF	22	pg/g	--	
HxCDFs (total)	210	pg/g	--	
1,2,3,4,7,8-HxCDF	ND	pg/g	82	y
1,2,3,6,7,8-HxCDF	31	pg/g	--	
2,3,4,6,7,8-HxCDF	19	pg/g	--	
1,2,3,7,8,9-HxCDF	16	pg/g	--	
HpCDFs (total)	290	pg/g	--	
1,2,3,4,6,7,8-HpCDF	220	pg/g	--	
1,2,3,4,7,8,9-HpCDF	50	pg/g	--	
OCDF	560	pg/g	--	
Dioxins				
TCDDs (total)	41	pg/g	--	
2,3,7,8-TCDD	2.0	pg/g	--	@
PeCDDs (total)	24	pg/g	--	
1,2,3,7,8-PeCDD	5.6	pg/g	--	@
HxCDDs (total)	230	pg/g	--	
1,2,3,4,7,8-HxCDD	10	pg/g	--	
1,2,3,6,7,8-HxCDD	29	pg/g	--	
1,2,3,7,8,9-HxCDD	24	pg/g	--	
HpCDDs (total)	1800	pg/g	--	
1,2,3,4,6,7,8-HpCDD	950	pg/g	--	
OCDD	13000	pg/g	--	E

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: F4
Lab ID: 082509-0002-SA
Matrix: SOIL
Authorized: 21 JUN 95

Sampled: 20 JUN 95
Prepared: 10 JUL 95

Received: 21 JUN 95
Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	92
13C-2,3,7,8-TCDD	95
13C-1,2,3,7,8-PeCDF	114
13C-1,2,3,7,8-PeCDD	131
13C-1,2,3,4,7,8-HxCDF	112
13C-1,2,3,6,7,8-HxCDD	106
13C-1,2,3,4,6,7,8-HpCDF	99
13C-1,2,3,4,6,7,8-HpCDD	102
13C-OCDD	102

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note y : Elevated detection limit due to chemical interference.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: H2
Lab ID: 082509-0003-SA
Matrix: SOIL Sampled: 20 JUN 95 Received: 21 JUN 95
Authorized: 21 JUN 95 Prepared: 10 JUL 95 Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	680	pg/g	--	
2,3,7,8-TCDF	68	pg/g	--	g
PeCDFs (total)	700	pg/g	--	
1,2,3,7,8-PeCDF	110	pg/g	--	
2,3,4,7,8-PeCDF	61	pg/g	--	
HxCDFs (total)	770	pg/g	--	
1,2,3,4,7,8-HxCDF	140	pg/g	--	
1,2,3,6,7,8-HxCDF	77	pg/g	--	
2,3,4,6,7,8-HxCDF	78	pg/g	--	
1,2,3,7,8,9-HxCDF	30	pg/g	--	
HpCDFs (total)	570	pg/g	--	
1,2,3,4,6,7,8-HpCDF	470	pg/g	--	
1,2,3,4,7,8,9-HpCDF	96	pg/g	--	
OCDF	710	pg/g	--	
Dioxins				
TCDDs (total)	74	pg/g	--	
2,3,7,8-TCDD	2.9	pg/g	--	@
PeCDDs (total)	63	pg/g	--	
1,2,3,7,8-PeCDD	8.6	pg/g	--	@
HxCDDs (total)	370	pg/g	--	
1,2,3,4,7,8-HxCDD	15	pg/g	--	
1,2,3,6,7,8-HxCDD	38	pg/g	--	
1,2,3,7,8,9-HxCDD	44	pg/g	--	
HpCDDs (total)	1500	pg/g	--	
1,2,3,4,6,7,8-HpCDD	830	pg/g	--	
OCDD	7100	pg/g	--	E

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: H2
Lab ID: 082509-0003-SA
Matrix: SOIL
Authorized: 21 JUN 95

Sampled: 20 JUN 95
Prepared: 10 JUL 95

Received: 21 JUN 95
Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	82
13C-2,3,7,8-TCDD	82
13C-1,2,3,7,8-PeCDF	89
13C-1,2,3,7,8-PeCDD	101
13C-1,2,3,4,7,8-HxCDF	88
13C-1,2,3,6,7,8-HxCDD	88
13C-1,2,3,4,6,7,8-HpCDF	80
13C-1,2,3,4,6,7,8-HpCDD	87
13C-OCDD	81

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

Note E : Concentration exceeds calibration range.

ND = Not detected
NA = Not applicable

Reported By: Clark Pickell

Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS
Method 8290

Client Name: Tighe and Bond
Client ID: H4
Lab ID: 082509-0004-SA
Matrix: SOIL — Sampled: 20 JUN 95 — Received: 21 JUN 95
Authorized: 21 JUN 95 — Prepared: 10 JUL 95 — Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

Parameter	Result	Units	Detection Limit	Data Qualifiers
Furans				
TCDFs (total)	290	pg/g	--	
2,3,7,8-TCDF	20	pg/g	--	g
PeCDFs (total)	200	pg/g	--	
1,2,3,7,8-PeCDF	23	pg/g	--	
2,3,4,7,8-PeCDF	17	pg/g	--	
HxCDFs (total)	150	pg/g	--	
1,2,3,4,7,8-HxCDF	38	pg/g	--	
1,2,3,6,7,8-HxCDF	17	pg/g	--	
2,3,4,6,7,8-HxCDF	15	pg/g	--	
1,2,3,7,8,9-HxCDF	ND	pg/g	3.7	
HpCDFs (total)	170	pg/g	--	
1,2,3,4,6,7,8-HpCDF	90	pg/g	--	
1,2,3,4,7,8,9-HpCDF	15	pg/g	--	
OCDF	140	pg/g	--	
Dioxins				
TCDDs (total)	45	pg/g	--	
2,3,7,8-TCDD	1.2	pg/g	--	@
PeCDDs (total)	17	pg/g	--	
1,2,3,7,8-PeCDD	ND	pg/g	3.8	
HxCDDs (total)	140	pg/g	--	
1,2,3,4,7,8-HxCDD	5.1	pg/g	--	@
1,2,3,6,7,8-HxCDD	11	pg/g	--	
1,2,3,7,8,9-HxCDD	16	pg/g	--	
HpCDDs (total)	410	pg/g	--	
1,2,3,4,6,7,8-HpCDD	180	pg/g	--	
OCDD	1600	pg/g	--	

(continued on following page)

ND = Not detected
NA = Not applicable

Reported By: Jill Kellmann — Approved By: Andre Algazi

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Rev 230787

Quanterra
Environmental Services

POLYCHLORINATED DIOXINS/FURANS
ISOMER SPECIFIC ANALYSIS (CONT.)
Method 8290

Client Name: Tighe and Bond
Client ID: H4
Lab ID: 082509-0004-SA
Matrix: SOIL
Authorized: 21 JUN 95

Sampled: 20 JUN 95
Prepared: 10 JUL 95

Received: 21 JUN 95
Analyzed: 15 JUL 95

Sample Amount 5.0 G
Column Type DB-5

	% Recovery
13C-2,3,7,8-TCDF	85
13C-2,3,7,8-TCDD	85
13C-1,2,3,7,8-PeCDF	102
13C-1,2,3,7,8-PeCDD	119
13C-1,2,3,4,7,8-HxCDF	99
13C-1,2,3,6,7,8-HxCDD	93
13C-1,2,3,4,6,7,8-HpCDF	87
13C-1,2,3,4,6,7,8-HpCDD	93
13C-OCDD	89

Note g : 2,3,7,8-TCDF results have been confirmed on a DB-225 column.

Note @ : Result is an estimated value that is below the lower calibration limit but above the target detection limit.

ND = Not detected
NA = Not applicable

Reported By: Jill Kellmann
Approved By: Andre Algazi

The cover letter is an integral part of this report.
Rev 230787

Quanterra
Environmental Services

LABORATORY CONTROL SAMPLE REPORT
Advanced Technology Group - High Resolution
Project: 082509

Category: 8290-HR-S C14-C18 D/F plus 2378-substituted isomers by Method 8290
Test: 8290-SW-S
Matrix: SOLID
QC Lot: 21 JUN 95-B QC Run: 28 JUN 95-A
Concentration Units: pg/uL

Analyte	Concentration Spiked	Concentration Measured	Accuracy(%) LCS	Accuracy(%) Limits
2,3,7,8-TCDF	10.0	9.69	97	60-140
1,2,3,7,8-PeCDF	25.0	26.7	107	60-140
2,3,4,7,8-PeCDF	25.0	27.6	111	60-140
1,2,3,4,7,8-HxCDF	25.0	24.2	97	60-140
1,2,3,6,7,8-HxCDF	25.0	22.7	91	60-140
2,3,4,6,7,8-HxCDF	25.0	27.0	108	60-140
1,2,3,7,8,9-HxCDF	25.0	27.6	110	60-140
1,2,3,4,6,7,8-HpCDF	25.0	25.3	101	60-140
1,2,3,4,7,8,9-HpCDF	25.0	28.0	112	60-140
OCDF	50.0	57.8	116	60-140
2,3,7,8-TCDD	10.0	11.2	112	60-140
1,2,3,7,8-PeCDD	25.0	25.4	101	60-140
1,2,3,4,7,8-HxCDD	25.0	28.7	115	60-140
1,2,3,6,7,8-HxCDD	25.0	24.4	98	60-140
1,2,3,7,8,9-HxCDD	25.0	27.9	111	60-140
1,2,3,4,6,7,8-HpCDD	25.0	27.5	110	60-140
OCDD	50.0	66.9	134	60-140
13C-2,3,7,8-TCDF	50.0	50.6	101	40-135
13C-1,2,3,7,8-PeCDF	50.0	57.8	116	40-135
13C-1,2,3,4,7,8-HxCDF	125	101	81	40-135
13C-1,2,3,4,6,7,8-HpCDF	125	115	92	40-135
13C-2,3,7,8-TCDD	50.0	43.3	87	40-135
13C-1,2,3,7,8-PeCDD	50.0	55.5	111	40-135
13C-1,2,3,6,7,8-HxCDD	125	108	86	40-135
13C-1,2,3,4,6,7,8-HpCDD	125	116	92	40-135
13C-OCDD	250	233	93	40-135

ND = Not Detected

Calculations are performed before rounding to avoid round-off errors in calculated results.

Chain of Custody Form

Commonwealth Analytical
53 Southampton Rd. Westfield, MA 01085
(413)572-3200 fax(413)572-3215

Client: Litton Systems Inc.
Job#/Proj. Manager: C325-2-310 / MJM
Workorder #
COC #
Address: 1725 Jefferson Davis Highway
Arlington, VA 22202
Work ID: Lake Salvage Remediation
Contact: Ted Craver
Phone: 413-572-3225
Collected by: MICHAEL MATILA NEW

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
1. Method 8290 TCDD/TCDF Dioxin

Requested Turn Around Time (T): 24 hr. [ ] 1 wk. [ ] Other [X] 48 hr. [ ] 2 wk. [ ] Specify: 3 wk.

Special Detection Limits? (T): Yes [ ] No [X] Specify:

Special QA/QC? (T): Yes [ ] No [X] Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(T)	Comp(T)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
	F2	SO	6-20-95 0900	X		1	G							X												1
	F4	SO	6-20-95 0913	X		1	G							X												1
	H2	SO	6-20-95 1021	X		1	G							X												1
	H4	SO	6-20-95 1045	X		1	G							X												1
		SO		X		1	G							X												1
		SO		X		1	G							X												1
		SO		X		1	G							X												1
		SO		X		1	G							X												1
		SO		X		1	G							X												1
		SO		X		1	G							X												1

Sampler rec'd in good condition MCD 062195

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Michael Matila	6/20/95	1600			
Relinquished by:	Date:	Time:	Received by:	Date:	Time:
Relinquished by:	Date:	Time:	Received by: MCDyan	Date: 062195	Time: 2045
Method of shipment:			Laboratory: QES		

Cooler #:
Temp. @ receipt: 5.0°C
Preservation pH checked NA
By: MCD Date: 062195

f:\data\excel\COCJ-L.XLS rev.5/94

Tighe&Bond
Consulting Engineers
Environmental Specialists

File No. 2325-2-310
Re: LAKE SALVAGE
Date: 6/20/95

QUANTERRA
ENVIRONMENTAL SERVICES
880 RIVERSIDE PARKWAY
WEST SACRAMENTO, CA.
95605

Att. CAB

We are sending:

☐ drawings ☐ shop drawings ☐ specifications ☒ other documents

as listed below:

No. Copies	DWG. #	Title
		4 SAMPLES - ANALYZE METHOD
		8290 TOTAL DIOXIN/FURANS

☐ approved
☐ approved as noted
☐ revise and resubmit
☐ not approved

☐ for your file
☐ as requested by
☐

Remarks PLEASE CALL 413-572-3225 (MIKE MATHANEY) WITH ANY QUESTIONS

Copies to:
FILE

Very truly yours,
Tighe & Bond, Inc.

Westfield Executive Park 53 Southampton Road Westfield, MA 01085 Tel. 413-562-1600 Fax. 413-562-5317

CommonwealthAnalytical

LITTON SYSTEMS INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

Attention: TED CRAVER

Work ID: LAKE SALVAGE REMEDIATION
Project # C325_2_310

Workorder # 9506385

Authorized Signature

Stephen L. Knollmeyer 7/11/95

Massachusetts Certificate MA014
Connecticut Certificate PH-0494
New Hampshire DES 253993 - A + C
New Jersey DEP Certificate 59845
New York Department of Health 10843
Rhode Island Department of Health 57
North Carolina Certificate 408
US Army Corps of Engineers

Drinking Water • Wastewater • Hazardous Waste • Toxicity Testing • Mobile Laboratory

Westfield Executive Park • 53 Southampton Road • Westfield, MA 01085-5308 • Tel 413·572·3200 • Fax 413·572·3215

12020 Sunrise Valley Drive • Suite 100 • Reston, VA 22091-3429 • Tel 703·391·2770 • Fax 703·391·2766

A division of Tighe & Bond, Inc

Commonwealth Analytical

Workorder #9506385

Laboratory Results Prepared For :

LITTON SYSTEMS INC.
1725 JEFFERSON DAVIS HIGHWAY
ARLINGTON, VA 22202

Attention : TED CRAVER

Company : LITTON SYSTEMS INC.

Facility : ARLINGTON, VA 22202
Contact : MJM_CFR

Laboratory Results Prepared By :

Commonwealth Analytical
53 Southampton Rd.
Westfield, MA 01085
Attention : Stephen L. Knollmeyer
(413) 572-3200

Work ID : LAKE SALVAGE REMEDIATION
Taken : 06/20/95
Transported : MJM-T&B/UPS
Type : SOIL
PO # :

7/11/95 gLB
Certified by

Commonwealth Analytical

Workorder #9506385

Inorganic Results for A4

Matrix:SOIL

Collected on 06/20/95 08:13:00

	Analyte	Result	Units	Test Date	Analyst
01A	PERCENT SOLIDS	98.8	percent	06/26/95	RZ

Metal Results for A4

Matrix:SOIL

Collected on 06/20/95 08:13:00

	Analyte	Result	Units	Test Date	Analyst
01A	LEAD by ICP	110	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **A4**

PCB's

Matrix:SOIL

Percent Solids: 98.8%

Collected on 06/20/95 08:13:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

01A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	7
	11104-28-2	PCB-1221	ND	7
	11141-16-5	PCB-1232	ND	7
	53469-21-9	PCB-1242	ND	7
	12672-29-6	PCB-1248	ND	7
	11097-69-1	PCB-1254	ND	7
	11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for A5

Matrix:SOIL

Collected on 06/20/95 08:05:00

	Analyte	Result	Units	Test Date	Analyst
02A	PERCENT SOLIDS	96.5	percent	06/26/95	RZ

Metal Results for A5

Matrix:SOIL

Collected on 06/20/95 08:05:00

	Analyte	Result	Units	Test Date	Analyst
02A	LEAD by ICP	800	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **A5**

PCB's

Matrix:SOIL

Collected on 06/20/95 08:05:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

Percent Solids: 96.5%

02A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	7
	11104-28-2	PCB-1221	ND	7
	11141-16-5	PCB-1232	ND	7
	53469-21-9	PCB-1242	ND	7
	12672-29-6	PCB-1248	ND	7
	11097-69-1	PCB-1254	ND	7
	11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for F1

Matrix:SOIL

Collected on 06/20/95 08:45:00

	Analyte	Result	Units	Test Date	Analyst
03A	PERCENT SOLIDS	95.1	percent	06/26/95	RZ

Metal Results for F1

Matrix:SOIL

Collected on 06/20/95 08:45:00

	Analyte	Result	Units	Test Date	Analyst
03A	LEAD by ICP	600	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **F1**

PCB's

Matrix:SOIL

Collected on 06/20/95 08:45:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 95.1%

03A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	7
	11104-28-2	PCB-1221	ND	7
	11141-16-5	PCB-1232	ND	7
	53469-21-9	PCB-1242	ND	7
	12672-29-6	PCB-1248	ND	7
	11097-69-1	PCB-1254	ND	7
	11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for F2

Matrix:SOIL

Collected on 06/20/95 09:00:00

	Analyte	Result	Units	Test Date	Analyst
04A	PERCENT SOLIDS	94.8	percent	06/26/95	RZ

Metal Results for F2

Matrix:SOIL

Collected on 06/20/95 09:00:00

	Analyte	Result	Units	Test Date	Analyst
04A	LEAD by ICP	670	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **F2**

PCB's

Matrix:SOIL

Percent Solids: 94.8%

Collected on 06/20/95 09:00:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

04A\PCBSWS CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	7
11104-28-2	PCB-1221	ND	7
11141-16-5	PCB-1232	ND	7
53469-21-9	PCB-1242	ND	7
12672-29-6	PCB-1248	ND	7
11097-69-1	PCB-1254	ND	7
11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for F3

Matrix:SOIL

Collected on 06/20/95 09:07:00

	Analyte	Result	Units	Test Date	Analyst
05A	PERCENT SOLIDS	98.3	percent	06/26/95	RZ

Metal Results for F3

Matrix:SOIL

Collected on 06/20/95 09:07:00

	Analyte	Result	Units	Test Date	Analyst
05A	LEAD by ICP	480	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **F3**

PCB's

Matrix:SOIL

Percent Solids: 98.3%

Collected on 06/20/95 09:07:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

05A\PCBSWS CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	7
11104-28-2	PCB-1221	ND	7
11141-16-5	PCB-1232	ND	7
53469-21-9	PCB-1242	ND	7
12672-29-6	PCB-1248	ND	7
11097-69-1	PCB-1254	ND	7
11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for F4

Matrix:SOIL

Collected on 06/20/95 09:13:00

	Analyte	Result	Units	Test Date	Analyst
06A	PERCENT SOLIDS	97.3	percent	06/26/95	RZ

Metal Results for F4

Matrix:SOIL

Collected on 06/20/95 09:13:00

	Analyte	Result	Units	Test Date	Analyst
06A	LEAD by ICP	1000	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for F4

PCB's

Matrix:SOIL

Collected on 06/20/95 09:13:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 97.3%

06A\PCBSWS CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	7
11104-28-2	PCB-1221	ND	7
11141-16-5	PCB-1232	ND	7
53469-21-9	PCB-1242	ND	7
12672-29-6	PCB-1248	ND	7
11097-69-1	PCB-1254	ND	7
11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for F5

Matrix:SOIL

Collected on 06/20/95 09:21:00

	Analyte	Result	Units	Test Date	Analyst
07A	PERCENT SOLIDS	93.2	percent	06/26/95	RZ

Metal Results for F5

Matrix:SOIL

Collected on 06/20/95 09:21:00

	Analyte	Result	Units	Test Date	Analyst
07A	LEAD by ICP	780	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for F5

PCB's

Matrix:SOIL

Collected on 06/20/95 09:21:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 93.2%

07A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	7
	11104-28-2	PCB-1221	ND	7
	11141-16-5	PCB-1232	ND	7
	53469-21-9	PCB-1242	ND	7
	12672-29-6	PCB-1248	ND	7
	11097-69-1	PCB-1254	ND	7
	11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for G1

Matrix:SOIL

Collected on 06/20/95 09:44:00

	Analyte	Result	Units	Test Date	Analyst
08A	PERCENT SOLIDS	97.0	percent	06/26/95	RZ

Metal Results for G1

Matrix:SOIL

Collected on 06/20/95 09:44:00

	Analyte	Result	Units	Test Date	Analyst
08A	LEAD by ICP	2300	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for G1

PCB's

Matrix:SOIL

Collected on 06/20/95 09:44:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 97.0%

08A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for G2

Matrix:SOIL

Collected on 06/20/95 09:44:00

	Analyte	Result	Units	Test Date	Analyst
09A	PERCENT SOLIDS	88.1	percent	06/26/95	RZ

Metal Results for G2

Matrix:SOIL

Collected on 06/20/95 09:44:00

	Analyte	Result	Units	Test Date	Analyst
09A	LEAD by ICP	770	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **G2**

PCB's

Matrix:SOIL

Percent Solids: 88.1%

Collected on 06/20/95 09:44:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

09A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for G3

Matrix:SOIL

Collected on 06/20/95 09:46:00

	Analyte	Result	Units	Test Date	Analyst
10A	PERCENT SOLIDS	92.9	percent	06/26/95	RZ

Metal Results for G3

Matrix:SOIL

Collected on 06/20/95 09:46:00

	Analyte	Result	Units	Test Date	Analyst
10A	LEAD by ICP	2200	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for G3

PCB's

Matrix:SOIL

Collected on 06/20/95 09:46:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

Percent Solids: 92.9%

10A\PCBSWS CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
12674-11-2	PCB-1016	ND	8
11104-28-2	PCB-1221	ND	8
11141-16-5	PCB-1232	ND	8
53469-21-9	PCB-1242	ND	8
12672-29-6	PCB-1248	ND	8
11097-69-1	PCB-1254	ND	8
11096-82-5	PCB-1260	ND	8

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for G4

Matrix:SOIL

Collected on 06/20/95 09:49:00

	Analyte	Result	Units	Test Date	Analyst
11A	PERCENT SOLIDS	95.2	percent	06/26/95	RZ

Metal Results for G4

Matrix:SOIL

Collected on 06/20/95 09:49:00

	Analyte	Result	Units	Test Date	Analyst
11A	LEAD by ICP	880	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **G4**

PCB's

Matrix:SOIL

Percent Solids: 95.2%

Collected on 06/20/95 09:49:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

11A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	7
	11104-28-2	PCB-1221	ND	7
	11141-16-5	PCB-1232	ND	7
	53469-21-9	PCB-1242	ND	7
	12672-29-6	PCB-1248	ND	7
	11097-69-1	PCB-1254	ND	7
	11096-82-5	PCB-1260	ND	7

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for G5

Matrix:SOIL

Collected on 06/20/95 10:06:00

	Analyte	Result	Units	Test Date	Analyst
12A	PERCENT SOLIDS	94.7	percent	06/26/95	RZ

Metal Results for G5

Matrix:SOIL

Collected on 06/20/95 10:06:00

	Analyte	Result	Units	Test Date	Analyst
12A	LEAD by ICP	480	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for G5

PCB's

Matrix:SOIL

Collected on 06/20/95 10:06:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

Percent Solids: 94.7%

12A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for H1

Matrix:SOIL

Collected on 06/20/95 10:13:00

	Analyte	Result	Units	Test Date	Analyst
13A	PERCENT SOLIDS	98.5	percent	06/26/95	RZ

Metal Results for H1

Matrix:SOIL

Collected on 06/20/95 10:13:00

	Analyte	Result	Units	Test Date	Analyst
13A	LEAD by ICP	1000	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **H1**

PCB's

Matrix:SOIL

Collected on 06/20/95 10:13:00
Extracted on 06/28/95
Analyzed on 07/05/95 by JAB

Percent Solids: 98.5%

13A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for H2

Matrix:SOIL

Collected on 06/20/95 10:21:00

	Analyte	Result	Units	Test Date	Analyst
14A	PERCENT SOLIDS	95.2	percent	06/26/95	RZ

Metal Results for H2

Matrix:SOIL

Collected on 06/20/95 10:21:00

	Analyte	Result	Units	Test Date	Analyst
14A	LEAD by ICP	2000	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **H2**

PCB's

Matrix:SOIL

Percent Solids: 95.2%

Collected on 06/20/95 10:21:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

14A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for H3

Matrix:SOIL

Collected on 06/20/95 10:26:00

	Analyte	Result	Units	Test Date	Analyst
15A	PERCENT SOLIDS	95.2	percent	06/26/95	RZ

Metal Results for H3

Matrix:SOIL

Collected on 06/20/95 10:26:00

	Analyte	Result	Units	Test Date	Analyst
15A	LEAD by ICP	1800	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **H3**

PCB's

Matrix:SOIL

Collected on 06/20/95 10:26:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 95.2%

15A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Inorganic Results for H4

Matrix:SOIL

Collected on 06/20/95 10:45:00

	Analyte	Result	Units	Test Date	Analyst
16A	PERCENT SOLIDS	98.5	percent	06/26/95	RZ

Metal Results for H4

Matrix:SOIL

Collected on 06/20/95 10:45:00

	Analyte	Result	Units	Test Date	Analyst
16A	LEAD by ICP	2800	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **H4**

PCB's

Matrix:SOIL

Collected on 06/20/95 10:45:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 98.5%

16A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Commonwealth Analytical

Workorder #9506385

Inorganic Results for H5

Matrix:SOIL

Collected on 06/20/95 10:49:00

	Analyte	Result	Units	Test Date	Analyst
17A	PERCENT SOLIDS	97.4	percent	06/26/95	RZ

Metal Results for H5

Matrix:SOIL

Collected on 06/20/95 10:49:00

	Analyte	Result	Units	Test Date	Analyst
17A	LEAD by ICP	57	mg/kg, Dry Wgt	07/08/95	TM

Commonwealth Analytical

Workorder #9506385

Results for **H5**

PCB's

Matrix:SOIL

Collected on 06/20/95 10:49:00
Extracted on 06/28/95
Analyzed on 07/06/95 by JAB

Percent Solids: 97.4%

17A\PCBSWS	CAS #	Compound	Result (ug/kg, Dry Wgt.)	Quantitation Limit (ug/kg, Dry Wgt.)
	12674-11-2	PCB-1016	ND	10
	11104-28-2	PCB-1221	ND	10
	11141-16-5	PCB-1232	ND	10
	53469-21-9	PCB-1242	ND	10
	12672-29-6	PCB-1248	ND	10
	11097-69-1	PCB-1254	ND	10
	11096-82-5	PCB-1260	ND	10

Notes and Definitions for This Test

ND = The compound was analyzed for but was not detected.
NA = The compound was not analyzed.
BQL = The compound was detected below the minimum quantitation limit.
B = The compound was also detected in the blank.

Test Methodologies

Test: **LEAD by ICP**
Method 6010, Test Methods for Evaluating Solid Waste, EPA-SW846, 1986 Edition.

Test: **PCB's IN SOIL**
Test Methods for Evaluating Solid Waste, EPA SW-846, 1986 Edition.

Preparation	Method 3580-3550
Clean Up	Method 3660
Analysis	Modified Method 8080

Test: **PERCENT SOLIDS**
Method 160.3, Methods for Chemical Analyses of Water and Wastes, EPA-600/4-79-020, 1983 Revision.

Chain of Custody Form

Commonwealth Analytical
[redacted] South[redacted]n Rd.[redacted]field,[redacted]085 [redacted]
(413)572-3200 fax(413)572-3215

Client: Litton Systems Inc. Job#/Proj. Manager: C325-2-310 / MJM

Workorder # 9526385 COC #

Address: 1725 Jefferson Davis Highway Work ID: Lake Salvage Remediation

Arlington, VA 22202 Contact: Ted Craver

Phone: 413-572-3225 Collected by: MIKE MATRAINEN

Shaded areas for office use

Analysis Requested
Check analysis and specify method and analytes in comments section.
For example:
500-series for drinking water
600-series for waste water
8000-series for haz/solid waste
Use comments section to further define.

Comments (Special Instructions)
1. Solper
2. T. Pb
3. PCBSWS

Requested Turn Around Time (T): 24 hr. [ ] 1 wk. [ ] Other [ ] 48 hr. [ ] 2 wk. [X] Specify:

Special Detection Limits? (T): Yes [ ] No [X] Specify:

Special QA/QC? (T): Yes [ ] No [X] Specify:

Sample Type Codes
WW-Wellwater W-Wastewater SW-Surfacewater LW-Labwater
RW-Raw Water GW-Groundwater PW-Public Water SO-Soil
S-Solid SL-Sludge O-Oil A-Air Z-Other

Fraction	Sample ID (Use one line per container. For volatiles-one line/analysis)	Sample Type	Date / Time Collected	Grab(T)	Comp(T)	# containers	Plastic(P) or Glass(G)	Preservative: Na2S2O3	HNO3 to pH <2	H2SO4 to pH <2	HCl to pH<2	NaOH to pH>12	Other	4° C	pH	Volatiles	Semivolatiles	PCB & Pesticides	Metals	Cyanide	TCLP	Oil & Grease	Total Pet. Hyd.(TPH)	General Chemistry	Bacteriological	Other
01 A	A4	SO	6-20-95 0813	X		1	G							X				3	2					1		
02 A	A5	SO	6-20-95 0805	X		1	G							X				3	2					1		
03 A	F1	SO	6-20-95 0845	X		1	G							X				3	2					1		
04 A	F2	SO	6-20-95 0900	X		1	G							X				3	2					1		
05 A	F3	SO	6-20-95 0907	X		1	G							X				3	2					1		
06 A	F4	SO	6-20-95 0918	X		1	G							X				3	2					1		
07 A	F5	SO	6-20-95 0921	X		1	G							X				3	2					1		
08 A	G1	SO	6-20-95 0944	X		1	G							X				3	2					1		
09 A	G2	SO	6-20-95 0944	X		1	G							X				3	2					1		
10 A	G3	SO	6-20-95 0946	X		1	G							X				3	2					1		

Shipped overnight by UPS

Relinquished by:	Date:	Time:	Received by:	Date:	Time:
[signature]	6-20-95	1400			
			Christa O-Brien	6/21/95	09:30

Method of shipment: UPS-Red

Laboratory: CA

Cooler #:

Temp. @ receipt: N/A

Preservation pH checked

By: CPB Date: 6/21/95

f:\data\excel\COCJ-L.XLS rev.5/94

MDS Laboratories
4418 POTTSVILLE PIKE
READING, PA 19605
610-921-8833 or 1-800-345-4026

INDUSTRIAL HYGIENE REQUEST FORM

PURCHASE ORDER NUMBER: 950002-0-001 (1100)

CLIENT INFORMATION
TIGHE + BOND INC.
53 SOUTHAMPTON ROAD
WESTFIELD MA

INVOICE TO: MICHAEL MATILAINEN

LAB REPORT TO: MICHAEL MATILAINEN

NUMBER OF SAMPLES: 1

TYPE OF SAMPLES: 37 MM CEF

LAB USE ONLY	CLIENT ID NUMBER, AIR VOLUME & ANALYSIS REQUESTED	SPECIAL INSTRUCTIONS
	6/14/95 - MJM - A 581 liters Lead Analysis NIOSH 7082	

Samples Relinquished by Sampler (Signature)	Samples Rec'd. by Courier (Signature)	Date 7/12/95	Time 7:00
Samples Relinquished by Courier (Signature)	Samples Rec'd. by Laboratory (Signature)	Date	Time
Samples Relinquished for Analysis (Signature)	Samples Rec'd. for Analysis (Signature)	Date	Time
Samples Relinquished *after* Analysis (Signature)	Analyzed Samples Rec'd. for Retention (Signature)	Date	Time

NOTES:
Please call with results
413-572-2225

I am submitting these samples for testing, at the regular fee, within the customary turnaround time.

Initial for approval

I request priority handling of these samples, *have already scheduled them by telephone*, and authorize the additional fee for this service.

Initial for approval

PLEASE REMEMBER TO INCLUDE PURCHASE ORDER NUMBER.

CLIENT TO RETAIN PART 3 OF FORM

MDS Laboratories

LABORATORY REPORT

INDUSTRIAL HYGIENE **ENVIRONMENTAL TESTING**

- EPA/NVLAP 1262
- AIHA ACCREDITATION NO. 8707
- NY DOH 10903
- PA DER 06-353
- NJ DEP 77678

TIGHE & BOND
5 SOUTHAMPTON ROAD
WESTFIELD, MA 01085

Work Order Number: R071395-012
Sample Recieved: 07/13/95
Report Date: 07/14/95

Attention: MIKE MATILAINEN

P.O. Number: 950002-0-001 (1100)

MDS Number	Client Number		Results	Concentration
95-0713-031	6/14/95-MJM-1	Air vol: 581.0 L		
1. LEAD			0.004 mg	0.007 mg/m3

Analytical Method: NIOSH 7082
Detection Limit: 0.001 mg Lead per sample

Reviewed by: _____
Fred Usbeck, CIH
Laboratory Director

4418 POTTSVILLE PIKE, READING, PENNSYLVANIA 19605 610-921-8833 FAX 610-921-9667

MDS Laboratories
4418 POTTSVILLE PIKE
READING, PA 19605
610-921-8833 or 1-800-345-4026

07F312-0952

INDUSTRIAL HYGIENE REQUEST FORM

PURCHASE ORDER NUMBER: 950002-0-001 (1100)

CLIENT INFORMATION
TIGHE + BOND INC.
53 SOUTHAMPTON ROAD
WESTFIELD MA

INVOICE TO: MICHAEL MATILAINEN

LAB REPORT TO: MICHAEL MATILAINEN

NUMBER OF SAMPLES: 1

TYPE OF SAMPLES: 37 MM CEF

LAB USE ONLY	CLIENT ID NUMBER, AIR VOLUME & ANALYSIS REQUESTED	SPECIAL INSTRUCTIONS
1713-031	6/14/95 - MJM - A 581 liters Lead Analysis NIOSH 7082 Lead	RESULTS WITH METHOD 29 7-14-95

		Date	Time
Samples Relinquished by Sampler (Signature) [signature]	Samples Rec'd. by Courier (Signature)	7/12/95	7:00
Samples Relinquished by Courier (Signature)	Samples Rec'd. by Laboratory (Signature) [signature]	7-13	0930
Samples Relinquished for Analysis (Signature)	Samples Rec'd. for Analysis (Signature) DK	7-13	13:30
Samples Relinquished *after* Analysis (Signature)	Analyzed Samples Rec'd. for Retention (Signature)		

NOTES:
Please call with results
413-572-3225
7-14. called to Mike 5:30 D.

I am submitting these samples for testing, at the regular fee, within the customary turnaround time.
[signature]
Initial for approval

I request priority handling of these samples, *have already scheduled them by telephone*, and authorize the additional fee for this service.
Initial for approval

PLEASE REMEMBER TO INCLUDE PURCHASE ORDER NUMBER.

CLIENT TO RETAIN PART 3 OF FORM

APPENDIX H

August 4, 1995 Remediation Progress Report

Tighe&Bond
Consulting Engineers
Environmental Specialists

C-325-2-310 (1151)
August 4, 1995

Mr. Mark Stanga
Litton Corporation
Law Department
P.O. Box 1601, Crystal Square 2
Arlington, Virginia 22202-3585

Re: Remediation Progress Report
Lake Salvage, Chicago

Dear Mr. Stanga:

The following letter report is intended to briefly summarize remediation and soil sampling results at the Lake Salvage Site. The attached site plan in Appendix A illustrates various remedial measures discussed throughout this letter. A final report is presently being prepared and will be submitted shortly which specifically details all of the remediation activities.

All of the work described hereinafter has been performed in strict accordance with the approved Work Plan and EPA consent order.

Site Remediation - Some building walls around the incinerators, the incinerators and associated - appurtenance as well as some soils identified by the EPA On Site Coordinator (OSC) Mr. Fred Bartman, were disposed of as hazardous waste and are identified as lightly shaded areas on the attached plan. The remainder of the building was demolished and disposed of as non-regulated construction and demolition (C&D) waste. In accordance with the OSC's on site direction, cleaned masonry was used to fill several of the on-site depressed areas such as the exterior loading dock pit and interior ash pit. These areas were topped with clean processed gravel.

The remaining floor slab (after building demolition) was left on site and the entire area was encapsulated as was approved by the EPA. In that the entire floor area was encapsulated, Mr. Fred Bartman did not require the collection and analyzing of wipe samples as was originally proposed in the work plan. The entire fence was removed from the site except that along the easterly property line. The Contractor is currently capping below grade utilities and will provide photo documentation of the same at completion of this task.

Soil/Manhole Sampling - Soil sampling and analysis was performed in the vacant lot to the west of the site in accordance with the Consent Order. The purpose of this soil sampling was to determine the concentrations of lead and PCB's on all samples and 25% of all samples for dioxins. All of the results are presented on the attached figure including manhole sampling results.

Westfield Executive Park 53 Southampton Road Westfield, MA 01085-5308 Tel. 413-562-1600 Fax. 413-562-5317
Original printed on recycled paper.

Table I shows the clean up threshold which were developed and approved for the site. The table also shows the range of concentrations observed in samples from the site. In that a dioxine soil clean up level was not determined for the site, we have included the Massachusetts cleanup standard for dioxin in soils for reference purposes.

Table I
Soil Analysis Ranges and Cleanup Thresholds

	Range of Samples Manhole	Range of Samples Soil	Cleanup Threshold
Lead	140-2600 mg/kg	57-3300 mg/kg	400 mg/kg
PCB's	ND-34 mg/kg	N.D.-14 mg/kg	1 mg/kg
Dioxins	16-7000 pg/g	26-190 pg/g	4 pg/g

N.D. Not detected
Pg/g picograms/gram (part per trillion)
mg/kg milligrams/kilogram (part per million)

In general, the data indicates that all area samples exceeded the cleanup thresholds for lead, PCB's and dioxins. As a result of the initial manhole sampling data, the manhole with the highest levels of contaminants was subsequently cleaned out during the remediation activity.

The lead sampling results indicate that concentrations in soil are highly variable. In accordance with the attached articles in Appendix B we reviewed regarding lead levels in Chicago soils, it is possible that some of this lead in the soil may be the result of automobile exhaust emissions, lead paint or other sources in the Chicago area (e.g. smelters, incinerators, etc.). The articles indicate ambient lead soil concentrations can approach 5,000 - 6,000 mg/kg in the Chicago area. These sources may have contributed to the overall lead concentrations detected at the site. A similar argument may hold true for both PCB's and dioxins located at the site.

In general, PCB's were not detected in throughout the majority of the samples at the site. Sample B1 did exceed the site cleanup standards.

The dioxin concentrations (calculated as EPA total equivalent factors) showed no specific trends toward or away from the site. All samples exceeded the Massachusetts cleanup standard for dioxin, including the background samples.

Note: It should be noted that the majority of soil materials in the vacant lot appear to be materials which have been hauled in from other locations and were not generally virgin materials for that site.

Soil Removal - A limited strip of surficial soil from the alley on the south side of the site was removed at the request of Mr. Fred Bartman. The area was scraped down approximately 1-inch. All liter and debris was removed to a C&D landfill while the soil was disposed of as a hazardous

waste. In addition, the EPA team coordinator collected a composite sample of soil in this area and reported residual concentrations in the order of 2000 mg/kg. This indicates that limited soil removal around the site may not effectively remove lead contaminants to previously established clean-up standards..

Based on the preceding information as well as the high variability of the data, which implies multiple potential off site sources of the lead, we will recommend no further soil remediation in and around this site.

We are preparing the final summary report which will be submitted to EPA and are planning on submitting it to Litton for review the week of July 8, 1995. The Consent Order requires that the final report be issued 60 days from the final completion of remediation activities at the site which would place the final date at approximately August 21, 1995.

Please contact the undersigned or Mr. Michael Matilainen, CIH at 413-562-1600 if you should have any questions concerning this information.

Very truly yours,

TIGHE & BOND, INC.

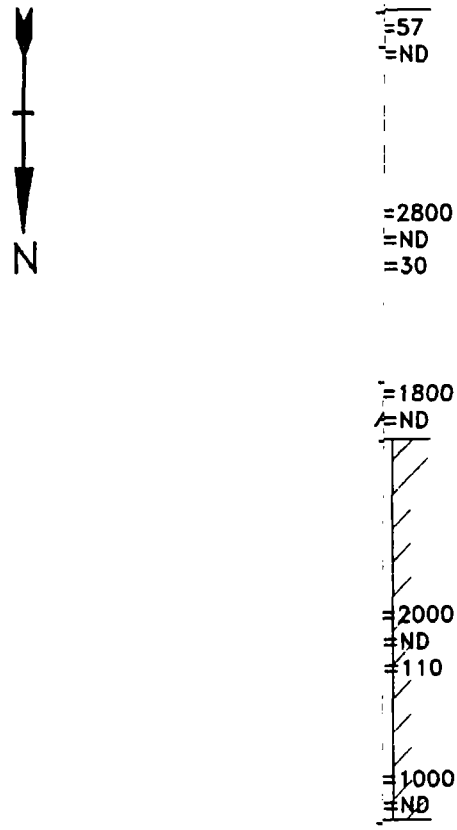
Thomas C. Couture, P.E.
Assistant Chief Engineer

kc\C325\LTR\TCC.F

cc: Theodore F. Craver

APPENDIX A

SITE PLAN



LEGEND

- SOIL SAMPLES
- L= LEAD mg/kg
- P= PCBs mg/kg
- D= EPA/TEQ DIOXIN Pg/g
- SITE
- PROPERTY LINE

ALL LOCATIONS AND AREAS APPROXIMATE

FIGURE A

DEMOLITION & REMEDIATION PLAN
SOIL SAMPLING RESULTS
LAKE SALVAGE CO.
CHICAGO, IL

TIGHE & BOND INC. CONSULTING ENGINEERS
WESTFIELD, MASS.

SCALE: 1"=50' DATE: JULY 1995

08/04/95 I:\MISC\C325BL2A

NERAC

One Technology Drive, Tolland, Connecticut 06084-3900

Phone: (203)872-7000
Fax: (203)875-1749
Documents: (203)872-9331

To: Tighe and Bond, Inc. Date: 7-26-95

From: Skye McClain Page 1 of 12

RUSH REQUEST TO: Mr. Michael Matilainen

PHONE: 413-572-3225

IMPORTANT -- IMPORTANT -- IMPORTANT

If the results contained in this report need refocussing or additional refinement, please contact Skye McClain at (203) 872-7000 and refer to question number 0865126.016

:AD LEVELS IN SOIL 0865126.016 / SXM
:HICAGO AREA)
-. Michael Matilainen SXM001

:O BUSINESS (BBS)

Superfund cleanup plan ignores >lead< data, groups say - BBS 92-28
0448412 51 NDN- 086-0043-9021-5

ANON

JOURNAL NAME- INDOOR POLLUTION NEWS VOL.5, NO.12, June 26, P.5 1992
LANGUAGE- ENGLISH

NO-ABSTRACT

DESCRIPTOR(S)- ASPEN; COLORADO; COMPUTER MODELING; CONTROVERSY; COST EFFECTIVENESS; EPA; GRANITE CITY; >ILLINOIS<; >LEAD< POISONING; PUBLIC HEALTH HAZARDS; RESEARCH; RISK ASSESSMENT; >SOIL< POLLUTION CONTROL; SUPERFUND PROGRAM; USA NAMED PERSON- DUNLOP, THOMAS, DIRECTOR, ENVIRONMENTAL HEALTH DEPT, PITKIN COUNTY, CO; KIMBROUGH, RENATE, SENIOR MEDICAL ASSOCIATE, INST OF EVALUATION OF HEALTH RISKS; GUIMOND, RICHARD, DEPUTY ASSIST ADMINISTRATOR, DIRECTOR, SUPERFUND PROGRAM, EPA CONCEPT CODE(S)- 04400, MINERALS & METALS; 22100, PEDIATRICS; 67100, SOIL SCIENCE; 70100, PUBLIC HEALTH; 70310, ENVIRONMENTAL & INDUSTRIAL TOXICOLOGY; 70330, POLLUTION; 80500, LEGISLATION & REGULATION.

INDUSTRIAL >LEAD< CONTAMINATION OF AN >ILLINOIS< (USA) WILDLIFE REFUGE AND INDIGENOUS SMALL MAMMALS - BBS 85-00 0005309 NDN- 086-0000-4309-0

KISSEBERTH, W. C.; SUNDBERG, J. P.; NYBOER, R. W.; REYNOLDS, J. D.; KASTEN, S. C.; BEASLEY, V. R.

JOURNAL NAME- JOURNAL OF THE AMERICAN VETERINARY MEDICAL ASSOCIATION VOL.185, NO.11, P.1309-1313 1984 CORPORATE AUTHOR- DEP. VET. BIOSCI., COLL. VET. MED., UNIV. ILLINOIS, URBANA, ILL. 61801 LANGUAGE- ENGLISH

Deer mice (Peromyscus maniculatus) were trapped from a sand prairie at various distances from an adjacent battery Pb-reclamation plant. Analysis of liver, kidney and bone for Pb concentrations showed an increase of tissue Pb concentrations over controls to a distance of .apprx. 400 m. >Soil< and plant Pb concentrations roughly correlated with the findings in deer mouse tissues. At higher tissue Pb concentrations, acid-fast staining intranuclear inclusions within renal tubular epithelial cells were an occasional finding.

DESCRIPTOR(S)- BONE; INTRANUCLEAR INCLUSION; KIDNEY; LIVER; PEROMYSCUS MANICULATUS; PLANT; SAND PRAIRIE; >SOIL<; TUBULAR EPITHELIAL CELL CONCEPT CODE(S)- 04400, MINERALS & METALS; 15200, BONES & RELATED TOPICS; 15600, DIGESTIVE SYSTEM; 16600, URINARY SYSTEM; 35600, TERRESTRIAL WILDLIFE MANAGEMENT; 70310, ENVIRONMENTAL & INDUSTRIAL TOXICOLOGY; 70330, POLLUTION.

:DLINE Database (1992 to Present)

Survey of >lead< exposure around a closed >lead< smelter. - MED 95-07
95215196 NDN- 101-0118-5044-9

Kimbrough, R.; LeVois, M.; Webb, D.

JOURNAL NAME- Pediatrics VOL. 95 NO. 4 1995 Apr PP. 550-4

DOCUMENT TYPE- JOURNAL ARTICLE JOURNAL CODE- OXV JOURNAL SUBSET- MEDJSA; MEDJSM ISSN- 0031-4005 CORPORATE AUTHOR- Institute for Evaluating Health Risks, Washington, DC 20005-3521, USA. PUBLICATION COUNTRY- UNITED STATES LANGUAGE- English

OBJECTIVE. To test the hypothesis that elevated >lead< in >soil< is positively correlated with blood >lead< (BPb) levels in children in an urban population surrounding a closed >lead< smelter, a US Environmental Protection Agency Superfund clean-up site was surveyed. METHOD. A total of 827 volunteers including 490 children under 6 years of age participated. A questionnaire was administered. Blood >lead< was determined as was >lead< content of samples of house dust, >soil<, paint, and water of the participants' homes. RESULTS. The arithmetic mean venous BPb in 490 children between 6 and 72 months of age was 6.9 micrograms/dL (0.33 mumol/L) range 0.7 to 40.2 micrograms/dL (0.03 to 1.94 mumol/L). The BPb of 78 (16%) children in this group was > or = 10 micrograms/dL (0.48 mumol/L). Based on multiple regression modeling, >lead< in house dust accounted for 18% of the variance in BPb. >Lead< in paint together with the condition of the house were the main contributors to the dust >lead< variance (26%) with >soil< >lead< accounting for an additional 6%. >Lead< in paint alone accounted for 3% of the BPb variance. >Lead< in paint together with the condition of the house accounted for 12% of BPb variance, and >lead< in >soil< accounted for an additional 3%. Factors other than environmental >lead< such as education of parents, household income, and behavior were associated with BPb levels. CONCLUSIONS. The mean BPb in children was below the present level of concern of the Centers for Disease Control and Prevention. Children with BPb of > or = 10 micrograms/L (0.48 mumol/L) tended to live in poorly maintained older houses. Based on these findings >lead< in >soil< and paint in well-maintained homes contributed little to the >lead< exposure of children.

CHECK TAG(S)- Female; Human; Male; Support, Non-U.S. Gov't; Support, U.S. Gov't, Non-P.H.S. MEDICAL DESCRIPTOR(S)- *Environmental Exposure --AN; *>Lead< --AN; *Metallurgy; *>Soil< Pollutants --AN Child, Preschool; Dust --AN; >Illinois<; Infant; >Lead< --BL; Multivariate Analysis; Paint --AN; Risk Assessment; United States; United States Environmental Protection Agency; Water Pollutants, Chemical --AN CAS REGISTRY/EC NUMBER(S)- 0; 0; 7439-92-1 CAS SUBSTANCE NAME(S)- Soil Pollutants; Water Pollutants, Chemical; Lead.

4. Relationship between >soil< >lead<, dust >lead<, and blood >lead< concentrations in pets and their owners: evaluation of >soil< >lead< threshold values. - MED 95-01 95009847 NDN- 101-0095-3314-0

Berny, P. J.; Cote, L. M.; Buck, W. B.

JOURNAL NAME- Environ Res VOL. 67 NO. 1 1994 Oct PP. 84-97 DOCUMENT TYPE- JOURNAL ARTICLE JOURNAL CODE- EI2 JOURNAL SUBSET- MEDJSM; MEDJSX ISSN- 0013-9351 CORPORATE AUTHOR- Centre National d'Informations Toxicologiques Veterinaires, Ecole Nationale Veterinaire de Lyon, Marcy l'Etoile, France. PUBLICATION COUNTRY- UNITED STATES LANGUAGE- English

This paper reports the results of a study conducted in Granite City, >Illinois< during the months of August through October 1991. The study involved a subpopulation of 77 households having 106 dogs and cats which was a corollary to a major study conducted in humans by the >Illinois< Department of Public Health to evaluate >lead< exposure. A secondary >lead< smelter had been in operation in this town for almost 80 years and was shut

down in 1982. Important >soil< contamination with >lead< was reported and this paper presents data regarding levels of >soil< and dust >lead< and associated blood >lead< concentrations in animals and their owners in a total of 77 households. Overall, blood >lead< concentrations (BLC) were low (0-13 micrograms/dl in the animal owners; 0-28 micrograms/dl in pets). There was no significant relationship between >soil< or dust >lead< and BLC in humans; however, the relationship was significant in animals. Odds ratios were computed to determine whether 500 or 1000 ppm >lead< in environmental samples was associated with increased risk of having a high BLC. We could not find any increased risk in humans, while the risk did increase in animals. It is concluded that animals are more at risk than their owners of having a high BLC when exposed to the same contaminated environment and can be used to monitor the bioavailability of lead.

CHECK TAG(S)- Animal; Comparative Study; Human; Support, Non-U.S. Gov't MEDICAL DESCRIPTOR(S)- *Cats --BL; *Dogs --BL; *Environmental Exposure; *>Lead< --AN; *>Soil< Pollutants --AN Adolescence; Adult; Age Factors; Child; Child, Preschool; Dust --AN; >Illinois<; Infant; >Lead< --BL; Linear Models; Metallurgy; Odds Ratio; Paint --AN; Water --AN CAS REGISTRY/EC NUMBER(S)- 0; 7439-92-1; 7732-18-5 CAS SUBSTANCE NAME(S)- Soil Pollutants; Lead; Water.

Low blood >lead< concentration associated with various biomarkers in household pets. - MED 94-06 94189964 NDN- 101-0071-9732-9

Berny, P. J.; Cote, L. M.; Buck, W. B.

JOURNAL NAME- Am J Vet Res VOL. 55 NO. 1 1994 Jan PP. 55-62 DOCUMENT TYPE- JOURNAL ARTICLE JOURNAL CODE- 40C JOURNAL SUBSET- MEDJSM ISSN- 0002-9645 CORPORATE AUTHOR- Centre National d'Informations Toxicologiques Veterinaires, Ecole Nationale Veterinaire de Lyon, Marcy l'etoile, France. PUBLICATION COUNTRY- UNITED STATES LANGUAGE- English

A former secondary >lead< smelter was in operation in Granite City, Ill, until the early 1980s. As a result, the surrounding area is heavily contaminated with >lead<. >Soil< concentrations as high as 5,000 ppm have been measured in prior studies. Because of growing concerns about health defects associated with low levels of >lead< exposure in human beings, a major study has been conducted on people living in the area. The study reported here was a corollary to the human exposure study. >Lead< concentration was determined in 84 dogs and 26 cats in the town and ranged between < 5 and 28 micrograms/dl. None of the dogs had clinical signs of >lead< poisoning. The CBC and serum biochemical values did not indicate many significant differences between dogs with a high (> or = 10 micrograms/dl) or low blood >lead< concentration (BLC). Hemoglobin concentrations were lower, and WBC counts were higher in dogs and cats with higher BLC, but they were still within reference ranges. Free erythrocyte protoporphyrin concentration was determined. Normal values appeared to be similar for dogs and cats. Only animals with BLC > or = 20 micrograms/dl were found to have somewhat increased concentration of free erythrocyte protoporphyrin. delta-Aminolevulinic acid dehydratase activity was measured and found to be negatively correlated with BLC. The relation was strong, even at low BLC (5 to 10 micrograms/dl) in both species. Age or sex difference was not observed. Therefore, biological changes associated with low BLC were limited to BLC in the 10- to 30-micrograms/dl range.

CHECK TAG(S)- Animal; Comparative Study; Female; Human; Male; Support, Non-U.S. Gov't MEDICAL DESCRIPTOR(S)- *Animals, Domestic; *Cats --BL; *Dogs --BL; *Environmental Exposure; *>Lead< --BL Aging --BL; Alanine

Aminotransferase --BL; Alkaline Phosphatase --BL; Aminolevulinic Acid Dehydratase --BL; Analysis of Variance; Aspartate Aminotransferase --BL; Biological Markers --BL; Blood Urea Nitrogen; Creatinine --BL; Erythrocyte Count; Erythrocytes --ME; >Illinois<; Leukocyte Count; Liver Function Tests; Protoporphyrins --BL; Sex Factors CAS REGISTRY/EC NUMBER(S)- EC-2.6.1.1; EC-2.6.1.2; EC-3.1.3.1; EC-4.2.1.24; 0; 0; 60-27-5; 7439-92-1 CAS SUBSTANCE NAME(S)- Aspartate Aminotransferase; Alanine Aminotransferase; Alkaline Phosphatase; Aminolevulinic Acid Dehydratase; Biological Markers; Protoporphyrins; Creatinine; Lead.

NIOSHTIC

6. Measurement of the Ambient >Lead< Concentration in the Vicinity of Urbana-Champaign, >Illinois< - NIO 73-00 NIOSH-00050660 NDN-148-0004-2181-2

Hudson, J. L.; Stukel, J. J.; Solomon, R. L.

1975-00-00 Atmospheric Environment, Vol. 9, pages 1000-1006, 24 references DATE FILED- 1974-07-18 CODEN- ATENBP

Atmospheric >lead< concentrations were measured as a function of both time and position in a rural area adjacent to Urbana-Champaign, >Illinois< during the period August 1973 to February 1974. The results were related to traffic and meteorological data with the use of a mathematical model for the transport of >lead< particulates from local sources. The mean rural concentration is 0.227 microgram per cubic meter. Most of the >lead< in the rural area is transported into the area from distant sources with the contribution of automobiles in Urbana-Champaign and local highways being minor. Measurements were also made of particle size distributions and deposition rates to the >ground<.

DESCRIPTOR(S)- Air quality measurement; Automotive emissions; Heavy metals; Metallic dusts; Particulate dusts; Particulate sampling; Sampling methods; Toxicology; 7439921.

POLLUTION ABSTRACTS

7. Sources of >lead< exposure in Granite City, >Illinois< - PAB 26-03 3658621 NDN- 090-0020-2803-7

Webb, D.

JOURNAL NAME- HEALTH ENVIRON. DIG. vol. 8, no. 9, pp. 69-71 1995
DOCUMENT TYPE- Journal Article BIBLIOGRAPHIC LEVEL- Analytical, Serial

The Madison County >Lead< Exposure Study was part of a three-state study of >lead< and cadmium exposure at lead-contaminated Superfund sites. The sites consisted of two lead-mining sites and the Granite City site, which was a secondary >lead< smelter. In 1991, the >Illinois< Department of Health (IDPH) and the Agency for Toxic Substances and Disease Registry (ATSDR) conducted a health assessment of the secondary smelter site. Based on results of this examination, the agencies concluded that a potential health risk existed. These findings, along with citizen concerns, prompted the exposure study in August 1991. The target population comprised those residents living near the smelter site or in areas where contaminated by-products of the smelter were used on roadways and alleys. Results indicated that >soil< was not the most significant source of >lead< exposure. Based on the data analysis, household dust contributed the most

to the blood >lead< levels of the study participants.

DESCRIPTOR(S)- byproducts; environmental health; hazardous wastes; >lead<; public health; smelters; toxic materials; waste disposal sites; Superfund; USA, >Illinois<, Granite City SECTIONAL CLASSIFICATION CODE- 6000, TOXICOLOGY AND HEALTH.

. Lake Michigan sediment contamination from 73 years of trap and skeet shooting - PAB 25-08 3563975 NDN- 090-0019-6267-0

Pott, D. B.; Shephard, B. K.; Modi, A. EDITOR- Christensen, E. R.; Edgington, D. N.; Giesy, J. P.

JOURNAL NAME- WATER SCI. TECHNOL. vol. 28, no. 8-9, pp. 383-386 1993 DOCUMENT TYPE- Book Monograph MONOGRAPH TITLE- CONTAMINATED AQUATIC SEDIMENTS. BIBLIOGRAPHIC LEVEL- Analytical, Monographic, Serial ISSN- 0273-1223 AUTHOR AFFILIATION- Harza Eng. Co., 233 S. Wacker Dr., Chicago, IL 60606, USA LITERARY INDICATOR(S)- K CONFERENCE DATE- 14-16 Jun 1993 CONFERENCE TITLE- 1. Int. Specialized Conf. on Contaminated Aquatic Sediments CONFERENCE LOCATION- Milwaukee, WI (USA) LANGUAGE- English

This study assessed sediment and >soil< contamination at the site of the former Lincoln Park Gun Club located on the shore of Lake Michigan in >Chicago<. Between 1918 and 1991 a shooting organization utilized the site for trap and skeet shooting, discharging tons of >lead< shot and clay targets to Lake Michigan. The targets were primarily dolomitic limestone with a petroleum pitch binder containing polynuclear aromatic hydrocarbons (PAH). This study measured vertical and lateral extent of >lead< and PAH contamination in site >soils<, near-shore sediments, lake water and >ground< water. Statistically significant correlations were found between the following pairs of Lake Michigan sediment analyses: TCLP >lead< and total >lead<; TCLP >lead< and supernatant >lead<; and supernatant >lead< and total >lead<. No significant correlations were found between any of the >lead< chemical analyses and >lead< shot counts. Microbial bioassays performed on sediment extracts found no measurable toxicity.

DESCRIPTOR(S)- aromatic hydrocarbons; groundwater contamination; lakes; >lead<; long-term records; man-induced effects; pollutants; pollution effects; polynuclear aromatic hydrocarbons; recreation; recreation; recreation areas; sediment pollution; sediments; water analysis; water pollution; USA, >Illinois<, Michigan L.; USA, Michigan L. IDENTIFIER(S)- trap and skeet shooting SECTIONAL CLASSIFICATION CODE- 2000, FRESHWATER POLLUTION.

. Nonpoint source pollution -- the >Illinois< approach - PAB 86-02 1130637 86-02854 NDN- 090-0011-9888-9

Werries, L. A.

JOURNAL NAME- PERSPECTIVES ON NONPOINT SOURCE POLLUTION: PROCEEDINGS OF A NATIONAL CONFERENCE -- KANSAS CITY, MISSOURI, MAY 19-22, 1985. 1985 PP. 9-10 AUTHOR AFFILIATION- Illinois Dep. Agric., Springfield, IL, USA PUBLISHER- U.S. EPA, OFFICE OF WATER REGULATIONS AND STANDARDS, WASHINGTON, DC (USA) CONFERENCE DATE- 19-22 May 1985 CONFERENCE TITLE- Perspectives on Nonpoint Source Pollution CONFERENCE LOCATION- Kansas City, MO (USA) ISSUE OF ORIGINATION- V17N2 LANGUAGE- ENGLISH

The 208 Water Quality Management Plan, completed in January 1979, designated the >Illinois< Department of Agriculture as the >lead< agency in

dealing with nonpoint source pollution. As major strides are made in reducing industrial and municipal waste pollution of our rivers, streams, and lakes, progress in controlling nonpoingt pollution appears to have stagnated and perhaps even been set back. Today >soil< erosion is worse than in the 1930's. However after 50 years of the conservation movement in this country, have made a difference. The >soil< erosion problem is not as severe as it would have been if left unattended. Several reasons account for the current depressing situation, including a lack of financial resources, existing farm crises, duoculture agriculture, and existing conservation philosophy.

DESCRIPTOR(S)- erosion; legislation; nonpoint pollution; pollution control; >soils<; water management; water pollution; >Illinois< SECTIONAL CLASSIFICATION CODE- 9000.

10. Relationship between traffic and >lead< concentration in roadside >soil< and plants. - PAB 77-02 NO-ACCESSION 76-01191 NDN-090-0004-0320-9

WHEELER, G. L.

JOURNAL NAME- National Conference on Environmental Engineering Research, Development and Design: Second Annual: Extended Abstracts. (n.p.), (1975?). 4 pp. 1975 AUTHOR AFFILIATION- Univ. of Illinois, Inst. for Environmental Studies, Urbana, IL 61801 LANGUAGE- ENGLISH

NO-ABSTRACT

DESCRIPTOR(S)- AUTOMOTIVE EXHAUST EMISSIONS; HIGHWAYS; >ILLINOIS<; >LEAD<; PLANTS; POLLUTANT DISPERSAL; >SOILS< IDENTIFIER(S)- ABSTRACT ONLY; U.S. HIGHWAY 45; URBANA.

11. >Lead< content of >soils< along Chicago's Eisenhower and Loop-terminal expressways. - PAB 77-02 NO-ACCESSION 74-03919 NDN-090-0003-2399-8

SALEEM, Z. A.

JOURNAL NAME- Archives of Environmental Contamination andToxicology, 1(3): 209-223, Oct. 1973.<CHICAGO EXPRESSWAYS 1973 AUTHOR AFFILIATION- Univ. of Chicago, Chicago Circle Campus, Dept. ofBiological Sciences, P.O. Box 4348, Chicago, IL 60680 LANGUAGE- ENGLISH

NO-ABSTRACT

DESCRIPTOR(S)- AUTOMOTIVE EXHAUST EMISSIONS; HIGHWAYS; >ILLINOIS<; >LEAD<; SEASONAL VARIATIONS; >SOIL< SAMPLING IDENTIFIER(S)- >CHICAGO< EXPRESSWAYS.

USG/NTIS

12. Public Health Assessment for Kerr-McGee Radiation Areas, West >Chicago<, Dupage County, >Illinois<, Region 5. Kress Creek: CERCLIS No. ILD980823991; Reed-Keppler Park: CERCLIS No. ILD980824007; Residental Areas: CERCLIS No. ILD980824015; Sewage Treatment Plant: CERCLIS No. ILD980824031. - USG 95-07 PB95-154803/XAB NDN- 059-0160-6084-7

NO-AUTHOR

14 Nov 94 243 page(s) DOCUMENT TYPE- Final rept. CORPORATE AUTHOR- Illinois State Dept. of Public Health, Springfield. CORPORATE AUTHOR CODE- 048535000 SPONSOR- Agency for Toxic Substances and Disease Registry, Atlanta, GA. NTIS PRICE(S)- PC A11; MF A03 SUPPLEMENTARY NOTE(S)- See also PB90-106089. Sponsored by Agency for Toxic Substances and Disease Registry, Atlanta, GA. ISSUE OF ORIGINATION- u9507

The Kerr-McGee radiation areas consist of the Kerr-McGee Facility (>Illinois< Department of Nuclear Safety jurisdiction) and National Priorities List (NPL) areas in and around West >Chicago<, >Illinois<: (1) Reed-Keppler Park, (2) the West >Chicago< Regional Wastewater Treatment Plant (WTP), (3) residential areas, (4) Kress Creek, and (5) the West Branch of the DuPage River (included with the WTP or Kress Creek areas for the NPL listings). Chemicals of concern include radon, radium, thorium, uranium, antimony, arsenic, barium, boron, cadmium, fluoride, >lead<, manganese, nickel, nitrate, selenium, silver, vanadium, zinc, and possibly chromium and polychlorinated biphenyls (PCBs). Exposure pathways include the inhalation of contaminated dust and gases; the ingestion of dust, groundwater, >soil<, sediments, and surface water; and dermal contact with dust, sediments, >soil<, and surface water.

DESCRIPTOR(S)- *Public health; *Risk assessment; *Health hazards; Environmental exposure pathway; Polychlorinated biphenyls; Radioisotopes; Metals; Nitrates; Fluorides; Boron; Dusts; Sediments; Soil contamination; Ground water; Surface waters; Land pollution; Water pollution; Illinois IDENTIFIER(S)- West Chicago(Illinois); DuPage County(Illinois) NTIS SUBJECT CATEGORY CODE(S)- 68G; 57U; 57V.

3. Public Health Assessment for U.S. Smelter and >Lead< Refinery, Inc. (a/k/a USS >Lead< Refinery Inc.) East >Chicago<, Lake County, Indiana, Region 5. CERCLIS No. IND047030226. - USG 94-24 PB94-210119/XAB NDN-059-0178-5369-4

NO-AUTHOR

24 Aug 94 38 page(s) DOCUMENT TYPE- Final rept. CORPORATE AUTHOR- Indiana State Dept. of Health, Indianapolis. CORPORATE AUTHOR CODE- 103503000 SPONSOR- Agency for Toxic Substances and Disease Registry, Atlanta, GA. NTIS PRICE(S)- PC A03; MF A01 SUPPLEMENTARY NOTE(S)- Sponsored by Agency for Toxic Substances and Disease Registry, Atlanta, GA. ISSUE OF ORIGINATION- u9424

The U.S. Smelter and >Lead< Refinery, Inc. (USS >Lead<), in East >Chicago<, Indiana, has been operating as a primary and secondary smelting facility since 1906. Wastes which were produced during smelting operations are calcium sulfate sludge, blast furnace flue-dust, baghouse bags, rubber and plastic battery casings, and waste slag. Limited sampling information is available, and indicates that on-site >soils< and wastes are contaminated with >lead< and other metals. Additional sampling off-site surface >soils< indicate that the contamination has spread off-site as far as one-half mile from the site. Surface water and sediment on-site has also become contaminated with >lead< and other metals, as well as waste oil. Based on the completed exposure pathways to >lead< through >soil< ingestion and dust inhalation, the Agency for Toxic Substances and Disease Registry concludes that contamination from the USS >Lead< site is a public health hazard.

DESCRIPTOR(S)- *Public health; *Risk assessment; *Health hazards; Environmental exposure pathway; Refineries; Smelters; Lead(Metal);

individually in paper copy or microfiche. REPORT NUMBER(S)- EPA/ROD/R05-90/163 NTIS PRICE(S)- PC A05; MF A02 SUPPLEMENTARY NOTE(S)- See also PB91-921509. ISSUE OF ORIGINATION- u9219

The U.S. DOI Sangamo/Crab Orchard NWR site is within the Crab Orchard National Wildlife Refuge, located near Carterville, >Illinois<. Within the 43,000-acre refuge, lakes and adjacent wetlands support recreational activities on the western portion of the refuge, while the eastern portion is used for manufacturing facilities. DOI leased portions of the refuge to manufacturers of PCB-containing transformers and capacitors, automobile parts, fiberglass boats, plated metal parts, and jet engine starters. Solid wastes generated from these industrial activities were disposed of in onsite landfills, while other liquid wastes may have been discharged into nearby surface waters and impoundments. The primary contaminants of concern affecting the >soil<, sediment, debris, and sludge are metals including cadmium, chromium, and >lead<. The selected remedial action for the site is included.

DESCRIPTOR(S)- *Superfund; *Remedial action; *Hazardous material; *Waste disposal; *Pollution control; Soil contamination; Sediments; Sludge disposal; Metals; Polychlorinated biphenyls; Illinois; Industrial wastes IDENTIFIER(S)- *Record of Decision; EPA region 5; Cleanup operations; Crab Orchard National Wildlife Refuge; Carterville(Illinois) NTIS SUBJECT CATEGORY CODE(S)- 68C; 43F; 91A.

16. Health Assessment for HOD Landfill, Antioch, Lake County, >Illinois<, Region 5. CERCLIS No. ILD980605836. - USG 90-00 PB90-105909 NDN-059-0141-8928-0

NO-AUTHOR

19 Jan 89 7p page(s) DOCUMENT TYPE- Preliminary rept. CORPORATE AUTHOR- Agency for Toxic Substances and Disease Registry, Atlanta, GA. CORPORATE AUTHOR CODE- 092477000 NTIS PRICE(S)- PC A02; MF A01 ISSUE OF ORIGINATION- u9001

The HOD Landfill site is listed on the National Priorities List. The 80-acre site, of which 50 acres have been landfilled, operated as an industrial waste landfill from 1963-1983. The site presently is closed pending site expansion litigation. The environmental contamination on-site consists of cadmium (8 ppb), >lead< (6 ppb), zinc (1,860 ppb), manganese (230 ppb), 1,2-dichloroethylene (71 ppb), 1,1-dichloroethylene (7 ppb), bis(2-ethylhexyl)phthalate (4,100 ppb), and benzene (8 ppb) in groundwater. The environmental contamination off-site consists of chromium (12 ppb), thallium, manganese (25 ppb), and arsenic in groundwater from residential and drinking water wells. The site is considered to be of potential public health concern because of the risk to human health caused by the possibility of exposure to hazardous substances via contaminated groundwater. Until more is known about the potential and possible extent of contamination in surface >soil<, sediment, surface water, and air, these pathways should be considered to be of public health concern also.

DESCRIPTOR(S)- *Water pollution; *Public health; *Environmental surveys; Aromatic polycyclic hydrocarbons; Metals; Industrial wastes; Earth fills; Exposure; Phthalates; Benzenes IDENTIFIER(S)- *Risk assessment; Antioch(Illinois); Environmental monitoring NTIS SUBJECT CATEGORY CODE(S)- 68G; 57U.

17. Health Assessment for Johns-Manville Disposal Area, Waukegan, >Illinois<,

Metals; Waste oils; Soil contamination; Sediments; Land pollution; Surface waters; Water pollution; Ambient air quality; Indiana IDENTIFIER(S)- East Chicago(Indiana); Lake County(Indiana) NTIS SUBJECT CATEGORY CODE(S)- 68G; 57U.

4. Toxicity Testing of >Soil< Samples from Joliet Army Ammunition Plant, >Illinois<. - USG 94-00 AD-A279 091/3 NDN- 059-0176-1584-9

Phillips, C. T.; Checkai, R. T.; Chester, N. A.; Wentsel, R. S.; Major, M. A.

Feb 94 74p page(s) DOCUMENT TYPE- Final rept. May 92-Jan 93. CORPORATE AUTHOR- Edgewood Research, Development and Engineering Center, Aberdeen Proving Ground, MD. CORPORATE AUTHOR CODE- 105802000 425909 REPORT NUMBER(S)- ERDEC-TR-137 NTIS PRICE(S)- PC A04; MF A01 SUPPLEMENTARY NOTE(S)- Prepared in collaboration with GEO-CENTERS, Inc., Fort Washington, MD 20744. ISSUE OF ORIGINATION- u9417

Environmental toxicity testing and >soil< chemical analyses were performed as part of an ecological risk assessment of the Joliet Army Ammunition Plant (JAAP), Joliet, IL. Test >soils< were collected from six sites at the plant (a load and pack area, two open burning areas, a >lead< azide area, a 2,4,6-trinitrotoluene (TNT) manufacturing site, and an evaporation bed). Control >soil< samples were collected from an adjacent area. >Soil< toxicity was determined using early seedling growth and vigor tests, earthworm survival and growth tests, and the Microtox assays. Relative toxicity of >soils< was determined within each area based on statistical significance (p = 0.05) of plant and earthworm growth and survival, and Microtox EC 50. Samples were designated as having high, moderate, or no toxicity. >Soil< samples that had significant toxicity according to at least one test and representative samples showing no toxicity were analyzed for munitions by High Performance Liquid Chromatography. Chemical residues found in >soils< included TNT, 1,3,5-trinitrobenzene (TNB), 2,4-dinitrotoluene (2,4-DNT), 2,6-DNT, 2-amino-4,6-DNT, 4-amino-2,6-DNT, cyclotrimethylenetrinitramine (RDX), and cyclotetramethylenetetranitramine (HMX). All >soils< with no significant toxicity were void of these chemicals. Microtox, Phytotoxicity, Earthworm survival, Munitions, Seedling growth, Environmental toxicity, Regressions, Terrestrial plants, Ecological risk assessment.

DESCRIPTOR(S)- *Ammunition; *Toxicity; Army; Azides; Chemicals; Combustion; Dnt; Evaporation; Hmx; Lead azides; Liquid chromatography; Manufacturing; Phytotoxicity; Rdx; Residues; Risk; Sites; Tnt; Test and evaluation; Seeds; Worms; Environmental protection IDENTIFIER(S)- *Soil contamination NTIS SUBJECT CATEGORY CODE(S)- 57Y; 68C; 79A.

5. Superfund Record of Decision (EPA Region 5): U.S. DOI Sangamo/Crab Orchard National Wildlife Refuge, Carterville, IL. (First Remedial Action), March 1990. - USG 92-00 PB92-964125 NDN- 059-0161-5064-0

NO-AUTHOR

30 Mar 90 97p page(s) CORPORATE AUTHOR- Environmental Protection Agency, Washington, DC. Office of Emergency and Remedial Response. CORPORATE AUTHOR CODE- 031287614 AVAILABILITY NOTE- Available on Standing Order, deposit account required for all RODS is $700 for U.S., Canada, and Mexico; all others $1,400. Deposit required for each region, $200, U.S., Canada, and Mexico; for all others $400. Also available

Region 5. CERCLIS No. ILD005443544. - USG 90-00 PB90-105891 NDN-059-0141-8927-8

NO-AUTHOR

11 Apr 88 15p page(s) DOCUMENT TYPE- Final rept. CORPORATE AUTHOR- Agency for Toxic Substances and Disease Registry, Atlanta, GA. CORPORATE AUTHOR CODE- 092477000 NTIS PRICE(S)- PC A03; MF A01 ISSUE OF ORIGINATION- u9001

The Johns-Manville National Priorities List site is located approximately 37 miles north of >Chicago<, in Waukegan, Lake County, >Illinois<. Waste materials consisting of asbestos, >lead<, chromium, thiram, and xylene have been deposited at the disposal site. Asbestos is found in some topsoil samples about the disposal site and has been found in air samples taken in a study conducted by EPA in 1982. The airborne asbestos found in air samples on-site and off-site are the major public health concern. Friable materials were found in the Agency for Toxic Substances and Disease Registry's visit to the site. These materials were scattered about the site and some had been blown onto the beach. The site is accessible to the public from the beach (open end) and poses a potential public health risk to trespassers and workers on-site from inhalation of airborne asbestos fibers, and possibly from ingestion and direct dermal contact of contaminated >soils<.

DESCRIPTOR(S)- *Public health; *Environmental surveys; *Air pollution; Metals; Asbestos; Exposure; Industrial wastes IDENTIFIER(S)- *Risk assessment; *Soil contamination; Waukegan(Illinois); Environmental monitoring NTIS SUBJECT CATEGORY CODE(S)- 68G; 57U.

8. Gasoline >Lead< in Urban and Rural Play Areas. - USG 87-00 DE86014594 NDN- 059-0122-8528-8

LaBelle, S. J.

1986 24p page(s) CORPORATE AUTHOR- Argonne National Lab., IL. Center for Transportation Research. CORPORATE AUTHOR CODE- 001960020 9521038 SPONSOR- Department of Energy, Washington, DC. CONTRACT/GRANT NUMBER- Contract W-31-109-ENG-38 REPORT NUMBER(S)- CONF-8605179-1 NTIS PRICE(S)- PC A02; MF A01 SUPPLEMENTARY NOTE(S)- World conference on transport research, Vancouver, Canada, 12 May 1986. ISSUE OF ORIGINATION- u8706; n1100

Leaded gasoline used as fuel for automobiles and trucks has been implicated as a source of >lead< that eventually reaches small children. >Lead< has deleterious effects on cognitive development of pre-school age children. Although allowable levels of >lead< in gasoline were reduced 90% on January 1, 1986, in the US, >lead< previously accumulated in >soil< will remain. Measurements of surface >soil< >lead< in >Illinois< play areas revealed higher accumulations in center city and suburban areas than in much less densely settled urban and rural areas outside the >Chicago< area (downstate >Illinois<). The results of the >soil< analysis in this study do not address the larger question of pathways for child-lead ingestion and consequent health effects. However, based on results of the study in the >Chicago< area, other high traffic suburban areas may wish to consider review of their >soils<. Risk assessment has not been undertaken, but may be the next step in determining the extent of hazard posed to small children from surface accumulations of >lead<. (ERA citation 11:052042)

DESCRIPTOR(S)- Lead; Biological Accumulation; *Children; Ecological Concentration; *Environmental Exposure Pathway; *Health Hazards; Illinois; Juveniles; Recreational Areas; *Soils; Urban Areas
IDENTIFIER(S)- ERDA/510200; ERDA/500200; ERDA/560306; *Lead(Metal); Sources NTIS SUBJECT CATEGORY CODE(S)- 68; 68G; 57Y.

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CONF-8605179--1

DE86 014594

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Presented at 4th World Conference on Transport Research
Vancouver, B.C.

May 12-15, 1986

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GASOLINE LEAD IN URBAN AND RURAL PLAY AREAS

by

Sarah J. LaBelle*

ABSTRACT

Leaded gasoline used as fuel for automobiles and trucks has been implicated as a source of lead that eventually reaches small children. Lead has deleterious effects on cognitive development of pre-school age children. Although allowable levels of lead in gasoline were reduced 90% on January 1, 1986 in the U.S., lead previously accumulated in soil will remain. Measurements of surface soil lead in Illinois play areas revealed higher accumulations in center city and suburban areas than in much less densely settled urban and rural areas outside the Chicago area (downstate Illinois).

The results of the soil analysis in this study do not address the larger question of pathways for child-lead ingestion and consequent health effects. However, based on results of the study in the Chicago area, other high traffic suburban areas may wish to consider review of their soils. Risk assessment has not been undertaken, but may be the next step in determining the extent of hazard posed to small children from surface accumulations of lead.

1 INTRODUCTION

1.1 THE LEAD PROBLEM

The human body has no need for lead, at any concentration. Lead is removed from the body when it is encountered in the environment, but only at very low levels of lead. Children are particularly unable to screen out lead that is ingested or inhaled. However, there are many sources of lead in the environment because lead is used in many industrial applications. It has long been part of pigments in paint, an octane enhancer for gasoline, part of solder for tin cans, and parts of automotive batteries.

Fatalities from lead exposure have accompanied industrial use of lead. At lower exposure levels, health effects include anemia and kidney

*Work supported by the U.S. Department of Energy under Contract W-31-109-ENG-38. Views presented are those of the author and do not necessarily reflect those of the Department of Energy, or Argonne National Laboratory.

damage. There is extensive evidence of nervous system damage in children with apparently low levels of lead in their blood: evidence is in the form of diminished cognitive abilities. Each new study documents measurable health effects lower levels of lead in the blood. Many major efforts have been undertaken to eliminate environmental sources of lead. Work place safety rules have drastically reduced exposure for workers, and for the families of workers. Other additives now enhance the octane of gasoline. Solders used in tin cans use no lead. Since the mid-1970s, paint for interior surfaces may have no more than 0.06% lead in it. In spite of all these improvements, unexpectedly high levels of lead are still found in young children's blood. The importance of soil as part of the pathway of lead to young children has risen, as health officials seek to explain the high lead levels.[1]

1.2 STUDY OF ILLINOIS SOILS IN PLAY AREAS

A joint study of lead in park soils throughout Illinois was undertaken by researchers at Argonne National Lab, (under sponsorship by the U.S. Department of Energy) and staff of the Illinois Department of Public Health and the Chicago Department of Health, as well as several suburban health departments. Participants wanted to learn the levels of lead in surface soils, in locations accessible to small children, under 7 years of age. The goal of the study was to learn the concentrations of lead in surface soil as related to the volume of traffic on nearby roads, as a stepping stone in the larger picture of estimating exposure levels of small children. The study was timed to coincide with the onset of the U.S. reduction of lead in gasoline,[2] which should nearly halt the increase in surface lead concentrations due to accumulation of airborne emissions. Although lead emissions will be substantially reduced as a result of both the phasedown and the switch to

unleaded fuels, lead presently in surface soils will stay there, due to lead's relative immobility in soils.[3]

Soil lead concentrations were determined using acid digestion of ground and sieved soil, analyzed via flame atomic absorption spectrophotometry. Samples were collected following a protocol developed at Argonne Lab.

No state has yet set standards indicating a safe or allowable level of lead in surface soil, although Minnesota is working toward such a goal: the legislature has requested the state pollution control agency develop a standard by January 1, 1988.[4] The Illinois study is not designed for setting a standard, but to provide observations of soil lead, collected consistently across the state, with associated data on automobile traffic.

No other study has included detailed analysis of suburban soils. The focus in the past has been on central cities[5,6,7,8,9] or, conversely, on crop land near major Interstate freeways.[10,11,12,13] In those studies, higher central city soil lead levels were related to the total lead emissions in central cities; rural soil lead levels were related to distance from one road. Prior research has not related observed surface soil lead levels to distance from, or traffic on, several nearby roads, nor distinguished the effect of traffic volume from that of traffic density. It was believed by public health specialists that the highest levels of exposure to lead would be exclusively in central cities because of higher traffic volumes there.[14] The Chicago area's suburbs are noted for high traffic streets; this is true for the suburbs of most of the very large metropolitan areas in the U.S. The traffic levels in many of Chicago's suburbs are higher than those found in the downtowns of many large cities.[15]

We expected the study to reveal patterns of lead concentration in surface soils, as related to traffic volumes, distance from the road, age of

the park, and other physical features of the park; the patterns may prove useful in guiding more widespread soil testing for lead. It is not expected that we would be able to determine a safe level of lead in soil as a result of this study. Further research and policy analysis are required before such a decision could be made.

2 TRANSPORTATION, LEAD, AND CHILDREN

The pathway from lead in gasoline to lead in children's blood is complex, both because of topographic variations and climate variations, as well as relationship with traffic. The pathway for exposure has been determined by medical researchers, and public health specialists.[16,17,18] The likelihood of exposure and the number of children likely to be exposed to lead in soil in public parks, as well as the amount of exposure are yet to be quantitatively specified. The major effects are discussed here.

2.1 ONE EFFECT OF CHILD'S PLAY

Children are the population of special concern from exposure to lead. Lead is toxic to adults as well as to children, but the pathways to adults are fewer than to children. The primary reason is the behavior by children referred to as "mouthing behavior". As you can recall from your observations of any small child, the child's fingers, toys, many other objects are put into the mouth frequently. Children at some ages eat dirt directly. These are not behaviors of adults. This constitutes an extra and significant pathway for lead-contaminated soils to reach small children.

Children are of further concern because of their lower level of protection against a given amount of lead exposure. Given exposure to one gram of soil containing 100 ug/g, an adult will absorb approximately 8%, or 8 ug/g of

lead, while a child will absorb approximate 6 times that much, 50 ug/g of lead.[19] As the child also has a lower volume of blood, the concentration in the blood is sharply higher in the child than in the adult. The development of the nervous system is influenced by the presence of lead in the blood. It appears that lead replaces calcium or iron in the blood, especially affecting the central nervous system development in deleterious fashion.[20,21] Children with poor nutrition are therefore at even greater risk of damage from exposure to lead. Calcium deficiency is common in lower income children, while iron deficiency is common in almost all children. Lower income children under the age of 7 living in areas with high traffic are at higher risk than other classes of children. It has further been suggested that black children may be more susceptible to damage of lead than are white children.[22]

The U.S. Environmental Protection Agency (EPA) has estimated that in 1986, 176,000 children over 6 months old would have blood lead levels exceeding the standard set by the Centers for Disease Control (CDC) (25 ug of Pb/dl of blood).[2] These children are susceptible to the health effects described above, including diminished cognitive abilities. In the city of Chicago alone, over 1600 children were found, in 1985, to have elevated blood lead levels, above the previous CDC standard of 30 ug of Pb/dl of blood.

The serious nature of the effects of lead on children, at such critical stages of their intellectual development, makes an almost overwhelming case to remove lead from the environment. Removal of lead from many products has been beneficial, as evidenced by falling concentrations of lead in air. Lead will continue to be controlled throughout industry, from paint manufacturers to gasoline refiners; however, the residuals of past practice are still with us, leaving us with a measurement and, perhaps, a clean-up problem in the future.

2.2 "ETHYL" GASOLINE

Once the internal combustion engine automobile took off as the most popular form of motorized travel, the demand for high performance fuel soon followed. Early engines required high octane fuel to burn smoothly and eliminate knocking in the engine. Knocking affects driveability of vehicles in the short-term. To answer that need, General Motors researchers discovered that tetraethyl lead added to gasoline greatly enhanced the octane level of the fuel end opened the door to development of higher compression engines. (Octane refers to the ability of the fuel to ignite in a predictable fashion). To keep the lead from building up in the engine, bromine and chlorine compounds were added to scavenge lead out of the engine and assure its passage into the environment. A certain amount of lead build-up was tolerated in the engine, and even needed for lubrication, but is no longer needed since the advent of hardened valve seats.[24]

The discovery of lead's octane-enhancing properties in the early 1920s was a boon to the fuel industry, but the toxicity of lead was being rediscovered at the same time, in lead mines and battery plants. An alarm was raised even at that time about the use of lead in gasoline, as documented in a detailed review of the introduction of leaded gasoline in the U.S.[25] There was extensive debate that lead would be too hazardous for widespread use, according to that review. The final judgment on lead, at least by the auto industry in 1923, was that the toxic effects of carbon monoxide, also a by-product of combustion engines, were greater than those of lead; therefore, lead toxicity was not a serious problem. The federal government agreed with the auto industry. Thus the search for alternatives to lead was laid aside for many years, as this judgment valuing lead's benefits over its costs was institutionalized. Because the public was learning about the very serious

effects of lead on miners, the industry coined the term ethyl gasoline, rather than leaded gasoline. The marketing of the fuel promoted the advantages of smoother burning for engines requiring extremely high octane (as high as 95 compared to the 87 - 91 now required).

This inauspicious beginning was all but forgotten until the late 1970's, when mounting evidence of pervasive lead in the environment was pointing back to the automobile as a significant source of lead. In the 1970's, devices to control pollutants from internal combustion engines, including the noxious carbon monoxide, had the characteristic that lead particles in the exhaust would disable the devices. This requirement spurred refiners to develop fuels using other octane enhancers than lead. The decision to develop unleaded fuels was at first strictly based on the inability of a catalytic convertor to tolerate any kind of particles in the exhaust. This was somewhat of a serendipitous event, given the growing body of knowledge implicating leaded gasoline as a source of environmental lead exposure.

2.3 URBAN, SUBURBAN AND RURAL TRAVEL

The other piece in the puzzle of children's exposure to lead from combustion of leaded gasoline is the amount of traffic near the children's homes and schools. Historically, public health specialists have zeroed in on the central cities of urban areas as the best place to study children and their environments, and to break the pathway of lead from the environment to the child. Efforts focused on the central cities were quite sensible, since lead-intoxicated children were frequently found in central cities. Several major cities began screening programs after a simple blood test was developed. Many cases of lead intoxication were discovered in this fashion, further

confirming the importance of central cities. Other less populated areas also had screening programs, but on a much smaller scale.[26] The biggest problems were clearly likely to happen in urban areas, because industrial sources and paint sources are added to possible traffic-related exposures.

Traffic in suburban areas, particularly very large metropolitan areas, can be as high as that in urban areas, however. In fact, the only substantial difference between the suburban and central city traffic situations in Chicago is the density of traffic, or vehicle-miles of travel per unit area. The Chicago area is deemed an excellent subject for study, as its suburban counties experience very high traffic, including many arterials with over 30,000 vehicles per day, and freeways with 40,000 vehicles per day and up. As in the central city of Chicago, parks are distributed throughout the region, near low-traffic as well as high-traffic roads.

Rural locations are distinctly different from urban areas in the level of traffic. Both volume of traffic (average daily traffic) and the density (vehicle-miles of travel per square mile) show a sharply lower profile than in more densely settled areas. Small cities throughout the downstate portion of Illinois (all of Illinois beyond the six-county Chicago area), are characterized by low density development. Some downstate towns have been active much longer than some Chicago area suburbs have been developed, perhaps influencing lead accumulations.

The relative accumulation of lead along various roadway types, assumed proportional to lead emissions on the roadway,[27,28] is displayed in Figures 1 and 2. In the first figure, the effect of traffic volumes and speed of traffic on lead production by a road carrying all lead-gasoline-fueled vehicles are shown. A reference situation of 2 g/gal of lead in the gasoline is assumed as part of the calculation to show the relative total lead produc-

tion along different roads. The calculation assumes an average speed approprpiate to each arterial or freeway traffic volume, ranging from 12.5 to 45 mph (20-72 km/h), and fuel use equations based on the assumed speed and traffic flow conditions. It is quite clear from this figure that volume has the dominant effect, rather than speed. At volumes that could occur both on very busy arterials and moderately busy freeways (30,000 to 50,000 cars per day), average speed does have a noticeable effect on total lead emissions. However, even the improvement from steady-speed operation does not compensate for the effect of volume. That is, a 40,000 vehicles/day road produces more lead than a 20,000 vehicles/day road regardless of average speed.

The second figure (Figure 2) provides an index of the effect of traffic volumes growing over time. The bars reflect the changing amount of lead per gallon of gasoline over time, the share of fuel that was leaded, and vehicle-miles of travel. Half of the lead deposited since 1924 was deposited after 1964.[29]

3 A PATTERN OF LEAD IN SURFACE SOILS IN ILLINOIS PLAY AREAS

The study undertaken in Illinois will help to determine patterns of lead in typical play areas, a difficult objective. There are very many factors influencing surface lead concentrations. The essence of our observations are presented in this section. As indicated in the introduction, the present study does not delve into all of the possible issues and does not begin to address the issue of an exposure model to small children. As such, the results presented here are somewhat limited relative to larger issue of the child-lead problem.

3.1 TYPICAL PLAY AREAS

Over 150 parks were sampled statewide for this study. Most sampled parks throughout the state are located near roads with less than 5,000 vehicles/day on them. This is the dominant pattern for downstate parks, very prevalent for parks in the City of Chicago, and least prevalent for the parks we sampled in the suburbs. It should be kept in mind that ours were not randomly selected parks; parks were selected because of the proximity to roads, use of soil in the play area, and inclusion of a play area for small children.

The layout of parks varied across the state. In some cases, the children's play area was located in the center of the park, far from any border street. In others, by contrast, the small children's play area was adjacent to a major arterial street bordering the park. Some of our locations were day care centers, school yards, or state parks; we also included a couple of roadside parks in rural areas. The day care centers were systematically different from the parks, in that there was a building 20-50 ft (6-15 m) from the play area in all cases. It was rare for the play area in a park to be located near (less than 2 m away from) a field house or any other type of structure. School yards were similar to day care centers, in that there was usually a building between the play area and the road.

These differences in the layout of the park clearly will yield differences in the surface soil concentrations. Distance from roads is anticipated to have a major effect on accumulations of lead in surface soils. It has also been observed that lead concentrations are higher in soil very near a building; this is caused by the washdown during rainfall of particles that have accumulated on the building prior to the rain.

Other features were also anticipated to influence lead concentration, such as sampling within the dripline of a tree, or near any other source of lead. We tried to stay away from other sources of lead, since our goal was to find gasoline lead. This goal was largely met, in that only one site was closer than one mile to an industrial source of lead, and that particular site showed very little evidence of accumulation. We also have a limited number of samples within two meters of any building, and a small number that were under the dripline of the tree. Surface accumulations under the tree could be expected to be higher than beyond the tree, as the leaves collect particles, including lead-bearing particles, from the air that are then deposited on the soil at the time of leaf fall in autumn.

Vegetation on the soil surface may also play a role in determining the surface soil concentration of lead. This effect is not as clear-cut. Vegetation covers the soil surface, inhibiting direct contact of airborne lead on the soil, but vegetation has a greater surface itself to catch lead, which then can be washed into the soil by rain.

The level of traffic on perimeter streets for each sampling location is shown in Figure 3.

3.2 CENTER CITY, SUBURBAN AND DOWNSTATE TRENDS

We were interested in observing whether parks in suburban areas were more similar to those in the center city or in downstate communities. In our study, suburban lead concentrations were between that of center city and downstate, but generally closer to the results of the center city than those of the downstate locations. The reasons for this pattern are not entirely clear. Density of traffic activity appears to be important; however, the underlying distribution of lead in the soil (measured at 10 to 12 in or 25-30

cm below soil surface), appears to play an important role in determining surface level. The mechanisms relating surface to depth measurements are not clear at this time.

The differing distributions of the surface samples concentration of lead is highlighted in Figure 4. The figure shows that each area shared the same right-skewed distribution of concentrations, and that the peak lead concentration values in the city and the suburbs were both quite high (over 1000 ppm). The center city parks had the highest values on average, closely followed by the suburban parks. The first research question is answered: the accumulation of lead in high traffic suburban parks is higher than in rural locations, but not quite as high as in the central city. All areas had average surface values higher than the approximate U.S. natural background level of 16 ppm lead.[3] There is a significant level of accumulation of lead in suburban soils, about equal to the accumulation in center city soils, although absolute concentrations in center city soils were generally higher than those in suburban soils for reasons not yet fully understood. Whether the accumulation at <u>any</u> level has substantial effects on small children remains to be determined.

3.3 RELATIONSHIPS BETWEEN TRAFFIC AND SOIL LEAD ACCUMULATION

Our expectation before the start of the study was that distance from roads would have a major positive effect on lead concentrations, and that the volume of traffic on nearby roads also would have a positive effect, but probably smaller than the first cause. As shown in Figures 5 and 6 these expectations were born out. However, the standard deviation on each of the means is extremely large. Further examination of the difference between the means have indicated that only a few of these differences are statistically

significant. Most surprising is that the highest-traffic roads, at over 50,000 vehicles/day, are not associated with the highest surface lead levels, apparently due to different dispersion patterns near those roads.

4 STANDARDS FOR LEAD IN SOIL

Although there have been many standards set for the usage of lead in various industries, there have not yet been any national standards for lead in soil, nor any state standards. The standard for lead in gasoline has recently been lowered, which should end soil accumulation of lead. The lead already in the soil will not disappear without some action, however, so states are now grappling with the issue of a safe level of lead in soil.

4.1 U.S. EPA'S REGULATION OF LEAD IN GASOLINE

The Environmental Protection Agency in the U.S. became aware of the connection between gasoline lead and lead in the blood of small children in the middle to late 1970s. They were already aware of the need to remove lead from gasoline, because the pollution control devices needed for reducing emissions of carbon monoxide, hydrocarbons, and oxides of nitrogen could not tolerate lead in the exhaust. In 1974, unleaded gasoline was introduced in gasoline service stations throughout the United States.

Further awareness by the EPA of the seriousness of the health effects of lead, and the growing evidence connecting gasoline lead to lead in the blood of small children, led EPA to promulgate a regulation limiting the amount of lead allowed in leaded gasoline.[2] The U.S. began a phasedown of allowable lead in leaded gasoline, from 1.1 g/gal to 0.5 g/gal on July 1, 1985. This was further reduced to 0.1 g/leaded gal on January 1, 1986, constituting a 90% reduction in allowable lead in gasoline. The level of 1.1

was set in 1982, a reduction from the days when two to three grams of lead per gallon had been common. The combination of the increased usage of unleaded gasoline, and the 90% reduction in the allowable lead in leaded gasoline, has essentially removed gasoline as a source airborne lead within the U.S. (although EPA is still considering a complete ban on the use of added lead in gasoline). The problem then facing the U.S. is how to deal with the lead that has already been dispersed in the environment.

4.2 STATE STANDARDS FOR SOIL

States are actively considering the need for standards for lead in soil. In Illinois, when a child has been found to be intoxicated with lead (at a level above the Centers for Disease Control standard now at 25 µg/dl), and the soil in the child's yard is found to be above 200 ppm, that soil must be removed, and replaced with less toxic soil or another material. This regulation is very recent and has been invoked only a few times.[30]

As mentioned in the introduction, the state of Minnesota is actively developing such a standard, expecting to collect thousands of soil samples statewide within the next year. Wisconsin is also actively considering this issue, and analyzing soil samples within the state.

The states will need to establish the exposure model to determine their standards. But considerable activity will be taking place in the near term, to determine whether there is a problem, and if so what are the best actions to take to deal with the problem.

5 WHAT IS NEXT?

Although this study has produced invaluable information on soil lead levels throughout Illinois, many questions are left unanswered. This study however, provides the basis for raising those questions, moving on to the important questions of exposure.

5.1 DETERMINING THE HEALTH RISKS OF GASOLINE LEAD

Once it is established that there is sufficient lead in soil to reach small children, the larger and more important question must be answered. What is the risk due to this source for small children? It must be determined how often a child will be in the play area, how long and to how many other exposure sources will the child be exposed that day. It must also be decided what is a reasonable estimate of ingested soil for a child on a typical day, in a typical park. Some studies have suggested that a child exposed to 60-100 ug/g lead via ingestion could expect blood lead in the range from 17-57 ug/dl; ingestion of 50 mg of soil during play due to mouthing behavior is not unexpected.[8] This type of relationship must be melded with data on frequency and duration of use of parks, as part of the research supporting the standard-setting process.

5.2 IMPLICATIONS FOR OTHER AREAS

The pattern of higher accumulations in suburban locations in Illinois may suggest that other high-traffic suburban areas warrant a survey of soils in play areas. Of course, this suggestion is made without placing a value on the importance of the levels observed in Illinois, because risk assessment has not yet been done. Other states may find it of value to survey their states in this fashion, or in the more detailed method being used by Minnesota. The

relationships seen in the Illinois study are not unexpected. Relatively high traffic roads, above 20,000 vehicle/day, definitely have generated greater lead burdens in nearby soils, than did local roads of much lower traffic levels. There appears to be a strong areawide component, however, to the surface lead concentrations. Understanding of these relationships will be enhanced by better knowledge of the interconnection among surface and subsurface soils relative to lead concentration.

ACKNOWLEDGEMENTS

This report is based on efforts by a large team of individuals in Illinois, who have funded and carried out the research described herein. The authors are indebted to staff in the public health departments of Chicago, Illinois, and nine suburban governments, and to lead and soil specialists at Argonne National Laboratory.

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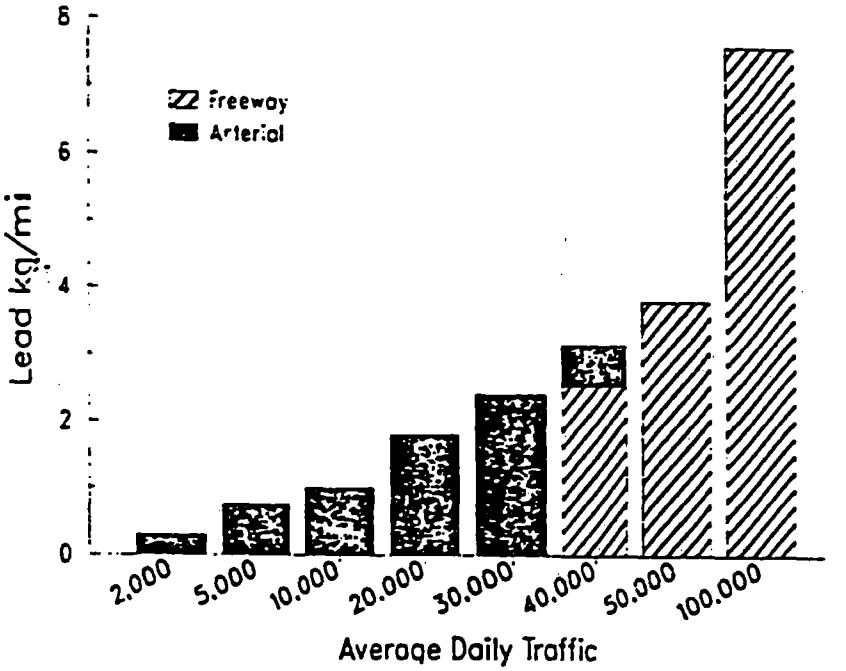

FIGURE 1 Relative Lead Emissions on Urban Roads

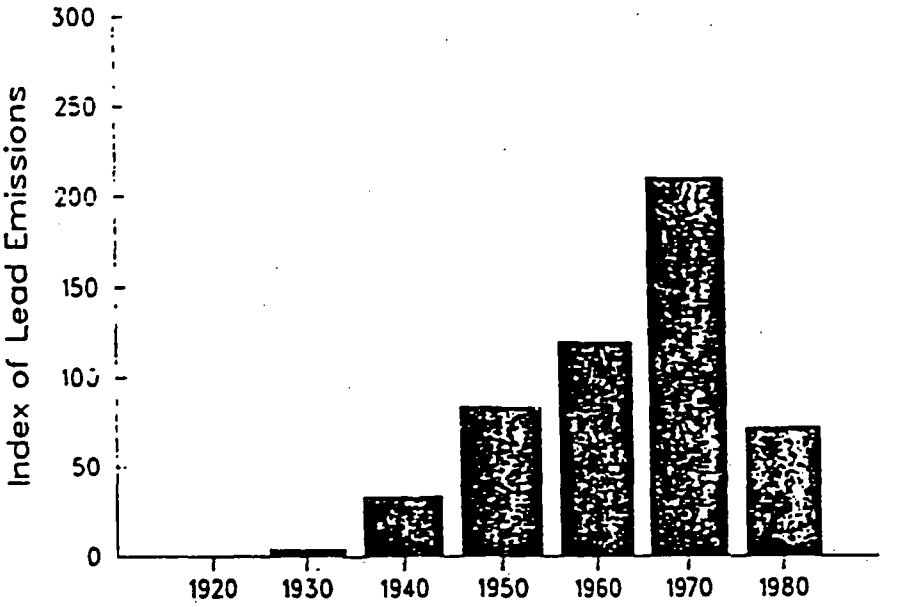

FIGURE 2 Relative Emissions of Lead from Gasoline-Fueled Vehicles in the USA 1920-1980

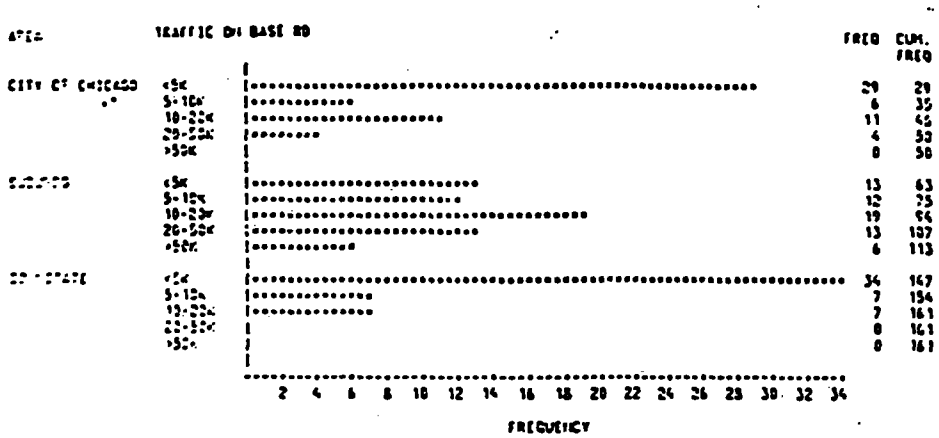

FIGURE 3 Number of Parks in Illinois Study by Traffic on Adjacent Road in Illinois

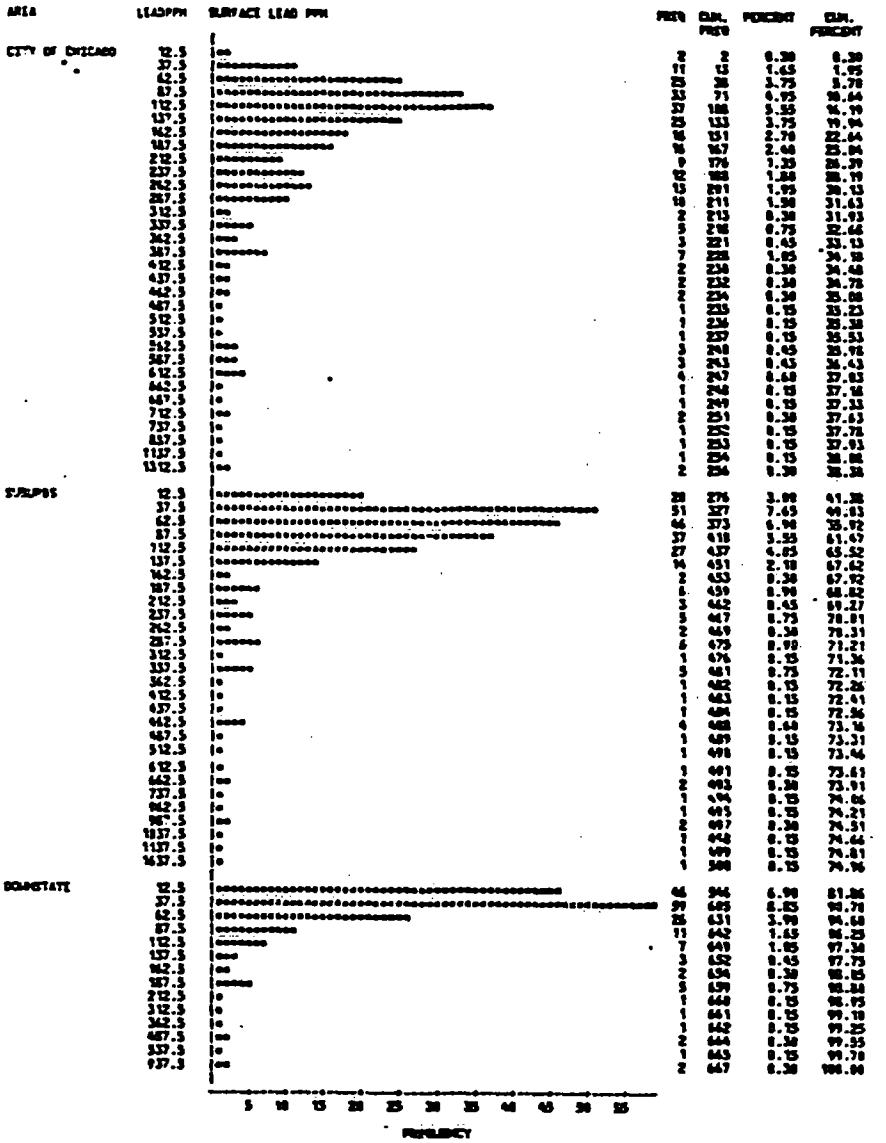

FIGURE 4 Distribution of Lead in Surface Soils in Illinois Play Areas

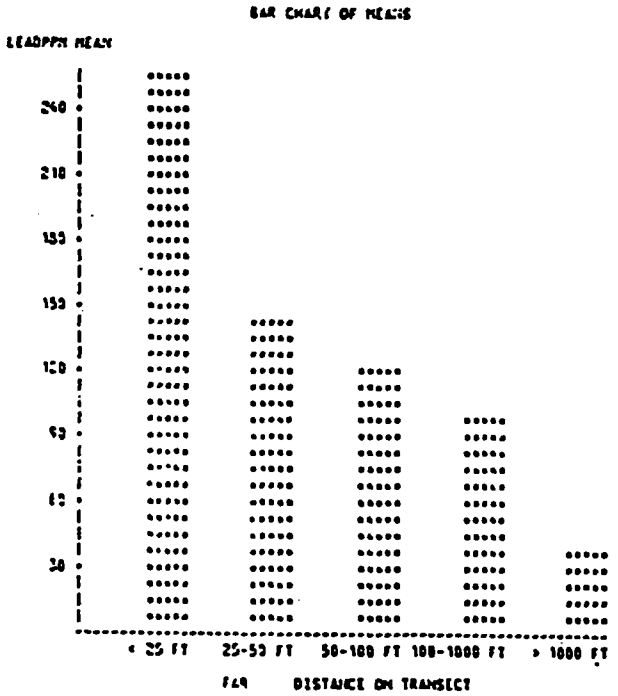

FIGURE 5 Mean Lead in Surface Soil by Distance from One Perimeter Road

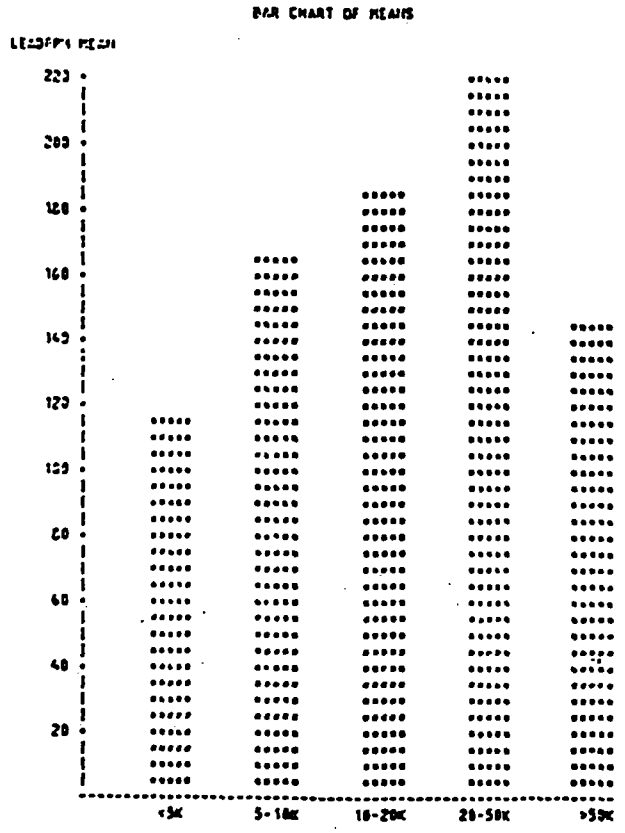

FIGURE 6 Mean Lead in Surface Soil by Traffic Volume on One Perimeter Road

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Manuscript received October 3, 1972; accepted October 20, 1972

LEAD CONTENT OF SOILS ALONG CHICAGO'S EISENHOWER AND LOOP-TERMINAL EXPRESSWAYS

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The lead content of soils along Chicago's two expressways, the Chicago Loop-terminal Expressway and the Eisenhower Expressway, have been determined in various seasons of the year and at various distances from the roadway. The concentration of lead in soils along the Chicago Loop-terminal Expressway and adjoining city streets show positive correlation (correlation coefficient = 0.988) with the average traffic volume near the sampling sites during the same season. The levels of lead in soils along the Eisenhower Expressway, at the same site, vary with the season; the lead levels are the least during fall and winter and they increase during spring and attain peak values during summer. This seasonal variation in the lead levels is similar to the seasonal variations in average monthly traffic volumes on the expressway. The soil contains as much as 7,600 parts per million of lead (micrograms per gram of dried soil) up to 45 feet and 900 parts per million up to 150 feet from the Eisenhower Expressway. There is a need to investigate the contamination of human beings that live or work in buildings within these distances from the expressways and wider buffer zones need to be provided along future expressways.

Lead is a natural, but minor, constituent of soil, being present at an average of 20 parts per million (ppm, 1 microgram per gram) (Swaine 1955). However, soils of agricultural land contaminated by pesticides, of urban areas contaminated with paint from demolished buildings and from automobile exhaust, and of industrial and mining areas in which wastes are dumped can have higher contents of lead. In such areas, the greatest contamination is found in the surface soil and the lead level decreases with depth (Wright *et al.* 1955). Urban soils in old residential sections where lead paints have been used contain up to 360 ppm lead; the soils in industrial sites, such as smelters, contain up to several thousand ppm lead (Motto 1970).

Lead deposited from automobile exhaust is widely distributed. As early as 1934, the dirt from streets of the city of New York contained 1,190 to 1,760 ppm lead (Haar, 1970). The vegetation growing five feet away from an expressway contained from 100 to

Archives of Environmental Contamination and Toxicology,
Vol. 1, No. 3, 1973, © 1973 by
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770 ppm lead (Cannon and Bowles 1962). The contamination decreased with distance from the highway, being 50 ppm at 500 feet and 5 ppm at 1,000 feet from the road. The ash from grass at the intersection of two highways contained 500 ppm lead in case of a moderately travelled road and 3,000 ppm in case of heavily travelled road (Cannon and Bowles 1962).

Several factors affect the levels of lead contamination of soils by automobiles along the expressway. These are: traffic volume, prevailing wind direction, weather conditions, type of soil, and vegetation (Cannon and Bowles 1962, Everett *et al.* 1967).

Automobile exhaust contains lead bromochloride particles which are blown with the wind and deposited on objects around the expressways. Since most of the expressways in the Chicago area pass through thickly populated residential areas, most of which comprise middle-class housing complexes, the residents are and will be continuously exposed to lead and other pollutants in the exhaust from the ever increasing volume of vehicle traffic. In view of the fact that soils along the expressway act as an immediate sink for particles of lead compounds, a periodic analysis of lead in such soils can be used for the determination of the rate of deposition, as well as of dissipation, of lead released in vehicle exhausts. We chose two sites to determine lead concentration in urban soils: 1) a ten-mile-long strip along the Eisenhower expressway which contains homes, hospitals, schools, and colleges, etc., and 2) the Chicago Loop-terminal Expressway which forms a loop of three different expressways receiving one of the largest traffic volumes reported in the United States (Fig. 1 and Fig. 2).

Materials and methods

Sample sites. Fig. 1 shows the sites from which samples were collected alongside the Eisenhower Expressway. Generally, the shoulders are raised at an angle of about 15° to 30° inclined upwards from roadway over a distance of about 150 feet, except when mentioned. There is grass all along this 10-mile strip except in certain places which have gravel instead of grass or which have bushes in addition to the grass. (These details are described in the Results section). Samples of soil (5 cm deep) were collected at distances of 10 to 50 feet from the line marking the inner boundary of the 13-foot-wide emergency lane of the road. These were taken from areas near exits, merging lanes, and areas between them.

Fig. 2 shows the location of sampling sites along the Chicago Loop-terminal Expressway System. Most of the shoulders are made of concrete except in few places which either have wood fillings or grass and bushes. There is sharp angular elevation of the shoulder from roadway all along ranging from about 20° to 45° over a distance of approximately 60 feet from the road. Pigeon litter, organic matter, and vegetation is much more concentrated on the shoulder in the Loop than along the Eisenhower Expressway. Distances of sample sites from the shoulder and streets are shown in Table I.

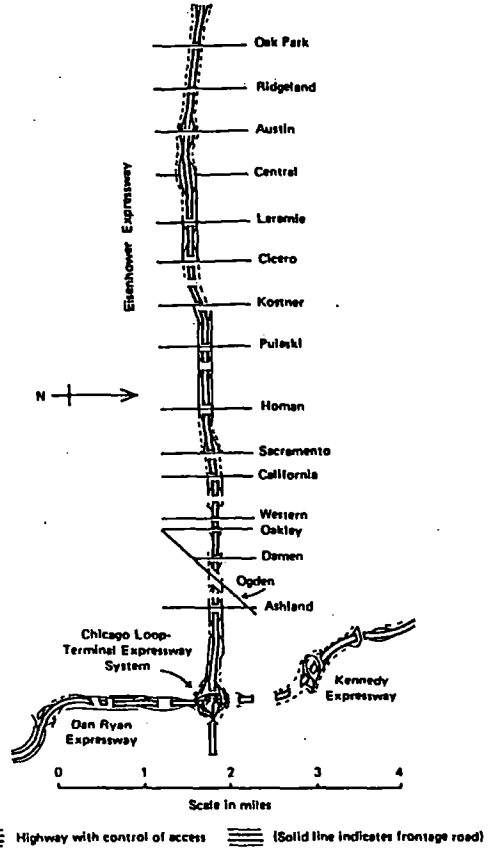

Fig. 1. Outline map of the Eisenhower Expressway (Westbound from Chicago Circle) showing the sampling sites. (Courtesy of the Cook County Expressway Department)

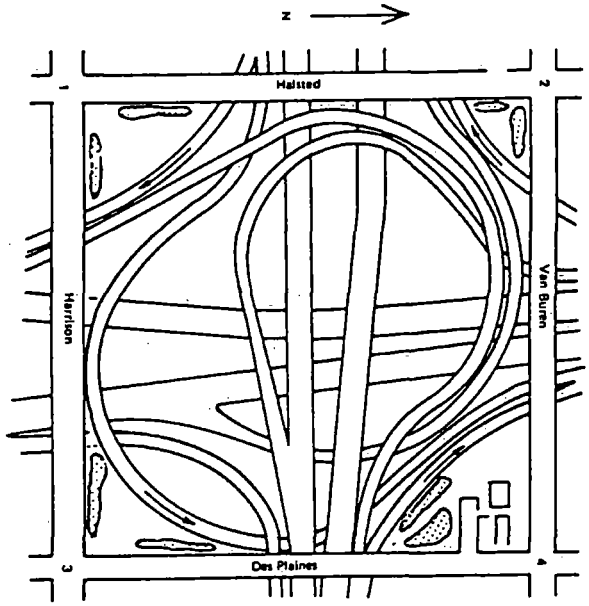

Fig. 2. Outline map of the Chicago Circle showing sites used for counting vehicles (solid arrows) and for the collection of soil samples, and numbered as described in Table I and Table II. (Courtesy of Cook County Expressway Department)

Table I. *Description of Sites Along the Chicago Loop-terminal Expressway from Which Samples Were Collected in Spring, 1971*

Site No.	Location[a]	Distance, feet from		Number of motor vehicles per hour[b]		
		Street	Expressway	Street	Expressway	Average
1	Harrison/Halsted	20-25	20-200	57,600	50,400	54,000
2	Van Buren/Halsted	20-25	20-120	86,400	97,200	91,800
3	Harrison/Des Plaines	20-40	20-180	42,500	21,600	32,050
4	Van Buren/Des Plaines	25-200	20-180	28,100	17,300	32,700

[a]The locations are shown in Fig. 2.
[b]Average traffic volume per hour between 4:00 and 4:30 PM.

Average number of vehicles passing per hour at these sites (Fig. 2 solid arrows) between 4 and 4:30 pm in spring is 47,000 on the expressway and 54,000 on the streets (Table I).

Soil sample characteristics. Most of the soils at the sampling sites consist mainly of clays with top layer of black dirt containing organic matter. The soils closer to the shoulder are generally sandy loams, sometimes mixed with clay.

The soil samples were dried in an oven at 150° for 2 to 3 hours. The samples were analyzed for lead either as taken or after ashing at 600°C for 4 hours in an electric furnace (Lindberg Heavy Duty, Sola Basic Industries).

One hundred milligrams of the soil was shaken in a separatory funnel with 100 ml of 13*N* nitric acid followed by five drops of metacresol to yield a purple color. To this mixture were added 10 ml of 50% citric acid followed with 50 ml of conc. ammonium hydroxide. The funnels were shaken for 1 to 2 min which resulted in a yellow color. After 4 to 5 min, 5 ml of 10% potassium cyanide were added followed by 30 ml of the dithiazone reagent (containing 200 μg range capacity). After vigorous shaking for 5 min, the lower layer was removed and diluted with chloroform (1:1 by volume) and read at 510 nm on the spectrophotometer. In later experiments, the soil sample was shaken with 25 ml of 20% nitric acid, filtered, and processed as above. The lead concentration in the soils, as determined by the method here described, were compared by analyzing the samples on a Jarrell-Ash Atomic Absorption spectrometer and results by two methods were found to be comparable.

Determination of lead in soil. The mixed-color method of Jacobs (1967) was used with following modifications. For the standard curve, 4, 8, 12, 16, and 20 ml of the solution B (10 μg lead nitrate/ml of 0.09% nitric acid) were made up to 50 ml with 0.1 *N* nitric acid in separatory funnels. To each portion were added 10 ml of ammonium cyanide solution (75 ml concentrated ammonium hydroxide added to 100 ml of 10% potassium cyanide and made up to 500 ml with water) followed by 30 ml of freshly prepared dithiazone reagent (200 μg-range lead dithiazone). After shaking, the separatory funnels were allowed to stand for 1 to 2 min. The bottom layer was removed and diluted with chloroform (1:1 by volume) and read at 510 nm on Beckman DBG sectrophotometer against the reagent blank. (Standard curves obtained on various times showed very little variation.) The values obtained in five different experiments were average and plotted, as shown in Fig. 3.

Results

Lead contents, during different seasons, of soils along shoulders of the city streets surrounding the Chicago Loop-terminal Expressway system are shown in Table II. The

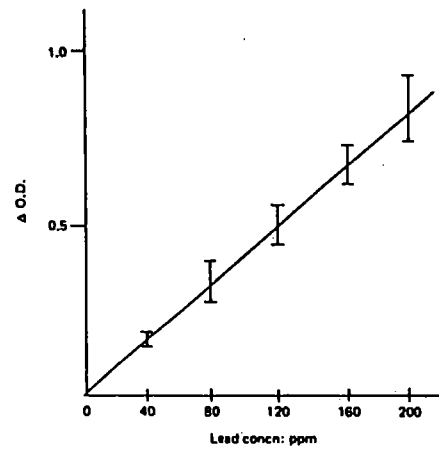

Fig. 3. Standard curve of lead concentration (ppm) vs. Δ optical density at 510 nm, using dithiazone mixed-color photometric method. The verticle bars on the curve show standard error calculated from curves obtained in 5 different experiments, using the same standard lead concentrations.

lead levels vary 1) as a function of the average distance of the soil sampling areas from the road; and 2) with seasons during which the soils were sampled.

Soil samples collected during March (spring) from the adjacent city streets showed a range of 520 to 2,230 ppm lead and those collected during December and January (winter) had lead contents of 10 to 510 ppm. The lead contents of soil samples collected during August through October (fall) showed a range of 110 to 1,000 ppm; this range of values is larger than the winter range and is smaller than the spring range of values. Lead concentrations in samples from sites 1, 2, and 3 (Fig. 2) were higher than those in samples from site 4, during all seasons.

Table III shows the average lead contents, during March, 1972, of soils along the right-hand shoulder of the westbound Eisenhower Expressway. The lead level of the soil is highest near the expressway, being as much as 2,530 ppm, and decreases gradually with

increase in the distance from the expressway (420 ppm at 135 to 150 feet from the expressway).

The average lead content of the soils in the section between Oakley and Ridgeland (Fig. 1) exits along the westbound Eisenhower Expressway, during three different seasons of years 1971 and 1972, are shown in Table IV. The average lead concentrations decrease

Table II. *Average Lead Content of Soils Along the Chicago Loop-terminal Expressway During Different Periods of 1971-72*

Sample site No.[a]	Lead concentration,[b] ppm, in samples taken on		
	March, 1972	Aug.-Oct., 1971	Dec.-Jan., 1972
1	1,372 (1,290-1,450)	186 (110-260)	53 (20-80)
2	2,166 (2,010-2,230)	378 (270-460)	112 (60-190)
3	952 (890-990)	785 (660-1,000)	450 (310-510)
4	565 (520-620)	191 (140-220)	36 (10-50)

[a]Sample sites are described in Table I.
[b]Average values; values in parentheses show the range of the results.

Table III. *Average Lead Content of Soils Along the Right-Hand Shoulder of the West-Bound Eisenhower Expressway (March, 1972)*

Distance from expressway, feet[a]	Lead content,[b] ppm, in samples taken	
	Quarter mile east of Homan Ave. Exit	Quarter to half mile east of Cicero Ave. Exit
13-15	---	2,044 (1,670 to 2,530)
16-40	---	1,316 (1,050 to 1,490)
40-60	2,100 (2,110 to 2,330)	1,075 (970 to 1,210)
60-100	2,045 (1,990 to 2,140)	---
100-135	---	1,008 (880 to 1,340)
135-150	575 (420 to 690)	826 (800 to 880)

[a]Values include 13-feet wide emergency parking lane.
[b]Average values; values in parentheses show the range of the results.

gradually with distance from the expressway. This pattern is identical to that observed in Table III. The average lead content of the soil (Table IV) is generally lowest during fall-winter and highest during summer months; spring values are intermediate between the summer and fall-winter values. These seasonal changes are similar to the seasonal variations observed along the Chicago Loop-terminal Expressway (Table II).

Table IV. *Range of Average Lead Contents of Soils of the Entire Section Between Oakley and Ridgeland Exits, Along the Westbound Eisenhower Expressway, in Three Seasons of the Year (1971-72)*

Distance from expressway, feet[a]	Range of lead contents, ppm, in samples taken in		
	Summer (June, July, 1971)	Fall-Winter (Oct.-Jan., 1971-72)	Spring (March, 1972)
13-15	3,570-6,300	475-1,320	85-1,670
16-20	4,150-5,750	1,170-1,230	60-2,530
21-30	3,500-4,150	200- 560	160-1,490

[a]There is a 13-foot-wide emergency parking lane on either side of the expressway; this distance is included.

Table V shows average lead content of soils on both sides of the Eisenhower Expressway near different exits between Oakley and Ridgeland (Fig. 1). The average lead content of soils along both sides of the expressway near the same exit is about equal and vary slightly from exit to exit. However, the lead content is consistently higher at a distance of 13 to 20 feet from the expressway than at 30 to 45 feet, for all exits examined.

Discussion

The following factors can affect the lead levels in soils: 1) differences in soil types and texture; 2) presence of litter, filling materials, and living and dead vegetation; 3) traffic conditions, e.g., volume and type of traffic per unit time and special conditions such as regions near the merge lanes where acceleration takes place and those near the exit lanes when slowing occurs; and 4) weather conditions, e.g., wind speed and direction, humidity, rain, and snow, which affect driving speed, the fate of exhaust fumes, and traffic volume (Yamati *et al.* 1967, Daines *et al.* 1970). However, at any place, one or more of the above factors can be more important than other factors in regard to the contamination of soils with lead.

The results demonstrate that the lead content of surface soils along roads increases with the increase in traffic volume. Fig. 4 shows a direct relationship between the average traffic volume (Table I) and the lead content of soils at sampling sites, along the Chicago Loop-terminal Expressway (Table II). The average lead concentration (C) in soils during March, 1972 and average traffic volume (T) during March, 1971 in the area are related by

Table V. *Average Lead Content of Soils Along the Eisenhower Expressway (August, 1972)*

Sampling locations,[a] between indicated exits	Lead content,[b] ppm, in samples taken at indicated distance[c] from expressway			
	13-20 feet		30-45 feet	
	Westbound	Eastbound	Westbound	Eastbound
Oakley-Western	3,690 (2,320-5,630)	3,550 (2,430-4,270)	2,630 (860-4,620)	2,460 (910-3,900)
California-Sacramento	–	–	4,920 (325-7,590)	4,650 (300-7,420)
Pulaski-Kostner	–	3,450 (3,360-3,740)	–	3,220 (2,700-3,990)
Laramie-Cicero	4,980 (4,160-6,170)	4,260 (3,980-4,600)	2,230 (1,608-3,400)	2,220 (1,570-3,380)
Laramie-Central	3,650 (3,500-3,900)	–	1,730 (1,690-1,780)	–
Austin-Ridgeland	3,910 (3,400-4,325)	–	3,100 (2,200-3,700)	–

[a] The distance between the two exits was divided into 3 sections; for each of these sections, soil samples were collected at the distances shown.
[b] Average values; values in parenthesis show the average range of results found in soil samples taken from all 3 sections.
[c] Distances include a 13-foot wide emergency parking lane.

C = 151.08 + 0.02219T with a statistically significant correlation coefficient of 0.988. All points in Fig. 4 do not fall exactly on the least square line probably because of the variations in distances of the sampling sites from the streets and expressways, and because of differences in soils at the different sites. However, the traffic data used in Fig. 4 is for spring, 1971, and the analytical data are for soil samples collected during spring, 1972. This lag possibly also has some effect on the correlation.

An examination of traffic data in the Chicago area (Anonymous, 1971) shows that the

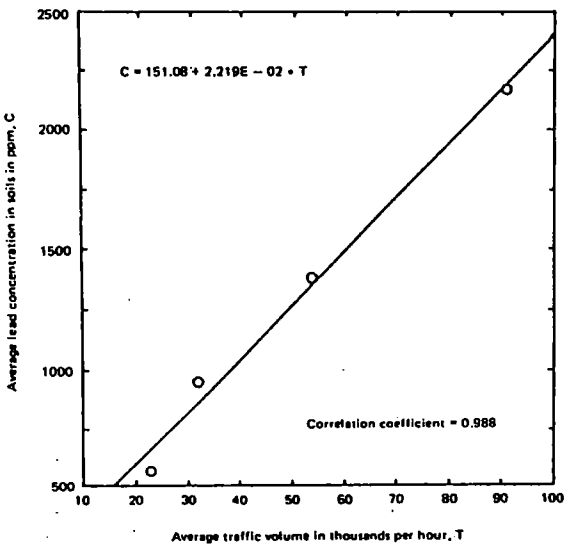

Fig. 4. Correlation between the average lead content of soils and the average traffic volume on Chicago Loop-terminal Expressway and surrounding city streets. Equation: C = 151.08 + 0.02219T; correlation coefficient = 0.988.

traffic volume at any given location varies each month. It is lowest in January (winter), increases gradually to a peak in July or August (summer), and drops to a value in December which is slightly higher than that in January. The lead contents of soils, according to this study (Table II, Table IV) are directly correlateable with changes in the traffic volume. However, other factors, e.g., weather changes which may affect physico-chemical characteristics of soils, possibly also contributes to the seasonal changes in lead levels in the soils.

The results reported here (Table III, Table IV, Table V) show that the lead level in soils along expressways decreases with the distance of the sampling site from the expressway (roadway), e.g., samples less than 15 feet away from the expressway contain as much as 7,200 ppm lead and those at 130-150 feet from the expressway contain as high as 580 ppm lead. Similar trends have been reported by several workers (Schuck and Locke 1970, Daines *et al.* 1970, Motto *et al.* 1970, Ebel 1969).

Some soil samples collected from sites at approximately the same distance from the expressway and during the same season contain different levels of lead. This random variation is as much as 830 to 5,630 ppm and can be attributed to the above-mentioned factors. However, on the average, the lead contents of soils do show systematic variations, as discussed above.

The average lead content of the upper 5-cm layer of the soil is 4,470 ppm[1]. The expected level of lead in the soil of this 10-mile long and 200-feet wide strip of shoulder along the Eisenhower Expressway (only one side of the expressway), is 7,653 ppm[2], as a result of deposition of lead from the automobile exhaust since October 1960 when this section of the expressway opened. So, only about 58% of the lead is retained in the soil. The 42% loss of lead from the soil possibly is the result of 1) experimental error, 2) not all lead falls on this 200-feet-wide shoulder, some being carried away with the wind, 3) some of the lead is washed off the soil by rains or melting of snow, 4) some of the lead migrates deeper than 5 cm in the soils, 5) some of it is secondarily lost due to heavy winds or volatilization, and 6) some of it may be absorbed by vegetation.

The lower levels of lead along the Loop-terminal Expressway (which has raised

[1] Calculated from 7590 ppm lead present up to 45 feet (Table V) and 880 ppm lead present up to 150 feet (Table III).

[2] Volume of the 10 mile x 200 feet x 5 cm strip = 34.9×10^{10} in.^{3}, the wt. of this much soil is 9.81×10^{10} gm (1 in. soil weighs 44 gm). Since October 1960, the average daily traffic volume on this 10-mile lane strip has increased from 60,000 vehicles/day to 87,000 vehicles/day (only one side of the expressway), giving a total number of 3.75×10^8 vehicles which have used this section of the expressway. If average consumption of gasoline for these 10 miles is 1 gallon (each containing 2 gm lead), then the total amount of lead exhausted during this time = $2\ (3.75 \times 10^8) = 7.5 \times 10^8$ gm. This will result in a soil concentration of lead = $(7.5 \times 10^8 / 9.8 \times 10^{10}) \times 10^6 = 7653$ ppm.

shoulders), compared with the Eisenhower Expressway, can be explained on the basis that it is washed off more easily by rains or melting snow.

The loss of lead from soil can possibly have serious effects on the organisms which come in contact with the lost material, especially human beings who can inhale this material and ecosystems which receives the water contaminated with lead. Analysis of samples of drinking water, as well as ground water, soil, vegetation and animals which receive this water, needs to be done and the health and ecological effects need to be studied.

In this study, determinations were not made of lead concentrations in the air (data are obtainable from the Illinois State Department of Health) or in the lawns and soils of buildings located along the Eisenhower Expressway. However, determinations were made of the levels of lead in the soil, vegetation, animal excreta, and hairs and feathers in animal cages in the Chicago's Brookfield Zoo (which is located along a local expressway). The samples of these materials contain as high as 600 ppm lead (Coello and Khan, unpublished data), although up to 3,900 ppm lead is present in the soil and animals of the Staten Island Zoo, in New York (Bazell 1971). In this study, the highest lead levels are found in the bark of trees and outer tissues of bushes along highways and expressways (several hundred thousand ppm in bark of trees on expressways and up to 15,000 ppm in the bark of the trees in lawns away from city streets).

Public buildings, houses, etc., should be built at safe distances from the expressways and much wider buffer zones should be provided if the slow poisoning by lead of human beings and animals is to be stopped.

Conclusions

The levels of lead found in soils in various seasons and at various distances along the Chicago Terminal-loop Expressway, the adjoining city streets, and the Eisenhower Expressway show a relationship between these parameters. The lead content of the soil along the former expressway is directly correlated with the traffic volume which is in turn affected by seasons.

The lead levels in soils at a particular site along the Eisenhower Expressway also varies with seasons. It is minimum during fall and winter, increases during spring and reaches peak levels in summer. Again, this pattern is similar to the average monthly traffic volumes which are lowest during winter, highest during summer, and intermediate during spring.

The lead content of soils along expressways decreases with distances from the road. As much as 7,600 ppm and 880 ppm lead is present in soils at less than 45 and 150 feet, respectively, from the expressway.

Acknowledgments

This research was partly supported by a grant from the National Institutes of Environmental Health Sciences (ES-00808). We are grateful to Professor E. B. Hadley and Professor W. Baur for helpful discussions. Excellent technical assistance of Leroy South, Tony and Camelia Parades, R. H. Stanton and R. I. Morimoto is acknowledged. The cooperation of the Cook County Expressway Department in providing maps and of Mr. J. Pawley of the Brookfield Zoo for other assistance is gratefully acknowledged.

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Manuscript received November 8, 1972; accepted March 20, 1973

APPENDIX I

APPENDIX I

Estimate of Costs

Tighe&Bond
Consulting Engineers
Environmental Specialists

C-325-2-310 1151
July 21, 1995

Mr. Mark Stanga
Litton Corporation
Law Department
1725 Jefferson Davis Highway
Suite 1601, Crystal Square Two
Arlington, VA 22202-3585

Re: Cost Estimate

Dear Mr. Stanga:

As requested on July 18, 1995, this letter provides a written estimate of the entire project costs.

ITEM	ESTIMATED COST
Remediation Contractor	$260,000
Tighe & Bond Design, Sampling and Oversight	$106,000
Final Report to EPA	$8,000
Outstanding Laboratory Costs	$9,700
TOTAL	$383,700

Please note that the above costs are estimates only and may fluctuate somewhat depending on a number of variables (e.g. EPA Reporting Requirements, Contractors Finalized Waste Volumes/Weights, etc.) In addition, the estimate does not include EPA oversight costs.

Please do not hesitate to contact the undersigned or Michael Matilianen, CIH if you should have any questions concerning this information.

Very truly yours,

TIGHE & BOND, INC.

Thomas C. Couture, P.E.
Assistant Chief Engineer

kc\C325\LTR\TCC.E
cc: Theodore F. Craver

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