36750

36750

ARCS II

Contract No. 68-W9-0051

LI TUNGSTEN
Glen Cove, New York
Work Assignment No. 025-2L4L

Draft Final
Remedial Investigation (RI) Report
Volume III of IV

Remedial Planning Activities at Selected
Uncontrolled Hazardous Substance Disposal Sites
USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, NY 10602

May 1998

MALCOLM PIRNIE

301513

CONTRACT NO. 68-W9-0051

LI TUNGSTEN
GLEN COVE, NEW YORK
Work Assignment No. 025-2L4L

DRAFT FINAL
REMEDIAL INVESTIGATION (RI) REPORT
VOLUME III OF IV

Remedial Planning Activities at Selected Uncontrolled Hazardous Substance Disposal Sites USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
104 Corporate Park Drive
White Plains, NY 10602

May 1998

301514

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APPENDIX A

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Appendix A

Geophysical Survey Data

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 36750

DOC TITLE/SUBJECT:
GEOPHYSICAL SURVEY RESULTS
EM SURVEY HORIZONTAL MODE
PLATE 1

THIS DOCUMENT IS OVERSIZED AND CAN BE LOCATED IN THE ADMINISTRATIVE RECORD FILE AT THE

SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 36750

DOC TITLE/SUBJECT:

GEOPHYSICAL SURVEY RESULTS
EM SURVEY VERTICAL MODE
PLATE 2

THIS DOCUMENT IS OVERSIZED AND CAN BE LOCATED IN THE ADMINISTRATIVE RECORD FILE AT THE

SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 36750

DOC TITLE/SUBJECT:
GEOPHYSICAL SURVEY RESULTS
MAGNETOMETER SURVEY
PLATE 3

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SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007

APPENDIX B

Appendix B

Test Pit Logs

TEST PIT LOGS

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-01	20-30	Dk. Grey-m-c sand and fill material	0-1	50	Fill material consisting of plastic, glass fragments, fiberglass, bricks and charcoal. Height of slag pile approx. 29" above grade; Collected soil sample for TAL/TCL, CN, Rad, TOC, pH.
		SAA	1-2	50 .	Fill, same as 0-1'; Collected soil sample for TAL/TCL, CN, Rad, TOC, pH.
		Lt. brn. m-c sand, gravel and fill	2-3	50	Fill, same as 0-2' except for presence of wood in fill material; automotive parts (steel drum and brake plate) may represent geophysical anomalies.
		Lt. brn. m-c sand, gravel, and native material	3-4	20	Interface of fill/native material
		Lt. brn. To org.-red m-c sand and till	4-5	20	Native material
		SAA	5-6	20	Native material
		till as 4-5, saturated	6-7	20	Native material
		Lt. brn. silty m-sand	7-8	20	Water table encountered at 8', bottom of test pit.

301523

TEST PIT LOGS (continued)

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-02	10-15	Lt. brn. f-m sand and gravel	0-1	20	
		SAA	1-2	20-40	Collected soil sample for TAL/TCL CN, Rad, TOC, pH
		SAA	2-3	20-50	
		Dk. grey clayey sand w/gravel	3-4	20	
		SAA	4-5	20-30	
		Dk.brn to grey till	5-6	20-30	
		Org.-red m-c sand and till; saturated	6-7	20-30	Water table encountered at 6.8' below grade
TP-03	8-12	Dk. Gry topsoil	0-1	100	Fill, collected soil sample for TAL/TCL, CN, Rad, TOC, pH
		Org-red/brn. clayey m-sand w/gravel	1-2	20-50	Fill

301524

TEST PIT LOGS (continued)

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-03 (cont'd)		Dk. grey silty clay	2-3	50-100	Fill
		SAA	3-4	20-50	Fill
		Gry. Mottled silty clay/asphalt roadway	4-5	20-50	At 4.5' encountered dark black asphalt parking lot
		Mottled gry silty clay	5-6	50-70	
		SAA	6-7	50-70	
		Org/red silty clay	7-8	50-70	
		SAA	8-9	50-70	
		SAA	9-10	50-70	Terminated test pit, no water encountered
TP-04	20-50	Dk. brn. m-c sand	0-1	20	Hnu=1 ppm>back
		Lt. br. sand and gravel	1-2	20	
		SAA	2-3	20	
		Lt. grey clay w/silt	3-4	50-70	

301525

TEST PIT LOGS (continued)

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-04 (cont'd)		Dk. gry. mottled clay	4-5	70	Collected soil sample for TAL/TCL, CN, Rad, TOC, pH
		Lt. tn. silty sand w/gravel.	5-6	70	
		SAA; moist	6-7	20-30	
		Dk. gry. Sand and gravel; saturated	8-9	20-30	Water table encountered at 8.9'
TP-05	800	Dk. gry. sand and fill	0-1	2000	Fill material consisting of glass bottles and metal fragments; collected soil sample for TAL/TCL, CN, Rad, TOC, pH.
		Lt. tn. m-c sand	1-2	1000	
		SAA; Native material	2-2.5'		Terminated test pit/native material
TP-06	8-10	Lt brn m-c sand and gravel	0-1	20	
		Org. f-m clayey sand	1-2	20	

301526

TEST PIT LOGS (continued)

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-06 (cont'd)		SAA	2-3	20-50	Collected soil sample for TAL/TCL, CN, Rad, TOC, pH.
		SAA	3-4	50	
		SAA	4-5	0	
		SAA	5-6	0	
		SAA	6-7	0	
		SAA	7-8	0	
		SAA	8-9	0	
		Same as above; grey clay Lens at 12.5'	9-13.5	50 CPM in clay	13.5'-bottom of test pit (No water encountered)
TP-07	8-10	Dk. Brn. Fill materials	0-1	70	Fill, mound approximately 3-4' above grade; fill material includes asphalt, bricks/stones
		Fill; asphalt roadway 1-2 feet	1-2	80-100	Fill including bricks, glass fragments, asphalt, porcelain; car tires and metal drum; Collected soil sample for TAL/TCL, CN, Rad, TOC, pH
		Fill, sand and gravel	2-3	70	Same as above

301527

TEST PIT LOGS (continued)

Test Pit I.D.	Surface Exposure Rate (uR/h)	Description of Material	Sample Depth (ft. bgs)	GM Pancake Detector Scan (cpm)	Comments
TP-07 (cont'd)		Org/red silty clay	3-4	70	Fill/Native contact
		SAA	4-5	70	Terminated. Water encountered at 5'
TP-08	12-15	Org. m-c sand w/red silty clay, gravel	0-1	20-50	
		SAA	1-2	20-50	
		SAA	2-3	20-50	
		SAA; saturated	3-4	20-50	
		SAA; saturated	4-5	20-50	0; terminated at 59"

Notes:

SAA=Same as above
B.O.B=Bottom of excavation
20 CPM=approximate background

G:\8001202\RIREPT\APPENB.TAB

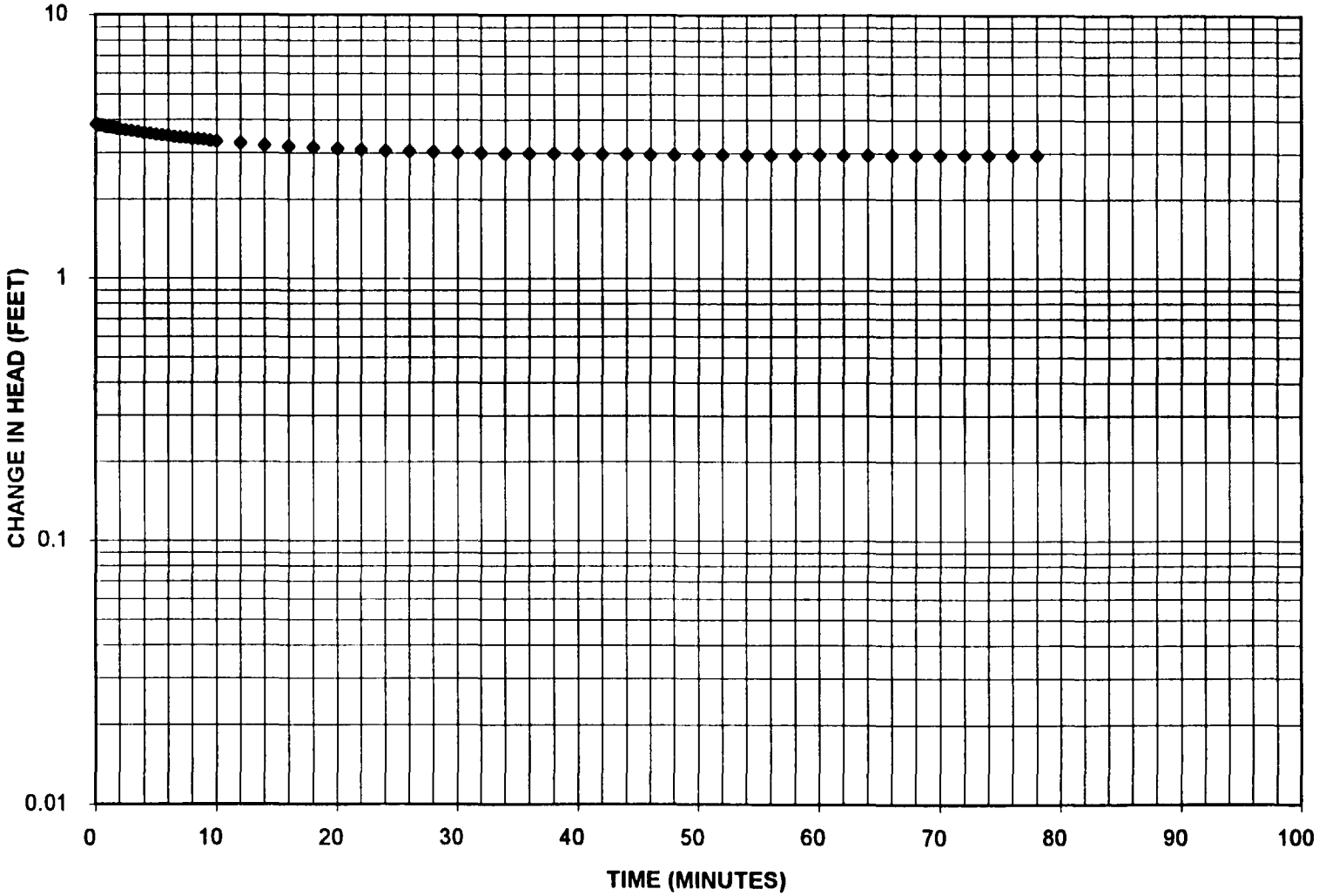
301528

APPENDIX C

Appendix C

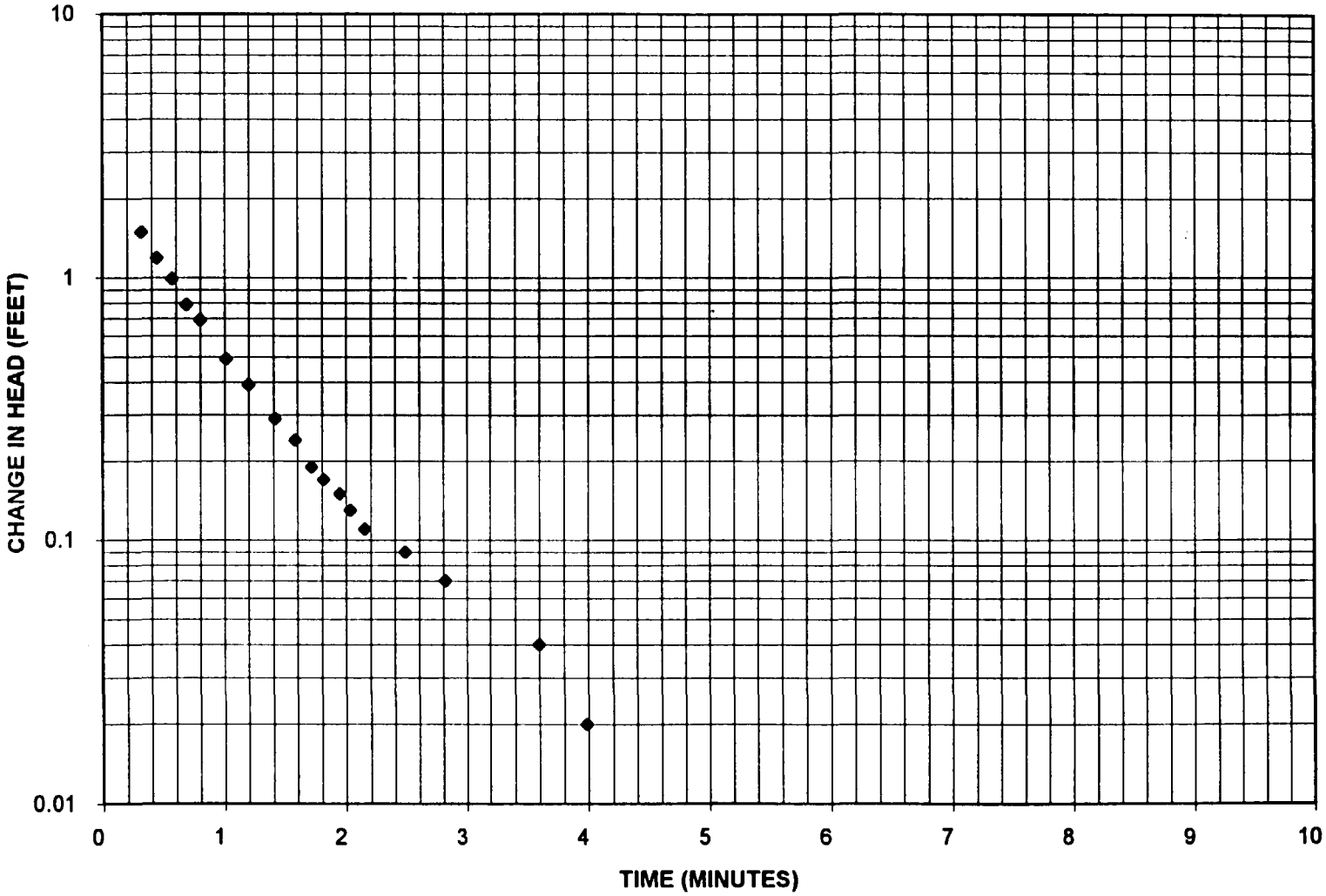
Existing Monitoring Well Evaluation Slug Test Data

EMW-1 RISING HEAD TEST



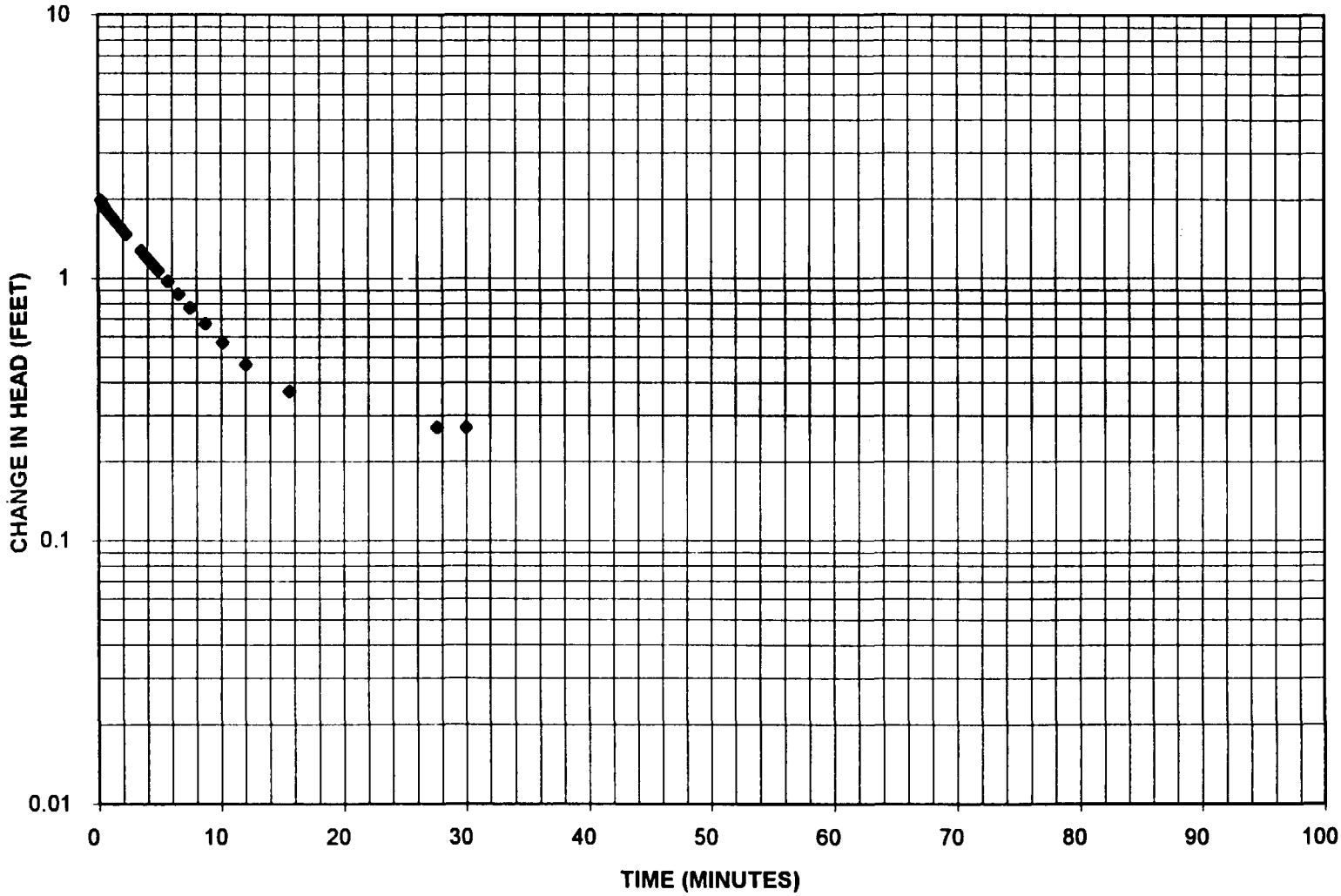
301531

GM-1 RISING HEAD TEST



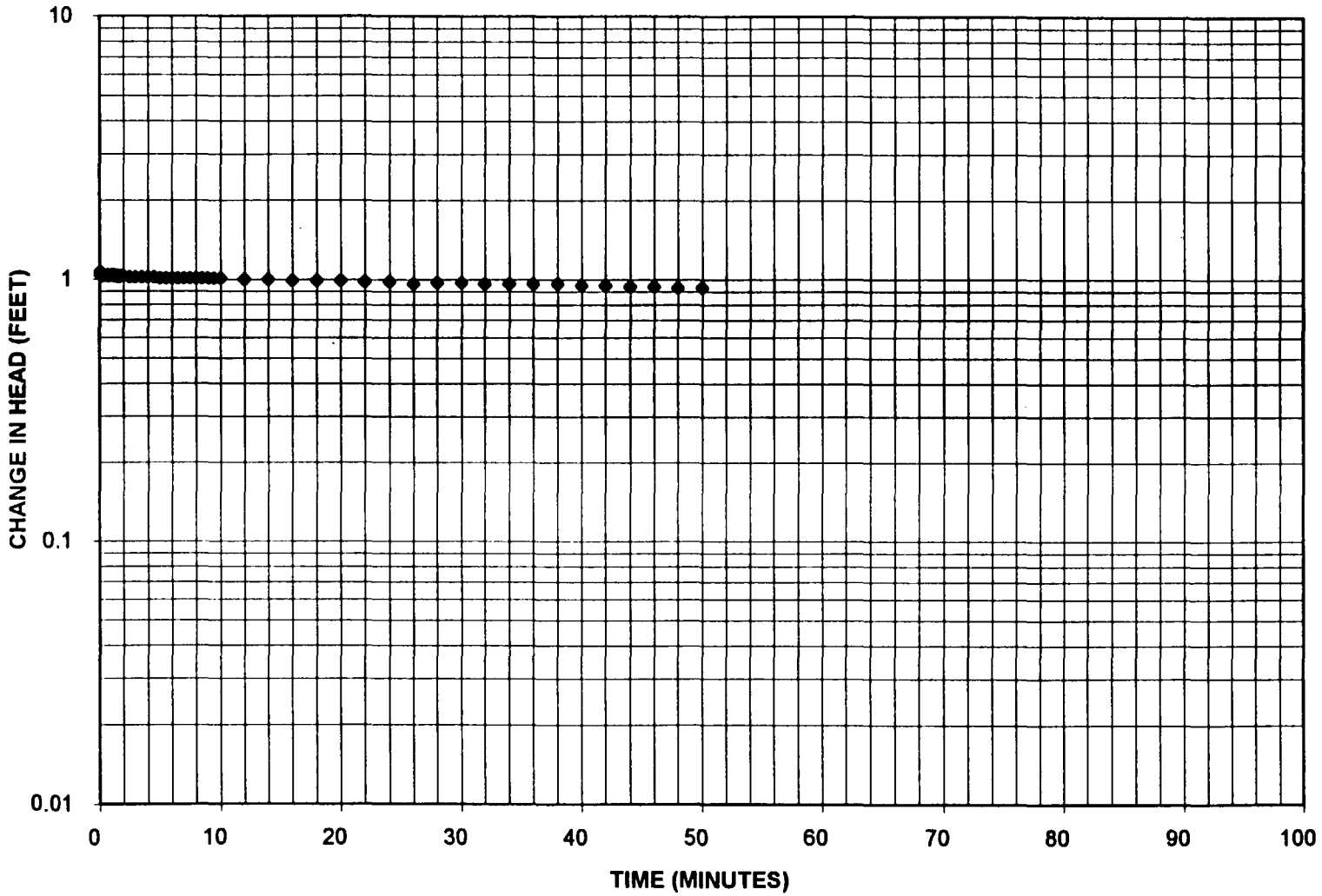
301532

GM-2 RISING HEAD TEST



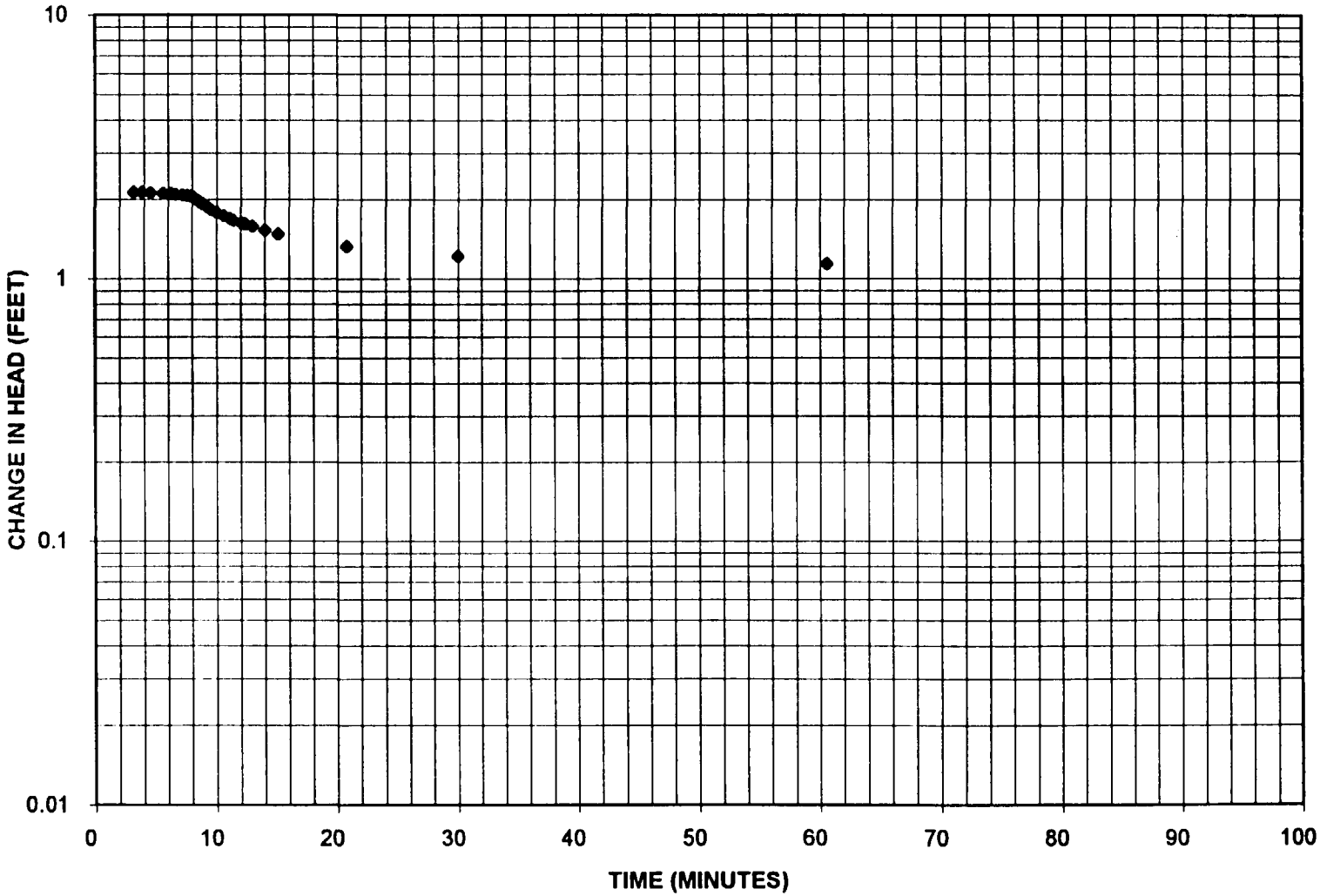
301533

EMW-4 RISING HEAD TEST



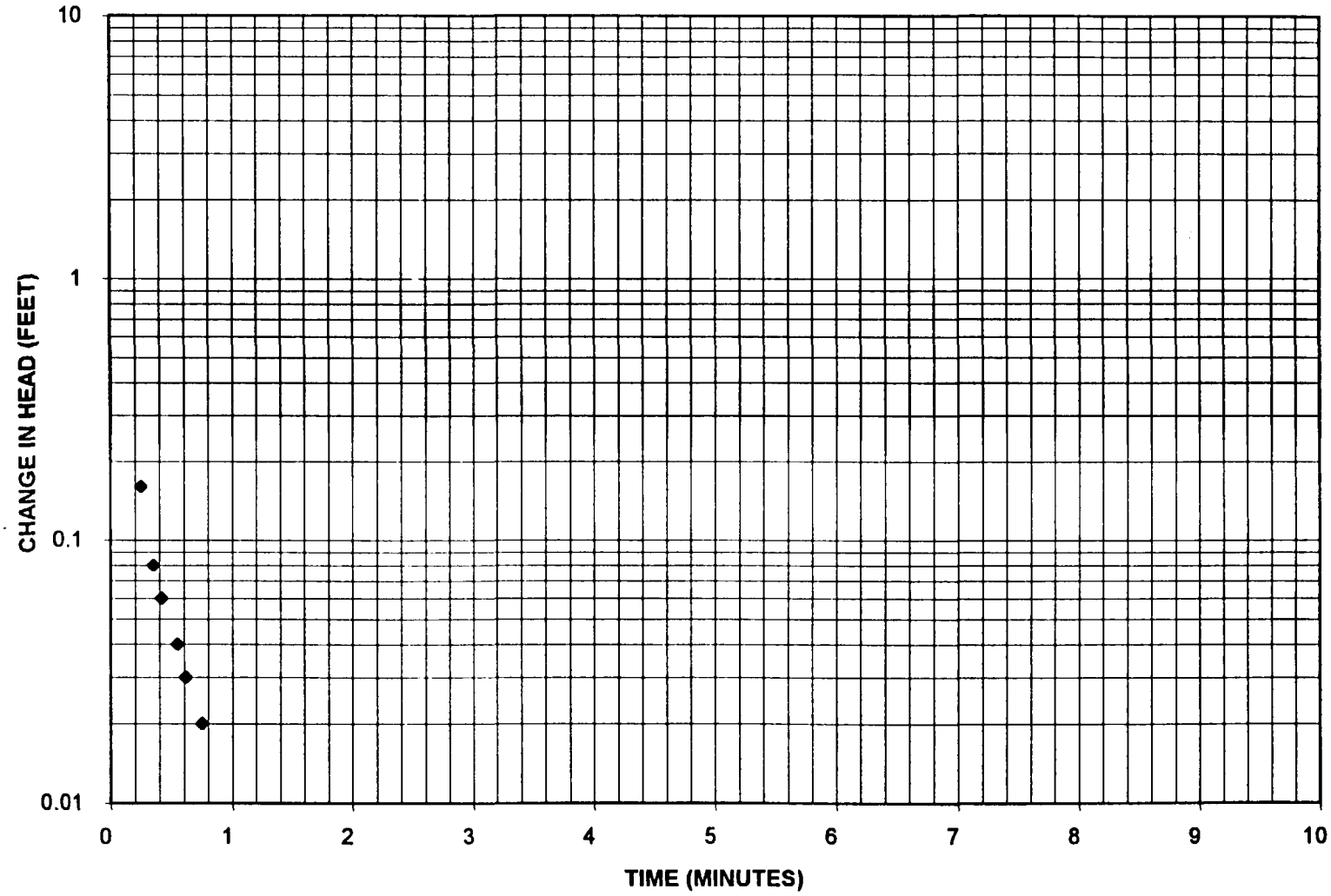
301534

GM-7 RISING HEAD TEST



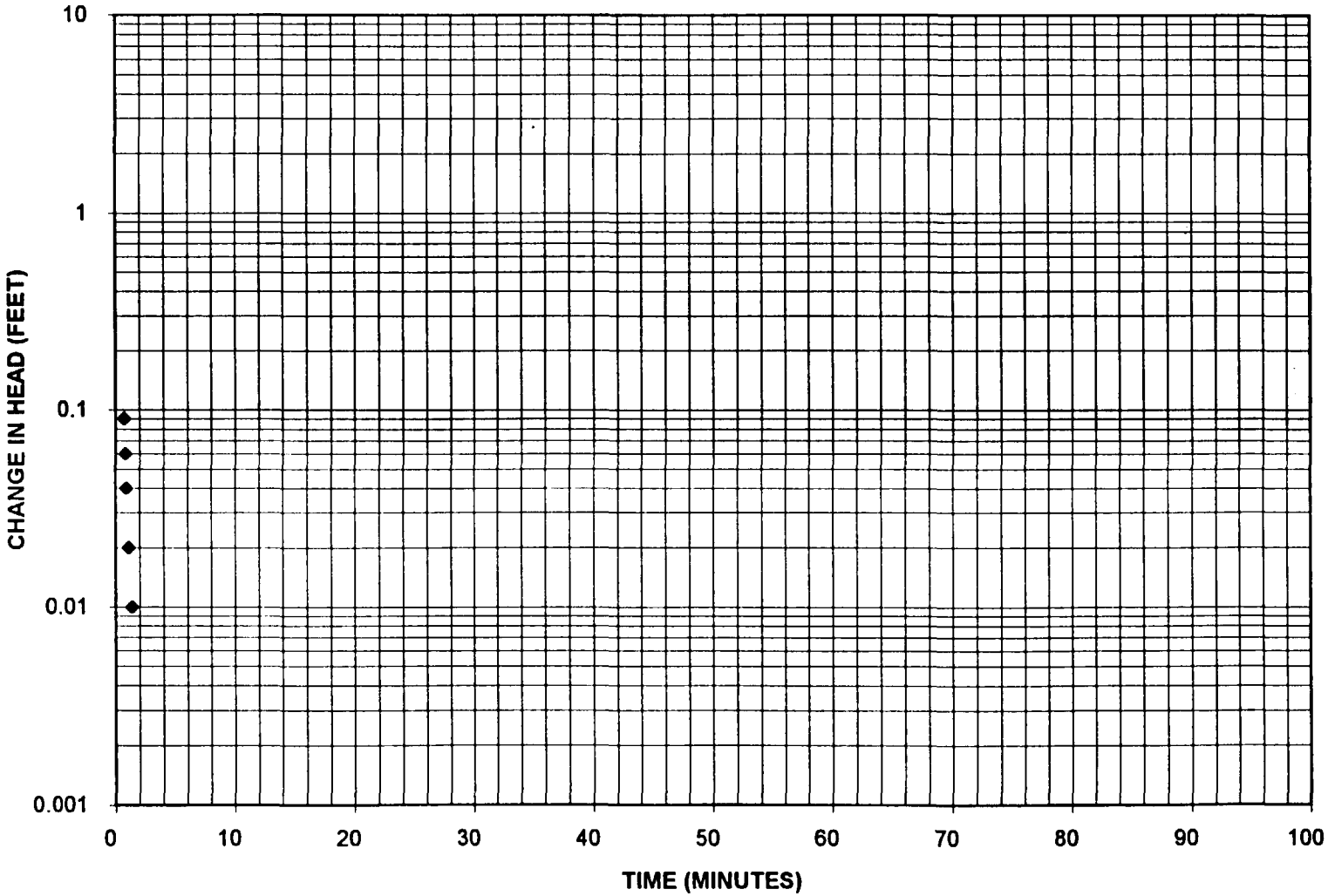
301535

GM-9 RISING HEAD TEST



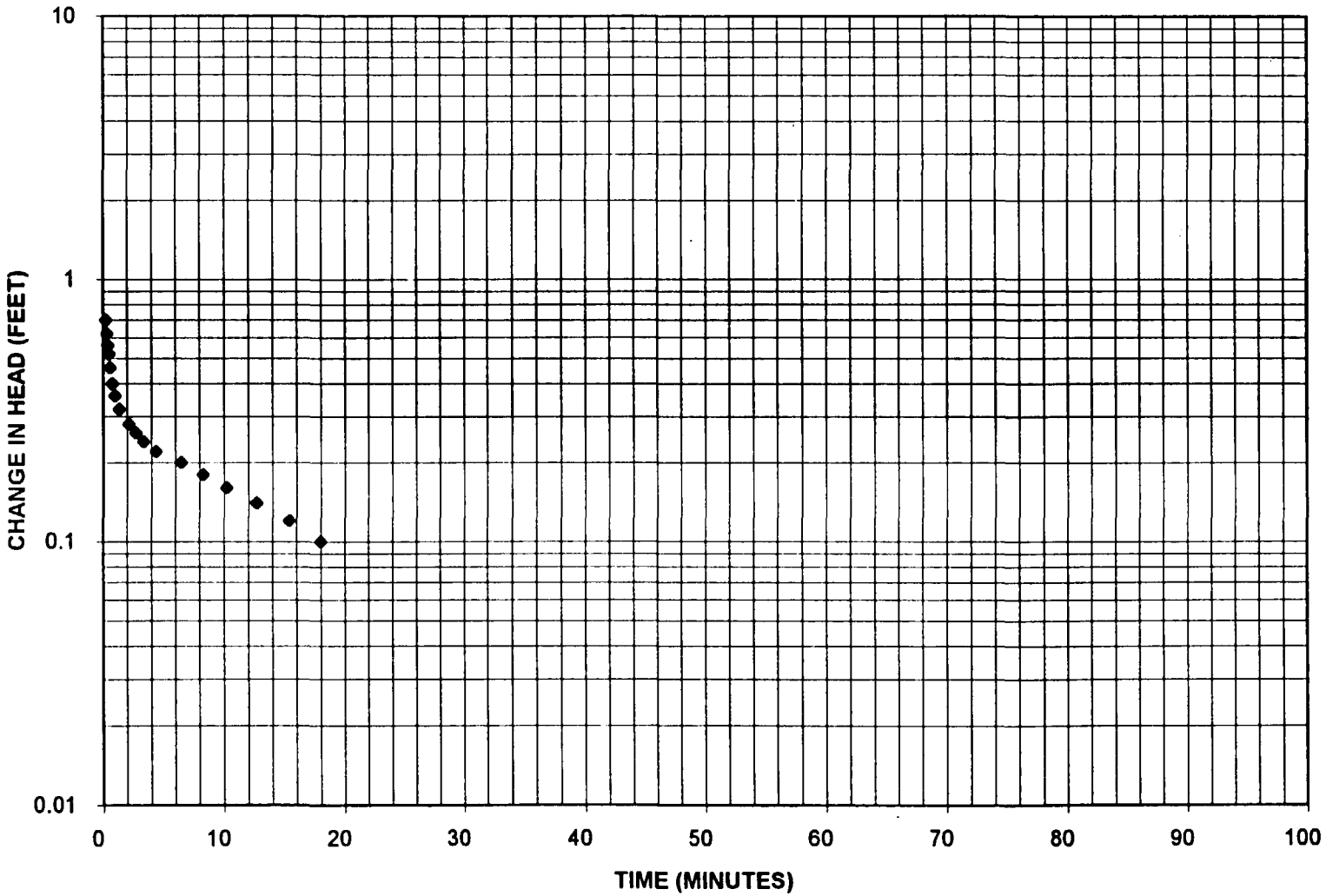
301536

GM-10 RISING HEAD TEST



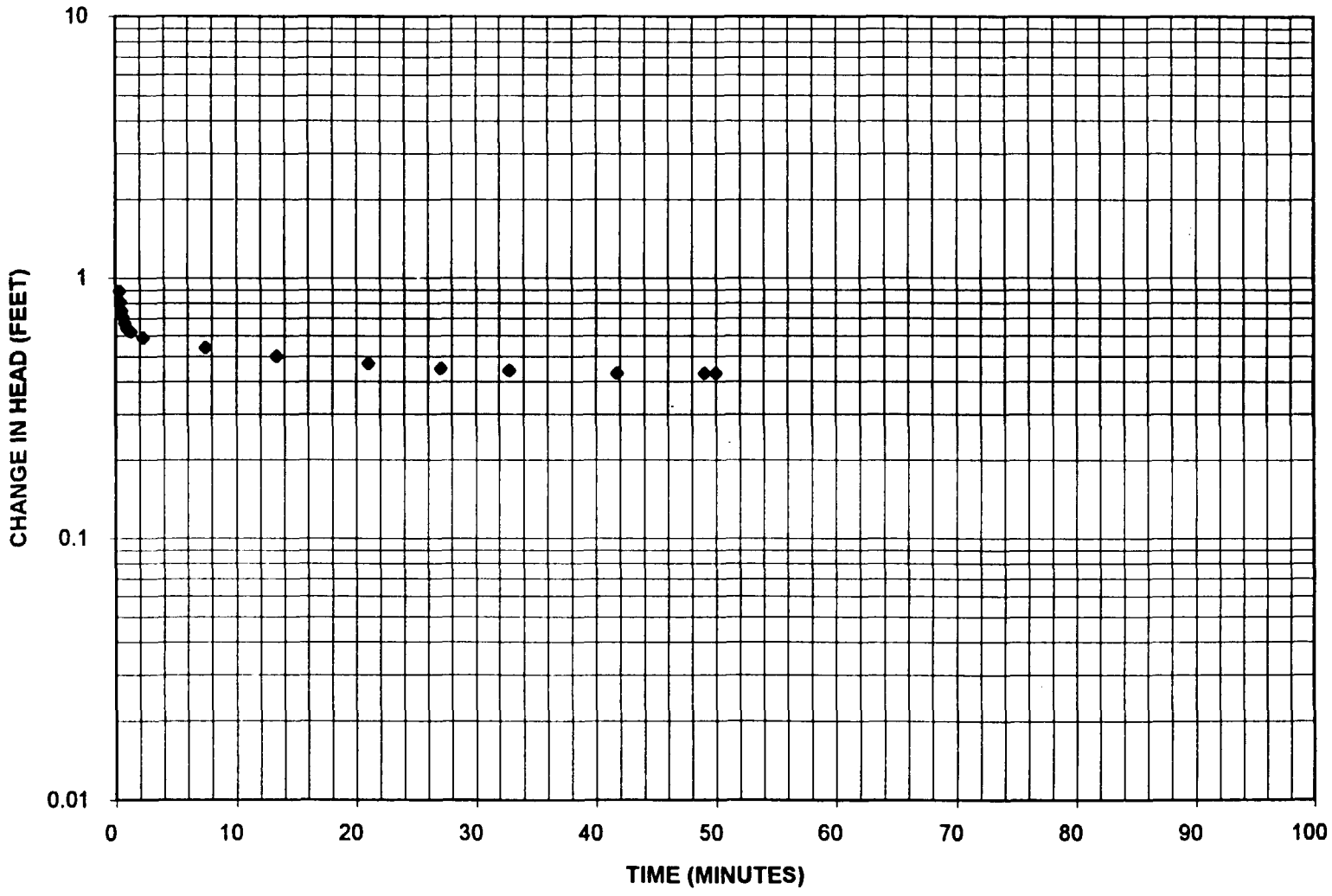
301537

GM-12 RISING HEAD TEST



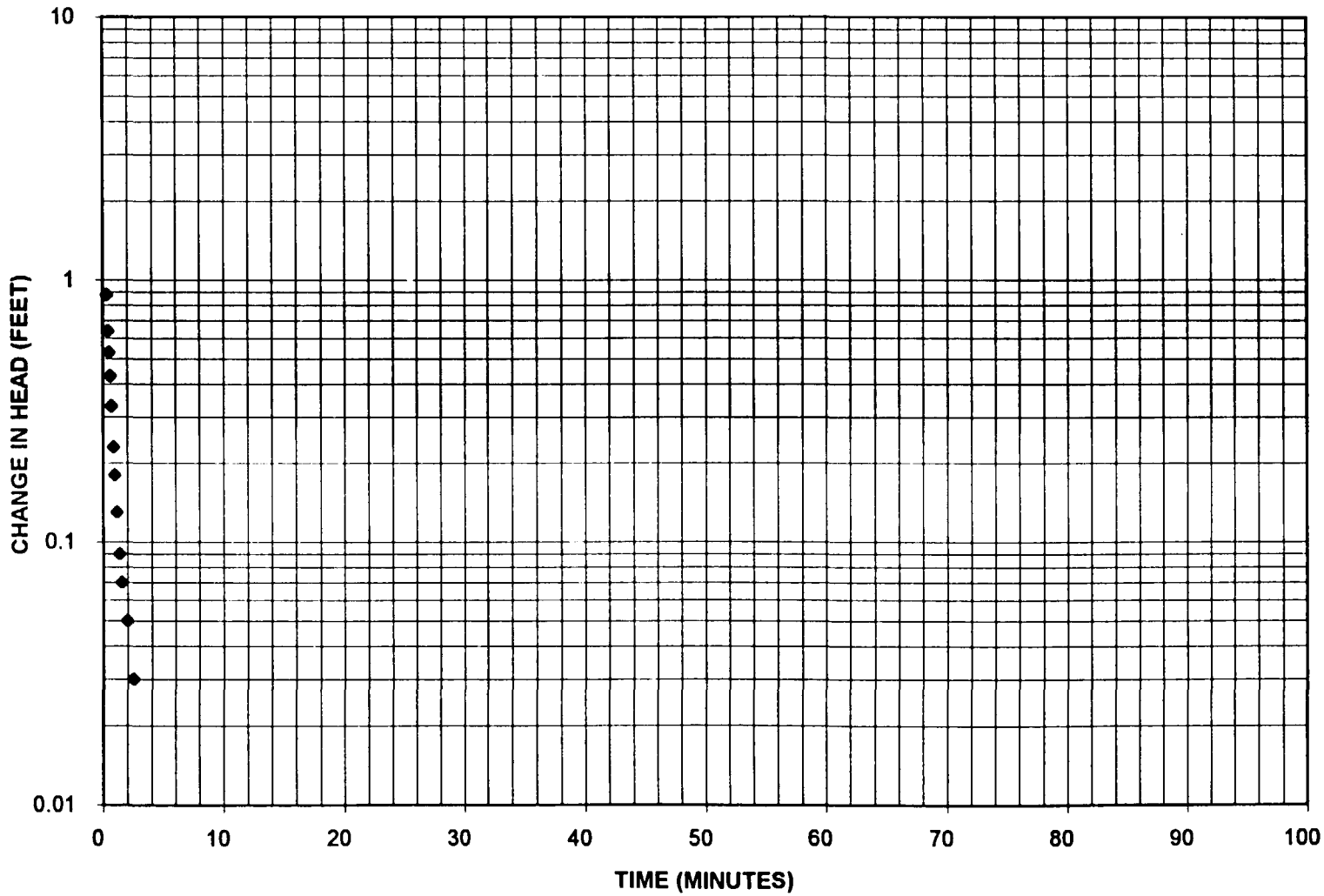
301538

GM-13 RISING HEAD TEST



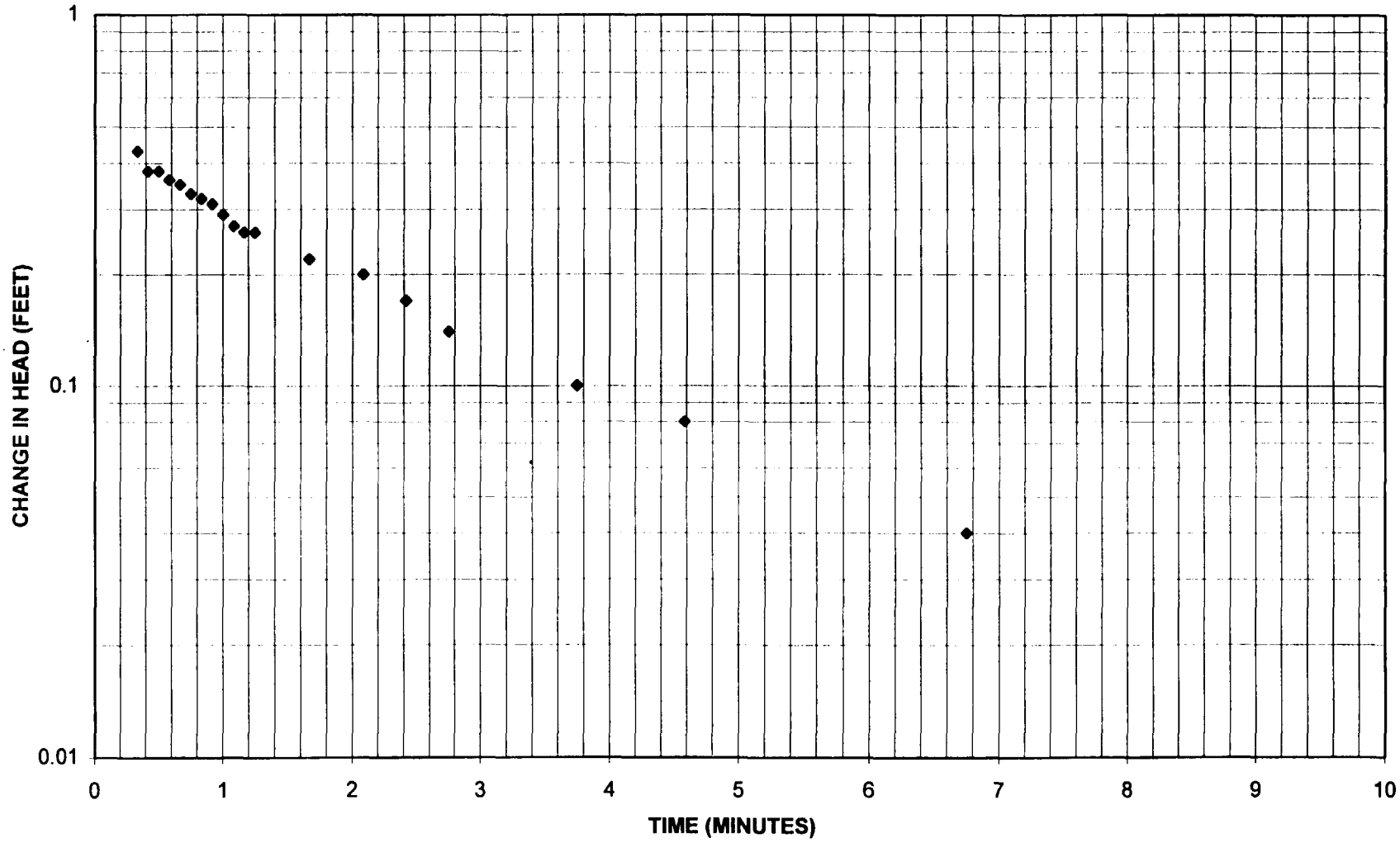
301539

GM-14A RISING HEAD TEST



301540

GM-15 RISING HEAD TEST



301541

APPENDIX D

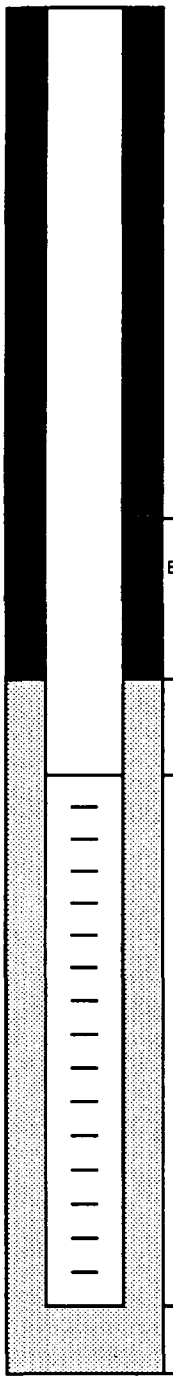
Appendix D

Monitoring Well Construction Data

MALCOLM PIRNIE, INC.

NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

☐ LOCKING PROTECTIVE CASING
■ FLUSHMOUNT
☐ OTHER

☐ BENTONITE GROUT
■ BENTONITE/CEMENT GROUT
☐ BACKFILL

☐ SLURRY
■ PELLETS
☐ HOLEPLUG

☐ GRAVEL PACK
■ SAND PACK
☐ FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-2D**
LOCATION	Parcel A

TOP OF CASING ELEVATION	17.349
GROUND ELEVATION	17.516
DEPTH TO WATER	~3
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	George Spiciarich
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/26/96
COMPLETION DATE	9/27/96
DEVELOPMENT DATE	10/7/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

REMARKS 8 inch diameter borehole.
Borehole drilled to 35 feet; Cement/Bentonite grout placed from 25 feet to 35 feet.

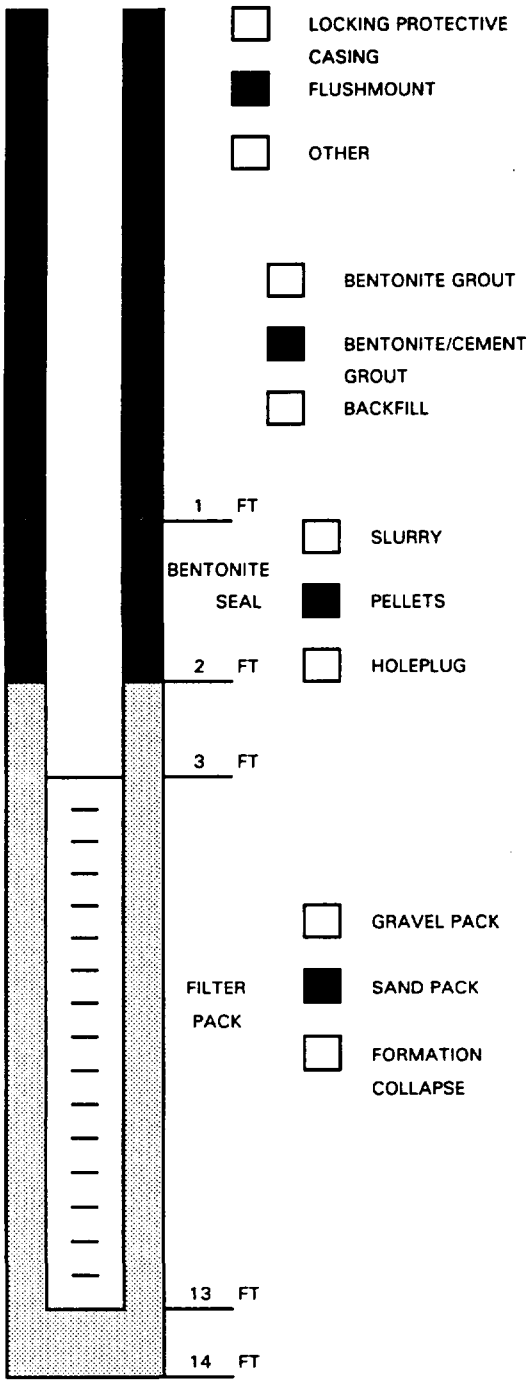
HYDROGEOLOGIST E. Johnson/C. Trione

301544

MALCOLM PIRNIE, INC.

JE INTERNATIONAL BLVD.
.IAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	MP-4
LOCATION	Parcel C
TOP OF CASING ELEVATION	37.073
GROUND ELEVATION	37.281
DEPTH TO WATER	~2
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	George Spiciarich
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	10/2/96
COMPLETION DATE	10/3/96
DEVELOPMENT DATE	10/10/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

REMARKS 8 inch diameter borehole.

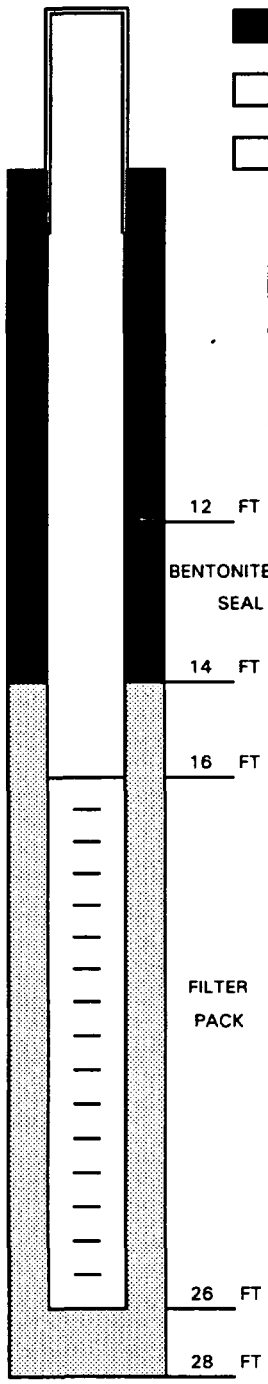
HYDROGEOLOGIST E. Johnson

301545

MALCOLM PIRNIE, INC.

JE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER

- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL

- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG

- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-5**
LOCATION	Parcel B
TOP OF CASING ELEVATION	71.653
GROUND ELEVATION	70.086
DEPTH TO WATER	~20
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/5/96
COMPLETION DATE	9/5/96
DEVELOPMENT DATE	10/22/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

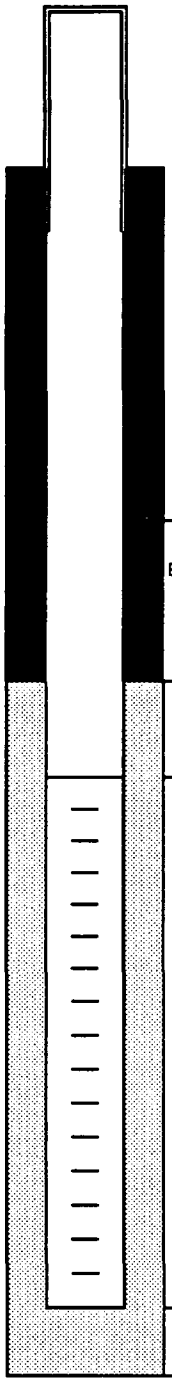
REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST C. Trione

301546

MALCOLM PIRNIE, INC.
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER

- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL

- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG

- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-6**
LOCATION	Parcel A
TOP OF CASING ELEVATION	27.983
GROUND ELEVATION	24.983
DEPTH TO WATER	~3
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	8/28/96
COMPLETION DATE	8/28/96
DEVELOPMENT DATE	9/27/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

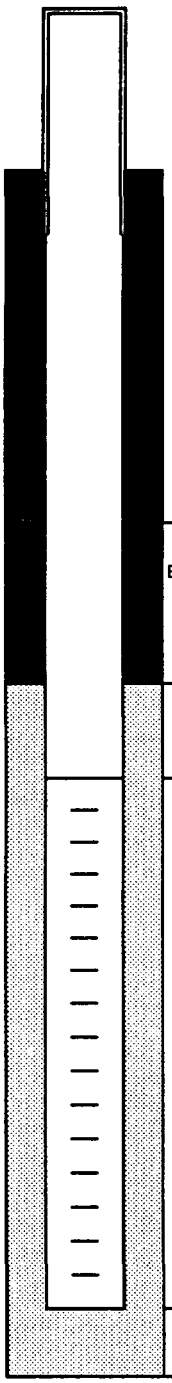
REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST E. Johnson

301547

MALCOLM PIRNIE, INC.
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



- ■ LOCKING PROTECTIVE CASING
- □ FLUSHMOUNT
- □ OTHER
- □ BENTONITE GROUT
- ■ BENTONITE/CEMENT GROUT
- □ BACKFILL
- □ SLURRY
- ■ PELLETS
- □ HOLEPLUG
- □ GRAVEL PACK
- ■ SAND PACK
- □ FORMATION COLLAPSE

TOTAL DRILLED DEPTH

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-11D**
LOCATION	Parcel C'
TOP OF CASING ELEVATION	78.733
GROUND ELEVATION	76.058
DEPTH TO WATER	~28
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Dan Gates
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/25/96
COMPLETION DATE	10/10/96
DEVELOPMENT DATE	10/23/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT □ COUPLING JOINT

CASING 4 INCH (I.D.) □ STAINLESS STEEL ■ PVC

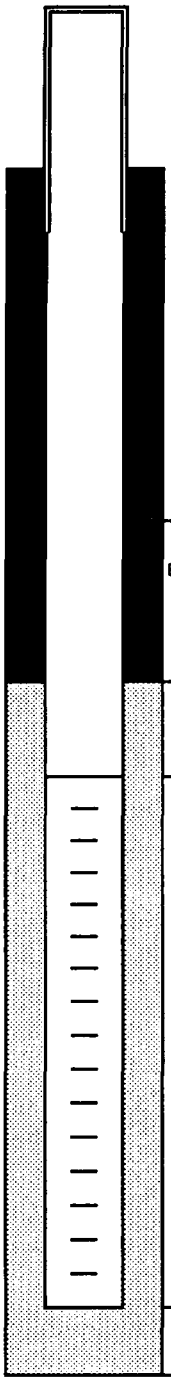
SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC □ STAINLESS STEEL

REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST J. Guerriero

MALCOLM PIRNIE, INC.
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER
- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL
- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG
- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-16D**
LOCATION	Parcel C
TOP OF CASING ELEVATION	48.783
GROUND ELEVATION	46.392
DEPTH TO WATER	~4
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/9/96
COMPLETION DATE	9/10/96
DEVELOPMENT DATE	10/16/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

REMARKS 8 inch diameter borehole.
Borehole drilled to 66 feet; Cement/Bentonite grout placed from 55 feet to 66 feet.

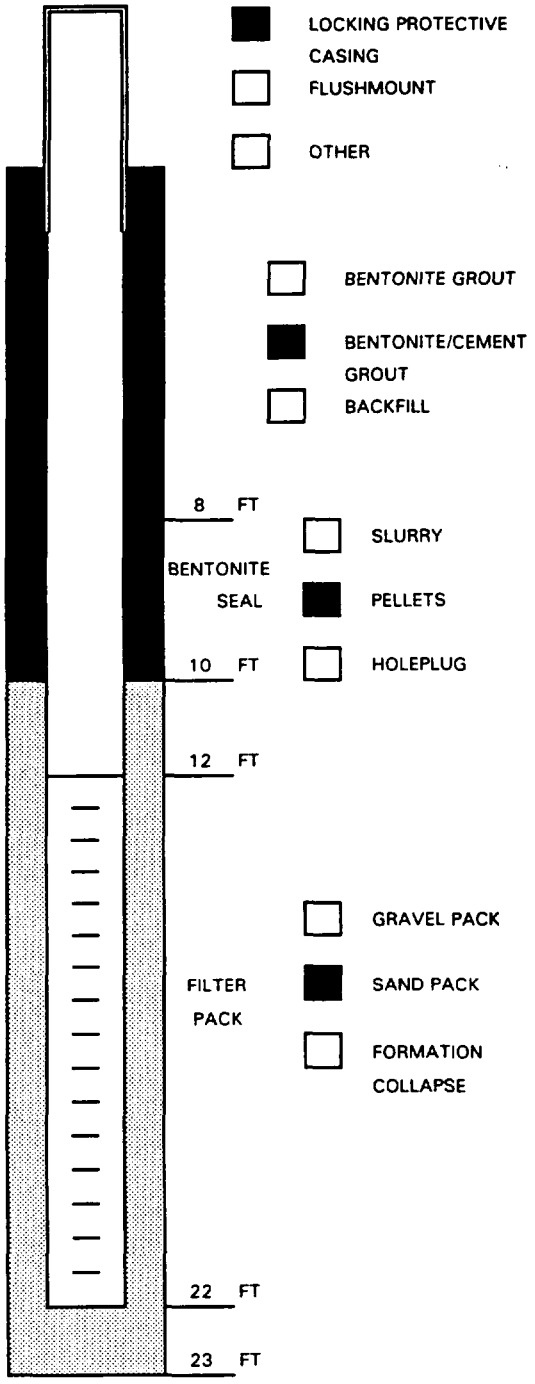
HYDROGEOLOGIST E. Johnson

301549

MALCOLM PIRNIE, INC.

NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-16**
LOCATION	Parcel C

TOP OF CASING ELEVATION	48.827
GROUND ELEVATION	45.985
DEPTH TO WATER	~2
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	George Spiciarich
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	10/9/96
COMPLETION DATE	10/9/96
DEVELOPMENT DATE	10/16/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

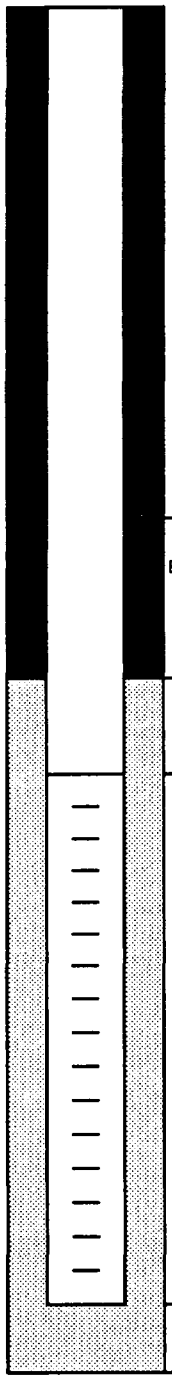
REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST J. Caragine

301550

MALCOLM PIRNIE, INC.
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

☐ LOCKING PROTECTIVE CASING
■ FLUSHMOUNT
☐ OTHER

☐ BENTONITE GROUT
■ BENTONITE/CEMENT GROUT
☐ BACKFILL

☐ SLURRY
■ PELLETS
☐ HOLEPLUG

☐ GRAVEL PACK
■ SAND PACK
☐ FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-17D**
LOCATION	Parcel A
TOP OF CASING ELEVATION	17.630
GROUND ELEVATION	17.826
DEPTH TO WATER	~1
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	8/22/96
COMPLETION DATE	8/22/96
DEVELOPMENT DATE	10/21/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

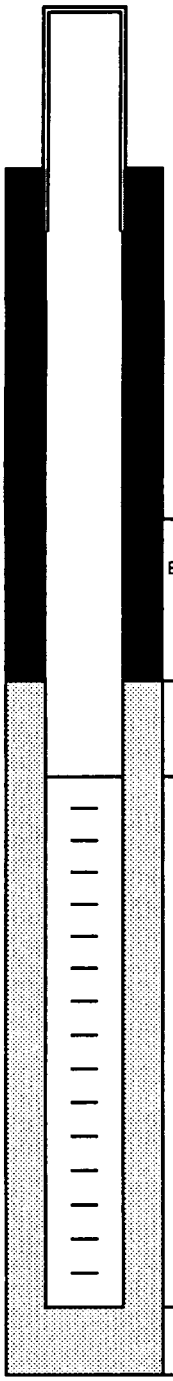
REMARKS 8 inch diameter borehole.
Borehole drilled to 29 feet; Cement/Bentonite grout placed from 14 feet to 29 feet.

HYDROGEOLOGIST C. Trione

MALCOLM PIRNIE, INC.

NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER

- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL

- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG

- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-18D**
LOCATION	Parcel C

TOP OF CASING ELEVATION	28.494
GROUND ELEVATION	25.919
DEPTH TO WATER	~6
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	George Spiciarich
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/12/96
COMPLETION DATE	9/13/96
DEVELOPMENT DATE	10/14/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

REMARKS 8 inch diameter borehole.

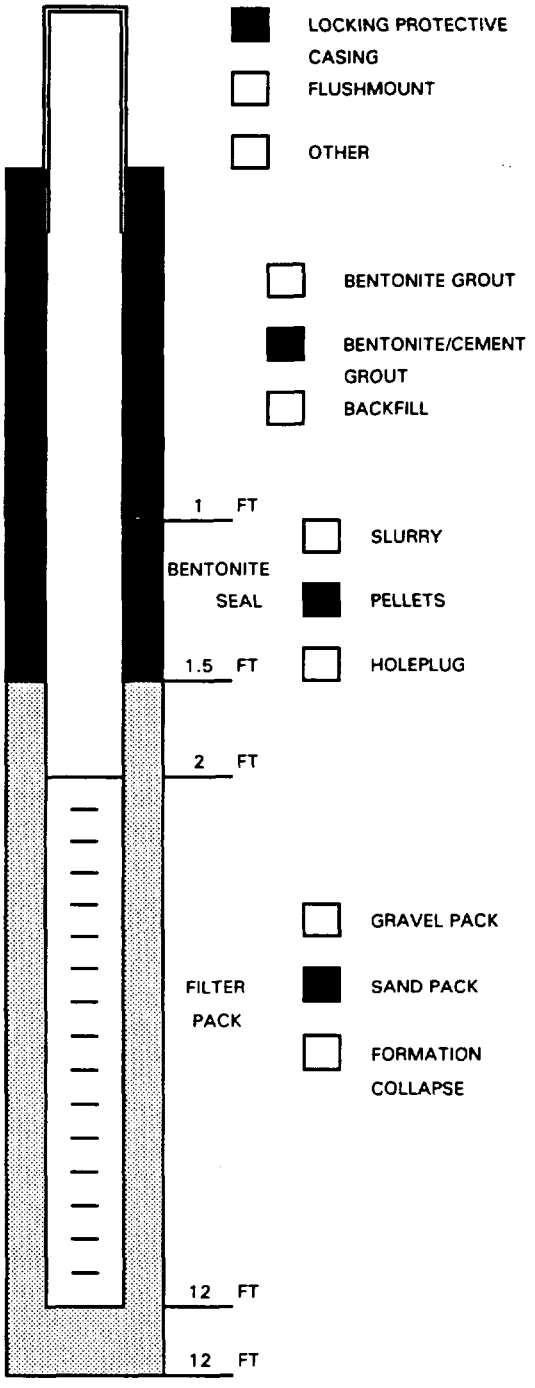
HYDROGEOLOGIST E. Johnson

301552

MALCOLM PIRNIE, INC.

NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-18**
LOCATION	Parcel C

TOP OF CASING ELEVATION	26.938
GROUND ELEVATION	25.969
DEPTH TO WATER	~4
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/3/96
COMPLETION DATE	9/3/96
DEVELOPMENT DATE	10/14/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST C. Trione

301553

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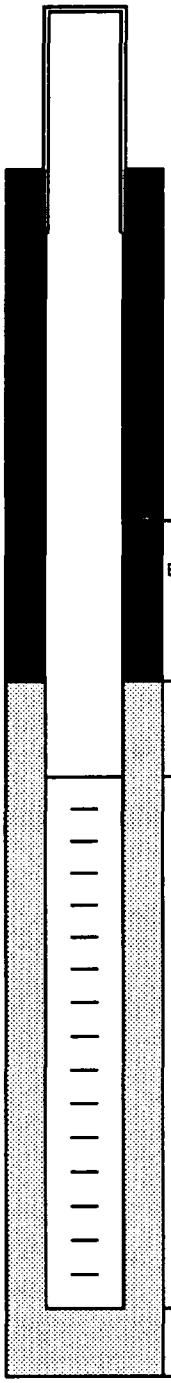
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER

- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL

- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG

- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-19D**
LOCATION	Parcel B

TOP OF CASING ELEVATION	42.505
GROUND ELEVATION	40.522
DEPTH TO WATER	~7
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	10/7/96
COMPLETION DATE	10/8/96
DEVELOPMENT DATE	10/22/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

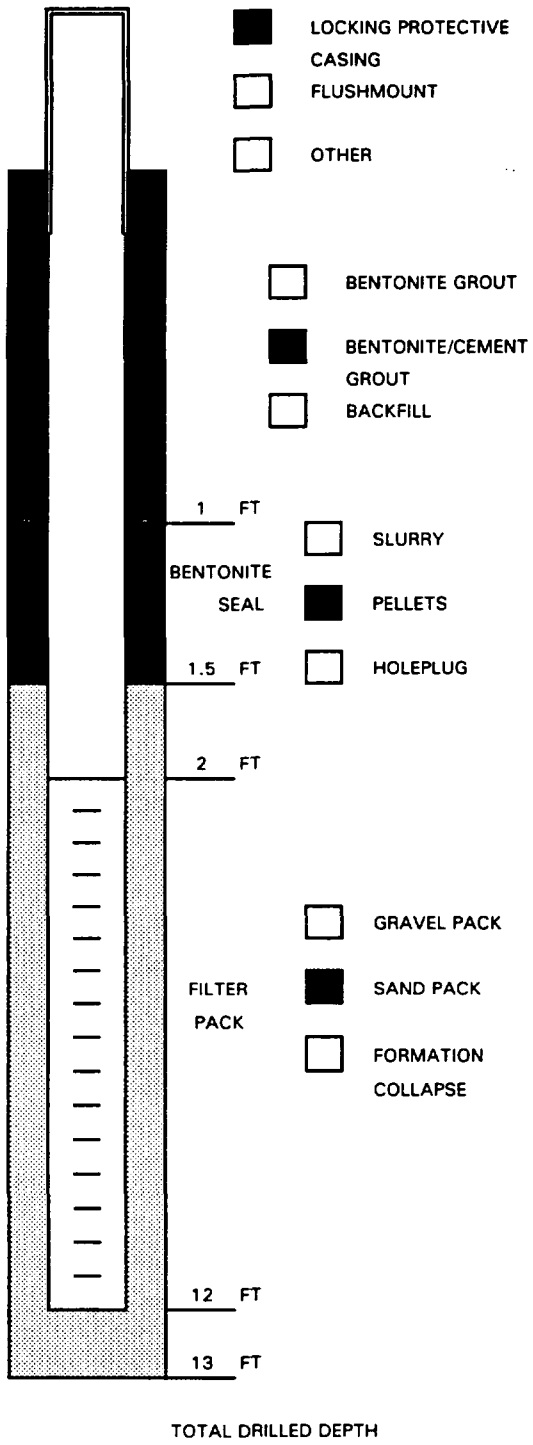
SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

REMARKS 8 inch diameter borehole. Borehole drilled to 48 feet; Cement/Bentonite grout placed from 38 feet to 48 feet.

HYDROGEOLOGIST E. Johnson/J. Caragine

MALCOLM PIRNIE, INC.
NE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-20**
LOCATION	Parcel A
TOP OF CASING ELEVATION	26.905
GROUND ELEVATION	25.538
DEPTH TO WATER	~3
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/9/96
COMPLETION DATE	9/9/96
DEVELOPMENT DATE	10/9/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST E. Johnson

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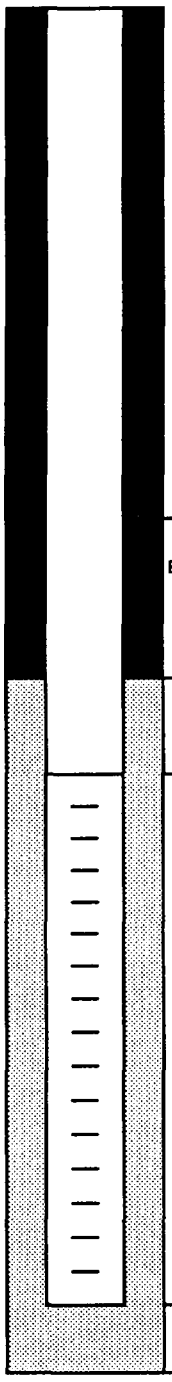
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

☐ LOCKING PROTECTIVE CASING
■ FLUSHMOUNT
☐ OTHER

☐ BENTONITE GROUT
■ BENTONITE/CEMENT GROUT
☐ BACKFILL

☐ SLURRY
■ PELLETS
☐ HOLEPLUG

☐ GRAVEL PACK
■ SAND PACK
☐ FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-21D**
LOCATION	Parcel A

TOP OF CASING ELEVATION	21.054
GROUND ELEVATION	21.221
DEPTH TO WATER	~2
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	George Spiciarich
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	9/23/96
COMPLETION DATE	9/24/96
DEVELOPMENT DATE	9/26/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

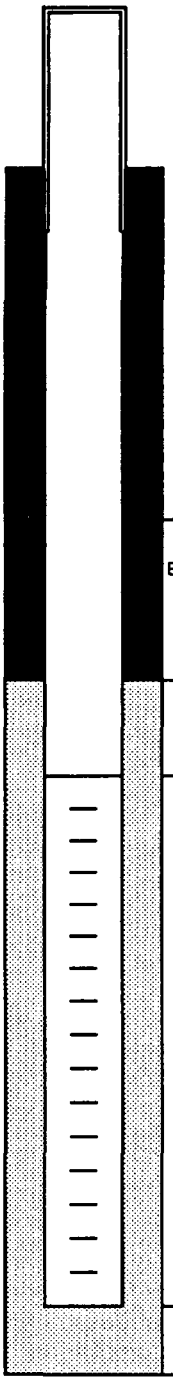
REMARKS 8 inch diameter borehole.
Borehole drilled to 67 feet; Cement/Bentonite grout placed from 57 feet to 67 feet.

HYDROGEOLOGIST C. Trione/E. Johnson

MALCOLM PIRNIE, INC.

VE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



TOTAL DRILLED DEPTH

- [x] LOCKING PROTECTIVE CASING
- [ ] FLUSHMOUNT
- [ ] OTHER

- [ ] BENTONITE GROUT
- [x] BENTONITE/CEMENT GROUT
- [ ] BACKFILL

- [ ] SLURRY
- [x] PELLETS
- [ ] HOLEPLUG

- [ ] GRAVEL PACK
- [x] SAND PACK
- [ ] FORMATION COLLAPSE

ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-22**
LOCATION	Parcel A

TOP OF CASING ELEVATION	21.562
GROUND ELEVATION	20.271
DEPTH TO WATER	~3
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	8/21/96
COMPLETION DATE	8/21/96
DEVELOPMENT DATE	10/1/96
WELL PURPOSE	monitoring

CASING JOINTS: [x] FLUSH JOINT [ ] COUPLING JOINT

CASING 4 INCH (I.D.) [ ] STAINLESS STEEL [x] PVC

SCREEN 4 INCH (I.D.) 10 SLOT [x] PVC [ ] STAINLESS STEEL

REMARKS 8 inch diameter borehole.

HYDROGEOLOGIST C. Trione

301557

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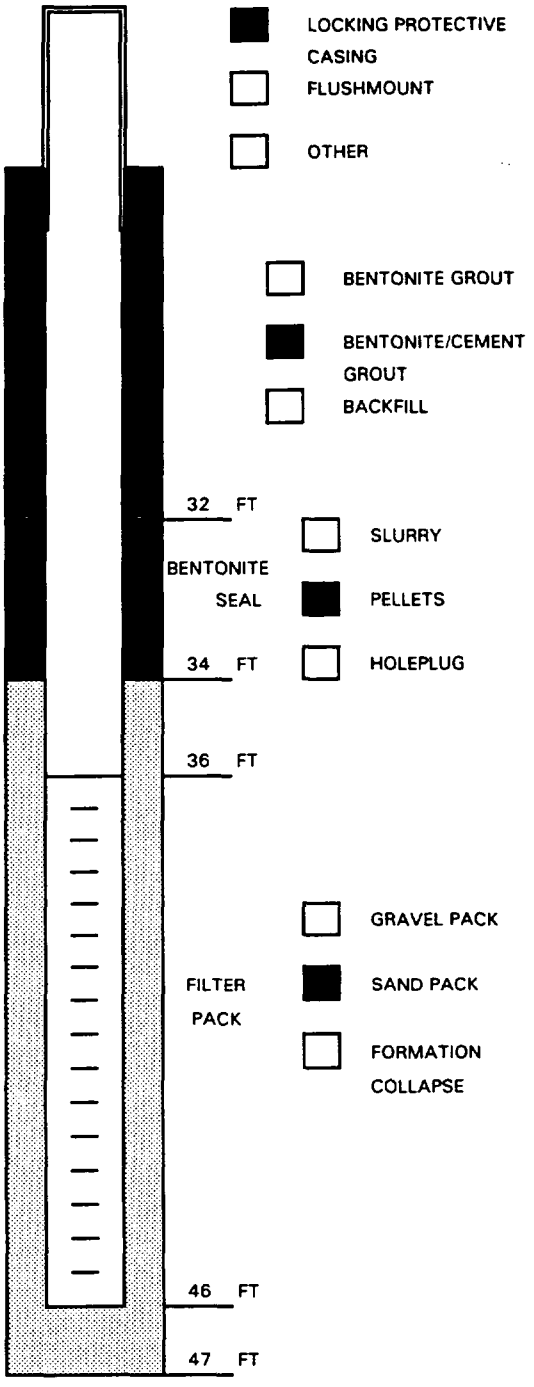
VE INTERNATIONAL BLVD.
MAHWAH, NJ 07495 - 0018

WELL CONSTRUCTION LOG



ALL MEASUREMENTS ARE FROM GROUND SURFACE UNLESS OTHERWISE NOTED

PROJECT NAME	Li Tungsten Superfund Site
PROJECT #	8001202
WELL I.D.	**MP-22D**
LOCATION	Parcel A

TOP OF CASING ELEVATION	22.046
GROUND ELEVATION	20.388
DEPTH TO WATER	~3
DRILLING CONTRACTOR	Environmental Products & Services
DRILLER	Roy Mentzer
DRILLING METHOD	Hollow Stem Augers
DRILLING FLUID	N/A
DRILLING DATE	8/13/96
COMPLETION DATE	8/21/96
DEVELOPMENT DATE	10/13/96
WELL PURPOSE	monitoring

CASING JOINTS: ■ FLUSH JOINT ☐ COUPLING JOINT

CASING 4 INCH (I.D.) ☐ STAINLESS STEEL ■ PVC

SCREEN 4 INCH (I.D.) 10 SLOT ■ PVC ☐ STAINLESS STEEL

REMARKS 8 inch diameter borehole.
Borehole drilled to 57 feet; Cement/Bentonite grout placed from 47 feet to 57 feet.

HYDROGEOLOGIST C. Trione

APPENDIX E

Appendix E

Field Measurements During Well Purging

Well Development
Round 1 Groundwater Sampling
Resampling Groundwater Sampling
Round 2 Groundwater Sampling

Well No. MP-5

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/22/96

SAMPLERS: Stanley Suchanski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 31.60

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 21.75

4) Volume of water in Casing (ga): 6.5

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	15	20	30	40	45	55			
Time (24 hr. clock)	11:05	11:20	11:45	12:00	12:40	13:10	13:30	14:00			
Conductivity (MHO/cm)	372	485	489	507	499	499	489	487			
Eh (mV)											
pH (SU)	7.65	7.71	6.60	6.57	6.43	6.48	6.53	6.53			
Temp. (°C)	19.5	17.4	18.0	18.0	15.3	14.6	14.7	14.5			
Turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000	390	270	130			

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-17D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/21/96

SAMPLERS: Stanly Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 14.6

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 1.12

4) Volume of water in Casing (ga): 8.90

$V = 0.0408(\#2)^2 \times (\#1 - \#3) = \#4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	10	15	20						
Time (24 hr. clock)	09:30	11:00	11:30	12:00	12:30						
Conductivity (MHO/cm)	1,587	2,820	2,600	2,420	2,540						
Eh (mV)											
pH (SU)	6.70	7.15	7.12	7.18	7.14						
Temp. (°C)	16.3	18.1	17.4	18.2	17.8						
Turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000						

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-18D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/14/96

SAMPLERS: Stanley Sucharski

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible / Centrifugal

1) Total Casing & Screen Length (ft): 47.60

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 6.40

4) Volume of water in Casing (ga): 27.20

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	15	30							
Time (24 hr. clock)	10/14 10:45	10/15 11:45	10/15 13:10	10/15 14:20							
Conductivity (MHO/cm)	3,710	686	1,910	2,680							
Eh (mV)											
pH (SU)	6.0	6.09	5.69	5.53							
Temp. (°C)	18.7	14.7	15.9	17.6							
Turbidity (NTUs)	>1,000	>1,000	>1,000	170							

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-18S

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/14/96

SAMPLERS: Stanley Sucharski (EP&S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible / Centrifugal

1) Total Casing & Screen Length (ft): 15.20

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 4.12

4) Volume of water in Casing (ga): 7.31

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	25	30	50	55						
Time (24 hr. clock)	12:40	13:50	14:40	15:35	16:20						
Conductivity (MHO/cm)	1,960	2,820	3,010	3,060	3,050						
Eh (mV)											
pH (SU)	5.20	4.79	4.97	5.15	5.00						
Temp. (°C)	19.4	20.8	17.6	19.7	19.2						
Turbidity (NTUs)	>1,000	>1,000	110	175	190						

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-4D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/10/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible

1) Total Casing & Screen Length (ft): 13.80

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 2.10

4) Volume of water in Casing (ga): 7.72

V = 0.0408(# 2)^2 X (# 1 - # 3) = # 4

V = 0.0408( )^2 X (-) = _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	5	30	55	75	130	150	220				
Time (24 hr. clock)	10/10 1210	10/10 1410	10/10 1513	10/10 1630	10/11 1000	10/11 1130	10/11 1600				
Conductivity (MHO/cm)	489	467	447	399	313	311	326				
Eh (mV)											
pH (SU)	6.87	6.63	7.33	7.05	7.05	7.03	7.02				
Temp. (°C)	19.8	25.6	21.1	21.7	16.4	16.0	16.2				
Turbidity (NTUs)	>1,000	>1,000	240	>1,000	>1,000	>1,000	>1,000				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-22D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/23/96

SAMPLERS: Stanley Suchorski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 50.44

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 5.82

4) Volume of water in Casing (ga): 26.78

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	25	35	45								
Time (24 hr. clock)	13:30	15:00	16:30								
Conductivity (MHO/cm)	4,270	4,290	4,300								
Eh (mV)											
pH (SU)	7.21	7.56	7.53								
Temp. (°C)											
Turbidity (NTUs)	>1000	>1000	>1000								

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-22S

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/1/96

SAMPLERS: Stanley Suharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 15.28

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 5.82

4) Volume of water in Casing (ga): 6.24

$V = 0.0408(\#2)^2 \times (\#1 - \#3) = \#4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	25	55	65								
Time (24 hr. clock)	11:30	13:15	14:30								
Conductivity (MHO/cm)	20,350	1,129	1,326								
Eh (mV)											
pH (SU)	6.21	6.18	6.22								
Temp. (°C)											
Turbidity (NTUs)	95	80	58								

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Page 1 of 2

Well No. MP-11D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: L: Tungsten

PROJECT NUMBER:

DATE: 10/23 10/24 + 10/25/96

SAMPLERS: Stanley Sochorski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal / Submersible Pump

1) Total Casing & Screen Length (ft): 114.5'

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 28.4

4) Volume of water in Casing (ga): 58.83

$V = 0.0408(\#2)^2 \times (\#1 - \#3) = \#4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	25	55	70	72	73	75	87	90	91	92
Time (24 hr. clock)	10/23 16:00	10/23 16:30	10/23 17:00	10/24 07:30	10/24 09:15	10/24 10:00	10/25 12:15	10/25 12:30	10/25 12:40	10/25 12:50	10/25 13:15
Conductivity (MHO/cm)	2,820	1,420	2,700	2,080	2,380	2,280	406	406	1,750	2,720	2820
Eh (mV)											
pH (SU)	11.67	11.43	11.53	11.47	11.54	11.46	9.87	9.75	11.43	11.56	11.75
Temp. (°C)	12.6	12.8	12.6	13.1	13.7	13.5	13.1	12.8	13.7	13.1	13.4
Turbidity (NTUs)	>1,000	370	380	350	330	270	>1000	>1000	>1000	>1000	>1000

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Page 2 of 2

Well No. MP-11D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/28/96 10/29/96 10/30/96

SAMPLERS: Stanley Suhanski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump/Bailer

1) Total Casing & Screen Length (ft): 114.5'

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 28.4'

4) Volume of water in Casing (ga): 58.83

$V = 0.0408(\# 2)^2 \times (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

Notes
* - After flushing well with 500 gallons of water from hydrant
** - Bailing

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	112	117	122	* 132	142	144	148	150	** 152	160	164
Time (24 hr. clock)	10/28 12:00	10/28 12:05	10/28 12:10	10/29 10:45	10/29 10:50	10/29 10:55	10/29 13:54	10/29 13:55	10/31 11:00	10/31 12:00	10/31 13:00
Conductivity (MHO/cm)				452	340	373	378	337			
Eh (mV)											
pH (SU)	11.23	11.35	11.28	8.19	9.26	10.04	9.93	9.94	10.78	10.84	10.95
Temp. (°C)				12.0	19.9	12.0	12.1	12.1			
Turbidity (NTUs)				>1,000	270	92	>1,000	>1,000			

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-21D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Lc Tungsten

PROJECT NUMBER:

DATE: 9/26/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft):

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 2.99

4) Volume of water in Casing (ga):

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	55	110	170	220	245	275					
Time (24 hr. clock)	12:50	13:40	14:39	15:15	16:02	16:15					
Conductivity (MHO/cm)	850	795	1,575	789	810	823					
Eh (mV)											
pH (SU)	9.78	8.85	11.07	8.57	7.28	8.96					
Temp. (°C)											
Turbidity (NTUs)	>1,000	200	130	75	78	18					

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-6

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 9/27/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 15.14

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 5.54

4) Volume of water in Casing (ga): 6.4

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\ \ )^2 X (\ \ - \ \ ) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	30	110	165	220	275	300	315	330			
Time (24 hr. clock)	11:30	11:38	11:46	12:25	12:36	12:40	12.44	12:45			
Conductivity (MHO/cm)	895	876	871	844	857	851	859	852			
Eh (mV)											
pH (SU)	6.37	5.77	5.67	5.51	5.46	5.42	5.41	5.42			
Temp. (°C)											
Turbidity (NTUs)	225	140	240	95	230	98	39	35			

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

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Well No. MP-2D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/7/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 24.94'

2) Casing Internal Diameter (in): 5.90'

3) Water Level Below Top of Casing: 4

4) Volume of water in Casing (ga): 12.57

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	15	55	80	120	135	165					
Time (24 hr. clock)	10/7 13:30	10/7 14:30	10/7 14:55	10/8 10:25	10/8 10:55	10/8 11:15					
Conductivity (MHO/cm)	4,820	2,282	1940	1,670	1,280	1,260					
Eh (mV)											
pH (SU)	6.13	6.05	6.15	6.24	6.31	6.24					
Temp. (°C)											
Turbidity (NTUs)	71,000	240	350	290	50	45					

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-20

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/9/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 15.58

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 5.43

4) Volume of water in Casing (ga): 6.70

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	5	30	55	75	90	100	110				
Time (24 hr. clock)	10:50	11:10	11:20	12:20	12:35	12:52	12:55				
Conductivity (MHO/cm)	546	484	481	491	487	486	490				
Eh (mV)											
pH (SU)	6.54	6.49	6.41	6.30	6.46	6.48	6.42				
Temp. (°C)											
Turbidity (NTUs)	>1,000	>1,000	340	230	225	72	48				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. Gm-14A

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/15/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 11.50

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 9.18

4) Volume of water in Casing (ga): 1.58

$V = 0.0408(\#\ 2)^2 \times (\#\ 1 - \#\ 3) = \#\ 4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	20	25	30	35	40				
Time (24 hr. clock)	10/15 17:12	10/15 17:45	10/16 09:30	10/16 10:00	10/16 10:30	10/16 11:00	10/16 11:30				
Conductivity (MHO/cm)	6,700	3,160	2,260	2,040	2,000	1,820	1,790				
Eh (mV)											
pH (SU)	9.41	8.33	7.14	7.26	7.29	7.76	7.68				
Temp. (°C)	19.5	20.8	18.1	19.8	20.1	20.4	20.1				
Turbidity (NTUs)	>1,000	>1,000	430	200	85	55	50				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-14B

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/15/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD:

1) Total Casing & Screen Length (ft): 19.55

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 6.51

4) Volume of water in Casing (ga): 2.22

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	10	15	20	25	30				
Time (24 hr. clock)	10/15 16:52	10/15 17:52	10/16 09:15	10/16 09:45	10/16 10:15	10/16 10:45	10/16 11:15				
Conductivity (MHO/cm)	19,060	5,840	>20,000	>20,000	18,150	3,030	15,240				
Eh (mV)											
pH (SU)	9.09	9.57	8.86	9.04	9.00	9.27	9.24				
Temp. (°C)	18.7	17.8	18.2	18.4	18.1	17.8	20.3				
Turbidity (NTUs)	>1000	>1000	>1000	>1000	>1,000	>1,000	>1,000				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-16S

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/16/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 22.70

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 2.29

4) Volume of water in Casing (ga): 13.47

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	15	18	20	22	24				
Time (24 hr. clock)	14:40	15:05	15:50	16:25	16:30	17:10 ~~16:40~~	17:45				
Conductivity (MHO/cm)	239	268	302	277	274	276	295				
Eh (mV)											
pH (SU)	8.08	8.26	9.11	8.81	8.46	8.19	8.73				
Temp. (°C)	15.3	20.8	20.5	20.6	22.2	25.5	28.5				
Turbidity (NTUs)	>1,000	140	250	140	78	57	23				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-16D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/16/96

SAMPLERS: Stanley Suchorski (EP&S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 55.10

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 15.36

4) Volume of water in Casing (ga): 23.84

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	15	20	25	28	30	32	35			
Time (24 hr. clock)	13:45	14:45	15:30	16:15	16:20	17:15	17:30	18:30			
Conductivity (MHO/cm)	338	284	306	319	308	290	289	305			
Eh (mV)											
pH (SU)	8.67	8.31	8.73	9.57	9.35	8.47	8.71	8.61			
Temp. (°C)	21.2	19.2	24.2	22.4	25.3	23.0	17.1	18.1			
Turbidity (NTUs)	>1,000	220	230	180	150	180	220	230			

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-1

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tengsten

PROJECT NUMBER:

DATE: 10/19/96

SAMPLERS: Stanley Sucharski (EP&S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 15.10

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 6.40

4) Volume of water in Casing (ga): 1.48

$V = 0.0408(\#2)^2 \times (\#1 - \#3) = \#4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	14	25							
Time (24 hr. clock)	09:15	09:46	09:46	10:15							
Conductivity (MHO/cm)	387	398	936	952							
Eh (mV)											
pH (SU)	7.72	7.38	6.73	6.68							
Temp. (°C)	18.6	20.0	21.2	19.6							
Turbidity (NTUs)	>1,000	100	26	37							

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. Gm-8

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/17/96

SAMPLERS: S. Suchorski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 14.52

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 6.73

4) Volume of water in Casing (ga): 1.32

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	30	55							
Time (24 hr. clock)	11:30	11:35	11:45	12:00							
Conductivity (MHO/cm)	276	287	397	398							
Eh (mV)											
pH (SU)	6.95	6.83	5.72	5.18							
Temp. (°C)	17.0	17.1	17.7	17.6							
Turbidity (NTUs)	>1,000	>1,000	24	39							

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. EMW-1

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/17/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 15.19

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 4.39

4) Volume of water in Casing (ga): 7.13

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	15	25	55							
Time (24 hr. clock)	12:30	12:40	12:55	13:20							
Conductivity (MHO/cm)	524	631	637	625							
Eh (mV)											
pH (SU)	6.45	6.25	6.13	6.06							
Temp. (°C)	19.9	21.3	20.1	19.2							
Turbidity (NTUs)	>1,000	190	110	6.8							

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-7

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/17/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 14.15

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 5.90

4) Volume of water in Casing (ga): 1.40

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	10	25	30	35	40	45	50	55	
Time (24 hr. clock)	13:43	14:00	14:15	14:30	14:40	14:50	15:10	15:20	15:30	15:40	
Conductivity (MHO/cm)	438	272 ~~24.4~~	270 ~~22.4~~	316 ~~28.7~~	274	327	367	419	451	442	
Eh (mV)											
pH (SU)	6.31	6.78	7.11	7.24	7.47	7.24	7.35	7.11	6.89	6.92	
Temp. (°C)	26.8	24.4	22.4	28.7	21.3	25.5	24.6	24.5	23.3	23.6	
Turbidity (NTUs)	>1,000	>1,000	230	140	160	130	130	42	27	25	

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. EMW-4

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/17/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 21.50

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 16.30

4) Volume of water in Casing (ga): 3.43

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	10	12	14	15	16	17	18	19	
Time (24 hr. clock)	10/17 16:30	10/17 16:37	10/17 17:30	10/17 18:00	10/17 18:30	10/18 08:30	10/18 03:45	10/18 09:00	10/18 09:15	10/18 09:30	
Conductivity (MHO/cm)	2,520	3,120	653	5,840	2640	3,550	4,150	4,140	4,090	4,010	
Eh (mV)											
pH (SU)	5.79	5.28	6.29	5.81	5.49	5.54	5.47	5.44	5.44	5.43	
Temp. (°C)	23.1	23.6	17.5	24.0	22.4	21.3	22.7	23.3	23.4	23.3	
Turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000	300	270	230	160	

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-13

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/18/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 19.00

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 13.00

4) Volume of water in Casing (ga): 1.02

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	6	7	9	11	14					
Time (24 hr. clock)	10:35	11:30	12:00	12:30	13:00	13:30					
Conductivity (MHO/cm)	601	610	593	581	604	596					
Eh (mV)											
pH (SU)	6.40	6.80	7.12	7.19	7.14	7.22					
Temp. (°C)	16.0	19.2	20.7	21.5	19.4	19.2					
Turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000	>1,000					

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-15

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/18/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 13.80

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 6.75

4) Volume of water in Casing (ga): 1.20

$V = 0.0408(\#2)^2 \times (\#1 - \#3) = \#4$

$V = 0.0408(\quad)^2 \times (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	8	15	35	45	55					
Time (24 hr. clock)	14.35	14:50	15:00	15:20	15:50	16:30					
Conductivity (MHO/cm)	383	454	599	796	727	740					
Eh (mV)											
pH (SU)	6.66	6.64	6.71	6.85	6.86	6.78					
Temp. (°C)	19.8	20.2	19.0	20.4	19.4	19.1					
Turbidity (NTUs)	>1,000	>1,000	230	60	56	23					

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-2

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/21/96

SAMPLERS: Stanley Sucharski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 12.45

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 0.65

4) Volume of water in Casing (ga): 2.0

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	5	8	15	20	25	30	35	40		
Time (24 hr. clock)	13:50	14:10	14:25	15:00	15:20	15:45	15:56	16:15	16:45		
Conductivity (MHO/cm)	1,660	1,510	1,500	1,420	1,680	1,750	1,630	853	1,268		
Eh (mV)											
pH (SU)	6.85	6.80	6.96	7.19	7.10	6.90	6.69	6.72	6.60		
Temp. (°C)	17.5	19.5	20.3	14.3	15.7	15.6	16.6	15.9	16.2		
Turbidity (NTUs)	>1,000	>1,000	>1,000	230	98	93	58	85	77		

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-9

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/22/96

SAMPLERS: Stanley Suchanski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 14.40

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 3.20

4) Volume of water in Casing (ga): 1.9

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	20	30	40	55						
Time (24 hr. clock)	08:30	08:50	09:10	09:30	10:00						
Conductivity (MHO/cm)	467	479	470	475	474						
Eh (mV)											
pH (SU)	6.88	6.55	6.27	6.24	6.23						
Temp. (°C)	14.6	15.7	16.1	16.3	16.3						
Turbidity (NTUs)	>1,000	200	330	60	38						

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MP-19D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/22/96

SAMPLERS: Stanley Suchanski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 35.5

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 7.2

4) Volume of water in Casing (ga): 18.68

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	25	40	55	75	110	140	165	190	220	
Time (24 hr. clock)	14:35	14:50	15:00	15:10	15:20	15:30	15:45	16:00	16:15	16:30	
Conductivity (MHO/cm)	517	606	613	614	616	615	618	613	617	614	
Eh (mV)											
pH (SU)	6.93	6.86	6.69	6.56	6.52	6.54	6.52	6.55	6.52	6.58	
Temp. (°C)	15.3	13.3	13.2	13.5	13.4	13.6	13.5	13.4	13.2	13.4	
Turbidity (NTUs)	>1,000	>1,000	250	140	130	100	90	75	50	20	

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-11

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: h: Tungsten

PROJECT NUMBER:

DATE: 10/22/96

SAMPLERS: Stanley Sucherski (EPrS)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft): 16.25

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 8.1

4) Volume of water in Casing (ga): 1.40

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	25	55	80	110	135	165				
Time (24 hr. clock)	17:05	17:20	17:45	18:05	18:25	18:45	19:00				
Conductivity (MHO/cm)	323	176	164	164	167	164	165				
Eh (mV)											
pH (SU)	7.58	7.24	5.80	5.40	5.28	5.22	5.03				
Temp. (°C)	14.8	14.0	13.8	13.9	13.9	14.1	14.0				
Turbidity (NTUs)	>1,000	>1000	>1000	380	210	70	10				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. Gm-12

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hi Tungsten

PROJECT NUMBER:

DATE: 10/23/96

SAMPLERS: Stanley Suchoski (EP-5)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Centrifugal Pump

1) Total Casing & Screen Length (ft):

2) Casing Internal Diameter (in):

3) Water Level Below Top of Casing:

4) Volume of water in Casing (ga):

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	20	30	40	50	55				
Time (24 hr. clock)	10:00	10:30	11:00	11:30	12:00	12:30	13:00				
Conductivity (MHO/cm)	529	561	554	551	573	555	526				
Eh (mV)											
pH (SU)	6.32	6.71	6.81	7.03	7.20	7.11	7.09				
Temp. (°C)	17.1	19.8	17.9	21.9	18.9	19.4	19.6				
Turbidity (NTUs)	>1,000	250	170	130	90	58	45				

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. GM-10

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: hs Tungsten

PROJECT NUMBER:

DATE: 10/24/94

SAMPLERS: Stanley Suchorski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 56.40

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 46.80

4) Volume of water in Casing (ga): ~~9.6~~ 1.6

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	20	30	40	55	70	90	110			
Time (24 hr. clock)	10:30	11:00	11:30	12:00	12:30	13:00	13:15	13:30			
Conductivity (MHO/cm)	315	238	205	195	175	170	167	166			
Eh (mV)											
pH (SU)	9.06	7.54	5.64	5.36	5.33	5.33	5.31	5.33			
Temp. (°C)	13.2	12.3	12.4	12.8	12.2	12.1	11.8	12.2			
Turbidity (NTUs)	>1,000	230	>1,000	110	70	60	55	68			

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MW-8D

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/24/96

SAMPLERS: Stanley Suchorski (EP+S)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 62.35

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 47.5

4) Volume of water in Casing (ga): 9.8

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	20	35	40	55	60	75	80	95	110	
Time (24 hr. clock)	14:00	14:10	14:20	14:30	14:40	14:50	15:00	15:10	15:20	15:30	
Conductivity (MHO/cm)	1,257	1,125	1,197	1,186	1,187	1,130	1,143	1,122	1,086	1,045	
Eh (mV)											
pH (SU)	5.93	6.02	6.07	6.10	6.11	6.10	6.09	6.10	6.11	6.14	
Temp. (°C)	12.2	12.2	12.2	12.0	12.2	12.2	12.1	12.2	12.2	12.2	
Turbidity (NTUs)	71,000	280	210	130	90	87	79	45	15	8.6	

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MW-8S

WELL DEVELOPMENT / PURGING LOG

PROJECT NUMBER: L: Tungsten

PROJECT NUMBER:

DATE: 10/24/96

SAMPLERS: Stanley Sucharski (EPAS)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Submersible Pump

1) Total Casing & Screen Length (ft): 49.95

2) Casing Internal Diameter (in): 4

3) Water Level Below Top of Casing: 46.20

4) Volume of water in Casing (ga): 2.48

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	1	10	15	20	25						
Time (24 hr. clock)	15:36	15:45	16:00	16:15	16:30						
Conductivity (MHO/cm)	382	587	600	594	605						
Eh (mV)											
pH (SU)	6.16	6.27	6.28	6.32	6.35						
Temp. (°C)	12.7	12.8	13.4	13.3	13.4						
Turbidity (NTUs)	>1,000	>1,000	79	35	10						

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

Well No. MW-10

WELL DEVELOPMENT / PURGING LOG

PROJECT NUNBER: Li Tungsten

PROJECT NUMBER:

DATE: 10/25/96

SAMPLERS: Stanley Sucharski (EPA)

DATE OF INSTALLATION:

DEVELOPMENT / PURGING METHOD: Bailer

1) Total Casing & Screen Length (ft): 66.95

2) Casing Internal Diameter (in): 2

3) Water Level Below Top of Casing: 54.20

4) Volume of water in Casing (ga): 2.17

$V = 0.0408(\# 2)^2 X (\# 1 - \# 3) = \# 4$

$V = 0.0408(\quad)^2 X (\quad - \quad) =$ _____ gallons

Note
1½" of black paint / thinner type product on water-table.

PARAMETER	ACCUMULATED VOLUME PURGED										
Gallons	0.5	1.5	3.0	4.5	6.0						
Time (24 hr clock)	09:00	09:15	09:30	09:45	10:00						
Conductivity (MHO/cm)	1,360	1,340	1,280	1,260	1,310						
Eh (mV)											
pH (SU)	8.39	7.57	6.90	6.49	6.35						
Temp (°C)	13.6	13.0	13.6	13.0	13.4						
Turbidity (NTUs)	>1,000	>1,000	>1,000	>1,000	>1,000						

PHOTO NUMBER IF TAKEN: _____ WATER LEVEL AFTER DEVELOPMENT: _____

CONSTANT FOR CALCULATING BOREHOLE & WELL WATER VOLUMES

WELL ID	2-inch	4-inch	6-inch	8-inch
VOL.(gal/ft)	0.17	0.66	1.50	2.60

FIGURE 3-14

TABLE 3-6
LI TUNGSTEN SUPERFUND SITE
Glen Cove, New York
Summary of Hydraulic Conductivity Results

Well I.D.	Location	Test Type	Hydraulic Conductivity(cm/s)
GM-1	Parcel A	Rising Head	7.0E-04
GM-2	Parcel A	Rising Head	5.5E-05
MP-4	Parcel C	Rising Head	1.4E-04
MP-5	Parcel B	Falling Head	7.9E-04
MP-5	Parcel B	Rising Head	2.2E-04
MP-6	Parcel A	Rising Head	6.0E-03
GM-7	Parcel B	Rising Head	3.3E-05
GM-9	Parcel B	Rising Head	1.1E-03
GM-12	Parcel C'	Rising Head	5.4E-05
GM-14A	Parcel C	Rising Head	1.2E-03
GM-15	Parcel C	Rising Head	2.6E-04
MP-16D	Parcel C	Falling Head	9.9E-06
MP-18S	Parcel C	Rising Head	1.8E-04
MP-18D	Parcel C	Falling Head	3.4E-05
MP-19D	Parcel B	Falling Head	2.2E-02
MP-19D	Parcel B	Rising Head	2.0E-02
MP-20	Parcel A	Rising Head	9.5E-04
MP-21D	Parcel A	Rising Head	2.5E-04

Avg. 3.1 E-03

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 3001202103 DATE 12/2/96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY C. Trigno

H. Kowalski

SAMPLE COLLECTION LOG

WELL ID GM-1 Round 1

WELL PURGING EQUIPMENT Centrifugal

TIME PURGING FINISHED 1045 TIME SAMPLING STARTED 1200

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 16.54 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 7.94 (8.10) (7.95) TIME 1000 (8.40) (5)

HEIGHT OF WATER IN WELL (FT) = 8.60

ONE WELL VOLUME (GALLONS) = 1.40

VOLUME WATER REMOVED (GALLONS) = 5.00

SAMPLE APPEARANCE Turbid Brown / Milky

NTU's	>1000	>1000	960	840	
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12	12	12	12	
SPEC COND. (umhos/cm)	850	840	840	840	
pH	6.23	6.21	6.43	6.29	
VOLUME PURGED (gal)	~.5	1.5	3.0	4.5	
DO mg/L	4.1	3.8	3.5	3.4	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TAL - TCL, CN, RAD, TDS, PCB's/Pest

WEATHER CONDITIONS Sunny - 48°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-4-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-2D

WELL PURGING EQUIPMENT Centrifugal Pump + 3/4" Poly Pipe

TIME PURGING FINISHED 1345 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT S.S. Bailers

WELL DEPTH (FT. FROM TOC) = 22.45

DEPTH TO WATER (FT. FROM TOC) = 6.92(I) 19.8(AA) 7.6(BS) TIME 1235

HEIGHT OF WATER IN WELL (FT) = 15.33 ~~20.5~~

ONE WELL VOLUME (GALLONS) = 9.9

VOLUME WATER REMOVED (GALLONS) = 30 Gal

SAMPLE APPEARANCE Gry - Blk Turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.5	11.0	11.0	
SPEC COND. (umhos/cm)	3,400	3,200	3,100	3,200	
pH	5.93	5.61	5.89	5.91	
VOLUME PURGED (gal)	21.0	10.0	20.0	30.0	
DO	4.0	3.60	4.60	5.10	
NTUS	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TCL - VOA, Br TAL - Dissolved, total Cn, TDS, RAD

WEATHER CONDITIONS P. Cloudy 45-50°F w/ Rain Showers in AM

OTHER NOTES Slow seepage.

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-4-96

PROJECT NAME L. Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-2

WELL PURGING EQUIPMENT Hand Evacuate w/ check valve + 3/4" Poly Pipe

TIME PURGING FINISHED 1400 TIME SAMPLING STARTED 1550

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 12.34 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 0.96 10.08 5.62 TIME 1245

HEIGHT OF WATER IN WELL (FT) = 11.38

ONE WELL VOLUME (GALLONS) = 1.8

VOLUME WATER REMOVED (GALLONS) = 6.0

SAMPLE APPEARANCE Grey - Blk turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	10.5	10.5	10.5	
SPEC COND. (umhos/cm)	1200	1200	1200	1200	
pH	6.38	6.42	6.51	6.39	
VOLUME PURGED (gal)	1.0	2.0	4.0	6.0	
DO	7.1	6.3	5.2	4.9	
NTU's	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TCL-VOA, TAL, Cn, RAD, Br, TDS

WEATHER CONDITIONS P. cloudy 45-50°F w/ rain showers in A.M.

OTHER NOTES Slow recharge

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-6-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-4

WELL PURGING EQUIPMENT Centrifugal Pump w/ 1/2" Poly Pipe + Check Valve

TIME PURGING FINISHED 1045 TIME SAMPLING STARTED 1120

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 12.88 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 0.02 10.5 0.2 TIME 1020

HEIGHT OF WATER IN WELL (FT) = 12.86

ONE WELL VOLUME (GALLONS) = 8.3

VOLUME WATER REMOVED (GALLONS) = ~25

SAMPLE APPEARANCE Cloudy Tan-Brown S. Turbid ~ 100 NTU's

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	12.0	12.0	12.0	
SPEC COND. (umhos/cm)	310	340	330	330	
pH	7.01	7.12	7.20	7.16	
VOLUME PURGED (gal)	1.0	8.3	16.6	24.9	
DO	3.9	4.2	5.1	5.0	
NTUs	>1000	>1000	650	111	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Ba, TDS, RAD, metals - dissolved, totals, Cn, PCBs/Pest

WEATHER CONDITIONS Rain - Temp 31°F wind 0-5 mph

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301598

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/6/96

PROJECT NAME C. Tungsten SAMPLERS C. Trin

SITE LOCATION Parcel B J. Guerriero

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-5

WELL PURGING EQUIPMENT Centrifugal pump

TIME PURGING FINISHED 1030 TIME SAMPLING STARTED 1130

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 28.65

DEPTH TO WATER (FT. FROM TOC) = 18.62 TIME 1030

HEIGHT OF WATER IN WELL (FT) = ~~28.65~~ 10.03

ONE WELL VOLUME (GALLONS) = 6.5 gal

VOLUME WATER REMOVED (GALLONS) = 20 gal

SAMPLE APPEARANCE Brown - Turbid, Muddy -

DO mg/L	7.28	7.01	7.03		
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	7°C	9°C	9°C		
SPEC COND. (umhos/cm)	400	550	560		
pH	6.36	6.32	6.31		
VOLUME PURGED (gal)	6.50	6.50	6.50		
Turbidity	>1000 NTU	>1000	>1000 NTU		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, Metals, Cyanide, TDS + Rad, PCB's/Pest

WEATHER CONDITIONS Rain - Temp 31°F Winds - 0-5 mph

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301599

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/18/96

PROJECT NAME L. Tungsten SAMPLERS C. Triano

SITE LOCATION Parcel "C" - Garvies Pt. Rd J. Guerrier

SAMPLE COLLECTION LOG

Round 1

WELL ID EMW-4

WELL PURGING EQUIPMENT Centrifugal Pump / 3/4" Poly - Check Valve

TIME PURGING FINISHED 10:42 TIME SAMPLING STARTED 1100

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 22.00

DEPTH TO WATER (FT. FROM TOC) = 4.85 TIME 1120

HEIGHT OF WATER IN WELL (FT) = 16.15

ONE WELL VOLUME (GALLONS) = ≈ 10.49 gallons

VOLUME WATER REMOVED (GALLONS) = ≈10.49 gallons - dry at 1 Volume

SAMPLE APPEARANCE Cloudy, Brownish - Gray - High Turbidity

DO. mg/L 7.18 Dry

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13.°C				
SPEC COND. (umhos/cm)	500				
pH	6.72				
VOLUME PURGED (gal)	≈10.49				

Turbidity NTU >1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's Metals, Cyanide, TDS + Rad parameters, PCB's/Pest

WEATHER CONDITIONS 50°F, Sunny, Mild - G.C. wet

OTHER NOTES Well Dry after 10.49 gallons

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

6

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202103 DATE 12/3/96

PROJECT NAME Li Tungsten SAMPLERS E Johnson

SITE LOCATION Glen Cove, NY C. Trione

H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-6

WELL PURGING EQUIPMENT centrifuges

TIME PURGING FINISHED 1240 TIME SAMPLING STARTED 1435

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 15.95

DEPTH TO WATER (FT. FROM TOC) = 5.14 TIME 1200

HEIGHT OF WATER IN WELL (FT) = 10.81

ONE WELL VOLUME (GALLONS) = 7.0

VOLUME WATER REMOVED (GALLONS) = 21.0

SAMPLE APPEARANCE Slightly Turbid.

NTU's	>1000	732	644	512	
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.5	12.0	12.0	12.0	
SPEC COND. (umhos/cm)	610	600	600	590	
pH	5.47	5.33	5.20	5.39	
VOLUME PURGED (gal)	~1.0	7.0	14.0	21.0	
DO mg/L	3.9	2.6	2.9	3.0	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TAL - TCL Co

RAD, TDS, Collected MS/MSD

WEATHER CONDITIONS Sunny 48°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/9/96

PROJECT NAME L. Tungsten SAMPLERS C. Triano

SITE LOCATION Parcel "B" J. Guerrero

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-7

WELL PURGING EQUIPMENT Centrifugal Pump / Check Valve, 3/4" Poly

TIME PURGING FINISHED 1441 TIME SAMPLING STARTED 1450

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 15.5

DEPTH TO WATER (FT. FROM TOC) = 6.5 TIME 1450

HEIGHT OF WATER IN WELL (FT) = 9.0

ONE WELL VOLUME (GALLONS) = 1.5 gallons

VOLUME WATER REMOVED (GALLONS) = 7.5 gallons

SAMPLE APPEARANCE Dk brown, Muddy

DO mg/L	4.53	7.24	7.15	6.18	7.10
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11°C	12°C	12°C	12°C	12°C
SPEC COND. (umhos/cm)	10	310	312	318	318
pH	6.42	6.33	6.37	6.35	6.33
VOLUME PURGED (gal)	1.5	1.5	1.5	1.5	1.5
Turbidity NTU	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, Metals, Cyanide, TDS, Rad, PCB's/Pest

WEATHER CONDITIONS Sunny, Fog 39°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 12-10-96

PROJECT NAME Li Tungsten SAMPLERS H. Kowalski

SITE LOCATION Glen Cove, NY E. Johnson

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-8

WELL PURGING EQUIPMENT centrifugal pump

TIME PURGING FINISHED 1200 TIME SAMPLING STARTED 1230

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 15.13 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 5.44 7.46 5.36 TIME 1115

HEIGHT OF WATER IN WELL (FT) = 9.69

ONE WELL VOLUME (GALLONS) = 1.58

VOLUME WATER REMOVED (GALLONS) = 7.5

SAMPLE APPEARANCE Brown - Grey cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	12.0	12.0	12.0	12.0
SPEC COND. (umhos/cm)	165	190	170	180	190
pH	5.55	5.2	4.95	5.05	5.03
VOLUME PURGED (gal)	1	2.0	4.0	6.0	7.5
DL NTU	7.02 >1000	6.17 >1000	5.46 >1000	5.49 >1000	5.76 >1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Br, Cr, TDS, RAD, metals - dissolved, total, PCBs/Pest

WEATHER CONDITIONS P. cloudy ~ 40°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-11-96

PROJECT NAME L. Tungsten SAMPLERS Johnson, Kowalski

SITE LOCATION Glen Cove, NY Trione, Guerrero

SAMPLE COLLECTION LOG

WELL ID MW-8D Round 1

WELL PURGING EQUIPMENT 2" submersible pump

TIME PURGING FINISHED 1445 TIME SAMPLING STARTED 1550

SAMPLING EQUIPMENT S.S bailer

WELL DEPTH (FT. FROM TOC) = 69.2 (AP)(BS)

DEPTH TO WATER (FT. FROM TOC) = 46.13 67.23 48.26 TIME 1225

HEIGHT OF WATER IN WELL (FT) = 23.13

ONE WELL VOLUME (GALLONS) = 15.1

VOLUME WATER REMOVED (GALLONS) = -45

SAMPLE APPEARANCE ~~brown, cloudy~~ (W) clear to slightly cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	15.5	15.0	15.0	14.5	
SPEC COND. (umhos/cm)	310	330	325	325	
pH	5.39	5.26	5.28	5.31	
VOLUME PURGED (gal)	1	15	30	45	
DO	6.34	6.11	6.21	6.51	
NTU	146	100	53	52	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Ba, TDS, RAD, Cr, metals - total, dissolved, PCBs, Pest

WEATHER CONDITIONS overcast ~50°F

OTHER NOTES Strong organic odor

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301604

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-17-96

PROJECT NAME L. Tungsten SAMPLERS Johnson, Kowal, Trione, Guerriero

SITE LOCATION Glen Cove, NY

SAMPLE COLLECTION LOG

Round 1

WELL ID ~~GM-30~~ MW-8S

WELL PURGING EQUIPMENT 2" submersible pump

TIME PURGING FINISHED ~~1200~~ 1220 TIME SAMPLING STARTED 1305

SAMPLING EQUIPMENT S.S bailer

WELL DEPTH (FT. FROM TOC) = 49.20 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 46.10 48.83 47.31 TIME 945

HEIGHT OF WATER IN WELL (FT) = 3.10

ONE WELL VOLUME (GALLONS) = 2.02

VOLUME WATER REMOVED (GALLONS) = 2

SAMPLE APPEARANCE orange, brown, slightly turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	14.5	15.0			
SPEC COND. (umhos/cm)	210	220	DRY		
pH	5.71	5.64			
VOLUME PURGED (gal)	1 ~~EST~~	2			
NTU	>1000	306			
DO	7.82	6.93			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Br, TDS, RAD, Cn, metals - total, dissolved, PCBs, Pest

WEATHER CONDITIONS overcast ~50°F

OTHER NOTES strong organic odor

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301605

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/9/96

PROJECT NAME Li Tungsten SAMPLERS C. Trione

SITE LOCATION Parcel B J. Guerriero

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-9

WELL PURGING EQUIPMENT Centrifugal Pump

TIME PURGING FINISHED 1135 TIME SAMPLING STARTED 1145

SAMPLING EQUIPMENT S.S Bailer

WELL DEPTH (FT. FROM TOC) = 14.30

DEPTH TO WATER (FT. FROM TOC) = 3.00 TIME 1105

HEIGHT OF WATER IN WELL (FT) = 11.30

ONE WELL VOLUME (GALLONS) = 1.8

VOLUME WATER REMOVED (GALLONS) = > 10 gallons

SAMPLE APPEARANCE Brown / Cloudy - Turbidity > 1000 NTU

DO mg/L 8.12 8.26 7.36 7.0 7.4

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13°	13°	13°	13°
SPEC COND. (umhos/cm)	370	375	372	375	376
pH	6.12	6.15	6.15	6.14	6.17
VOLUME PURGED (gal)	1.8	1.8	1.8	1.8	1.8
Turbidity (NTU)	> 1000	> 1000	> 1000	> 1000	> 1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOAs - Jar. VOAs, Metals, Cyanide, TDS, Rad, PCB/Pest

WEATHER CONDITIONS Sunny, Temp 39°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

11.30
.16
67.80
1130
1.8080

301606

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-17-96

PROJECT NAME Li Tungsten SAMPLERS Johnson, Kowalski, Trione, Guerriero

SITE LOCATION Glen Cove, NY

SAMPLE COLLECTION LOG

Round 1

WELL ID MW-10

WELL PURGING EQUIPMENT 2" submersible pump

TIME PURGING FINISHED 1505 TIME SAMPLING STARTED ~~1615~~ 1615

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 66.7 (AR) (BS)

DEPTH TO WATER (FT. FROM TOC) = 44.9 65.12 53.26 TIME 1240

HEIGHT OF WATER IN WELL (FT) = 21.8

ONE WELL VOLUME (GALLONS) = 14.23

VOLUME WATER REMOVED (GALLONS) = 20

SAMPLE APPEARANCE cloudy - orange/brown

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	15.0	14.5	15.0		
SPEC COND. (umhos/cm)	250	260	250		
pH	5.46	5.37	5.61		
VOLUME PURGED (gal)	1 gal	15	20		
DO	7.18	7.62	7.31		
NTU	>1000	942	936		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Bn, TDS, Cn, RAD, metals - total, dissolved, PCBs/Pest

WEATHER CONDITIONS overcast ~50°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301607

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-17-96

PROJECT NAME Li Tungsten SAMPLERS Johnson, Kozak, Irione, Guerriero

SITE LOCATION Glen Cove, NY

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-10

WELL PURGING EQUIPMENT 2" @ submersible pump

TIME PURGING FINISHED ~~1005~~ 1025 TIME SAMPLING STARTED ~~1045~~ 1050

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 56.50 (AP) BS

DEPTH TO WATER (FT. FROM TOC) = 47.21 54.92 48.17 TIME 925

HEIGHT OF WATER IN WELL (FT) = 9.29

ONE WELL VOLUME (GALLONS) = 1.5

VOLUME WATER REMOVED (GALLONS) = ~5

SAMPLE APPEARANCE brown, gray turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	15.0	16.0	15.5	15.5	
SPEC COND. (umhos/cm)	210	165	170	160	
pH	4.82	4.98	5.02	4.96	
VOLUME PURGED (gal)	~ 1/2	1.5	3	4.5	
D.O.	4.50	6.17	5.92	6.13	
NTU	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Bn, Cn, TDS RAD, metals - total - dissolved, Pest/PCB

WEATHER CONDITIONS Overcast

OTHER NOTES May 23, 1996 (bailer)

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301608

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-11-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-11

WELL PURGING EQUIPMENT 2" submersible pump

TIME PURGING FINISHED 1330 TIME SAMPLING STARTED 1545

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 16.10 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 6.20 10.71 7.18 TIME 1155

HEIGHT OF WATER IN WELL (FT) = 9.9

ONE WELL VOLUME (GALLONS) = 1.6

VOLUME WATER REMOVED (GALLONS) = 5

SAMPLE APPEARANCE cloudy, turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	~~10.0~~	11.0	11.0	11.0	11.0
SPEC COND. (umhos/cm)	~~700~~	110	110	110	115
pH	~~10.95~~	7.24	7.31	7.39	7.36
VOLUME PURGED (gal)	~~1~~	1/2	1 1/2	3	5
DO	1.90	5.18	5.90	5.76	5.73
NTU	>1000	300	317	293	287

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Br, TDS, Cr, metals - total, dissolved, RAD, ~~PB~~, Pest

WEATHER CONDITIONS cloudy ~45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301609

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 12-11-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-11D

WELL PURGING EQUIPMENT 2" Submersible Pump

TIME PURGING FINISHED 1310 TIME SAMPLING STARTED 1550

SAMPLING EQUIPMENT SS. bailer

WELL DEPTH (FT. FROM TOC) = 115.3 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 19.1 113.6 104.38 TIME 1140

HEIGHT OF WATER IN WELL (FT) = 96.2

ONE WELL VOLUME (GALLONS) = ~66

VOLUME WATER REMOVED (GALLONS) = 66

SAMPLE APPEARANCE cloudy - turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	6.5	11.5			
SPEC COND. (umhos/cm)	360	500	DRY		
pH	10.42	10.93			
VOLUME PURGED (gal)	1	66			
D.O.	1.8 (CT)	613			
NTU	96	80.4			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA ~~SVOC~~ (W), Bn TDS metals total, dissolved, Cn, RAD, PCBs/Pest

WEATHER CONDITIONS Cloudy ~45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301610

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # L. Tungsten RI/FS 8001202 DATE 10/11/96

PROJECT NAME L. Tungsten SAMPLERS DB. C.T.

SITE LOCATION Parcel "C"

SAMPLE COLLECTION LOG

Round 1

WELL ID 6M-12

WELL PURGING EQUIPMENT Centrifugal Pump 3/4" Poly Hose

TIME PURGING FINISHED 1150 TIME SAMPLING STARTED 1230

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 16.00'

DEPTH TO WATER (FT. FROM TOC) = 5.92 TIME 1136

HEIGHT OF WATER IN WELL (FT) = 10.18

ONE WELL VOLUME (GALLONS) = 1.6 gallons

VOLUME WATER REMOVED (GALLONS) = 6.5 gallon

SAMPLE APPEARANCE Cloudy Brown Muddy

DO mg/L 13.5 12.1 8.7 9.7

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13°C	13°C	13°C	
SPEC COND. (umhos/cm)	500	520	520	520	
pH	6.6	6.21	6.20	6.18	
VOLUME PURGED (gal)	1.6	1.6	1.6	1.6	
Turbidity	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Semi-VOA, Metals TDS, Red parameters, T Collected Duplicate PCBs/Pest

WEATHER CONDITIONS Cloudy - Rain -

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

6

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 12/10/96

PROJECT NAME L. Tungsten SAMPLERS C. Trivne

SITE LOCATION Parcel "B" GM-13 J. Guerriero

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-13

WELL PURGING EQUIPMENT 3/4" Poly Hose / Check Valve Centrifugal Pump

TIME PURGING FINISHED 1509 TIME SAMPLING STARTED 1555

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 18.90

DEPTH TO WATER (FT. FROM TOC) = 12.16 TIME 1500

HEIGHT OF WATER IN WELL (FT) = 6.74

ONE WELL VOLUME (GALLONS) = 1.08 gal

VOLUME WATER REMOVED (GALLONS) = 4 gal

SAMPLE APPEARANCE cloudy

DO (mg/L) 12.1 13.4 13.6 13.2

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13.5°C	13°C	13°C	
SPEC COND. (umhos/cm)	900	950	1000	1000	
pH	5.99	6.06	6.18	6.19	
VOLUME PURGED (gal)	1.08	1.08	1.08	1.08	
Turbidity (NTU)	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, Metals, Cyanide, Rad + TDS, PCB Pest

WEATHER CONDITIONS Sunny, Temp PM - 33-34°F

OTHER NOTES 15.5 hrs after Purging

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-12-96

PROJECT NAME L. Tungsten SAMPLERS Johnson

SITE LOCATION Glen Cove, NY Trione

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-14A

WELL PURGING EQUIPMENT 2" Submersible pump

TIME PURGING FINISHED 1050 TIME SAMPLING STARTED 1150

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 9.90

DEPTH TO WATER (FT. FROM TOC) = 1.18 TIME 0950

HEIGHT OF WATER IN WELL (FT) = 7.72

ONE WELL VOLUME (GALLONS) = 1.2

VOLUME WATER REMOVED (GALLONS) = 4.5

SAMPLE APPEARANCE grey-blk turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.2	11.0	11.0	11.0	
SPEC COND. (umhos/cm)	1000	1050	1050	1050	
pH	4.91	4.80	4.77	4.69	
VOLUME PURGED (gal)	0.5	1.5	3.0	4.5	
DO mg/L	2.1 >1000	2.4 >1000	1.7 700	2.3 620	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Ba, RAD, TDS, metals - total, dissolved, Pest/PCB

WEATHER CONDITIONS p. cloudy ~45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-12-96

PROJECT NAME L Tungsten SAMPLERS Johnson

SITE LOCATION Glen Cove, NY Tr. One

SAMPLE COLLECTION LOG

Round 1

WELL ID GM-14B

WELL PURGING EQUIPMENT 2" Submersible pump

TIME PURGING FINISHED 1330 TIME SAMPLING STARTED 1500

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 19.72

DEPTH TO WATER (FT. FROM TOC) = 5.20 TIME 1045

HEIGHT OF WATER IN WELL (FT) = 14.52

ONE WELL VOLUME (GALLONS) = 2.3

VOLUME WATER REMOVED (GALLONS) = 7.5

SAMPLE APPEARANCE black

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	12.0	11.5	11.5	
SPEC COND. (umhos/cm)	910	1000	1050	1000	
pH	9.71	9.69	9.78	9.81	
VOLUME PURGED (gal)	0.5	2.5	5.0	7.5	
DO NTU's	3.2 >1000	7.1 >1000	3.0 >1000	1.9 >1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Br, RAD, TDS, metals - total, dissolved, Pest/PCB

WEATHER CONDITIONS p. cloudy ~45°F

OTHER NOTES odor

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 12/5/96

PROJECT NAME Li Tungsten SAMPLERS J. Guerrier

SITE LOCATION Parcel C Well-6M-15 C. Trione

SAMPLE COLLECTION LOG

Round 1

WELL ID 6M-15

WELL PURGING EQUIPMENT Honda - Trash Pump - 2" PVC - Well

TIME PURGING FINISHED 1507 TIME SAMPLING STARTED 1545

SAMPLING EQUIPMENT S.S Bailer

WELL DEPTH (FT. FROM TOC) = 13.60

DEPTH TO WATER (FT. FROM TOC) = 5.12 TIME 1500

HEIGHT OF WATER IN WELL (FT) = 8.48

ONE WELL VOLUME (GALLONS) = 1.4 gallons

VOLUME WATER REMOVED (GALLONS) = ≈6 gallons

SAMPLE APPEARANCE

DO (mg/L) 4.41 7.3 6.22 7.20

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	14°C	14°C	14°C	
SPEC COND. (umhos/cm)	360	340	490	490	
pH	6.31	6.36	6.41	6.43	
VOLUME PURGED (gal)	1.4 gallons	1.4 gal	1.4 gal	1.4	
Turbidity (NTU)	>1000 gal	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOAs Semi-VOAs Metals (D/F), Cyanide, TDS + Rad. Gamma Tests, PCB/Pest

WEATHER CONDITIONS Sunny to P/Cloudy in AM - Temp - 33°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-10-96

PROJECT NAME Ci Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-16D

WELL PURGING EQUIPMENT 2" Grundfos Submersible Pump + 3/4" Poly Pipe

TIME PURGING FINISHED 1220 TIME SAMPLING STARTED 1400

SAMPLING EQUIPMENT Stainless Steel bailer

WELL DEPTH (FT. FROM TOC) = 55.04 (AM (DS)

DEPTH TO WATER (FT. FROM TOC) = 3.12 549. 592 TIME 1045

HEIGHT OF WATER IN WELL (FT) = 51.92

ONE WELL VOLUME (GALLONS) = 33.89

VOLUME WATER REMOVED (GALLONS) = 34

SAMPLE APPEARANCE Gray - Brown V. Turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	11.5	DRY		
SPEC COND. (umhos/cm)	2900	3000			
pH	11.54	11.21			
VOLUME PURGED (gal)	~10	34			
DO	25	3.0			
NTU's	650	94.1			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) BAD TDS Cn metals - dissolved total, VOA, Ba, PCBs, Pest

WEATHER CONDITIONS P. Cloudy 40°F

OTHER NOTES Well Purged Dry - slow Recharge
Possible Grout/Cement Contamination

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301616

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-9-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Parcel C A. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-16S

WELL PURGING EQUIPMENT Centrifugal pump

TIME PURGING FINISHED 1300 TIME SAMPLING STARTED 1500

SAMPLING EQUIPMENT Stainless Steel bailer

WELL DEPTH (FT. FROM TOC) = 24.04 (AB) (BS)

DEPTH TO WATER (FT. FROM TOC) = 0.78 24.0 20.15 TIME 1050

HEIGHT OF WATER IN WELL (FT) = 23.26

ONE WELL VOLUME (GALLONS) = 15.18

VOLUME WATER REMOVED (GALLONS) = ~15

SAMPLE APPEARANCE brown, cloudy, turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.5	10.5			
SPEC COND. (umhos/cm)	150	200	DRY		
pH	6.0	6.39			
VOLUME PURGED (gal)	2.0	15			
DO	7.71	6.91			
NTU	>1000	>1000			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Bn, TDS, Metals - Dissolved, total RAD, Cn, PCBs, Pest

WEATHER CONDITIONS ? Cloudy ~40°F

OTHER NOTES Well went dry after one volume. Very slow recharge. All parameters collected except TDS, & RAD. Well will be repurged tomorrow & remaining samples collected

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 12-10-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-16S

WELL PURGING EQUIPMENT centrifugal pump

TIME PURGING FINISHED _____ TIME SAMPLING STARTED 1315

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 24.04 (Air) (ass)

DEPTH TO WATER (FT. FROM TOC) = 14.96 (24.0) 22.46 TIME 0915

HEIGHT OF WATER IN WELL (FT) = 9.08

ONE WELL VOLUME (GALLONS) = 5.9

VOLUME WATER REMOVED (GALLONS) = ~6

SAMPLE APPEARANCE brown - Cloudy S. Turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.0			
SPEC COND. (umhos/cm)	190	200			
pH	6.41	6.22	DRY		
VOLUME PURGED (gal)	2	6			
DO	5.45	5.40			
NTU	>1000	>1000			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) RAD, TDS, Cn, metals - dissolved - total, VOA, Pn, PCB, Pest

WEATHER CONDITIONS ? cloudy ~ 40°F

OTHER NOTES Well purged dry. Will let well recharge. Remaining samples will be collected after well has recovered

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/5/96

PROJECT NAME Li Tungsten SAMPLERS C-Trione

SITE LOCATION Parcel "A" Well # MP-17 J. Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-17 Round 1

WELL PURGING EQUIPMENT 3/4" Black Poly - Check Valve - 1/2 8 Purge Start + Tiel Trash Pump

TIME PURGING FINISHED 1204 TIME SAMPLING STARTED 1415

SAMPLING EQUIPMENT 2" S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 14.5'

DEPTH TO WATER (FT. FROM TOC) = 1.5' TIME 1110

HEIGHT OF WATER IN WELL (FT) = 13.0'

ONE WELL VOLUME (GALLONS) = 8.5 gallons

VOLUME WATER REMOVED (GALLONS) = 8.5 gallons

SAMPLE APPEARANCE Cloudy - Orange - Stained in PVC - 4" - Oily Appearance Dk black/grey - color.

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	16°C				
SPEC COND. (umhos/cm)	1500				
pH	6.46				
VOLUME PURGED (gal)	8.5	~~8.5~~ 8	~~8.5~~ 9		

DO Yes Dry Dry

Turbidity >1000 NTU

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOAs Sem. VOAs, Metals, Cyanide, TDS, Rad, PCBs/Pest

WEATHER CONDITIONS Sunny Skies, Temp 37° F, Winds - 0-x mph

OTHER NOTES Purged dry after 10 gallons - at 1204

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301619

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/13/96

PROJECT NAME Li Tungsten SAMPLERS C Trone

SITE LOCATION Parcel C J. Guerriero

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-18D

WELL PURGING EQUIPMENT sub. pump

TIME PURGING FINISHED 1145 TIME SAMPLING STARTED 1200

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 48.00

DEPTH TO WATER (FT. FROM TOC) = 8.20 TIME 1050

HEIGHT OF WATER IN WELL (FT) = 39.80

ONE WELL VOLUME (GALLONS) = 25.8

VOLUME WATER REMOVED (GALLONS) = 75

SAMPLE APPEARANCE slightly cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	11.0	11.0	11.0	
SPEC COND. (umhos/cm)	8000	8500	8000	8000	
pH	5.20	5.16	5.22	5.21	
VOLUME PURGED (gal)	1	26	52	78	
DO	2.88	2.93	3.17	2.97	
NTU	196	214	236	227	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's Semi-VOA's Metals, Cyanide, TDS, Rad, Pest/PCB

WEATHER CONDITIONS cloudy 45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/13/96

PROJECT NAME Li Tungsten SAMPLERS E Johnson

SITE LOCATION Parcel C H Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-18S Round 1

WELL PURGING EQUIPMENT Centrifugal Pump

TIME PURGING FINISHED 1120 TIME SAMPLING STARTED 1145

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 14.20

DEPTH TO WATER (FT. FROM TOC) = 2.40 TIME 1050

HEIGHT OF WATER IN WELL (FT) = 9.80

ONE WELL VOLUME (GALLONS) = 6.4

VOLUME WATER REMOVED (GALLONS) = 20

SAMPLE APPEARANCE slightly cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	11.5	12.0	12.0	
SPEC COND. (umhos/cm)	1900	1800	1850	1800	
pH	4.46	4.58	4.97	4.83	
VOLUME PURGED (gal)	1	6.5	13	19	
DO (mg/L)	3.23	3.56	3.48	3.72	
NTU	746	778	800	813	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's Semi-VOA's Metals Cyanide, TDS, Rad, PCB's/Pest

WEATHER CONDITIONS cloudy 45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

4 9.80
.65
1 4900
5 8800
6.37

301621

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800 1202 DATE 12/10/96

PROJECT NAME L. Tungsten SAMPLERS C. Triano

SITE LOCATION Parcel "B", MP-19D J Guerriero

SAMPLE COLLECTION LOG

Round 1

WELL ID MP-19D

WELL PURGING EQUIPMENT 2" S.S. Submersible Pump 3/4" Poly Hose

TIME PURGING FINISHED 1100 TIME SAMPLING STARTED 1230

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 35.50

DEPTH TO WATER (FT. FROM TOC) = 7.18 TIME 1036

HEIGHT OF WATER IN WELL (FT) = 28.32

ONE WELL VOLUME (GALLONS) = 19.41 gallons

VOLUME WATER REMOVED (GALLONS) = 60 gallons

SAMPLE APPEARANCE Clear, Low Turbidity -

DO mg/L 8.29 8.90 10.40

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12°C	12°C	12°C		
SPEC COND. (umhos/cm)	500	500	500		
pH	6.32	6.38	6.39		
VOLUME PURGED (gal)	19.41	19.41	19.41		
Turbidity, NTU	100	12	10		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's - Semi-VOA's, Metals, Cyanide, TDS, + Rel. parameters, PCB's, Pest

WEATHER CONDITIONS Sunny, Temp 39°F, Wind 0-5, G.C. wet

OTHER NOTES 7.2 W.C. after Purging

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301622

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202103 DATE 12/3/96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY C. Trione

H Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-20 Round 1

WELL PURGING EQUIPMENT Centrifugal

TIME PURGING FINISHED 1140 TIME SAMPLING STARTED 1305

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 10.22 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 3.72 4.62 3.74 TIME 1115

HEIGHT OF WATER IN WELL (FT) = 6.48

ONE WELL VOLUME (GALLONS) = ~~1.06~~ CT 4.23

VOLUME WATER REMOVED (GALLONS) = 12.75

SAMPLE APPEARANCE Turbid To moderately Turbid

NTUs (Turbidity) >1000 >1000 490 360

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13	12.5	12.5	12.5	
SPEC COND. (umhos/cm)	410	390	380	380	
pH	6.56	6.73	6.81	6.69	
VOLUME PURGED (gal)	~1.0	4.25	8.50	12.75	
DO. mg/L	3.9	4.6	4.2	4.0	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TAL - TCL, CN RAD, TDS, PCBs/Pest

WEATHER CONDITIONS Sunny - 48°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/5/96

PROJECT NAME L. Tungsten SAMPLERS C Triane

SITE LOCATION Parcel A Well # 21D S. Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-21D Round 1

WELL PURGING EQUIPMENT Submersible 2" Grundfos Pump (0954)

TIME PURGING FINISHED 1159 TIME SAMPLING STARTED 1341

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 54.7

DEPTH TO WATER (FT. FROM TOC) = 1.0' TIME 0930

HEIGHT OF WATER IN WELL (FT) = 53.7'

ONE WELL VOLUME (GALLONS) = 35 gallons

VOLUME WATER REMOVED (GALLONS) = 105 gallons

SAMPLE APPEARANCE Clear after 2-3 volumes -

DO (mg/L)	2.52 mg/L	3.61	3.28		
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13°C	14°C		
SPEC COND. (umhos/cm)	600	590	600		
pH	8.5	6.72	6.10		
VOLUME PURGED (gal)	35 gallons	35	35 gallons		
Turbidity (NTU)	55	20	12		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's, Total/Dissolved Metals, Cyanide, TDS + Rad parameters VOA's - HCL - PCBs/PEST

WEATHER CONDITIONS Sunny, Skies, Temp 34°F, Winds - 0-4 mph

OTHER NOTES 35.50 W.L after Purging - Clear after 3 volumes

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301624

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12-10-96

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

Round 1

WELL ID EMW-1

WELL PURGING EQUIPMENT centrifugal pump

TIME PURGING FINISHED 1525 TIME SAMPLING STARTED 1660

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 15.05 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 2.07 8.32 8.12 TIME 1450

HEIGHT OF WATER IN WELL (FT) = 12.98

ONE WELL VOLUME (GALLONS) = 8.5

VOLUME WATER REMOVED (GALLONS) = ~~270~~ 36

SAMPLE APPEARANCE Brown - orange, turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	9.0	11.0	10.5	10.0	10.0
SPEC COND. (umhos/cm)	385	410	400	380	390
pH	6.02	6.00	5.96	6.03	5.12
VOLUME PURGED (gal)	1	9	18	27	36
DO / TTU	8.60 / >1000	9.65 / >1000	9.61 / >1000	9.75 / >1000	9.82 / >1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Br, TDS, Cn RAD, metals - dissolved, total

WEATHER CONDITIONS P. cloudy ~ 40°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

6

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/4/96

PROJECT NAME Li Tungsten SAMPLERS C Trine

SITE LOCATION Parcel A J Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-22D Round 1

WELL PURGING EQUIPMENT Centrifugal/hand Pump

TIME PURGING FINISHED 1630 TIME SAMPLING STARTED 1640

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 50.00

DEPTH TO WATER (FT. FROM TOC) = 8.51 TIME 1520

HEIGHT OF WATER IN WELL (FT) = 41.49

ONE WELL VOLUME (GALLONS) = 27

VOLUME WATER REMOVED (GALLONS) = 55

SAMPLE APPEARANCE Slightly Turbid

D.O. mg/L	2.60	3.75	Dry		
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	9°C	8°	Dry —		
SPEC COND. (umhos/cm)	500	640	—		
pH	8.45	7.98	—		
VOLUME PURGED (gal)	27	28	—		
Turbidity (NTU	700 NTU	500 NTU	—		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, Metals, Cyanide, TDS, Rad, PCBs/Pest

WEATHER CONDITIONS Rain —

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301626

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 12/4/96

PROJECT NAME Li Tungsten SAMPLERS C Trione

SITE LOCATION Parcel A J. Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-22s Round 1

WELL PURGING EQUIPMENT centrifugal/hand pump

TIME PURGING FINISHED 1305 TIME SAMPLING STARTED 1455

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 11.60 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 4.30 Dry 5.12 TIME 1210

HEIGHT OF WATER IN WELL (FT) = 7.30

ONE WELL VOLUME (GALLONS) = 4.7

VOLUME WATER REMOVED (GALLONS) = 15 gallons

SAMPLE APPEARANCE Ok block (1st Volume) ; Ok block - Volumes 2 + 3

Turbidity (NTU) >1000 NTU >1000 >1000

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10°C	10°C	11°C		
SPEC COND. (umhos/cm)	350	350	350		
pH	6.84	6.64	6.42		
VOLUME PURGED (gal)	5 gallons	5 gallons	5 gallons		
0.0 mg/L	11.82 mg/L	3.63 mg/L	4.82		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA, Metals, Cyanide, TDS, Rad, PCBs/Pests

WEATHER CONDITIONS Rain, fin AM - Cloudy - Temp 38°F

OTHER NOTES Turbidity > 1000, Hand-bailed -

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

7.30 / .65

301627

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 80012021 DATE 1/6/92

PROJECT NAME L. Tungsten SAMPLERS J. Guerin

SITE LOCATION Parcel "B" C. Triene

SAMPLE COLLECTION LOG

WELL ID MP-5 (Re-sample) 1st Round

WELL PURGING EQUIPMENT 3/4" Poly - Check Valve Center pump.

TIME PURGING FINISHED 1317 TIME SAMPLING STARTED 1500

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 28.60

DEPTH TO WATER (FT. FROM TOC) = 16.68 TIME 1300

HEIGHT OF WATER IN WELL (FT) = 11.92

ONE WELL VOLUME (GALLONS) = 7.74

VOLUME WATER REMOVED (GALLONS) = ~23 gal

SAMPLE APPEARANCE 1st Volume - Orange-Brown, 3rd Volume - Dk Gray -

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	7°	8°	8°		
SPEC COND. (umhos/cm)	500	490	510		
pH	6.41	6.39	6.39		
VOLUME PURGED (gal)	7.74	7.74	7.74		
DO (mg/L)	6.56	6.41	6.39		
Turb (NTU)	>1000	>1000	>1000		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's, + Cyanide

WEATHER CONDITIONS 15 mph - Clear. 30°F.

OTHER NOTES Sample VOA's - Sem-VOA's, + Cyanide -

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

1

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1-6-97

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-4 (resample 1st Round)

WELL PURGING EQUIPMENT Centrifugal pump w/ 2" PVC pipe

TIME PURGING FINISHED 1340 TIME SAMPLING STARTED 1500

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 12.38 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 0.31 (10.6) (6.93) TIME 1250

HEIGHT OF WATER IN WELL (FT) = 12.07

ONE WELL VOLUME (GALLONS) = 8.3

VOLUME WATER REMOVED (GALLONS) = ~25.0

SAMPLE APPEARANCE cloudy yellow-Tan ~~Tan~~

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.5	11.5	11.5	
SPEC COND. (umhos/cm)	180	210	200	190	
pH	6.18	6.46	6.32	6.21	
VOLUME PURGED (gal)	2.0	8.5	17.0	25.0	
DO (mg/L)	3.9	4.0	7.2	4.9	
~Turb	56.0	>1000	245	96.2	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Br, Co

WEATHER CONDITIONS P. Cloudy ~40°F

OTHER NOTES Duplicate sample collected at this location

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301629

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1-7-97

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-16S (resample 1st Round)

WELL PURGING EQUIPMENT Centrifugal pump

TIME PURGING FINISHED 1215 TIME SAMPLING STARTED 1510

SAMPLING EQUIPMENT 3/2 bailer

WELL DEPTH (FT. FROM TOC) = 24.04 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 1.1 23.48 20.16 TIME 1005

HEIGHT OF WATER IN WELL (FT) = 22.94

ONE WELL VOLUME (GALLONS) = 14.9

VOLUME WATER REMOVED (GALLONS) = ~15

SAMPLE APPEARANCE cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.0	10.0			
SPEC COND. (umhos/cm)	210	200	DRY		
pH	6.47	6.62			
VOLUME PURGED (gal)	2	15			
D.O. (mg/L)	6.33	5.96			
ORP	432	196			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Br, Co

WEATHER CONDITIONS P. cloudy ~35

OTHER NOTES slow recharge

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301630

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1-7-97

PROJECT NAME L. Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H. Kawalski

SAMPLE COLLECTION LOG

WELL ID MP-16D (resample 1st Round)

WELL PURGING EQUIPMENT 2" submersible pump

TIME PURGING FINISHED 1125 TIME SAMPLING STARTED 1425

SAMPLING EQUIPMENT SS. bailer

WELL DEPTH (FT. FROM TOC) = 55.04 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 3.59 54.6 50.23 TIME 1010

HEIGHT OF WATER IN WELL (FT) = 51.45

ONE WELL VOLUME (GALLONS) = 33.6

VOLUME WATER REMOVED (GALLONS) = ~35

SAMPLE APPEARANCE Grey-Brown v. turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.0			
SPEC COND. (umhos/cm)	2800	2980	DRY		
pH	11.23	11.11			
VOLUME PURGED (gal)	~5	35			
DO (mg/L)	2.2	1.8			
NTU	435	862			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA Br Cn

WEATHER CONDITIONS p. cloudy ~30-35°F

OTHER NOTES slow recharge

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 11/7/96

PROJECT NAME L. Tungsten SAMPLERS E Guerrero

SITE LOCATION Parcel "B" C Trivne

SAMPLE COLLECTION LOG

WELL ID MP-19D (resample)

WELL PURGING EQUIPMENT Honda Pump 2500 3/4" Black Poly - Sub Pump

TIME PURGING FINISHED 1417 TIME SAMPLING STARTED 1500

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 35.50

DEPTH TO WATER (FT. FROM TOC) = 7.74 TIME 1400

HEIGHT OF WATER IN WELL (FT) = 27.76

ONE WELL VOLUME (GALLONS) = 18 gals

VOLUME WATER REMOVED (GALLONS) = 55

SAMPLE APPEARANCE Clear

DO (mg/L) 9.85 8.52 8.71

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	9.0	9.0	9.0		
SPEC COND. (umhos/cm)	470	468	470		
pH	6.27	6.30	6.31		
VOLUME PURGED (gal)	15	20	20		
Turb (NTU)	90	20	10		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, Cyanide

WEATHER CONDITIONS Temp 50°F, Winds - 15 mph - gusty, overcast

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301632

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/7/98

PROJECT NAME L. Tungsten SAMPLERS J Guerrero

SITE LOCATION Parcel "B" C Trione

SAMPLE COLLECTION LOG

WELL ID GM-13 (Re-Sample - 1st Round)

WELL PURGING EQUIPMENT 3/4" Poly Hose, Check Valve, Centrifugal Pump

TIME PURGING FINISHED 1145 TIME SAMPLING STARTED 1200

SAMPLING EQUIPMENT S S Bailer

WELL DEPTH (FT. FROM TOC) = 18.9

DEPTH TO WATER (FT. FROM TOC) = 12.6 TIME ~~1200~~ 1126 (CT)

HEIGHT OF WATER IN WELL (FT) = 6.3

ONE WELL VOLUME (GALLONS) = 1.0 gallons

VOLUME WATER REMOVED (GALLONS) = 5 gallons

SAMPLE APPEARANCE Turbid Muddy

DO (mg/L)	12.2	13.5	12.6	11.9	12.8
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.0	11.0	10.0	10.0	9.0
SPEC COND. (umhos/cm)	870	870	900	875	895
pH	6.00	6.12	5.99	6.08	6.12
VOLUME PURGED (gal)	1.0	1.0	1.0	1.0	1.0
Turb (NTU)	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's + Cyanide Only

WEATHER CONDITIONS Temp 30°F

OTHER NOTES 5 gallons purged.

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
(2)	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1-8-98

PROJECT NAME Li Tungsten SAMPLERS H Kowalski

SITE LOCATION Glen Cove NY E. Johnson

SAMPLE COLLECTION LOG

WELL ID GM-7 (resample 1st Round)

WELL PURGING EQUIPMENT Centrifugal pump w/foot valve

TIME PURGING FINISHED 1050/1115 TIME SAMPLING STARTED 1320/1340

SAMPLING EQUIPMENT SS. bailer

WELL DEPTH (FT. FROM TOC) = 15.5

DEPTH TO WATER (FT. FROM TOC) = 6.96 TIME 1020

HEIGHT OF WATER IN WELL (FT) = 8.54

ONE WELL VOLUME (GALLONS) = 1.4

VOLUME WATER REMOVED (GALLONS) = ~~6.5~~ 6.5

SAMPLE APPEARANCE Dark Brown

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10	10.5	10	10.5	11
SPEC COND. (umhos/cm)	360	370	370	365	370
pH	6.53	6.42	6.43	6.30	6.34
VOLUME PURGED (gal)	~1/2	1.5	3	4.5	6.5
DO (mg/L)	4.76	7.24	7.36	7.13	7.47
NTU (NTU)	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA, Ba, Cr

WEATHER CONDITIONS p cloudy - p sunny ~ 30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1-8-96

PROJECT NAME Li Tungsten SAMPLERS H. Kowalski

SITE LOCATION Glen Cove, NY E. Johnson

SAMPLE COLLECTION LOG

WELL ID GM-9 (resample 1st round)

WELL PURGING EQUIPMENT Centrifugal Pump

TIME PURGING FINISHED 1140/1210 TIME SAMPLING STARTED 1350/1420

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 14.30

DEPTH TO WATER (FT. FROM TOC) = 3.90 TIME 1135

HEIGHT OF WATER IN WELL (FT) = 10.4

ONE WELL VOLUME (GALLONS) = 1.7

VOLUME WATER REMOVED (GALLONS) = ~8

SAMPLE APPEARANCE Brown V. turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	11.5	11.5	11.5	11.5
SPEC COND. (umhos/cm)	400	370	380	380	380
pH	6.33	6.45	6.19	6.17	6.23
VOLUME PURGED (gal)	1/2	~2	4	6	8
DO (mg/L)	8.12	8.26	7.81	1.23	6.19
NTU (NTU)	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

VOA Bn Cn

WEATHER CONDITIONS p. cloudy, p. sunny ~30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/8/97

PROJECT NAME L. Tungsten SAMPLERS J. Guerriero

SITE LOCATION Parcel "B" C. Trione

SAMPLE COLLECTION LOG

WELL ID EMW-1 (resample)

WELL PURGING EQUIPMENT 3½" Grab V4 3½" Valve, Centrifugal Pump

TIME PURGING FINISHED 1045 TIME SAMPLING STARTED 1140

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 15.2

DEPTH TO WATER (FT. FROM TOC) = 3.7 TIME 1000

HEIGHT OF WATER IN WELL (FT) = 11.5

ONE WELL VOLUME (GALLONS) = 7.5 gals

VOLUME WATER REMOVED (GALLONS) = 23 gals

SAMPLE APPEARANCE Slightly turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	8.0	9.0	8.0		
SPEC COND. (umhos/cm)	400	390	385		
pH	5.96	6.00	6.02		
VOLUME PURGED (gal)	8	16	23		
DO (mg/L)	8.70	8.82	8.65		
NTU (NTU)	2000	1000	1000		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA, Sem. VOA, Cyanide

WEATHER CONDITIONS sunny 30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/28/97

PROJECT NAME L. Tungsten SAMPLERS J. Guerrier

SITE LOCATION Parcel "C" C. Trione

SAMPLE COLLECTION LOG

WELL ID EMW-1 (Round #2)

WELL PURGING EQUIPMENT 3/4" Poly Hose, Centrifugal Pump, 3/4" Check Valve

TIME PURGING FINISHED 1452 TIME SAMPLING STARTED 1519

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 15.05

DEPTH TO WATER (FT. FROM TOC) = 3.74 TIME 1519

HEIGHT OF WATER IN WELL (FT) = 11.31

ONE WELL VOLUME (GALLONS) = 7.35 gallons

VOLUME WATER REMOVED (GALLONS) = 37 gallons

SAMPLE APPEARANCE Brownish/Orange - Turbid, To DK Grey -

DO mg/L	8.62	9.60	9.65	9.55	9.46
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.0°C	11.0°C	12°C	12°C	12°C
SPEC COND. (umhos/cm)	450	410	422	418	401
pH	6.00	6.02	6.01	6.01	6.01
VOLUME PURGED (gal)	7.35	7.35	7.35	7.35	7.35
Turbidity (NTU)	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's, Metals, TDS, Rad + Cyanide, PCB/Pesticides

WEATHER CONDITIONS P/Cloudy 30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301637

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/20/97

PROJECT NAME Li Tungsten SAMPLERS Kowalski, Johnson, Trione Guerriero

SITE LOCATION Glen Cove, NY

SAMPLE COLLECTION LOG

WELL ID GM-1 (Round #2)

WELL PURGING EQUIPMENT Centrifugal

TIME PURGING FINISHED 1445 TIME SAMPLING STARTED 1600

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 16.54 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 8.22 8.03 7.56 TIME 1415

HEIGHT OF WATER IN WELL (FT) = 8.32

ONE WELL VOLUME (GALLONS) = ~1.3

VOLUME WATER REMOVED (GALLONS) = ~4

SAMPLE APPEARANCE tan - brown - turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.5	10.5	10.5	10.5	
SPEC COND. (umhos/cm)	860	840	840	840	
pH	6.34	6.28	6.31	6.33	
VOLUME PURGED (gal)	1.0	1.5	~3	4	
DO (mg/L)	4.13	4.28	4.31	4.26	
NTU	>1000	>1000	980	860	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL-TCL, Cr, RAD, TDS

WEATHER CONDITIONS cloudy ~25°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301638

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800/202 DATE 1/22/97

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-2D (Round #2)

WELL PURGING EQUIPMENT Centrifugal pump w/ 3/4" poly pipe

TIME PURGING FINISHED 1415 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 22.45

DEPTH TO WATER (FT. FROM TOC) = 1.68 TIME 1105

HEIGHT OF WATER IN WELL (FT) = 20.77

ONE WELL VOLUME (GALLONS) = 13.5

VOLUME WATER REMOVED (GALLONS) = 42

SAMPLE APPEARANCE Grey - Blk turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.0	9.5	10.0	9.5	
SPEC COND. (umhos/cm)	3600	3400	3100	3100	
pH	5.92	5.73	5.76	5.77	
VOLUME PURGED (gal)	~5	14	28	42	
D.O. NTU	4.0 >1000	3.74 >1000	3.86 >1000	4.2 >1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TCL - TAL Cr, TDS, RAD

WEATHER CONDITIONS p. cloudy - 40°F

OTHER NOTES well frozen shut

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301639

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # _____ DATE 1/22/97

PROJECT NAME L. Tungsten SAMPLERS F. Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

WELL ID GM-2 (Round #2)

WELL PURGING EQUIPMENT Hand evacuate w/ check valve & poly pipe

TIME PURGING FINISHED 1135 TIME SAMPLING STARTED 1315

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 12.34

DEPTH TO WATER (FT. FROM TOC) = 0.86 TIME 1050

HEIGHT OF WATER IN WELL (FT) = 11.48

ONE WELL VOLUME (GALLONS) = 1.8

VOLUME WATER REMOVED (GALLONS) = ~6

SAMPLE APPEARANCE Grey - pink turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	9.0	9.5	10.0	10.0	
SPEC COND. (umhos/cm)	1300	1250	1150	1100	
pH	6.41	6.38	6.35	6.39	
VOLUME PURGED (gal)	0.5	2	4	6	
DO NTU	7.14 >1000	4.23 >1000	4.24 >1000	4.16 >1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, Cn, TDS, RAD

WEATHER CONDITIONS P. cloudy ~ 40°F

OTHER NOTES Slow recharge

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301640

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/31/97

PROJECT NAME L. Tungsten SAMPLERS J. Guerrier

SITE LOCATION Parcel "C" Garvies Pt. Rd C. Trione

SAMPLE COLLECTION LOG

WELL ID EMW-4 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump / 3/4" Poly Hose, Check Valve

TIME PURGING FINISHED 0958 TIME SAMPLING STARTED 1010

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 22.00

DEPTH TO WATER (FT. FROM TOC) = 4.80 TIME 1055

HEIGHT OF WATER IN WELL (FT) = 17.20

ONE WELL VOLUME (GALLONS) = 11.20

VOLUME WATER REMOVED (GALLONS) = ≈ 11 gallons - dry at 1 Volume

SAMPLE APPEARANCE Clear To Slightly brownish

D.O mg/L 6.21

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C				
SPEC COND. (umhos/cm)	500	dry @			
pH	6.69	2nd Volume			
VOLUME PURGED (gal)	≈ 11 gal				

Turbidity (NTU) >100

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's Sem-VOA's PCB/Pesticides, Metals, Cyanide, TDS + Rad

WEATHER CONDITIONS 29°F Cloudy / Overcast

OTHER NOTES Dry after 1 volume

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/23/97

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove NY H Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-4 (Round #2)

WELL PURGING EQUIPMENT centrifugal pump w/ 3/4" poly

TIME PURGING FINISHED 1305 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT S.S bailer

WELL DEPTH (FT. FROM TOC) = 12.88

DEPTH TO WATER (FT. FROM TOC) = 0.77 TIME 1210

HEIGHT OF WATER IN WELL (FT) = 12.11

ONE WELL VOLUME (GALLONS) = 7.87

VOLUME WATER REMOVED (GALLONS) = ~25.0

SAMPLE APPEARANCE cloudy Yellow-tan

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.5	10.0	10.0	
SPEC COND. (umhos/cm)	170	180	190	190	
pH	6.23	6.14	6.23	6.28	
VOLUME PURGED (gal)	3	8	16	24	
D.O.	3.87	4.21	4.36	4.46	
DTW	>1000	>1000	310	48.1	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, TDS, Cn, RAD,

WEATHER CONDITIONS p.cloudy ~50°F

OTHER NOTES Duplicate sample collected

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301642

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/28/97

PROJECT NAME Li Tungsten SAMPLERS H. Kowalski

SITE LOCATION Glen Cove, NY E. Johnson

SAMPLE COLLECTION LOG

WELL ID MP-5 (Round #2)

WELL PURGING EQUIPMENT Centrifugal pump

TIME PURGING FINISHED ~~0945~~ 1015 TIME SAMPLING STARTED 1130

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 28.65

DEPTH TO WATER (FT. FROM TOC) = 16.50 TIME 0930

HEIGHT OF WATER IN WELL (FT) = 12.15

ONE WELL VOLUME (GALLONS) = 7.9

VOLUME WATER REMOVED (GALLONS) = ~24

SAMPLE APPEARANCE Brownish - muddy & very turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	6°	7°	7.5	7.5	
SPEC COND. (umhos/cm)	600	570	550	560	
pH	6.37	6.32	6.35	6.31	
VOLUME PURGED (gal)	~3	8	16	24	
DO NTU	7.35 >1000	7.26 >1000	7.14 >1000	7.03 >1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, Ca, TDS, RAD

WEATHER CONDITIONS cloudy ~30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/24/97

PROJECT NAME Li Tungsten SAMPLERS E Johnson

SITE LOCATION Glen Cove, NY H. Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-6 (Round #2)

WELL PURGING EQUIPMENT centrifugal

TIME PURGING FINISHED 1045 TIME SAMPLING STARTED 1145

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 15.95

DEPTH TO WATER (FT. FROM TOC) = 5.25 TIME ~~1000~~ 1000 (W)

HEIGHT OF WATER IN WELL (FT) = 10.70

ONE WELL VOLUME (GALLONS) = 6.95

VOLUME WATER REMOVED (GALLONS) = ~21

SAMPLE APPEARANCE tan - orange turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.5	10.5	10.0	10.0	
SPEC COND. (umhos/cm)	630	610	620	610	
pH	5.32	5.41	5.38	5.36	
VOLUME PURGED (gal)	2	7	14	21	
D.O.	3.9	4.1	4.3	4.3	
NTU	[illegible]	816	72[illegible]	693	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TCL - TAL, Cn, TDS, RAD

WEATHER CONDITIONS p. cloudy ~ 35°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301644

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/27/97

PROJECT NAME Li Tungsten SAMPLERS J. Guerrier

SITE LOCATION Parcel "B" C Trisne

SAMPLE COLLECTION LOG

WELL ID GM-7 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump · 3/4" Poly Hose, 3/4" Check Valve

TIME PURGING FINISHED 1430 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 15.50

DEPTH TO WATER (FT. FROM TOC) = 7.50 TIME 1530

HEIGHT OF WATER IN WELL (FT) = 8.00

ONE WELL VOLUME (GALLONS) = ≈ 1.4

VOLUME WATER REMOVED (GALLONS) = ≈ 8 gallons

SAMPLE APPEARANCE Cloudy, Dk brown

DO mg/L 5.12 6.18 7.12 6.93 7.28

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12°C	13°C	12°C	12°C	12°C
SPEC COND. (umhos/cm)	280	300	315	320	328
pH	6.58	6.39	6.39	6.43	6.40
VOLUME PURGED (gal)	1.4	1.4	1.4	1.4	1.4
Turbidity	>100	>100	>100	>100	>100

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, PCB/Pesticide, Cyanide, Rad + TDS

WEATHER CONDITIONS P/Cloudy, Temp 29-30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/24/97 Friday

PROJECT NAME L. Tungsten SAMPLERS J. Trione

SITE LOCATION Parcel "B" J. Guerrier

SAMPLE COLLECTION LOG

WELL ID GM-8 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump / Check Valve

TIME PURGING FINISHED 1137 TIME SAMPLING STARTED 1430

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 15.18

DEPTH TO WATER (FT. FROM TOC) = 5.41 TIME 1430

HEIGHT OF WATER IN WELL (FT) = 8.77

ONE WELL VOLUME (GALLONS) = ≈ 2 gallons

VOLUME WATER REMOVED (GALLONS) = 10 gallons

SAMPLE APPEARANCE Dk Black / Brown -

DO (mg/L) 7.00 6.28 6.17 5.99 5.89

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	12.2	12.1	12.1	12.0
SPEC COND. (umhos/cm)	210	200	190	190	195
pH	5.62	5.51	5.42	5.31	5.21
VOLUME PURGED (gal)	2	2	2	2	2
Turbidity (NTU)	>1000	>1000	>1000	>1000	>1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's, Metals, Cyanide, Rad, TDS, PCB/Pest.

WEATHER CONDITIONS P/Cloudy - 33°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301646

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/31/97

PROJECT NAME Li Tungsten SAMPLERS Irene Guerriero

SITE LOCATION Glen Cove, NY Johnson Kowalski

SAMPLE COLLECTION LOG

WELL ID MW-8D (Round # 2)

WELL PURGING EQUIPMENT 2" Submersible pump

TIME PURGING FINISHED 1135 TIME SAMPLING STARTED 1305

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 69.2

DEPTH TO WATER (FT. FROM TOC) = 47.28 TIME ~~1045~~ 1020

HEIGHT OF WATER IN WELL (FT) = 21.92

ONE WELL VOLUME (GALLONS) = ~14.3

VOLUME WATER REMOVED (GALLONS) = ~44

SAMPLE APPEARANCE Clear - turbid cloudy

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	14.0	13.5	13.5	13.5	
SPEC COND. (umhos/cm)	320	340	330	330	
pH	5.36	5.41	5.31	5.28	
VOLUME PURGED (gal)	2	14	29	44	
DO	6.29	6.11	6.63	6.52	
NTU	721	100	54	52	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TCL-TAL, TDS, RAD, Co

WEATHER CONDITIONS overcast, ~50°F

OTHER NOTES strong odor

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301647

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/30/97

PROJECT NAME L. Tungsten SAMPLERS J. Guerrero

SITE LOCATION Parcel "C" H. Yadav.

SAMPLE COLLECTION LOG

WELL ID MW-85 (Round #2)

WELL PURGING EQUIPMENT S.S. Bailer

TIME PURGING FINISHED 1510 TIME SAMPLING STARTED 1515

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 49.20

DEPTH TO WATER (FT. FROM TOC) = 47.82 TIME 1557

HEIGHT OF WATER IN WELL (FT) = 1.38

ONE WELL VOLUME (GALLONS) = ≈.89 gallons

VOLUME WATER REMOVED (GALLONS) = ≈ 2 gallons

SAMPLE APPEARANCE Orange-brown - Slightly Turbid, Odor - Strong Organic Odor.

DO (mg/L) 7.52 6.99

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°	13°C	Dry		
SPEC COND. (umhos/cm)	220	215			
pH	5.82	5.89			
VOLUME PURGED (gal)	.89	.89			
Turbidity (NTU)	>1000	298			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, TDS, Rad, Cn, Metal, PCB/Pest.

WEATHER CONDITIONS

OTHER NOTES Dry after 2nd Volume, Odor - Strong Organic Odor

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

1

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/27/97

PROJECT NAME L. Tungsten RI/FS SAMPLERS J Guernies

SITE LOCATION Parcel "B" C. Trione

SAMPLE COLLECTION LOG

WELL ID GM-9 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump, 3/4" Poly Hose 3/4" Check Valve

TIME PURGING FINISHED 1145 TIME SAMPLING STARTED

SAMPLING EQUIPMENT S S Bailer

WELL DEPTH (FT. FROM TOC) = 14.30

DEPTH TO WATER (FT. FROM TOC) = 3.65 TIME 1210

HEIGHT OF WATER IN WELL (FT) = 10.65

ONE WELL VOLUME (GALLONS) = ≈ 1.7 gallons

VOLUME WATER REMOVED (GALLONS) = ≈ 9 gallons

SAMPLE APPEARANCE Cloudy - Brownish -

DO mg/L	7.15	6.28	7.41	7.40	7.31
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13°C	13°C	13°C	13°C
SPEC COND. (umhos/cm)	410	389	382	391	387
pH	6.15	6.16	6.16	6.14	6.14
VOLUME PURGED (gal)	1.7	1.7	1.7	1.7	1.7
Turbidity NTU	>100	>100	>100	>100	>100

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, PCB/Pest, Metals, Cyanide, TDS, Rad

WEATHER CONDITIONS Tg 30°F, P/Cloudy

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301649

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/30/97

PROJECT NAME Li Tungsten SAMPLERS Irene Guarro

SITE LOCATION Glen Cove, NY Johnson, Kowalski

SAMPLE COLLECTION LOG

WELL ID MW-10 (Round #2)

WELL PURGING EQUIPMENT 2" Submersible pump

TIME PURGING FINISHED 1330 TIME SAMPLING STARTED 1401

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 66.7

DEPTH TO WATER (FT. FROM TOC) = 43.62 TIME 1315

HEIGHT OF WATER IN WELL (FT) = 23.08

ONE WELL VOLUME (GALLONS) = 3.8

VOLUME WATER REMOVED (GALLONS) = ~8

SAMPLE APPEARANCE cloudy - red/brown

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	14.5	13.0	13.0		
SPEC COND. (umhos/cm)	230	260	250	DRY	
pH	5.53	5.47	5.43		
VOLUME PURGED (gal)	2	4	8		
DO	7.16	7.43	7.52		
NTU	>1000	986	974		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, TDS, Cn, RAD

WEATHER CONDITIONS p cloudy ~45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301650

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 80 1202 DATE 1/30/97

PROJECT NAME L. Tungsten SAMPLERS H. Yadav, J. Guerrero

SITE LOCATION Panel "C"

SAMPLE COLLECTION LOG

WELL ID 617-10 (Round #2)

WELL PURGING EQUIPMENT SS Bailer Had Bailed

TIME PURGING FINISHED 1400 TIME SAMPLING STARTED 1421

SAMPLING EQUIPMENT S. S. Bailer

WELL DEPTH (FT. FROM TOC) = 56.30

DEPTH TO WATER (FT. FROM TOC) = 46.90 TIME ~~1420~~ 1345

HEIGHT OF WATER IN WELL (FT) = 9.40

ONE WELL VOLUME (GALLONS) = ≈1.6

VOLUME WATER REMOVED (GALLONS) = ≈6 gallons

SAMPLE APPEARANCE Brown - Muddy - Turbid

DO (mg/L) 4.75 6.11 6.05 5.94

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°	13°	14°	13°	
SPEC COND. (umhos/cm)	210	200	180	182	
pH	5.03	4.99	5.04	5.04	
VOLUME PURGED (gal)	1.6	1.6	1.6	1.6	
Turbidity (NTU)	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, PCB/Pest., Cyanide, Metals, TDS, Rad

WEATHER CONDITIONS Sunny, Temp. 22°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 11/29/97

PROJECT NAME Li Tungsten SAMPLERS E Johnson

SITE LOCATION Glen Cove, NY H Kowalski

SAMPLE COLLECTION LOG

WELL ID GM-11 (Round #2)

WELL PURGING EQUIPMENT Centrifugal pump w/ 3/4" poly pipe

TIME PURGING FINISHED 1115 TIME SAMPLING STARTED 1350

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 16.10

DEPTH TO WATER (FT. FROM TOC) = 6.82 TIME 1045

HEIGHT OF WATER IN WELL (FT) = 9.28

ONE WELL VOLUME (GALLONS) = 1.4

VOLUME WATER REMOVED (GALLONS) = ~5

SAMPLE APPEARANCE Cloudy brown - turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.5	10.0	9.5	9.5	
SPEC COND. (umhos/cm)	125	120	120	120	
pH	7.32	7.36	7.37	7.41	
VOLUME PURGED (gal)	0.5	1.5	3	5	
DO	4.3	5.63 212	5.42 244	5.71 287	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL TDS, Cn, RAD

WEATHER CONDITIONS Sunny - cold - 30°F

OTHER NOTES Duplicate sample collected here

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301652

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/30/97

PROJECT NAME L. Tungsten SAMPLERS Trione, Guerra

SITE LOCATION Glen Cove, NY Johnson, Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-11D (Round #2)

WELL PURGING EQUIPMENT 2" Submersible

TIME PURGING FINISHED ~~0805~~ 1005 TIME SAMPLING STARTED 1042

SAMPLING EQUIPMENT 2" bailer

WELL DEPTH (FT. FROM TOC) = 115.3

DEPTH TO WATER (FT. FROM TOC) = 18.6 TIME 0850

HEIGHT OF WATER IN WELL (FT) = 96.7

ONE WELL VOLUME (GALLONS) = ~63

VOLUME WATER REMOVED (GALLONS) = 63

SAMPLE APPEARANCE cloudy - clear

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	7.5	10.5			
SPEC COND. (umhos/cm)	380	510			
pH	10.56	10.96			
VOLUME PURGED (gal)	2	63			
DO	2.3	1.18			
ORP	110	85.4			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TCL - TAL, TDS, BOD, Cn

WEATHER CONDITIONS p cloudy - ~45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 801202 DATE 1/29/97

PROJECT NAME Li Tungsten SAMPLERS H. Kowalski

SITE LOCATION Glen Cove NY E Johnson

SAMPLE COLLECTION LOG

WELL ID GM-12 (Round #2)

WELL PURGING EQUIPMENT Centrifugal pump w/ poly pipe

TIME PURGING FINISHED 1450 TIME SAMPLING STARTED 1545

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 16.80 (AP) (BS)

DEPTH TO WATER (FT. FROM TOC) = 6.23 14.5 6.80 TIME 1415

HEIGHT OF WATER IN WELL (FT) = 9.77

ONE WELL VOLUME (GALLONS) = 1.6

VOLUME WATER REMOVED (GALLONS) = ~5

SAMPLE APPEARANCE Cloudy - Brownish

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	12.0	11.5	11.5	
SPEC COND. (umhos/cm)	490	530	540	540	
pH	6.72	6.63	6.68	6.23	
VOLUME PURGED (gal)	0.5	1.6	3.2	4.8	
D.O.	13.5 >1000	12.2 >1000	7.9 >1000	8.7 >1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL- TCL, RAD, TDS, Cn

WEATHER CONDITIONS Sunny - cold - 30°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/28/97

PROJECT NAME L. Tungsten SAMPLERS J Guerrien

SITE LOCATION Parcel "C" C. Trione

SAMPLE COLLECTION LOG

WELL ID GM-13 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump 3/4" Poly Hose / Check Valve

TIME PURGING FINISHED 1030 TIME SAMPLING STARTED 1105

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 18.90

DEPTH TO WATER (FT. FROM TOC) = 12.31 TIME ~~1030~~ 0932

HEIGHT OF WATER IN WELL (FT) = 6.59

ONE WELL VOLUME (GALLONS) = 1.09

VOLUME WATER REMOVED (GALLONS) = ≈ 5.5 gallons

SAMPLE APPEARANCE Cloudy, Dk, brown

DO mg/L	7.2	9.8	12.6	13.8	13.1
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12°C	12°C	13°C	13°	13°C
SPEC COND. (umhos/cm)	1000	982	989	1000	1000
pH	6.14	6.12	6.17	6.17	6.19
VOLUME PURGED (gal)	1.09	1.09	1.09	1.09	1.09
Turbidity (NTU)	>100	>100	>100	>100	>100

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA, Metals, Cyanide + TDS, PCB/Pest

WEATHER CONDITIONS P/Cloudy, 38°F, Rain Heavy at Time

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

3.74

301655

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800,202 DATE 1/21/97

PROJECT NAME L. Tungsten SAMPLERS Johnson Kowalski

SITE LOCATION Glen Cove NY

SAMPLE COLLECTION LOG

WELL ID GM-14A (Round #2)

WELL PURGING EQUIPMENT ~~2" Submersible pump~~ Centrifugal

TIME PURGING FINISHED 1120 TIME SAMPLING STARTED 1305

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 11.5

DEPTH TO WATER (FT. FROM TOC) = 3.34 TIME 1030

HEIGHT OF WATER IN WELL (FT) = 8.24

ONE WELL VOLUME (GALLONS) = ~1.3

VOLUME WATER REMOVED (GALLONS) = ~5

SAMPLE APPEARANCE tan-brown turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.0	9.5	10.0	10.0	
SPEC COND. (umhos/cm)	1050	1180	1180	1000	
pH	4.61	4.72	4.69	4.71	
VOLUME PURGED (gal)	0.5	1.5	3	~4.5	
DO	2.3	2.1	2.7	2.5	
NTU	>1000	>1000	>700	620	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL-TCL, Ca, TDS, RAD

WEATHER CONDITIONS p cloudy - sunny ~35°F

OTHER NOTES slow recharge

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/21/97

PROJECT NAME Li Tungsten SAMPLERS Johnson

SITE LOCATION Glen Cove, NY Kowalski

SAMPLE COLLECTION LOG

WELL ID GM-14B (Round # 2)

WELL PURGING EQUIPMENT ~~2" submersible pump~~ centrifugal

TIME PURGING FINISHED 1250 TIME SAMPLING STARTED 1435

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 14.72

DEPTH TO WATER (FT. FROM TOC) = 7.18 TIME 1020

HEIGHT OF WATER IN WELL (FT) = 7.54

ONE WELL VOLUME (GALLONS) = 1.2

VOLUME WATER REMOVED (GALLONS) = 4.5

SAMPLE APPEARANCE Black -

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10.5	10.0	10.0	10.0	
SPEC COND. (umhos/cm)	960	1000	1100	1100	
pH	9.73	9.62	9.67	9.75	
VOLUME PURGED (gal)	0.5	1.5	3	4.5	
DO	3.4	2.6	2.1	1.7	
NTU	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, RAD, Cn, TDS

WEATHER CONDITIONS p cloudy - sunny - 35°F

OTHER NOTES Slow recharge

Strong odor - sample in off-gasing

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301657

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/23/96

PROJECT NAME Li Tungsten SAMPLERS J. Guerrier

SITE LOCATION Parcel "C" - GM-15 C. Trione

SAMPLE COLLECTION LOG

WELL ID GM-15 (Round #2)

WELL PURGING EQUIPMENT Centrifugal Pump - 3/4" Poly - Check Valve

TIME PURGING FINISHED 1520 TIME SAMPLING STARTED 1542

SAMPLING EQUIPMENT SS. Bailer

WELL DEPTH (FT. FROM TOC) = 13.62

DEPTH TO WATER (FT. FROM TOC) = 5.12 TIME 1542

HEIGHT OF WATER IN WELL (FT) = 8.50

ONE WELL VOLUME (GALLONS) = 1.5 gallons ≈

VOLUME WATER REMOVED (GALLONS) = ≈ 7 gallons

SAMPLE APPEARANCE Turbid - Brown

0.0 (mg/L)	5.17	6.72	6.39	6.85	
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	13°C	13°C	14°C	14°C	
SPEC COND. (umhos/cm)	420	370	430	450	
pH	6.21	6.32	6.48	6.48	
VOLUME PURGED (gal)	1.5	1.5	1.5	1.5	
Turbidity NTU -	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem. VOA's, Metals (Dissolved + Filtered), Cyanide, TDS, Rad, PCB/Pest

WEATHER CONDITIONS Sunny - P/Cloudy in PM, Temp 40-45°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/27/97

PROJECT NAME Li Tungsten SAMPLERS H Kowalski

SITE LOCATION Glen Cove, NY E. Johnson

SAMPLE COLLECTION LOG

WELL ID MP-16D (Round #2)

WELL PURGING EQUIPMENT 2" submersible pump w/ 3/4" poly

TIME PURGING FINISHED 1315 TIME SAMPLING STARTED 1600

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 55.04

DEPTH TO WATER (FT. FROM TOC) = 3.4 TIME 1050

HEIGHT OF WATER IN WELL (FT) = 51.64

ONE WELL VOLUME (GALLONS) = 33.5

VOLUME WATER REMOVED (GALLONS) = ~35

SAMPLE APPEARANCE Grey - Brownish turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	11.0			
SPEC COND. (umhos/cm)	2800	2700	Dry		
pH	11.62	11.31			
VOLUME PURGED (gal)	~5	34			
0.0 NTU	3.1 670	2.0 94.6			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TCL - TAL, TDS, RAD, Cn

WEATHER CONDITIONS Cloudy - 30°F

OTHER NOTES well purged dry - very slow recharge

Possible cement/grout contamination

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301659

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/27/97

PROJECT NAME L. Tungsten SAMPLERS H. Kowalski

SITE LOCATION Glen Cove, NY E. Johnson

SAMPLE COLLECTION LOG

WELL ID MP-16S (Round #2)

WELL PURGING EQUIPMENT 2" centrifugal pump

TIME PURGING FINISHED 1130 TIME SAMPLING STARTED 1445

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 24.04

DEPTH TO WATER (FT. FROM TOC) = 0.6 TIME 1045

HEIGHT OF WATER IN WELL (FT) = 23.44

ONE WELL VOLUME (GALLONS) = 15.3

VOLUME WATER REMOVED (GALLONS) = ~15

SAMPLE APPEARANCE brown - cloudy slurry

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	9.0	9.0			
SPEC COND. (umhos/cm)	160	210	DRY		
pH	6.13	6.42			
VOLUME PURGED (gal)	2	15			
DO	7.82	6.44			
NTU	>1000	>1000			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) TAL - TCL, Cn, TDS, RAD

WEATHER CONDITIONS cloudy - 30°F

OTHER NOTES Top of well frozen

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301660

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/23/97

PROJECT NAME Li Tungsten SAMPLERS E. Johnson

SITE LOCATION Glen Cove, NY H Kowalski

SAMPLE COLLECTION LOG

WELL ID MP-17 (Round #2)

WELL PURGING EQUIPMENT 3/4" poly pipe w/ check valve

TIME PURGING FINISHED 1115 TIME SAMPLING STARTED 1415

SAMPLING EQUIPMENT S.S. bailer

WELL DEPTH (FT. FROM TOC) = 14.50

DEPTH TO WATER (FT. FROM TOC) = 0.85 TIME 1030

HEIGHT OF WATER IN WELL (FT) = 13.65

ONE WELL VOLUME (GALLONS) = 8.87

VOLUME WATER REMOVED (GALLONS) = ~10

SAMPLE APPEARANCE Cloudy ~ orange

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.0	11.0			
SPEC COND. (umhos/cm)	1400	1300	DRY		
pH	6.59	6.53			
VOLUME PURGED (gal)	2	8.5			
DO	4.56	4.31			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL - TCL, TDS, Cn, RAD

WEATHER CONDITIONS p. cloudy ~50°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301661

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 800.202 DATE 1/21/97

PROJECT NAME L. Tungsten SAMPLERS J G

SITE LOCATION Parcel C L T.

SAMPLE COLLECTION LOG

WELL ID MP-180 (Round #2)

WELL PURGING EQUIPMENT 3/4" Poly Hose, Submersible Pump

TIME PURGING FINISHED 1340 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 48.00

DEPTH TO WATER (FT. FROM TOC) = 7.23 TIME 1230 ~~1530~~ CT

HEIGHT OF WATER IN WELL (FT) = 40.77

ONE WELL VOLUME (GALLONS) = 26

VOLUME WATER REMOVED (GALLONS) = 75

SAMPLE APPEARANCE Slightly Turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
DO	2.75	2.80	2.75		
TEMP (°C)	10.5	11.0	11.0	✓	
SPEC COND. (umhos/cm)	7600	7700	7750	~~7700~~ CT	
pH	5.15	5.20	5.21		
VOLUME PURGED (gal)	10	40	75		
NTU	7,000	200	150		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's Semi-VOA's Metals, Cyanide, TDS, Rad, PCB/Pest.

WEATHER CONDITIONS Sunny 40°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

40.77
.66
2035
2446

301662

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/21/97

PROJECT NAME Li Tungsten SAMPLERS J. Guerrero

SITE LOCATION Panel C C Trione

SAMPLE COLLECTION LOG

WELL ID 18.5 (Round #2)

WELL PURGING EQUIPMENT 3/4" Poly Hose Submersible Pump

TIME PURGING FINISHED 1405 TIME SAMPLING STARTED 1420

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 14.20

DEPTH TO WATER (FT. FROM TOC) = 3.50 TIME ~~1420~~ 1335 CT

HEIGHT OF WATER IN WELL (FT) = 10.70

ONE WELL VOLUME (GALLONS) = 6.9

VOLUME WATER REMOVED (GALLONS) = 28

SAMPLE APPEARANCE slightly cloudy

DO	3.00	2.95	3.06	3.10	
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11.5	11.0	11.0	11.0	
SPEC COND. (umhos/cm)	1600	1700	1650	1600	
pH	4.32	4.27	4.35	4.30	
VOLUME PURGED (gal)	1	7	14	28	
NTU	>1000	>1000	>1000	>1000	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Semi-VOA's, PCB/Pesticides, Metals, Cyanide, TDS + Rad

WEATHER CONDITIONS Sunny, Temp 40° F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301663

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8601202 DATE 1/29/97, Wed.

PROJECT NAME Li Tungsten SAMPLERS C Tran

SITE LOCATION Parcel B J. Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-19D (Round #2)

WELL PURGING EQUIPMENT 2" SS sub. pump

TIME PURGING FINISHED 1215 TIME SAMPLING STARTED 1245

SAMPLING EQUIPMENT SS. Bailer

WELL DEPTH (FT. FROM TOC) = 35.50

DEPTH TO WATER (FT. FROM TOC) = 7.20 TIME 1245

HEIGHT OF WATER IN WELL (FT) = 28.30

ONE WELL VOLUME (GALLONS) = ≈ 20 gallons

VOLUME WATER REMOVED (GALLONS) = 60 gallons

SAMPLE APPEARANCE Clear -

DO mg/L 9.18 8.72 8.75

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12°C	12°C	12°		
SPEC COND. (umhos/cm)	500	500	500		
pH	6.31	6.35	6.40		
VOLUME PURGED (gal)	20	20	20		
Turbidity (NTU)	40	15	12		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) VOA's, Sem-VOA's Metals, Cyanide, TDS + Rad parameters, PCB/Pest

WEATHER CONDITIONS P/Cloud, To Sunny - 29°F, Winds 0-5 mph

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301664

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/20/97

PROJECT NAME Li Tungsten SAMPLERS Johnson, Kowalski

SITE LOCATION Glen Cove, NY Trione, Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-20 (Round #2)

WELL PURGING EQUIPMENT centrifugal

TIME PURGING FINISHED 1330 TIME SAMPLING STARTED 1515

SAMPLING EQUIPMENT SS bailer

WELL DEPTH (FT. FROM TOC) = 10.22 (AP)(BS)

DEPTH TO WATER (FT. FROM TOC) = 4.50 6.32 4.93 TIME 1300

HEIGHT OF WATER IN WELL (FT) = 5.72

ONE WELL VOLUME (GALLONS) = 3.7

VOLUME WATER REMOVED (GALLONS) = ~13

SAMPLE APPEARANCE yellowish - S. turbid

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	12.0	11.5	11.0	11.0	
SPEC COND. (umhos/cm)	430	410	405	390	
pH	6.63	6.74	6.61	6.57	
VOLUME PURGED (gal)	1.0	4.5	8.5	13	
NTU	>1000	>1000	>1000	>1000	
DO	3.5	4.1	3.8	3.9	

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS)

TAL, TCL, Cn, RAD, TDS

WEATHER CONDITIONS cloudy ~25°F

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301665

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/23/97

PROJECT NAME L. Tungsten SAMPLERS C. Trione

SITE LOCATION Parcel A J. Guerrier

SAMPLE COLLECTION LOG

WELL ID MP-21D. (Round #2)

WELL PURGING EQUIPMENT 3½" Poly Submersible Pump, Grundfos

TIME PURGING FINISHED 1055 TIME SAMPLING STARTED 1130

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 54.70

DEPTH TO WATER (FT. FROM TOC) = 1.20 TIME 1130

HEIGHT OF WATER IN WELL (FT) = 53.50

ONE WELL VOLUME (GALLONS) = 35 gallons

VOLUME WATER REMOVED (GALLONS) = 105 gallons

SAMPLE APPEARANCE Clear

D.O mg/L 3.18 3.05 2.89

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	14°C	13°C	13°C		
SPEC COND. (umhos/cm)	720	630	620		
pH	7.31	6.85	6.43		
VOLUME PURGED (gal)	35 gal	35	35		
Turbidity (NTU)	72	32	15		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) Collected VOA's Semi-VOA's, Metals (dissolved/unfiltered), Cyanide, PCB/Pest., TDS, Rad,

WEATHER CONDITIONS Sunny, Temp 50°F, Wind low

OTHER NOTES Collected MS/MSD

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

301666

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/22/97

PROJECT NAME Li Tungsten SAMPLERS: C Trine

SITE LOCATION Parcel A J. Guerrieri

SAMPLE COLLECTION LOG

WELL ID MP-22S (Round #2)

WELL PURGING EQUIPMENT centrifugal/hand pump

TIME PURGING FINISHED 1030 TIME SAMPLING STARTED 1130

SAMPLING EQUIPMENT S.S. Bailer

WELL DEPTH (FT. FROM TOC) = 11.60

DEPTH TO WATER (FT. FROM TOC) = 5.28 TIME 1130

HEIGHT OF WATER IN WELL (FT) = 6.32

ONE WELL VOLUME (GALLONS) = 4.1

VOLUME WATER REMOVED (GALLONS) = 12 gal ≈

SAMPLE APPEARANCE Dark black to grey

DO mg/L 7.54 6.29 6.18

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11°C	10°C	10°C		
SPEC COND. (umhos/cm)	360	362	352		
pH	6.71	6.68	6.65		
VOLUME PURGED (gal)	4 gal	5 -	3 —		

NTU (Turbidity) >1000

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) Collected - VOA's, Semi-VOA's, Metals, TDS, PCB/Pesticides, Cyanide

WEATHER CONDITIONS P/Cloudy

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

6.32
.65
3760
3792

301667

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 1/22/97

PROJECT NAME Li Tungsten SAMPLERS C. Trone

SITE LOCATION Parcel A J. Guerriero

SAMPLE COLLECTION LOG

WELL ID MP-22D (Round #2)

WELL PURGING EQUIPMENT Centrifugal / hand pump

TIME PURGING FINISHED 1530 TIME SAMPLING STARTED 1545

SAMPLING EQUIPMENT S.S. Bailer.

WELL DEPTH (FT. FROM TOC) = 50.00

DEPTH TO WATER (FT. FROM TOC) = 9.20 TIME 1545

HEIGHT OF WATER IN WELL (FT) = 40.80

ONE WELL VOLUME (GALLONS) = 26.5

VOLUME WATER REMOVED (GALLONS) = 60 gallons ≈

SAMPLE APPEARANCE Clear To Cloudy -

DO mg/L	3.00	3.31			
FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	10°C	9°C	8°C/Dry		
SPEC COND. (umhos/cm)	450	500			
pH	8.42	7.99			
VOLUME PURGED (gal)	30	30			
NTU (Turbidity)	550	490			

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) Collected VOA's, Sem-VOA's, Metals, Cyanide, PCB/Pesticides, TDS

WEATHER CONDITIONS P/Cloudy

OTHER NOTES

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

40.80
-6
20.80
24.80
26.50

301668

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD, MAHWAH, NJ 07495-0018

PROJECT # 8001202 DATE 3/21/97

PROJECT NAME Li Tungsten SAMPLERS C. Trione

SITE LOCATION Off-site (north of Pace/B) I. Guerriero

SAMPLE COLLECTION LOG

WELL ID MW-12 (Konica well)

WELL PURGING EQUIPMENT SS Bailer

TIME PURGING FINISHED 1500 TIME SAMPLING STARTED 1530

SAMPLING EQUIPMENT SS Bailer

WELL DEPTH (FT. FROM TOC) = 27.50

DEPTH TO WATER (FT. FROM TOC) = 16.42 TIME 1430

HEIGHT OF WATER IN WELL (FT) = 11.08

ONE WELL VOLUME (GALLONS) = 1.8

VOLUME WATER REMOVED (GALLONS) = 5.5 gals

SAMPLE APPEARANCE cloudy - red/brown

DO (mg/l) 5.95 5.96 5.98

FIELD PARAMETERS	FIRST	SECOND	THIRD	FOURTH	FIFTH
TEMP (°C)	11	10	10		
SPEC COND. (umhos/cm)	450	435	430		
pH	6.61	6.58	6.55		
VOLUME PURGED (gal)	2.0	2.0	1.5		
Turbidity NTU	>1000	>1000	>1000		

SAMPLES COLLECTED (PARAMETERS AND PRESERVATIONS) Full TAL + TCL (Filtered + unfiltered) CN, RAD, TDS

WEATHER CONDITIONS P. Cloudy 40°F

OTHER NOTES 80 oz of split sample provided per Dan Romeo (Konica)

CASING DIAMETER (IN.)	CASING VOLUME (GALLONS/LINEAR FT.)
1.25	0.0637
1.50	0.0918
2	0.1632
2.5	0.2550
3	0.3672
3.5	0.4998
4	0.6528
6	1.4687

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APPENDIX F

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Appendix F

Downhole Gamma Logging Data

LI TUNGSTEN SUPERFUND SITE
GLEN COVE, NEW YORK
RESULTS OF GAMMA LOGGING
AREA 1

Depth (ft)	GAMMA LOGGING MEASUREMENTS (30 second counts)				
	RT-11	RT-12	RT-13	RT-14	RT-15
0	90903	108278	219230	5451	23106
0.5	108943	119433	250607	6437	18906
1	69331	93015	214583	6892	12623
1.5	40224	57168	132220	7088	8808
2	37335	32053	72943	7343	7603
2.5	41682	20689	40110	7612	7425
3	28531	15744	20346	7650	7224
3.5	15851	12367	13336	7774	7544
4	11020	10178	10881	7994	8119
4.5	9040	8730	10561	7892	9088
5	8367	8385	11724	7784	9563
5.5	8046	7715	10294	7454	8585
6	7741	7815	9162	7146	8609
6.5	7405	8443	8398	7543	8514
7	7282	9050	7882	8382	8178
7.5	7535	9498	8636	8661	8322
8	7694	10425	8344	8024	8498
8.5	7635	10501	7623	8093	8341
9	7224	10168	7081	8023	7918
9.5	6897	8996	8768	8880	7744
10	6335	7391	14122	9732	7585
10.5	6216	5819	14513	9823	7275
11	6219	5755	8832	9487	6811
11.5	6320	6632	6667	8418	6572
12	6247	9509	6942	7936	6662
12.5	5585	5904	5866	8059	6932
13	4792	4693	4557	8785	7271
13.5	4384	4429	4102	8987	7439
14	4321	4367	3731	9412	7623
14.5	B.O.H. = 14'	4994	3623	9874	7991
15		8839	4214	9263	8159
Surface Exposure Rate (uR/h)	250 - 1000	300 - 400	72.5	12	700
Adjusted Surface Exposure Rate (uR/h)	225 - 900	270 - 360	65.25	10.8	630

NOTES: B.O.H. = Bottom of hole

Adjusted Surface Exposure (uR/h) = 0.9 x Surface Exposure (uR/h). The 0.9 adjustment factor is based on a comparison of the NaI readings

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LI TUNGSTEN SUPERFUND SITE
GLEN COVE, NEW YORK
RESULTS OF GAMMA LOGGING
AREA 2

Depth (ft)	GAMMA LOGGING MEASUREMENTS (30 second counts)		
	RT-18	RT-19	RT-20
0	4513	44196	6250
0.5	4187	85202	7405
1	3812	62995	7542
1.5	3387	30533	7837
2	3146	17299	7936
2.5	3311	12404	6857
3	4068	10826	5793
3.5	5702	10594	5172
4	6670	11397	5137
4.5	6823	15538	5957
5	6571	21336	6592
5.5	6605	16502	6212
6	6488	18699	5791
6.5	5888	22457	5865
7	5493	17397	5571
7.5	5140	14389	5539
8	5004	13211	5154
8.5	5123	14093	5242
9	5449	15796	5549
9.5	5693	10871	6399
10	5600	9640	6526
10.5	5535	8155	6546
11	5662	6892	6391
11.5	5719	5926	6350
12	5853	6443	6458
12.5	6108	12493	B.O.H. = 12'
13	5949	6047	
13.5	6532	4462	
14	6686	4111	
14.5	B.O.H. = 14'	B.O.H. = 14'	
15			
Surface Exposure Rate (uR/h)	12	150	13
Adjusted Surface Exposure Rate (uR/h)	10.8	135	11.7

NOTES: B.O.H. = Bottom of hole

Adjusted Surface Exposure (uR/h) = 0.9 x Surface Exposure (uR/h).

The 0.9 adjustment factor is based on a comparison of the NaI readings

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LI TUNGSTEN SUPERFUND SITE
GLEN COVE, NEW YORK
RESULTS OF GAMMA LOGGING
AREA 3

Depth (ft)	GAMMA LOGGING MEASUREMENTS (30 second counts)											
	RT-1	RT-2	RT-3	RT-4	RT-5	RT-6	RT-7	RT-8	RT-9	RT-10	RT-16	RT-17
0	32142	24606	91153	5818	92059	13497	145361	21463	4699	5872	4272	4088
0.5	36545	37853	145244	6742	88097	12860	202303	19689	6289	7235	4629	4930
1	39200	34797	197324	7504	97835	10773	220131	19304	6793	8060	4905	5559
1.5	37335	25035	202321	8057	25151	9877	165903	19462	6622	8210	5101	5629
2	30434	17046	153395	8212	16160	9057	96103	19469	5681	7848	4775	4965
2.5	28807	11485	78715	7736	11739	8058	63947	19701	4529	6928	4463	4211
3	20290	9547	35564	6894	10455	7395	46679	19203	4068	6137	4155	3399
3.5	13570	8921	22628	6395	10376	7141	39068	16703	4056	5697	4033	3348
4	10374	8859	16921	6653	10539	6495	37738	13220	4067	5719	4062	3312
4.5	9959	8817	13077	6402	10498	5918	39949	B.O.H. = 4'	4197	5525	4193	3093
5	10409	8167	10289	6782	9486	6025	32617		4640	5458	4887	2852
5.5	9067	7618	9625	7393	7757	5953	19213		5040	5823	5056	2849
6	7670	7098	9387	7332	7068	5403	13737		5358	6265	4462	2584
6.5	7348	7169	8612	6927	6753	5105	11982		5197	5983	4612	2522
7	6689	7506	8146	6739	6106	5462	10963		4842	5224	4846	2542
7.5	7338	7986	7819	6768	5563	5703	9497		4663	5076	4821	2455
8	7651	7941	7770	6511	5157	5735	11038		4831	4803	4704	2370
8.5	6188	7825	7380	6376	4793	4947	17918		5193	4577	4842	2362
9	5399	7738	7323	6855	4043	4594	37924		5196	4247	4579	2288
9.5	5495	7436	7152	7646	3561	4688	35409		5014	3907	4583	2957
10	6080	6689	6744	8377	3584	4361	25110		5396	3862	4636	2367
10.5	6835	6163	6921	8985	3201	4013	38835		5217	3538	B.O.H.=10'	B.O.H.=10'
11	7335	5981	7686	9154	2791	3738	42584		5411	3786		
11.5	7048	5958	7532	9756	2359	3560	35548		6309	4110		
12	6408	6162	6892	9965	2218	3568	23188		6862	4190		
12.5	5763	6810	6684	10075	2040	3475	11900		7539	4041		
13	6097	7948	B.O.H. = 12.5'	10229	2090	3205	7155		8494	3936		
13.5	6566	8989		9626	2827	3238	5961		8978	3937		
14	4986	8550		9411	B.O.H. = 13.5'	B.O.H. = 13.5'	5999		9124	B.O.H.=13.5'		
14.5	4895	7429		9041			6287		9290			
15	4928	6909		8584			B.O.H. = 14.5'		9247			
Surface Exposure Rate (uR/h)	200 - 250	100	150 - 200	11	700	50	250	80 - 100	10	14	12	11
Adjusted Surface Exposure Rate (uR/h)	180 - 225	90	135 - 180	9.9	630	45	250	72 - 90	9	12.6	10.8	9.9

NOTES: B.O.H. = Bottom of hole

Adjusted Surface Exposure (uR/h) = 0.9 x Surface Exposure (uR/h). The 0.9 adjustment factor is based on a comparison of the NaI readings to readings taken with a pressurized ion chamber.

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APPENDIX G

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Appendix G

Wetland Delineation Report

LI TUNGSTEN CORPORATION SITE
WETLANDS DELINEATION REPORT

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3	Soil Conservation Survey Soils Map	4
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C	Resumes and Certifications

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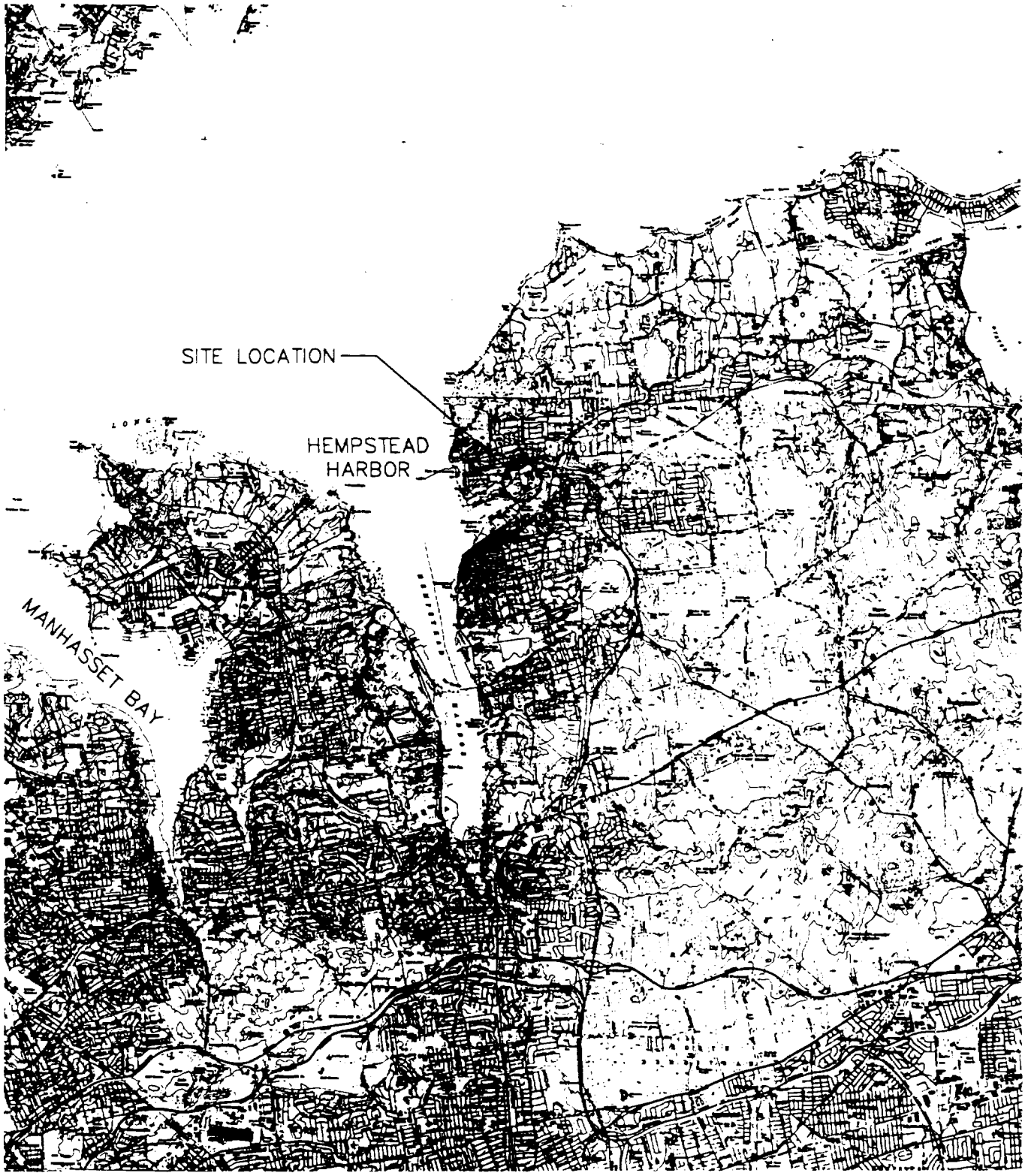
1.0 INTRODUCTION

The Li Tungsten Corporation site (Li Tungsten) includes approximately 26 acres located at 63 Herb Hill Road, City of Glen Cove, Nassau County, New York (see Figure 1) (USEPA ID#NYD9869926-60). The site is bordered by active and inactive industrial properties and the Glen Cove Creek as well as some residential properties to the north.

Currently inactive, the Li Tungsten facility smelted tungsten ore and concentrates to produce tungsten carbide powder, tungsten wire, and welding rods from the early 1940s until 1985 (NUS, 1989, 1990). In 1985 the company filed for bankruptcy and the facility ceased operations. When the site was abandoned, ore concentrates and residual waste or slag were left on site. There is evidence that this slag was placed in waste piles at the ground surface or buried on site (NUS, 1989, 1990). Various site investigation activities have been conducted from 1987 to the present. The results of some of these investigations indicate the presence of heavy metals, fuel oil constituents, and volatile organic chemicals in the groundwater, surface water, sediments and soils. A Remedial Investigation/Feasibility Study (RI/FS) is currently being conducted at the site.

Because remedial measures may impact the present site conditions, federally jurisdictional wetlands must be identified in order to determine the need for mitigation measures. Scientists from Malcolm Pirnie, Inc. performed wetland delineations on October 14-15 and November 28-30, 1996. On-site jurisdictional wetlands were determined by following the U.S. Army Corps of Engineers (ACOE) 1987 Wetland Delineation Manual and were mapped accordingly.

It is the intent of this document to provide sufficient information to the regulatory branches of the USEPA and the District of the U.S. Army Corps of Engineers (ACOE) to enable respective jurisdictional determinations concerning the delineated wetland boundaries. Information concerning the extent of regulated wetlands will be utilized to evaluate and mitigate wetlands impacts, if any, while preparing feasible remedial alternatives.



TITLE:	DATE:	FIGURE NO.:
SITE LOCATION MAP	AUGUST 1997	FIGURE 1

GLEN COVE, NEW YORK

USEPA REGION II ARCS

CONTRACT NO. 68-W9-0051; W.A. NO. 025-2L4L

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2.0 SITE DESCRIPTION

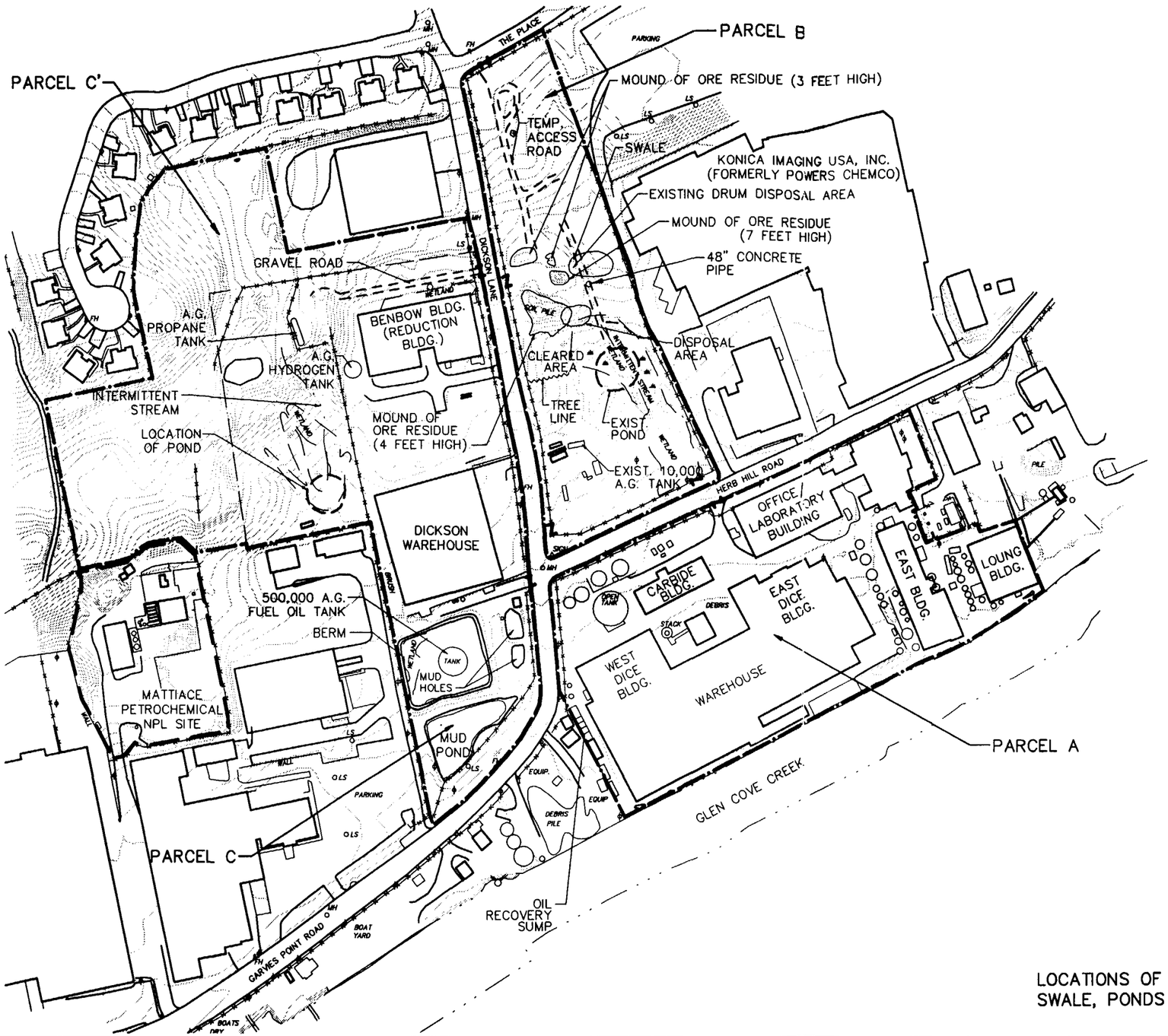
2.1 Site History

The 26 acre site consists of four separate parcels. The location of Parcels A, B, C, and C′ and the significant site features of each are shown on the site plan in Figure 2.

Parcel A is approximately seven acres in size and served as the center of operations. Parcel A is primarily covered by buildings or pavement. Many buildings on Parcel A have deteriorated to a point where walls and roofs have collapsed. Numerous above ground tanks used to store reactants for the tungsten extraction are located on Parcel A. When abandoned, many drums, wooden crates, and piles of slag were left both inside and outside the buildings. Parcel A is bordered by Herb Hill Road to the north, Glen Cove Creek to the south and active industrial properties to the east and west.

Parcel B is approximately six acres in size and is located due north of Parcel A. Parcel B is bordered on the south by Herb Hill Road, to the north by a residential street, The Place, to the west by Dickson Lane, and to the east by an active industrial property. The lower portion of Parcel B was historically used as a parking lot for Li Tungsten employees. The surface of the parking lot was gravel. Historically, slag was piled and other material was landfilled on the middle to upper portion of Parcel B.

Parcel C is approximately 10 acres in size. Parcel C is located on the west side of Dickson Lane and is bordered to the south by Garvies Point Road, to the west by Parcel C′ and another superfund site (Mattiace Petrochemical), and to the north by an active commercial/ industrial property. Parcel C contains two buildings, a 500,000 gallon above ground tank historically used to store road oil, and three surface impoundments. These impoundments are comprised of a lined pond and two former unlined ponds, historically used to dispose of process waste water. Parcel C is divided into a lower and upper half by the Dickson warehouse. The surface impoundments and the above ground storage tank are located on lower Parcel C. The tank is surrounded by a berm. Radioactive waste and petroleum products were preliminarily identified within this berm. One area within the berm was



LEGEND

- BUILDING
- TREE/TREE LINE
- FENCE LINE
- GUARD RAIL
- WALL
- PAVED ROAD
- GRAVEL/DIRT ROAD
- WATER LINE
- PARCEL BOUNDARY
- MAINT. HOLE/FIRE HYDRANT
- LIGHT STANDARD/UTILITY POLE
- SWAMP
- WETLAND
- PILES (SOIL, WASTE OR DEBRIS)
- MAIN GATES

LOCATIONS OF TEMPORARY ACCESS ROAD, SWALE, PONDS ARE APPROXIMATE.

0 100 200 300
SCALE IN FEET
1"=200'

MALCOLM PIRNIE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

TITLE: SITE PLAN

LI TUNGSTEN REMEDIAL INVESTIGATION
GLEN COVE, NEW YORK
USEPA REGION II ARCS
CONTRACT NO. 68-W9-0051; W.A. NO. 025-2L4L

DATE: AUGUST 1997

PROJECT NO.: 8001202

FIGURE NO.: FIGURE 2

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delineated as a wetland. The Benbow building and several above ground storage tanks exist on upper Parcel C (Figure 2).

Parcel C′ is a portion of undeveloped land to the west of Parcel C, approximately four acres in size. Parcel C′ was not originally part of the Li Tungsten property during operations, but was acquired sometime after 1984 by the Glen Cove Development Corporation. Parcels C′ is located on the west side of Parcel C and is bordered to the west by Garvies Point Preserve, to the south by the Mattiace Petrochemical site and to the north by residential properties. Parcel C′ consists of an upland forested area in which no wetlands were identified.

Due to the dilapidated state of many of the on-site buildings, drums and crates, as well as the excess slag piled in and around the buildings, and in order to provide a safe work environment for the Remedial Investigation team, Interim Remedial Actions were conducted prior to the Remedial Investigation activities. Drums, crates, and slag were moved and stored in the Dickson Warehouse. All friable asbestos was removed from the buildings. In addition, laboratory chemicals were also removed.

The Remedial Investigation field activities began on August 12, 1996. Due to inaccessibility issues, much of the vegetation on the western portion of Parcel B was removed. A road was also constructed north of the Benbow building to provide access to upper Parcel C and Parcel C′. Given this, on-site drainage and vegetation may have been disturbed in the recent past.

2.2 Current Site Description

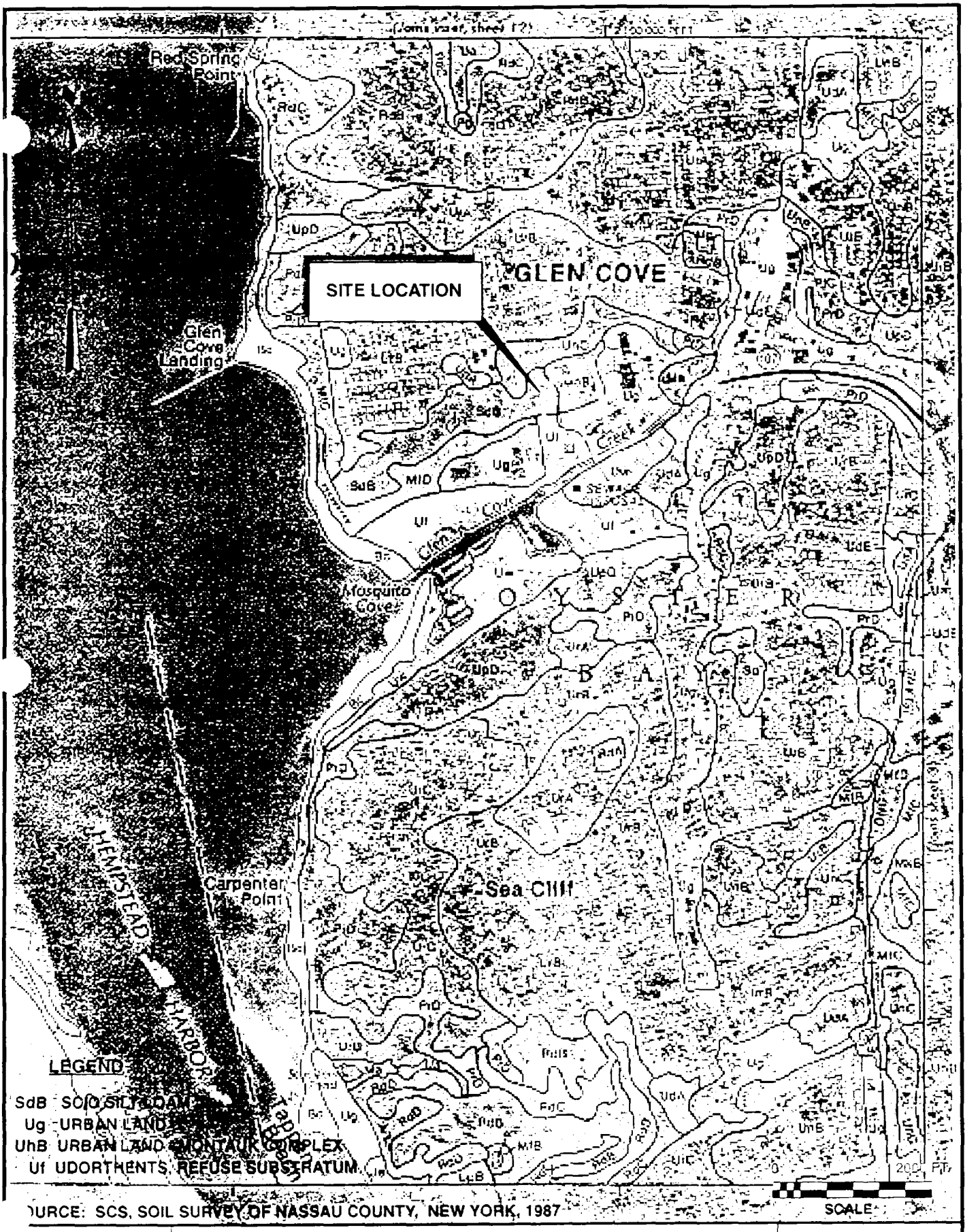
There are no large freshwater streams in the Glen Cove area. The Li Tungsten site is located on the north side of Glen Cove Creek, a saltwater tidal channel. Approximately 3000 feet southeast of the Li Tungsten site Glen Cove Creek empties into Hempstead Harbor. Surface drainage from the site generally is southward toward Glen Cove Creek. Since the area is developed, much of the surface water runoff is collected in storm drains that outfall in Glen Cove Creek.

Total site relief ranges from 10 to 96 feet above mean sea level. Parcel A is relatively level at 10 feet above mean sea level. Relief on Parcel B ranges from approximately 20 to 60 feet above mean sea level; on Parcel C from 10 to 70 feet above mean sea level and from 40 to 96 feet above mean sea level on Parcel C′. Wetlands onsite appear to be associated with natural drainage patterns and impoundments due to human activity.

According to the Soil Conservation Service's Survey of Nassau County, the site contains two mapping units (see Figure 3). Parcel A soil is designated as Urban Land or "Ug". The Urban land mapping unit consists of areas that are at least 85% covered with asphalt, concrete, or other impervious building material. Many are in the business centers in villages and cities and are nearly level or gently sloping. A few areas within this mapping unit are in low spots where seasonal wetness may cause flooding of the surface or frost heaving and subsequent breakup of surface pavements. Lower Parcel B is designated as Urban Land and middle to upper Parcel B is designated as Urban land-Montauk complex or "UnB". The UnB unit consists of urbanized areas and deep and well drained soils. UnB soils are well drained and located on the sides and top of gentle slopes (3 to 8 percent). Upper Parcel C is designated as UnB, middle and lower Parcel C are designated as Urban Land and Udorthents, refuse substratum or "Uf". This soil type consists of nearly level to steep, sandy soils associated with sanitary landfill cover. The upper 2 to 3 feet of this unit is mixed layers of sandy fill material. Parcel C′ and westernmost Parcel C are designated as Scio silt loam, till substratum or "SdB". This unit consists of a very deep, moderately well drained soil and is commonly found at foot slopes adjacent to small hills or rises. Most areas that contain this unit are in woodland.

Precipitation in Nassau County is well distributed. Data recorded at Mineola between 1951 and 1980 shows that annual precipitation is 42 inches. Approximately 50 percent falls between April and September (Soil Conservation Service, 1987).

Groundwater flow is principally south toward Glen Cove Creek. Groundwater levels on Parcel A range from 1.45 to 9.90 feet below ground surface, on Parcel B from 3.85 to 19.01 feet below ground surface, on Parcel C and C′ from 5.79 to 54.79 feet below ground surface.



SOURCE: SCS, SOIL SURVEY OF NASSAU COUNTY, NEW YORK, 1987

MALCOLM PIRNIE

CITY OF GLEN COVE
LI TUNGSTEN SITE

SOIL CONSERVATION SURVEY SOILS MAP

MALCOLM PIRNIE, INC

FIGURE 3

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There are two surface water systems on-site. A drainage ditch located on the eastern half of Parcel B runs south approximately two-thirds the length of the parcel. A small pond approximately 15 feet wide by 25 feet long is located approximately midway down the drainage ditch. The most northerly section of the ditch was dry during the October-November field visits. Common reed (*Phragmites australis*) is the dominant species growing around the pond. Significant shrub and overstory species include northern spicebush (*Lindera benzoin*), northern arrowwood (*Vibirnum recognitum*), and poison ivy (*Toxicodendron radicans*). The drainage becomes undefined in lower Parcel B. Dominant species growing in and around the remaining drainage include jewelweed species (*Impatiens spp.*), common reed (*Phragmites australis*), poison ivy (*Toxicodendron radicans*), and pussy willow, (*Salix discolor*). Dominant herbaceous vegetation growing in the non-wetland includes greenbriar (*Smilax glauca*). Dominant shrub and overstory species include black cherry (*Prunus serotina*).

A series of drainages running south on the western portion of middle Parcel C end in a pond. The area is forested and the pond is only very sparsely vegetated by emergent sedges. The northern portion of the largest drainage appears to be affected by silt from an upgradient unvegetated area. Vegetation is relatively homogeneous. Dominant vegetation growing in the wetland includes northern spicebush (*Lindera benzoin*), northern arrowwood (*Vibirnum recognitum*), and common reed (*Phragmites australis*). In the drainages and at the north end of the pond, dominant herbaceous vegetation includes jewelweed (*Impatiens capensis*), royal fern (*Osmunda regalis*), and skunk cabbage (*Symplocarpus foetidus*). Dominant herbaceous vegetation growing in the upland area includes striped wintergreen (*Chimaphila maculata*), smooth solomon's seal (*Polygonatum biflorum*), and goldenrod species (*Solidago spp.*). Dominant upland shrub and overstory species include gray birch (*Betula populifolia*), red oak (*Quercus rubra*), red maple (*Acer rubrum*), and sassafras (*Sassafras albidum*).

Two areas of impounded water exist on Parcel C that contain wetland vegetation. These areas have resulted from human activity which provided suitable conditions for the establishment of wetland communities. An area along the north side of the Benbow building measures approximately 20 feet by 160 feet. Dominant wetland vegetation includes

jewelweed species (*Impatiens spp.*), common reed (*Phragmites australis*), and northern arrowwood (*Vibirnum recognitum*). Dominant upland vegetation includes red oak (*Quercus rubra*), black cherry (*Prunus serotina*), gray birch (*Betula populifolia*), and Japanese honeysuckle (*Lonicera japonica*).

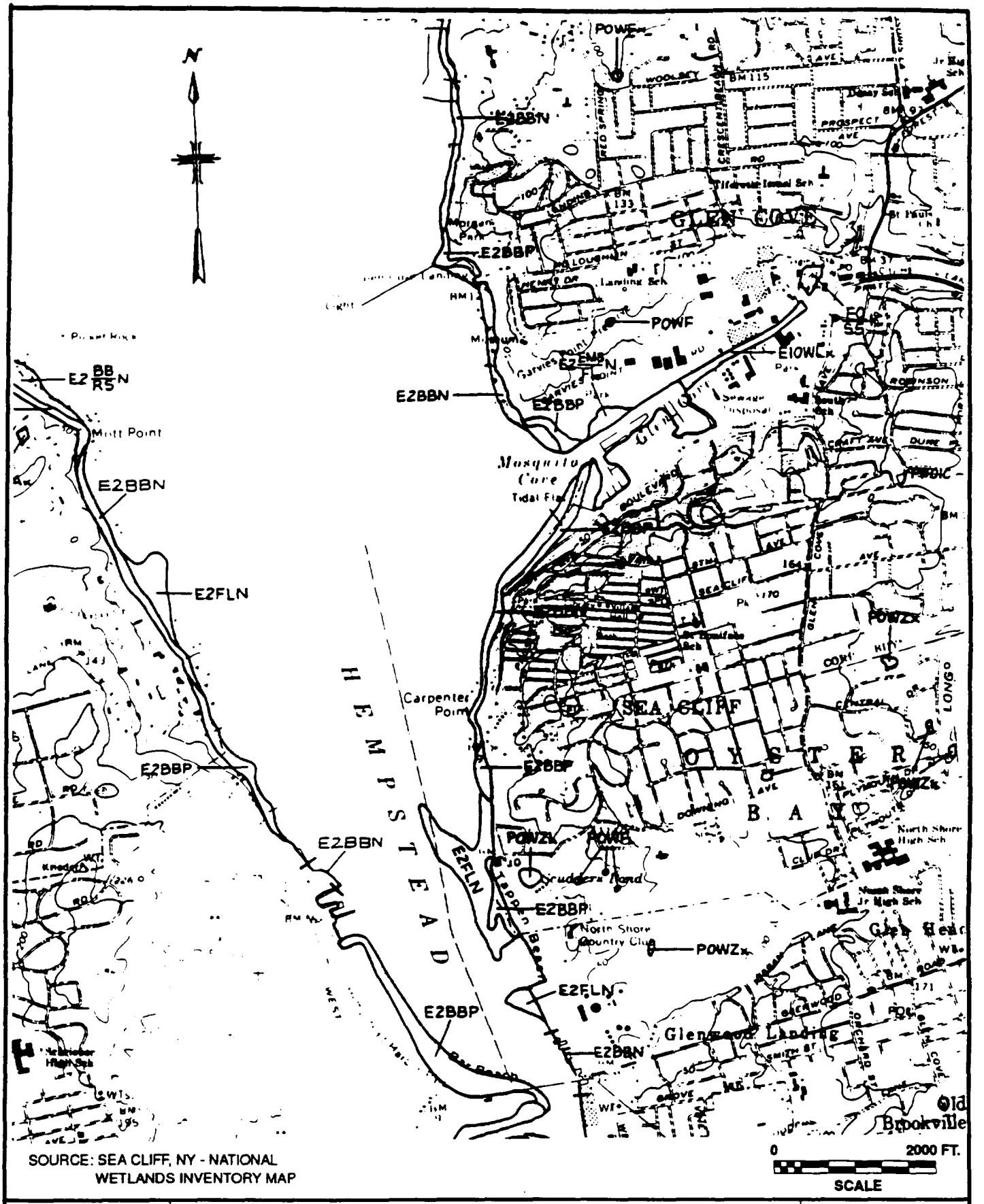
An area along the west side and within the limits of the berm on lower Parcel C measures approximately 15 feet by 25 feet in size. Dominant wetland vegetation includes pussy willow, (*Salix discolor*), wool grass (*Scirpus cyperinus*), sedge (*Carex scoparia*), and tussock sedge (*Carex stricta*). Dominant species growing in the upland area includes gray birch (*Betula populifolia*) and common reed (*Phragmites australis*).

A small area to the north of the Benbow building was also observed as a wetland. This small wooded wetland pocket is situated on a slope between two access roads created during the remedial investigation activities. Vegetation in this area consists of silver maple (*Acer saccharinum*) and arrowwood (*Viburnum recognitum*). This area exhibited wetland characteristics but was not surveyed. Field measurements indicate the area is approximately 2,500 square feet in area (approximately 20 feet by 125 feet).

No wetland areas are depicted within the site boundaries on either the National Wetlands Inventory Map for Sea Cliff New York prepared by the U.S. Fish and Wildlife Service (USFWS) or the New York State Department of Environmental Conservation Freshwater Wetland Map (Figures 4 and 5).

3.0 METHODOLOGY

Malcolm Pirnie wetlands biologists identified wetland-nonwetland boundaries using the Corps of Engineers Wetlands Delineation Manual (Dept. of the Army, 1987) and the Memorandum on "Clarification and Interpretation of the 1987 Manual" (Dept. of the Army, March 1992). The routine determination method was applied for the collection of data, since wetland areas delineated were small and had little vegetation diversity. Application of this procedure required identification of plant community types and characterization of



SOURCE: SEA CLIFF, NY - NATIONAL WETLANDS INVENTORY MAP

MALCOLM PIRNIE	LI TUNGSTEN REM EDIAL INVESTIGATION GLEN COVE, NEW YORK USEPA REGION IIARCS **NATIONAL WETLANDS INVENTORY MAP**	MALCOLM PIRNIE, INC. **FIGURE 4**

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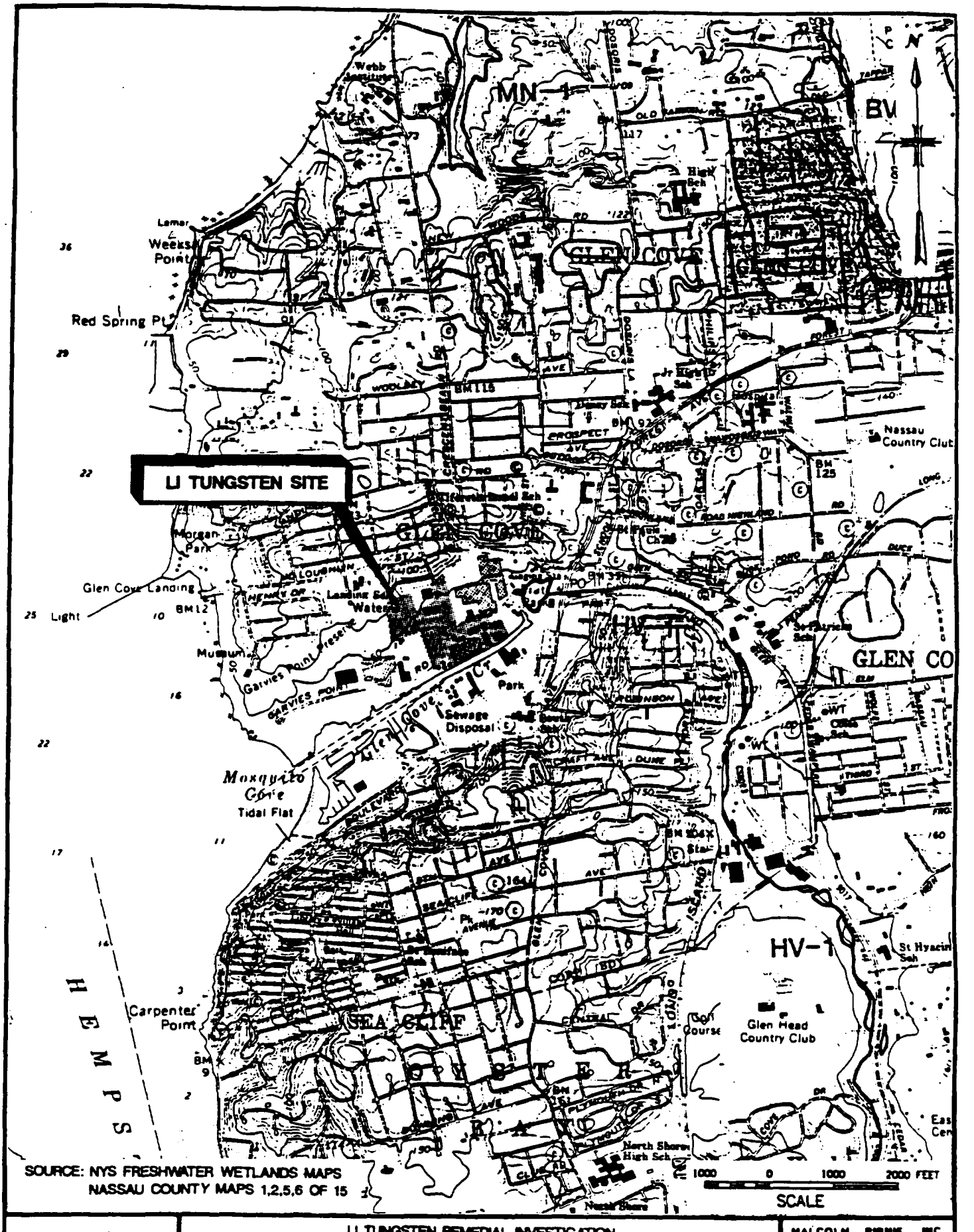

SOURCE: NYS FRESHWATER WETLANDS MAPS
NASSAU COUNTY MAPS 1,2,5,6 OF 15

MALCOLM PIRNIE

LI TUNGSTEN REMEDIAL INVESTIGATION
GLEN COVE, NEW YORK
USEPA REGION II ARCS

NEW YORK STATE FRESHWATER WETLANDS MAP

MALCOLM PIRNIE, INC.

FIGURE 5

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vegetation, soils and hydrology using established criteria. Data were collected at the sampling stations noted on the forms in Appendix A and shown on Plate 1 (designated as "SS").

Within sample quadrats and along transects, dominant plant species for each vegetative stratum were classified using the National List of Plant Species That Occur in Wetlands: Northeast (Region 1) (US Fish and Wildlife Service, 1988). On-site soil series were identified from mapping provided in the Soil Survey of Nassau County New York (USDA Soil Conservation Service, 1987). Soil bore holes along transects were augered to a depth of 12 to 18 inches and observed for hydric soil characteristics and surficial ground water levels. Soils sampled at these locations were characterized for hydric indicators using Munsell Soil Color Charts (Munsell Color, 1990). Wetland hydrology was determined by the presence of saturated soils, and the depth to water as observed in unlined, hand-augered bore holes (see Appendix A).

The following is an outline of the steps taken to determine the presence of wetlands in accordance with the 1987 federal guidelines for a routine determination with onsite inspection.

Steps 1-3: Locate the Project Area. Determine Whether an Atypical Situation Exists. Determine the Field Characterization Approach to be Used.

The wetland areas located on Parcels B and C are shown on Plate 1. Because the delineated wetland areas occurred in small discrete pockets less than one acre in area and the vegetation, soils, and/or hydrologic regime appeared relatively homogenous throughout the site, routine wetland delineation procedures were applied.

Although the entire site has been repeatedly altered in the past and to a lesser extent recently altered due to the Remedial Investigation field activities, two of the four wetland areas identified appear to be associated with natural drainages and therefore less likely to have been originally created by human activity; these include wetlands B and C3. Wetlands C1 and C2 are two impounded areas that have resulted from human activity.

Steps 4-9: Determine Whether Normal Environmental Conditions are Present. Characterize Plant Community Types. Classify Dominant Vegetation Species. Determine the Presence of Hydrophytic Vegetation.

The delineation was conducted in late fall following a wet summer and early fall. Normal environmental conditions were present within the plant communities observed. All of the wetland areas have been affected by human activity whether recent or past. With the exception of wetland C1 on lower Parcel C and possibly wetland C2 on upper Parcel C, the wetlands appear to have natural hydrology. A main drainage channel of wetland C3 on upper Parcel C appears to have somewhat recent deposits of sediment from an upgradient unvegetated location. Wetland B may have been disturbed by fill activities in the past and has been disturbed more recently by investigation activities such as clearing and vehicular traffic. A main drainage channel of wetland C3 on upper Parcel C appears to have somewhat recent deposits of sediment from an upgradient unvegetated location. Data forms were completed for each of the wetland areas identified, and short transects of sampling points were run across the wetland-nonwetland boundaries in order to establish the wetland line. The wetland areas are labeled for reference and shown on Plate 1.

At least one set of data sheets were compiled for each wetland; more than one set was recorded for larger areas or those with more than two distinct vegetative communities. A summary of the dominant vegetation, and the primary soil and hydrology indicators for each sample location is presented in Table 1. Complete Routine Wetland Determination data forms are included in Appendix A.

Wetland vegetation communities on Parcels B and C are relatively homogenous. Wetland plant species identified on-site and their USFWS classifications are presented in Table 2. Dominant herbaceous species include poison ivy (*Toxicodendron radicans; FAC*), jewelweed (*Impatiens capensis*; FAC), common reed (*Phragmites australis*; FACW), skunk cabbage (*Symplocarpus foetidus*; OBL), tussock sedge (*Carex stricta*; OBL). Woody tree and shrub species include northern arrow-wood (*Vibirnum recognitum*; FACW-), northern spicebush (*Lindera benzoin*; FACW-), and pussy willow (*Salix discolor*; FACW). More than 50 percent of the vegetative communities were comprised of Facultative (FAC) to Obligate

TABLE 3-1

SUMMARY OF DOMINANT VEGETATION, SOILS, AND HYDROLOGY
LI TUNGSTEN SITE

PLOT	DOMINANT PLANT SPECIES			SOIL COLOR	HYDROLOGY
	HERBACEOUS	SHRUB	TREE		
B-1 (wetland)	*Phragmites australis*	*Vibirnum recognitum*	N/A	10YR 5/3 @ 12"	Saturation
B-1 (nonwetland)	N/A	*Toxicodendron radicans*	*Paulownia tomentosa*		Saturation
B-11 (wetland)	N/A	*Vibirnum recognitum*	N/A	10YR 3/2 @ 12"	Saturation
B-11 (nonwetland)	N/A	*Toxicodendron radicans*	*Prunus serotina*	5 YR 5/6 @ 12"	No evidence
B-14f (wetland)	*Phragmites australis*	N/A	*Salix discolor*	10 YR 3/3 @ 12"	Saturation
B-14f (nonwetland)	*Artemisia vulgaris*	N/A	*Robinia pseudoacacia*	10 YR 6/3 @ 12"	No evidence
B-15 (wetland)	*Phragmites australis*	*Vibirnum recognitum*	N/A	1 gley 7/10Y @ 12"	Saturation
B-15 (nonwetland)	*Smilax rotundifolia*	N/A	*Prunus serotina*	10 YR 4/3 @ 12"	No evidence
B-17 (wetland)	*Phragmites australis*		N/A	Organic	Saturation
B-17 (nonwetland)	N/A	*Vibirnum recognitum*	*Prunus serotina*	10 YR 3/2 @ 12"	No evidence
C1-1 (wetland)	*Carex scoparia*	*Salix discolor*	N/A	10 YR 7/2 @ 12"	Inundation
C1-1 (nonwetland)	*Phragmites australis*	N/A	*Betula populifolia*	10 YR 5/1 @ 12"	No evidence
C2-2 (wetland)	*Phragmites australis*	N/A	N/A	10 YR 3/6 @ 12"	Inundation
C2-2 (nonwetland)	*Ascarum shuttleworthii*	*Rosa multiflora*	*Quercus rubra*	10 YR 4/3 @ 12"	Saturation
C2-5 (wetland)	*Phragmites australis*	*Vibirnum recognitum*	N/A	Organic	Inundation
C2-5 (nonwetland)	*Phragmites australis*	N/A	*Prunus serotina*	2.5YR 6/2	Saturation
C3-5 (wetland)	*Phragmites australis*	*Lindera benzoin*	*Acer rubrum*	10 YR 3/1 @ 12"	Saturation
C3-5 (nonwetland)	*Smilax glauca*	N/A	*Betula populifolia*	10 YR 4/3 @ 12"	Saturation
C3-9 (wetland)	*Symplocarpus foetidus*	*Vibirnum recognitum*	N/A	1 gley 5/N @ 12"	Inundation
C3-9 (nonwetland)	*Chimaphila maculata*	*Lindera benzoin*	*Quercus rubra*	10 YR 7/1 @ 12"	No evidence
C3-17 (wetland)	*Osmunda regalis*	*Vibirnum recognitum*	N/A	10 YR 3/1 @ 12"	Inundation
C3-17 (nonwetland)	*Chimaphila maculata*	*Lindera benzoin*	*Acer rubrum*	10 YR 3/3 @ 12"	No evidence

TABLE 3-2

WETLAND PLANT SPECIES
LI TUNGSTEN SITE

LATIN NAME	COMMON NAME	USFWS WETLAND CLASSIFICATION*
Herbacious Species		
Phragmites australis	Common Reed	FACW
Toxicodendron radicans	Poison Ivy	FAC
Impatiens sp.	Jewelweed	FAC
Symplocarpus foetidus	Skunk Cabbage	OBL
Carex stricta	Tussock Sedge	OBL
Scirpus cyperinus	Wool grass	FACW+
Carex scoparia	Sedge	OBL
Smilax glauca	Greenbriar	FACU
Osmunda regalis	Royal Fern	OBL
Impatiens capensis	Jewelweed	FACW
Trees and Shrubs		
Vibirnum recognitum	Northern Arrow-wood	FACW-
Lindera benzoin	Northern Spicebush	FACW-
Salix discolor	Pussy Willow	FACW
Betula populifolia	Gray Birch	FAC
Prunus serotina	Black cherry	FACU

*USFWS WETLAND CLASSIFICATION SCHEME:

OBLIGATE PLANTS (OBL): Plants almost always (estimated probability >99%) in wetlands under natural condition.

FACULTATIVE WETLAND PLANTS (FACW): Plants that usually occur (estimated probability 67% to 99%) in wetlands.

FACULATIVE PLANTS (FAC): Plants with a similar likelihood (estimated probability 33% to 67%) of occurring in both wetlands and nonwetlands.

The facultative categories are subdivided by (+) and (-) modifiers.

(OBL) plant species which fulfills the hydrophytic vegetation criterion for the federal methodology.

Nonwetland vegetation communities on Parcels B and C are relatively homogenous. Dominant herbaceous species include poison ivy (*Toxicodendron radicans*; FAC), common mugwort (*Artemisia vulgaris*), greenbrier (*Smilax rotundifolia*), and striped winterberry (*Chimaphilia maculata*). Woody tree and shrub species include Princess tree (*Paulownia tomentosa*), multiflora rose (*Rosa multiflora*), black locust (*Robinia psuedoacacia*), black cherry (*Prunus serotina*), gray birch (*Betula populifolia*), red oak (*Quercus rubra*), and red maple (*Acer rubrum*). The plant community types in nonwetland areas contain less than 50 percent OBL, FACW and/or facultative (FAC) plants, which does not fulfill the hydrophytic vegetation criterion.

Steps 10-11: Apply Wetland Hydrologic Indicators. Determine the Presence of Wetland Hydrology.

Positive wetland hydrology indicators for the federal methodology were present in each of the wetland areas onsite. The main wetland hydrologic indicators were saturated soils and inundation. All four wetland areas had impounded water on some portion. Wetlands C1 and C2 had generally less than 10 inches of impounded water. The pond in wetland B had a water level exceeding 10 inches. The pond associated with wetland C3 also had a water level exceeding 10 inches, however, the portion of the pond included in the wetland boundary had a water level approximately 6 inches. All wetland areas had saturated soils within 12 inches of the soil surface. According to the ACOE methodology, primary indicators of wetland hydrology include inundation or saturation within 12 inches of the soil surface. All wetland borings fulfilled this criterion.

Steps 12-15: Characterize Wetland Soils. Apply Hydric Soil Indicators. Determine the Presence of Hydric Soils.

Since much of the soil at the site contains fill material and the soil is somewhat sandy, low chroma could not be relied on as a hydric indicator. An aquic moisture regime provided the most immediate evidence of hydric soil conditions. In all cases except wetland C1, soils with

high organic content or high organic content of the surface layer also provided evidence of hydric soil conditions. Soil at wetland C1 was fill material with a red/orange color. In this instance, it can be assumed that the soils are functioning as hydric soils if positive indicators of hydrophytic vegetation and wetland hydrology are found (ACOE, 1987). Using the federal methodology, hydric soils can be assumed to be present in wetland C1, since this wetland area has dominant plant species classified as OBL, with an abrupt wetland/nonwetland boundary. Detailed descriptions of soil conditions are found on the field data forms in Appendix A.

Step 16: Make Wetland Determination.

The wetland areas as shown on Plate 1 support the federal criteria for hydrophytic vegetation, wetland hydrology and hydric soils. Since wetland indicators for the ACOE methodology were present during the October 14-15 and November 28-30, 1996 field investigation, the areas delineated meet the multi-parameter criteria established for determination of ACOE jurisdictional wetlands. Photographs of the wetland systems are presented in Appendix B.

4.0 RESULTS AND CONCLUSION

Based on field investigations of vegetation, soils and hydrology, and the data recorded on forms in Appendix A, the four delineated areas B, C1, C2, C3 and the small pocket of silver maple and arrowwood on Parcel C meet the federal criteria for wetland designation based on the application of the Corps of Engineers Wetland Delineation Manual (Dept. of the Army, 1987). Wetland B is approximately 25,246 square feet (0.58 acre) in size. Wetlands C1, C2, and C3 are approximately 2,867 square feet (0.07 acre), 3,246 square feet (0.07 acre), and 11,376 square feet (0.26 acre) in size, respectively. The small wooded wetland on Parcel C is approximately 2,500 square feet (0.06 acre) in size. Cumulatively, the wetland areas occupy approximately 1.0 acre of the Li Tungsten site. Wetland B can be classified as a palustrine emergent persistent and scrub-shrub broad-leaved deciduous wetland (PEM1/SS1), based on the Cowardin system (USFWS, 1979) of wetland classification.

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Wetlands C1 and C2 can also be classified as PEM1/SS1. Wetland C3 contains a mixture of wetland types and can best be classified as PSS1/PFO1 (palustrine scrub-shrub broad-leaved deciduous/palustrine forested broad-leaved deciduous) and PEM2/PEM1 (palustrine emergent nonpersistent and persistent). Plate 1 depicts the delineated boundaries of the onsite wetlands. Acreage was determined from a survey performed by American Geotech, Inc. In October 1996, American Geotech, Inc. located the flags, surveyed the transects, and mapped the areas accordingly. Although Parcel A is predominantly paved, a small strip approximately 2 feet wide by 50 feet long (Area A) supports wetland vegetation. Upon investigation it was discovered that while inundated, this vegetation was growing on approximately ½ inch of silt on top of pavement. The three surface impoundments (a lined pond and an area of two former unlined ponds) on lower Parcel C historically used to dispose of process waste water were also not delineated as wetlands. The two unlined ponds appear not to exist at present. They are relatively level and while saturated do not contain standing water. There is no vegetation in what formerly were the ponds and the soil consists of fill material. The lined pond contains a dense stand of common reed (*Phragmites australis*) in the southwestern half of the pond. The 'soil' on top of the liner consisted of a red clay/sand and dense root mat. The data collected at Area A and the lined pond can be found on data sheets in Appendix A. Data collected at the small wooded wetland pocket north of the Benbow building on Parcel C can also be found on a data sheet in Appendix A.

5.0 REFERENCES

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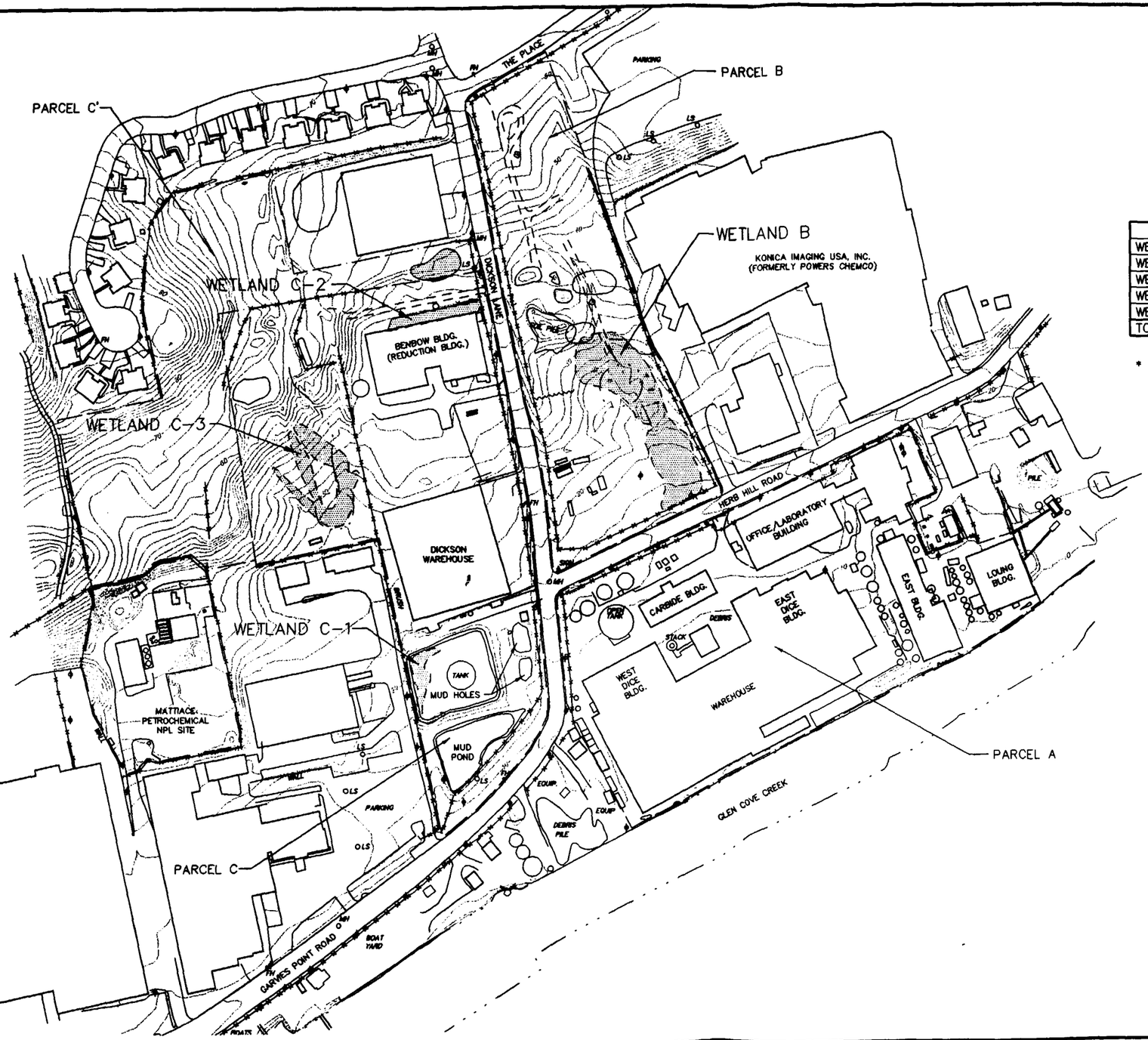

WETLAND AREAS		
WETLAND LOCATION	AREA	
WETLAND B	25,246 SQ. FT.	0.58 ACRES
WETLAND C-1	2,867 SQ. FT.	0.07 ACRES
WETLAND C-2	3,246 SQ. FT.	0.07 ACRES
WETLAND C-3	11,376 SQ. FT.	0.26 ACRES
TOTAL *	45,235 SQ. FT.	1.0 ACRE

* TOTAL INCLUDES SMALL WOODED WETLAND (0.06 ACRE)

LEGEND

- BUILDING
- TREE/TREE LINE
- FENCE LINE
- GUARD RAIL
- WALL
- PAVED ROAD
- GRAVEL/DIRT ROAD
- WATER LINE
- PARCEL BOUNDARY
- MAINT. HOLE/FIRE HYDRANT
- LIGHT STANDARD/UTILITY POLE
- SWAMP
- WETLAND
- PILES (SOIL, WASTE OR DEBRIS)
- MAIN GATES

LOCATIONS OF TEMPORARY ACCESS ROAD, SWALE, PONDS ARE APPROXIMATE.

0 100 200 300
SCALE IN FEET
1"=200'

MALCOLM PIRNIE

UNITED STATES ENVIRONMENTAL PROTECTION AGENCY

LI TUNGSTEN REMEDIAL INVESTIGATION
GLEN COVE, NEW YORK
USEPA REGION II ARCS
CONTRACT NO. 68-W9-0051; W.A. NO. 025-2L4L

WETLAND DELINEATION MAP

DATE: MAY 1998

PROJECT NO.: 8001202

PLATE #1

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APPENDIX A

DATA FORMS

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	1

VEGETATION

Dominant Plant Species	Stratum	Indicator
Phragmites australis	Herb	FACW
Vibirnum recognitum	Shrub	FACW-
Lindera benzoin	Shrub	FACW-
Toxicodendron radicans	Shrub/Vine	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 80 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __0"__

Depth to Water in Pit: __8"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met. Shallow root systems.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 4"	Organic			dark fiborous
4" - 6"	A	10YR 3/3		silty sand
6" - 20"	B	10YR 5/3	7.5YR 5/8	silty sand

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

Sand becomes lighter at 20"; abundant mottling 4-20".

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	1

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Tree	FACU
Paulownia tomentosa	Tree	NI
Toxicodendron radicans	Shrub/Vine	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 33 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_✔_ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology indicators present.

SOILS

Series and Phase: Urban land-Montauk complex (UnB)- 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
Fill				

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Appears fill is local bulldozed soil and vegetation.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	Yes
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: Although hydrology indicators are present, hydrophytic vegetation and hydric soil characteristics are not present, therefore, this sampling location is a non-wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	11

VEGETATION

Dominant Plant Species	Stratum	Indicator
Vibirnum recognitum	Shrub	FACW-
Impatiens sp.	Herb	FAC
Toxicodendron radicans	Shrub/Vine	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 33 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: ____

Depth to Water in Pit: __12"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔__ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 3"	Organic			
3" - 12"	A	10YR 3/2		silty sand

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	11

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Tree	FACU
Toxicodendron radicans	Shrub	FAC
Smilax glauca	Herb	FACU
Ascarum shuttleworthii	Shrub/Vine	NI

Percent of Dominant Species that are OBL, FACW, or FAC = 25 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 0.5"	Organic			Fibrous root material
0.5" - 14	A	5YR 4/6		Yellowish red
14" - 20"	B	10YR 3/3		Dark brown

Hydric Soil Indicators

_____ Histosol

_____ Histic Epipedon

_____ Sulfide Odor

_____ Aquic Moisture Reg.

_____ Reducing Conditions

_____ Gleyed or Low-Chroma

_____ Concretions

_____ High Organic Content on Surface Layer

_____ Organic Streaking in Sandy Soil

_____ Listed on Local Hydric Soils List

_____ Listed on National Hydric Soils List

_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	14F

VEGETATION

Dominant Plant Species	Stratum	Indicator
Salix discolor	Tree	FACW
Phragmites australis	Herb	FACW
Impatiens sp.	Herb	FAC
Aster sp.	Shrub/Vine	N/I

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 66 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _0"_

Depth to Water in Pit: __8"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

__✔__ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔__ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 2"	Organic			
2" - 18"	A	10YR 3/3		organic streaking; high aggregate soil

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	14F

VEGETATION

Dominant Plant Species	Stratum	Indicator
Robinia pseudoacacia	Tree	FACU-
Artemisia vulgaris	Herb	FACU-

Percent of Dominant Species that are OBL, FACW, or FAC = 0 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 0.5"	Organic			
0.5" - 16	A	10YR 6/3		Sandy loam

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met. .

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York

Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	15

VEGETATION

Dominant Plant Species	Stratum	Indicator
Vibirnum recognitum	Shrub	FACW-
Lindera benzoin	Shrub	FACW-
Phragmites australis	Herb	FACW

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __0"__

Depth to Water in Pit: __0"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔__ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met. Shallow root systems.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 8"	Organic			
8" - 20"	A	1 gley 7/10 Y	10YR 5/6 20-30%	silty sand

Hydric Soil Indicators

_____	Histosol	_____	Concretions
_____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
__✔__	Sulfide Odor	_____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
_____	Gleyed or Low-Chroma	_____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

Sand becomes lighter at 20"; abundant mottling 4-20".

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	15

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Tree	FACU
Smilax rotundifolia	Herb	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 50 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 8"	A	10YR 6/4	10YR 5/8 >10%	Silty sand
8" - 20"	B	10YR 4/3		Silty sand

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met. .

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York

Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	17

VEGETATION

Dominant Plant Species	Stratum	Indicator
Phragmites australis	Herb	FACW
Symplocarpus foetidus	Herb	OBL
Carex stricta	Herb	OBL

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _0"_

Depth to Water in Pit: _6"_

Depth of Saturated Soil: _0"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔__ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met. Shallow root systems.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 20"	Organic			

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
__✔__	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

> 20" dark gray sand with gravel

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 13, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	B
Is the area potential Problem Area?	No	Plot ID:	17

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Tree	FACU
Liriodendron tulipifera	Tree	FACU
Vibirnum recognitum	Shrub	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 33 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 8"	A	10YR 3/2		dark brown, dry w/ dense root material
8" refusal				

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York
Do normal conditions exist on site?	yes	Community ID:	Wetland
Is the site significantly disturbed?	yes	Transect ID:	C1
Is the area potential Problem Area?	no	Plot ID:	1

VEGETATION

Dominant Plant Species	Stratum	Indicator
Salix discolor	Shrub	FACW
Betula populifolia	Tree	FAC
Scirpus cyperinus	Herbaceous	FACW+
Carex scoparia	Herbaceous	FACW
Carex stricta	Herbaceous	OBL

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 80 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

__✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __3"__

Depth to Water in Pit: _____

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

__✔ Inundation

__✔__ Saturated in upper 12 inches

__✔__ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

__✔__ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS (C1-1 wetland)

Series and Phase:	Drainage Class:
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type?

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 10"	A	10 YR, 4/4		silty sand
10 - 16"	B	10 YR, 7/2		sandy loam

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil contained abundant gravel aggregates, and clay and organic deposits were existant throughout the profile. Strong petroleum odor.

Wetland Determination

Hydrophytic Vegetation Present	yes
Wetland Hydrology Present	yes
Hydric Soils Present	no, soils disturbed
Is this sampling point within a wetland?	yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York

Do normal conditions exist on site?	yes	Community ID:	Non-wetland
Is the site significantly disturbed?	yes	Transect ID:	C1
Is the area potential Problem Area?	no	Plot ID:	1

VEGETATION

Dominant Plant Species	Stratum	Indicator
Betula populifolia	Tree	FAC
Phragmites australis	Herbaceous	FACW

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 50 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

__✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __NA___

Depth to Water in Pit: __>12"___

Depth of Saturated Soil: __>12"___

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS (C1-1 upland)

Series and Phase: Udorthents refuse substratum (uf)	Drainage Class: excessively drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 12"	fill/berm	10 YR, 5/1		silty sand

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil sample taken from berm (north of wetland)

Hydric soil criterion not met.

Wetland Determination

Hydrophytic Vegetation Present	no
Wetland Hydrology Present	no
Hydric Soils Present	no, soils disturbed
Is this sampling point within a wetland?	no

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York

Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	C2
Is the area potential Problem Area?	No	Plot ID:	2

VEGETATION

Dominant Plant Species	Stratum	Indicator
Phragmites australis	Herb	FACW
Impatiens sp.	Herb	FACW
Aster sp.	Herb	

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __0"__

Depth to Water in Pit: __0"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

__✔__ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 8"	Organic			Organic muck
8" - 16"	A	10YR 3/6		Fill

Hydric Soil Indicators

_____	Histosol	_____	Concretions
_____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
_____	Sulfide Odor	_____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
_____	Gleyed or Low-Chroma	_____	Other (Explain Below)

Remarks: Soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	C2
Is the area potential Problem Area?	No	Plot ID:	2

VEGETATION

Dominant Plant Species	Stratum	Indicator
Quercus rubra	Tree	FACU-
Prunus serotina	Tree	FACU
Morus rubra	Tree	FACU
Rosa multiflora	Shrub	FACU
Prunus serotina	Shrub	FACU
Ascarum shuttleworthii	Herb	NI
Lonicera japonica.	Herb	FAC-

Percent of Dominant Species that are OBL, FACW, or FAC = 0 %

(Excluding FAC) %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_✔_ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 1"	Organic			Organic material
1" - 14"	A	10YR 4/3		Loamy sand
14"+	Fill			Black sand

Hydric Soil Indicators

_____ Histosol
_____ Histic Epipedon
_____ Sulfide Odor
_____ Aquic Moisture Reg.
_____ Reducing Conditions
_____ Gleyed or Low-Chroma
_____ Concretions
_____ High Organic Content on Surface Layer
_____ Organic Streaking in Sandy Soil
_____ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	C2
Is the area potential Problem Area?	No	Plot ID:	5

VEGETATION

Dominant Plant Species	Stratum	Indicator
Vibirnum recognitum	Shrub	FACW-
Phragmites australis	Herb	FACW

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __0"__

Depth to Water in Pit: __0"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

__✔__ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 12"+	Organic			silty sandy soil

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Soil criterion has been met.

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: All three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Non-wetland
Is the site significantly disturbed?	No	Transect ID:	C2
Is the area potential Problem Area?	No	Plot ID:	5

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Tree	FACU
Betula populifolia	Tree	FAC
Phragmites austalis	Herb	FACW
Smilax rotundifolia	Herb	FAC
Prunus serotina (seedlings, saplings)	Tree	FACU

Percent of Dominant Species that are OBL, FACW, or FAC = 40 %

(Excluding FAC) 20 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __-__

Depth to Water in Pit: _>16"_

Depth of Saturated Soil: _>12"_

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 8"	Organic			Root mass
8" - 16"	A	2.5YR 6/2		sand

Hydric Soil Indicators

_____ Histosol
_____ Histic Epipedon
_____ Sulfide Odor
_____ Aquic Moisture Reg.
_____ Reducing Conditions
_____ Gleyed or Low-Chroma
_____ Concretions
_____ High Organic Content on Surface Layer
_____ Organic Streaking in Sandy Soil
_____ Listed on Local Hydric Soils List
_____ Listed on National Hydric Soils List
_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York
Do normal conditions exist on site?	yes	Community ID:	Non-wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	9

VEGETATION

Dominant Plant Species	Stratum	Indicator
Quercus rubra	Tree	FACU-
Liriodendron tulipifera	Tree	FACU
Lindera benzoin	Shrub	FACW-
Acer rubrum	Shrub	FAC
Sassafras albidum	Tree	FACU-
Chimaphila maculata	Herbaceous	not listed
Polygonatum biflorum	Herbaceous	FACU
Solidago spp.	Herbaceous	

Percent of Dominant Species that are OBL, FACW, or FAC = 33 %

(Excluding FAC) 17 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

___✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _____

Depth of Saturated Soil: _____

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS (C3-9 upland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to 8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 1"	Organic			humic
1 - 10"	A	10 YR, 3/1		sand loam
10 - 16"	E	10 YR, 7/1		silty sand

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
____	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
__✔__	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Hydric soil indicators are present.

Wetland Determination

Hydrophytic Vegetation Present	no
Wetland Hydrology Present	no
Hydric Soils Present	Yes
Is this sampling point within a wetland?	no

Remarks: Although soils have a low chroma, hydrology and hydrophytic vegetation are not present therefore, this sampling location is not a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York

Do normal conditions exist on site?	yes	Community ID:	Wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	9

VEGETATION

Dominant Plant Species	Stratum	Indicator
Viburnum recognitum	Shrub	FACW-
Lindera benzoin	Shrub	FACW
Symplocarpus foetidus	Herbaceous	OBL

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

__✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: __8"___

Depth of Saturated Soil: __0"___

Wetland Hydrology Indicators

Primary Indicators:

__✔__ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

__✔__ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔_ Water-stained Leaves

_____ Local Soil Data

✔ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS (C3-9 wetland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to 8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 8"	Organic			mucky organic
8 - 16"	A	Chart 1 (gley), 5/N	5 YR, 5/8	sandy clay

Hydric Soil Indicators

____ Histosol	____ Concretions
____ Histic Epipedon	_✔_ High Organic Content on Surface Layer
_✔_ Sulfide Odor	____ Organic Streaking in Sandy Soil
_✔_ Aquic Moisture Reg.	____ Listed on Local Hydric Soils List
_✔_ Reducing Conditions	____ Listed on National Hydric Soils List
_✔_ Gleyed or Low-Chroma	____ Other (Explain Below)

Remarks: Hydric soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	yes
Wetland Hydrology Present	yes
Hydric Soils Present	yes
Is this sampling point within a wetland?	yes

Remarks: All three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	November 11, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Wetland
Is the site significantly disturbed?	No	Transect ID:	C North of road
Is the area potential Problem Area?	No	Plot ID:	

VEGETATION

Dominant Plant Species	Stratum	Indicator
Vibirnum recognitum	Shrub	FACW-
Lindera benzoin	Shrub	FACW-
Aster sp.	Herb	N/I

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __0"__

Depth to Water in Pit: __6"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met. Some inundation close to the road

SOILS

Series and Phase: Urban land Montauk complex (UnB) - 3 to 8 percent slopes	Drainage Class: well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 12"	Organic			dark brown
				sandy brown

Hydric Soil Indicators

_____	Histosol	_____	Concretions
_____	Histic Epipedon	__✔__	High Organic Content on Surface Layer
_____	Sulfide Odor	_____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	_____	Listed on Local Hydric Soils List
_____	Reducing Conditions	_____	Listed on National Hydric Soils List
_____	Gleyed or Low-Chroma	_____	Other (Explain Below)

Remarks: Soil is a dark organic loam.

Wetland Determination

Hydrophytic Vegetation Present	Yes
Wetland Hydrology Present	Yes
Hydric Soils Present	Yes
Is this sampling point within a wetland?	Yes

Remarks: This is a very small area, approximately 50 feet by 3 three feet. The area has been recently disturbed by on-site remediation activities and hydrology may be present due to the roadway impounding the area. Given that vegetation consists of shrub species that exhibit several years of growth, it is likely that the wetland criteria have existed on-site for a period of time and the area is a wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York
Do normal conditions exist on site?	yes	Community ID:	Non-wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	17

VEGETATION

Dominant Plant Species	Stratum	Indicator
Acer rubrum	Tree	FAC
Sassafras albidum	Tree	FACU-
Carya cordiformis	Tree	FACU+
Lindera benzoin	Shrub	FACW-
Viburnum recognitum	Shrub	FACW-
Prunus serotina (sapling)	Tree	FACU
Chimaphila maculata	Herbaceous	not listed
Toxicodendron radicans	Herbaceous	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 57 %

(Excluding FAC) 40 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

___✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _____

Depth of Saturated Soil: _____

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydology criterion has not been met.

SOILS (C3-17 upland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to 8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 1"	Organic			humic
1 - 12"	A	10 YR, 3/3		sand loam

Hydric Soil Indicators

____ Histosol	____ Concretions
____ Histic Epipedon	____ High Organic Content on Surface Layer
____ Sulfide Odor	____ Organic Streaking in Sandy Soil
____ Aquic Moisture Reg.	____ Listed on Local Hydric Soils List
____ Reducing Conditions	____ Listed on National Hydric Soils List
____ Gleyed or Low-Chroma	____ Other (Explain Below)

Remarks: Hydric soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present no

Wetland Hydrology Present no

Hydric Soils Present no

Is this sampling point within a wetland? no

Remarks: None of the three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York

Do normal conditions exist on site?	yes	Community ID:	Wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	17

VEGETATION

Dominant Plant Species	Stratum	Indicator
Viburnum recognitum	Shrub	FACW-
Lindera benzoin	Shrub	FACW
Osmunda regalis	Herbaceous	OBL
Impatiens capensis	Herbaceous	FACW

Percent of Dominant Species that are OBL, FACW, or FAC = 100 %

(Excluding FAC) 100 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

__✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: __2"___

Depth to Water in Pit: _ _ ___

Depth of Saturated Soil: __0"___

Wetland Hydrology Indicators

Primary Indicators:

__✔__ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

__✔__ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔_ Water-stained Leaves

_____ Local Soil Data

✔ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS (C3-17 wetland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 8"	Organic			organic sand
8 - 16"	A	10 YR, 3/1		silty sand

Hydric Soil Indicators

____ Histosol

____ Histic Epipedon

_✔_ Sulfide Odor

_✔_ Aquic Moisture Reg.

_ _ Reducing Conditions

_ _ Gleyed or Low-Chroma

____ Concretions

_✔_ High Organic Content on Surface Layer

____ Organic Streaking in Sandy Soil

____ Listed on Local Hydric Soils List

____ Listed on National Hydric Soils List

____ Other (Explain Below)

Remarks: Hydric soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present yes

Wetland Hydrology Present yes

Hydric Soils Present yes

Is this sampling point within a wetland? yes

Remarks: All three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York
Do normal conditions exist on site?	yes	Community ID:	Non-wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	5

VEGETATION

Dominant Plant Species	Stratum	Indicator
Betula populifolia	Tree	FAC
Smilax glauca	Vine	FACU

Percent of Dominant Species that are OBL, FACW, or FAC = 50 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

____ Tide Gauge

____ Aerial Photos

__✔_ Other: Soil Survey

____ No Recorded Data

Field Characteristics

Depth of Surface Water: ____

Depth to Water in Pit: __12"__

Depth of Saturated Soil: __0"__

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

____ Drift Lines

____ Sediment Deposits

____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

____ Oxidized Root Channels in upper 12 inches

____ Water-stained Leaves

____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS (C3-5 upland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to 8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? Yes

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 8"	Organic			mucky sand
8 - 16"	A	10 YR, 4/3		silty sand

Hydric Soil Indicators

____	Histosol	____	Concretions
____	Histic Epipedon	____	High Organic Content on Surface Layer
____	Sulfide Odor	____	Organic Streaking in Sandy Soil
__✔__	Aquic Moisture Reg.	____	Listed on Local Hydric Soils List
____	Reducing Conditions	____	Listed on National Hydric Soils List
____	Gleyed or Low-Chroma	____	Other (Explain Below)

Remarks: Hydric soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	no
Wetland Hydrology Present	yes
Hydric Soils Present	no
Is this sampling point within a wetland?	no

Remarks: Although hydrology indicators are present, hydrophytic vegetation is not present therefore, this sampling location is a non-wetland.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 30, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove. L.I.
Investigator:	Hope Yendersin / Tim Ellis	State:	New York
Do normal conditions exist on site?	yes	Community ID:	Wetland
Is the site significantly disturbed?	no	Transect ID:	C3
Is the area potential Problem Area?	no	Plot ID:	5

VEGETATION

Dominant Plant Species	Stratum	Indicator
Acer rubrum	Tree	FAC
Prunus serotina	Tree	FACU
Lindera benzoin	Shrub	FACW-
Phragmites australis	Herbaceous	FACW
Symplocarpus foetidus	Herbaceous	OBL
Smilax glauca	Vine	FACU
Toxicodendron radicans	Shrub/Vine	FAC

Percent of Dominant Species that are OBL, FACW, or FAC = 86 %

(Excluding FAC) 60 %

Remarks: Hydrophytic vegetation criterion has been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

__✔_ Other: Soil Survey

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: __8"___

Depth of Saturated Soil: __0"___

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

__✔__ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

__✔__ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

__✔_ Water-stained Leaves

_____ Local Soil Data

✔ FAC-neutral Test

Remarks: Hydrology criterion has been met.

SOILS (C3-5 wetland)

Series and Phase: Scio silt loam; till substratum (SdB) - 3 to 8 percent slopes	Drainage Class: moderately well drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0 - 6"	Organic			mucky sand
6 - 16"	A	10 YR 3/1		sandy loam

Hydric Soil Indicators

____ Histosol	____ Concretions
____ Histic Epipedon	_✔_ High Organic Content on Surface Layer
_✔_ Sulfide Odor	____ Organic Streaking in Sandy Soil
_✔_ Aquic Moisture Reg.	____ Listed on Local Hydric Soils List
____ Reducing Conditions	____ Listed on National Hydric Soils List
____ Gleyed or Low-Chroma	____ Other (Explain Below)

Remarks: Hydric soil criterion has been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	yes
Wetland Hydrology Present	yes
Hydric Soils Present	yes
Is this sampling point within a wetland?	yes

Remarks: All three wetland criteria have been met.

DATA FORM
ROUTINE WETLAND DETERMINATION

Project Site:	Li Tungsten	Date:	October 28, 1996
Applicant/Owner:	USEPA	Municipality:	Glen Cove
Investigator:	Hope Yendersin/ Tim Ellis	State:	New York
Do normal conditions exist on site?	Yes	Community ID:	Nonwetland
Is the site significantly disturbed?	No	Transect ID:	
Is the area potential Problem Area?	No	Plot ID:	lined pond

VEGETATION

Dominant Plant Species	Stratum	Indicator
Prunus serotina	Shrub	FACU
Betula populifolia	Shrub	FAC
Poa pratensis	Herb	FACU
Solidago sp.	Herb	N/I

Percent of Dominant Species that are OBL, FACW, or FAC = 25 %

(Excluding FAC) 0 %

Remarks: Hydrophytic vegetation criterion has not been met.

HYDROLOGY

Recorded Data:

_____ Tide Gauge

_____ Aerial Photos

_____ Other

_____ No Recorded Data

Field Characteristics

Depth of Surface Water: _____

Depth to Water in Pit: _____

Depth of Saturated Soil: _____

Wetland Hydrology Indicators

Primary Indicators:

_____ Inundation

_____ Saturated in upper 12 inches

_____ Water Marks

_____ Drift Lines

_____ Sediment Deposits

_____ Drainage Patterns in Wetlands

Secondary Indicators: (2 required)

_____ Oxidized Root Channels in upper 12 inches

_____ Water-stained Leaves

_____ Local Soil Data

_____ FAC-neutral Test

Remarks: Hydrology criterion has not been met.

SOILS

Series and Phase: Udorthents refuse (substratum (Uf)	Drainage Class: excessively drained
Taxonomy (Subgroup):	Field Observations Confirm Mapped Type? No

Profile Observations

Depth	Horizon	Matrix Color	Mottle Color	Soil Description
0" - 12"		2.5YR 3/3		Fill

Hydric Soil Indicators

_____ Histosol	_____ Concretions
_____ Histic Epipedon	_____ High Organic Content on Surface Layer
_____ Sulfide Odor	_____ Organic Streaking in Sandy Soil
_____ Aquic Moisture Reg.	_____ Listed on Local Hydric Soils List
_____ Reducing Conditions	_____ Listed on National Hydric Soils List
_____ Gleyed or Low-Chroma	_____ Other (Explain Below)

Remarks: Soil criterion has not been satisfied.

Wetland Determination

Hydrophytic Vegetation Present	No
Wetland Hydrology Present	No
Hydric Soils Present	No
Is this sampling point within a wetland?	No

Remarks: None of the three wetland criteria have been met.

APPENDIX B

PHOTOLOG

PROJECT: Li Tunsten **DATE:** October 13-14, 1996

DESCRIPTION: A west to northwest view of wetland area B, looking at flag B-6 and the pond. The dominant wetland vegetation is common reed (*Phragmites australis*) and the dominant nonwetland vegetation is Arrowwood (*Vibirnum recognitum*).

PHOTO NO. 1 **By:** H.Yendersin and T.Ellis

301748

PROJECT: Li Tunsten **DATE:** October 13-14, 1996

DESCRIPTION: A north view of wetland area B, looking at flag B-14F and the wetland/nonwetland boundary. The dominant wetland vegetation is pussy willow (*Salix discolor*) and the dominant nonwetland vegetation is black locust (*Robinia pseudoacacia*).

PHOTO NO. 2 **By:** H.Yendersin and T.Ellis

301749

PROJECT: Li Tunsten **DATE:** October 13-14, 1996

DESCRIPTION: A southwest view of wetland area B, looking at flags B-18 and B-19. The dominant wetland vegetation is common reed (*Phragmites australis*) and the dominant nonwetland vegetation is Arrowwood (*Vibirnum recognitum*).

PHOTO NO. 3 **By:** H.Yendersin and T.Ellis

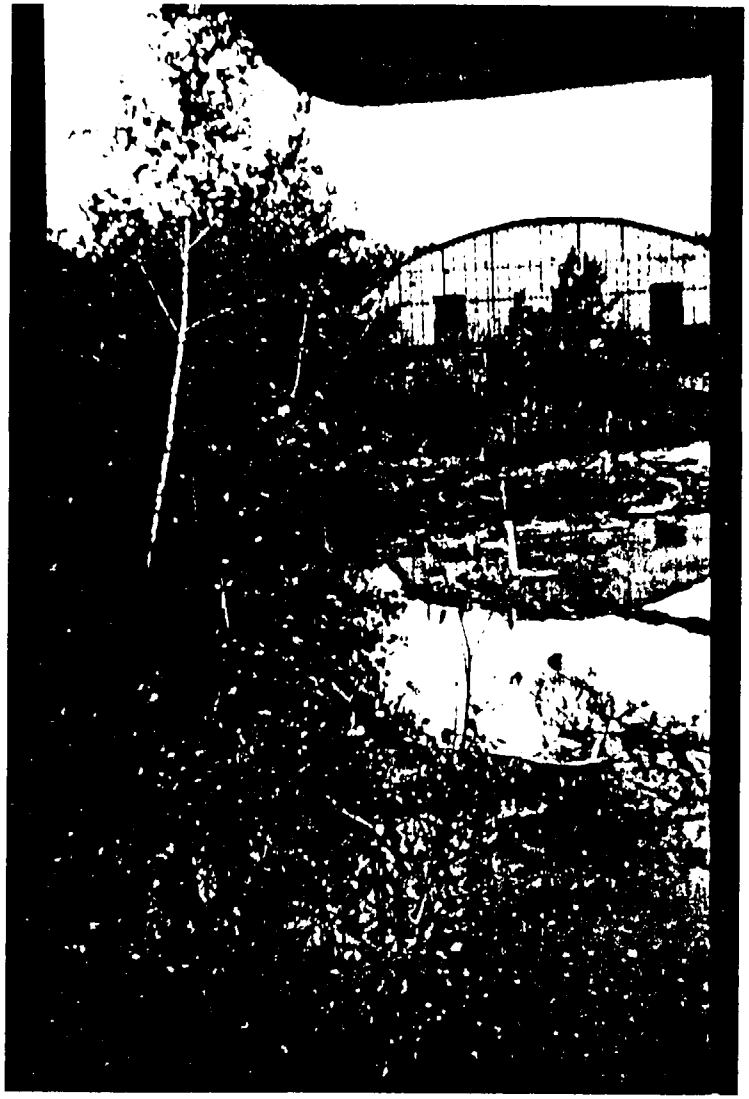
301750

PROJECT: Li Tunsten **DATE:** October 30, 1996

DESCRIPTION: A west view of wetland area C1. The dominant wetland vegetation is tussock sedge (*Carex sticta*) and (*Carex scoparia*).

PHOTO NO. 4 **By:** H.Yendersin and T.Ellis

301751



PROJECT: Li Tunsten **DATE:** October 30, 1996
DESCRIPTION: A north view of wetland area C1.
PHOTO NO. 5 **By:** H.Yendersin and T.Ellis

301752

PROJECT: Li Tunsten **DATE:** October 30, 1996

DESCRIPTION: A south view of wetland area C2 at flag C2-2. The dominant wetland vegetation is common reed (*Phragmites australis*) and the dominant upland vegetation is black cherry (*Prunus serotina*) and multiflora rose (*Rosa multiflora*).

PHOTO NO. 6 **By:** H.Yendersin and T.Ellis

301753

PROJECT: Li Tunsten **DATE:** October 30, 1996

DESCRIPTION: A southeast view of wetland area C2 at flag C2-5. The dominant wetland vegetation is common reed (*Phragmites australis*).

PHOTO NO. 7 **By:** H.Yendersin and T.Ellis

301754

PROJECT: Li Tunsten **DATE:** December 16, 1996

DESCRIPTION: A north view of wetland C3, looking at a drainage course. The dominant wetland vegetation includes red maple (*Acer rubrum*), black cherry (*Prunus serotina*), spicebush (*Lindera benzoin*), common reed (*Phragmites australis*) and skunk cabbage (*Symplocarpus foetidus*) and the dominant nonwetland vegetation is gray birch (*Betula populifolia*) and greenbrier (*Smilax glauca*).

PHOTO NO. 8 **By:** H.Yendersin and T.Ellis

301755

PROJECT: Li Tunsten **DATE:** December 16, 1996

DESCRIPTION: A north to northwest view of wetland C3, looking at the drainages. The dominant wetland vegetation includes arrowwood (*Viburnum recognitum*), spicebush (*Lindera benzoin*), royal fern (*Osmunda regalis*)and jewelweed (*Impatiens capensis*)and the dominant nonwetland vegetation includes red maple (*Acer rubrum*), sassafras (*Sassafras albidum*) and hickory (*Carya cordiformis*).

PHOTO NO. 9 **By:** H.Yendersin and T.Ellis

301756

APPENDIX C

RESUMES AND CERTIFICATIONS

ANTHONY M. RUSSO
Senior Associate

EDUCATION

BS (Biology) 1978; Fordham University
MS (Environmental Biology and Ecology) 1980; Fordham University
Louis Calder Conservation and Ecology Study Center of Fordham University
Specialized Training: OSHA Health and Safety Operations Training and Supervisor Training for Hazardous Materials Sites
Wetland Training Institute - Federal Wetland Delineation Certification

REGISTRATION

Certified Professional Wetlands Scientist
Certified Ecologist
U.S. Fish and Wildlife Service Certified HEP Biologist

SOCIETIES

American Fisheries Society
American Society of Limnology and Oceanography
Ecological Society of America
Society of Wetlands Scientists

SUMMARY OF EXPERIENCE

As Chief Scientist and Manager of the Environmental Assessment and Planning Group, Mr. Russo specializes in wetlands, environmental impact studies, permitting, biological and limnological studies, landfill and hazardous waste site investigations, and dredged material disposal studies. In addition, as Technical Director Delegate, he is responsible for providing direction and oversight of the firm's environmental programs nationwide. He has conducted Remedial Investigation/Feasibility Study (RI/FS) hazardous waste site investigations under Superfund and environmental studies under various regulations such as Section 404 of the Clean Water Act, National Environmental Policy Act (NEPA), and the New York State Environmental Quality Review Act (SEQRA). His background in aquatic biology and water quality studies encompasses freshwater, estuarine and marine habitats. This experience includes the evaluation of benthic, fish, and plankton communities as well as water quality sampling and analysis, field survey organization, limnological and lake management studies, fish entrainment and impingement studies, wetlands delineation, mitigation, assessment and regulatory interface. His project experience in environmental analysis and planning includes air quality, noise, solid waste, land use changes and socioeconomic issues.

DETAILED EXPERIENCE

1984 to Date — Malcolm Pirnie, Inc.

As Chief Scientist and Associate:

- For the Hydroelectric Commission of Tasmania and Australian Parliament, served as senior scientist and project manager for an inquiry into the proposal to drain and restore Lake Pedder. Key considerations included an evaluation of potential environmental impacts and costs arising from draining and restoring 250

(continued)

DETAILED EXPERIENCE (Continued)

1984 to Date Malcolm Pirnie, Inc. (continued)

sq km of lake bottom; implications on management of the Tasmanian Wilderness World Heritage Area; and the adequacy of existing data and needs for further research.

- For the Tasmanian Department of Environmental and Land Management, served as senior scientist and project manager for a study to evaluate remedial measures associated with the Mt. Lyell mining operation. Key issues included remediation of river and harbor sediments and restoration of tailing deposit areas.

- For an international consortium, served as chief scientist in the evaluation of mitigation and monitoring requirements associated with construction of a 2,400-MW hydroelectric dam in the State of Sarawak, Malaysia. Major project elements included the flooding of 69,000 ha of Dipterocarp rain forest, displacement of more than 8,500 inhabitants, construction of 125 km of access road, and installation of more than 1,000 km of transmission line.

- For the City of Birmingham Water and Wastewater Authority, performed detailed environmental assessments and risk analyses for two existing dams and a proposed new dam for creation of a water supply reservoir. Issues included water quality, population relocation, endangered species habitat and historic resources.

- Responsible for managing the scoping and preparation of a NEPA EIS on behalf of the National Park Service for construction of a proposed pedestrian bridge to the Ellis Island National Monument, New York.

- For the Port Authority of New York and New Jersey, served as project manager for a series of studies to evaluate the practicability of building a containment island in the New York-New Jersey Harbor Region for disposal of contaminated dredged materials.

- Responsible for preparing and managing the preparation of a long-term dredged material management and sediment decontamination plan for the New York District Corps of Engineers pursuant to a Congressional mandate under Section 412(b) of the Water Resources Development Act. Plan objectives were to reduce dredged material contamination, maximize beneficial reuse potential, and reduce the need for ocean disposal.

- Has managed numerous environmental assessments and impact statements pursuant to the New York City Environmental Quality Review (CEQR) process and coordinated with the NYCDEP Office of Environmental Planning (OEP). Project examples include: Coney Island WWTP environmental assessments (EA), Hill View Reservoir EA, Wards Island WWTP EA and DEIS, Chelsea Pumping Station EA and DEIS, and zebra mussel control project EA and DEIS.

(continued)

DETAILED EXPERIENCE (Continued)

1984 to Date — Malcolm Pirnie, Inc. (continued)

- Responsible for managing a multidisciplinary team of scientists in the delineation of wetlands throughout New York, New Jersey, Connecticut, Alabama, Mississippi, Ohio, Minnesota, and Puerto Rico, using techniques developed by the U.S. Army Corps of Engineers and the U.S. Environmental Protection Agency. Special studies include jurisdictional determinations and dredge and fill permit application pursuant to Section 404 of the Clean Water Act; nationwide permit determinations and application; wetland functional and value assessment using the computer-based Wetland Evaluation Technique (WET); and development of mitigation plans to replace or enhance wetland functional and habitat value.

- Responsible for preparing and managing several limnological and lake management studies including diverse topics such as algae control dredging, zebra mussel control, fisheries management, sediment chemistry, hypolimnetic aeration, and nutrient recycling. Examples include: Lake Maury, Virginia; Tarrytown Lakes, New York; West Branch and Kensico Reservoirs, New York; and Loch Raven Reservoir, Maryland.

- Responsible for preparing and managing both Phase I and Phase II property transfer audits for several major banks and real estate mortgage companies. Site uses include residential, commercial, and industrial, and range in size from 1 to 300 acres.

- Responsible for preparing and managing an RI/FS at a New York State Department of Environmental Conservation (NYSDEC) Class 2 hazardous waste site in the Village of Mamaroneck NY. The $1.6 million budget included an investigation of soils, ground water, surface water, and soil gas. Specialized studies included geophysical surveys to delineate drum burial areas and implementation of interim mitigating measures to control site drainage and reduce potential exposure routes to indigenous biota and the local population.

- Responsible for organizing and managing ecological risk assessment studies at state and federal Superfund sites throughout New York, New Jersey, and Minnesota. Techniques employed focus on assessing ecological values and characteristics on species, population and community levels. Sensitive habitats and species are identified, field measurements collected, results compared to published standards, and risks assessed both qualitatively and quantitatively.

- Responsible for preparing and managing a NEPA/Environmental Quality Board (EQB) environmental impact statement (EIS) for the Puerto Rico Aqueduct and Sewer Authority (PRASA). This unique project involves construction of a new 6,300-meter land and deep ocean outfall for the Ponce Regional Wastewater Treatment Plant (WWTP) under a 301(h) waiver application. Special studies to support permitting and engineering design included terrestrial ecology, wetlands, archaeology, aquatic biology, and oceanography.

- Responsible for managing the mitigation, design and assessment of a 15-acre tidal freshwater marsh contaminated with cadmium at the Marathon Battery Superfund site. The final marsh design integrated dredging to remove highly contaminated sediments, clay encapsulation, soil placement and replanting to restore wetland functional benefits, enhance wildlife value and increase human use potential. This project won several prestigious awards in 1992, including the Grand Prize from the Academy of Environmental Engineers.

(continued)

DETAILED EXPERIENCE (Continued)

1984 to Date — Malcolm Pirnie, Inc. (continued)

- Responsible for managing the mitigation, design and assessment of 5.5 acres of riparian floodplain wetlands in Nyack NY for both habitat replacement and flood control. The final wetlands creation plan involved excavation of construction and demolition materials, soil replacement, grading, and selected plantings. Project goal was to restore a former floodplain wetland and provide flood storage area and assorted habitat opportunities for wetland-dependent fauna impacted by construction of a regional shopping mall.

- Responsible for managing the mitigation, design, and assessment of wetlands impacted by creation of an inland disposal site in Ft. Edward NY for encapsulation of dredged Hudson River PCB-contaminated sediments. The final plan was designed to create 35 acres of diversified wetlands with higher functional values than those on-site. The Corps' WET procedure was utilized to prioritize wetlands values in the design and achieve an interagency consensus of no net loss.

- Responsible for managing the mitigation and design of 2.5 acres of wetlands impacted by hazardous waste remedial efforts at the Newsom Bros. site in Columbia MS. The mitigation concept included design of a two-stage open water/emergency system to abate local flooding problems, replace and enhance lost wetland functional values, and create diversified habitat opportunities for aquatic biota. The final design plan achieved interagency consensus of no net loss in value.

- Responsible for managing a multidisciplinary evaluation of a 250-acre site selected for development as a major league baseball stadium and hotel complex. Conducted a hazardous waste site investigation of abandoned landfill areas to assess soil, soil gas and surface water contamination. Delineated wetlands to determine USCOE jurisdictional authority and performed subsequent quality analyses (WET) to assess degree of project impact. Performed and managed a year-long biological study of the project site including bird surveys, mammal trapping, fish and estuarine invertebrate collection and endangered species identification. Results of the various studies were then incorporated into Draft EIS, U.S. Corps of Engineers (USCOE) 404(b)(1) and New Jersey Department of Environmental Protection and Energy (NJDEPE) landfill investigation work plan reports.

- Responsible for preparing and managing a SEQRA EIS for remediation and expansion of a fireman's training center on Long Island. Site constraints at this NYSDEC Class 2 hazardous waste site included extensive ground water contamination, methane gas from an adjacent landfill, air emissions, and wetlands.

- Responsible for preparing and managing an extensive zone change SEQRA Draft and Final EIS for an 875,000-sf regional shopping center in West Nyack NY. Involved with follow-up reports investigating a broad range of socioeconomic and environmental issues. Performed a hazardous waste site investigation study for two 12-acre landfills included in the project site and listed on New York State Registry of Inactive Hazardous Waste Sites. Prepared an RI/FS report and an HRS model to facilitate the NYSDEC review of the site's hazard potential. Prepared a wetlands delineation report, wetlands mitigation plan, and 401 water quality certification information for submittal to state and federal agencies.

(continued)

DETAILED EXPERIENCE (Continued)

1984 to Date — Malcolm Pirnie, Inc. (continued)

- Responsible for organizing and managing an ecological and limnological study to determine the impacts of discharging up to 100 mgd of chlorinated water into an Upstate New York reservoir. The study included an evaluation of impacts to fish and benthos, as well as sediment chemistry and water quality. As a concurrent study, entrainment and impingement impacts to fish species at a Hudson River pumping station were evaluated in order to gauge the potential reductions to indicator species population levels.

As Project Environmental Scientist:

- Responsible for preparing and managing a zone change SEQRA EIS for a 525,000-sf regional shopping center in Yonkers NY. Supervised detailed noise modeling and carbon monoxide modeling analyses to assess project development impacts on adjacent residential neighborhoods.

- Responsible for preparing a Draft EIS for the Saratoga County NY Solid Waste Management Agency. The study involved evaluating existing environmental conditions at several prospective sites, waste stream characteristics, resource recovery technologies and alternatives analysis.

- Conducted fisheries and biological impact evaluations of reactivating the Chelsea Pumping Station on New York's Hudson River for the New York City Department of Environmental Conservation. This study included a detailed evaluation of fish entrainment and impingement impacts as well as chlorine toxicity effects throughout the reservoir system.

- Evaluated fishery resources of the New York State Barge Canal as part of a 10-year management plan developed by the New York State Department of Transportation (NYSDOT) identifying dredge reaches and disposal sites. Responsibility included a characterization of the fish community throughout the canal, delineation of habitat types and sensitive areas, and an assessment of the dredging effects on the canal's benthic community.

4/84-9/84 — NUS Corporation

As Environmental Scientist: Conducted field investigations, preliminary assessments, and prepared remedial investigations for uncontrolled hazardous waste sites under Superfund throughout the New York-New Jersey area. Data gathered was then utilized to rank sites under the EPA Hazardous Ranking System and prepare feasibility studies.

1980-1984 — Hazen and Sawyer, P.C.

As Biologist: Responsible for the field collection and analysis of water quality, effluent, and biological data relating to the effects of less than secondary treated effluent on the local biological community for the following WPCP facilities in support of 301(h) waiver applications: Newtown Creek, Red Hook, Hunts Point and Bowery Bay, North River, all in New York City, and the Town of Mamaroneck NY. Studies focused on water quality, hydrodynamics, sediment quality, and estuarine ecology of indicator species and populations. Biological study components included fish, benthos, phytoplankton, zooplankton, periphyton, and epibenthic macrofauna.

(continued)

DETAILED EXPERIENCE (Continued)

1978-1980 — Fordham University
Louis Calder Conservation and Ecology Study Center at Armonk NY

As Research Scientist: Participated in an evaluation of the lower food chain kinetics of PCBs in the Hudson River, assessment of the plankton community and primary productivity in New York Harbor, and data analysis of a joint U.S.-U.S.S.R. investigation of the Bering Sea. This latter joint venture included an evaluation of water quality, nutrient cycling, and micronutrient levels as they related to seasonal pulses in zooplankton and phytoplankton community shifts and densities.

1983-1986 — Mercy College, New York

As Adjunct Professor: Taught courses in Environmental Biology, General Biology and Human Anatomy and Physiology.

1981-1984 — Our Lady of Victory Academy, New York

As Department Chairman and Instructor: Responsible for maintaining academic standards and achievements of students in a diversified science curriculum. Taught advance placement courses in biology, ecology, and human physiology.

Society of Wetland Scientists Certification Program, Inc.

grants the designation

Professional Wetland Scientist

to

Anthony M. Russo, M.S.

In recognition of all the professional requirements approved by the Society of Wetland Scientists Certification Program, Inc. and verified by the Society's Certification Review Panel on the 4th day of November, 1994.
Professional Wetland Scientist number 000177

Mary C. Landin, Ph.D., President

Thomas E. Simpson, Ph.D., Chair

301764

Wetland Training Institute

This certifies that

ANTHONY RUSSO

has completed the Wetland Training Institute, Inc.
Course entitled:

BASIC WETLAND DELINEATION

Given at Chincoteague, Va.

On 13 - 16 August, 1991

Robert J. Pierce
Course Coordinator

301765

U.S. FISH AND WILDLIFE SERVICE

This is to certify that

ANTHONY RUSSO

has successfully completed the requirements

of the course in

Habitat Evaluation Procedures

Given at TAMPA, FLORIDA On MAY 18-22, 1987

Instructor

301766

The Ecological Society of America

Founded 1915

The Ecological Society of America,
upon the recommendation of the Board of
Professional Certification, hereby certifies that

Anthony Russo

meets the requirements as a certified

Ecologist

and is governed by the Society's Code of Ethics.

Certified by the Ecological Society of America
this 1st day of June 1991.

301767

HOPE YENDERSIN
Environmental Scientist

EDUCATION

AAS (Natural Resources) 1989; Morrisville College
BS (Natural Resources) 1991; Cornell University
OSHA 40-Hour Training-Health and Safety Operations at Hazardous Materials Sites, October 1994
USACE Wetland Delineator Certification Program Certificate of Training, May 1996

SUMMARY OF EXPERIENCE

Ms. Yendersin's work focuses on human health risk assessment. Her strong computer skills have facilitated the evaluation of toxicological data, exposure estimations, and risk characterizations. Recent projects center on risk assessments under the U.S. Environmental Protection Agency (USEPA) Superfund program, state Superfund programs in Connecticut and Michigan, for the Army Corps of Engineers, and for private sector clients. In the field, she has assisted wetlands delineation projects and multi-media field investigations.

DETAILED EXPERIENCE

1994 to Date — Malcolm Pirnie, Inc.

- Quantified potential human exposure and health risks associated with chemical contamination in soil, groundwater, surface water, sediment and air at the Higgins Disposal Services site, New Jersey. Applied air dispersion modeling results to assess potential risks associated with exposure to airborne particulates and volatilized chemicals emanating from impacted soils.

- Evaluated and characterized health risks associated with exposure to chemical contamination in spring water, soil, surface water, sediment, and air at the Sidney Landfill site, New York.

- Prepared a conceptual site model for the Newstead site, New York. Identified sources of contamination, environmental release and transport mechanisms, potential routes of human exposure, and potentially exposed human populations.

- Calculated human health risk-based cleanup levels for soil and groundwater for the South Pine Creek Pond site, Connecticut.

- Assisted in the derivation of a human-health protective criterion for PCB levels in sediment, based on human consumption in sport fish for the Shiawassee River site, Michigan.

- Assisted freshwater and tidal wetland delineations at a major international airport in accordance with 1987 U.S. Army Corps of Engineers guidelines. Delineations encompassed an area of approximately 800 acres, where wetlands comprised approximately 130 acres. Compiled supplemental data and assisted preparations of summary reports discussing vegetation, hydrology and soil characteristics.

- Acted as a field team leader in data collection for a Habitat Evaluation Procedures study for potential siting of a drinking water reservoir in King William County, Virginia. Assisted in collecting data for input into 13 Habitat Suitability Index Models.

(continued)

DETAILED EXPERIENCE (continued)

1994 to Date — Malcolm Pirnie, Inc.

- Performed wetland delineation and assisted in multi-media field investigations at the Li Tungsten site, New York. Compiled supplemental data and assisted preparations of summary reports discussing vegetation, hydrology and soil characteristics. Assisted in a gamma radiation survey to characterize residual contamination following interim cleanup.

- Compiled a Hazardous Waste Tracking and Description Database as part of a hazardous waste minimization plan for a U.S. Naval Station in Puerto Rico.

- Conducted environmental Phase I audit sampling and assisted report preparation at a commercial property in New Rochelle, New York.

- Provided screening level risk analyses evaluating human exposure relative to health-protective risk-based chemical concentrations at the former Glasgow Air Force Base, Montana.

1991-1994

- Employed in positions with related experience including: coordinating environmental education programs, laboratory research in veterinary medicine and in plant breeding.

THE STATE UNIVERSITY OF NEW JERSEY

RUTGERS

Campus at New Brunswick

COOK COLLEGE

Continuing Professional Education

THIS CERTIFICATE IS AWARDED TO

Hope Yendersin

U.S. ARMY CORPS OF ENGINEERS
WETLAND DELINEATOR CERTIFICATION PROGRAM
CERTIFICATE OF TRAINING

This training has been based in part on the U.S. Army Corps of Engineers Wetlands Delineation Manual, Technical Report Y-87-1 (1987 Manual), as provided for in the training materials developed in conjunction with Section 307 (e) of the Water Resources Development Act of 1990 for the Wetland Delineator Certification Program.

Edward V. Lipman, Jr.
Director
Continuing Professional Education

Zane R. Heisel
Director
Rutgers Cooperative Extension

301770

TIMOTHY D. ELLIS
Environmental Scientist

EDUCATION

BA (Literature) 1991; Fordham University
BS (Environmental Science - Ecology) expected September 1997; State University of New York at Purchase

CERTIFICATION

Health and Safety Personal Protective Equipment, 1994
Hazardous Communication/Right-to-Know Program, 1994
U.S. Army Corps of Engineers: Wetland Delineator Certification Program Certificate of Training, 1995; Rutgers, State University of New Jersey
OSHA 40-Hour Hazardous Waste Operations Training, 1995
Bloodborne Pathogens Exposure Control, 1995
CPR/First Aid, 1995
Environmental Management Certificate, 1996; State University of New York at Purchase
Botany Certificate (Field Botany and Plant Systematics) 1996; New York Botanical Gardens
OSHA 8-Hour Hazardous Waste Operations Supervisor Training, 1996
OSHA 8-Hour Hazardous Waste Operations Refresher/First Responder Awareness, 1996, 1997

DETAILED EXPERIENCE

1993 to Date — Malcolm Pirnie, Inc.

- **Puerto Rico Aqueduct and Sewer Authority (PRASA) Mayagüez Regional Wastewater Treatment Plant (WWTP): Environmental Impact Statement (EIS) for Outfall Feasibility and Secondary Treatment Evaluation.** Contributing sections to the EIS report including Aquatic Ecology of the Affected Environment and Environmental Consequences of Alternatives on Aquatic Ecology sections, as well as assisting in the composition of other sections of the report. The EIS evaluates alternatives to minimize water quality impacts and associated impacts to the aquatic environment related to discharge of effluent from the Mayagüez WWTP. In addition, future work includes benthic sampling in Mayagüez Bay.

- **Port Authority of New York and New Jersey (PANYNJ), John F. Kennedy International Airport: Proposed Site for Contractors Staging and Laydown Area.** Performed wetlands delineation and composed a report for a 21-ac plot to define and map the limits of Section 404 jurisdictional freshwater wetlands as determined by application of the 1987 U.S. Army Corps of Engineers (USACE) methodology. Wetlands were also delineated in accordance with the New York State Department of Environmental Conservation's (NYSDEC) Freshwater Wetlands Delineation Manual (Revised July 1995) and regulations pursuant to 6NYCRR Part 664. In addition, New York State Article 25, Environmental Conservation Law for Tidal Wetlands and regulations pursuant to 6NYCRR Part 661 were considered in determining wetlands boundaries. It is the intent of this document to provide sufficient information to the New York District of the USACE to enable a jurisdictional determination of waters of the United States within the limits of the defined survey area. Information concerning the extent of regulated wetlands will be utilized by PANYNJ to avoid or minimize wetland impacts, if any, in preparing plans for implementation of the contractors staging and laydown area.

DETAILED EXPERIENCE (Continued)

1993 to Date Malcolm Pirnie, Inc. (continued)

- **United States Environmental Protection Agency (USEPA) Site Inspection Prioritization (SIP) report: Bendix - Allied Signal, Inc. Teterboro Facility.** Composed SIP report for EPA which includes gathering information, following completion of the Site Investigation (SI), to help set priorities among sites listed in the Comprehensive Environmental Response, Compensation, and Liability Act Information System (CERCLIS) inventory for National Priority List (NPL) listing or screen them from further Superfund attention. The report required gathering information in order to determine a Hazard Ranking System (HRS) score which evaluates the following target data: groundwater migration pathways, surface water migration pathways, overland/flood migration components, groundwater to surface water migration components, soil exposure pathways, and air migration pathways. In addition, previously performed investigations and composed reports for two other SIP sites in New York State.

- **New York City Department of Environmental Protection (NYCDEP) Coney Island Water Pollution Control Plant (WPCP): Plant Outfall Reconstruction Impacts to Benthic Community.** Developed benthic macroinvertebrate investigation sampling program to serve as the foundation for assessing the ecological impacts of alternative outfall location construction.

- **PANYNJ, Wetland Mitigation Banking Study.** Composed sections of the report studying the implications of agency guidances for banking credits to mitigate for wetlands losses as a result of unavoidable impacts. Submitted sections of the report to PANYNJ included: federal, state, and local district requirements for mitigation banks which discussed policy, regulations, and guidelines as directed by each authority and interaction between them; and mitigation bank implementation procedures which defined modes of operation, credit systems, and credit production, maintenance, and evaluation for mitigation banks. Information and conclusions reached by this report may be used by the PANYNJ to assess the processes and feasibility of future projects undertaken by PANYNJ which call for wetland mitigation.

- **American Water Works Service Company (AWWSC) Putnam Lake Residuals Study.** Developed fish survey and benthic macroinvertebrate investigation programs to serve as the foundation for assessing the ecological impacts of residuals deposition in the lake. Future work includes performing the benthic sampling and drawing conclusions from results.

- **Byram Lake Water Quality Assessment.** Developed a benthic macroinvertebrate investigation program to serve as the foundation for assessing the ecological assessment of the lake, and examine the potential for future adverse impacts on the water quality of the lake and its ecosystem due to proposed projects. Future work includes performing the benthic sampling and drawing conclusions from results.

- **USEPA, Fried Industries Superfund Site, East Brunswick, New Jersey.** Performed investigations to confirm previous wetlands delineation of the site which included examining maps, aerial photos, and site visit to determine appropriateness of preestablished wetland boundaries on the site. Future works includes an amended delineation and mapping of the limits of Section 404 jurisdictional wetlands of this site as determined by application of the 1987 USACE methodology.

- **USACE, Fort Drum, New York.** Conducted semiannual surface water and sediment sampling at a stream near a sanitary landfill at Fort Drum. Samples were analyzed for chemical and biological characteristics to evaluate potential impacts of landfill leachate to the stream adjacent and downgradient to the landfill.

(continued)

DETAILED EXPERIENCE (Continued)

1993 to Date Malcolm Pirnie, Inc. (continued)

- **USEPA, Li Tungsten Superfund Site, Glen Cove, New York.** Performed wetlands delineation and assisted in the composition of a report for the 42-ac site to define and map the limits of Section 404 jurisdictional wetlands as determined by application of the 1987 USACE methodology. Wetlands were also delineated in accordance with NYSDEC's Freshwater Wetlands Delineation Manual (revised July 1995) and regulations pursuant to 6NYCRR Part 664. It was the intent of the study to provide sufficient information to the New York District of the USACE to enable a jurisdictional determination of waters of the United States within the limits of the defined survey area. Information concerning the extent of regulated wetlands, together with additional ecological information, was utilized by the EPA to assess impacts from previous site operations and to prepare mitigation plans for this site.

- **USEPA, Picatinny Arsenal, Rockaway Township, New Jersey.** Conducted oversight of Remedial Investigation (RI) field activities to evaluate whether approved RI/FS Planning Documents and EPA-approved sampling procedures are being adhered to. Oversight was performed for the following RI activities: well installation, soil core sampling, well development, groundwater sampling, and surface water and sediment sampling. Performed 10% split samples during the oversight of the RI field investigation program, taking into account the type of sampling method, the media being sampled, and the area of concern (AOC) being investigated.

- **USACE, Kansas City District, Former Olathe Naval Air Station (New Century Air Center), Olathe, Kansas.** Composed site background, activities overview, and current conditions sections of the Site Investigation (SI) report. The SI was undertaken to determine the presence or absence of potential chemical contamination resulting from past Department of Defense (DOD) activities at the Former NAS.

- **NYCDEP, Wards Island Water Pollution Control Plant (WPCP): Hazardous Materials Investigation Report.** Performed review, updating, and restructuring of analytical data; prepared summary data tables for remediation discussion. Performed lead paint chip sampling for remediation and disposal of on-site holding tanks.

- **USACE, Kansas City District Plattsburgh Air Force Base, New York: Remedial Investigation and Site Inspection.** Performed review and updating of analytical reports; prepared and tabulated project summary report.

- **USACE, New York District, Picatinny Arsenal: Remedial Investigation and Feasibility Study.** Prepared review and comment for Phase II remedial investigation/feasibility study (RI/FS) planning document, RI reports, and risk assessments revision report; tabulated Phase II RI/FS field activities summary.

- **U.S. Army Corps of Engineers Kansas City District Vineland Chemical Company Superfund Site: Hazardous Remediation Design.** Reviewed and tabulated analytical data; performed research and prepared field equipment cost data reports.

- **U.S. Army Corps of Engineers Kansas City District Marathon Battery Superfund Site: Hazardous Remediation.** Reviewed, organized, and consolidated work plans and analytical data.

(continued)

DETAILED EXPERIENCE (Continued)

1993 to Date Malcolm Pirnie, Inc. (continued)

- **U.S. Army Corps of Engineers New York District Raritan Bay Anchorages: Deep Draft Navigation Reconnaissance Study.** Performed research and prepared dredging summary reports.

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Edward V. Lipman, Jr.
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The New York Botanical Garden

Timothy Ellis

has satisfactorily completed the requirements for the

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NY Botanical Garden

Natalie J. Anderson

Director of Continuing Education

August 25, 1996

Date

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Purchase College
State University of New York

awards this certificate

to

TIMOTHY ELLIS

in recognition of the achievement
of a prescribed level of competence in

ENVIRONMENTAL MANAGEMENT

October 4, 1996
Date

Chairperson of Natural Sciences

Dean of Continuing Education

301777

APPENDIX II

Appendix H

Stage 1a Cultural Resources Survey Report

MALCOLM PIRNIE

ARCS II

CONTRACT NO. 68-W9-0051

LI TUNGSTEN
GLEN COVE, NEW YORK

Work Assignment No. 025-2L4L

DRAFT FINAL REPORT
STAGE Ia ARCHAEOLOGICAL SURVEY

Remedial Planning Activities at Selected Uncontrolled Hazardous Substance Disposal Sites USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
102 Corporate Park Drive
White Plains, New York 10602

April 1995

301780

CONTRACT NO. 68-W9-0051

LI TUNGSTEN
GLEN COVE, NEW YORK

Work Assignment No. 025-2L4L

DRAFT FINAL REPORT
STAGE Ia ARCHAEOLOGICAL SURVEY

Remedial Planning Activities at Selected Uncontrolled Hazardous Substance Disposal Sites USEPA Region II (NY, NJ, PR, VI)

Malcolm Pirnie, Inc.
102 Corporate Park Drive
White Plains, New York 10602

April 1995

301781

ARCS II CONTRACT NO. 68-W9-0051

WORK ASSIGNMENT # 025-2L4L

SITE NAME: **LI TUNGSTEN**
GLEN COVE, NEW YORK

DRAFT FINAL REPORT
STAGE Ia ARCHAEOLOGICAL SURVEY

APRIL 1995

CONTRACTOR QA/QC SIGN-OFF

Malcolm Pirnie, Inc., has reviewed this document in accordance with the contractor's ARCS II Quality Assurance Procedures Manual SOP (MP-PMOQA-006-12/90, Revision 1) and is submitting it to USEPA, Region II under Work Assignment No. 025-2L4L and Contract No. 68-W9-0051.

This document has not been approved by USEPA Region II and is not intended for release to the public.

Dennis G. McGrath
SITE MANAGER
Date: 17 April 1995

Kris Krishnaswami
ARCS II Program Manager
Date: April 17, 1995

TECHNICAL REPORT ABSTRACT

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PROJECT OFFICER:	Fernando Rosado
PROJECT OFFICER ADDRESS:	290 Broadway, 18th Floor New York, NY 10007-1866
PROJECT OFFICER TELEPHONE:	212-637-4346
PROGRAM OFFICE:	102 Corporate Park Drive White Plains, NY 10602
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DOES THIS REPORT CONTAIN CONFIDENTIAL BUSINESS INFORMATION

YES _____ **NO** ___✓___

REPORT ABSTRACT

A Stage Ia Archaeological Survey was completed at the Li Tungsten site in Glen Cove, NY. The Stage Ia Survey was initiated at this time principally to evaluate the potential architectural significance of site buildings that could be affected by site activities during the Interim Remedial Actions (IRA). Secondary considerations included identification of potential archeological resources at the site and to recommend further investigations, if necessary, prior to the initiation of IRA and RI/FS field activities.

Based on the results of the Stage Ia survey, it is unlikely that any activities related to the IRAs or the RI/FS will disturb or destroy possibly significant archeological or architectural resources. Potential archeological and architectural resources were identified on Parcel A and B. These cultural resources may warrant further investigation prior to remedial construction activities if large scale ground disturbance or building demolition is planned.

In summary, the results and analysis of the Stage Ia Archeological Survey indicate the following:

- Some of the existing structures within Parcel A may be associated with the early twentieth century Ladew Leather Belting Works and may possess architectural and/or historical value;

- Parcel B is sensitive for the presence of possibly significant prehistoric period and historic period archaeological resources; and

- The artificially filled area behind the bulkhead along Glen Cove Creek (Parcel A) may possibly constitute an historic period cultural resource.

KEY WORDS/DESCRIPTORS: Stage Ia Archaeological Survey; Cultural Resources; Archaeology; Li Tungsten Corporation; Glen Cove, NY;

STAGE Ia ARCHAEOLOGICAL SURVEY
LI TUNGSTEN SITE - GLEN COVE, NEW YORK

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1.0 INTRODUCTION

This report presents the results of a Stage Ia Archaeological Survey of the Li Tungsten Corporation (Li Tungsten) site located at 63 Herb Hill Road, City of Glen Cove, Nassau County, New York (Figures 1 and 2). The Stage Ia Survey was conducted as part of the remedial investigation/feasibility study (RI/FS) scope of work as described in the RI/FS Work Plan (Malcolm Pirnie, 1993).

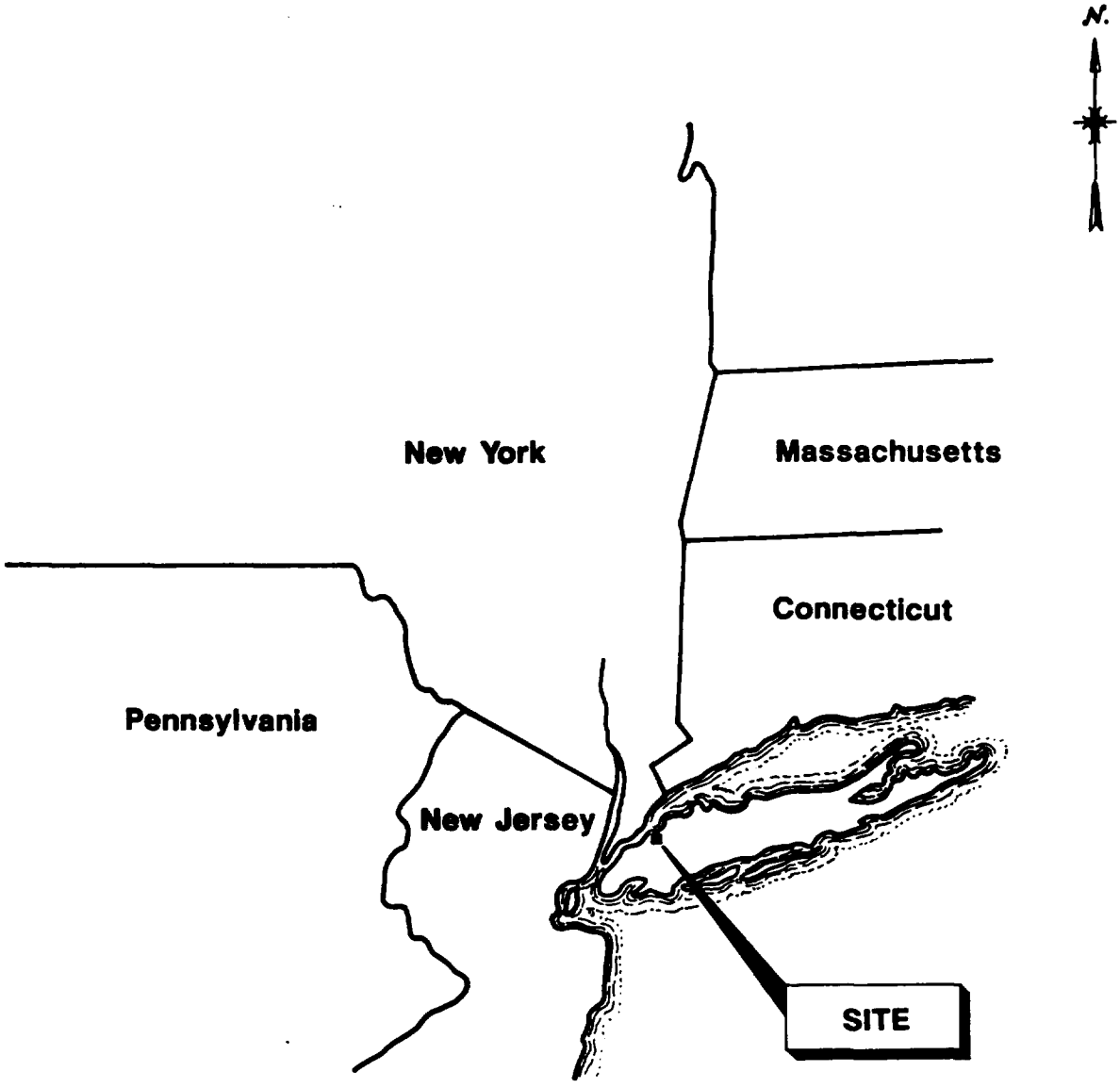
Interim Remedial Actions (IRA), as described in the IRA Work Plan (Malcolm Pirnie, 1994), are to be conducted prior to implementation of the RI. Activities associated with the IRA have the potential for disturbance of buildings during the removal and restaging of the tungsten ore. This Stage Ia survey was conducted at this time primarily to assess the need for an architectural assessment prior to initiating IRA activities. In addition, other activities during both the IRA and RI have the potential to disturb cultural resources of significance. For example, during both the IRA and RI there will be movement of vehicles and heavy equipment across the site. In addition, ground disturbance during the RI will result from soil boring and monitoring well installation and test pit excavations. The objective of this study, therefore, was to assess the likelihood that significant cultural resources exist within on the site and to recommend any necessary further investigations.

The Stage Ia Survey was conducted and this document prepared in accordance with the U. S. Environmental Protection Agency (USEPA) cultural resource survey procedures for Superfund Sites, 36 CFR 800, Section 106 of the National Historic Preservation Act, and the USEPA publication: CERCLA Compliance with other Laws Manual: Part III. Clean Air Act and Other Environmental Statues and State Requirements (USEPA, 1988).

From the early 1940's until approximately 1985, tungsten ores or concentrates, imported primarily from mainland China, South America, and Canada were smelted at the Li Tungsten facility for the production of tungsten carbide powder, tungsten wire, and welding rods (NUS, 1989; 1990). In 1985, the company filed for bankruptcy and the facility ceased operation.

Large quantities of ore concentrates were left on site in various processed and unprocessed forms. The ore, which is present in drums, wooden crates and piles both inside and outside the buildings, contains heavy metals and radioactive isotopes of uranium, thorium, and radium.

FIGURE 1



MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK
REGIONAL LOCATION MAP

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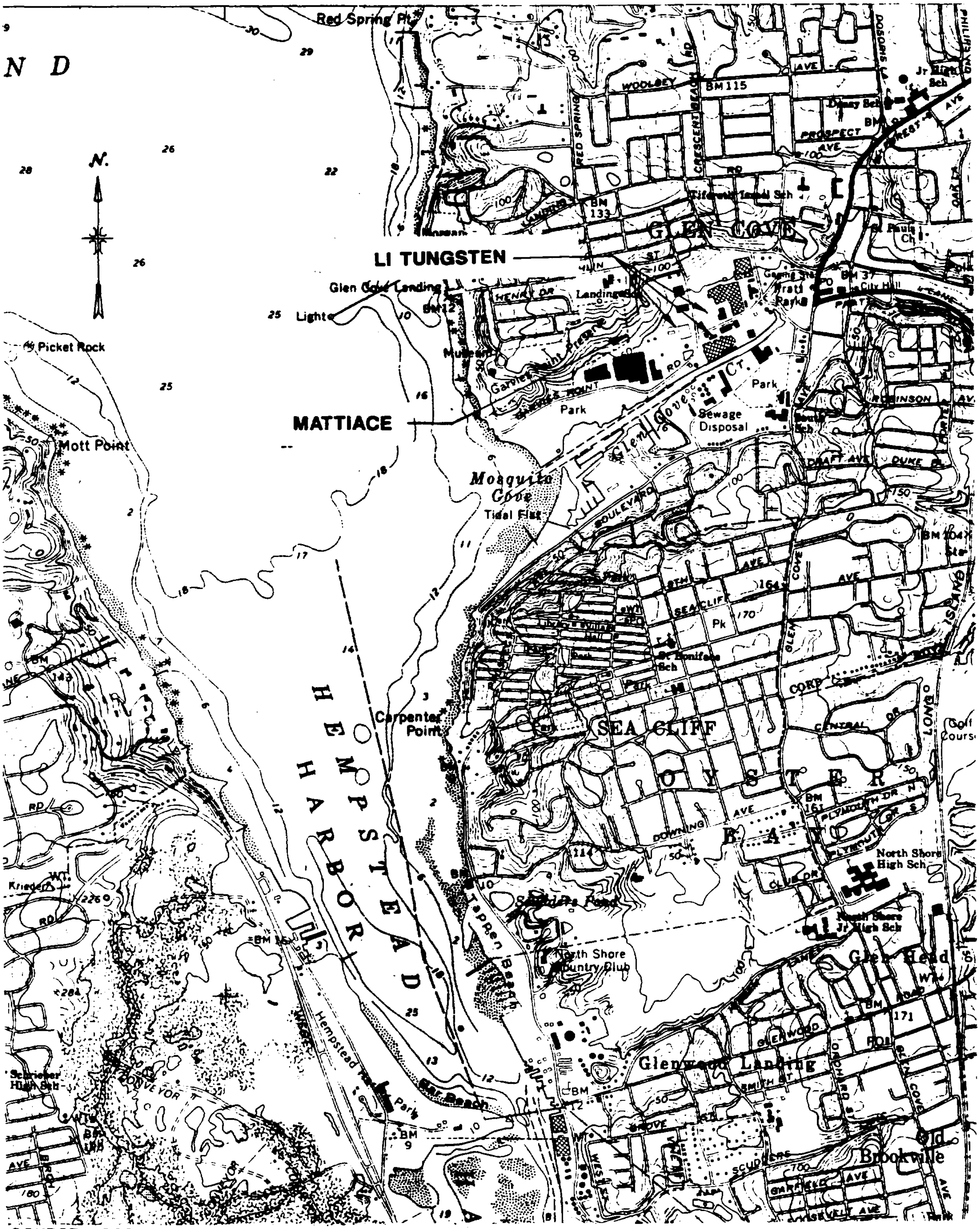
FIGURE 2



SOURCE: USGS MAP SEA CLIFF, NEW YORK QUAD., 1979

LI TUNGSTEN
GLEN COVE, NEW YORK

LOCATION MAP

SCALE 1"=2000'

MALCOLM PIRNIE

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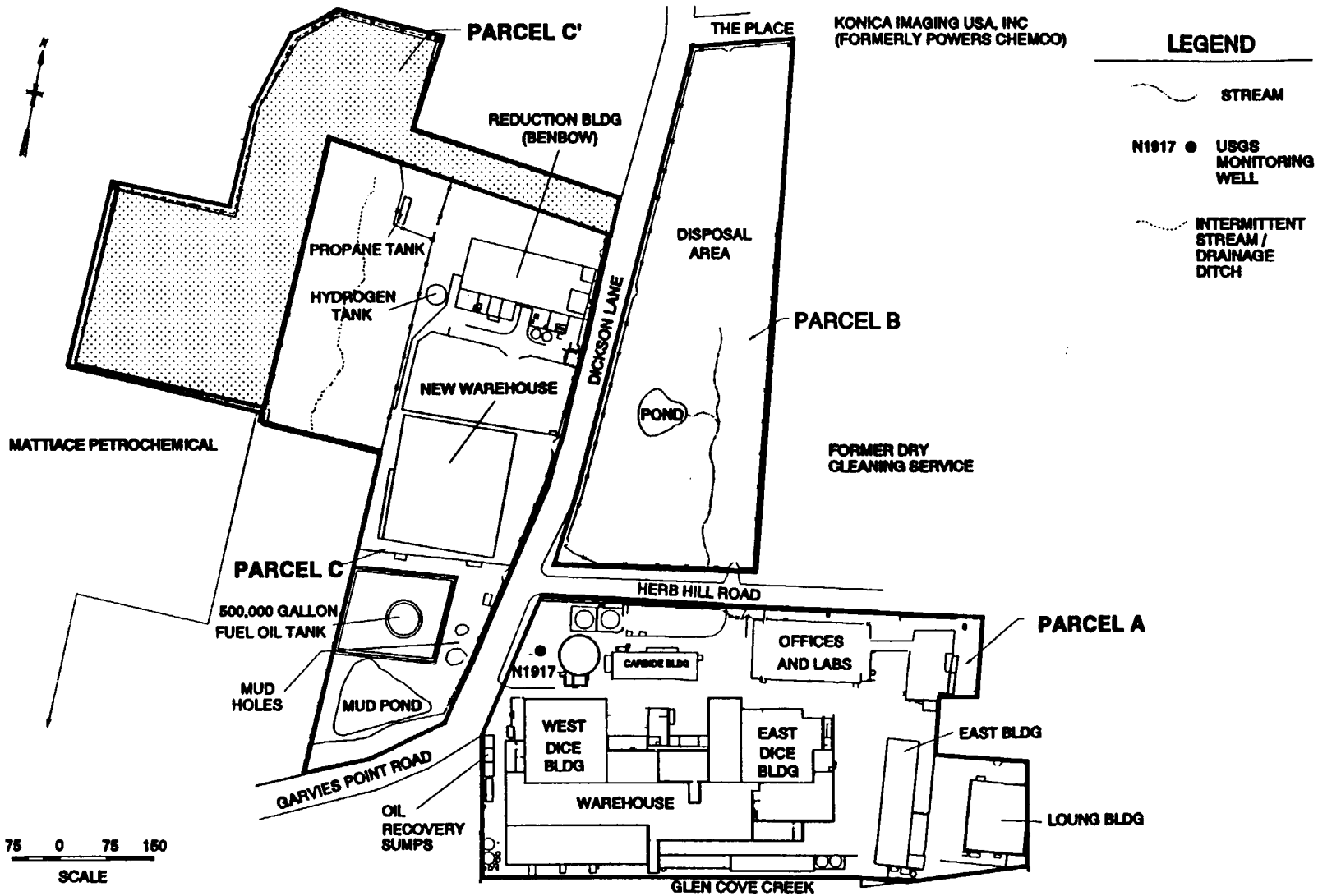
Many of the drums and crates are weathered and corroded to an extent that the contents have spilled. In other areas, the drums have been overstacked and have become very unstable as the drums deteriorated and corroded.

1.1 Site Description

The Li Tungsten site is approximately 26 acres in size and consists of three separate parcels designated A, B, and C (including C') (Figure 3; Photograph #1). Parcel A is approximately seven acres in size and is characterized by relatively level topography. It is bounded by Herb Hill Road on the north, Garvies Point Road on the west, an adjoining property on the east, and Glen Cove Creek on the south. The area served as the main operations center when the facility was active. It contains the majority of buildings, structures, facilities (e.g. tanks, surface impoundments, sub-surface utilities and piping), and drums/crates of tungsten ore (Photographs #2-4). Accordingly, almost the entire parcel has been subject to some sort of construction activity producing large-scale ground disturbances.

Glen Cove Creek, formerly known as Mosquito Creek, located south of Parcel A is a tidal creek whose course has been extensively modified (filled and straightened) by the United States Army Corps of Engineers beginning in the late nineteenth century (Photograph #5). The creek formerly meandered extensively through a narrow valley and contained a number of islets. It was reportedly deep enough for the passage of sloops and small schooners during much of the historic period (Russell, 1990). Subsequent dredging enabled passage of larger vessels. Salt marshes, brackish/fresh water wetlands, and meadows formerly bordered Glen Cove Creek, covering most of the area now included in Parcel A (and probably portions of Parcels B and C). Much of Parcel A and portions of Parcels B and C have apparently been filled to some extent.

Parcel B is the smallest of the three parcels at less than six acres in size and is located due north of Parcel A. It is bounded by Herb Hill Road on the south, Dickson Lane on the west, The Place on the north, and an adjoining property on the east. The northernmost approximately three quarters of Parcel B consists of bench-like terraces located along the slope of a hill. The area is covered with trees and scrub vegetation (Photographs #6-7). The southernmost approximately one quarter of the Parcel is relatively level and covered with grass and scrub vegetation (Photograph #8). The area was formerly a parking lot for workers at the facility. Filling and grading activities apparently occurred there.



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MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

SITE PLAN

FIGURE 3

An artificially created pond, approximately 70 feet in diameter, is located in the south-central part of Parcel B (Photograph #9). The pond appears to be shallow and support a thick growth of vegetation along its margins. The pond and the area to the north are drained by several small ditches which merge to form an intermittent stream (Photograph #10). A portion of Parcel B north of the pond is reportedly the location of past disposal activities (NUS, 1989; 1990; 1991). A number of soil piles, covered with vegetation, are located in the central portion of this parcel.

Parcel C is approximately 14 acres in size, however, not all of this parcel was part of the Li Tungsten property during active site operations. The Glen Cove Development Corporation acquired approximately four acres of undeveloped property, designated Parcel C', sometime after 1984. Parcel C contains several buildings, a 500,000 gallon above ground fuel oil storage tank, other tanks, surface impoundments, and an underground network of utilities and piping (Photographs #11-13, 15). A number of small areas within this parcel are covered with trees and scrub vegetation (Photograph #14). Similar to Parcel B, bench-like terraces formerly existed. The topography of the area, however, has apparently been modified by construction activities associated with site operation to such an extend that they are no longer readily identifiable.

An area covered by tree and scrub vegetation is situated north of the Reduction (Benbow) Building. The location has apparently been disturbed as evidenced by the following: indications of below ground piping; areas where the upper soil layers have been removed (stripped) revealing the sub-soil; and the presence of vegetation characteristic of disturbed locales. A small, intermittent drainage stream is also located in this portion of Parcel C.

Another tree cover area, which also contains wetland vegetation growing in an artificially created depression, is located between the Dickson Warehouse and the Reduction Building. The area also shows surface evidence of large-scale ground disturbance (i.e. surface depressions, stripped soil areas, vegetation characteristic of disturbed areas, indications of below ground utilities, piping, and possibly tanks).

Parcel C' consists principally of sloping terrain. The northern and eastern portions of the Parcel are wooded with areas of scrub vegetation. Most of the southern and western portions are

unvegetated although small areas of scrub growth and grass exist.

1.2 Scope of Work

This Stage Ia Survey involved documentary research on the prehistory and history of the site and a site reconnaissance of selected portions. Research was conducted at the New York Public Library (Local History, Map, and General Research Divisions); Elmer Holmes Bobst Library - New York University; the Glen Cove Public Library; the City of Glen Cove Municipal Building; the Garvies Point Museum; the Nassau County Historical Society; and the Nassau County Soil Conservation Office. A site reconnaissance was conducted between January 11-19, 1995.

Requests for technical assistance (search of site files; opinions of the sensitivity of the area;) were made to the staff of the New York State Historic Preservation Office and to the New York State Museum. A reply was received from the New York State Museum and is presented in Appedix A and discussed in Section 3.3. No reply has been received from the New York State Historic Preservation Office as of the date of this report. In addition, during the course of research the Principal Investigator met in person with Mr. Daniel Russell, the City Historian of Glen Cove and with Mr. Ronald Wyatt, Staff Archaeologist for the Nassau County Museum.

Based on the documentary research and the site reconnaissance, the sensitivity of the site was assessed. Assessment of prehistoric period sensitivity was based on the location of known archaeological sites reported in the literature as well as a consideration of the past and present topographic and physiographic characteristics of the project site. Assessment of historic period sensitivity was based on an analysis of seventeenth to twentieth century maps as well as a review of secondary sources.

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2.0 REGIONAL DESCRIPTION

The site area, located north of Glen Cove Creek, is part of the relatively flat to undulating headland that separates Hempstead Bay and Cold Spring Harbor/Oyster Bay on the northern shore of Long Island (Van Diver, 1985).

2.1 Regional Geology

The geology of northwestern Long Island is discussed below with particular emphasis on the Glen Cove region. The Glen Cove region for the purpose of this discussion is defined as the area surrounding the Li Tungsten site for a distance of approximately one mile to the north, east and south, and bounded by Hempstead Harbor to the west. The information was obtained from several USGS publications (Swarzenski, 1963; Kilburn and Krulikas, 1987; Smolensky et. al., 1989; USGS, 1946).

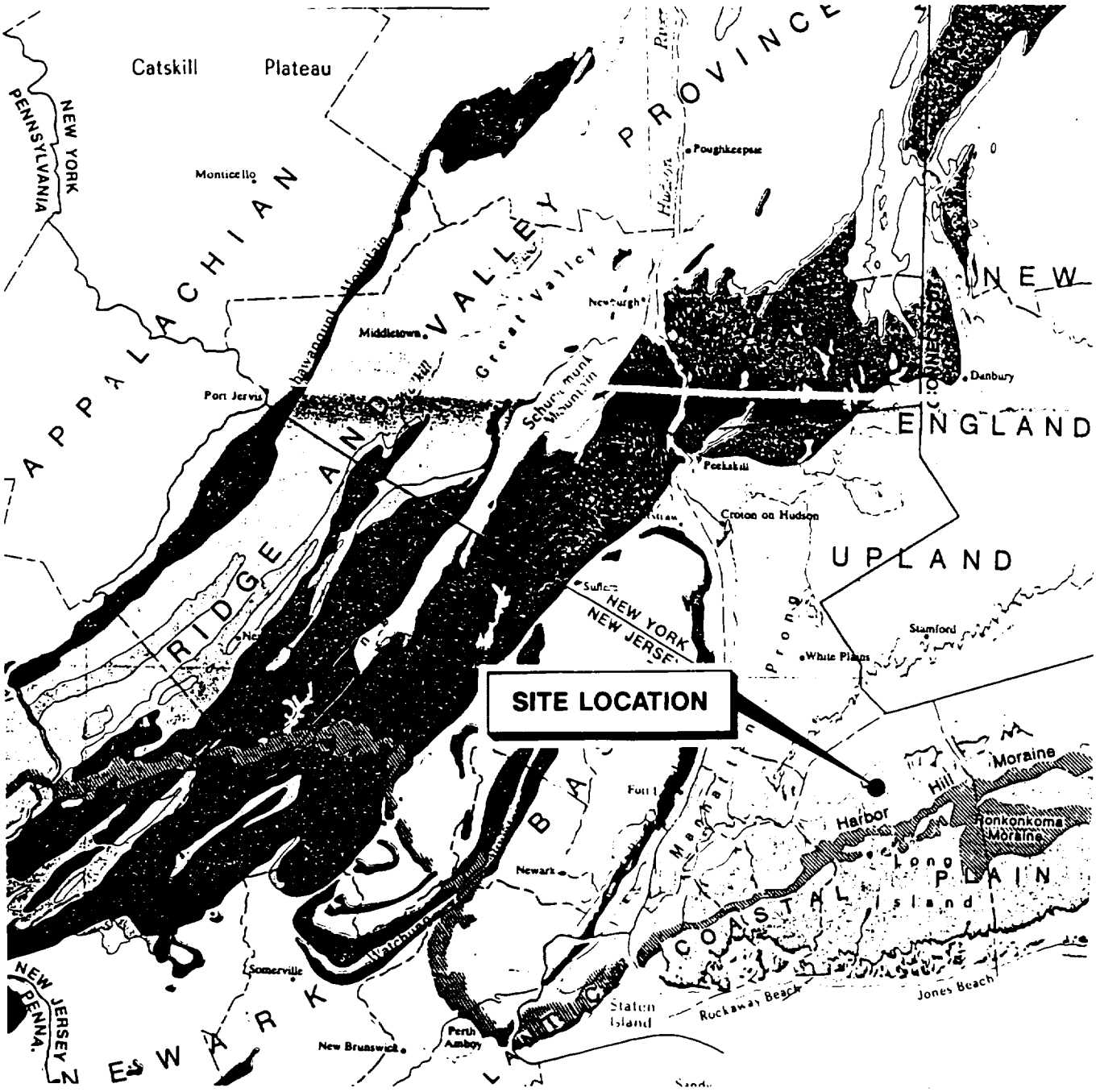
Long Island is the northern most extension of the Atlantic Coastal Plain (Figure 4). The Island is composed of terrestrial deposits of Cretaceous age and Quaternary deposits primarily of glacial origin (Pleistocene). These deposits form a southeastward thickening wedge of sediments which overlie Paleozoic and Precambrian crystalline bedrock. The bedrock surface and the overlying strata generally dip to the southeast, with the unconsolidated strata thickening in the down-dip direction. In the Glen Cove region, the unconsolidated sediments are 400 to 600 feet thick. The bedrock of the Coastal Plain in the Long Island vicinity consists of soft, easily eroded, Cretaceous age metamorphic and igneous rock, specifically muscovite-biotite schist, gneiss, and granite (Gratacap, 1904; Schuberth, 1968). The bedrock surface generally dips to the southeast.

2.2 Surface Geology

The portion of the Atlantic Coastal Plain in New York was greatly affected by the Wisconsin glaciation. Glacial till and outwash sediments cover most of the province. In addition, glaciofluvial events created kames, kame terraces, outwash plains, scoured rock surfaces, and eskers throughout the area (Fenneman, 1938). Surface evidence of glaciation is common on Long Island.

The site is located about four miles north of the Harbor Hill terminal moraine, a series of irregular hills (kames) which form a pronounced ridge trending north-northeast across Long

FIGURE 4



SOURCE: GROSS AND OSTROWSKI 1984

LI TUNGSTEN
GLEN COVE, NEW YORK

ATLANTIC COASTAL PLAIN PHYSIOGRAPHIC PROVINCE

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Island. This moraine marks the terminal position of the most recent Pleistocene (late Wisconsin) ice sheet to reach Long Island.

The site is located within the extensive Harbor Hill ground moraine. Areas of ground moraine are formed during a standstill in the terminus of a glacial ice front when the rate of advance of the ice is balanced by melting and other wastage. Subsequent warming of the climate causes the stationary ice sheet to melt uniformly over a large area, depositing unevenly whatever heterogeneous drift happens to be present in the ice, creating an undulating topography (Wolfe, 1977:233).

The ground moraine in the Glen Cove vicinity is typically five to ten feet thick although in some areas its thickness may increase to 40 feet. It consists of a heterogeneous mixture of clay, silt, sand, and boulders interlayered with gray clay lenses and deltaic deposits. Earlier glacial deposits associated with the Ronkonkoma glaciation underlie the Harbor Hill drift (Kilburn and Krulikas, 1987).

2.3 Flora and Fauna

The predominant pre-contact period habitats present within the Atlantic Coastal Plain were salt and brackish water marshes and meadows and oak-chestnut climax forest (Shelford, 1974:19). Tidal flats were located in some areas and fresh water marshes and meadows would have existed further back from the coast. All of these habitats were probably present in the site vicinity.

Chrysler (1910) provides a list of 38 plants present in salt and brackish water marshes and meadows in the order of their occurrence in soils with decreasing salt content. All most likely were formerly present in the site vicinity. The first four are glasswort, found nearest to salt water, sea-lavender, salt reed grass, and salt water cord grass. The composites marsh elder and groundsel occur near the center of Chrysler's list followed a little further down by cat-tails. The last four salt tolerating plants listed are swamp rose, arrowhead, lizard's tail, and bur-marigold (Chrysler, 1910).

The oak-chestnut forest was composed primarily of mixed oaks (white, red, and black) with some chestnut trees present on drier slopes (Robichaud and Buell, 1973). Beech, several varieties of hickory, sugar maple, white ash, and black cherry would also have been numerous

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(Shelford, 1974). A description of the plentiful oak-chestnut forest in the area around Hempstead in 1670 is provided by Daniel Denton (1670):

> *The greatest part of the Island is very full of timber, as Oaks, white and red, Walnut trees, Chestnut trees, which yield store of mast for Swine, and are often therewith sufficiently fatted with Oat-Corn as also Maples, Cedars, Saxifrage, Beach, Birch, Holly, Hazel, with many sorts more.*

Pre-contact faunal species usually present within marshes and meadows included various invertebrates, migratory water fowl and other birds, muskrat and small rodents, rabbit, raccoon, otter, skunk, oppossum, and white-tailed deer (Shelford, 1974; Gosner, 1978; Roberts, 1979). Within the pre-contact forests, game birds, small mammals, white-tailed deer, bear, and during at least a portion of the prehistoric period, elk were present (Shelford, 1974). In the forest's freshwater stream and marsh habitats were found mussels, fish, certain amphibians, reptiles, migratory fowl, and semi-aquatic mammals (Shelford, 1974). Some species of salt water fish would and been present year round and anadromous fish would have been present seasonally in the site vicinity via the Glen Cove Creek. The Creek would also have contained numerous species of shellfish.

2.4 Soils

As a result of extensive land development along Glen Cove Creek, the soil association mapped for much of the area, including the site, by the United States Soil Conservation Service (SCS) is Urban Land (Ug) (SCS, 1987). This soil unit consists of areas where at least 85 percent of the land surface is covered with impervious materials. These impervious materials include paved roadways, parking lots, buildings, and sidewalks (SCS, 1987:41). This characterizes Parcels A and C. Included in this unit are areas where the underlying soil has not been appreciably altered or which are not under an impervious cover (SCS, 1987:41). Soils in these locations which includes most of Parcel B are probably related to the Riverhead Series soil types.

Riverhead Series soils are deep, well drained soils of moderately coarse to medium texture with

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moderate to high permeability. They form on nearly level to steeply sloping terrain. They generally form in moranial areas or outwash plains. The surface layer is loam or sandy loam and the sub-soil (usually below 12 inches) is loam, loamy sand, or gravelly loamy sand. The sub-stratum, usually found 35 to 65 inches below the surface, is sand and/or gravel. These areas usually support various species of oak (SCS, 1987:80). Some portions of the project site, particularly within Parcel A and part of Parcel C, were probably covered by salt and/or brackish water marsh. In the coastal lowlands, such areas have an organic surface layer a few inches to several feet thick below which is usually a pale-gray or white sand sub-stratum (Shelford, 1974; SCS, 1987).

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3.0 DOCUMENTARY RESEARCH - PREHISTORIC PERIOD

3.1 Background Culture History

The prehistory of the Nassau County region includes the PaleoIndian, Archaic, Transitional, and Woodland periods. The PaleoIndian period (10,000-8,000 B.C.) represents the earliest occupation of this area. The Archaic (8,000-1,700 B.C.) refers to a time prior to the introduction of horticulture and pottery manufacture and is divided into Early, Middle, and Late periods. The Transitional period (1,700-1,000 B.C.) witnessed a gradual change in Archaic lifestyles with the development of "Woodland" period traits. The Woodland period (1,000 B.C.-1,600 A.D.), which is characterized by the use of pottery and reliance on horticulture, is also divided into Early, Middle, and Late periods.

3.1.1 PaleoIndian Period

The PaleoIndian period corresponds with the end of the Wisconsin glaciation. Sea levels were lower during this period and the subsequent Early Archaic period due to sea water being trapped in remaining glacial ice. Lowering of sea levels resulted in the exposure of large expanses of continental shelf causing Long Island to become part of a broad, fertile coastal plain. Utilization by PaleoIndian and later cultures of areas that are now inundated has been suggested (Edwards and Emery, 1966, 1977; Salwen, 1962, 1965).

A tundra environment characterized the landscape of the area during the late glacial and immediate post-glacial periods. As the glaciers retreated northward water drained from the melting ice sheet creating large inland lakes, kame lakes, bogs, and marshes. The tundra and lacustrian landscape was rapidly succeeded by forest. Local forests consisted primarily of spruce and fir with small amounts of oak and other deciduous species (Snow, 1980). Many faunal species now extinct or no longer native to the area were present. These included mammoth, mastodont, horse, caribou, giant beaver, sloth, elk, moose, and peccary (Snow, 1980).

Little is known about cultural activities during the PaleoIndian period although it is generally accepted that the region was first inhabited by humans approximately 10,000 B.C. (Funk, 1976; Ritchie, 1980). Small nomadic bands of hunters and gatherers probably subsisted on the animal species mentioned previously as well as small game, certain riverine resources, and a variety of plants. Population density, however, was very sparse. The nearest identified PaleoIndian sites to

the present project are located on Staten Island (e.g. Port Socony north and south, Cutting site).

A variety of functionally diverse site types have been identified for the PaleoIndian period based upon intersite variability of artifact assemblages and environmental settings. These include base camps, quarry workshops, rockshelter habitations, open air hunting camps, kill and butchering sites, and other temporary camps (Funk, 1972; Moeller, 1980; Gramley, 1982). Most evidence of PaleoIndian activity, however, is represented by scattered surface finds of Clovis Fluted points, a diagnostic PaleoIndian artifact (Funk, 1976:205). No fluted points have been reported from the Glen Cove area. However, such artifacts have been found along the eastern shore of Port Washington Harbor, a north shore inlet east of Port Washington (Saxon, 1973:254-255). Other fluted points were recovered from the Villages of Wantagh and Wyandanch in Nassau County (Saxon, 1973:256-257).

Information from known PaleoIndian sites in the New York-New Jersey-Connecticut region suggests that high, well-drained areas near streams or wetlands were the areas preferred for occupation. Rock shelters, areas near lithic sources, lower river terraces and bench areas also were subject to PaleoIndian occupation and use (Funk, 1976; Moeller, 1980; Ritchie, 1980).

3.1.2 Archaic Period

During the Archaic period, the environment changed from a coniferous forest to an increasingly deciduous forest which achieved an essentially modern character by 2,000 B.C. (Salwen, 1975). While Archaic cultures have been traditionally thought of as reflecting a forest-based adaptation, more recent research has produced a picture of an increasingly varied subsistence pattern based on the seasonal exploitation of various faunal and floral resources (Ritchie and Funk, 1973; Funk, 1976).

Archaic hunters and gatherers were still nomadic and organized into small bands which occupied localities along the Atlantic coast and estuaries during the warmer months and interior regions during the colder months (Ritchie, 1980). Population growth throughout the period resulted in an increase in both site density and the number of functional site types represented in the archaeological record. Site types recognized for this period include spring fishing camps along major streams, fall open air hunting camps, rockshelter habitations, shellfish collecting and processing stations, mortuary sites, quarry and workshop sites, and semi-permanent villages

(Brennan, 1974; Dincause, 1975, 1976; Barber, 1980; Ritchie, 1980; Snow, 1980; Weigand, 1980; 1983). Archaic sites are small and multicomponent, lacking traces of substantial dwellings, fortifications, storage pits, and graves (Ritchie, 1980:32 and 35).

Referring specifically to Long Island Archaic sites, Ritchie states that they are numerous, small, and nearly always multicomponent. They are situated on tidal inlets (such as Glen Cove Creek), coves, bays, and fresh water ponds. In the vicinity of the project site, the range of reported site types associated with the Archaic period is limited to shellfishing stations along Glen Cove Creek and the Long Island Sound shore and possibly small temporary camps in the interior (Funk, 1976; Levine, 1978; Ritchie, 1980; Truex, 1982).

Most information concerning the Archaic period comes from Late Archaic sites since evidence for Early and Middle Archaic sites in the project region is almost as scarce as for PaleoIndian sites. The rarity of Early Archaic (8,000-5,000 B.C.) sites is probably due to the dominance of a coniferous forest in the region during that period (Ritchie, 1980). Such environments are inhospitable to human exploitation, offering few plants and animals for consumption. Early Archaic components, however, have been identified in the project region on Staten Island and along the Hudson River shore in Westchester County, New York (Ritchie and Funk, 1973:38-39; Brennan, 1977). On Long Island, bifurcated projectile points, a diagnostic Early and Middle Archaic type, have been recovered as isolated finds along the north shore (Wyatt, 1977).

Early Archaic life styles and adaptations are generally considered to be similar to PaleoIndian lifestyles and adaptations (Gardner, 1974). During the Middle Archaic (5,000 - 2,500 B.C.) the region's coniferous forests receded and were replaced by deciduous forests which provided humans with more exploitable resources. Sites dating to this period tend to be located on floodplains and low terraces of major rivers and streams and in association with marsh, swamp, and estuarine environments. Although rare (or rarely recognized) on Long Island, Middle Archaic components have been identified at the Garvies Point (Section 3.3) and Stony Brook sites (Ritchie, 1980).

Human population, site density, and site size increased in the Long Island region during the Late Archaic (2,500 - 1,500 B.C.). Some sites appear to have been occupied on a semi-permanent basis. Late Archaic sites have been found in low-lying areas in close proximity to area estuaries and along major interior streams (Wyatt, 1977). In the immediate site vicinity, evidence of Late Archaic

occupation have been found at the Glen Cove site and the Garvies Point site (Section 3.3).

3.1.3 Transitional Period

Sites dating to the Transitional Period (or Terminal Archaic; 1,500 - 1,000 B.C.) are most frequently found along the coast and major waterways (Funk, 1976; Ritchie, 1980; Vargo and Vargo, 1983) although smaller sites are known from the interior (Funk, 1976; Vargo and Vargo, 1983). New and radically different broadbladed projectile point types appeared during this period as did the use, during the latter half, of steatite (soapstone) vessels. Evidence of Transitional period occupation is fairly widespread on Long Island (Boyd, 1982:64-69). In the vicinity of the project area the range of reported site types associated with this period is limited to shellfishing stations along Glen Cove Creek (Glen Cove site, Muskeeta Cove 1 site - Section 3.3) and the Long Island Sound shore.

3.1.4 Woodland Period

During the Early Woodland period (1,000 B.C. - A.D. 1), the use of fired clay ceramic vessels gradually replaced the reliance on steatite vessels. Subsistence practices included a continuation of the hunting, gathering, and fishing of the Archaic but were supplemented by an increase in shellfish collecting. It has been suggested that this indicates a trend towards more sedentary lifestyles (Funk, 1976; Snow, 1980). Early Woodland sites have been found along the Long Island Sound shore in the Throgs Neck section of the Bronx (Lopez, 1955).

Human populations during the Middle Woodland period (A.D. 1 - 800) gradually adopted a more sedentary lifestyle. Although it is generally felt that subsistence was essentially based on hunting and gathering supplemented by fishing and shellfish collecting, there has been speculation that domestication of various plants occurred during this period (Ritchie and Funk, 1973; Snow, 1980). Most known Middle Woodland sites are located along the Hudson River or its tributaries although smaller inland sites are also known (Funk, 1976; Ritchie, 1980). Middle Woodland components in the site vicinity have been found at Matinecock Point (Ritchie, 1980).

By Late Woodland times (A.D. 900 - 1600) horticulture was the primary subsistence base and permanent villages existed (Ritchie, 1980; Snow, 1980). Use was still made, however, of temporary and special purpose campsites such as shellfish processing sites (Ritchie, 1980; Snow 1980). On Long Island, Late Woodland sites are relatively numerous and most frequently found along the Long Sound shore (Bolton, 1922; Parker, 1922; Funk, 1976; Levine, 1978; Ritchie, 1980; Truex,

1982). Large base camps/villages are usually situated on tidal inlets (such as Glen Cove Creek), coves, bays, and fresh water ponds. These were probably occupied on a permanent basis. Smaller inland sites, usually located near a water source, that were probably occupied on a seasonal or temporary basis have also been recognized (Funk, 1976; Ritchie, 1980; Snow, 1980).

Smith (1950), basing his conjectures on ceramic typologies, sees an initial "Windsor Tradition" Late Woodland culture occupying all of Long Island. This culture was eventually forced from the western part of the Island by the "East River" culture, associated with another Late Woodland group which Smith (1950) sees as expanding eastward from New Jersey and/or southeastern New York. The East River culture is divided into an earlier, Bowman's Brook phase and a later Clason's Point phase.

Muskeeta Cove 2 (Salwen, 1968:322-340) is a Late Woodland shell processing site located in the immediate vicinity of the site that contains evidence of both Windsor Tradition and East River Tradition occupations.

3.2 Native American-European Contact Period

The Contact period (A.D. 1600 - ca. 1750) is the time of the first large scale contacts between Native Americans and European colonists. By the latter part of the Late Woodland period Native American cultures began to resemble those of groups that were encountered by seventeenth century Europeans. At this time Long Island's Native Americans were part of the widespread Algonquian cultural and linguistic stock. Specifically they consisted of groups of Munsee speakers who occupied the western portion of the Island (Salomon, 1982), Quiripi-Unquachoq speakers who occupied the central portion of the Island, and Pequot-Mohegan speakers who inhabited the eastern portion of Long Island (Salwen, 1978:160-161). Most scholars feel that the Contact Period Native Americans who occupied the area that now includes Nassau County were Munsee speakers. However, others feel that the eastward drift of the Native American population in the seventeenth century has made it difficult to identify the locations of linguistic boundaries on Long Island and that Nassau County natives during this period were, in fact, Quiripi-Unquachoq speakers (Goddard, 1978a:215). For the purposes of this document, the Contact Period aboriginals who inhabited Nassau County are considered to have been Munsee speaking Native Americans.

The Munsee speaking groups of western Long Island migrated into that area and Staten Island

during Late Woodland times (Goodard, 1978a, 1978b; Salwen, 1978). The Munsee speakers were a linguistic subgroup of the Lenape or Delaware. The Lenape consisted of autonomous, loosely related bands or lineages living in small family groups or hamlets. They never formed a politically united tribe. The origin of the name "Lenape" is unclear. Goddard (1978b:236) states that the name translates roughly as "real people." Salomon (1982:14) agrees in a general sense stating that the name means "the real men" or "common people."

The Munsee composed a relatively large, loosely related Lenape group who shared the same totemic symbol, the wolf (Ruttenbur, 1872:47). They occupied most of the land south of the Catskill Mountains to a line drawn from the headwaters of the Lehigh River through the Delaware water gap area to the Raritan River in New Jersey, and eastward to approximately the Smithtown area of Long Island (Salwen, 1978).

Munsee settlements included camps along major rivers, estuaries, coves, inlets, and bays with larger villages located at river mouths (Salomon, 1982). Small hunting, gathering, and agricultural sites were located in the interior. Despite references to such sites by early European explorers and settlers, only a few Contact Period sites have been identified on Long Island. Two of the better known Contact Period sites are Fort Corchaug, located near Cutchoque, and Fort Massapeag, located near Massapequa (Ritchie, 1980). Both were palisaded strong points.

The political, linguistic, and social relationships that existed among the various bands of Munsee speakers and other linguistic groups on Long Island will probably never be fully understood for a number of reasons. The native groups themselves had no fixed boundaries and "ownership" of particular areas may have overlapped with use rights shared. EuroAmerican colonists also frequently misunderstood and misrecorded Native American associations with particular areas. Finally, early pressure on some Native groups by colonial expansion probably resulted in frequent shifts of villages and territories (Goddard, 1978b).

What is known is that in political terms, Contact Period Long Island Native Americans were divided into 13 groups (Becker, 1934; Skinner, 1932; Bailey, 1959; Bolton, 1975). Scholars have usually associated the Matinecock with the area that now includes the project site (Cook, 1976:79). As has been stated, they were probably a Munsee speaking group but may have spoken a Quiripi-Unquachoq dialect.

The land traditionally associated with the Matinecock extended from Newton, Queens County eastward to the Nissequogue River and southward to the approximate center of Long Island (Ruttenbur, 1872:74). According to Tooker (1911), the name "Matinecock" roughly translates as "at the hilly land" which certainly describes the morainal north shore land that they occupied. A number of villages were recorded for the Matinecock. These included habitations at Flushing, Glen Cove (reportedly located immediately north of the Glen Cove Creek and possibly including at least a portion of the project site), Dosoris (Matinecock Point), Matinecock, Huntington, Cold Spring Harbor, Cow Harbor, and on the Nissequogue River (Bolton, 1975:54).

During this period, the Native American name for the Glen Cove area was "Muskitoe" (spelled in a variety of ways by EuroAmericans throughout the seventeenth to nineteenth centuries) which roughly translates as meadow and described the wetlands that formerly bordered Glen Cove Creek (Tooker, 1911).

Problems and conflicts during the Contact Period between Long Island Native Americans and the Dutch resulted in the deaths of large numbers of aboriginals. The introduction of European diseases, such as smallpox, further devastated local Native American populations. During the early years of European Contact, the total Native American population of Long Island is estimated to have been approximately 7,500 individuals (Cook, 1976:84). The population of the Matinecock alone has been estimated at approximately 1,200. By the year 1650, it has been estimated that the total Native American population on Long Island had been reduced to approximately 1,000 people with the Matinecocks totaling approximately 200 individuals (Cook, 1976:84). By the time of the American Revolution only 100 to 200 Native Americans remained on Long Island (Cook, 1976:82).

3.3 Native American Sites and Activity in the Site Vicinity

To evaluate the prehistoric archaeological potential of the Li Tungsten site, an examination was made of the Nassau County Archaeological Site Files located at the Garvies Point Museum and the published archaeological literature. In addition, a request was made to the staffs of the New York State Historic Preservation Office and the New York State Museum to search their site files for listings in the vicinity of the project site. As of the date of this report, a response was received from the New York State Museum (Appendix A), but not from the New York State Historic Preservation Office. Information obtained from the New York State Museum is included in the discussion below.

The region surrounding the site has long been recognized as rich in evidence of Native American occupations (Harrington, 1909; Parker, 1922; Orchard, 1928; Smith, 1950) Areas near watercourses and estuaries have been identified as particularly sensitive. This was noted by Parker (1922:626) who stated that "shell heaps exist on nearly all the creeks in Oyster Bay township [including Glen Cove Creek] and there is abundant evidence of aboriginal occupation. Grooved stone axes and quartz projectile points are commonly found." A century earlier, Wood (1824:23) noted the same association stating that Long Island Native American settlements were all located "on the bays, creeks, and harbors on the north and south sides of the island."

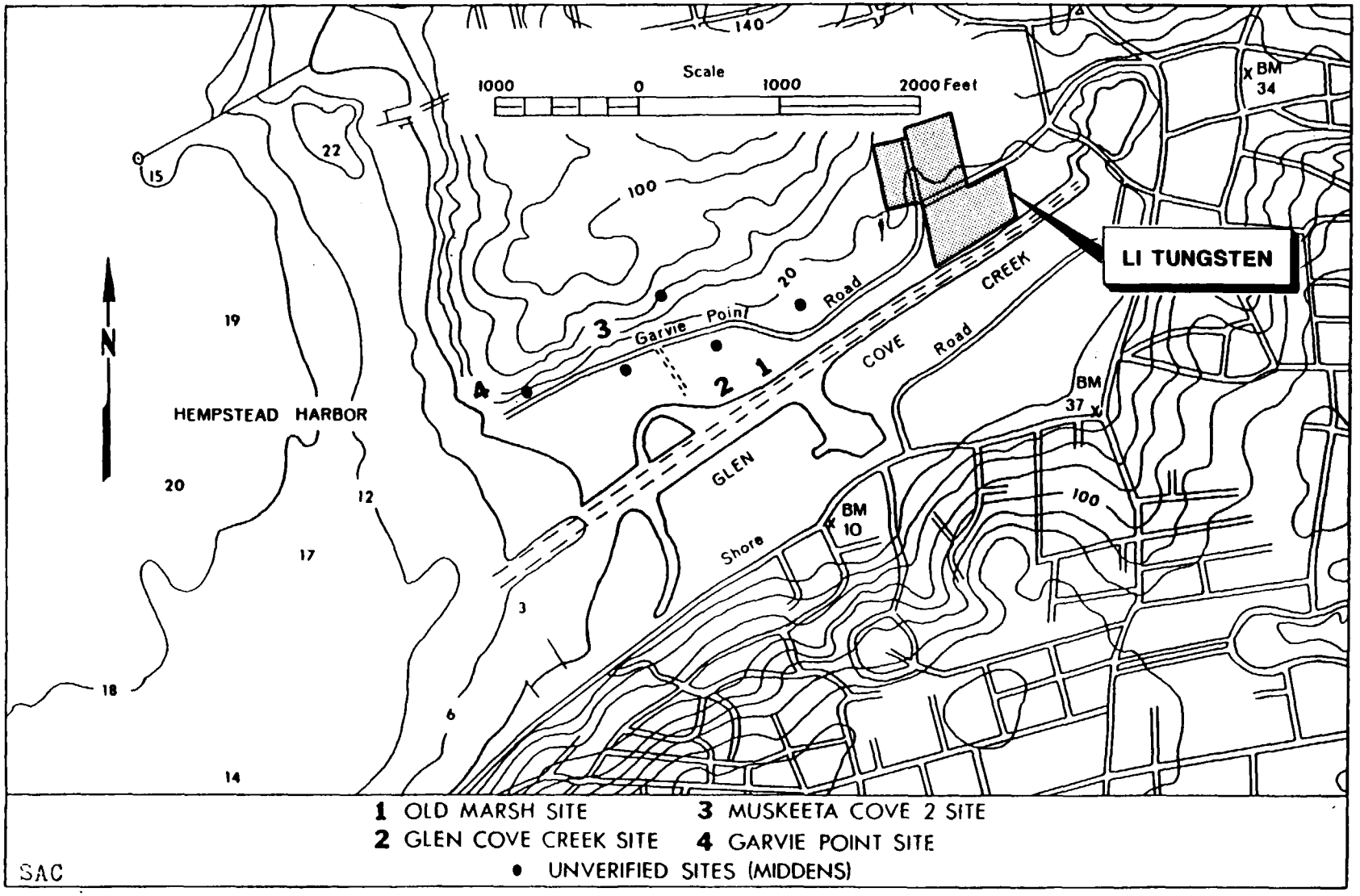
A number of prehistoric sites have been identified within the vicinity of the Li Tungsten area. The following are brief descriptions of these sites based on published references and on information contained in the Archaeological Site Files of the Nassau County Museum and the New York State Museum. Figures 5 and 6 show the general location of these sites as well as the location of other Native American artifact finds in the project vicinity. The NCM numbers are those assigned to the sites by the Nassau County Museum; the OYB site numbers are assigned by the New York State Office of Historic Preservation; and the NYSM site numbers are assigned by the New York State Museum (Appendix A).

3.3.1 Old Marsh Site (NCM #58)

The Old Marsh site was located north of Glen Cove Creek on raised ground that, prior to filling, was surrounded by wetlands (Figure 5 and Figure 7, Area A). It consisted of a shell midden that contained evidence of Archaic period occupation. The Old Marsh Site was located approximately 1,600 feet west of Parcel A and Parcel C.

3.3.2 Glen Cove Creek Site (NCM #3)

Also referred to as the Dump site in the files of the Nassau County Museum, this was a stratified, multicomponent site located north of Glen Cove Creek on raised ground that, prior to filling of the area, was surrounded by wetlands (Figure 5 and Figure 7, Area B). The site consisted of a shell midden and other cultural deposits. A variety of functional tool types, manufactured primarily from quartz, were recovered as well as diagnostic projectile points that indicate the site was occupied during the Transitional (Orient Focus) and Late Archaic periods. The location of the site is approximately 1,900 feet west of Parcel A and Parcel C.



SOURCE: NASSAU COUNTY MUSEUM ARCHAEOLOGICAL SITE FILE

LI TUNGSTEN
GLEN COVE, NEW YORK

LOCATION OF IDENTIFIED CULTURAL RESOURCE SITES IN THE GLEN COVE CREEK DRAINAGE AREA

FIGURE 5

MALCOLM PIRNIE

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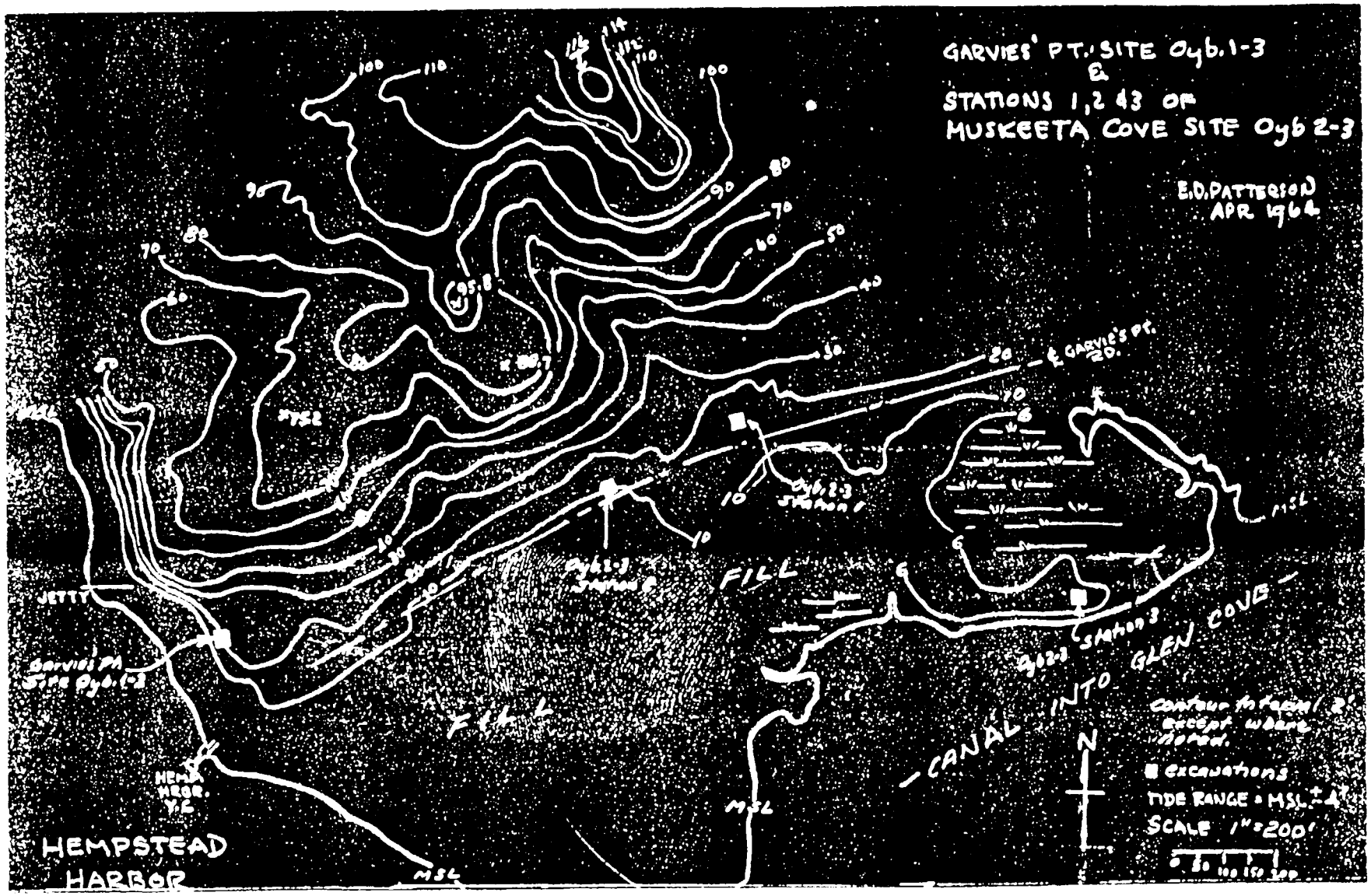

SOURCE: NASSAU COUNTY MUSEUM ARCHAEOLOGICAL SITE FILE

LI TUNGSTEN
GLEN COVE, NEW YORK

GARVIES POINT AND MUSKEETA COVE SITE LOCATIONS

FIGURE 6

MALCOLM PIRNIE

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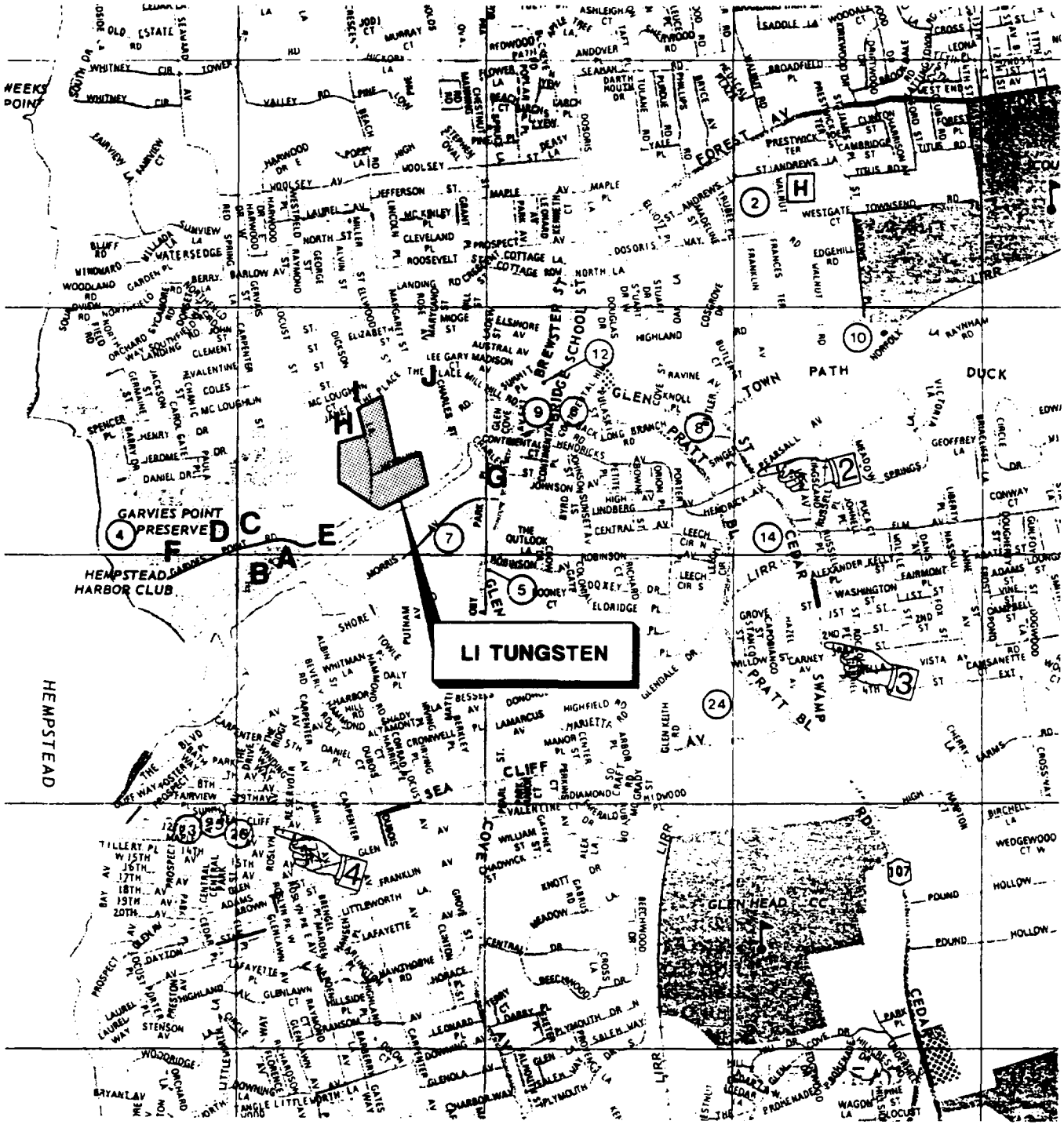

BASE MAP: YELLOW BOOK COMPANY 1994

SCALE OF ORIGINAL: 1"=1,920'

LI TUNGSTEN
GLEN COVE, NEW YORK

MALCOLM PIRNIE

NATIVE AMERICAN ARTIFACT FINDS IN THE PROJECT VICINITY

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3.3.3 Muskeeta Cove Site (NCM #19; OYB 2-3; NYSM 5991, 7682, 7683)

Muskeeta Cove is a multicomponent site complex that contains three separate loci (referred to as Station 1, 2, and 3) of occupation debris (Figures 5, 6, and 7). Station 1 (OYB 2-3; NYSM 5991) was located north of Glen Cove Creek on a terrace of that creek (Figure 7, Area C). It consisted of a shell midden that contained evidence of Transitional Period (Orient Focus) occupation (Patterson, 1956). The site was located approximately 1,100 feet west of Parcel A and Parcel C.

Station 2 (OYB 2 Locus 2; NYSM 7682) was a shell midden and camp site located north of Glen Cove Creek on a terrace of that creek (Figure 7, Area D). The site contained ceramic and other evidence of two Late Woodland occupations (Windsor Tradition and East River Tradition; Salwen 1968:322-340). It was located approximately 2,500 feet west of Parcel A and Parcel C.

Station 3 (OYB 2 Locus 3; NYSM 7683) was located immediately north of Glen Cove Creek on high ground within the wetlands that formerly existed in the area (Figure 7, Area E). The site may have been filled during relatively recent modification of the Glen Cove area. The site was located approximately 1,000 feet west of Parcel A and 800 feet southwest of Parcel C.

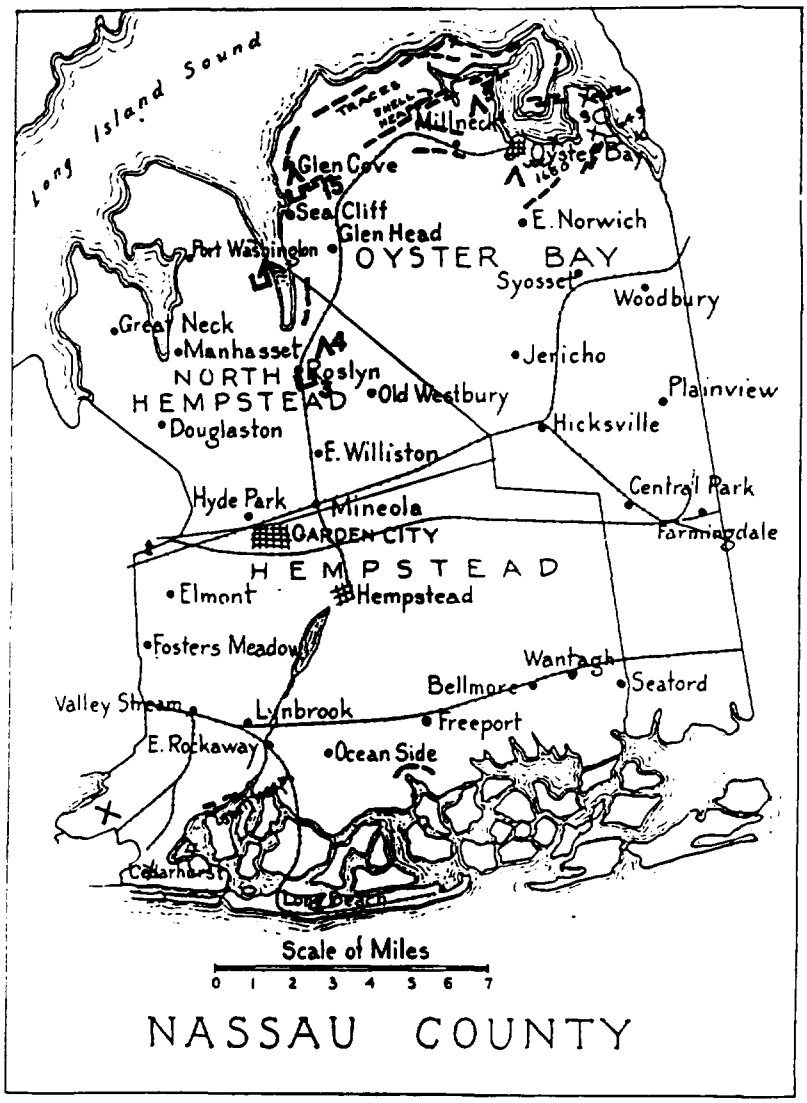
3.3.4 Garvies Point (NCM #18; OYB 1-3; NYSM 5990)

The Garvies Point site was located north of the mouth of Glen Cove Creek on a bench of the bluff overlooking Hempstead Harbor (Figures 5 and 6; Figure 7, Area F). The site contained a shell midden and produced evidence of Middle and Late Archaic period occupations (Patterson, 1955). This site was located approximately 3,000 feet west of Parcel A and Parcel C.

3.3.5 Other Native American Sites in the Project Vicinity

A number of shell middens in addition to those previously mention are indicated in the Nassau County Museum Archaeological Sites Files as located on both sides of Garvies Point Road (Figure 5). No other information is provided on these deposits. Parker (1922:Plate 191; Figure 8) must be referring to these middens and the previously mentioned sites when he indicates that traces of Native American occupation are located along most of the north shore of Glen Cove Creek including the area that is now part of Parcel A. Bolton (1975:90) identifies the entire north shore of Glen Cove Creek as a "station of the Matinecocks."

Other traces of Native American occupation are indicated by Parker (1922:Plate 191) as present



SOURCE: PARKER (1922)

LEGEND:

- Λ VILLAGE SITE
- ⊔ BURIAL OR GRAVE SITE
- – – – TRACES OF OCCUPATION
- 15 VERBAL DESCRIPTION PROVIDED IN TEXT OF PARKER (1922)

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

MAP OF NASSAU COUNTY PREHISTORIC ARCHAEOLOGICAL SITES

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along the entire northeastern shore of Hempstead Bay and the adjacent shoreline of Long Island Sound (Figure 8).

Parker (1922:Plate 191) also indicates the presence of a Native American village, east of Glen Cove Creek (Figure 7, Area G and Figure 8). This site is also listed in the New York State Museum Archaeological Site Files (NYSM 4028). Coles and Santvoord (1967:76) state that the remains of this site were clearly evident at the eastern end of Glen Cove Creek until the early 1940's. The location of this site would have been approximately 1,000 feet east of Parcel A.

Parker describes another village as well as a six foot thick shell midden and burial site, as located near Matinecock Point on Dosoris Pond approximately four miles north of the project site (Parker, 1922:625). This site or the site at the eastern end of Glen Cove Creek may, at least in part, be the village identified by Bolton (1975:90) as associated with the Contact Period Matinecocks. A village site, other traces of occupation, and shell middens are indicated by Parker (1922:Plate 191) as present in Lattingtown near Mill Neck Bay and in Matinecock near Beaver Brook (Figure 8).

According to Russell (1995), Robert Coles, a former Glen Cove Town Historian, remembers the existence of a Native American shell midden in the area now occupied by Janet Court and the Avanti Company (Figure 7, Area H). These locations are within a few hundred feet of Parcels B, C and C'. Furthermore, according to Russell (1995), Coles had in his personal collection of local Native American artifact finds a human mandible which he reported to have recovered from the Janet Court area. A previously unrecorded Native American site was apparently located in the Avanti Company-Janet Court area which is approximately 75 feet northwest of Parcel B and 300 feet north of Parcel C. The existence of this site is supported by the recovery of a number of other Native American artifacts from the area. Information on these finds is recorded in the Archaeological Site Files of the Nassau County Museum (see below).

3.3.6 Surface Finds

Reports of a number of aboriginal surface finds recovered in the immediate vicinity of the Li Tungsten site (Figure 7) are included in the Nassau County Museum archaeological site files. The presence of these finds, along with the sites previously mentioned, indicate intensive Native American use of the area. These finds (along with their Nassau County Museum Site File number) include:

- NCM 52-X-20: a large unidentified jasper projectile point was found in the vicinity of Dickson Lane and The Place (Figure 7, Area I). This location is approximately 50 feet northwest of Parcel B and 300 feet north of Parcel C.

- NCM 52-X-22-28: two quartz knives, a triangular projectile point, three body pottery sherds (Clearview Stamped, Plain Vinette I, and an unclassified cordmarked sherd), and a worked stone were found in a field west of the intersection of Dickson Street and The Place (north of the existing Avanti Factory) during a construction project (Figure 7, Area I). A previously unrecorded Native American site was apparently located in the area which is approximately 75 feet northwest of Parcel B and 300 feet north of Parcel C.

- NCM 52-X-29-33: a projectile point preform and four unclassified sherds were found near the intersection of The Place and Charles Street (Figure 7, Area J). The intersection is located approximately 1,000 feet east of Parcel B and 1,300 feet northeast of Parcel A.

- NCM 52-X-48: a stone axe was found in the marsh by the Avanti Factory located on Dickson Street immediately north of Parcel C and across the road from Parcel B. The marsh is located behind (west of) the factory building (Figure 7, Area K). Its location is approximately 300 feet west of Parcel B and 50 feet north of Parcel C.

- NCM 52-X-63: a three quarters grooved axe was recovered west of Dickson Street near Janet Lane (Figure 7, Area I). The location is approximately 100 feet northwest of Parcel B and 300 feet north of Parcel C.

3.3.7 Other Evidence

Other Native American activity in the vicinity of the site is suggested by references to Contact period aboriginal trails in the area. Present day Route 25A (Mann, 1949) and probably Glen Cove Avenue follow the course of aboriginal trails. Other trails would have extended along the north shore of Glen Cove Creek. The use of these routes would have brought seventeenth century Native Americans into the immediate vicinity of the site.

4.0 DOCUMENTARY RESEARCH - HISTORIC PERIOD

4.1 Background Information - Seventeenth and Eighteenth Century Settlements

The first land purchase from Native Americans in the region occurred in 1635 or 1639 when William Alexander, Earl of Sterling, purchased the neck of land west of Hempstead Harbor and the present site which came to be called Cow Neck (Manhasset Neck). In the spring of 1640, a small number of immigrants under the auspices of the Earl of Sterling landed on the west side of the Neck and erected habitations and other shelters (Thompson, 1918:552). In the view of the government of New Netherlands, however, this land was Dutch territory and the Dutch authorities quickly acted to remove the trespassing settlers and destroyed the settlement. Over the next decade negotiations with the English government sought to establish legal title to Long Island (Thompson, 1918:552). Official recognition of title to the area occurred in 1650 through a treaty signed by the Dutch and English at Hartford, Connecticut. The treaty stated that:

> *Upon Long-Island, a line run from the western-most part of Oyster Bay, and so a straight and direct line to the sea, shall be the bounds between the English and the Dutch there: the easterly part to belong to the English, and the westernmost to the Dutch (Wood, 1824:10).*

By this treaty, the Dutch received title recognition to most of what are now Nassau County, including the site, and Kings and Queens Counties, while the British received title to the eastern most part of Nassau County and Suffolk County. The Dutch did little to settle the Nassau County portion of their claim. When New Netherlands became New York in 1664 with the ouster of the Dutch by the British all of Long Island became the possession of Charles II, the English monarch. The first recorded land sale that included the present site occurred on May 24th, 1668 when Joseph Carpenter purchased from two Matinecock sachems:

> *. . . . a certain parcel of woodland containing a hundred acres lying upon the north side of Musquito Cove, with a square mile of timber and grazing on the north side of this hundred acres, also a square of timber and grazing on the south side of said Cove, the meadows and all the creek thatch excepted, lying or being about said Cove, joining on the said hundred acres, the premises above mentioned, with all privileges*

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of fishing, fowling, hunting, minerals, according to law, within the said hundred acres (DiRiggi, 1979:58).

In return for the land, Carpenter gave the Indians "valuable considerations" the exact nature of which is unknown (DiRiggi, 1979:59). Carpenter had come to Oyster Bay from Warwick, Rhode Island with his wife Hannah in 1659 in search of land where he could construct a mill and establish a settlement. Carpenter had visited the Oyster Bay area in search of favorable land as early as 1663. He reportedly toured the area that is now Glen Cove and found the area around Glen Cove Creek suitable for his dream (Russell, 1990).

On November 30th, 1668, Carpenter signed a partnership agreement with four other men: Nathaniel Coles, Robert Coles, Thomas Townsend, and Abiah Carpenter. Later Abiah Carpenter relinquished his claim and two other men Daniel Coles and Nicholas Simpkins signed the partnership agreement. Based on this agreement, the proprietors divided the purchase among them, each partner receiving a number of parcels situated at different locations within the purchase to ensure an equitable division of each type of land (e.g. meadow, woods, waterfront, marshland etc.).

One of the first collective projects of the proprietors was the erection of an earthen mill dam along Glen Cove Creek at the foot of present day Mill Hill and the construction of a saw mill (Russell, 1990). The mill complex was built prior to 1676 and may have been built as early as 1668 (Coles, 1949; Russell 1990). If the latter date is correct, construction of the complex must have commenced prior to the formal signing of the partnership agreement. The mill was located east of the present site, at the foot of Mill Hill near the present day Glen Cove Avenue extension (Coles and Santvoord, 1967:10).

Soon after their formal partnership, the proprietors did build a roadway which they called "The Place" along which at least some of them constructed homes on five acres lots (Section 4.4). One of the original houses, constructed by Robert Coles, still exists at #34 The Place (Coles and Santvoord, 1967:10) and is listed on the National Register of Historic Places (Russell, 1995). The road extended from the site of the saw mill westward across the higher ground overlooking Glen Cove Creek. The Place borders Parcel B to the north. The Coles house is located approximately 250 feet northeast of Parcel B.

In 1677, according to contemporary procedure, Joseph Carpenter and his proprietor partners received a patent for the original purchase from the English Governor of New York, Edward Andros. The so-called "Andros Patent" confirmed the original purchase. With legal confirmation acquired, Carpenter apparently felt secure to invest in his property. Later that year (1677), he constructed a grist mill adjacent to the saw mill (Studenroth, 1992:9). Both mills were apparently successful and contributed to the growth of the Mosquito Cove community. By the 1680's, much of the original purchase had been subdivided by the original proprietors with parcels leased or sold to new arrivals. By that decade the community reportedly consisted of farmers, traders, carpenters, weavers, wool-spinners, saddlers, tailors, tanners, shoe-makers, millers, millwrights, ship builders, coopers, caulkers, and importers (Studenroth, 1992:9). It was a thriving, self-sufficient community.

During the early and mid-eighteenth century, the population of the Mosquito Cove area slowly increased. By the time of the American Revolution, approximately 250 people lived there (Coles and Santvoord, 1967:20). Traders and craftsmen, particularly those associated with the shipping trade, lived and worked in the area around Mosquito Creek. In outlying areas farming, particularly dairying, was the primary occupation (Coles, 1949).

4.2 The Revolutionary War Years

During the American Revolution, most of the inhabitants of the Mosquito Cove area remained loyal to the British Crown (Studenroth, 1992:14; Luke and Venables, 1976). After defeating the Americans at the Battle of Long Island in 1776, the British occupied Long Island until the end of the war in 1783. An armed British vessel was reportedly permanently stationed in Hempstead Harbor usually near the mouth of Mosquito Cove (Studenroth, 1992: 14).

Throughout the war, the Mosquito Cove settlement served as a center of the collection of fire wood for use by British forces in New York. This necessitated British transports frequently coming to the Cove and troops being stationed there. The troops were reportedly Hessians who were quartered on the farm of William Townsend on Duck Pond Road located east of the site (Coles and Santvoord, 1967:20). Local inhabitants suffered greatly due to British requisition of cordwood and other supplies and deprivations caused by American raiders during the so-called period of "whaleboat" warfare (Coles and Russell, 1976:29-31). Although accounts of the Glen Cove area during the Revolutionary War years are limited, a number of incidents are recorded as occurring there. These include the following events:

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- In September of 1778, the houses of William Cock, Jacob Carpenter and John Weeks were robbed by whaleboat men (Coles and Santvoord, 1967:20). These were apparently located along Hempstead Harbor northwest of the site.

- On September 28th, 1779, an American whale boat entered Mosquito Cove in an attempt to steal a boat moored there. The Americans were spotted by local tories who fired at them, killing three, and forcing the remainder to withdraw (Onderdonk, 1846).

- On the night of July 3rd, 1779, American marauders landed near Mosquito Cove and ransacked the homes of 11 Loyalists. All eleven Loyalists were forcibly taken to Connecticut for questioning on British troop movements in the area and held for ransom (Onderdonk, 1846).

- During the fall of 1780, the 17th Regiment of Light Dragoons was stationed in Mosquito Cove (Coles and Santvoord, 1967:20).

After the Revolutionary war, agriculture and small business formed the basis of the Mosquito Cove area economy. Local industry, however, was developing and diversifying with a number of mill operated industries located along Mosquito Creek by the early nineteenth century (Coles and Santvoord, 1967:37). The increase in the economic base is reflected in the increase in population of the Mosquito Cove area which, by the last decade of the century, consisted of about 300 individuals in 32 families (Studenroth, 1992:14)).

4.3 The Nineteenth and Early Twentieth Centuries

Beginning with the second third of the nineteenth century, other industries were founded in the Mosquito Cove area, primarily attracted by the advantageous location of Mosquito Creek which enabled the easy transport of raw materials and finished goods. New companies situated along the creek during this period included construction companies, iron and tinworks, harness and saddle factories, starch works, coal and lumber yards, and blacksmith establishments. The operation of these industries attracted a large group of working class immigrants (Studenroth, 1992:25).

The beginning of scheduled steamboat service to New York City in the early 1830's also attracted

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another class of people, daily commuters, to the area. These commuters were primarily professional people whose presence in the Mosquito Cove area, along with the working class immigrants, began to slowly transform the community into a primarily residential one. In 1834, in order to encourage continued settlement in the community, town leaders changed its name from Mosquito Cove, with all its unpleasant connotations of an insect haven, to Glen Cove (Coles, 1949:47).

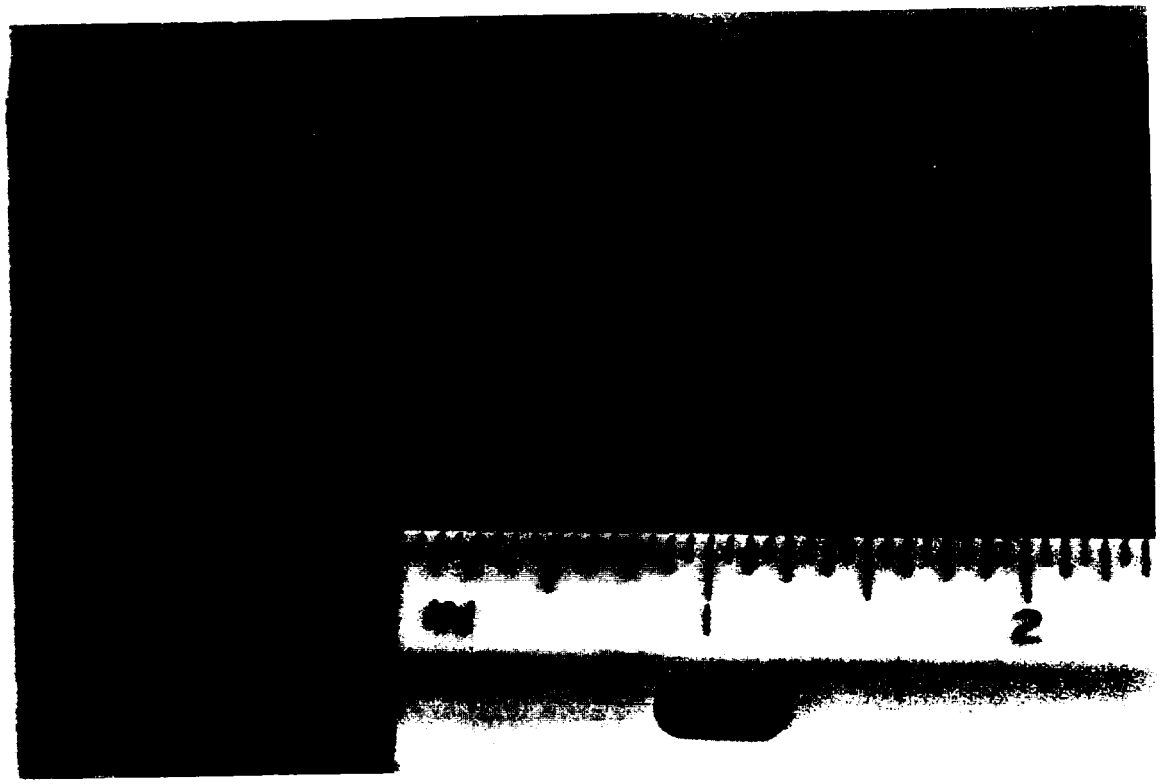
The modern appearance of Glen Cove began with the arrival of the railroad in 1867 which facilitated the daily commute to New York City (Coles, 1949:40). With the coming of the railroad the area again changed in character, becoming more prosperous. Portions of Glen Cove became a summer resort for wealthy New York City residents and other notables and large mansions were built along Hempstead Harbor and in other locations. Some of the wealthy chose to live in the area year round (Coles, 1949:42). By the early twentieth century, Glen Cove became part of the "playground for the wealthy" known as the "Gold Coast" which gained notoriety in the F. Scott Fitgerald novel The Great Gatsby (1925). By that time, Glen Cove had increased in population to approximately 10,000 people. The City of Glen Cove was incorporated in 1917 (Studenroth, 1992:30) to increase the efficiency of government and improve various municipal services.

4.4 History of Site Area

To investigate the history of EuroAmerican land use of the Li Tungsten site, maps showing the pertinent sections of Glen Cove or Nassau County and other documentary sources were consulted. It was determined that on seventeenth century maps the site is located north of the eastern end of Mosquito Creek. On nineteenth and early twentieth century maps the site is located between The Place and Glen Cove Creek. The route of Dickson Lane and Gravies Point Road (also referred to as Barlow Point Road) are also indicated on some of these maps providing points for orientation.

4.4.1 The Late Seventeenth Century

One of the earliest known depictions of the Mosquito Cove area is on the 1670 Ryder Map of Long Island (Figure 9). Only one structure is shown on that map, the saw mill built by Joseph Carpenter (Section 4.1) located at the eastern end of Mosquito Creek. The map, apparently, does not indicated residential structures since, according to Coles (1949:14), houses were built along The Place as early as 1668 (see below).



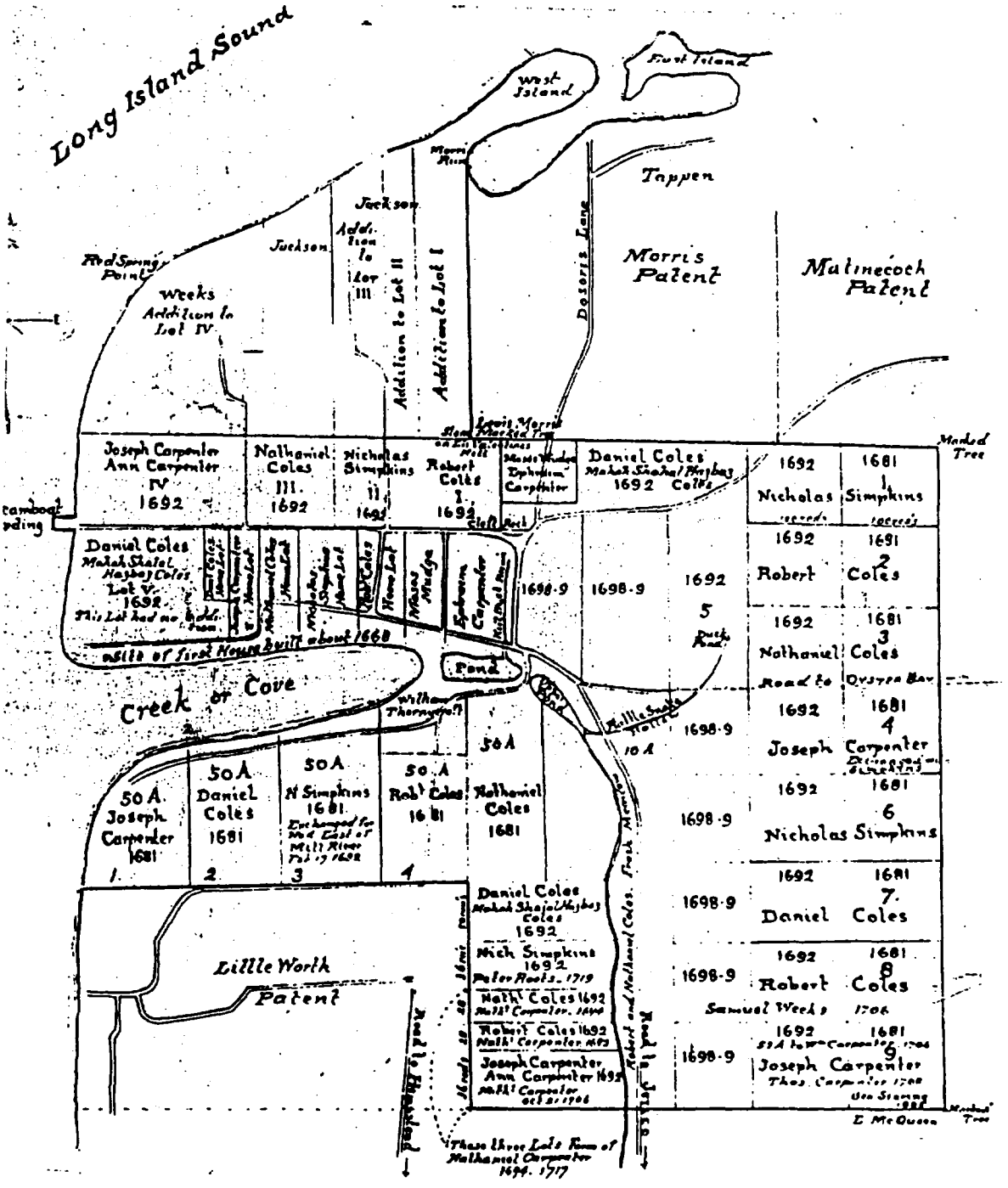
1670 Ryder Map of Long Island
Scale of Original: 9/16th of an inch = 1 mile

Figure 10 is a more detailed map of the Muskitoe (Mosquito) Cove area as of 1677. It was compiled in the late nineteenth century by Isaac Coles (1872) from early settlement records. The homelots for each of the proprietors (as well as the parcel sold to Moses Mudge in 1674 by Joseph Carpenter) are shown as are the routes of The Place and a portion of present day Ellwood Street. The present site is located south of The Place. Although locating the exact parcel boundaries is difficult, it appears that Parcels A and B are situated on land formerly part of the homelots of Nathaniel Coles and Nicholas Simpkins. These lots are situated on the 1677 map north of the eastern end of Glen Cove Creek. Parcels C and C' are located within the former homelot of Joseph Carpenter.

According to Russell (1995) most of the earliest houses in Mosquito Cove were constructed on the north side of The Place. However, at least one house, built by Joseph Carpenter in 1668 and demolished in 1835, was erected south of that roadway. The former house site is now the location of the Avanti Company (Coles, 1949:14) which is located west of Dickson Lane, approximately 100 feet west of Parcel B and the same distance north of Parcel C. Coles (1949:14) states that the former house location is immediately north of land owned by the Wah Chang Trading Corporation (now Parcel C), a predecessor firm to Li Tungsten (see below). Coles and Santvoord (1967:Map 2) indicate the former location of the Carpenter house on a copy of the 1873 Beers Map of Glen Cove (see Figure 13).

Information on the former locations of houses built by Nathaniel Coles and/or Nicholas Simpkins in Mosquito Cove was not found in the sources consulted. It is possible that they were located north of The Place. It is also possible that these individuals never constructed houses on their assigned lots. According to Daniel Russell (1995), some of the original proprietors never occupied their home lots but lived in other locations on Long Island acting as absentee landowners. In any case, it is unlikely that a residence would have been constructed during this period on what is now Parcel B given the proximity of the Carpenter house. However, outbuildings and/or features may have been situated there. Outbuildings and/or features associated with the Carpenter homestead may have been located on Parcel C.

None of the sources consulted suggest that residences or other large buildings were located at this time on what is now Parcel A. This is not surprising, given that much of the area was probably



SOURCE: COLES AND SANTVOORD 1967

LI TUNGSTEN
GLEN COVE, NEW YORK

MALCOLM PIRNIE

MAP OF MOSCHETO COVE PATENT 1677

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wetlands. However, small docks and/or sheds may have been built near Mosquito Creek.

4.4.2 The Eighteenth Century

Examination of the eighteenth century maps available in the collection of the New York City Public Library and other documentary sources indicated that no residential or other substantial structures existed within the site vicinity during this period. It is possible that some small outbuildings associated with the Carpenter farmstead may have been present within what is now Parcel C.

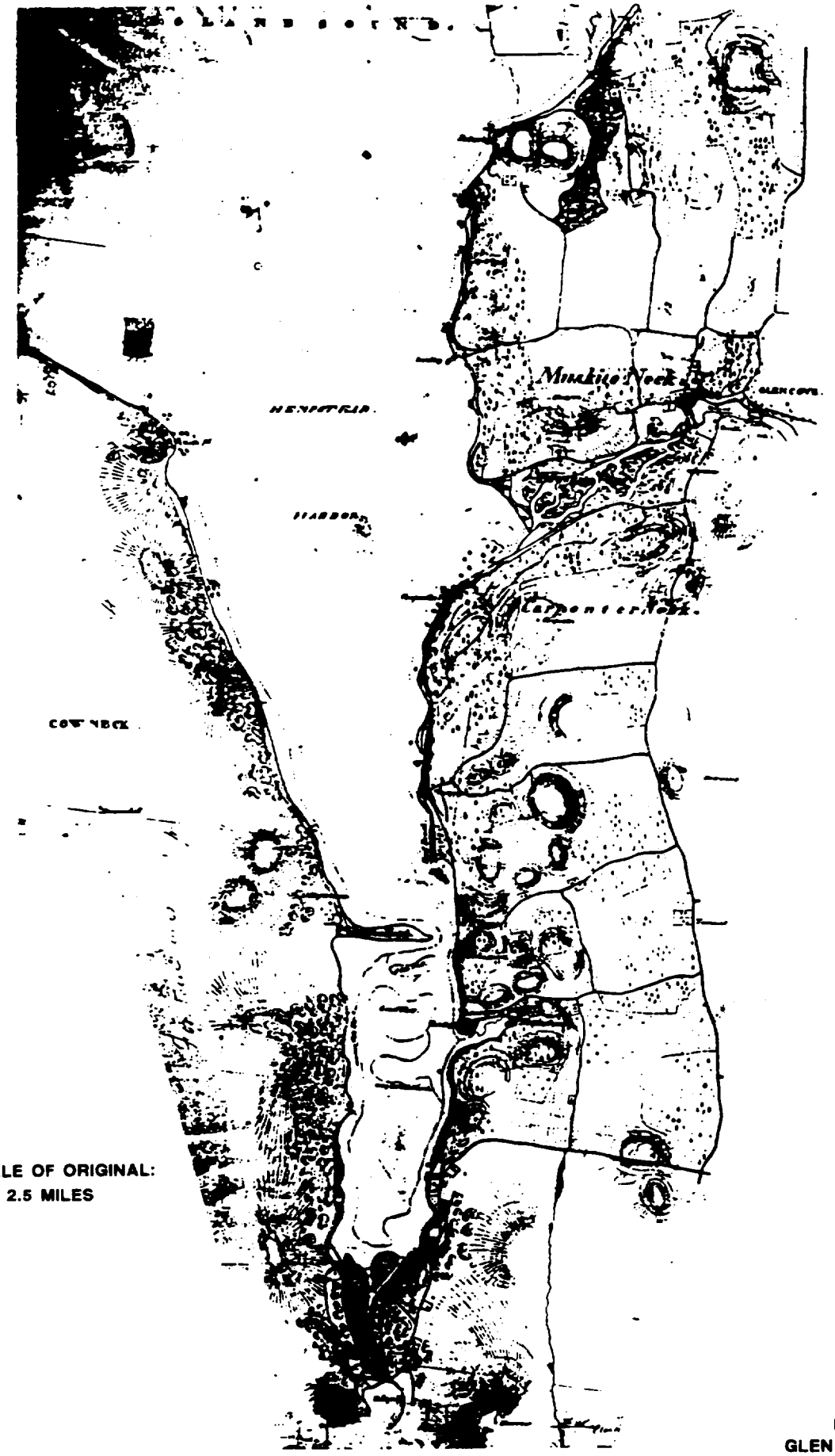
4.4.3 The Mid to Late Nineteenth Century

Beginning in the mid-nineteenth century, fairly detailed maps were drawn which indicate land ownership and land-use on the site. The earliest of these maps is the 1837 United States Coast Survey Map (Figure 11). No structures are indicated in the site vicinity on this map nor is the Carpenter homestead, which was demolished two years previously (1835), shown (Coles, 1949:14).

The first map that indicates the presence of a structure on the site is the 1847 Smith Map. A residence is shown east of Dickson Lane, approximately 650 feet north of the westward turn of what is now Garvies Point Road. This location is now approximately 375 feet north of the intersection of Herb Hill Road and Dickson Lane. The 1847 map is in the collections of the New York Public Library. Unfortunately it is too fragile to be reproduced or photographed. However, the 1859 Walling Map also shows a residence in approximately the same location (Figure 12) and indicates that the house was owned by "R. Dickson." That map also indicates that the area north of the house (which includes the northern portion of Parcel B) was owned by a "Starch Co." No structures are indicated as being located in this area. The referred to starch establishment was the Glen Cove Starch Manufacturing Company, incorporated in 1855. This company was an expansion of a smaller starch manufacturing company owned by Hendrick Vanderbilt Duryea that by the early 1850's was located principally on the Lower Mill Dam (Lower Glen Lake), east of the present site (Cohen, undated:1). The indication that the Starch Company owned the area north of the Dickson house is probably not accurate. By the late 1850's, the Glen Cove Starch Manufacturing Company owned approximately 30 acres of land primarily located towards the eastern end of Glen Cove Creek and along the south shore of that waterway (Cohen, undated:1-2).

The 1859 Walling Map also indicates the presence of the Thorne Lumber Yard immediately north of Glen Cove Creek (Figure 12). No locational or other information is provided on the structures

FIGURE 11



SCALE OF ORIGINAL:
1" = 2.5 MILES

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

1837 UNITED STATES COAST SURVEY MAP

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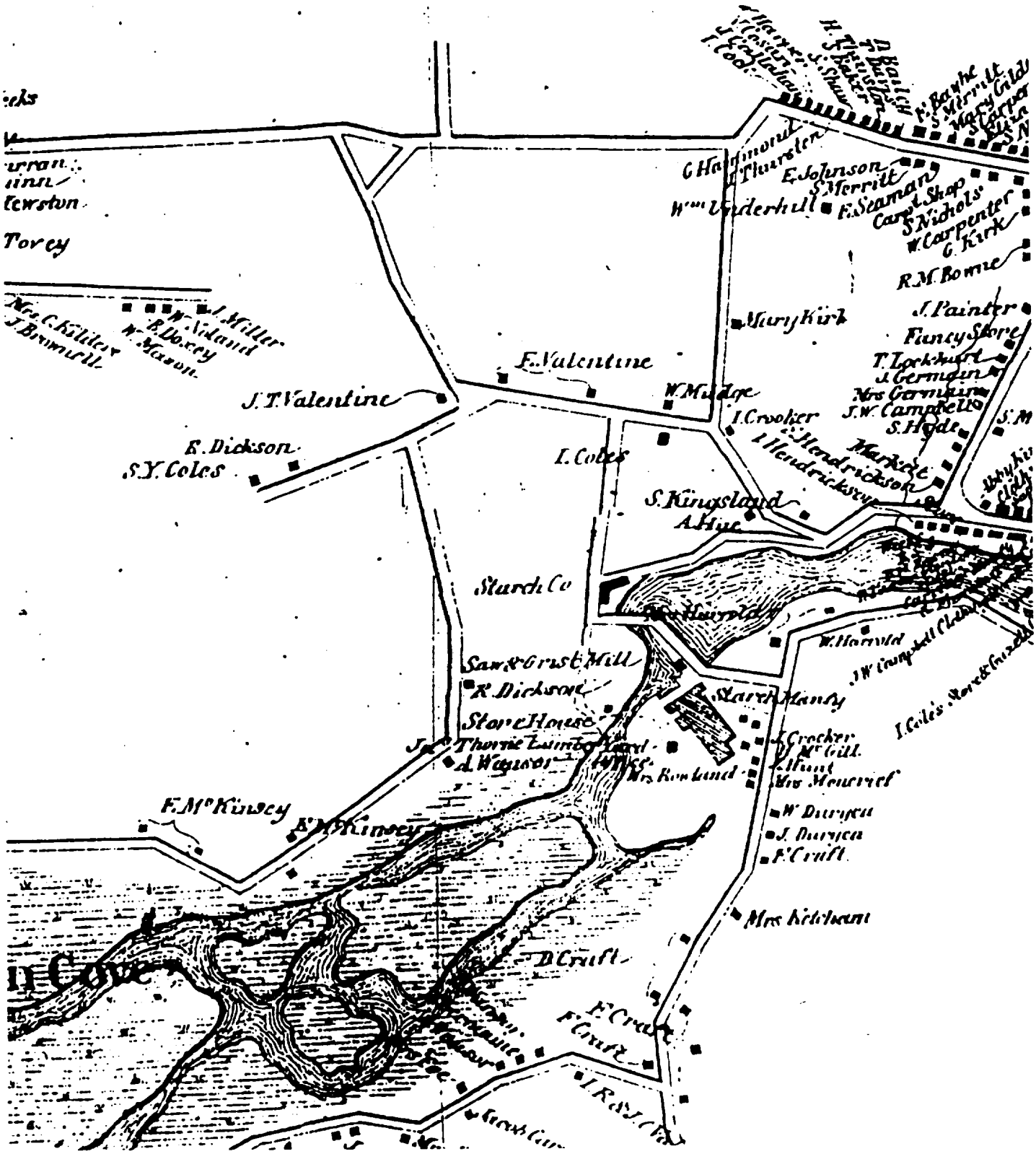
FIGURE 12



SCALE OF ORIGINAL: 1/10,000

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK
1859 WALLING MAP

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associated with that establishment. Based on the 1873 Beers Map (Figure 13), however, the location of the company was determined to be east of Parcel A near present day Charles Street.

On the 1873 Beers Map (Figure 13) a structure is shown as located east of Dickson Lane and owned by "J.D." The structure is probably the same residence which the 1859 Walling Map indicates was owned by R. Dickson. J.D. stands for J. Dickson. who was probably R. Dickson's son (Russell, 1995). J.D. is also indicated on this map as the owner of the property east and west of Dickson Lane. The parcel west of Dickson Lane now includes Parcels C and C' while the parcel east of that roadway now includes Parcels A and B. During this period, much of the property was probably agricultural in nature.

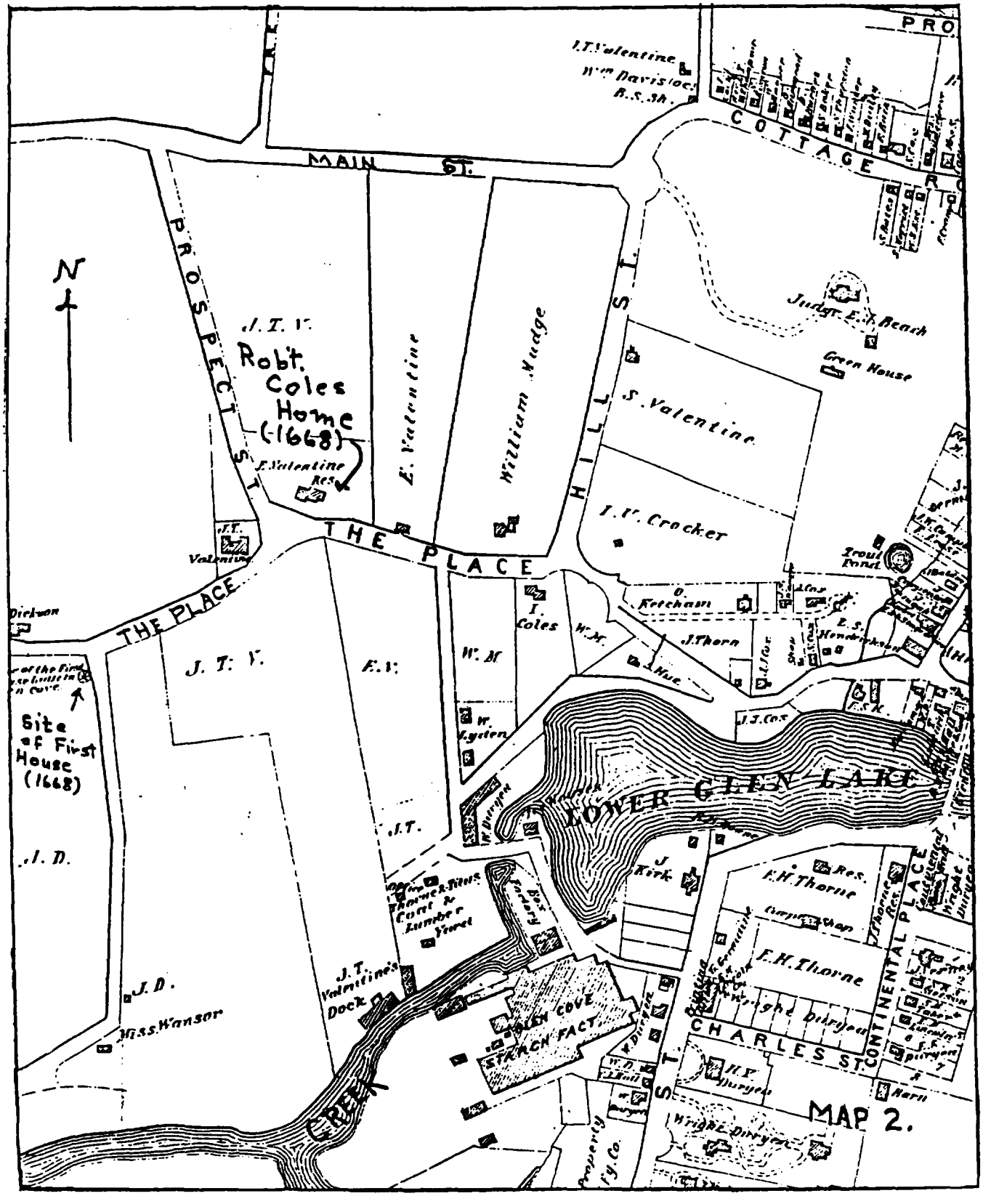
The residence formerly owned by J. Dickson is also indicated on the 1886 Beers Map (Figure 14). Although the scale of the map permits only approximate distance determinations, the indicated house is the only structure present in the area east of Dickson Lane between The Place and Glen Cove Creek. Indication of this structure's ownership is not included on the 1886 map so it was not determined whether J. Dickson or an heir owned the house at this time. All or at least the majority of the site at this time was probably part of the Dickson property.

The 1886 map also indicates the (Glen Cove) Starch Company as located on both sides of Glen Cove Creek in what is now the approximate site vicinity. The map, however, distorts the length of Glen Cove Creek and places the location of the Starch Company too near to the western turn of Garvies Point Road. The indicated length of the creek should be slightly reduced and the location of the Starch Company should be shown closer to Lower Glen Lake.

However, at this time, the Starch Company apparently did own a small amount of land north of the creek. A later map (1902 Sanborn Map; see below) indicates that the land was used primarily for storage purposes and it is probable that the area was used similarly during the 1886 period. It is unclear from the sources consulted exactly where the parcel was located but it was probably situated east of what is now Parcel A.

As indicated by the Beers Map, by 1886 Glen Cove Creek had been straightened and narrowed by artificial filling along both sides of the waterway, particularly the south shore. The filling occurred sometime between 1873 and 1886 and included most, if not all of the original shoreline of Parcel

FIGURE 13



SCALE OF ORIGINAL: 200 RODS = 1"

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

1873 BEERS MAP OF GLEN COVE

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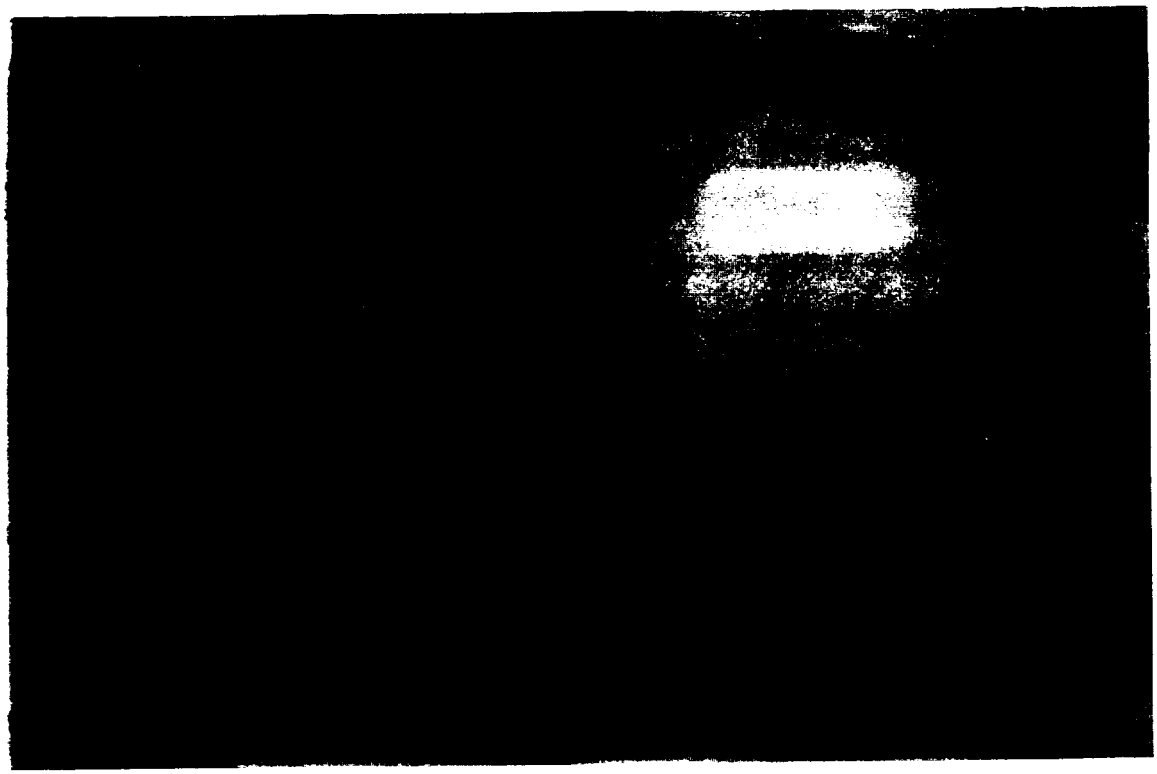


1886 Beers Map
Scale of Original: 700 rods = 1 inch

A. Artificial bulkheads and other sub-surface structures were apparently also constructed during this period to retain the fill and stop the creek from meandering. These activities changed the nature of the creek and the Mosquito Cove area, permitting a new period of industrial development along the shore of the creek.

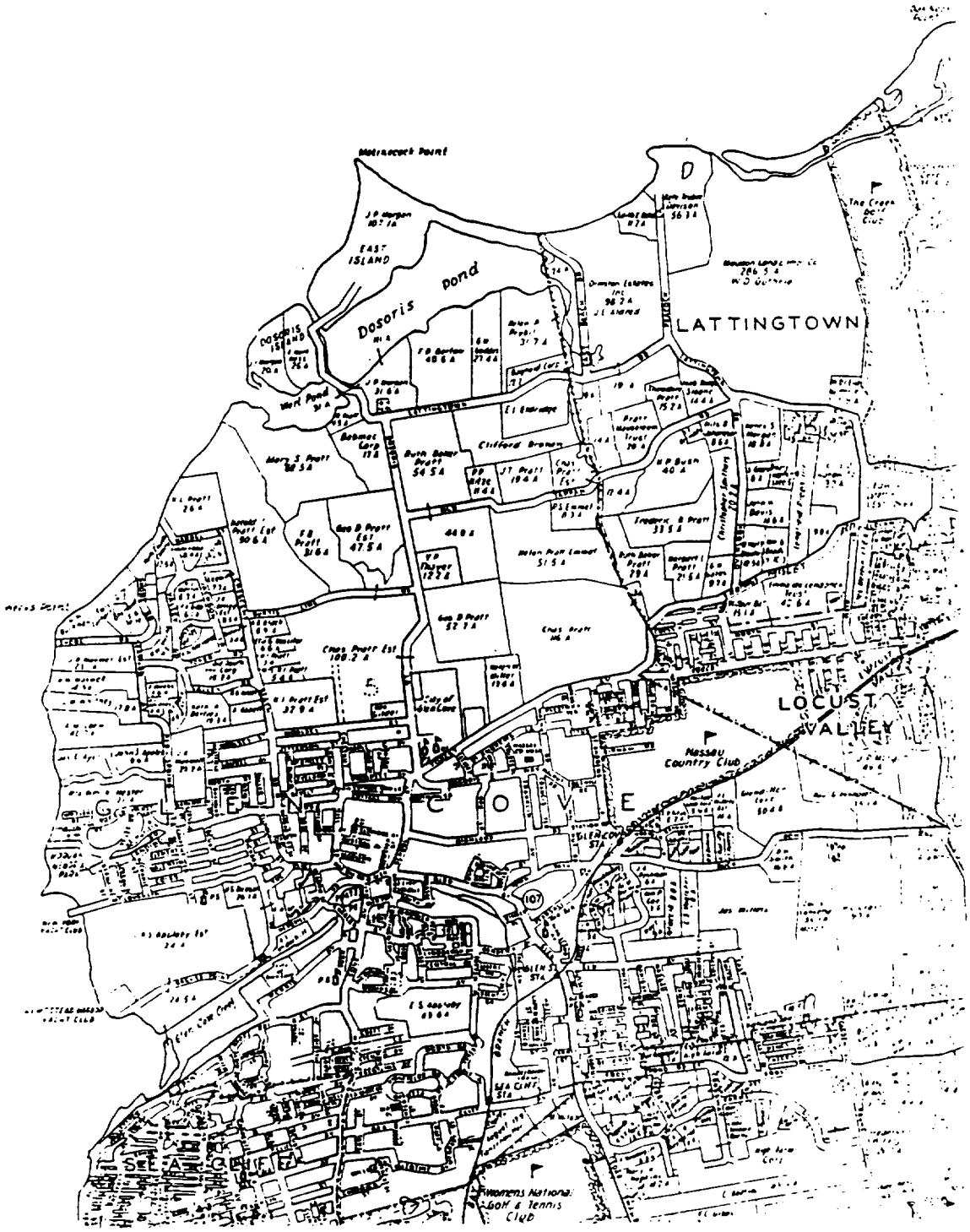
4.4.4 The Twentieth Century

By 1900, Herb Hill Road had been built connecting Charles Street and Garvies Point Road. The roadway extended through the property owned by the Dickson family. As indicated on the 1900 Bailey Map (Figure 15), W.S. (Ward) Dickson apparently retained ownership of the lands between Herb Hill Road and The Place, which now includes Parcel B, and west of Dickson Lane between Garvies Point Road and McLoughin Street, which now includes Parcels C and C'. Residential structures are not indicated on the Bailey Map, but it is assumed that the Dickson residence was at the same location as indicated on the 1859, 1873 and 1886, maps.

The property south of Herb Hill Road formerly owned by the Dickson family, is shown on Bailey map as owned by B.L. Underhill. Underhill reportedly used the property as a commercial coal and lumber yard with an emphasis on nautical products (Russell, 1995). The property appears to include all of what is now Parcel A.

At the turn of the twentieth century, the National Starch Company, the successor company to the Glen Cove Starch Manufacturing Company, apparently still owned a small parcel north of and adjacent to Glen Cove Creek which was used primarily for storage of lumber and other materials (Sanborn, 1902:4). The company moved to Illinois in 1902 and for many years afterward the Company's property remained unused and its buildings deserted (Coles and Santvoord (1967:39). The Starch Company property north of Glen Cove Creek may have included the easternmost end of Parcel A but was probably located further to the east. In any case, the activities conducted there would have been similar to those occurring at the Underhill Coal and Lumber Yard. As indicated on the Bailey Map, by 1900 additional filling had occurred along Glen Cove Creek.

Sometime during the first few years of the twentieth century, the Edwin (or Edward) R. Ladew Leather Belting Company occupied the area that was formerly the Underhill Coal and Lumber Yard. A predecessor firm, the Fayerweather and Ladew Leather Company was located north of Glen Cove Creek but east of the site area in the 1890's (Studenroth, 1992:35). Both companies



NO SCALE

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK
1900 BAILEY MAP

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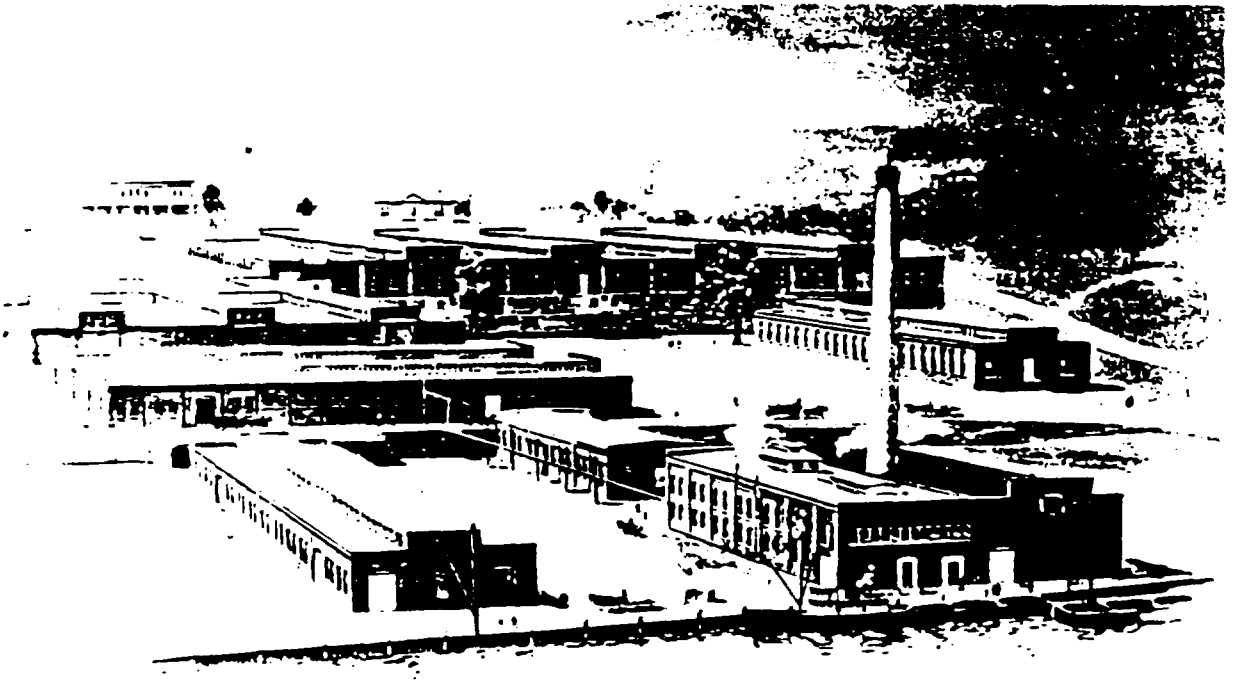
primarily made industrial belts and pulleys for power transmission and also engaged in fine, decorative leather working on a small scale. Fayerweather and Ladew was owned, wholly or in part, by Edwin Ladew's father, a prominent New York City tanner and leather merchant. In addition to the Glen Cove facility, the company owned tanneries and belting works in several southern states and New York City. Sometime prior to 1903, Edwin succeeded to the ownership of the Fayereather and Ladew Company. In that year, a fire partially destroyed the New York City factory. The younger Ladew apparently decided to expand the Glen Cove facility and in 1905 he reincorporated Fayereather and Ladew as the Edwin R. Ladew Belting Company. It was at that time that the Glen Cove facility was probably expanded and occupied most, if not all, of the area that is now Parcel A. The company never owned or occupied what are now Parcels B and C. The Ladew Leather Belting Company remained in existence until the late 1920's when the depression apparently forced its closure (Russell, 1995).

As part of this study, the Sanborn Insurance Maps of Glen Cove for the years 1893, 1902 1908, 1920, and 1925 were reviewed. The area covered by these maps did not include what is now Parcel A. The portion of the Ladew Leather Belting Company in the vicinity of Charles Street is shown on the twentieth century Sanborn Maps. Other than a general view of the Ladew works during its later period of operation (Figure 16), no detailed plans or other records of the company were found during the documentary research. As a result, the exact number and location of Ladew Company buildings that were present during the early twentieth century within what is now Parcel A was not determined.

The structure containing the smokestack and the building to its left in Figure 16 are probably the same buildings depicted on the 1906 Hyde Map (Figure 17) immediately north of Glen Cove Creek and west of the Titus Lumber and Coal Yard. The map indicates that the buildings are owned by E.R. Ladew. The location of these buildings is east of the present site. The westernmost building is identified on the 1906 map as an "Engine House" which appropriately would have a smokestack.

According to Russell (1995), a few of the existing structures within Parcel A were associated with the early twentieth century Ladew works. Based on the site reconnaissance, the frame structures located in the northeastern portion of Parcel A appear to date to the turn of the century period and may have been part of the Ladew company buildings (Photograph #3 and #16). The other structures within Parcel A appear to be of later construction. However, some may have been



SOURCE: STUDENROTH 1992

LI TUNGSTEN
GLEN COVE, NEW YORK

PARTIAL VIEW OF THE EDWARD R. LADEW LEATHER BELTING WORKS

MALCOLM PIRNIE

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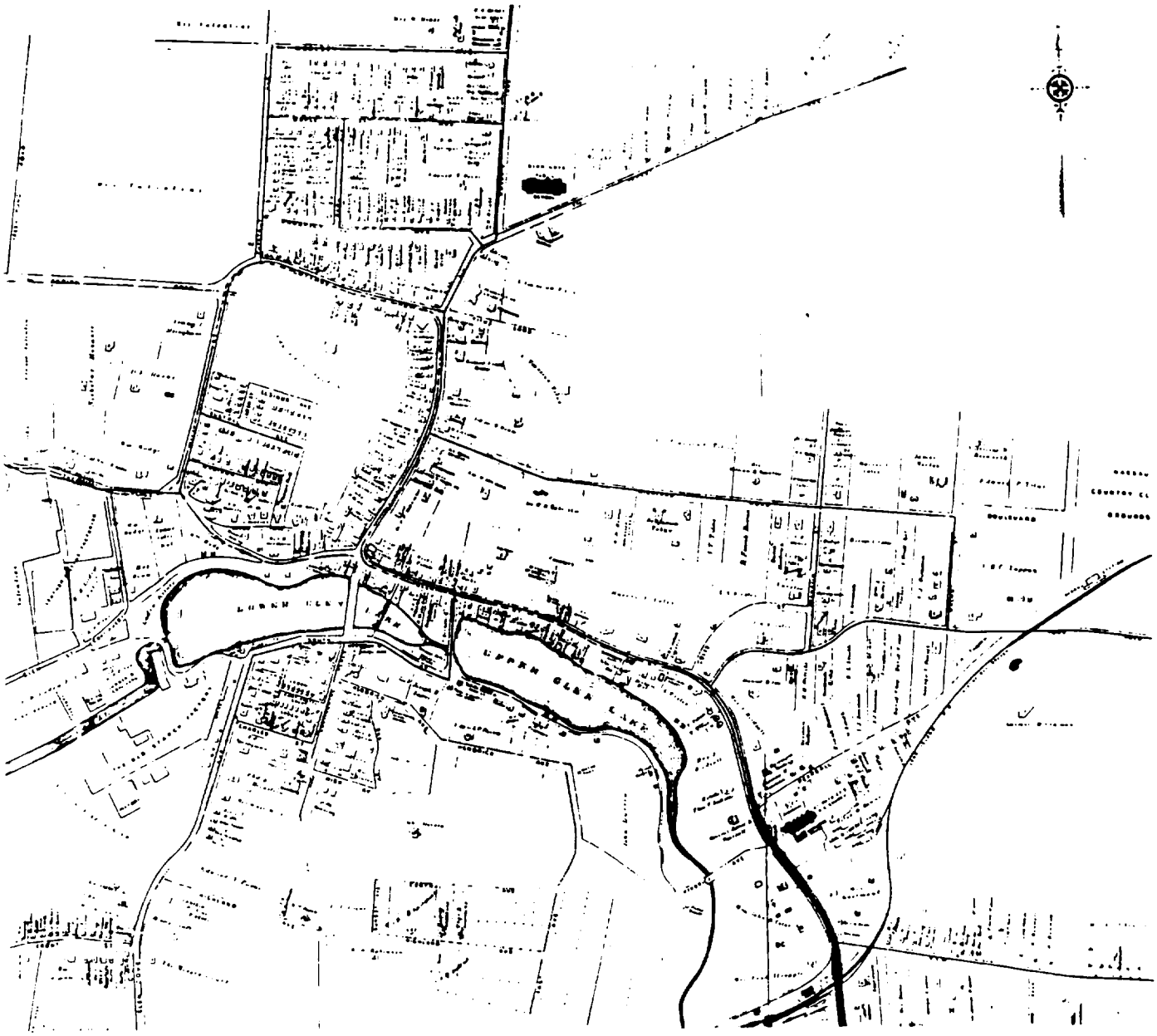
FIGURE 17



NO SCALE

MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

1906 HYDE MAP OF GLEN COVE

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modified during the period the Wah Chang Trading Corporation (see below) owned the site and actual date to the Ladew Company period.

By the early 1940's title to the (former) Dickson property and portions of the Ladew property had been acquired by Mr. Kuo Ching Li and the National Reconditioning Corporation. By 1942, a tungsten processing facility had been constructed on parts of the acquired land and operations began. The company changed name in 1948 to the Wah Chang Smelting and Refining Corporation. In 1964, the tungsten facility was leased to and operated by the Wah Chang Trading Corporation of New York, also a Kuo Ching Li enterprise. Teledyne Corporation merged with Wah Chang Trading in the late 1960's forming the Teledyne-Wah Chang Corporation which managed and operated the facility until 1972. In that year, the Wah Chang Smelting and Refining Corporation formed a wholly owned subsidiary, the Li Tungsten Corporation, which operated the facility until it filed for bankruptcy in 1985.

Numerous buildings and other structures were constructed on the Li Tungsten site during the operation of the facility causing extensive ground disturbance (Figure 3 and Photograph #1). In addition, surficial evidence indicates the presence, particularly in Parcel A, of an extensive network of underground piping and utilities.

5.0 ASSESSMENT OF THE ARCHAEOLOGICAL SENSITIVITY

5.1 General Considerations

The reported presence of Native American sites and activity in the vicinity of the Li Tungsten site area and the other sites noted in Section 3.3 indicate that in general the vicinity of the project witnessed extensive Native American occupation and utilization. Summarizing the potential of the Mosquito Cove vicinity for Native American sites, Salwen (1968:322) states that:

> *The Musketta Cove vicinity was evidently an ideal one from the aboriginal point of view. The creek and connecting waterways offered a wide variety of fish and shellfish resources and the wooded hills provided land flora and fauna as well as shelter from the winds blowing off Long Island Sound. As might be expected, the area yielded evidence of a number of prehistoric culture complexes.*

A request was made to the staff of the New York State Museum to assess the overall sensitivity of the site area based on the nature of the terrain. Their evaluation was that the site had a "high probability of producing prehistoric archaeological data" (Appendix A). They base their evaluation on the fact that:

- A recorded site(s) is(are) indicated in, adjacent to, or in the vicinity of the location and we have reason to believe it (they) could be impacted by the proposed activity.

- The terrain in the location is similar to terrain in the general vicinity where recorded archaeological sites are indicated.

- The physiographic characteristics of the location suggest a high probability of prehistoric occupation or use.

The prehistoric period sensitivity of the area that now includes Parcel B, in particular, is illustrated by Coles (1949). Referring to the area of the seventeenth century homelots on The Place, immediately north of Parcel B, Coles (1949:15) states that:

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Within a stone's throw of these home sites may be found to this day the discarded shells of clams, oysters and scallops left by the Indians near their ancient wigwams. Among these shells are found implements of stone, bone and antler, fragments of Indian pottery and the ashes of the camp fires over which they prepared their feasts some three centuries ago.

The extensive use of the area by Native Americans is not surprising given the area's formerly favorable topography and physiography (higher ground and bench-like terraces overlooking Mosquito Creek and the surrounding wetlands) and the resulting subsistence potential of the area (fish and shellfish in Mosquito Creek; waterfowl, other game, economic plants associated with the surrounding marshland). Areas on the Li Tungsten site having these characteristics would have been excellent locations for temporary or semi-permanent camps oriented towards the exploitation of marine and wetland subsistence resources.

Bench-like terraces overlooking Glen Cove Creek and the former adjoining wetlands still exist on Parcel B and previously existed on Parcel C. Although Parcel A formerly consisted primarily of wetlands, localized areas of raised ground, similar to the location of Muskeeta Cove Station 3, may have existed there.

On historic period domestic and industrial sites, archaeological deposits can exist in the form of surficial middins, which represent refuse discarded during residential occupations prior to the institution of refuse collection. Such surficial deposits would tend to be preserved where ground surfaces were covered by the deposition of subsequent landfill. Historic period artifact deposits are also typically found in subsurface features such as wells, cisterns, and privies. The artifacts could have been accidently deposited during the period of use of the feature. In addition, such features were often used to dispose of refuse after their period of primary use. This period ended either when new features were constructed, or when the use of such features became unnecessary (i.e., after the introduction of public water and sewage services). Features as well as midden deposits are typically found to the rear of residential structures. On industrial period sites, structural features and machinery remnants can be of significance.

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Part of what is now Parcel A is artificially created land, filled during the late nineteenth century and may constitute an archaeological resource. Landscape modification in the late nineteenth century is a record of land development to support an increasing population and a society undergoing a major change as a result of the industrial revolution. The ability to modify land during this period, including the transport of large amounts of material to fill coves and shorelines became common technological accomplishments (Rutsch and others, 1978).

Landfill may be a source of artifact deposits. This is the case where such fill incorporates refuse. Important cultural/historical information can be obtained from such deposits where inferences can be made as to the source of the landfill. In some cases landfill excavations have uncovered landfill retaining structures (e.g. bulkheads, wharves) which have provided information pertaining to the history of landfilling technology.

5.2 Architectural Sensitivity

Most of the buildings on the Li Tunsgten site were erected since the early 1940's. The only buildings on the site that have any potential for architectural significance are those on Parcel A that were associated with the early twentieth century Ladew Belting Company. All of the existing buildings and facilities within Parcel C appear to date to the Li Tungsten occupation. None are considered to have potential significance. No buildings exist on Parcel B.

Documented historic period activity occurred in the vicinity of the site during the late seventeenth century. At least one house, built by Joseph Carpenter, was located immediately north of Parcel C and across Dickson Lane from Parcel B. Another dwelling may have been located north of Parcel B on the north side of The Place. Other historic period resources present within what is now Parcel B could be associated with the mid to late nineteenth century Dickson residence formerly located east of Dickson Lane. Architectural remains, features, or deposits associated with the occupation of these structures may still exit.

5.3 Archaeological Sensitivity

<u>Parcel A</u>

Parcel A is the most intensively developed portion of the Li Tungsten site. Most of the parcel has been extensively disturbed as a result of twentieth century construction activities, particularly activities associated with the operation of the Li Tungsten facility. Although Parcel A may formerly

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have been the location of a Native American site or sites, it is unlikely that such locales would remain undisturbed. More suitable locations for Native American occupation (and more likely locations for intact sites) would be areas of higher elevation located further to the north (Parcels B and C).

Parcel A was also the former location of the early twentieth century Ladew Belting Company. Construction associated with the operation of the Li Tungsten facility most likely would have affected any subsurface remains associated with the belting company. Some of the existing Li Tungsten structures, however, may have been originally associated with the Ladew Belting Company. Some may retain architectural integrity and may be of historic and/or architectural value. None of the existing buildings dating to the Li Tungsten period are considered to have potential significance.

The shoreline within Parcel A was apparently filled sometime between 1873 and 1886. During the site reconnaissance, a filled section along the Glen Cove shoreline was observed in an erosional cut behind the bulkhead (Photograph #17). Historic period bottles and other artifacts were observed in the eroded face of the cut and what appeared to be part of a fill retaining structure was visible at the base of the cut. Conditions were too unsafe to permit sampling of the noted artifacts.

Due to its potential to provide technological information related to the landfilling operations along Glen Cove Creek during the late nineteenth century and cultural/historical information on the Glen Cove community during that period, the artificially created land adjacent to Glen Cove Creek within Parcel A is considered to be a possible historic period archaeological resource. The distance that artificially created land extends northward from the creek is unknown.

Parcel B

The environmental characteristics of Parcel B are similar to those of known sites within the Glen Cove drainage. This plus the fact that aboriginal artifacts have been recovered within a few hundred feet of the northern portion of the parcel strongly suggests that Native American activity would have occurred there.

Historic period resources possibly present within Parcel B may be associated with the mid to late nineteenth century Dickson house and/or associated outbuildings. Such resources may include

buried architectural remains, archaeological features (i.e. wells, privies, cisterns) and/or archaeological deposits. Other historic period resources possibly present within Parcel B may be associated with the occupations of the Carpenter house and/or the dwellings located north of The Place.

Parcel B is the least developed portion of the site. Except in the central portion of the parcel where excavation activities are known to have occurred, and along the routes of the drainage ditches, ground disturbance within Parcel B appears to be limited. Even within the graded former parking area in the southern portion of the parcel, truncated prehistoric period and/or historic period features may remain. The lack of extensive disturbance within the remaining portions of Parcel B suggests that archaeological sites could be present. Accordingly, undisturbed portions of the area are considered sensitive for the possible presence of archaeological resources.

Parcel C (including C')

The environmental characteristics of Parcel C were formerly similar to those of known sites within the Glen Cove drainage. This plus the fact that aboriginal artifacts have been recovered within a few hundred feet of the northern portion of the Parcel strongly suggests that Native American activity would have occurred there.

Historic period resources possibly present at some point within Parcel C may have been associated with the occupations of the Carpenter and/or Dickson house. The distance of the reported locations of these dwellings, however, is great enough to make the presence of domestic features and/or deposits within this parcel unlikely. Such archaeological resources are usually found in close proximity to an associated dwelling. However, farm structures or other outbuildings associated with either residence may have been located within what are now Parcel C or C'. Architectural remains, archaeological features, and/or archaeological deposits associated with activities that occurred at those structures may formerly have been present.

The extent of ground disturbance within Parcel C associated with construction activities related to the operation of the Li Tungsten facility is extensive enough to render the presence of intact archaeological resources unlikely. Standing buildings and other facilities as well as indications of underground utilities, piping, and tanks occupy most of the area. Evidence of ground disturbance (i.e. disturbed earth, indications of underground utilities/facilities) in the vegetated areas located

in the center and northern end of Parcel C is also apparent. It is therefore considered unlikely that undisturbed archaeological resources are located within Parcel C.

6.0 CONCLUSIONS AND RECOMMENDATIONS

6.1 Summary

The results of the research and analysis conducted for this Stage Ia Archaeological Survey indicate the following:

- Some of the existing structures within Parcel A may be associated with the early twentieth century Ladew Belting Company and may possess architectural and/or historical value;

- Parcel B is sensitive for the presence of possibly significant prehistoric period and historic period archaeological resources; and

- The artificially filled area behind the bulkhead along Glen Cove Creek (Parcel A) may possibly constitute an historic period cultural resource.

It is unlikely that any work related to the IRAs (which is non-intrusive), or the intrusive work to be conducted during the RI (i.e., soil borings, test pits), will disturb or destroy any possibly significant cultural or architectural resources. The buildings that will be affected during restaging of the tungsten ore during the IRA (i.e., Dice Warehouse on Parcel A and the Dickson Warehouse on Parcel C) were built after the Li Tungsten facility opened in the early 1940's. The Dice Warehouse building on Parcel A was not part of the Ladew Leather Belting Company buildings and, therefore, is not considered to have potential architectural or historical significance.

6.2 Recommendations for Additional Work

If it is determined at the completion of the RI/FS that remedial construction activities resulting in extensive ground disturbance are necessary, it is recommended that a Stage IB Survey (i.e., subsurface testing) be conducted in the archaeologically sensitive areas that will be disturbed as a result of those activities. Subsurface testing will determine whether any possibly significant archaeological resources are present within those areas.

<u>Parcel A</u>

If it is determined, after completion of the IRA or the RI/FS, that the demolition of structures

within Parcel A may be necessary, an architectural evaluation of the standing structures should be conducted by an architectural historian prior to those activities. The architectural survey should particularly attempt to identify and preliminarily evaluate the significance of buildings that may have been associated with the Ladew Belting Company.

The general scope of a subsurface investigation on Parcel A, prior to any large scale excavation, should consist of a program of mechanical testing employing a standard tractor mounted backhoe within the artificially filled areas along Glen Cove Creek (Figure 18). Mechanical testing should investigate whether artifact deposits or fill retaining structures are present within any fill areas that are to be affected by remedial construction activities. If deposits or fill retaining structures/features are encountered they should be archaeologically investigated to the extent necessary to determine whether additional study is warranted.

Parcel B

To adequately test for the presence of prehistoric and or historic period deposits and/or features within the undisturbed portions of Parcel B, a two phase testing program consisting of shovel testing and mechanized excavations should be completed. The general scope of that testing is discussed below.

The initial phase of testing should consist of the excavation of shovel tests to determine whether prehistoric resources are present. These tests should be conducted using standard archaeological techniques and located at 50 or 100 foot intervals in the undisturbed portions of Parcel B and the former parking lot area (Figure 18). These tests will also indicate whether historic period resources (particularly resources dating to the period of earliest EuroAmerican settlement in Glen Cove) are present in the portion of Parcel B that borders The Place.

Shovel tests should also be conducted in the vicinity of the former location of the Dickson house to determine if midden deposits are present (Figure 18). Shovel tests should be excavated at approximately 25 foot intervals in this area. If a shovel test encounters evidence of prehistoric or historic period activity that is considered to be of possible archaeological value, additional tests should be excavated in the immediately surrounding area to further investigate that location.

The second phase of testing in Parcel B should consist of the utilization of power equipment (i.e.

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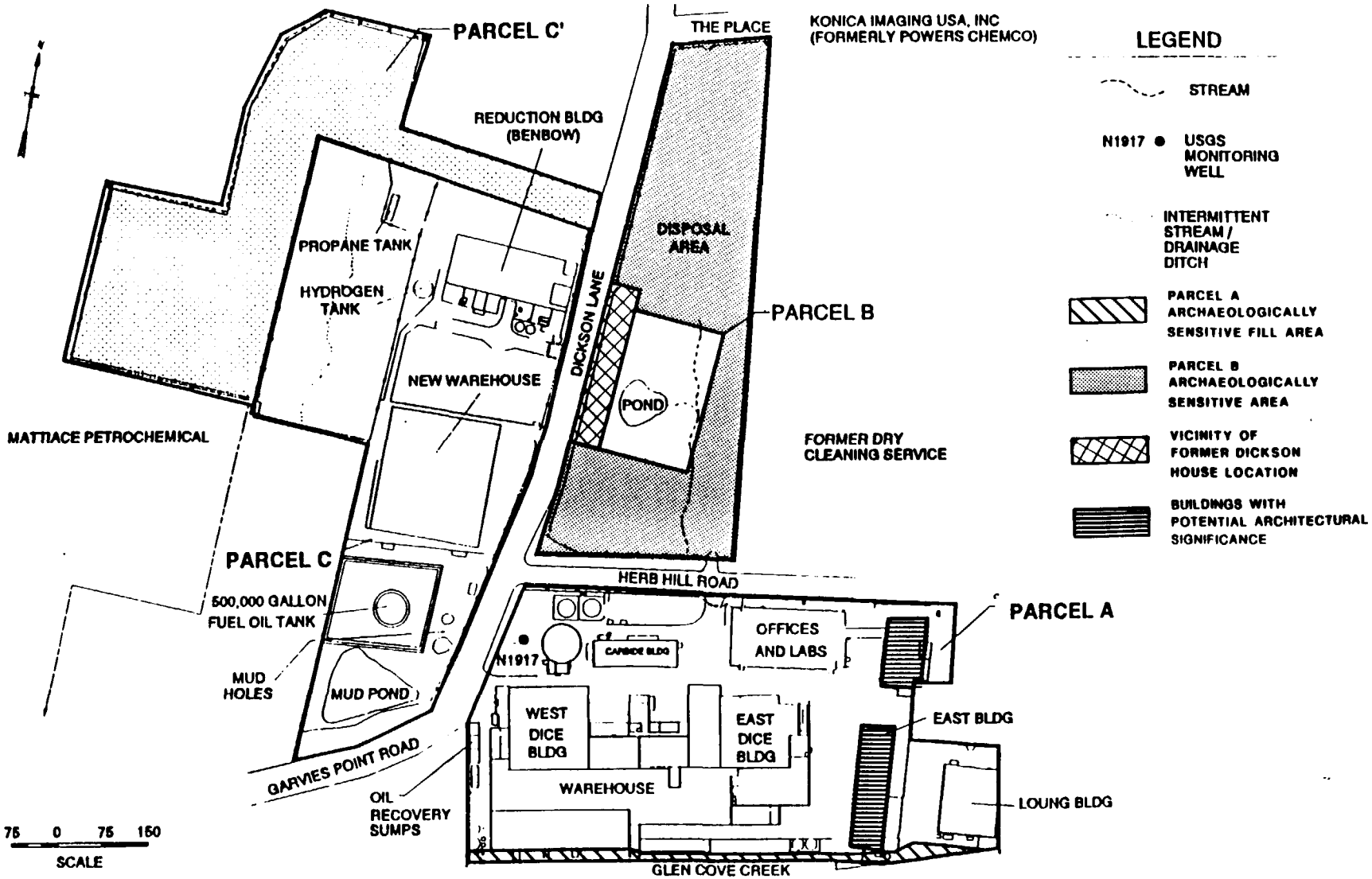

LI TUNGSTEN
GLEN COVE, NEW YORK

ARCHAEOLOGICALLY SENSITIVE LOCATIONS WITHIN THE LI TUNGSTEN PROJECT SITE

FIGURE 18

MALCOLM PIRNIE

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a standard tractor mounted backhoe) in the vicinity of the former location of the Dickson house in the areas where shovel testing did not detect midden deposits. The backhoe should remove topsoil and other soil strata present to the extent necessary to expose remains of any historic period sub-surface features which may be present. If warranted, encountered features will be tested only so far as is necessary to determine whether artifact deposits are, in fact, present. Further evaluation of such deposits would be undertaken during future phases of work.

If prehistoric material is recovered from the former parking lot area during shovel testing, additional testing should be conducted using power equipment. The backhoe should removed the upper soil layers (strip the surface) in those areas to determine whether any truncated archaeological features are present. If evidence of historic period resources are encountered during shovel testing in the northern portion of Parcel B (in the vicinity of The Place), backhoe testing should be conducted there to investigate for the presence of historic period features. The methodology employed in the conduct of this work would be the same as that employed during mechanized investigation of the Dickson house site.

Parcel C

No additional archaeological investigations are recommended for Parcel C.

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APPENDIX A

NEW YORK STATE MUSEUM RESPONSE TO INFORMATION REQUEST

NEW YORK STATE MUSEUM

3122 Cultural Education Center
Albany, NY 12230
518/474-5813 FAX 518/473-8496

Anthropological Survey

DATE: 1/17/95

To:
EUGENE BOESCH
MALCOLM-PIRNIE, INC.
377 BARRETT HILL ROAD
MAHOPAC, NY 10541

Proposed Project: LITUNGSTEN, GLEN COVE
7.5' U.S.G.S. Quad: SEACLIFF

In response to your request our staff has conducted a search of our data files* for locations and descriptions of prehistoric archaeological sites within the area indicated above. The results of the search are given below.
If specific information requested has not been provided by this letter, it is likely that we are not able to provide it at this time, either because of staff limitations or policy regarding disclosure of archaeological site data.

Questions regarding this reply can be directed to the site file manager, at (518) 474-5813 or the above address. Please refer to the N.Y.S.M. site identification numbers when requesting additional information.

Please resubmit this request if action is taken more than one year after your initial information request.

*[NOTE: Our files normally do not contain historic archeological sites or architectural properties. For information on these types of sites as well as prehistoric sites not listed in the N.Y.S.M. files contact The State Historic Preservation Office; Office of Parks, Recreation & Historic Preservation; Agency Building #1; Empire State Plaza; Albany,NY,12238 at (518) 474-0479.

RESULTS OF THE FILE SEARCH:

Recorded sites ARE located in or within one mile of the project area. If so, see attached list.

Code "ACP" = sites reported by Arthur C. Parker in The Archeology Of New York, 1922, as transcribed from his unpublished maps.

SEARCH CONDUCTED BY: BW (initials) Anthropological Survey, NYS Museum

cc: N.Y.S. OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION; HISTORIC PRESERVATION FIELD SERVICES BUREAU

301854

1/17/95 To: EUGENE BOESCH, MALCOLM-PIRNIE, INC.

Project: LITUNGSTEN, GLEN COVE Topo. Maps: SEACLIFF
BW (initials) Anthropological Survey, NYSM

New York State Museum Prehistoric Archaeological Site Files
EVALUATION OF ARCHAEOLOGICAL SENSITIVITY FOR PREHISTORIC (NATIVE AMERICAN) SITES
Examination of the data suggests that the location indicated has the following sensitivity rating:

HIGH PROBABILITY OF PRODUCING PREHISTORIC ARCHAEOLOGICAL DATA.

The reasons for this finding are given below:

[✓] A RECORDED SITE(S) IS(ARE) INDICATED IN, ADJACENT TO, OR IN THE VICINITY OF THE LOCATION AND WE HAVE REASON TO BELIEVE IT(THEY) COULD BE IMPACTED BY THE PROPOSED ACTIVITY.

[ ] A RECORDED SITE IS INDICATED IN THE GENERAL VICINITY OR SOME DISTANCE AWAY. DUE TO THE MARGIN OF ERROR IN THE LOCATION DATA IT IS POSSIBLE THE SITE ACTUALLY EXISTS IN OR IMMEDIATELY ADJACENT TO THE LOCATION.

[✓] THE TERRAIN IN THE LOCATION IS SIMILAR TO TERRAIN IN THE GENERAL VICINITY WHERE RECORDED ARCHAEOLOGICAL SITES ARE INDICATED.

[✓] THE PHYSIOGRAPHIC CHARACTERISTICS OF THE LOCATION SUGGEST A HIGH PROBABILITY OF PREHISTORIC OCCUPATION OR USE.

[ ] THE PHYSIOGRAPHIC CHARACTERISTICS OF THE LOCATION SUGGEST A MEDIUM PROBABILITY OF PREHISTORIC OCCUPATION OR USE.

[ ] THE PHYSIOGRAPHIC CHARACTERISTICS OF THE LOCATION SUGGEST A LOW PROBABILITY OF PREHISTORIC OCCUPATION OR USE.

[ ] EVIDENCE OF CULTURAL OR NATURAL DESTRUCTIVE IMPACTS SUGGESTS A LOSS OF ORIGINAL CULTURAL DEPOSITS IN THIS LOCATION.

[ ] THE PHYSIOGRAPHIC CHARACTERISTICS OF THE LOCATION ARE MIXED, A HIGHER THAN AVERAGE PROBABILITY OF PREHISTORIC OCCUPATION OR USE IS SUGGESTED FOR AREAS IN THE VICINITY OF EITHER PRESENT OR PREEXISTING BODIES OF WATER, WATERWAYS, OR SWAMPS. A HIGHER THAN AVERAGE PROBABILITY IS SUGGESTED FOR ROCK FACES WHICH AFFORD SHELTER OR FOR AREAS SHELTERED BY BLUFFS OR HILLS. AREAS IN THE VICINITY OF CHERT DEPOSITS HAVE A HIGHER THAN AVERAGE PROBABILITY OF USE. DISTINCTIVE HILLS OR LOW RIDGES HAVE AN AVERAGE PROBABILITY OF USE AS A BURYING GROUND. LOW PROBABILITY IS SUGGESTED FOR AREAS OF EROSIONAL STEEP SLOPE.

[ ] PROBABILITY RATING IS BASED ON THE ASSUMED PRESENCE OF INTACT ORIGINAL DEPOSITS, POSSIBILITY UNDER FILL, IN THE AREA. IF NEAR WATER OR IF DEEPLY BURIED, MATERIALS MAY OCCUR SUBMERGED BELOW THE WATER TABLE.

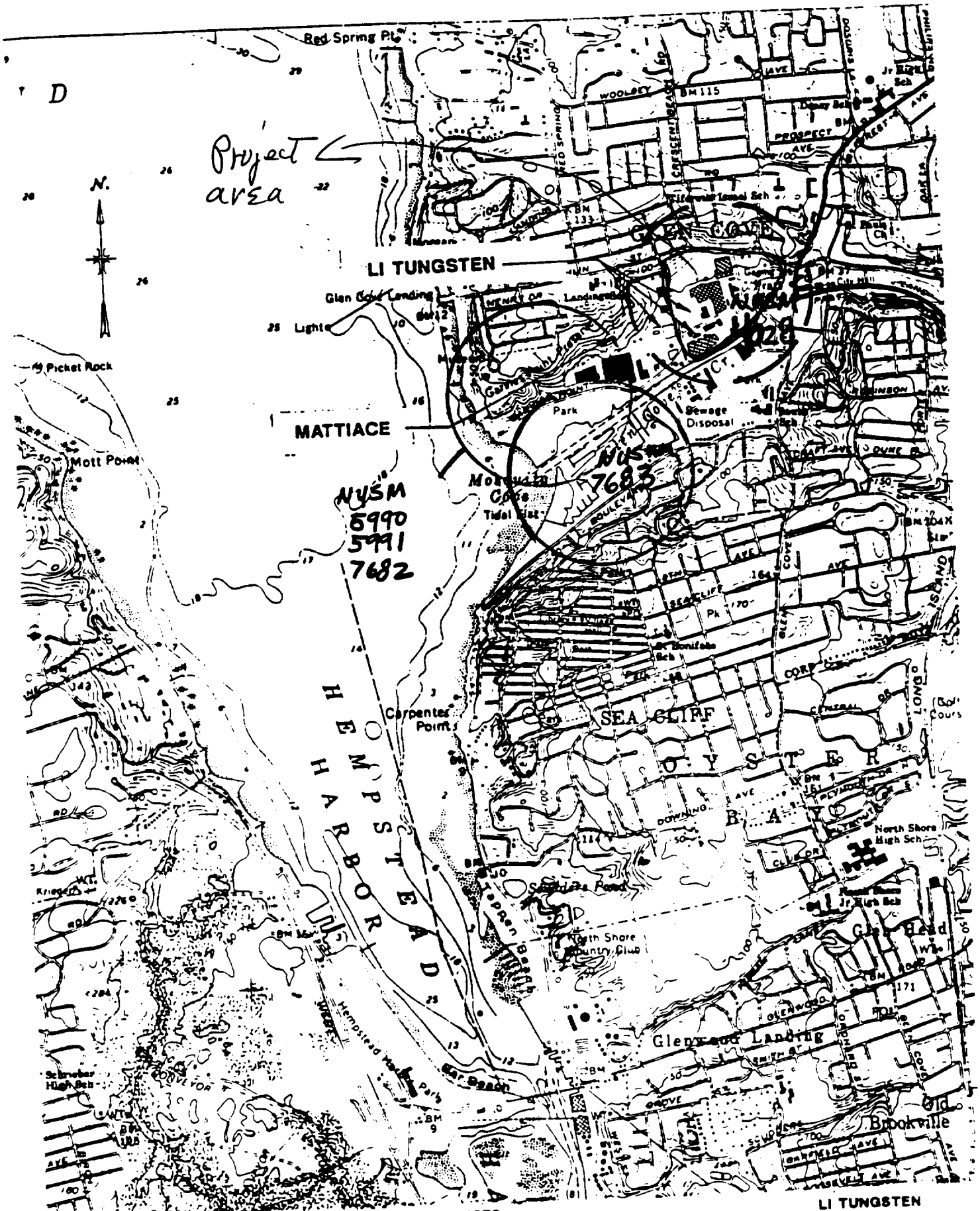
[ ] INFORMATION ON OTHER SITES MAY BE AVAILABLE IN A REGIONAL INVENTORY MAINTAINED AT THE FOLLOWING LOCATION(S).

COMMENTS:

cc: N.Y.S. OFFICE OF PARKS, RECREATION AND HISTORIC PRESERVATION; H. P. FIELD SERVICES BUREAU

301855

FIGURE 2-2



SOURCE: USGS MAP SEA CLIFF, NEW YORK QUAD., 1979

LI TUNGSTEN
GLEN COVE, NEW YORK
SITE LOCATION MAP

MALCOLM

301856

N.Y.S. MUSEUM ARCHAEOLOGICAL SITE FILE
RM. 3122, C.E.C., ALBANY, N.Y., 12230
CONFIDENTIAL:INFORMATION FOR RELEASE ONLY AS REQUIRED BY LAW
OR AS AUTHORIZED IN WRITING BY THE NYSM ANTHROPOLOGY SURVEY

-ID. NYSM	# S- ALT, OLD, (DHP)	SITE NAME	REPORTED: *:AGE :SITETYPE :STRATIG	REMARKS	USGS TOPO 7.5'(15') :COUNTY	REPORTER (RECORDER) -[EARLIER REPORTER]	PROJ. ID. : PUB	DFILE 1NOTE 2MAP: 3ELOC
4028	ACP NSAU 7()	NO INFO	* NO INFO() :VILLAGE :NO INFO		SEA CLIFF (OYSTER BAY) :NAS	PARKER, A.C. -[]	NO INFO :PARKER:1922	1. 2. 3.Y
5990	OYB 1-3()	GARVIE POINT, GARVIE'S POINT	* NO INFO.(NO INFO) :NO INFO. :NO INFO	OLD SF 1943 MAP, # 1. 'EXCAVATION ' (1 SQUARE?) NOTED E.P. MAP '64.	SEA CLIFF (OYSTER BAY) :NAS	ED. PATTERSON, /55 -[]	NO INFO. :	1.X+ 2.TOP 3.Y
5991	OYB 2-3()	MUSKEETA COVE STATION1,MOSQUITO COVE(SIC	* NO INFO.(NO INFO) :NO INFO. :NO INFO	'IN NASSAU CO. GARVIES' PT. PRES.' E.P. MAP'64. 'FINDS INCLUDE GORGE LIKE MUSKEETA COVE ART.S' E.P. CORRES. 4/'62. OLD SF MAP 1943 # 2. STATION 2 AND 3 ID.ED AS SEPARATE LOCI AND GIVEN NYSM #S 7682, 7683 ON 11/92 BW.	SEA CLIFF (OYSTER BAY) :NAS	ED. PATTERSON, /64 -[]	NO INFO. :	1.X 2.TOP 3.Y
7682	OYB 2 LOCUS 2()	MUSKEETA COVE STATION2,MOSQUITO COVE(SIC	* NO INFO(NO INFO) :NO INFO :NO INFO	SEE NYSM 5991, THIS STATION (LOCUS) GIVEN #7682 11/92 BW. 'EXCAVATION '(1 SQUARE) NOTED E.P.	SEA CLIFF (OYSTER BAY) :NAS	PATTERSON,ED:1964 -[NO INFO]	:	1.X 2.T 3.Y

N.Y.S. MUSEUM ARCHAEOLOGICAL SITE FILE
RM. 3122, C.E.C., ALBANY, N.Y., 12230
CONFIDENTIAL:INFORMATION FOR RELEASE ONLY AS REQUIRED BY LAW
OR AS AUTHORIZED IN WRITING BY THE NYSM ANTHROPOLOGY SURVEY

-ID. NYSM	# S- ALT, OLD, (DHP)	SITE NAME	REPORTED: *:AGE :SITETYPE :STRATIG	REMARKS	USGS TOPO 7.5'(15') :COUNTY	REPORTER (RECORDER) -[EARLIER REPORTER]	PROJ. ID. : PUB	DFILE 1NOTE 2MAP: 3ELOC
7683	OYB 2 LOCUS 3()	MUSKEETA COVE STATION3,MOSQUITO COVE(SIC	* NO INFO(NO INFO) :NO INFO :NO INFO	MAP '64. SEE NYAM 5991, THIS STATION (LOCUS) GIVEN #7683 11/92 BW. 'EXCAVATION ' (1SQUARE?) NOTED E.P. MAP '64.	SEA CLIFF (OYSTER BAY) :NAS	PATTERSON,ED,:1964 -[NO INFO]	:	1.NO INFO 2.T 3.Y

APPENDIX B

PHOTOGRAPHS

LIST OF PHOTOGRAPHS

Photograph #1 - Aerial View of the Li Tungsten Site

Photograph #2 - Parcel A: Smokestack Vicinity - View to the Southwest

Photograph #3 - Parcel A: Eastern Portion of the Site - View to the South

Photograph #4 - Parcel A: Western Portion of the Site - View to the North

Photograph #5 - Filled North Shoreline of Glen Cove Creek - View to the Northwest

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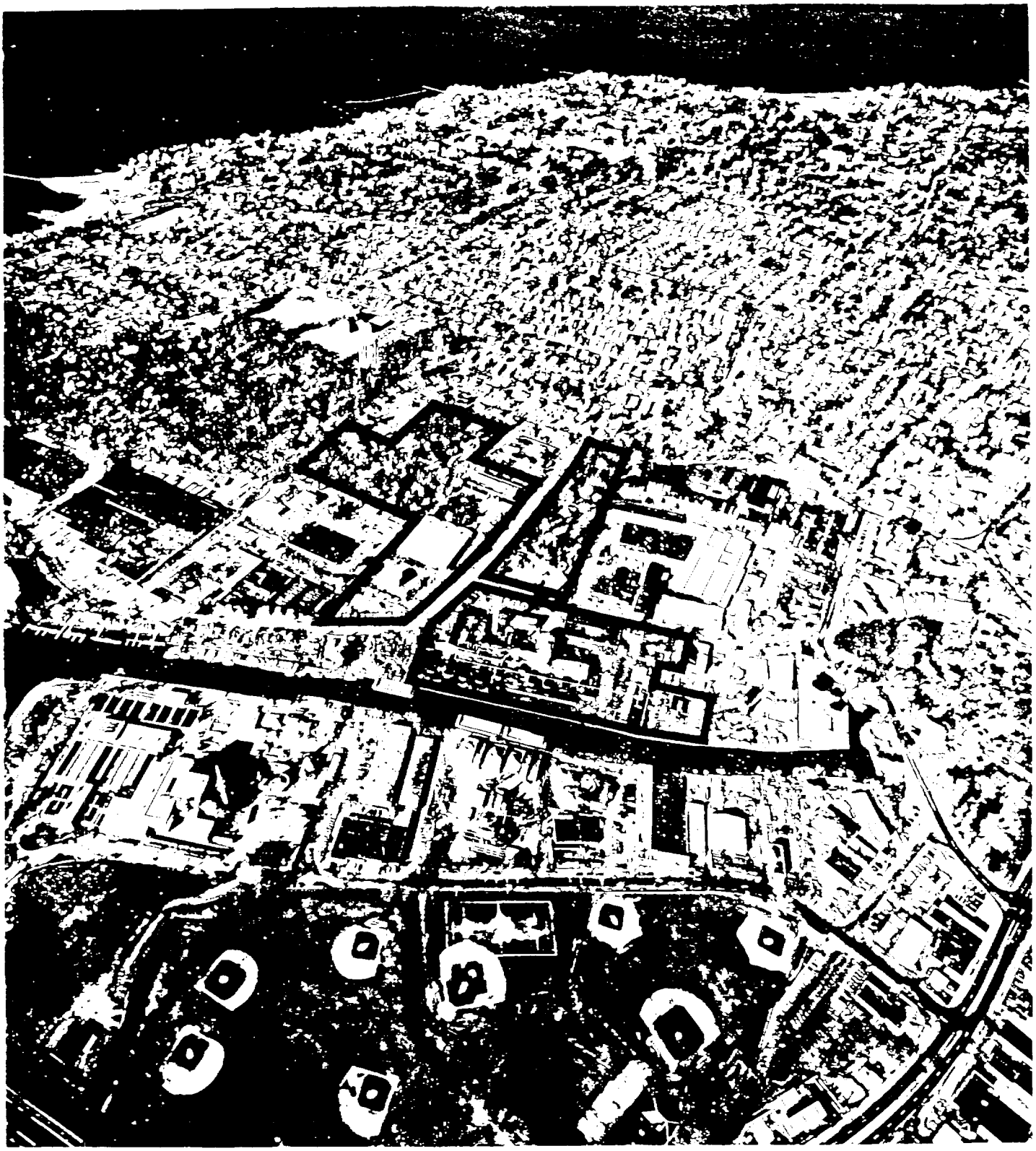

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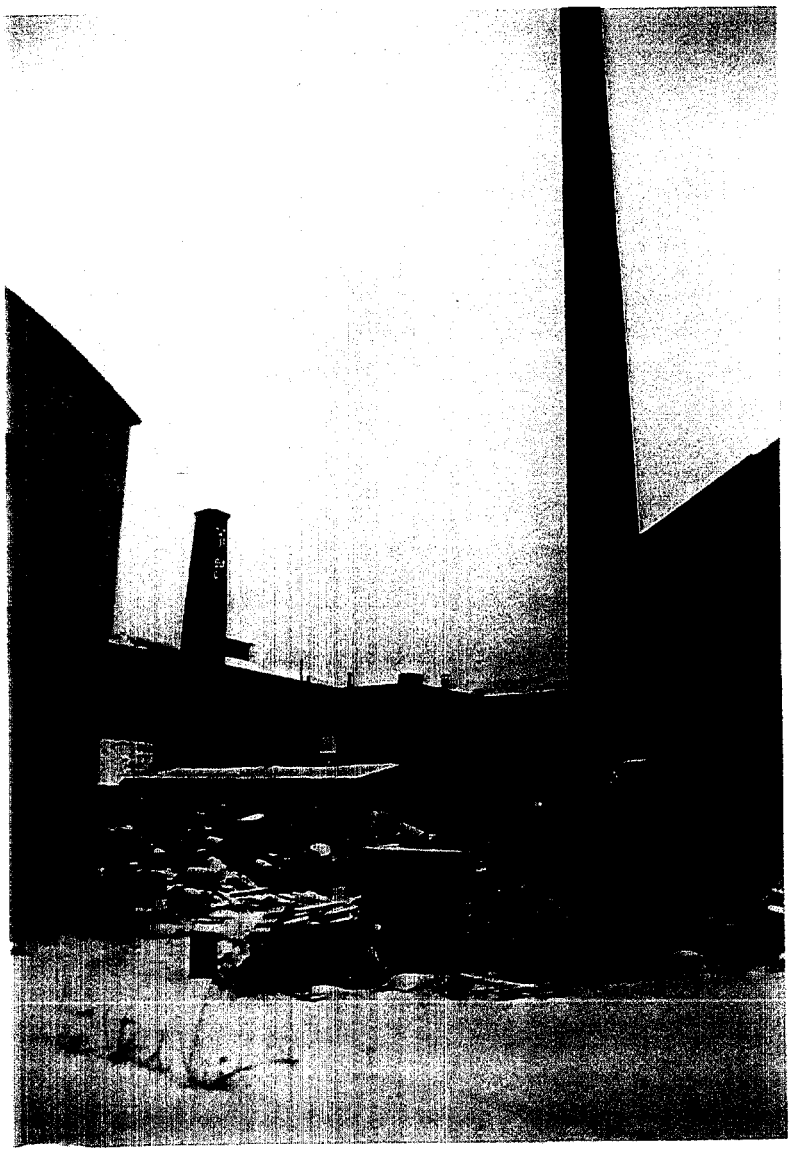

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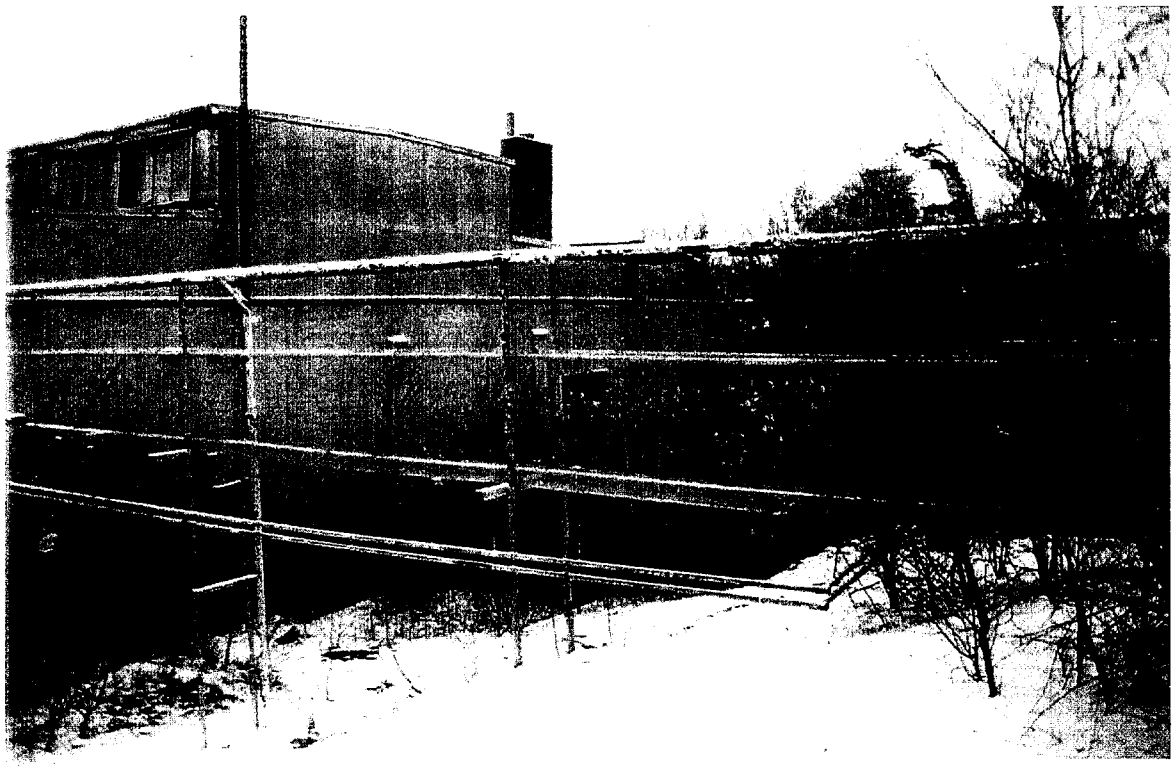

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APPENDIX I

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Appendix I (1)

Sub-Surface Archaeological Investigation of a Portion of Parcel A
Li Tungsten Project Area

SUB-SURFACE ARCHAEOLOGICAL INVESTIGATION OF A PORTION OF PARCEL A - LI TUNGSTEN PROJECT AREA, CITY OF GLEN COVE, NASSAU COUNTY, NEW YORK

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1.0 INTRODUCTION

In February 1995 a report was submitted presenting the results of a Stage Ia archaeological investigation of the Li Tungsten Corporation (Li Tungsten) site located at 63 Herb Hill Road, City of Glen Cove, Nassau County, New York (Malcolm Pirnie 1995; Figures 1 and 2). The report concluded that portions of the pr perty, which consists of three Parcels (A, B, and C; see Figure 3), were sensitive for the possible presence of Native American and Historic period archaeological resources and it evaluated the relative sensitivity of various portions of the property for such sites.

The documentary research indicated that two locations within the Li Tungsten property were archaeologically sensitive (see Malcolm Pirnie 1995:5-3 - 5-5, Figure 18). One location, the subject of this investigation, is situated within Parcel A and consists of the filled land adjacent to Glen Cove Creek (Figure 3). This study area extends for approximately 780 feet (east to west) along Glen Cove Creek and is approximately 20 feet wide (north to south). For purposes of this report this area is referred to as Zone 1.

The second location identified in the Stage Ia report as archaeologically sensitive consists of most of Parcel B, located north of Parcel A (Figure 3). The second location was not investigated as part of this study.

The objective of this Stage Ib archaeological investigation is to determine the actual presence or absence of archaeological resources which are possibly eligible for listing on the National Register of Historic Places within Zone 1.

Sub-surface investigation of Zone 1 was conducted on February 27th, 29th, March 5th, 11th, 12th, 16th, 18th, and 19th 1995. The project principal investigator, a professional archaeologist with prior formal archaeological field training, conducted the field investigation.

The Stage Ib investigation was conducted and this document prepared in accordance with the United States Environmental Protection Agency (USEPA) cultural resource survey procedures for Superfund Sites, 36 CFR 800, Section 106 of the National Historic Preservation Act, and the USEPA publication CERCLA Compliance with other Laws Manual: Part III. Clean Air Act and Other Environmental Statues and State Requirements (USEPA 1988).

1.1 Background Information

Documentary research suggests that Zone 1 was initially filled sometime between 1873 and 1886 (Malcom Pirnie 1995:5-3 - 5-4).

This artifically created land was determined to be archaeologically sensitive due to its potential to provide technological information relating to the landfilling operations along Glen Cove Creek during the late nineteenth and early twentieth centuries and cultural/historical information on the Glen Cove community during that period.

Glen Cove Creek is tidal, it's course extensively modified (filled and straightened) by the United States Army Corps of Engineers beginning in the late nineteenth century (Malcolm Pirnie 1995:1-4). The creek formerly meandered extensively through a narrow valley and contained a number of islets. It was reportedly deep enough for the passage of sloops and schooners during much of the historic period (Russell 1990). Subsequent dredging enabled passage of larger vessels. Salt marshes, brackish/fresh water wetlands, and meadows formerly bordered Glen Cove Creek covering most of the area now included in Parcel A. Along with the study area immediately north of the bulkhead, much of Parcel A has apparently been filled.

Prior to the mid-1890's, the area that now includes Parcel A (and Zone 1) was relatively undeveloped and probably agricultural in nature. During the 1890's, the National Starch Company may have owned a portion of Parcel A, using it for storage purposes. By 1900, B.L. Underhill owned what is now Parcel A and reportedly used the property as a commercial coal and lumber yard with an emphasis on nautical products. Sometime during the first few years of the twentieth century, the Edwin (or Edward) R. Ladew Leather Belting Company occupied the area that was formerly the Underhill Coal and Lumber Yard (Malcolm Pirnie 1995:4-12 - 4-16).

In addition to potentially containing Historic period archaeological deposits, evidence of Native American activity may be present below the fill within Zone 1. A number of Native American sites have been identified adjacent to Glen Cove Creek in the vicinity of the Li Tungsten site (Malcolm Pirnie 1995:3-7 - 3-15). It is possible that areas of high ground bordering the creek formerly existed in the vicinity of Zone 1 and were subsequently filled when the creek was straightened. Such high ground may have been the location of Native American activity. Evidence of such activity could be preserved beneath the fill.

1.2 Zone 1 Description and Project Impacts

Five irregularly shaped locations within Zone 1 have been subject to soil erosion due to openings in the bulkhead. These wash-out areas (identified as Areas A-E) extend for various extents into the land fill, exposing fill strata as well as bulkheads and pilings. Exposed strata extend from the contemporary surface to below mean high water. Debris (pilings,

tires, wood planks, refuse) are located within the wash-out areas. Area A within Zone 1 (Figures 4 and 5), the western most of the wash-out locations, is approximately fifty feet long (east to west) and 10 feet wide (north to south). Area B, located approximately 30 feet east of Area A, is approximately 50 feet long and 10 feet wide (Figures 4 and 6); Area C, located approximately 175 feet east of Area B, is approximately 15 feet long and 10 feet wide (Figures 4 and 7). Area D, located approximately 175 feet east of Area C, is approximately 113 feet long and 15 feet wide (Figures 4 and 8). Area E, located approximately 20 feet east of Area D, is approximately 53 feet long and 15 feet wide (Figures 4 and 9). Clean fill subsequently will be placed within the wash-out locations.

Construction plans call for the rehabilitation of the wash-out locations by the: 1) mechanical removal of interior debris; 2) mechanical excavation of eroded faces to stabilize the wash-out edges and removal of eroded/excavated soils (eroded soil removal would incidentally result in the removal by excavation of sub-fill strata within the wash-out locations); 3) removal of exposed interior pilings; 4) replacement of bulkheading; and 5) replacement/repair of tie-back structures anchoring bulkheads into the fill.

Excavation of the eroded edges and base of the wash-out areas could impact potentially significant archaeological deposits.

1.3 Methodology

The Stage Ib sub-surface investigation included mechanical and manual excavations within each of the five wash-out areas to produce a stratigraphic profile that was than examined and profiled. The profile extended from the contemporary surface to below the extent of maximum high water. The remaining portions of the wash-outs were visually examined to determine: 1) whether any archaeological features were present in locations away from the profile section; and 2) if the stratigraphy in those locations was meaningfully different than that present in the profile section. No archaeological features were detected in the washouts, other than the occasional presence of pilings, and the stratigraphy observed throughout each of the wash-outs was similar to that seen in the associated profile sections.

After the profiles were recorded and the remaining portions of the wash-outs examined, approximately three liters of soil were manually excavated from each stratum. Shovel tests also were excavated at the base of each of the profiles or at nearby locations. The shovel tests extended from the base of the profile section to the extent possible using manually excavation techniques. These tests reached depths ranging from 40 to 52 inches below the base of the profiles (115 to 152 inches below

the contemporary surface). In locations where tests revealed evidence of Native American activity, additional shovel tests were excavated in the immediately surrounding area to further investigate the location. A total of seven shovel tests (Numbers 1 - 7) were excavated as part of this study. The locations of the profiled sections are indicated on Figure 4. The locations of the shovel tests also are indicated on Figure 4 with each test identified by a number. The profiled sections and shovel tests were located in relation to the location of the existing structures indicated on Figure 3.

Soil removed from the stratigraphic profiles and shovel tests was screened through 1/4 inch mesh (hardware cloth) to detect the presence of artifacts. Material recovered from each soil stratum was bagged separately whenever possible. Appendix A to this report lists the stratigraphy encountered in each profile and shovel test and the artifacts recovered from each stratum. Appropriate metrics are provided for each artifact.

The first stage of analysis consisted of laboratory processing of all artifacts recovered. Each artifact was cleaned, examined, and identified as to type, function, cultural affiliation, and period of manufacture where possible. The cleaned artifacts were placed in labelled plastic bags or directly numbered to indicate provenience.

The second stage of analysis consisted of studying the stratigraphy of the profiled sections and shovel tests in conjunction with the artifacts recovered in order to interpret the investigation results.

Research on the recovered artifacts (function, period of manufacture, etc.) was conducted at: 1) the New York City Public Library, Local History and Genealogy Division; 2) the Brick Archive in the office of Dr. Alan Gilbert, Department of Sociology at Fordham University; and 3) the Nassau County Historical Society.

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2.0 RESULTS OF SUB-SURFACE INVESTIGATIONS

Section 2 presents the results of the field investigations, describing the stratigraphy encountered in the profile sections and shovel tests in Areas A through E. The artifacts recovered during the field work also are briefly described. The results of the analysis of the encountered stratigraphy and recovered artifacts are presented in Section 3.

The profile stratum numbers indicated after the soil descriptions correspond to the stratum numbers depicted on the profile drawings included as Appendix B to this report and are also presented in Appendix A. The stratum numbers indicated after the soil descriptions in the shovel test discussions correspond to the stratum numbers presented in Appendix A.

2.1 Area A: Profile Section

A five foot section of Area A was profiled (see Figure 10 and Appendices A and B). The profiled section was the eastern edge of the wash-out. Fifteen strata were identified in the profile, the first 13 of which were recently developed soils or fill. The bottom most three strata appear to be natural, representing former river bank deposits of Glen Cove Creek. The initial four inches seen in the profile was the modern ground surface represented by dark brown sandy silt (Stratum I). No cultural material was recovered from the soil sample taken from this stratum. Beneath the modern surface was an eight inch thick deposit of dark brown sandy silt mixed with brown sand (Stratum II). This deposit appeared to consist of ground surface soils (A and B horizons) that had become mixed with brown sand. One piece of plain white ironstone was associated with this deposit. Below this mixed deposit was a 15 to 24 inch thick layer of brown sand (Stratum III) which may be the source of the sand in the overlying deposit. One red brick was recovered from the soil sample recovered from this layer. The embossed letters "DPBW" were located on the frog or panel on the upper face of the brick (Figure 18). These letters indicate that the brick was manufactured by the Dennings Point Brick Works formerly located in Fiskill, New York (Gilbert 1996). According to de Noyelles (1982:231), this company dates to 1899 suggesting that it was in operation during the turn-of-the-century period.

Below the brown sand was a five to 12 inch thick layer of brown and tan sand (Stratum IV) which may be an extension of the overlying brown sand. A white porcelain insulator was recovered from the soil sample taken from this layer (Figure 19). The insulator was rectangular-shaped with a threaded cavity on one face. Embossed (molded) letters/numbers located on one face of the insulator (see Appendix A) indicate that the device was patented on August 13th, 1895 (Figure 20). Patent information

concerning the insulator was not locally available since the Science and Technology Section of the New York Public Library, which contains patent data, is currently closed. The section will reopen in May of 1996 at a new location.

Beneath the brown and tan sand layer was an eight inch layer of brown and gray white sand (Stratum V). No cultural material was associated with the soil sample taken from this stratum.

A six inch lens of layered brown and tan sand (Stratum VI) was located within the brown and gray white sand stratum. A piece of clear molded glass was associated with this lens.

Beneath the brown and gray white sand in the southern portion of the profile was seen an eight to nine inch thick layer of medium brown sand (Stratum VII). A fragment of plain white porcelain and a piece of clear curved glass were recovered from this stratum.

A three inch thick layer of gray black sandy silt (Stratum VIII) extended across the entire profile beneath the brown and gray white and medium brown sand layers. This layer may represent a former ground surface suggesting that this area may have undergone more than one episode of filling. A rim and body fragment of a brown salt glazed stoneware, straight sided, open topped jar was recovered from this layer (Figure 21). Beneath this possible surface was a 12 inch thick deposit of dark brown sandy silt (Stratum IX) which may, in part, represent a leaching zone (B-horizon) underlying the former surface. One piece of clear, curved glass was recovered from this layer.

Below the dark brown sandy silt were three sand strata which comprise the remaining fill deposits seen in this profile. The first of these was a four inch thick layer of brown gray sand (Stratum X) from which were recovered a hand blown, green tinted bottle glass fragment and a hand blown, blue green tinted bottle neck and rim fragment (Figure 22). The mold seam on the bottle neck and rim ends 0.75 inches below the lip. The lip was seen to have been applied separately to the bottle body during its manufacture. The mold seam and the separately applied lip suggest that the bottle was blown in a three piece mold. These characteristics indicate that the bottle was manufactured during the last decades of the nineteenth century (see Lorrain 1968; Munsey 1970:39).

The gray brown sand layer was underlain by a 24 inch thick deposit of rust brown sand (Stratum XII). One unglazed redware body fragment was recovered from this layer (Figure 23).

An eight to nine inch thick lens of brown sand (Stratum XI) was present towards the top of the rust brown sand layer. No artifacts were recovered from the lens.

A portion of a 12 inch thick, horizontally oriented, wooden piling extended outward (westward) from the rust brown sand layer. The piling may have been part of a wooden bulkhead that formerly was located where the steel bulkhead is now situated. The piling appears to be a modified tree trunk which is possibly oak.

Beneath the rust brown sand was what appeared to be natural river bank deposits, apparently representing the original tidal shoreline of Glen Cove Creek that was subsequently filled. The first of these was an eight inch thick organic deposit of gray black clay (Stratum XIII). Below this clay was an 11 inch thick deposit of gray silty sand (Stratum XIV) followed by dark brown black silty clay (Stratum XV). No cultural material was recovered from these layers.

At the northern edge of the profile, beginning at approximately 28 inches below the contemporary surface (within Stratum III - brown sand) and extending below the base of the profile section, was a vertically oriented wooden piling, approximately 12 inches in diameter. The piling is apparently a tree trunk partially modified to serve as a piling. Bark is still present on the trunk/piling. The tree seems to be oak. The piling may be part of a former bulkhead which was subsequently extended outward (further south) to the line of the existing bulkhead. Some additional pilings were observed along this line along the length of the wash-out although their spacing was not consistent or systematic. If an earlier bulkhead line was formerly present some of the piling were apparently removed either intentionally or as a result of wash-out erosion.

2.2 Area A: Shovel Tests 1 - 3

Three shovel tests were excavated in the immediate vicinity of the base of the profile section. Shovel test 1 was situated approximate 18 inches west of the base of the profile wall. The initial stratum encountered was the gray black clay (nine inches thick; Stratum I) which apparently represents the uppermost of the former bank deposits. A brown chert flake was recovered from this layer (Figure 24).

Below the clay was 11 inches of gray silty sand (Stratum II) followed by a layer of dark brown black silty clay (Stratum III). Over two feet of the latter deposit was excavated at which point (140 inches below the contemporary surface) excavation ceased due to the presence of tidal groundwater in the shovel test. Tidal groundwater was initially encountered in this test at 99 inches below the contemporary surface. Cultural material was not recovered from either of these layers.

Due to the recovery of the brown chert flake, two additional

shovel tests were excavated in the immediate vicinity of shovel test 1 to further investigate the area. Shovel test 2 was located approximately two feet to the west of shovel test 1 and shovel test 3 was located approximately two feet to the southwest.

The stratigraphic sequence in shovel tests 2 and 3 (gray black clay, gray silty sand, and dark brown black silty clay) were similar to that encountered in shovel test 1 (see Appendix A). Tidal groundwater was encountered in both tests between 99 and 100 inches below the contemporary surface. No cultural material was encountered in either test.

2.3 Area B: Profile Section

A four foot section of Area B was profiled (see Figure 11 and Appendices A and B). The profiled section was located along the north wall in the eastern portion of the wash-out. Twelve strata were identified in the profile, the first 10 of which were recently developed soils or fill. The bottom most two strata were natural, former river bank deposits of Glen Cove Creek. The initial ten inches seen in the profile was a layer of dark brown sandy silt (Stratum I). No cultural material was recovered from the soil sample taken from this stratum. This layer appeared disturbed and represents the modern surface as well as the uppermost fill deposit.

Beneath the modern surface were two sand layers. The first 12 inches consisted of tan sand (Stratum II) while the bottom most six inches were a brown sand (Stratum III). No cultural material was recovered from either sand layer.

Below the brown sand was a 12 inch thick deposit of medium brown sandy silt (Stratum IV). A brick fragment was the only piece of cultural material recovered from the soil sample taken from this deposit. The brick contained a portion of its frog (panel) with the embossed letters "alley" (Figure 25). The recovery from Area E of a brick fragment with the front portion of a frog containing the letters "Mall" (Figure 25) indicates that these bricks were manufactured by the MALLEY Brick Company. The company was in operation between 1890 and sometime after 1909. Between 1890 and 1898, the Malley company was owned by Thomas Malley and located in Grassy Point, New York. After that date it apparently moved and, for the next 11 years, was located in Haverstraw, New York. In 1900, Mary Malley assumed control of the company, her husband apparently having died. Mary owned the company until 1909 when it moved to Fishkill Landing, New York. At that time, the name of the company changed to the "MALLEY Brothers" with the owners listed as Thomas and William Malley. The siblings were apparently the offspring of Mary and Thomas Malley (see de Noyelles 1982:248).

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A 13 inch layer of dark brown sandy silt (Stratum V) with pebbles was located below the medium brown sandy silt. This layer may represent a former ground surface and underlying leaching zone. One saddle-shaped object made from a synthetic material and of apparent industrial function was the only cultural material recovered from this layer (Figure 26). The saddle appears to be comprised of tan colored celluloid. Celluloid was developed in the 1860's by John Wesley Hyatt and was the first artificially created substance to be commercially produced (Cook and Slessor 1992:61). The substance consists of a core of molded gum shellac, a natural plastic obtained from the secretion of the lac beetle, combined with pulp. This was coated with collodion, a solution of cellulose nitrate, alcohol, and camphor, which dries on contact with air to form a thin film (Cook and Slessor 1992:61).

By 1871 Hyatt established the American Celluloid Company and distributed the product worldwide. One of the attributes of celluloid was that it could be molded to any shape required which made it extremely valuable for industrial purposes. According to Cook and Slessor (1992:61), the "celluloid era" in the United States began around 1880 and lasted until the 1920's with yearly production of celluloid peaking at over 40,000 tons per year. Celluloid continued to be commercially important well into the 1930's.

Below the dark brown sandy silt was a 12 inch thick layer of medium brown sandy silt with pebbles and cobbles (Stratum VI). Single fragments of plain ironstone and plain porcelain were recovered from this layer. Under the medium brown sandy silt was six inches of black brown clay (Stratum VII). No cultural material was recovered from the soil sample taken from this layer.

Beneath the clay was a seven inch thick layer of brown and rust sandy silt (Stratum VIII) from which two pieces of green tinted window glass were recovered. A six inch thick layer of brown sand with cobbles (Stratum IX) was situated beneath Stratum VIII followed by a 13 inch thick layer of brown sandy gravel (Stratum X). A plain, hard paste porcelain cup handle was recovered from the soil sample taken from Stratum IX. No artifacts were recovered from the soil sample taken from Stratum X.

Beneath the sandy gravel were layers representing the pre-filling river bank of Glen Cove Creek. The first of these was a seven inch thick layer of black silty sand (Stratum XI) below which was a layer of black silt (Stratum XII). No cultural material was recovered from either of these layers.

2.4 Area B: Shovel Test 4

One shovel test (Number 4) was excavated in Area B (see Figure 4 and Appendix A). The shovel test was located approximately 18 inches south and 12 inches west of the base of the profile section. The initial stratum encountered was the black silty sand seen at the base of the profile section (eight inches thick; Stratum I) which apparently represents the uppermost of the former bank deposits.

Below the black silty sand was encountered a seven inch thick deposit of black silt (Stratum II). This was followed by a layer of dark brown black silty clay (Stratum III) which was excavated for 34 inches at which point (146 inches below the contemporary surface) excavation ceased due to the presence of tidal groundwater in the shovel test. Tidal groundwater was initially encountered in this test at 100 inches below the contemporary surface.

Cultural material was not recovered from any of these layers.

2.5 Area C: Profile Section

A four foot section of Area C was profiled (see Figures 12 - 13 and Appendices A and B). The profiled section was located along the north wall in the eastern portion of the wash-out. Twelve strata were identified in the profile, the first nine of which were recently developed soils or fill. The bottom most three strata were natural, former river bank deposits of Glen Cove Creek.

The initial four inches seen in the profile was the modern ground surface represented by dark brown sandy silt (Stratum I). No cultural material was recovered from the soil sample taken from this stratum. Beneath the modern surface was a four to five inch thick deposit of brown sandy silt (Stratum II). This deposit appeared to consist of both leaching zone soils and fill. No cultural material was associated with this deposit in the profile section.

Below the brown sandy silt was a six to 17 inch thick layer of black brown sandy silt (Stratum III). The layer was thicker in the western portion of the profile. One clear bottle base fragment was recovered from the soil sample taken from this deposit. Beneath this black brown sandy silt layer in the eastern three quarters of the profile section was a one to 11 inch thick deposit of rust brown sandy silt with rocks and pebbles (Stratum IV). A hard paste white porcelain tile fragment was recovered from this stratum.

A four to seven inch thick deposit of medium brown sandy silt

(Stratum V) was located below Strata III and IV). A green glass insulator fragment and a lump of melted glass were recovered from the soil sample. A small lens of black silty clay (Stratum VI) was located at the base of this layer in the eastern third of the profile. No artifacts were found to be associated with the soil lens.

Underlying Strata V and VI were three soil layers that were similar in appearance and texture. None of the soil samples taken from these layers contained cultural material. The first of these was a nine to 11 inch layer of gray black sandy silt (Stratum VII). This was followed by 11 to 14 inches of gray brown sandy silt (Stratum VIII) and 16 to 19 inches of gray brown sandy silt with pebbles (Stratum IX).

Below the gray brown sandy silt layers were the natural river bank deposits of Glen Cove Creek. These consisted, sequentially, of a seven to eight inch layer of gray black silty clay, a five inch thick layer of black sandy silt, and a layer of gray black silt. No cultural material was recovered from the soil samples taken from these layers.

Stratigraphic indications of a former ground surfaces was not detected in this profile section.

2.6 Area C: Shovel Test 5

One shovel test (Number 5) was excavated in Area C (see Figure 4 and Appendix A). The shovel test was located approximately 12 inches south of the base of the profile section. The initial stratum encountered was the black silty sand seen at the base of the profile section (five inches thick; Stratum I) which apparently represents the uppermost of the former bank deposits.

Below the black silty sand was encountered a five inch thick deposit of black silt (Stratum II). This was followed by a layer of gray black silt (Stratum III) which was excavated for 30 inches at which point (115 inches below the contemporary surface) excavation ceased due to the presence of tidal groundwater in the shovel test. Tidal groundwater was initially encountered in this test at 95 inches below the contemporary surface.

Cultural material was not recovered from any of these layers.

2.7 Area D: Profile Section

A four foot section of Area D was profiled (see Figures 14 - 15 and Appendices A and B). The profiled section was located along

the north wall in the eastern portion of the wash-out. Nine strata were identified in the profile, the first six of which were recently developed soils or fill. The bottom most three strata were natural, former river bank deposits of Glen Cove Creek.

The initial 12 inches seen in the profile was the modern ground surface and underlying leaching zone represented by dark brown sandy silt (Stratum I). No cultural material was recovered from the soil sample taken from this stratum. Beneath the modern surface was a six inch thick deposit of light brown sandy silt (Stratum II). This deposit appeared to consist of fill. A piece of molded, brown glass was recovered from the soil sample taken from this layer.

Below the light brown sandy silt was a six inch thick layer of black silty sand (Stratum III). A ceramic insulator similar to the one found in Area A was recovered from this layer (Figure 19). As with the insulator from Area A, the embossed patent date of August 13th, 1895 was present on the Area B insulator (Figure 20; see Appendix A). No other cultural material was recovered from Stratum III.

A 57 inch thick mixed layer of brown, rust, and medium brown sandy silt with rocks, pebbles, and wood fragments (Stratum IV) underly the black silty sand in the profile. A brown glazed porcelain door handle (Figure 27), a molded glass citrus fruit squeezer/juicer (Figure 28), and a unglazed redware vessel base and body fragment (Figure 23) were recovered from Stratum IV.

Below Stratum IV was another mixed soil layer. This deposit, 24 inches thick, consisted of gray brown clayey silt with rocks and pebbles and dark brown black clayey silt mottling. Five mammal bone fragments, all probably from domesticated animals and showing evidence of butchering, were recovered from the soil sample taken from this layer (Figure 29).

Below this layer was the natural river bank layers associated with Glen Cove Creek. The first of these stratum was a black sandy silt with pebbles (Stratum VII) layer that was seven inches thick. No cultural material was recovered from this layer. A lens of gray green brown silty clay (Stratum VI) that contained glass and worked leather fragments (Figure 30) was located in the upper portion of Stratum V and is apparently the result of Historic period disturbance.

Below the black sandy silt was a four inch thick layer of dark brown silty clay with black brown silty clay mottling (Stratum VIII) followed by a black brown silty clay layer (Stratum IX). Cultural material was not recovered from the soil samples taken from either of these former river bank layers.

Stratigraphic indications of former ground surfaces were not detected in this profile section.

2.8 Area D: Shovel Test 6

One shovel test (Number 6) was excavated in Area D (see Figure 4 and Appendix A). The shovel test was located approximately 15 inches south of the base of the profile section. The initial stratum encountered was a black silty sand with pebbles which was also encountered at the base of the profile section (ten inches thick; Stratum I) and which apparently represents the uppermost of the former bank deposits.

Below the black silty sand was encountered a three inch thick deposit of dark brown silty clay with black brown sandy silt mottling (Stratum II). This was followed by a layer of black brown silty clay (Stratum III) which was excavated for 27 inches at which point (145 inches below the contemporary surface) excavation ceased due to the presence of tidal groundwater in the shovel test. Tidal groundwater was initially encountered in this test at 120 inches below the contemporary surface.

Cultural material was not recovered from any of these layers.

2.9 Area E: Profile Section

A four foot section of Area E was profiled (see Figures 16 - 17 and Appendices A and B). The profiled section was located in the center of the wash-out. Thirteen fill strata were identified in the profile.

A six inch thick concrete slab (Stratum I) was the contemporary surface, overlying all of the fill strata. Below the slab was a three to six inch thick layer of medium brown sandy silt with pebbles (Stratum II). The sand was probably the bed for the concrete slab. No cultural material was recovered from the soil sample taken from this stratum.

Beneath the medium brown sandy silt was a three inch thick layer of dark brown gray clayey silt (Stratum III). This layer probably represents a former surface which was subsequently covered by the concrete slab and its bedding. No cultural material was recovered from the soil sample taken from this layer. Underlying the dark brown gray clayey silt was a two inch thick layer of tan sand (Stratum IV). No artifacts were recovered from this layer.

Under the tan sand was a three inch thick deposit of dark brown gray sandy silt (Stratum V) which may represent a former ground surface. A white porcelain insulator, similar to the insulators

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recovered from Area A and Area D, was recovered from the soil sample taken from this layer (Figure 19). As with the two other insulators, the August 13th, 1895 patent date was present on this artifact (Figure 20). No other cultural material was recovered.

Under this possible former surface was a two inch deposit of orange tan brown sand (Stratum VI). A red brick with the embossed letters "Staples" within the brick's frog was the only artifact recovered from this stratum (Figure 31). According to de Noyelles (1982:261-262), the Staples name was used by a number of individuals and brick companies in the Hudson Valley between 1859 and 1910. John H. Stephens of Haverstraw, New York used the Staples name between 1859 and 1868 after which date Alexander Stewart of Farmingdale, New York employed it. By 1899, Alva S. Staples of East Kingston, New York was manufacturing bricks with the Staples name. In 1905, the Staples Brick Company of Malden, New York opened and used the name Staples on their bricks for about a decade. Based on the appearance of the brick (shape of frog, depth of frog, orientation of letters) the manufacture of the Staples brick recovered from Area E probably post-dates the period 1899-1915.

Below Stratum VI was a four inch thick layer of dark brown sand (Stratum VII). A red brick fragment with the embossed letters "Mall" on the portion of the frog present was recovered from this layer (Figure 25). The embossed letters indicate that the brick was manufactured by the Malley Brick Company, as was the brick recovered from Area B. The company was in operation between 1890 and sometime after 1909 (see Section 2.3).

Underlying Stratum VII was a three inch thick layer of dark grayish brown sandy silt (Stratum VIII) which may represent another former ground surface. No cultural material was recovered from this layer. Below it were a series of fill layers from which no cultural materials were recovered. These layers consisted of five inches of tan brown sand with pebbles (Stratum IX); five inches of brown gray clayey silt with pebbles (Stratum X); six inches of layered gray brown and tan sand (Stratum XI); four inches of tan sand (XII); and 45 to 48 inches of dark brown gray clayey silt with pebbles and rock/cobbles (Stratum XIII). The base of Stratum XIII was not seen in the profile.

At the eastern edge of Stratum XIII was a 12 inch diameter vertically oriented wooden piling. The piling was a modified tree trunk, possible oak. The upper end of the piling was two inches below the base of Stratum XII (48 inches beneath the top of the concrete slab) and extended below the base of the profile section.

A portion of another piling extended horizontally eastward from

the profile within Stratum XII, originating from behind the vertical piling. While the vertical piling may represent a former bulkhead line, the horizontally section of piling appears to be debris within the fill. Also within Stratum XII, was a section of a laid brick and mortar platform. The platform was oriented at a slight angle within the fill and not anchored to any foundation. The platform did not appear to be an intact structural element but was debris within Stratum XIII. No marker's marks or letters were observed on the platform bricks.

2.10 Area E: Shovel Test 7

One shovel test (Number 5) was excavated in Area E (see Figure 4 and Appendix A). The shovel test was located approximately 48 inches south of the base of the profile section and 12 inches lower in elevation due to the presence of a large amount of eroded soil immediately in front of the profile section. The initial stratum encountered was a gray black silty clay (eight inches thick; Stratum I) which apparently represents the uppermost of the former bank deposits. The top of this layer is 107 inches below the contemporary surface.

Below the gray black silty clay was encountered a 12 inch thick deposit of gray silty sand (Stratum II). This was followed by a layer of dark brown black silty clay (Stratum III) which was excavated for 25 inches at which point (152 inches below the contemporary surface) excavation ceased due to the presence of tidal groundwater in the shovel test. Tidal groundwater was initially encountered in this test at 111 inches below the contemporary surface.

Cultural material was not recovered from any of these layers.

3.0 ARCHAEOLOGICAL ANALYSIS OF ZONE 1

This section presents the results of the analysis of the archaeological data recovered from Zone 1.

3.1 Fill Deposits

The archaeological stratigraphy recorded in the profile sections in Areas A through E suggest that more than one episode of filling occurred along the Glen Cove Creek shoreline within the Li Tungsten property. Evidence of possible former ground surfaces were detected in Areas A, B, and E. The possible former ground surface and underlying leaching zone in Area A is represented by an organic layer of gray black sandy silt (Stratum VIII) and an underlying leaching zone of dark brown sandy silt (Stratum IX) located between 49 and 64 inches below the contemporary surface. A fragment of brown salt glazed stoneware and a piece of clear, curved glass were recovered from these layers. A similar organic layer of dark brown sandy silt (Stratum V) which may represent a former surface was located between 40 and 53 inches below the contemporary surface in Area B. A celluloid industrial saddle-shaped object was recovered from this layer.

In Area E, two organic layers consisting of dark brown gray sandy silt (Strata V and VIII) were located between 14 and 17 inches and 24 and 27 inches below the contemporary surface and apparently represent two distinct former ground surfaces. In the uppermost of these layers (Stratum V), a red brick with the embossed letters "Staples" was recovered. No cultural material was recovered from the soil sample taken from the second (lower) of these soil layers (Stratum VIII).

The initial filling episode at the Li Tungsten site apparently occurred between 1873 and 1886 as indicated by the Historic period maps analyzed for the previously conducted documentary study (see Malcolm Pirnie 1995). During this period the course of Glen Cove Creek was straightened and the creek bed extensively dredged. The uppermost vertical extent of this filling episode may be represented by the former ground surfaces seen in Area A and Area B and the second (lower) of the two ground surface layers seen in Area E.

Cultural material recovered from deposits below the possible ground surfaces in these three areas were limited in quantity. One temporally diagnostic artifact, however, was recovered from a layer immediately below the former ground surface in Area A. This was a blue green tinted bottle neck and rim fragment which contains attributes that indicate it was manufactured during the last decades of the nineteenth century (see Section 2.1).

The celluloid saddle-shaped object recovered from the possible former ground surface layer in Area B may also indicate period of fill deposition. Although celluloid was in use in the United States until the 1930's, the major period of its use dates from 1880 to the early 1920's (see Section 2.3). Thus, the presence of that artifact in the possible surface layer is not inconsistent with the area having been filled around 1880.

The soils above these former surfaces were apparently deposited subsequently as indicated by the generally later date of manufacture of the temporally diagnostic artifacts associated with them. Temporally diagnostic artifacts recovered from overlying layers consist of: 1) a Dennings Point Brick Works Brick and an 1895 patented ceramic insulator from Area A; 2) a Malley Brick fragment from Area B; and 3) a Staples Brick, a Malley Brick fragment, and an 1895 patented ceramic insulator from Area E (see Section 2). Another 1895 patented ceramic insulator was recovered from an upper fill layer in Area D (see below). The recovery of these artifacts suggest that one or more episodes of filling occurred along the Glen Cove shoreline between 1895 and the second decade of the twentieth century. This could account for the development of the upper ground surface layer seen in Area E from which the Staples red brick was recovered.

No ground surface layers were seen in Areas C and D. Such surfaces may not have formed in these areas due to: 1) industrial activities occurring at those locations preventing their development; 2) removal of the ground surface prior to subsequent filling; and/or 3) leaching of the organics from ground surface layers subsequent to filling. Failure to recognize such layers during the field investigation may also have occurred.

Although recovered artifacts were limited, the patented ceramic insulator in an upper fill stratum (Stratum III) in Area D suggests that deposition occurred contemporaneously with deposition of the upper fill strata in Areas A, B, and E. The hand blown green glass from the lowest fill stratum (Stratum VI) in Area D suggests that this layer was deposited earlier. Although the data is limited, the depositional history of the fill in Area D (and also Area C) is probably similar to that of Areas A, B, and E.

Based on the data from the profile sections it seems that fill was initially deposited directly on the former bank of Glen Cove Creek, probably during the initial straightening of that waterway. Although no evidence was seen of fill retaining structures in the wash-out locations, the pilings located within the fill in Areas A and E indicate that earlier bulkheads probably existed.

The origin of the fill deposits detected in Areas A through E is unknown. Although some domestic artifacts were recovered, the relative scarcity of artifacts within the sampled fill indicates that domestic deposits from some unknown location were not borrowed as fill. The sand and sandy silt nature of the majority of the fill soils indicate that they are probably glacial in origin. Given the proximity of Glen Cove Creek, the fact that that waterway was initially straightened and dredged between 1873 and 1886, and the need for additional maintenance dredging of the creek over the subsequent years, it is likely that the fill, at least in part, consists of dredged soil from the creek bed. Late nineteenth and early twentieth century fill also may have derived from within what subsequently became Li Tungsten property as a result of construction activity associated with the Underhill Coal and Lumber Yard, the National Starch Company, and/or the Ladew Leather Belting Company (see Malcolm Pirnie 1995).

3.2 Sub-Fill Layers

The seven shovel tests excavated within Zone 1 detected evidence of Native American activity in one location (Area A). One brown chert flake was recovered from the gray black clay in shovel test 1. This layer is the uppermost of the former river bank deposits in that location. Other tests excavated in the vicinity of shovel test 1 did not encounter additional evidence of Native American activity. It is possible that the area formerly may have been high ground adjacent to Glen Cove Creek and could have been utilized by Native Americans. It is also possible that the flake was not in its primary context but had been alluvially redeposited at that location.

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4.0 CONCLUSIONS AND RECOMMENDATIONS

The fill within Zone 1, Areas A through E, apparently consists primarily of redeposited glacial soils which became mixed with small quantities of cultural material. At least two filling episodes apparently occurred within Zone 1. The sampled upper fill layers, probably deposited late in the nineteenth or early in the twentieth century, primarily contained construction related artifacts which were probably associated with industrial activities occurring on the Li Tungsten property during that period. The sampled lower fill deposits contained no industrial/construction related artifacts reflecting the lack of such activity within the Zone 1 vicinity prior to the 1890's (see Malcolm Pirnie 1995:4-12 - 4-16).

None of the strata encountered in Zone 1 consisted of primary or secondary domestic deposits nor where any intact fill retaining structures or other features seen there.

Although shovel test 1 encountered an aboriginal flake within the uppermost sub-fill creek bank layer in Area A, additional investigation of the vicinity did not encounter any additional evidence of Native American activity. The flake recovered from shovel test 1 may represent a small campsite located on what formerly could have been an area of higher ground overlooking Glen Cove Creek. Such camp sites most likely would have been oriented towards exploiting subsistence resources in the vicinity of Glen Cove Creek. Alternatively, however, the flake may not be in a primary context but may have been redeposited by alluvial activity.

Sub-surface investigation within Zone 1, Areas A through E did not reveal the presence of any fill deposits that are potentially eligible for listing on the National or State Registers of Historic Places. Therefore, further archaeological investigations of the fill within Zone 1 are not warranted.

Although, an aboriginal flake was recovered from Area A, evidence of Native American archaeological deposits (additional lithics/ceramics, shell, faunal remains, features, etc.) were not encountered. Given the lack of such evidence, further archaeological investigations of the sub-fill deposits within Zone 1 are not warranted.

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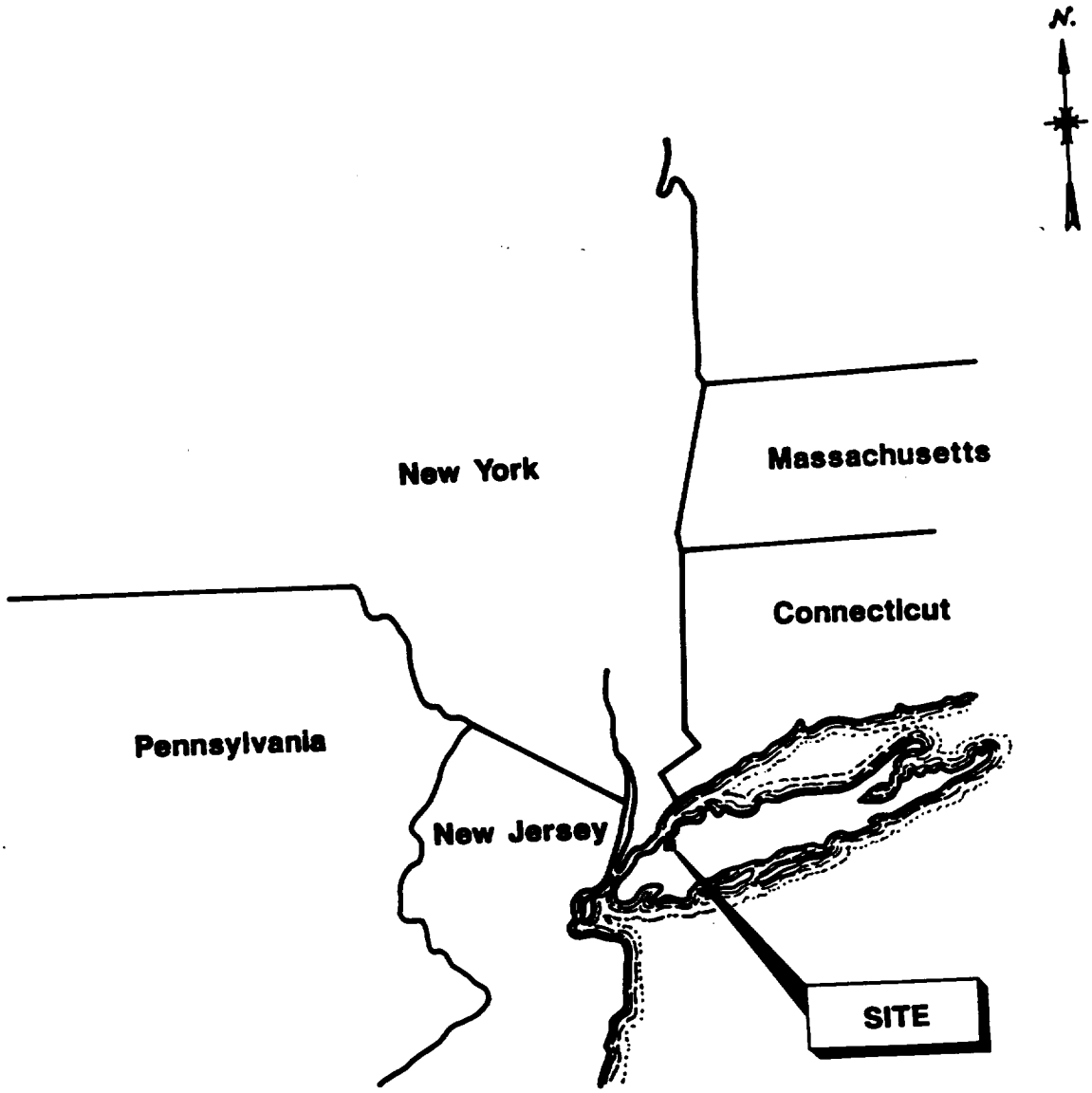
Figure 1
Li Tungsten Site
Regional Location Map

FIGURE 1



MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK
REGIONAL LOCATION MAP

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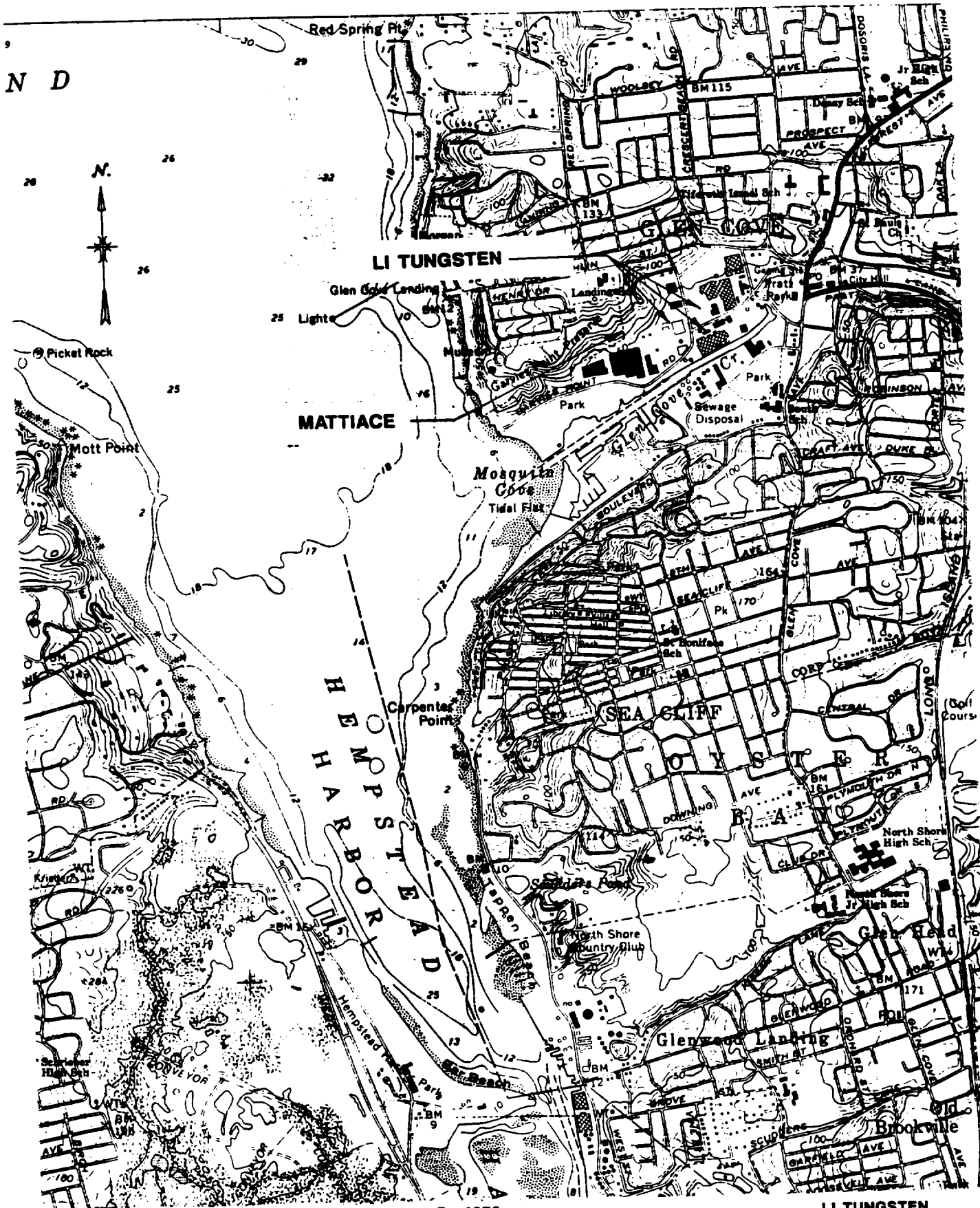
Figure 2
Li Tungsten Site
Location Map

Base Map: United States Geological Survey 1979
Scale: 1 inch = 2,000 feet

FIGURE 2



SOURCE: USGS MAP SEA CLIFF, NEW YORK QUAD., 1979

LI TUNGSTEN
GLEN COVE, NEW YORK
LOCATION MAP
SCALE 1"=2000'

MALCOLM PIRNIE

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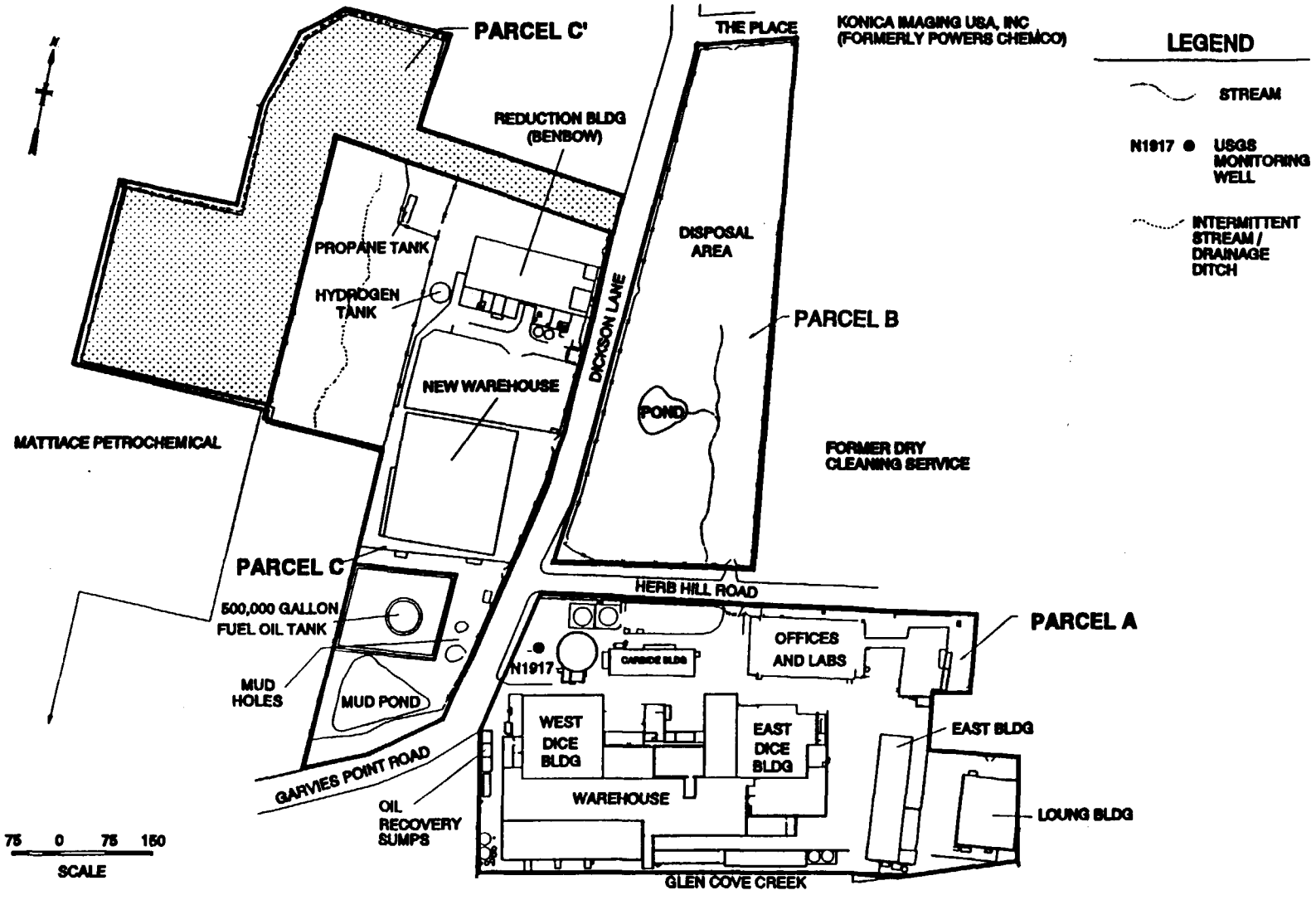
Figure 3
Li Tungsten Site
Site Plan Indicating Location of Zone 1 (Study Area)



MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

SITE PLAN

FIGURE 3

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Figure 4
Location of Wash-Out Areas Within Zone 1
Showing Location of Profile Sections and Shovel Tests
Scale of Original: 3/4's inch = 20 feet
Base Map: Oxford Engineering Company 1995

EPA REGION II
SCANNING TRACKING SHEET

DOC ID # 36750

DOC TITLE/SUBJECT:
BULKHEAD RESTORATION PLAN

THIS DOCUMENT IS OVERSIZED AND CAN BE LOCATED IN THE ADMINISTRATIVE RECORD FILE AT THE

SUPERFUND RECORDS CENTER
290 BROADWAY, 18TH FLOOR
NEW YORK, NY 10007

Figure 5
Area A
View is to the east

Figure 6
Area B
View is to the east

Figure 7
Area C
View is to the west

Figure 8
Area D
View is to the east

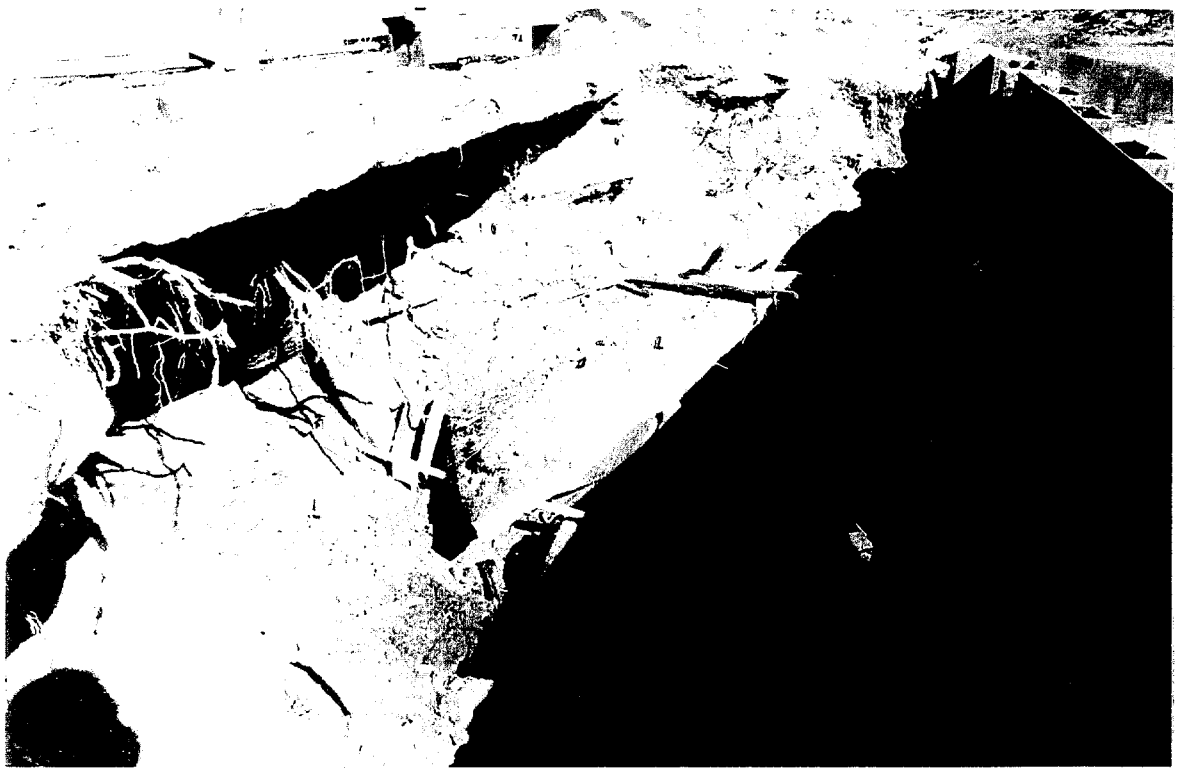

Figure 9
Area E
View is to the east

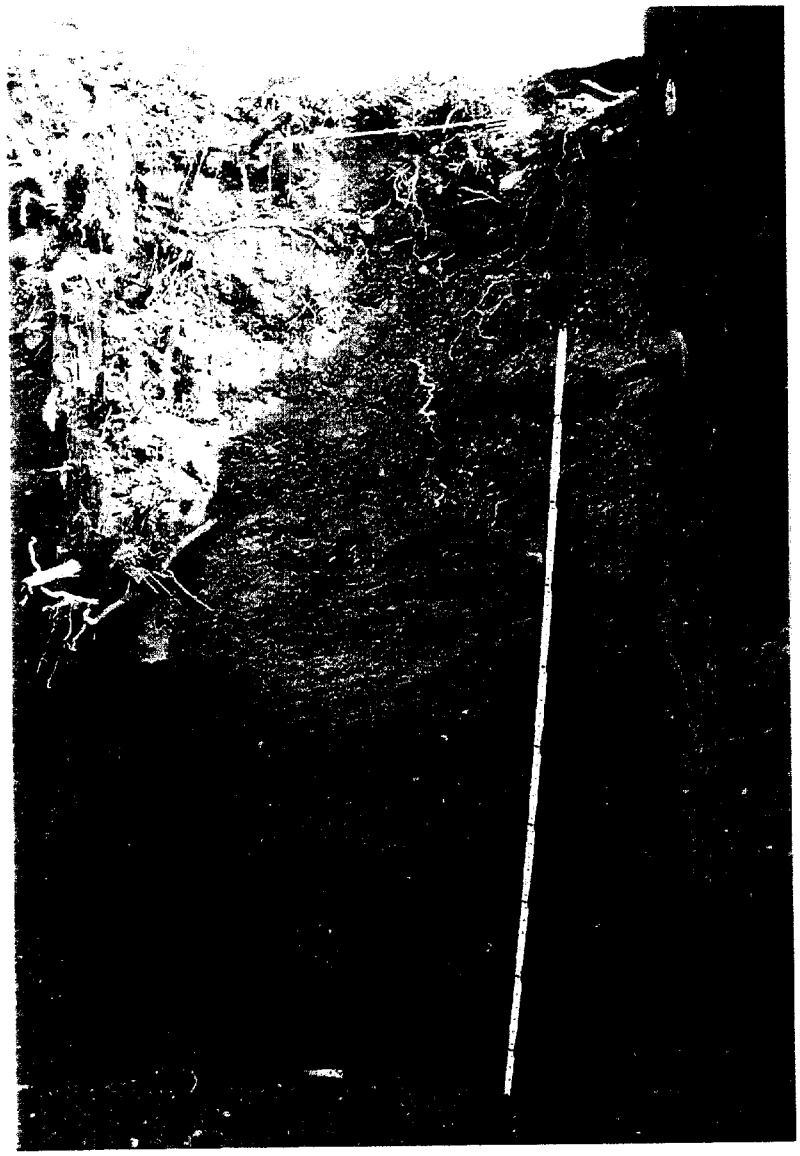

Figure 10
Area A
East Wall Profile

Figure 11
Area B
North Wall Profile

Figure 12
Area C
North Wall Profile (Upper Portion)

Figure 13
Area C
North Wall Profile (Lower Portion)

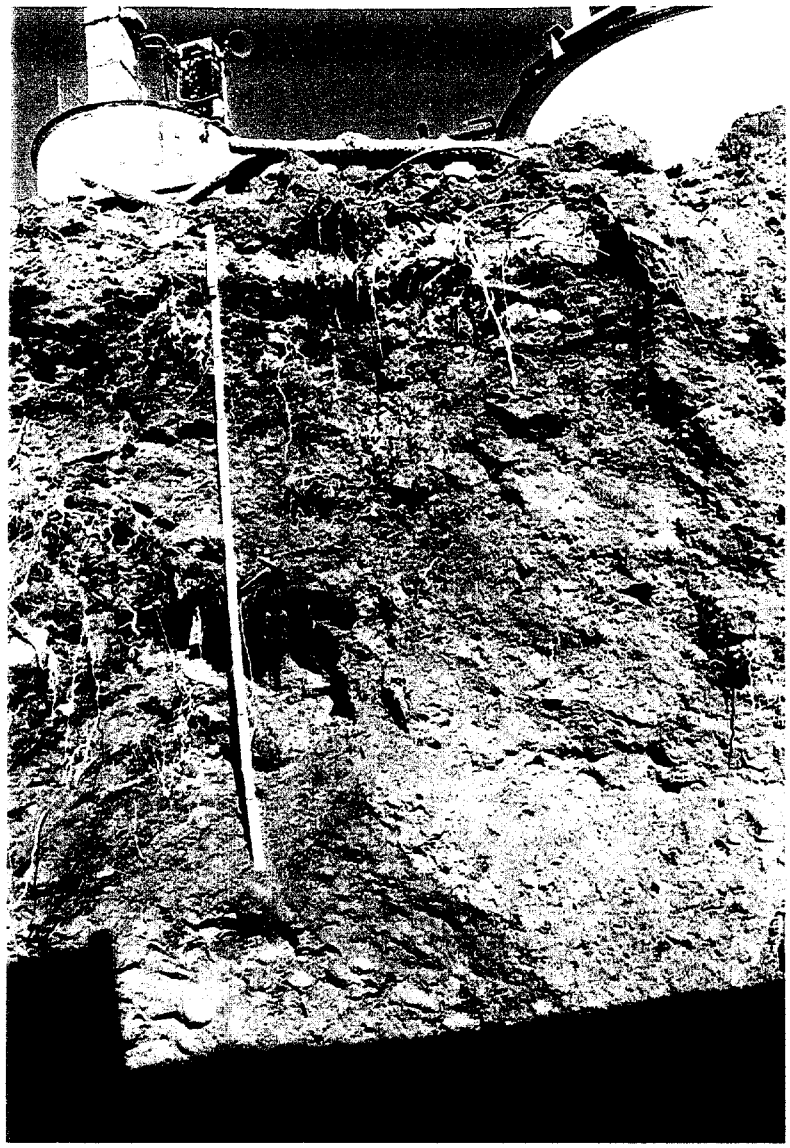

Figure 14
Area D
North Wall Profile (Upper Portion)

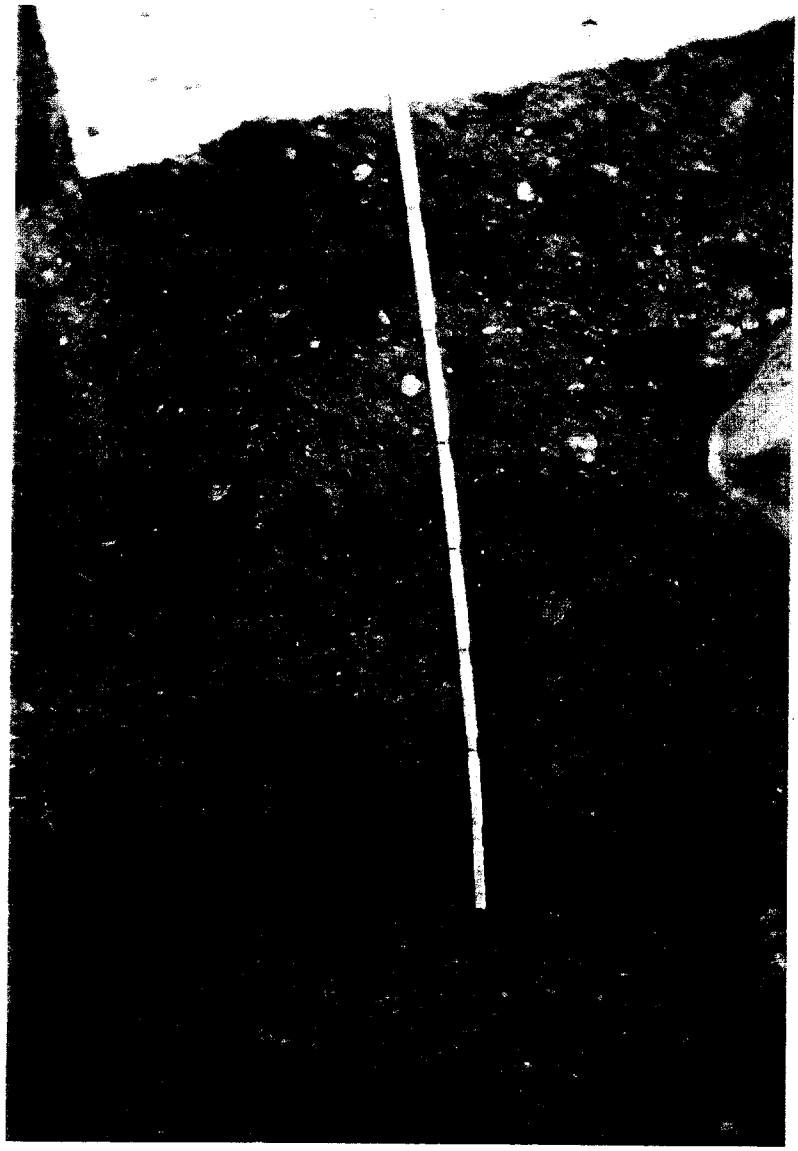

Figure 15
Area D
North Wall Profile (Lower Portion)

Figure 16
Area E
North Wall Profile (Upper Portion)

Figure 17
Area E
North Wall Profile (Lower Portion)

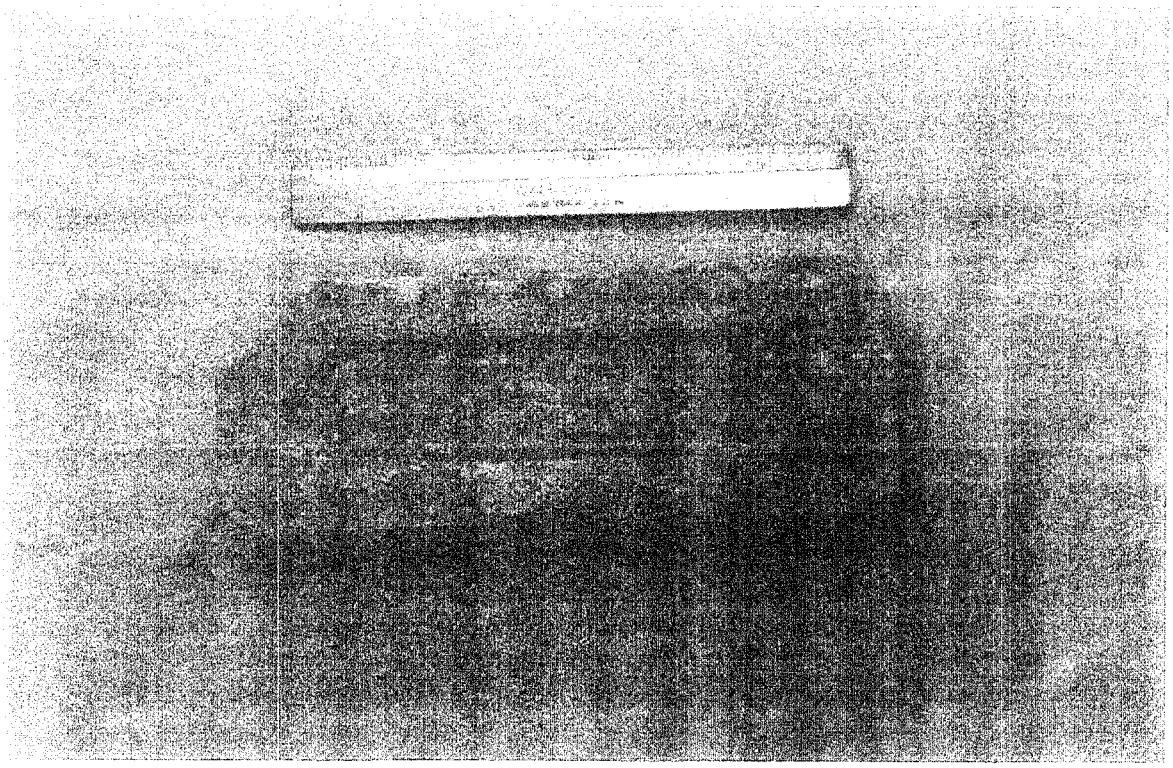

Figure 18
Dennings Point Brick Works (DPBW) Red Brick - Area A

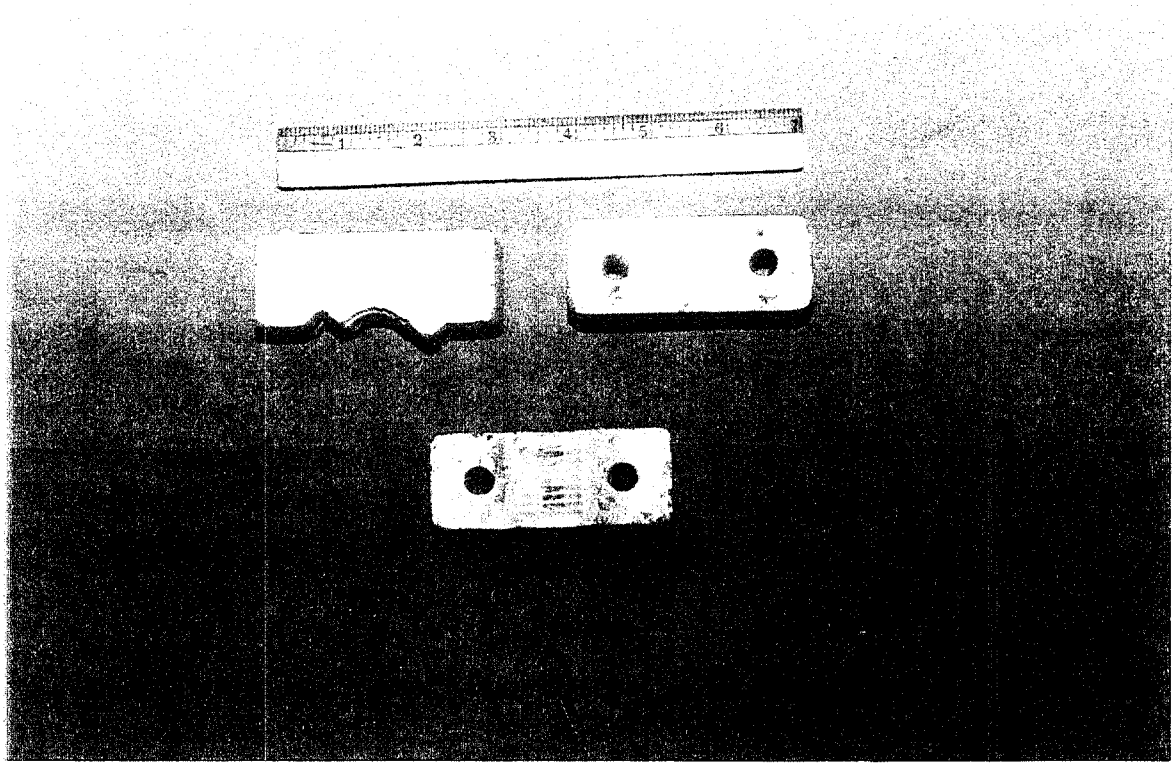

Figure 19
Porcelain Insulators
(Area A: Upper Left; Area D: Upper Right;
Area E: Bottom)

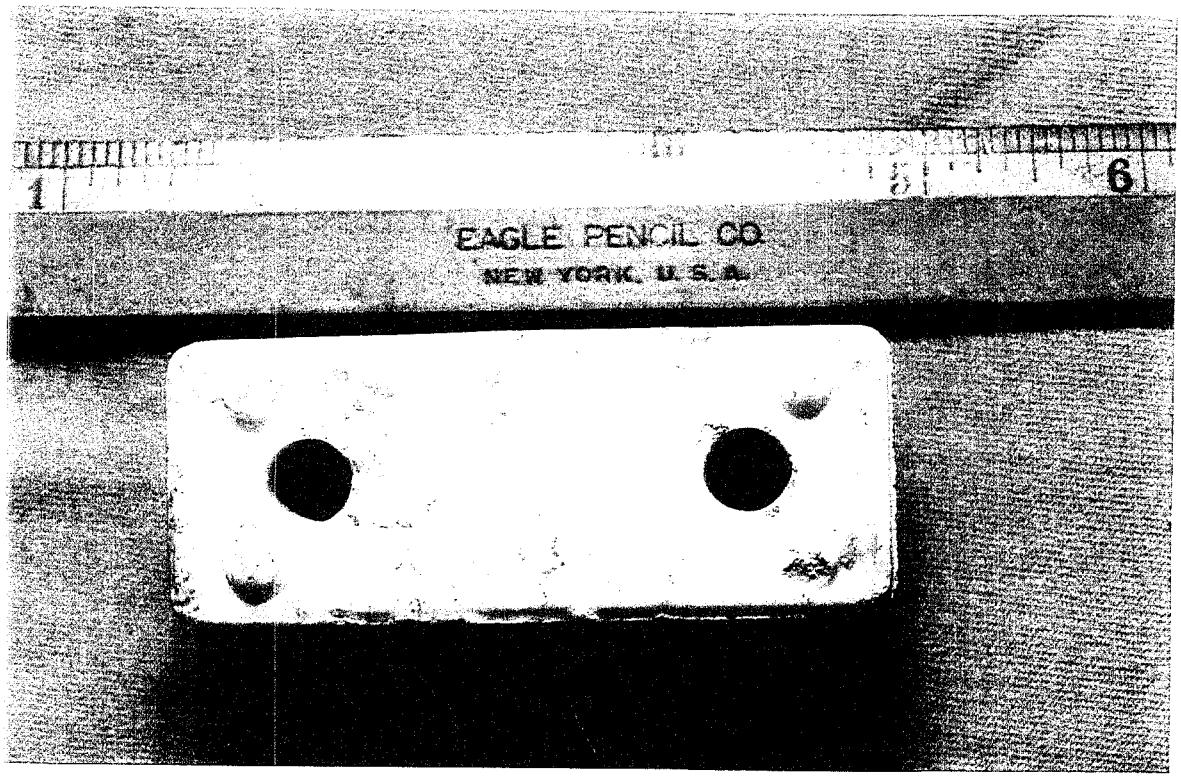

Figure 20
Porcelain Insulator: Close-Up View

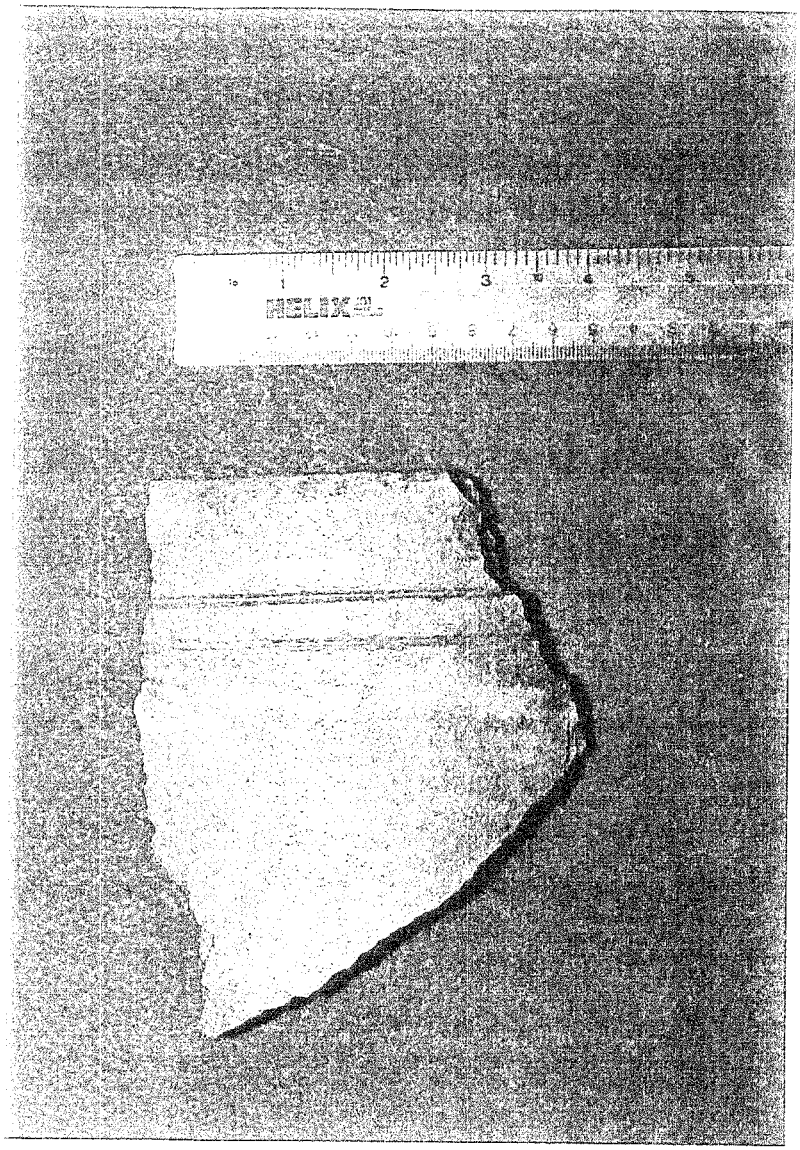

Figure 21
Brown Salt Glazed Stoneware Fragment - Area A

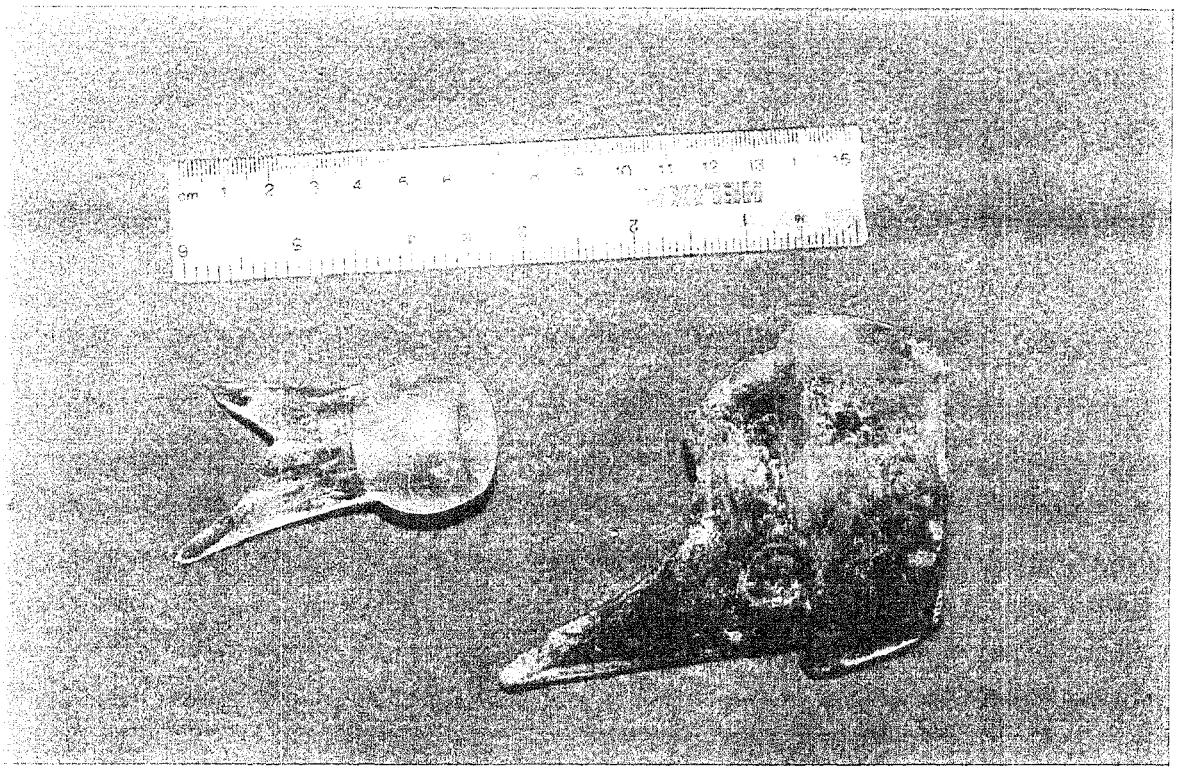

Figure 22
Green Glass Insulator Fragment - Area C (Top)
Bottle Neck and Rim Fragment - Area A (Bottom)

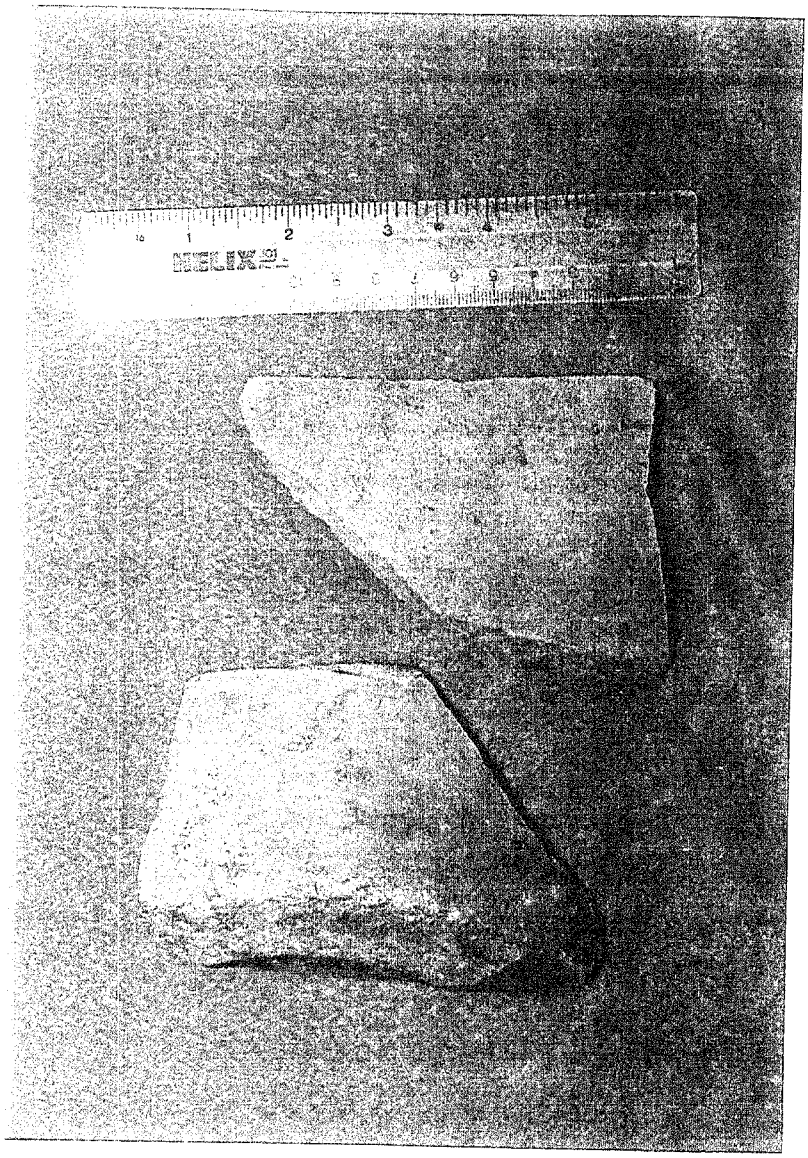

Figure 23
Unglazed Redware Body Fragment - Area A (Top)
Unglazed Redware Base and Body Fragment - Area D (Bottom)

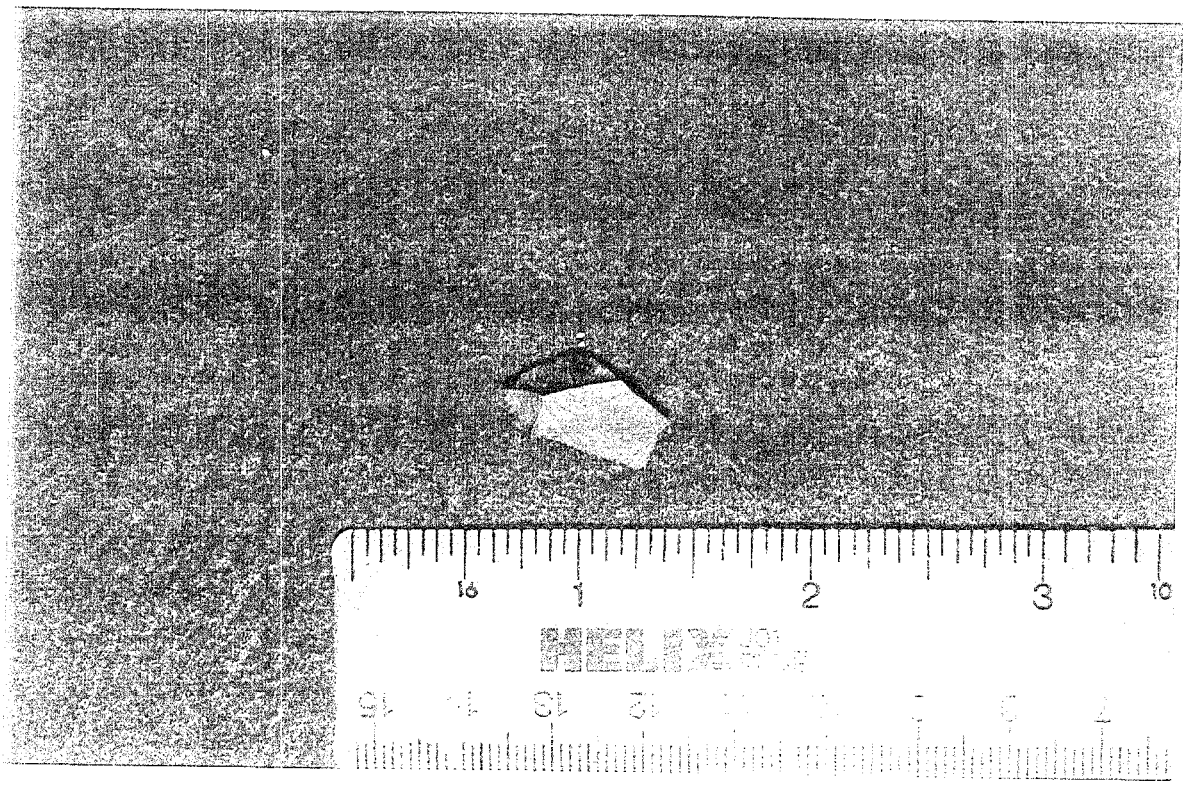

Figure 24
Brown Chert Flake - Shovel Test 1, Area A

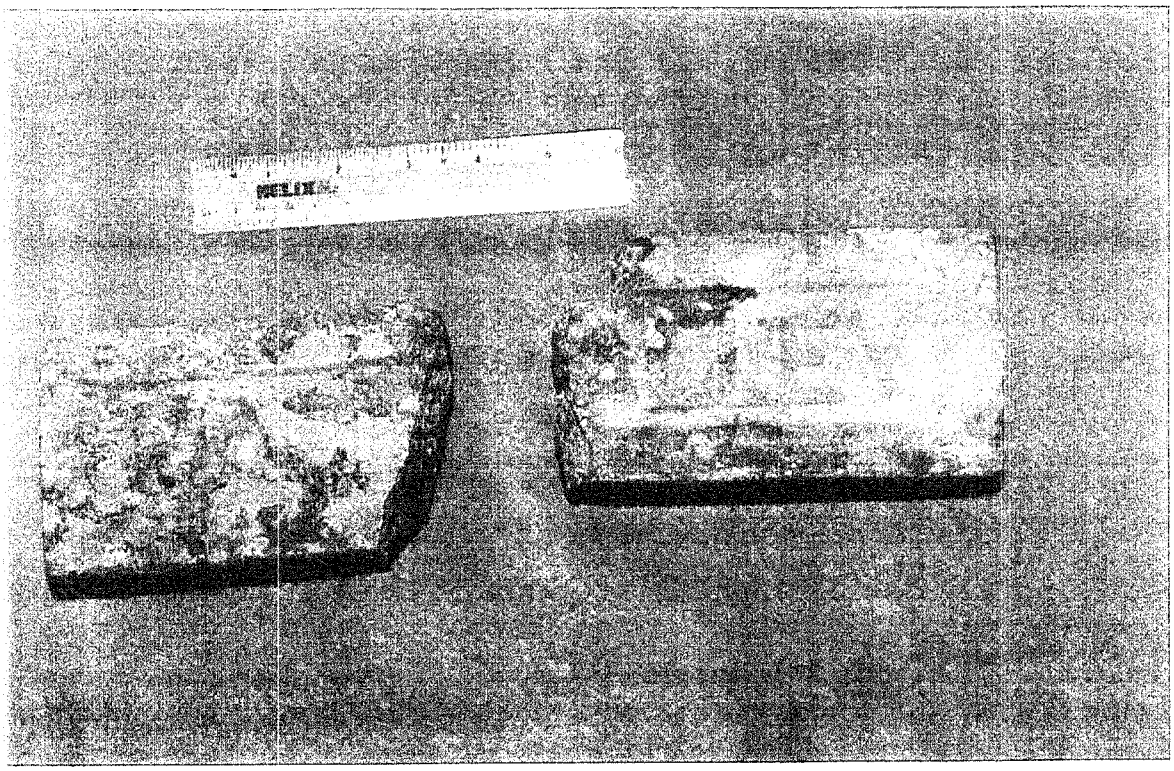

Figure 25
Red Brick Fragments (Malley) -
Area B (Right) and Area E (Left)

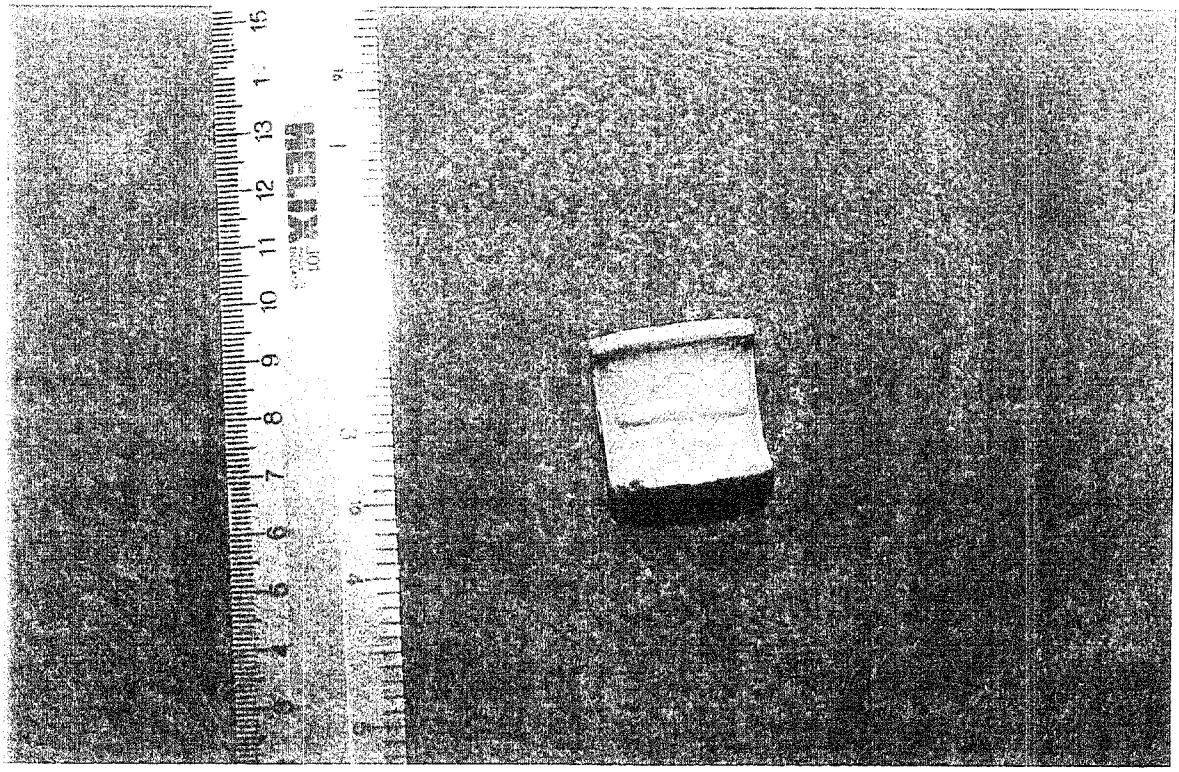

Figure 26
Celluloid Saddle - Area B

Figure 27
Porcelain Door Knob - Area D

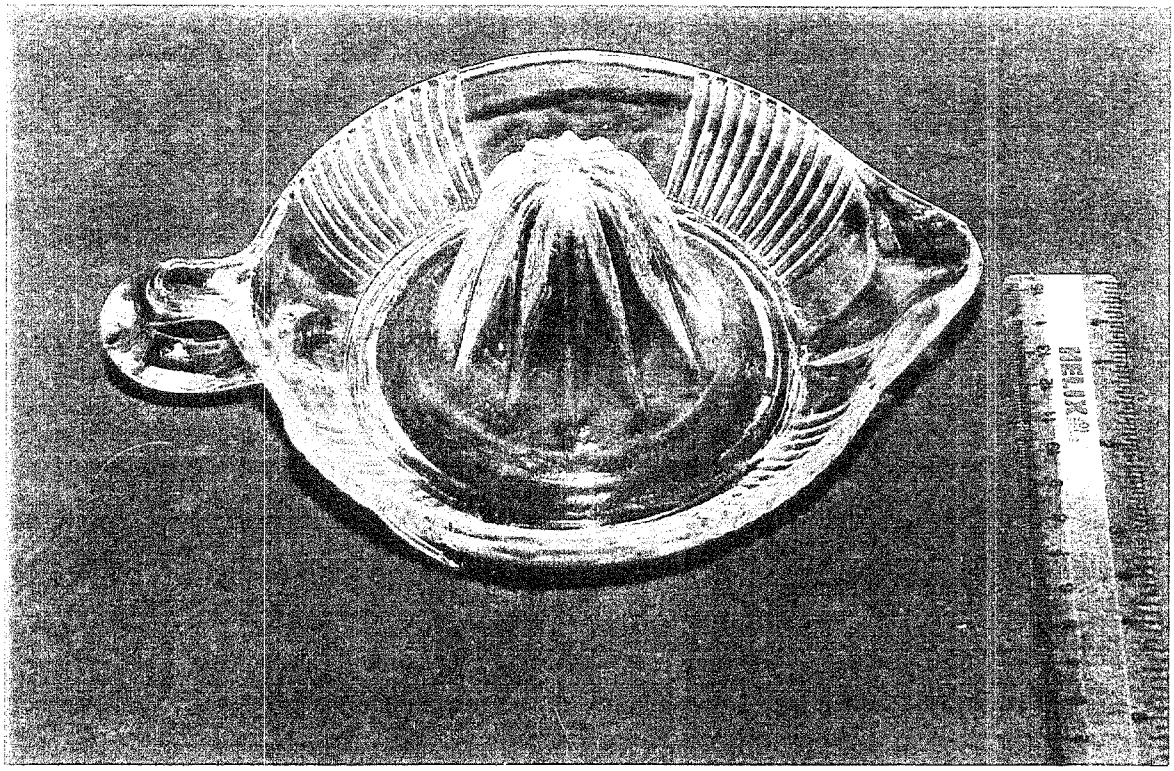

Figure 28
Glass Citrus Squeezer/Juicer - Area D

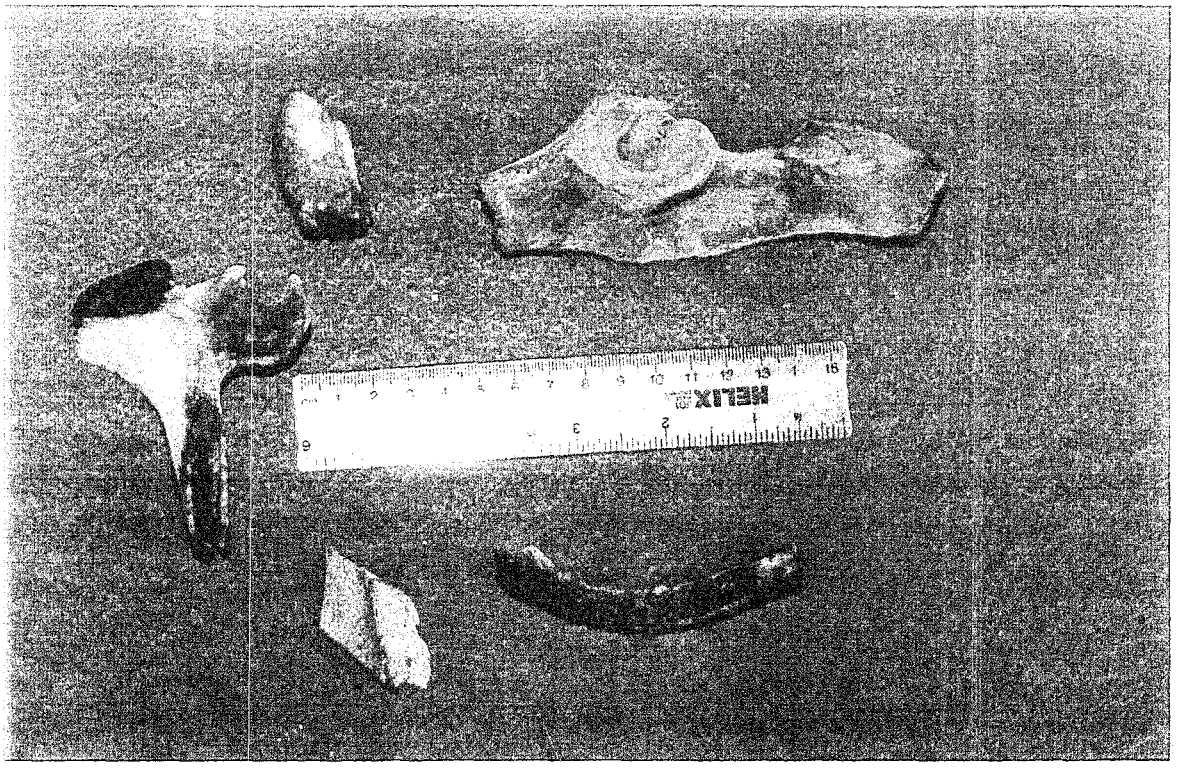

Figure 29
Domesticated Mammal Bone - Area D

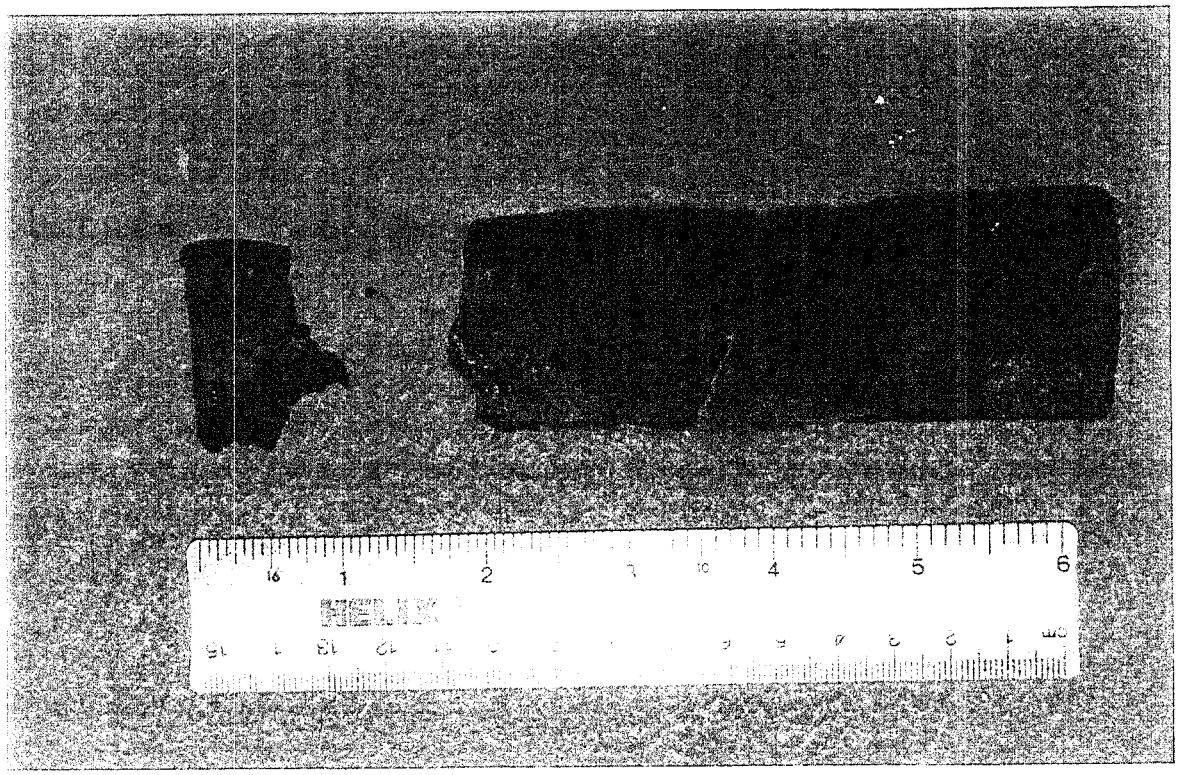

Figure 30
Worked Leather Fragment - Area D

Figure 31
Red Brick (Staples) - Area E

APPENDIX A

ARCHAEOLOGICAL STRATIGRAPHY AND ARTIFACTS INVENTORY

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AREA A PROFILE - WEST WALL PROFILE

Strat. No.	Depth (inches)	Description	Artifacts
I	0-4	Dark Brown Sandy Silt	None
II	4-12	Dark Brown Sandy Silt mixed with Brown Sand	1 pc. plain ironstone
III	12-27/36	Brown Sand	1 red brick "DPBW" on frog (panel) leng.: 8 in., wid.: 3in., ht.: 2.5 in. wt.: 3 lbs. Depth of panel: 3/16th in.
IV	27/36 - 32/48	Brown and Tan Sand	1 white porcelain insulator - rectangular-shaped with threaded cavity on one face; on opposite face are four bosses and molded letters/numbers: "B & D 3 Pat. Aug. 13 95"; two attachment holes extend through insulator; leng.: 4.25 in. wid.: 1.25 in. thick.: 1.25/1.33 in. wt.: 177.3 g.
V	32/48 - 40/50	Brown and Gray White Sand	None
VI	36-40/44	Layered Brown and Tan Sand	1 pc. clear molded glass

AREA A PROFILE - WEST WALL PROFILE
(continued)

Strat. No.	Depth (inches)	Description	Artifacts
VII	40/48-49	Medium Brown Sand	1 pc. plain white porcelain 1 pc. clear curved glass
VIII	49-52	Gray Black Sandy Silt	1 brown salt glazed stoneware rim and body frag.; two incised banding lines 1.25 in. below lip
IX	52-64	Dark Brown Sandy Silt	1 pc. clear curved glass
X	64-68	Brown Gray Sand	1 curved green tinted bottle glass fragment; air bubbles visible 1 blue green tinted bottle neck and rim frag.; seam ends 0.75 in. below lip; air bubbles visible
XI	68-76	Brown Sand	None
XII	68-92	Rust Brown Sand	1 unglazed redware body fragment
XIII	92-101	Gray Black Clay	None
XIV	101-112	Gray Silty Sand	None
XV	112-128	Dark Brown Black Silty Clay	None

AREA B PROFILE - NORTH WALL PROFILE

Strat. No.	Depth (inches)	Description	Artifacts
I	0-10	Dark Brown Sandy Silt	None
II	10-22	Tan Sand	None
III	22-28	Brown Sand	None
IV	28-40	Medium Brown Sandy Silt	1 red brick fragment "Alley" on frog portion present leng.: N.A. wid.: 3.25 in. ht.: 2.5 in. wt.: 2.5 lbs. Depth of frog (panel): 2/16th in.
V	40-53	Dark Brown Sandy Silt with pebbles	1 tan colored celluloid industrial saddle (wt.: 11.3 g.)
VI	53-65	Medium Brown Sandy Silt with pebbles and cobbles	1 pc. plain ironstone 1 pc. plain porcelain
VII	65-71	Black Brown Clay	None
VIII	71-78	Brown and Rust Sandy Silt	2 pc. green tinted window glass
IX	78-84	Brown Sand with cobbles	1 plain porcelain cup handle
X	84-97	Brown Sandy gravel	None
XI	97-104	Black Silty Sand	None
XII	104-112	Black Silt	None

AREA C PROFILE - NORTH WALL PROFILE

Strat. No.	Depth (inches)	Description	Artifacts
I	0-4	Dark Brown Sandy Silt	None
II	4-8/9	Brown Sandy Silt	None
III	8/9-14/25	Black Brown Sandy Silt	1 clear bottle base frag., seam visible
IV	14/24-25	Rust Brown Sandy Silt with rocks and pebbles	1 porcelain tile frag.
V	24/25-31	Medium Brown Sandy Silt	1 lump melted dark green glass - patinated (wt.: 14.4 g.) 1 green glass insulator frag; no seam visible
VI	27-31	Black Silty Clay	None
VII	31-40/42	Gray Black Sandy Silt	None
VIII	40/42-51/56	Gray Brown Sandy Silt	None
IX	51/56-72	Gray Brown Sandy Silt with pebbles	None
X	72-79/80	Gray Black Silty Clay	None
XI	79/80-84/85	Black Sandy Silt	None
XII	85-92	Gray Black Silt	None

AREA D PROFILE - NORTH WALL PROFILE

Strat. No.	Depth (inches)	Description	Artifacts
I	0-12	Dark Brown Sandy Silt	None
II	12-18	Light Brown Sandy Silt	1 curved, molded brown glass frag.
III	18-24	Black Silty Sand	1 white porcelain insulator - rectangular-shaped with threaded cavity on one face; on opposite face are four bosses and molded letters/numbers: "B & D 3 Pat. Aug. 13 95"; two attachment holes extend through insulator; leng.: 4.25 in. wid.: 1.25 in. thick.: 1.25/1.33 in. wt.: 177.3 g.
IV	24-81	Brown, Rust, and Medium Brown Sandy Silt with rocks, pebbles, and wood fragments	1 molded glass citrus squeezer/ juicer; circular in shape (6 in. dia.) with handle 1 brown glazed porcelain door handle 1 unglazed redware base and body fragment

AREA D PROFILE - NORTH WALL PROFILE
(continued)

Strat. No.	Depth (inches)	Description	Artifacts
V	81-105	Gray Brown Clayey Silt with rocks and pebbles and Dark Brown Black Clayey Silt mottling	1 pelvic frag.-cow (wt.: 55.0 g.) 1 mammal rib frag. (wt.: 2.9 g.) 1 mammal rib frag. (wt.: 5.4 g.) 1 mammal rib frag. (wt.: 5.1 g.) 1 vertebra frag. (wt.: 37.5 g.); All bone fragments show evidence of butchering
VI	105-110	Gray Green Brown Silty Clay	1 pc. molded, blue green tinted curved glass frag.; air bubbles visible 1 molded green tinted bottle base; words: "EW YOR" present on base 3 leather frags. all worked/tooled; two largest pieces mend; smallest piece has punched holes; (wts.: 10.9, 6.0, 1.4 gs.)
VII	105-112	Black Sandy Silt with pebbles	None
VIII	112-116	Dark Brown Silty Clay with Black Brown Silty Clay mottling	None
IX	116-124	Black Brown Silty Clay	None

AREA E PROFILE - NORTH WALL PROFILE

Strat. No.	Depth (inches)	Description	Artifacts
I	0-6	Concrete Slab	None
II	6-9	Medium Brown Sandy Silt with pebbles	None
III	9-12	Dark Brown Gray Sandy Silt	None
IV	12-14	Tan Sand	None
V	14-17	Dark Brown Gray Sandy Silt	1 white porcelain insulator - rectangular-shaped with threaded cavity on one face; on opposite face are four bosses and molded letters/numbers: "B & D 3 Pat. Aug. 13 95"; two attachment holes extend through insulator; leng.: 4.25 in. wid.: 1.25 in. thick.: 1.25/1.33 in. wt.: 177.3 g.
VI	17-19	Orange Tan Brown Sand	1 red brick; "Staples" on portion of frog present; leng.: 3.5 in. wid.: 2.25 in. ht.: 2.25 in. wt.: 4 lbs. Depth of frog (panel): 2/16th in.

AREA E PROFILE - NORTH WALL PROFILE
(continued)

Strat. No.	Depth (inches)	Description	Artifacts
VII	20-24	Dark Brown Sand	1 red brick frag. "Mall" on frog portion present; leng.: N.A. in. wid.: 3.25 in. ht.: 2.5 in. wt.: 2.25 lbs. Depth of frog (panel): 2/16th in.
VIII	24-27	Dark Brown Gray Sandy Silt	None
IX	27-32	Tan Brown Sand with pebbles	None
X	32-37	Brown Gray Clayey Silt with pebbles	None
XI	37-43	Layered Gray Brown and Tan Sand	None
XII	43-47	Tan Sand	None
XIII	47-92/95	Dark Brown Gray Clayey Silt with pebbles and rocks/cobbles	None

AREA A - SHOVEL TESTS 1 - 3

SHOVEL TEST 1

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	92-101	Gray Black Clay	1 brown chert flake (wt.: 0.3 g.)
II	101-112	Gray Silty Sand	None
III	112-140	Dark Brown Black Silty Clay	None

Hit tidal water at 99 inches

SHOVEL TEST 2

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	92-105	Gray Black Clay	None
II	105-115	Gray Silty Sand	None
III	115-145	Dark Brown Black Silty Clay	None

Hit tidal water at 99 inches

SHOVEL TEST 3

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	92-107	Gray Black Clay	None
II	107-114	Gray Silty Sand	None
III	114-145	Dark Brown Black Silty Clay	None

Hit tidal water at 100 inches

AREA B - SHOVEL TEST 4

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	97-105	Black Silty Sand	None
II	105-112	Black Silt	None
III	112-146	Dark Brown Black Silty Clay	None

Hit tidal water at 100 inches

AREA C - SHOVEL TEST 5

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	75-80	Gray Black Silty Clay	None
II	80-85	Black Sandy Silt	None
III	85-115	Gray Black Silt	None

Hit tidal water at 95 inches

AREA D - SHOVEL TEST 6

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	105-115	Black Sandy Silt with pebbles	None
II	115-118	Dark Brown Silty Clay with Black Brown Silty Clay mottling	None
III	118-145	Black Brown Silty Clay	None

Hit tidal water at 120 inches

AREA E - SHOVEL TEST 7

Strat. No.	Depth (inches below surface)	Description	Artifacts
I	107-115	Gray Black Silty Clay	None
II	115-127	Gray Silty Sand	None
III	127-152	Dark Brown Black Silty Clay	None

Hit tidal water at 111 inches

APPENDIX B

ARCHAEOLOGICAL PROFILES: AREAS A - E

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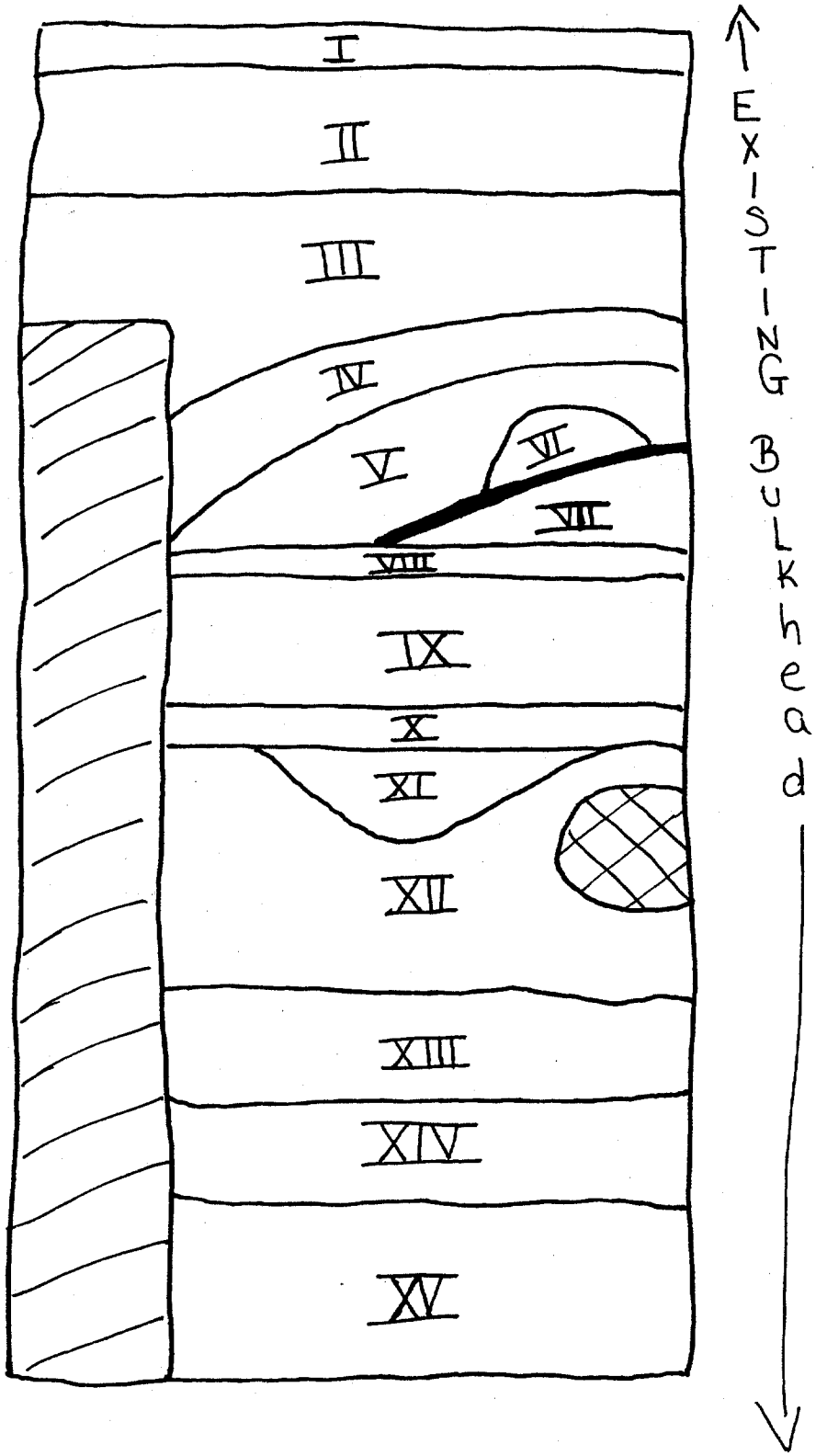
AREA A - EAST WALL PROFILE
Scale: 0.25 inch = 4 inches

Profile - Area A



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PROFILE - AREA A

KEY:

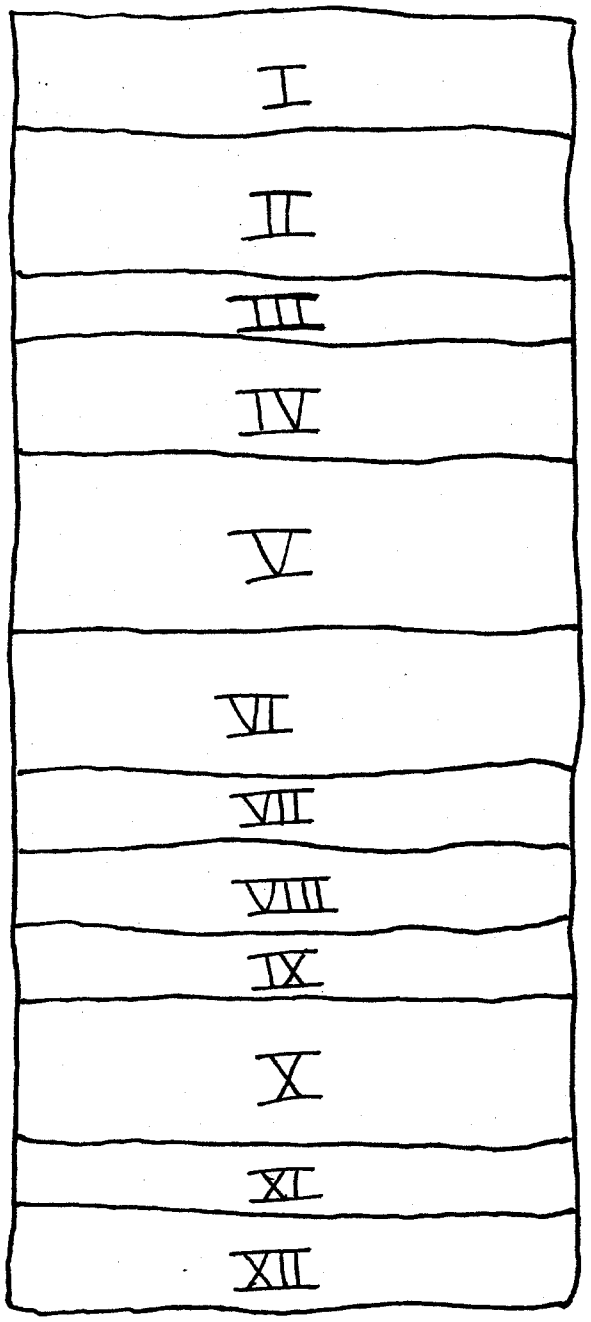
I: Dark Brown Sandy Silt
II: Dark Brown Sandy Silt mixed with Brown Sand
III: Brown Sand
IV: Brown and Tan Sand
V: Brown and Gray White Sand
VI: Layered Brown and Tan Sand
VIIG: Medium Brown Sand
VIII: Gray Black Sandy Silt
IX: Dark Brown Sandy Silt
X: Brown Gray Sand
XI: Brown Sand
XII: Rust Brown Sand
XIII: Gray Black Clay
XIV: Gray Silty Sand
XV: Dark Brown Black Silty Clay

: wood

: wood piling

AREA B - NORTH WALL PROFILE
Scale: 0.25 inch = 4 inches

Profile- Area B



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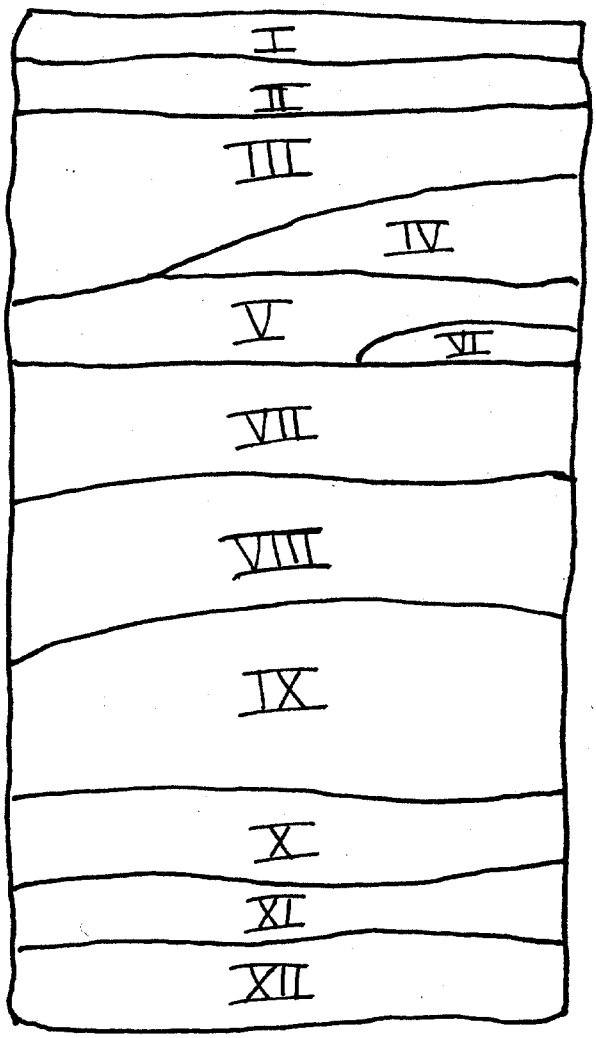
PROFILE - AREA B

KEY:

I: Dark Brown Sandy Silt
II: Tan Sand
III: Brown Sand
IV: Medium Brown Sandy Silt
V: Dark Brown Sandy Silt with pebbles
VI: Medium Brown Sandy Silt with pebbles and cobbles
VII: Black Brown Clay
VIII: Brown and Rust Sandy Silt
IX: Brown Sand with pebbles
X: Brown Sandy gravel
XI: Black Silty Sand
XII: Black Silt

AREA C - NORTH WALL PROFILE
Scale: 0.25 inch = 4 inches

Profile - Area C



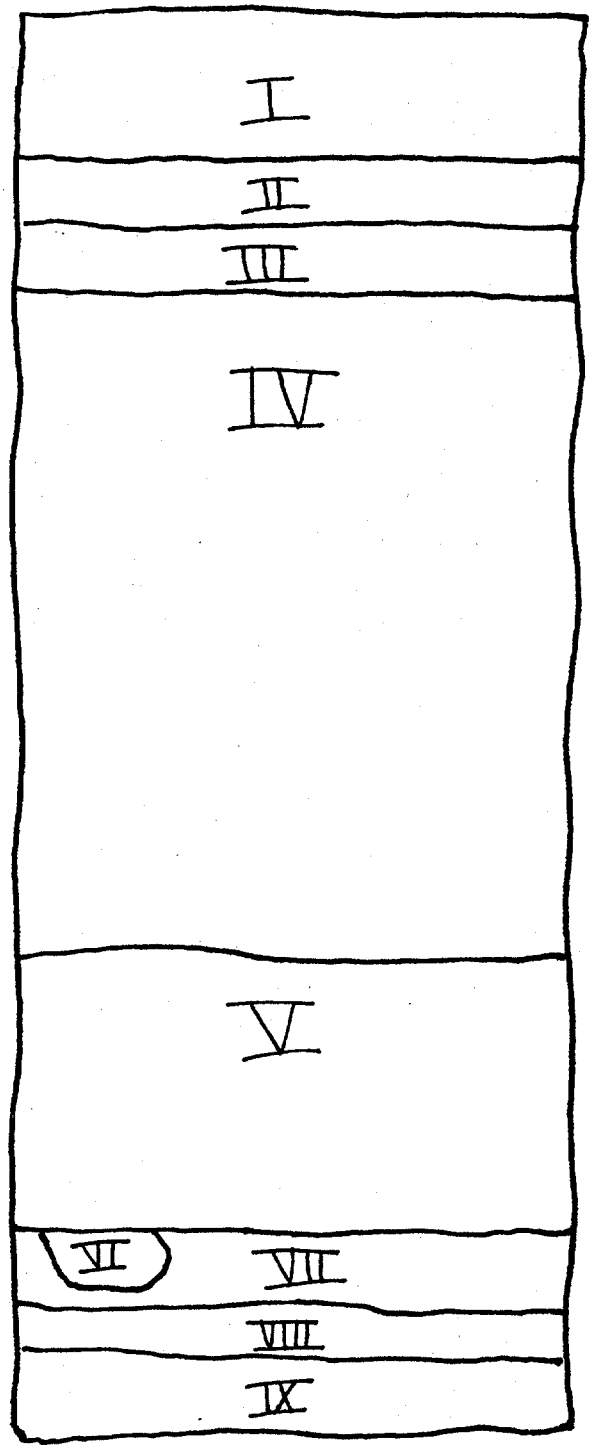
PROFILE - AREA C

KEY:

I: Dark Brown Sandy Silt
II: Brown Sandy Silt
III: Black Brown Sandy Silt
IV: Red Brown Sandy Silt with pebbles
V: Medium Brown Sandy Silt
VI: Black Sandy Clay
VII: Gray Black Sandy Silt
VIII: Gray Brown Sandy Silt
IX: Gray Brown Sandy Silt with pebbles
X: Gray Black Silty Clay
XI: Black Sandy Silt
XII: Gray Black Silt

AREA D - NORTH WALL PROFILE
Scale: 0.25 inch = 4 inches

Profile - Area D



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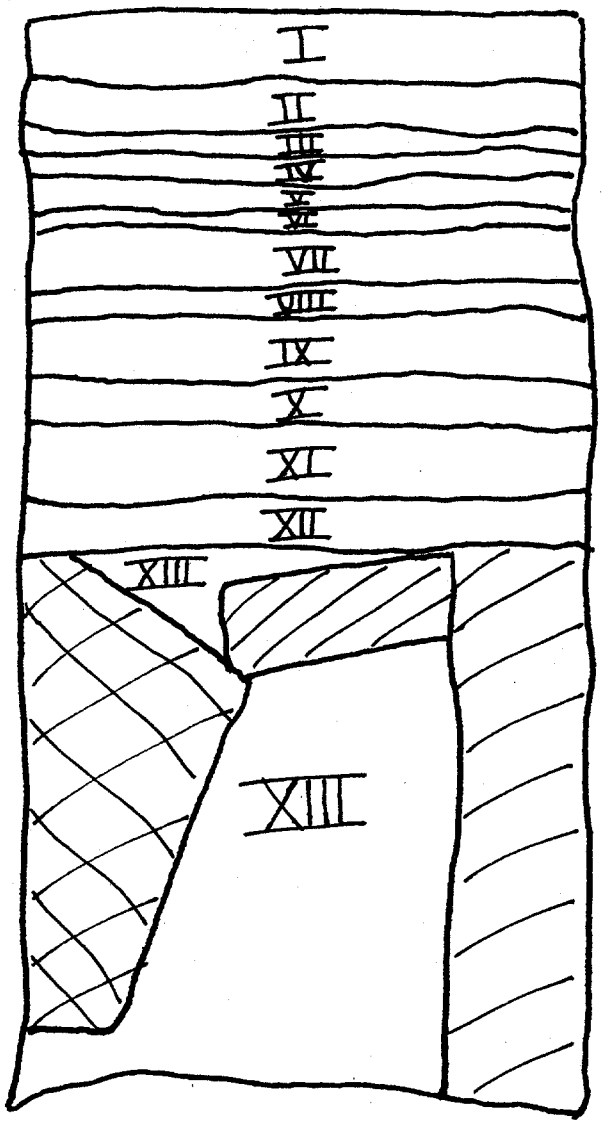
PROFILE - AREA D

KEY:

I: Dark Brown Sandy Silt
II: Light Brown Sandy Silt
III: Black Silty Sand
IX: Brown, Rust, and Medium Brown Sandy Silt with rocks, pebbles, brick, and wood fragments
V: Gray Brown Clayey Silt with rocks and pebbles and Dark Brown Black Clayey Silt mottling
VI: Gray Green Brown Silty Clay
VII: Black Sandy Silt with pebbles
VIII: Brown Silty Clay with Dark Brown Silty Clay mottling
IX: Black Brown Silty Clay

AREA E - NORTH WALL PROFILE
Scale: 0.25 inch = 4 inches



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PROFILE - AREA E

KEY:

I: Concrete Slab
II: Medium Brown Sandy Silt with pebbles
III: Dark Brown Gray Sandy Silt
IV: Tan Sand
V: Dark Brown Gray Sandy Silt
VI: Orange Tan Brown Sand
VII: Dark Brown Sand
VIII: Dark Brown Gray Sandy Silt
IX: Tan Brown Sand with pebbles
X: Brown Gray Clayey Silt with pebbles
XI: Layered Gray Brown and Tan Sand
XII: Tan Sand
XIII: Dark Brown Gray Clayey Silt with pebbles and rocks/cobbles

: wood piling (tree trunks)

: laid brick and mortar

Appendix I (2)

Archaeological Monitoring of Remedial Investigation Test Trenches - Parcel B, Li Tungsten Superfund Site

ARCHAEOLOGICAL MONITORING OF REMEDIAL INVESTIGATION TEST TRENCHES - PARCEL B, LI TUNGSTEN SUPERFUND SITE, GLEN COVE, NEW YORK

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Figure 2 - Li Tungsten Site Location
Figure 3 - Parcel B Site Plan
Figure 4 - Parcel B Showing Test Trench Locations

1.0 INTRODUCTION

This report presents the results of archaeological monitoring of the mechanized excavation of seven test trenches in Parcel B of the Li Tungsten Corporation (Li Tungsten) site located at 63 Herb Hill Road, City of Glen Cove, Nassau County, New York (Figures 1 - 3). The test trenches were excavated as part of the Remedial Investigation of the site. The archaeological monitoring was conducted as part of the remedial investigation/ feasibility study (RI/FS) scope of work as described in the RI/FS Work Plan (Malcolm Pirnie 1993).

A previously conducted Stage Ia archaeological investigation of the Li Tungsten site (Malcolm Pirnie 1995) determined that portions of Parcel B were sensitive for the presence of Native American and Historic period cultural resources. That report recommended a Stage Ib investigation of Parcel B be undertaken prior to any large-scale disturbance and/or earth removal conducted as part of the Remedial Action.

The environmental characteristics of Parcel B are similar to those of known sites within the Glen Cove drainage. This, plus the fact that aboriginal artifacts have been recovered within a few hundred feet of the northern portion of the parcel, suggests that Native American activity could have occurred within the study area.

Historic Period resources possibly present within Parcel B could be associated with the mid to late nineteenth century Dickson house and/or associated outbuildings. Such resources may include buried architectural remains, archaeological features (i.e. wells, privies, cisterns) and/or archaeological deposits. The area of Historic period sensitivity associated with the Dickson house is located adjacent to the western most portion of Parcel B beginning approximately 220 feet north of the intersection of Herb Hill Road and Dickson Lane and extending northward for approximately 275 feet (Figure 3). This area is approximately 50 feet wide.

Other Historic period resources possibly present within Parcel B could be associated with the seventeenth century occupation of the Carpenter house or other contemporary residences formerly located north of The Place. The high ground adjacent to The Place in the northernmost portion of the site is sensitive for these historic properties.

Given the fact that Parcel B was considered to be archaeologically sensitive and that a Stage Ib investigation has not been conducted as of this date, it was felt that archaeological monitoring of the excavation of the remedial investigation test trenches was warranted. The purpose of the monitoring was to determine whether the test trenches

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encountered: 1) Historic period features and/or structural elements; 2) obvious Historic period deposits; and 3) obvious aboriginal deposits.

1.1 Parcel B Description

Parcel B is the smallest of the four parcels at the Li Tungsten site at less than six acres in size. It is bounded by Herb Hill Road on the south, Dickson Lane on the west, The Place on the north, and an adjoining property on the east (Figure 3). The northernmost approximately three quarters of Parcel B consists of bench-like terraces located along the slope of a hill (see Malcolm Pirnie 1995:1-4 - 1-6). The area is covered with trees and scrub vegetation. The southernmost approximately one quarter of the Parcel is relatively level and covered with grass and scrub vegetation. The latter area was formerly a parking lot for workers at the facility. Filling and grading activities apparently occurred there.

An artificially created pond, approximately 70 feet in diameter, is located in the south-central part of Parcel B. The pond appears to be shallow and supports a thick growth of vegetation along its margins. The pond and the area to the north and east are drained by several small ditches which merge to form an intermittent stream. A portion of Parcel B north of the pond is reportedly the location of past disposal activities (NUS 1989; 1990; 1991). A number of soil piles, covered with vegetation, are located in the central portion of this parcel.

2.0 METHODOLOGY

Seven mechanized (standard tractor mounted backhoe) test trenches were excavated in Parcel B in areas where: 1) previously conducted remote sensing investigations had detected the presence of anomalies whose source may be associated with hazardous materials and 2) radiation surveys detected levels that are substantially higher than background amounts. Test trenches were conducted primarily to investigate the source of the anomalies and/or radiation. Site vegetation was mechanically removed in the immediate vicinity of each test trench and along corridors providing access to the trench locations.

Excavated test trenches were between 10 to 15 feet in length and between two and four feet in width. The test trenches were excavated in approximately one foot levels with two or more passes of the machine's bucket required to achieve that depth. This excavation methodology allowed the trenches to be examined for the presence of archaeological resources in intervals of six inches or less. After each one foot increment was excavated, Remedial Investigation soil sampling was undertaken. After each

sampling, the wall profiles and the trench floor were examined and the stratigraphy recorded before trenching resumed.

The mechanized test trenches were excavated to various depths depending upon the requirements of the Remedial Investigation. At the conclusion of each test trench, at least one wall profile was appropriately recorded.

The location of each test trench is indicated on Figure 4.

In addition to the test trenches, further surface examination was conducted in Parcel B, particularly in those locations were vegetation was removed in order to conduct the mechanized test trenches.

3.0 TEST TRENCH STRATIGRAPHY

3.1 Test Trench 1

Fill consisting of approximately two and a half feet of brown to dark brown sandy silt was the initial deposit encountered beneath the approximately one foot thick modern humus and leaching zone in this test trench which was located in the raised, east central portion of Parcel B, approximately 110 feet south of the middle entrance gate (Figure 4). Automobile hub caps, steel car drum and metal brake, other pieces of miscellaneous metal, brick, glass, and plastic were observed in the fill. Beneath the fill was an approximately three inch thick deposit of dark brown black sandy silt which is apparently the pre-fill ground surface. A dark gray brown sandy silt leaching zone, approximately four inches thick, was located immediately below the former ground surface. No cultural material was noted in either of these layers. Under these former surficial strata were a series of culturally sterile glacial sub-soil layers extending to the base of the test trench located at approximately eight feet below modern grade. These layers consists of approximately ten inches of yellow brown silty sand, 14 inches of orange brown silty sand, and two feet or rust orange brown silty sand with cobbles and gravel. Ground water was encountered at approximately seven and a half feet below modern grade.

3.2 Test Trench 2

The initial three feet of soil encountered in this test trench, located in the low-lying part of the east central portion of the project area approximately 170 feet south of the main gate and 78 feet east of the fence line, consisted of various layers of light brown to dark brown sandy silt fill (Figure 4). Relatively recently manufactured cultural material (i.e. plastic, aluminum cans) were associated with the fill. Below

the fill was what appeared to be an approximately five inch thick, former wetland deposit consisting of dark gray black sandy clay. Below the dark gray black sandy clay was an approximately two foot thick layer of gray green sandy clay with dark brown silty clay mottles which apparently also represents a wetland deposit. No cultural material was seen to be associated with these layers. Ground water was encountered in the gray green sandy clay layer. A disturbance of some sort consisting of a lens of dark brown organic silt extended parallel to the trench along its eastern wall at the top of the gray green sandy clay. The disturbance may be an old root mold/impression or rodent burrow. Below the sandy clay was a rust orange brown silty sand layer with cobbles and rock representing the local, culturally sterile, glacial sub-soil. The glacial sub-soil extended to the base of the test trench located at approximately seven feet below grade.

3.3 Test Trench 3

Beneath thin layers (0.5-2 inches thick) of relatively recently developed surface soils in this test trench, located approximately 30 feet north of the middle entrance gate, was approximately three feet of fill consisting of various layers of gray brown to red brown clayey sand to sandy silt (Figure 4). Underlying the fill was a two inch thick layer of dark brown sandy silt that is apparently a former ground surface. An approximately one inch thick leaching zone of gray brown sandy silt was located beneath the former surface layer. No cultural material was observed in either of these strata. Below them was an approximately 18 inch thick deposit of brown to orange brown silty sand. This layer may represent an earlier fill episode over which subsequently developed the former ground surface. Redeposited glacial sub-soil was apparently used for the fill. No cultural material was detected in the brown to orange brown sandy silt layer. Below this strata was a gray mottled silty clay fill layer within which was a an approximately 0.5 inch thick layer of asphalt. The asphalt probable is park of a former parking lot surface. The fill and asphalt overly a layer of bluish gray clayey silt which appeared to be a wetland associated deposit. The clayey silt deposit extended to the base of the trench, a depth of over 10 feet.

3.4 Test Trench 4

The initial strata seen in test trench 4, located approximately 35 feet west of the east fence line, were the recently developed seven inch thick humus and three inch thick leaching zone (Figure 4). Beneath these layers was an approximately two and a half foot thick fill deposit of gray brown to tan brown sandy silt. Below the fill was an approximately eight inch thick deposit of gray black sandy silt mixed with light brown sandy silt. This is a former ground surface but appears to have been

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disturbed. Below the mixed strata was a five to six inch thick leaching zone of light gray brown sandy silt. Underlying the leaching zone and extending to the base of the trench (approximately eight feet below grade) was the culturally sterile glacial subsoil which, here, was a brown to orange brown silty sand. Ground water was encountered in this trench at approximately seven and a half feet below grade.

3.5 Test Trench 5

A three inch thick humus layer and a three inch thick leaching zone were the initial strata encountered in test trench 5 (Figure 4). Below these surface layers was an approximately 10 inch thick fill layer consisting of dark brown to gray brown sandy silt. Miscellaneous fragments of metal and glass were seen in the fill. Below the fill was an approximately ten inch thick layer of black sandy silt followed by three inches of gray brown sandy silt. These layers are a former ground surface and underlying leaching zone. No cultural material was seen to be associated with either of these strata. Below these surface layers was the culturally sterile glacial subsoil which in test trench 5 was a light brown to orange brown silty sand. This stratum extended to the base of the test trench located at approximately two and a half feet below grade.

3.6 Test Trench 6

No fill was encountered in test trench 6 which was located approximately 250 feet north of the main gate and 23 feet east of the fence line (Figure 4). Only the natural soil sequence was revealed. The initial stratum revealed here was the modern humus which extended to between three and four inches below the surface. Below the humus was the underlying leaching zone extending to approximately 14 inches below the surface. Only modern cultural material (plastic, cellophane, cigarette filter) was found to be associated with these strata. Beneath the leaching zone as the culturally sterile brown to orange brown silty sand glacial subsoil. This deposit extended to the bottom of the test trench which was located at approximately 13.5 feet below grade.

3.7 Test Trench 7

Below approximately 10 inches of modern surface soils in test trench 7, located approximately 30 feet north of the south east entrance gate, was a six to eight inch thick fill layer of light brown to brown sandy silt (Figure 4). A thin asphalt layer, probably associated with a former parking area, was located in the fill. Beneath the fill was a six to seven inch thick former ground surface layer of black silt below which was a 4 inch thick leaching zone of dark brown sandy silt. No cultural material was found to be associated with either of the former

surface strata. Underlying the leaching zone was a 13 inch thick layer of brown to orange brown sandy silt with gravel. Below the sandy silt and gravel fill was a layer of dark brown to reddish brown silty clay which extended to the base of the test trench located at approximately five feet below grade. Ground water was encountered in this test trench the top of the silty clay.

4.0 INTERPRETATIONS AND CONCLUSIONS

The results of the test trench excavations suggest that extensive filling occurred in the northern portion of Parcel B. These soils apparently served, at least in part, to fill in low-lying and wetland areas that were formerly located in the parcel. No cultural deposits or architectural features of potential archaeological value were encountered in any of the test trenches. Such historic properties may be present in the project area, however, but were not detected in the monitored test trenches. The subsurface investigations recommended in the Stage Ia study (Malcolm Pirnie 1995:5-4 - 5-5, 6-1 - 6-3) should be conducted within Parcel B if further, substantial ground disturbance will occur there as part of scheduled clean-up activities.

5.0 REFERENCES CITED

Malcolm Pirnie, Inc.

1994 Remedial Investigation/Feasibility Study Work Plan. Prepared Under Work Assignment No. 025-2L4L, Contract No. 68-W9-0051 for the United States Environmental Protection Agency, Region II, March 1993.

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NUS

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United States Geological Survey
1979 Sea Cliff Quadrangle, New York, 7.5 Minute Series (Topographic). United States Department of the Interior, United States Geological Survey, Washington, D.C.

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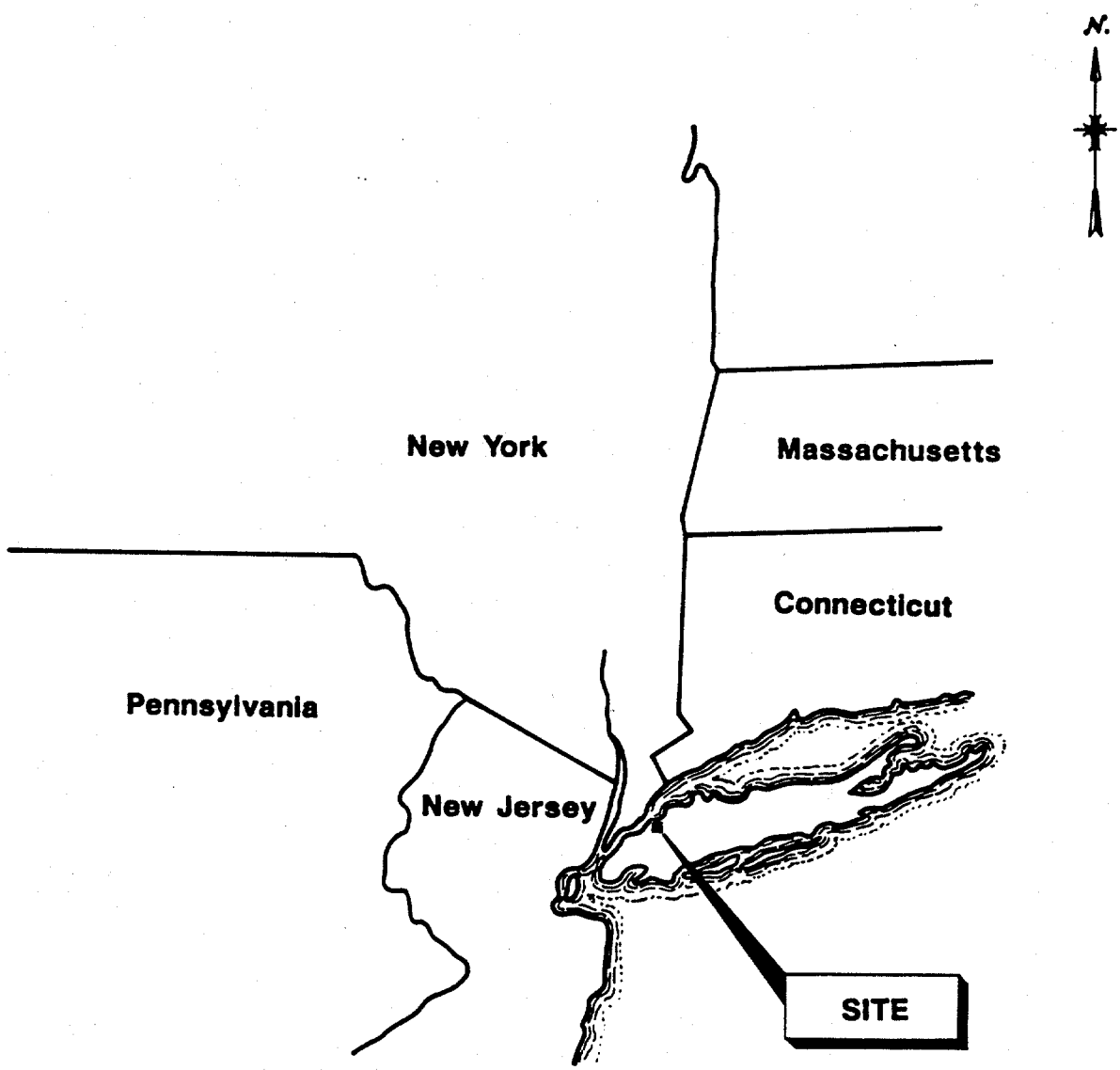
Figure 1
Regional Location Map
Li Tungsten
Glen Cove, New York

FIGURE 1



MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK
REGIONAL LOCATION MAP

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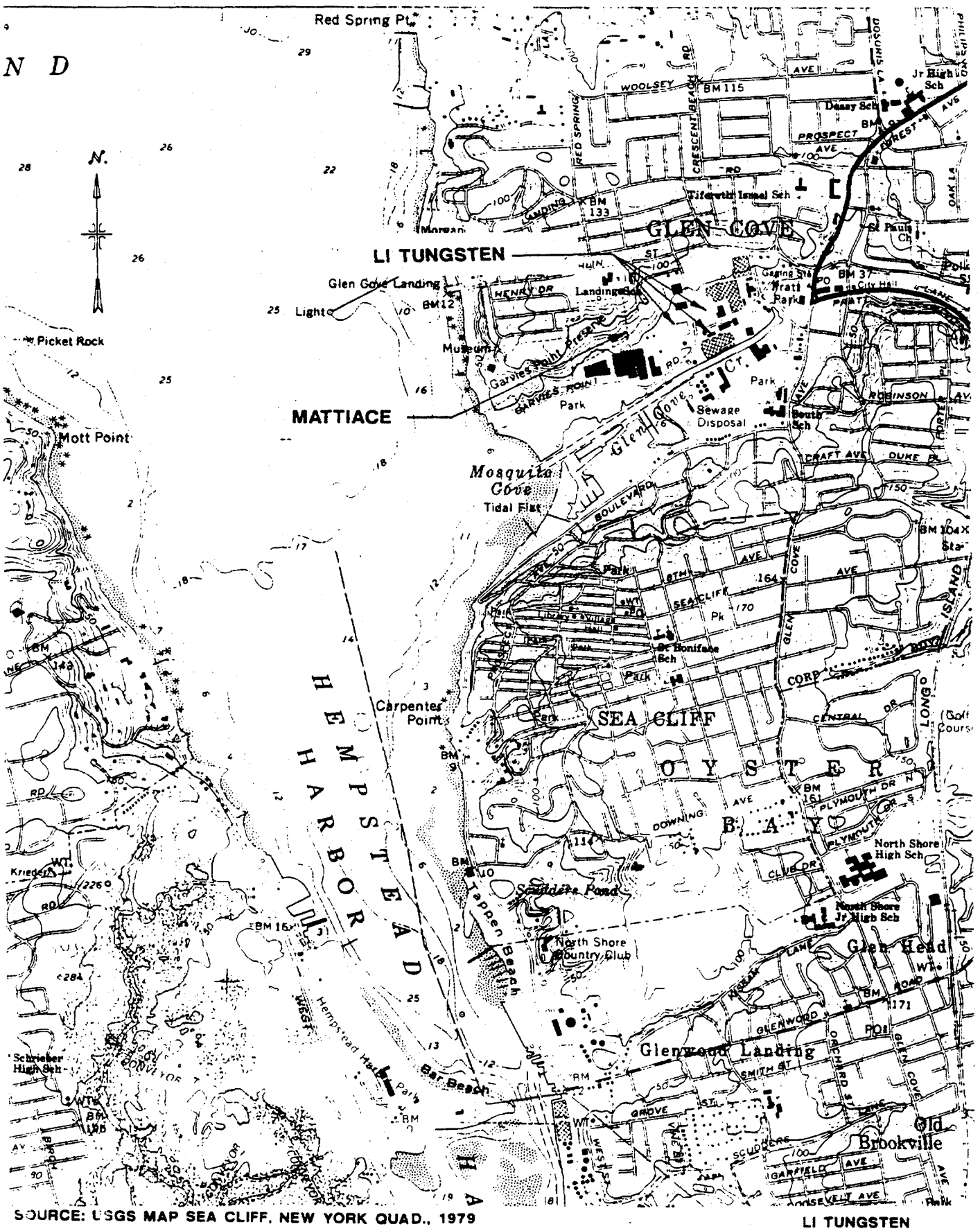
Figure 2
Site Location Map
Li Tungsten, Glen Cove, New York
Scale: 1 Inch = 2,000 Feet
Base Map Source: U.S.G.S. 1979

FIGURE 2



SOURCE: USGS MAP SEA CLIFF, NEW YORK QUAD., 1979

LI TUNGSTEN
GLEN COVE, NEW YORK

LOCATION MAP

SCALE 1"=2000'

MALCOLM PIRNIE

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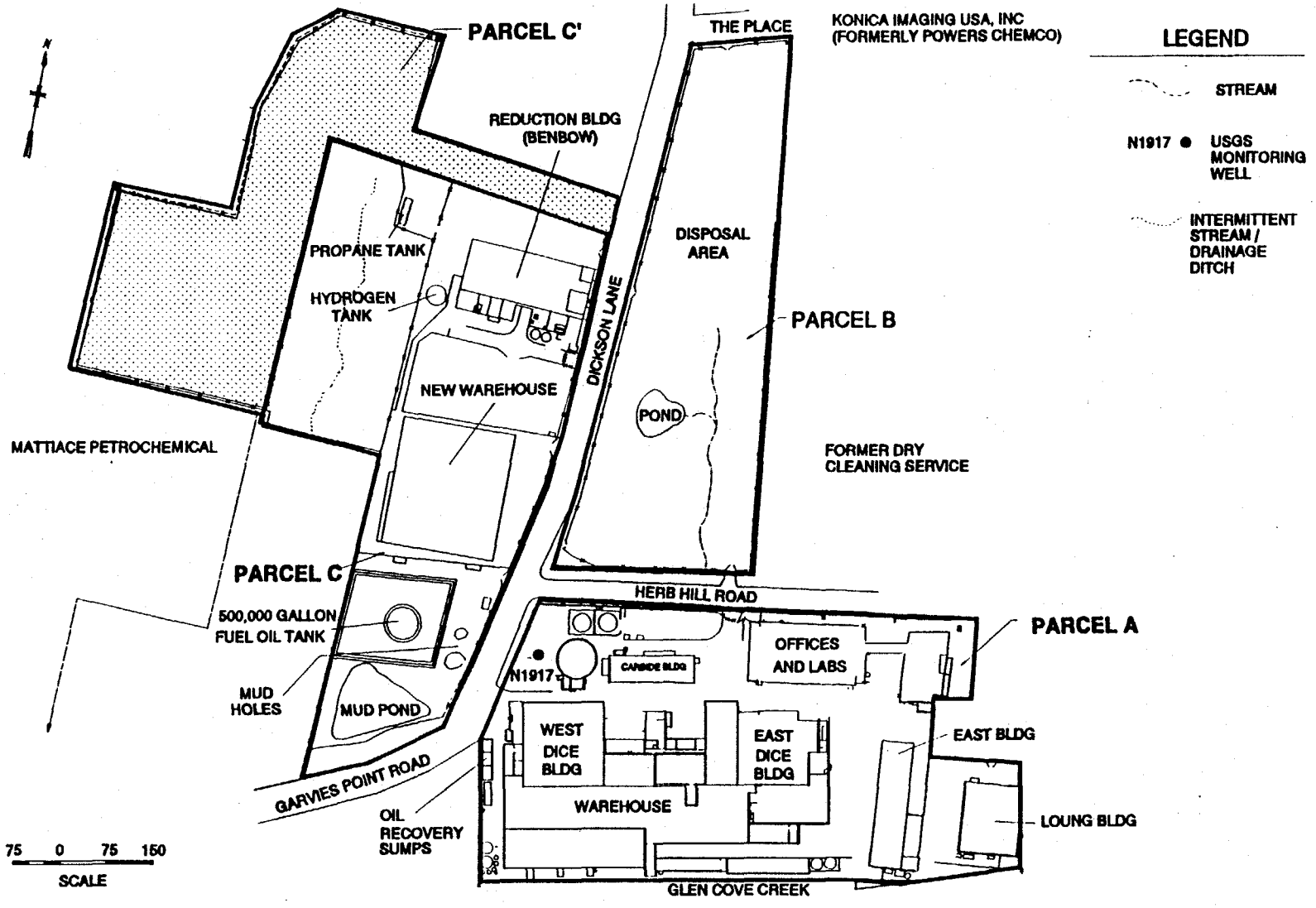
Figure 3
Site Plan Showing Parcel B
Li Tungsten, Glen Cove, New York



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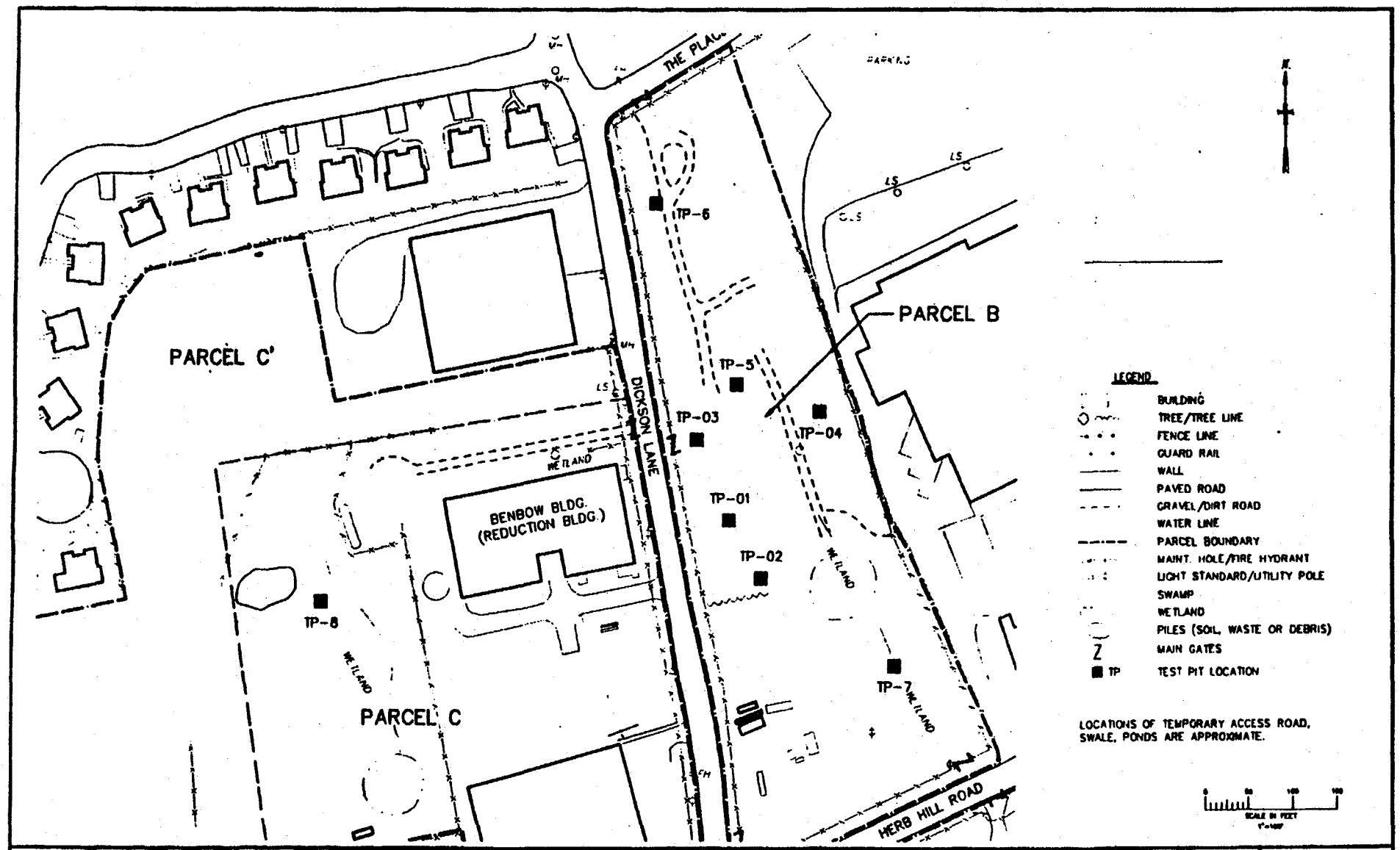
MALCOLM PIRNIE

LI TUNGSTEN
GLEN COVE, NEW YORK

SITE PLAN

FIGURE 3

Figure 4
Li Tungsten
Parcel B Showing Location of Test Trenches



MALCOLM PIRNIE

TITLE: TEST PIT LOCATION MAP

LI TUNGSTEN REMEDIAL INVESTIGATION
GLEN COVE, NEW YORK
USEPA REGION II ARCS
CONTRACT NO. 68-W9-0051; W.A. NO. 025-2L4L

DATE: SEPT. 1997

PROJECT NO.: 8001202

FIGURE NO.: Figure 4

301977

APPENDIX J

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Appendix J

Architectural Assessment Report

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ARCHITECTURAL AND INDUSTRIAL ARCHEOLOGICAL ASSESSMENT OF THE LI TUNGSTEN SITE IN GLEN COVE NASSAU COUNTY, NEW YORK

by

Edward S. Rutsch
and
Patricia J. Condell

of

Historic Conservation and Interpretation, Inc.
115 Route 519, Newton, NJ 07860

for

Malcolm Pirnie, Inc.
104 Corporate Park Drive, White Plains, NY 10602

MAY 1997

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I. INTRODUCTION

The following report contains the results of an architectural and industrial archeological assessment of the Li Tungsten Site, a Superfund site in Glen Cove, Nassau County, New York. In the Winter of 1997, Historic Conservation and Interpretation, Inc. (hereafter also "HCI") of Newton, New Jersey was requested by Malcolm Pirnie, Inc. of White Plains, New York, to make an architectural assessment of two standing structures located within Parcel A of the tungsten site (see Figure 1). The purpose of the assessment was to identify and evaluate the National Register significance of both the East Building and the easternmost structure of the Office and Laboratory Buildings, which might have been associated with the early twentieth-century Edwin R. Ladew Leather Belting Company. In 1995, Dr. Eugene Boesch completed a Stage Ia cultural resources survey of the Li Tungsten Site and he concluded that some of the extant structures on Parcel A may originally have been associated with the earlier belting works and could be of historic and/or architectural value. He recommended that an evaluation of the standing structures be made before any demolition occurred on the site (Boesch 1995:5-4, 6-1).

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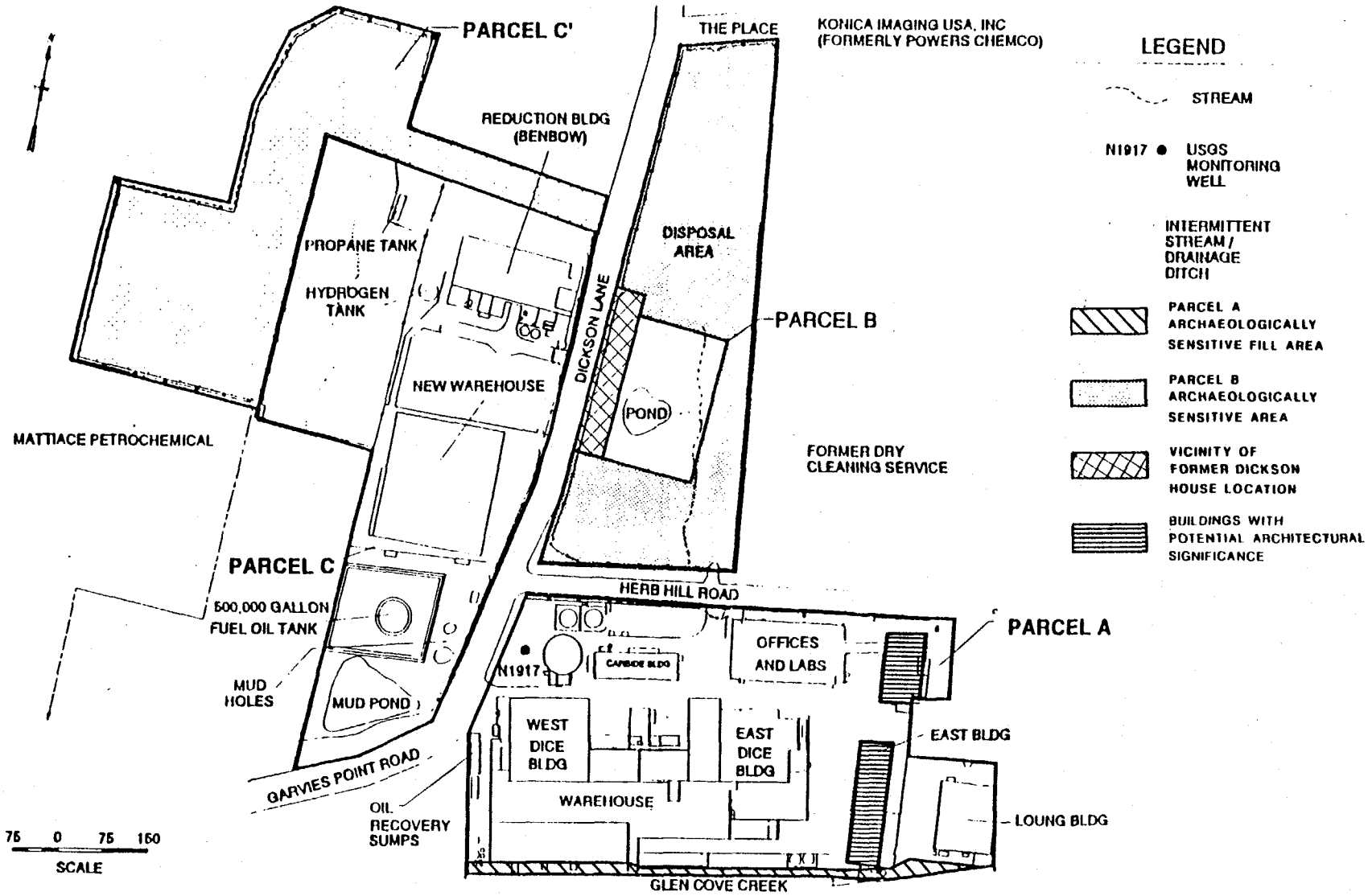

FIGURE 1. Site Plan

LI TUNGSTEN
GLEN COVE, NEW YORK

ARCHAEOLOGICALLY SENSITIVE LOCATIONS

MALCOLM PIRNIE

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With the help of Dr. Boesch, the scope of work of the present study was adjusted to also include an industrial archeological assessment of the tungsten-associated facilities located on Parcel A. After HCI's initial visits to the site, it was felt that the extant structures and ore-processing equipment of the Li Tungsten Company may also be a potentially significant historic industrial resource that also needed to be evaluated.

All data collected during the course of this study has been analyzed, summarized, and presented in the following report.

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II. EDWIN R. LADEW LEATHER BELTING COMPANY

A. Architectural Assessment of Li Tungsten's East Building

The East Building of the Li Tungsten Site is a long, rectangular, one-story structure that was originally part of the early twentieth-century Edwin R. Ladew Leather Belting Company (see Figure 1; Hyde 1906; Boesch 1995:4-18,19). However, it has undergone many changes during the tenancy of the tungsten company. HCI has determined that it is not a potentially significant architectural resource. It is constructed of brick, but its exterior has been covered with a thin layer of concrete or stucco (see Figure 2). Most of the original structure has been encompassed and obscured by frame and concrete-block additions, as well as numerous tanks, pipes, and equipment for the tungsten works. At the time of HCI's on-site inspection, the interior of the building was primarily occupied with different types of tanks used in the tungsten business. No indications of the belting company's operations were evident in the building's interior.

The structure built by the Ladew Belting Company is typical of early twentieth-century industrial architecture and possesses only a modest amount of stylistic elements. Originally, the building's north and south elevations were

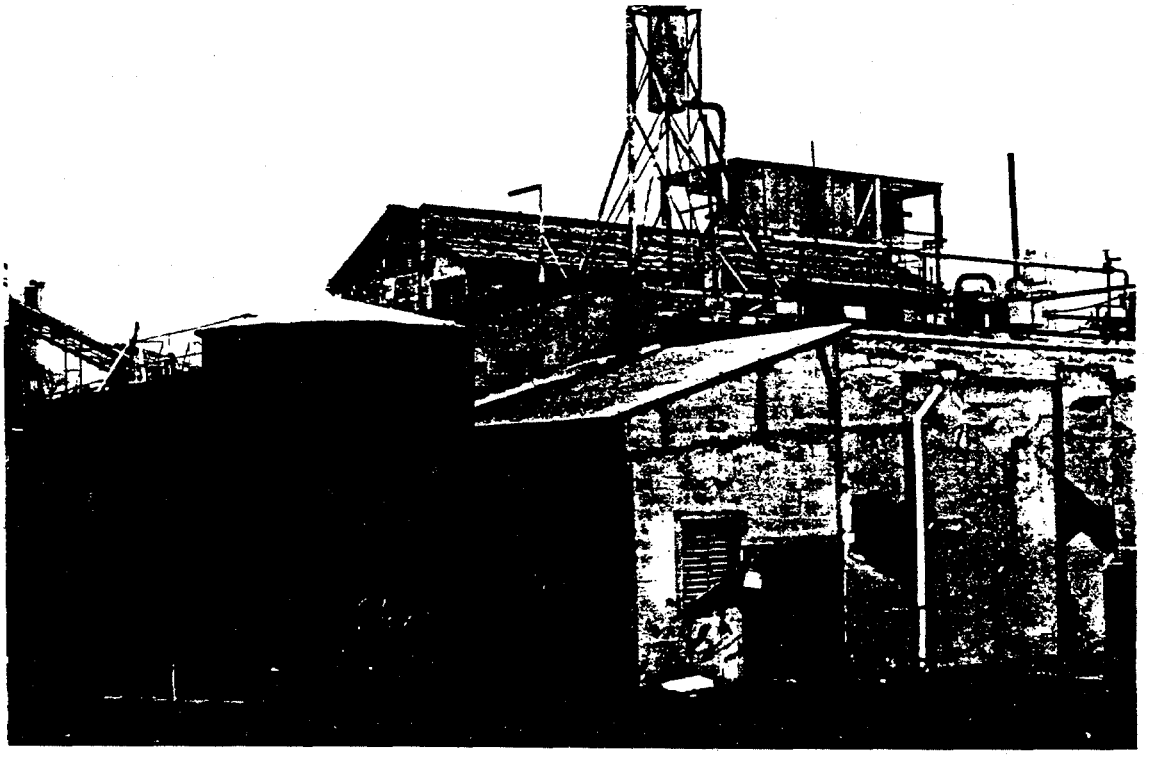

FIGURE 2. Photograph looking southeast at the northern end of the East Building. Most of the original structure, which was built by the Ladew Leather Belting Company, has been obscured by numerous additions and equipment of the tungsten works (William Sandy, photographer, 1997).

divided into three bays; a parapet emphasized the center bay (see Figure 3). This emphasis continued the length of the building using a clerestory. The brick structural system was disguised on the exterior with the use of pilasters and a corbelled-brick cornice line. Today, much of the segmental-arched fenestration has been filled. These original lines can be seen presently in the south or creek-side elevation (see Figure 4; Leo *et al.* 1978:33; Boesch 1995:4-18).

The East Building possesses the same construction and stylistic characteristics as a group of buildings that are located directly across Herb Hill Road and west of Charles Street. These buildings, which are presently occupied by Konica Imagining USA, Inc., once comprised the main complex of the Edwin R. Ladew Leather Belting Company (Hyde 1906). The Lounge Building of the Li Tungsten Site, which is immediately east of the East Building, also possesses the same construction and style (see Figures 1 and 5). These extant structures probably represent Ladew's expansion of the belting works c. 1905, after his New York City factory was destroyed by fire. At that time, the Lounge Building functioned as the company's power house (Boesch 1995:4-17; Hyde 1906). No significant remains associated with this original function were found within the building during HCI's on-site inspection.

Also, a few additional Ladew structures were once located in the immediate vicinity of the East and Lounge

FIGURE 3. Historic photograph showing the structures of the Ladew Leather Belting Company that were erected along the waterfront. As originally built, the East Building of the Li Tungsten Site, which is the structure at the extreme left of the photo, was typical of early twentieth-century industrial architecture. The Lounge Building is to the right of the East Building (Scrapbook, Glen Cove Library; copywork by Michael Spozarsky, 1978).

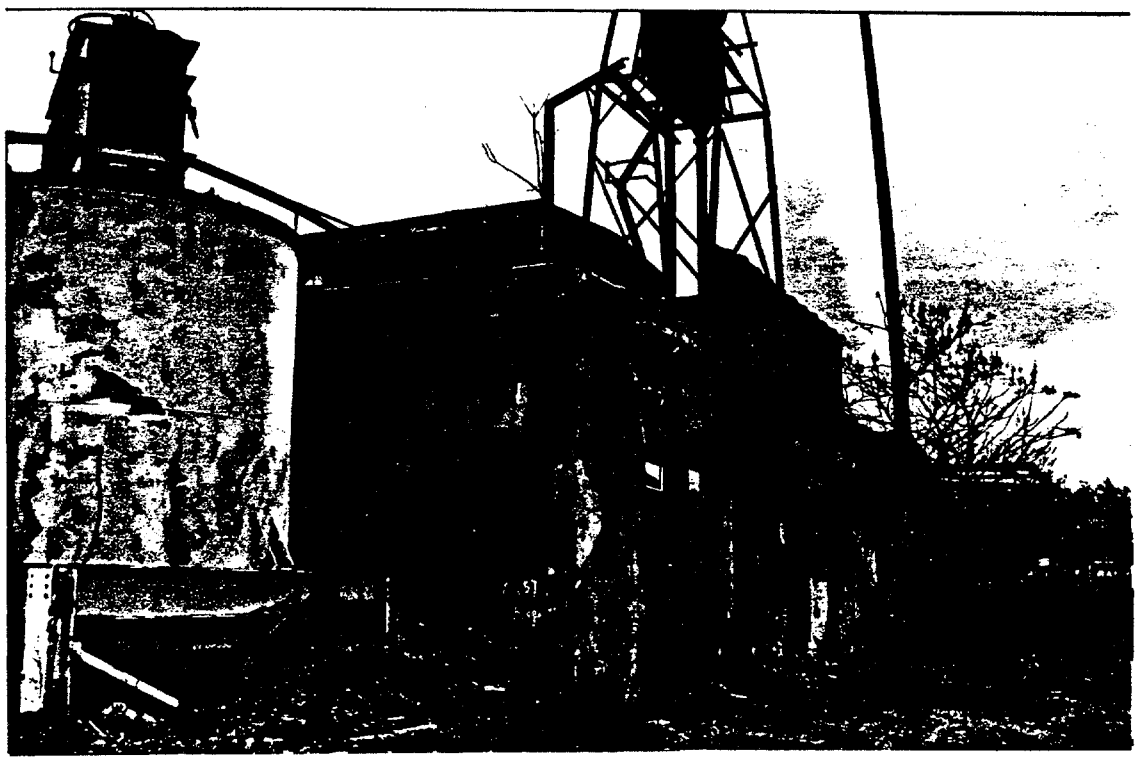

FIGURE 4. Photograph looking northeast at the southern elevation of the East Building. Today, the original lines of the structure can best be seen at this end. Note the parapet, clerestory and segmental-arched fenestration (Patricia Condell, photographer, 1997).

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FIGURE 5. Photograph looking southeast at the Lounge Building, which possesses the same construction and architectural style as the East Building. The Lounge Building was originally built by the Ladew Leather Belting Company as a power house (William Sandy, photographer, 1997).

Buildings of the Li Tungsten Site. However, the majority were located outside the site, immediately to the east (Boesch 1995:4-18). They, nevertheless, have long since disappeared. In fact, the easternmost structure of the Office and Laboratory Buildings of the tungsten works now occupies the site of one such building.

B. Industrial Archeological Assessment of the Ladew Belting Company Buildings

In carrying out the industrial archeological assessment, the following question was posed, "Is there anything about the building or any artifacts that represent the leather belting industry?" Special attention was paid to any settings and equipment that might have been present. HCI consulted with Robert Howard, a curator at the Hagley Museum in Wilmington, DE, to gain insight on the type of specialized features or equipment that might have been employed at the belting works by the Ladew Company in the early-twentieth century. Mr. Howard has recorded a number of Wilmington-area tanneries with his field classes comprised of Hagley Museum Fellows. Among these was the Rhoads Leather Company, a manufacturer of industrial belts and pulleys. He was also consulted in 1984 when HCI conducted an archeological survey of the Mary C. I. Williams School Site in Wilmington, where several tanneries were studied.

Generally, the research showed that tanneries mostly used unspecialized leather-tanning pits and vats. The only

industrialized setting and specialized equipment that were used in making leather belting were reels that wound the new leather stock and the finished belting. Between these reels was a long work table where the leather was cut and sewn into belts. It is interesting to note that drive belts, which were so very important in transferring mechanical power from drive shafts to machines, are no longer made in the United States, with one exception. The Page Manufacturing Company of Concord, NH presently supplies belts to museums, historic sites, and hobbyists who operate nineteenth-century machinery (Chappelle 1975; Howard 1997:personal communication).

HCI's survey revealed that the East Building of the Li Tungsten Site did not contain any remains that could be associated with the Edwin R. Ladew Leather Belting Company. Its close proximity to the creek may indicate that it was used for storage and shipping and may never have been used for actual belt manufacturing. The size and number of the buildings originally comprising the belting works suggests that this was possibly the case. The Lounge Building also did not possess any remains that could identify it as being the belting works' power house. Even its tall smoke stack has been torn down.

Interior foundations, machine settings, etc. that were found were constructed of mid-twentieth-century materials and are alterations made by the tungsten company who adapted the leather-belting structures for their own purposes.

Because of the lack of physical evidence, HCI has determined that the East Building, as well as the Lounge Building, of the Li Tungsten Site are not potentially significant historic industrial resources.

III. THE LI TUNGSTEN WORKS

A. Architectural Assessment of the Office/Lab Building

The easternmost structure of the Li Tungsten Office and Lab Buildings is a very vernacular building that does not possess any stylistic characteristics (see Figures 1 and 6). HCI has determined that it is not a potentially significant architectural resource. The structure is presently surrounded by additional one-story frame lab buildings, as well as a one-story, concrete-block passageway that connects all the buildings together. After HCI's on-site inspection and analysis of the available historic photographs and data, it was determined that this building had been constructed by the tungsten company and not the Ladew Leather Belting Company. In fact, a large brick structure that was part of the Ladew works stood at this locale during the early-twentieth century (Leo *et al.* 1978:31-33; Boesch 1995:4-18).

The Office/Lab Building is a two-story frame building with a gable roof and is clad with asbestos shingles. The north side of the first floor is built banked into the ground and has a masonry foundation. At the time of HCI's on-site inspection, the first floor contained the remains of lab and office equipment, including company records that have been damaged by water. The second story, which was

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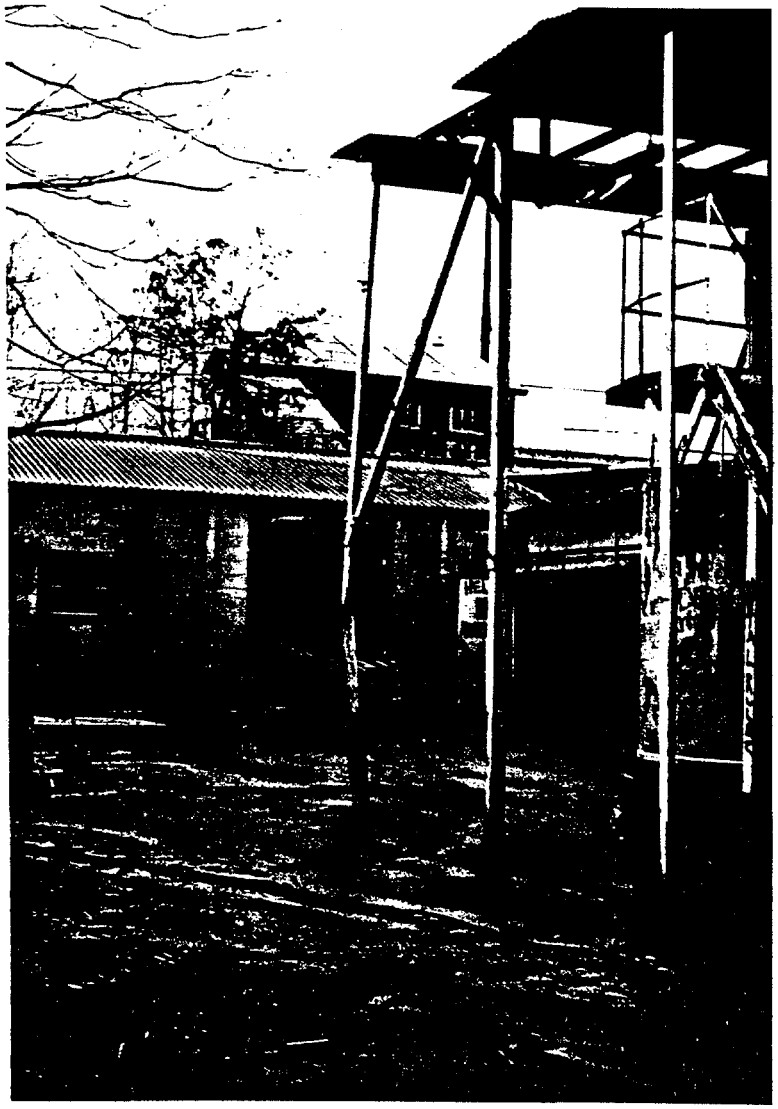

FIGURE 6. Photograph looking north at the easternmost structure of the Office and Laboratory Buildings (William Sandy, photographer, 1997).

used for office space and bathroom, can be reached only by an exterior enclosed stairway.

B. Industrial Archeological Assessment

The tungsten works' date of construction, changes of ownership, as well as the processes employed in reclaiming tungsten from scrap and ore have already been documented in Section 2 of Malcolm Pirnie's 1993 Remedial Investigation/ Feasibility Study of the Li Tungsten Site. Pertinent portions of Malcolm Pirnie's report have been reproduced in Appendix A of this report for ease of reviewers and readers who will find it a useful reference.

The name tungsten means "heavy stone". It has a high specific gravity and generally makes up only 0.5% - 2.0% of the excavated ore. Therefore, it requires a significant amount of processing and refining before it is a useable metal. Though first isolated in Europe in the eighteenth century, tungsten's first important application was its use as an alloy in steel during the mid-nineteenth century (Encyclopaedia Britannica 1966:548). In 1855, the Austrian metallurgist, Franz Koller was producing tungsten steel (Singer *et al.* 1958:65). In 1871, Robert Mushet, a metallurgist better known for his association with the Bessemer-steel process, used an alloy of tungsten and steel to cast a very strong "tool" steel in Great Britain (McHugh 1980:163-4).

At first, this alloy steel was used in the manufacture of very strong tools and cutting instruments, such as rock drills. By the 1890s, it was found also to be useful in making metal-cutting tools. Not only would the hard tungsten steel cut metal more easily, it also did not heat up as fast from the friction. This allowed higher cutting speeds that proved very useful in modern machining (Singer *et al.* 1958:65)

At the beginning of the twentieth century, a second broad application was found for tungsten - the manufacture of lamp filaments. Tungsten's melting point, which is 3410°C, is the highest of all metals and the lamp filaments made from it are very durable; thus solving one of the major problems of lamp reliability (Singer *et al.* 1958:98-99). Though other materials have been found for creating strong alloy steels and lamp filaments, tungsten is still used in both applications. In addition, tungsten steel is used in creating hard strong gears and durable gear boxes.

Two research questions were posed in evaluating the Li Tungsten Works, "Was there something unique and significant about the production of tungsten products at the Glen Cove works?" and "Do the buildings and the remains of machinery represent a unique or potentially significant cultural resource?"

The Glen Cove tungsten works were built by Kuo Ching (K.C.) Li and the National Reconditioning Company during the Second World War. It was found that a scarcity of tungsten

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in the Second World War period led metallurgists to substitute tungsten with other alloy materials that did the job adequately and, in some cases, at far less cost. The Glen Cove plant was built by Chinese metallurgists, who were already familiar with Asian tungsten ore and then applied this expertise to reclaiming tungsten from other sources, especially scrap metal. Chinese ore did not play a large part in the Glen Cove refining.

HCI recognized that much of the tungsten-processing machinery was still present on site, though scavengers and time had not been kind to the remains (Malcolm Pirnie 1993:2-11, 15). One can associate the different extant processing machinery with the various phases of refining tungsten that are illustrated in the material-processing flow chart of Malcolm Pirnie's report (see Appendix). The industrial-processing buildings are timber-framed and have cement-block curtain walls. The curious lack of steel in the interior framing is probably indicative of the fact that the buildings were constructed during the Second World War when more important priorities precluded its use in construction.

Several experienced metallurgists and historians of technology were consulted for their knowledge on the history of metals. Colleagues Ronald Brucker, a senior metallurgist with a lifetime of work on specialty steel, and Dr. Robert Gordon of Yale University both agree that there is not a strong case that the Li Tungsten Site is a potentially

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significant historic industrial resource. They agreed that there was nothing unique about the extant ore-processing equipment and machinery at Glen Cove. Many similar processing plants exist today that utilize the same refining techniques that were employed at Glen Cove (Brucker; Gordon; Bergstressor; Bogert; Vogel; Casey; Harvey; Mulholland 1997: personal communication).

IV. CONCLUSIONS

Based on the architectural and industrial archeological assessments, HCI has determined that the Li Tungsten Site is not a significant architectural or industrial resource and therefore, is not elegible for inclusion on the National Register of Historic Places. The East Building, as well as the Lounge Building, located on Parcel A of the tungsten works,. were built in the early-twentieth century as part of the Edwin R. Ladew Leather Belting Company and are the only remaining buildings of the belting works that were located on Ladew's property south of Herb Hill Road and along the waterfront. However, they are typical examples of early twentieth-century industrial architecture and possess only a modest amount of stylistic elements. Both structures, the East Building especially, have undergone many changes and alterations made by the tungsten company, who adapted the sturctures for their own purposes. In addition, no indications of the belting company's operations were evident in the interior of either building.

The remaining structures on Parcel A were built by the tungsten company during the time of the Second World War. During the course of this study, HCI determined that the easternmost structure of the Office and Laboratory Buildings was built by the tungsten company and not the Ladew Leather

Belting Company. In fact, a large brick belting-works structure occupied the same location in the early-twentieth century. The Office/Lab Building is a very vernacular structure possessing no stylistic characteristics and is not architecturally significant. In addition, HCI found that there was nothing unique or historically significant about the production of tungsten products at the Glen Cove facility. Also, there is nothing unique about the extant ore-processing equipment and machinery on the site. Many similar processing plants still exist that utilize the same refining techniques that were employed at the Li Tungsten Site.

Since the Li Tungsten Site is not eligible for inclusion on the National Register, HCI concludes that no further cultural resources work is necessary as part of the cleanup of this toxic site.

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VI. APPENDIX - Site History Section of Malcolm Pirnie's Report of the 1993 Remedial Investigation/ Feasibility Study of the Li Tungsten Site

approximately four acres of undeveloped property, designated Parcel C', sometime after 1984. Parcel C contains several buildings, a 500,000 gallon aboveground fuel oil storage tank, and three surface impoundments (e.g., Mud Pond and two Mud Holes) used to dispose of process waste water.

2.2 Site History

This site has a complex history of name and ownership changes, and environmental site assessments, investigations and removal actions. Specific details are discussed in the paragraphs below. The chronological history of site ownership, operations, and preliminary investigations/interim remedial actions is summarized in Table 2-1.

Early in the 1940's the National Reconditioning Company was formed by Kuo Ching (K.C.) Li. The company was operated and managed by the Wah Chang Trading Corporation of New York. In addition to being the chairman and chief engineer of Wah Chang Trading Corporation, K. C. Li was also a distinguished mining engineer, discoverer of tungsten in China, and was responsible for first importing tungsten into the United States. The purpose of the company was to build a facility in Glen Cove, NY, to concentrate tungsten ores.

The facility became operational in 1942. Operation consisted of processing raw ore and scrap tungsten concentrates to produce ammonium paratungstate (APT) and subsequently formulating APT to metal tungsten powder and tungsten carbide powder. Other specialty products that were produced included: tungsten carbide powder for plasma spraying; tungsten titanium carbide powder; tantalum carbide powder; tungsten spray powder; crystalline tungsten powder; and molybdenum spray powder.

Based on available information, a variety of extraction processes (or treatments) were used to separate the various accessory metals (or impurities) from the tungsten depending upon the specific type of ore or concentrate that was imported. The smelting was generally conducted in relatively small batches, to permit any individual or combination of extraction treatments. Typical treatments in the smelting process included physical, chemical and mechanical processes such as: sizing and crushing; gravity, magnetic and electrostatic

TABLE 2-1
CHRONOLOGY OF EVENTS AND SITE INVESTIGATIONS
Li Tungsten Site
Glen Cove, New York

DATE	EVENT
1940	National Reconditioning Corporation was formed by K. C. Li with the express purpose of building the Glen Cove facility.
1942	Facility becomes operational. Operation consisted of processing raw ore and scrap tungsten concentrates to produce ammonium paratungstate (APT) and subsequently formulating APT to metal tungsten powder and tungsten carbide powder. Other specialty products including tungsten carbide powder plus cobalt and other material for plasma spraying; tungsten titanium carbide powder; tantalum carbide powder; tungsten spray powder; crystalline tungsten powder; and molybdenum spray powder were also produced.
1948	National Reconditioning Corporation changes its name to Wah Chang Smelting and Refining Corporation (WCSRC).
1948 - 1964	Site operated by WCSRC.
1964	WCSRC leases equipment/property to the Wah Chang Corporation (WCC) which continued to operate the facility.
April 1967 - 1972	Teledyne acquired the stock of WCC and the two companies merged. Operations at the site continued by Teledyne-Wah Chang Corporation.
1972	WCSRC formed a wholly owned subsidiary (Li Tungsten Corporation) which operated the facility until filing for bankruptcy in 1985.
1984	Property acquired by the Glen Cove Development Company (GCDC). GCDC is a general partnership duly organized and existing under the laws of the State of New York and is owned by the Old Court Holdings Company and the Old Court Joint Ventures, Inc., both of which, in turn, are wholly-owned subsidiaries of Old Court Savings and Loan, Inc., (in Receivership) located in Maryland

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TABLE 2-1 (continued)
CHRONOLOGY OF EVENTS AND SITE INVESTIGATIONS
Li Tungsten Site
Glen Cove, New York

DATE	EVENT
1984	GCDC continues to lease the site to Li Tungsten Corporation. Market for tungsten in decline.
June 1985	Li Tungsten Corporation files for bankruptcy. Manufacturing operations at the facility cease.
May 1988	RTP Environmental Associates, Inc., (Westbury, NY) completes Site Investigation Report for Campon Reality Corporation (RTP, 1988). Site investigation undertaken to evaluate environmental conditions prior to residential development. Geraghty and Miller was subcontracted to perform the hydrogeology investigation.
March 29, 1989	New York State Department of Environmental Conservation (NYSDEC) performs site inspection.
April 14-16, 1989	USEPA assumes lead enforcement role on response actions at the site. USEPA FIT2 contractor (NUS) initiates Preliminary Assessment.
July 21, 1989	Administrative Order On Consent (AOC) issued by USEPA to Glen Cove Development Corporation which specified nine (9) interim remedial actions.
September 18, 1989	USEPA FIT2 contractor (NUS) issues Preliminary Assessment Report (NUS, 1989).
April 4, 1990	Interim remedial actions completed and final report submitted (HART, 1990).
September 28, 1990	USEPA FIT2 contractor (NUS) issues Site Inspection Report (NUS, 1990).
July 1991	Li Tungsten site proposed for inclusion on the National Priorities List (NPL).
February 12, 1992	Special Notice letters were sent by USEPA to five PRPs (Teledyne, Inc.; Li Tungsten Inc.; the Glen Cove Development Corporation; Wah Chang Smelting and Refining Corporation; and Mr. John Li (son

TABLE 2-1 (continued)
CHRONOLOGY OF EVENTS AND SITE INVESTIGATIONS
Li Tungsten Site
Glen Cove, New York

DATE	EVENT
	of Mr. K. C. Li). These letters solicited the involvement of the PRPs in the investigation of the site.
August 26, 1992	Malcolm Pirnie receives work assignment to prepare RI/FS Work Plan.

separation; roasting; leaching; floatation; and fusion. A generalized flow sheet of the treatment processes is show in Figure 2-4.

Numerous aboveground wooden, steel or fiberglass tanks were used in performing some of these treatments and to store reactants (e.g., hydrochloric acid, ammonia, hydrogen) and/or intermediate compounds (e.g., APT). Many of these tanks still contain some hazardous and inorganic liquids. As the tungsten ore moved through its various processing stages, the naturally occurring radioactive isotopes of thorium, uranium, and radium became more concentrated in the residual waste or slag. There are indications that some of this slag was placed in waste piles at the ground surface and buried on site (NUS, 1989; 1990). Accessory metals which constitute the impurities that were removed during the extraction process include: antimony, arsenic, barium, bismuth, copper, cobalt, chromium, lead, manganese, mercury, molybdenum, nickel, thorium, uranium, vanadium, and zinc.

In 1948 the National Reconditioning Company changed its name to Wah Chang Smelting and Refining Corporation (WCSRC). WCSRC continued to operate the site until 1964 when they leased the equipment and property to Wah Chang Corporation (WCC). In 1966 Teledyne acquired the stock of WCC and the two companies merged. Operations at the site continued by Teledyne-Wah Chang Corporation.

In 1972 WCSRC, which had been leasing the equipment and property to Teledyne-Wah Chang Corporation, formed a wholly owned subsidiary (Li Tungsten Corporation) which continued to operate the facility. In 1984 the property was acquired by GCDC. GCDC is a general partnership duly organized and existing under the laws of the State of New York and is owned by the Old Court Holdings Company and the Old Court Joint Ventures, Inc., both of which, in turn, are wholly-owned subsidiaries of Old Court Savings and Loan, Inc., (in Receivership) located in Maryland. GCDC continued to lease the site to Li Tungsten Corporation until 1985 when Li Tungsten Corporation ceased operations at the site and filed for bankruptcy.

There is very little specific documented knowledge on waste volumes that were generated or waste disposal practices. Drummed waste is also reported to have been buried on-site in a portion of Parcel B (NUS, 1989, 1990). Liquid wastes are believed to have been disposed of through numerous subsurface drainage pipes that have been noted in the

FLOWSHEET OF WAH CHANG'S PLANT FOR CONCENTRATING TUNGSTEN

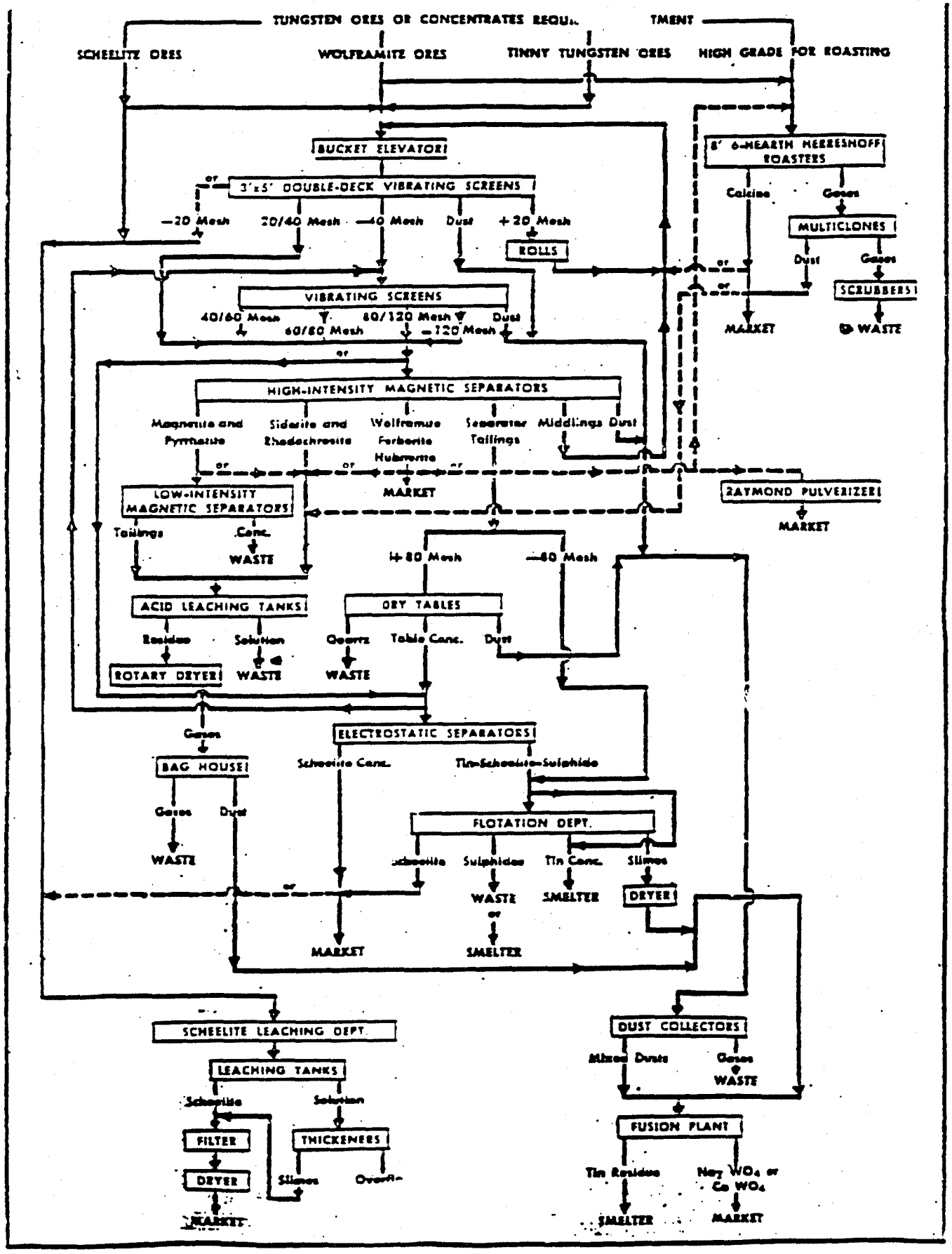


FIGURE 2-4

bulkhead and empty directly in Glen Cove Creak. State Pollution Discharge Elimination System (SPDES) permits allowed for up to as many as 250,000 gallons per day of discharge to Glen Cove Creek. Mud Pond and the two Mud Holes were also reportedly used to dispose of liquid wastes.

On April 14, 1989 the USEPA received a request from the NYSDEC to use its Superfund authority to respond to threats posed by hazardous materials at the site. USEPA's preliminary assessment and site inspection of site conditions (NUS, 1989; 1990), revealed a large quantity of slag which was emitting low-level beta-gamma radiation. In addition, large quantities of laboratory reagents, various hazardous materials in drums and tanks, asbestos, transformers, and cylinders containing compressed liquids and gases were found in several buildings. Air monitoring showed no dangerous levels of organic compounds either on site or off-site. As a result of the conditions identified at the site, the USEPA issued an Administrative Order on Consent (AOC) to GCDC to stabilize all potential threats to the public and the environment.

Fred C. Hart Associates, Inc., (HART) was hired by GCDC to coordinate the nine (9) interim remedial actions identified in the AOC (HART, 1990). Additional removal/remedial actions were also undertaken by GCDC. A list of the interim remedial actions and the additional actions completed at the site is summarized in Table 2-2.

The Hazard Ranking Score (HRS) for the Li Tungsten site was 50.00 which is above the 28.5 threshold value for inclusion on the NPL (NUS, 1991). In July 1991 the Li Tungsten site was proposed for inclusion on the NPL and in October 1992, the site was placed on the NPL.

2.3 Current Conditions

The Li Tungsten site ceased operations in June 1985 and has been inactive since. Site security (fencing and guard) was addressed as one of the interim remedial measures in the AOC. Although a security guard is present on-site 24 hours a day, the site could be entered without knowledge of the security guard through breaks in the fence. During the site visits, observations were made that trespassing has occurred. Many of the salvageable fixtures

THE FOLLOWING PAGES WERE INTENTIONALLY

LEFT BLANK : (2-12) - (2-14).

(e.g., copper wiring and piping) have been removed and general debris (e.g., washing machines, mattresses) have been left behind.

APPENDIX K

302015

Appendix K

Boring Logs

Monitoring Well Borings

Soil Borings

Radiological Borings

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-2D

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 9-26 - 9/27	LOCATION: Parcel A
ELEVATION: Casing = 7.094 PVC=6.927	DATUM: Ground Elev. 7.094 MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
							Top 12" concrete AL		
S-1	1-3	18"	12	10			Dk Grey F-UC SAND + Gravel little Clay/silt, little Cobbles. Fill water AT 2' bg SP		
			9	8					
S-2	3-5	12"	12	11			SAA		
			11	9	5				
S-3	5-7	10"	10	8			SAA SP		
			9	10					
S-4	7-9	8"	10	11			Gry-Blk silty clay w/ some(-) f-c Gravel + trace(-) Cobbles + organics peat fragments PT/CL		cement/Bentonite Grout 10' bg to ~2' bg
			11	8					
S-5	9-11	6"	13	18	10				
			21	24			Gry-Blk f-c SAND some(-) silt trace(-) clay		
S-6	11-13	8"	19	19					Bentonite Seal 10' to 12' bg
			21	22					
1	13-15	12"	29	26					4" PVC Sd 40 Riser 4' bg to Grade
			24	30	15				
S-8	15-17	10"	25	21					
			21	19			SP		
S-9	17-19	12"	20	22					
			26	28			Grey silty CLAY CL		
S-10	19-21	12"	48	56	20		Red-brown F-UC SAND some(-) silt little(-) Gravel F-UC.		
			49	52					
S-11	21-23	10"	10	12					4" PVC 10 Slot screen 24' to 14' bg
			14	19					
S-12	23-25	14"	19	18					Morie #0 SAND PACK 26 to 12' bg
9/27			14	16	25		SP		
9/27 S-13	25-27	16"	20	21					8" DIA Bore hole 25' bg
			29	24			Grey - silty clay trace(-) f. SAND trace(-) f. Gravel. CL	Bentonite Grout	
S-14	27-29	18"	19	21			Gray SILTY-CLAY Port washington formation		
			23	26					
S-15	29-31	18"	24	21	30				

NOTES:

SHEET 1 OF 2

302017

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-2D

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 9/26/96 to 9/27/96	LOCATION: Parcel A
ELEVATION: —	DATUM: —

SAMPLE NO.	SAMPLE DEPTH	SAMPLE REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
					30				
S-15	29-31	18"	24	21			port washington - clay		All GM Readings = Blue 20-40
S-16	31-33	16"	23	26					
			22	21					
ST-1	33-35'		I	I			collect shelby tube from 33-35' CL		All HNu Readings = Blue ∅
					35		EOB 35' bg		

NOTES: Driller George Spiciarich
Canterra CT-250
Hydro E. Johnson / E Torin

SHEET 2 OF 2

302018

MALCOLM PIRNIE — MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-44

PROJECT:	Li Tungsten	PROJECT NO:	8001202 (MP-40)
DATE:	10-1-96 to 10-1-96	LOCATION:	Parcel C
ELEVATION:	Casing = 26.859 PVC = 26.651	DATUM:	Ground = 26.859 MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S							Concrete AL		All HNu Readings = Ø
S-1	1-3	12"	8	10			Red-Brn VF-VC SAND and SILT w/ little(-) clay. little(-) f-vc Gravel SP SM		All GM Readings = BKG
			10	12					
S-2	3-5	18"	12	18			SAA		
			21	25	5				
S-3	5-7	12"	21	21			SAA less silt + clay → water at ~5.5 bg SP		
			28	28					
S-4	7-9	18"	54	44			SAA		
			33	17					
S-5	9-11	18"	11	12	10		Gry-tan F-M SAND and silt/clay trace(+) C-F Gravel (Till) SP/SM	No well Installed → Grout up	
			14	19					
S-6	11-13	12"	6	8			SAA		
			16	16					
7	13-15	12"	12	14			SAA		
			16	19	15				
S-8	15-17	16"	12	10			SAA		
			11	19					
S-9	17-19	12"	14	18			SAA more Gry (Till)		
			10	12					
S-10	19-21	12"	10	11	20		SAA		
			19	22					
S-11	21-23	12"	21	19			SAA		
			27	20					
S-12	23-25	12"	28	28			SAA		
			30	24	25				
S-13	25-27	14"	26	21			SAA (Till)		
			19	12					
S-14	27-29	12"	21	19			SAA to 28'		
			27	22			White to light Gray VF-M SAND some(+) silt-little(-) clay		
S-15	29-31	16"	30	36	30		White-Gray clayey silt ML	↑	

NOTES: Driller George Spiciarich
Cantera CT 250
Hydro E. Johnson

SHEET 1 OF 2

302019

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-44 / MP-4D

PROJECT:	L. Tungsten	PROJECT NO:	8001202
DATE:	10-1-96 To 10-1-96	LOCATION:	Parcel C
ELEVATION:	—	DATUM:	—

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
					30				
S-15	29-31	16"	32	37			w/ Some - Red - Brown Mottled coloration - Port Washington form.		
S-16	31-33	12"	27	29			SAA CL		
			39	28					
S-17	33-35	18"	20	31			SAA		
			36	32	35				
S-18	35-37	18"	34	39			SAA	Backfill	
			40	28					
ST-1	37-39	18"	I	I			SAA Nuc = 75%		
			I	I					
					40		EOB 39' bg		
					45				
					50				
					55				
					60				

OTES:

SHEET 2 OF 2

302020

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-4D

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 8-29-96	LOCATION: Parcel C
ELEVATION: 26.859 - Casing - 26.651 - PVC	DATUM: 26.859' Ground MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Top 1" Concrete [AL		
S-1	1-3	90%	15	12			Yellow Brown f-c SAND Some C-S SLRF		HNu=0
			21	16			Some (+) f-c Gravel Dp-DR [SP		GM=20
S-2	3-5	80	24	15			SAA		HNu=0
			15	19	5		last 4" Gry silt + f SAND		GM=20
S-3	5-7	0	100/0				-Spoon- Auger Refusal at 5' bgs		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302021

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-5

PROJECT: Li Tungo Tem

PROJECT NO: 8001202

DATE: 9/5/96

LOCATION: North Parcel B

ELEVATION: Casing = 61.489 PVC = 61.231

DATUM: MSL Ground = 59.664

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS ppm	
S-1	0-2	80%	12	14			SP- cf org/brn SAND, tr. silt.		0.0	<20
			18	20						
S-2	2-4	20%	15	25					0.2	<20
			30	20						
S-3	4-6	80%	14	24	5				0.0	40
			18	31			ML - grn/gry SILT, some f. sand			
S-4	6-8	80%	6	8			SP- cf org/brn SAND, tr. silt		0.2	<20
			9	14						
S-5	8-10	100%	13	11					0.0	<20
			18	15	10					
S-6	10-12	100%	11	12					0.0	<20
			21	12						
S-7	12-14	100%	12	4			ML- gry/brn SILT, some f. sand		0.0	<20
			8	10						
S-8	14-16	100%	15	12	15		SP- cf org/brn SAND, tr. silt. 1" layer of c. blk sand @ 15.5'		0.0	<20
			9	11						
S-9	16-18	100%	10	10					0.2	<20
			9	8						
S-10	18-20	100%	11	15			SW- f. org/brn SAND, some silt, tr. clay		0.4	<20
			19	17	20					
S-11	20-22	100%	12	18					0.2	<20
			19	11						
S-12	22-24	100%	20	10					0.2	<20
			9	8						
S-13	24-26	100%	7	9	25		ML- gry/brn SILT, tr. f. sand		0.0	40
			11	11						
S-14	26-28	100%	13	14					0.0	40
			12	10						
					30		End of Boring at 28'			
					35					
					40					

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302022

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-6

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 2/28/96	LOCATION: Parco A
ELEVATION: Casing = 18.803 PVC=17.561	DATUM: MSL = Ground = 14.561'

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	50%	12	7			Tan-Brn F-C SAND some Sclt Some (+) F VC Gravel /SM		HNu = Ø
			13	6					
S-2	2-4	60%	18	3			Top 4" SAA last 8" weathered Granit fragment Biotite Rich - wet at 4' bg		GM = 20
			23	76					
S-3	4-6	80%	14	18	5		SAA Top 6" Gray-Tan Sclt + F. SAND trace(+) F-VC Gravel - orange brown F-VC SAND last 4". ML/SM		HNu = Ø
			21	19					
S-4	6-8	90%	29	31					GM = 30
			36	52					
S-5	8-10	40%	31	26			SAA - Orn-Brn F-C SAND some (-) Sclt - Granit fragments in sample. /SM		HNu = Ø
			29	34	10				GM = 20
S-6	10-12	20%	37	31			SAA		HNu = Ø
			42	29			SAA		GM = 20
					15		EOB 12' bg		
					20		• 4" 10-slot Screen from 12-2' bg		
					25		• 4" pvc Sch 40 Riser to 2' to +2'.		
					30		• Morie #0 Sand from 13' to 1.5' bg		
					35		• Bentonite Seal from 1.5 to 1.0' bg		
					40		• Grout from 1.0 to Grade		

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-8D

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 9-18-96	LOCATION: —
ELEVATION:	DATUM: MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	60"	9	24			Org-Brn F-VC SAND and F-VC Gravel some(-) silt little (+) cobbles well rounded to sub rounded SP-SM		All HNu Readings = BKG = Ø
			25	19					
S-2	2-4	12"	15	25			SAA		AV GM Readings = BKG on 20 PPM
			18	22					
S-3	4-6	14"	25	28	5		SAA water at 4' bg		
			16	19					
S-4	6-8	12"	7	3			SAA		
			5	4					
S-5	8-10	18"	11	9			SAA		
			11	9	10				
S-6	10-12	12"	4	8			SAA		
			8	8					
S-7	12-14	18"	17	30			SAA		
			35	37					
S-8	14-16	14"	20	18	15		SAA		
			21	19					
S-9	16-18	12"	20	18			SAA		
			22	24					
9/18 S-10	18-20	20"	29	31			SAA AT 18' Dk bry-Gry silty clay CL		
9/19			27	28	20		SAA Dk Gray - silty-CLAY very cohesive & dense CL		
S-11	20-22	18"	30	35					
			27	28					
S-12	22-24	16"	35	35					
			40	42					
S-13	24-26	18"	14	20	25				
			28	30					
S-14	26-28	18"	20	28					
			28	35					
ST-1	28-30						EOB 29.5' bg		
					30				

WELL DETAIL: No well installed

NOTES: Driller: George Spiciarich

Drill Rig: Centerra CT 250 6¼ ID Hollow Stem Augers 2" + 3" standard split spoon ~~Hydraulic~~ Samplers Driven w/ 140 lbs hammer on 30" Drop

Hydrogeologist: Eric Johnson

SHEET 1 OF 1

302024

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-9D

PROJECT: Li Tungsten

PROJECT NO: 8001202

DATE: 9/4/96

LOCATION: Parcel B south entrance

ELEVATION: Ground Elev = 16.036

DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	HNU REMARKS	GW
S-1	0-2	100	5	8			SP-Cf lt. brn SAND, tr. gravel, tr silt	No well installed	0.2	60
			11	22						
S-2	2-4	100%	34	24					0.2	40
			11	16						
S-3	4-6	100%	3	6	5				0.4	40
			18	12						
S-4	6-8	20%	7	7					0.2	40
			8	3						
S-5	8-10	50%	10	11			ML - gry/brn SILT, tr. clay, tr. f. sand. poor plastic		0.0	20
			7	12	10				0.0	20
S-6	10-12	50%	4	4						
			5	8						
S-7	12-14	0%	10	9					No Recovery	
			7	12						
S-8	14-16	60%	10	8	15				0.0	20
			7	10						
S-9	16-18	50%	9	8					0.0	20
			7	7						
S-10	18-20	60%	7	7					0.2	20
			10	12	20					
					25					
					30					
					35					
					40					

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302025

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-16S

PROJECT: Li Tungsten | PROJECT NO: 800120 z

DATE: 10-9-96 | LOCATION: Parcel C

ELEVATION: Casing = 38.630 PVC = 38.405 | DATUM: MSL Ground = 35.563

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	22"	4	18			Brown VF-C SAND, little silt, some F-C Gravel [SP]		GM = 60 cpm HNu = BKGD
			17	15					
S-2	2-4	17"	11	9			Grayish brown VF-M SAND & SILT, trace F-M Gravel [SM]		GM = 40 cpm HNu = BKGD * water at ~3.0 ft (perched?)
			7	9					
S-3	4-6	16"	2	4	5		Brown VF-M Sand & some silt, trace F-M Gravel [SP/SM]		GM = 40 cpm HNu = BKGD
			4	2			SAA Gray VF-M SAND & SILT [SM]		
S-4	6-8	12"	11	9			Grayish Brown VF-M SAND & SILT some Clay [SM]		GM = 40 cpm HNu = BKGD
			7	9					
S-5	8-10	14"	12	10			SAA Brown VF-M SAND some SILT trace Gravel [SM/SP]		GM = 40 cpm HNu = BKGD
			7	14	10				
S-6	10-12	6"	4	2			Grayish Brown VF-M SAND & SILT, trace Gravel & Clay [SM]		GM = 40 cpm HNu = BKGD
			4	7					
S-7	12-14	7"	4	2			SAA		GM = 20 cpm HNu = BKGD * sample is wet
			8	6					
S-8	14-16	24"	12	14			SAA Grayish Brown VF-C SAND, some SILT & Gravel [SM]		GM = 20 cpm HNu = BKGD
			9	16	15				
S-9	16-18	10"	10	5			Brown VF-C SAND, some Gravel trace SILT [SP/SM]		GM = 20 cpm HNu = BKGD
			10	15					
S-10	18-20	6"	10	13			Grayish Brown VF-C SAND, some Gravel & trace SILT		GM = 20 cpm HNu = BKGD
			17	20	20				
S-11	20-22	18"	8	10			SAA [SP/SM]		GM = 20 cpm HNu = BKGD
			25	34					
S-12	22-24	21"	16	14			SAA		GM = 20 cpm HNu = BKG
			17	19					
					25		EOB @ 24 ft		8" Borehole to 23 ft BGL
							Drilled to 23 ft & set 4" ID PVC 10 slot screen from 12-22 ft BGL		
							Morie #0 Sand Pack 10-23 ft BGL		
							Bentonite Seal 8-10 ft BGL		
							Cement-Bentonite Grout 0-10 ft BGL		

NOTES: Driller: George Spicharich

Canterra CT-250 w/ 6¼" HSA

Hydrogeologist: Joe Cragine

SHEET 1 OF 1

302026

MALCOLM PIRNIE — MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-16D

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 9-9-96 to 9-10-96	LOCATION: Parcel C
ELEVATION: Casing = 38.578 PVC = 38.361	DATUM: MSL Ground = 35.970

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	24"	6	12			Brown VF-C SAND, little silt, some F-C Gravel SM/SP		
			14	19			Grayish Brown VF-C SAND & Silt, trace F-M Gravel. SM		see log for MP-16S for Details
					5				
									Auger directly to 24 ft bgl w/ 6¼ HSA
					10				
					15				
					20				
S-2	24-26	12"	14	19	25		Gry-Brn F-C SAND, little (+) silt some (+) F-VC Gravel SP		
			21	21					
S-3	26-28	8"	19	24			SAA		
			23	18					
S-4	28-30	6"	36	42			Gry-silt + F SAND some (-) F-VC Gravel, well rounded Qtz/Arkose ML		
			41	29	30				

NOTES: Driller - Roy Mentzer
Cantera - LT 250
Hydro - E. Johnson

SHEET 1 OF 3

302027

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-16D

PROJECT: Ci Tungsten	PROJECT NO: 8001202
DATE: 9-9- 9/10/96	LOCATION: Parcel C
ELEVATION: —	DATUM: MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-5	30-32	10"	28	31	30		Yellow-Brown VF-C SAND and Gravel (little) SILT - Sub Rounded grains. SP		
			19	26					
S-6	32-34	12"	34	30			SAA		
			28	21					
S-7	34-36	12"	19	23	35		SAA		
			32	31					
S-8	36-38	10"	28	36			SAA		Cement/Bentonite Grout from 39' to Grade
			40	27					
S-9	38-40	14"	33	32			SAA		
			46	41	40				Bentonite Seal from 41' to 39' bg
S-10	40-42	12"	44	56			SAA		
			62	63					
S-11	42-44	12"					Gry VF SAND + SILT w/(+) F-C Gravel (Till) SM/ML		
S-12	44-46	8"			45		SAA		
S-13	46-48	6"					SAA		
S-14	48-50	4"					SAA		4" PVC 10-slot Screen from 53 to 43' bg
					50				
S-15	50-52	6"					SAA		
S-16	52-54	4"					SAA		Monie #0 SAND PACK from 55' to 41' bg
S-17	54-56	16"			55		Port Washington Clay CL		
S-18	56-58	20"							
S-18	58-60	24"							
					60				

NOTES:

SHEET 2 OF 3

302028

MALCOLM PIRNIE

MALCOLM PIRNIE, INC., ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING MP-16D

PROJECT:	L. Tungsten RI	PROJECT NO:	8001202
DATE:	9-9- 9/10/96	LOCATION:	Parcel C
ELEVATION:	—	DATUM:	MSL

SAMPLE NO.	SAMPLE DEPTH	SAMPLE REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
					60				
S-19	60-62	18					CL		
S-20	62-64	20							
ST-1	64-66'				65				
							EOB 66' bg		
							note ST-1 tube crushed when pushed not enough Recovery		

NOTES:

SHEET 3 OF 3

302029

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-17D

PROJECT: Li Tungsten	PROJECT NO: 8801202
DATE: 8/22/96	LOCATION: Parcel A southeast corner
ELEVATION: Casing = 7.404', PVC = 7.208'	DATUM: MSL Ground = 7.404

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							asphalt + cement AL		▽ water @ 6"
S-1	1-3	0	15	4			SP- cf blk SAND, some gravel, tr. silt		GM = 40 ct/min
		10%	6	4					
S-2	3-5	50%	5	1			SAA w/ some silt some CS clay		GM = 40 ct/min
	4-5		1	Wt	5				
S-3	5-7	50%	4	3			SAA		20 ct/min
			1	1					= 40 ct/min
S-4	7-9	70%	5	3			ML - gry/blk SILT and clay, mod plasticity, tr. peat @ 9'		
			2	2					
S-5	9-11	80%	11	13	10		SM - mf gry SAND, tr. silt		= 30 ct/min
			14	16					
S-6	11-13	80%	11	12			ML - gry SILT, tr. clay non plastic.		= <20 ct/min
			13	10					
S-7	13-15	100%	10	13					= 40 ct/min
			11	17	15		S.A.A. increase clay (mottled red/gry)		
S-8	15-17	100%	6	8					= 40 ct/min
			9	13					= 70 ct/min
S-9	17-19	80%	7	9					
			9	11					= 60 ct/min
S-10	19-21	80%	8	8	20				
			9	10					= 40 ct/min
S-11	21-23	80%	5	5					
			3	7					= 40 ct/min
S-12	23-25	80%	6	9					
			5	10	25				
S-13	25-27	100%	5	4					
			4	8					
S-14	27-29	80%							
S-15	29-31				30		E.O.B @ 29'		
S-16	31-33								
S-17	33-35								
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302030

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-18

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 9/3/96	LOCATION: Parcel A 500,000 gal AST
ELEVATION: PVC = 16.514'	DATUM: MSL - Ground = 15.547

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	100%	4	12			sm - mf orn/brn SAND, some silt, tr. gravel		HNu=0.0 GM=<20
			19	22					
S-2	2-4	100%	9	8					
			20	24					Auger to 12'
S-3	4-6	70%	19	16	5				description
			14	13					from cuttings
					10				
							End of Boring.		
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302031

HTW DRILLING LOG

HOLE NO. MP-18D

1 COMPANY NAME Malcolm Pirnie Inc	2 DRILLING SUBCONTRACTOR EPS
SHEET 1 OF 3 SHEETS	
3 PROJECT L: Tungsten RI	4 LOCATION Parcel C - Lower C
5. NAME OF DRILLER George Spiciarich	6. MANUFACTURER'S DESIGNATION OF DRILL Centerra CT-250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3"/2" S.S. Split-Spoon; 6"/4" Hollow-Stem Augers	8. HOLE LOCATION MP-18D Parcel C
	9. SURFACE ELEVATION Ground Elev. 15.497
	10. DATE STARTED 9-12-96 / 11. DATE COMPLETED 9-13-96
12. OVERBURDEN THICKNESS >60'	15. DEPTH GROUNDWATER ENCOUNTERED >12'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 57'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	2, 4, 6, 8, 10	See B. log MP-18 For lithology 0-12' bg			~~4-5~~ ~~3-8~~		
S-1	12	Red-Brown F-M SAND some(-) silt little clay, little(-) f-c Gravel - SATURATED	GM 20 HM=Ø		~~4-5~~ ~~10-9~~	4-5 / 10-9	Rec = 80%
S-2	14	SAA - SAT SM/SC			~~9-4~~ ~~6-9~~	9-11 / 6-9	Rec = 90%
S-3	16	SAA				5-6 / 7-8	Rec = 90%
S-4	18	SAA - Grading to more UF SAND + SILT Red-brown last 10" ML/SM				12-19 / 21-24	Rec = 80%

PROJECT | HOLE NO MP-18D

302032

HTW DRILLING LOG

HOLE NO. MP-18D

PROJECT: L. Tungsten

INSPECTOR: E Johnson

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-5	20	Red-Brown-Tan F-C SAND some(-) silt little(-) clay trace f-c gravel SM/SP	GM = 20 HNu = Ø			18-16 12-10	Rec = 60%
S-6	22	SAA				10-14 14-13	Rec = 70%
S-7	24	SAA				9-10 10-12	Rec = 50%
S-8	26	SAA				10-14 29-31	Rec = 50%
S-9	28	SAA to 29' last 1" (Till) Gray F-C SAND and silt w/ some(+) f-c gravel SM				30-30 24-29	Rec = 50%
S-10	30	SAA				15-29 20-20	Rec = 40%
S-11	32	SAA				18-26	Rec = 30%
S-12	34	SAA				25-30 21-29	Rec = 50%
S-13	36	SAA				30-30 28-28	Rec = 40%
S-14	38	SAA top 12" / last 10" white-gray silt/clay w/ some f. SAND trace(-) f gravel. ML/CL				30-30 29-22 21-20	Rec = 80% Rec = 90%
S-15	40					29-36 31-29	Rec = 40%
S-16	42	(Till) Gray-Brn F-C SAND and silt w/ some(+) f-c gravel SM/SP				29-34 36-39	Rec = 30%
S-17	44	Till SAA				38-29 31-32	Rec = 40%
S-17	46	SAA: Grading Red-Brn vf-M SAND Gry-white-clay in tip of spoon w/ silt.				29-36 31-32	Rec = 80%
S-18	48	Gry-white-clay traces silt very cohesive-dense CL				26 29 22 22	Rec = 50%
S-19	50	SAA some Rd coloration				26-24 23-20	Rec = 40%
S-20	52	SAA → port washington clay CL				30-29 28-19	Rec = 20% Rec = 40%
S-21	54	SAA				27-27 26-30	Rec = 80%
	56						

9/12

9/13

PROJECT: L. Tungsten RI

HOLE NO. MP-18D

302033

HTW DRILLING LOG

HOLE NO. MP-18 D

PROJECT L: Tungsten RI

INSPECTOR [illegible]

SHEET 3 OF 3 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
ST-1	56		HNu=0 GM=20			I	collected 2' Shelby tube
	58'	EOB 57' bg					
		could only push ST. one foot 56 to 57'					

PROJECT L: Tungsten RI

HOLE NO. MP-18 D

302034

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-47 MP-19D

PROJECT:	Ci Tungsten	**PROJECT NO:**	8001202
DATE:	10-7-96 to 10-8-96	**LOCATION:**	Parcel B
ELEVATION:	Casing = 32.40, PVC = 32.083	**DATUM:**	MSL = Ground = 30.100

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	12"	10	9			Gry-Tan VF-C SAND + SILT little(+) f-VC Gravel D-M SM		All HNu Readings = BKG
			8	12					
S-2	2-4	18"	10	11			SAA		All GM Readings = BKG = 20.50 cpm
			8	11					
S-3	4-6	18"	12	12	5		Orng-Brn F-VC SAND, some(+) F.VC Gravel little(-) Silt - trace(-) Cobbles well rounded Qtz / Arkose. SP/SM		
			14	9					
S-4	6-8	18"	11	8			SAA - water at ~6.5 'bg		
			16	18					
S-5	8-10	12"	14	10			SAA		
			9	8	10				
S-6	10-12	12"	9	12			SAA		
			16	14					
S-7	12-14	14"	14	12			SAA		
			18	16					
S-8	14-16	12"	10	12	15		SAA		
			12	11					
S-9	16-18	18"	14	11			SAA		4" PVC Sd 40 Riser 23 'bg to +2' Ag
			11	10					
S-10	18-20	18"	19	10			SAA		
			9	11	20				
S-11	20-22	18"	12	16			SAA		Cement Bentonite Grout From 19' to Grade
			11	13					
S-5	22-24	18"	12	13			SAA		
			13	16					
S-6	24-26	20"	14	15	25		SAA		Bentonite Seal From 25' to 19' bg
			12	11					
S-7	26-28	18"	10	9			SAA		
			8	13					
S-8	28-30	14"	16	19			SAA		
			12	13	30				

NOTES: Co. Canterra CT 250
Driller: ~~George Spiciarich~~ / Roy Mentzer
Hydro: Eric Johnson / J. Cavagine

SHEET 1 OF 2

302035

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-47 MP-19D

PROJECT:	Li Tungsten	**PROJECT NO:**	8001262
DATE:	10-7-96	**LOCATION:**	Parcel B
ELEVATION:	Ground = 30.100, Cas. = 32.4	**DATUM:**	MSL, PVC = 32.083

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-9	30-32	12"	16	19	30		SAA		4" Sch 40 PVC 10 Slot Screen from 33-23' bg
			12	10					
S-10	32-34	10"	14	15			SAA		
			17	18					
S-11	34-36	12"	18	19	35		SAA		
			20	17					
S-12	36-38	10"	18	17			SAA		More #0 SAND PACK from 38' to 23' bg
			17	16					
S-13	38-40	8"	21	26			Gry Silty CLAY trace(-) f-c Gravel - Port Washington Formation CL		8" DIA Borehole
			27	29	40				
S-14	40-42	10"	31	26			SAA		note: Running SANDS from 38' to 34' in Bottom of Boring so well set at 33' w/ ~1' of sand pack below Screen.
			27	34					
S-15	42-44	8"	32	33			SAA		
			29	31					
S-16	44-46	11"	36	30	45		SAA		
			29	28					
ST-1	46-48		T	T					
			T	T					
							EOB 48' bg		

Borehole

NOTES:

SHEET 2 OF 2

302036

~~AMP-20~~

HTW DRILLING LOG

HOLE NO. MP-20

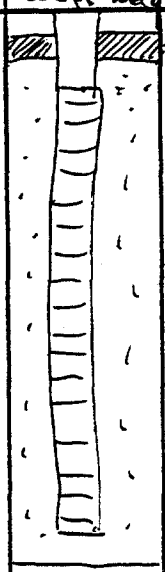
1. COMPANY NAME: Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR: EP+S.
SHEET 1 OF 1 SHEETS 1	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel A
5. NAME OF DRILLER: George Spiranchi.	6. MANUFACTURER'S DESIGNATION OF DRILL: Canterra CT 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Spl. T-Spoons; 6"/4" Hollow Stem Augers; Casing = 32.40	8. HOLE LOCATION: MP-20 Parcel A
	9. SURFACE ELEVATION: Ground = 30.100 PVC = 32.083
	10. DATE STARTED: 9-9-96
	11. DATE COMPLETED: 9-9-96
12. OVERBURDEN THICKNESS: >60'	15. DEPTH GROUNDWATER ENCOUNTERED: 3.0' bg
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 13'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
		—	N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
MW's				Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	~~GEOTECH SAMPLE OR CORE BOX NO.~~ well Diag	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1		Brn-Tan F-C SAND w/ Top soil + Brick + concrete frgmts TS/SP	GM=20 HNu=Ø		MP-20 0-2'	75-20 14-13	Rec = 90%
	2	2					
S-2		SAA w/ more Some(+) silt. SP/SM	GM=20 HNu=0		MP-20B 2-3' bg	13-11 14-12	Rec = 80%
	4						
S-3		Top 6" SAA last 12" Gry-silty-clay trace(-) F. SAND ML/CL	GM=20 HNu=Ø			9-11 13-12	Rec = 80%
	6						
S-4		SAA Gry silty clay mottled w/ Brn coloration	GM=20 HNu=Ø			11-18 20-21	Rec = 90%
	8						
S-5		SAA ML/CL	GM=20 HNu=Ø			18-19 16-20	Rec = 60%
	10						
S-6		SAA	GM=20 HNu=Ø			17-17 19-21	Rec = 75%
	12						
		EOB 13' bg					
	14						
	16						



PROJECT: Li Tungsten RI | HOLE NO: MP-20

302037

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-38 / MP-210

PROJECT: L. Tungsten	PROJECT NO: 8001202
DATE: 9/23/96 to 9/25/96	LOCATION: MSL = Parcel A
ELEVATION: Casing = 10.799, PVC = 10.632	DATUM: MSL = Ground ~ 10.799

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
							Cement/asphalt [AL]		
S-1	1-3	20%	8	10		SP	cf orn/brn SAND, some gravel, tr. silt, tr. pebbles		HNu = Ø
			15	9					GM = Bkg = 20
S-2	3-5	60%	18	12			water at 23' bg		
			17	26	5				
S-3	5-7	60%	22	19					
			25	34					
S-4	7-9	100%	9	15					
			76	78			[SP]		
S-5	9-11	100%	11	13	10	SW	mf gry/brn SAND, tr. silt.		
			18	11			[SP]		
S-6	11-13	80%	5	13					
			11	12					
-7	13-15	100%	8	11			vf orn/red SAND, some silt		
			14	18	15				
S-8	15-17	100%	9	12					
			18	17					
S-9	17-19	100%	12	13			[SP/SM]		
			14	12					
S-10	19-21	100%	10	11	20	ML	orn/brn SILT, some f. sand, tr. clay		
			12	12					cobble stuck in tip of spoon
S-11	21-23	80%	2	10					
			25	64					
S-12	23-25	30%	19	24			[SM/SP]		
			27	32	25		Orn/brn f-vc SAND + Gravel trace(+) silt, trace(+) cobbles (Qtz/Arkose sub rounded.)		
S-13	25-27	40%	19	27					
			35	46					
S-14	27-29	50%	41	47					
			49	56			[SP]		
S-15	29-31	45%	42	42	30				

NOTES: Driller: George Spiriarich
CT 250
Hydro: C. Trione / E. Johnson

SHEET 1 OF 3

302038

MALCOLM PIRNIE MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-38 / MP-21D

PROJECT:	Li Tungsten	PROJECT NO:	8001202
DATE:	9/23/ – 9/25/96	LOCATION:	Parcel B
ELEVATION:	—	DATUM:	MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-15	29-31	45%	42	51	30		SAA [SP]		HNu = Ø
S-16	31-33	50%	36	41			SAA		GM = BKG = 20
			43	48					
9/23 S-17	33-35	75%	40	38			SAA		
↑			37	34	35				
↓ S-18	35-37	90%	39	46			SAA [SP]		
9/24			71	68					
S-19	37-39'	90%	76	59			Orn/red/brn VF-M SAND some(+) silt, trace(-) f-vc gravel [SP/SM]		cement bentonite grout from 41' to grade
			60	68					
S-20	39-41'	90%	61	70	40		SAA		
			58	56					
S-21	41-43	80	29	36			SAA (and silt) [SM]		Bentonite seal from 43' to 41' bg
			47	39					
22	43-45	90%	27	36			SAA w/ trace(-) clay [SM/SC]		4" PVC Sd 40 PVC riser from 45 to +2'
			39	41	45				
S-23	45-47	90%	36	34			SAA		
			39	32					
S-24	47-49	90%	40	36			SAA w/ Gray silt + F. SAND w/ little(-) clay at ~ 48' bg [ML]		
			31	38					
S-25	49-51	60%	30	28	50		SAA		
			29	36					
S-26	51-53	50%	36	39			SAA		4" Sched 40 PVC 10 slot screen from 55-45' bg
			41	44					
S-27	53-55	50%	40	41			SAA		
			39	42	55				
S-28	55-57	40%	40	26					#0 SAND PACK from 57' to 43' bg
			31	39					
S-29	57-59	40%	29	20			Grey clayey-silt w/ trace(-) UF-F SAND - Port Washington Formation [CL]		
			17	19					
S-30	59-61	40%	22	24	60				

NOTES:

302039

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-38 / MP-31D

PROJECT: Li Tungsten	PROJECT NO: 80012 d 2
DATE: 9/23 - 9/25/96	LOCATION: Parcel C
ELEVATION: MSL	DATUM: MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
					60				
S-30	59-61	40%	20	21			Grey CLAYEY SILT [CL] Port. Washington		
S-31	61-63	30%	19	23					
			21	20					
S-32	63-65	90%	20	24			SAA	Bentonite	All GM readings = BKG
			22	23	65				
ST-1	65-67		T	T					
			T	T					
							EOB 67'-6"		All HNu readings = Ø
					70				
					75				
					80				
					85				

NOTES:

SHEET 3 OF 3

302040

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-22

PROJECT: Li Tungsten

PROJECT NO: 8001202

DATE: 8/21/96

LOCATION: Parcel A southwest corner

ELEVATION: Casing = 11.482 PVC = 11.1[illegible]

DATUM: MSL, Ground = 9.849

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
	0-1						Cement (AL		
	1-2		77	32			~~SP- CF blk SAND, some gravel~~		
MP-22	2-3	100%	17	15			SP- CF brn SAND, some gravel, tr silt.	26	1455 60 ct/min
	3-4		10	10				26	1500 45 ct/min
MP-22D	4-5	50%	9	5	5				1503 45 ct/min
	5-6		7	14					
	6-7	70%	5	22					Auger to 13'
					10				
							End of Boring @ 13'		
					15				
					20				
					25				
					30				
					35				
					40				

NOTES: 2" split spoon 140# hammer

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302041

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING MP-22D

PROJECT: Li Tungsten | PROJECT NO: 8001202

DATE: 8/13/96 | LOCATION: Parcel A SW corner

ELEVATION: Casing = 12.099, PVC = 11.624 | DATUM: MSL - Ground = 9.966

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
							Cement		HNu
			12	18			SP - cf blk/brn SAND, some pebbles, trace gravel, tr. silt.		
MP-22	1-3'	80%	10	12					8 ppm
			28	16	5				▽ water @ 4.5'
MP-22A	3'-5'	100%	14	9					7 ppm
			7	2			S.A.A. Trace clay		
Pavs.	5-7	60%	4	2					10 ppm
			9	21					
	7-9	20%	17	29	10				15 ppm
			4	7			slight sheen on water		
	9-11	10%	6	2			Organic clay (peat) brown, tr. silt		9 ppm
			4	2			PT		
	11-13	10%	3	3					10 ppm
			2	1	15		S.A.A. less organics with depth		10 ppm
	13-15	100%	2	2			Mod plasticity		
			17	13					4 ppm
	15-17	40%	29	22			SP - cf orn/yel SAND, some gravel, some cobbles		
			18	8					4 ppm
	17-19	100%	49	100/6"	20				spoon refusal @ 20' Auger to 21'
			8	15					
	19-21	100%	100/6"	X			GL - orn/yel GRAVEL, some cobbles, trace cf sand.		
			18	55					
	21-23	80%	95	100/4"			SM - cm - orn/brn SAND, tr. gravel, tr. silt.		Auger to 25'
			X	X	25				
			X	X					
Move up 1 foot	25-27	90%	47	65			CL - dense gray CLAY - E plasticity, coarse gravel, some pebbles, tr. red clay		Ø ppm
			90	95					
			I	I					Shelby Tube (1) 27'-29'
					30		SW - f. red/brn/brn SAND, tr. silt, tr. clay.		
			I	I					Shelby Tube (2) 29'-31'
	31-33	80%	6	12					Auger to 31'
			13	27					Ø ppm
	33-34	50%	26	100/2"	35				Ø ppm Auger to 35'
			X	X					
	35-36	50%	20	100/2"					Auger to 37'
			X	X					
	37-38	50%	13	100/2"					sand heaving into augers
			X	X	40				Auger to 39'
			25	19			SW - mf red/brn SAND, tr. silt, tr. clay.		
	39-41	100%	20	20					

NOTES: 3" split spoon 140# hammer from 1' to 9'; 2" split spoon thereafter
HNu and OVM perform screening in log book

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302042

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

(2)

BORING MP-22D

PROJECT: L. Tungsten

PROJECT NO: 8001202

DATE: 8/13/96

LOCATION: Parcel A

ELEVATION: Casing = 12.099 PVC = 11.62

DATUM: MSL Ground = 9.966

SAMPLE no.	depth	recovery %	blows per 6"	DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
				40		SW - mf red/brn SAND, tr silt tr. clay		heavy sand heave Auger to 44 and wash inside of augers
	44-45'		42 4	45				
	45-46	100%	4 80			CL - dense mottled CLAY gray, blk, white, red/brn mod plasticity, trace f. sand and silt.		Shelby tube 46'-48' still some sand in augers. Tube again @ 48-50'
		40%						
		30%		50				
		60%					Pellets	Shelby to be 50-52 feet @ 1345 Auger to 55'
				55				
		75%				End of Boring @ 57'		
				20				
				25				
				30				
				35				
				40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302043

MP-

HTW DRILLING LOG

HOLE NO. 11D

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 14	
3. PROJECT: Li Tungsten Superfund Site	4. LOCATION: Parcel C'
5. NAME OF DRILLER: Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 6 1/4" Augers; 3" S.S. To Water Table; 2" S.S. from Water To Top of Port Washa Clays	8. HOLE LOCATION: Parcel C'
	9. SURFACE ELEVATION: 65.636
	10. DATE STARTED: 9/25/96 — 11. DATE COMPLETED: 10/10/96
12. OVERBURDEN THICKNESS: +100+	15. DEPTH GROUNDWATER ENCOUNTERED: 9.8'
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 116'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
11D-0-2', -8-10'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
MW				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		1" of dk Black Highly Organic Mat. w/abund roots Topsoil, w/holes; 2" of LT Tan to dk Tan f-sand with few pebbles, Trace silt; dry. LT Tan To Orange poorly-sorted f-sand; soft To v. soft; Trace silt uniform; dry, no odor; SP	40-50 CPM (0,0 ppm)	1601 (9/25/96)	X Collected 11D 0-2 for Chemi	6, 12, 13, 14	No Recov 2'
	2	Same as above; Uniform LT Tan To Orange-brn f-sand; Trace silt, mica present; SP	40-50 CPM (0,0 ppm)	1612 (9/25/96)		12, 18, 18, 18	2' Recovery
	4	Same as above; SP	40-50 CPM (0,0 ppm)	1630	X Collected Grain Size physical Properties	14, 15	1? Recov

PROJECT: Li Tungsten RI — HOLE NO: MP-11D

302044

HTW DRILLING LOG

HOLE NO. 11D

PROJECT Li Tungsten Superfund Site | INSPECTOR [illegible] | SHEET 2 OF 2 SHEETS 12

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Large Cobble at 5.5'-(1") rounded.				18 18	
	6	Same as above, except Trace to little silt Colors - [illegible] Damp at 6.5'/moist SP	40-50 CPM (0,0 ppm)	1630		14 14 18 18	2' Recovery
	8	Dk brown to B Orange - Tan f-sand as above Trace to little silt SM/SP Interbedded - Silt - Sand layer SM 2" layer - Silty - Sand SM Orange - Br/Tan - f-sand - with 20% gravel (well-sorted) SP/SW Sub-rounded to rounded to 1/2" max 1" layer Silt Wet - To Saturated at 9.8'	(40-50 CPM) (0,0 ppm)	1640 (9/25/96)	X Collected SB-11D (B) 8-10' for chemical	30 25 23 22	2' Recov
9.5' ▼	10	B. Orange m-sand poorly sorted at 10.0 - To 2 saturated SP LT Tan To LT brown f-m-sand with gravel 15-20% - 1/16" max - Gravel is well-graded - saturated, Trace silt, Trace clay - SW/SP	40-50 CPM (0,0 ppm)	9/26/96 0851		15 14 10 12	2" S.S from here down Recov 1.1'
	12	LT Tan To B Orange m-sand with Trace to little silt - Trace pebble SP 1-1 1/2" lens of Grey - Clay ML LT Tan To B Orange m-sand with Trace silt SP 1" Grey-med plastic clay lens ML	40-50 CPM - (0,0 ppm)	0928		6 6 6 2	1.0' recov
	14						

PROJECT Li Tungsten RI | HOLE NO. 11D

302045

HTW DRILLING LOG

HOLE NO. 11D

PROJECT L: Tungsten RI | INSPECTOR [illegible] | SHEET 3 OF 3 SHEETS 14

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LT Tan - Silt - L. Orange - Sand with few gravel - 1/64" SM Dk brown To Ch. brn. Silt - soft with few gravel 1/32 - 1/64" - 10-15% in matrix, saturated, Trace To some clay - ML	40-50 cpm (0,0 ppm)	0938		3 2 1 1	14" → 24" Recovery
	16	B. Orange To lt brn - poorly-sorted m-c - sand with few gravel To 1/2" angular - Trace silt SP/SW Dk brn To dk grey-/brn - c/brn Clayey - Silt - ML	40-50 cpm (0,0 ppm)	0948		WT H 2 8 15	2' Recovery
	18	LT Br. To Tan f-m poorly-sorted sand; Trace gravel pebbles - 1/32 - 1/64" max - rounded To sub-rounded; saturated; med stiff, no odor; Trace silt. SP	40-50 cpm (0,0 ppm)	1005		7 5 25 59	2' Recovery
	20	Same as above except no gravel present. SP	40-50 cpm (0,0 ppm)	1315		7 7 14 53	Heaving - Sands 4" No Recovery
	22	Same as above, except Trace gravel present as 18-20' interval SP	—	1345		3 3	2" No Recovery

PROJECT L: Tungsten RI | HOLE NO. MP-11D

302046

HTW DRILLING LOG

HOLE NO. 11D

PROJECT L: Tungsten RI

INSPECTOR [signature]

SHEET 4 OF 4 SHEETS 14

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Grey - Silty - Clay - Lens (4") - med plasticity To low plasticity [ML]				8	
		Silty - Sand To Lt Brn Silt - lens 2-3" [SM]				18	
	24	Wash ↓ f-m - sand ↓		1421		4	No Recovery
		LT Grey - Clay Lens 1½" [ML]				8	
		F-M - Silty - Clayey - Sand - Dk Br To LT BRN + B. Orange - [ML] [SC]	40-50 CPM (0,0 ppm)			10	
		LT Grey - Clay - Lens 1¼" [CL]				7	
		Gravelly - C - Sand w/ silt - Gravel well-sorted - / Sand - poorly-sorted loose [SW] [SP]					
	26	LT Tan - To LT Brn - m - sand Trace silt; Poorly-sorted, [SP]	40-50 CPM (0,0 ppm)	1436		6	
		3" Gravelly - m - sand - Gravel well sorted 1/32" max rounded [SW]				6	
		DK Grey - / Blue - Grey - Silty - Clay - med - high plasticity - [CL]				12	2' Recovery
						18	
	28	LT Tan - To LT Brn - m - c - sand, Trace Clay - [SP]	40-50 CPM (0,0 ppm)	1500		8	
						10	
		LT Grey - m - c - poorly-sorted sand; cohesive, little - Trace silt [SP]				15	2' Recovery
						16	
	30	LT Grey m - c poorly-sorted sand, Trace to little silt - [SP]	40-50 CPM (0,0 ppm)	1510		15	2" No Recov
						15	Recov
		DK Grey Clayey - Sand w/ Silt Grading to C - gravelly - B/Orange To Reddish - Brn Sand [SC] [SM]				30	
		B. Orange To Rust / Color - C - sand Trace To few pebbles - 1/64" max - [SP] [SC]				33	
	32						

PROJECT L: Tungsten RI

HOLE NO. MP-11D

302047

HTW DRILLING LOG

HOLE NO. 11D

PROJECT L: Tungsten RI

INSPECTOR [signature]

SHEET 5 OF 5 SHEETS 14

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	32	Lt. Tan To brn m-f- silty-sand - To m-f-sand SM LT Grey - B/Grey - Sandy Silt - To m-c - sand, trace pebbles SC SM Bright Orange - Rusty - m-c sand, Trace pebbles <5% SP	40-50 CPM (0,0 ppm)	1620		3 WTH WTH 22	No Recov 5"
	34	LT Tan To dk brn m-sand - [illegible] Trace silt SP 1" Lens of Dk Tan m-silty-sand SM B./Orange m-c - poorly-sorted sand, Trace pebbles <5% - To 1/64" max Throughout matrix med. dense; Trace silt SP	40-50 CPM (0,0 ppm)	0900 (9/27/96		9 18 20 >100	No Recov 4' Recov.
	36	S. A. A; B/Orange - brn m-c - sand - except no pebbles grading To m-sand at 37.1 To 38', few fines - SP	40-50 CPM (0,0 ppm)	1020		4 17 55 68	2' Recov.
	38	Heaving Sands; Wash - Advance;		X			Note: Wash borehole due To heaving sands.
	40	L-Orange To L. Tan To L. Brn m-f sand poorly-sorted, Clean-Sand - trace To no fines - dense - m dense homogeneous - [illegible] SP	40-50 CPM (0,0 ppm)	1208		6 30	

PROJECT L: Tungsten RI

HOLE NO. MP-11D

302048

HTW DRILLING LOG

HOLE NO. 11D

PROJECT: L: Tungsten RI

INSPECTOR: [illegible]

SHEET 14 OF 6 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	41	SP				>80	2' Recovery
	42	Advance 2' due To heaving sands - no SS/- Material at surface up from augers - Change Orange-sand To gray-sand → Use potable water - SP		1325			Advance 2' due To heaving sands -
	44	S.A. 40-42' Except Trace < 5% pebbles 1/16"-1/8" in fine-soil matrix from 45.6' To 46' SP		1347		4 17 42 83	No Recov 3'' Recovery 2
	46	S.A.A except no pebbles SP	40-60 cpm 0.0ppm	9/13e/96 1025		wt 14 20 41	~~wt~~ ~~#~~ 2' Recovery ~~20~~ ~~41~~
	48						Auger to 50'
	50	SP	—				

PROJECT: L: Tungsten RI

HOLE NO. MP-11D

302049

HTW DRILLING LOG

HOLE NO. 110

PROJECT Li Tungsten RI

INSPECTOR [illegible]

SHEET 7 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	50	As Above	40-60 cpm	1126		10	spoon advanced 1.5'
			0.0 ppm			36	recovery = 1.5'
						150	
	52						Auger to 55'
	54						
	55	SP- cf o-a/br. SAND some gravel, trace pebbles (1/16")	40-50 cpm	1435		8	spoon advanced 1.5'
			0.0 ppm			73	recovery = 1.5'
	56	SP				135	
		SW- gy/brn silty SAND, trace gravel					
	57						
	58						

PROJECT Li Tungsten RI

HOLE NO. MP-110

302050

HTW DRILLING LOG

HOLE NO. 11D

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 8 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	59						
	60	S.A.A.	40-60 cpm 0.0 ppm	1620		25 12 9 10	Recovery 1'
	61						
	62						
	63						
	64	SW Wash-Down pebbles - 60-70% 1/16"-1/32" ø Silty Brn Sand - SW Silty Grey/Brn - f-m-sand, Trace Gravel SW Clayey Silty - f-m-sand, Grey-Brn Trace To little gravel 10-15% SW	40-50 cpm (0.0 ppm)	1138		15 38 57 35	2' Recovery
	66	Shunce					
	68						

PROJECT Li Tungsten RI

HOLE NO. MP-11D

302051

HTW DRILLING LOG

HOLE NO. 110

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 9 OF 9 SHEETS 14

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	68	Wash-Down - gravel-pebbles - 1/2 1/2'	40-50 CPM (0,0 ppm	14:26 10/2/96		8 73 35 60	No Recovery
	70						
	72						
	74	Wash-Down SW	40-50 CPM ([illegible])	1634 10/2/96		16 52 54 48	No Recovery 12'
	75	DK Grey To Lt. Grey-Silt and f-m-Sand, clay Traces ML					Recovery 1'
	76						

PROJECT Li Tungsten RI

HOLE NO. MP-11D

302052

HTW DRILLING LOG

HOLE NO. 110

PROJECT: L. Tungsten RI

INSPECTOR: [illegible]

SHEET 10 OF 10 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	77	Advance 6 1/4" Auger To 78' ML					
	78	Grey SILT and F-M SAND little GS clay trace GS f-c Gravel (Till)	40 CPM Ø ppm	1000 10/3/96		30 40 44 36	
	80	Till					
	82	Till					
	84	Till					
	86	SAA - Till Till	40-50 CPM Ø ppm	1125 10/3/96		36 32 41 38	

PROJECT: L. Tungsten RI

HOLE NO. MP-110

302053

HTW DRILLING LOG

11D

PROJECT: Li Tungsten RI | INSPECTOR: Jo Sue | SHEET 11 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	86						
	87						
		Till					
	88	F-m-well-sorted gravel with f-m-sand-(Till) Till		1448 10/3/96		14	
		B. Orange f-m-poorly sorted sand less 1-1½	40-50 cpm			14	
	89	LT Grey-To Tan-Clayey-Silt 5-gravel-gravel-<5%-1/16" max. (Till)	(0,0) ppm			45	
						43	
		Till					
	90			10/3/96 ↓			
	91	Wash + Advance		10/4/96			
	92						
	93						
		Till					
	94		40-50 cpm	10/4/96 11:49		25	No Recov 12'
			(0,0 ppm)			54	
	95	Till					

PROJECT: Li Tungsten RI | HOLE NO. MP-11D

302054

HTW DRILLING LOG

HOLE NO. 110

PROJECT: Li Tungsten RI

INSPECTOR: [illegible]

SHEET 14 OF 12 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	95	LT Tan f-c well-sorted Sand, Saturated, Trace silt				83	1' Recov
		Cobble-Blel-Gray-3"-brown Till				100	
	96						
		Alumie 6 1/4" Augers To 100'		1333 10/4/96			
	97						
	98						
	99						
	100	Till					
		Alumie 6 1/4" Augers To 108'		1354 10/7/96			
	101						
	102						
	103						
	104	Till					

PROJECT: Li Tungsten RI

HOLE NO. MP-110

302055

HTW DRILLING LOG

HOLE NO. 110

PROJECT Li Tungsten RI

INSPECTOR [illegible]

SHEET 14 OF 13 SHEETS

ELEV. a	DEPTH	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	104						
	105						
	106	Advance Augers to 108'					
	107						
	108	Till					
	109						
	110						
	111						
	112						
	113	Till	—				

PROJECT Li Tungsten RI

HOLE NO. AP-110

302056

HTW DRILLING LOG

HOLE NO. 110

PROJECT RI -

INSPECTOR [signature]

SHEET 14 OF 14 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	113						
	114	Till CL Port Washington Clay					
	115						
	116	B.O.H = 116'					
	117						
	118						
	119						
	120						
	121						
	122						

PROJECT Li Tungsten RI

HOLE NO. MP-110

302057

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-8018

BORING SB-1

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 8/27/96	LOCATION: Parcel A
ELEVATION: 10.672'	DATUM: 10.672' (MSL)

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement		HNu=20 Gmole
S-1	1-3	100%	12	13			SP- gry/blk SAND, some silt, tr. gravel, tr. pebbles		▽ @ 3'
			16	11					
~~S-2~~	~~2-5~~						EOB @ 3		
					5				
~~S-3~~	~~5-7~~								
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302058

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-2

PROJECT: L. Tugsden	PROJECT NO: 8001202
DATE: 8/23/96	LOCATION: Entrance to Parcel A
ELEVATION: 13.346' (MSL)	DATUM: 13.346 MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement		
S-1	1-3	60%	15	8			SP-cf blk/brn SAND, some silt, tr pebbles + gravel		= 40cf/min
			5	7					
S-2	3-5	60%	6	18					= 30cf/m
			16	30	5				▽ @5'
							End of Boring @5'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302059

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-3

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 8/26/96	LOCATION: Parcel A
ELEVATION: 12.063'	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement		
S-1	1-3	60%	14	18			sp-cf brn/blk sand, some pebbles, tr. gravel, tr. silt		GM = 40cf/
			12	11					
S-2	3-5	100%	25	25					= 40cf
			33	18	5				
S-3	5-7	60%	11	10					<20cf
			9	12					
							End of Boring @ 7'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302060

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-4

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 8/26/96	LOCATION: Parcel A
ELEVATION: 9.90 y'	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							asphalt/cement		
S-1	1-3	50%	13	16			SP cf orn/brn SAND, some gravel, tr. silt.		GW=40ct/i
			21	17					
S-2	3-5	70%	20	29					GW=40ct
			26	30	5				
							End of Boring @ 5'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302061

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-05

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 9/4/96	LOCATION: Parcel A southeast Corner
ELEVATION: 7,860	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
S-1	0-2	60%	6	6			SP-cf blk/brn SAND, some ash, cinders, tr. gravel, tr. silt.		HNu=0.0 GM=220
			12	10					
S-2	2-4	80%	8	11					HNu=0.0 GM=220
			11	22					Pe4'
					5		End of Boring @ 4'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302062

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-7

PROJECT: L. Tingten	PROJECT NO: 8801202
DATE: 8/27/96	LOCATION: Parcel A southwest Corner
ELEVATION: 9.633	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
F-1	0-2	50%	13	16			SP-cf blk/brn SAND, some pebbles tr. gravel.		HNu: 80 GM=80
			21	17					
S-2	2-4	60%	28	29			Oil sheen on soil @ 3.5'-4.0'		HNu: 40. GM=60
			26	30					
					5		End of Boring @ 4'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302063

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-8

PROJECT: L. Tingsten

PROJECT NO: 8001202

DATE: 8/27/96

LOCATION: ~~8/27/96~~ Parcel A

ELEVATION: 10,426'

DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
S-1	0-2	60%	10	6			SP- br-/blk sand, some pebbles, tr. gravel		HNU 0.2 ppm
			14	9					
S-2	2-4	60%	11	18					0.6 <20
	-		10	17					@ 4'
					5		End of Boring at 4'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOISTURE = MOISTURE

HTW DRILLING LOG

HOLE NO. SB-9

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel B
5. NAME OF DRILLER: Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Split-Spoon; 6"/4" H.S.A.	8. HOLE LOCATION: Parcel B
	9. SURFACE ELEVATION: 42.473
	10. DATE STARTED: 8/28/96 — 11. DATE COMPLETED: 8/28/96
12. OVERBURDEN THICKNESS: +40 >	15. DEPTH GROUNDWATER ENCOUNTERED: 7.0'
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 10'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-Bentonite Grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
			20-50 CPM HNU- (0ppm, 0)		Collected SB-9 0-2	10	13uR/hr at Surface No Recov 6"
		bk brown topsoil/roots, organics				12	
		Lt Brown/Tan Sandy Clay TS				27	1039
		Concrete rubble, fill, concrete fragments to 3" - Conglomerate FL				2	
		Lt Brown Sandy Topsoil - Concrete fragments to 3", roots, gravel 10% TS/FL					
	2	Dk Grey Clay at 1st of [illegible] fine roots	70 CPM HNU- (0ppm, 0)			15	1042 No Recovery
		Lt Brown Sandy-Clay grading to;				11	
		Lt Grey Silty Clay med - plasticity - high plasticity				10	
		CL/SC				7	
	4					7	1051
						5	No Recov 10"

PROJECT: Li Tungsten RI — HOLE NO. SB-9

302065

HTW DRILLING LOG

HOLE NO. SB-9

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk Black Sandy-Bad, poorly-sorted Silty-Grey Clay, moist-wet- to slightly saturated CL	20-50 CPM HNU			9 7	
	6	LT Grey-Silty-Sand- Roots-Dense- wet to slightly saturated- Dk brown Sand- SM	20-50 CPM 0 ppm HNU		Collected SB-6-8 9B	10 19 30 24	1131 2' Recov.
	8	DK Brown Sand LT. Grey Silty-Sand- w/ gravel - 5%- Saturated SM	20-30 CPM HNU 0			17 29 51 59	1154 2' Recov
	10	B.O.B-10'					

PROJECT Li Tungsten RI

HOLE NO. SB-9

302066

HTW DRILLING LOG

HOLE NO. SB10

1. COMPANY NAME Malcolm Pirnie, Inc	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Split-Spoon; 3¼/6¼" H.S.A.	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 43.365
	10. DATE STARTED 8/28/96 — 11. DATE COMPLETED 8/28/96
12. OVERBURDEN THICKNESS +40+ >	15. DEPTH GROUNDWATER ENCOUNTERED 5.1'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE 6'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
+2 elevat.		DK Black to grey Topsoil/Loam loose w/ abund roots + plant fragments organics + clay (trace) Peat OH/TS	400 CPM 10"		Collected SB10 0-2	5 12 13 9	125 uR/hr at Surface No Recov 6" 1415 Recov
		Mottled clay - lt brown to dk brown mottled clay, silt (trace) CL	50 CPM 0 HNU				
	2	DK Gray Sandy - Silt some clay - Some gravel 5% to 1/4" DK Gray-banding to dk black banding moist to saturated SM	R: 50-100 CPM		Collected SB10B 2-4	6 6 6 8	1419 No Recov
	4	Same as above Saturated at 5.1' SM				5 9	

PROJECT Li Tungsten RI — HOLE NO. SB10

302067

HTW DRILLING LOG

HOLE NO. SB10

PROJECT: L: Tungsten RI

INSPECTOR: Joe [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						11 14	1955 2' R.O
	6	B.O.B 6'					
	8						
	10						

PROJECT: L: Tungsten RI

HOLE NO. SB10

302068

HTW DRILLING LOG

HOLE NO. SB-11

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT L. Tungsten Superfund Site	4. LOCATION Parcel "B"
5. NAME OF DRILLER Dan / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" SS Split Spoon; 6 1/4" HSA	8. HOLE LOCATION Parcel "B" - SB-11
	9. SURFACE ELEVATION 40.461
	10. DATE STARTED 8/26/96 — 11. DATE COMPLETED 8/27/96
12. OVERBURDEN THICKNESS ≠ 40 >	15. DEPTH GROUNDWATER ENCOUNTERED 12' - W.T. Measured at 1500
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 10'
14. TOTAL DEPTH OF HOLE 12'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk br Sandy-Topsoil w/about roots, some org-rich, lg wood fragments - 3" lime (white) present ↓ TS/SP Gravel - 1" at bottom of gouge	50-100 CPM HNU - Back (0.0 ppm)		Collected SB-11 0-2 1234	5 14 18 9	1234 2' Recov
	2	Dk gray to dk brown Silty Topsoil w/ 2% brick frags Rel. Roots fill materials, wood fragments LT (Bright) orange wood fragments fill m-c LT Orange to bk br. Sand w/ gravel Some - Poorly graded, Trace, dry Some silt FL	30-100 CPM HNU - Back - 0-2 (0.0 ppm)			6 17 37 29	1432 1.9' Recov
	4	Dk brown Clay To Dk-Grey - hard - gravel - 20% - Trace silt Gravel To 1 1/2" rounded To sub-rounded Grading to lt. brown Sand — White calcite / quartz inclusions present	20-50 CPM HNU - (0.0 ppm)			32 36	

PROJECT L. Tungsten RI — HOLE NO. SB-11

302069

HTW DRILLING LOG

HOLE NO. SB-11

PROJECT Li Tungsten RI | INSPECTOR [illegible] | SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT brown To Tn Clay; dry gravel 5% To 1/2", little sand soft To med, dry CL/SP				36 36	
	6	Clayey-Silty-Sand lt brn. To Dk Tan w/ gravel To 1/2" SC soft, white calcite inclusion Dry; Silt-60% Clay-30% Compacted-Silt-dense Sand Lens-1/4" Thick-interbedded Lens of poorly graded m-c-sand SC Dk. Black Clayey-Sand w/ gravel (35%) To 1/2" rounded, Moist.	R=50-100 CPM HNU-0 ppm-0 ppm			32 27 32 73	1620 7.9' Recov Collapse at 8'
	8	Silty-Clay w/ tn gravel To compacted Silts-dk grey CL Gravel Band 1" To 1 1/2" Thick Angular To Sub-Rounded 1 1/2" max GP Some Gravel; 40% Grey-Black Sand w/ [illegible] interbedded w/ clay-1/4" lens, moist, Red-Band-sandy-gravel Orange-reddish gravelly-sand m-c poorly graded moist-Gravel-To saturated SM/SP	R=50 CPM HNU=0 ppm above back (0,0 ppm)		Collected Analytical Sample SB-11B 8-10	51 58 36 29	4" No Recov 1455 8/27 Recov
	10	Black Band-1 1/4"-Gravel-2" Gravelly-Sand-Lt orange-Tan SW Interbedded w/ silt/clay lens-1/4" Gravelly To LT Tan To white [illegible] sand. Saturated at 11.7' SP	R=50 CPM (0,0 ppm)			27 26 54 52	[illegible] Recov
	12	B.O.B Collected SB-11-2 SB-11-9-11 for [illegible]					

PROJECT Li Tungsten RI | HOLE NO. SB-11

302070

HTW DRILLING LOG

HOLE NO. SB-12

1. COMPANY NAME Malcolm Pirnie.	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B
5. NAME OF DRILLER Dan/Jim	6. MANUFACTURER'S DESIGNATION OF DRILL 150'
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT — 3" SS Split-spoon; Bowls Trowel; 3 1/4" HSA	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 41.010
	10. DATE STARTED 8/28/96 — 11. DATE COMPLETED 8/28/96
12. OVERBURDEN THICKNESS +40' >	15. DEPTH GROUNDWATER ENCOUNTERED 5.5'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 6'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Roots, Topsoil (2") some gravel Dk brown lean clay, moist, Organics presents throughout; TS/CL	20-50 CPM (HNU-0 ppm) 0		Collected Sample SB-12 (0-2)	3 7 5 5	15 μR/hr at Surface; No Recov 5"; 0900
		Br. Orange lean clay, med plasticity, moist, easy crinoid with silt roots present, silt ML/CL					
	2	DK - Same as above ML/CL	20-50 CPM (HNU 0 ppm, 0 ppm)		Collected SB-12 B 4'	10 16 14 15	No Recov 7"; 0915
		LT Grey To dk Grey Silty Clay ML/CL					
	4	Same as above? ML/CL	20-50 CPM (0, 0 ppm)			11 15	0929

PROJECT Li Tungsten RI — HOLE NO. SB-12

302071

HTW DRILLING LOG

HOLE NO. SB-12

PROJECT Li Tungsten RI

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same as above,				20	929
		Saturated at 5.5'				15	
							[illegible]
	6	B.O.B 6'					
							[illegible]
	8						
	10						
	12						

PROJECT Li Tungsten RI

HOLE NO. SB-12

302072

HTW DRILLING LOG

HOLE NO. SB-13

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B
5. NAME OF DRILLER Don / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" Split Spoon; 140 lb. Hammer; 6"/4" HSA	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 59.664
	10. DATE STARTED 8/22/96 — 11. DATE COMPLETED 8/23/96
12. OVERBURDEN THICKNESS +40' >	15. DEPTH GROUNDWATER ENCOUNTERED N/A
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED N/A
14. TOTAL DEPTH OF HOLE 5.5'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DK Bl To Gry. Clayey Topsoil Loam with abund. wood fragments, wood chips organics TS DK brown Clay; few gravel <5% To 1/2 inch med plasticity - dry; no odor CL	50-cpm (2-4 ppm) (0 ppm)	Collected Composite 0-4 +			(Back) R= 10 uR/hr 1534 8/22/ 1.5' Recov
	2	Same as above; CL	50 cpm (0.0 ppm)	Duplicate 0-4			1550 8/22 Recov 2'
	4	Lt Tan Sand w/ Silt (Trace to few) Compact: dense; hard. SM				36 24	8/23/96

PROJECT RI - Li Tungsten — HOLE NO. SB-13

302073

HTW DRILLING LOG

HOLE NO. SB-13

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						100	
						Refusal at 5.5'	
	6	B.O.B. 5.5' ?					
	8						
	10						
	12						
	14						

PROJECT Li Tungsten RI

HOLE NO. SB-13

302074

HTW DRILLING LOG

HOLE NO. SB-13

1. COMPANY NAME	Malcolm Pirnie
2. DRILLING SUBCONTRACTOR	EP+S
SHEET 1 OF 1 SHEETS	
3. PROJECT	Li Tungsten RI
4. LOCATION	Parcel B
5. NAME OF DRILLER	Jim / Don
6. MANUFACTURER'S DESIGNATION OF DRILL	ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2"/3" Split Spoon; 6 1/4" H.S.A.; HNU for field screening
8. HOLE LOCATION	Parcel B
9. SURFACE ELEVATION	59.66 ft
10. DATE STARTED	8/22/96
11. DATE COMPLETED	8/22/96
12. OVERBURDEN THICKNESS	40' >
15. DEPTH GROUNDWATER ENCOUNTERED	N/A
13. DEPTH DRILLED INTO ROCK	N/A
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	N/A
14. TOTAL DEPTH OF HOLE	B.O.H = 4'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	N/A
18. GEOTECHNICAL SAMPLES	DISTURBED / UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES	N/A
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)
21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE	Cement-bentonite; BACKFILLED / MONITORING WELL / OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk Grey To Black Clay + Topsoil with roots, few gravel To 1/16" rounded. Some organics; wood fragments. TS/SC	50 CPM (Back) (0.0 ppm)			N/A	Back = 13 uR/hr 1404
		Lt. Tan Clay increas. gravel To 5% Stiff; dry, dense; low To mod plastic.					1.9' Recov
		Refusal at 1.5' - move 5' S. CL					Refusal at 2' due To Cobble - Move - 5' S.
	2	Abandoned Borehole at 1520 due To Refusal at 3 locations					1418
	4	4' - B.O.H					

PROJECT: Li Tungsten RI — HOLE NO. SB-13

302075

HTW DRILLING LOG

HOLE NO. SB-13

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B
5. NAME OF DRILLER Jim / Don	6. MANUFACTURER'S DESIGNATION OF DRILL ATV-150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Split-Spoons; HNU - F.S.; 6"/4" - 3 1/2" HSA	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 59.664
	10. DATE STARTED 8/29/96 — 11. DATE COMPLETED 8/29/96
12. OVERBURDEN THICKNESS ≠ 40+ >	15. DEPTH GROUNDWATER ENCOUNTERED —
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE R= 50 cpm Back. / 18'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		See Previous Log					
	2						
	4		50 cpm Back			22 36	No Recov 6" 1355

PROJECT Li Tungsten RI — HOLE NO. SB-13

302076

HTW DRILLING LOG

HOLE NO. SB13

PROJECT Li Tungsten RI | INSPECTOR [signature] | SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Tan To grey - clayey - silt - dense, hard, dry, few gravel 2-3% - rounded to sub-r., some quartz ML				23 25	1410
	6	Clayey - Silt - LT brown to Tan - loose, dry ↓ ML LT brown/ Sandy - Silt, Soft, To v. soft, dry - loose SM	R: Back (0,0ppm)			18 24 23 23	1417 2' Reco
	8	LT brown To Tan f-sand, some silt, clay 10% - Trough st gravel - few - 3%, sand is poorly sorted; SP	R: Back (0,0ppm)			13 14 16 16	1438 1 8' Reco
	10	Same as above Clay increase 20% SP	R= 40-50 (0,0ppm)			28 23 22 19	1505 ?'
	12	Same As Above; SP	(R= Back (0,0ppm	Collected Physical SB13 12-14		28 23 21 18	~~1550~~ 1540 2'
	14						

PROJECT Li Tungsten RI | HOLE NO. SB-13

302077

HTW DRILLING LOG

HOLE NO. SB13

PROJECT L. Tungsten RI

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Same as above, f-sand w/silt some clay, poorly-sorted, soft SP	R = Back		Collected SB13 14-16 Analytical	18 22 17 13	1603 2' Recov
		Dk black-f-m-sand. Bands 1½" SP					
		Lt Tan silt, little clay 20% unable to roll, moist, Compact SM					
	16	Same as above SM					1630 2' Rec
		Lt Tan Silt, Trace Clay, wet to moist ML/CL					
	18	B.O.B = 18'					
	20						

PROJECT L. Tungsten RI HOLE NO. SB-13

302078

HTW DRILLING LOG

HOLE NO. SB-14

1. COMPANY NAME	Malcolm Pirnie
2. DRILLING SUBCONTRACTOR	EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT	Li Tungsten RI
4. LOCATION	Parcel B
5. NAME OF DRILLER	
6. MANUFACTURER'S DESIGNATION OF DRILL	ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2"/3" S.S. Sp.T-Spoon; 6"/4" - 3"/4" HSA; HNU - Field Screen; Rad Meter
8. HOLE LOCATION	Drum Disposal Area.
9. SURFACE ELEVATION	39.540
10. DATE STARTED	8/30/86
11. DATE COMPLETED	8/30/86
12. OVERBURDEN THICKNESS	60uR/hr at Surface
15. DEPTH GROUNDWATER ENCOUNTERED	8'
13. DEPTH DRILLED INTO ROCK	N/A
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	
14. TOTAL DEPTH OF HOLE	10'
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	
18. GEOTECHNICAL SAMPLES	DISTURBED / UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES	N/A
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)
21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE	Cement-bentonite
	BACKFILLED / MONITORING WELL / OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR	[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DK BL To gry bl Sandy Tapp ll. Lean w/ abnt roots, organics, Tr. frag. slag SL	100cpm		Subint SB-14 0-2	2 6 9 9	No Recov 3" 1015
		LT Tan To dk Tan clayey Silt Sand Sand 50%-60% - poorly sorted. loose; Silt-20% - C/W to rolled. Crumbles easily; no odor SL/ML	60 cpm (0,0ppm)				
	2	Same as above except becoming more clayey less sand; SC/SL	60-100cpm (0,0ppm)			10 16 16 16	1027 2' Recov
	4	Same as above; To 5' SC/SL	60-100 cpm (0,0ppm)			16 20	1038

PROJECT: Li Tungsten RI

HOLE NO. SB-14

302079

6

HTW DRILLING LOG

HOLE NO. SB14

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Poorly-Graded-Orange-Reddish brown f-sand-interbedded with 1/2 to 1" band of gravel. SP		Submitted SB14 4-6 for grain size		22 22	2'0 Rec
	6	Same as above; more gravel-25% SP Silt/Clay layer interbedded 1" Large cobble-3.5" diam rounded pres ↓ Becoming more gravelly-LT brown-Gravelly-fm-Sand-Gravel-1/4"-30%, slightly wet to moist SP/GC	R=60-100 cpm (0,0 ppm)	Submitted SB14 6-8 for Analytical Sample		22 21 16 23	1045 2' Recov
	8	Same as above; ↓ f-m-sand SP BOB = 10'	R=60-100 cpm (0,0 ppm)			21 22 19 17	1148 2' Recov
	10						
	12						

PROJECT Li Tungsten RI

HOLE NO. SB-14

302080

HTW DRILLING LOG

HOLE NO. SB15

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel B
5. NAME OF DRILLER: Don/Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. split spoon; ATV 150	8. HOLE LOCATION: Parcel "B"
	9. SURFACE ELEVATION: 43.374
	10. DATE STARTED: 8/28/96 — 11. DATE COMPLETED: 8/28/96
12. OVERBURDEN THICKNESS: + 50' >	15. DEPTH GROUNDWATER ENCOUNTERED: 6
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 6'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DK black Sandy Topsoil, loose w/ abund roots - SL	500-600 CPM (0,0 ppm)	Collected Analytical Sample SB15-0-2	1457	2, 3, 12, 9	300 uR/hr at Pile Surface; No Recov 4"
		Mottled-Tan Clay had with some gravel - few 3%-1/16" rounded, med plasticity, stiff CL					
	2	LT Tan - f-m poorly-sorted Sand - orange-brown gravel 5-70% to 1/16" rounded Recov - gravelly ↓ Trace silt SP	R=40-50 CPM (0,0 ppm)	Collected Grain Size Sample SB15 2-4	1500	11, 16, 16, 13	No Recov 6"; Recov
	4	Mottled Tan Clay as 0-2' CL	R=40-50 CPM (0,0 ppm)	Collected Analytical Sample SB15B	1516	21, 29	2' Recov

PROJECT: Li Tungsten RI 4-6 — HOLE NO. SB-15

302081

HTW DRILLING LOG

HOLE NO. SB15

PROJECT Li Tungsten RI

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
						25	
						24	
		Saturated at 6'					
	6	B.O. 8" 6'					

PROJECT RI Li Tungsten

HOLE NO. SB-15

302082

HTW DRILLING LOG

HOLE NO. SB-16

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: L. Tungsten RI	4. LOCATION: B"
5. NAME OF DRILLER: Don / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" SS Spl. 7-Spoon; ATV150; HNU –; 6"/4 / 3¼ HSA	8. HOLE LOCATION: 41.942 / B"
	9. SURFACE ELEVATION: 41.942
	10. DATE STARTED: 8/22/96
	11. DATE COMPLETED: 8/22/96
12. OVERBURDEN THICKNESS: +50+ >	15. DEPTH GROUNDWATER ENCOUNTERED: 9.9.
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 9.9' at 1139
14. TOTAL DEPTH OF HOLE: 12'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cant-bentonite				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SKETCH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h	
		Dk Gry. Topsoil w/ organics, sandy silt, sand, dry SC/TS	Scan R=50 cpm 25uR/hr Head (0ppm) (0ppm)		Collected SB-16 0-2	N/A	0912	Recov 1.9'
		LT To dk Ton/Orange mottled clay w/ trace gravel, silt to fine round to subrounded CL	Back 50 cpm 25uR/hr at Surface					
	2	LT Ton/Orange Coarse-fine sand poorly sorted To Coarse - loose SC	R= 50 CPM Head (0ppm) 0ppm)				0935	
		Med To Coarse Sand some silt poorly sorted dry SP					Recov 2.0'	
		Dk Ton silty clay To silty sand fine sand poorly sorted SM/SP						
		LT Orange Sand – fine silty sand – SP						
		Dk Ton/Orange mottled clay as 0-2' BP/CL						
	4	Same as above; mottled Ton clay as 3.5-4.0' CL	R=50cpm Head (0ppm 0)				No recov (6")	

PROJECT: L. Tungsten RI | HOLE NO. SB-16

302083

HTW DRILLING LOG

HOLE NO. SB-16

PROJECT: Li Tungsten RI

INSPECTOR: [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Poorly-Graded - Orange Sand and gravel Gravelly-Sand - Gravel [illegible] To 3" Rounded [illegible] SP					
	6	Same as above gravelly-sand - gravel 30-40% [illegible] SP [illegible] Sand layer 1-1½" SP [illegible] SM	R = 50 CPM 0 ppm (0 ppm)				0956 20'
	8	Gravelly-Sand - Gravel 20% - Sand poorly-sorted - m-c - silt 20% SP Moist at 9.5' [illegible] clay-lens with silt CL	R = 50 CPM 0 ppm (0 ppm)		Collected SB-16B 8-10		1004 1.8' Rec
W.T ▼ 9.9'	10	Gravelly-Sand - Saturated at 11.1' becoming silty ↓ SP	R = 50 CPM 0 ppm (0 ppm)				1133 2' Rec
	12	B.O.H 12'					

PROJECT: Li Tungsten RI

HOLE NO. SB-16

302084

HTW DRILLING LOG

HOLE NO. SB-17

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel "B"
5. NAME OF DRILLER: Jim / Don	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Split-Spoons; 3¼ H.S.A; HNu - field Screening; S.S. Bowl, Trowel	8. HOLE LOCATION: Parcel B
	9. SURFACE ELEVATION: 39.115
	10. DATE STARTED: 8/29/96 — 11. DATE COMPLETED: 8/29/96
12. OVERBURDEN THICKNESS:	15. DEPTH GROUNDWATER ENCOUNTERED: 10'
13. DEPTH DRILLED INTO ~~ROCK~~: 400 u R/hr at Surface	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 60-80 CPM - Background
14. TOTAL DEPTH OF HOLE:	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement - benton Te grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		TS/SL Dk bl. Topsoil / Loam with roots few Gravel To 3" Rounded To Sub-Round Clayey-Sand w/ silt - 20% Poorly-Sorted - S-f-m - Dk black To dk Tan - mottled clay SC/CL	500 CPM HNu = 0.0 pm 60-80 CPM		Collect SB-17 0-2 Collected TOP-0-2	9 4 3 3	0910 2' Recov
	2	Same as above - gravel - To < 5% roots SL Dk Black Film on - outside on S.S. - Exhibits - Elev. Rod Reading - easily crumbled Mottled appearance 25% Sand 60% - Clay - 30 - Silt - 20% - Gravel < 5% - To - Poorly-Graded Sand SP	200-300 CPM 60-80 CPM 100 - (0.0 pm		Collect SB-17 2-4 for physical properties	9 4 13 6	0911
	4	Dk [illegible] / Tan - Mottled Clay [illegible] - Dk Black [illegible] along [illegible] 1' CL	400 CPM (0.0 pm		Collected SB-17 B 4-6	36 27	0917

PROJECT: Li Tungsten RI — HOLE NO. SB-17

302085

6

HTW DRILLING LOG

HOLE NO. SB-17

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Gravel band 1-1½" - becoming sandy → w/ gravel to 1½" ↓ SP	100 cpm (0.0 ppm) ↓			44 19	
	6	Clayey - (20%) Gravelly - Sand - poorly sorted - Lt Tan to dk brn - loose, dry, mica present. Gravel to 3" quartz present. Spoon - Gravel stick, elevated Slightly wet to saturated at 7.5' SP SM	80-100 CPM (0.0 ppm) ↓			32 27 28 35	0925
	8	Saturated at 8.0' Lt Brown/w/Mica present. f-m Silty - Sand ; Soft - ~~wet~~ gravel SP SM Silty - Gravelly - Sand, Mica present Becoming Gravelly Throughout Saturated ↓ SP	60-70 CPM (0.0 ppm) ↓			32 30 50 49	No Recov 6" 1124
	10	B.O.H.					

PROJECT Li Tungsten RI

HOLE NO. SB-17

302086

HTW DRILLING LOG

HOLE NO. SB-18

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: Environmental Products + Services
SHEET 1 OF 1 SHEETS	
3. PROJECT: Li Tungsten Superfund Site	4. LOCATION: Glen Cove L.I.
5. NAME OF DRILLER: Dan/Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: Concord 9200 Series
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" Split-Spoon S.S. Bowls Trees etc. Concord 9200 Series Geoprobe w/ 608 Pick-Up	8. HOLE LOCATION: Parcel ("B")
	9. SURFACE ELEVATION: 16.666
	10. DATE STARTED: 8/21/96 — 11. DATE COMPLETED: 8/21/96
12. OVERBURDEN THICKNESS: ≈	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 4.1'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): N/A

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
SB-18-0-4" SB-18-0-2'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-Grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		2" Concrete matrix - Asphalt layer AL Dk black/grey clay (lean clay) stiff. CL	2 ppm > back R = 400 CPM		Collected SB-18-0-2" for Rod Only! Collected SB-18 0-2'	N/A	10:26 No Recov 4" 0-2" Sample Collected for Rod Analysis Only - Composite 2'-24"
		Orange-reddish brown - sand with gravel (few-little) Sand M-C grained loose; gravel 20% - rounded to sub-rounded, poorly-graded sand loose, no odor SP/SW	R = 50-100 CPM Back-Ambient 50-100 CPM				
	2	Orange-reddish/br poorly-graded sand m-c, gravelly-sand gravel to 1½" rounded to sub-rounded, some silt, loose; no odor SP	0 ppm > back R = 50-100 CPM				No Recov. 5" 10:40
	4	= B.O.H. Refusal at 4.1' - Moved - Same.		Collected SB-18-0-2" for Rod Only SB-18B-0-2'			

PROJECT: Li Tungsten RI — HOLE NO. SB-18

302087

6

HTW DRILLING LOG

HOLE NO. SB-19

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS	d
3. PROJECT: Li Tungsten Superfund Site	4. LOCATION: Parrel "B"
5. NAME OF DRILLER: Dan	6. MANUFACTURER'S DESIGNATION OF DRILL: Concord 9200 Series
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" Split Spoon S.S. Powd. Travel at Direct Push	8. HOLE LOCATION: Parrel "B"
	9. SURFACE ELEVATION: 21,018
	10. DATE STARTED: 8/21/96
	11. DATE COMPLETED: 8/21/96
12. OVERBURDEN THICKNESS: 40+ >	15. DEPTH GROUNDWATER ENCOUNTERED: 2.5' w/ m-scope
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: 2.5
14. TOTAL DEPTH OF HOLE: 6.0	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
						%

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Tan To yellow (orange) sand, poorly sorted with few gravel To 1/4", some organics, roots, slag. SL SP	150 CPM: Rd - 0-4" 0 ppm HNu (0 ppm Head)		Collected SB-19 0-2	N/A	No Recov. 2" 1437
		Dk Grey To Black Silty Clay, low-med plasticity with some gravel To 10%. Orange To yellow and dk grey silty Clay. CL	40 µR/hr Background				
	2	Dk To LT Tan silty [illegible] with some gravel To 1/2" rounded med-plasticity.	150 CPM 1 ppm (0 ppm (Head))		Collected SB-19B 2-4	N/A	2' Recov. 1450
WL 2.5'		▼	50-100 CPM				
		CL					
	4	Saturated at 4-6' Same as above. CL					

PROJECT: Li Tungsten RI

HOLE NO. SB-19

302088

HTW DRILLING LOG

HOLE NO. SB-19

PROJECT L: Tungsten

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
	6	B.O.H 6.0					
	8						

PROJECT L: Tungsten RI

HOLE NO. SB-19

302089

HTW DRILLING LOG

HOLE NO. SB-20

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR E P+S
SHEET 1 OF 1 SHEETS 1	
3. PROJECT L. Tungsten Superfund Site	4. LOCATION Parcel "B"
5. NAME OF DRILLER Don	6. MANUFACTURER'S DESIGNATION OF DRILL Concord 9200
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" S.S. [illegible] / Bowls S.S. / HNU for field screening / Rad Meter	8. HOLE LOCATION Parcel "B"
	9. SURFACE ELEVATION 24.777
	10. DATE STARTED 7/21/96 — 11. DATE COMPLETED 8/21/96
12. OVERBURDEN THICKNESS 40+ >	15. DEPTH GROUNDWATER ENCOUNTERED 3.2'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED 3.2'
14. TOTAL DEPTH OF HOLE 6'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grout-				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk Gray Silt, Trace Clay, some sand	0 ppm Scan - 20-ppm 0 ppm, 0 Hexagore		SB-0-2 Collected Sample	N/A	1537 Recov
		ML Dk Black peat [illegible] sandy-bon (1") L- Gray [illegible] Dk-Gray-Clay	Back-: 25 μR/hr Surface				
3.2' W.T.		LT Tan To dk Tan mottled clay [illegible] Becoming dk gray silty clay [illegible] moist To saturated CL	SB-100 cpm- Back-Scan (0 ppm [illegible]) 0 ppm)		SB-2-4 Collected Sample	N/A	1551 2' Recov
	4	Saturated [illegible]	56-100 cpm (0, 0 ppm)				1615 2' Rec

PROJECT B.O. to 6' HOLE NO. SB-20

302090

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-23

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 9/13/96	LOCATION: Parcel [illegible] 600,000 AST
ELEVATION: 15.037	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	70%	3	18			sm - mf brn SAND, tr. silt, tr pebbles		HNu = 6 ct<20
			12	10			sp - cf blk SAND, some gravel, tr. organic debris, tr. silt		HNu=5 <20ct
S-2	2-4	30%	8	3					@ 4'
			7	2					
S-3	4-6	10%	2	4	5				HNu=5 <20ct
			8	6					
							End of Boring @ 6'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

302091

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-24

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 9/3/96	LOCATION: Parcel C 500,000 AST
ELEVATION: 14.959	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	100%	5	10			Sm-mf o-n/gray SAND, some silt, fr. gravel		0.0 <20ct
			11	12					
S-2	2-4	100%	15	29					I@3.5'
			31	42					HNU=10.0 <20ct
					5		End of Boring @ 4'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-25

PROJECT: L. Tungsten	PROJECT NO: 8001202
DATE: 9/3/96	LOCATION: Parcel C 500,000 gal AST
ELEVATION: 15.398	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	90%	13	21			sp- cf brn SAND, tr. silt, tr. gravel		HNu ppm = <200ft/m
			9	20					
S-2	2-4	70%	11	17					0.0
			12	24			sw- f. gry SAND, tr. silt.		V@4' <200ft
S-3	4-6	70%	42	32	5				
			14	22			sp- cf orn/brn SAND, some gravel		0.0 <200ft
							End of Boring @ 6'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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302093

HTW DRILLING LOG

HOLE NO. SB-26

1. COMPANY NAME Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York.	4. LOCATION Parcel C'
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150; 3" S.S. Split-Spoons; HNu / Rad Meter	8. HOLE LOCATION Parcel C'
	9. SURFACE ELEVATION 57.628
	10. DATE STARTED 9/24/96 — 11. DATE COMPLETED 9/24/96
12. OVERBURDEN THICKNESS Exp. at 10-12 uR/hr surface	15. DEPTH GROUNDWATER ENCOUNTERED 11.8'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE 12'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grout -				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk brn To dk Grey m-c sand and clayey-silty. Topsoil/loam w/ about root/root hole. Trace gravel - 1/32", organics 1-2 large cobbles gravel 2-3" TS SP/OH	80 CPM (0.0 ppm)	1150	X (Collected) SB-26 0-2'	8, 11, 11, 14	No Recov 9"
	2	Dk brn - To ch. brn sandy-silt w/ m clay - some gravel - SM	50-60 CPM	1155		11, 21, 35, 18	No Recov 9"
	12"	LT Grey - m - To f - sand with few gravel, moist. Sal poorly-sorted; gravel To 10%, some organics SP					
	4	LT Grey - Clay CL	50-60 CPM	1200		9, 10	1.9' Recov

PROJECT: Li Tungsten RI — HOLE NO. SB-26

302094

HTW DRILLING LOG

HOLE NO. SB-26

PROJECT Li Tungsten Superfund Site | INSPECTOR [signature] | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Grey to to lt orange lean Clay Trace silt, med-high plasticity, easily rolled, CL				8 13	
	6	Same as above moist lt Grey-Clay - lean Clay Trace silt, moist CL	50-60 cpm (0,0 ppm)	1210		13 9 10 8	2' Recovery
	8	Boulder X	90-100 cpm	1245			~~2' Recov~~
	10	LT Grey-lean Clay plastic, concave CL LT Grey-lean Clay with silt, some sand-f.-wet to moist SP CL LT. Grey-Silty-Grey-Clay - to Sat Grey-Silt near bt. Grey-Silt layer CL LT Brown to tan m-c sand, poorly sorted Saturated at 11.8'	90-100 cpm	1249	X Collected SB-26B 10-12'	17 25 25 37	2' Recovery
	12	B.O.D = 12'					
	14						

PROJECT Li Tungsten RI | HOLE NO. SB-26

302095

HTW DRILLING LOG

HOLE NO. SB-27

1. COMPANY NAME: Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR: Environmental Products & Services
SHEET 1 OF 1 SHEETS: 2	
3. PROJECT: L. Tungsten, Glen Cove, New York.	4. LOCATION: Parcel C'
5. NAME OF DRILLER: Don / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" S.S. Split-Spoons; 3 1/2" H.S.A; HNu / Rad Meters	8. HOLE LOCATION: Parcel C'
	9. SURFACE ELEVATION: 60.395
	10. DATE STARTED: 9/24/96 Tues
	11. DATE COMPLETED: 9/24/96
12. OVERBURDEN THICKNESS: +40>	15. DEPTH GROUNDWATER ENCOUNTERED: —
13. DEPTH DRILLED INTO ROCK: 9-10 mR/hr at Surface	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
N/A			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Black / Slag from elev. pile SL Dk Grey - Silty - Sand Gold - Brn - Gravelly - Sand (wet) Chrom - Color Lt Tan / Beige / Pink - f-m - poorly sorted Sand - Trace gravel - 1/32" Silt - Dk Grey at bt SP	60-70 cpm (0,0 ppm)	1440	Collected SB-27 0-2' + TCLP 0-2'	1 2 3 25	18' Recov
	2	Bright Orange To Tan - 5-7% m-c - sand, Trace silt gravel, 20% / pebbles / To 1/32" max - SP	50-60 cpm (0,0 ppm)	1510	X Collected physical 2-4' Att Moist. Grains Bulk Re. Hydrau Cond	30 30 54 20	2' Recov
	4	Lt Tan - m-f - sand with some gravel to 1/16" max rounded - cohesive SP	50-60 cpm	1540	Collected SB-27B 4-6' for chem	32 45	2' Recov

PROJECT: L. Tungsten RI | HOLE NO. SB-27

302096

HTW DRILLING LOG

HOLE NO. SB-27

PROJECT Li Tungsten Superfund Site

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						55	
	19"	Lt Tan / Grey - Brown - Silt SP				35	
	6	Lt Tan / Grey / Clay - lens - 1" CL					
				1545		18	
		Bright / Orange - Lt Grey - f-m - sand - Trace to some gravel - 1/2" (pebbles) - Trace to some / little silt, wet				19	
						37	
		Saturated at 7.5' - - -				42	
	8	SP					
		B.O.B 8'					
	10						
	12						
	14						

PROJECT Li Tungsten RI

HOLE NO. SB-27

302097

HTW DRILLING LOG

HOLE NO. SB-28

1. COMPANY NAME: Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR: Environmental Products + Services
SHEET 1 OF 1 SHEETS	
3. PROJECT: L. Tungsten, Glen Cove, New York.	4. LOCATION: Parcel C
5. NAME OF DRILLER: Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3" SS - Split-Spoons; 3 1/4" HSA; HNu / Rad Meter - Bowls, Trowels, S.S. sp	8. HOLE LOCATION: Parcel C
	9. SURFACE ELEVATION: 57.614
	10. DATE STARTED: 9/25/96 Wed
	11. DATE COMPLETED: 9/25/96
12. OVERBURDEN THICKNESS: 11 uR/hr at Surface	15. DEPTH GROUNDWATER ENCOUNTERED: 7.6'
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED:
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
							No Recov 12"
		DK blackish - sand / Slag - with cobbles - 2" rounded - little dry, no odor SP SL	40-50 cpm	0915			
	2	LT Tan to dk Tan fine - sand interbedded with thin layers of silt 1/32" max, few rounded gravel. Some roots, wood fragments, some organics - odor SP	40-50 CPM (10 ppm)	1000	X Collected SB-28 2-4'	10 15 23 30	1.8' Recov
	4	LT to dk Gray - fine - sand - Trace silt. LT Tan to LT brn v fine - sand, poorly - sorted - soft - to v soft, Trace silt SP	40-50 cpm (0,0 ppm)	1019	X Collected SB-28B 4-6'	70 35	2' Recov

PROJECT: L. Tungsten RI

HOLE NO. SB-28

302098

HTW DRILLING LOG

HOLE NO. SB-28

PROJECT Li Tungsten Superfund Site

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Interbedded - silt w/sand -		1019		80 72	
	6	SP					
		B Orange f-sand with silt grey - Tan - hard, poorly-sorted;		1039		32 41	
		Dk Grey - poorly-sorted f-sand - with silt - wet -	40-50 CPM (0.0 ppm)			52 54	2' Recov
		Saturated at 7.6'					
	8	SP B.O.B = 8'					
	10						
	12						
	14						

PROJECT Li Tungsten RI

HOLE NO. SB-28

302099

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-29

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 8/27/96	LOCATION: Panel A
ELEVATION: 9.703	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement /AL		HNu=0.5 GM=20
S-1	1-3	50%	10	25			sp. cf blk SAND, some pebbles, tr. gravel - slight		
			24	22					
S-2	3-5	80%	20	20					HNu=30 GM=40
			19	18	5				
							End of Boring @ 5'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-31

PROJECT: L. Tungsten RI	PROJECT NO: 8001202
DATE: 8/28/96	LOCATION: Parcel A
ELEVATION: 7,781	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
							topsoil 1' Asphalt		
S-1	1-3	80	19	17			Blk-Tan f-c sand some (+) Gravel trace (+) silt. coal fragments SP		HNu = 1.1 GM = 20
			8	20					
S-2	3-5	90	14	12					
			4	3	5		SAA none silt/clay grading to silty clay at ~4.8' bg cinder at 3.0' bg.		HNu = 1.0 GM = 20-30
							EOB at 5' bg		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-32

PROJECT: L. Tungsten RI	PROJECT NO: 8001202
DATE: 8/28/96	LOCATION: Parcel A
ELEVATION: 7.807	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION (M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *)	WELL CONST.	REMARKS
							Top 12" Asphalt TAL		
S-1	1-3	75%	18	21			Blk-Tan f-c ~~GRAVEL~~ SAND some(-) f-vc ~~SAND~~ Gravel trace(-) silt EP		HNu = 0.9
			9	14					GM 20
S-2	3-5	80%	16	18			SAA - Gray-Tan silt/clay at ~4.5'bg water at 3.0'bg		HNu =
			11	9	5		EOB at 5'bg SM		OM =
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-33

PROJECT: L. Tungsten RI	PROJECT NO: 8001202
DATE: 8/28/96	LOCATION: Parcel A
ELEVATION: 8.880	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Top 1' Asphalt		
S-1	1-3	80%	19	18			Dry - Brn - Org F-C SAND - some (-)	AL	HNu = 6.2
			16	13			Silt - some pebbles trace(d) F-VC Gravel	SM	GM: 30
S-2	3-5	90%	9	5			SAA w/ more silt (and) less Gravel	SM/ML	
			4	5	5		water at ~2.5' bg		HNu = 12.8
							EOB AT 5' bg		GM = 30-40
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-34

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 8/28/96	LOCATION: Parcel A
ELEVATION: C	DATUM: MSL

SAMPLE S no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.: 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Top 1' Asphaect [AL		
S-1	1-3	90%	17	21					
			20	16			sp Orn - Brn - Gry		HNu = 8.2
							C-F SAND some(-) silt		GM = 30
					5		some(+) F-VC Gravel [SM		
							little (+) pebbles		
							Dmp - moist water at 3'bg		
					10		EB 3'bg		
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-35

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 8/28/96	LOCATION: Parcel A
ELEVATION: 11.993	DATUM: MSL

SAMPLE no.	SAMPLE depth	SAMPLE recovery %	SAMPLE blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Rollerbit through 1' of Asphaut. AL		
S-1	1-3	75%	12	28					4Nu = 9.2 PPM
			20	17			sp orn/brn C-F SAND some(+) Gravel, trace(+) silt ~~+ Pebb~~ + trace bebbles Damp to nosit wet at 3'bg. SP		GM = 20
					5				
					10		EOB 3' bg		
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-36

PROJECT: Li Tungsten RI	PROJECT NO: 8001202
DATE: 8/27/96	LOCATION: Parcel A
ELEVATION: 13.441 -	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement AL		
S-1	1-3	50%	21	26			SP- orn/brn of sand, some gravel, tr pebbles		[illegible]
			12	11					
							End of Boring at 3'		
					5				
					10				
					15				
					20				
					25				
					30				
					35				
					40				

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018 BORING SB-37

PROJECT: L. Tungsten	PROJECT NO: 8001202
DATE: 8/27/96	LOCATION: Parcel A
ELEVATION: 10.631	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
							Cement		
S-1	1-3	50%	9	3			SP- ~~[illegible]~~ cf on/brn SAND, some gravel		[illegible]
			11	15					▼ @ 3'
					5		End of Boring @ 3'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

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302107

MALCOLM PIRNIE — MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-39

PROJECT: Li Tungsten	PROJECT NO: 8001202
DATE: 9-19-96 to 9/20/96	LOCATION:
ELEVATION:	DATUM:

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"	DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	6"	25 54			Gry-Black F-C SAND and f VC Gravel some(-) silt ~~water~~ at ~25' bg —		All HNu Readings = 0
			72 69					
S-2	2-4	13"	6 9			Gry-Brn F-C SAND + silt trace(+) f-c Gravel [SM		All GM Readings = 20-40
			6 4					
S-3	4-6	16"	6 9	5		SAA		
			7 5					
S-4	6-8	20"	3 8			Orng-Brn f-c SAND some(+) silt some(-) f VC Gravel + cobbles [SM		
			9 11					
S-5	8-10	16"	9 9			Rd-Brn-Tan VF-M SAND and silt ~~[illegible]~~ Trace(+) f-vc Gravel [SM	No well Installed	
			11 7	10				
S-6	10-12	20"	10 12			Red-Brn clayey silt, ~~[illegible]~~ trace(-) f-M SAND trace(-) f Gravel [CL/ML		
			12 18					
S-7	12-14	12"	42 44			SAA		
			50 56					
S-8	14-16	8"	30 29	15		SAA		
			35 35					
S-9	16-18	8"	34 32			SAA		
			31 32					
S-10	18-20	10"	28 21			SAA		
			29 30	20				
S-11	20-22	12"	30 30			SAA		
			27 27					
S-12	22-24	14"	29 31			SAA		
			34 26			Gry VF SAND + silt little(+) clay. [SM		
S-13	24-26	12"	27 26	25				
			26 40			SAA		
S-14	26-28	14"	34 32					
			32 36					
S-15	28-30	15"	24 31			orng-brown f-vc SAND + Gravel trace(-) silt [SP] [SM		
			30 27	30				

11 9/20

NOTES: Driller George Spiciarich
SAME AS - 8D

SHEET 1 OF 2

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MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-39

PROJECT: L. Tungsten AI.	PROJECT NO: 8001202
DATE: 9/19 to 9/20	LOCATION:
ELEVATION:	DATUM:

SAMPLE NO.	SAMPLE DEPTH	SAMPLE REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-16	30-32	20"	26	22	30		SAA SAND & Gravel		
			21	24					
							EOB 32' bgl		
					35				

NOTES:

SHEET 2 OF 2

302109

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BOULEVARD MAHWAH, NJ 07495-0018

BORING SB-40

PROJECT: L. Tungsten RI	PROJECT NO: 8001202
DATE: 9/6/96	LOCATION: South of Parcel C (Garvies Pt Rd)
ELEVATION: 9.458	DATUM: MSL

SAMPLE no.	depth	recovery %	blows per 6"		DEPTH	STRATA	SOIL DESCRIPTION M. COMP., TEX., C., 2nd COMP., TEX. C.; 3rd COMP., ETC., MOIST., OTHER *	WELL CONST.	REMARKS
S-1	0-2	100	13	9			sm-mf red/brn SAND, tr. silt, tr.		0.2 <20
			12	6					
S-2	2-4	100%	3	3					0.2 <20
			2	14					
S-3	4-5	100%	8	5	5				0.2 <20
							End of Boring @ 5'		
					10				
					15				
					20				
					25				
					30				
					35				
					40				

NOTES:

* NOTE: M. COMP. = MAJOR COMPONENT, TEX. = TEXTURE, C. = COLOR, COMP. = COMPONENT, MOIST. = MOISTURE

HTW DRILLING LOG

HOLE NO. SB-41

1. COMPANY NAME Malcolm Pirnie Inc.	2. DRILLING SUBCONTRACTOR Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York	4. LOCATION Parcel C
5. NAME OF DRILLER Don / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: S.S. split-spoons; Bowls Trowels; Augered To 8'; 3 1/4" H.S.A	8. HOLE LOCATION Parcel C
	9. SURFACE ELEVATION 25.667
	10. DATE STARTED 9/23/96 — 11. DATE COMPLETED 9/23/96
12. OVERBURDEN THICKNESS Exposure at Surface 10 uR/hr	15. DEPTH GROUNDWATER ENCOUNTERED 4.0
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DK Black - Clayey - Topsoil / Sand - 2" layer, Roots / Organics - 1.2" SL/TS Tan To LT Brown - Clayey - S. lT. mod plasticity, few gravel - 1/16" ML LT-Tan - M-F - Sand - few gravel To Trace Gravel, poorly-sorted SP	30-40 CPM HNU - 0 ppm (0 ppm)	1337	2"	6 6 12 12	No Recov 10"
	2	LT Tan To B/Orange - gravelly - m-c - sand - poorly-sorted sand - well-sorted gravel To 1/8", wet To saturated, Red brick SP	30-40 CPM (0 ppm (0 ppm)	1339	2"	18 16 18 18	No Recov 10"
	4	Saturated: Same as above; except large cobbles: 2" - present - add. gravel, 50-60% SP	30-40 CPM - (0, 0 ppm)	1417	3" X collected	10 24	Recov 17

PROJECT Li Tungsten RI — HOLE NO. SB-41

302111

HTW DRILLING LOG

HOLE NO. SB-41

PROJECT: L. Tungsten Superfund Site

INSPECTOR: [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						55 70	
	6						
		Same as 4-6		150z	3" S.S.	60 60 86 86	2' Recov
		SP					
	8	B.O.B. 8'	Collected Composite 4-8' sample for VOA's, Semi-VOA's, Metals, Rad. + Duplicate + TCLP		+ TCLP Duplicate		
	10						
	12						
	14						

PROJECT: L. Tungsten RI

HOLE NO. SB-41

302112

HTW DRILLING LOG

HOLE NO. SB-42

1. COMPANY NAME Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR Environmental Products + Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York	4. LOCATION Parcel C
5. NAME OF DRILLER	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150 – 3 1/4" H.S.A. Spoons Spatula Rad / HNU – Meters	8. HOLE LOCATION Parcel C
	9. SURFACE ELEVATION 36.079
	10. DATE STARTED 9/23/96
	11. DATE COMPLETED 9/23/96
12. OVERBURDEN THICKNESS (30 CPM Back)	15. DEPTH GROUNDWATER ENCOUNTERED 4.0'
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED –
14. TOTAL DEPTH OF HOLE 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-bentonite grout				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		6" Asphalt / Conc, Grey-Concrete AL		1636			
		DK Grey to DK brown Clayey-Silt with some-m-c lt brown sand, med plasticity-dry, no odor ML	50 cpm (0,0 ppm)			1 6 8	Recov 15
	2	LT to dk grey-sandy clayey silt 1 to Trace gravel to 1/16" max rounded, no odor med plasticity ML/CL	50 cpm (0,0 ppm)	1637		8 12 14 12	1.4' Recov
	4	Wet to Saturated at 4.0', sandy-clayey-silt Same as above, with few to Trace gravel-LT brown to lt grey-silt ML/CL	40-50 cpm	1646	X Collected SB-42 4-6'	17 14	No Recov

PROJECT Li Tungsten RI HOLE NO. SB-42

302113

HTW DRILLING LOG

HOLE NO. SB-42

PROJECT L. Tungsten Superfund Site

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						13 2\3	
	6						
		Dk Grey - Silty - Clay - moist - plastic					
		CL Red - Clayey - Silt to Red - Grey Clay.					
	8	// P.O B = 8'					
	10						
	12						
	14						

PROJECT L. Tungsten RI

HOLE NO. SB-42

302114

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-44

PROJECT:	Li Tungsten	PROJECT NO:	8001202 (MP-40)
DATE:	10-1-96 to 10-1-96	LOCATION:	Parcel B
ELEVATION:	26.859	DATUM:	MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S							Concrete AL		
S-1	1-3	12"	8	10			Red-Brn VF-VC SAND and SILT w/ little(-) clay. little(-) f-vc Gravel SP SM		All HNu Readings = Ø
			10	12					
S-2	3-5	18"	12	18			SAA		All GM Readings
[illegible]	[illegible]	[illegible]	[illegible]	[illegible]			[illegible]		[illegible]
S-3	5-7	12"	21	21	5		SAA less silt + clay → water at ~5.5 bg SP		
			28	28					
S-4	7-9	18"	54	44			SAA		
			33	17					
S-5	9-11	18"	11	12	10		Gry-tan F-M SAND and silt/clay trace(+) C-F Gravel (Till) SP/SM	No well installed → Grout up	
			14	19					
S-6	11-13	12"	6	8			SAA		
			16	16					
S-7	13-15	12"	12	14			SAA		
			16	19	15				
S-8	15-17	16"	12	10			SAA		
			11	19					
S-9	17-19	12"	14	18			SAA more Gry (Till)		
			10	12					
S-10	19-21	12"	10	11	20		SAA		
			19	22					
S-11	21-23	12"	21	19			SAA		
			27	20					
S-12	23-25	12"	28	28			SAA		
			30	24	25				
S-13	25-27	14"	26	21			SAA (Till)		
			19	12					
S-14	27-29	12"	21	19			SAA to 28'		
			27	22			White to light Gray VF-M SAND some(+) silt. little(-) clay		
S-15	29-31	16"	30	36	30		White-Gray clayey silt ML	↑	

NOTES: Driller George Spiciarich
Cantera CT 250
Hydro E. Johnson

SHEET 1 OF 3

302115

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-44 / MP-4D

PROJECT:	C. Tungsten	PROJECT NO:	8001202
DATE:	10-1-96 - 10-1-96	LOCATION:	Parcel B
ELEVATION:	26.859	DATUM:	MSL

SAMPLE NO.	SAMPLE DEPTH	SAMPLE REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-15	29-31	16"	32	37	30		w/ Some - Red - Brown Mottled coloration - Port Washington form.		
S-16	31-33	12"	27	29			SAA CL		
			39	28					
S-17	33-35	18"	20	31			SAA		
			36	32	35				
S-18	35-37	18"	34	39			SAA	Bentonite	
			40	28					
ST-1	37-39	18"	I	I			SAA Rec = 75%		
					40		EOB 39' bg		
					45				
					50				
					55				
					60				

NOTES:

SHEET 2 OF 2

302116

HTW DRILLING LOG

HOLE NO. SB-45

1. COMPANY NAME: L. Tungsten / Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 3	
3. PROJECT: L. Tungsten RI	4. LOCATION: Parcel
5. NAME OF DRILLER: Roy Menzer EP+S	6. MANUFACTURER'S DESIGNATION OF DRILL: Longyear CT 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 3 1/4" H.S.A.	8. HOLE LOCATION: -
	9. SURFACE ELEVATION: —
	10. DATE STARTED: 10/4/96
	11. DATE COMPLETED: 10/4/96
12. OVERBURDEN THICKNESS: + 40' >	15. DEPTH GROUNDWATER ENCOUNTERED
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 36'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-Bentonite Grout				G. T.

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SKETCH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
							Auger Directly to 26'
	2						
	4						
	6						
	8						
	10						

PROJECT: L. Tungsten RI HOLE NO. SB-45

302117

HTW DRILLING LOG

HOLE NO. SB-45

PROJECT Li Tungsten Superfund Site

INSPECTOR [illegible]

SHEET 2 OF 2 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	10						
12	12						
	14						
16	16						
	18						
20	20						
	22						
24	24						
	26	ML - gry/lt.brn SILT, some clay tr. f. sand, tr. 1/16" ~~pebbl~~ 1/8" pebbles. poor - mod plasticity	40-60 cpm 0.2 ppm	100%	S-1	3 5 3 7	
28	28						

PROJECT Li Tungsten RI

HOLE NO. SB-45

302118

HTW DRILLING LOG

HOLE NO. SB-45

PROJECT L. Tungsten Superfund Site | INSPECTOR [illegible] | SHEET 2 OF 2 SHEETS 3

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		ML - gry/lt. brn SILT, some clay, tr. 1/8" - 1/4" pebbles	40 cpm 0.0ppm	100%	S-2	4 3 3 7	
30		S. A. A.	40-60 cpm 0.0ppm	100%	S-3	10 12 15 29	
	32	S. A. A	40-60 cpm 0.0ppm	80%	S-4	25 20 18 20	
34		S. A. A	40-60 cpm 0.0ppm	80%	S-5	9 15 11 7	
	36	EOB @ 36'					
	10						
	12						
	14						

PROJECT L. Tungsten RI | HOLE NO. SB-45

302119

MALCOLM PIRNIE

MALCOLM PIRNIE, INC. ONE INTERNATIONAL BLVD., MAHWAH NJ 07495-0018

BORING SB-46

PROJECT: L. Tungsten	**PROJECT NO:**
DATE: 10-8-96 / 10-9-96	**LOCATION:** Parcel B
ELEVATION:	**DATUM:** MSL

SAMPLE NO.	DEPTH	REC.	BLOWS PER 6"		DEPTH	STRATA	SAMPLE DESCRIPTION	WELL DETAIL	REMARKS
S-1	0-2	19"	8	12			Grayish Brown VF-C Sand & Silt, little F-C Gravel [SP/SM]		No HNu readings recorded because of rain. All GM readings = BKG. (20-40 cpm)
			14	18					
S-2	2-4	4"	10	18			Grayish Brown VF-C Sand & Silt trace F-C Gravel [SP/SM]		
			20	24					
S-3	4-6	15"	32	18	5		Orange Brown VF-C Sand, trace Silt some F-C Gravel [SP/SM]		
			16	23			Brown VF Sand & Silt, trace Clay		
S-4	6-8	16"	16	32			SAA [SP/SM]		
			35	21			Orange Brown VF-C Sand, trace Silt & F-C Gravel		
S-5	8-10	20"	12	12			SAA [SP/SM]		
			12	6	10				
S-6	10-12	15"	18	16			Brown VF-M Sand, some Silt [SM]		
			19	25					
S-7	12-14	12"	19	21			Orange Brown VF-C Sand, little F-C Gravel [SM/SP]		
			28	31					
S-8	14-16	22"	32	25	15		SAA		CLAY @ ~15 FT
			18	29			Gray Silty Clay trace F-C Sand & Gravel [CL]		
S-9	16-18	24"	19	25			SAA		
			21	32					
S-10	18-20	6"	23	35			SAA		
			31	22	20				
S-11	20-22	13"	17	19			SAA		
			28	26					
S-12	22-24	18"	20	16			SAA		
			19	25					
ST-1	24-26	24"	I	I	25		SAA		
							EOB @ 26 FT		

NOTES: Driller: George Spiciarich / Ray Mentzer

Cantera CT-250

4 1/4" HSA 140 lb Hammer w/ 30" drop 2" ID split spoon sampler

Hydrogeologist: Joe Cragine

SHEET 1 **OF** 1

302120

HTW DRILLING LOG

HOLE NO. RT-1

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S.
SHEET 1 OF 1 SHEETS 1	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel B
5. NAME OF DRILLER: George Spinarci	6. MANUFACTURER'S DESIGNATION OF DRILL: Cafferra CT 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" Sp. Spoons; 6 1/4" H.S.A	8. HOLE LOCATION: RT-1 Parcel B
	9. SURFACE ELEVATION: 41.825
	10. DATE STARTED: 9-10-96
	11. DATE COMPLETED: 9-10-96
12. OVERBURDEN THICKNESS: +40'	15. DEPTH GROUNDWATER ENCOUNTERED: 12' bg
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1	2	Brn-Tan C-F SAND some(+) SLt/ Clay little(+) C-F Gravel organics -	GM = 120 HNu = ∅	RT-1 0-2' DUP 07 (Rt)		9-12 8-10	Rec = 60%
S-2	4	SAA top DRY [SP	GM 280 HNu = .6	RT-1B 2-4' bg		5-8 6-5	Rec = 80%
S-3	6	GRY SLt + Clay trace(-) F-C Gravel (M-W) [CL	GM = 60 HNu = ∅			8-5 6-7	Rec = 60%
S-4	8	GRY SLt + Clay w/ trace(-) F-C Gravel Mst.	GM = 60 HNu = ∅			6-8 10-10	Rec = 70%
S-5	10	SAA [CL	GM = 60 HNu = ∅			8-9 6-4	Rec = 60
S-6	12	Green-Gry SLt w/ little(-) Clay little/trace fine to C Gravel [ML	GM = 40 HNu = ∅			5-1 3-21	Rec = 50
S-7	14	SAA = SAT water 12' bg top 6" last 6" F-C SAND w/ some F-VC gravel.	GM = 60 HNu = ∅			8-10 11-4	Rec = 50
	16	EOB 15' bg					

PROJECT: Li Tungsten RI

HOLE NO. RT-1

302121

6

HTW DRILLING LOG

HOLE NO RT-2

1. COMPANY NAME: Malcolm Pirnie, Inc	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 1	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel B
5. NAME OF DRILLER: George Spiranci	6. MANUFACTURER'S DESIGNATION OF DRILL: Canterra CT 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S Split Spoon; 6"/4" H.S.A.	8. HOLE LOCATION: RT 2 Parcel B
	9. SURFACE ELEVATION: 44.289'
	10. DATE STARTED: 9-10-96
	11. DATE COMPLETED: 9-10-96
12. OVERBURDEN THICKNESS: +40'	15. DEPTH GROUNDWATER ENCOUNTERED: —
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY):

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: —

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1		Blk F-C SAND Some (+) F-VC gravel (Fill) Brk fgms.	GM = 500 CPM HMu = Ø		RT-2 0-2'	8-12 14-10	Rec = 60%
	2						
S-2		SAA. SP	GM = 250 HMu = Ø		RT-2B 2-4'	9-10 9-6	Rec = 80%
	4						
S-3		Gn-Tan silt + clay Some(+) F-VC Gravel CL	GM = 50 HMu = Ø			17-16 15-12	Rec = 80%
	6						
S-4		Red-Brn F-C SAND and silt trace(+) F-VC Gravel. SP	GM = 20 HMu = Ø			14-7 16-11	Rec = 75%
	8						
S-5		SAA more gray in color	GM = 50 HMu = Ø			20-17 13-19	Rec = 50%
	10						
S-6		SAA	GM = 50 HMu = Ø			13-11 16-10	Rec = 50%
	12						
S-7		SAA SP	GM = 40 HMu = Ø				Rec = 75%
	14						
		EOB 15' bg	GM = 50 HMu = Ø				
	16						

PROJECT: Li Tungsten RI | HOLE NO: RT-2

302122

HTW DRILLING LOG

HOLE NO. RT 3

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 2 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL CME / Con Terra 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2"/3" S.S. split-spoons; 6 1/4" H.S.A.	8. HOLE LOCATION Parcel B.
	9. SURFACE ELEVATION 44.371
	10. DATE STARTED 9/12/96 — 11. DATE COMPLETED 9/12/96
12. OVERBURDEN THICKNESS + 40'	15. DEPTH GROUNDWATER ENCOUNTERED 9'
13. DEPTH DRILLED INTO ROCK Exposure at surface 150-200 μR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SKETCH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
					1112 (collected) RT33 0-2' X	3 6 7 9	No Recovery 1'
		DK Black Topsoil / Slag w/ few/trace some roots / organics, clay - 5% -, no odor, trace silt TS SL	300-400 cpm (0.0 ppm)				
	2				1118	9 8 12 13	No Recov 1'
		1" Gravel present LT Tan Clayey-Sand w/ gravel Clay - 20-30% Sand m-c-grained; gravel - 10-15% - 1/16" SC	90-100 cpm (0.0 ppm)				
	4	DK Grey - Silty - Clay - med-high plasticity CL			1123	4 5	No Recov 1'

PROJECT Li Tungsten RI — HOLE NO RT3

302123

HTW DRILLING LOG

HOLE NO. RT3

PROJECT: L. Tungsten RI

INSPECTOR: [signature]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Grey - To dk Gry - Silty - Clay - as 4-6' CL	50-CPM (0,0 ppm)			8 8	1' Recov
	6				1130	6 5	No Recovery 9"
		Dk Grey To LT Grey Silty - Clay → as 4-6 - Same as 4-6' CL	40-50 CPM (0,0 ppm)			10 10	
	8	Same as 6-8 -	50-100 CPM		1200	18	No Recov
		Dk Black Slag ~~Topsoil~~ ~~[illegible]~~ log SL	300-400 CPM			22 22	1.8' R
	Saturated	LT Grey - Silty - Grey - Blue Sand More - Silty Than 6-8' - Sandy Clay - Sand is fine To v. soft Saturated at 9.5' SP/CL	50-100 CPM (0,0 ppm)			20	
	10	Same as above; LT Grey - Silty - Blue - Grey - Sand - Sand is fine To v. soft - v.sf; Some clay - 15-20% - Saturated - SP LT Orange - Yellow band band v. fine	50-100 CPM (0,0 ppm)		1209	12 12 12 12	2' Recovery
Gravelly Silty Sand	12	LT Grey - Blue - f - sand - increasing gravel - 5% - 20-25% gravel SP			1227 Collected RT3 12-14	15	
		LT Grey - Blue Gravelly - Sand m-c - (40-50% Gravel) SP	40-50 CPM (0,0 ppm)			12 12	2' Recovery
		Gravelly layer 40% - To 1/4" round SW				10	
	14	Decreasing Gravel LT-Grey-Blue C-grained - sand SW/SP					

PROJECT: L. Tungsten R.I.

B.O.B.

HOLE NO. RT3

302124

9-10-96

HTW DRILLING LOG

HOLE NO. RT-4

PROJECT Cantevra CT 250 | INSPECTOR E. Johnson | SHEET 1 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1	2	Tan - Brown SILT f f-c SAND Trace(+) f-c Gravel /SP		GM=40 HMu=Ø	RT-4 0-2'	10-10 10-4	Rec = 80%
S-2	4	SAA Some(+) f-vc Gravel		GM=50 HMu=Ø		10-29 41-36	Rec = 90%
S-3	6	SAA /SP		GM=40 HMu=Ø		31-27 20-24	Rec = 60%
S-4	8	Whit-Tan SILT w/ f-A SAND Trace(+) f Gravel /ML/SP		GM=40 HMu=Ø		16-18 10-16	Rec = 60%
S-5	10	SAA More Red-Brown		GM 20 HMu=Ø		10-9	Rec = 60%
S-6	12	SAA w/ f-c SAND trace(+) /SP		GM=20 HMu=Ø		8-12	Rec = 60°
S-7	14	SAA - DRY note No clay!		GM=20 HMu=Ø	RT-4B 12-14' bg	10-11 11-12	Rec = 70%
	16	EOB = 15' bg		GM=20 HMu=Ø		12-10 9-11	

PROJECT L. Tungsten RI | HOLE NO. RT-4

302125

HTW DRILLING LOG

HOLE NO. RT5

1. COMPANY NAME Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York.	4. LOCATION Parcel B
5. NAME OF DRILLER Dan / Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2"/3" S.S. Split-spoons; 6"/4" H.S.A	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 38.406
	10. DATE STARTED 9/17/96 — 11. DATE COMPLETED 9/17/96
12. OVERBURDEN THICKNESS +50'	15. DEPTH GROUNDWATER ENCOUNTERED —
13. DEPTH DRILLED INTO ROCK Exposed Surface 700 mR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
			—

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
				1359	X		No Recov 5"
		DK. Black Clayey-Loam layer, Slag SL	600 CPM		RT5 0-1'		
		LT Tan / Silt - Trace Cl ML	30-40 CPM	1400	RT5B 1-2'		
	2	No Recovery	30-40 CPM	1401		44 49	
		LT Tan Silt - some gravel, hard, dense ML					Recov 8"
	4	Same as above				44 56 63	X No Recov 1'

PROJECT Li Tungsten RI — HOLE NO. RT5

302126

HTW DRILLING LOG

HOLE NO. RT5

PROJECT: Li Tungsten Superfund Site

INSPECTOR: [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dense Silt – Cobbles / – hard. compacted. Well-Sorted ML					
	6	f-m-sand – w/ gravel well-sorted – SP/ML		1522		56	
		Dense Silt and v. fine dk gray sand – Dense Silt – [illegible] ML				65	1.6' Recov
		Large boulder Quartz, biotite				80	
						60	
	8	Orange red-brown c-sand – well sorted gravel – 1/16 SW		1528		10	
		Gray c-m-sand – well-sorted gravel GW/SW				12	1.8 [illegible]
		Orange-red-brown c-sand w/ pebbles – well sorted gravel GW/SW				16	
						20	
	10	Same as above GW/SW		1545		8	
						10	
						[illegible]	
		Orange – Gray – [illegible] SP				[illegible]	
	12	Same as above		1610		[illegible]	
						[illegible]	
						[illegible]	
		[illegible] SP				20	
	14						

PROJECT: B.O.H. 14' Li Tungsten RI

HOLE NO. RT5

302127

HTW DRILLING LOG

HOLE NO. RT6

1. COMPANY NAME Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York.	4. LOCATION Parcel B
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150; 2" S.S. Split-Spoons; HSA - 6 1/4"	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION —
	10. DATE STARTED 9/18/96
	11. DATE COMPLETED 9/18/96
12. OVERBURDEN THICKNESS Exposure at Surface 50 µR/hr	15. DEPTH GROUNDWATER ENCOUNTERED —
13. DEPTH DRILLED INTO ROCK Landfill Area - RT6	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Topsoil Sandy Loam - 1/2" TS DK Black Clay - Some wood - bark. KL LT brown To Tan organics Gravel - little to Trace - 1/16" FL DK Black Clay layer, wood - KL LT Grey - Clay layer bark part	50-60 cpm (0,0 ppm)	1136	X Collected RT6 0-2' X	3 9 10 20	No Recov 1'
	2	LT brown clayey-f-m-Sand - Some organics/roots dry; soft To v. soft - Trace silt. Sand is poorly - sorted - SC	50-60 CPM HNU - (0,0 ppm)	1139	X Collected RT6 2-4'	25 22 24 16	No Recov 5"
	4	Same as above; - Trace gravel - 5's - SC	50-60 CPM	1142		40 60	No Recover 1'

PROJECT Li Tungsten RI HOLE NO. RT6

302128

HTW DRILLING LOG

HOLE NO. RT6

PROJECT: Li Tungsten Superfund Site

INSPECTOR: [signature]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6			1345		65	No Recov 5"
		LT Tan To brn gravelly-silty-f-m-sand SM/SP	40-50 CPM			50	
		V. soft LT brown/silty-f to v.f-sand, compact, SM				50	
		Very soft. G-gravel+sand. 2" cobble present SM/SW	(0,0 ppm)			60	
	8			1352		25	No Recov 5"
		Saturated. Gravelly-Well-Sorted m-c sand - SW	40-50 CPM (0,0 ppm)			22	
						22	
						20	
	10	Lt Brn Silty-Sand SM		1401		5	No Recov 6"
		Gravelly-Silty-Sand ↓ SM/GM	40-50 CPM (0,0 ppm)			10	
						40	
						70	
	12			1419		17	
		C-sand, Trace silt poorly-sorted. SP	40-50 CPM			14	1.8 Recov
		Gravel-Well-Sorted-Washed-gravel-sand 20% c-m- SW	(0,0 ppm			18	
		↓ becoming more sandy-30% large 2" washed gravel				20	
	14						

PROJECT: B.O.H. 14' Li Tungsten RI

HOLE NO. RT6

302129

9-10-96

HTW DRILLING LOG

HOLE NO. RT-7

PROJECT Conterra CT250 | INSPECTOR E. Johnson | SHEET 1 OF 1 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1	2	Blk f-c SAND some (+) f-vc Gravel trace(-) silt. SP	HNu=1.0 1000=GM		RT-7 0-2' Spun		
S-2	4	SAA	HNu=1.0 GM=1000		RT-7 B 2-4' bg		
S-3	6	Gray-Tan Silt + clay some (+) f-c Gravel KL	HNu=Ø GM=120				
S-4	8	Red-Brn f-c SAND and silt trace(+) f-vc Gravel	HNu=Ø GM=100				
S-5	10	SAA SP	HNu=Ø GM=60				
S-6	12	SAA water at 10' bg	HNu=Ø GM=60				
S-7	14	Gray f-c SAND w/ some(-) f-vc Gravel trace(-) silt SP	HNu Ø GM=60				
	16	EOB 15' bg					

PROJECT L. Tungsten RI | HOLE NO. RT-7

302130

HTW DRILLING LOG

HOLE NO. RT 8

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel B
5. NAME OF DRILLER: Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S Split-Spoons; 6 1/4" H.S.A.	8. HOLE LOCATION: RT 8
	9. SURFACE ELEVATION: 37.823
	10. DATE STARTED: 9/12/96 — 11. DATE COMPLETED: 9/13/96
12. OVERBURDEN THICKNESS: 40' + >	15. DEPTH GROUNDWATER ENCOUNTERED: N/A
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: N/A
14. TOTAL DEPTH OF HOLE: 8'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Void SL/TS 5" Recov LT Bn. Sand-m-c-p/sorted w/ abund roots Twigs, trace gravel 1/16" SP	400 CPM (0.0 ppm)		1608 X Collected 1 Jar only for Radiological	1 2 1 3	Note: Large 1.5 x .5 boulder removed from surface Exposure Rate dropped from 400 uR/hr To 80 uR/hr / No Recov
	2	Void			1616	15 13 18 13	V No Recov.
	4	Void	100 CPM (0.0 ppm		1626		No Recov

PROJECT: Li Tungsten RI — HOLE NO. RT8

302131

HTW DRILLING LOG

HOLE NO. RT 8

PROJECT

INSPECTOR

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Wet To Saturated Dk brown silty-Sand-m-c- w/roots, organics wood, fill material					6" Recovery
	6	SM FL					
		Split-Spoon - To 6'- Abandon Borehole * Landfill Area X					
		FL					
	8						
	10						
	12						
	14						

PROJECT L: Tungsten RI

HOLE NO. RT 8

302132

HTW DRILLING LOG

HOLE NO. RT-9

1 COMPANY NAME	MPI
2 DRILLING SUBCONTRACTOR	EPS
SHEET 1 OF 1 SHEETS	
3 PROJECT	Li Tungsten
4 LOCATION	Parcel B
5. NAME OF DRILLER	Ray Metzer
6. MANUFACTURER'S DESIGNATION OF DRILL	Centerra CT 250
7 SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT	2" x 24" Split Spoons; 6¼" Hollow Stem Augers; Spoons Advanced w/ 140 lbs Hamer on 30" Drop
8. HOLE LOCATION	RT-9 Parcel B
9. SURFACE ELEVATION	16.036
10. DATE STARTED	9-9-96
11. DATE COMPLETED	9-9-96
12. OVERBURDEN THICKNESS	40' >
13. DEPTH DRILLED INTO ROCK	N/A
14. TOTAL DEPTH OF HOLE	15'
15. DEPTH GROUNDWATER ENCOUNTERED	2.0' bg
16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED	N/A
17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)	N/A
18. GEOTECHNICAL SAMPLES	DISTURBED / UNDISTURBED
19. TOTAL NUMBER OF CORE BOXES	N/A
20. SAMPLES FOR CHEMICAL ANALYSIS	VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)
21. TOTAL CORE RECOVERY	
22. DISPOSITION OF HOLE	BACKFILLED / MONITORING WELL / OTHER (SPECIFY)
23. SIGNATURE OF INSPECTOR	Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SKETCH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1	2	Gray-Brown M-F-SAND some(-) silt some(+) f-vc Gravel Damp SP	GM=20 HNu=Ø		RT-9 0-2'	7-9-12 20	Rec=80%
S-2	4	SAA - SAT last 12" OTM-BM F-C SAND w/ some(+) f-vc Gravel	GM=20 HNu=Ø			21-21 17-12	Rec=60%
S-3	6	SAME - Org-Brn F-C SAND w/ some(+) f-vc Gravel	GM=20 HNu=Ø			10-6 9-27	Rec=50%
S-4	8	SAA w/ Qtz/Ahose pebbles + Cobbles	GM=20 HNu=Ø			13-13 14-13	Rec=80%
S-5	10	SAA SP	GM=20 HNu=Ø			17-19 27-36	Rec=60%
S-6	12	SAA w/ Gray Silt + Little (-) Clay last 8" SP ML	HNu=Ø GM=20		RT-9B 12-14'	27-31 18-29 38-51	Rec=80% Rec=80%
S-7	14	SAA - Org-Brn SAND w/ Cobbles SP					
		EOB = 15' bg					
	16						

PROJECT Li Tungsten RI HOLE NO RT-9

302133

HTW DRILLING LOG

HOLE NO. RT 10

1. COMPANY NAME Malcolm Pirnie Inc.	2. DRILLING SUBCONTRACTOR Environmental Products + Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT L. Tungsten, Glen Cove, New York.	4. LOCATION Parcel B
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S.S. split-spoons; 6 1/4" H.S.A	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 36.610
	10. DATE STARTED 9/16/96 — 11. DATE COMPLETED 9/16/96
12. OVERBURDEN THICKNESS 40' >	15. DEPTH GROUNDWATER ENCOUNTERED 8.0'
13. DEPTH DRILLED INTO ROCK Exposure at Surface 14 up/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY %

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
—				

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Brn To Tan Sandy-Silt Soft To v soft Trace Clay Cohesive dry; no odor few pebbles [SM]	30-40 cpm (0.0 ppm)	12:50	X (collected) RT10 0-2' X	4 14 24 29	No Recov 4" Recovery
	2	Red/Brn-Orange f-m-sand [SP] w/gravel, Trace silt, few gravel grading To f-vf sand cobbles at 3.6' — f-silty-sand; v soft To soft, LT Tan + brn interbedded [SM]	30-40 cpm (0.0 ppm)	1310		14 24 50 26	No Recov 9"
	4	Dk brown m-silty-sand, Trace clay - Trace gravel [SM]	30-40 cpm (0.0 ppm)	1314	Collected RT10B 4-6' X	28 40	No Recov

PROJECT L. Tungsten RI — HOLE NO. RT10

302134

HTW DRILLING LOG

HOLE NO. RT10

PROJECT Li Tungsten Superfund Site | INSPECTOR [illegible] | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Gravelly-Cobbles-m-sand w/ silty-sand, orange-reddish w/ biotite present SP SM Gravel + Cobbles - 1½ max rounded GP				50 65	
	6	LT Brn-m-silty-sand w/ little to trace gravel/pebbles SM Cobble/gravel layer, DK blue to lt blue, to lt blue quartz fragments w/ c-sand-gravelly-sand, pink cryst, wet/moist SW	20-30 CPM (0,0 ppm)	1333		10 23 23 25	No Recov 9"
	8	Saturated at 8.0' LT Blue to dk Grey-m-c Sand-poorly-sorted, little silt, wet to saturated SP	20-30 CPM (0,0 ppm)	1345		16 16 20 28	No Recov 5"
	10	LT brn to yellow brn-c-sand, poorly-sorted, saturated SP Gravel layer LT Blue m-c-sand, poorly sorted, trace silt, hard SP Cobbles-rounded present-1½" + gravel, pebbles GP	20-30 CPM (0,0 ppm)	1359		12 20 35 36	2' Recov
	12	Same as above; LT Blue to dk. blue c-sand. SP/GP	20-30 CPM (0,0 ppm)	1418		16 30 40 42	2' Recov
	14						

PROJECT | HOLE NO. RT10

BOB = 14' Overdrill to 15'
Li Tungsten RI

302135

HTW DRILLING LOG

HOLE NO: RT 11

1. COMPANY NAME: Malcolm Pirnie, Inc	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: L: Tungsten RI	4. LOCATION: Parcel C
5. NAME OF DRILLER: Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" Cubic Steel Spoons; 4½" I.D. Hollow Stem Auger	8. HOLE LOCATION: Parcel C
	9. SURFACE ELEVATION: 36.395
	10. DATE STARTED: 9/4/96 — 11. DATE COMPLETED: 11/5/96
12. OVERBURDEN THICKNESS: Auger To 15'. S.S To 14'	15. DEPTH GROUNDWATER ENCOUNTERED: 11.5
13. DEPTH DRILLED INTO ROCK: Exposure at Surface 1000mR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)
18. GEOTECHNICAL SAMPLES: DISTURBED / UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: N/A
20. SAMPLES FOR CHEMICAL ANALYSIS: VOC / METALS / OTHER (SPECIFY) / OTHER (SPECIFY) / OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
22. DISPOSITION OF HOLE: BACKFILLED / MONITORING WELL / OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		DK GRY To BL. Topsoil, loose; dry Some roots, few gravel, no odor organics SL White Calc. To grey, dk black/black organics SL/TS LT. Tan - Clayey - Gravelly - Sand m-c poorly sorted - Gravel - ½" Rounded may dry; Trace silt ML/SP	900 - 1000 CPM (0.0 ppm) 100 CPM 60 CPM	1324	Collected RT 11 0-2' X @ 1524	9 25 23 25	3' No Recov Recov
	2	Same as above; less gravelly (5-10%) ML/SP Becoming more clayey, increasing gravel	150 CPM (0.0 ppm) 50 - 100 CPM	1531	Collected RT 11B 2-4 X 1531	16 15 36 65	No Recov 6" Recovery
	4	t-m poorly sorted clayey - m-c sand; some gravel To few gravel To ½" angular To rounded. Trace silt SC	50-60 CPM (0.0 ppm)	1615		10 12	2' Recov

PROJECT: L: Tungsten RI — HOLE NO: RT 11

302136

HTW DRILLING LOG

HOLE NO. RT11

PROJECT Li Tungsten RI | INSPECTOR [signature] | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO f	BLOW COUNTS g	REMARKS h
		Orange-reddish brown clayey-sand; few gravel SC				25 26	
		Black-Orange-reddish brown layer - m-c SC SP					
	6	Same as above; except increasing gravelly-Sand w/clay mica present - f-m - poorly-sorted sand. CL SP	30-40 CPM (0,0 ppm)	1629		29 25 39 56	No Recov 10" Recov
		Becoming clayey - increase 60% - w/ gravel to 1½" max SP CL					
	8	Lt Tan Silty Clayey Sand - becomes more clayey SC		0913 9/5/96		12 20	Start 9/5/96 No Recov 8"
		Silty-Clayey-Sand - SC Moist Calcite chips - ½" present - cobbles Red Cobble 1" at bt of S.S SC	30-50 CPM (0,0 ppm)			35 56	Recovery
	10			0934		33 22	9" No Recovery
		Lt Dk brown/Tan Silty-Clayey Sand with Sand 25% - gravel - 5% - 1½" max - Moist To Saturated at 11.5' SC	30-50 CPM (0,0 ppm)			24 46	
		Mottled Clay at 11.8' - clays Saturated CL					
	12		30	0952		8 12 13	No Recovery 1'
		Saturated - Orange-Red/brown Gravelly Sand - M-C - poorly-sorted - Gravel - 30% - [illegible] max SW	30-50 CPM (0,0 ppm)			18	

PROJECT B.O.B = 14 Overdrilled To 15' Li Tungsten RI | HOLE NO. RT11

302137

HTW DRILLING LOG

HOLE NO RT12

1. COMPANY NAME Malcolm Pirnie, Inc	2. DRILLING SUBCONTRACTOR EP+J
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel C
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT 2" S.S. Split Spoons; 6 1/4" H.S.A.	8. HOLE LOCATION Parcel C
	9. SURFACE ELEVATION 34.674
	10. DATE STARTED 9/10/96 — 11. DATE COMPLETED 9/10/96
12. OVERBURDEN THICKNESS +40+>	15. DEPTH GROUNDWATER ENCOUNTERED 12.5'
13. DEPTH DRILLED INTO ROCK Exposure at Surface 300 400 uR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE Overdrill To 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
RT12-0-3 inches; RT12-6-8'						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c (SL)	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Dk Black Topsoil w/ abunt roots Slag-fine-grained rock-1/2" present, glass present	500-600 CPM	1219	Collected RT12-0-3 inches x	2	
		LT Tan to brown mottled clayey-m-c sand; few gravel 5% of matrix; dry; quartz present. poorly-sorted, f-m-sand-here	(0,0 ppm) 80 CPM			3	2' Recov
						32	1 jar only for Rad
						42	
		SL SC					
	2			1230		41	No Recovery (1")
						37	
		Same as above; SC	60 CPM (0,0 ppm)			37	
		Quartz Rocks present 2" (Cobbles)				64	
	4			1240	1240		No Recovery 2"

PROJECT Li Tungsten RI — HOLE NO RT12

302138

HTW DRILLING LOG

HOLE NO. RT 12

PROJECT L: Tungsten RI | INSPECTOR [signature] | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						100	Refusal at 6' due to boulder
	6	Clayey-Sand, gravel 5-10% 1/4" max; hard; SC	200-400 CPM	1413	Collected RT12B 6-8	29	2' Recov
		This layer of ash-colored-sand f-slag? Cobalt-blue rock present?				15	
		LT Tan f-silty-Sand; soft to v soft, poorly-sorted; quartz-present. SM	150-CPM (0,0 ppm)		X	35	
						40	
	8			1439		24	No Recov 1'
						16	
						16	
		3"-4" - Ash-Colored-f-sand p-sorted - gravel 1/16"-5% SP	50-60 CPM (0,0 ppm)			16	Recov
		Bright-Orange-Reddish-br. sand f-sand-poorly-sorted-silty-sand Calcite crystals-10% broken in matrix ok brown sand at br. SP					
	10			1524		17	No Recovery 6"
		Saturated at 10.5'				17	
		LT brown to rd. br. f-sand-moist to saturated, becoming increasing gravel-15% Type gravelly-sand-silt - SP GC	30-40 CPM (0,0 ppm)			24	Recov
						24	
	12	No Recov 8"		1536		20	No Recov 8"
		Saturated; Dk black-Sand				22	
		Dk gray-black-f-sand - SP	60-80 CPM (0,0 ppm)			24	Recov
		Orange-brown f-sand, Gravel-10%-increasing gravel content poorly-sorted Trace silt SM SP				17	
	14						

PROJECT D.O.B = 14' Overdrilled to 15' L: Tungsten RI | HOLE NO. RT12

302139

HTW DRILLING LOG

HOLE NO RT13

1. COMPANY NAME: Malcolm Pirnie, Inc	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel C
5. NAME OF DRILLER: Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S.S. Split-Spoons; 6 1/4" H.S.A.	8. HOLE LOCATION: Parcel C
	9. SURFACE ELEVATION: 33.658
	10. DATE STARTED: 9/11/96 — 11. DATE COMPLETED: 9/11/96
12. OVERBURDEN THICKNESS: AT Surface > 2.5 mR/hr	15. DEPTH GROUNDWATER ENCOUNTERED: 8.1'
13. DEPTH DRILLED INTO ROCK: 1' offset to 1.5 mR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Grout /				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	Dk brown to gry f-sand/Topsoil w/ roots (abund) TS/SC Black Slag containing Glass fragments LT Tan to Orange m-c clayey Sand - soft; dry - Containing Calcite; no odor SC	100 CPM - 170 CPM SC 200 CPM 40-50 CPM (0,0 ppm)	1516	Collected RT13 0-2 X	9 27 26 22	No Recov 6" Recov 1.5'
	2	LT brown to Orange Gravelly (20%) Silty f-sand - poorly-sorted; Trace Clay - To little clay - Gravel to 1/2" rounded to subrounded dry, no odor ML/SM	50-75 CPM (0,0 ppm)	1520	Collected RT13 2-4	35 35 45 46	No Recov 8"
	4	Same as above. except more silt - Silty f-sand soft to v. soft. ML/SM	40-50 CPM (0,0 ppm	1614		14 14	1.8' Recov

PROJECT: Li Tungsten RI — HOLE NO RT13

302140

HTW DRILLING LOG

HOLE NO. RT13

PROJECT: Li Tungsten RI

INSPECTOR: [signature]

SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		less gravelly - 5-7% - more silty - sand - SM				14 14	
	6	Same as above; becoming → increasing clay content - 25% → SC SM	40-50 CPM ~~[illegible]~~ 0.0 ppm	1624		12 12 25 14	No Rec 13 Recov
	8	Saturated at 8.1' LT brn. To org brn m-c - gravelly sand - saturated at 8.1' SW	40-50 CPM (0.0 ppm)	1629		8 12 8 8	2' Recov
	10	Saturated ↓ Same as above - Org/brn gravelly - sand, m-c Gravel - 15% - Some silt - increasing gravel content 20% ML SP Dk bl. f - sand poorly - sorted SP Same as 10-11' above ↓ SP	40-50 CPM (0.0 ppm)	1647		45 60 64 40	2' Recov
	12	Same as above - increasing gravel - Silty - Gravelly - Sand - f - m - Gravel at b.o.s. GM	40-50 CPM (0.0 ppm)	1716		7 40 47 50	No Recov 1'
	14						

PROJECT

B.O.B = 14 Overdrilled to 15'

HOLE NO. RT13

302141

HTW DRILLING LOG

HOLE NO. RT14

SHEET 1 OF 1 SHEETS 3

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
3. PROJECT: Li Tungsten RI	4. LOCATION: RT14
5. NAME OF DRILLER: Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150; 2" Carbon-Steel Spoons; 3½" Hollow-Stem Augers	8. HOLE LOCATION: RT14 Parcel C
	9. SURFACE ELEVATION: 33.896
	10. DATE STARTED: 9/11/96 — 11. DATE COMPLETED: 9/11/96
12. OVERBURDEN THICKNESS: +40+	15. DEPTH GROUNDWATER ENCOUNTERED: 6.5'
13. DEPTH DRILLED INTO ROCK: Surface Exposure 12 uR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: Back Scan 40 CPM	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): Overdrill To 15' for Gamma Log Boring

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES: N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		1½" Wood Chips, Twigs -- 1" Dk brown To gray Topsoil w/ roots TS Lt Tan To dk Tan Clayey-Gravelly f-m Sand w/ quartz pebbles present Throughout 1" max - rounded, dry, no odor SP	50 CPM HNU - 0.0 ppm	1011	Collected RT14 0-2 for Rad.	5 18 23 18	No Recovery (9")
	2	Same as above - except less gravel - 10% To 1¼" max. Clayey-Sand f-m - Trace silt present SP	50 CPM HNU - 0.0 ppm	1025		12 12 9 8	No Recov 1'
	4	Same as above - less gravel 5-3% - SP	40-50 CPM HNU - (0.0 ppm	1030		6 7	No Recov 2"

PROJECT: Li Tungsten RI — HOLE NO. RT14

302142

HTW DRILLING LOG

HOLE NO. RT14

PROJECT Li Tungsten RI

INSPECTOR [signature]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Tan silty-clay-lens-3"-B. orange-Tan- CL				14 18	
	6	Orange-red brown f-m sand, poorly sorted, Trace silt. SP					
		Same as above; wet to saturated, Trace silt-gravel-5-7%-1/4" max-rounded SP	40 CPM (0,0)	1035		10 7	
		LT Tan to gry silty-clay moist med-plasticity-moist SM CL				25 42	2' Recov
	8	LT Tan to LT brn silty-f-sand; saturated; some gravel to 1/16" max becoming m-c-sand with gravel at 9'0' SM	30-40 CPM HNU (0ppm, 0)	1049	Collected RT14 8-10 X for Red Analy	12 7	
		DK Gray silty Clay to reddish brown-high to med plasticity, moist: CL				12 12	2' Recovery
	10			1117		11 10 10 12	No Recov 1.5'
		DK Silty-Grey Clay as 9-10 above; CL	30-40 CPM (HNU 0ppm) 0				
	12			1123		12 14 16 18	No Recov 1.0'
		Same as above; as 11.5 to 12 CL	30-40 CPM (HNU-0 ppm) 0				
	14						

PROJECT Li Tungsten RI

HOLE NO. RT14

302143

HTW DRILLING LOG

HOLE NO. RT 14

PROJECT: Li Tungsten RI

INSPECTOR: [signature]

SHEET 3 OF 3 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	14	LT brown To Tan - silty - f gravelly - sand, poorly - sorted gravel 15-20% - To 1/8" rounded To sub-rounded SP	40-50 CPM	1146		18 10	2'
		Silty - Dk - Grey - Clay as 12-14 above. saturated Dk Grey To pinkish Grey - Clay - Some gravel To 1/16" rounded To sub-rounded 5-8% of matrix CL	MW - 0 PM			12 43	Recovery
	16	Same as 14-15' above - silty - f - sand - w/ gravel SM		1152		40 42 42 42	
	18						

B.O.H = 18' - Overdrilled To 15' for Gamma Log

18' - 2" Split-Spoons 3 1/4"

15' - Hollow Stem Augers

Collected RT14-0-2' for Radiology 8-10'

PROJECT: Li Tungsten RI

HOLE NO. RT14

302144

HTW DRILLING LOG

HOLE NO. RT 15

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten RI	4. LOCATION: Parcel C
5. NAME OF DRILLER: Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" Carbon-Steel S.S. Boylls Travels - SS. 6 1/4" H.S.A	8. HOLE LOCATION: RT 15
	9. SURFACE ELEVATION: 34.988
	10. DATE STARTED: 9/9/96 — 11. DATE COMPLETED: 9/9/96
12. OVERBURDEN THICKNESS: Exposure at Surface 600 μR/hr	15. DEPTH GROUNDWATER ENCOUNTERED: 12'
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: 14'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT brown To tan f-m-sand Some gravel + dk brown topsoil To 1/16" max; loose; dry TS SP	40 CPM (HNU 0,0)	1407	Collected RT15 0-2	10 21 32 24	No Recov 5"
	2	Same as above - except clay - 10% - Clayey - Sand - increasing clay content f-m - poorly sorted; moist Trace Silt SP SC	40 CPM (0,0 ppm)	1417	Collected RT-2-4	9 10 12 13	2' Recov
	4	Grey - Silty - Clay - moist To wet, CL ML	40-50 CPM (0,0 ppm)	1420		7 10	No Recov 4"

PROJECT: Li Tungsten RI — HOLE NO. RT 15

302145

6

HTW DRILLING LOG

HOLE NO. RT15

PROJECT: Li Tungsten RI

INSPECTOR: [signature]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
						10 7	
	6	Same as above; moist CL/ML f-poorly-sorted sand Trace silt SP DK-Grey To Black m-c-Black Sand, cobalt blue, wet some clay at 7	40-50 CPM (0,0 ppm)	1421		11 10 10 17	No Recov 12"
	8	SP Same as above; moist. To saturated, cobalt blue f-sand, poorly-sorted Red/Brick Red Cobble- f-sand- as above-dk black To cobalt blue, few gravel SP	50-60 CPM (0,0 ppm)	1432		34 12 14 15	No Recov 6"
	10	San SP Same as above; increasing gravel 5-10% - 1/16" max f-sand as above saturated SW/SP	50-60 CPM (0,0 ppm)	1439		19 19 12 12	No Recov 1'
	12	DK Grey-Clay-Med plasticity, few gravel, saturated, Battleby Grey CL	50 CPM 60 CPM	1600			No Recov 1'
	14						

PROJECT

B.O.B = 14' Overdrill To 15'

HOLE NO. RT15

302146

HTW DRILLING LOG

HOLE NO. RT16

1. COMPANY NAME Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten, Glen Cove, New York.	4. LOCATION Parcel B
5. NAME OF DRILLER Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S.S. Split-Spoons; 6 1/4" H.S.A	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 32.988
	10. DATE STARTED 9/16/96 — 11. DATE COMPLETED 9/16/96
12. OVERBURDEN THICKNESS +60' >	15. DEPTH GROUNDWATER ENCOUNTERED 8'
13. DEPTH DRILLED INTO ROCK Exposure at Surf. 11μR/hr	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE Overdrill To 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE Cement Grout Hole	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SPLIT SPOON SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
				1610	X Collected RT16 0-2' (Rad) X	4 3 12 22	Recovery 8'
		OL/ML Dk Brown Clayey Loam w/Silt + Roots - Barks - Wood & Organics	20-30 cpm (0.0 ppm)				
		LT Tan/Orange brown gravelly C-sand gravel To 1/4" well-sorted gravel, organics					
	2	Large 1½" quartz present-white		1613		2 12 10 12	
			20-30 cpm (0.0 ppm)				
		Slough - Organics - from 0-2					Recovery 6"
		LT Tan Orange/brown gravelly C-sand little silt, wet to saturated SP					
	4			1626		16 16	No Recov 1'

PROJECT Li Tungsten RI — HOLE NO. RT16

302147

HTW DRILLING LOG

HOLE NO. RT16

PROJECT: L. Tungsten Superfund Site | INSPECTOR: [illegible] | SHEET 2 OF 2 SHEETS

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Dk brown c-sand + pebbles	CL			29	Recov
		Dk br Silty-Clay-low-plasticity	30-40			70	1'
		Well-Graded-c-sand and gravel-well-graded, Trace silt Saturated SW	CPM (0,0 ppm)				
	6			1638		46	No Recov
						25	8"
		LT Blue To dk Blue-gravelly-c-Sand-well-graded gravel and sand; gravel; Large Cobbles-1½" gravel-20% Throughout 50% gravel 50% Saturated; sand; Trace silt SW/GP	30-40 CPM (0,0 ppm)			13	Recov
						14	
	8			1658	RT16B X 8-10'	11	
		Same as above; Saturated; except no cobbles.	50-60 CPM (0,0 ppm)			11	1.9 Recov
		LT Blue To dk blue/brn-gravelly-c-sand-well-graded. grading To m-sand SW/SP				15	
		Some LT brown silty-f-m-sand at 6' SM				10	
	10			1719		48	
		DK brown To gray-f-m-silty sand as 9.8' To 10'				15	1.8' Recov
		LT Blue To dk Blue/brn gravelly-c-sand-well-sorted as 8-10', Trace To little silt	40-50 CPM (0,0 ppm)			10	
		SP				13	
	12			1744		50	
		DK brn To gray f-m-silty Sand as 10-10.4'				38	1.7' Recov
		Gravelly-c-sand-as 10-12	40-50 CPM (0,0 ppm)			20	
		SP				13	
	14						

PROJECT | HOLE NO. RT16

SS To 14' Overdrill to 15'

302148

HTW DRILLING LOG

HOLE NO. RT17

1. COMPANY NAME Malcolm Pirnie	2. DRILLING SUBCONTRACTOR EP+S
SHEET 1 OF 1 SHEETS 2	
3. PROJECT Li Tungsten RI	4. LOCATION Parcel B.
5. NAME OF DRILLER Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S.S. Spl. 7-Spoons; 6 1/4" H.S.A.	8. HOLE LOCATION Parcel B
	9. SURFACE ELEVATION 30.924
	10. DATE STARTED 9/13/96 — 11. DATE COMPLETED 9/16/96
12. OVERBURDEN THICKNESS At Surface 11 uR/hr	15. DEPTH GROUNDWATER ENCOUNTERED 8.5
13. DEPTH DRILLED INTO ROCK N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE Overdrilled To 10'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY) —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement Bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	SCETCH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	0	No Recovery			1146 X Collected RT17 0-2'	7 18	No Recov 13"
		Gravel / pebbles layer 1" - 1 1/4" To 1 1/2" Dk Black / brown Topsoil w/ roots [TS] Gravelly Topsoil / Blue — LT Grey - Silty - Grey - Clay - soft, dry, easily crumbled without pressure. [ML/CL]	30-40 CPM (Back)			20 15	
	2				1150	10 18 30 30	No Recovery
		Gravelly - Sand - m-c [SP]	30-40 CPM				
	4	Silty - Gravelly - Sand - m-c — [ML/SM] Gravelly - Sand - m-c - poorly - sorted - More Gravel → In 4-4.5'	30-40 CPM		1216		2' Recov

PROJECT Li Tungsten RI — HOLE NO. RT17

302149

HTW DRILLING LOG

HOLE NO. RT17

PROJECT: L. Tungoten RI

INSPECTOR: Joe [illegible]

SHEET OF 2 SHEETS 2

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL* SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Gravelly - Silty - Sand - f-m - Gravel - 20-30% SP/SM		9/13/96			2'
		Gravelly - Sand - m-c - Gravel 55% 1/4 To 1/8"		9/16/96			
	6	No Recovery	30-40 CPM (0.0 ppm)		1013	6 8 8 10	9/16/96 No Recovery
	8	LT brn. m-c sand, little silt, wet To saturated; Trace clay. SP			1019 X Collected RT17B 8-10'	9 8 8 10	No Recov 3"
		Gravel layer - 80% - Sand - m-c - 20% - Gravel angular To sub-rounded Gravel - 1/16" max - GW					
	10	less Gravel - 60-70% - more sand + silt - m-c - SP GW					
		LT Tan/Brn m-c - poorly sorted Sand - gravel 20-30% little silt. Saturated, 1/16" Becoming more gravelly SP	30-40 CPM (0.0 ppm)		1036	8 9 9 9	2' Recovery
	12	Gravelly - Dk Black - m - Sand - 20-30% gravel - 1/16" SP					
		Same as above. Dk Black To Gray - Gravelly - Sand - m-c - grained - Gravel - 1/16" - 40-50% of matrix - Sand - 30-50% Trace silt SP	30-40 CPM (0.0 ppm)		1053	9 14 16 14	No Recovery Rec
	14	LT Grey - Silt at BT of S.S					

PROJECT: SS To 14' Overdrilled To 10' Collected SB17-0-2 SB17B-8'-10'

HOLE NO. RT17

302150

6

HTW DRILLING LOG

HOLE NO: RT-18

1. COMPANY NAME: Malcolm Pirnie	2. DRILLING SUBCONTRACTOR: EPS
SHEET 1 OF 1 SHEETS 1	
3. PROJECT: L. Tungsten RI	4. LOCATION: Parcel C
5. NAME OF DRILLER: Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: Canterra CT 250
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: 2" S.S Spl. T-Spoons; 6 1/4" H.S.A	8. HOLE LOCATION: RT-18 Parcel C
	9. SURFACE ELEVATION: 18.637
	10. DATE STARTED: 9-12-96
	11. DATE COMPLETED: 9-12-96
12. OVERBURDEN THICKNESS: +60"	15. DEPTH GROUNDWATER ENCOUNTERED: 2.0' bg
13. DEPTH DRILLED INTO ROCK: N/A	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED
14. TOTAL DEPTH OF HOLE: 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
—			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
—				Eric Johnson

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
S-1	2	Red-brown SLCT + F SAND trace(-) clay some(+) Gravel orge-B/L mottled coloration	HMu=Ø GM=40		RT-18 0-2'	9-6 8-4	Rec=90%
S-2	4	Gry-Tan SLCT and F. SAND with some(-) clay trace(+) F-VC Gravel water at 2.0' bg	HMu=Ø GM=40			5-7 9-5	Rec=90%
S-3	6	SAA CL	HMu=Ø GM=40			5-5 5-7	Rec=80%
S-4	8	SAA but more DK Gray to Black in color	HMu=Ø GM=40			8-7 6-5	Rec=90%
S-5	10		HMu=Ø GM=30			2-3 4-6	Rec=90%
S-6	12						Rec=80%
S-7	14	Green-Gray F-C SAND and SLCT w/ some(+) F-VC Gravel SP	HMu=Ø GM=40		RT-18B 12-14'	4-4 5-4 11-2 1-5	Rec=90%
		EOB 15' bg					
		no clay!					

PROJECT: L. Tungsten RI | HOLE NO: RT18

302151

HTW DRILLING LOG

HOLE NO. RT19

1. COMPANY NAME: Malcolm Pirnie, Inc.	2. DRILLING SUBCONTRACTOR: Environmental Products & Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT: Li Tungsten, Glen Cove, New York.	4. LOCATION: Lower Parcel C
5. NAME OF DRILLER: Don + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL: ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150; 2" S.S. Split-spoon; 6 1/4" H.S.A	8. HOLE LOCATION: Lower Parcel "C"
	9. SURFACE ELEVATION: 17.251
	10. DATE STARTED: 9/19/96 — 11. DATE COMPLETED: 9/19/96
12. OVERBURDEN THICKNESS: +60+ >	15. DEPTH GROUNDWATER ENCOUNTERED: 10'
13. DEPTH DRILLED INTO ROCK: 150 uR/hr at Surface	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED: —
14. TOTAL DEPTH OF HOLE: Offset 1' = 400 uR/hr. 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY): —

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES
Back - 40-50 CPM			N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement-Bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT grey - f m-sand, poorly sorted; LT Tan To lt brn f m-sand w/ few gravel, Trace silt; Rounded gravel (5%) SP	(200 CPM) (Head) (5, 50 ppm)	0835	X Collected RT19 0-2'	4, 7, 19, 18	No Recov 16"
	2	Brick FL; Red - To Bright brn - Clayey - Silty - Sand - med plastic, cohesive; Cobbles at 3.5' - moist SM; Dk Black To Dk Grey - + Red crushed Rocks / wet 5	80-100 CPM (0,0)	0844		7, 40, 20, 11	No Recov 14"
	4		80-100 CPM	0855	X Collected RT19 4-6'	14, 28	No Recov 8"

PROJECT: Li Tungsten RI — HOLE NO. RT19

302152

HTW DRILLING LOG

HOLE NO. RT 19

PROJECT: L. Tungsten Superfund Site | INSPECTOR: [illegible] | SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		LT Tan To brn - gravelly - C-sand [illegible] SP			Collect 4-6' for (TPH also)	72	
		Bright/green To dk blue clay - high plasticity; cohesive; wet/KL oily appearance	(20-35) ppm				
		White- To lt grey - f - silty - poorly-sorted sand, dense pinkish	(35-50 Head)		*		
	6	Some pet. odor SM		0925		32	No Recov 11'
			50 CPM			40	
		White - m-c - sand - Trace silt, Some clay SP/SM				42	
		V. fine - White Sand - Some silt; soft To v. soft wet, Some	(20-30) ppm			70	
	8	petroleum odor, oily appearance SP	50ppm (Head)				
		Slough from 6 - 8' ..	60-70 CPM	1021		40	No Recov 5'
						102	
		Oily - Appearance / Hydrocarbon Odor - m-c	10ppm			50	
		V. fine - White Sand - some silt as 6-8' - except increasing gravel - rounded to sub-rounded 5-10% - Saturated SP	(25ppm) Head sp			48-60 3" fm	
	10			1030			No Recov 8"
						35	
		lt. White To lt grey - c - (poorly sorted) sand - Trace-some gravel	40-50 CPM			35	
		becoming more gravelly at bt	(0ppm)			42	
		Gravelly - White - c - sand poorly-sorted - Saturated SP	Head			20	
	12			1054			1' No Recov
						35	
		Gravelly - c - sand ..	40-50 CPM			30	
		Gravel - well-sorted - sub-rounded To rounded - sand - poorly-sorted - Saturated	(0ppm)			32	
		Orange - sand + gravel				32	
	14	SP					

B.O.B. 14' - SS 15'. Overdrill To 105' for gamma

PROJECT | HOLE NO. RT 19

302153

HTW DRILLING LOG

HOLE NO. RT 20

1. COMPANY NAME Malcolm Pirnie Inc.	2. DRILLING SUBCONTRACTOR Environmental Products + Services
SHEET 1 OF 1 SHEETS 2	
3. PROJECT L. Tungsten, Glen Cove, New York.	4. LOCATION Parcel C
5. NAME OF DRILLER Dan + Jim	6. MANUFACTURER'S DESIGNATION OF DRILL ATV 150
7. SIZES AND TYPES OF DRILLING AND SAMPLING EQUIPMENT: ATV 150; 2" S.S. Split-Spoons; 6 1/4" H.S.A.	8. HOLE LOCATION Parcel C
	9. SURFACE ELEVATION 15.982
	10. DATE STARTED 9/19/96 — 11. DATE COMPLETED 9/19/96
12. OVERBURDEN THICKNESS Surface Exposure 13 uR/hr.	15. DEPTH GROUNDWATER ENCOUNTERED 6.0'
13. DEPTH DRILLED INTO ROCK Background - 30 CPM	16. DEPTH TO WATER AND ELAPSED TIME AFTER DRILLING COMPLETED —
14. TOTAL DEPTH OF HOLE Overdrilled To 15'	17. OTHER WATER LEVEL MEASUREMENTS (SPECIFY)

18. GEOTECHNICAL SAMPLES	DISTURBED	UNDISTURBED	19. TOTAL NUMBER OF CORE BOXES N/A

20. SAMPLES FOR CHEMICAL ANALYSIS	VOC	METALS	OTHER (SPECIFY)	OTHER (SPECIFY)	OTHER (SPECIFY)	21. TOTAL CORE RECOVERY
—						

22. DISPOSITION OF HOLE	BACKFILLED	MONITORING WELL	OTHER (SPECIFY)	23. SIGNATURE OF INSPECTOR
Cement Bentonite				[signature]

ELEV. a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO. e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
		Rubber - Black (Liner fragments)		1310		1	
		LT - Brn - f - sand - pl sorted, SP			Collected		
		Trace - Clay	50 CPM (0.1 ppm) (50-60 ppm Head)			3	Recov 3"
						4	
						34	
		Wood - fragments - IT - LT Blue - Rock fragments - Organics - Clayey - DK brown - Sand FL SC					Recov 18" to 24"
	2			1322	RT20-0-4 Composite 1310	14	
			40-50 CPM (0 ppm) (50-60 ppm Head)			12	
						10	
		LK brn clay - sand 20% - Wood fragments throughout - Some Rock - crushed - Red FL CL				10	Recov 18"-24"
	4			1343		~~10~~ 6	No
			40-50 CPM			7	Recov 0-10"

PROJECT L. Tungsten RI — HOLE NO. RT20

302154

HTW DRILLING LOG

HOLE NO. RT20

PROJECT: L. Tungsten Superfund Site

INSPECTOR: [illegible]

SHEET 2 OF 2 SHEETS

ELEV a	DEPTH b	DESCRIPTION OF MATERIALS c	FIELD SCREENING RESULTS d	GEOTECH SAMPLE OR CORE BOX NO e	ANALYTICAL SAMPLE NO. f	BLOW COUNTS g	REMARKS h
	6	Lt Grey-Silty-Grey-Clay-Some-Trace pebbles-1/16" max-rounded-to sub-rounded Wet To saturated-Some Odor.- CL	(3ppm) (30-40 ppm)	1343		8 6	
	8	Silty-Grey-Clay-To lt brown-Silt-as 4-6 Saturated, med-high plast. Pet Odor, DK Grey Oil present CL	40-50 CPM (3-4ppm) (40 ppm Head)	1345		2 1 1 1	Recov 18"-24"
	10	Pet Odor / Dk-Grey-Oil present Mottled-Silty-Grey-Clay med-to high plasticity- CL	40-50 CPM 400-ppm (Head)	1346	X Collected RT20B 8-10' for Rad+TPH	2 3 5 7	Recov 17"-24"
2' Recov	12	Lt Grey-Silt-Sand-med-plasticity to Lt Grey-Clay- Same as 8-10' Sand-w/gravel- SM/CL Stained Dk Grey-Soil/Petroleum Odor	40-50 CPM 50 ppm Head)	1347		11 23 20 18	Recov 0-18" 2' Recov No Recov
	14	Lt Grey-Sand-m-c-w/gravel- petroleum-coated Throughout SM	40-50 CPM 15 ppm Head	1526		7 21 16 12	1.2' Recov

B.O. 14 Overdrilled To 15'

PROJECT

HOLE NO. RT20

302155