GROUNDWATER MONITORING WELL INSPECTION REPORT FOR GREENWOOD CHEMICAL SITE

Contract No. DACW65--D-0080, DO 0003

March 13, 2000

Prepared for the
U. S. Army Corps of Engineers
Norfolk District
803 Front Street
Norfolk, VA 23510-1096

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Printed on Recycled Paper

Executive Summary

This Groundwater Monitoring Well Inspection Report addresses current monitoring well conditions and makes recommendations for refurbishing or abandonment. A total of 48 wells have been installed on the Greenwood Chemical Site property in Albemarle County, Virginia. Forty-seven (47) of these wells are monitoring wells and one well is identified only as an "old well".

Of the original 48 wells installed on site a total of 35 monitoring wells are in a condition that may be sampled after minor refurbishing. Ten (10) monitoring wells require more extensive refurbishment. Two (2) of these monitoring wells are artesian and have badly rusted fittings. It is recommended that stainless steel fittings and sampling ports be installed to sample these wells. Three (3) other monitoring wells had broken casings in the upper five feet. It is recommended that these well casings be repaired prior to sampling event. Five (5) other monitoring wells were converted to extraction wells and are currently unavailable for sampling. The installation of sampling ports is required if these 5 wells are to be sampled. Finally, three wells required abandonment. Two (2) of the original 48 wells installed on site were found destroyed from previous site activities and are not repairable. The location of the destroyed wells could not be positively identified. It is believed that one well is under a paved area created during construction of the treatment facility. The other well is covered by compacted soil. Abandonment of these wells will not be possible. The third monitoring well requiring abandonment is a shallow well. This well, which is a dry hole, was constructed above the water table and can be properly abandoned.

Table of Contents

Table of Tables

APPENDICES

1.0 PROJECT DESCRIPTION

The Greenwood Chemical Site, located in Albemarle County, Virginia, is an 18-acre site which produced chemicals for applications in industrial, agricultural, pharmaceutical, and photographic processes from the late 1940's until 1985 (Figure 1). The Site has been placed on the EPA Superfund National Priority List (NPL) due to contaminant releases resulting from past waste disposal practices and a fire that destroyed the manufacturing facility.

EPA recently completed construction of an on-site system to treat contaminated groundwater and surface water. The primary contaminants of concern are volatile organic contaminants (VOCs), including benzene, perchloroethylene (PCE), trichloroethylene (TCE), and toluene; semi- volatile organic contaminants (SVOCs), including naphthalene; and metals, including arsenic. The pump and treat system is designed to treat contaminated ground water from extraction wells on site, and surface water drawn from the two remaining lagoons.

2.0 PROJECT ORGANIZATION AND RESPONSIBILITIES

Mr. Christian Jacobs is the Project Manager. His responsibilities for this project included: coordinating all site activities, scheduling, technical editing of reports, and client communication. Mr. Glenn Harrison, Site Superintendent, oversaw the initial phase of locating the wells, clearing operations, well identification, videography and initial inspection of all wells for refurbishment or abandonment. Mr. Dana Jackson, P.G., reviewed initial field survey results, conducted additional monitoring well assessments and monitored subsurface video footage of monitoring wells to assist in making assessments and final recommendations.

3.0 SCOPE AND OBJECTIVES

The purpose of this Groundwater Monitoring Well Inspection Report is to summarize the current condition of the 48 monitoring wells located on the site. Horne Engineering conducted the following steps to complete this task:

- Performed an inventory of existing wells.
- Performed cursory external and interior inspection of each well identified.
- Cleared the area of debris and vegetation surrounding each well for access.
- Performed downhole inspections of wells using a submersible video camera.
- Determined which wells were suitable for refurbishment or abandonment.

4.0 FIELD ACTIVITIES

This section summarizes the field investigation results and well assessment information. Horne mobilized field personnel to the site and conducted the following tasks:

Field personnel cleared the immediate area and access to the monitoring wells of scrub brush and other growth (Appendix A, Field Logs). The condition of each well was accurately determined and recorded (Appendix B, Monitoring Well Inspection/Inventory Log). Well inspections were overseen by the project geologist and the information was recorded on a well inspection form used in this report (Appendix B, Monitoring Well Inspection/Inventory Log). The condition of the well casing, well covers, concrete pad and other details were noted. An overview map of the area is also included (Appendix C, Overall Site and Control Plan). United Technologies Services, Inc. performed the internal video inspection of the wells, which included videotape footage for 37 of the 48 monitoring wells. Internal inspection could not be performed on nine (9) of the wells (i.e., well was destroyed, artesian well, or extraction well). A VHS copy of the internal well inspections is included with this report. The data collected from the field survey was used to develop the table of recommendations and correctives measures necessary to refurbish each monitoring well. The field survey also identified those wells recommended for abandonment.

5.0 RECOMMENDATIONS

Of the original 48 wells installed, 35 monitoring wells are in a condition that may be sampled after minor refurbishing (Table 1, Monitoring Well Inventory Requiring Minor Refurbishment). One of these wells actually contains two wells completed to different depths [MW18D (1) 95 feet and MW18D (2) 74 feet]. Water level elevations between these two wells differ by two feet and may indicate that they intersect different water bearing formations. Six other wells were completed as open holes in the bedrock and may require extensive pumping to meet turbidity requirements to allow sampling (BR-1, BR-3, MW7D, MW12S, MW12D, and MW16D). If these wells cannot be meet the sampling criteria they may be redeveloped and reconstructed using PVC well materials or abandoned.

There are 10 monitoring wells that require more extensive repairs before they can be used for groundwater sampling. These wells are listed in Table 2, Monitoring Well Inventory Requiring More Extensive Refurbishment. Two (2) monitoring wells are artesian and have badly corroded fittings for discharging water (MW13, and BR5). Each well will require installation of new fittings to be usable for groundwater sampling based on the analytes of concern. Three (3) other monitoring wells had broken casings in the upper few feet near the surface. While a bailer may

Table 1, Monitoring Well Inventory Requiring Minor Refurbishment

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
1	**BR1** RW/NC	Yes	24	80	Concrete Pad, Paint Peeling, Lock	New Pad, Paint well , Replace lock	9:19	10:54
2	**BR3** RW/NC	Yes	10	97	Paint Peeling, Lock	Paint well, Replace lock	14:03	15:01
3	**BR4**	Yes	26	51	Rusty, Lock	Paint well, Replace lock	52:37	54:18
4	**MW2S**	Yes	20	43	No Pad, Cover bent, Rusty, Well Cap, Lock	New Pad, Repair cover, Paint well, Replace lock & 4' cap	2:58	4:21
5	**MW2D**	Yes	29	87	Rusty, Well Cap, Lock	Paint well, Replace lock & 4" well cap	4:21	5:56
6	**MW5**	Yes	10	21	Rusty, Well Cap, Lock	Paint well, Replace lock & 4" well cap	15:01	15:49
7	**MW7S**	Yes	9	47	Concrete Pad, Paint Peeling, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	32:33	33:57
8	**MW7D** RW/NC	Yes	3	72	Concrete Pad, Paint Peeling, Lock	New Pad, Paint well, Replace lock	30:45	32:33
9	**MW9**	Yes	23	49	Concrete Pad, Paint Peeling, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	34:46	36:41
10	**MW10**	Yes	42	48	Concrete Pad, Paint Peeling, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	55:58	57:22
11	**MW10D**	Yes	47	74	Concrete Pad, Paint Peeling, Well Cap, Lock	New Pad, Paint well, Replace lock & 2" well cap	54:18	55:58
12	**MW11**	Yes	40	54	Concrete Pad, Paint Peeling, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	1:10	2:58
13	**MW12D (S)[2]** RW/NC	Yes	11	18	Rusty, Lock	Paint well, Replace lock	17:56	18:53
14	**MW12S(D)[2]** RW/NC	Yes	5	130+	Rusty, Lock	Paint well, Replace lock	18:53	23:17

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

Table 1, Monitoring Well Inventory Requiring Minor Refurbishment Continued

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
15	MW14S	Yes	9	22	Concrete Pad, Rusty, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	33:57	34:46
16	MW14D RW/NC	Yes	1	130+	Concrete Pad Rusty, Well Cap, Lock	New Pad, Paint well, Replace lock & 2" well cap	27:16	30:45
17	MW16S	Yes	39	79	Concrete Pad, Rusty, Well Cap, Lock	New Pad, Paint well, Replace lock & 4" well cap	36: 41	38:41
18	MW16D	Yes	41	99	Concrete Pad, Rusty, Well Cap, Lock	New Pad, Paint well, Replace lock	38:41	43:56
19	MW17S	Yes	37	49	Concrete Pad, Rusty, Well Cap, Lock	New Pad, Paint well, Replace lock & 2" well cap	43:56	45:50
20	MW17D	Yes	28	130+	Concrete Pad, Rusty, Lock	New Pad, Paint well, Replace lock	45:50	48:37
21	MW18S	Yes	26	55	Rusty, Well Cap, Lock	Paint well, Replace lock & 2" well cap	58:50	1:00:10
22	MW18D (1)	Yes	26	85	Rusty, Well Cap, Lock	Paint well, Replace lock & 2" well cap	1:00:10	1:02:20
22	MW18D (2)	Yes	28	74	Rusty, Well Cap, Lock	Paint well, Replace lock & 2" well cap	1:02:20	1:03:42
23	MW19	Yes	31	53	Rusty, Well Cap, Lock	Paint well, Replace lock & 2" well cap	51:10	52:37
24	MW20S[3]	Yes	NA	NA	Rusty, Lock	Paint well, Replace lock	NA	NA
25	MW20D[3]	Yes	NA	NA	Rusty, Lock	Paint well, Replace lock	NA	NA
26	MW21S	Yes	10	35	Rusty, Well Cap, Lock	Paint well, Replace lock & 2" well cap	24:37	25:54
27	MW21D	Yes	7	64	Rusty, Well Cap, Lock	Paint well, Replace lock & 4" well cap	23:17	24:37

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

Table 1, Monitoring Well Inventory Requiring Minor Refurbishment Continued

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
28	OB1	Yes	35	47	Lock	Replace lock	10:54	12:31
29	OB2	Yes	32	60	Lock	Replace lock	12:31	14:03
30	OB3	Yes	30	39	Lock	Replace lock	14:03	15:01
31	OB4	Yes	26	52	Lock	Replace lock	1:03:42	1:05:29
32	OB5	Yes	35	64	Lock	Replace lock	57:22	58:50
33	OB6	Yes	24	52	Lock	Replace lock	1:05:29	1:06:44
34	OB7	Yes	9	45	Well Cap, Lock	Replace lock & 4" well cap	1:06:44	1:07:57
35	OB8	Yes	9	37	Lock	Replace lock	25:54	27:16

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

Table 2, Monitoring Well Inventory Requiring Major Refurbishment.

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
1	**BR2**	Yes	NA	NA	Converted to extraction well located in vault.	Add sampling port, Paint wells, Replace lock	NA	NA
2	**BR5**	Yes	NA	NA	Artesian well, fittings extremely corroded.	Replace current fittings with stainless steel with sampling port. Paint well, replace lock	NA	NA
3	**BR6**	Yes	NA	NA	Converted to extraction well located in vault.	Add sampling port, Paint wells, Replace lock	NA	NA
4	**BR7**	Yes	NA	NA	Converted to extraction well located in vault.	Add sampling port, Paint wells, Replace lock	NA	NA
5	**BR8**	Yes	NA	NA	Converted to extraction well located in vault.	Add sampling port, Paint wells, Replace lock	NA	NA
6	**MW3**	Yes	26	43	Broken casing near surface may allow sediment to enter well during purging and sampling.	Repair Well Casing, Paint Well, Replace lock	5:56	7:50

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

Table 2, Monitoring Well Inventory Requiring Major Refurbishment Continued.

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
7	**MW4**	Yes	29	49	Broken casing near surface may allow sediment to enter well during purging and sampling.	Repair Well Casing, Paint Well, Replace lock	7:50	9:19
8	**MW6**	Yes	7	26	Broken casing near surface may allow sediment to enter well during purging and sampling.	Repair Well Casing, Paint Well, Replace lock	49:22	51:10
9	**MW13**	Yes	NA	NA	Artesian well, fittings extremely corroded.	Replace current fittings with stainless steel with sampling port. Paint well, replace lock	NA	NA
10	**MW23**	Yes	NA	NA	Converted to extraction well located in vault.	Add Sampling Port, Paint well, replace lock	NA	NA

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

pass through the break, there is the potential for dislodging soil debris into the well (MW3, MW4, and MW6). Finally, there are the five (5) monitoring wells that were modified as extraction wells for the treatment system. The installation of sampling ports are recommended on these wells (BR2, BR6, BR7, BR8, and MW23) if sample collection is desired.

The last category is monitoring wells recommended for abandonment (Table 3, Monitoring Wells Recommended to be Abandoned). Two (2) monitoring wells were found destroyed. The remnants of the first well (MW1) were located. However, the well casing is currently buried under compacted soil. The second destroyed well was labeled the "Old Well". This well was buried during the construction of the treatment system and is somewhere underneath the paved area. Due to the current site conditions, neither of these two wells can be located to properly abandon. The third well recommended for abandonment is MW6R. This well was found to be a dry hole and only penetrated the subsurface to a depth of less than 7 feet. This well can be properly abandoned.

6.0 PHOTOGRAPHIC LOG

Photographs were taken of all Monitoring Wells. Photographs for each well was identified and labeled. These photographs are found in Appendix D, Monitoring Well Inventory Photographs.

7.0 ANALYTICAL RESULTS REPORT

All refurbishment and abandonment activities will be included and documented in the Analytical Results Report. The draft version of this report will be submitted following completion of all sampling, analysis, and receipt of lab results.

Table 3, Monitoring Wells Requiring Abandonment.

No.	Monitoring Well Number	Refurbish (Yes/No)	Relative Water Level[1]	Relative Total Depth[1]	Problem	Corrective Action	Video Inventory Hr/Min/Sec (End 1:07:57) Start	Stop
1	**OLD WELL**	No	N/A	N/A	Well destroyed and buried under paved area.	None.	N/A	N/A
2	**MW1**	No	N/A	N/A	Monitoring well destroyed, buried under compacted soil.	None.	N/A	N/A
3	**MW6R**	No	N/A	N/A	Dry Hole	Abandon well according to federal and state regulations	44:37	49:22

1. Measurements based on depth of down hole tool.
2. MW12S and MW12D monitoring wells are reversed in video tape footage.
3. + Indicates limit of downhole tool.

NA – Not Available

RW/NC – Rock Well /No Casing

APPENDIX A.

FIELD LOGS

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/16/00
Project No: 3162-C01 Weather: clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

Personnel: Glenn Harrison Supervisor/Leadman

Maurice Brawner Corey Hill

Jason Hopson

SUBCONTRACTORS

Company	Foreman/Super	Performing	Arr/Dep Time
		N/A	

Production: No subs working today

Comments/Directives by Client - Changes in Scope:

No changes in scope

AR300285

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/16/00
Project No: 3162-C01 Weather: clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

General Field Notes:

Clear and grub, weed eat around wells, remove dirt from pads general clearing and cleaning for well i inspection. Home employees worked 6 hours.

VISITORS

Name	Company	Time on Site	Comments
No visitors today			

AR300286

DAILY FIELD LOG

Project: Greenwood Chemical Co.
Project No: 3162-C01
Date: 2/17/00
Weather: clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

Personnel: Glenn Harrison — Supervisor/Leadman
Maurice Brawner
Corey Hill
Jason Hopson

SUBCONTRACTORS

Company	Foreman/Super	Performing	Arr/Dep Time
		N/A	

Production: No subs working today

Comments/Directives by Client - Changes in Scope:

No changes in scope

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/17/00
Project No: 3162-C01 Weather: clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

General Field Notes:

Clear and grub, weed eat around wells, remove dirt from pads general clearing and cleaning for well i inspecton. Home employees worked 10 hours

VISITORS

Name	Company	Time on Site	Comments
No visitors today			

AR300288

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/22/00
Project No: 3162-C01 Weather: Clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

Personnel: Glenn Harrison Supervisor/Leadman

Maurice Brawner Corey Hill

Jayson Hopson

SUBCONTRACTORS

Company	Foreman/Super	Performing	Arr/Dep Time
United Technologies	Paul Valler	**Video tape wells to determine**	11:00/6:30
Services Inc.	John Ile	**condition of wells**	

Production: Video tape wells as per contract, production is good with no problems

Comments/Directives by Client - Changes in Scope:

Comments by NorAir, progress is good,no problems.

No changes in scoope

DAILY FIELD LOG

Project: Greenwood Chemical Co.
Project No: 3162-C01

Date: 2/22/00
Weather: Clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

General Field Notes:

Continue to clear around wells to make inspection possible

production is good with no problems

VISITORS

Name	Company	Time on Site	Comments
N/A No visitors today			

AR300290

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/23/00
Project No: 3162-C01 Weather: Clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

Personnel: Glenn Harrison Supervisor/Leadman

Maurice Brawner Corey Hill

Jayson Hopson

SUBCONTRACTORS

Company	Foreman/Super	Performing	Arr/Dep Time
United Technologies	Paul Valler	**Video tape wells to determine**	7:00am/4:30pm
Services Inc.	John Ile	**condition of wells**	

Production: Video tape wells as per contract, production is good with no problems

Comments/Directives by Client - Changes in Scope:

Progress is good,no problems.

No changes in scoope

AR300291

DAILY FIELD LOG

Project: Greenwood Chemical Co. Date: 2/23/00
Project No: 3162-C01 Weather: Clear

Site Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

General Field Notes:

Continue to clear around wells to make inspection possible
production is good with no problems

VISITORS

Name	Company	Time on Site	Comments
Dana Jackson	Home Eng.	All day	Notes and Recomdations for report
Philip H. Rotstein	E.P.A.	All day	Notes and inspection

AR300292

APPENDIX B.

MONITORING WELLS INVENTORY/INSPECTION LOG

United Technologies Services, Inc.
Well Monitoring-Video Log

Well Nos.	(Feet) Depth to Water	(Feet) Depth Total	Comments
MW11	42	54	
MW2S	29	43	
MW2D	29	87	
BR7	N/O	N/O	VAULT
MW3	29	43	
MW4	49	49	
BR1	29	87	
OB1	36	49	
OB2	32	60	
MW1	N/O	N/O	DESTROYED
OB3	31	39	
BR2	N/O	N/O	VAULT
MW5	10	22	
BR3	10	96	
MW12S	10	19	
MW12D	5	175	
OLD WELL	N/O	N/O	DESTROYED
MW21D	7	65	
MW21S	9	35	
BR6	N/O	N/O	VAULT
OB8	10	37	
MW14D	0	200	WATER TO TOP OF CASING
MW7D	7	72	
MW7S	9	47	
MW14S	9	22	
BR5	N/O	N/O	HOSE BIB ATTACHMENT
MW9	29	49	
MW16S	39	79	
MW16D	49	97	
MW17S	37	49	
MW17D	38	160	
MW13	N/O	N/O	HOSE BIB ATTACHMENT
MW6R	N/A	7	NO WATER IN WELL
MW6	7	26	
MW19	31	52	
BR4	26	51	
MW23	N/O	N/O	VAULT
MW10D	37	73	
MW10	42	48	
OB5	35	56	
MW18S	26	55	
MW18D(1)	28	95	
MW18D(2)	28	75	
OB4	26	52	
BR8	N/O	N/O	VAULT
OB6	24	52	
OB7	9	45	

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap	Need To Replace Lock	Comments
BR1	Replace - cracked up	Good	Needs Paint	~~YES~~ NO	YES ~~NO~~	
BR2	VAULT			~~YES~~ NO	~~YES~~ NO	
BR3	Good	Good	Good - Freshen up Paint	~~YES~~ NO	YES ~~NO~~	No well inside
BR4	Good	Good	Rusty	~~YES~~ NO	YES ~~NO~~	No PVC in Casing
BR5	Good	No Cover - Has a Hose Bib	Good	~~YES~~ NO	~~YES~~ NO	Needs Paint
BR6	VAULT			~~YES~~ NO	~~YES~~ NO	
BR7	VAULT			~~YES~~ NO	~~YES~~ NO	
BR8	VAULT			~~YES~~ NO	~~YES~~ NO	

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap		Need To Replace Lock		Comments
MW-1	**Destroyed**	Gone						Totally Destroyed
MW-2D	Good	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug - 4" PVC is cut at an angle
MW-2S	No Concrete Pad	Cover needs welded & Tabs are bent back	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug - Lid needs welded
MW-3	No Concrete Pad	Needs work or to be replaced	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug - 4" PVC is down about 2' in casing
MW-4	No Concrete Pad	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug - 4" PVC is broken down 3' in casing
MW5	Replace Concrete	Good - is Rusty	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug & Paint
MW6	Replace Concrete	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug & Paint
MW6R	Good	Good	Rusty	~~YES~~	NO	YES	~~NO~~	Needs Paint

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap		Need To Replace Lock		Comments
MW7D	No Concrete Pad	Good	Rusty	~~YES~~	NO	YES	~~NO~~	No well inside
MW7S	Has Pad - Too Small Suggest Replacing	Need to Straighten Lid	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug
MW9	No Concrete Pad	Good - Bent	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug
MW10	No Concrete Pad	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Screw Cap
MW10D	Pad has sunk down 4- 6" Replace Concrete	Needs new Cover	Good	YES	~~NO~~	YES	~~NO~~	Well Cap is a 2" Screw Cap Concrete is covered up
MW11	No Concrete Pad - Rip Rap	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug PVC cut on 2 angles need to grind straight
MW12D	Good	Good	Rusty	~~YES~~	NO	YES	~~NO~~	No Well Inside (No PVC)
MW12S	Good	Good	Rusty	~~YES~~	NO	YES	~~NO~~	No Well Inside (No PVC)

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap		Need To Replace Lock		Comments
MW13	Very Small - Replace	No Cover - Hose Bib	Rusty	~~YES~~	NO	~~YES~~	NO	Upper cap on top is cracked in half & is leaking - Replace the flange for plumbing
MW14D	Very Small - Replace	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 2" Compression Plug Well is too tall, need to be cut down
MW14S	No Concrete Pad	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug 4"" PVC needs to be extended is 2' in well
MW-16D	Deteriorating - Replace	Good	Rusty	~~YES~~	NO	YES	~~NO~~	No Well Inside (No PVC)
MW-16S	Deteriorating - Replace	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 4" Compression Plug & Paint
MW17D	Good	Rusty	Rusty	~~YES~~	NO	YES	~~NO~~	Lock Tabs on Cover are bent
MW17S	Good	Rusty	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 2" Compression Plug
MW18D1	Good	Good	Rusty	YES	~~NO~~	YES	~~NO~~	2 Wells in 1 casing Both need new 2" Screw Plugs
MW18D2				YES	~~NO~~	YES	~~NO~~	

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap		Need To Replace Lock		Comments
MW18S	Good	Rusty	Rusty	YES	~~NO~~	YES	~~NO~~	Needs 2" Screw Cap
MW19	Good	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Well Cap is a 2" Compression Plug & Paint On the other side of the fence
MW20D	Good	Good	Rusty	~~YES~~	NO	YES	~~NO~~	
MW20S	Good	Good	Rusty	~~YES~~	NO	YES	~~NO~~	
MW21D	Good	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Needs 4" Screw Plug & Paint
MW21S	Good	Good	Rusty	YES	~~NO~~	YES	~~NO~~	Needs 2" Screw Plug & Paint
MW23	VAULT			~~YES~~	NO	~~YES~~	NO	
OB1	Good	Good	Good	~~YES~~	NO	YES	~~NO~~	Needs Paint
OB2	Good	Good	Good	~~YES~~	NO	YES	~~NO~~	Needs Paint

INVENTORY/INSPECTION OF MONITORING WELLS

Project: Greenwood Chemical Co.
Project #: 3162-C01
Date: 2/16/00 - 2/23/00 (dates indicated on photos)
Weather: Mostly Clear

Location: Greenwood Chemical Co. Superfund Site, Newtown, VA

*Note conditions of well casing, cover and concrete pad etc.

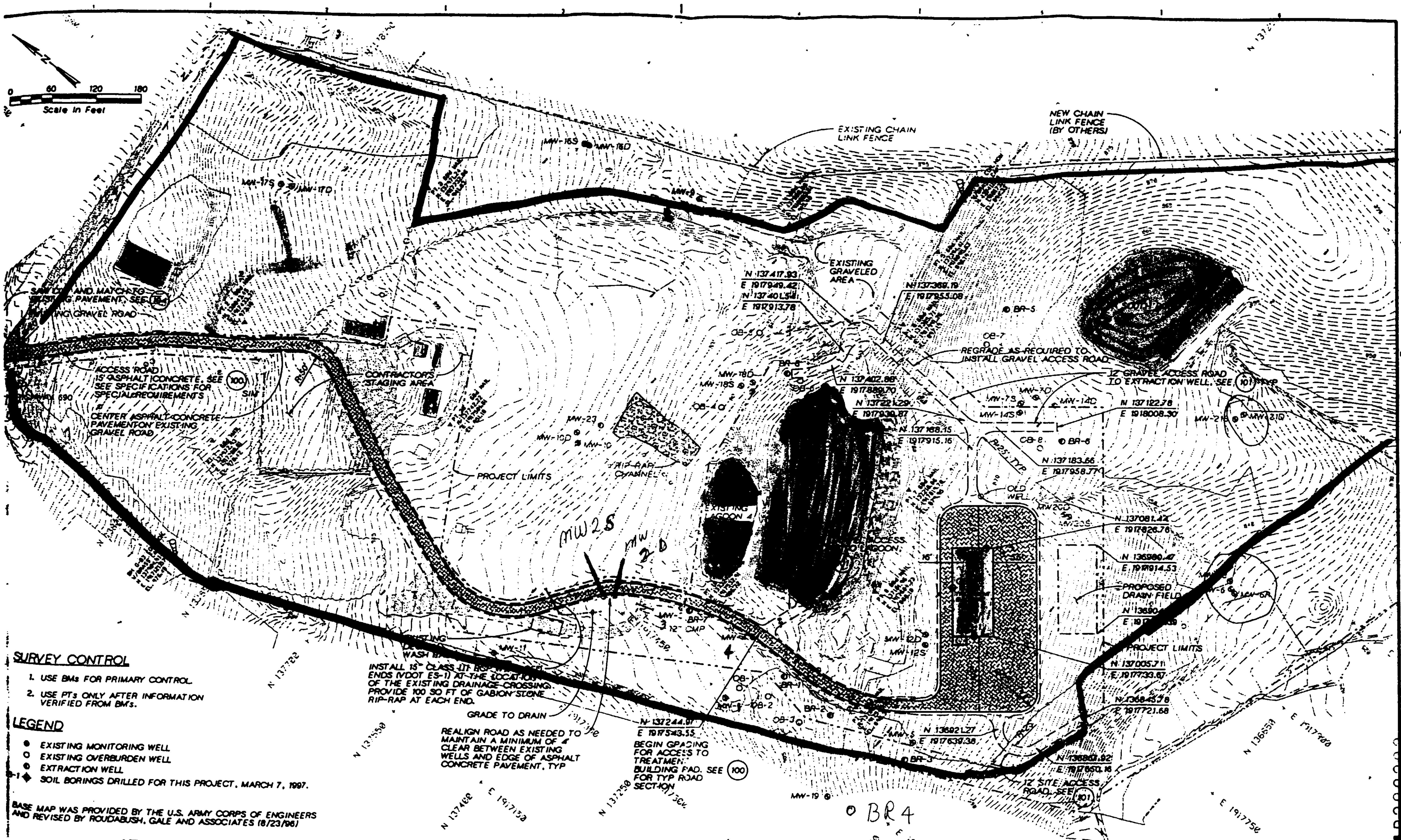
WELL ID	Concrete Pad	Well Cover	Well Casing	Need To Replace Well Cap	Need To Replace Lock	Comments
OB3	Good	Good	Good	~~YES~~ NO	YES ~~NO~~	Needs Paint
OB4	Good	Good	Good	~~YES~~ NO	YES ~~NO~~	Needs Paint
OB5	Good	Good	Good	~~YES~~ NO	YES ~~NO~~	Needs Paint
OB6	Good	Good	Good	~~YES~~ NO	YES ~~NO~~	Needs Paint
OB7	Good	Good	Good	YES ~~NO~~	YES ~~NO~~	Well Cap is a 4" Compression Plug & Paint
OB8	Good	Good	Good	~~YES~~ NO	YES ~~NO~~	Needs Paint
Old Well	**Destroyed**	Gone				Totally Destroyed - Appears to have been dug up

48 on List

2 Destroyed
2 Hose Bibs
5 Vaults

APPENDIX C.

OVERALL SITE AND CONTROL PLAN



SURVEY CONTROL

1. USE BMs FOR PRIMARY CONTROL.
2. USE PTs ONLY AFTER INFORMATION VERIFIED FROM BMs.

LEGEND

- ● EXISTING MONITORING WELL
- ○ EXISTING OVERBURDEN WELL
- ◉ EXTRACTION WELL
- B-1 ◆ SOIL BORINGS DRILLED FOR THIS PROJECT, MARCH 7, 1997.

BASE MAP WAS PROVIDED BY THE U.S. ARMY CORPS OF ENGINEERS AND REVISED BY ROUDABUSH, GALE AND ASSOCIATES (8/23/96)

DSGN W. HUBBELL	NO.	DATE	REVISION	BY	APVD
DR R. STEIGERWALD					
CHK M. OSBORNE					
APVD C. BROWN					

BAR IS ONE INCH ON ORIGINAL DRAWING. IF NOT ONE INCH ON THIS SHEET, ADJUST SCALES ACCORDINGLY.

GROUNDWATER AND LAGOON WATER TREATMENT SYSTEM FOR ARCS GREENWOOD CHEMICAL SITE
ALBEMARLE COUNTY, VIRGINIA

CIVIL
OVERALL SITE AND CONTROL PLAN

SHEET 8
DWG NO. C-1
DATE APR 1997
PROJ NO. 10481UFD.TS

03-APR-1997 10810001.dw

APPENDIX D.

MONITORING WELL INVENTORY PHOTOGRAPHS

MW BR2
February 17, 2000

MW BR1
February 17, 2000

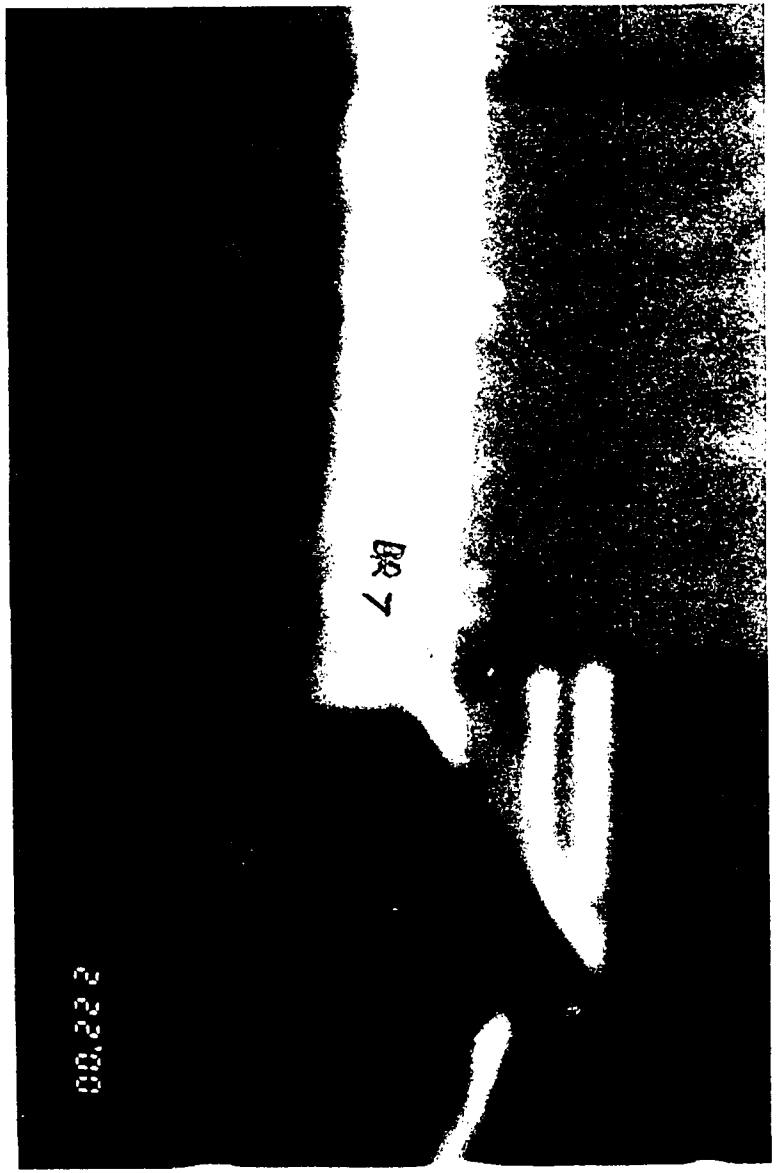
MW BR4
February 22, 2000

MW BR3
February 17, 2000

MW BR5
February 17, 2000

MW BR5
February 17, 2000

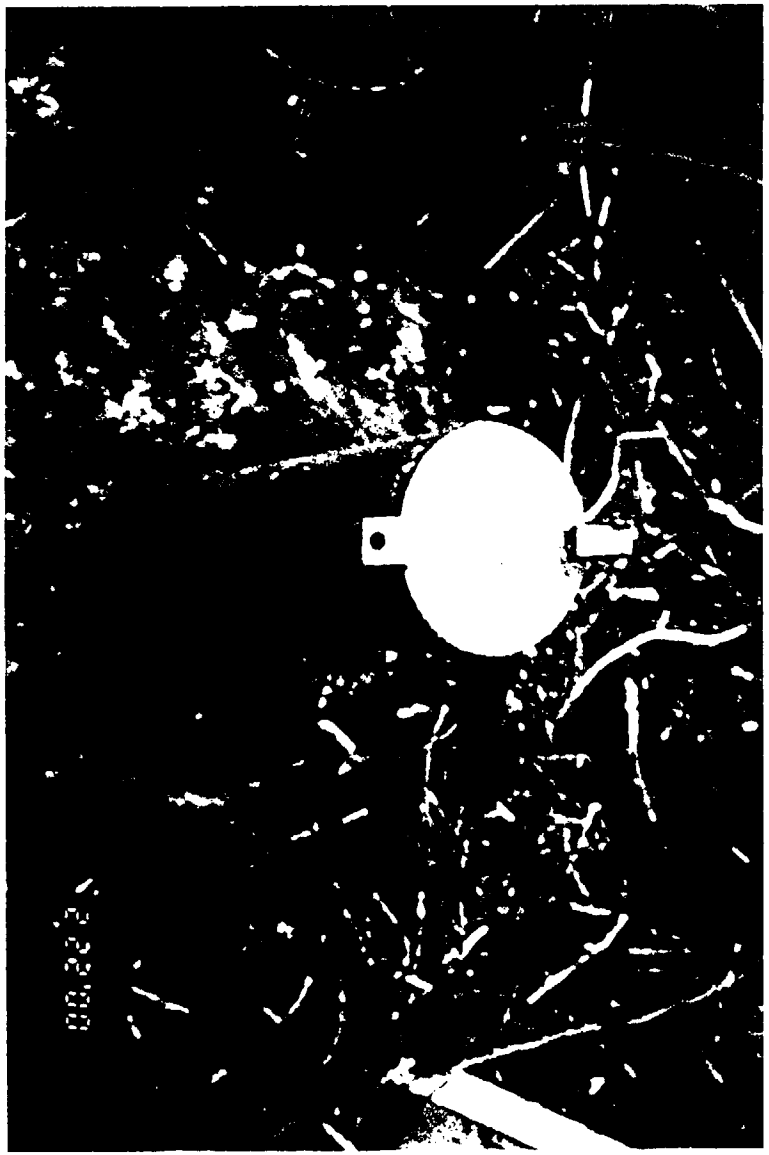
AR300306



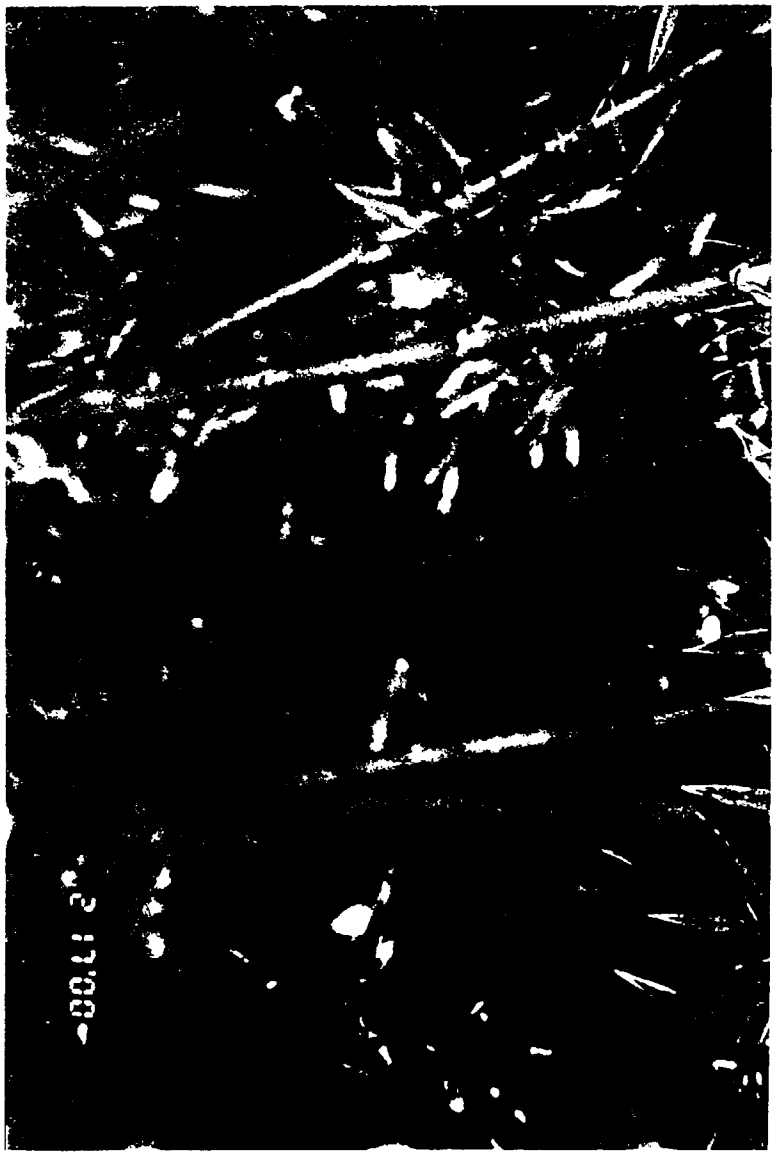
MW BR7
February 22, 2000

MW BR6
February 17, 2000

MW BR8
February 16, 2000

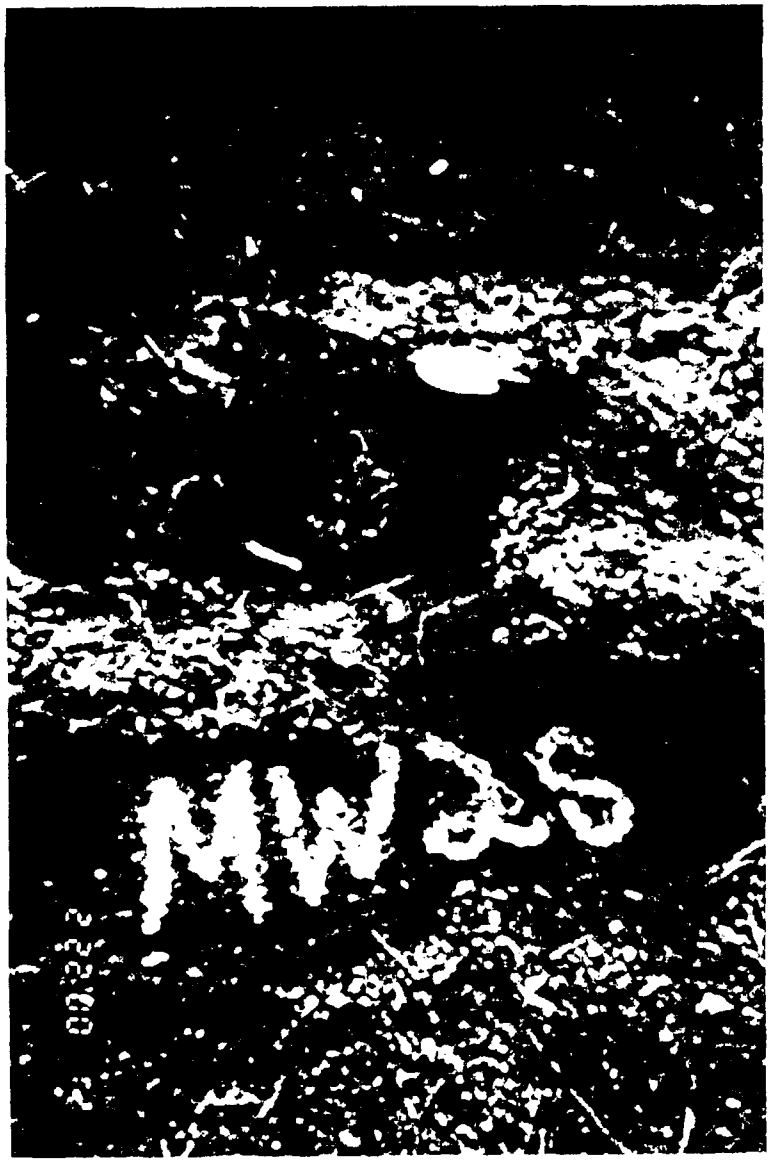


MW 2D
February 22, 2000



MW 1
February 17, 2000

AR300309



MW 2S
February 22, 2000

MW 2D
February 22, 2000

MW-3
February 22, 2000

MW-2S
February 22, 2000

MW-4
February 22, 2000

MW-4
February 22, 2000

MW 5
February 17, 2000

MW 4
February 22, 2000

MW 6R
February 17, 2000

MW 6
February 17, 2000

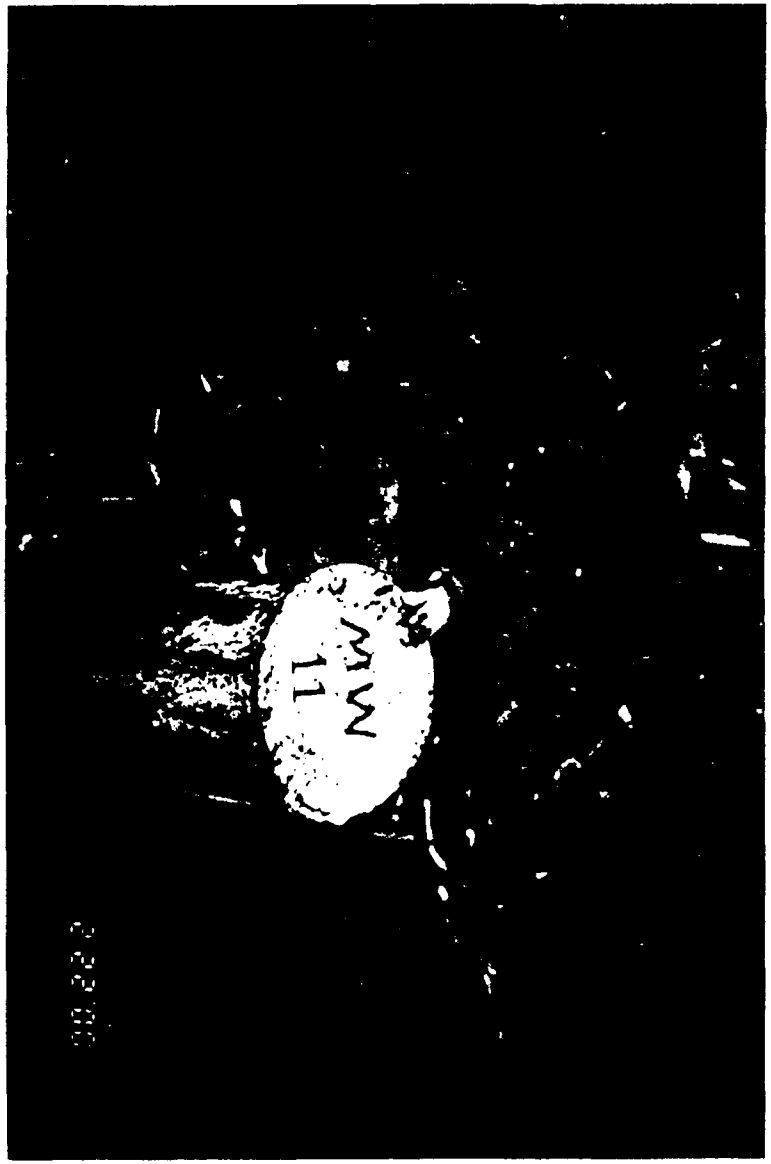
MW 6R
February 17, 2000

MW 7S
February 17, 2000

MW 7D
February 17, 2000

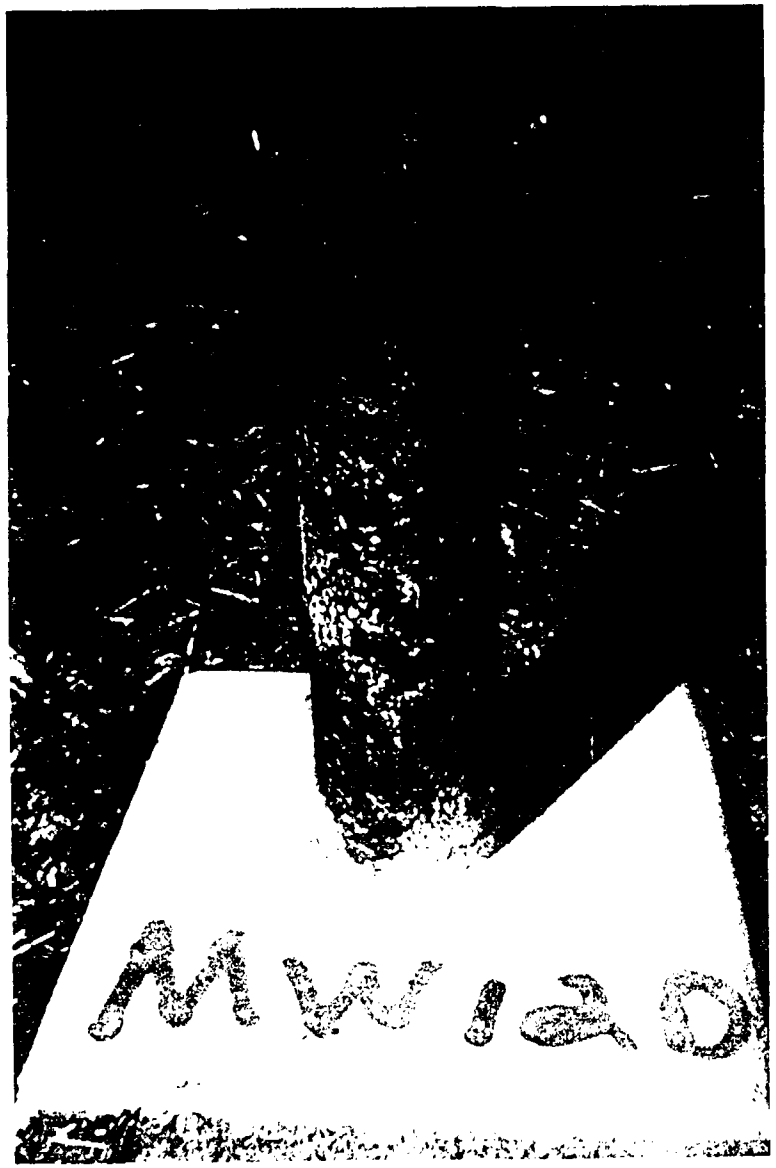
MW 10
February 17, 2000

MW 9
February 23, 2000



MW 11
February 22, 2000

MW 10D
February 17, 2000



MW 12D
February 17, 2000

MW 11
February 22, 2000

MW 12S
February 17, 2000

MW 12S
February 17, 2000

MW 13
February 17, 2000

MW 13
February 17, 2000

MW 13
February 17, 2000

MW 13
February 17, 2000

AR300322

MW 13
February 17, 2000

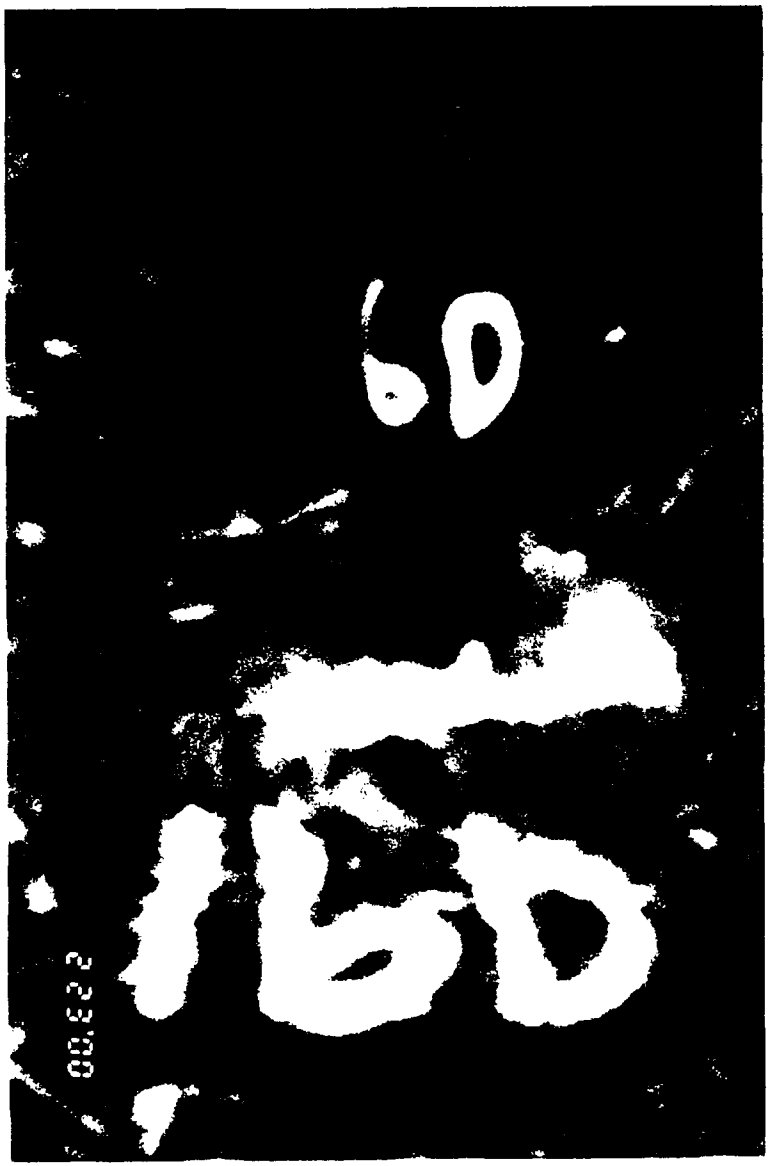
MW 13
February 17, 2000

MW 14D
February 17, 2000

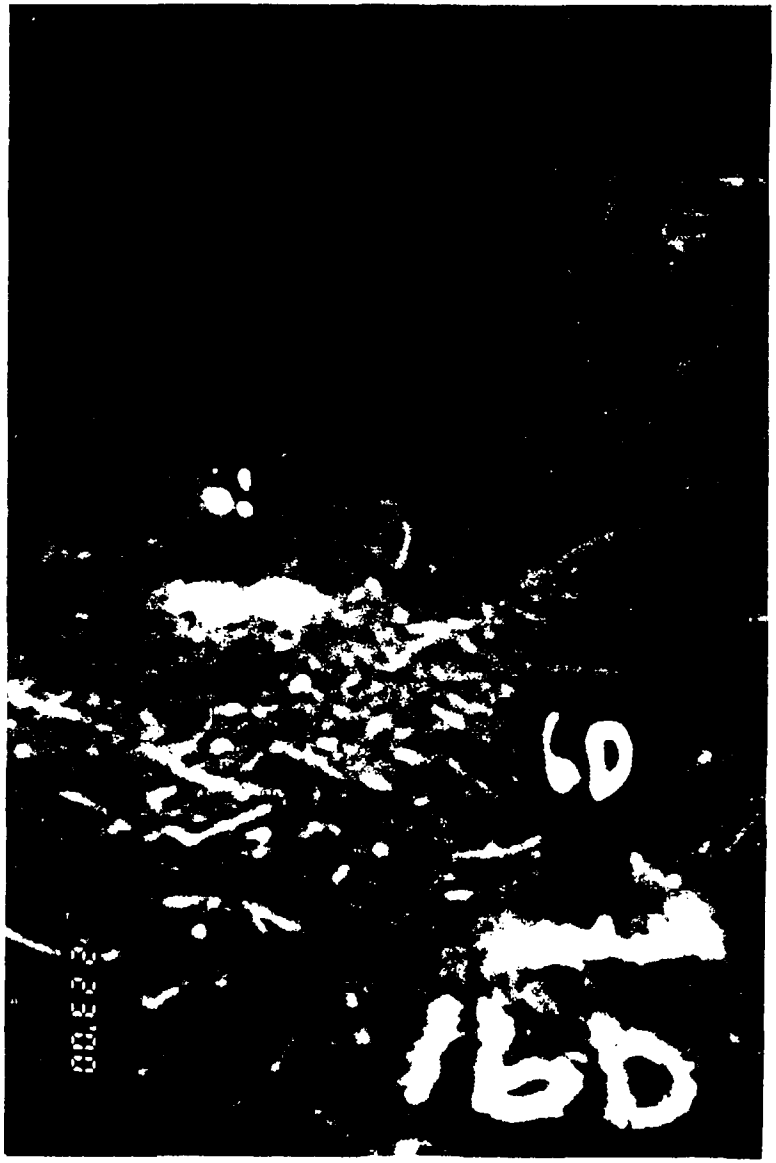
MW 14D
February 17, 2000

MW 14S
February 17, 2000

MW 14S
February 17, 2000

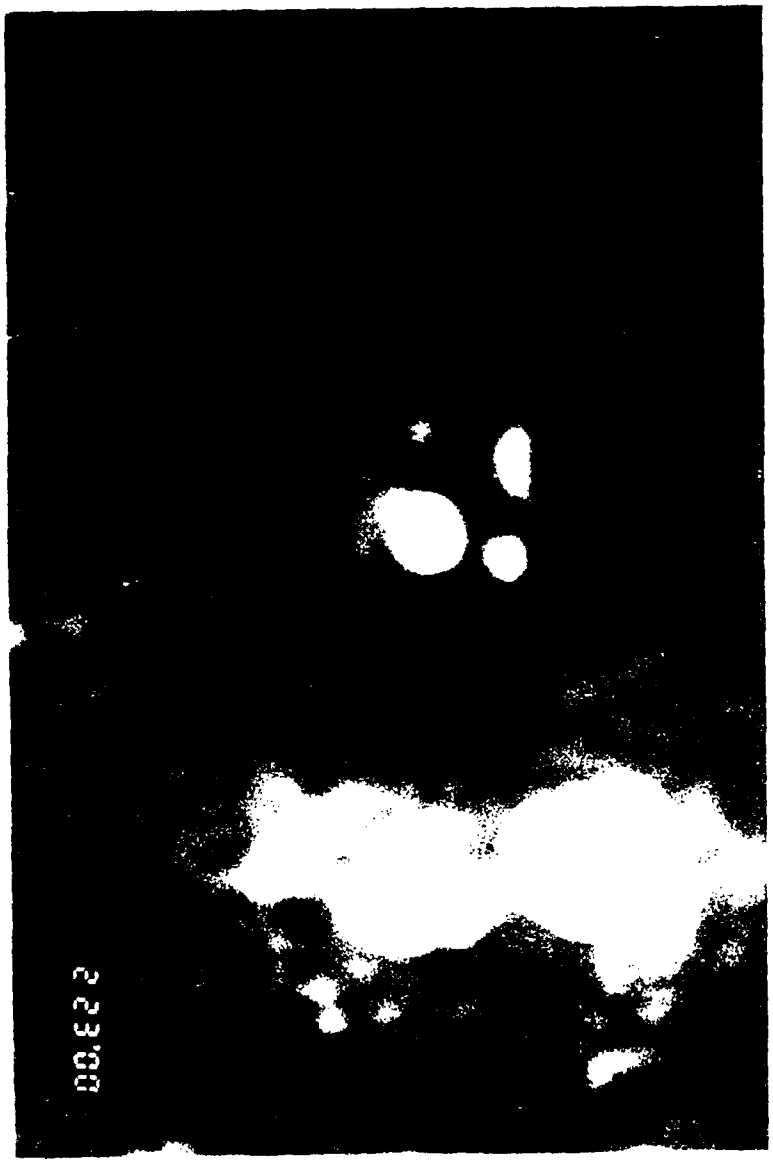


MW 16D
February 23, 2000

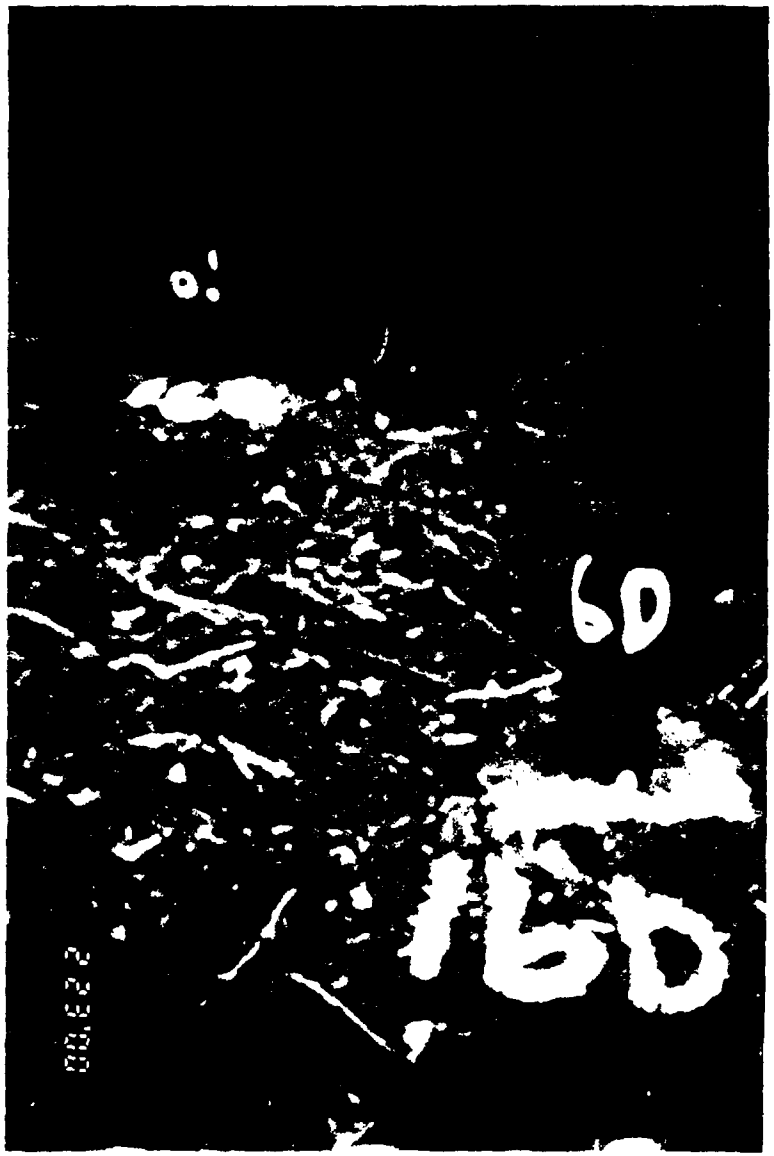


MW 16D
February 23, 2000

AR300326



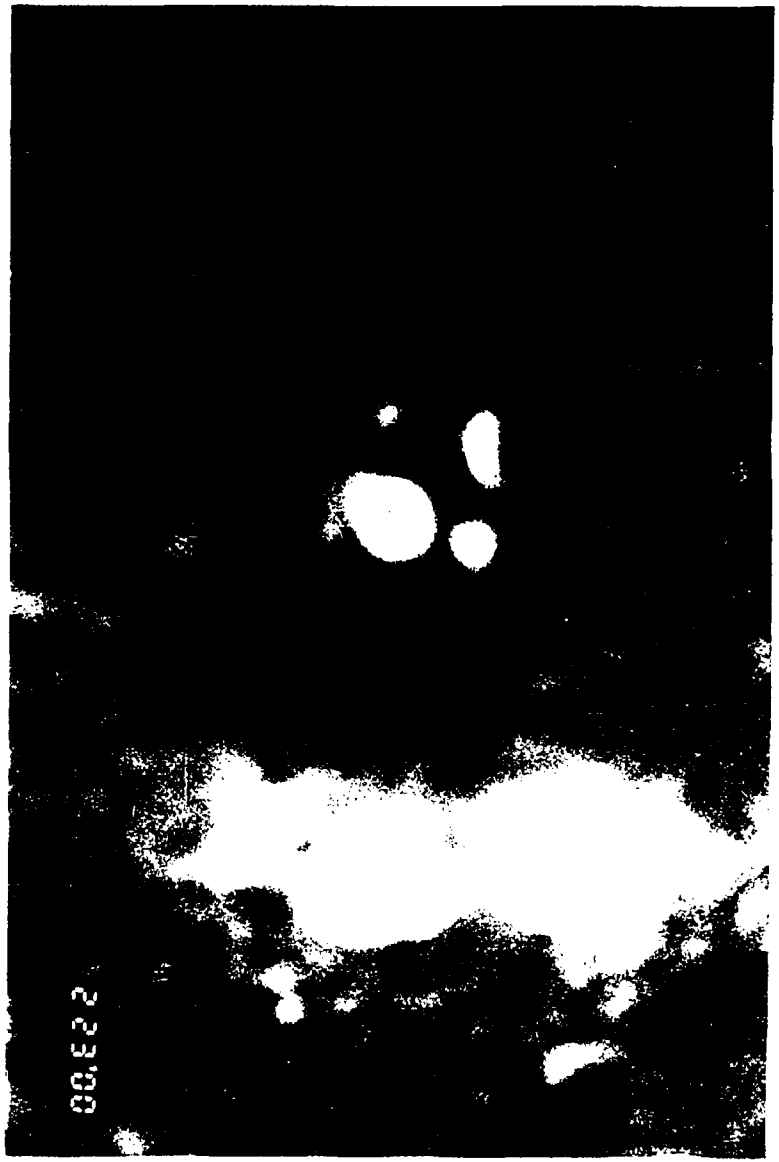
MW 16S
February 23, 2000



MW 16D
February 23, 2000

AR300327

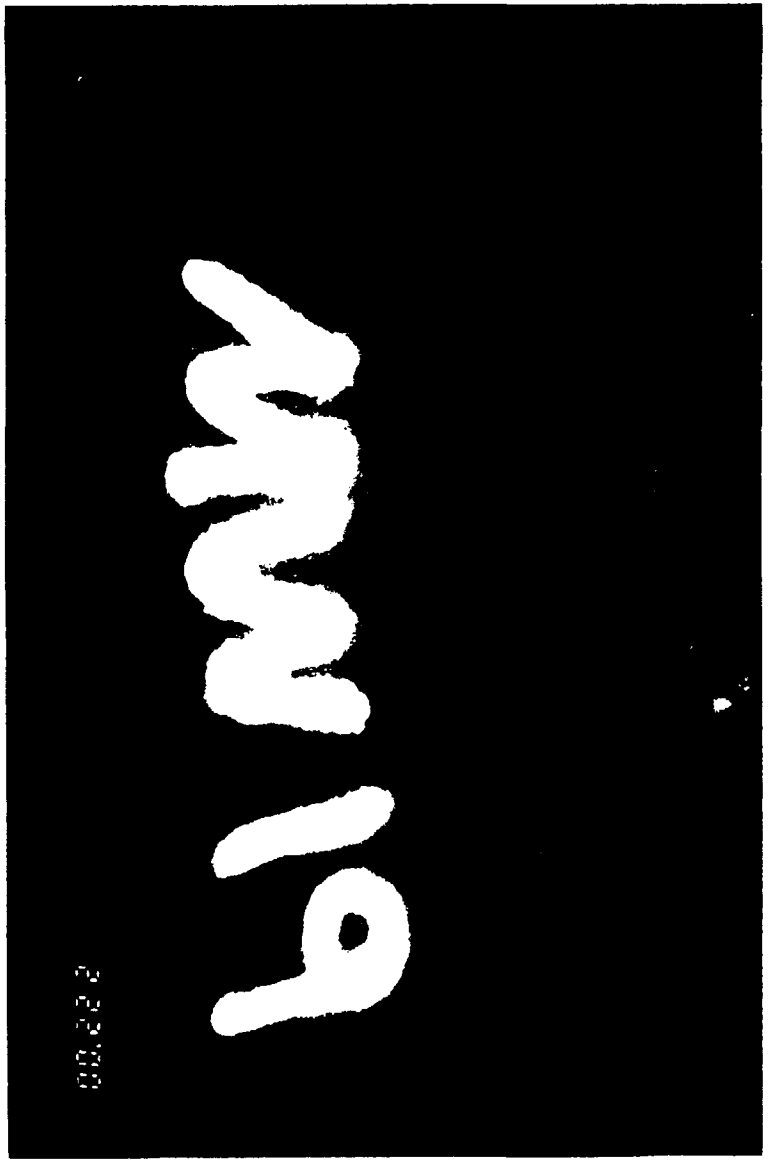
MW 17D
February 16, 2000



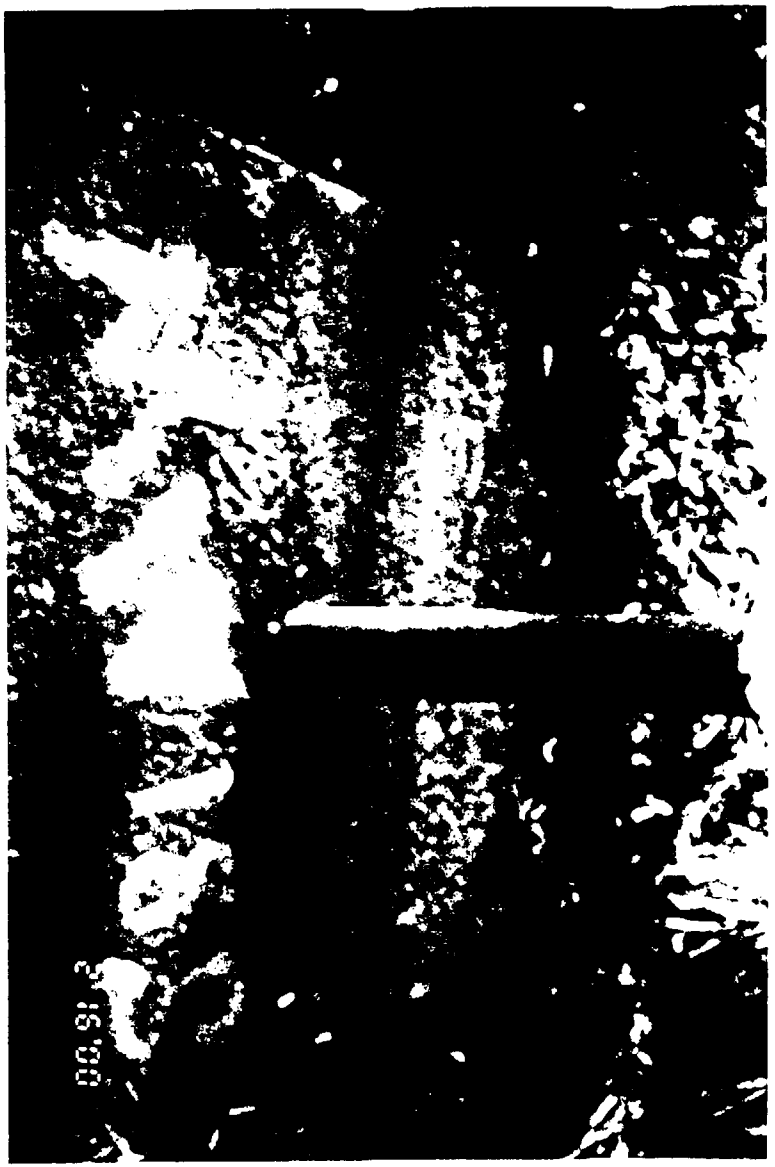
MW 16S
February 23, 2000

MW 18D
February 16, 2000

MW 17S
February 16, 2000

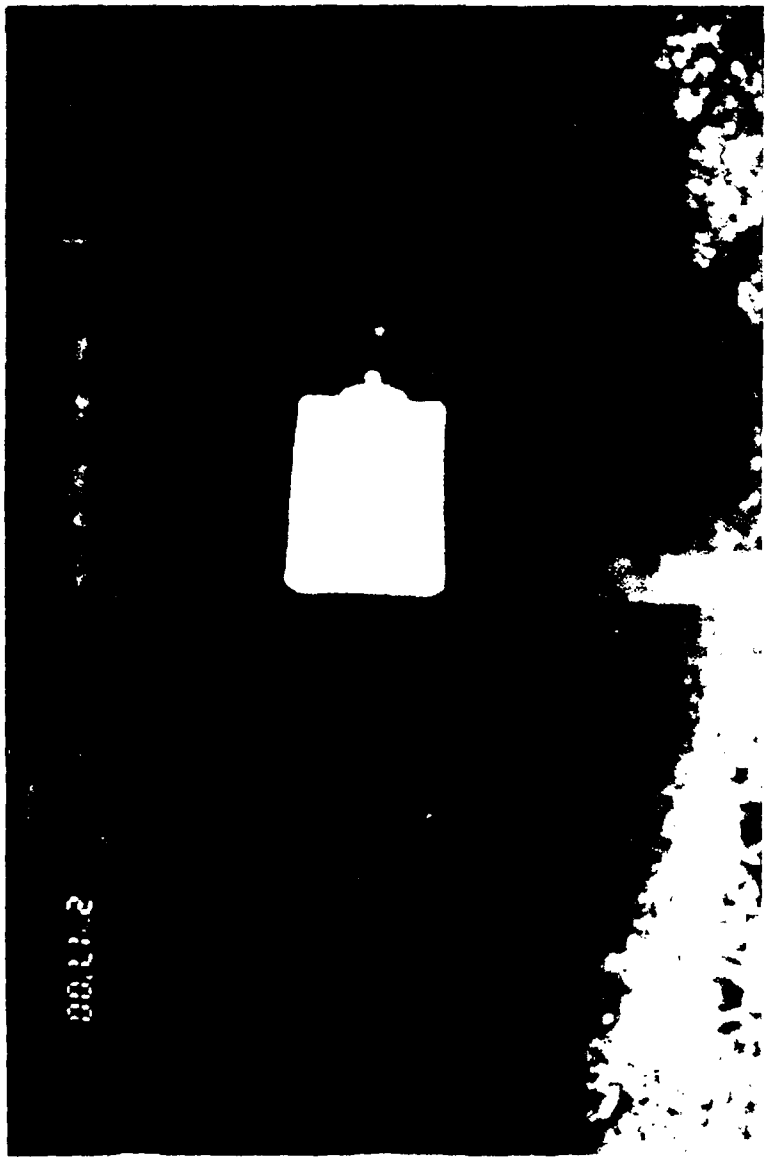


MW 19
February 22, 2000



MW 18S
February 16, 2000

AR300330

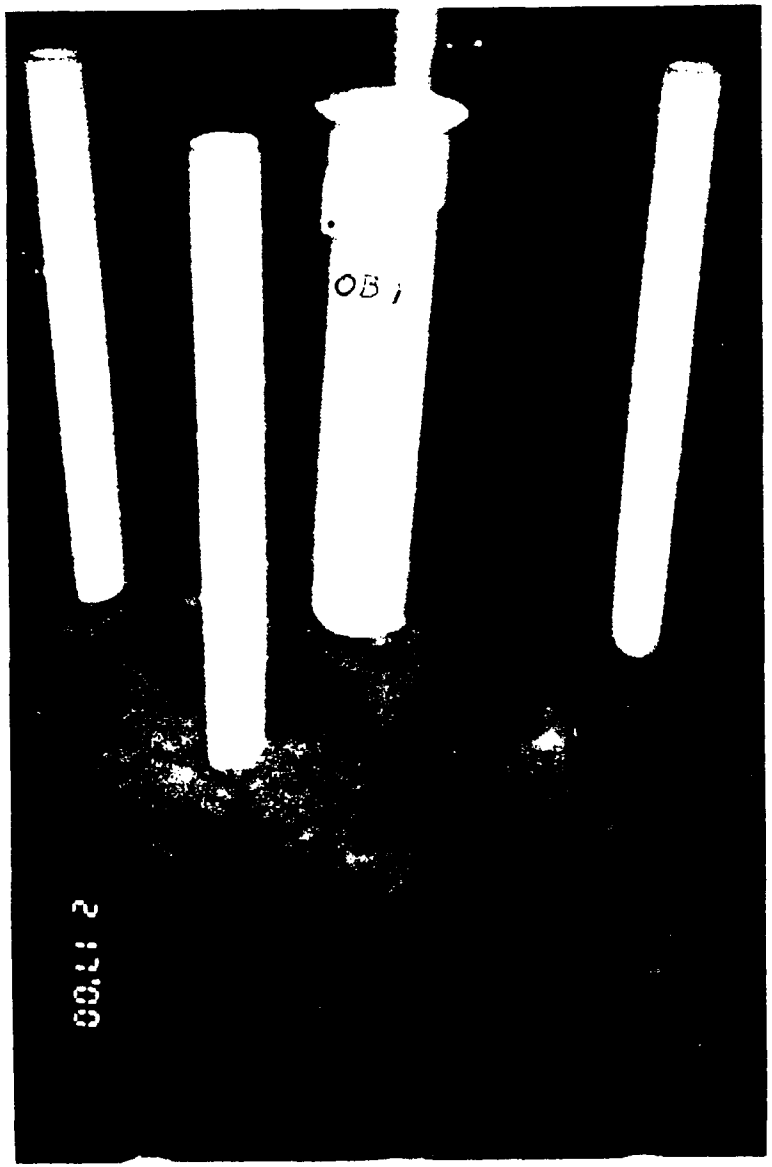


MW 20D
February 17, 2000

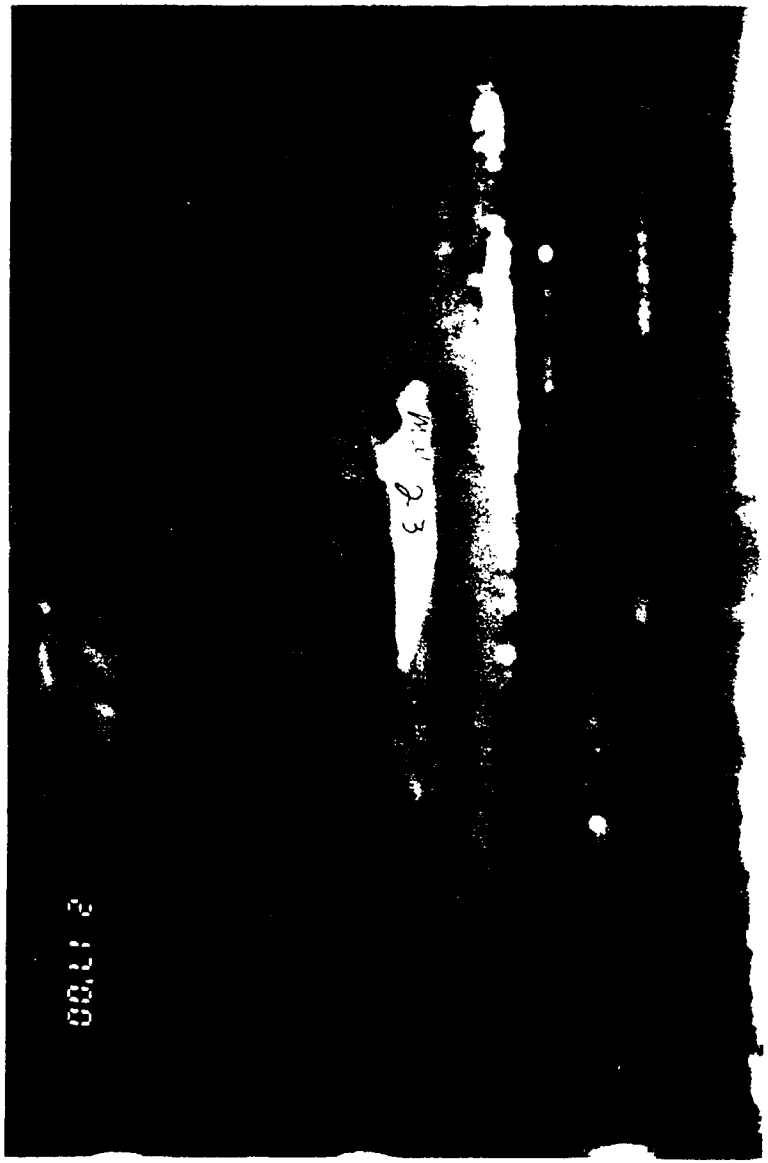
MW 20S
February 17, 2000

MW 21S
February 17, 2000

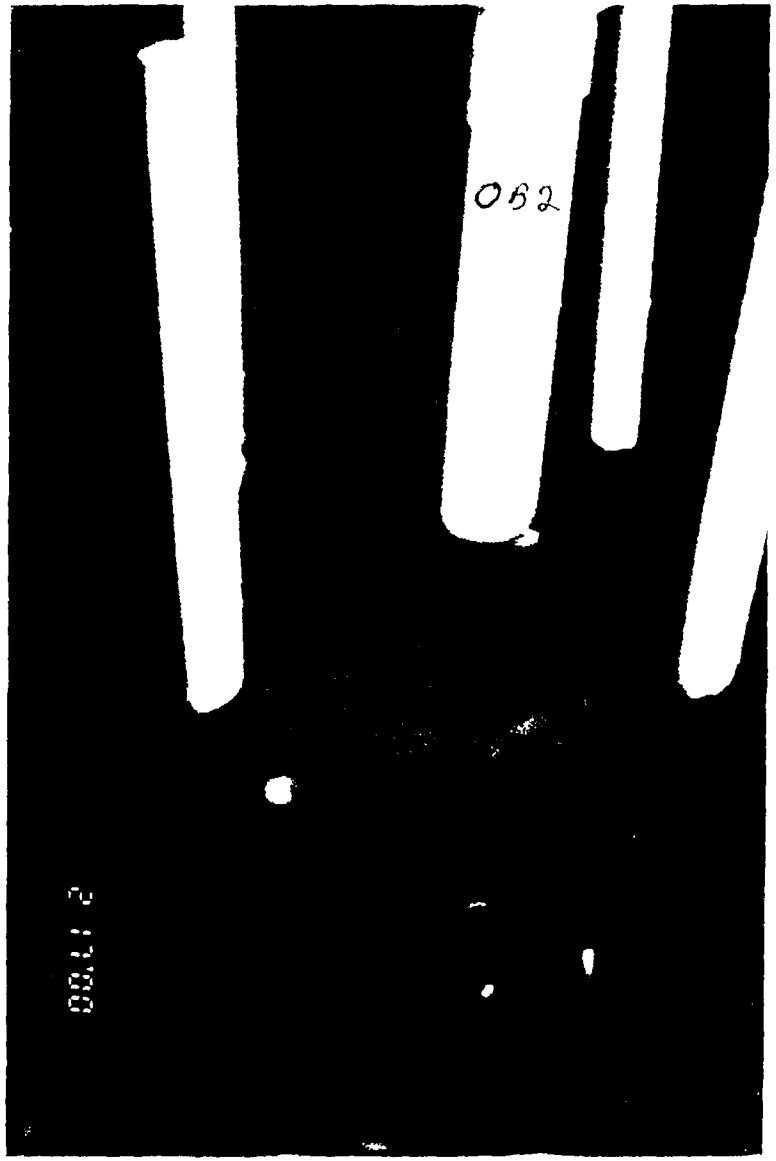
MW 21D
February 17, 2000



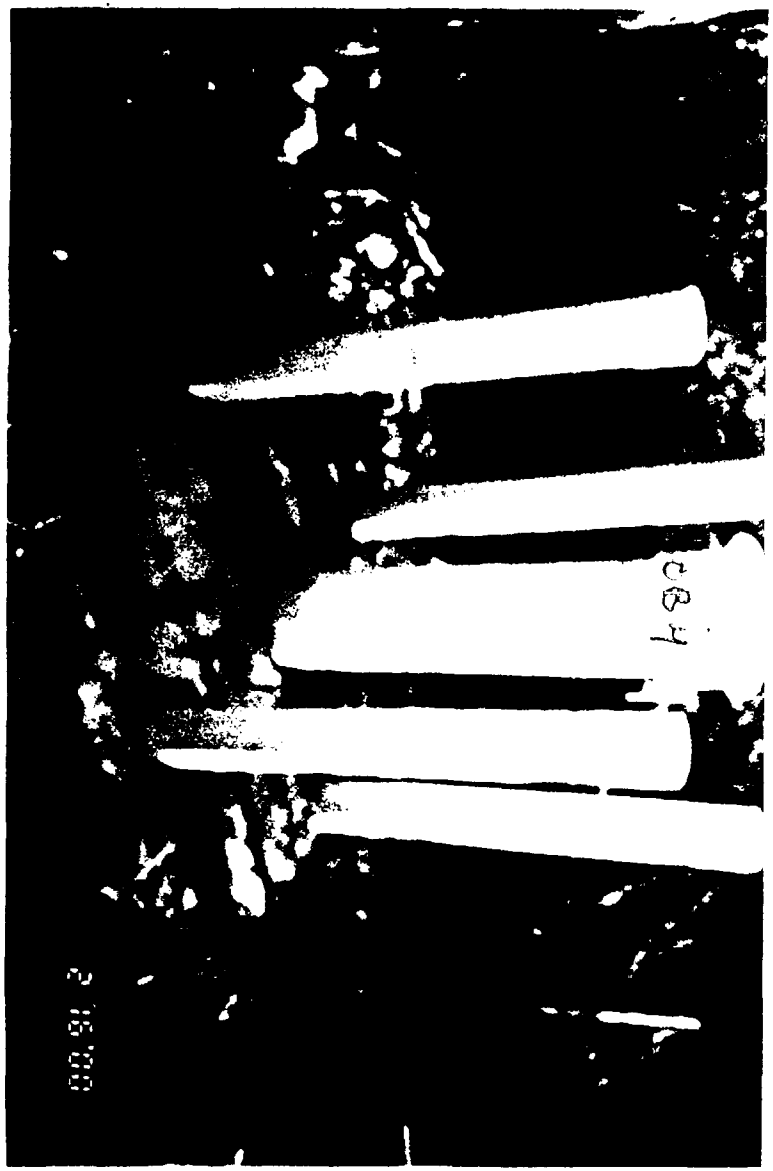
MW OB1
February 17, 2000



MW 23
February 17, 2000

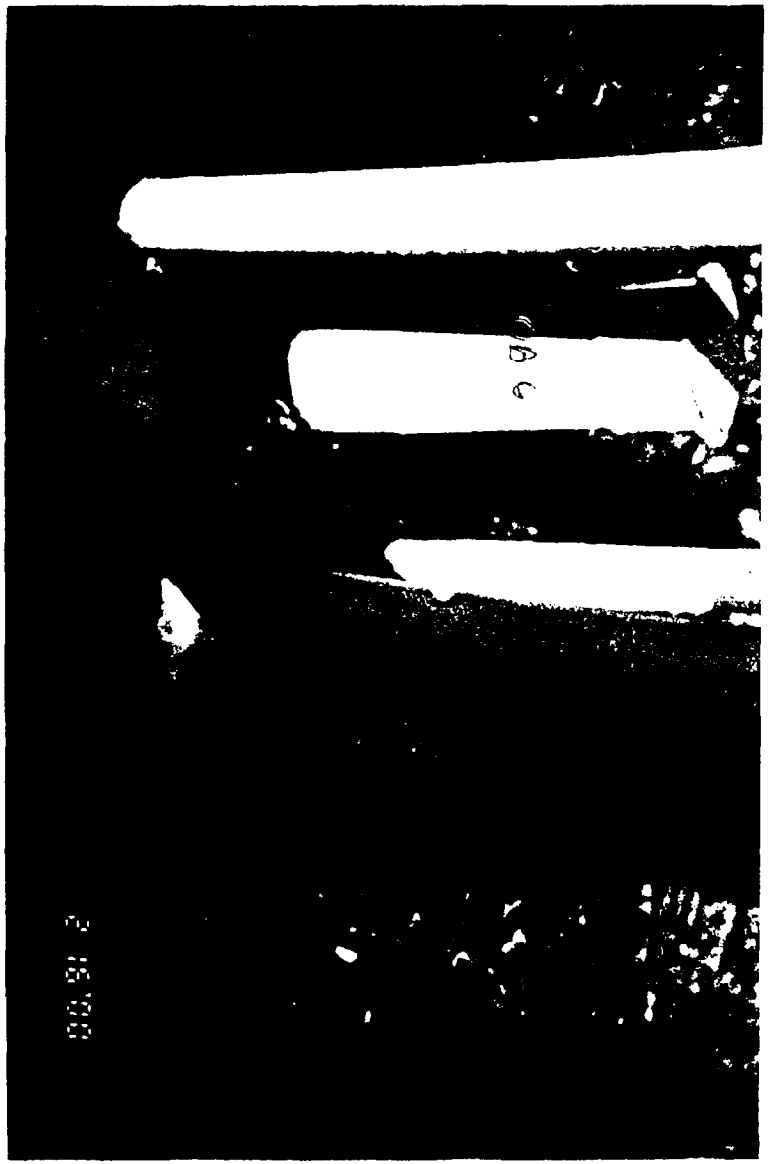


MW OB2
February 17, 2000

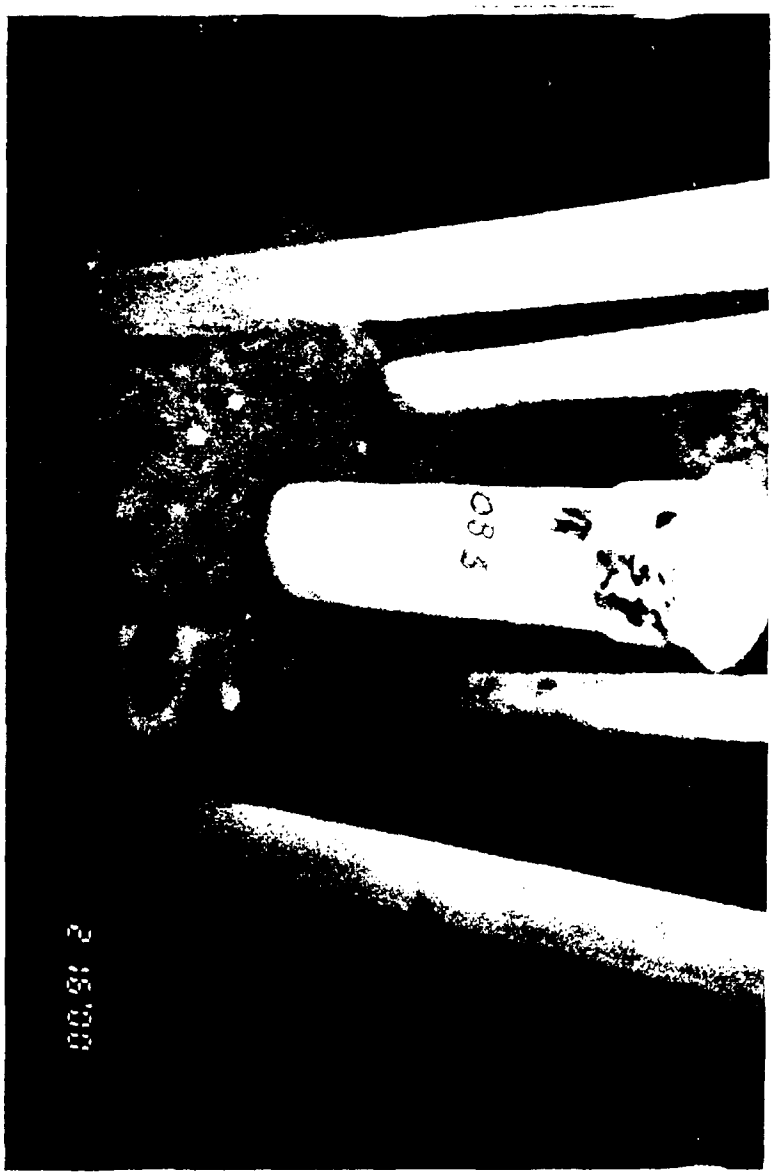


MW OB4
February 16, 2000

MW OB3
February 17, 2000



MW OB6
February 16, 2000



MW OB5
February 16, 2000

MW OB8
February 17, 2000

MW OB7
February 17, 2000

OLD WELL
February 17, 2000

APPENDIX E.

LIST OF COMMON ACRONYMS AND ABBREVIATIONS

EPA	Environmental Protection Agency
FIR	Field Inspection Report
OVA	organic vapor analyzer
POC	point of contact
RCRA	Resource Conservation and Recovery Act
SVOC	Semi- volatile organic compound
TAL	Target Analyte List
TCL	Target Compound List
USACE	U. S. Army Corps of Engineers
VOC	volatile organic compound

APPENDIX F.

REFERENCES

U.S. Environmental Protection Agency. 1997. *EPA Requirements for Quality Assurance Project Plans*. EPA QA/R-5. Washington, DC: USEPA Quality Staff.

U.S. Army Corps of Engineers. 1994. *Requirements for the Preparation of Sampling and Analysis Plans*. EM 200-1-3. Washington, DC: USACE.