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399

**FINAL REPORT FOR THE FMPC OUTFALL
LINE AIR TESTING REVISION 1 JUNE 1990**

06-01-90

THETA/WMCO

38

REPORT

**Final Report
for the
FMPC Outfall Line Air Testing
Revision 1**

**Feed Materials Production Center (FMPC)
Fernald, Ohio**



June 1990

**U. S. DEPARTMENT OF ENERGY
OAK RIDGE OPERATIONS OFFICE**

**Prepared by: Theta Technologies, Inc.
For Westinghouse Materials Company of Ohio**



From: J. P. Finley

THETA: 308

Date: June 20, 1990

**Subject: OUTFALL LINE AIR TESTING
FINAL REPORT - Revision 1**

To: J. P. Hopper, WMCO

This letter formally transmits Theta Technologies' final report (revision 1) for the air testing of the FMPC outfall line. The testing was performed on Saturday, June 16, 1990 in accordance with the Site-Specific Health and Safety Plan previously transmitted to you on April 26, 1990 and the NASSCO specification required by the Scope of Work (Recommended Specifications for Sewer Collection System Rehabilitation, Section 12.11, page 47). This was the second round of testing of the outfall line, undertaken after procedures followed and data collected during the first round of testing (April 28, 1990) proved to be inadequate. Testing was performed without any additional cost to WMCO.

The first four of the seven outfall line segments (MH-175 to MH-179) were retested during this second round. Segment 5 (MH-179 to MH-180) was not retested because it had obviously failed (i.e. would not pressurize) during the first round of testing. Segment 6 (MH-180 to MH-181) also was not retested because it had obviously passed during the first round of testing.

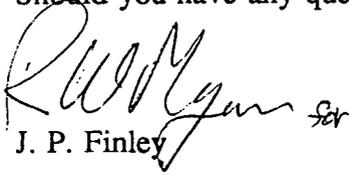
Segment 7 (MH-181 to the Great Miami River) remains untested due to river conditions and the location of the outfall in the river. During the first round of testing, the diver was unable to locate the end of the pipe in the river. After searching the river channel bottom 25-30 lineal feet from the end of the visible riprap and being unsuccessful in that search, it became apparent that the outfall pipe was most likely buried within the submerged riprap. Alternate plans are now being formulated to test this last segment.

The results of the second round of testing confirm the conclusions of the first round, i.e. five of the six pipeline segments tested passed with one segment (MH-179 to MH-180) failing. The following documents are included to confirm these findings:

1. Advanced Companies final report
2. Copies of photographs of the testing procedures

Theta's testing subcontractor, of their own volition, conducted and recorded a video inspection of the failing Segment 5. Copies of the video inspection report and the VHS video tape will be provided to WMCO under separate cover.

Should you have any questions, please call myself or Bob Myers of this office.


J. P. Finley

Attachments

- cc: G. J. Brown, WMCO
- D. J. Carr, WMCO
- W. E. Mayer, Advanced Companies
- R. W. Myers, Theta
- R. S. Shirley, WMCO
- ERA Project Files
- AR Files
- Central Files

Prepared



Exclusively
for

JUN 20 1990

Theta Technologies Inc. Fairfield, Ohio

June 1990

FMPC Outfall Line Air Testing Report

Preparer: William E. Mayer
Vice President of Operations

American Test & Seal

3220 Profit Dr.
Fairfield, Ohio 45014

4

June 19, 1990

To: Robert Myers
Sr. Management Control Analyst

From: William E. Mayer
Vice President of Operations

RE: FMPC Outfall Line Air Test (report)
Contract No. 90-01-5308-44
Subcontract No. 2-97565

Introduction

The following report is being filed as required by contract noted above.

This report will provide documentation of our test and the resultant findings, as called for within the Scope of Work. The individual line segment field reports enclosed, will outline our procedure as the specifications required under the NASSCO (National Association of Sewer Service Companies) guidelines.

See enclosed pages from NASSCO handbook relative to "Air Testing" procedure. Also included are trade references which adhere to these specifications and guidelines.

The report will be broken down into four sections which are noted below.

- I. Written Report with Field Reports and Recommendations
- II. Equipment Utilized & Personnel
- III. Confined Space Entry Permits
- IV. Radiological Survey Reports

Air Test
References

The NASSCO criteria is a nationally accepted basis for the "Air Testing" of sewer lines. The following references utilize the services of American Test and Seal to perform this test according to the noted specifications.

City of Fairfield
Mr. Larry Ceasar, Inspector
(513) 867-5300

Butler County Sewer & Water Inspection
Mr. Elmer Meyers
(513) 887-3061

INTRODUCTION

These recommended specifications were prepared by the National Association of Sewer Service Companies (NASSCO) in response to requests from engineering firms, municipalities, and other organizations concerned with sewer collection system maintenance and rehabilitation. The recommended specifications are intended to assist engineers and municipal officials to properly specify sewer rehabilitation work and thereby obtain desired long-lasting results.

NASSCO has also published its Inspector Handbook for Sewer Collection System Rehabilitation. The handbook is intended to educate and assist inspectors in all phases of sewer maintenance and rehabilitation. The 90-page handbook covers the intent, conditions for proper application, equipment, materials, advantages, limitations, precautions, difficulty factors, inspection requirements, and final acceptance criteria for each rehabilitation procedure. It represents NASSCO's continuing effort to promote effective procedures and quality performance standards throughout the sewer rehabilitation industry.

NASSCO Inspector Handbooks are available at \$42.50 per copy prepaid ... Add \$10 per order if invoicing is required. Price includes taxes and shipping. Order by mail from NASSCO, 101 Wymore Rd., Suite 521, Altamonte, FL 32714.



All statements and data given herein are believed to be accurate and reliable but are presented without guaranty, warranty, or responsibility of any kind, express or implied. Statements or suggestions concerning possible use of products or procedures are made without representation or warranty that any such use or procedure is free of patent infringement. The user should not assume that all safety measures are indicated or that other measures may not be required.

12.11 Final Acceptance: After installation of the liner, the Contractor shall at the option of the Owner's Representative either TV inspect the sewer line as specified or perform a test on the sewer line as specified below.

Testing: After installation and before any service connections are reinstated, the Contractor shall run a test on the sewer line to determine if it is watertight.

The Contractor shall furnish all necessary equipment to conduct the test. An acceptable method is a low-pressure air test, conducted as follows:

Pressurize the test section to 4.0 psi and hold above 3.5 psi for not less than 2 minutes. Add air if necessary to keep the pressure above 3.5 psi. At the end of this 2-minute stabilization period, note the pressure (must be 3.5 psi minimum) and begin the timed period. If the pressure drops 0.5 psi in less than the time given in the table below, the section of pipe shall have failed the test.

When the prevailing groundwater is above the sewer being tested, test pressure shall be increased 0.43 psi for each foot that the water table is above the invert of the sewer.

Sewer Size (Inches)	Minimum Test Time (Minutes)
4	2
6	3
8	4
10	5
12	6
15	7-1/2
18	9
21	10-1/2
24	12
27	13-1/2
30	15
36	18
42	21
48	24
54	27

If the time for the pressure to drop 0.5 psi is 125 percent or less of the time given in the table, the line shall immediately be repressurized to 3.5 psi and the test repeated.

If building sewers have been reinstated before the air test, they shall be considered part of the pipe to which they are connected and no adjustment of test time shall be allowed.

The pressure gage used shall be supplied by the Contractor and have minimum divisions of 0.10 psi.

Section I

*Written Report with Field
Reports & Recommendations*

FMPC Outfall Line Air-Test

Report

Sewer Line Composition: 16" Diameter Ductile Iron Pipe
(AWWA standard centrifugal cast iron pipe, bell and spigot fittings, class 160, Fed. STD WW-P-421)

Manhole Composition: Concrete (various sizes)
With gunite rehabilitative coating

AMERICAN TEST & SEAL
AIR-TEST FORM
FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 6/16/90
Line Segment No. : 1 Test No.: 3
Manhole No. : 175 To Manhole No. : 176
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 528.03 ft.

Stabilization

- 1. Stabilization Time: 2 minutes
- 2. Length of Time to Pressurize Segment(initially): 2 : 30 minutes
- 3. Pressure @ Compressor Shutdown: 4.3 PSI
- 4. Pressure After Stabilization Period: 3.8 PSI
- 5. Air Added During Stabilization? N (Y/N) If yes, explain below.

Test

- 6. Test Time: 8 minutes
- 7. Pressure @ Start: 3.8 PSI (Same as No. 4. above)
- 8. Pressure @ 100% of Test Time (8 minutes) 3.4 PSI
- 9. Elapsed Time for 0.5 PSI Pressure Drop: _____ minutes (If Test Failed)
- or
- 10. Pressure @ 125% of Test Time (10 minutes): 3.3 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

The necessity to test this line segment 3 times was due to the fact that the dead-end plug would not seat properly. This was caused by excess gunite sprayed into line during manhole rehabilitation. After insertation of a different type plug (Sealco) the test could be conducted. The results of this test are noted above and provides the documentation that virtually no exfiltration exists in this segment.

As Witnessed By:

Actual signed copies in records of Theta Technologies.

Gordon J. Brown Jr. (WMCO)
Robert Myers (Theta)

William Humphrey (Theta)
William Mayer (ATS)

AMERICAN TEST & SEAL
AIR-TEST FORM
FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 6/16/90
Line Segment No. : 2 Test No.: 4
Manhole No. : 176 To Manhole No. : 177
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 227.15 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment(initially): 36 sec. minutes
3. Pressure @ Compressor Shutdown: 4.1 PSI
4. Pressure After Stabilization Period: 3.7 PSI
5. Air Added During Stabilization? Y (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: 3.7 PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes) 3.2 PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: 8 minutes (If Test Failed)
or
10. Pressure @ 125% of Test Time (10 minutes): 3.05 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

To facilitate proper stabilization within this line segment .6 PSI was added. Difficulty with the seating of test plugs due to gunite residue in the line made it necessary to re-set the plugs 4 times. It was necessary to dislodge some of the gunite before proper seating could be facilitated. The results of this test provided that even though line segment passed that a retest needed to be undertaken for verification. See page note test No. 5 verification.

As Witnessed By:

Actual signed copies in records of Theta Technologies.

Gordon J. Brown Jr. (WMCO)

William Humphrey (Theta)

Robert Myers (Theta)

William E. Mayer (ATS)

AMERICAN TEST & SEAL AIR-TEST FORM FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 6/16/90
Line Segment No.: 2 Test No.: 5 verification
Manhole No.: 176 To Manhole No.: 177
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 227.15 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment(initially): 10 sec. minutes
3. Pressure @ Compressor Shutdown: 4.2 PSI
4. Pressure After Stabilization Period: 3.8 PSI
5. Air Added During Stabilization? N (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: 3.8 PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes) 3.3 PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: _____ minutes (If Test Failed)
or
10. Pressure @ 125% of Test Time (10 minutes): 3.2 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

It only took 10 sec. to pressurize line as it already had 3 PSI remaining from previous test. No air was added to facilitate stabilization during this verification test. The results provided by this re-test verify that the line segment is stable and document that virtually no ex-filtration exists.

As Witnessed By:

Actual signed copies in records of Theta Technologies.

Gordon J. Brown Jr. (WMCO)
Robert Myers (Theta)

William Humphrey (Theta)
William E. Mayer (ATS)

AMERICAN TEST & SEAL AIR-TEST FORM FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 6/16/90

Line Segment No. : 3

Test No.: 1

Manhole No. : 177

To Manhole No. : 178

Pipe Size: 16"

Pipe Composition: Ductile Iron

Length of Line Segment: 254.82 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment(initially): 45 sec. minutes
3. Pressure @ Compressor Shutdown: 4.2 PSI
4. Pressure After Stabilization Period: 3.5 PSI
5. Air Added During Stabilization? N (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: 3.5 PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes) 3.2 PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: _____ minutes (If Test Failed)
- or
10. Pressure @ 125% of Test Time (10 minutes): 3.1 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

No significant plug insertion difficulties were noted in this line segment. Gunite residue was still present in the line but did not inhibit the test. The results of this test are noted above and provides the documentation that virtually no ex-filtration exists in this segment. In manhole No. 178 on the downstream side a leak was noted at the top of pipe on wall.

As Witnessed By:

Actual signed copies in records of Theta Technologies.

Gordon J. Brown Jr. (WMCO)

William Humphrey (Theta)

Robert Myers (Theta)

William E. Mayer (ATS)

AMERICAN TEST & SEAL
AIR-TEST FORM
FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 6/16/90
Line Segment No. : 4 Test No.: 2
Manhole No. : 178 To Manhole No. : 179
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 530.00 ft.

Stabilization

- 1. Stabilization Time: 2 minutes
- 2. Length of Time to Pressurize Segment(initially): 1 : 20 minutes
- 3. Pressure @ Compressor Shutdown: 4.1 PSI
- 4. Pressure After Stabilization Period: 3.6 PSI
- 5. Air Added During Stabilization? N (Y/N) If yes, explain below.

Test

- 6. Test Time: 8 minutes
- 7. Pressure @ Start: 3.6 PSI (Same as No. 4. above)
- 8. Pressure @ 100% of Test Time (8 minutes) 3.3 PSI
- 9. Elapsed Time for 0.5 PSI Pressure Drop: _____ minutes (If Test Failed)
or
- 10. Pressure @ 125% of Test Time (10 minutes): 3.3 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

It was necessary to test this line segment 2 times because the plugs had to be re-set due to the gunite residue in line. After re-insertion the test could be conducted and a conclusion achieved. The results of this test are noted above and provides the documentation that virtually no ex-filtration exists in this segment.

As Witnessed By:

Actual signed copies in records of Theta Technologies.

Gordon J. Brown (WMCO)
Robert Myers (Theta)

William Humphrey (Theta)
William E. Mayer (ATS)

AMERICAN TEST & SEAL AIR-TEST FORM FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 4/28/90
Line Segment No.: 5 Test No.: 1
Manhole No.: 179 To Manhole No.: 180
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 278.69 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment (initially): minutes
3. Pressure @ Compressor Shutdown PSI
4. Pressure After Stabilization Period: 3.1 PSI
5. Air Added During Stabilization? (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: 3.1 PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes) PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: minutes (If Test Failed)
or
10. Pressure @ 125% of Test Time (10 minutes): PSI (If Test Passed)

Segment Status: FAILED

Note/Comments:

During the previous test conducted on April 28th this line segment could not be pressurized to the designated NASSCO specifications. A re-test was attempted but the same results were noted. Line would not exceed 3.1 PSI during both pressurization attempts, this line segment is suspect to its stability and ex-filtration is very likely.

As Witnessed By:

AMERICAN TEST & SEAL AIR-TEST FORM FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 4/28/90
Line Segment No. 6 Test No.: 1
Manhole No. 180 To Manhole No.: 181
Pipe Size: 16" Pipe Composition: Ductile Iron
Length of Line Segment: 1423.20 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment (initially): 42 minutes
3. Pressure @ Compressor Shutdown: 4 PSI
4. Pressure After Stabilization Period: 3.7 PSI
5. Air Added During Stabilization? N (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: 3.7 PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes): 3.7 PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: _____ minutes (If Test Failed)
- or
10. Pressure @ 125% of Test Time (10 minutes): 3.7 PSI (If Test Passed)

Segment Status: PASSED

Note/Comments:

During the previous test conducted on April 28th this line segment was pressurized to 4 PSI and stabilized to 3.7 PSI. Throughout a total of 27 minutes the line segment held at 3.7 PSI thus no drop could be noted. This time period far exceeded NASSCO guidelines of 8 minutes. The results of this test are noted above and provides the documentation that virtually no ex-filtration exists in this segment.

As Witnessed By:

AMERICAN TEST & SEAL AIR-TEST FORM FMPC OUT FALL PIPELINE

All NASSCO guidelines and specifications are to be followed explicitly throughout the test.

Test Date: 4/28/90
Line Segment No.: 7 Test No.: 1
Manhole No.: 181 To Manhole No.: River Out-fall point
Pipe Size: 16" Pipe Composition: Cast Iron
Length of Line Segment: 1160.95 ft.

Stabilization

1. Stabilization Time: 2 minutes
2. Length of Time to Pressurize Segment(initially): minutes
3. Pressure @ Compressor Shutdown: PSI
4. Pressure After Stabilization Period: PSI
5. Air Added During Stabilization? (Y/N) If yes, explain below.

Test

6. Test Time: 8 minutes
7. Pressure @ Start: PSI (Same as No. 4. above)
8. Pressure @ 100% of Test Time (8 minutes) PSI
9. Elapsed Time for 0.5 PSI Pressure Drop: minutes (If Test Failed)
or
10. Pressure @ 125% of Test Time (10 minutes): PSI (If Test Passed)

Segment Status: NOT TESTED

Note/Comments:

On April 28th no test could be conducted on this segment as the diver could not locate the end of the outfall line. The protective "Rip Rap" which protruded twenty five feet into the Great Miami River did not allow for the end of the line to remain exposed. This precluded any placement of a plug to facilitate the test. The end of the outfall line was determined to be buried under the "Rip Rap".

As Witnessed By:

Recommendations

- A. In segment No. 5, which failed the air testing, it is recommended that a T.V. inspection be made of that portion of pipeline. At the conclusion of that inspection, a rehabilitative measure can be recommended. There are several potential remedies that could be utilized which would achieve a solution to the problem without excavation or disruption to the environment. Upon the conclusion of this rehabilitation in segment No. 5, another air test should be conducted to prove soundness of the line.

- B. Rehabilitative measures should be undertaken in Manhole No. 178 to address the leak noted on the field report for line segment No. 3.

Section II

*Equipment Utilized
&
Personnel*

Equipment Utilized

Seal Co Inc.
Air Testing Equipment
Meter & Gauges

American Logiball Inc.
Sewer Plugs 9 to 16 in.
Test & Dead End

Sealco Inc.
Sewer Plug 15 to 18 in.
Test Plug

Sealco Inc.
Sewer Plug 15 to 18 in.
Dead End Plug

Misc. Support Equipment

Personnel

Bill Mayer - Vice President of Operations
Randall Turner - Field Superintendent
Arnold Huber - Field Technician
James Meadows - Field Laborer
John Jentgen - Diver
John Barker - Tender

Section III

Confined Space Entry Permits

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: **19606**

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME
 DATE: **6-16-90** TIME: **8:00**

C. EXPIRATION DATE & TIME
 DATE: **6-16-90** TIME: **1900**

D. EXACT LOCATION: **MH 175** E. EQUIPMENT: **Manhole**

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: **Inspection**

G. EMPLOYEE(S) ASSIGNED TO JOB: **JAMES C. MEADOWS**
ARNOLD L. HUBER

H. SUPERVISOR(S)/WMCO PROJECT ENGINEER: **G. BROWN**

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL

RADIATION (Copy to be attached) CONFINED SPACE ENTRY

OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	✓	
2. Nuclear Safety checks completed	✓	
3. Lock & Tag Procedures required and followed	✓	
4. Water in space has been collected and sampled		✓
5. Complete isolation of process lines to space has been completed	✓	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	✓	
7. Electrical isolation complete for Lock & Tag Procedure	✓	
8. All lines within space have been cleaned and purged	✓	

Equipment is safe and ready for work (FACILITY OWNER'S SIGNATURE):
 [Redacted Signature]

BADGE NO.: **534** DATE: **6-16-90** TIME: **0800**

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	✓		
Acid Splash Suit	✓		
Gloves	✓		
Respiratory Protection (consult with IH rep.)			
Flame Retardant Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	✓		

OTHER PROTECTION REQUIREMENTS:
11

[Redacted Signature] BADGE NO.: **7231** DATE: **6/16/90**

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions			

[Redacted Signature] BADGE NO.: **534** DATE: **016-91**

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NO.	DESCRIPTION
1	POST AT JOB
2	SUPERVISOR-IN-CHARGE
3	IH&S (RECORD) (COPY)

SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
0905	21.0%	0905	0%	0905	3.0 - CO
				0905	0.0 - H ₂ S

PRECAUTIONS TAKEN/NEEDED

	YES	NO	DNA
1. Forced ventilation required			✓
2. Work requires staging or ladder	✓		
3. Ground Fault Interrupting protection required	✓		
4. Adequate/proper illumination required	✓		
5. Standby notified what action to take	✓		
6. Safety line and harness required	✓		✓
7. Nonsparking tools required	✓		✓
8. Periodic gas testing required	✓		✓

STANDBY-WORKER COMMUNICATION: **VOICE / VISUAL**

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

[Redacted Signature] BADGE NO.: **7144** DATE: **6-16-90** TIME: **0905**

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardant tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:
EQUIPMENT/AREA CHECKED:
SPECIAL INSTRUCTIONS/PRECAUTIONS:

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND

[Redacted Signature] BADGE NO.: **7231** DATE: **6/16/90**

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: 19607

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO.: _____ B. STARTING DATE & TIME
 DATE: 6-16-90 TIME: 8:00 C. EXPIRATION DATE & TIME
 DATE: 6-16-90 TIME: 19:00

D. EXACT LOCATION: MH 176 E. EQUIPMENT: _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: Inspection

G. EMPLOYEE(S) ASSIGNED TO JOB: James C. Meadows BADGE NO.: _____ H. SUPERVISOR(S)/WMCO PROJECT ENGINEER:
Arnold L. Huber G. Brown

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL
 RADIATION (Copy to be attached) CONFINED SPACE ENTRY
 OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	✓	
2. Nuclear Safety checks completed	✓	
3. Lock & Tag Procedures required and followed	✓	
4. Water in space has been collected and sampled		✓
5. Complete isolation of process lines to space has been completed	✓	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	✓	
7. Electrical isolation complete for Lock & Tag Procedure	✓	
8. All lines within space have been cleaned and purged	✓	

Equipment: _____ (PROPERTY OWNER'S SIGNATURE): _____

BADGE NO.: 534 DATE: 6-16-90 TIME: 0900

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	✓		
Acid Splash Suit			
Gloves	✓		
Respiratory Protection (consult with IH rep.)			
Flame Retardant Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	✓		

OTHER PROTECTION REQUIREMENTS: _____

BADGE NO.: 7231 DATE: 6/16/90

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions:			

BADGE NO.: 537 DATE: 6-16-90

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SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
0850	21.0%	0850	0%	0850	1.0 - CO
				0850	0.0 - H ₂ S

PRECAUTIONS TAKEN/NEEDED

	YES	NO	DNA
1. Forced ventilation required			✓
2. Work requires staging or ladder	✓		
3. Ground Fault Interrupting protection required	✓		
4. Adequate/proper illumination required	✓		
5. Standby notified what action to take	✓		
6. Safety line and harness required	✓		
7. Nonsparking tools required			✓
8. Periodic gas testing required			✓

STANDBY-WORKER COMMUNICATION: VOICE / VISUAL

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

IHM: _____ BADGE NO.: 7144

PERMIT ISSUED DATE: 6-16-90 TIME: 0853

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardant tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS: _____

EQUIPMENT/AREA CHECKED: _____

SPECIAL INSTRUCTIONS/PRECAUTIONS: _____

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND

BADGE NO.: 7231 DATE: 6/16/90

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: **19608**

399

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME
 DATE: **6-16-90** TIME: **8:00** C. EXPIRATION DATE & TIME
 DATE: **6-16-90** TIME: **12:00**

D. EXACT LOCATION: **MH 177** E. EQUIPMENT: _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: **Inspection**

G. EMPLOYEE(S) ASSIGNED TO JOB: **James Meacham, Arnold Huber** BADGE NO. _____ H. SUPERVISOR(S)/WMCO PROJECT ENGINEER: **G. Brown**

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL
 RADIATION (Copy to be attached) CONFINED SPACE ENTRY
 OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	✓	
2. Nuclear Safety checks completed	✓	
3. Lock & Tag Procedures required and followed	✓	
4. Water in space has been collected and sampled		
5. Complete isolation of process lines to space has been completed	✓	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	✓	
7. Electrical isolation complete for Lock & Tag Procedure	✓	
8. All lines within space have been cleaned and purged	✓	

CILITY OWNER'S SIGNATURE: _____
 BADGE NO. **537** DATE: **6-16-90** TIME: **8:00**

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	✓		
Acid Splash Suit			
Gloves	✓		
Respiratory Protection (consult with IH rep.)			
Flame Retardent Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	✓		

OTHER PROTECTION REQUIREMENTS: _____
 CILITY OWNER'S SIGNATURE: _____
 BADGE NO. **7231** DATE: **6/16/90**

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions:			

CILITY OWNER'S SIGNATURE: _____
 BADGE NO. **537** DATE: **6-16-90**

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SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
1135	21.1%	1135	0%	1135	0.0 - CO
				1135	0.0 - H ₂ S

PRECAUTIONS TAKEN/NEEDED

	YES	NO	DNA
1. Forced ventilation required			✓
2. Work requires staging or ladder	✓		
3. Ground Fault Interrupting protection required	✓		
4. Adequate/proper illumination required	✓		
5. Standby notified what action to take	✓		
6. Safety line and harness required	✓		
7. Nonsparking tools required	✓		
8. Periodic gas testing required	✓		

STANDBY-WORKER COMMUNICATION: **VOICE / VISUAL**

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

PERMIT ISSUED DATE: **6-16-90** TIME: **1135**

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardent tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:

EQUIPMENT/AREA CHECKED: _____

SPECIAL INSTRUCTIONS/PRECAUTIONS: _____

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND FOUND ACCEPTABLE FOR USE

CILITY OWNER'S SIGNATURE: _____
 BADGE NO. **7231** DATE: **6/16/90**

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: 19609

399

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME: DATE: 6-16-90 TIME: 8:00 C. EXPIRATION DATE & TIME: DATE: 6-16-90 TIME: 9:00

D. EXACT LOCATION: MH 178 E. EQUIPMENT: _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: Inspection

G. EMPLOYEE(S) ASSIGNED TO JOB: James Meadows BADGE NO.: _____ H. SUPERVISOR(S)/WMCO PROJECT ENGINEER: R. Brown
Arnold Huber

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL

RADIATION (Copy to be attached) CONFINED SPACE ENTRY

OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	/	
2. Nuclear Safety checks completed	/	
3. Lock & Tag Procedures required and followed	/	
4. Water in space has been collected and sampled	/	
5. Complete isolation of process lines to space has been completed	/	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	/	
7. Electrical isolation complete for Lock & Tag Procedure	/	
8. All lines within space have been cleaned and purged	/	

Equipment is safe and ready for work (FACILITY OWNER'S SIGNATURE): _____

BADGE NO. 537 TIME: 6:16-90 0900

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	/		
Acid Splash Suit	/		
Gloves	/		
Respiratory Protection (consult with IH rep.)			
Flame Retardant Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	/		

OTHER PROTECTION REQUIREMENTS: _____

BADGE NO.: 7231 DATE: 6/16/90

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN

	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions:			

BADGE NO.: 537 DATE: 6/16/90

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SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
1330	21.1%	1330	0%	1330	2.0 - CO
				1330	0.0 - H ₂ S

PRECAUTIONS TAKEN/NEEDED

	YES	NO	DNA
1. Forced ventilation required			/
2. Work requires staging or ladder	/		
3. Ground Fault Interrupting protection required	/		
4. Adequate/proper illumination required	/		
5. Standby notified what action to take	/		
6. Safety line and harness required			/
7. Nonsparking tools required			/
8. Periodic gas testing required			/

STANDBY-WORKER COMMUNICATION: Voice/Visual

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

PERMIT ISSUED DATE: 6-16-90 BADGE NO.: 7144 TIME: 1330

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardant tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:

EQUIPMENT/AREA CHECKED:

SPECIAL INSTRUCTIONS/PRECAUTIONS: _____

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND USE

BADGE NO.: 7231 DATE: 6/16/90

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: 19610

399

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME
 DATE: 6-16-90 TIME: 8:00 C. EXPIRATION DATE & TIME
 DATE: 6-16-90 TIME: 19:00

D. EXACT LOCATION: MH179 E. EQUIPMENT _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: Inspection

G. EMPLOYEE(S) ASSIGNED TO JOB: James Meadows, Arnold Huber BADGE NO. _____ H. SUPERVISOR(S)/WMCO PROJECT ENGINEER: C. Brown

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL
 RADIATION (Copy to be attached) CONFINED SPACE ENTRY
 OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	✓	
2. Nuclear Safety checks completed	✓	
3. Lock & Tag Procedures required and followed	✓	
4. Water in space has been collected and sampled		✓
5. Complete isolation of process lines to space has been completed	✓	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	✓	
7. Electrical isolation complete for Lock & Tag Procedure	✓	
8. All lines within space have been cleaned and purged	✓	

Equipment is safe and ready for work (FACILITY OWNER'S SIGNATURE): _____

BADGE NO.: 534 DATE: 6-16-90 TIME: 0900

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	✓		
Acid Splash Suit			
Gloves	✓		
Respiratory Protection (consult with IH rep.)	✓		
Flame Retardent Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	✓		

OTHER PROTECTION REQUIREMENTS: _____

BADGE NO.: 7231 DATE: 6/16/90

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions			

FACILITY OWNER'S SIGNATURE: _____ BADGE NO.: 537 DATE: 6/16/90

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SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
1400	21.1%	1400	0%	1400	0.0 - CO
				1400	0.0 - H ₂ S

PRECAUTIONS TAKEN/NEEDED

PRECAUTIONS TAKEN/NEEDED	YES	NO	DNA
1. Forced ventilation required			✓
2. Work requires staging or ladder	✓		
3. Ground Fault Interrupting protection required	✓		
4. Adequate/proper illumination required	✓		
5. Standby notified what action to take	✓		
6. Safety line and harness required			✓
7. Nonsparking tools required			✓
8. Periodic gas testing required			✓

STANDBY-WORKER COMMUNICATION: Voice/Visual

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

BADGE NO.: 7144

PERMIT ISSUED DATE: 6-16-90 TIME: 1400

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardent tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS: _____

EQUIPMENT/AREA CHECKED: _____

SPECIAL INSTRUCTIONS/PRECAUTIONS: _____

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND FOUND ACCEPTABLE FOR USE

BADGE NO.: 7231 DATE: 6/16/90

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: 19611

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME
 DATE: 6-16-90 TIME: 8:00
 C. EXPIRATION DATE & TIME
 DATE: 6-16-90 TIME: 19

D. EXACT LOCATION: MH 180
 E. EQUIPMENT: _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: Inspection

G. EMPLOYEE(S) ASSIGNED TO JOB: Arnel Huber, James Meadors
 H. SUPERVISOR'S NAME: G. Brown, PROJECT ENGINEER

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached)
 RADIATION (Copy to be attached)
 CHEMICAL/HAZARDOUS MATERIAL
 CONFINED SPACE ENTRY
 OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged	✓	
2. Nuclear Safety checks completed	✓	
3. Lock & Tag Procedures required and followed	✓	
4. Water in space has been collected and sampled	✓	
5. Complete isolation of process lines to space has been completed	✓	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	✓	
7. Electrical isolation complete for Lock & Tag Procedure	✓	
8. All lines within space have been cleaned and purged	✓	

Equipment is safe and ready for work (FACILITY OWNER'S SIGNATURE)
 [Redacted Signature]

BADGE NO. 534 DATE: 6-16-90

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	✓		
Acid Splash Suit			
Gloves	✓		
Respiratory Protection (consult with IH rep.)			
Flame Retardent Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	✓		

OTHER PROTECTION REQUIREMENTS:
 [Redacted]

BADGE NO. 7231 DATE: 6/16/90

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions:			

BADGE NO. 534 DATE: 6/16/90

SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
1405	21.1%	1405	0%	1405	0.0-CO
				1405	0.0-H2S

PRECAUTIONS TAKEN/NEEDED

PRECAUTIONS TAKEN/NEEDED	YES	NO	DNA
1. Forced ventilation required			✓
2. Work requires staging or ladder	✓		
3. Ground Fault Interrupting protection required	✓		
4. Adequate/proper illumination required	✓		
5. Standby notified what action to take	✓		
6. Safety line and harness required			✓
7. Nonsparking tools required			✓
8. Periodic gas testing required			✓

STANDBY-WORKER COMMUNICATION: Voice/Visual

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

IH&S REPRESENTATIVE SIGNATURE: [Redacted] BADGE NO.: 7144
 PERMIT ISSUED DATE: 6-16-90 TIME: 1405

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

PRECAUTIONS VERIFIED	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardent tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:

EQUIPMENT/AREA CHECKED:

SPECIAL INSTRUCTIONS/PRECAUTIONS:

FIRE & SAFETY INSPECTOR SIGNATURE: [Redacted] BADGE NO.: _____
 PERMIT ISSUED DATE: _____ TIME: _____

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VIEWED AND APPROVED

[Redacted Signature] BADGE NO.: 7231 DATE: 6/16/90

FMPC WORK PERMIT

This work permit is to be completed in accordance with FMPC-516.

Work Permit Number: 19612

SECTION A - BACKGROUND INFORMATION (To be completed by supervisor-in-charge)

A. MAINTENANCE REQUEST NO. _____ B. STARTING DATE & TIME
 DATE: 6-16-90 TIME: 8:00 C. EXPIRATION DATE & TIME
 DATE: 6-16-90 TIME: 19:00

D. EXACT LOCATION: MH181
 E. EQUIPMENT: _____

EXACT DESCRIPTION OF WORK TO BE CONDUCTED: Inspection

G. EMPLOYEE(S) ASSIGNED TO JOB: James ~~Hofer~~ Meadows
Arnold Hofer BADGE NO.: _____ H. SUPERVISOR (S) NAME: B. Brown
 PROJECT ENGINEER:

SECTION B - TYPES OF PERMITS REQUIRED (Checked by supervisor-in-charge)

ASBESTOS (Copy to be attached) CHEMICAL/HAZARDOUS MATERIAL

RADIATION (Copy to be attached) CONFINED SPACE ENTRY

OPEN FLAME/WELDING

SECTION C - GENERAL PRECAUTIONS

ITEM	YES	NO
1. Equipment cleaned and purged		
2. Nuclear Safety checks completed	<input checked="" type="checkbox"/>	
3. Lock & Tag Procedures required and followed	<input checked="" type="checkbox"/>	
4. Water in space has been collected and sampled		
5. Complete isolation of process lines to space has been completed	<input checked="" type="checkbox"/>	
6. All mechanical equipment to the space have been tagged, disconnected and/or blocked	<input checked="" type="checkbox"/>	
7. Electrical isolation complete for Lock & Tag Procedure	<input checked="" type="checkbox"/>	
8. All lines within space have been cleaned and purged	<input checked="" type="checkbox"/>	

Equipment OWNER'S SIGNATURE: _____
 BADGE NO.: 534 DATE: 6-16-90 TIME: 0900

SECTION D - PERSONAL PROTECTIVE EQUIPMENT REQUIRED

EQUIPMENT	YES	NO	SPECIFY
Face Shield			
Hearing Protection			
Eye Protection	<input checked="" type="checkbox"/>		
Acid Splash Suit			
Gloves	<input checked="" type="checkbox"/>		
Respiratory Protection (consult with IH rep.)			
Flame Retardent Clothing			
Disposable Hood, Coveralls and Shoe Covers worn over Company-Issued Clothing	<input checked="" type="checkbox"/>		

OTHER PROTECTION REQUIREMENTS: _____

_____ BADGE NO.: 7231 DATE: 6/16/90

SECTION E - CHEMICAL/HAZARDOUS MATERIAL PERMIT

TYPE OF MATERIAL: _____ NAME OF MATERIAL(S): _____

PRECAUTION TAKEN

ITEM	YES	NO	DNA
1. Equipment and/or lines have been drained, flushed, purged, or neutralized			
2. Valves have been closed and locked (when feasible) and danger tagged			
3. Area isolated			
4. Safety shower is operable close to worksite			
5. Special clothing or other protective equipment required			
6. Special precautions:			

_____ BADGE NO.: 534 DATE: 6-16-90

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SECTION F - CONFINED SPACE ENTRY PERMIT (Valid for no more than 12 hours)

ATMOSPHERIC GAS TESTING RESULTS

OXYGEN CONTENT		COMBUSTIBLE GAS		TOXICITY	
TIME	READINGS	TIME	READINGS	TIME	READINGS
1410	21.1%	1410	0%	1410	0.0 - CO
				1410	0.0 - H2S

PRECAUTIONS TAKEN/NEEDED

ITEM	YES	NO	DNA
1. Forced ventilation required			<input checked="" type="checkbox"/>
2. Work requires staging or ladder	<input checked="" type="checkbox"/>		
3. Ground Fault Interrupting protection required	<input checked="" type="checkbox"/>		
4. Adequate/proper illumination required	<input checked="" type="checkbox"/>		
5. Standby notified what action to take	<input checked="" type="checkbox"/>		
6. Safety line and harness required			<input checked="" type="checkbox"/>
7. Nonsparking tools required			<input checked="" type="checkbox"/>
8. Periodic gas testing required			<input checked="" type="checkbox"/>

STANDBY-WORKER COMMUNICATION: Voice / Visual

SPECIAL INSTRUCTIONS: _____

TYPE OF CONFINED SPACE: CLASS A CLASS B CLASS C

PERMIT ISSUED DATE: 6-16-90 BADGE NO.: 7144 TIME: 1410

SECTION G - OPEN FLAME/WELDING PERMIT

PRECAUTIONS VERIFIED (within 35 feet of work)

ITEM	YES	NO	DNA
1. Combustibles, magnesium and uranium have been removed, covered or shielded.			
2. Flammable liquids have been removed or isolated.			
3. Wall and floor openings are covered or protected.			
4. A flame retardent tarp has been suspended underneath work.			
5. A combustible gas check has been made.			
6. (work on walls/ceilings) All combustibles have been removed from opposite sides.			
7. A Fire Watch will be required and will remain posted during breaks and for 30 minutes after work is completed.			
8. Fire Watch is supplied with an extinguisher and know-how to activate the nearest fire alarm.			
9. Fire & Safety Inspector shall be present during the burning operation.			
10. Fire & Safety Inspector shall be present to monitor when the system is initially opened.			

COMBUSTIBLE GAS TESTING RESULTS:

EQUIPMENT/AREA CHECKED:

SPECIAL INSTRUCTIONS/PRECAUTIONS: _____

FIRE & SAFETY INSPECTOR SIGNATURE: _____ BADGE NO.: _____

PERMIT ISSUED DATE: _____ TIME: _____

SECTION H - WORK AUTHORIZATION REVIEWED AND

_____ BADGE NO.: 7231 DATE: 6/16/90

Section IV

Radiological Survey Reports

399

FMPC
INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

Date: 16 July 90 LOCATION: Oilfield Line RST: R. Coover Page 1 of 1
 T: 0922 LEVEL: _____

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
mantle # 175
Radio # = .008
Level = .008
Some Trans. field out

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
3	44107	Aug 90	-	8.6%
3	65355	Nov 90	50	10%

ANALYZE FOR: ALPHA BETA-GAMMA OTHER _____

FOLLOW-UP SURVEY ATTACHED YES NO
 SURVEY MAP ATTACHED YES NO

TYPE OF SURVEY: CONTAMINATION RADIATION OTHER _____

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			γ	β/γ	γ	β/γ	100 CM ²	PROBE	100 CM ²	PROBE
			CONTACT	CONTACT	3 FT.	3 FT.				
1	mantle # 175	Lip					<1K	<1K	<1K	<1K
2	↓	wall					↓	↓	↓	↓
3		↓								
4		Burrow								
5		↓								
6		Pipe walls								
7		↓								
8		↓								
9		↓								
10		↓								

NO.	DISTRIBUTION OF COPIES
1	Radiological Safety Technician Supervisor
2	Radiological Safety Engineer
3	Facility Supervisor

NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

FMPC
INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

399

Date: 16 June 90 LOCATION: Outfall Line RST: R Counter Page 1 of 1
 T: 0900 LEVEL: _____

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
Manhole # 176
Radius w/c = ~~208~~ .012
Limit = 0.08
Smear's Indicate Field Count

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
3	44107	Aug 90	-	8.6%
3	65355	Nov 90	50	10%

ANALYZE FOR: ALPHA BETA-GAMMA OTHER _____

FOLLOW-UP SURVEY ATTACHED YES NO
 SURVEY MAP ATTACHED YES NO

TYPE OF SURVEY: CONTAMINATION RADIATION OTHER _____

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			γ	β/γ	γ	β/γ	100 CM ²	PROBE	100 CM ²	PROBE
			CONTACT	CONTACT	3 FT.	3 FT.				
1	Manhole # 176	Lip					<1K	<1K	<1K	<1K
2	↓	walls								
3		↓								
4		Bottom								
5		↓								
6		P.P.S walls								2.6K
7		↓								
8		↓								
9		↓								
10		↓								

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2	Radiological Safety Engineer
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NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

32

FMPC
INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

Date: 16 June 90 LOCATION: Outfall Line RST: R. Coomer Page 1 of 1
LEVEL:

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
Manhole # 177.
Radon w/L = .023
Limit = 0.08
Smear indicates field count.

INSTRUMENTS

MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
3	44107	Aug 90	-	8.6%
3	65355	Nov 90	50	10%

ANALYZE FOR: ALPHA BETA-GAMMA OTHER
TYPE OF SURVEY: CONTAMINATION RADIATION OTHER

FOLLOW-UP SURVEY ATTACHED YES NO
SURVEY MAP ATTACHED YES NO

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA			
			γ	B γ	γ	B γ	100 CM ²	PROBE	100 CM ²	PROBE		
			CONTACT	CONTACT	3 FT.	3 FT.						
1	Manhole #177	Lip					<1K	<1K	<1K	1K		
2		Walls								5K		
3		↓										↓
4		Bottom										5K
5		↓										↓
6		Pipe walls										40K
7		↓										↓
8		↓										↓
9		↓										↓
10		↓										↓

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NOTIFICATION OF SURVEY RESULTS

SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

FMPC
INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

Date: 16 June 90 LOCATION: Outfall Line RST: R Coomer Page 1 of 1
 T LEVEL: _____

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
manhole # 178
Radon w/p = .023
Limit = 0.08
Smears indicate field cont

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
3	44107	Aug 90	-	8.6%
3	65355	Nov 90	50	10%

ANALYZE FOR: ALPHA BETA-GAMMA OTHER _____
 TYPE OF SURVEY: CONTAMINATION RADIATION OTHER _____

FOLLOW-UP SURVEY ATTACHED YES NO
 SURVEY MAP ATTACHED YES NO

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			Y	B/Y	Y	B/Y	100 CM ²	PROBE	100 CM ²	PROBE
			CONTACT	CONTACT	3 FT.	3 FT.				
1	manhole #178	Lip					<1K	<1K	<1K	<1K
2	↓	walls					↓	↓	↓	↓
3	↓	↓					↓	↓	↓	<1K
4	↓	Bottom					↓	↓	↓	↓
5	↓	↓					↓	↓	↓	<1K
6	↓	Pipe walls					↓	↓	↓	<1K
7	↓	↓					↓	↓	↓	↓
8	↓	↓					↓	↓	↓	↓
9	↓	↓					↓	↓	↓	↓
10	↓	↓					↓	↓	↓	↓

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2	Radiological Safety Engineer
3	Facility Supervisor

NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

FMPC
INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

Date: 16 June 90 LOCATION: Outfall Line RST: R. Coomer Page 1 of 1
 T LEVEL: _____

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
Manhole # 179
Radon w/L = .059
Limit = 0.08
Smears indicate field count.

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
<u>J</u>	<u>44107</u>	<u>Aug 90</u>	<u>-</u>	<u>8.6%</u>
<u>J</u>	<u>65355</u>	<u>Nov 90</u>	<u>50</u>	<u>10%</u>

ANALYZE FOR: ALPHA BETA-GAMMA OTHER _____
 TYPE OF SURVEY: CONTAMINATION RADIATION OTHER _____

FOLLOW-UP SURVEY ATTACHED YES NO
 SURVEY MAP ATTACHED YES NO

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			y	B/y	y	B/y	100 CM ²	PROBE	100 CM ²	PROBE
			CONTACT	CONTACT	3 FT.	3 FT.				
<u>1</u>	<u>Manhole #179</u>	<u>Lip</u>					<u><1K</u>	<u><1K</u>	<u><1K</u>	<u><1K</u>
<u>2</u>		<u>walls</u>								
<u>3</u>		<u>↓</u>								
<u>4</u>		<u>Bottom</u>								
<u>5</u>		<u>↓</u>								
<u>6</u>		<u>Pipe walls</u>								<u>3.6K</u>
<u>7</u>		<u>↓</u>								
<u>8</u>										
<u>9</u>										
<u>10</u>		<u>↓</u>								

NO.	DISTRIBUTION OF COPIES
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<u>2</u>	<u>Radiological Safety Engineer</u>
<u>3</u>	<u>Facility Supervisor</u>

NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

399

FMPC
 INDUSTRIAL, RADIOLOGICAL SAFETY & TRAINING - RADIOLOGICAL SAFETY
RADIOLOGICAL SURVEY REPORT

Date: 16 June 90 LOCATION: Overfall Line RST: R. Coomer Page 1 of 1
 T LEVEL: ROUTINE SPECIAL REQUEST RWP INCIDENT

REASON FOR SURVEY: ROUTINE SPECIAL REQUEST RWP INCIDENT

COMMENTS:
 Manhole #180
 Radon w/L = .008
 Limit = 0.03
 Smears indicate field count

INSTRUMENTS				
MODEL	SERIAL NUMBER	CALIBRATION DATE	BKRD.	EFF.
3	44107	Aug 90	-	8.6%
3	65355	Nov 90	SD	10%

ANALYZE FOR: ALPHA BETA-GAMMA OTHER

FOLLOW-UP SURVEY ATTACHED YES NO
 SURVEY MAP ATTACHED YES NO

TYPE OF SURVEY: CONTAMINATION RADIATION OTHER

ITEM NUMBER	GRID COORDINATES	DESCRIPTION	CORRECTED DOSE RATE (mRem/hr)				DPM ALPHA		DPM BETA-GAMMA	
			γ	β/γ	γ	β/γ	100 CM²	PROBE	100 CM²	PROBE
			CONTACT	CONTACT	3 FT.	3 FT.				
1	Manhole #180	Lip					<1K	<1K	<1K	1K
2	↓	walls								4K
3		↓								↓
4		Bottom								16K
5		↓								↓
6		pipe walls								24K
7		↓								↓
8		↓								↓
9		↓								↓
10		↓								↓

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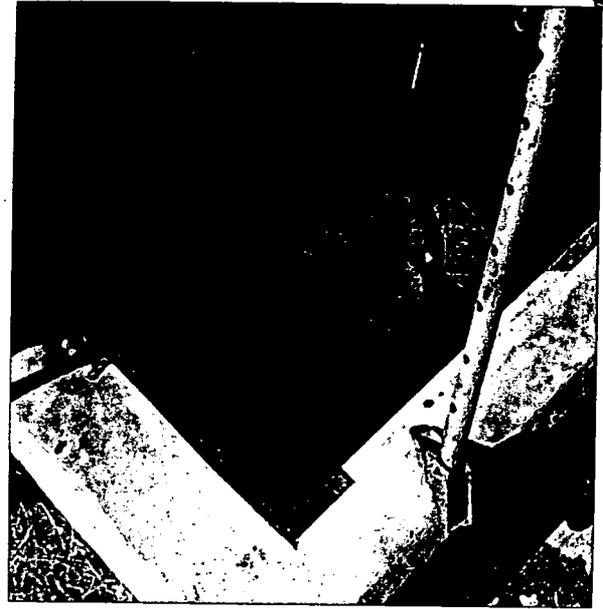
NOTIFICATION OF SURVEY RESULTS					
SUPERVISOR NOTIFIED	TIME	DATE	NOTIFIED BY	REVIEWED BY	DATE

310



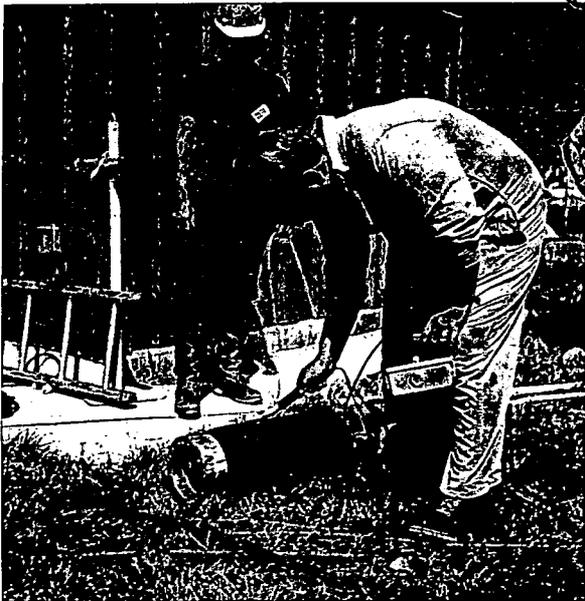
ENTERING MANHOLE AT
MH-175

6-16-90



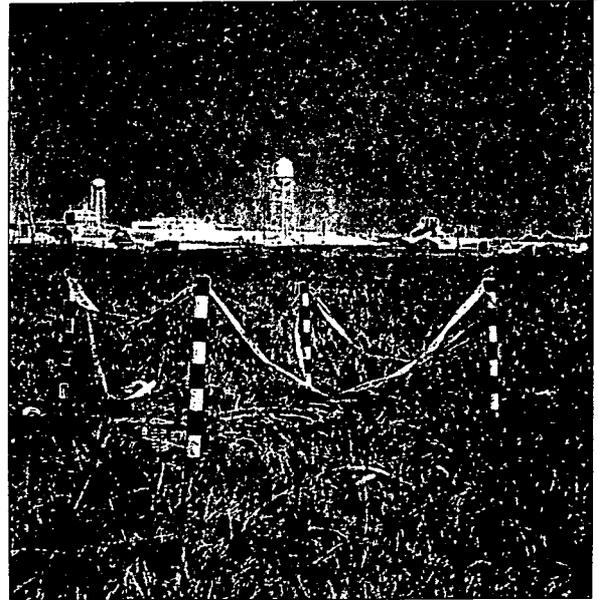
INSERTING TEST PLUG
AT MH-175

6-16-90



POST-TESTING RADIATION CHECK
OF TEST PLUG AT MH-175

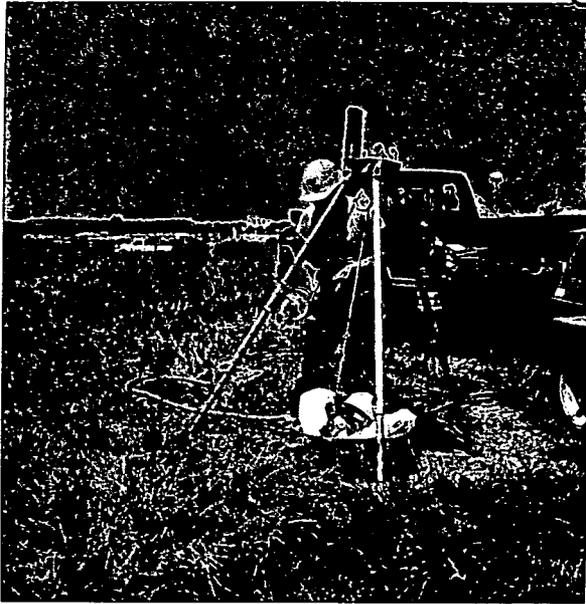
6-16-90



SAFETY BARRIER AT
MH-176

6-16-90

5



TECHNICIAN ENTERING
MANHOLE AT MH-177
6-16-90

6



TEST PLUG, HOSE, ETC. AT
MH-179
6-16-90

7



VIDEO EQUIPMENT AT
MH-179
6-16-90