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PROJECT EVALUATION REPORT NEAT ENHANCED HEAVY FUEL OIL RECOVERY PILOT TEST VOLUME 2 OF 2 APPENDICES E TO I NWS YORKTOWN VA

3/1/1994

GROUNDWATER TECHNOLOGY GOVERNMENT SERVICES

GROUNDWATER
TECHNOLOGY
GOVERNMENT SERVICES

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PROJECT EVALUATION REPORT
NAVAL SUPPLY CENTER YORKTOWN
HEAT-ENHANCED HEAVY FUEL OIL RECOVERY
PILOT TEST

VOLUME 2 OF 2

(APPENDICES E-I)

RAC N47408-92-D-3044
Delivery Order 11

PREPARED FOR:

ATLANTIC DIVISION
NAVAL FACILITIES ENGINEERING COMMAND
6500 HAMPTON BLVD.
BUILDING A/LAFAYETTE ANNEX
NORFOLK, VIRGINIA 23511-6287

MARCH 1994

APPENDIX E

OPERATIONAL CHRONOLOGICAL NOTES, PILOT TEST CALENDAR AND CHRONOLOGICAL FIELD NOTES

GROUNDWATER TECHNOLOGY

The general chronology of the pilot test is as follows:

April 25, 1993 through April 30, 1993:
Finished construction of the pilot systems.

May 3, 1993: (Monday)
Tested the boiler and piping for leaks of water and or steam.

May 4, 1993: (Tuesday) Day 1
All three systems started and commenced pilot test system operation.

May 5, 1993: (Wednesday) Day 2
Boiler shut down automatically due to a low water condition resulting from lack of makeup water to the boiler. The lack of water was caused by an off-site break in the water main feeding the hydrant which provided water to the boiler. Once the off-site water line was repaired, the boiler was again ready for operation.

May 6, 1993: (Thursday) Day 3
The water meters on the groundwater discharge from RW-1S, RW-2H, and RW-3X were replaced. The original water meters were deficient at the low-volume operation required from the groundwater discharge pumps.

May 7, 1993: (Friday) Day 4
At recovery well RW-1S (Steam System), the liquid hydrocarbon recovery tank experienced a near rupture due to overpressurization of the tank.

The factors which lead up to the incident were lack of adequate venting for the tank and failure of the tank full switch to operate and shut off the LPH recovery pump.

The system at RW-1S was shut off completely for a full diagnosis. The other two systems (RW-2H and RW-3X) were also shut off pending further investigation of a similar type problem. Additionally, the systems were to be shut off this date due to the electrical service to the site being temporarily shut off for the weekend to facilitate electrical work at the adjacent Coast Guard facility.

May 10, 1993: (Monday) Day 7
Site visit performed:
GRS (Groundwater Recovery Systems) on site:

- The following corrective activities were performed:

  - Installed proper adequate venting to the recovery tanks located at RW-1S, RW-2H, RW-3X, and at the recovery tank adjacent to the oil/water

separator.

- Corrected the electrical problem in the control panel at RW-1S by installing an additional relay switch for the control of the tank float switch.

- Installed the same relay in the control panels for RW-2H and RW-3X to correct the similar deficiencies in those control panels.

- All of the groundwater and liquid petroleum hydrocarbon recovery equipment was inspected and tested by GRS.

John Y. Wright contractor's on site (boiler vendor):

- Performed the following maintenance activities on the boiler and its associated equipment:

  - Corrected the minor leakage in the heat exchanger transfer pump valve seal in order for it to seat correctly.

  - Cleaned the clinker from inside the fire chamber within the boiler.

  - Cleaned the boiler burner jets.

  - Checked all piping for steam and water leaks and tightened where necessary.

  - Re-fired the boiler unit, checked the operation of the heat exchanger for the hot water injection system, and brought the steam generation and hot water injection systems back on line.

GSI on site:

- Supervised subcontractors and the repair/maintenance activities.

- Performed the following maintenance/monitoring activities associated with data collection for the operation of the pilot test:

  - Gauged the monitoring wells and recovery well for liquid level data (groundwater level, liquid petroleum hydrocarbon level).

  - Collected and recorded temperature data from the monitoring wells with thermistors for the steam injection and hot water injection systems.

  - Performed standard boiler maintenance.

May 11, 1993: (Tuesday) Day 8

GSI on site:

- Site visit to check operations of systems, site visit included:

  - Steam system check - ok.

  - Hot water injection system check - ok.

  - Standard system operation check - ok.

  - Detailed inspection of groundwater discharges and noted that discharge from the groundwater discharge from RW-1S contained emulsified liquid petroleum hydrocarbons. Due to this observation, the groundwater discharge pump was shut off to allow the liquid hydrocarbons to float to the surface of the recovery well for collection by the liquid hydrocarbon recovery system. It should be noted that the groundwater level in the recovery well was 14 feet below ground surface, and the water intake for the groundwater recovery pump is located 29 feet below ground surface. Emulsified oil in the groundwater recovered is 15 feet below the groundwater surface and indicates extremely deep LPH or trapped LPH at a lower level.

May 12, 1993: (Wednesday) Day 9

GSI on site:

- Site visit to check operations of systems, site visit included:

  - Collection of temperature data from the thermistors.

  - Gauged monitoring wells and recovery wells.

  - Performed boiler maintenance.

  - Inspected and recorded steam injection wellhead pressures.

  - Inspected and recorded groundwater discharge pumping rates and total volume pumped.

  - Inspected and recorded recovery of liquid petroleum hydrocarbons from RW-1S, RW-2H, RW-3X, and the recovery tank located adjacent to the oil/water separator.

  - Inspected and checked oil/water separator transfer pump operation.

May 14, 1993: (Friday) Day 11

GSI on site:

- Site visit to check operations of systems, site visit included:

  - Collection of temperature data from the thermistors.
  - Gauged monitoring wells and recovery wells.
  - Performed boiler maintenance.
  - Inspected and recorded steam injection wellhead pressures.
  - Inspected and recorded groundwater discharge pumping rates and total volume pumped.
  - Inspected and recorded recovery of liquid petroleum hydrocarbons from RW-1S, RW-2H, RW-3X, and the recovery tank located adjacent to the oil/water separator.
  - Inspected and checked oil/water separator transfer pump operation.

- Groundwater discharge pumps were switched off at RW-1S, RW-2H and RW-3X due to emulsified LPH and LPH being pumped by the groundwater recovery pumps. This was performed to allow for equalization of the liquid petroleum hydrocarbons to separate from the water and float to the surface of the water in the respective recovery well for removal by the liquid petroleum hydrocarbon recovery pumps, (separation to occur by density differences, within the well, between the two liquids). Liquid petroleum hydrocarbon recovery pumps remained in operation.

May 16, 1993:(Sunday) Day 13

By secondary information: Main electrical power was shut off to all three systems at approximately 10:30 a.m. Power was shut off because security personnel noticed steam, condensate water, and liquid petroleum hydrocarbons coming out of monitoring well MW-3S at the test site.

May 17, 1993: (Monday) Day 14

GSI notified of system shutdown over the weekend (Sunday).

Site Monitoring:

- Site visit to check operations of systems, site visit which included:

  - Collection of temperature data from the thermistors.

  - Gauged monitoring wells and recovery wells.

  - Standard boiler maintenance not performed as boiler was shut down when power was shut off on 5/16/93.

  - Recorded groundwater discharge total volumes from RW-1S, RW-2H, and RW-3X.

  - Checked and recorded recovered liquid petroleum hydrocarbons in recovery tanks at RW-1S, RW-2H, RW-3X, and tank adjacent to oil/water separator.

  - Inspection of the area surrounding monitoring well MW-3S.

    - Impact: 2-3 gallons of liquid petroleum hydrocarbons, had sprayed onto the grass area surrounding MW-3S. An estimate of water volume ejected from the monitoring well was not made.

    - Resolution of the problem of liquid petroleum hydrocarbons on the surface surrounding MW-3S: Soil and grass coated with the liquid petroleum hydrocarbons to be removed and disposed of accordingly.

    - Resolution of the situation arising when the steam front passes by a screen interval of a monitoring well: Provide for capping all monitoring wells associated with the steam injection system.

May 18, 1993: (Tuesday) Day 15

GSI informed that the site needed to be cleaned up immediately as state regulatiry personnel were to be onsite in the near future.

GSI immediate response:

- Mobilized to the site supervisor and subcontractor laborers to perform the following activities:

  - Shoveled up LPH-coated soils, grass, and debris in the immediate vicinity of monitoring well MW-3S, and containerized in two 55-

gallon drums supplied by the subcontractor.

May 19, 1993: (Wednesday) Day 16

GSI on site to perform normal maintenance and restart all systems after the shutdown due to the incident on May 16, 1993.

The following activities were performed:

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells for liquid-level data.

- Attempt made to restart recovery systems. Electrical power on; however, systems not functioning correctly or coming on at all.

    - Transfer pump
    - RW-2H control panel problems
    - RW-1S control panel problems
    - RW-3X control panel problems
    - Control panel for transfer pump at oil/water separator problems

- Determine that further diagnosis is necessary to correctly identify the electrical problems with the systems.

May 21, 1993: (Friday) Day 18

Site Monitoring:

The following activities were performed:

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells for liquid-level data.

- Closer inspection of the control panels for the recovery wells and the transfer pump revealed that none of these panels were operating correctly, even though power was getting to them from the main breaker. GRS, the vendor for the recovery equipment, stated that they did not have enough information regarding proper diagnosis of the problem.

  Subsequent action to take place and require follow-up: Get the additional information that GRS needs to correct the problem.

May 24, 1993: (Monday) Day 21
Site Visit:

The following activities were performed:

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells.

May 25, 1993: (Tuesday) Day 22
Site Visit:

The following activities were performed:

- Installed threaded well caps on each of the monitoring wells associated with the steam injection system to prevent expulsion of steam, condensate, and liquid petroleum hydrocarbons as the steam front passes through the monitoring well locations.

- Set up to perform a comprehensive diagnosis of the electrical system for the site.

May 26, 1993: (Wednesday) Day 23
Site Visit:

The following activities were performed:

- GSI electrical engineer (EE) visited the site to diagnose the panel electrical problems.

- Diagnosis proceeded on the system, and the findings indicated:

  - There was a DC voltage problem in the control panel at the transfer pump.

  - Fuses were blown at recovery wells RW-1S, RW-2H and RW-3X panels.

  - The control panel for RW-3X also has a PC board problem.

- Called GRS with the above information who responded by sending someone to the site.

May 27, 1993: (Thursday) Day 24

Site Visit:

The following activities were performed:

- GRS onsite to correct electrical problems at the transfer pump and control panels for RW-1S, RW-2H and RW-3X.

- All of the problems were verified by GRS, and an additional control panel problem was found in the transfer pump panel. GRS were unable to correct the problems until after the Memorial Day weekend because the parts and/or PC boards were unobtainable until then.

- John Y. Wright, boiler vendor on site, indicated electrical power to boiler satisfactory; boiler back on line with no apparent electrical problems.

- Boiler was shut off until the recovery system electrical problems can be corrected.

May 28, 1993: (Friday) Day 25

Site Visit:

The following activities were performed:

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells.

June 1, 1993: (Tuesday) Day 29

Site Visit:

The following activities were performed:

- GRS on site for equipment repairs.

- GRS replaced PC board in control panel for the oil/water separator transfer pump.

- Boiler fired up and running after three warm up cycles. Boiler on line at full steam by 10:55 a.m.

- GRS fixed other three recovery well control panels (i.e., replaced fuses and necessary capacitors). Liquid-phase hydrocarbons and groundwater pumps on and functioning normally.

- Did not turn on RW-2H hot water system extraction due to a large inversion of petroleum hydrocarbons trapped below the surface of the water table. Not injecting hot water into this pilot system at this time. Waiting to see if subsurface system equalizes with static conditions for a few days.

- Noted that groundwater extraction system RW-3X was pumping LPH. Intake for the groundwater extraction pump was set at 29 feet. Recovery pump intake is set at 16 feet. There is an inversion of water over the less dense liquid petroleum hydrocarbons. Shut off the groundwater extraction pump until the next site visit to allow the situation to correct itself.

- Steam to 40 psig and injection occurring as designed into the injection wells. Groundwater being extracted from the recovery well RW-1S (system running at this time) has a temperature in the range of 160°F to 175°F at the wellhead temperature gauge. The temperature probe within the effluent groundwater discharge line before entry into the oil/water separator is set to close the influent steam feed to the steam system if water (extracted groundwater) exceeds ~170°F. This is a protection device designed to protect the PVC and CPVC piping and the plastic internal parts of the oil/water separator system. With the extracted groundwater temperatures being what they were,the steam system automatically shut off. This shutdown of steam feed and injection does not shut off the burner to the boiler. Since the situation was noticed in the field, the fire in the boiler was turned off in order to conserve fuel. Shutdown until June 4, 1993 will give the groundwater some time to cool to a better operating condition (groundwater temperatures in the range of 120°F to 150°F). The liquid hydrocarbon recovery pump side of the system will be left on allowing for continual recovery of liquid petroleum hydrocarbons.

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells.

- Performance of boiler maintenance.

- Inspected and recorded steam injection well head pressures.

- Inspected and recorded groundwater discharge pumping rates and total volume pumped.

- Inspected and recorded recovery of liquid petroleum hydrocarbons from RW-1S, RW-2H, RW-3X and the recovery tank located adjacent to the oil/water separator.

- Inspected and checked groundwater transfer pump operation.

June 2, 1993: (Wednesday) Day 30
Site Visit:

The following activities were performed:

- Boiler not running at this time due to groundwater extraction temperatures.

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells for liquid level data.

- Inspected and recorded recovery of liquid petroleum hydrocarbons from RW-1S, RW-2H, RW-3X and the recovery tank located next to the oil/water separator.

June 4, 1993: (Friday) Day 32
Site Visit:

The following activities were performed:

- Boiler was shut off due to high temperatures from groundwater extraction.

- Collected temperature data from monitoring wells.

- Gauged the monitoring wells and recovery wells.

- Inspected and recorded recovery of liquid petroleum hydrocarbons from RW-1S, RW-2H, RW-3X, and the recovery tank adjacent to the oil/water separator.

June 7, 1993: (Monday) Day 35
Site Visit (GSI):

The following activities were performed:

- The boiler and the steam injection were restarted as extracted groundwater temperatures had come down.

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week:	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU
Date:	5/4/93	5/5/93	5/6/93	5/7/93	5/8/93	5/9/93	5/10/93	5/11/93	5/12/93	5/13/93
Day of Operation:	1	2	3	4	5	6	7	8	9	10
Boiler on/off	on	off	on	on	off	off	on	on	on	on
RW-1S/WTDP on/off	on	on	on	off	off	off	on	off	off	off
RW-2H/WTDP on/off	on	on	on	off	off	off	on	on	on	on
RW-3X/WTDP on/off	on	on	on	off	off	off	on	on	on	on
RW-1S/PR on/off	on	on	on	on	off	off	on	on	on	on
RW-2H/PR on/off	on	on	on	on	off	off	on	on	on	on
RW-3X/PR on/off	on	on	on	on	off	off	on	on	on	on
RW-1S GW pumped Cumulative	20	302	302	302	302	302	302	302	395	395
RW-2H GW pumped Cumulative	30	30	30	30	30	30	30	30	232	232
RW-3X GW pumped Cumulative	35	46	46	46	46	46	46	46	259	259
Liquid Petroleum Recovered RW-1S	0	0	4	33	33	33	92	92	92	92
Liquid Petroleum Recovered RW-2H	0	0	0	0	0	0	0	0	7	7
Liquid Petroleum Recovered RW-3X	0	0	0	0	0	0	0	0	0	0
Liquid Petroleum Recovered Oil/wtr Separator	0	0	0	0	0	0	17	17	25	25

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT	SUN
Date:	5/14/93	5/15/93	5/16/93	5/17/93	5/18/93	5/19/93	5/20/93	5/21/93	5/22/93	5/23/93
Day of Operation:	11	12	13	14	15	16	17	18	19	20
Boiler on/off	on	on	off	off	off	off	off	off	off	off
RW-1S/WTDP on/off	off	off	off	off	off	off	off	off	off	off
RW-2H/WTDP on/off	on	on	off	off	off	off	off	off	off	off
RW-3X/WTDP on/off	on	on	off	off	off	off	off	off	off	off
RW-1S/PR on/off	on	on	off	off	off	off	off	off	off	off
RW-2H/PR on/off	on	on	off	off	off	off	off	off	off	off
RW-3X/PR on/off	on	on	off	off	off	off	off	off	off	off
RW-1S GW pumped Cumulative	395	395	395	396	396	396	396	396	396	396
RW-2H GW pumped Cumulative	232	232	232	399	399	399	399	399	399	399
RW-3X GW pumped Cumulative	259	259	259	357	357	357	357	357	357	357
Liquid Petroleum Recovered RW-1S	105	105	105	105	105	105	105	105	105	105
Liquid Petroleum Recovered RW-2H	7	7	7	7	7	7	7	7	7	7
Liquid Petroleum Recovered RW-3X	0	0	0	0	0	0	0	0	0	0
Liquid Petroleum Recovered Oil/wtr Separator	25	25	25	25	25	25	25	25	25	25

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE	WED
Date:	5/24/93	5/25/93	5/26/93	5/27/93	5/28/93	5/29/93	5/30/93	5/31/93	6/1/93	6/2/93
Day of Operation:	21	22	23	24	25	26	27	28	29	30
Boiler on/off	off	off	off	off	off	off	off	off	on	off
RW-1S/WTDP on/off	off	off	off	off	off	off	off	off	on	off
RW-2H/WTDP on/off	off	off	off	off	off	off	off	off	on	on
RW-3X/WTDP on/off	off	off	off	off	off	off	off	off	on	off
RW-1S/PR on/off	off	off	off	on	on	on	on	on	on	on
RW-2H/PR on/off	off	off	off	on	on	on	on	on	on	on
RW-3X/PR on/off	off	off	off	on	on	on	on	on	on	on
RW-1S GW pumped Cumulative	396	396	396	396	398	398	398	398	448	738
RW-2H GW pumped Cumulative	399	399	399	399	399	399	399	399	399	399
RW-3X GW pumped Cumulative	357	357	357	357	357	357	357	357	357	357
Liquid Petroleum Recovered RW-1S	105	105	105	105	105	105	105	105	105	105
Liquid Petroleum Recovered RW-2H	7	7	7	7	9	9	9	9	9	9
Liquid Petroleum Recovered RW-3X	0	0	0	0	0	0	0	0	4	4
Liquid Petroleum Recovered Oil/wtr Separator	25	25	25	25	33	33	33	33	33	33

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI	SAT
Date:	6/3/93	6/4/93	6/5/93	6/6/93	6/7/93	6/8/93	6/9/93	6/10/93	6/11/93	6/12/93
Day of Operation:	31	32	33	34	35	36	37	38	39	40
Boiler on/off	off	off	off	off	on	on	on	on	off	off
RW-1S/WTDP on/off	off	off	off	off	on	on	on	off	off	off
RW-2H/WTDP on/off	on	off	off	off	off	off	on	on	on	on
RW-3X/WTDP on/off	off	on	on	on	off	off	on	on	on	on
RW-1S/PR on/off	on	on	on	on	off	on	on	off	on	on
RW-2H/PR on/off	on	on	on	on	on	on	on	on	on	on
RW-3X/PR on/off	on	on	on	on	on	on	on	on	on	on
RW-1S GW pumped Cumulative	738	1246	1246	1246	1246	1246	1246	1246	1246	1246
RW-2H GW pumped Cumulative	399	400	400	400	400	400	400	400	408	408
RW-3X GW pumped Cumulative	357	357	357	357	357	357	357	357	357	357
Liquid Petroleum Recovered RW-1S	105	119	119	119	119	119	148	148	148	148
Liquid Petroleum Recovered RW-2H	9	10	10	10	10	10	10	10	10	10
Liquid Petroleum Recovered RW-3X	7	7	7	7	7	7	7	7	7	7
Liquid Petroleum Recovered Oil/wtr Separator	33	38	38	38	38	38	38	38	38	38

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week	SUN	MON	TUE	WED	THU	FRI	SAT	SUN	MON	TUE
Date:	**6/13/93**	**6/14/93**	**6/15/93**	**6/16/93**	**6/17/93**	**6/18/93**	**6/19/93**	**6/20/93**	**6/21/93**	**6/22/93**
Day of Operation:	**41**	**42**	**43**	**44**	**45**	**46**	**47**	**48**	**49**	**50**
Boiler on/off	off	off	off	off	off	off	off	off	off	off
RW-1S/WTDP on/off	off	off	off	off	off	off	off	off	off	off
RW-2H/WTDP on/off	on	off	on	off	off	off	off	off	off	off
RW-3X/WTDP on/off	on	on	on	off	off	off	off	off	off	off
RW-1S/PR on/off	on	on	on	on	on	on	on	on	on	on
RW-2H/PR on/off	on	on	on	on	on	on	on	on	on	on
RW-3X/PR on/off	on	on	on	on	on	on	on	on	on	on
RW-1S GW pumped Cumulative	1246	1246	1246	1246	1246	1246	1246	1246	1246	1246
RW-2H GW pumped Cumulative	408	648	648	648	648	648	648	648	648	648
RW-3X GW pumped Cumulative	357	357	357	357	357	357	357	357	357	357
Liquid Petroleum Recovered RW-1S	148	163	163	163	163	163	163	163	163	163
Liquid Petroleum Recovered RW-2H	10	10	10	10	10	10	10	10	10	10
Liquid Petroleum Recovered RW-3X	7	7	7	7	7	7	7	7	7	7
Liquid Petroleum Recovered Oil/wtr Separator	38	38	38	38	38	38	38	38	38	38

OPERATIONAL STATUS CALENDAR

WTDP = Water Table Depression Pump
PR = Product recovery pump, i.e. liquid petroleum hydrocarbon recovery pump.

Day of Week	WED	THU	FRI	SAT	SUN	MON	TUE	WED	THU	FRI
Date:	6/23/93	6/24/93	6/25/93	6/26/93	6/27/93	6/28/93	6/29/93	6/30/93	7/1/93	7/2/93
Day of Operation:	51	52	53	54	55	56	57	58	59	60
Boiler on/off	off	off	off	off	off	off	off	off	off	off
RW-1S/WTDP on/off	off	off	off	off	off	off	off	off	off	off
RW-2H/WTDP on/off	off	off	off	off	off	off	off	off	off	off
RW-3X/WTDP on/off	off	off	off	off	off	off	off	off	off	off
RW-1S/PR on/off	off	off	off	off	off	off	off	off	off	off
RW-2H/PR on/off	off	off	off	off	off	off	off	off	off	off
RW-3X/PR on/off	off	off	off	off	off	off	off	off	off	off
RW-1S GW pumped Cumulative	1246	1246	1246	1246	1246	1246	1246	1246	1246	1246
RW-2H GW pumped Cumulative	648	648	648	648	648	648	648	648	648	648
RW-3X GW pumped Cumulative	357	357	357	357	357	357	357	357	357	357
Liquid Petroleum Recovered RW-1S	163	163	163	163	163	163	163	163	163	163
Liquid Petroleum Recovered RW-2H	10	10	10	10	10	10	10	10	10	10
Liquid Petroleum Recovered RW-3X	7	7	7	7	7	7	7	7	7	7
Liquid Petroleum Recovered Oil/wtr Separator	38	38	38	38	38	38	38	38	38	38

YORKTOWN SITE MONITORING FORM

DATE: 3 May 1993
NAME: T. Sword
Arrive on site (time) 830

Weather Conditions: Fair
Depart From Site (time) 1530

System not yet on line

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13		2-TAPES ON WIRE FOR JACK	
	T2	18		1-TAPE ON WIRE FOR JACK	
	T3	23		NO TAPE ON WIRE FOR JACK	

System not yet on line

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 3 May 1993

WELL	DTP*	DTW**	NOTES:
RW-1S		14.65	Diff. for DTP/ w/ paste
RW-2H	16.50	17.00	
RW-3X		17.00	
MW-1S			
MW-2S			
MW-3S			
MW-4S			
MW-5S			
MW-1H			
MW-2H			
MW-3H			
MW-4H			
MW-5H			

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE *System not yet on line*

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

System not yet on line

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN FIELD DATA COMPILE

03 MAY 93 (MONDAY)

SET PRODUCT RECOVERY PUMPS - INITIAL SET.

RW-1S PRODUCT/ @ 15'2" = 15.17'

PRODUCT PUMP INTAKE SET AT 15.5'

APPARENT PRODUCT THICKNESS 4" = .33 ft

DTP @ 15.17'
DTW @ 15.50'

RW-2A PRODUCT @ 16'6" = 16.50'

PRODUCT PUMP INTAKE SET AT 17.50'

APPARENT PRODUCT THICKNESS 1.9'

DTP @ 16.50'
DTW @ 18.40'

RW-3S PRODUCT @ 17.00'
PRODUCT PUMP INTAKE SET AT 17'1" = 17.08'

APPARENT PRODUCT THICKNESS 3/4" = 0.06'

DTP @ 17.00'
DTW @ 17.06'

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE

03 MAY 93 (MONDAY)

WTDP SET UPS -

RW-15 Pump INTAKE @ ~29' (WELL T.D. @ 30')

RW-21A Pump INTAKE @ ~29' (WELL T.D. @ 30')

RW-3X Pump INTAKE @ ~28' (WELL T.D. @ 30')

WTDP WATER LEVEL PROBES INITIAL SET UPS

RW-15 @~21 DTW 15.5 / MAX POSS. DRAWDOWN ~ 5.5

RW-21A @~21 DTW 18.4 / MAX POSS. DRAWDOWN ~ 2.6

RW-3X @~22 DTW 17.0 / MAX POSS DRAWDOWN ~ 5.0

CHOKE FLOW RATE TO (NTE) MAX DRAW - OR CLOSE TO ~ WANT ~ 2' EA MAX TO START

GW Rec. Begun? Each area?
Flow rates?

V

YORKTOWN SITE MONITORING FORM

DATE: 4 May 1993
NAME: T. Sword
Arrive on site (time) 630

Weather Conditions: Fair
Depart From Site (time) 1530

System Start date:

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	60.5	2-TAPES ON WIRE FOR JACK	707
	T2	18	60.8	1-TAPE ON WIRE FOR JACK	707
	T3	23	63.7	NO TAPE ON WIRE FOR JACK	708
MW-2S	T1	13	56.7	2-TAPES ON WIRE FOR JACK	708
	T2	18	57.5	1-TAPE ON WIRE FOR JACK	709
	T3	23	59.7	NO TAPE ON WIRE FOR JACK	709
MW-3S	T1	13	58.5	2-TAPES ON WIRE FOR JACK	709
	T2	18	57.9	1-TAPE ON WIRE FOR JACK	709
	T3	23	58.3	NO TAPE ON WIRE FOR JACK	709
MW-4S	T1	13	57.3	2-TAPES ON WIRE FOR JACK	710
	T2	18	57.5	1-TAPE ON WIRE FOR JACK	711
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	712
MW-5S	T1	13	56.3	2-TAPES ON WIRE FOR JACK	705
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	706
	T3	23	57.9	NO TAPE ON WIRE FOR JACK	707

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	58.2	2-TAPES ON WIRE FOR JACK	714
	T2	18	58.0	1-TAPE ON WIRE FOR JACK	714
	T3	23	59.2	NO TAPE ON WIRE FOR JACK	714
MW-2H	T1	13	56.3	2-TAPES ON WIRE FOR JACK	715
	T2	18	56.9	1-TAPE ON WIRE FOR JACK	715
	T3	23	58.1	NO TAPE ON WIRE FOR JACK	716
MW-3H	T1	13	56.2	2-TAPES ON WIRE FOR JACK	717
	T2	18	57.1	1-TAPE ON WIRE FOR JACK	717
	T3	23	58.3	NO TAPE ON WIRE FOR JACK	717
MW-4H	T1	13	56.4	2-TAPES ON WIRE FOR JACK	718
	T2	18	56.7	1-TAPE ON WIRE FOR JACK	718
	T3	23	58.0	NO TAPE ON WIRE FOR JACK	719
MW-5H	T1	13	56.2	2-TAPES ON WIRE FOR JACK	719
	T2	18	57.0	1-TAPE ON WIRE FOR JACK	719
	T3	23	58.6	NO TAPE ON WIRE FOR JACK	720

YORKTOWN SITE MONITORING FORM

DATE: 4 May 1993
NAME: T. Sword
Arrive on site (time) 630

Weather Conditions: Fair
Depart From Site (time) 1530

Steam Injection System Monitoring

MONITORING WELLS TEMPERATURE READINGS
1125 hr readings

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	60.7	2-TAPES ON WIRE FOR JACK	1125
	T2	18	61.1	1-TAPE ON WIRE FOR JACK	
	T3	23	63.9	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	56.9	2-TAPES ON WIRE FOR JACK	
	T2	18	57.8	1-TAPE ON WIRE FOR JACK	
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	58.7	2-TAPES ON WIRE FOR JACK	
	T2	18	58.1	1-TAPE ON WIRE FOR JACK	
	T3	23	58.5	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	57.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.7	1-TAPE ON WIRE FOR JACK	
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	56.4	2-TAPES ON WIRE FOR JACK	
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	
	T3	23	58.4	NO TAPE ON WIRE FOR JACK	1130

Hot Water System Temperature Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	63.0	2-TAPES ON WIRE FOR JACK	1350
	T2	18	87.1	1-TAPE ON WIRE FOR JACK	
	T3	23	140.0	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	56.5	2-TAPES ON WIRE FOR JACK	
	T2	18	57.2	1-TAPE ON WIRE FOR JACK	
	T3	23	58.3	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	56.5	2-TAPES ON WIRE FOR JACK	
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	
	T3	23	58.6	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	56.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.0	1-TAPE ON WIRE FOR JACK	
	T3	23	57.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	56.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.3	1-TAPE ON WIRE FOR JACK	
	T3	23	58.8	NO TAPE ON WIRE FOR JACK	1355

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 4 May 1993

WELL	DTP*	DTW**	NOTES:
RW-1S	13.7	14.50	initial
RW-2H	16.50	16.50	Trace of product
RW-3X	17.00	17.00	Trace of product
MW-1S		12.60	
MW-2S	13.00	13.40	
MW-3S	13.50	13.70	
MW-4S	12.70	12.80	
MW-5S	13.60	13.60	Trace of product
MW-1H	14.50	--	to bottom of well...
MW-2H	14.40	14.40	Trace of product
MW-3H		14.55	No product
MW-4H	14.40	14.40	Trace of product
MW-5H	15.00	15.20	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	265	in psig	-
Boiler Pressure:	30	in psig	-
Stack Temperature:	375	in deg. F	-
Steam Feed Rate	590	in lb/hr	-
Total Steam Fed x100	0	in lbs	-

Water Level (sight glass low _____ normal * high _____ (Located right hand side of boiler)

Note boiler fire conditio low fire * high fire _____ Boiler Running? Yes

Heat Exchanger for Hot Water Injection system Data: Fuel Tank(s) in use: Inside

Water Level (sight glass low _____ normal * high _____

Influent Water Temp:	65	in deg. F
Influent Water Pressur	50	in psig
Influent Water Meter	--	in gal.
Effluent Water Temp.	145	in deg. F
Hot Water Meter	--	in gal.
Hot Water Flow Rate	9.2	in GPM

Fuel Oil received today?No
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 4 May 1993

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	5
SI-2	5
SI-3	5
SI-4	4

Total Steam Injection Pressur12 psig

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100
SI-2	100
SI-3	100
SI-4	100

Recovery wells:

RW-1S	Steam System	Steam Start @ 1020hr
RW-2H	Hot Water System	Start @ 1023 hr
RW-3X	Standard System	Start @ 1027 hr

Well	GPM	Total Mtr Reading
RW-1S	2	20
RW-2H	1.5	30
RW-3X	1	35

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN FIELD DATA SHEET

DATE: 5/4/93 NAME: T. SWORD
TIME ON SITE: 0650

STEAM SYSTEM TEMPERATURE READINGS:

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13	60.8	205
	T_2	18	61.2	
	T_3	23	64.6	
MW-2S	T_1	13	56.8	
	T_2	18	57.7	
	T_3	23	59.8	
MW-3S	T_1	13	58.7	
	T_2	18	58.2	
	T_3	23	58.6	
MW-4S	T_1	13	57.5	
	T_2	18	57.7	
	T_3	23	59.8	
MW-5S	T_1	13	56.5	
	T_2	18	57.5	
	T_3	23	58.1	215

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13		
	T_2	18		
	T_3	23		
MW-2S	T_1	13		
	T_2	18		
	T_3	23		
MW-3S	T_1	13		
	T_2	18		
	T_3	23		
MW-4S	T_1	13		
	T_2	18		
	T_3	23		
MW-5S	T_1	13		
	T_2	18		
	T_3	23		

YORKTOWN FIELD DATA SHEET

DATE: 5/4/93 NAME: T. SWORD
TIME ON SITE: 0650

STEAM SYSTEM TEMPERATURE READINGS:

← SYSTEM NOT RUNNING

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13	60.5	707
	T_2	18	60.8	707
	T_3	23	63.7	708
MW-2S	T_1	13	56.7	708
	T_2	18	57.5	709
	T_3	23	59.7	709
MW-3S	T_1	13	58.5	709
	T_2	18	57.9	709
	T_3	23	58.3	709
MW-4S	T_1	13	57.3	710
	T_2	18	57.5	711
	T_3	23	59.9	712
MW-5S	T_1	13	56.3	705
	T_2	18	57.4	706
	T_3	23	57.9	707

← START STEAM SYSTEM 0958AM. 5/4/93

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13	60.7	1125
	T_2	18	61.1	
	T_3	23	63.9	
MW-2S	T_1	13	56.9	
	T_2	18	57.8	
	T_3	23	59.9	
MW-3S	T_1	13	58.7	
	T_2	18	58.1	
	T_3	23	58.5	
MW-4S	T_1	13	57.6	
	T_2	18	57.7	
	T_3	23	59.9	
MW-5S	T_1	13	56.4	
	T_2	18	57.4	
	T_3	23	58.0	1135

YORKTOWN FIELD DATA COMPILED

5/4/93

STEAM SYSTEM THERMISTOR READINGS

WELL	PROBE	DEPTH	TEMP °F	TIME
MW-1S	T_1	13	60.5	707
	T_2	18	60.8	
	T_3	23	63.7	
MW-2S	T_1	13	56.7	
	T_2	18	57.5	
	T_3	23	59.7	
MW-3S	T_1	13	58.5	709
	T_2	18	57.9	
	T_3	23	58.3	
MW-4S	T_1	13	57.3	
	T_2	18	57.5	
	T_3	23	59.9	712
MW-5S	T_1	13	56.3	
	T_2	18	57.4	
	T_3	23	57.9	

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE

5/1/93

HOT WATER INJECTION SYSTEM THERMISTOR READINGS

INITIAL READINGS.

WELL	PROBE	DEPTH (ft)	TEMP °F	TIME
MW-1H	T_1	13	58.2	714
	T_2	18	58.0	
	T_3	23	59.2	
MW-2H	T_1	13	56.3	
	T_2	18	56.9	
	T_3	23	58.1	716
MW-3H	T_1	13	56.2	
	T_2	18	57.1	
	T_3	23	58.3	
MW-4H	T_1	13	56.4	
	T_2	18	56.7	
	T_3	23	58.0	719
MW-5H	T_1	13	56.2	
	T_2	18	57.0	
	T_3	23	58.6	720

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN DATA COMPILE

5.4.93

STEAM SYSTEM THERMISTOR READINGS

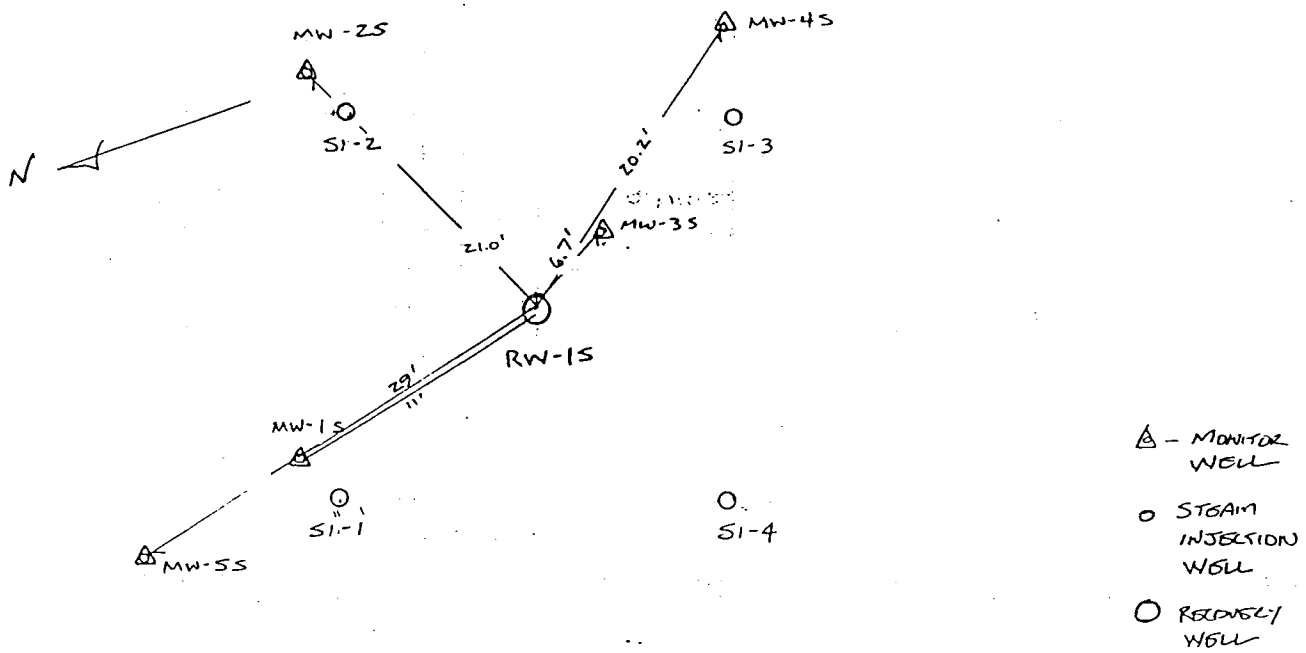
WELL	PROBE	DEPTH	TEMP °F	TIME	
MW-1S	T_1	13	60.7	1125	STEAM TURNED ON @ 1020AM
	T_2	18	61.1		
	T_3	23	63.9		
MW-2S	T_1	13	56.9		
	T_2	18	57.8		
	T_3	23	59.9		
MW-3S	T_1	13	58.7		
	T_2	18	58.1		
	T_3	23	58.5		
MW-4S	T_1	13	57.6		
	T_2	18	57.7		
	T_3	23	59.9		
MW-5S	T_1	13	56.4		
	T_2	18	57.4		
	T_3	23	58.4	1130	

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN DATA COMPILE

5-4-93 MONDAY

STEAM SYSTEM LAYOUT (AREAL) APPROX. NOT TO SCALE

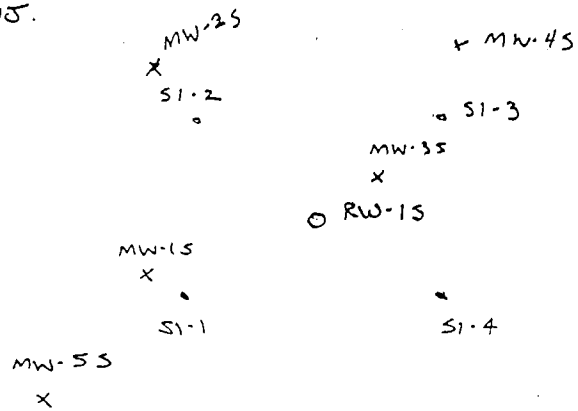


AMPAD 22-141 50 SHEETS 22-142 100 SHEETS 22-144 200 SHEETS

AMPAD 22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS

BASIC SITE SKETCH W/ LABELS

S1 - STEAM INJ.



THERMISTORS

MW-4S
T1 = 13' — 2 TAPE
T2 = 18' - 1 TAPE
T3 = 23' NO TAPE

MW-5S
T1 13' 2 TAPE
T2 18' 1 TAPE
T3 23' NO TAPE

MW-3S
T1 13' 2-TAPE
T2 18' 1-TAPE
T3 23' NO TAPE

MW-2H
T1 13' 2-tape
T2 18' 1-tape
T3 23' No tape

MW-1S
T1 - 13 2-tape
T2 - 18 1-tape
T3 - 23 No tape

MW-2S
T1 - 13 2-tape
T2 18 1-tape
T3 23 No tape

5/4/93

YORKTOWN FIELD DATA COMPILE
5-4-93

HOT WATER INJECTION SYSTEM THERMISTOR READINGS (1350 HR)

WELL	PROBE	DEPTH	TEMP °F	TIME
MW-1H	T_1	13	63.0	1350
	T_2	18	87.1	
	T_3	23	140.0	
MW-2H	T_1	13	56.5	
	T_2	18	57.2	
	T_3	23	58.3	
MW-3H	T_1	13	56.5	
	T_2	18	57.4	
	T_3	23	58.6	
MW-4H	T_1	13	56.6	
	T_2	18	57.0	
	T_3	23	57.2	
MW-5H	T_1	13	56.6	
	T_2	18	57.3	
	T_3	23	58.8	1355

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE
5-4-93

LIQUID LEVEL DATA - INITIAL

WELL	DTW	DTP	NOTES
RW-1S	14.5	13.7	Δ PUMP LEVELS & INTAKE
RW-2H	16.5	16.5	TRACE OF PROD.
RW-3X	17.0	17.0	TRACE OF PROD
MW-1S	12.6	—	
MW-2S	13.4	13.0	
MW-3S	13.7	13.5	
MW-4S	12.8	12.7	
MW-5S	13.6	13.6	TRACE OF PROD
MW-1H	—	14.5	- CAN'T FIND WTR >9' PROD?
MW-2H	14.4	14.4	TRACE OF PROD
MW-3H	14.5	—	NO PROD
MW-4H	14.4	14.4	TRACE OF PROD
MW-5H	15.2	15.0	

BOILER CHECKED OUT & FIRED UP READY TO GO -

1020 START INJECT STEAM. (RW-1S) SYSTEM START

1023 START HOT WTR INJ SYS (RW-2H) SYSTEM START

1027 START STANDARD WTR/RJC (RW-3X) SYSTEM START.

STEAM INJECT SYSTEM -

OPERATION PARAMETERS

INJ WELL	INJ P (psig)
S1-1	5
S1-2	5
S1-3	5
S1-4	4

VALVE STATUS

INJ WELL		
S1-1	100%	OPEN
S1-2	100%	OPEN
S1-3	100%	OPEN
S1-4	100%	OPEN

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN DATA COMPILE
5-4-93

WTSDP & ROC PUMP READJUSTS

RW-1S DTW @ 14.5 DTP @ 13.7
MOVE UP ROC PROD PUMP INTAKE ↑ 6" to 15'
(EMULSIFIED PROD. HEAVY EMULSIFICATION W/ H_2O)
WAS INITIALLY @ 15.5'

RW-2A DTW @ 16.5 DTP @ 16.5
MOVE UP ROC PROD PUMP ↑ 12" to 16.5'
WAS INITIALLY @ 17.5'

* SOME EMULSION - WAIT READJUST

RW-3X DTW @ 17.0 DTP @ 17.0 TRACE PROD
INTAKE INITIALLY @ ~ 17.0
NO READJUST AT THIS TIME

WAIT READJUST @ STABILIZATION - ? (TIME)

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE 5-4-93
SYSTEM START UP D-LOGGER SET UP -

CH-1 MW-1S
CH-2 MW-2S
CH-3 MW-3S
CH-4 MW-4S
CH-5 MW-5S
CH-6 RW-1S

MW-1 LINEARITY +.140 PROBE @ 18' BGS = 5.4' BWS
SCALE 20.060
OFFSET +0.78

MW-2 LINEARITY +.111 PROBE @ 18' BGS = 4.6' BWS
SCALE 20.013
OFFSET -0.052

MW-3 LINEARITY +.037 PROBE @ 18' BGS = 4.3' BWS
SCALE 10.020
OFFSET +.003

MW-4 LINEARITY +.150 PROBE @ 18' BGS = 5.2' BWS
SCALE 50.139
OFFSET -.022

MW-5 LINEARITY +.133 PROBE @ 18' BGS = 4.4' BWS
SCALE 20.116
OFFSET +.011

RW-1S LINEARITY +.122 PROBE @ 21' BGS = 6.5' BWS
SCALE 20.111
OFFSET -.010

BGS = BELOW GND SURF @ CSG
BWS = BELOW WTR SURF

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE

5/4/93

STEAM SYSTEM THERMISTOR READINGS 1405 HR

WELL	PROBE	DEPTH	TEMP °F	TIME
MW-1S	T_1	13	60.8	1405
	T_2	18	61.2	
	T_3	23	64.6	
MW-2S	T_1	13	56.8	
	T_2	18	57.7	
	T_3	23	59.8	
MW-3S	T_1	13	58.7	
	T_2	18	58.2	
	T_3	23	58.6	
MW-4S	T_1	13	57.5	
	T_2	18	57.7	
	T_3	23	59.8	
MW-5S	T_1	13	56.5	
	T_2	18	57.5	
	T_3	23	58.1	1410

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

YORKTOWN FIELD DATA COMPILE

1415 HR 5/4/93

WELL	DTW	DTP	NOTES
MW-1H	11.74	—	
MW-2H	14.4	14.4 +	TRACE PROD.
MW-3H	14.53	—	
MW-4H	14.4	—	
MW-5H	15.2	15.0	0.2±
RW-1H	19.82		

22-141 50 SHEETS
22-142 100 SHEETS
22-144 200 SHEETS
AMPAD

Yorktown

Field Data Compile

5/5/93

On site 0800
Boiler Down
Low water condition, boiler shut down automatically.
Side panel In boiler set reset button no action. Called John Y. Wright Company and discussed situation and agreed with the low water condition. Said to check Mc Donald Miller, Miller cover on right hand side of boiler front, long black (18" - long) bellows like with a flat head for secondary reset switch.
Also check second control cabinet, open, Warrick control transformer with 5-6 connectors, check for loose wires.

Boiler check as described above -- no apparent problems with controls.
Upon further investigation and discussons with personnal at the Fuel office it was noted that the water main feeding into the area had been broken the afternoon before (5/4/93) and thus no make up water was supplied to the boiler after a period of time. This caused the boiler to experience the low water condition and subsequently shut down.

The transfer pump breaker from the holding tank had tripped. Upon discussions with John Y Wright Company the transfer pump impeller clearance needs to be adjusted. John Y. Wright to send out a person to adjust and check the boiler.

New water meters requested for each of the WTDP's due to the fact that the ones originally order with the system do not work accordingly. Water meters shipped overnight to Chesapeake office.

Extra transfer pump filters shipped to Chesapeake office. Filter unit also shipped.

Steam System monitored: Readings taken, System (boiler shut down some time during the early morning, when the boiler experienced the low water condition.

Well	PROBE	DEPTH	TEMP °F	Time
MW-1S	T1	13	64.5	1020
	T2	18	67.1	
	T3	23	96.0	
MW-2S	T1	13	59.5	
	T2	18	62.4	
	T3	23	65.9	
MW-3S	T1	13	62.7	
	T2	18	62.3	
	T3	23	61.2	
MW-4S	T1	13	61.0	
	T2	18	59.9	
	T3	23	61.9	
MW-5S	T1	13	59.9	
	T2	18	61.6	
	T3	23	62.4	1030

Hot Water System Monitored.

Well	Probe	Depth	Temp °F	Time
MW-1H	T1	13	135.5	1120
	T2	18	86.3	
	T3	23	96.7	
MW-2H	T1	13	60.7	
	T2	18	58.6	
	T3	23	59.6	
MW-3H	T1	13	59.9	
	T2	18	60.1	
	T3	23	61.2	
MW-4H	T1	13	59.9	
	T2	18	61.0	
	T3	23	61.6	
MW-5H	T1	13	58.7	
	T2	18	62.0	
	T3	23	60.1	1130

Take down data logger decon all probes and probe cables. Heavy rain fall today.

YORKTOWN FIELD DATA SHEET

DATE: 5/5/93 NAME: T SWORD
TIME ON SITE: 0750

STEAM SYSTEM TEMPERATURE READINGS:

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13	64.5	1022
	T_2	18	67.1	1023
	T_3	23	96.0	1023
MW-2S	T_1	13	59.5	1029
	T_2	18	62.4	1029
	T_3	23	65.9	1030
MW-3S	T_1	13	62.7	1020
	T_2	18	62.3	1021
	T_3	23	61.2	1021
MW-4S	T_1	13	61.0	1052
	T_2	18	59.9	1053
	T_3	23	61.9	1054
MW-5S	T_1	13	59.9	1026
	T_2	18	61.6	1027
	T_3	23	62.4	1028

← STEAM SYSTEM OFF DUE TO BOILER LOW WATER CONDITION - DUE TO WATER MAIN BREAK OFF-SITE NO WATER (MAKE UP WATER) CURRENTLY SUPPLIED TO SITE

Well	Probe #	Depth (ft)	T°F	Time
MW-1S	T_1	13		
	T_2	18		
	T_3	23		
MW-2S	T_1	13		
	T_2	18		
	T_3	23		
MW-3S	T_1	13		
	T_2	18		
	T_3	23		
MW-4S	T_1	13		
	T_2	18		
	T_3	23		
MW-5S	T_1	13		
	T_2	18		
	T_3	23		

Yorktown field data compile
5/6/93
on site 0804

John Y. Wright Steam Contractor on site :
All Steam Injection well heads welded up 5/5/93
Boiler fired this morning, electric problems fixed with regard to transfer pump and impeller issue.
Vaccum in fuel line cleared up.
Water from city for make up water to boiler cleared up and on line.

T. Orner, piping in filer unit for water transfer unit. Still need to get sample port installed.

New water meters for RW's brought to site and installed.

Temperature readings for steam system taken:

Well	Probe	Depth	Temp °F	Time
MW-1S	T1	13	71.1	833
	T2	18	68.6	834
	T3	23	90.8	834
MW-2S	T1	13	59.3	831
	T2	18	59.8	832
	T3	23	65.4	833
MW-3S	T1	13	63.1	829
	T2	18	63.4	829
	T3	23	63.5	830
MW-4S	T1	13	61.5	830
	T2	18	61.0	830
	T3	23	61.3	831
MW-5S	T1	13	60.8	835
	T2	18	61.2	836
	T3	23	61.5	836

GW- Pumping systems: water meter readings;
RW-1S 302 gal WTDP off
RW-2H 30 gal WTDP off
RW-3X 46 gal WTDP off All three meters to be replaced today
Replaced meters
GW-Discharge temps once on:
RW-1S = 84°F
RW-2H = 76
RW-3X = 58

RW-1S dtw = 15.1 dtp = 14.87
RW-2H dtw = 15.43 dtp = tr discharge emulsified in part
RW-3X dtw = 16.55 dtp = tr discharge emulsifed in part

HOT WATER INJECTION SYSTEM BACK ON LINE: Temperature readings:

Well	Probe	Depth	Temp°F	Time
MW-1H	T1	13	112.6	842
	T2	18	89.7	842
	T3	23	93.2	843
MW-2H	T1	13	61.7	843
	T2	18	58.2	843
	T3	23	61.2	844
MW-3H	T1	13	57.9	844
	T2	18	58.7	844
	T3	23	59.9	845
MW-4H	T1	13	59.5	845
	T2	18	59.3	845
	T3	23	59.2	846
MW-5H	T1	13	62.2	846
	T2	18	60.6	847
	T3	23	60.4	847

Flow rates:

RW-1S = 2.1 gpm
RW-2H = 3.2 gpm
RW-3X = 2.0 gpm

New water meter initial readings:
RW-1S @ 10 gal
RW-2H @ 10 gal
RW-3X @ 10 gal

Product recovery notes:
1. RW-1S 1/2" product in bottom of recovery tank
2. RW-2H No recovery as of yet
3. RW-3X No recovery as of yet

Steam Pressure Injection rates
SI-1 = 8 psig
SI-2 = 6 psig
SI-3 = 6 psig
SI-4 = 6 psig

Total injection pressure rate 12 psig

YORKTOWN SITE MONITORING FORM

DATE: 5/17/93
NAME: J. Martin
Arrive on site (time) 13:30

Weather Conditions: Partly Cloudy
Depart From Site (time) _____

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	172.6	2-TAPES ON WIRE FOR JACK	13:40
	T2	18	150.2	1-TAPE ON WIRE FOR JACK	
	T3	23	155.4	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	86.7	2-TAPES ON WIRE FOR JACK	
	T2	18	71	1-TAPE ON WIRE FOR JACK	
	T3	23	67.4	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	211	2-TAPES ON WIRE FOR JACK	
	T2	18	212	1-TAPE ON WIRE FOR JACK	
	T3	23	214	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	198.6	2-TAPES ON WIRE FOR JACK	
	T2	18	137.6	1-TAPE ON WIRE FOR JACK	
	T3	23	100	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	57.2	2-TAPES ON WIRE FOR JACK	
	T2	18	58.3	1-TAPE ON WIRE FOR JACK	
	T3	23	58.4	NO TAPE ON WIRE FOR JACK	13:50

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	89	2-TAPES ON WIRE FOR JACK	13:50
	T2	18	92	1-TAPE ON WIRE FOR JACK	
	T3	23	72	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	68	2-TAPES ON WIRE FOR JACK	
	T2	18	58	1-TAPE ON WIRE FOR JACK	
	T3	23	60	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	57	2-TAPES ON WIRE FOR JACK	
	T2	18	57	1-TAPE ON WIRE FOR JACK	
	T3	23	58	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72	2-TAPES ON WIRE FOR JACK	
	T2	18	66	1-TAPE ON WIRE FOR JACK	
	T3	23	65	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	124	2-TAPES ON WIRE FOR JACK	
	T2	18	99	1-TAPE ON WIRE FOR JACK	
	T3	23	65	NO TAPE ON WIRE FOR JACK	14:00

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/17/93

WELL	DTP*	DTW**	NOTES:
RW-1S	13.20		H^2O mix on surface
RW-2H	15.06		-
RW-3X	15.63		
MW-1S	12.08	12.63	.55 LPH
MW-2S		11.84	LPH mix
MW-3S	12.48		
MW-4S		11.52	Lite LPH mix on surface
MW-5S		12.98	No LPH
MW-1H	14.48		H^2O mix on surface
MW-2H		13.15	Lite LPH mix
MW-3H		13.24	No LPH
MW-4H		13.08	No LPH
MW-5H		14.08	No LPH

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler Not in operation this visit

			Time
Fuel Pressure:	OFF	in psig	
Boiler Pressure:	↓	in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data: Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter	1150	in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y) or N)
If yes, how many gals 433
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/17/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	
SI-4	

Total Steam Injection Pressure: 0 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	0	104
RW-2H	0	379
RW-3X	0	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	FILM
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation No (ok - yes or no)
Notes; Power to site turned off By Coast Guard over weekend due to steam/product mix rising From MW35.

✓ Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

5/17
5/18

GROUNDWATER TECHNOLOGY, INC.
Accident/Incident (near miss) Report
↳ SYSTEM.

Employee's Name: N/A. D.O.B. N/A
Address: SITE - YORKTOWN D.O.H. N/A
SS# N/A.

Job Title: — Supervisor's Name: - T. SWORD - SITE MGR
Office Location: CHESAPEAKE
Location at Time of Incident: YORKTOWN Project Site FISC
Date/Time of Incident: 5-16-93 10AM (SUNDAY)
Project Name: YORKTOWN
Project Number: 830011098 Project Mgr. PAUL FARRINGTON

Describe clearly how the ~~accident~~ incident. occurred: SEE ATTACHED.

Was incident: Physical X Chemical —
Parts of body affected N/A. Exposure: Dermal —
right left Inhalation —
Ingestion —
Witnesses: 1) — COAST GUARD SECURITY — 2) —
Conditions/acts contributing to this incident SEE ATTACHED.

Managers must complete this section:
Explain specifically the corrective action you have taken to prevent a recurrence:
① SYSTEM SHUT DOWN ② ENGINEERING - REPAIR TO ALL MONITORING WELLS TO INCLUDE THREADED TIGHT WELL CAPS - ③ RE-EVALUATE SYSTEM OPS.
Did injured go to doctor: N/A Where: N/A
— When: —
Did injured go to hospital: N/A Where: —
When: —

Signatures:

Employee	Reporting Manager	Health & Safety Manager
5-18-93	5.18.93	
Date	Date	Date

Accidents must be reported immediately; this form must be completed, signed and returned to the Health and Safety Manager within 24 hours. The HSM will forward a copy to Corporate Health and Safety.

May 18, 1993

Incident description:

During the Coast Guard's security personnel rounds at the Yorktown site (during the weekend) petroleum odor was noticed coming from the vicinity of the steam injection pilot system. Upon further inspection by the coast Guard personnel it was noted that from the tee atop the monitoring well, (MW-1S) [monitoring well no. 1 - steam], condensate water and steam and product was spurting out. As a result they called to FISC (Fleet Industrial Supply Center) "Fuel Center" personnel to see what to do to correct the problem.

They therefore shut off the power to the entire system and notified the GSI Chesapeake office Monday morning at 7:30 am. GSI responded to the site 5/17/93 Monday and arrived at the site at 13:30 hr. The system was further shut down and monitored for temperatures with special attention to the steam system.

The response of shutting off the power was the correct response.

Inspection of the site on 5/17/93 indicated that approximately 2 to 3 gallons of oil (product) with water had sprayed onto the grass area immediately surrounding the monitoring well head.

Clean up response to the site transpired on 5/18/93 at 12:00 hr. A subcontractor (Fishburne Drilling) provided laborers and two empy drums to shovel contaminated soil into. A subcontractor was utilized to clean up the problem due to the lack of immediately available GSI/GTI resources based out of the Chesapeake office. The need to immediately address this situation was expressed by the customer at 9:05 hr. on 5/18/93 as the State Regulatory body will be visiting the site on 5/19/93

Boiler:
Fuel pressure 280 psig
Boiler pressure 28 psig
Water level normal
In low fire condition @ 930am
Hot water meter @ 12901 gals @ 9.6 gpm
lb/hr steam feed rate 500 lb/hr @938 am
Stack Temp 450°F
Steam totalizer @ 1 x 100 = 100 lb + 8800 previously = 8900lb/steam
All systems running.

Heat exchanger:
Holding tank temp = 140°F
Sight tube normal level
Influent wtr temp 63°F
Effluent wtr temp 160°F
Influent wtr pressure 42 psig
Influent wtr mtr @ 3042 gal

Yorktown field data compile
5/7/93

0758 receive call from Bobby Vandevender:

One of the recovery tanks, RW-1S overflowed, leaked and spurted oil and water on the ground surrounding it. Bobby shut off the system and it stopped.

Mobilized to site arrive on site @ 1350 hr
1. RW-1S recovery tank over pressurized. Tank initially installed with out vent relief...
2. Tank full probe activated however did not stop recovery pump from pumping, control panel failure.
3. Tank full switch tripped. Reset and would not operate manually, Control panel relay clicking..failure in electrical system. Shut off system electrics.

4. Shut off hot water system and standard system in case of similar type problems with control panels. Shut off boiler, power to the site for the weekend is going to be shut off for maintenance.

Several phone calls made to appropriate personnel to mobilize to site for repairs on Monday.

Start clean up proceedings. Four drums with contaminated soil filled and site cleaned up. Additional clean up on tank needs to take place on Monday. Vents need to be installed on all four tanks. Control panels all need to be looked at for similar type problems and repaired as necessary.

YORKTOWN SITE MONITORING FORM

DATE: 5/7/93
NAME:
Arrive on site (time)

Weather Conditions: Fair
Depart From Site (time)

Steam Injection System Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING °F	Description	TIME
MW-1S	T1	13	70.8	2-TAPES ON WIRE FOR JACK	
	T2	18	72.4	1-TAPE ON WIRE FOR JACK	
	T3	23	100.3	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	57.0	2-TAPES ON WIRE FOR JACK	
	T2	18	57.7	1-TAPE ON WIRE FOR JACK	
	T3	23	59.8	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	70.6	2-TAPES ON WIRE FOR JACK	
	T2	18	68.8	1-TAPE ON WIRE FOR JACK	
	T3	23	68.1	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	~~70.6~~ 67.9	2-TAPES ON WIRE FOR JACK	
	T2	18	~~68.8~~ 66.3	1-TAPE ON WIRE FOR JACK	
	T3	23	~~68.1~~ 66.2	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	56.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	
	T3	23	57.9	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	86.3	2-TAPES ON WIRE FOR JACK	
	T2	18	74.5	1-TAPE ON WIRE FOR JACK	
	T3	23	70.9	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	56.9	2-TAPES ON WIRE FOR JACK	
	T2	18	57.3	1-TAPE ON WIRE FOR JACK	
	T3	23	58.3	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	56.5	2-TAPES ON WIRE FOR JACK	
	T2	18	57.2	1-TAPE ON WIRE FOR JACK	
	T3	23	58.3	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	56.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.0	1-TAPE ON WIRE FOR JACK	
	T3	23	57.6	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	69.4	2-TAPES ON WIRE FOR JACK	
	T2	18	60.8	1-TAPE ON WIRE FOR JACK	
	T3	23	58.8	NO TAPE ON WIRE FOR JACK	

GROUNDWATER TECHNOLOGY

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: _____

WELL	DTP*	DTW**	NOTES:
RW-1S			
RW-2H			
RW-3X			
MW-1S			
MW-2S			
MW-3S			
MW-4S			
MW-5S			
MW-1H			
MW-2H			
MW-3H			
MW-4H			
MW-5H			

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low _____ normal ____ high _____ (Located right hand side of boiler)

Note boiler fire conditio low fire _____ high fire _____

Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low _____ normal ____ high _____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

GROUNDWATER TECHNOLOGY

YORKTOWN SITE MONITORING FORM

Yorktown data compile

5/10/93 (Monday)
Mobilize to site to take care of the following problems:

1. GRS - issue with the control panel and tank full probe failure at RW-1S.

2. GRS- issue with providing adequate venting for each of the recovery tanks.

3. John Y. Wright Company - issue with transfer pump in boiler, clinker in boiler, and cleaning of the fuel jets for the boiler burner.

4. Full clean up check of the product sprayed out of the recovery tank at RW-1S.

Standard monitoring as the system was shut down over the weekend due to problems and also the fact that power was turned off to the site over the weekend. This means a restart-up of the system will also occur.

Site cleaned up...

Vents installed on all four recovery tanks, i.e. one at oil water separator, RW-1S, RW-2H, and RW-3X.

Each of the control panels were worked on by GRS, and new extra relays were installed in each of the control panels. Equipment was then check for proper operation.

All equipment was then functional. Each of the product recovery pumps were adjusted (minor) for location of intaske with respect to the level of product in the well. Level switch probes were cleaned and checked.

Boiler was fixed with respect to clinker, burner jets and the transfer pump. System fired back on and made functional.

YORKTOWN SITE MONITORING FORM

DATE: 5-10-93
NAME: John Partin
Arrive on site (time) 9:45 am

Weather Conditions: clear, sunny
Depart From Site (time) 3:15 pm

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	74	2-TAPES ON WIRE FOR JACK	12:00pm
	T2	18	76.7	1-TAPE ON WIRE FOR JACK	Thru
	T3	23	92.9	NO TAPE ON WIRE FOR JACK	14:30
MW-2S	T1	13	57.5	2-TAPES ON WIRE FOR JACK	
	T2	18	57.9	1-TAPE ON WIRE FOR JACK	
	T3	23	59.7	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	81.9	2-TAPES ON WIRE FOR JACK	
	T2	18	78.2	1-TAPE ON WIRE FOR JACK	
	T3	23	78.1	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	85.4	2-TAPES ON WIRE FOR JACK	
	T2	18	70.4	1-TAPE ON WIRE FOR JACK	
	T3	23	67.6	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	56.6	2-TAPES ON WIRE FOR JACK	
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	
	T3	23	58.0	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	84.2	2-TAPES ON WIRE FOR JACK	14:30
	T2	18	78.9	1-TAPE ON WIRE FOR JACK	Thru
	T3	23	78.3	NO TAPE ON WIRE FOR JACK	15:30
MW-2H	T1	13	57.0	2-TAPES ON WIRE FOR JACK	
	T2	18	57.3	1-TAPE ON WIRE FOR JACK	
	T3	23	58.4	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	56.5	2-TAPES ON WIRE FOR JACK	
	T2	18	57.2	1-TAPE ON WIRE FOR JACK	
	T3	23	58.2	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	56.7	2-TAPES ON WIRE FOR JACK	
	T2	18	56.8	1-TAPE ON WIRE FOR JACK	
	T3	23	57.7	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	68.1	2-TAPES ON WIRE FOR JACK	
	T2	18	64.4	1-TAPE ON WIRE FOR JACK	
	T3	23	58.8	NO TAPE ON WIRE FOR JACK	

GROUNDWATER TECHNOLOGY

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5-10-93

WELL	DTP*	DTW**	NOTES:
RW-1S	12.12	14.06	1.94 LPH
RW-2H	15.54	17.62	2.08 LPH
RW-3X	16.58		NO H2O, All LPH
MW-1S		13.10	NO LPH
MW-2S	12.33		NO H2O, All LPH
MW-3S	13.13		NO H2O, All LPH
MW-4S		12.43	NO LPH
MW-5S		13.24	NO LPH
MW-1H	12.20	13.10	.90 LPH
MW-2H		14.35	NO LPH
MW-3H		14.53	NO LPH
MW-4H		14.45	NO LPH
MW-5H		15.30	NO LPH

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	275	in psig	
Boiler Pressure:	34	in psig	
Stack Temperature:	440	in deg. F	1430
Steam Feed Rate	565	in lb/hr	1430
Total Steam Fed x100	5700	in lbs	1430

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? (Yes) or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	66	in deg. F
Influent Water Pressure:	48	in psig
Influent Water Meter	478	in gal.
Effluent Water Temp.	180 @ 48	in deg. F
Hot Water Meter	282	in gal.
Hot Water Flow Rate	9.9	in GPM

Fuel Oil received today? (Y or (N))
If yes, how many gals _____
And which tank inside or outside.

GROUNDWATER TECHNOLOGY

Yorktown

5-10-93 | 830011C98 - 620418 | 7.25hr | Clear Sunny 80°

SISM	T1	T2	T3
MW1S	74	76.7	92.9
MW2S	57.5	57.9	59.7
MW3S	81.9	78.2	78.1
MW4S	85.4	70.4	67.6
MW5S	56.6	57.4	58.0
HWSTM 1H	84.2	78.9	78.3
2H	57.0	57.3	58.4
3H	56.5	57.2	58.2
4H	56.7	56.8	57.7
5H	68.1	64.4	58.8
	Flow meter	Temp	GPM
RW1S	17	85	2.4
RW2H	18	64	2.5
RW 3	41	61	2.4

Adjust to 1.6

MW	DTW	DTP	PT
MW1S	13.10		
RW1S	14.06	15.12	1.94
RW2H	15.54	17.62	2.08
RW5x		16.58	
MW2S		12.33	
MW3S		13.13	
MW4S	12.45		
MW5S	13.24		
MW1H	13.10	12.20	.90
MW2H	14.35		
MW3H	14.53		
MW4H	14.45		
MW5H	15.30		

- Introduced to site & equipment by Taylor.
- Overview of operation, maintenance & monitoring w/ Taylor.

YORKTOWN SITE MONITORING FORM

Yorktown field data compile
5/11/93

Site visit:

Check if all systems are running.
Perform minor boiler maintenance.
Explain system to Mike McQuiston

All systems runing normally at 1300 hr

Perform boiler blow down and minor boiler maintenance

Check all three WTDP and water discharges. From the water discharge at RW-1S getting emulsified product in the water going to the oil water separator. Shut off the WTDP only at RW-1S to see what effect if any on the emulsified problem. Intake for the water is down at 29 feet below grade. Water interface with product is at ~14 ft.

YORKTOWN SITE MONITORING FORM

DATE: 5-12-93
NAME: J. PARTIN
Arrive on site (time) 8:00AM

Weather Conditions: Sunny, Clear 80°
Depart From Site (time) 3:00 pm

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	116.4	2-TAPES ON WIRE FOR JACK	8:44
	T2	18	161.9	1-TAPE ON WIRE FOR JACK	~~8:45~~
	T3	23	158.9	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	58.6	2-TAPES ON WIRE FOR JACK	8:45
	T2	18	58.8	1-TAPE ON WIRE FOR JACK	↓
	T3	23	60.3	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	138	2-TAPES ON WIRE FOR JACK	8:49
	T2	18	163.2	1-TAPE ON WIRE FOR JACK	↓
	T3	23	161	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	115.3	2-TAPES ON WIRE FOR JACK	8:47
	T2	18	87.2	1-TAPE ON WIRE FOR JACK	↓
	T3	23	71.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	56.8	2-TAPES ON WIRE FOR JACK	8:42
	T2	18	57.4	1-TAPE ON WIRE FOR JACK	↓
	T3	23	57.8	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	165.2	2-TAPES ON WIRE FOR JACK	8:51
	T2	18	151.4	1-TAPE ON WIRE FOR JACK	↓
	T3	23	166.2	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	57.1	2-TAPES ON WIRE FOR JACK	8:53
	T2	18	57.3	1-TAPE ON WIRE FOR JACK	↓
	T3	23	58.5	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	56.5	2-TAPES ON WIRE FOR JACK	8:55
	T2	18	57	1-TAPE ON WIRE FOR JACK	↓
	T3	23	58.1	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	57.2	2-TAPES ON WIRE FOR JACK	8:57
	T2	18	57.1	1-TAPE ON WIRE FOR JACK	↓
	T3	23	57.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	86.8	2-TAPES ON WIRE FOR JACK	8:59
	T2	18	68.3	1-TAPE ON WIRE FOR JACK	↓
	T3	23	59.1	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/12/93

WELL	DTP*	DTW**	NOTES:
RW-1S		13.81	Product Film
RW-2H	21.46		
RW-3X	19.36		
MW-1S	11.82		
MW-2S	11.81		
MW-3S	12.04		
MW-4S		11.73	Product Film
MW-5S		12.44	
MW-1H	11.93		
MW-2H	13.55		
MW-3H	13.74		
MW-4H	13.41		Product Film
MW-5H	12.84		

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	275	in psig	10:30am
Boiler Pressure:	34	in psig	|
Stack Temperature:	440	in deg. F	|
Steam Feed Rate	655	in lb/hr	|
Total Steam Fed x100	32900	. in lbs	11:00am

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? (Yes) or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	68	in deg. F
Influent Water Pressure:	50	in psig
Influent Water Meter	394	in gal.
Effluent Water Temp.	180	in deg. F
Hot Water Meter	533	in gal.
Hot Water Flow Rate	8.5	in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals 494.8
And which tank inside or (outside)

YORKTOWN SITE MONITORING FORM

Date: 5/12/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	8
SI-2	6
SI-3	6
SI-4	6

Total Steam Injection Pressure: 13 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	Pump off	103
RW-2H	1.2	212
RW-3X	2.6	223

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	7"
RW-2H	Film
RW-3X	Film
O/W*	2"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation ok (ok - yes or no)
Notes;

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

Yorktown

5-12-93

HOT & HAZE 82°

-	SISM	WELL	TEMP	
MW15	T1	T2	T3	TIME
MW15	116.4	161.9	158.9	8:44
MW25	58.6	58.8	60.3	8:45
MW35	128.0	163.2	161.0	8:49
MW45	115.3	87.2	71.7	8:47
MW55	56.8	57.4	57.8	8:42
-				
HWSTM	T1	T2	T3	TIME
MW1H	165.2	151.4	166.2	8:51
MW2H	57.1	57.3	58.5	8:53
MW3H	56.5	57.0	58.1	8:55
MW4H	57.2	57.1	57.2	8:57
MW5H	86.8	68.3	59.1	8:59

- Gauge monitoring wells on site

MW	DTP	DTW	Flow TOTAL GPM	GPM	Temp
RW15		13.81	103	Pump OFF	99° when ran
RW2H	21.46		212	cycling 1.2	70°
RW3X	19.36		223	2.6	60°
✓ MW15	11.82	unable	to gauge H_2O level		
MW25	11.81				
MW35	12.04				
✓ MW45		11.73	Product Film		
✓ MW55		12.44			
MW1H	11.93				
✓ MW2H	13.55				
✓ MW3H	13.74				
✓ MW4H	13.41	LT. Film product			
✓ MW5H	12.84				

- Due to the thickness & coatability of this product it is impossible to gauge DTW where there is considerable levels of product in well.

5/12/93

Yorktown

- Boiler Maintenance
- Fuel Pressure 275 psig
- Boiler Pressure 34 psig
- Stack Temp 440 °F
- Steam Feed Rate 655 lb/hr
  x 100
- Total Steam Feed 32900 lbs
- Sight glass H^2O Level = Normal
- Boiler Fire Cond = LOW

HEAT Exchanger Hot Water Inj.

- Sight glass H^2O Level = Normal
- INF H^2O Temp = 68
- INF H^2O Pressure = 50
- INF H^2O meter = 894
- EFF H^2O temp = 180
- Hot H^2O meter = 533
- Hot H^2O Flow rate = 8.5

- STEAM INJ. System
- Total Pressure = 13 psig

INJ. WELL	PSIG	Valve
1	8	100% O.
2	6	100% O.
3	6	100% O.
4	6	100% O.

	P.R.T.	
RW-1S	7"	inches of Product
RW-2H	Film	
RW-3X	Film	
O/W	2"	

YORKTOWN SITE MONITORING FORM

DATE: 5/14/93
NAME: J. PACTIN
Arrive on site (time) 9:00 AM

Weather Conditions: RAIN
Depart From Site (time) 4:00 pm

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	146	2-TAPES ON WIRE FOR JACK	10:30 AM
	T2	18	169	1-TAPE ON WIRE FOR JACK	↓
	T3	23	158	NO TAPE ON WIRE FOR JACK	↓
MW-2S	T1	13	67	2-TAPES ON WIRE FOR JACK	10:35
	T2	18	65	1-TAPE ON WIRE FOR JACK	↓
	T3	23	65	NO TAPE ON WIRE FOR JACK	↓
MW-3S	T1	13	186	2-TAPES ON WIRE FOR JACK	10:40
	T2	18	186	1-TAPE ON WIRE FOR JACK	↓
	T3	23	189	NO TAPE ON WIRE FOR JACK	↓
MW-4S	T1	13	173.1	2-TAPES ON WIRE FOR JACK	10:45
	T2	18	123	1-TAPE ON WIRE FOR JACK	↓
	T3	23	88.3	NO TAPE ON WIRE FOR JACK	↓
MW-5S	T1	13	58.7	2-TAPES ON WIRE FOR JACK	10:50
	T2	18	61	1-TAPE ON WIRE FOR JACK	↓
	T3	23	58	NO TAPE ON WIRE FOR JACK	↓

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	147.8	2-TAPES ON WIRE FOR JACK	10:55
	T2	18	124.6	1-TAPE ON WIRE FOR JACK	↓
	T3	23	129.4	NO TAPE ON WIRE FOR JACK	↓
MW-2H	T1	13	60.3	2-TAPES ON WIRE FOR JACK	11:00
	T2	18	62.6	1-TAPE ON WIRE FOR JACK	↓
	T3	23	63.4	NO TAPE ON WIRE FOR JACK	↓
MW-3H	T1	13	60	2-TAPES ON WIRE FOR JACK	11:05
	T2	18	60.8	1-TAPE ON WIRE FOR JACK	↓
	T3	23	58.9	NO TAPE ON WIRE FOR JACK	↓
MW-4H	T1	13	63.5	2-TAPES ON WIRE FOR JACK	11:10
	T2	18	63.8	1-TAPE ON WIRE FOR JACK	↓
	T3	23	63.9	NO TAPE ON WIRE FOR JACK	↓
MW-5H	T1	13	108.2	2-TAPES ON WIRE FOR JACK	11:15
	T2	18	84.7	1-TAPE ON WIRE FOR JACK	↓
	T3	23	61.3	NO TAPE ON WIRE FOR JACK	↓

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/14/93

WELL	DTP*	DTW**	NOTES:
RW-1S		12.35	INY Film
RW-2H	20.02		
RW-3X	17.46		
MW-1S	12.97		
MW-2S	11.91		
MW-3S		13.17	Film
MW-4S		12.39	Film
MW-5S		12.88	
MW-1H	12.79		
MW-2H		13.60	Film
MW-3H		13.69	
MW-4H		13.52	Film
MW-5H		14.46	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	278	in psig	2:00 PM
Boiler Pressure:	25	in psig	
Stack Temperature:	400	in deg. F	
Steam Feed Rate	540	in lb/hr	
Total Steam Fed x100	44500	in lbs	2:15 PM

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	68	in deg. F
Influent Water Pressure:	49	in psig
Influent Water Meter	1172	in gal.
Effluent Water Temp.	164	in deg. F
Hot Water Meter	773	in gal.
Hot Water Flow Rate	9.25	in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals 276.5
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/14/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	8.5
SI-2	6.25
SI-3	6.25
SI-4	6.75

Total Steam Injection Pressure: 12 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	↓
SI-4	↓

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	Pump OFF	
RW-2H	↓	
RW-3X	↓	

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	Film
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation OK (ok - yes or no)
Notes;

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

Yorktown

5/14/93 — RAIN 72°

-	T1 SISM	T2 WELL	T3 TEMP
MW-1S	146	169	158
MW-2S	67	65	65
MW-3S	186	186	189
MW-4S	173.1	123	88.3
MW-5S	58.7	61	58
-	T1 HWSTM	T2	T3
MW-1H	147.8	124.6	129.4
MW-2H	60.3	62.6	63.4
MW-3H	60	60.8	58.9
MW-4H	63.5	63.8	63.9
MW-5H	108.2	84.7	61.3

- Upon arrival Boiler was down
- Called Taylor, Called John Wright spoke to Mr. Ohrien he said they had been out on site 5/13/93 to check Boiler & Chip was on his way there now due to a control which was short cycling causing boiler to shut down. Will gauge wells while waiting for chip.

- Gauge monitoring wells on site

MW	DTP	DTW	
RW-1S		12.35	Hvy. Film
RW-2H	20.02		
RW-3x	17.46		
MW-1S	12.97		
MW-2S	11.91		
MW-3S		13.17	Film
MW-4S		12.39	Film
MW-5S		12.88	
MW-1H	12.79		
MW-2H		13.60	Film
MW-3H		13.69	
MW-4H		13.52	Film
MW-5H		14.46	

5/14/93 Yorktown

–	Boiler Maintenance			TIME
–	Fuel Pressure	378	psig	
–	Boiler Pressure	85.	psig	
–	Stack Temp.	400	°F	
–	Steam Feed Rate	540	lb/hr	
–	Total Steam Feed	44500	lb	
–	H^2O Level Sight glass =		Norm.	
–	Boiler Fire Cond. = LOW			
	HEAT Exchanger Hot WATER INJEC.			
–	H^2O Level Sight glass = Norm.			
–	INF H^2O Temp	68	°F	
–	INF H^2O Pressure	49	psig	
–	INF H^2O meter	1172	Gal.	
–	EFF H^2O Temp	164	°F	
–	Hot H^2O meter	773	Gal.	
–	Hot H^2O Flow Rate	9.25	GPM	

5/14/93 Yorktown

–	STEAM Pressure	Injec. System	Total press. = 12
INJ. WELL	PSIG	VALVE	
51-1	8.5	100%O.	
51-2	6.25	↓	
51-3	6.25		
51-4	6.75		
–	Recovery	Wells	RW15 - STEAM RW2H - HOT H^2O RW3X - Standard
RW	GPM	TOTAL FLOW	
RW15	OFF		
RW2H	OFF		
RW3X	OFF		
–	Product Recovery in inches		
RW15	8.5"		
RW2H	.8"		
RW3X	Film		
O/W	3"		

5

5/14/93

- Chip arrived 10:30 am worked on boiler until it was started @ 1:00 pm. Chip departed 2:45 pm after giving me a run down on the boiler.
- IF boiler pressure ever reaches above 40 psig turn off & call for service.
- IF boiler is not running upon arrival check following.
  1) low water & feed tank sight glass for water level. If ok
  2) check fuel pressure 275 normal
     0 = no fuel.
  3) check elec breakers.
  4) Press reset button once only burner should start.
- When checking low water level cut off for boiler, slowly open valve, glass will empty out and burner should cut off, feed pump will start to replenish water removed from process.
- Closing the valve should cause filling to normal level thus feed pump should cut off and burner should start.
- If feed pump does not cut off turn burner off and close INF to boiler water valve to avoid flooding of boiler.
- All WTDP are pumping product thus they were turned off until I could speak to Taylor concerning this matter. Product pumps were left on.

5/17/93

Yorktown

	SISM T1	T2	T3
MW1S			
MW2S			
MW3S			
MW4S			
MW5S			
	HWSTM T1	T2	T3
MW1H			
MW2H			
MW3H			
MW4H			
MW5H			

- ELEC. PWR TO SITE TURNED OFF By Coast Guard over WEEKEND DUE to CONCERN OF STEAM/Product mix EXITING From MW3S, It WAS very MINOR AND ONLY A SMALL AMOUNT OF Product WAS distributed in TWO Areas Aprox. 2x2 surrounding the T-CAP OF MW3S.

- Gauge WELLS ON SITE

MW	DTP	DTW	
RW1S	13.20	H_2O mix ON SURFACE	
RW2H	15.06		
RW3X	15.63		
MW1S	12.08	12.63	.55 LPH
MW2S		11.84	LPH mix
MW3S	12.48		
MW4S		11.52	Lite LPH mix ON SURFACE
MW5S		12.98	NO LPH
MW1H	14.48		H_2O mix ON SURFACE
MW2H		13.15	Lite LPH mix
MW3H		13.24	NO LPH
MW4H		13.08	NO LPH
MW5H		14.08	NO LPH

5/17/93

— Boiler Maintenance

— Boiler remains OFF AS INSTRUCTED By TAYLOR until Further NOTICE.

— Hot H^2O METER = 1150 gal.

— Fuel delivered = 435 gals

Totalizer Values inconsistent ?

— Recovery Wells

H^2O	Total METER READING
RW1S	104
RW2H	379
RW3X	381

— Product Recovery TANK

RW1S	8.5"
RW2H	.8"
RW3X	Fill
O/W	3"

Conditions/acts contributing to this incident:

This is a steam injection pilot system. Steam is being injected into the subsurface to help heat the soils at the vadose zone and just below the vadose zone to reduce the viscosity of bunker No. 6 --- so that flow of bunker No. 6 will occur towards a centralized recovery well. As the steam front moved away from the injection well -- it past through the monitoring well which is open to atomospheric pressure. The steam is being injected at 6 to 12 psig, and once the steam front past the open monitoring well, the path of least resistance was followed and steam, steam condensate water and some product was ejected from the monitoring well to the surface.

In order to mitigate this occurance the system has been shut down temporarily to facilitate the application of threaded tight (water tight) well caps. Due to some of the temperatures involved the well caps are or have to be low carbon steel or stainless steel. Plastic or rubber plug type well caps will not withstand the temperatures of the steam, which is in excess of 200 degrees fahrenheit.

The new well caps will be installed on the system by Friday 5/21/93.

Post-It™ brand fax transmittal memo 7671	# of pages ▸ 6
To D. SKOMSKY	From T. SYWORD
Co. GSI C/F	Co. GSI CHESAP
Dept.	Phone #
Fax # 215 558 2145	Fax #

May 18, 1993

Incident Report Yorktown

Date of incident: May 16, 1993 (Sunday)

Incident description:

During the Coast Guard's security personnel rounds at the Yorktown site petroleum odor was noticed coming from the vicinity of the steam injection pilot system. Upon further inspection by the coast Guard personnel it was noted that from the tee atop the monitoring well, (MW-$S) [monitoring well no. $- steam], condensate water and steam and product was spurting out. As a result they called to FISC (Fleet Industrial Supply Center) "Fuel Center" personnel to see what to do to correct the problem. They therefore shut off the power to the entire system and notified the GSI Chesapeake office Monday morning at 7:30 am. GSI responded to the site 5/17/93 Monday and arrived at the site at 13:30 hr. The system was further shut down and monitored for temperatures with special attention to the steam system.

The response of shutting off the power was the correct response.

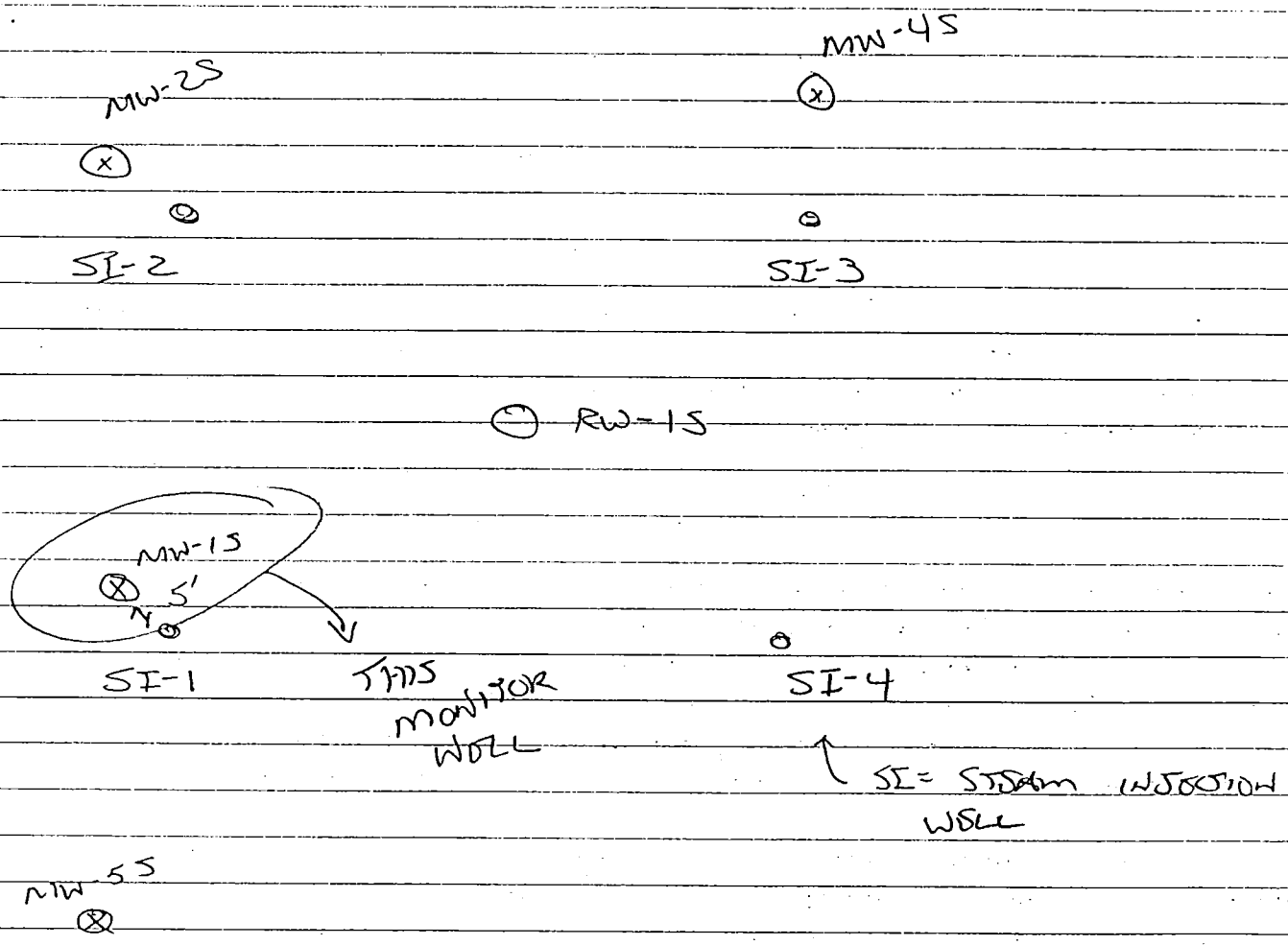
Inspection of the site on 5/17/93 indicated that approximately 2 to 3 gallons of oil (product) with water had sprayed onto the grass area immediately surrounding the monitoring well head.

In order to clean up two to three drums will be necessary to shovel dirt into covered with product. Potentially, some absorbant pads will be necessary to soak up any water with product in it. In discussions with on site personnel, the system is to remain shut down and clean up to transpire on Wednesday 5/19/93. The soils were bermed and the product at this time remains un-mobile.

On Tuesday 5/18/93 at 9:05 hrs GSI talked with J. Conway the RPM for the site and was appraised of the situation. On monday 5/17/93 the RPM was unavailable for notification. The PM Paul Farrington was notified on Monday 5/17/93.

During the Tuesday 5/18/93 phone discussion GSI was notified that the state of Virginia Regulatory body, had notified the Navy of a site visit to investigate contaminant problems associated with the Yorktown site. Mr. Conway expressed that the site should and had to be clean and presentable to the regulatory personnel. Subsequent to this GSI Chesapeake tried to locate personnel to mobilize to the site on an emergency basis to clean up the immediate problem --- the result is that no one is available, all personnel are committed to other projects -- GTI personnel were also tied up. As a result GSI called Fishburne Drilling for two laborers and two drums to immediately correct the situation today 5/18/93. I was quoted over the phone the cost of $300.00 to correct the problem. Mobilization to the site to occur this afternoon, --- and subsequent clean up to take place. Cost of this emergency clean up effort should not exceed $1,000.00.

YORKTOWN


MW-4S
MW-2S
SI-2
SI-3
RW-1S
MW-1S
5'
SI-1
THIS MONITOR WELL
SI-4
SI= STEAM INJECTION WELL
MW-5S

GROUNDWATER
TECHNOLOGY
GOVERNMENT SERVICES

Groundwater Technology Government Services, Inc.
1244 B Executive Boulevard, Suite 106, Chesapeake, VA 23320
Tel: (804) 436-7881 Fax: (804) 436-2312

PHONE LOG

DATE: 5·17·93

Call Recieved By: P. Taylor Sword, C.P.G.
Project Manager/Remediation Specialist

7:28 Am.

Made Call: ☐ Received Call: ☒ Returned Call: ☐

Contact: Norson -
Company Name:
Address: Site / Yorktown.

Title Maintenance Man @ FISC
Project Name: Yorktown
Project No. 830011098
Phone No.

Summary of Conversation

on Sunday 5/16/93 ~ 10 Am. Coast Guard Security, smelled oil @ Pilot Site. Steam injection system - oil & water coming out of ground @ injection point or monitoring well -

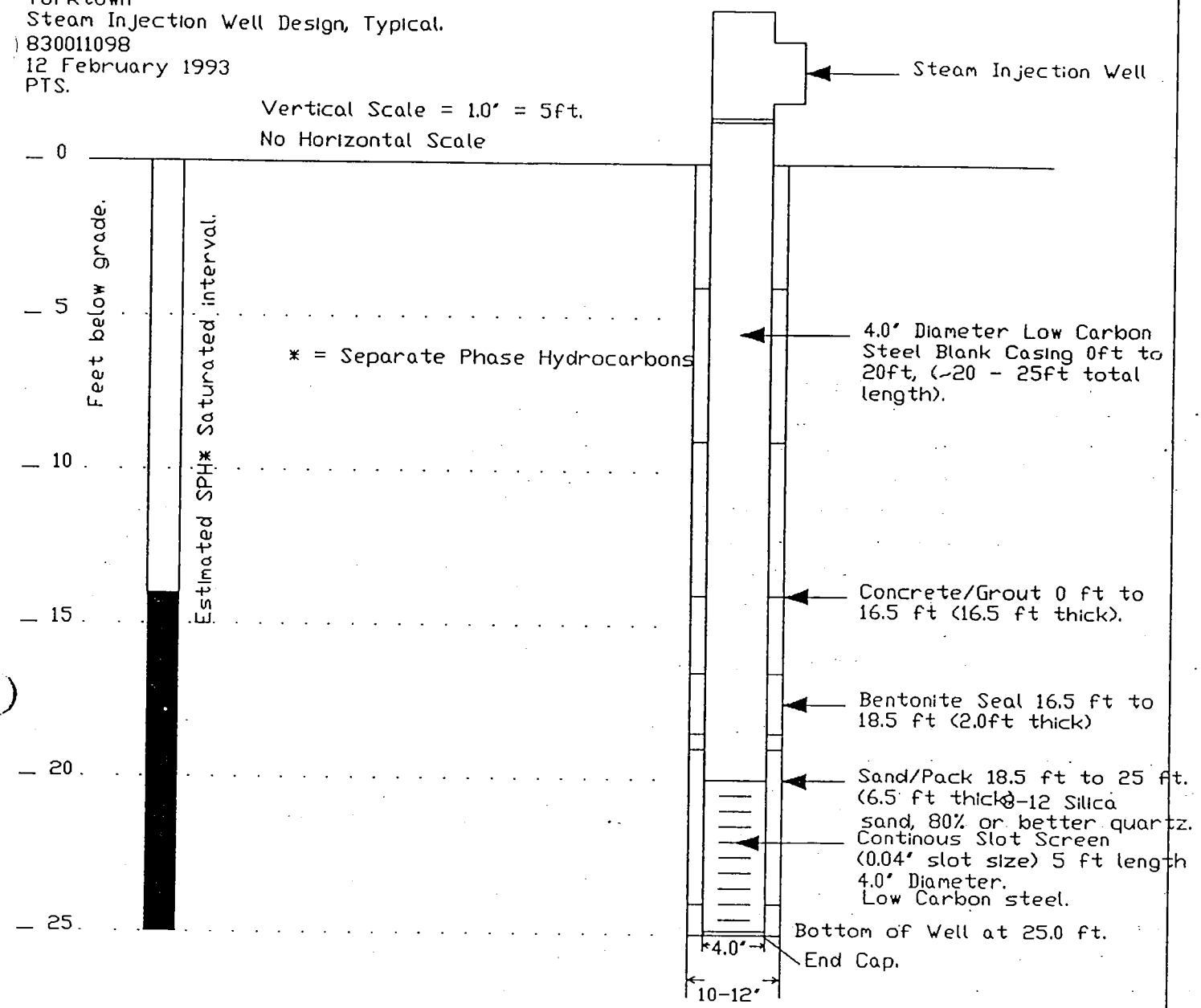
Therefore Coast Guard shut down power to system.

Norson @ Fuel Office said he was going to contact & let John Conway know this morning 5/17/93.

RESPONSE:

_____ Copy this memo to:

Yorktown
Steam Injection Well Design, Typical.
830011098
12 February 1993
PTS.



**Note: Final installed depth specifications to be determined in field due to SPH conditions.

GROUNDWATER TECHNOLOGY GOVERNMENT SERVICES INC.

YORKTOWN SITE MONITORING FORM

DATE: 5/19/93
NAME: J. Partin
Arrive on site (time) 8:00am

Weather Conditions: Cloudy 62°
Depart From Site (time) 13:00

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	169.8	2-TAPES ON WIRE FOR JACK	8:50AM
	T2	18	122	1-TAPE ON WIRE FOR JACK	
	T3	23	143.8	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	94.1	2-TAPES ON WIRE FOR JACK	
	T2	18	76.4	1-TAPE ON WIRE FOR JACK	
	T3	23	69.8	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	208	2-TAPES ON WIRE FOR JACK	
	T2	18	211	1-TAPE ON WIRE FOR JACK	
	T3	23	211	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	194.7	2-TAPES ON WIRE FOR JACK	
	T2	18	NEEDS REPAIR	1-TAPE ON WIRE FOR JACK	
	T3	23	107.2	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	61	2-TAPES ON WIRE FOR JACK	
	T2	18	62.8	1-TAPE ON WIRE FOR JACK	
	T3	23	64.7	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	110	2-TAPES ON WIRE FOR JACK	
	T2	18	97	1-TAPE ON WIRE FOR JACK	
	T3	23	94	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	65	2-TAPES ON WIRE FOR JACK	
	T2	18	62	1-TAPE ON WIRE FOR JACK	
	T3	23	61	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	58	2-TAPES ON WIRE FOR JACK	
	T2	18	58	1-TAPE ON WIRE FOR JACK	
	T3	23	59	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71	2-TAPES ON WIRE FOR JACK	
	T2	18	70	1-TAPE ON WIRE FOR JACK	
	T3	23	64	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	109	2-TAPES ON WIRE FOR JACK	
	T2	18	93	1-TAPE ON WIRE FOR JACK	
	T3	23	68	NO TAPE ON WIRE FOR JACK	9:00am

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/19/93

WELL	DTP*	DTW**	NOTES:
RW-1S	13.58		
RW-2H	16.82		
RW-3X	16.22		
MW-1S	12.47		
MW-2S	12.10		
MW-3S	12.50		
MW-4S		11.79	Lite LPH Mix
MW-5S		12.92	
MW-1H	13.28		
MW-2H		13.82	Lite LPH Film on Surface
MW-3H		14.97	
MW-4H		13.85	
MW-5H		14.86	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler Not in operation this visit.

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter	1150	in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y) or N)
If yes, how many gals 34.5
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/19/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	
SI-4	

Total Steam Injection Pressure: 0 psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O -
SI-2	↓
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S	0	104
RW-2H	0	379
RW-3X	0	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	FILM
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation NO (ok - yes or no)
Notes; ELEC PWR REAPPLIED HOWEVER A PROBLEM EXISTS AND WILL REQUIRE FUTHER INVESTIGATION. NEXT VISIT ON 5/21/93

✓ Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

Yorktown Fl

5/19/93

Cloudy 62° rain

- SISM & HWSTM

MW	T1	T2	T3	Time
MW1S	169.8	122	145.8	8:30am
MW2S	94.1	76.4	69.8	
MW3S	208	211	211	
MW4S	194.7	Needs repair	107.2	
MW5S	61	62.8	64.7	
MW1H	110	97	94	
MW2H	65	62	61	
MW3H	58	58	59	
MW4H	71	70	64	
MW5H	109	93	68	9:00am

- wire lead to T2 of MW4S had been cut & will be repaired.

- Gauge wells on site

MW	DTP	DTW	Total Flow		
RW1S	13.58		104		
RW2H	16.82		379		
RW3X	16.22		3.21		
MW1S	12.47				
MW2S	12.10				
MW3S	12.50				
MW4S		11.79	LT. LPH	mix	
MW5S		12.92			
MW1H	13.28				
MW2H		13.82	LT. LPH	Film	
MW3H		14.97			
MW4H		13.85			
MW5H		14.86			

Yorktown

5/19/93

- Boiler maintenance
- Boiler not in operation at this time having been powered down over weekend. Taylor instructed me not to restart boiler this visit. I have informed Bobby to supply elec. power to site for use in pumping systems only.
- I could hear x-former in control box for groundwater & O/W seperator pumps running but could not obtain supply power for well pump operation.

- Recovery Wells

	TOTAL METER READING
RW1S	104
RW2H	379
RW3X	321

- Product Recovery

RW1S	8.5"
RW2H	.8"
RW3X	Film
O/W	3"

Post-It™ brand fax transmittal memo 7671 | # of pages ▸ 4

To	From
Ron Fitzsimmons	T. Sword
Co. GSI 4P	Co. GSI Amoco
Dept. F/1	Phone #
Fax # 215 588 2415	Fax #

Yorktown Site Chronology: 5/21/93 to

5/21/93

Site visit on Friday: 5/21 J. Partin Tech.
Monitor site for DTW DTP in Monitoring wells and Recovery wells.
Temperature readings taken at each of the thermistors at each of the monitoring wells.

Boiler Still down electrical Problems, associated with the initial try after clean up of incident and subsequent system shut off on 5/16/93. Upon further inspection power main breaker was turned on to the system 5/19/93 however none of the recovery panels controlling the WTDP's or recovery pumps was operable. In addition the transfer pump operation was affected and non-functional.

J. Partin relayed this information to the GSI office on 5/19/93 and again on 5/21/93. GRS the vendor for the recovery equipment has been contacted, and states that they do not have enough information regarding proper diagnosis of the problem.

Subsequent action to take place, get on GRS's case and get the information necessary to diagnose the problem.

5/24/93 Monday: Site monitored even though boiler down, and recovery systems are down. No available Site manager unable to visit site this day due to prior committments. Site monitored for DTW DTP and temp data, recovery data etc., as per the normal routine for monitoring.

Data being compiled for Mr. John Conway: Discussed data compilation on Friday 5/21 and stated delivery date for data to date will be on 5/25/93 Tuesday.

5/25/93 Tuesday:

T. sword leave office at 1100 hr arrive at LANTDIV OFFICE 1135 hr. Dropped off all field data to date (5/21/93) on Mr. J. Conway's desk. John was not in at the time. Talked with Mr. J. Kresky other project issues.

Leave LANTDIV office at 1207 hr continue to Yorktown.
Arrive at Yorktown at 1300 hr.
Install well caps SS-307 2.0 inch diameter on each of the monitoring wells associated with the steam injection system.

Met with Mr. B. Vandevender, re: verify and check main breaker suppling power to the system is on. It was.

All systems seem to have power from the main trunk. Need to check sub-panel, and Verify with EE (electronic engineer) - GRS - Internal>>>>follow up on>>>>
Technically, - beyond site manager's technical expertise>>>> schedule EE for site visit.

5/26/93 Wednesday;

Arrive on site 0835hr with D. Winslow EE/GTI for system electric diagnosis: will further relay information to GRS to correct problem.

System power 480 v 3 phase power.

Meter out system:

1. Ck sub panel:
   a. 480v 3 phase coming in from main - ok
   b. RW-1S 480 v 3 phase coming in - ok
   c. RW-2H 480v 3 phase coming in - ok
   d. RW-3X 480v 3 phase coming in - ok

2. Transfer pump panel:
   Fuses ok
   relay - hand push transfer pump runs
   dc voltage problem --? relay not kicking dc voltage should be 12v dc - no reading -- relay not kicking

3. RW-3X panel
   Panel power from sub-panel - ok
   outside fuse gone - blown>>>>>>
   what would cause >>> possible spike?
   Supply side >>>

4. RW-2H panel
   Panel power from sub-panel - ok
   outside fuse gone - blown>>>>>>
   what would cause >>> possible spike?
   Supply side >>>

5. RW-1S panel
   Panel power from sub-panel - ok
   outside fuse blown >>>

Called GRS @ 0943 hr ~ relay all above information to:

Also explain transfer pump panel: in that dc voltage problem with power pack internal to panel, no voltage across or not 12 v dc --

Follow up with memorandum to P. Farrington and subsequent phone calls.

5/27/93 Thursday
Arrive on site at 1007 hr
GRS to be on site:
GRS Mike Repetto arrive on site 1009 hr RE: to correct electrical problems with the recovery equipment:

Open up panel for the transfer pump/
For transfer pump and ICV valve: check power supply, for 12 v dc power: getting 4.77 v dc pos.
Not behaving like it is designed to --- problem ---

Checked main pc board -- ok --- still have 12 v dc problem ---

on dc power board found that a resistor fried, and two capacitors were burnt ---

---

Attempt to fire boiler -- no success -- called John Y. Wright Co. Sending out some one this afternoon-----

---

Transfer pump control panel:
Power 12 v dc pak replaced converter - ok execept when turn on hand 12 v power drops out - - not suppost to do that --
Checked relay - ok
Diode above relay cut out -- diode bad
works ok without diode --?
diode used for filtering electronic noise for relay system connetion --
replaced diode --
After rewire transfer control panel with replacement parts power converter/supply dc voltage and new diode, panel is ok --- works as designed --**(see additional notes ↓)

As far as diagnosis of what caused problem:
1. Power pack dc volts dropped out - yet to determine as to why?
2. Power pack resistor burnt out - yet to determine as to why?
3. 2 - resistors capacitors on power pack burnt out - yet to determine as to why?
4. Diode on relay burnt out - why?

RW-3X control panel check:
check fuse on power supply: fuse blown 480v 1/2 amp fuse -- replaced
solid state pc board, relay fried and closed on RW-3x, with this condition product pump will run continously regardless of what probe tells it. >>>>> "doogie" gone.

RW-2H WTDP & rec. pump ok, wtdp pumps product ? product sinking in well —
Fuse: replaced and then system runs ok >>>>

RW-1S Fuse: replaced and then system runs ok >>>>

TRANSFER PUMP (AGAIN)
it was off, fill water side of o/wtr separator, and float switch over-rides WTDP for operation. This is what the system is suppost to do. Upon further inspection of the transfer pump panel, indications in tring to get it back on line today, lead to the discovery of a further panel failure: GRS continues to work on:
i/o board failure?
or chip board failure?

"doogie" on pc board for RW-3X is replaced, RW-3 up and running as designed.

Transfer pump panel:
Mike of GRS calling in to GRS office: pc board failure: he might be able to repair on site today: otherwise checking into fedxing one replacement down for install tomorrow: otherwiths is ther one of the 3 in the other systems that could be scavenged .... not really, ... wait and see after talking with office (GRS)...

GRS rep return from making phone call to home office: Don't have any replacement boards in stock at home office, cannot take one of the other boards from the recovery systems. Transfer pump in operable therefore none of the GW WTDP's can operate>>>>

Chip from John Y. Wright arrive: go thru boiler>>> fires up minor problem with leaky valve -- fixed.
With out WTDP's cannot run total system.

GRS said they can be back on Tues. 6/1 after memorial day weekend with correct parts. Temps for soils and GW high enough to carry through weekend without running boiler ... other wise would have to make special arrangements for fuel delivery on Monday (holiday) therefore system (boiler left off) product recovery pumps left on.

6/1/93
0930 hr arrive at Yorktown site:
GRS to be on site @ 1000hr

Inspect system with respect to conditions, and not having the transfer pump panel in operation, to be corrected today 6/1/93 Tuesday.

0945 Fire up boiler: first round; cold start; run for ten minutes; rest for ten minutes
1005hr second round: run for 10 minutes, rest for ten minutes;
1025hr third round run for ten minutes, rest for ten minutes;

1050hr fourth round run continous: build up steam at start 15 psig. Steam system on full line at 1055hr.

GRS: Mike Repetto on site at 1009hr Start work on pc board replacement at transfer pump control panel. PC board replaced by 1040 hr and system running as designed.

All recovery pumps on

Check all WTDP's Groundwater recovery: all operable:

GW being pumped from RW-1S: ~5-7gpm ok Recovery pump ok

RW-2H - not injecting hot water at this time. Water inversion layer at this time, i.e. water is on top of the product in the recovery well, without further damage to the system or the hydrogeological environment, letting the system equilabrate naturally. Upon inspection it was noted that the WTDP at 29 ft below grade in the recovery was pumping product, and the product recovery pump at ~16 ft was pumping water emulsufied with product, thus the inversion. (Hot water density vs. product density - temperature differences?)

RW-3X Standard system with no heat applied: GW WTDP pump product, Recovery pump pump product. Length of recovery well saturated with product. Shut off WTDP so not to overwhelm the oil water separator with product, since no water at this time in this well, continue to pump product with the product recovery pump. This is being done because the WTDP is not specifically designed to pump product and continually pumping product with a groundwater pump can and will have adverse effects on the wear and tear of the WTDP.

Boiler build steam to 40 psig and injection occurring into injection wells.
Groundwater temperatures of the groundwater being extracted from RW-1S between 150°F and 170°F, at well head, temperature probe within the effluent groundwater discharge line from the heated system (steam in this case) is set to close influent steam feed valve at between 160°F and 175°F, with the extracted groundwater temperatures being what they were the valve closed automatically. This is a protection device designed to protect plastic components within meters, cpvc piping etc... Upon noticing this the boiler was shut off so not to waste fuel and give the groundwater pumping system from the steam system time to cool to more normal operable conditions of the groundwater temperature being in the 100 to 120°F range. The boiler will be restarted and set to run continously on 6/4/93. The recovery (product) side of the system will be left on during this period as the heat at the system is appropriate for designed operation.

YORKTOWN SITE MONITORING FORM

DATE: 5/21/93
NAME: J. Partin
Arrive on site (time) 7:30am

Weather Conditions: clear / sunny 53°
Depart From Site (time) 11:00AM

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	161	2-TAPES ON WIRE FOR JACK	8:00am
	T2	18	114	1-TAPE ON WIRE FOR JACK	
	T3	23	128	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	89	2-TAPES ON WIRE FOR JACK	
	T2	18	73	1-TAPE ON WIRE FOR JACK	
	T3	23	69	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	206	2-TAPES ON WIRE FOR JACK	
	T2	18	208	1-TAPE ON WIRE FOR JACK	
	T3	23	205	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	184	2-TAPES ON WIRE FOR JACK	
	T2	18	139	1-TAPE ON WIRE FOR JACK	
	T3	23	107	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	59	2-TAPES ON WIRE FOR JACK	
	T2	18	60	1-TAPE ON WIRE FOR JACK	
	T3	23	65	NO TAPE ON WIRE FOR JACK	✓

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	105	2-TAPES ON WIRE FOR JACK	
	T2	18	99	1-TAPE ON WIRE FOR JACK	
	T3	23	96	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	67	2-TAPES ON WIRE FOR JACK	
	T2	18	61	1-TAPE ON WIRE FOR JACK	
	T3	23	61	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	59	2-TAPES ON WIRE FOR JACK	
	T2	18	58	1-TAPE ON WIRE FOR JACK	
	T3	23	58	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71	2-TAPES ON WIRE FOR JACK	
	T2	18	67	1-TAPE ON WIRE FOR JACK	
	T3	23	64	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	99	2-TAPES ON WIRE FOR JACK	
	T2	18	92	1-TAPE ON WIRE FOR JACK	✓
	T3	23	69	NO TAPE ON WIRE FOR JACK	10:20am

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/21/93

WELL	DTP*	DTW**	NOTES:
RW-1S	13.8		H_2O mix on surface, Hot
RW-2H	15.90		
RW-3X	16.22		
MW-1S	13.38		H_2O mix on surface
MW-2S	12.24		
MW-3S	12.50		
MW-4S		11.88	Product mix on SURFACE
MW-5S		12.93	
MW-1H	13.90		
MW-2H		14.06	
MW-3H		14.11	
MW-4H		13.97	
MW-5H		14.80	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler not in operational this visit.

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter	1150	in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or (N))
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/21/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	
SI-4	

Total Steam Injection Pressure: 0 psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	0	104
RW-2H	↓	379
RW-3X		321

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	Film
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation NO (ok - yes or no)
Notes; System not in operation
requires further investigation

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

5/21/93 Yorktown

Clear Sunny 53°

SISM & HWSTM

MW	T1	T2	T3	TIME
MW15	161	114	128	8:00am
MW25	89	73	69	
MW35	206	208	205	
MW45	184	139	107	
MW55	59	60	65	
MW1H	105	99	96	
MW2H	67	61	61	
MW3H	59	58	58	
MW4H	71	67	64	
MW5H	99	92	69	10:20

- Repaired MW45 T2 Temp line.
- Gauged wells along with collecting Temp.

- Gauge wells on site

MW	DTP	DTW	
MW15	13.38	H_2O mix on surface	
MW25	12.24		
MW35	12.50		
MW45		11.85	Product mix on surface
MW55		12.93	
MW1H	13.40		
MW2H		14.06	
MW3H		14.11	
MW4H		13.97	
MW5H		14.80	
RW15	13.48	Hot, H_2O mix on surface	
RW2H	15.90		
RW3X	16.23		

5/21/93

- Boiler not in operation this visit
- Hot H_2O meter 1150 gal
- No Fuel delivered as of 10:40am

- Recovery wells
  Total meter reading

RW1S	104	Gals
RW2H	379	↓
RW3X	321	

- Product Recovery Tank

RW1S	8.5"
RW2H	.8"
RW3X	Film
O/W	3"

- Phoned Taylor just to inform him of findings from this site visit.
- Requested Drew to come out for a few hours mon 5/24/93 if possible.

YORKTOWN SITE MONITORING FORM

DATE: 5/24/93
NAME: J. Partin
Arrive on site (time) 13:00

Weather Conditions: clear
Depart From Site (time) 15:30

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	150.2	2-TAPES ON WIRE FOR JACK	1500
	T2	18	107.4	1-TAPE ON WIRE FOR JACK	
	T3	23	110.8	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	82.4	2-TAPES ON WIRE FOR JACK	
	T2	18	70.9	1-TAPE ON WIRE FOR JACK	
	T3	23	68.7	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	200	2-TAPES ON WIRE FOR JACK	
	T2	18	197	1-TAPE ON WIRE FOR JACK	
	T3	23	192	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	171.8	2-TAPES ON WIRE FOR JACK	
	T2	18	132.7	1-TAPE ON WIRE FOR JACK	
	T3	23	107.8	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	60	2-TAPES ON WIRE FOR JACK	
	T2	18	61.1	1-TAPE ON WIRE FOR JACK	
	T3	23	60.6	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	98.8	2-TAPES ON WIRE FOR JACK	
	T2	18	96.6	1-TAPE ON WIRE FOR JACK	
	T3	23	94.3	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64	2-TAPES ON WIRE FOR JACK	
	T2	18	61.3	1-TAPE ON WIRE FOR JACK	
	T3	23	60.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	58.8	2-TAPES ON WIRE FOR JACK	
	T2	18	58.9	1-TAPE ON WIRE FOR JACK	
	T3	23	58.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	69.7	2-TAPES ON WIRE FOR JACK	
	T2	18	67.2	1-TAPE ON WIRE FOR JACK	
	T3	23	63.9	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	89.6	2-TAPES ON WIRE FOR JACK	
	T2	18	87.1	1-TAPE ON WIRE FOR JACK	
	T3	23	66.5	NO TAPE ON WIRE FOR JACK	1530

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/24/93

WELL	DTP*	DTW**	NOTES: C = clear/clear
RW-1S	13.33		~~Lt. Film~~
RW-2H	15.68		
RW-3X	16.64		
MW-1S		13.24	Lt. Film
MW-2S	11.90		
MW-3S	12.14		
MW-4S		12.90	Film
MW-5S		12.75	C
MW-1H	13.09		
MW-2H		13.84	Lt. Film
MW-3H		13.88	C
MW-4H		13.77	C
MW-5H		14.79	C

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler Not in use this visit.

			Time
Fuel Pressure:	~~0~~	in psig	
Boiler Pressure:	~~0~~	in psig	
Stack Temperature:	~~0~~	in deg. F	
Steam Feed Rate	~~0~~	in lb/hr	
Total Steam Fed x100	~~0~~	in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter	11.50	in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/24/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	↓
SI-4	↓

Total Steam Injection Pressure: 0 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	104	
RW-2H	379	
RW-3X	321	

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	Film
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation System Down (ok - yes or no)
Notes;

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

5/24/93 Yorktown 4hr

SISM & HWSTM

MW	T1	T2	T3
MW1S	150.2	107.4	110.8
MW2S	82.4	76.9	68.7
MW3S	200	197	192
MW4S	171.8	132.7	107.8
MW5S	60	61.1	60.6
MW1H	98.8	96.6	94.3
MW2H	64	61.3	60.9
MW3H	58.8	58.9	58.9
MW4H	69.7	67.2	63.9
MW5H	89.6	87.1	66.5

- Gauge wells on site

MW	DTP	DTW	COND.
1S		13.24	LT. Film
2S	11.90		
3S	12.14		
4S		12.90	Film
5S		12.75	C
1H	13.09		
2H		13.84	LT. Film
3H		13.88	C
4H		13.77	C
5H		14.77	C
RW1S	13.53		
RW2H	15.68		
RW3H	16.04		

5/24/95

- Boiler not in operation this week
- Hot H_2O meter = 1150 gal

- Recovery wells
  Total meter reading

RW1S	104	GALS.
RW2H	379	
RW3X	321	

- Product Recovery Tanks

RW1S	8.5"
RW2H	.8"
RW3X	Film
O/W	3"

5/25/93

0100 HR LV OFFICE

1135 HR ARV @ LANDIN OFFICE

DROP OFF PAPER WORK DATA SHEETS TO JOHN CONWAY.

TALK BRIEFLY W/ JOHN KELLY ON ~~[illegible]~~ PIER PROJECT.

1207 HR LV FOR YORKTOWN

1300 HR ARRIVE YORKTOWN

PUT ON THREADED SS 304 WELL CAPS ON MW-1 → MW-5S

CHECK BREAKERS - OFF AT SUBPANEL

TURN ON - NO RECOGNITION OF POWER AT RW-1 RW-2 OR RW-3

MEET UP W/ BOBBY V. GO TO MAIN POWER BREAKER FOR SUPPLY TO SUB-BREAKER - POWER IS ON - EVERYTHING THERE SEEMS TO BE IN ORDER

5/25/93

WALK THRU SYSTEM W/ J. PAC

EXPLAIN THINGS

BOILER STILL DOWN -

NEED ELECTRIC MOTOR/VOLTAGE MTR TO ADDRESS POWER ISSUE TO PANEL -

TECHNICALLY - BEYOND MY LEVEL OF EXPERTISE ON DIAGNOSIS OF ELECTRICAL - NEED AN ELECTRICIAN OR A GRS REPRESENTATIVE TO DIAGNOSIS - SISS & EQUIPMENT.

- FOR ME TO DIAGNOSE WOULD BE A VIOLATION OF CORP H&S POLICY

- 3:10pm LV MESSAGE ON VOICE MAIL FOR PAUL FARRINGTON - #15074 WITH REGARD TO WHAT IS HAPPENING

YORKTOWN SITE MONITORING FORM

DATE: 5/26/93
NAME: J. Partin
Arrive on site (time) 8:40am

Weather Conditions: Rain 68°
Depart From Site (time) 12:10pm

Steam Injection System Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	142.4	2-TAPES ON WIRE FOR JACK	9:30am
	T2	18	104.7	1-TAPE ON WIRE FOR JACK	
	T3	23	105.6	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	81.7	2-TAPES ON WIRE FOR JACK	
	T2	18	71.4	1-TAPE ON WIRE FOR JACK	
	T3	23	68.2	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	194.8	2-TAPES ON WIRE FOR JACK	
	T2	18	189.5	1-TAPE ON WIRE FOR JACK	
	T3	23	184.8	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	168.2	2-TAPES ON WIRE FOR JACK	
	T2	18	131.2	1-TAPE ON WIRE FOR JACK	
	T3	23	108.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	61.9	2-TAPES ON WIRE FOR JACK	
	T2	18	63.5	1-TAPE ON WIRE FOR JACK	
	T3	23	63.2	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	96.5	2-TAPES ON WIRE FOR JACK	
	T2	18	95.7	1-TAPE ON WIRE FOR JACK	
	T3	23	93.4	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	65	2-TAPES ON WIRE FOR JACK	
	T2	18	61.8	1-TAPE ON WIRE FOR JACK	
	T3	23	61.3	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	60.4	2-TAPES ON WIRE FOR JACK	
	T2	18	60.7	1-TAPE ON WIRE FOR JACK	
	T3	23	60.2	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	69.4	2-TAPES ON WIRE FOR JACK	
	T2	18	67.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.7	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	87.3	2-TAPES ON WIRE FOR JACK	
	T2	18	84.9	1-TAPE ON WIRE FOR JACK	
	T3	23	66.8	NO TAPE ON WIRE FOR JACK	11:50am

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/26/93

WELL	DTP*	DTW**	NOTES: C = clear/clear
RW-1S	13.30		
RW-2H	15.47		
RW-3X	16.03		
MW-1S		12.32	HY Film / warm Temp
MW-2S	11.95		
MW-3S	12.15		
MW-4S		11.64	LT. Film / Hot Temp
MW-5S		12.79	C/ odor
MW-1H	13.12		
MW-2H		13.76	LT. Film
MW-3H		13.92	C/odor
MW-4H		13.81	LT. Film
MW-5H		14.70	LT. Film

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler not in use this visit.

			Time
Fuel Pressure:	0	in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	0	in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter	1150	in gal.
Hot Water Flow Rate	0	in GPM

Fuel Oil received today? (Y or (N))
If yes, how many gals ____
And which tank inside or outside.

Instructed driver to phone Taylor @ OFFICE Fri. 5/28/93 To confirm delivery of FUEL.

YORKTOWN SITE MONITORING FORM

Date: 5/26/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	↓
SI-4	

Total Steam Injection Pressure: 0 psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	↓
SI-4	↓

Well	GPM	Total Mtr Reading
RW-1S		104
RW-2H		379
RW-3X		371

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8.5"
RW-2H	.8"
RW-3X	FILM
O/W*	3"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation System Down (ok - yes or no)
Notes: CRS has been contacted FOR SERVICE ASAP.

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

5/26/93 Yorktown

rain 68°

SISM & HWSIM

MW	T1	T2	T3
MW15	142.4	104.7	105.0
25	81.7	71.4	68.2
35	194.8	189.5	184.8
45	168.2	131.2	108.7
55	61.9	63.5	63.2
1H	96.5	95.7	95.4
2H	65	61.5	61.3
3H	60.4	60.7	60.2
4H	69.4	67.5	64.7
5H	87.3	84.9	66.8

Gauge wells on site

MW	DTP	DTW	
RW15	13.30		
RW2H	15.47		
RW3x	16.03		
MW15		12.32	Hvy. Film, water Temp
25	11.95		
35	12.15		
45		11.64	Lt. Film, Hot Temp
55		12.79	c/odor
1H	13.12		
2H		13.76	Lt. Film
3H		13.92	C
4H		13.81	Lt. Film
5H		14.70	Lt. Film

5/26/93

Boiler not in operation this visit

- Hot H_2O meter = 1150

- Rec. wells

Total meter reading

RW15	104
RW24	379
RW3X	371

P.R.T. inches of Product

RW15	8.5"
RW24	.8"
RW3X	Film
O/W	3"

- Taylor & Drew were on site when I arrived. They had found elec. problems w/ GRS gear and were contacting GRS for mobil service.

- I spoke w/ Mike w/ GRS from 8:40am - 9:20am concerning the systems operation. Drew had already isolated the problem

- Performed standard Temp & gauge monitoring.

5/26/93

YORKTOWN QUICKTASK LIST

010313 SITE WORKPLAN
020402 MW DRILLING
020418 TESTS SITE MONITORING
020502 GW SAMPLING
020602 SOIL SAMPLING
060102 INJ & RW WELL DRILLING
990405 DISS GEOLOGIST
139101 SYM & HOT WTR INJ PORTABLE UNIT
991604 START UP PGM.

0700 - 0730 PREP & LOAD FOR SITE VISIT
QC ELECTRICAL PROBLEM
@ RW'S & SUBELECTRIC PANEL

5/26/93 WEDS

YORKTOWN 830011098.020418
.991604 START UP
.990405

QUESTION TO ASK - FUEL TO RUN THRU MEMORIAL DAY WEEKEND

TO DO: MOVER OUT SUBPANEL
IF POSITIVE IS IF POWER TRUE
CHECK INDIVIDUAL CONTROL PANELS
@ RW-1 RW-2 RW-3

IF NOT ELECTRICAL CONTRACTOR
NEEDS TO BE CONTACTED FOR
DIAGNOSIS ON MAIN BREAKER

DEALING W/ 460V 3Φ
POWER

5/26/93

LV OFF 0800

ARV YOKOHAMA 0910

① CK SUB PANEL

A) 480V Coming in OK

B) RW-1 480V 3Φ OK

C) RW-2 480V 3Φ OK

D) RW-3 480V 3Φ OK

② TRANSFER PUMP CONTROL PANEL

FUSES OK

RELAY - HAND PUSH PUMP RUNS

- DC VOLTAGE PROBLEM

- RELAY NOT LATCHING

③ RW-3

PANEL POWER TO OK

OUTSIDE FUSE GONE/NO GOOD

Possible Power Supply Spike Bad

④ RW-2

POWER OK TO

OUTSIDE FUSE BLOWN

5/26/93

⑤ RW-1

POWER OK TO

OUTSIDE FUSE BLOWN -

9AM CALL GRS @ 215 524 2790

CALL 617 769 7602 PAUL.

GRS - MIKE ROOTO -

TALK W/ & EXPLAIN TRANSFER PUMP DC. VOLTAGE PROBLEM.

- RW-1 2 & 3 SUPPLY SINGLE VOLTAGE FUSE BLOWN.

- MEMO TO PAUL. HAS PROBLEM.

5/26/93

SECURITY - COMPLAINT ABOUT
DOMESTIC OIL SUPPLY TRUCK
DRIVER: DRIVING TOO FAST
CALL TOMMY
804 547-7000

5/27/93 YORKTOWN
LV OFF @ 0845
ARV ON SITE @ 1007

GRS MIKE REPORTS ARV ON SITE
@ 1009 -
RES ELECTRICAL PROBS.

OPEN UP TRANSFER CONTROL PANEL
FOR TRANSFER PUMP & ICV VALVE
+14.77V DC NOT 12V DC LIKE
DESIGNED
CHECKED MAIN BOARD - ACCORDING
TO MIKE IT IS OK
STILL DV POWER SUPPLY PROBLEM.

ON DV BOARD: RESISTOR FRIED.
& (2) CAPACITORS FRIED.

- ATTEMPT TO START UP BOILER
NO SUCCESS -
CALL JOHN Y WRIGHT.
MAC @ 622 7167

5/27/93

Vince O'Brien VP Jozi Y Wright Co.

Told him what was going on to try to refire even after reset pushed & was five minutes no action

Vince said he'd get someone up here early this afternoon

Transfer Pump Control Panel

Power 12 v DC replaced converter ok except turn on hand 12V power drops out

Checked relay - ok

Diode across relay cut out works ok - bad diode?

Used for filtering out electrical noise/ replaced diode

5/27/93

After rewire transfer control panel w/ replacement power conversion/supply DC volts & new diode panel is ok & works as designed

As far as diagnosis of what caused:

(1) Power pack DC volts drop out. Yet to be determined

(2) Power pack resistor burn out - yet to be determined

(3) Diode burn out/on relay yet to be determined

(4) 2 - resistors/capacitors on power pack burned out why - yet to be determined

5/27/93 Yorkstown w/ GRS

RW-3X

Control Panel Check

(1.) Check fuse

fuse blown Supply side

480 ✓

1/2 Amp Fuse

it is blown —

Miles Report From GRS Checking

(2) Solid State

Relay Fried Located

on RW-3X

— Needs to be

Replaced

Product Pump will Run

Continously Regardless

of what Probe Tells it —

5/27/93

RW-2H

WTDP & REC Prod Pump OK

WTDP Pumps Product - ?

Product Sinking in well

Product Recovery Pump Pumping

Water ?

Hydrocarbons sinking in well?

Density Difference

.97 = Product

1.00 = Water

.03

Fuse Supply Side RW-2H Replaced

System works Except WTDP Pumps Prod

RW-1S

Fuse - Supply Side Replaced

System Runs - OK

WTDP - OK WTR Temp @ 150° F

Transfer Pump off Fill WTR Side

Transfer Flow Switch overrides

WTDP @ RW-1S (shuts off)

This what it is supposed to do

5/27/93
Yorktown

Further inspection of transfer pump control panel indicates further panel failures in float read switch & interlocks of control panel

GRS continues to work on -
I/O board failure?
or chip board failure -
continue to work on

RW-3 X relay "Doogie" bad
needs replacement
GRS working on.

Drain rain water out of secondary containment containers surrounding diesel fuel tanks on outside of boiler trailer

---

Soil temps - 180-190°F MW-15 & MW-35
See monitoring data from WBDS
J. Martin notes

Site also to be monitored Friday
5/28/93

5/27/93 Thursday
Oil/water separator ~ 3/4" of product in - top decant carefully product off into O/W separator product recovery tank - ~ gravity feed & ran for ~ 30 min.

5/27/93
1340 hr ck in w/ Paul
617 769 2602
Gave Paul brief run down
Paul asked that I call in before end of day

5/27/93 RW-3X Mike Repeto
Got board fixed "Doogie" relay replaced & panel controlling RW-3X WTDP & prod. rec. pump working as designed

I asked about power surge issue & if it could have caused these problems - It is possible but to say that a power surge caused the different types of problems is impossible to determine based on information

5/27/93 - Yucktown -

Transfer Pump Panel
Mike Collard in RS - PC Board
has gone down - 125 miles to be
able to repair on site today
otherwise is there one of
the (3) existing systems:
RW-1, RW-2 or RW-3, which
could be temporarily shut down
and its board used for the
transfer pump control panel?
? - RW-3x
or we may have to wait until
Tuesday (After Memorial Day)
to replace & get running
??

5/27/93
2:20 Mike back from Phone Call
Boards to be remade
Sunset ?

240 Chip w/ Johnny Wright
Boiler Fires - OK
Transfer Float Valve leaks
Transfer Wtr Tank
Potential for flooding wtr
transfer tank - to be fixed.

I said hell fire - up Tuesday
am.

YORKTOWN SITE MONITORING FORM

DATE: 5/28/93
NAME: J. Partin
Arrive on site (time) 7:30 am

Weather Conditions: Clear 75°
Depart From Site (time) 9:50 am

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	133.7	2-TAPES ON WIRE FOR JACK	7:30am
	T2	18	99.9	1-TAPE ON WIRE FOR JACK	
	T3	23	99.0	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	81.3	2-TAPES ON WIRE FOR JACK	
	T2	18	70.8	1-TAPE ON WIRE FOR JACK	
	T3	23	67.6	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	188.9	2-TAPES ON WIRE FOR JACK	
	T2	18	182.6	1-TAPE ON WIRE FOR JACK	
	T3	23	178.3	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	164.9	2-TAPES ON WIRE FOR JACK	
	T2	18	129.8	1-TAPE ON WIRE FOR JACK	
	T3	23	108.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	61.2	2-TAPES ON WIRE FOR JACK	
	T2	18	62.0	1-TAPE ON WIRE FOR JACK	
	T3	23	62.3	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	95.0	2-TAPES ON WIRE FOR JACK	
	T2	18	95.2	1-TAPE ON WIRE FOR JACK	
	T3	23	92.2	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	63.4	2-TAPES ON WIRE FOR JACK	
	T2	18	61.7	1-TAPE ON WIRE FOR JACK	
	T3	23	61.5	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	59.8	2-TAPES ON WIRE FOR JACK	
	T2	18	59.4	1-TAPE ON WIRE FOR JACK	
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	69.8	2-TAPES ON WIRE FOR JACK	
	T2	18	67.9	1-TAPE ON WIRE FOR JACK	
	T3	23	65.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	84.2	2-TAPES ON WIRE FOR JACK	
	T2	18	82.9	1-TAPE ON WIRE FOR JACK	
	T3	23	67.2	NO TAPE ON WIRE FOR JACK	9:30am

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 5/28/93

WELL	DTP*	DTW**	NOTES:
RW-1S	13.54		
RW-2H	15.67		
RW-3X	16.02		
MW-1S	12.78		
MW-2S	11.97		
MW-3S	12.14		H_2O mix
MW-4S		11.66	LT. Film
MW-5S		12.78	C/odor
MW-1H	13.14		
MW-2H		13.68	C
MW-3H		14.09	C
MW-4H		13.80	C
MW-5H		14.69	C

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler not in use this wkl.

			Time
Fuel Pressure:	Ø	in psig	
Boiler Pressure:	Ø	in psig	
Stack Temperature:	Ø	in deg. F	
Steam Feed Rate	Ø	in lb/hr	
Total Steam Fed x100	Ø	in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals Ø
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 5/28/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	↓
SI-4	↓

Total Steam Injection Pressure: 0 psig.

Recovery wells: System OFF

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	↓
SI-4	↓

Well	GPM	Total Mtr Reading
RW-1S	0	106
RW-2H	0	379
RW-3X	0	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8"
RW-2H	1 1/8"
RW-3X	Film
O/W*	4"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; System will be started on Tues. 6/1/93

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

5/28/93 Yorktown

– STSM & HWSTM

MW	T1	T2	T3
1S	133.7	99.9	99.0
2S	81.3	70.8	67.6
3S	188.9	182.6	178.3
4S	164.9	129.8	108.7
5S	61.2	62.0	62.3
1H	95.0	95.2	92.2
2H	63.4	61.7	61.5
3H	59.8	59.4	59.9
4H	69.8	67.9	65.2
5H	84.2	82.9	67.2

– Gauge wells on site

MW	DTP	DTW	
RW1S	13.54		
RW-2H	15.67		
RW3X	16.02		
1S	12.78		
2S	11.97		
3S	12.14	H_2O mix	
4S		11.66	L.T. Film
5S		12.78	C/odor
1H	13.14		
2H		13.68	C
3H		14.09	C
4H		13.80	C
5H		14.69	C

Yorktown

5/28/93

- Boiler maintenance
- Boiler not in use this visit
- Hot H_2O meter = 1150
- Recovery wells

Total meter reading

RW1S	106	gals.
RW2H	379	gals.
RW3X	321	gals.

- Product recovery in inches

RW1S	8"
RW2H	1 1/8"
RW3X	Film
O/W	4"

6/1/93
Yorktown 830017098
0830 LV office 8:30 AM LV OFFICE
IN CHESAPEAKE

0930 ARRV @ YORKTOWN SITE
GRS TO BE ON SITE @
APPROX 1000 HR.

TO DO:
FIRE UP BOILER
FIRE UP RV SYSTEMS 1-2-3

6/1/93 1000 / RENTAL TOOLS GUY —
0945 - FIRE BOILER INTERMITT.
PRIOR TO FULL FIRE UP --

RENTAL TOOLS GUY Showed up asking about test - told him not much - he he asked how much longer test going to be running I State & that we're not SURE - & DID NOT say anything else HE LEFT @ 1002 HR

6/1/93
0945 HR FIRE BOILER LOW FIRE
to 955 -
WAIT 10 minutes TILL

1005 HR & REFIRE FOR 10 min.
REPEAT PROCEDURE 4 X TO
15 psig BOILER PRESSURE

2ND FIRE 1005 to 1015 AM

3RD FIRE 1025 - 1035
GOT TO 15 psi. BOILER RUN Normal
& LEAVE ON TILL 1120 HR
NOT INJECTING VALVE AFTER
FLOW PRESSURE DIFFERENTIAL
CLOSED AUTOMATICALLY

MIKE ROPETO ARRIVE 1015
MIKE REPLACE PC BOARDS @
TRANSFER PUMP - EVERYTHING OK
MIKE ROPETTO LV @ 1125 AM

6/1/93

Boiler Build up to 40 psig -
Stop firing transfer water
tank making all sorts of
noise - like pressure wise

- Hook up to HEAT Exchanger
off
- Have 15 so no steam to
HEAT EXCHANGER -

- NEED TO CALL JOHN Y WRIGHT
& PAUL FARRINGTON?

-

1210 pm Lv Site.

1230 PHONE CALL TO PAUL FARRINGTON
Run Down on Y-tank:
- Boiler seems ok But
running funny.
- Paul said call w/ John Y Wright Co.
- Paul said call J. Conway & Lv
message with him - follow up.

AS OF THIS PAGE
AND ALL PRECEDING
PAGES - GIVEN
COPYS to MR. J. CONWAY.
S/N - 6/1/93 DATA
DROPPED AT LANSDIN
on 6/4/93

YORKTOWN SITE MONITORING FORM

DATE: 6/1/93
NAME: J. Partin
Arrive on site (time) 1530

Weather Conditions: clear 70°+
Depart From Site (time) 1530

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	118.4	2-TAPES ON WIRE FOR JACK	1300
	T2	18	96.9	1-TAPE ON WIRE FOR JACK	
	T3	23	91.4	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	80.2	2-TAPES ON WIRE FOR JACK	
	T2	18	71.7	1-TAPE ON WIRE FOR JACK	
	T3	23	67.6	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	174.6	2-TAPES ON WIRE FOR JACK	
	T2	18	168.5	1-TAPE ON WIRE FOR JACK	
	T3	23	165.3	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	157.1	2-TAPES ON WIRE FOR JACK	
	T2	18	131.1	1-TAPE ON WIRE FOR JACK	
	T3	23	110.3	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	64	2-TAPES ON WIRE FOR JACK	
	T2	18	63.2	1-TAPE ON WIRE FOR JACK	
	T3	23	62.5	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	90.3	2-TAPES ON WIRE FOR JACK	
	T2	18	91.5	1-TAPE ON WIRE FOR JACK	
	T3	23	89.9	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	63.5	2-TAPES ON WIRE FOR JACK	
	T2	18	62.3	1-TAPE ON WIRE FOR JACK	
	T3	23	61.7	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	60.9	2-TAPES ON WIRE FOR JACK	
	T2	18	62.1	1-TAPE ON WIRE FOR JACK	
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	70.1	2-TAPES ON WIRE FOR JACK	
	T2	18	68.9	1-TAPE ON WIRE FOR JACK	
	T3	23	69.8	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	80.5	2-TAPES ON WIRE FOR JACK	
	T2	18	79.7	1-TAPE ON WIRE FOR JACK	
	T3	23	67.8	NO TAPE ON WIRE FOR JACK	1530

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/1/93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.29	~~12.57~~	Film, Product mix
RW-2H	14.69		
RW-3X	16.07		
MW-1S		12.57	Film, Product mix
MW-2S	12.11		Thin visc., H_2O mix
MW-3S	12.32		Product warm & thin visc.
MW-4S		10.98	Product Aprox. 2' BELOW H_2O
MW-5S		12.88	odor/c
MW-1H	13.20		normal visc.
MW-2H		13.79	odor/iron
MW-3H		13.98	vr. odor/c
MW-4H		13.82	" "
MW-5H		14.74	" "

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE: Boiler had been in operation for several hours prior to my arrival, off upon arrival,

			Time
Fuel Pressure:	0	in psig	1500
Boiler Pressure:	10	in psig	↓
Stack Temperature:	250	in deg. F	↓
Steam Feed Rate	0	in lb/hr	↓
Total Steam Fed x100	663	in lbs	1530

Water Level (sight glass low ✓ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data: Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	82	in deg. F
Influent Water Pressure:	0	in psig
Influent Water Meter	1612	in gal.
Effluent Water Temp.	80°	in deg. F
Hot Water Meter	1150+	in gal.
Hot Water Flow Rate	0	in GPM

Fuel Oil received today? (Y or (N)
If yes, how many gals 0
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/1/95

time = 13:25

Steam Injection System: Readings-boiler down

Injection Well	Injection Pressure in psig
SI-1	~~0~~
SI-2	↓
SI-3	
SI-4	

Total Steam Injection Pressure: 7 psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S	2.3	156
RW-2H	~~0~~	379
RW-3X	~~0~~	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8"
RW-2H	1 1/8"
RW-3X	1/2"
O/W*	4"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok (yes) or no)
Notes; _____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6/1/93 — Yorktown — Arrival 13:30 — Depart 1530 — Clear No°

— STS M & H-WSTM

MW	T1	T2	T3
15	118.4	96.9	91.4
25	80.2	71.7	67.6
35	174.6	168.5	165.3
45	157.1	131.1	110.3
55	64	63.2	62.5
1H	90.3	91.5	89.9
2H	63.5	62.3	61.7
3H	60.9	62.1	59.9
4H	70.1	68.9	69.8
5H	80.5	79.7	67.8

— Product recovery Tank

RW15	8"
RW2H	1 1/8"
RW3X	1/2"
O/W	4"

— Gauge wells on site

MW	DTP	DTW			
15		12.57	Film, Product mix		
25	12.11	Thin visc.			
35	12.32	Product	warm & thin visc.		
45		10.98	odor / Product approx 2' Below HB		
55		12.88	odor / C		
1H	13.20	Normal visc.			
2H		13.79	odor / iron		
3H		13.98	Lt. odor / C		
4H		13.82	Lt. odor / C		
5H		14.74	Lt. odor / C		
			Temp	GPM	Mtr. Total
RW15	14.29	Thin	visc, 144°	2.3	156
RW24	14.69	Normal visc.	90°	NOT IN operation	379
RW3X	16.07	Normal visc.	88°	NOT IN operation	321

6/1/93

Boiler Maintenance

- Feed rate steam = 0
  " " " Total = 663
- Boiler press. @ 13:25 = 10
- Fuel press = " " " = 0
- Feed tank Temp " " = 150°
- INF H_2O temp " " = 82°
- EFF H_2O Temp " " = 80°
- INF H_2O meter " " = 1612
- Hot H_2O meter " " 1150+
- Total Steam press " " = 7

YORKTOWN SITE MONITORING FORM

DATE: 6/2/93
NAME: J. Partin
Arrive on site (time) 1300

Weather Conditions: Clear 70°
Depart From Site (time) 1530

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	111.5	2-TAPES ON WIRE FOR JACK	1300
	T2	18	92.0	1-TAPE ON WIRE FOR JACK	
	T3	23	89.0	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	78.5	2-TAPES ON WIRE FOR JACK	
	T2	18	70.2	1-TAPE ON WIRE FOR JACK	
	T3	23	66.9	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	172.0	2-TAPES ON WIRE FOR JACK	
	T2	18	164.2	1-TAPE ON WIRE FOR JACK	
	T3	23	163.6	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	152.9	2-TAPES ON WIRE FOR JACK	
	T2	18	131.0	1-TAPE ON WIRE FOR JACK	
	T3	23	108.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	62.9	2-TAPES ON WIRE FOR JACK	
	T2	18	63.4	1-TAPE ON WIRE FOR JACK	
	T3	23	62.4	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	89.9	2-TAPES ON WIRE FOR JACK	
	T2	18	91.4	1-TAPE ON WIRE FOR JACK	
	T3	23	89.3	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	63.5	2-TAPES ON WIRE FOR JACK	
	T2	18	62.1	1-TAPE ON WIRE FOR JACK	
	T3	23	61.7	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	61.0	2-TAPES ON WIRE FOR JACK	
	T2	18	61.9	1-TAPE ON WIRE FOR JACK	
	T3	23	59.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	70.1	2-TAPES ON WIRE FOR JACK	
	T2	18	68.9	1-TAPE ON WIRE FOR JACK	
	T3	23	69.0	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	79.8	2-TAPES ON WIRE FOR JACK	
	T2	18	79.1	1-TAPE ON WIRE FOR JACK	
	T3	23	67.9	NO TAPE ON WIRE FOR JACK	1500

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/2/93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.27		
RW-2H	14.82		
RW-3X	16.12		
MW-1S		12.85	Film
MW-2S	12.33		Normal visc.
MW-3S	12.68		Thin visc. warm
MW-4S		12.17	Product air
MW-5S		13.14	odor/C
MW-1H	13.26		Normal visc.
MW-2H		13.94	odor/LT. Film
MW-3H		14.07	LT. odor/C
MW-4H		13.95	odor/C
MW-5H		14.84	odor/LT. Film

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	0	in psig	1500
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100	66300	in lbs	

Water Level (sight glass low ✓ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ✓ normal ____ high ____

Influent Water Temp:	80°	in deg. F
Influent Water Pressure:	50	in psig
Influent Water Meter	1612	in gal.
Effluent Water Temp.	76°	in deg. F
Hot Water Meter	1150+	in gal.
Hot Water Flow Rate	N/A	in GPM

Fuel Oil received today? (Y or (N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/2/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	↓
SI-4	↓

Total Steam Injection Pressure: 0 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	↓
SI-4	↓

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	2	446
RW-2H	0	379
RW-3X	0	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	8"
RW-2H	1 1/8"
RW-3X	1/2"
O/W*	4"

*O/W = Oil / Water Separator

Transfer Pump from O/W operation ok (ok - yes or no)
Notes;

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

4/2/93 Yorktown

arrival 1300

DEPART 1535

clear 70°

MW	T1	T2	T3
1S	111.5	92.0	89.0
2S	78.5	70.2	66.7
3S	172.0	164.2	163.4
4S	152.9	131.0	108.7
5S	62.9	63.4	62.4
1H	89.9	91.4	89.3
2H	63.8	62.1	61.7
3H	61.0	61.9	59.9
4H	70.1	68.9	69.0
5H	79.8	79.1	67.9

SISM & HWSIM

	DTP Gauge	DTW wells	on site		
1S		12.85	Film		
2S	12.32	Norm. visc			
3S	12.68	Apox. 1" H_2O on surface/Hot			Thick visc
4S		12.17	Product mix		
5S		13.14	odor/c		
1H	13.24	Norm. visc			
2H		13.94	odor/LT. Film		
3H		14.07	c/odor		
4H		13.95	c/odor		
5H		14.84	odor/LT. Film		
			GPM	TOTAL	TEMP
RW1S	14.27		2 gal	446	142°
RW2H	14.82		NOT IN operation	379	83°
RW3X	16.12		NOT IN operation	321	84°

6/2/93 Yorktown

- Boiler Maintenance
- Boiler not in operation

This visit, readings taken @ 1500

- Feed tank temp = 82°
- INF H_2O temp = 80°
- EFF H_2O Temp = 76°
- INF Press = 50
- Total Feed = 663

- Hand pumped product down in RW15
- Checked pumps RW211 & RW3X
- RW2H H_2O pump mixed w/Product but mostly water.
- RW3X H_2O pump pure product but product pump pumps H_2O mix w/ product but mostly H_2O.

YORKTOWN SITE MONITORING FORM

DATE: 6/4/93
NAME: J. Partin
Arrive on site (time) 7:30am

Weather Conditions: Overcast, Hazy 70°
Depart From Site (time) 1530

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	101.8	2-TAPES ON WIRE FOR JACK	8:00am
	T2	18	87.1	1-TAPE ON WIRE FOR JACK	
	T3	23	87.9	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	76.0	2-TAPES ON WIRE FOR JACK	
	T2	18	69.4	1-TAPE ON WIRE FOR JACK	
	T3	23	69.1	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	167.3	2-TAPES ON WIRE FOR JACK	
	T2	18	163.9	1-TAPE ON WIRE FOR JACK	
	T3	23	160.5	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	146.8	2-TAPES ON WIRE FOR JACK	
	T2	18	129.7	1-TAPE ON WIRE FOR JACK	
	T3	23	106.9	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	65.2	2-TAPES ON WIRE FOR JACK	
	T2	18	66.6	1-TAPE ON WIRE FOR JACK	
	T3	23	63.0	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	89.2	2-TAPES ON WIRE FOR JACK	
	T2	18	92.4	1-TAPE ON WIRE FOR JACK	
	T3	23	88.0	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	65.2	2-TAPES ON WIRE FOR JACK	
	T2	18	63.6	1-TAPE ON WIRE FOR JACK	
	T3	23	65.4	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	63.9	2-TAPES ON WIRE FOR JACK	
	T2	18	63.2	1-TAPE ON WIRE FOR JACK	
	T3	23	62.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.0	2-TAPES ON WIRE FOR JACK	
	T2	18	72.5	1-TAPE ON WIRE FOR JACK	
	T3	23	69.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	80.1	2-TAPES ON WIRE FOR JACK	
	T2	18	79.8	1-TAPE ON WIRE FOR JACK	
	T3	23	71.1	NO TAPE ON WIRE FOR JACK	10:15am

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/4/93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.72		
RW-2H	15.96		
RW-3X	16.29		
MW-1S		13.02	Product mix
MW-2S	12.12		Normal viscl
MW-3S	12.82		Hot, thin viscl
MW-4S		12.34	Product mix
MW-5S		13.26	Lt. odor/c
MW-1H	13.46		Normal viscl
MW-2H		14.05	Lt. odor/sheen
MW-3H		14.15	c
MW-4H		14.04	Lt. odor/c
MW-5H		14.92	Lt. odor/sheen

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100	63300	in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data: Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/4/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	↓
SI-3	
SI-4	

Total Steam Injection Pressure: 0 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S	1	954
RW-2H	0	380
RW-3X	0	321

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	10 1/4
RW-2H	1 1/4
RW-3X	7/8
O/W*	4 1/2

*O/W = Oil / Water Separator

Transfer Pump from O/W operation OK (ok - ~~yes~~ or no)
Notes; Called boiler leasing to after 2 attempts to start boiler were made. Talked to Mack @ 12:10pm he said he would send someone out.

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6/4/93 Yorktown

overcast HAZY 70°

- SISAM & HWSTM

MW	T1	T2	T3
1S	101.8	87.1	87.9
2S	76.0	69.4	67.1
3S	167.3	163.9	160.5
4S	146.8	129.9	106.9
5S	65.2	66.6	63.0
1H	89.2	92.4	88.0
2H	65.2	63.6	65.4
3H	63.9	63.2	62.9
4H	72.0	72.5	69.2
5H	80.1	79.8	71.1

- Upon arrival @ 7:30am I collected Temp & C.C. data.

- Gauge water on site

MW	DTP	DTW		
RW1S	14.72			
RW2H	15.96			
RW3X	15.29			
1S		13.02	Product mix	
2S	12.12	Norm. vis		
3S	12.82	Hot, thin		
4S		12.34	Product mix	
5S		13.26	LT. odor/C	
1H	13.46		normal vis	
2H		14.05	LT. odor/sheen	
3H		14.15	C	
4H		14.04	LT. odor/C	
5H		14.92	LT. odor/sheen	

	CPM	Total	TEMP	P.E.T.
RW1S	2	954	136	10 1/4"
RW2H	0	380	74°	1 1/4"
RW3X	0	381	72°	7/8"
O/W				4.5"

6/4/93 Yorktown

Overcast 70°

- RW 2H H_2O pumps product water mix. Product pump pumps H_2O & product mix but mostly H_2O
- RW 3X H_2O pumps pure product and product pump pumps H_2O product mix but mostly H_2O
- RW15 H_2O pumps only H_2O and product pump pumps product mix w/ H_2O but mostly product.
- RW15 is only system active @ this time.
- There is a sheen produced by RW15 H_2O pump but no product is visible @ this time.
- Hand pumped product from RW15

- Phoned Taylor @ 10:20am & he instructed me to start boiler for weekend operation. Will call him back later.
- Could not get water in sight glass on boiler. Talked to Mack w/ Leasing Co. he said to flip red emergency switch on boiler when feed tank sight glass is 1/2 full not boiler sight glass.
- Made attempt to start boiler burner did start but only ran for aprox 30 sec & cut off. Waited 5 min & depressed red reset switch on start control box, same thing happened again. Will call Taylor

YORKTOWN SITE MONITORING FORM

DATE: 6-7-93
NAME: J. Partin/Tom Orner
Arrive on site (time) 13:00

Weather Conditions: clear 80°
Depart From Site (time) 15:30

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	90.2	2-TAPES ON WIRE FOR JACK	1300
	T2	18	82.7	1-TAPE ON WIRE FOR JACK	
	T3	23	81.2	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	73.3	2-TAPES ON WIRE FOR JACK	
	T2	18	67.4	1-TAPE ON WIRE FOR JACK	
	T3	23	64.3	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	159.0	2-TAPES ON WIRE FOR JACK	
	T2	18	156.7	1-TAPE ON WIRE FOR JACK	
	T3	23	152.8	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	139.6	2-TAPES ON WIRE FOR JACK	
	T2	18	123.4	1-TAPE ON WIRE FOR JACK	
	T3	23	105.5	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	64.6	2-TAPES ON WIRE FOR JACK	
	T2	18	65.2	1-TAPE ON WIRE FOR JACK	
	T3	23	63.8	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	86.8	2-TAPES ON WIRE FOR JACK	
	T2	18	82.3	1-TAPE ON WIRE FOR JACK	
	T3	23	85.6	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	63.4	2-TAPES ON WIRE FOR JACK	
	T2	18	62.0	1-TAPE ON WIRE FOR JACK	
	T3	23	61.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	62.0	2-TAPES ON WIRE FOR JACK	
	T2	18	61.3	1-TAPE ON WIRE FOR JACK	
	T3	23	60.5	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.6	2-TAPES ON WIRE FOR JACK	
	T2	18	69.7	1-TAPE ON WIRE FOR JACK	
	T3	23	68.8	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	76.4	2-TAPES ON WIRE FOR JACK	
	T2	18	76.1	1-TAPE ON WIRE FOR JACK	
	T3	23	68.1	NO TAPE ON WIRE FOR JACK	1400

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/7/93

WELL	DTP*	DTW**	NOTES:
RW-1S	15.48		
RW-2H	16.83		
RW-3X	16.42		
MW-1S	14.21	12.66	warm/Product below 1%
MW-2S		12.26	normal Temp of Product
MW-3S		12.49	
MW-4S		12.00	odor/Film
MW-5S		13.19	c/iron
MW-1H	13.52		
MW-2H		14.19	odor/sheen
MW-3H		14.35	odor/c/iron
MW-4H		14.20	odor/c.
MW-5H		15.09	odor/sheen

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	320	in psig	1330
Boiler Pressure:	35	in psig	
Stack Temperature:	400	in deg. F	
Steam Feed Rate	682	in lb/hr	
Total Steam Fed x100	69600	in lbs	1400

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? (Yes) or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	82	in deg. F
Influent Water Pressure:	48	in psig
Influent Water Meter	1684	in gal.
Effluent Water Temp.	82	in deg. F
Hot Water Meter	1150+	in gal.
Hot Water Flow Rate	0	in GPM

Fuel Oil received today? (Y or (N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/7/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	9
SI-2	7
SI-3	6.75
SI-4	7

Total Steam Injection Pressure: 16 psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100% O.
SI-2	↓
SI-3	
SI-4	

Well	GPM	Total Mtr Reading	Temp
RW-1S	Flow meter DOWN	954	126
RW-2H	0	380	95
RW-3X	0	321	92

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	10 1/4
RW-2H	1 1/4
RW-3X	7/8
O/W*	4.5

*O/W = Oil / Water Separator

Transfer Pump from O/W operation ok (ok - yes or no)
Notes; RW15 Flow meter is not working did not have time to check.

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6/7/93 Yorktown clear 80°

- Boiler Maintenance 1330-1400

Fuel Pres.	320	Psig
Bed Pres.	35	Psig
STACK TEMP	400°	
STEAM Feed Rate	682	
Total STEAM Feed	69600	

- Boiler H_2O Level = Normal
- Boiler Fire Cond = Low
- Feed tank H_2O Level = Normal

INF H_2O TEMP	82°	
INF H_2O Pres.	48	Psig
INF H_2O Meter	1686	gal
EFF H_2O Temp	82°	
HOT H_2O METER	1150+	gal
HOT H_2O Flow	0	gpm

- No Fuel oil delivered today
- outside tanks in use

SIS

- Injection pressure @ well

		Valve
S1	9 psig	100%0
S2	7 " "	
S3	6.75 " "	
S4	7 " "	

- Recovery wells

	GPM Flow meter down	TOTAL 954	P.R.T. 10 1/4	Temp. 126
RW1S				
RW24	0	380	1 1/4	95
RW3X	0	321	7/8	92
O/W			4 1/2	

- Flow meter on RW1S is not functioning and will be checked by Tom Orner on his visit 6/9/93.

6/7/93 Yorktown

	T1 SESM	T2 HWSTM	T3		
MW1S	90.2	82.7	81.2		
MW2S	73.3	67.4	64.3		
MW3S	159.0	156.7	153.8		
MW4S	139.6	123.4	105.5		
MW5S	64.6	65.2	65.8		
MW1H	86.8	89.3	85.6		
MW2H	63.4	62.0	61.9		
MW3H	62.0	61.3	60.5		
MW4H	72.6	69.7	68.8		
MW5H	76.4	76.1	68.1		

clear 80°

— Gauge wells ON site.

MW	DTP	DTW		
RW1S	15.48			
RW2H	16.83			
RW3X	16.42			
1S	14.21	12.66	warm Product below H_2O	
2S		12.26	Normal Product temp	
3S		12.49		
4S		12.00	odor/Film	
5S		13.19	c/iron	
1H	13.52			
2H		14.19	odor/sheen	
3H		14.35	odor/c/iron	
4H		14.20	odor/c	
5H		15.09	odor/sheen	

YORKTOWN SITE MONITORING FORM

DATE: 6-9-93
NAME: Tom Oenier
Arrive on site (time) 8:25

Weather Conditions: Clear Humid 85°
Depart From Site (time) 11:15

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

@ 300
@ 300
@ 300

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	211	2-TAPES ON WIRE FOR JACK	9:25
	T2	18	207	1-TAPE ON WIRE FOR JACK	
	T3	23	107.5	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	76.1	2-TAPES ON WIRE FOR JACK	9:27
	T2	18	68.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.3	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	213	2-TAPES ON WIRE FOR JACK	9:30
	T2	18	216	1-TAPE ON WIRE FOR JACK	
	T3	23	217	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	183.4	2-TAPES ON WIRE FOR JACK	9:33
	T2	18	129.9	1-TAPE ON WIRE FOR JACK	
	T3	23	106.5	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	64.9	2-TAPES ON WIRE FOR JACK	9:35
	T2	18	66.6	1-TAPE ON WIRE FOR JACK	
	T3	23	63.9	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	86.6	2-TAPES ON WIRE FOR JACK	9:10
	T2	18	88.6	1-TAPE ON WIRE FOR JACK	
	T3	23	87.4	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.7	2-TAPES ON WIRE FOR JACK	9:13
	T2	18	62.2	1-TAPE ON WIRE FOR JACK	
	T3	23	62.4	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	63.9	2-TAPES ON WIRE FOR JACK	9:15
	T2	18	62.a	1-TAPE ON WIRE FOR JACK	
	T3	23	62.5	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.7	2-TAPES ON WIRE FOR JACK	9:18
	T2	18	[illegible]	1-TAPE ON WIRE FOR JACK	
	T3	23	67.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	76.4	2-TAPES ON WIRE FOR JACK	9:20
	T2	18	76.1	1-TAPE ON WIRE FOR JACK	
	T3	23	63.[illegible]	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-9-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.08		TEMP GAUGE 180°
RW-2H	14.98		" 108°
RW-3X	16.05		" 98°
MW-1S			WATER/PRODUCT MIX BUBBLING FROM TOP OF WELL
MW-2S		12.30	ODOR
MW-3S		12.12	ODOR/LT FILM
MW-4S		12.36	WATER PRODUCT MIX
MW-5S		12.85	ODOR/FILM
MW-1H	13.18		OIL IN WELL
MW-2H		13.88	ODOR/SHEEN
MW-3H		14.05	ODOR/CLEAR
MW-4H		13.75	ODOR/CLEAR
MW-5H		14.80	ODOR/SHEEN

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	275	in psig	8:45
Boiler Pressure:	30	in psig	
Stack Temperature:	400	in deg. F	
Steam Feed Rate	665.1	in lb/hr	
Total Steam Fed x100	100500	in lbs	

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ✓ high fire ____ Boiler Running? (Yes) or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	90	in deg. F
Influent Water Pressure:	45	in psig
Influent Water Meter	231.6	in gal.
Effluent Water Temp.	88	in deg. F
Hot Water Meter	0	in gal.
Hot Water Flow Rate	0	in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals N
And which tank inside or outside.
RECEIVED 6-7-93 233GAL

NOTE: WATER WAS RUNNING FROM TOP OF STACK AT HEAT EXCHANGER

YORKTOWN SITE MONITORING FORM

Date: 6-9-93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	9
SI-2	7
SI-3	6
SI-4	6

Total Steam Injection Pressure: 15 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	100%
SI-2	100%
SI-3	100%
SI-4	100%

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading	
RW-1S	N/A	9.54 NOT TURNING	180° NOT TURN
RW-2H		3.80 NOT TURNING	108°
RW-3X		3.21 NOT TURNING	90°

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	(13 3/4)
RW-2H	1 1/4
RW-3X	3/4
O/W*	3 3/8

*O/W = Oil / Water Separator

Transfer Pump from O/W operation OK - YES (ok - yes or no)
Notes:

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

DATE: 6/11/93
NAME: J. PARTIN
Arrive on site (time) 1400

Weather Conditions: clear, Hot
Depart From Site (time) 1330

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	208	2-TAPES ON WIRE FOR JACK	14:30
	T2	18	215	1-TAPE ON WIRE FOR JACK	
	T3	23	150	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	93	2-TAPES ON WIRE FOR JACK	
	T2	18	70	1-TAPE ON WIRE FOR JACK	
	T3	23	64	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	206	2-TAPES ON WIRE FOR JACK	
	T2	18	213	1-TAPE ON WIRE FOR JACK	
	T3	23	214	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	201	2-TAPES ON WIRE FOR JACK	
	T2	18	143	1-TAPE ON WIRE FOR JACK	
	T3	23	107	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	65.4	2-TAPES ON WIRE FOR JACK	
	T2	18	65.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.1	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	85.2	2-TAPES ON WIRE FOR JACK	
	T2	18	87.0	1-TAPE ON WIRE FOR JACK	
	T3	23	86.2	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	62.7	2-TAPES ON WIRE FOR JACK	
	T2	18	61.8	1-TAPE ON WIRE FOR JACK	
	T3	23	60.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	70.9	2-TAPES ON WIRE FOR JACK	
	T2	18	69.8	1-TAPE ON WIRE FOR JACK	
	T3	23	66.6	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	64.0	2-TAPES ON WIRE FOR JACK	
	T2	18	62.0	1-TAPE ON WIRE FOR JACK	
	T3	23	61.9	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	MISSED	2-TAPES ON WIRE FOR JACK	
	T2	18	THIS	1-TAPE ON WIRE FOR JACK	
	T3	23	visit	NO TAPE ON WIRE FOR JACK	1500

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/11/93

15:00 - 15:30

WELL	DTP*	DTW**	NOTES:
RW-1S	14.22		Steam rising From well
RW-2H			MISSED
RW-3X			MISSED
MW-1S		13.47	Lt. Film/odor
MW-2S	12.58		Product Thin visc,
MW-3S	13.40		" "
MW-4S		12.63	Product mix
MW-5S		13.36	ODOR/C
MW-1H			MISSED
MW-2H		14.11	ODOR/Lt. Film
MW-3H		14.25	" "
MW-4H		14.25	" "
MW-5H			MISSED

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	170	in psig	14:00
Boiler Pressure:	26	in psig	↓
Stack Temperature:	270	in deg. F	↓
Steam Feed Rate	99.5	in lb/hr	↓
Total Steam Fed x100	128900	in lbs	14:30

Water Level (sight glass low ____ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire OFF high fire ____ Boiler Running? Yes or (No)

Heat Exchanger for Hot Water Injection system Data: Fuel Tank(s) in use: (Outside) or Inside

Water Level (sight glass low ____ normal ✓ high ____

Influent Water Temp:	100	in deg. F
Influent Water Pressure:	50	in psig
Influent Water Meter	3216	in gal.
Effluent Water Temp.	96	in deg. F
Hot Water Meter	1150	in gal.
Hot Water Flow Rate	0	in GPM

Fuel Oil received today? (Y) or N)
If yes, how many gals 129.2
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/11/93

Steam Injection System:

Injection Well.	Injection Pressure in psig
SI-1	0
SI-2	0
SI-3	0
SI-4	0

Total Steam Injection Pressure: 12 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	closed
SI-2	↓
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading	
RW-1S	0	954	108°
RW-2H	1	388	64°
RW-3X	0	321	106°

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	Pumped Product out Bred/Bright
RW-2H	missed
RW-3X	missed
O/W*	missed

*O/W = Oil / Water Separator

Transfer Pump from O/W operation OK (ok - yes or no)
Notes: RW2H WTOP was in overside and was reset and adjusted to 1 GPM, will try & increase next visit

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6/11/93 Yorktown

— Boiler Maintenance 1400-1430

Fuel Pres.	170	PSIG
Boiler Pres	26	" "
Stack Temp	270°	
Steam Feed RATE	99.5	lb/hr
Total Steam Feed	128900	
INF H_2O Temp	100°	
INF H_2O Pres.	50	PSIG
INF H_2O Meter	3216	GAL.
EFF H_2O Temp	96°	
Hot H_2O Meter	1150+	
Hot H_2O Flow	0	GPM

— 129.2 gal Fuel delivered

— Boiler Not in operation

— STEAM Injection System

Inj. Pres. = 0 All injection points

Valve Status = All closed

— Recovery Wells

	GPM	TOTAL	TEMP
RW1S	0	954	108°
RW2H	1	388	64°
RW3X	0	321	106°

— Product Recovery Tanks

RW1S pumped out approx 25gal UPH, 15gal H_2O

RW2H missed

RW3X missed

O/W missed

— Transfer pump in operation

YORKTOWN SITE MONITORING FORM

DATE: 6/14/93
NAME: J. PARTIN
Arrive on site (time) 12:00

Weather Conditions: cloudy, periods of RAIN
Depart From Site (time) 14:50

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	195.9	2-TAPES ON WIRE FOR JACK	12:00 pm
	T2	18	150.9	1-TAPE ON WIRE FOR JACK	
	T3	23	140.6	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	99.6	2-TAPES ON WIRE FOR JACK	
	T2	18	70.8	1-TAPE ON WIRE FOR JACK	
	T3	23	65.3	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	204	2-TAPES ON WIRE FOR JACK	
	T2	18	211	1-TAPE ON WIRE FOR JACK	
	T3	23	212	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	197.6	2-TAPES ON WIRE FOR JACK	
	T2	18	145.3	1-TAPE ON WIRE FOR JACK	
	T3	23	110.5	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	65.7	2-TAPES ON WIRE FOR JACK	
	T2	18	65.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.0	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	84.6	2-TAPES ON WIRE FOR JACK	
	T2	18	86.1	1-TAPE ON WIRE FOR JACK	
	T3	23	85.1	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.1	2-TAPES ON WIRE FOR JACK	
	T2	18	62.6	1-TAPE ON WIRE FOR JACK	
	T3	23	61.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	62.9	2-TAPES ON WIRE FOR JACK	
	T2	18	61.8	1-TAPE ON WIRE FOR JACK	
	T3	23	61.0	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.7	2-TAPES ON WIRE FOR JACK	
	T2	18	70.9	1-TAPE ON WIRE FOR JACK	
	T3	23	68.4	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	73.3	2-TAPES ON WIRE FOR JACK	
	T2	18	73.0	1-TAPE ON WIRE FOR JACK	
	T3	23	67.9	NO TAPE ON WIRE FOR JACK	15:30

YORKTOWN SITE MONITORING FORM

DATE: 6-14-93
NAME: TOM OENER
Arrive on site (time) 8:55

Weather Conditions: OVERCAST - RAINY
Depart From Site (time) 11:30

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	196.4	2-TAPES ON WIRE FOR JACK	9:25
	T2	18	152.3	1-TAPE ON WIRE FOR JACK	
	T3	23	141.0	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	99.4	2-TAPES ON WIRE FOR JACK	9:29
	T2	18	70.7	1-TAPE ON WIRE FOR JACK	
	T3	23	65.2	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	204	2-TAPES ON WIRE FOR JACK	9:33
	T2	18	211	1-TAPE ON WIRE FOR JACK	
	T3	23	212	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	197.9	2-TAPES ON WIRE FOR JACK	9:38
	T2	18	145.1	1-TAPE ON WIRE FOR JACK	
	T3	23	110.3	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	65.7	2-TAPES ON WIRE FOR JACK	9:41
	T2	18	65.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.0	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	84.5	2-TAPES ON WIRE FOR JACK	9:45
	T2	18	86	1-TAPE ON WIRE FOR JACK	
	T3	23	85	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.1	2-TAPES ON WIRE FOR JACK	9:48
	T2	18	62.5	1-TAPE ON WIRE FOR JACK	
	T3	23	61.8	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	62.8	2-TAPES ON WIRE FOR JACK	9:52
	T2	18	61.7	1-TAPE ON WIRE FOR JACK	
	T3	23	60.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.6	2-TAPES ON WIRE FOR JACK	9:55
	T2	18	70.8	1-TAPE ON WIRE FOR JACK	
	T3	23	68.4	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	73.3	2-TAPES ON WIRE FOR JACK	9:58
	T2	18	73.0	1-TAPE ON WIRE FOR JACK	
	T3	23	67.9	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-14-93

WELL	DTP*	DTW**	NOTES:
RW-1S	13' 10 1/16"		NORMAL
RW-2H	19' 9/16"		NORMAL
RW-3X	16' 6 3/8"		NORMAL
MW-1S		11' 10 11/16"	ODOR, OILY
MW-2S		12' 4"	OILY RESIDUE
MW-3S		11' 11 1/8"	ODOR, OILY
MW-4S		12' 3 7/16"	ODOR, OILY
MW-5S		13' 1 1/8"	OILY
MW-1H	13' 8 5/8"		NORMAL
MW-2H		14' 4 7/16"	CLEAR
MW-3H		14' 6 13/16"	ODOR CLEAR
MW-4H		14' 6 1/8"	ODOR CLEAR
MW-5H		15 3 3/16	ODOR

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____

Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6/14/93

WELL	DTP*	DTW**	NOTES:
RW-1S			
RW-2H			
RW-3X			
MW-1S	12.72		HOT
MW-2S	12.34		WARM
MW-3S	12.88		HOT
MW-4S		12.10	ODOR/FILM
MW-5S		13.28	ODOR/FILM
MW-1H	13.73		
MW-2H		14.35	ODOR/FILM
MW-3H		14.54	ODOR/SHEEN
MW-4H		14.48	ODOR/SHEEN
MW-5H		15.26	ODOR/LT. FILM

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:	40	in psig	1400
Boiler Pressure:	0	in psig	↓
Stack Temperature:	0	in deg. F	↓
Steam Feed Rate	0	in lb/hr	↓
Total Steam Fed x100	129100	in lbs	↓

Water Level (sight glass low ✓ normal ✓ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low ✓ normal ____ high ____

Influent Water Temp:	74	in deg. F
Influent Water Pressure:	50	in psig
Influent Water Meter	3216	in gal.
Effluent Water Temp.	72	in deg. F
Hot Water Meter	1150+	in gal.
Hot Water Flow Rate	6	in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: 6/14/93

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	0
SI-2	0
SI-3	0
SI-4	0

Total Steam Injection Pressure: 0 psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	CLOSED
SI-2	↓
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading	
RW-1S		954	80°
RW-2H		628	78°
RW-3X		371	79°

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	1 3/4 New hand pump
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation: ok (OK? yes or no)
Notes;

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6/14/95 Yorktown

TEMP	T1	T2	T3
1S	195.9	150.9	140.6
2S	99.6	70.8	65.3
3S	204	211	212
4S	197.6	145.3	110.5
5S	65.7	65.5	64.0
1H	84.6	84.1	85.1
2H	64.1	62.6	61.9
3H	62.9	61.8	61.0
4H	71.7	70.9	68.4
5H	73.3	73.0	67.9

- All data collected 12:00 noon to 13:30, prior to boiler start.
- Phoned office to speak w/ Taylor concerning boiler start up for Hot H_2O system. He was not in.
- Tried to pull system out of RW2H but was unable to do so due to product coating or rope making it too slippery →

Cloudy Periods of rain 62°

	DTP	DTW	CPM	TOTAL	WTOP H_2O TEMP
1S	12.72	Hot			
2S	12.34	warm			
3S	12.88	Hot			
4S		12.10	odor / Film		
5S		13.28	odor / Film		
1H	13.73				
2H		14.35	odor / Film		
3H		14.54	odor / sheen		
4H		14.48	odor / sheen		
5H		15.26	odor / LT. Film		
RW1S	13.83	Hot	0	954	80°
RW2H	19.09	shut down due to product miss w/ H_2O	0		
RW3X	16.54				

→ to do safely by one person.
→ Opted to wait until I could talk to Taylor.
→ Called office again for Taylor @ 1405 & spoke to Bill until Taylor came back from lunch.

6/14/93 Yorktown

- As instructed by Taylor
→ Hand pump product from RW's
→ Pump's On H_2O only 3X
→ Product Pump on all RW Systems

RW15 - Pumped approx. 1 3/4". Product into P.R.T. It was pumped out to empty on Fri. Product pump only in Auto H_2O off.

- RW3H - Pumping H_2O from product
- pump left in Auto. WTDP off
- RW3X Pumping H_2O from product
- pump left in Auto. WTDP adjusted
- to 2.2 gpm & in Auto
-
- - Departed site 1450
-
-

[illegible]

[illegible]

7:45 LEAVE FOR YORKTOWN
[illegible] AT SITE
LOOK OVER BOILER UNIT
[illegible]
LOOK WITH BOBBY

9:15 CALL TAYLOR ABOUT
BOILER

9:25 START TAKING READINGS
[illegible] AT STEAM
INJECTION WELL

10:00 FINISHED WITH READINGS
OF STEAM + HOT WATER MONITORING
SYSTEMS

10:10 START TO [illegible] WELLS
[illegible] WELLS
CALL TAYLOR

11:30 FINISHED CLEANING
UP GLOVES RAGS AND TAPE
CLEAN UP.
12:00 BACK AT OFFICE
1:30 LUNCH

1:30 - 2:00 FINISHED PAPERWORK
FOR YORKTOWN

YORKTOWN SITE MONITORING FORM

DATE: 6-16-93
NAME: TOM OBRIER
Arrive on site (time) 9:45

Weather Conditions: PARTLY SUNNY
Depart From Site (time) 1:45

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	186.4	2-TAPES ON WIRE FOR JACK	10:05
	T2	18	137.3	1-TAPE ON WIRE FOR JACK	
	T3	23	132.4	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	100.2	2-TAPES ON WIRE FOR JACK	10:09
	T2	18	72.6	1-TAPE ON WIRE FOR JACK	
	T3	23	65.7	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	202	2-TAPES ON WIRE FOR JACK	10:13
	T2	18	208	1-TAPE ON WIRE FOR JACK	
	T3	23	208	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	194.1	2-TAPES ON WIRE FOR JACK	10:18
	T2	18	147.4	1-TAPE ON WIRE FOR JACK	
	T3	23	111.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	66.2	2-TAPES ON WIRE FOR JACK	10:22
	T2	18	65.7	1-TAPE ON WIRE FOR JACK	
	T3	23	64.2	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	83.8	2-TAPES ON WIRE FOR JACK	10:28
	T2	18	85.4	1-TAPE ON WIRE FOR JACK	
	T3	23	84.2	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.3	2-TAPES ON WIRE FOR JACK	1031
	T2	18	62.7	1-TAPE ON WIRE FOR JACK	
	T3	23	61.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	63.2	2-TAPES ON WIRE FOR JACK	10:35
	T2	18	62.0	1-TAPE ON WIRE FOR JACK	
	T3	23	61.1	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.7	2-TAPES ON WIRE FOR JACK	10:39
	T2	18	70.6	1-TAPE ON WIRE FOR JACK	
	T3	23	67.3	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	73.0	2-TAPES ON WIRE FOR JACK	10:42
	T2	18	72.5	1-TAPE ON WIRE FOR JACK	
	T3	23	67.8	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-16-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14' 1 9/16		
RW-2H	16' 2 11/16		
RW-3X	19 4 5/16		
MW-1S		12.248	HOT - FILM
MW-2S	12.435		PRODUCT WAS HOT
MW-3S	13.015		PRODUCT WAS HOT
MW-4S		12.290	FILMY
MW-5S		13.456	FILM
MW-1H	13.840		PRODUCT
MW-2H		14.406	FILM / SHEEN
MW-3H		14.571	FILM / SHEEN
MW-4H		14.442	FILM / SHEEN
MW-5H		15.405	SHEEN

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y) or N)
If yes, how many gals 44.8
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

[illegible] CLEAN[illegible]
[illegible] IS [illegible]
[illegible] SITE
[illegible] ALL [illegible]
LUNCH

[illegible]
[illegible]RKTOWN

83001098

6-16-93

7:45 ARRIVE ON SITE
GATHER EQUIPMENT FOR YORKTOWN
AND LOAD INTO TRUCK
8:00 CHEVY S-10 IS NOT STARTING
AFTER CHECKING UNDER HOOD
AND LIGHTS IT APPEARS TO
BE THE BATTERY

8:30 LEAVE FOR YORKTOWN IN
MY OWN TRUCK
9:45 ARRIVE ON SITE
TAKE A WALK THROUGH TO
SEE IF EVERYTHING IS OK
10:00 START TO TAKE TEMPERATURE
READINGS OF STEAM + HOT
WATER MONITORING WELLS
10:45 FINISHED WITH TEMP.
READINGS
10:50 STARTING TO GAUGE
RECOVERY + MONITORING WELLS
FOR WATER + PRODUCT DEPTH
11:50 CALL TAYLOR - TALK
ABOUT PRODUCT IN STEAM
MONITORING WELLS

11:50 CHECK THAT ALL DRUM PUMPS ARE ON AUTOMATIC SETTING AT CONTROL PANELS
12:05 DOMESTIC INDUSTRIES ARRIVES WITH FUEL OIL DELIVERY 44.8 GALLONS

12:10 FINISHED WITH WELL GAUGING
12:15 START TO DRAIN WATER FROM OIL HOLDING TANK AT OIL WATER SEPERATOR TO COLLECT A BOTTLE (LITER) OF PRODUCT
1:25 FINISHED - EACH PLASTIC CONTAINER HAD TO BE STRAINED TO SEPERATE THE OIL FROM WATER
1:30 CALL TAYLOR - EVERYTHING IS OK
1:40 FINISHED CLEANING UP AND READY TO LEAVE SITE
1:45 OFF SITE
2:55 BACK AT OFFICE
3:10 MARKING LITER BOTTLE AND TRANSFERRING NOTES
3:30 DAILY REPORT TO TAYLOR

YORKTOWN SITE MONITORING FORM

DATE: 6-18-93
NAME: TOM ORNER
Arrive on site (time) 10:00

Weather Conditions: 90° Hot Hazy
Depart From Site (time) 1:35

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	176.7	2-TAPES ON WIRE FOR JACK	10:20
	T2	18	130.2	1-TAPE ON WIRE FOR JACK	
	T3	23	123.6	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	100.0	2-TAPES ON WIRE FOR JACK	10:23
	T2	18	74.4	1-TAPE ON WIRE FOR JACK	
	T3	23	66.0	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	199.3	2-TAPES ON WIRE FOR JACK	10:28
	T2	18	203.	1-TAPE ON WIRE FOR JACK	
	T3	23	201	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	190.1	2-TAPES ON WIRE FOR JACK	10:50
	T2	18	148.1	1-TAPE ON WIRE FOR JACK	
	T3	23	112.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	66.6	2-TAPES ON WIRE FOR JACK	10:54
	T2	18	66.0	1-TAPE ON WIRE FOR JACK	
	T3	23	64.4	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	83.1	2-TAPES ON WIRE FOR JACK	10:58
	T2	18	84.9	1-TAPE ON WIRE FOR JACK	
	T3	23	83.1	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.5	2-TAPES ON WIRE FOR JACK	11:01
	T2	18	62.8	1-TAPE ON WIRE FOR JACK	
	T3	23	62.	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	63.4	2-TAPES ON WIRE FOR JACK	11:05
	T2	18	62.1	1-TAPE ON WIRE FOR JACK	
	T3	23	61.3	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.7	2-TAPES ON WIRE FOR JACK	11:08
	T2	18	70.5	1-TAPE ON WIRE FOR JACK	
	T3	23	67.4	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	72.8	2-TAPES ON WIRE FOR JACK	11:10
	T2	18	72.1	1-TAPE ON WIRE FOR JACK	
	T3	23	67.7	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-18-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14 2 3/16		
RW-2H	16 3 3/16		
RW-3X	16 11 3/16		
MW-1S	12.960		HOT PRODUCT
MW-2S	12.509		HOT PRODUCT
MW-3S	13.098		HOT PRODUCT
MW-4S		12.524	SHEEN
MW-5S		13.541	LIGHT SHEEN
MW-1H	13.870		PRODUCT
MW-2H		14.483	OILY SHEEN
MW-3H		14.628	OILY SHEEN
MW-4H		14.515	OILY SHEEN
MW-5H		15.477	LIGHT SHEEN

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low _____ normal ____ high _____ (Located right hand side of boiler)

Note boiler fire conditio low fire _____ high fire _____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low _____ normal ____ high _____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

6-18-93 83001093

8:00 CHEVY S-10 IS NOT STARTING
8:45 HAUL TRUCK RUN ... AND LEAVE FOR YORKTOWN
10:00 ARRIVE AT SITE WALK THROUGH TO CHECK THAT EVERYTHING IS OK
10:20 START WITH TEMP READINGS OF MONITORING WELLS.
10:25 SURVEYORS ARRIVE
10:50 FINISHED SURVEYING THEM AROUND SITE. GO BACK TO TAKING TEMP READINGS
11:10 START TO GAUGE WELLS
12:30 FINISHED GAUGING WELLS. START TO TAKE SAMPLES OF OIL FROM OIL WATER SEPARATOR.
1:25 DROP OFF 3 SAMPLES WITH BOBBY.
1:35 FINISHED CLEANING UP AND LEAVE SITE.

2:55 ARRIVE BACK AT OFFICE
3:30 FINISHED TRANSFERRING
NOTES TO CHRIS SHEET AND
DELIVER TO TAYLOR

YORKTOWN SITE MONITORING FORM

DATE: 7-16-93
NAME: Tom Orrie
Arrive on site (time) 9:00

Weather Conditions: Clear 88°
Depart From Site (time) 1:00

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	103.1	2-TAPES ON WIRE FOR JACK	9:10
	T2	18	92.6	1-TAPE ON WIRE FOR JACK	
	T3	23	87.4	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	90.0	2-TAPES ON WIRE FOR JACK	9:14
	T2	18	79.3	1-TAPE ON WIRE FOR JACK	
	T3	23	68.5	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	140.0	2-TAPES ON WIRE FOR JACK	9:18
	T2	18	138.3	1-TAPE ON WIRE FOR JACK	
	T3	23	138.8	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	145.3	2-TAPES ON WIRE FOR JACK	9:22
	T2	18	138.1	1-TAPE ON WIRE FOR JACK	
	T3	23	119.2	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	72.8	2-TAPES ON WIRE FOR JACK	9:26
	T2	18	70.4	1-TAPE ON WIRE FOR JACK	
	T3	23	68.2	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	79.1	2-TAPES ON WIRE FOR JACK	9:31
	T2	18	78.4	1-TAPE ON WIRE FOR JACK	
	T3	23	76.0	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	67.5	2-TAPES ON WIRE FOR JACK	9:35
	T2	18	64.7	1-TAPE ON WIRE FOR JACK	
	T3	23	62.7	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	66.7	2-TAPES ON WIRE FOR JACK	9:39
	T2	18	64.2	1-TAPE ON WIRE FOR JACK	
	T3	23	62.9	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.7	2-TAPES ON WIRE FOR JACK	9:43
	T2	18	70.5	1-TAPE ON WIRE FOR JACK	
	T3	23	68.5	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	71.3	2-TAPES ON WIRE FOR JACK	9:47
	T2	18	69.0	1-TAPE ON WIRE FOR JACK	
	T3	23	66.6	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 7-16-93

WELL	DTP*	DTW**	NOTES:
RW-1S	15.092		
RW-2H	17.154		
RW-3X	17.603	17.890	
MW-1S	13.830	14.172	
MW-2S	13.464	13.518	
MW-3S	14.187	14.311	
MW-4S		13.316	
MW-5S		14.398	
MW-1H	14.532		
MW-2H		15.339	
MW-3H		15.462	
MW-4H		15.375	
MW-5H		15.872	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

1-16-93

7:15 ARRIVE OFFICE
GATHER MATERIALS FOR YORKTOWN
7:45 LEAVE FOR YORKTOWN
9:00 ARRIVE AT SITE
9:10 START TEMP READINGS
10:00 START GAUGING WELLS
11:35 FINISHED GAUGING WELLS
11:45 CALL TAYLOR
11:55 START CUTTING PVC PIPE AND STACKING ON GRAVEL PAD
12:50 FINISHED WITH PIPE CLEAN UP
1:00 LEAVE SITE
2:05 ARRIVE AT OFFICE

YORKTOWN SITE MONITORING FORM

DATE: 7-19-93
NAME: Tom Oenick
Arrive on site (time) 9:00

Weather Conditions: OVERCAST 85°
Depart From Site (time) 12:00

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	100.2	2-TAPES ON WIRE FOR JACK	9:00
	T2	18	91.1	1-TAPE ON WIRE FOR JACK	
	T3	23	86.4	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	89.2	2-TAPES ON WIRE FOR JACK	9:04
	T2	18	79.2	1-TAPE ON WIRE FOR JACK	
	T3	23	68.5	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	135.5	2-TAPES ON WIRE FOR JACK	9:07
	T2	18	134.1	1-TAPE ON WIRE FOR JACK	
	T3	23	134.8	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	142.3	2-TAPES ON WIRE FOR JACK	9:11
	T2	18	136.5	1-TAPE ON WIRE FOR JACK	
	T3	23	118.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	73.2	2-TAPES ON WIRE FOR JACK	9:15
	T2	18	70.7	1-TAPE ON WIRE FOR JACK	
	T3	23	68.4	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	78.8	2-TAPES ON WIRE FOR JACK	9:20
	T2	18	78.0	1-TAPE ON WIRE FOR JACK	
	T3	23	75.6	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	67.9	2-TAPES ON WIRE FOR JACK	9:24
	T2	18	64.9	1-TAPE ON WIRE FOR JACK	
	T3	23	62.8	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	67.0	2-TAPES ON WIRE FOR JACK	9:27
	T2	18	64.4	1-TAPE ON WIRE FOR JACK	
	T3	23	63.0	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.8	2-TAPES ON WIRE FOR JACK	9:31
	T2	18	70.5	1-TAPE ON WIRE FOR JACK	
	T3	23	68.5	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	71.4	2-TAPES ON WIRE FOR JACK	9:35
	T2	18	68.9	1-TAPE ON WIRE FOR JACK	
	T3	23	66.6	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 7-19-93

WELL	DTP*	DTW**	NOTES:
RW-1S	15.312		OIL WAS THICK
RW-2H	17.258		"
RW-3X	17.716		"
MW-1S	14.028	14.557	
MW-2S	13.581		
MW-3S	14.167	14.342	
MW-4S		13.338	OILY FILM
MW-5S		14.509	CLEAR
MW-1H	14.561		
MW-2H		14.884	CLEAR
MW-3H		15.578	CLEAR
MW-4H		15.468	CLEAR
MW-5H		16.370	CLEAR

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

7/6/93

	DTP	DTW
RW1S	15.092	
RW2H	17.154	
RW3	17.603	17.840
MW1S	13.830	14.172
MW2S	13.464	13.518
MW3S	14.187	14.311
MW4S		13.316
MW5S		14.398
MWH1	14.532	
MWH2		15.339
MWH3		15.462
MWH4		15.375
MWH5		15.872

TEMP READINGS

MW1S	103.1	92.6	87.4
MW2S	90.0	79.3	68.5
MW3S	140.0	138.3	138.8
MW4S	145.3	138.1	119.2
MW5S	72.8	70.4	68.2
MW1H	79.1	78.4	76.0
MW2H	67.5	64.7	62.7
MW3H	66.7	64.2	62.9
MW4H	72.7	70.5	68.5
MW5H	71.3	69.0	66.6

7-19 93 YORKTOWN

7:45 ARRIVE OFFICE
7:50 LEAVE YORKTOWN
9:00 ARRIVE AT YORKTOWN
START TO MONITOR WELLS FOR TEMPERATURE READINGS
9:40 FINISHED WITH TEMP READINGS
9:45 START TO GAUGE WELLS
11:15 FINISHED GAUGING WELLS
START TO CLEAN UP AROUND SITE AND PUT EQUIPMENT AWAY
11:30 CALL TAYLOR
11:35-12:00 PICK UP WOOD AND TRASH
12:00 LEAVE SITE
1:15 BACK AT OFFICE
1:30 FINISHED WITH PAPERWORK

YORKTOWN SITE MONITORING FORM

DATE: 6-21-93
NAME: Tom Orner
Arrive on site (time) 9:30

Weather Conditions: Hot 83°
Depart From Site (time) 3:30

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	162.4	2-TAPES ON WIRE FOR JACK	9:45
	T2	18	121.7	1-TAPE ON WIRE FOR JACK	
	T3	23	112.9	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	99.2	2-TAPES ON WIRE FOR JACK	9:50
	T2	18	76.3	1-TAPE ON WIRE FOR JACK	
	T3	23	66.4	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	193.1	2-TAPES ON WIRE FOR JACK	9:54
	T2	18	193.8	1-TAPE ON WIRE FOR JACK	
	T3	23	190.7	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	184.0	2-TAPES ON WIRE FOR JACK	9:59
	T2	18	148.0	1-TAPE ON WIRE FOR JACK	
	T3	23	114.2	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	67.4	2-TAPES ON WIRE FOR JACK	10:05
	T2	18	66.5	1-TAPE ON WIRE FOR JACK	
	T3	23	64.8	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	82.2	2-TAPES ON WIRE FOR JACK	10:10
	T2	18	83.9	1-TAPE ON WIRE FOR JACK	
	T3	23	81.6	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	64.7	2-TAPES ON WIRE FOR JACK	10:14
	T2	18	63.0	1-TAPE ON WIRE FOR JACK	
	T3	23	62.0	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	63.8	2-TAPES ON WIRE FOR JACK	10:20
	T2	18	62.3	1-TAPE ON WIRE FOR JACK	
	T3	23	61.5	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.6	2-TAPES ON WIRE FOR JACK	10:24
	T2	18	70.4	1-TAPE ON WIRE FOR JACK	
	T3	23	67.4	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	72.4	2-TAPES ON WIRE FOR JACK	10:28
	T2	18	71.5	1-TAPE ON WIRE FOR JACK	
	T3	23	67.5	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: _____

WELL	DTP*	DTW**	NOTES:
RW-1S	14 2 15/16		
RW-2H	16 3 7/16		
RW-3X	17 25/32		
MW-1S	13.020		
MW-2S	12.690		
MW-3S	13.180		
MW-4S		12.952	
MW-5S		13.573	
MW-1H	13.920		
MW-2H		14.537	
MW-3H		14.648	
MW-4H		14.525	
MW-5H		15.432	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low _____ normal ____ high _____ (Located right hand side of boiler)

Note boiler fire conditio low fire _____ high fire _____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low _____ normal ____ high _____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

DATE: 6-25-93
NAME: TOM OMAR
Arrive on site (time) 8:50

Weather Conditions: HOT 85°
Depart From Site (time) 10:45

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	146.3	2-TAPES ON WIRE FOR JACK	9:00
	T2	18	113.5	1-TAPE ON WIRE FOR JACK	
	T3	23	103.9	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	97.4	2-TAPES ON WIRE FOR JACK	9:04
	T2	18	77.7	1-TAPE ON WIRE FOR JACK	
	T3	23	66.8	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	183.1	2-TAPES ON WIRE FOR JACK	9:08
	T2	18	181.2	1-TAPE ON WIRE FOR JACK	
	T3	23	178.8	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	176.2	2-TAPES ON WIRE FOR JACK	9:13
	T2	18	147.2	1-TAPE ON WIRE FOR JACK	
	T3	23	116.7	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	68.4	2-TAPES ON WIRE FOR JACK	9:18
	T2	18	67.3	1-TAPE ON WIRE FOR JACK	
	T3	23	65.4	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	81.3	2-TAPES ON WIRE FOR JACK	9:22
	T2	18	82.8	1-TAPE ON WIRE FOR JACK	
	T3	23	80.8	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	65.1	2-TAPES ON WIRE FOR JACK	9:27
	T2	18	63.2	1-TAPE ON WIRE FOR JACK	
	T3	23	62.1	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	64.2	2-TAPES ON WIRE FOR JACK	9:31
	T2	18	62.7	1-TAPE ON WIRE FOR JACK	
	T3	23	61.7	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	71.7	2-TAPES ON WIRE FOR JACK	9:35
	T2	18	70.4	1-TAPE ON WIRE FOR JACK	
	T3	23	67.9	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	71.9	2-TAPES ON WIRE FOR JACK	9:40
	T2	18	70.8	1-TAPE ON WIRE FOR JACK	
	T3	23	67.4	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-25-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14 3/4		14.27
RW-2H	16 4/16		16.35
RW-3X	17 2/8		17.17
MW-1S	13.182		
MW-2S	12.738		
MW-3S	13.342		
MW-4S		13.084	
MW-5S		13.640	
MW-1H	13.987		
MW-2H		14.593	
MW-3H		14.726	
MW-4H		14.581	
MW-5H		15.476	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Steam-System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes: _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

DATE: 6-30-93
NAME: TOM OWEN
Arrive on site (time) 10:15

Weather Conditions: HOT + HAZY 85°
Depart From Site (time) 3:00

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	130.8	2-TAPES ON WIRE FOR JACK	10:25
	T2	18	106.3	1-TAPE ON WIRE FOR JACK	
	T3	23	97.5	NO TAPE ON WIRE FOR JACK	10
MW-2S	T1	13	95.2	2-TAPES ON WIRE FOR JACK	10:29
	T2	18	79.8	1-TAPE ON WIRE FOR JACK	
	T3	23	67.4	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	171.1	2-TAPES ON WIRE FOR JACK	10:33
	T2	18	167	1-TAPE ON WIRE FOR JACK	
	T3	23	166.5	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	166.8	2-TAPES ON WIRE FOR JACK	10:37
	T2	18	146.0	1-TAPE ON WIRE FOR JACK	
	T3	23	120.1	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	71.1	2-TAPES ON WIRE FOR JACK	10:41
	T2	18	70.3	1-TAPE ON WIRE FOR JACK	
	T3	23	66.6	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	81.4	2-TAPES ON WIRE FOR JACK	10:47
	T2	18	82.5	1-TAPE ON WIRE FOR JACK	
	T3	23	80.6	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	67.2	2-TAPES ON WIRE FOR JACK	10:51
	T2	18	65.3	1-TAPE ON WIRE FOR JACK	
	T3	23	64.9	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	67.6	2-TAPES ON WIRE FOR JACK	10:55
	T2	18	65.3	1-TAPE ON WIRE FOR JACK	
	T3	23	64.0	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	73.0	2-TAPES ON WIRE FOR JACK	11:00
	T2	18	71.1	1-TAPE ON WIRE FOR JACK	
	T3	23	69.2	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	73.0	2-TAPES ON WIRE FOR JACK	11:04
	T2	18	72.1	1-TAPE ON WIRE FOR JACK	
	T3	23	70.1	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 6-30-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14. 3 1/2		
RW-2H	16. 3 11/16		
RW-3X	17. 2 5/16		
MW-1S	13.214		
MW-2S	12.687		
MW-3S	13.386		
MW-4S		13.128	OILY SHEEN
MW-5S		13.587	OILY SHEEN
MW-1H	13.924		
MW-2H		13.607	OILY SHEEN
MW-3H		13.684	LIGHT SHEEN
MW-4H		13.620	LIGHT SHEEN
MW-5H		15.345	OILY SHEEN

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

DATE: 7-2-93
NAME: TOM DENRK
Arrive on site (time) 9:10

Weather Conditions: HOT HUMID RAIN
Depart From Site (time) 11:25

Steam Injection System Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	125.5	2-TAPES ON WIRE FOR JACK	9:20
	T2	18	103.5	1-TAPE ON WIRE FOR JACK	
	T3	23	95.2	NO TAPE ON WIRE FOR JACK	
MW-2S	T1	13	94.3	2-TAPES ON WIRE FOR JACK	9:24
	T2	18	78.9	1-TAPE ON WIRE FOR JACK	
	T3	23	67.5	NO TAPE ON WIRE FOR JACK	
MW-3S	T1	13	166	2-TAPES ON WIRE FOR JACK	9:28
	T2	18	162.9	1-TAPE ON WIRE FOR JACK	
	T3	23	162.2	NO TAPE ON WIRE FOR JACK	
MW-4S	T1	13	163.3	2-TAPES ON WIRE FOR JACK	9:32
	T2	18	144.8	1-TAPE ON WIRE FOR JACK	
	T3	23	119.3	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	70.2	2-TAPES ON WIRE FOR JACK	9:37
	T2	18	68.6	1-TAPE ON WIRE FOR JACK	
	T3	23	66.5	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring — MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	80.2	2-TAPES ON WIRE FOR JACK	9:44
	T2	18	81.0	1-TAPE ON WIRE FOR JACK	
	T3	23	79.1	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	65.9	2-TAPES ON WIRE FOR JACK	9:47
	T2	18	63.6	1-TAPE ON WIRE FOR JACK	
	T3	23	63	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	65.8	2-TAPES ON WIRE FOR JACK	9:51
	T2	18	64.9	1-TAPE ON WIRE FOR JACK	
	T3	23	62.2	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	72.0	2-TAPES ON WIRE FOR JACK	9:55
	T2	18	70.4	1-TAPE ON WIRE FOR JACK	
	T3	23	68.1	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	71.4	2-TAPES ON WIRE FOR JACK	9:58
	T2	18	69.9	1-TAPE ON WIRE FOR JACK	
	T3	23	67.5	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS) Date: 7-2-93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.3 11/16		
RW-2H	16.4 11/16		
RW-3X	17.2 7/8		
MW-1S	13.760		
MW-2S	12.692		
MW-3S	13.361		
MW-4S		13.085	
MW-5S		13.613	
MW-1H	13.971		
MW-2H		13.543	
MW-3H		13.658	
MW-4H		13.647	
MW-5H		15.291	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____ Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use: Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

YORKTOWN SITE MONITORING FORM

Date: _____

Steam Injection System:

Injection Well	Injection Pressure in psig
SI-1	
SI-2	
SI-3	
SI-4	

Total Steam Injection Pressure: _____ psig.

Recovery wells:

RW-1S Steam System
RW-2H Hot Water System
RW-3X Standard System

Steam System Valve Status

Injection Well	Valve - open 100% or closed?
SI-1	
SI-2	
SI-3	
SI-4	

Well	GPM	Total Mtr Reading
RW-1S		
RW-2H		
RW-3X		

Noted Product Recovery

Well	Measured inches product in recovery tank.
RW-1S	
RW-2H	
RW-3X	
O/W*	

*O/W = Oil / Water Separator

Transfer Pump from O/W operation _____ (ok - yes or no)
Notes; _____
_____
_____

Fill Out Boiler Maintenance Form for John Y. Wright Co. (Located in Boiler Trailer)

Call Site Manager before leaving Yorktown:

Office: 804-436-7881
Home: 804-549-1205

YORKTOWN SITE MONITORING FORM

DATE: 7/6/93
NAME: ORNER / REUTHER
Arrive on site (time) / 2:10

Weather Conditions: HOT, HAZY 95°
Depart From Site (time) 3:20

Steam Injection System Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe ID	Depth	TEMP READING	Description	TIME
MW-1S	T1	13	117.0	2-TAPES ON WIRE FOR JACK	2:13
	T2	18	102.6	1-TAPE ON WIRE FOR JACK	2:15
	T3	23	92.4	NO TAPE ON WIRE FOR JACK	2:16
MW-2S	T1	13	92.9	2-TAPES ON WIRE FOR JACK	2:19
	T2	18	79.3	1-TAPE ON WIRE FOR JACK	2:21
	T3	23	68.1	NO TAPE ON WIRE FOR JACK	2:23
MW-3S	T1	13	157.4	2-TAPES ON WIRE FOR JACK	2:26
	T2	18	154.7	1-TAPE ON WIRE FOR JACK	2:28
	T3	23	154.7	NO TAPE ON WIRE FOR JACK	2:29
MW-4S	T1	13	157.2	2-TAPES ON WIRE FOR JACK	2:32
	T2	18	143.0	1-TAPE ON WIRE FOR JACK	
	T3	23	119.6	NO TAPE ON WIRE FOR JACK	
MW-5S	T1	13	71.2	2-TAPES ON WIRE FOR JACK	2:39
	T2	18	69.3	1-TAPE ON WIRE FOR JACK	
	T3	23	67.2	NO TAPE ON WIRE FOR JACK	

Hot Water System Temperature Monitoring

MONITORING WELLS TEMPERATURE READINGS

Well No.	Probe Id	Depth	TEMP READING	Description	TIME
MW-1H	T1	13	79.5	2-TAPES ON WIRE FOR JACK	2:44
	T2	18	80.2	1-TAPE ON WIRE FOR JACK	
	T3	23	78.0	NO TAPE ON WIRE FOR JACK	
MW-2H	T1	13	66.4	2-TAPES ON WIRE FOR JACK	2:47
	T2	18	64.1	1-TAPE ON WIRE FOR JACK	
	T3	23	62.5	NO TAPE ON WIRE FOR JACK	
MW-3H	T1	13	65.7	2-TAPES ON WIRE FOR JACK	2:51
	T2	18	63.9	1-TAPE ON WIRE FOR JACK	
	T3	23	62.6	NO TAPE ON WIRE FOR JACK	
MW-4H	T1	13	75.6	2-TAPES ON WIRE FOR JACK	2:56
	T2	18	70.6	1-TAPE ON WIRE FOR JACK	
	T3	23	68.5	NO TAPE ON WIRE FOR JACK	
MW-5H	T1	13	71.4	2-TAPES ON WIRE FOR JACK	3:01
	T2	18	69.6	1-TAPE ON WIRE FOR JACK	
	T3	23	67.1	NO TAPE ON WIRE FOR JACK	

YORKTOWN SITE MONITORING FORM

LIQUID LEVEL DATA: (GAUGING OF WELLS)

Date: 7/6/93

WELL	DTP*	DTW**	NOTES:
RW-1S	14.723		
RW-2H	16.694		
RW-3X	17.131		
MW-1S	13.467		
MW-2S	12.997		
MW-3S	13.618		
MW-4S		12.948	
MW-5S		14.450	
MW-1H	14.218		
MW-2H		14.890	
MW-3H		14.755	
MW-4H		14.937	
MW-5H		15.814	

* DTP = Depth to product.
** DTW = Depth to water.

BOILER MAINTENANCE

READINGS TO TAKE:

			Time
Fuel Pressure:		in psig	
Boiler Pressure:		in psig	
Stack Temperature:		in deg. F	
Steam Feed Rate		in lb/hr	
Total Steam Fed x100		in lbs	

Water Level (sight glass low ____ normal ____ high ____ (Located right hand side of boiler)

Note boiler fire conditio low fire ____ high fire ____

Boiler Running? Yes or No

Heat Exchanger for Hot Water Injection system Data:

Fuel Tank(s) in use:
Outside or Inside

Water Level (sight glass low ____ normal ____ high ____

Influent Water Temp:		in deg. F
Influent Water Pressure:		in psig
Influent Water Meter		in gal.
Effluent Water Temp.		in deg. F
Hot Water Meter		in gal.
Hot Water Flow Rate		in GPM

Fuel Oil received today? (Y or N)
If yes, how many gals _____
And which tank inside or outside.

APPENDIX F

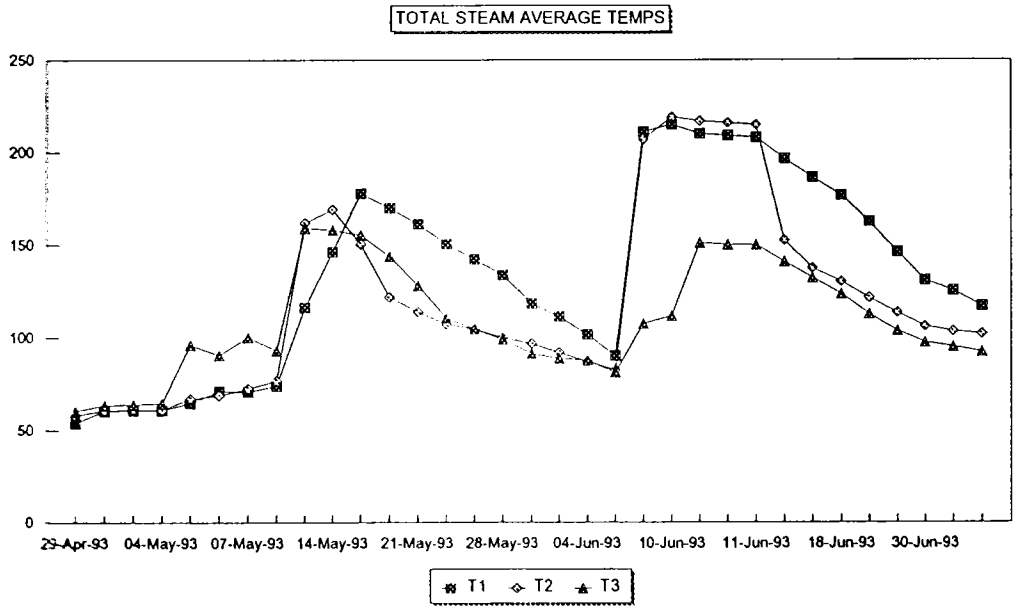
SPECIFIC TEMPERATURE DATA AND ASSOCIATED GRAPHS FROM STEAM SYSTEM MONITORING WELLS AND THERMISTOR DATA

GROUNDWATER TECHNOLOGY

FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

WELL **MW-1S**

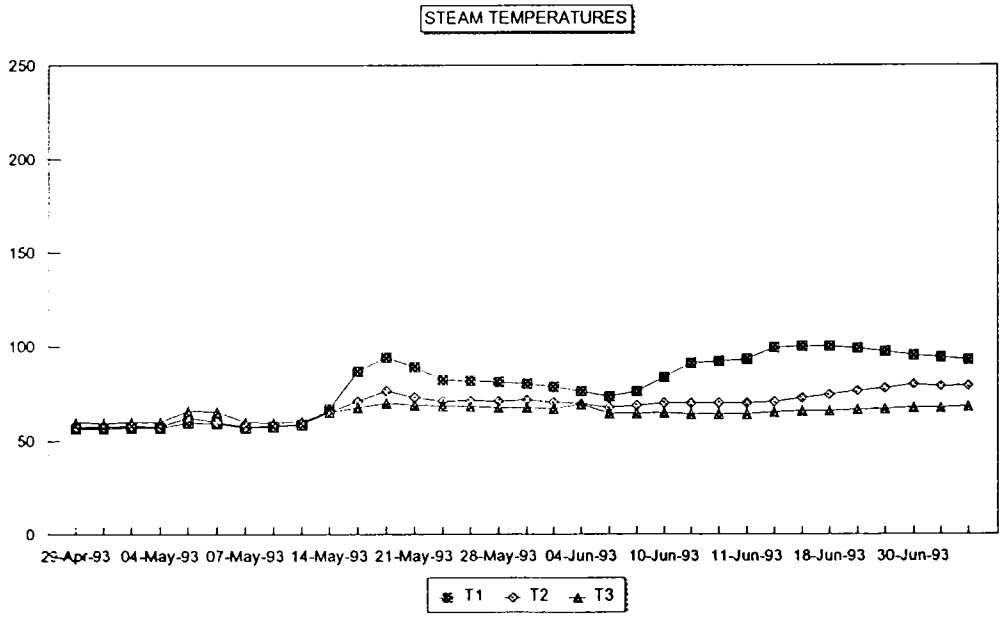
DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93	1230	53.7	57.9	60.3	
04-May-93	707	60.5	60.8	63.7	
04-May-93	1125	60.7	61.1	63.9	
04-May-93	1405	60.8	61.2	64.6	
05-May-93	1020	64.5	67.1	96.0	
06-May-93	833	71.1	68.6	90.8	
07-May-93		70.8	72.4	100.3	Time Not Recorded
10-May-93	1200	74.0	76.7	92.9	
12-May-93	844	116.4	161.9	158.9	
14-May-93	1030	146.0	169.0	158.0	
17-May-93	1340	177.6	150.2	155.4	
19-May-93	830	169.8	122.0	143.8	
21-May-93	800	161.0	114.0	128.0	
24-May-93	1300	150.2	107.4	110.8	
26-May-93	930	142.4	104.7	105.0	
28-May-93	730	133.7	99.9	99.0	
01-Jun-93	1300	118.4	96.9	91.4	
02-Jun-93	1300	111.5	92.0	89.0	
04-Jun-93	800	101.8	87.1	87.9	
07-Jun-93	1300	90.2	82.7	81.2	
09-Jun-93	925	211.0	207.0	107.5	
10-Jun-93	1150	215.0	219.0	111.7	
11-Jun-93	1100	210.0	217.0	151.0	
11-Jun-93	1335	209.0	216.0	150.0	
11-Jun-93	1430	208.0	215.0	150.0	
14-Jun-93	925	196.4	152.3	141.0	
16-Jun-93	1005	186.4	137.3	132.4	
18-Jun-93	1002	176.7	130.2	123.6	
21-Jun-93	945	162.4	121.7	112.9	
25-Jun-93	900	146.3	113.5	103.9	
30-Jun-93	1025	130.8	106.3	97.5	
02-Jul-93	920	125.5	103.5	95.2	
06-Jul-93	1413	117.0	102.0	92.4	



FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

WELL MW-2S

		Probes			
		T1	T2	T3	
DATE	TIME	13FT	18FT	23FT	Comments:
29-Apr-93	1230	56.5	57.6	59.9	
04-May-93	708	56.7	57.5	59.7	
04-May-93	1125	56.9	57.8	59.9	
04-May-93	1405	56.8	57.7	59.8	
05-May-93	1020	59.5	62.4	65.9	
06-May-93	831	59.3	59.8	65.4	
07-May-93	1400	57.0	57.7	59.8	
10-May-93	1200	57.5	57.9	59.7	
12-May-93	845	58.6	58.8	60.3	
14-May-93	1035	67.0	65.0	65.0	
17-May-93	1340	86.7	71.0	67.4	
19-May-93	830	94.1	76.4	69.8	
21-May-93	800	89.0	73.0	69.0	
24-May-93	1300	82.4	70.9	68.7	
26-May-93	930	81.7	71.4	68.2	
28-May-93	730	81.3	70.8	67.6	
01-Jun-93	1300	80.2	71.7	67.6	
02-Jun-93	1300	78.5	70.2	66.7	
04-Jun-93	800	76.0	69.4	69.1	
07-Jun-93	1300	73.3	67.4	64.3	
09-Jun-93	927	76.1	68.5	64.3	
10-Jun-93	1150	83.6	69.9	64.6	
11-Jun-93	1100	91.0	70.0	64.0	
11-Jun-93	1335	92.0	70.0	64.0	
11-Jun-93	1430	93.0	70.0	64.0	
14-Jun-93	929	99.4	70.7	65.2	
16-Jun-93	1009	100.2	72.6	65.7	
18-Jun-93	1023	100.0	74.4	66.0	
21-Jun-93	950	99.2	76.3	66.4	
25-Jun-93	904	97.4	77.7	66.8	
30-Jun-93	1029	95.2	79.8	67.4	
02-Jul-93	924	94.3	78.9	67.5	
06-Jul-93	219	92.9	79.3	68.1	

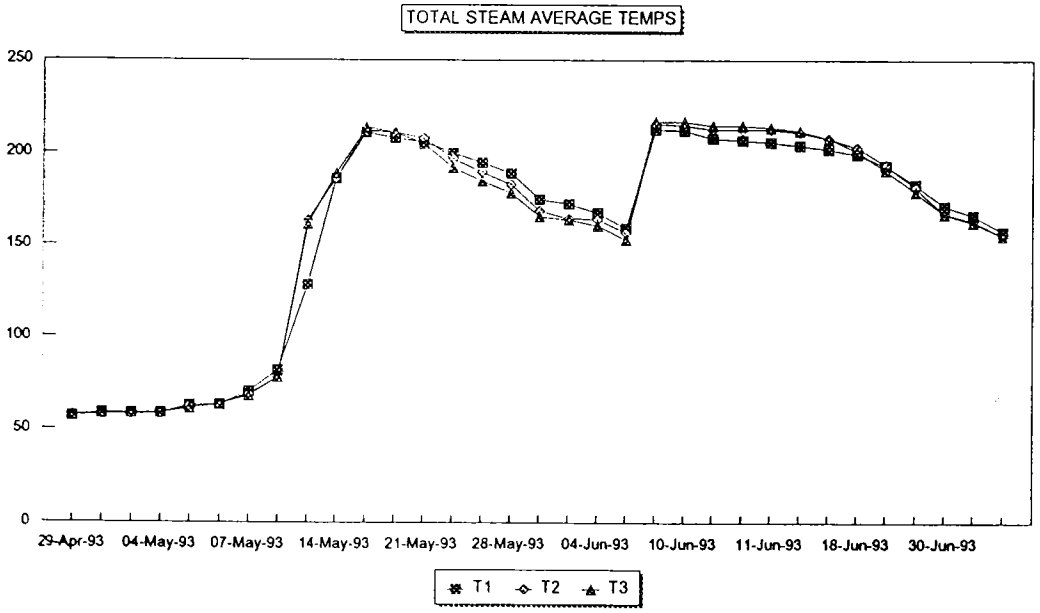


P:\ENG\HIGGINS ..mw2s.wk4

FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

WELL **MW-3S**

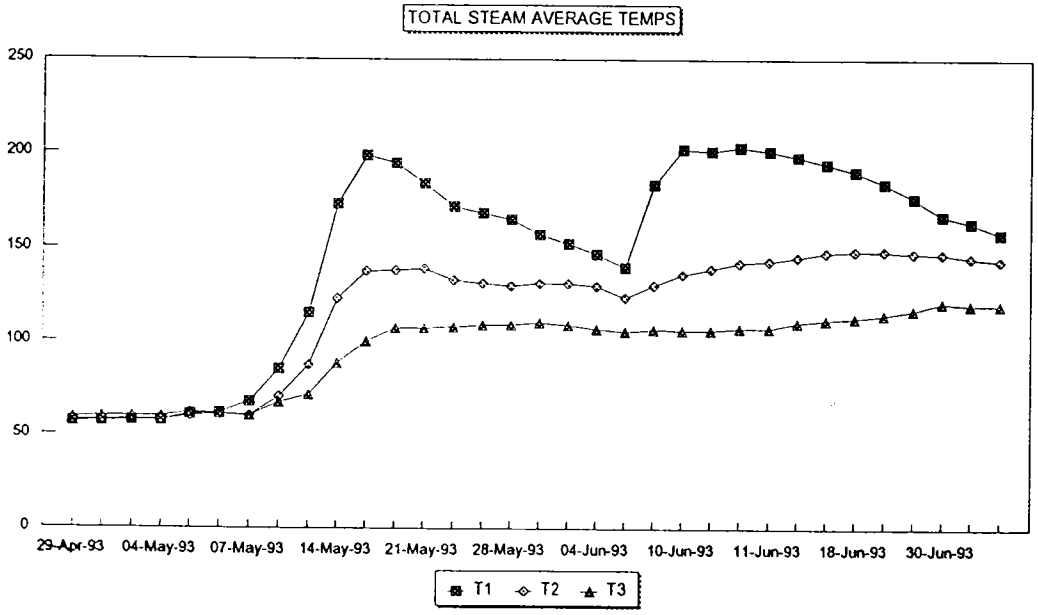
DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93	1230	56.8	57.0	57.5	
04-May-93	709	58.5	57.9	58.3	
04-May-93	1125	58.8	58.1	58.5	
04-May-93	1405	58.7	58.2	58.6	
05-May-93	1020	62.7	62.3	61.2	
06-May-93	829	63.1	63.4	63.5	
07-May-93	1400	70.6	68.8	68.1	
10-May-93	1200	81.9	78.2	78.1	
12-May-93	849	128.0	163.2	161.0	
14-May-93	1040	186.0	186.0	189.0	
17-May-93	1340	211.0	212.0	214.0	
19-May-93	830	208.0	211.0	211.0	
21-May-93	800	206.0	208.0	205.0	
24-May-93	1300	200.0	197.0	192.0	
26-May-93	930	194.8	189.5	184.8	
28-May-93	730	188.9	182.6	178.3	
01-Jun-93	1300	174.6	168.5	165.3	
02-Jun-93	1300	172.0	164.2	163.6	
04-Jun-93	800	167.3	163.9	160.5	
07-Jun-93	1300	159.0	156.7	152.8	
09-Jun-93	930	213.0	216.0	217.0	
10-Jun-93	1150	212.0	215.0	217.0	
11-Jun-93	1100	208.0	213.0	215.0	
11-Jun-93	1335	207.0	213.0	215.0	
11-Jun-93	1430	206.0	213.0	214.0	
14-Jun-93	933	204.0	211.0	212.0	
16-Jun-93	1013	202.0	208.0	208.0	
18-Jun-93	1028	199.3	203.0	201.0	
21-Jun-93	959	193.1	193.8	190.7	
25-Jun-93	908	183.1	181.2	178.8	
30-Jun-93	1033	171.1	167.0	166.5	
02-Jul-93	928	166.0	162.9	162.2	
06-Jul-93	1426	157.4	154.7	154.7	



FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

WELL **MW-4S**

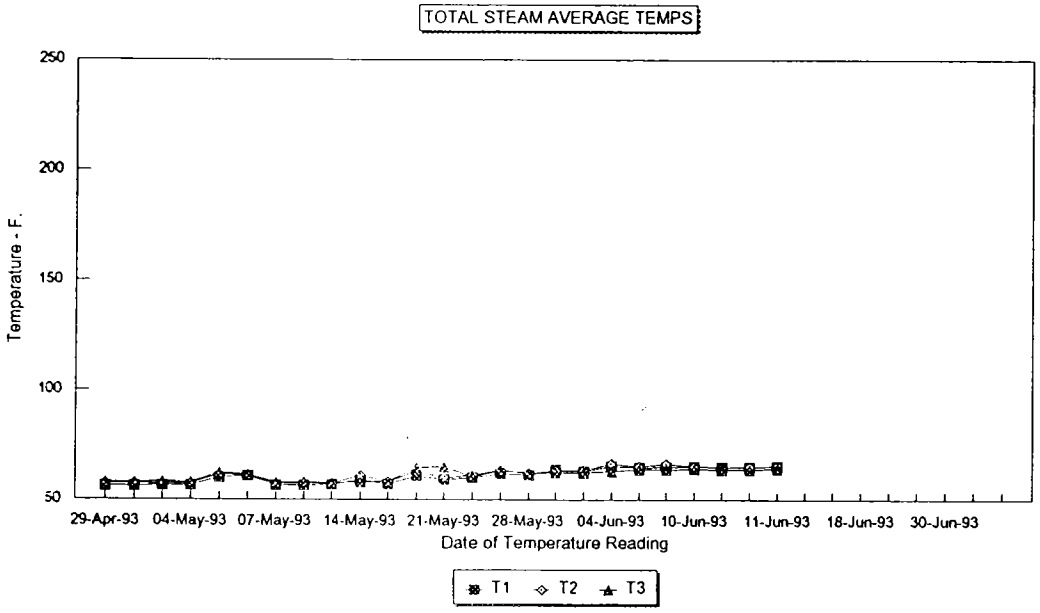
DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93	1230	57.0	57.4	59.3	
04-May-93	710	57.3	57.5	59.9	
04-May-93	1125	57.6	57.7	59.9	
04-May-93	1405	57.5	57.7	59.8	
05-May-93	1020	61.0	59.9	61.9	
06-May-93	830	61.5	61.0	61.3	
07-May-93	1400	67.9	60.3	60.2	
10-May-93	1200	85.4	70.4	67.6	
12-May-93	847	115.3	87.2	71.7	
14-May-93	1045	173.1	123.0	88.3	
17-May-93	1340	198.6	137.6	100.0	
19-May-93	830	194.7	138.0	107.2	Extrapolated Data Point
21-May-93	800	184.0	139.0	107.0	
24-May-93	1300	171.8	132.7	107.8	
26-May-93	930	168.2	131.2	108.7	
28-May-93	730	164.9	129.8	108.7	
01-Jun-93	1300	157.1	131.1	110.3	
02-Jun-93	1300	152.4	131.0	108.7	
04-Jun-93	800	146.8	129.7	106.9	
07-Jun-93	1300	139.6	123.4	105.5	
09-Jun-93	933	183.4	129.9	106.5	
10-Jun-93	1150	202.0	135.7	106.2	
11-Jun-93	1100	201.0	139.0	106.0	
11-Jun-93	1335	203.0	142.0	107.0	
11-Jun-93	1430	201.0	143.0	107.0	
14-Jun-93	938	197.9	145.1	110.3	
16-Jun-93	1018	194.1	147.4	111.7	
18-Jun-93	1050	190.1	148.1	112.7	
21-Jun-93	959	184.0	148.0	114.2	
25-Jun-93	913	176.2	147.2	116.7	
30-Jun-93	1037	166.8	146.8	120.7	
02-Jul-93	932	163.3	144.8	119.3	
06-Jul-93	1432	157.2	143.0	119.6	



FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

WELL **MW-5S**

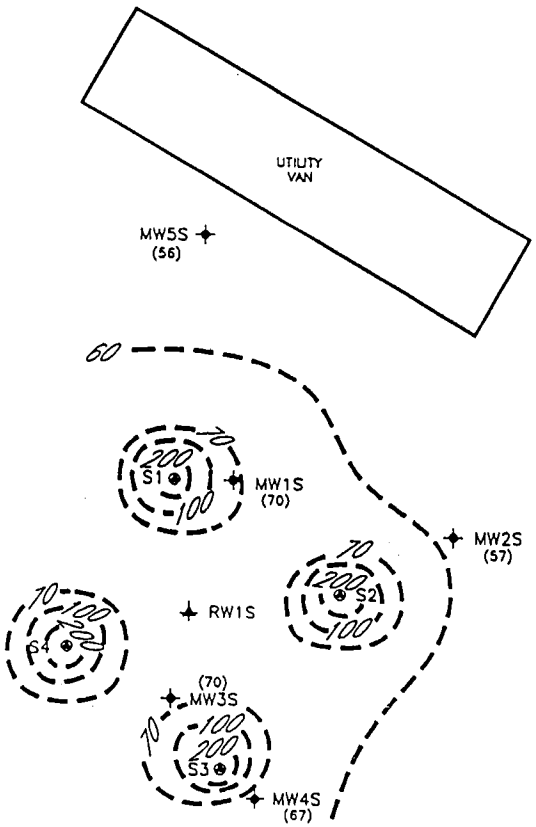
DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93	1230	56.2	57.4	58.0	
04-May-93	705	56.3	57.4	57.9	
04-May-93	1125	56.4	57.4	58.4	
04-May-93	1405	56.5	57.5	58.1	
05-May-93	1020	59.9	61.6	62.4	
06-May-93	835	60.8	61.2	61.5	
07-May-93	1400	56.6	57.4	57.9	
10-May-93	1200	56.6	57.4	58.0	
12-May-93	842	56.8	57.4	57.8	
14-May-93	1050	58.7	61.0	58.0	
17-May-93	1340	57.2	58.3	58.4	
19-May-93	830	61.0	62.8	64.7	
21-May-93	800	59.0	60.0	65.0	
24-May-93	1300	60.0	61.1	60.6	
26-May-93	930	61.9	63.5	63.2	
28-May-93	730	61.2	62.0	62.3	
01-Jun-93	1300	64.0	63.2	62.5	
02-Jun-93	1300	62.9	63.4	62.4	
04-Jun-93	800	65.2	66.6	63.0	
07-Jun-93	1300	64.6	65.2	63.8	
09-Jun-93	935	64.9	66.6	63.9	
10-Jun-93	1150	65.2	65.4	64.1	
11-Jun-93	1100	65.0	65.0	64.0	
11-Jun-93	1335	65.0	65.0	64.0	
11-Jun-93	1430	65.4	65.5	64.1	
14-Jun-93					No data Recorded
16-Jun-93					No data Recorded
18-Jun-93					No data Recorded
21-Jun-93					No data Recorded
25-Jun-93					No data Recorded
30-Jun-93					No data Recorded
02-Jul-93					No data Recorded
06-Jul-93					No data Recorded



APPENDIX G

STEAM INJECTION SYSTEM TEMPERATURE GRADIENT MAPS

GROUNDWATER TECHNOLOGY



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (56) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

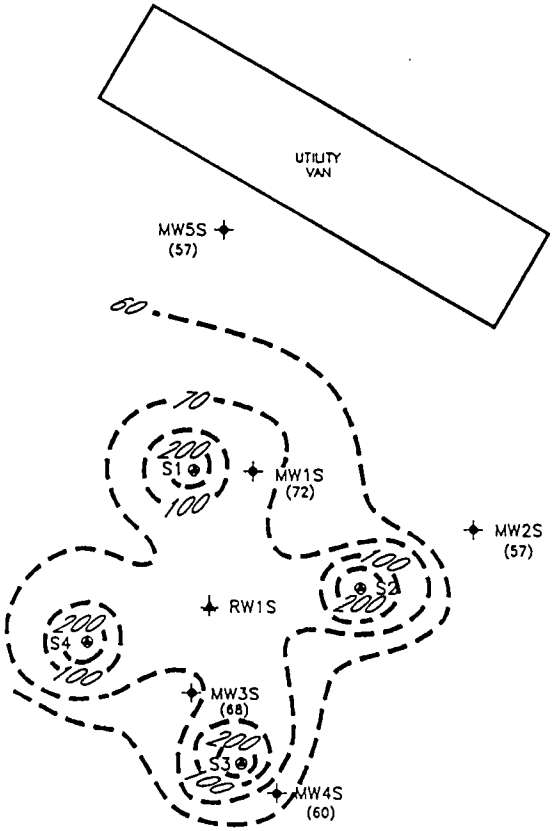
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 7, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (57) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

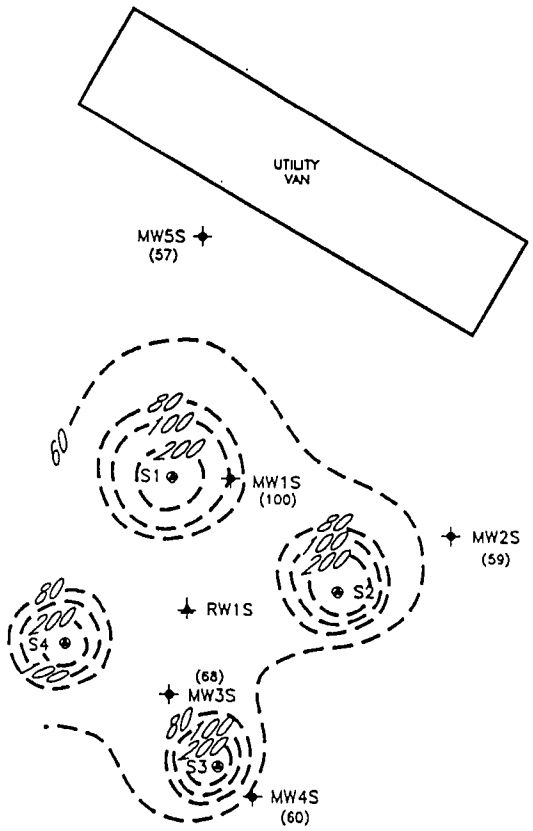
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM
TEMPERATURE GRADIENT PLOT
MAY 7, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE: •



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (57) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

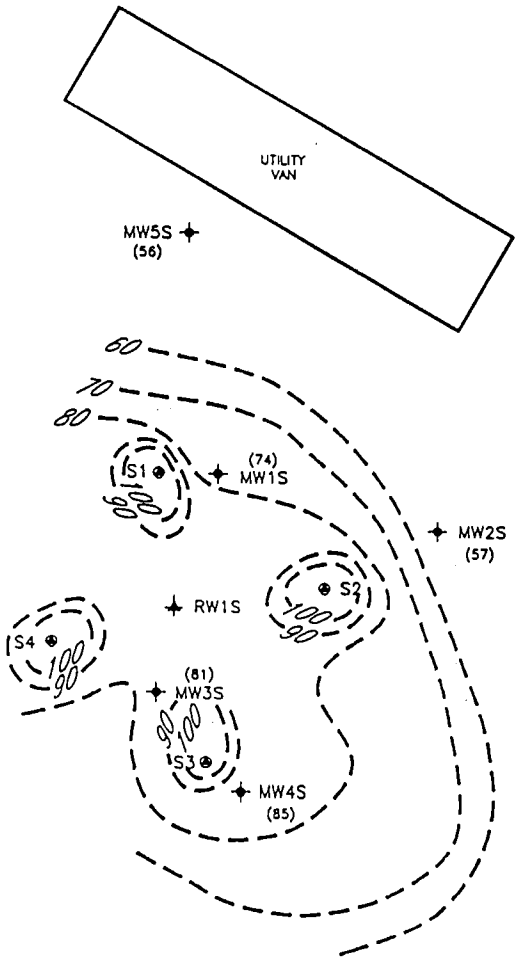
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 7, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE: •



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (56) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

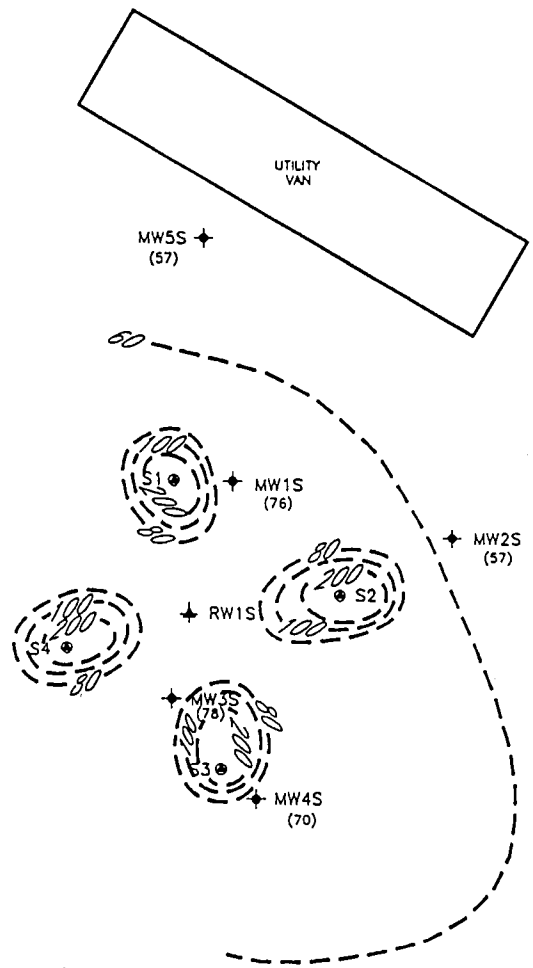
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 10, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/HG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE: •



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (57) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

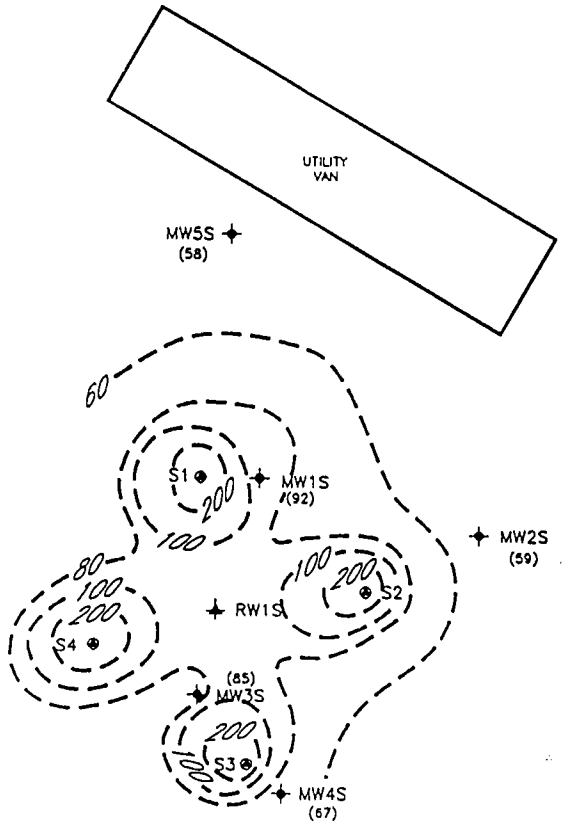
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 10, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (58) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

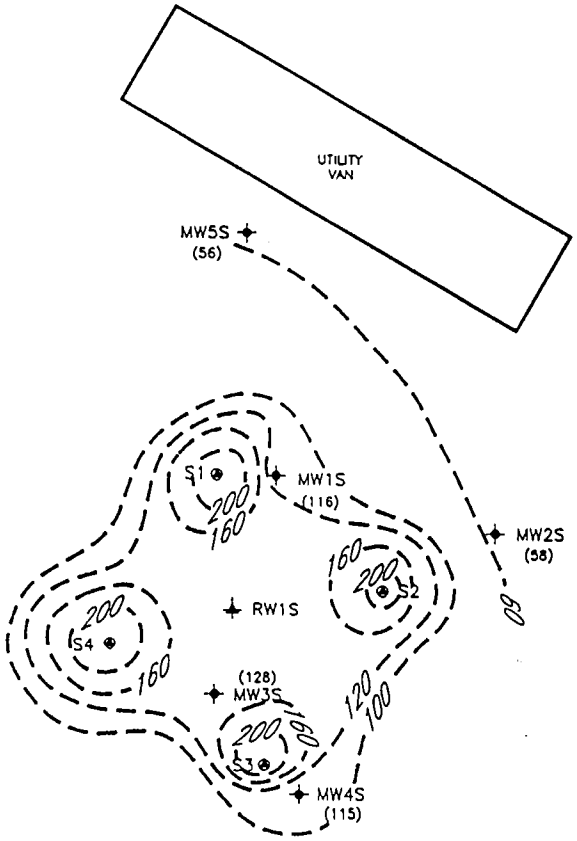
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 10, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (58) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

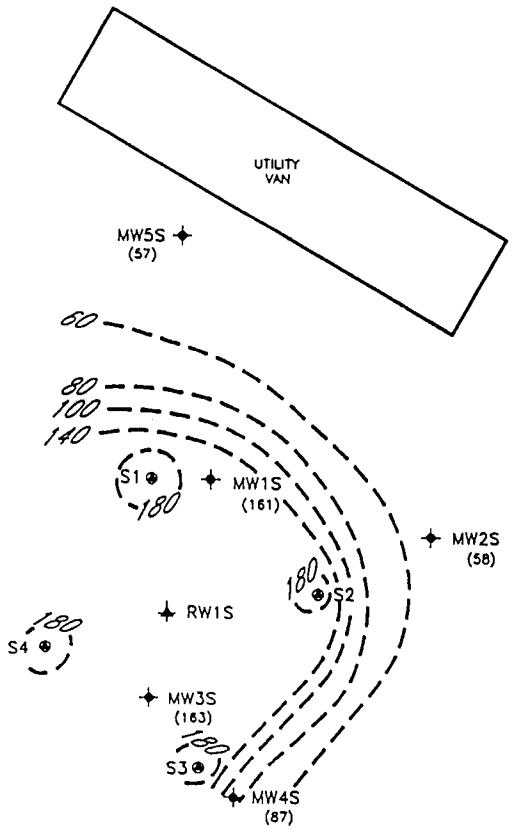
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 12, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (58) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

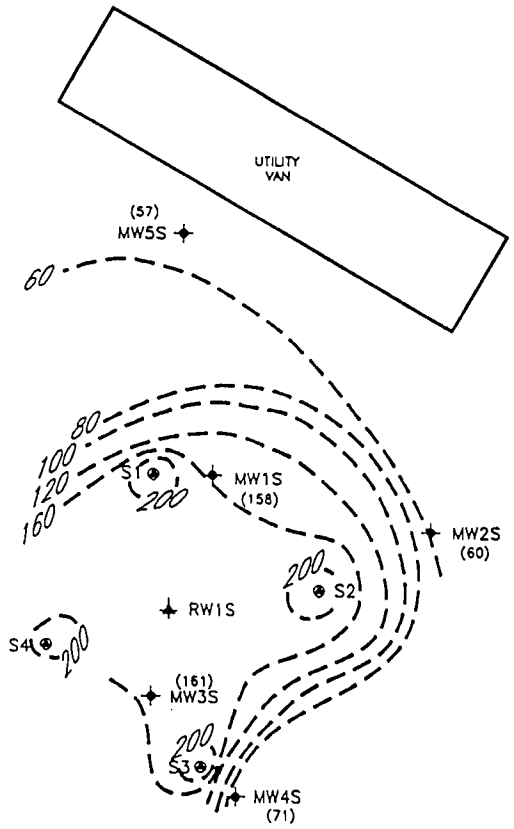
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 12, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (60) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

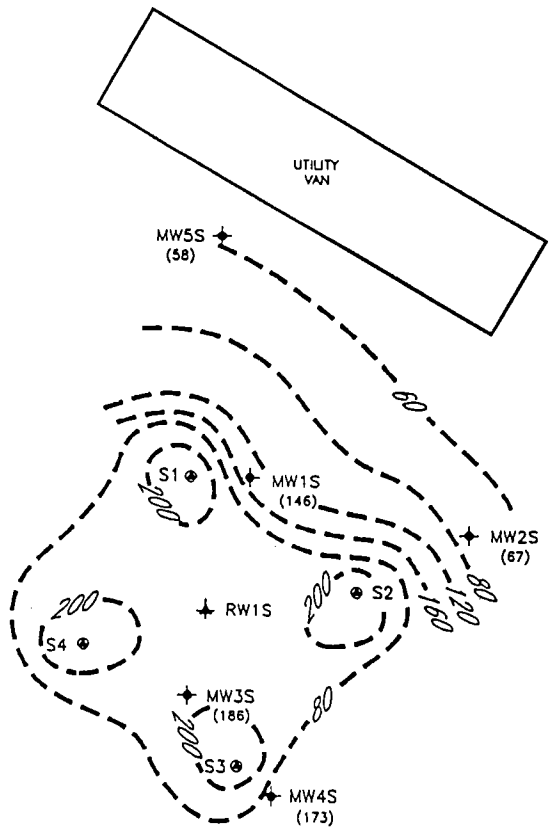
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 12, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (67) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

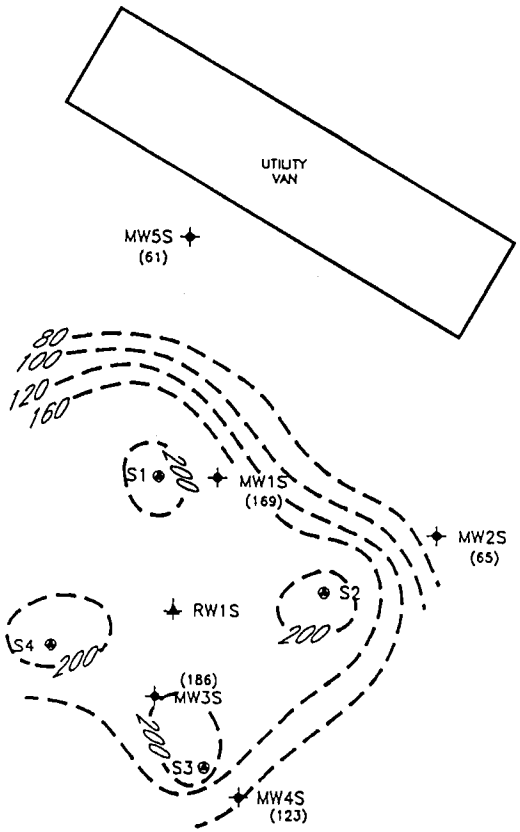
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 14, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (65) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

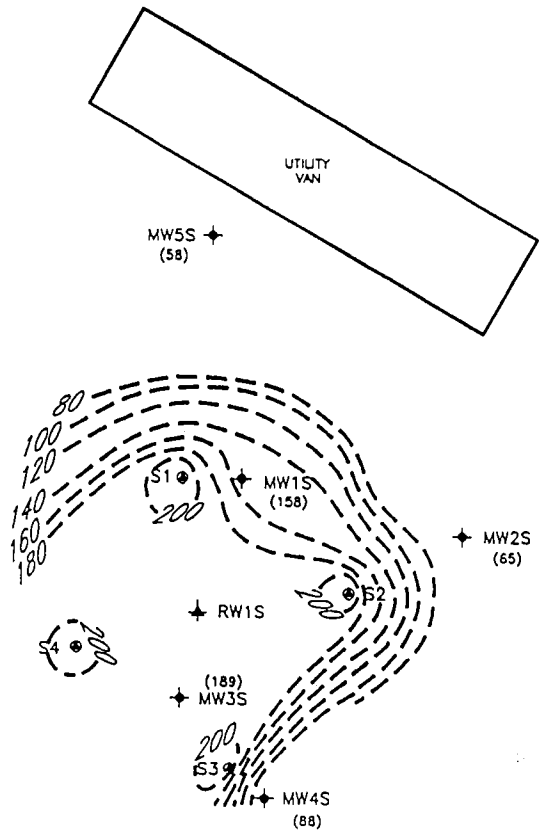
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 14, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (65) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

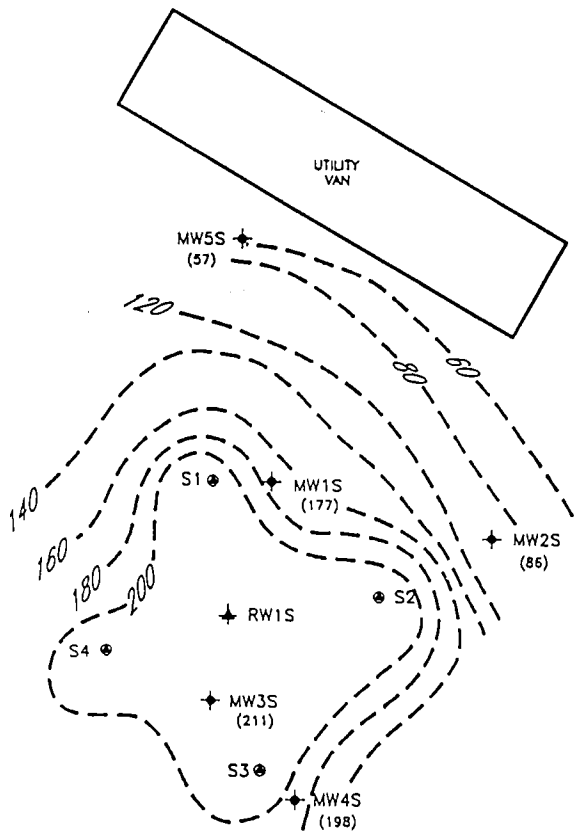
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 14, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (86) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

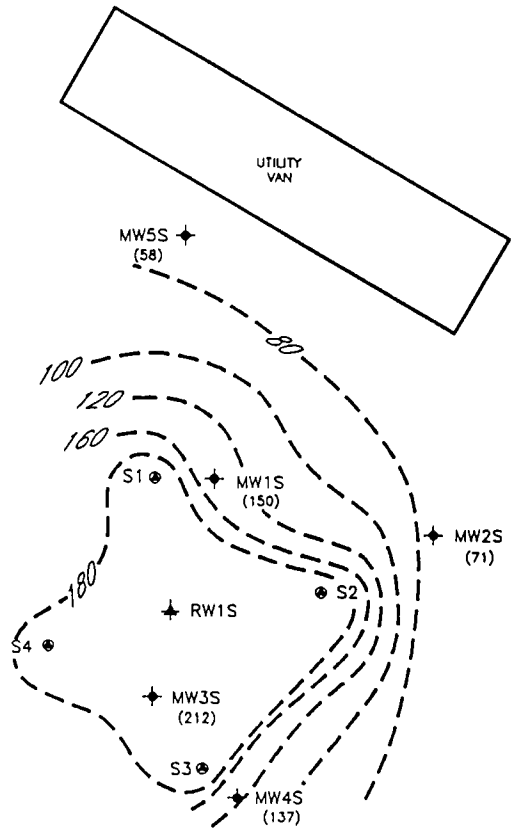
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 17, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (71) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

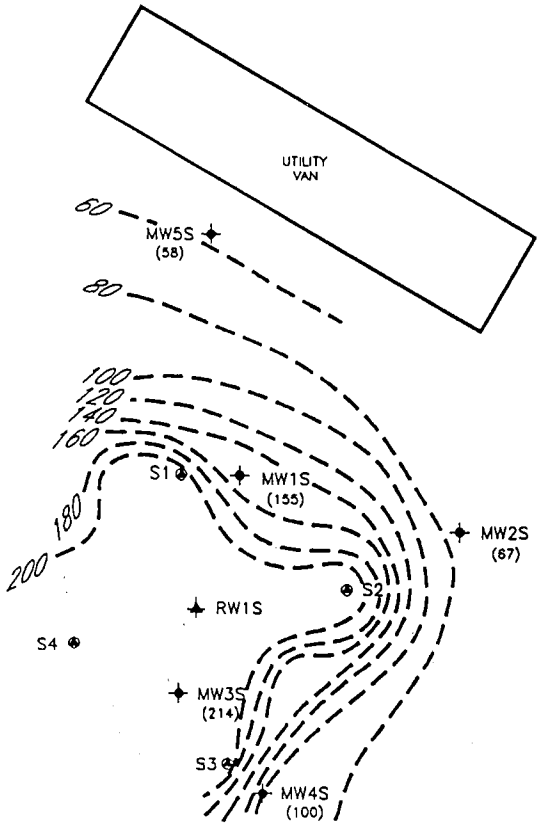
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT	

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 17, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (67) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

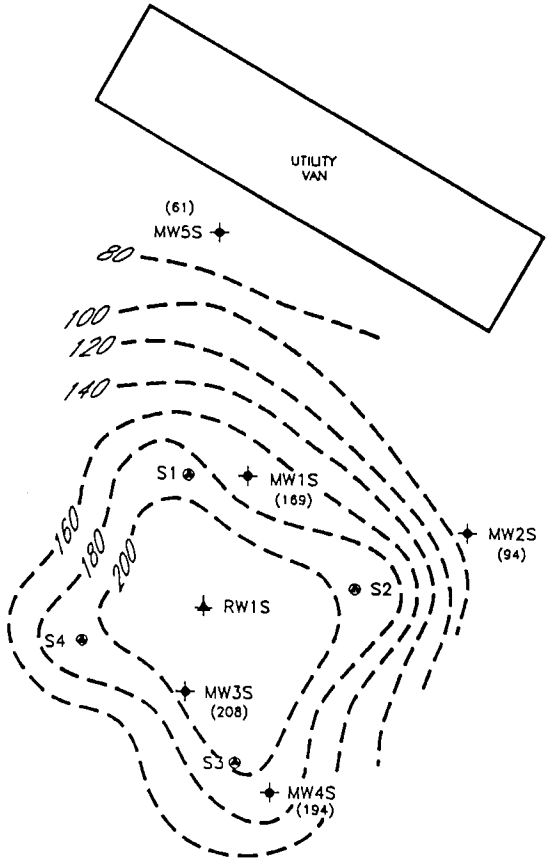
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 17, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (94) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

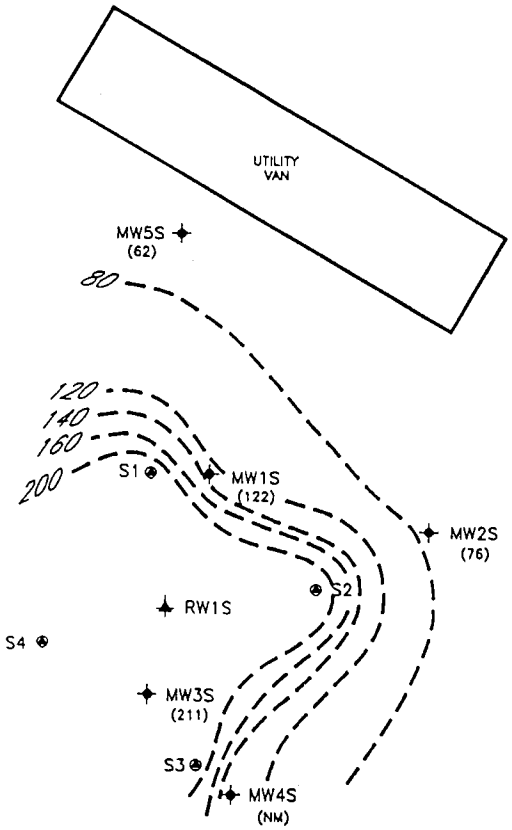
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 19, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (76) TEMPERATURE IN DEGREES F
- (NM) NOT MEASURED. LEADS ON TEMPERATURE SENSOR DAMAGED.

N

0 10 20
SCALE FEET

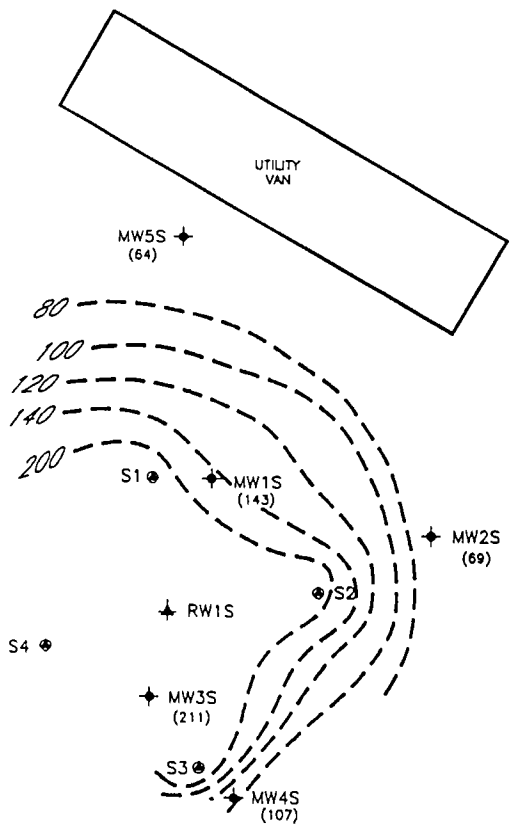
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 19, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (69) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

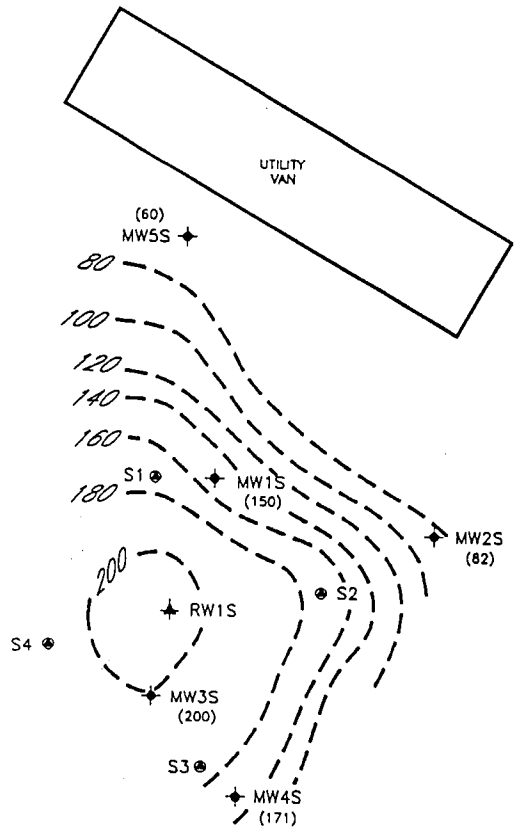
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
MAY 19, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (82) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

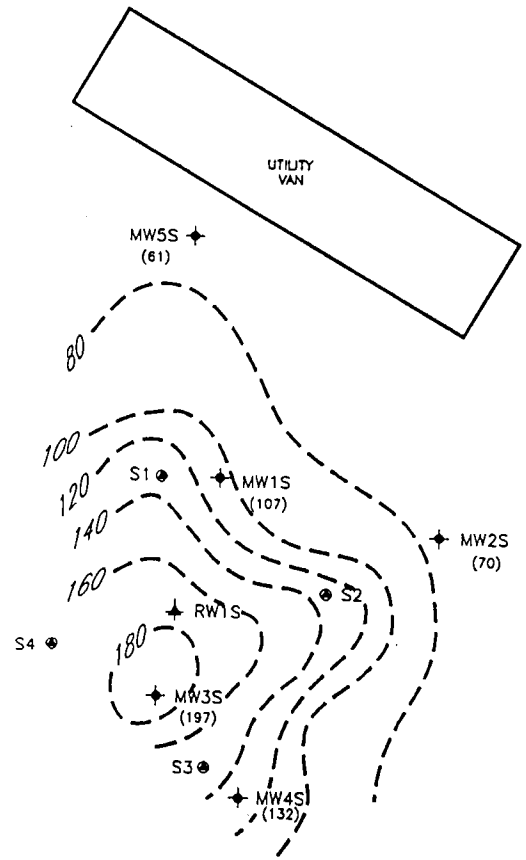
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 24, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (70) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

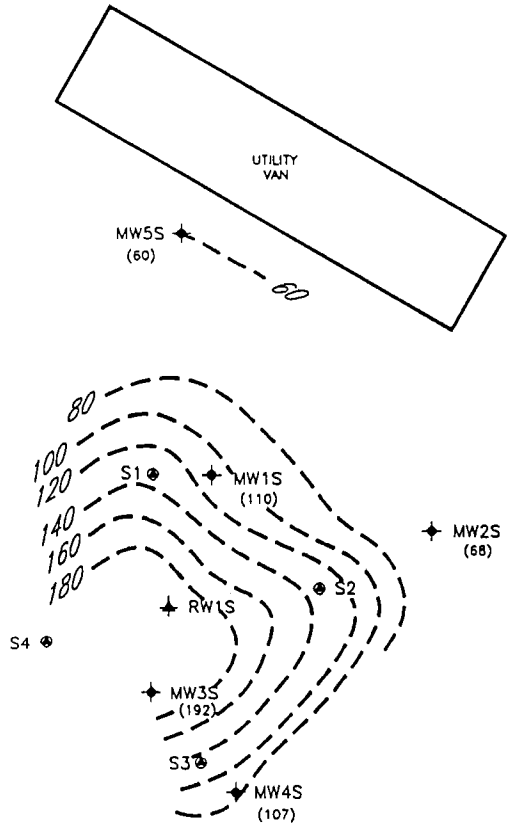
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 24, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: B30011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (68) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

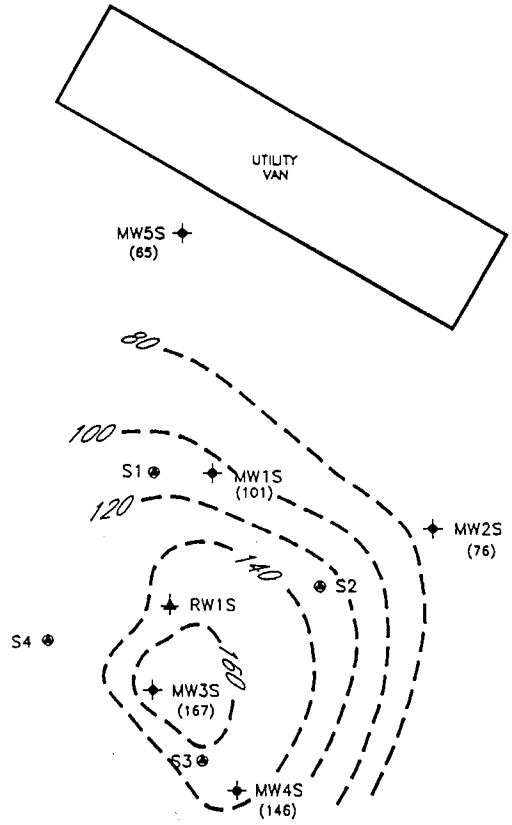
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT MAY 24, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (76) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

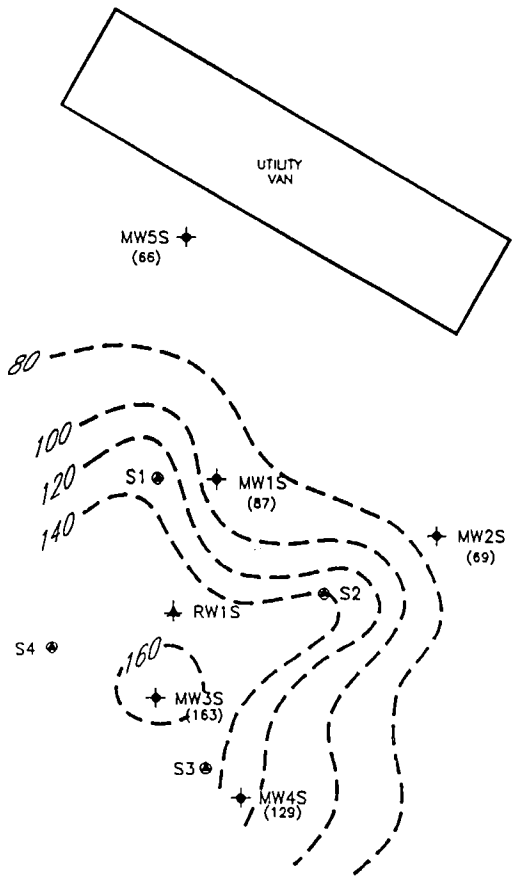
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 4, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (69) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

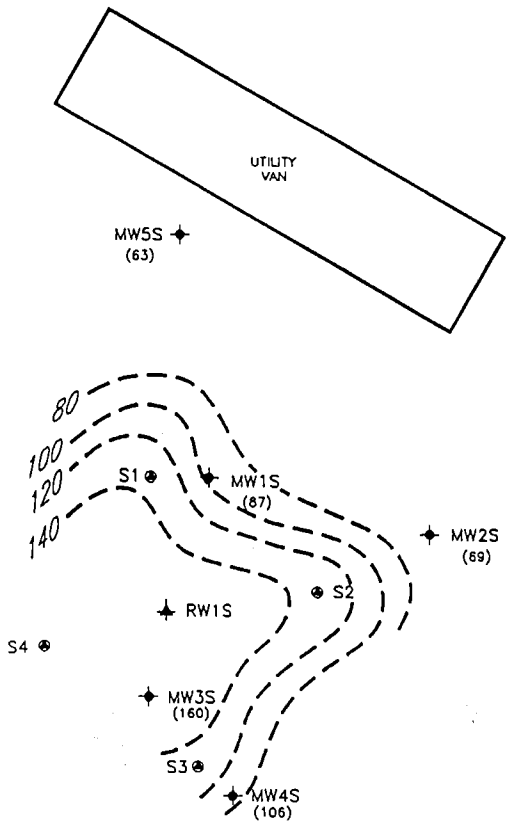
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM
TEMPERATURE GRADIENT PLOT
JUNE 4, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (69) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

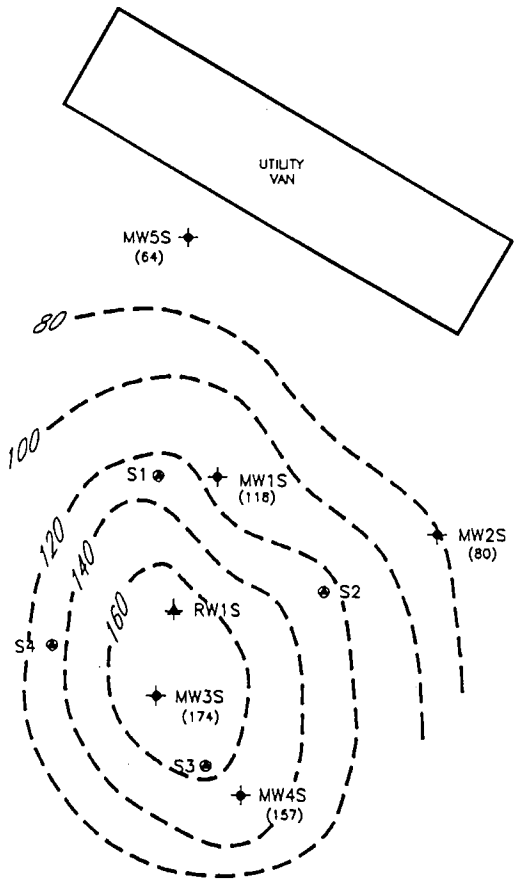
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 4, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (80) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

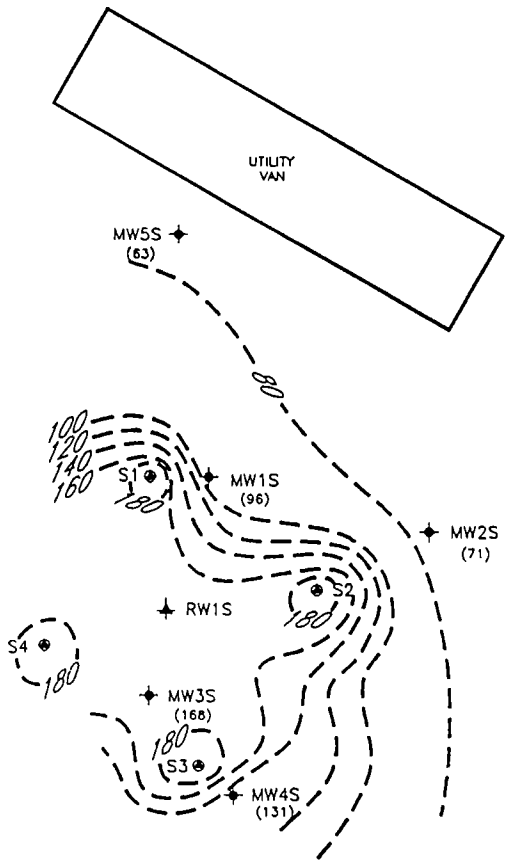
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 1, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (71) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

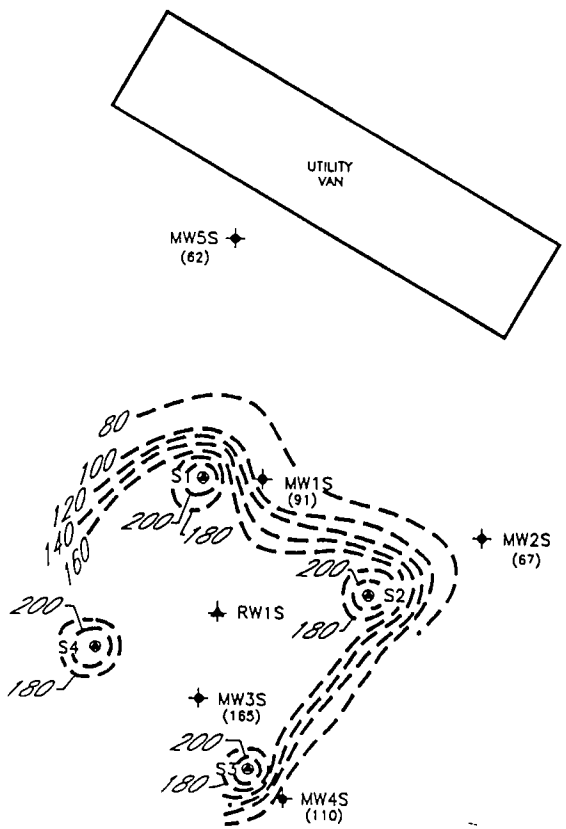
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT	

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 1, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (67) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

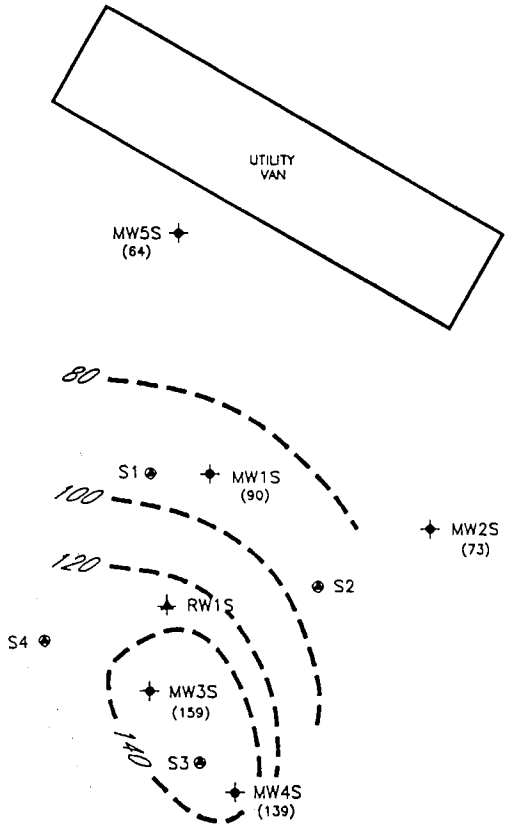
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK2SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 1, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (73) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

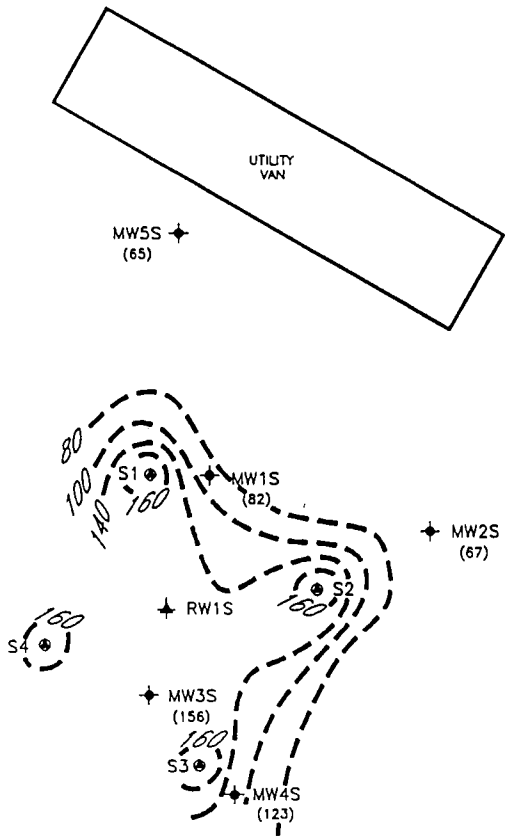
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT JUNE 7, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (67) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

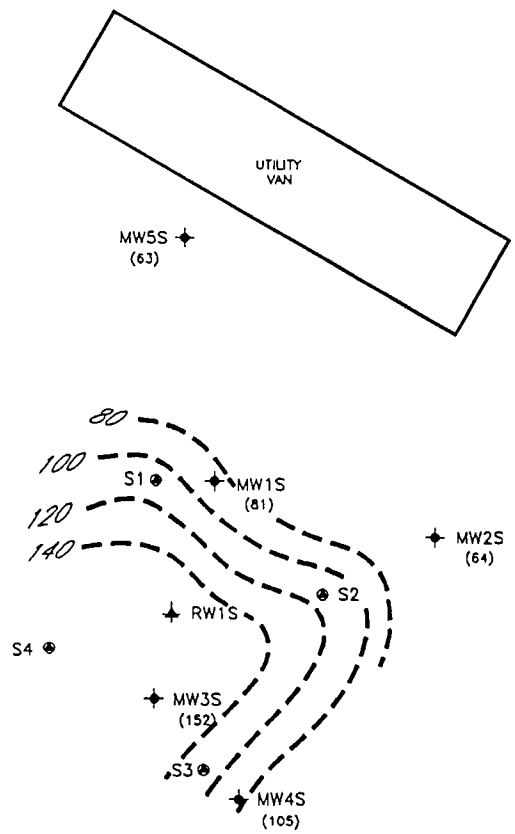
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM
TEMPERATURE GRADIENT PLOT
JUNE 7, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: B30011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (64) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

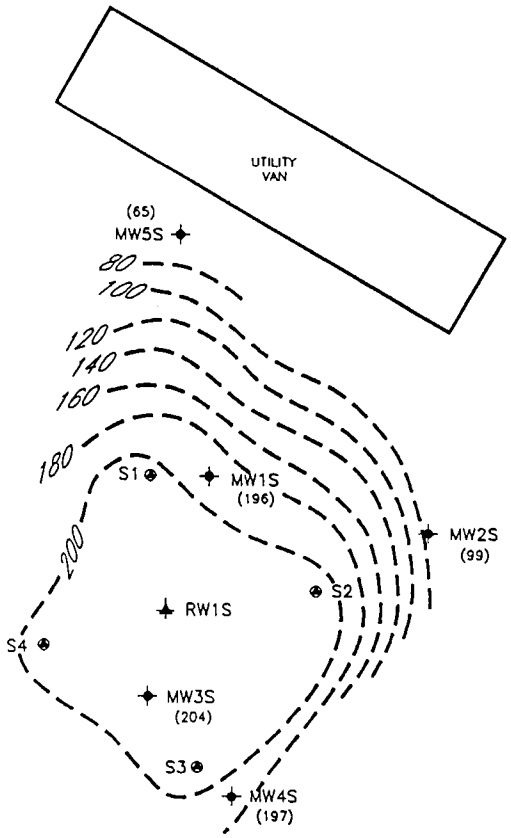
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 7, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (99) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

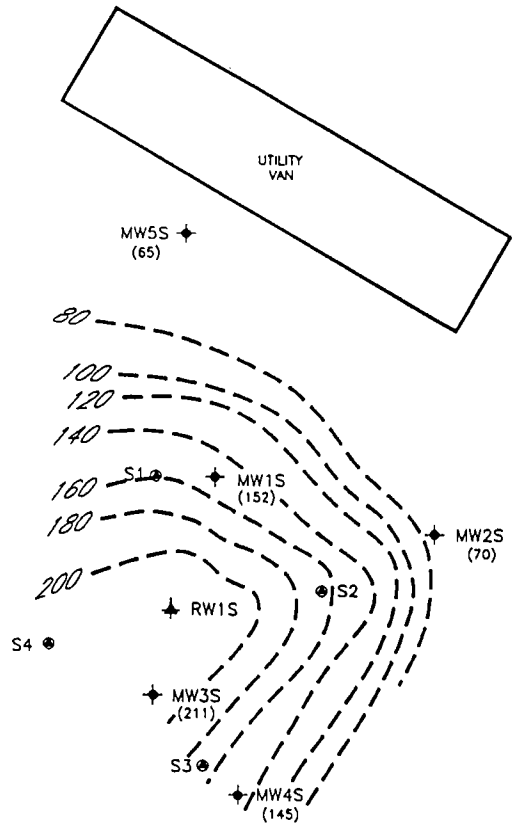
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 14, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (70) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

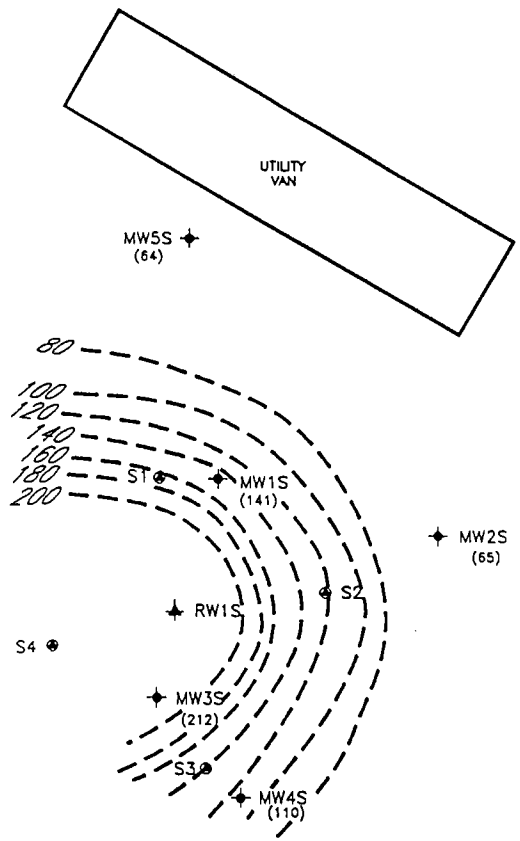
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 14, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (65) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

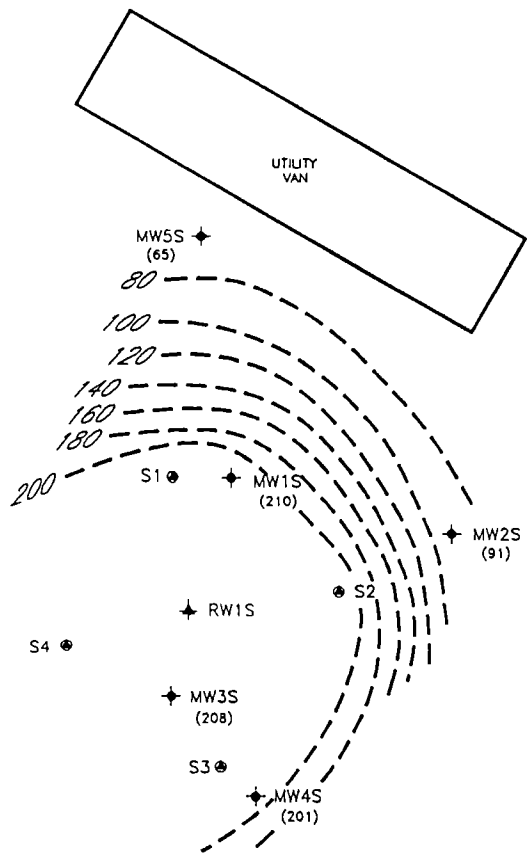
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT	

STEAM SYSTEM TEMPERATURE GRADIENT PLOT JUNE 14, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (91) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

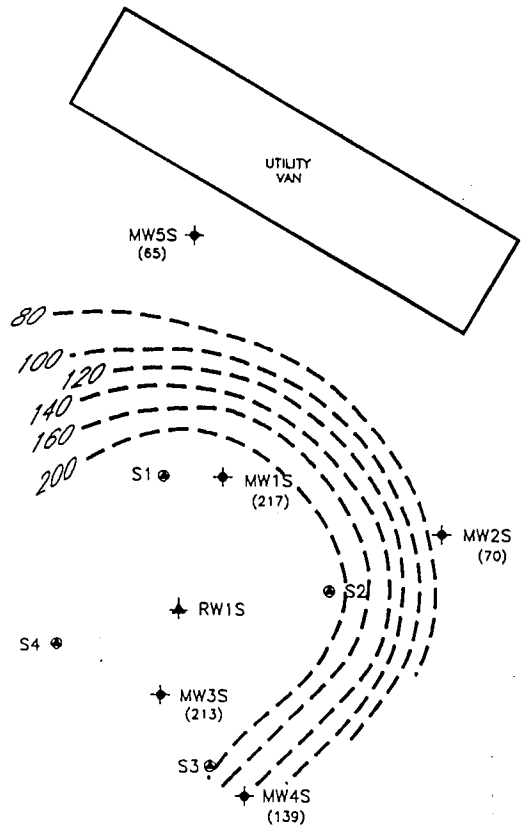
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 11, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (70) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

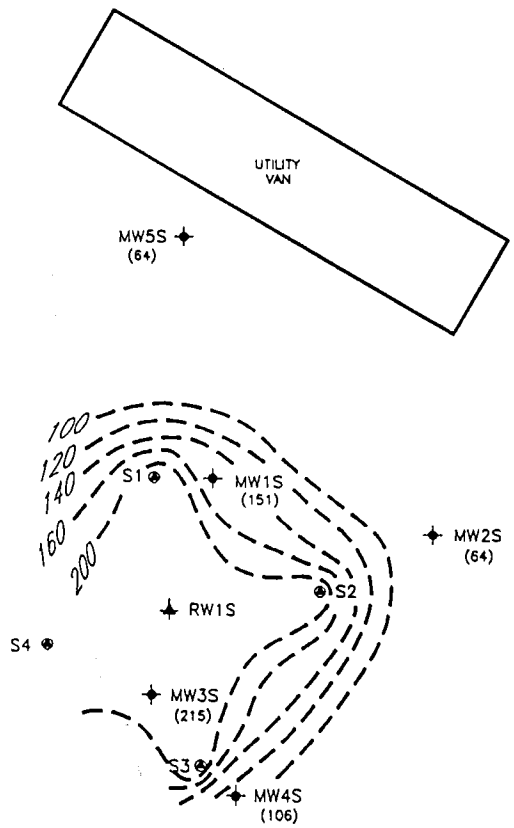
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 11, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (64) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

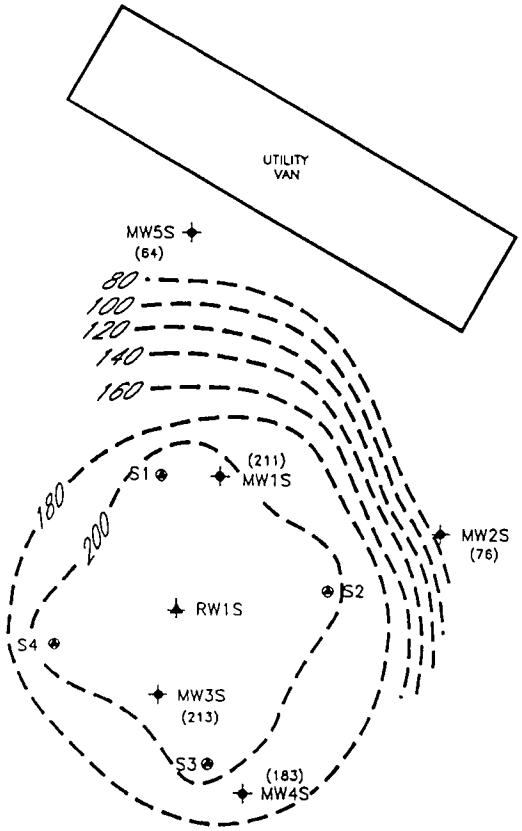
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 11, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (76) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

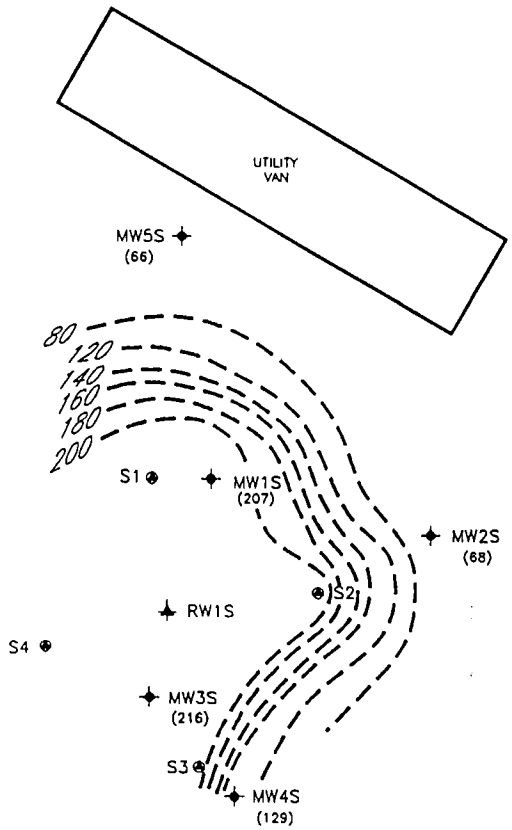
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 9, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (68) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

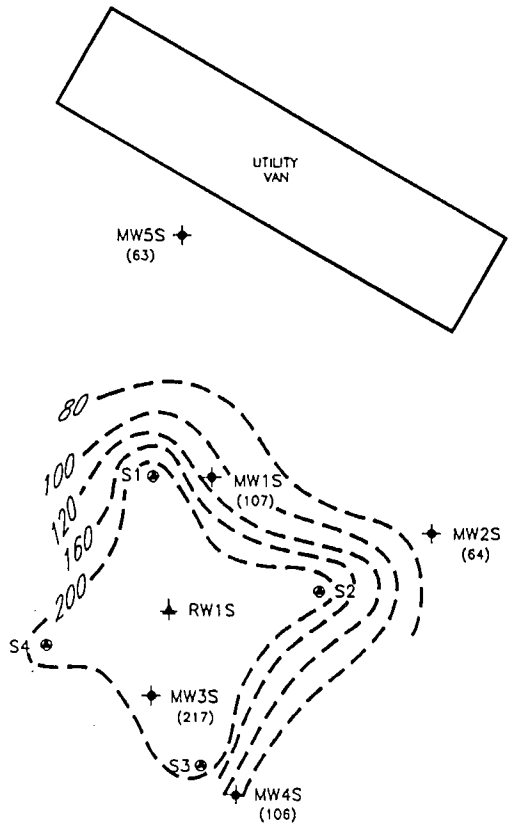
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 9, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (64) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

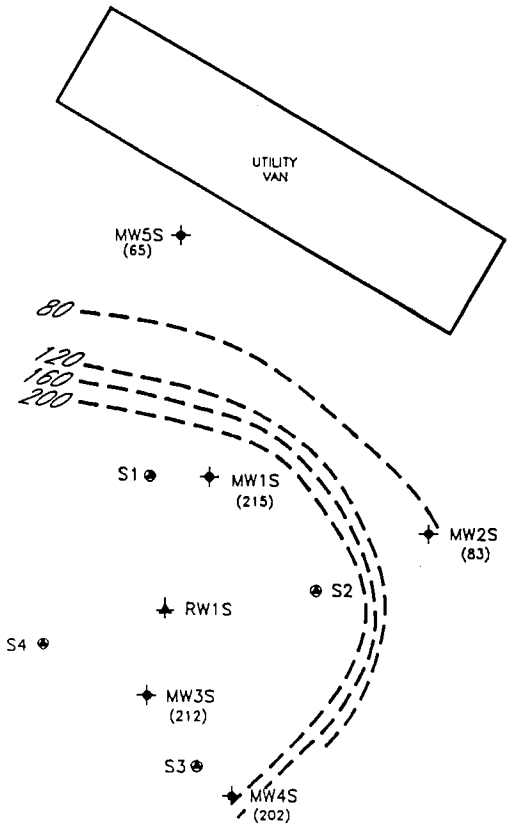
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT	

STEAM SYSTEM
TEMPERATURE GRADIENT PLOT
JUNE 9, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (83) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

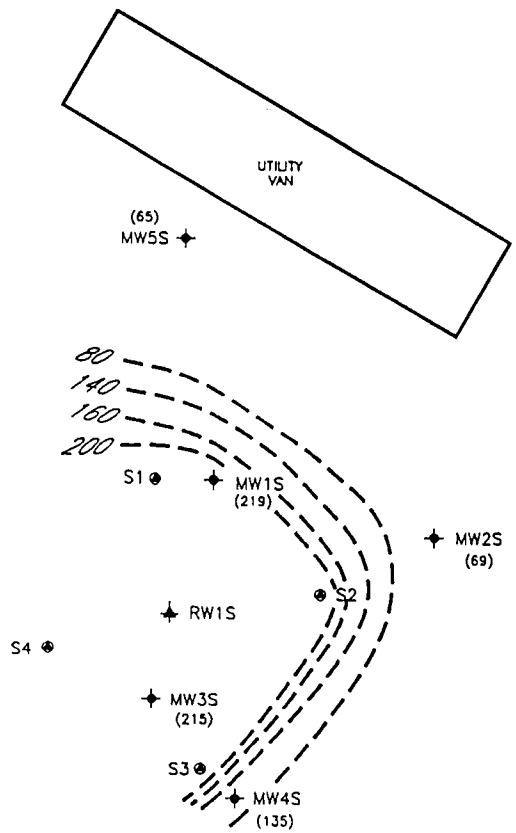
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 10, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (69) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

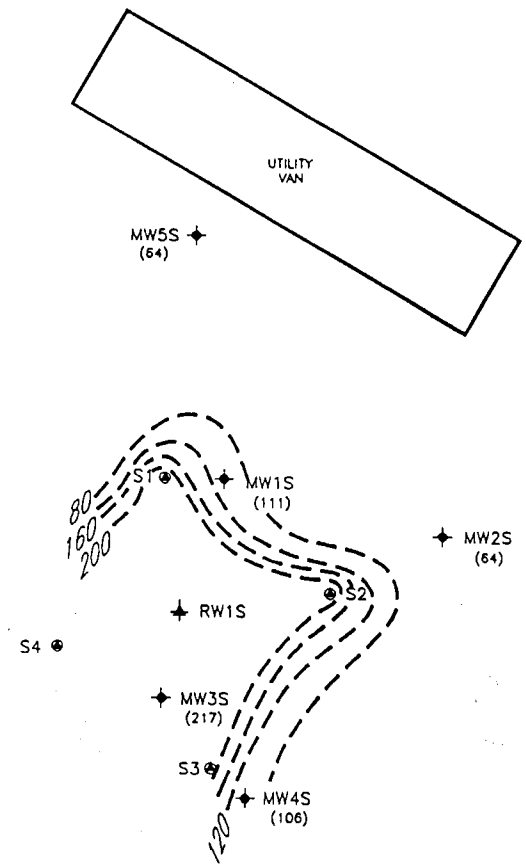
SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 10, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- STEAM INJECTION WELL
- GRADIENT LINE
- (64) TEMPERATURE IN DEGREES F

N

0 10 20
SCALE FEET

SOURCE: BOBBITT SURVEYING, P.A.

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/4/93	ACAD FILE: YORK-SIT

STEAM SYSTEM TEMPERATURE GRADIENT PLOT JUNE 10, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: PTS	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:

APPENDIX H

HOT WATER SYSTEM MONITORING WELL TEMPERATURE DATA AND GRAPHS AND HOT WATER INJECTION SYSTEM TEMPERATURE GRADIENT MAPS

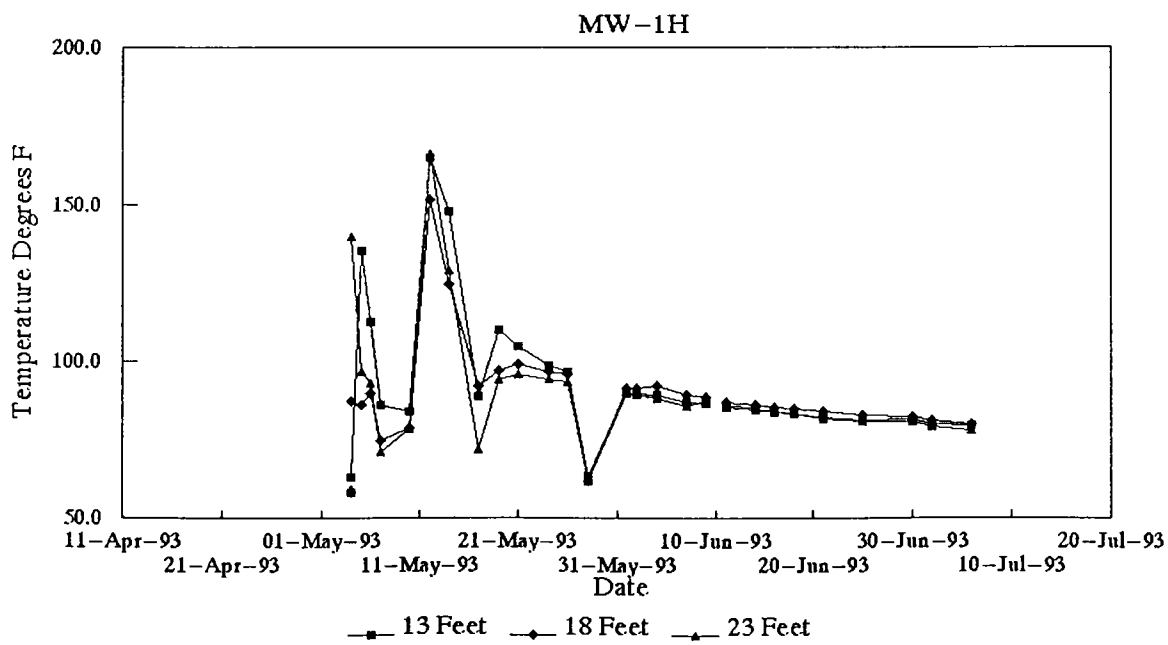
GROUNDWATER TECHNOLOGY

FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

File Name:
B:\mw1h.wk1
Date: file made: 6/14/93.pts

WELL **MW-1H**

DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93					
04-May-93	714	58.2	58.0	59.2	
04-May-93					
04-May-93	1350	63.0	87.1	140.0	
05-May-93	1120	135.5	86.3	96.7	
06-May-93	842	112.6	89.7	93.2	
07-May-93	1400	86.3	74.5	70.9	
10-May-93	1430	84.2	78.9	78.3	
12-May-93	851	165.2	151.4	166.2	
14-May-93	1055	147.8	124.6	129.4	
17-May-93	1350	89.0	92.0	72.0	
19-May-93	900	110.0	97.0	94.0	
21-May-93	1020	105.0	99.0	96.0	
24-May-93	1530	98.8	96.6	94.3	
26-May-93	1130	96.5	95.7	93.4	
28-May-93	930	63.4	61.7	61.5	
01-Jun-93	1530	90.3	91.5	89.9	
02-Jun-93	1500	89.9	91.4	89.3	
04-Jun-93	1015	89.2	92.4	88.0	
07-Jun-93	1400	86.8	89.3	85.6	
09-Jun-93	910	86.6	88.6	87.4	
10-Jun-93					
11-Jun-93					
11-Jun-93					
11-Jun-93	1500	85.2	87.0	86.2	
14-Jun-93	945	84.5	86.0	85.0	
16-Jun-93	1028	83.8	85.4	84.2	
18-Jun-93	1058	83.1	84.9	83.1	
21-Jun-93	1010	82.2	83.9	81.6	
25-Jun-93	922	81.3	82.8	80.8	
30-Jun-93	1047	81.4	82.5	80.6	
02-Jul-93	944	80.2	81.0	79.1	
06-Jul-93	1422	79.5	80.2	78.0	
16-Jul-93		79.1	78.4	76.0	
19-Jul-93		78.8	78.0	75.6	

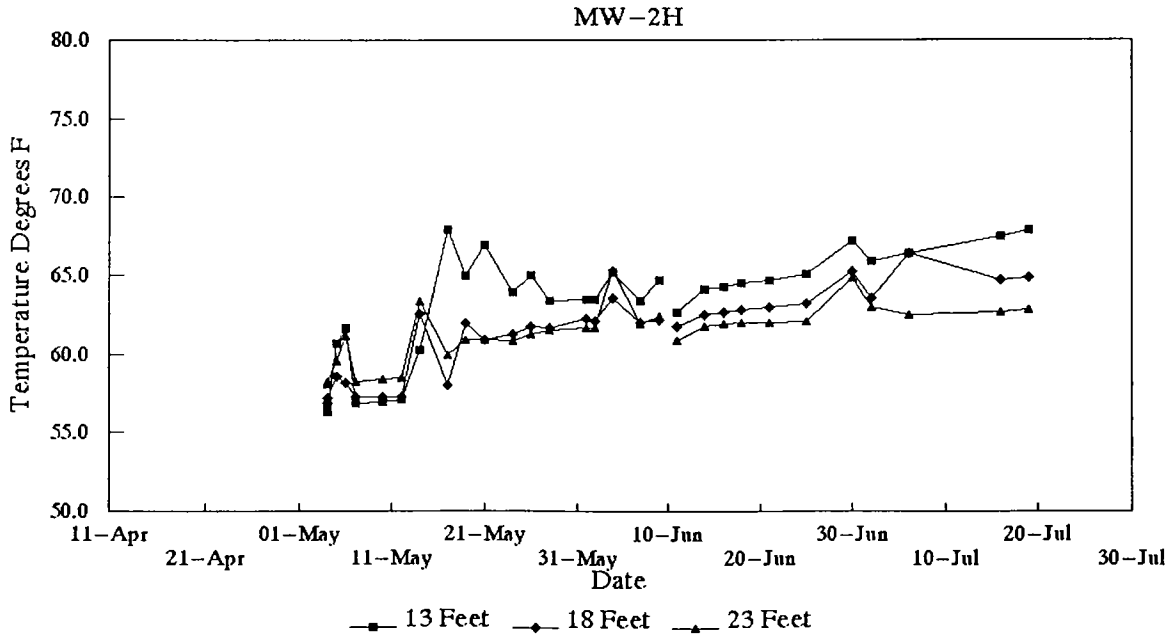


FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

File Name:
B:\mw2h.wk1
Date: file made: 7/14/93.pts

WELL **MW-2H**

DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93					
04-May-93	715	56.3	56.9	58.1	
04-May-93					
04-May-93	1350	56.5	57.2	58.3	
05-May-93	1120	60.7	58.6	59.6	
06-May-93	843	61.7	58.2	61.2	
07-May-93	1400	56.9	57.3	58.3	
10-May-93	1430	57.0	57.3	58.4	
12-May-93	853	57.1	57.3	58.5	
14-May-93	1100	60.3	62.6	63.4	
17-May-93	1350	68.0	58.0	60.0	
19-May-93	900	65.0	62.0	61.0	
21-May-93	1020	67.0	61.0	61.0	
24-May-93	1530	64.0	61.3	60.9	
26-May-93	1130	65.0	61.8	61.3	
28-May-93	930	63.4	61.7	61.5	
01-Jun-93	1530	63.5	62.3	61.7	
02-Jun-93	1500	63.5	62.1	61.7	
04-Jun-93	1015	65.2	63.6	65.4	
07-Jun-93	1400	63.4	62.0	61.9	
09-Jun-93	913	64.7	62.2	62.4	
10-Jun-93					
11-Jun-93					
11-Jun-93					
11-Jun-93	1500	62.7	61.8	60.9	
14-Jun-93	948	64.1	62.5	61.8	
16-Jun-93	1031	64.3	62.7	61.9	
18-Jun-93	1101	64.5	62.8	62.0	
21-Jun-93	1014	64.7	63.0	62.0	
25-Jun-93	927	65.1	63.2	62.1	
30-Jun-93	1051	67.2	65.3	64.9	
02-Jul-93	947	65.9	63.6	63	
06-Jul-93	1447	66.4	66.41	62.5	
16-Jul-93		67.5	64.7	62.7	
19-Jul-93		67.9	64.9	62.8	

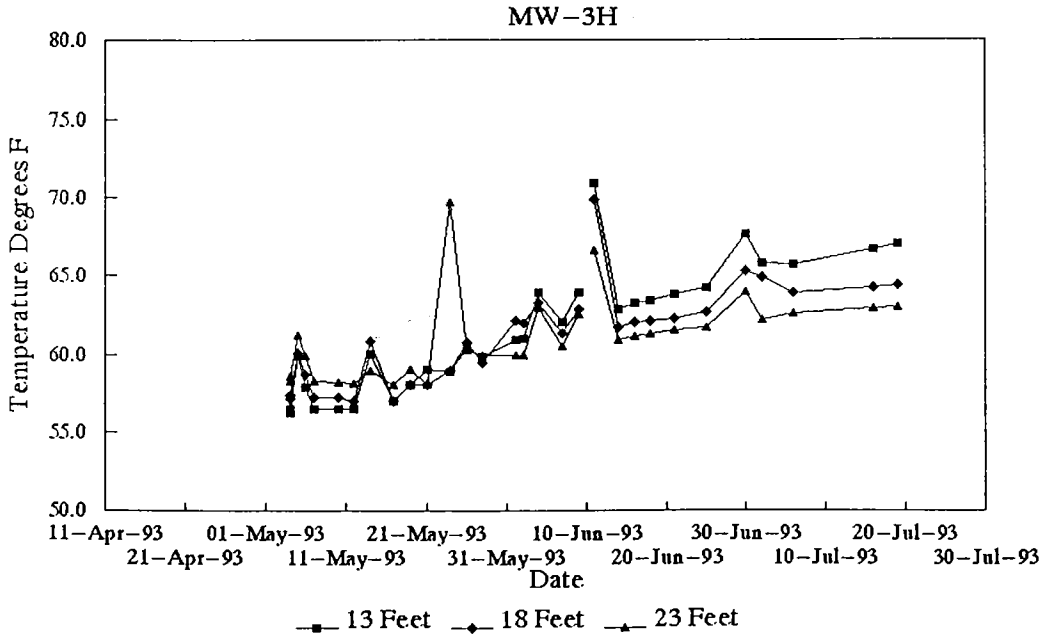


FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

File Name:
B:\mw3h.wk1
Date: file made: 7/14/93.pts

WELL **MW-3H**

DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93					
04-May-93	717	56.2	57.1	58.3	
04-May-93					
04-May-93	1350	56.5	57.4	58.6	
05-May-93	1120	59.9	60.1	61.2	
06-May-93	844	57.9	58.7	59.9	
07-May-93	1400	56.5	57.2	58.3	
10-May-93	1430	56.5	57.2	58.2	
12-May-93	855	56.5	57.0	58.1	
14-May-93	1105	60.0	60.8	58.9	
17-May-93	1350	57.0	57.0	58.0	
19-May-93	900	58.0	58.0	59.0	
21-May-93	1020	59.0	58.0	58.0	
24-May-93	1530	58.8	58.9	69.7	
26-May-93	1130	60.4	60.7	60.2	
28-May-93	930	59.8	59.4	59.9	
01-Jun-93	1530	60.9	62.1	59.9	
02-Jun-93	1500	61.0	61.9	59.9	
04-Jun-93	1015	63.9	63.2	62.9	
07-Jun-93	1400	62.0	61.3	60.5	
09-Jun-93	915	63.9	62.8	62.5	
10-Jun-93					
11-Jun-93					
11-Jun-93					
11-Jun-93	1500	70.9	69.8	66.6	
14-Jun-93	952	62.8	61.7	60.9	
16-Jun-93	1035	63.2	62.0	61.1	
18-Jun-93	1105	63.4	62.1	61.3	
21-Jun-93	1020	63.8	62.3	61.5	
25-Jun-93	931	64.2	62.7	61.7	
30-Jun-93	1055	67.6	65.3	64.0	
02-Jul-93	951	65.8	64.9	62.2	
06-Jul-93	1451	65.7	63.9	62.6	
16-Jul-93		66.7	64.2	62.9	
19-Jul-93		67.0	64.4	63.0	

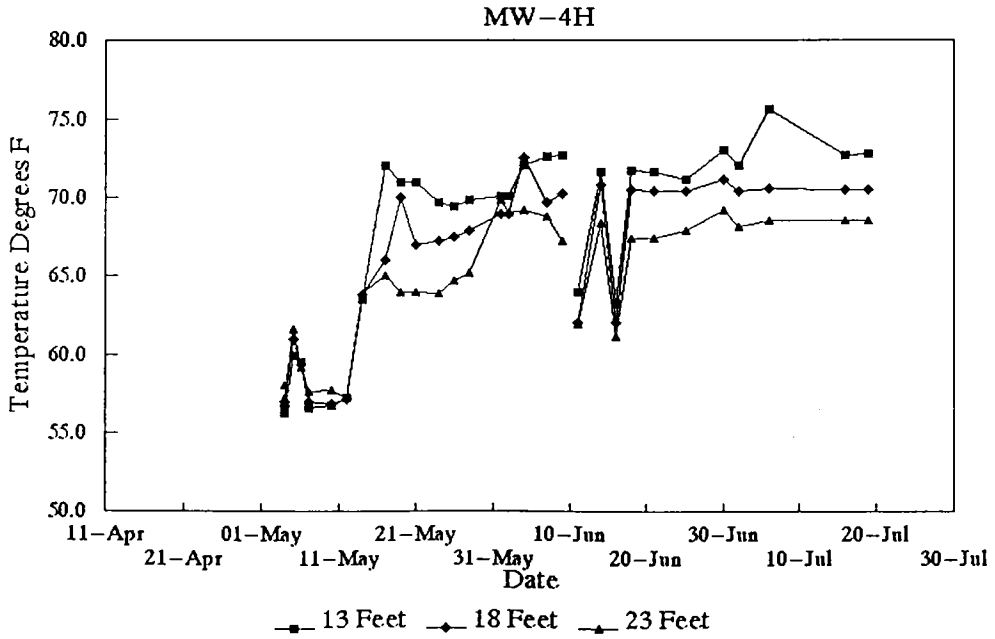


FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

File Name:
B:\mw4h.wk1
Date: file made: 6/17/93.pts

WELL **MW-4H**

DATE	TIME	Probes T1 13FT	T2 18FT	T3 23FT	Comments:
29-Apr-93					
04-May-93	718	56.4	56.7	58.0	
04-May-93					
04-May-93	1350	56.2	57.0	57.2	
05-May-93	1120	59.9	61.0	61.6	
06-May-93	845	59.5	59.3	59.2	
07-May-93	1400	56.6	57.0	57.6	
10-May-93	1430	56.7	56.8	57.7	
12-May-93	857	57.2	57.1	57.2	
14-May-93	1110	63.5	63.8	63.9	
17-May-93	1350	72.0	66.0	65.0	
19-May-93	900	71.0	70.0	64.0	
21-May-93	1020	71.0	67.0	64.0	
24-May-93	1530	69.7	67.2	63.9	
26-May-93	1130	69.4	67.5	64.7	
28-May-93	930	69.8	67.9	65.2	
01-Jun-93	1530	70.1	68.9	69.8	
02-Jun-93	1500	70.1	68.9	69.0	
04-Jun-93	1015	72.0	72.5	69.2	
07-Jun-93	1400	72.6	69.7	68.8	
09-Jun-93	918	72.7	70.2	67.2	
10-Jun-93					
11-Jun-93					
11-Jun-93					
11-Jun-93	1500	64.0	62.0	61.9	
14-Jun-93	955	71.6	70.8	68.4	
16-Jun-93	1035	63.2	62.0	61.1	
18-Jun-93	1108	71.7	70.5	67.4	
21-Jun-93	1024	71.6	70.4	67.4	
25-Jun-93	935	71.1	70.4	67.9	
30-Jun-93	1100	73.0	71.1	69.2	
02-Jul-93	955	72.0	70.4	68.1	
06-Jul-93	1456	75.6	70.6	68.5	
16-Jul-93		72.7	70.5	68.5	
19-Jul-93		72.8	70.5	68.5	

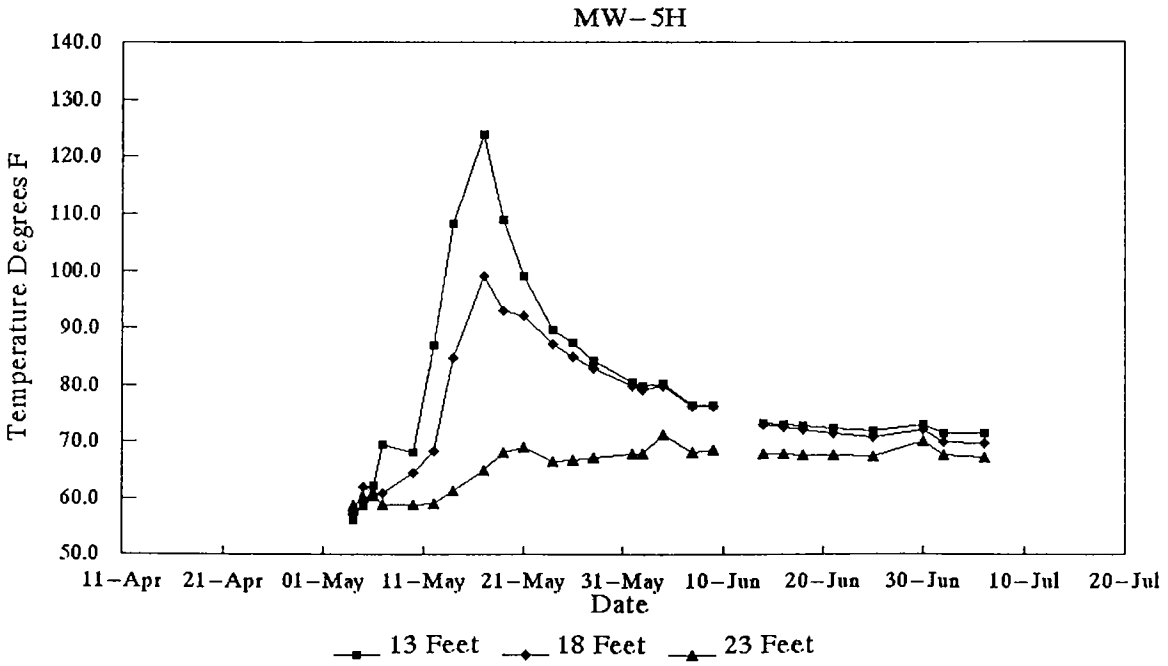


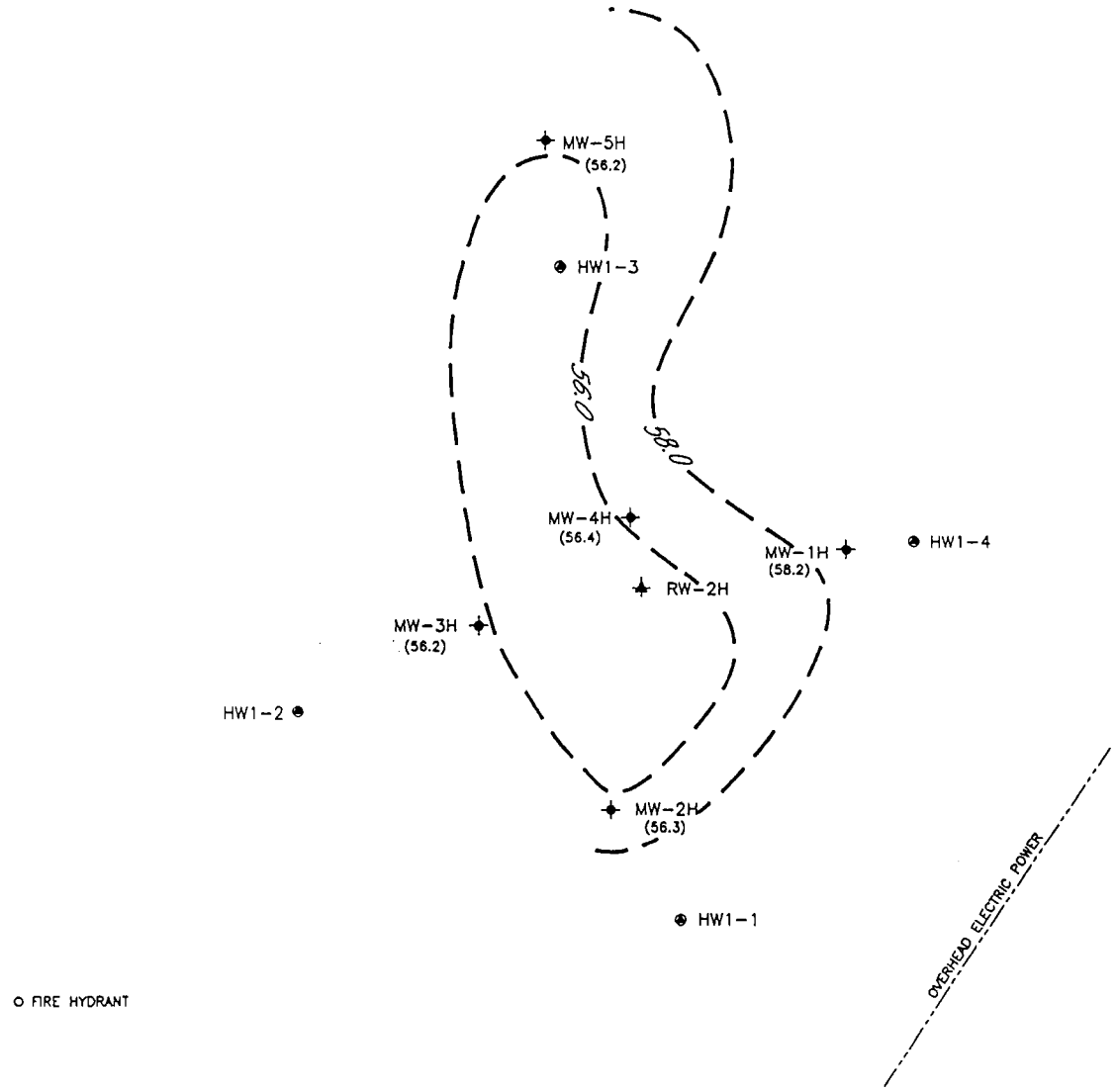
FISC YORKTOWN
DATA REDUCTION
TEMPERATURE DATA

File Name:
B:\mw5h.wk1
Date: file made: 7/14/93.pts

WELL **MW-5H**

DATE	TIME	T1 13FT	T2 18FT	T3 23FT	Comments:
		Probes			
29-Apr-93					
04-May-93	719	56.2	57.0	58.6	
04-May-93					
04-May-93	1350	56.6	57.3	58.8	
05-May-93	1120	58.7	62.0	60.1	
06-May-93	846	62.2	60.6	60.4	
07-May-93	1400	69.4	60.8	58.8	
10-May-93	1430	68.1	64.4	58.8	
12-May-93	859	86.8	68.3	59.1	
14-May-93	1115	108.2	84.7	61.3	
17-May-93	1350	124.0	99.0	65.0	
19-May-93	900	109.0	93.0	68.0	
21-May-93	1020	99.0	92.0	69.0	
24-May-93	1530	89.6	87.1	66.5	
26-May-93	1130	87.3	84.9	66.8	
28-May-93	930	84.2	82.9	67.2	
01-Jun-93	1530	80.5	79.7	67.8	
02-Jun-93	1500	79.8	79.1	67.9	
04-Jun-93	1015	80.1	79.8	71.1	
07-Jun-93	1400	76.4	76.1	68.1	
09-Jun-93	920	76.4	76.1	68.5	
10-Jun-93					
11-Jun-93					
11-Jun-93					
11-Jun-93					
14-Jun-93	958	73.3	73.0	67.9	
16-Jun-93	1042	73.0	72.5	67.8	
18-Jun-93	1110	72.8	72.1	67.7	
21-Jun-93	1028	72.4	71.5	67.5	
25-Jun-93	940	71.9	70.8	67.4	
30-Jun-93	1104	73.0	72.1	70.1	
02-Jul-93	958	71.4	69.9	67.5	
06-Jul-93	1501	71.4	69.6	67.1	





LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (56.2) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 2.0 DEGREE F

N

0 10 20
SCALE FEET

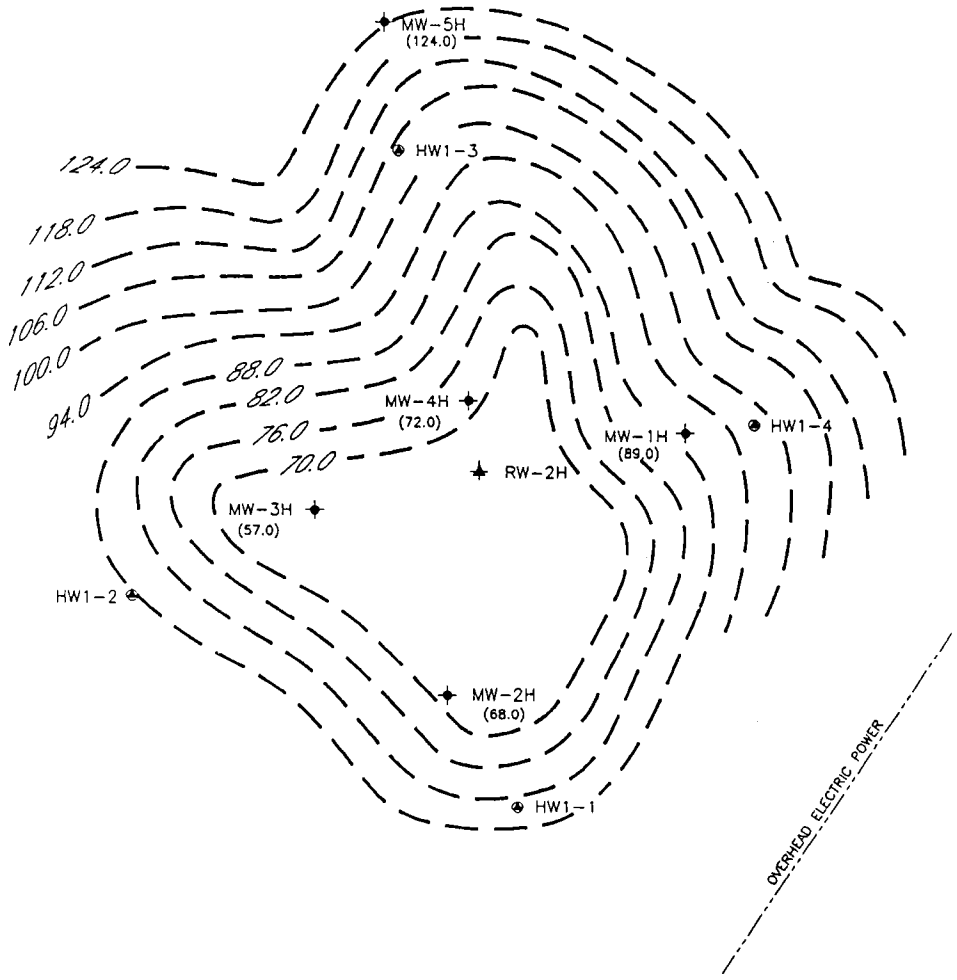
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 4, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (89.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

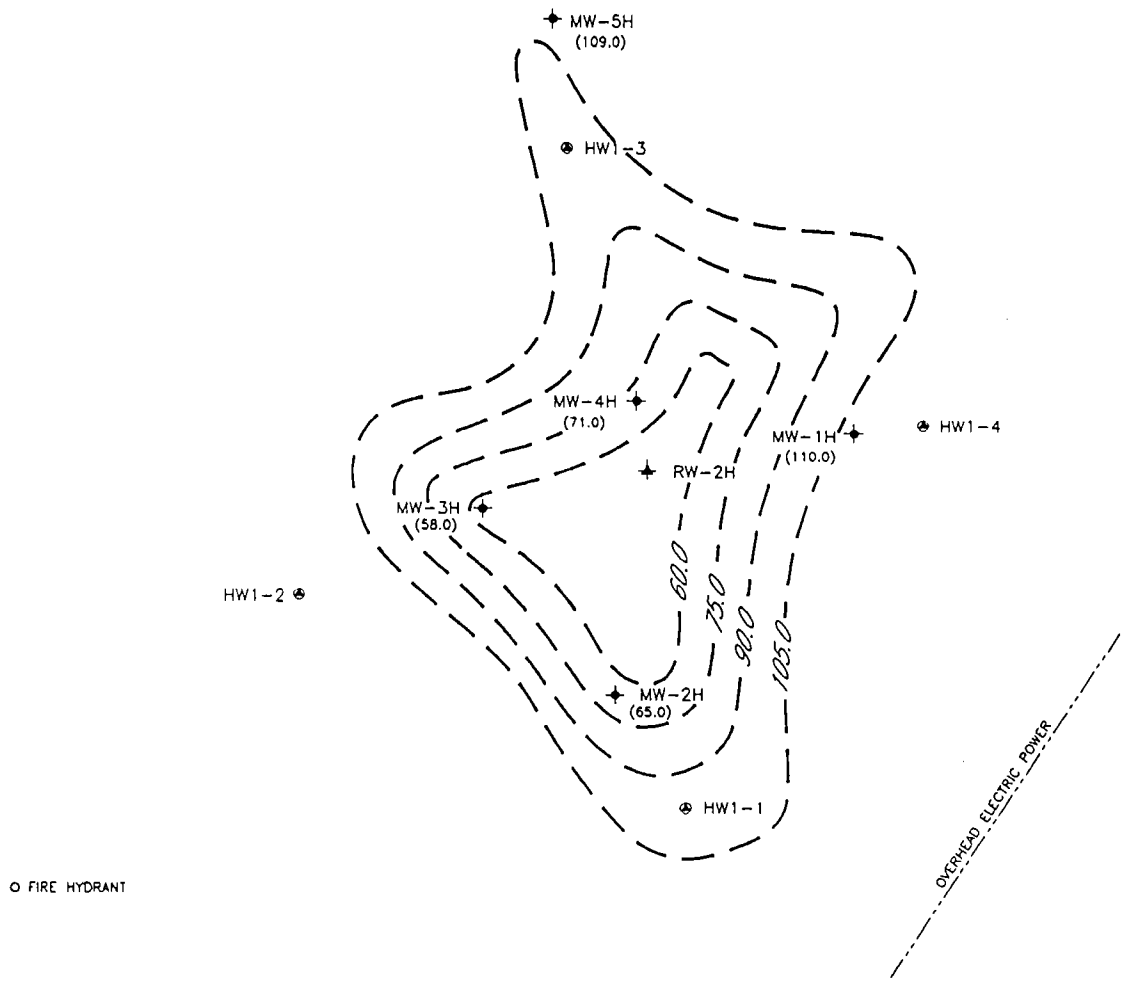
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 17, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (109.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 15.0 DEGREE F

N

0 10 20
SCALE FEET

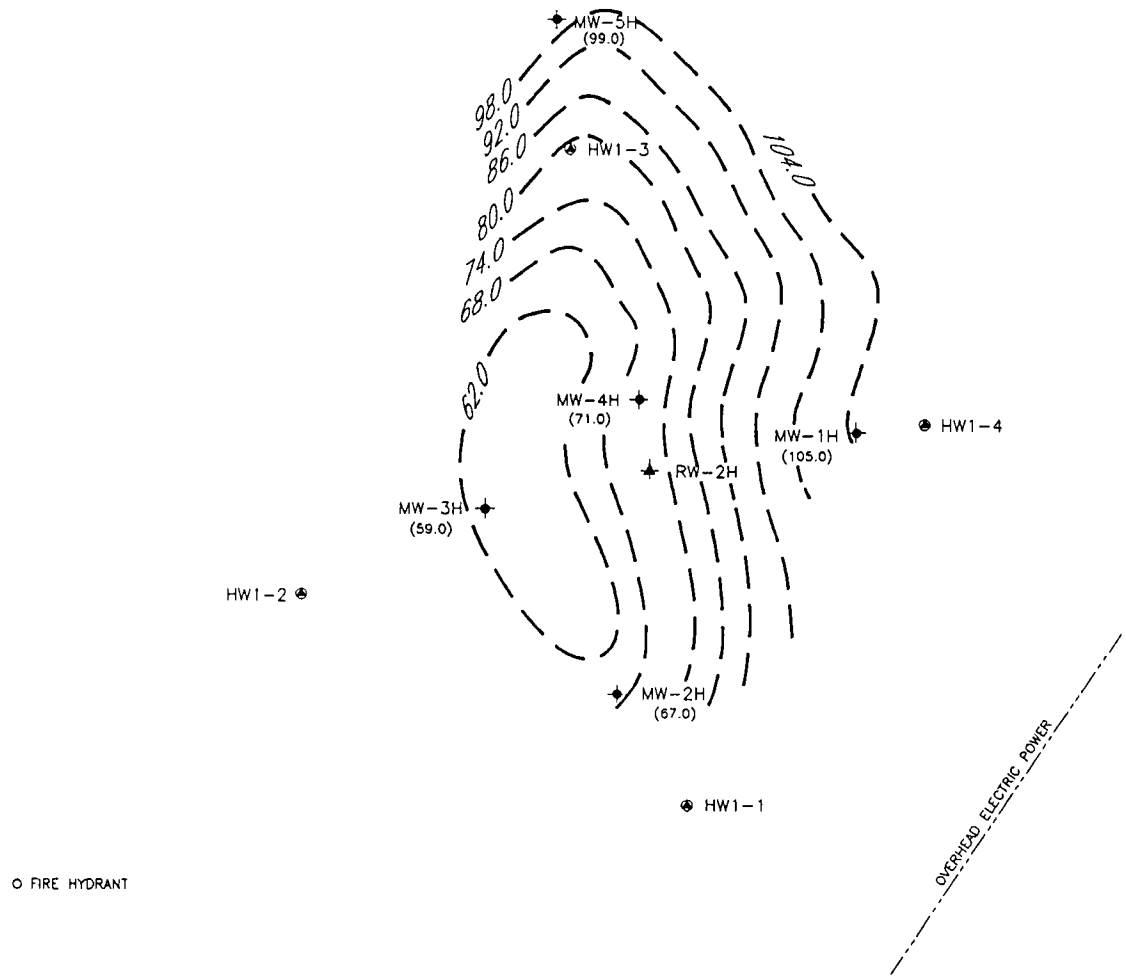
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 19, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (105.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

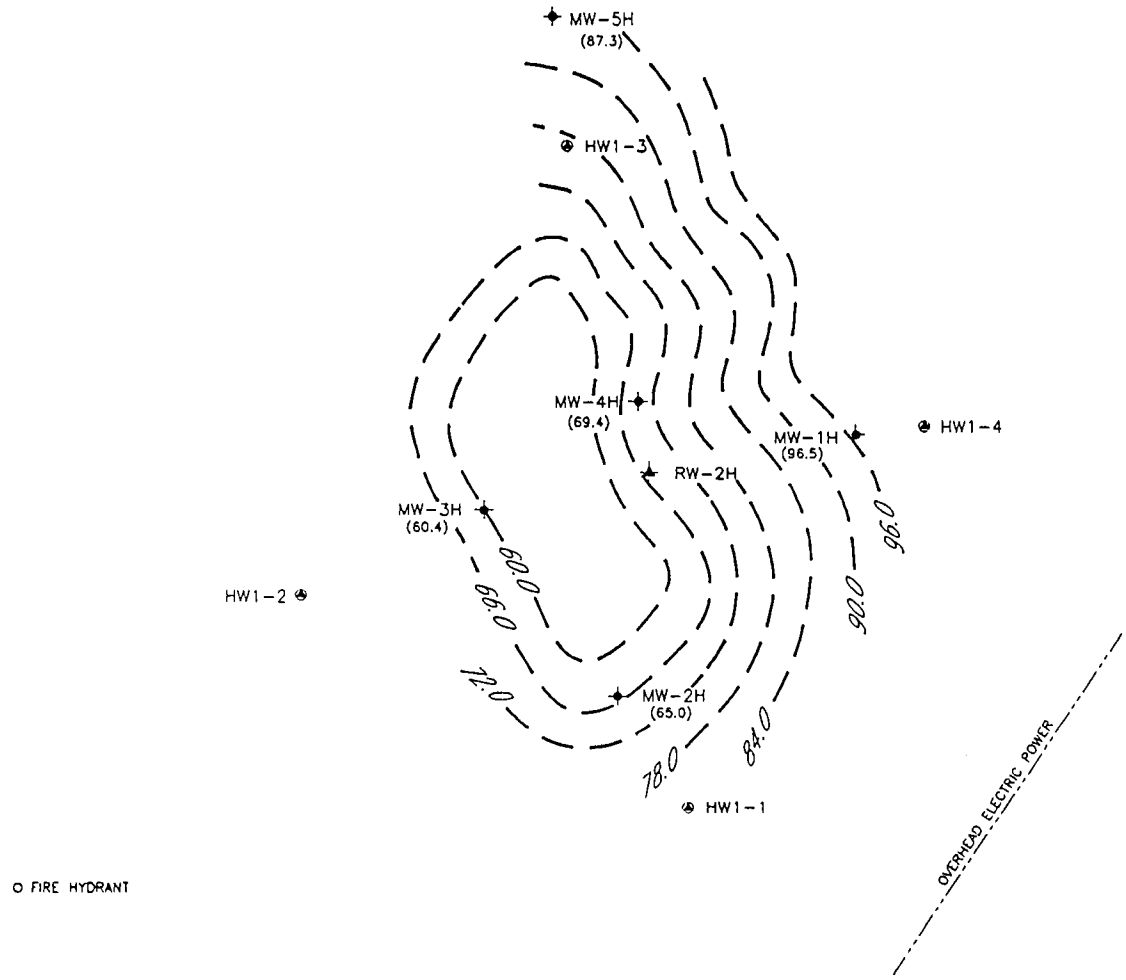
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 21, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (87.3) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

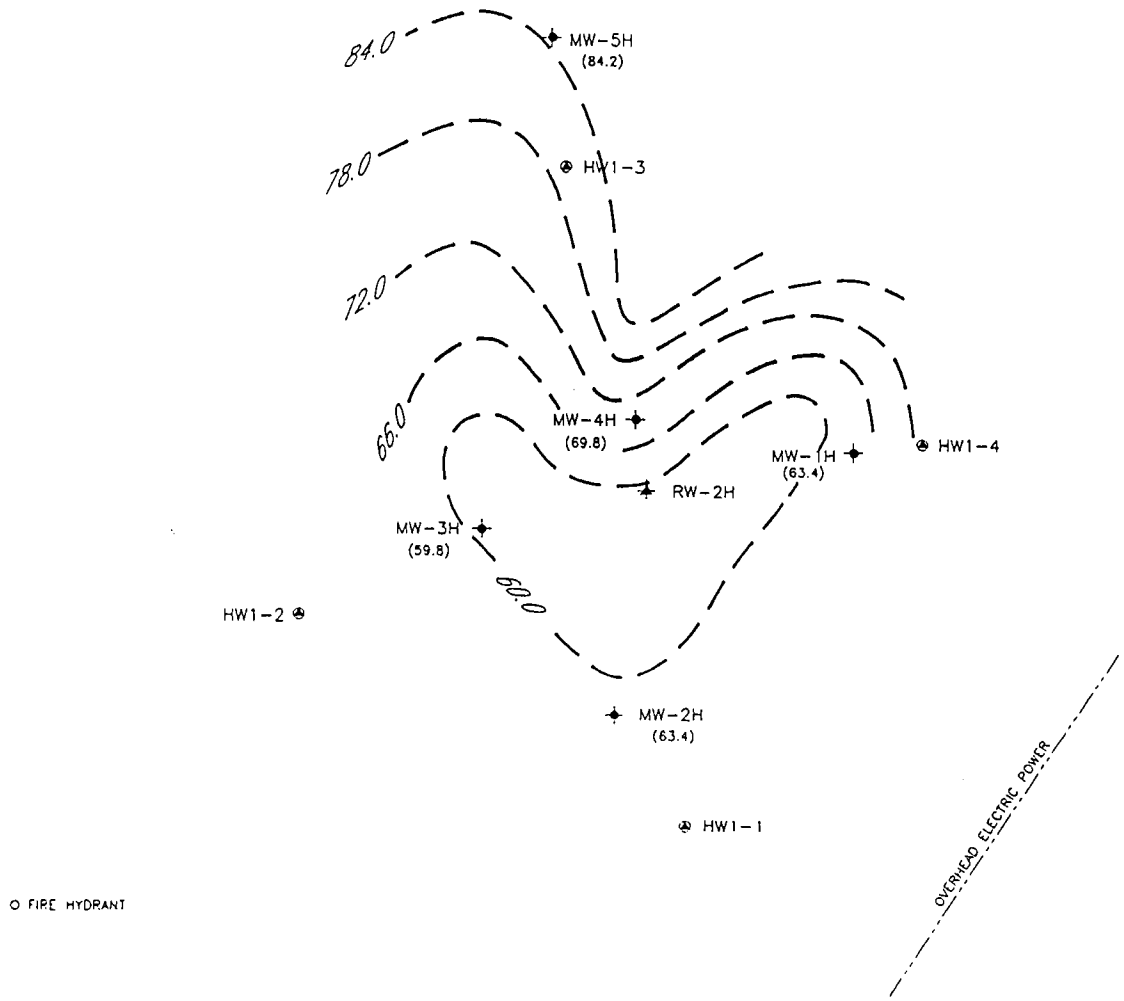
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 26, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (84.2) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

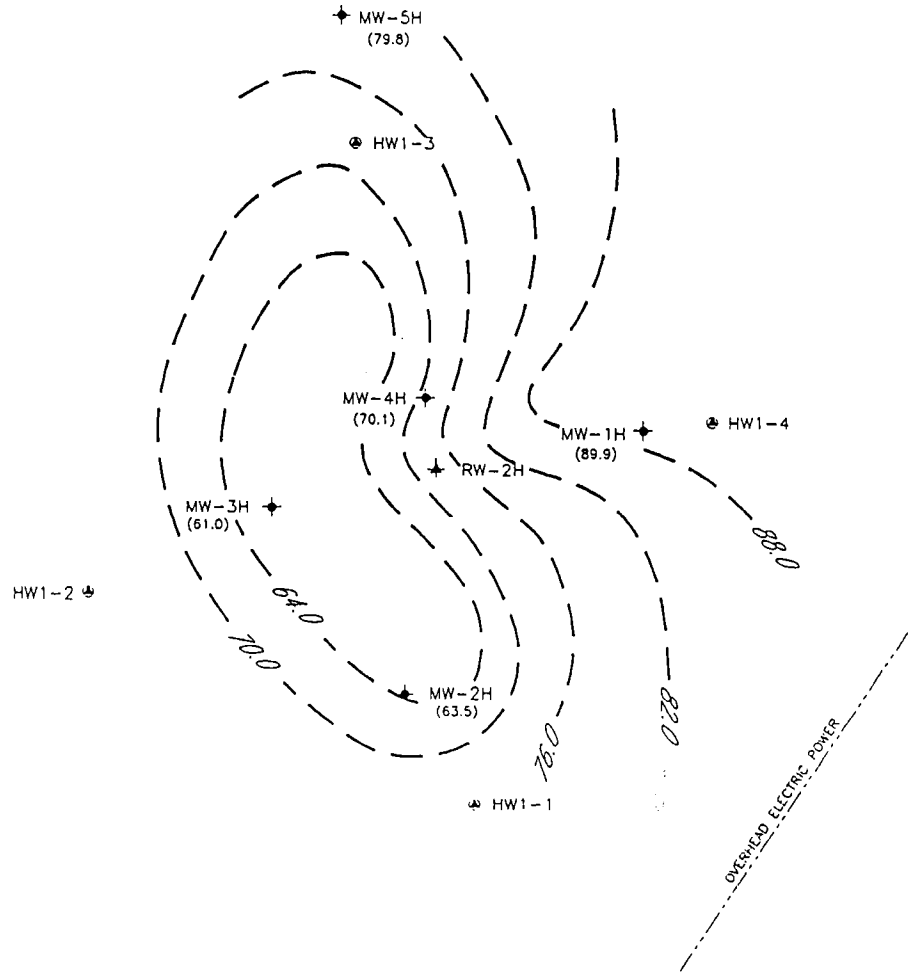
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 28, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (79.8) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

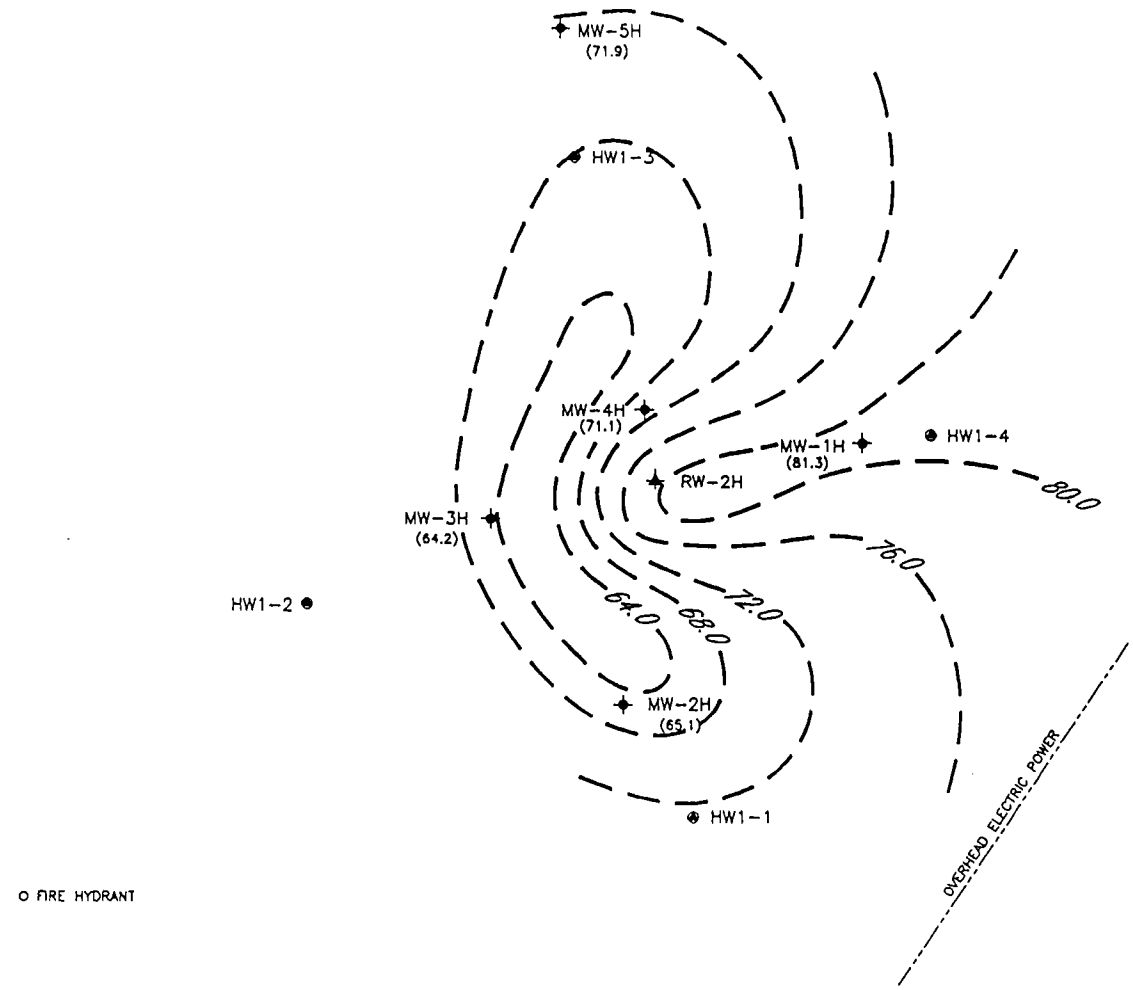
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD
CHESAPEAKE, VA. 23320
(804) 436-7891

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 2, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/HG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (71.9) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

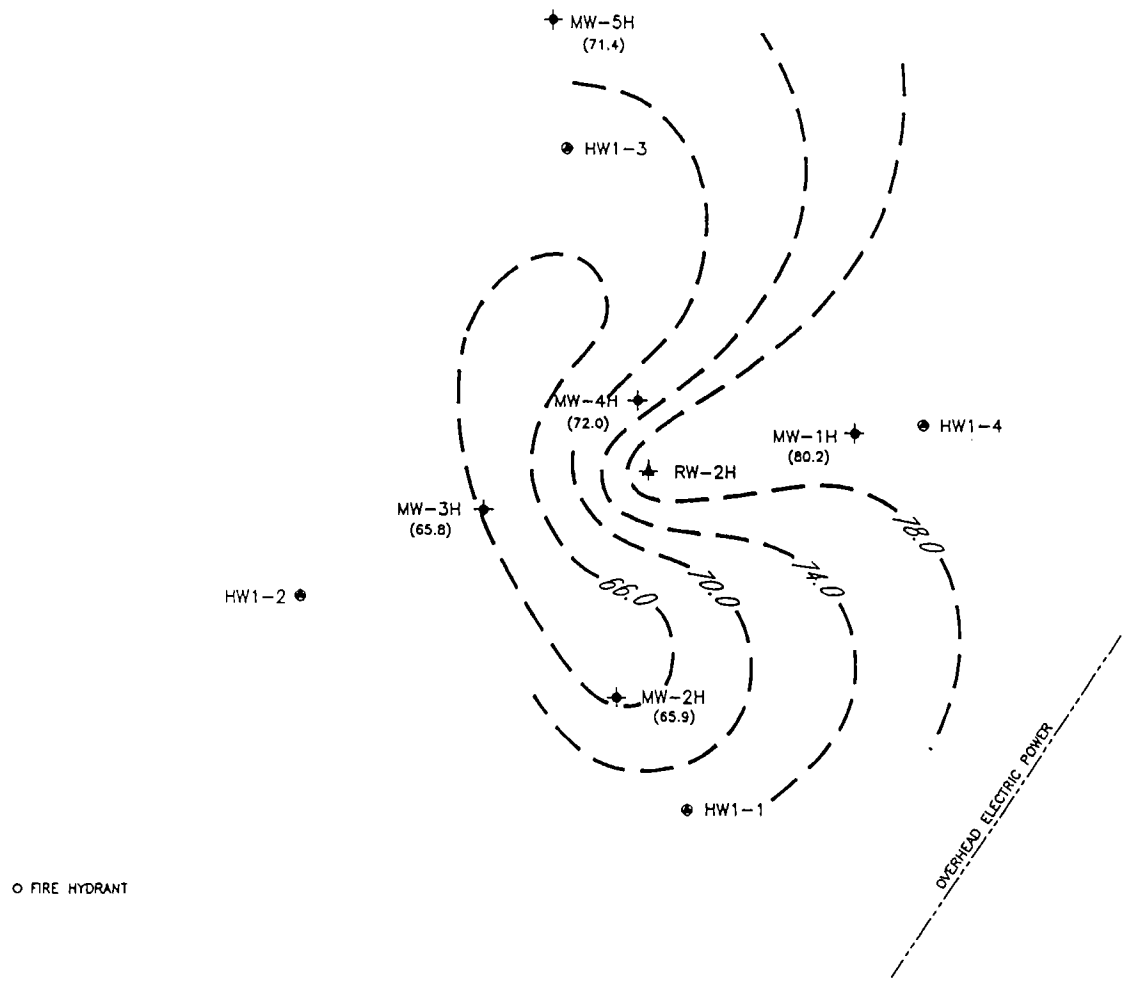
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT JUNE 25, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (71.4) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

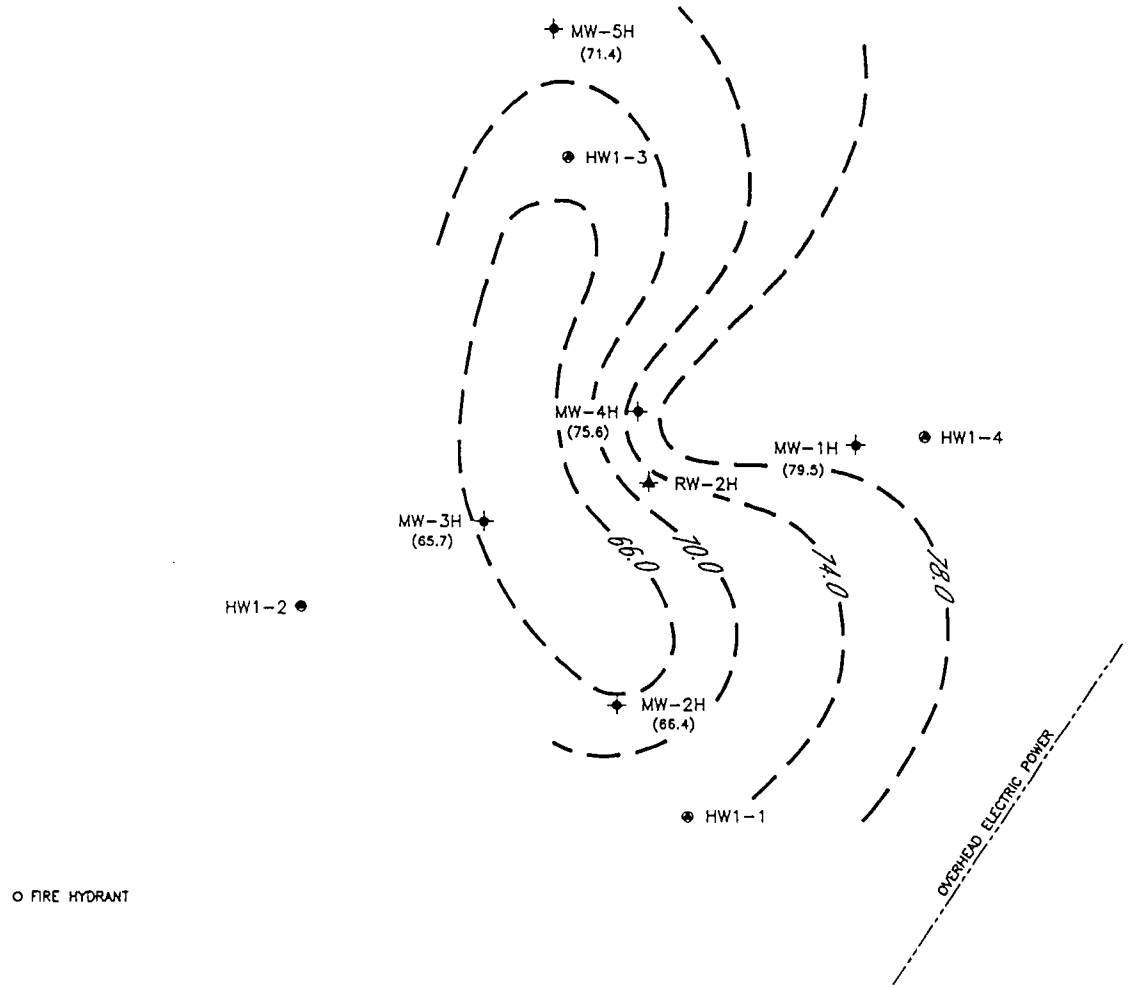
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JULY 2, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (71.4) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

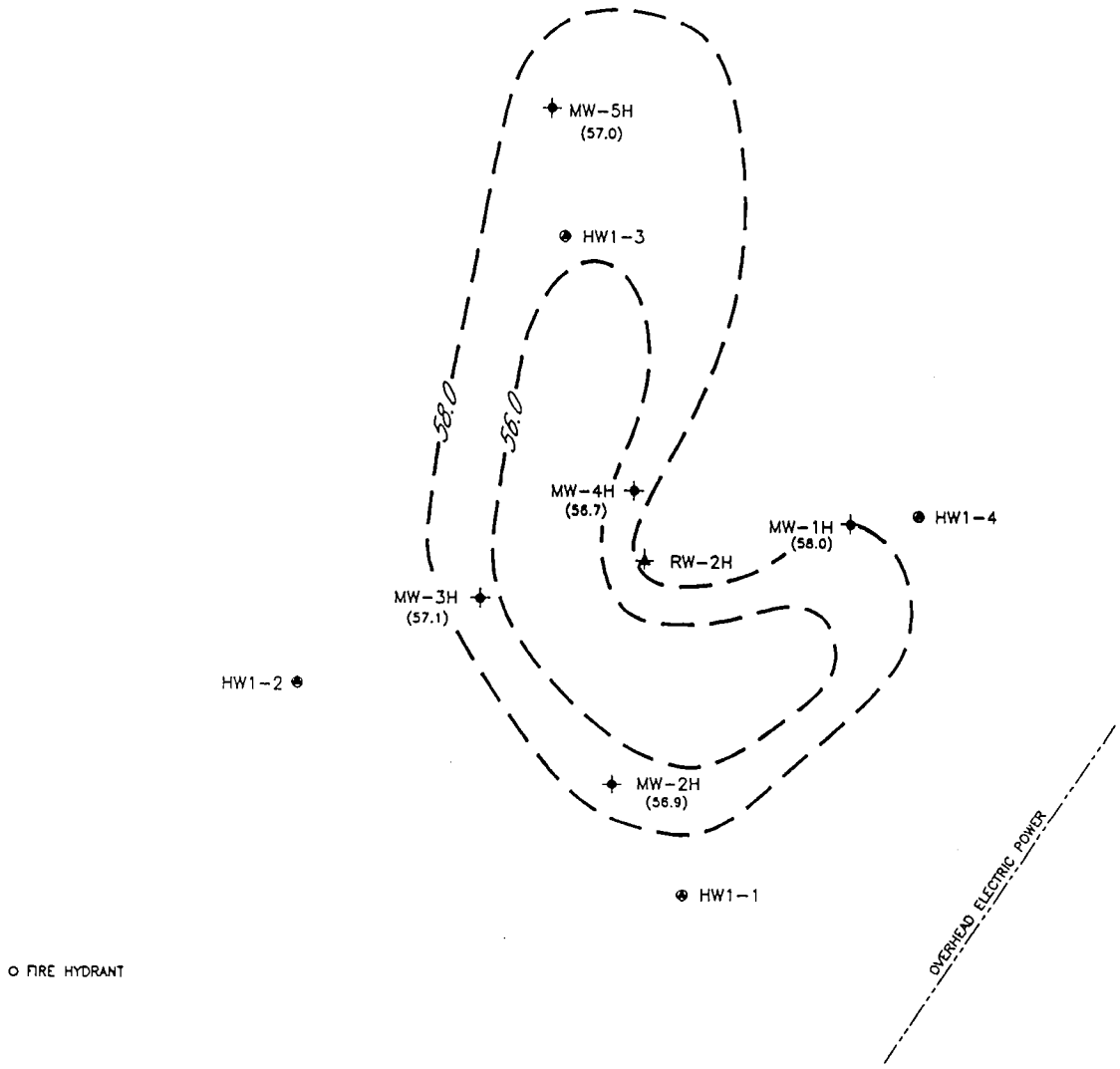
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT JULY 6, 1993 (13' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (57.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 2.0 DEGREE F

N

0 10 20
SCALE FEET

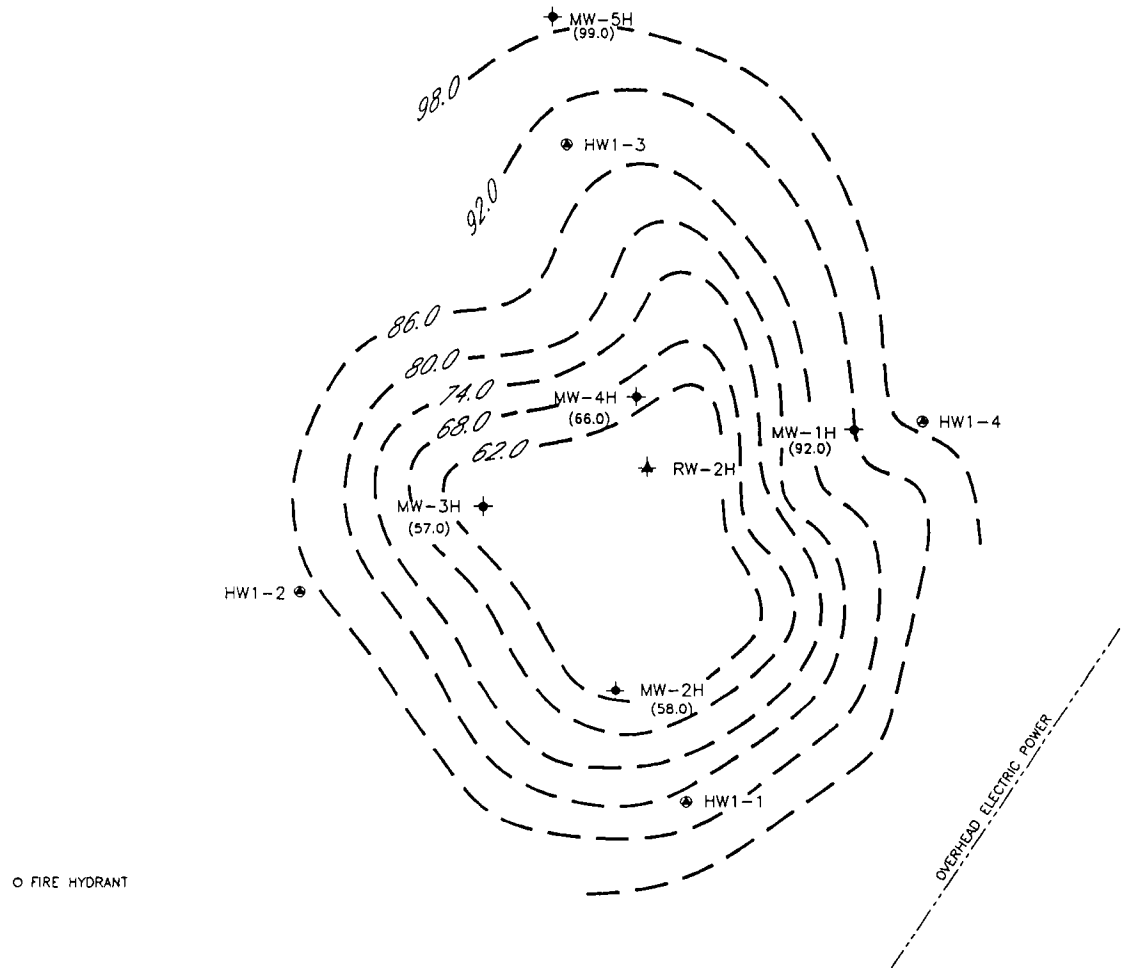
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 4, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (99.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

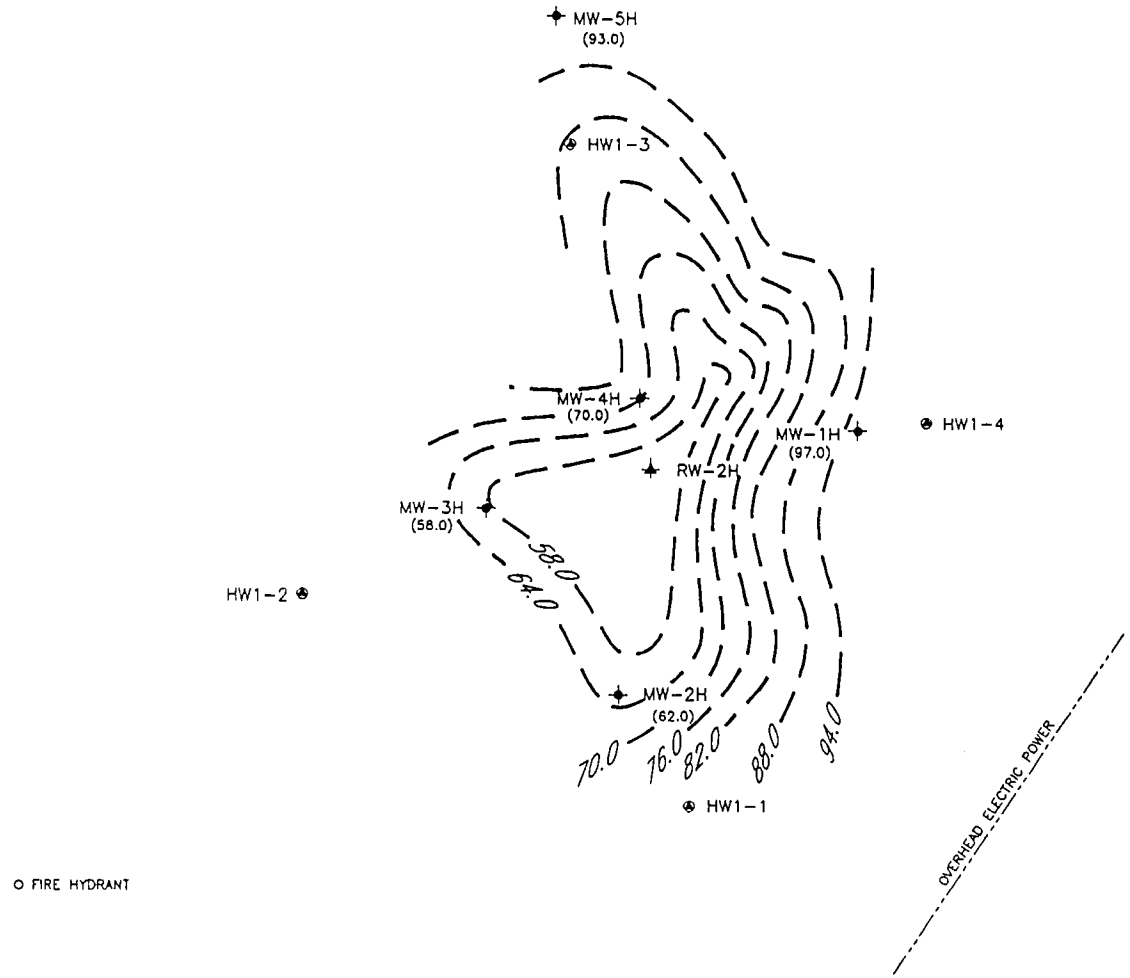
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 17, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (93.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

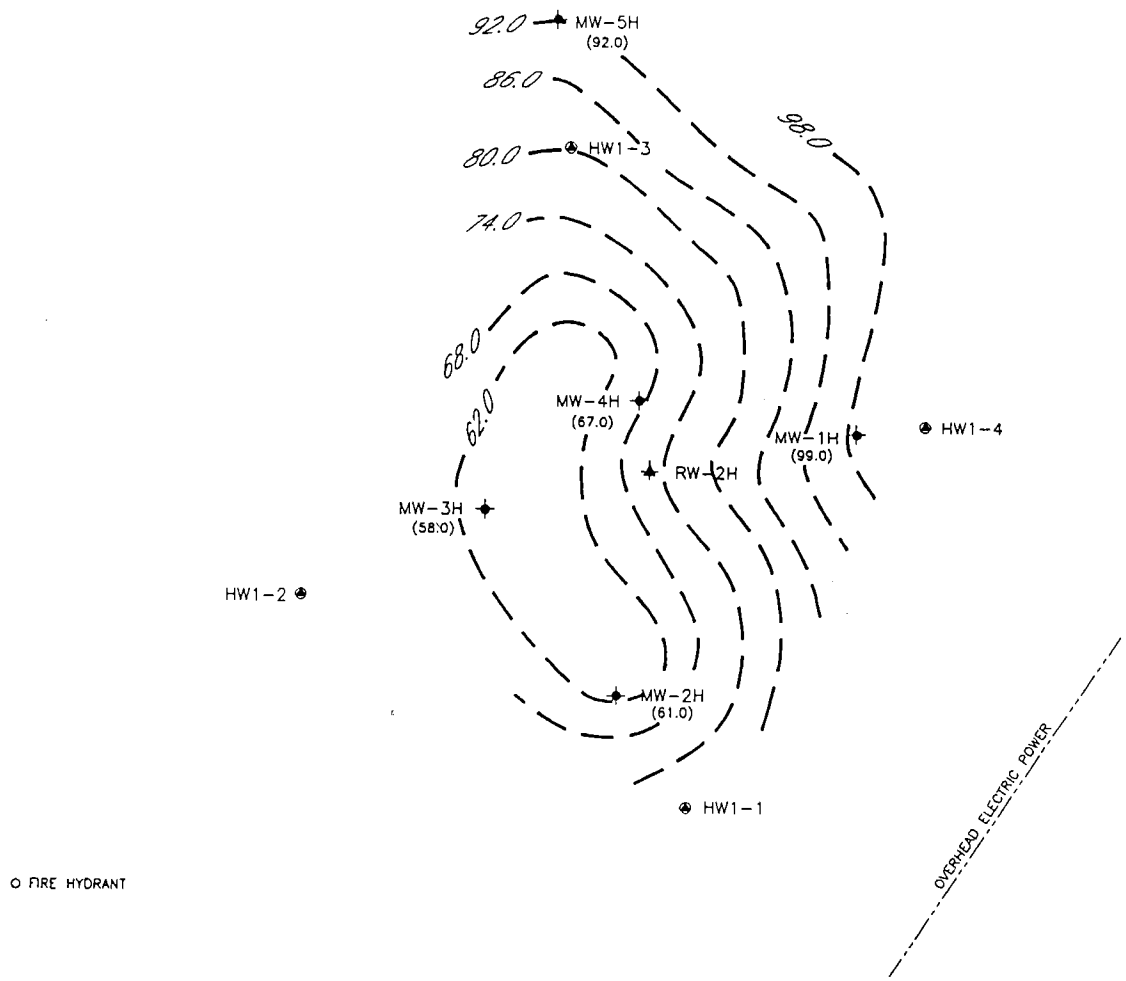
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 19, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (99.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

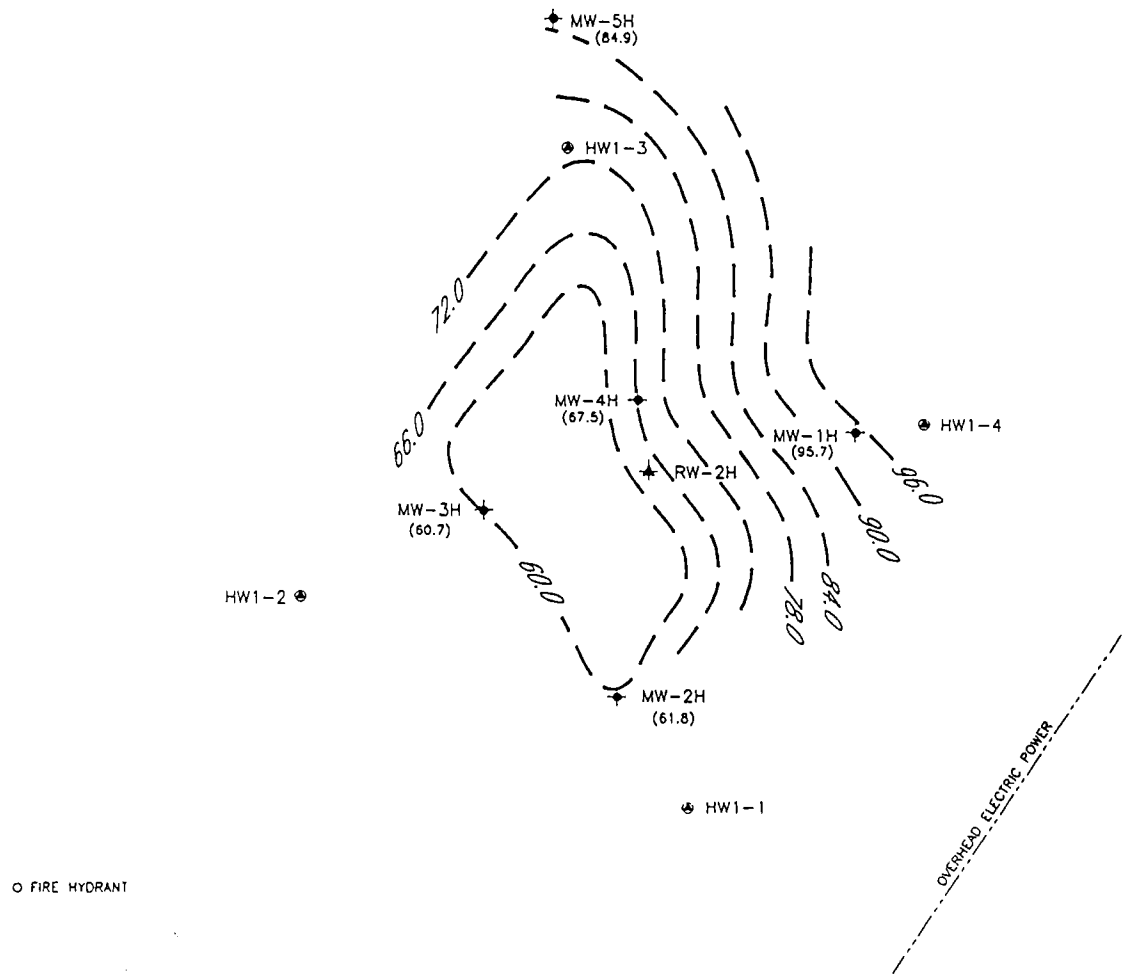
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 21, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (84.9) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

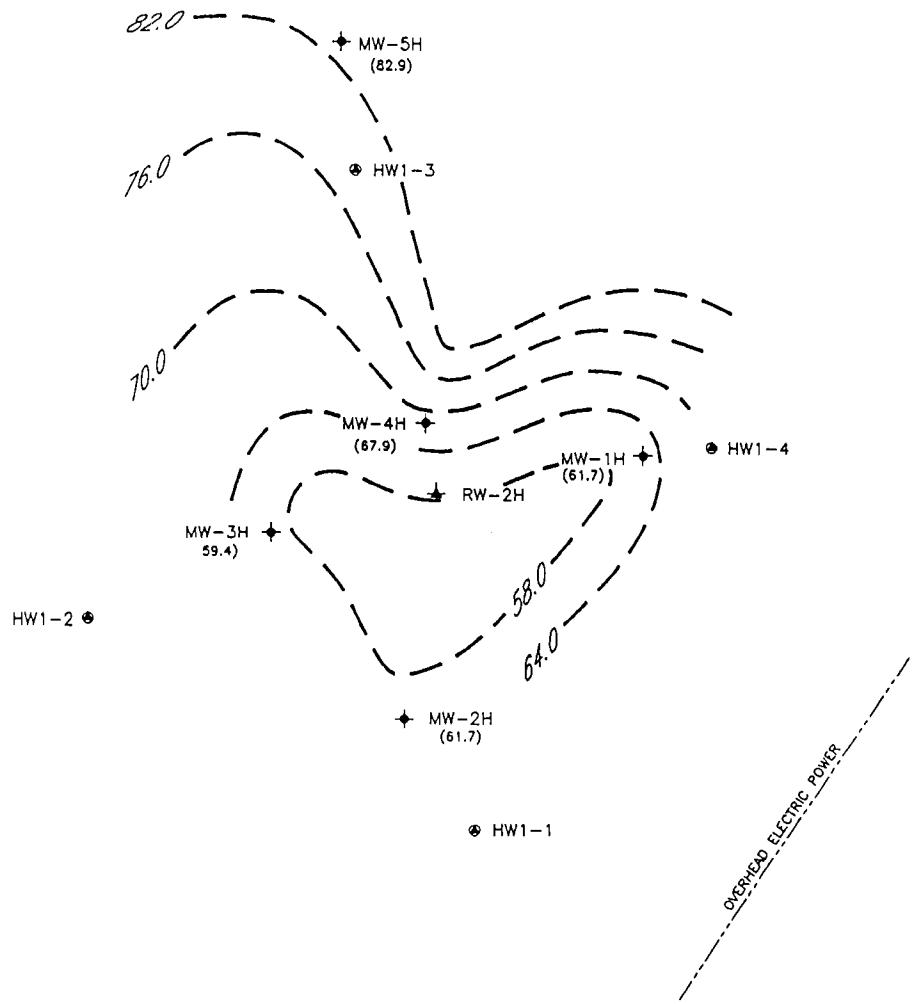
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 26, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (82.9) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

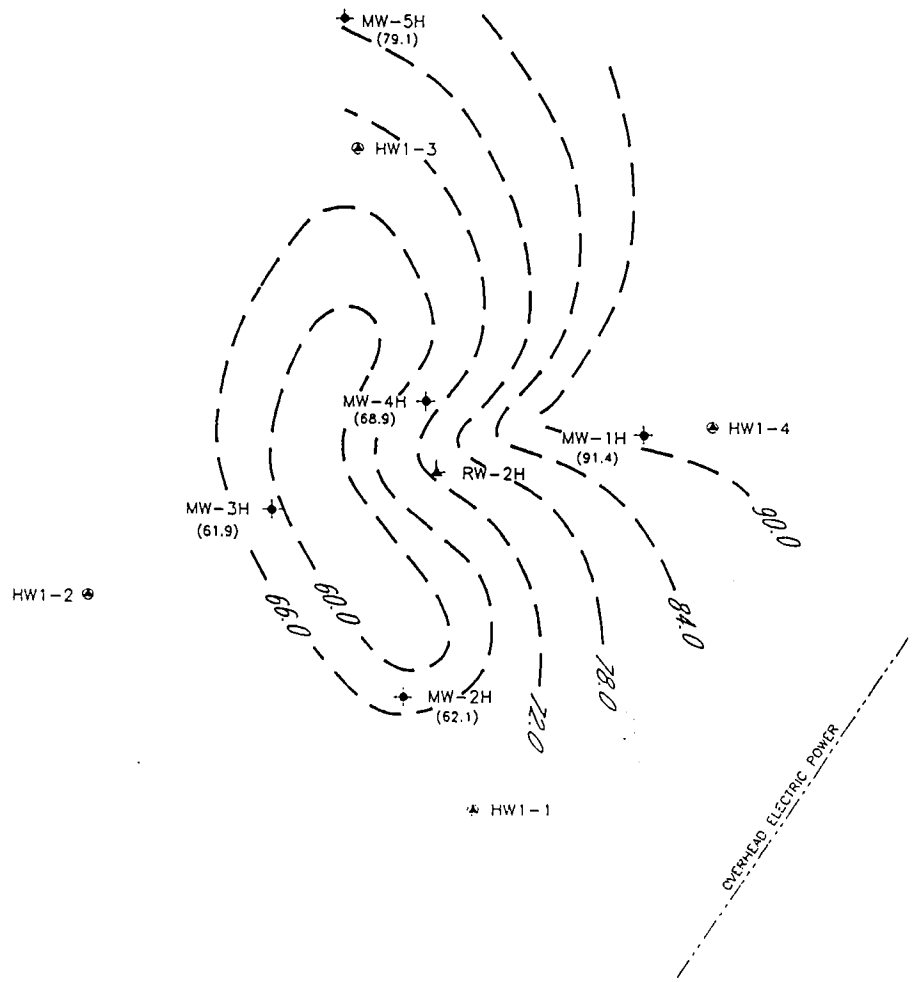
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 28, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (79.1) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

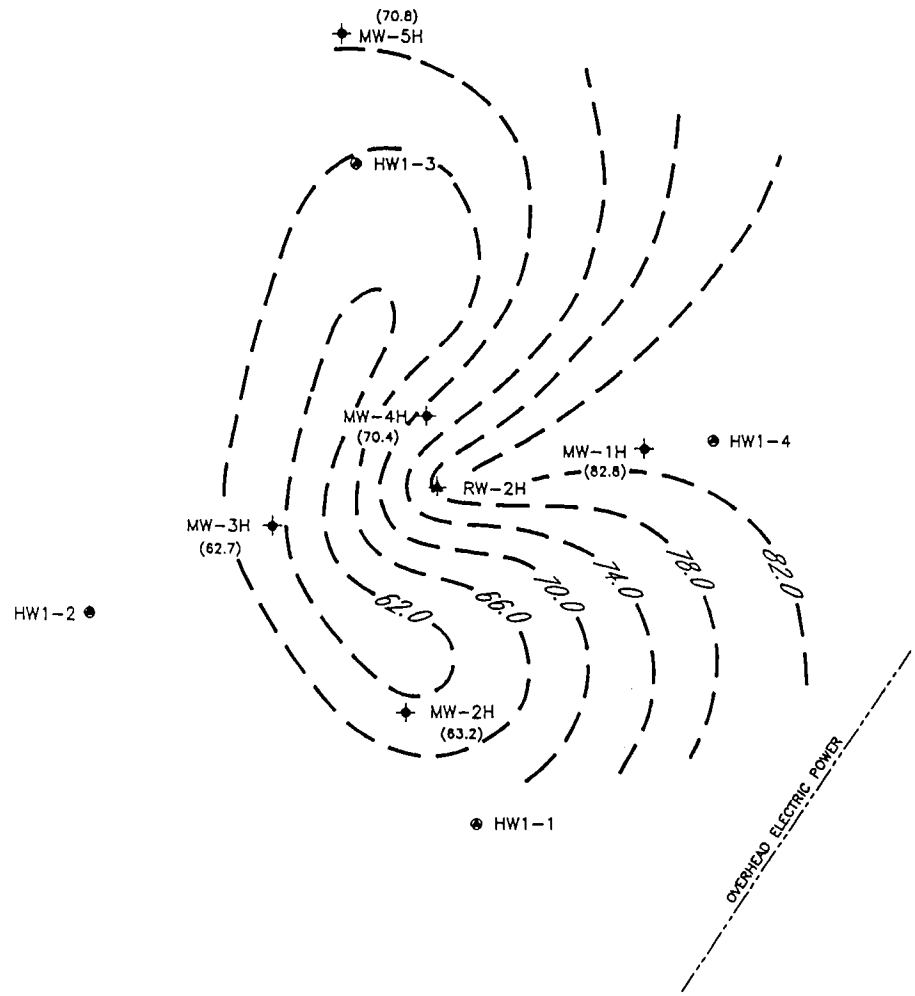
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7891

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 2, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (70.8) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

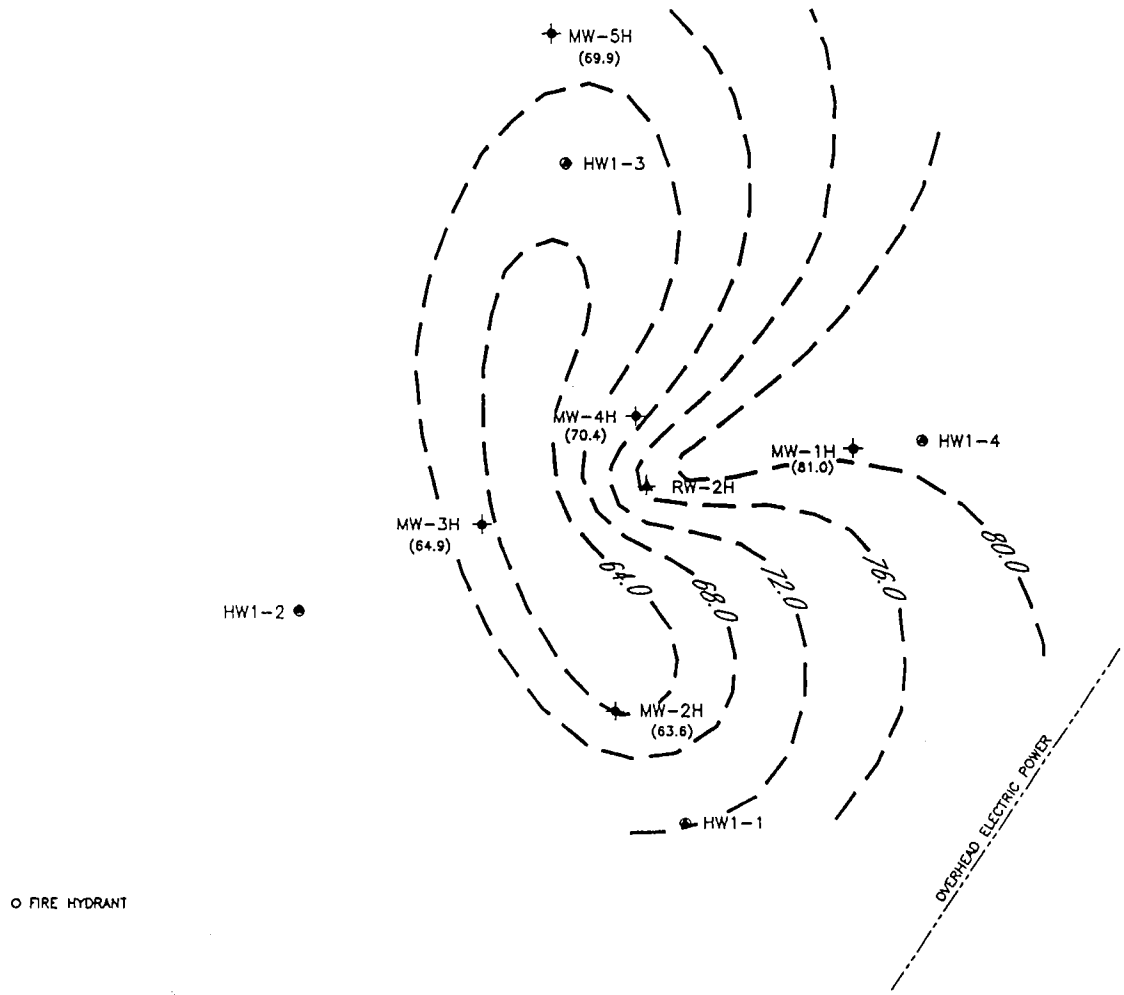
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 25, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (69.9) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

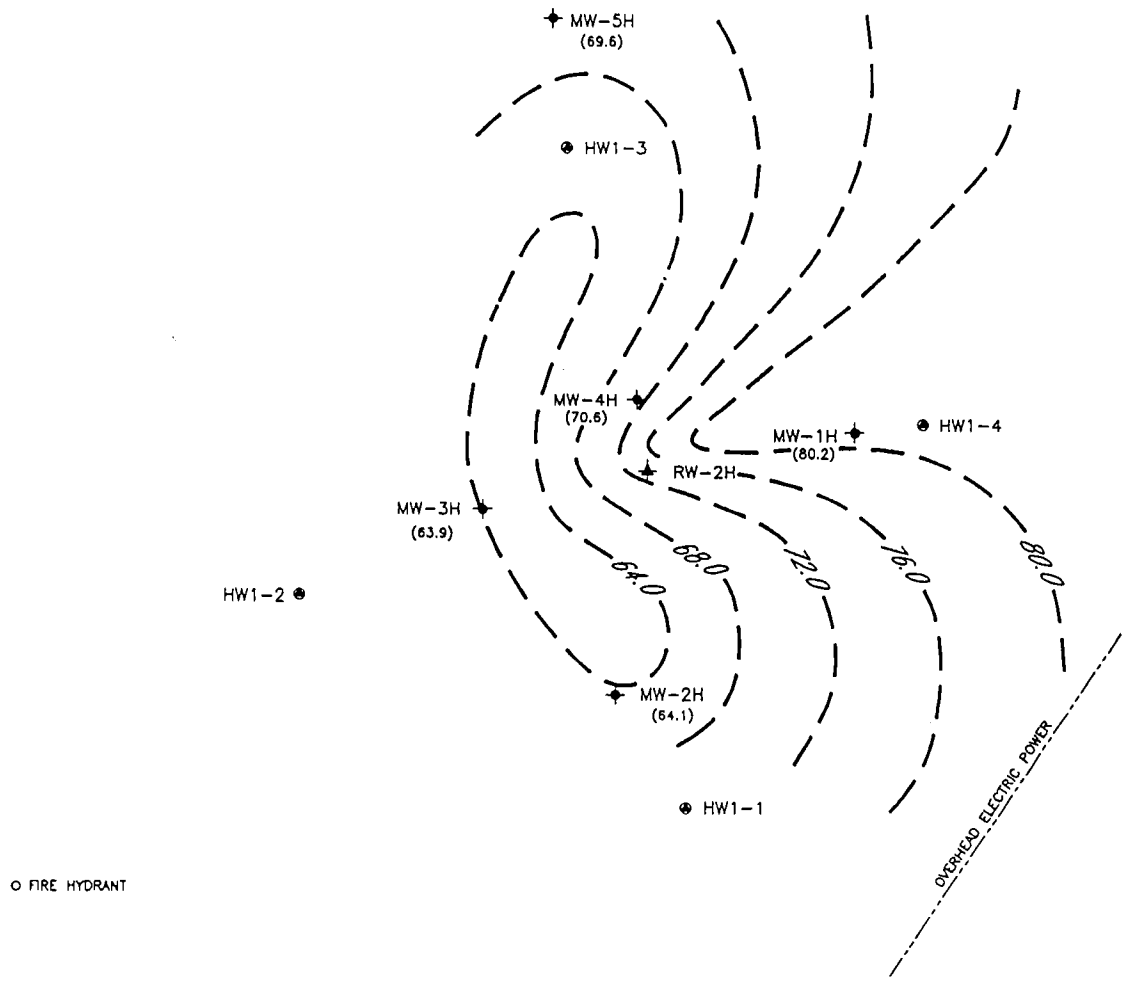
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JULY 2, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (69.6) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

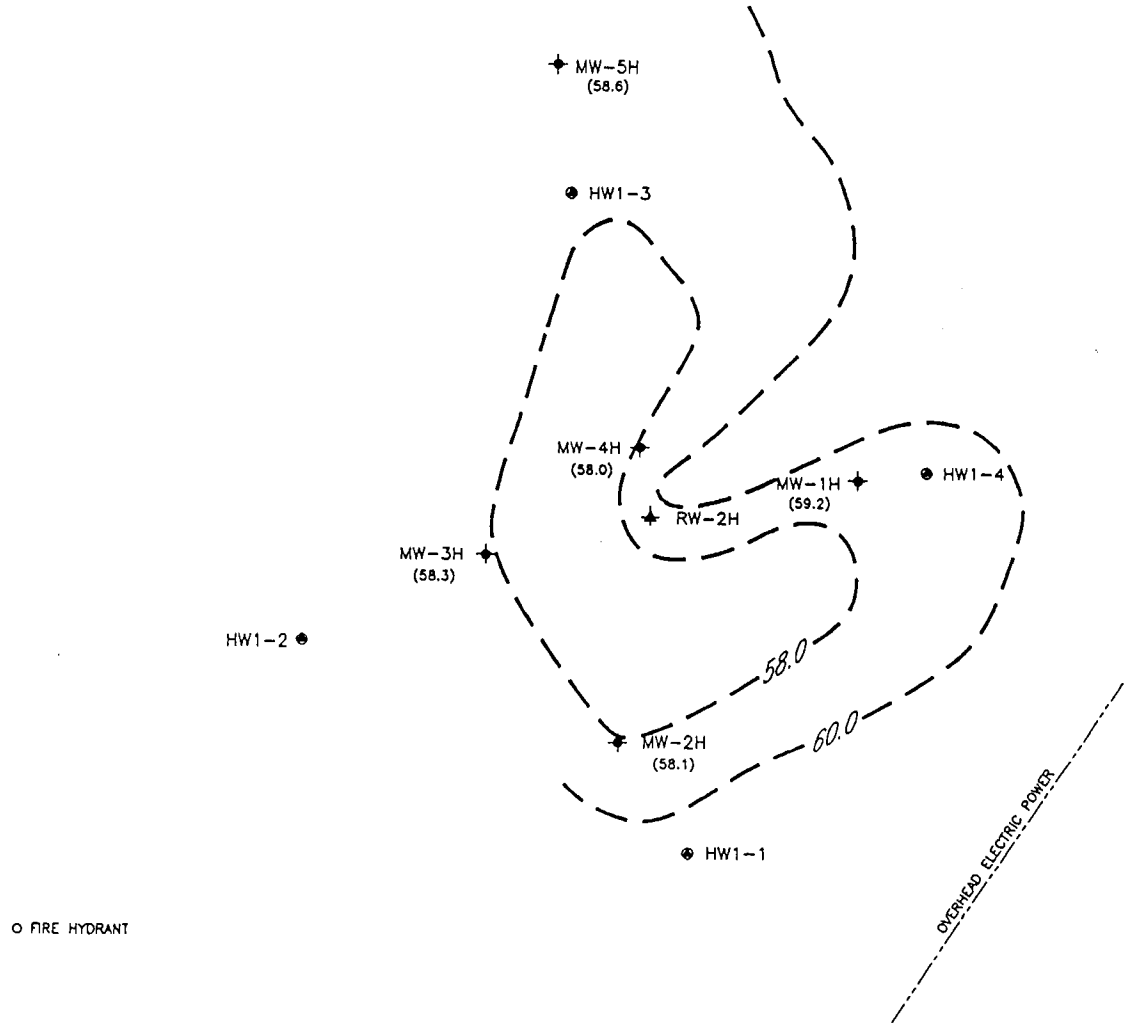
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JULY 6, 1993 (18' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (58.6) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 2.0 DEGREE F

N

0 10 20
SCALE FEET

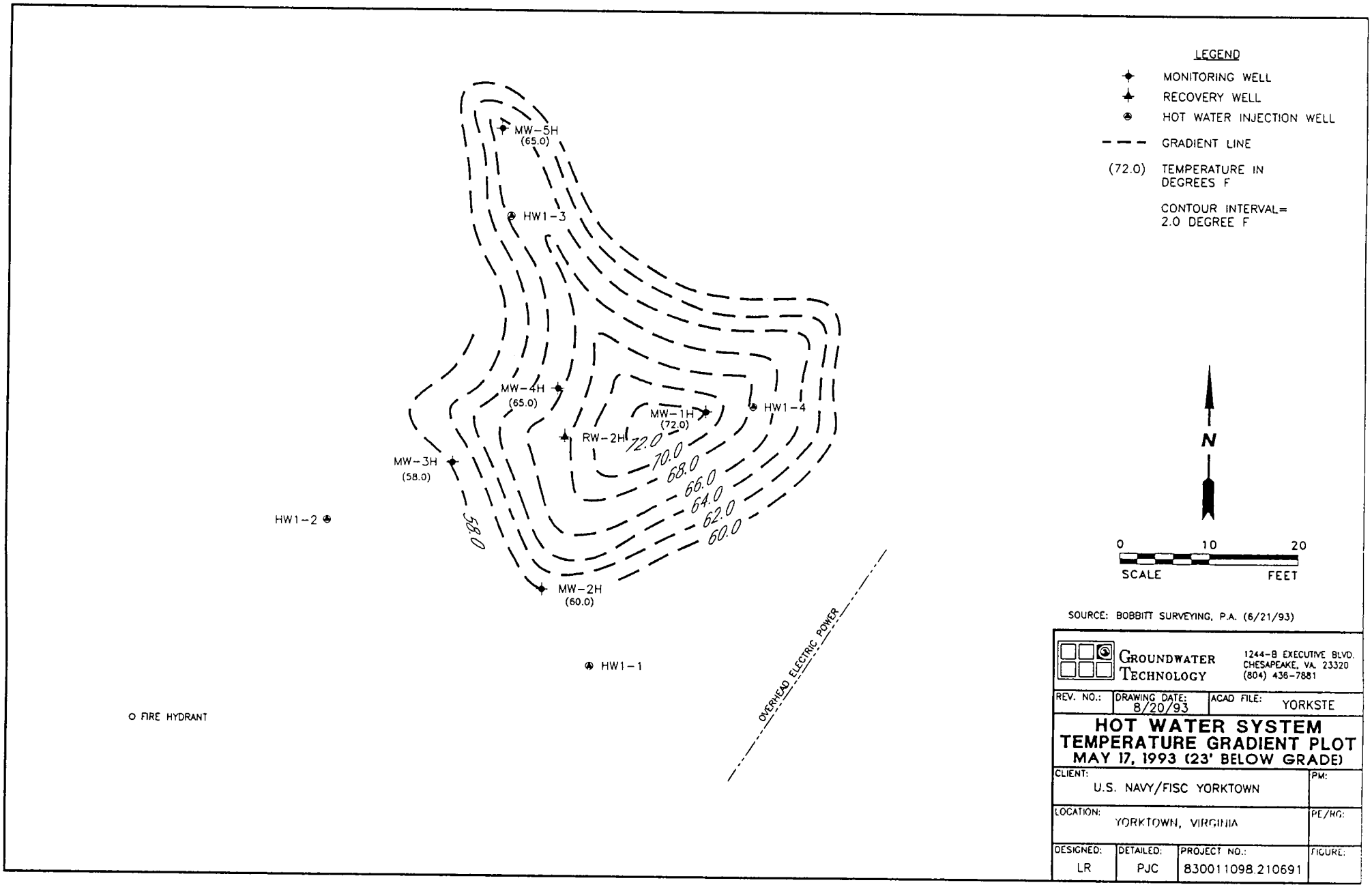
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

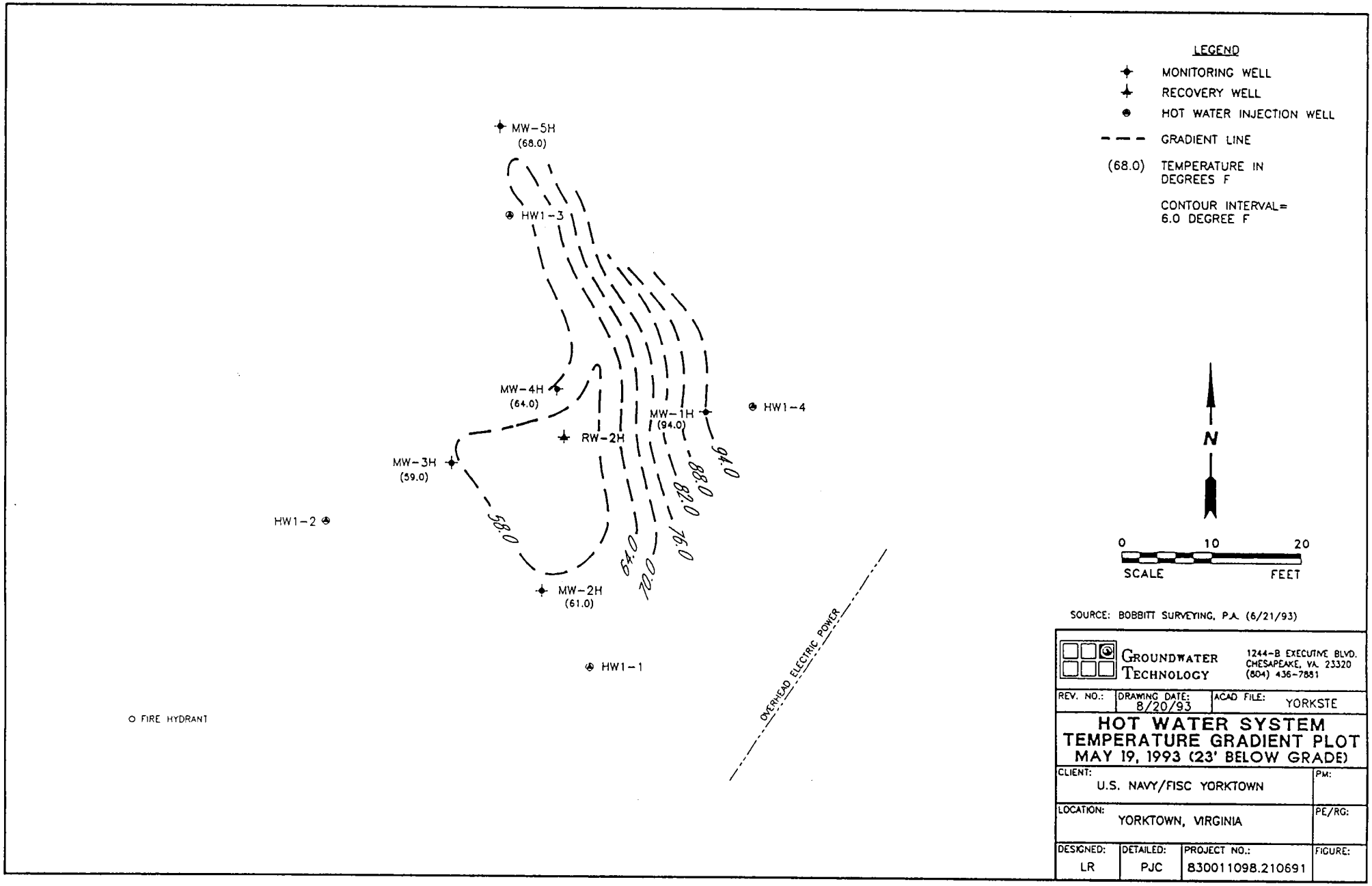
GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

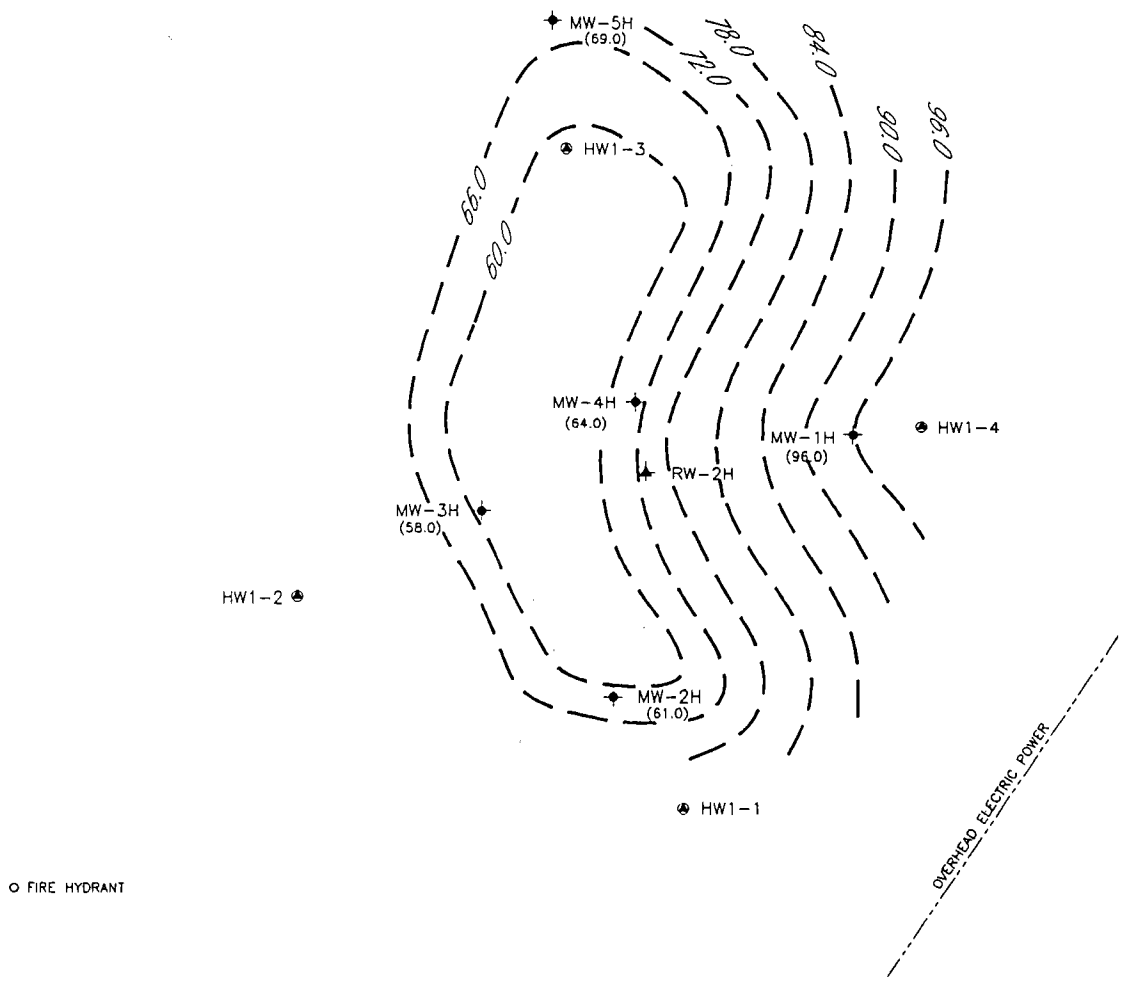
REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 4, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:


LEGEND
MONITORING WELL
RECOVERY WELL
HOT WATER INJECTION WELL
GRADIENT LINE
(72.0) TEMPERATURE IN DEGREES F
CONTOUR INTERVAL= 2.0 DEGREE F
MW-5H (65.0)
HW1-3
MW-4H (65.0)
MW-1H (72.0)
HW1-4
RW-2H
MW-3H (58.0)
HW1-2
MW-2H (60.0)
HW1-1
72.0
70.0
68.0
66.0
64.0
62.0
60.0
58.0
OVERHEAD ELECTRIC POWER
O FIRE HYDRANT
N
0 10 20
SCALE FEET
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)
GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881
REV. NO.:
DRAWING DATE: 8/20/93
ACAD FILE: YORKSTE
HOT WATER SYSTEM
TEMPERATURE GRADIENT PLOT
MAY 17, 1993 (23' BELOW GRADE)
CLIENT: U.S. NAVY/FISC YORKTOWN
PM:
LOCATION: YORKTOWN, VIRGINIA
PE/RG:
DESIGNED: LR
DETAILED: PJC
PROJECT NO.: 830011098.210691
FIGURE:


LEGEND
MONITORING WELL
RECOVERY WELL
HOT WATER INJECTION WELL
GRADIENT LINE
(68.0) TEMPERATURE IN DEGREES F
CONTOUR INTERVAL= 6.0 DEGREE F
MW-5H (68.0)
HW1-3
MW-4H (64.0)
RW-2H
MW-1H (94.0)
HW1-4
MW-3H (59.0)
HW1-2
MW-2H (61.0)
HW1-1
58.0
64.0
70.0
76.0
82.0
88.0
94.0
OVERHEAD ELECTRIC POWER
FIRE HYDRANT
N
0 10 20
SCALE FEET
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)
GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881
REV. NO.:
DRAWING DATE: 8/20/93
ACAD FILE: YORKSTE
HOT WATER SYSTEM
TEMPERATURE GRADIENT PLOT
MAY 19, 1993 (23' BELOW GRADE)
CLIENT: U.S. NAVY/FISC YORKTOWN
PM:
LOCATION: YORKTOWN, VIRGINIA
PE/RG:
DESIGNED: LR
DETAILED: PJC
PROJECT NO.: 830011098.210691
FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (96.0) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

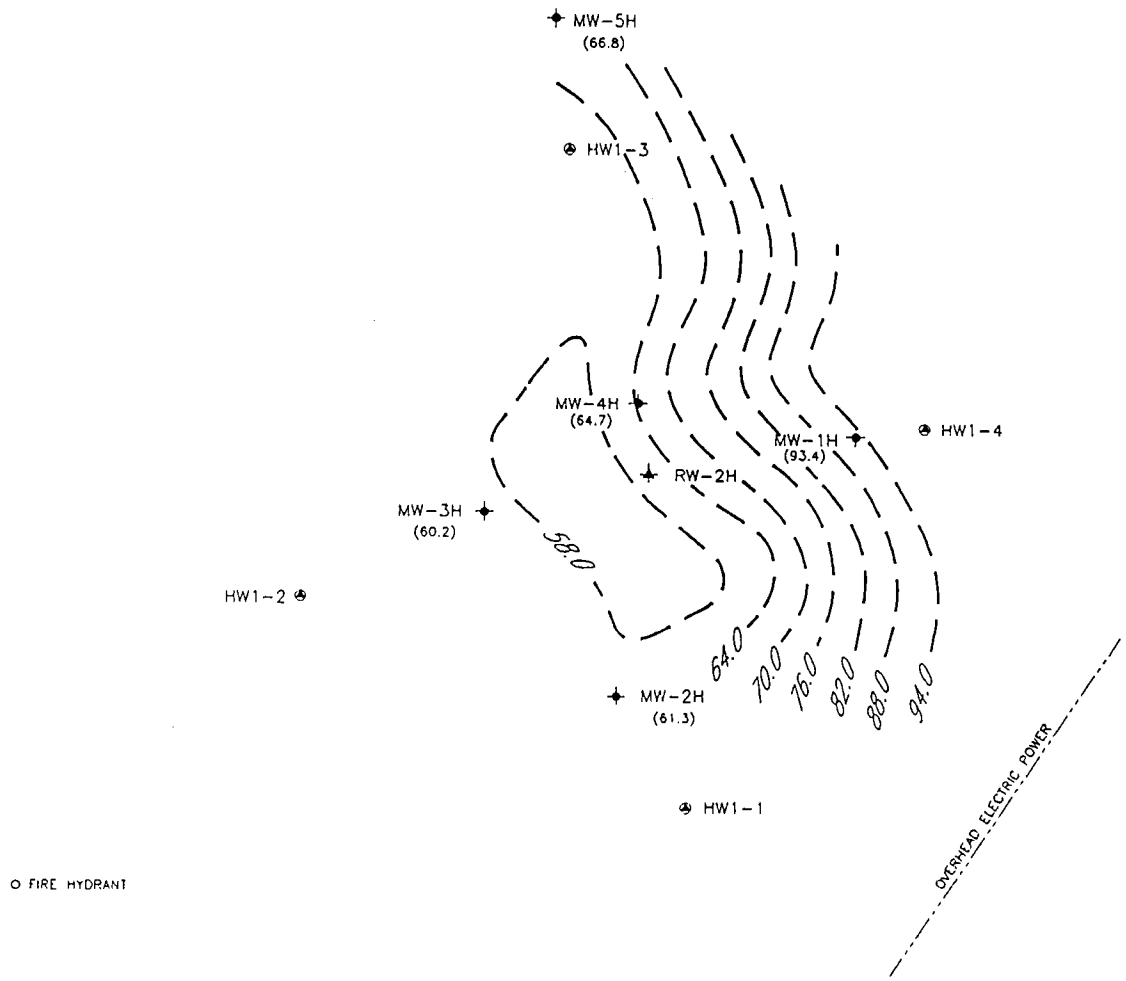
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 21, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (66.8) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

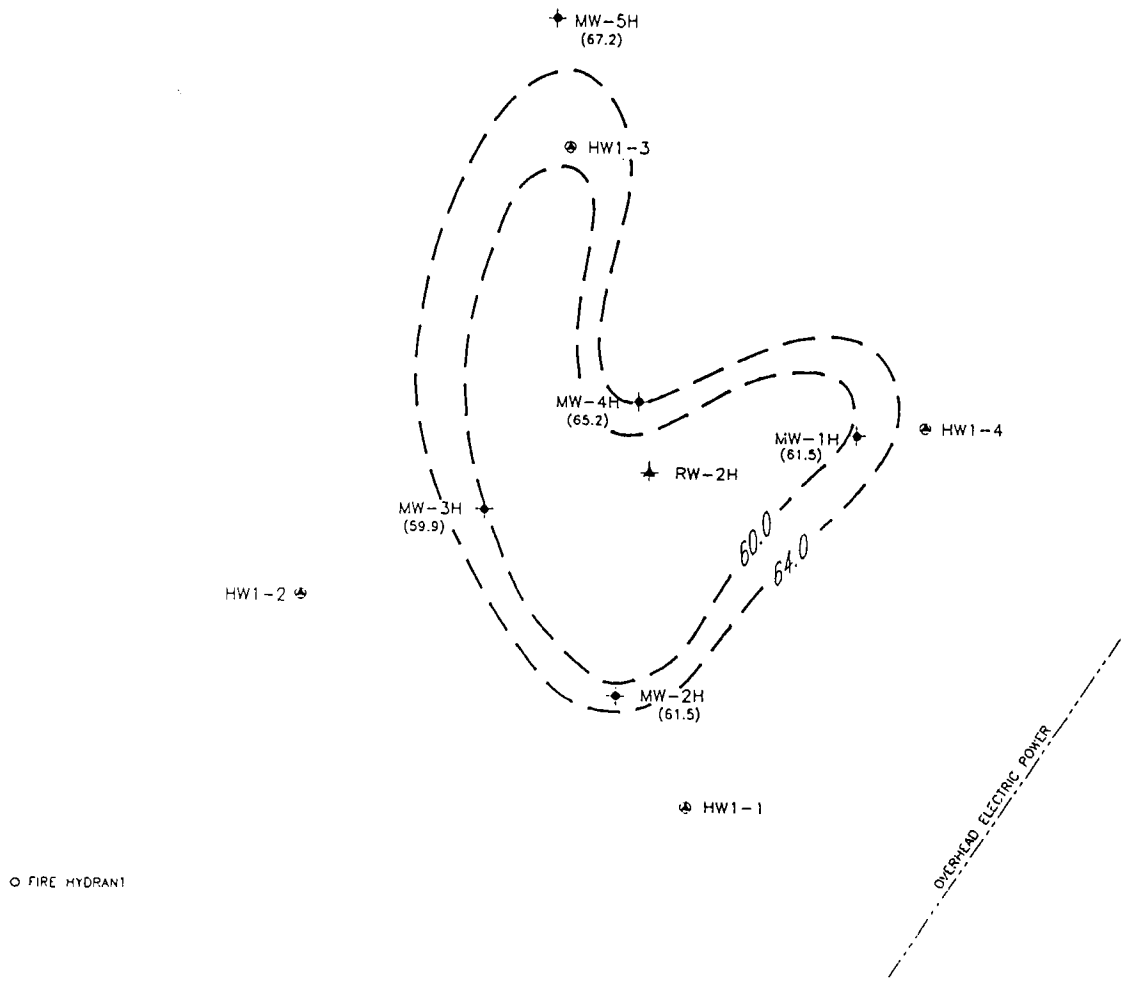
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT MAY 26, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (67.2) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

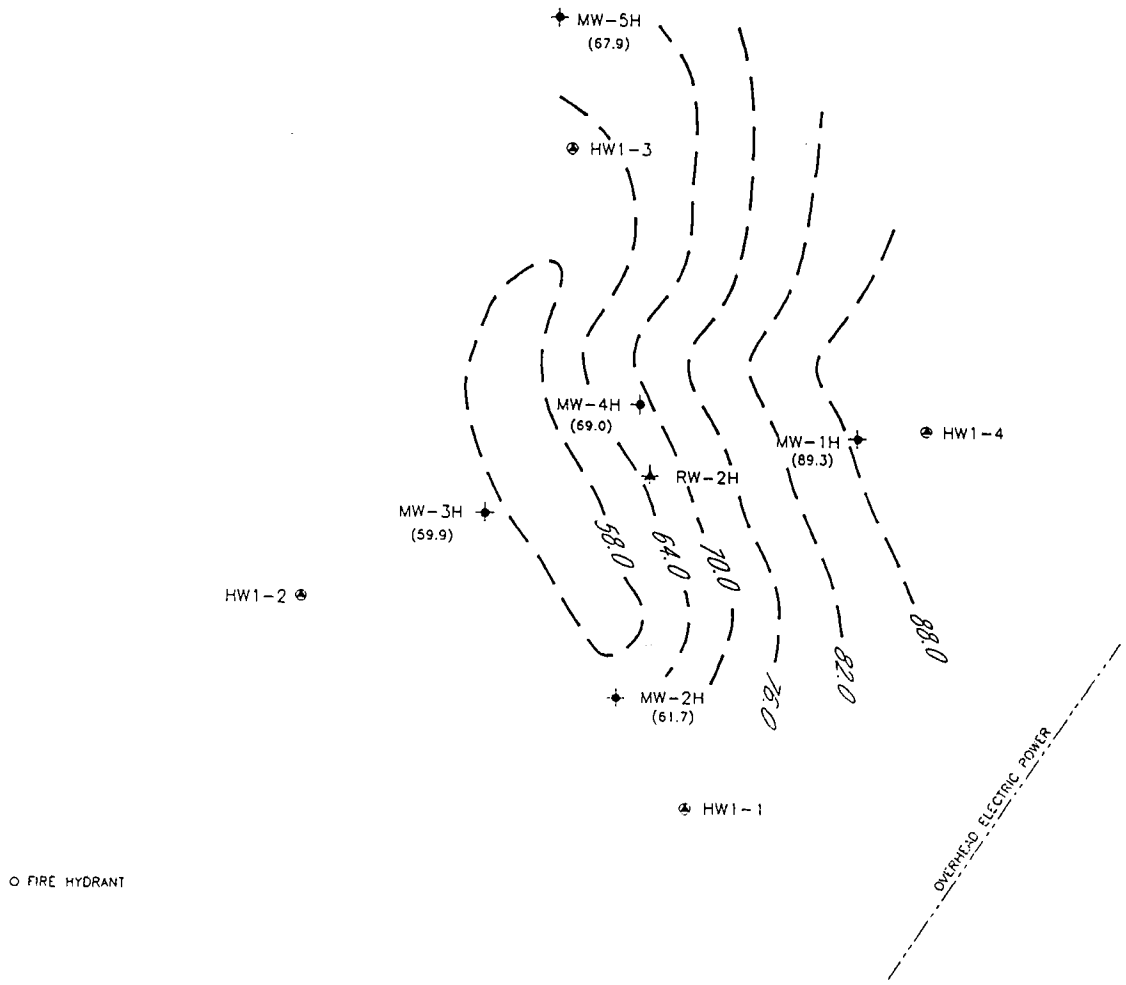
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
MAY 28, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (67.9) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 6.0 DEGREE F

N

0 10 20
SCALE FEET

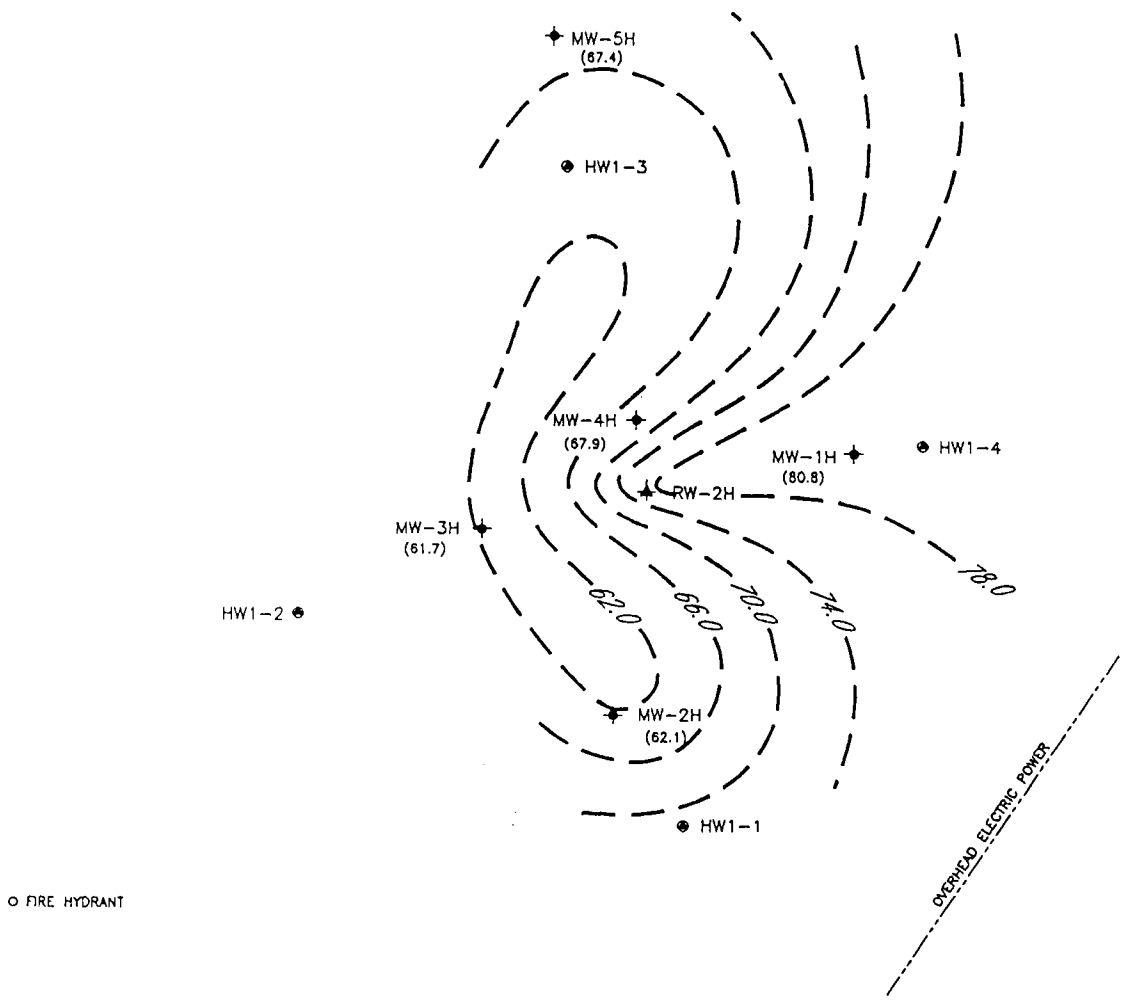
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JUNE 2, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: B30011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (67.4) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

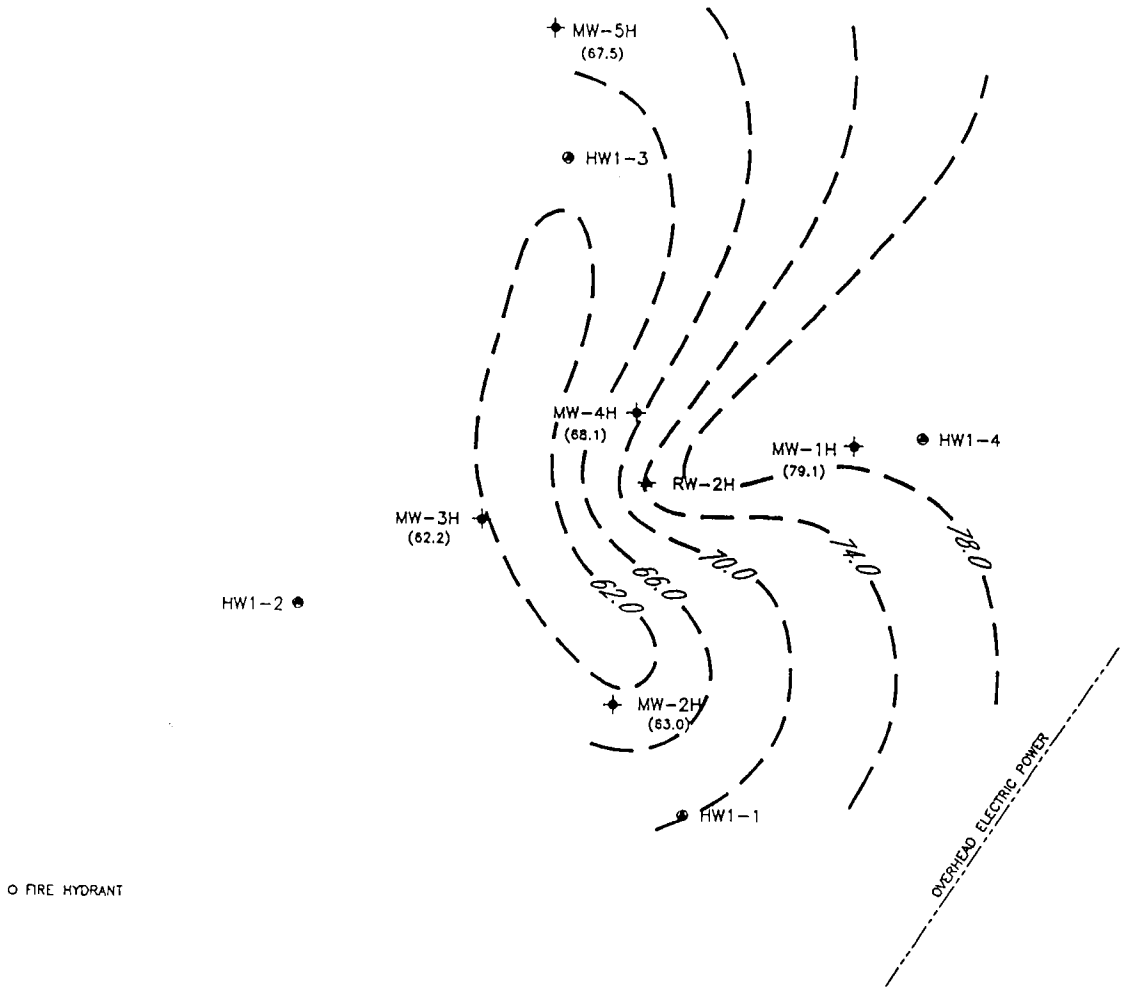
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT JUNE 25, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



O FIRE HYDRANT

LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (67.5) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL= 4.0 DEGREE F

N

0 10 20
SCALE FEET

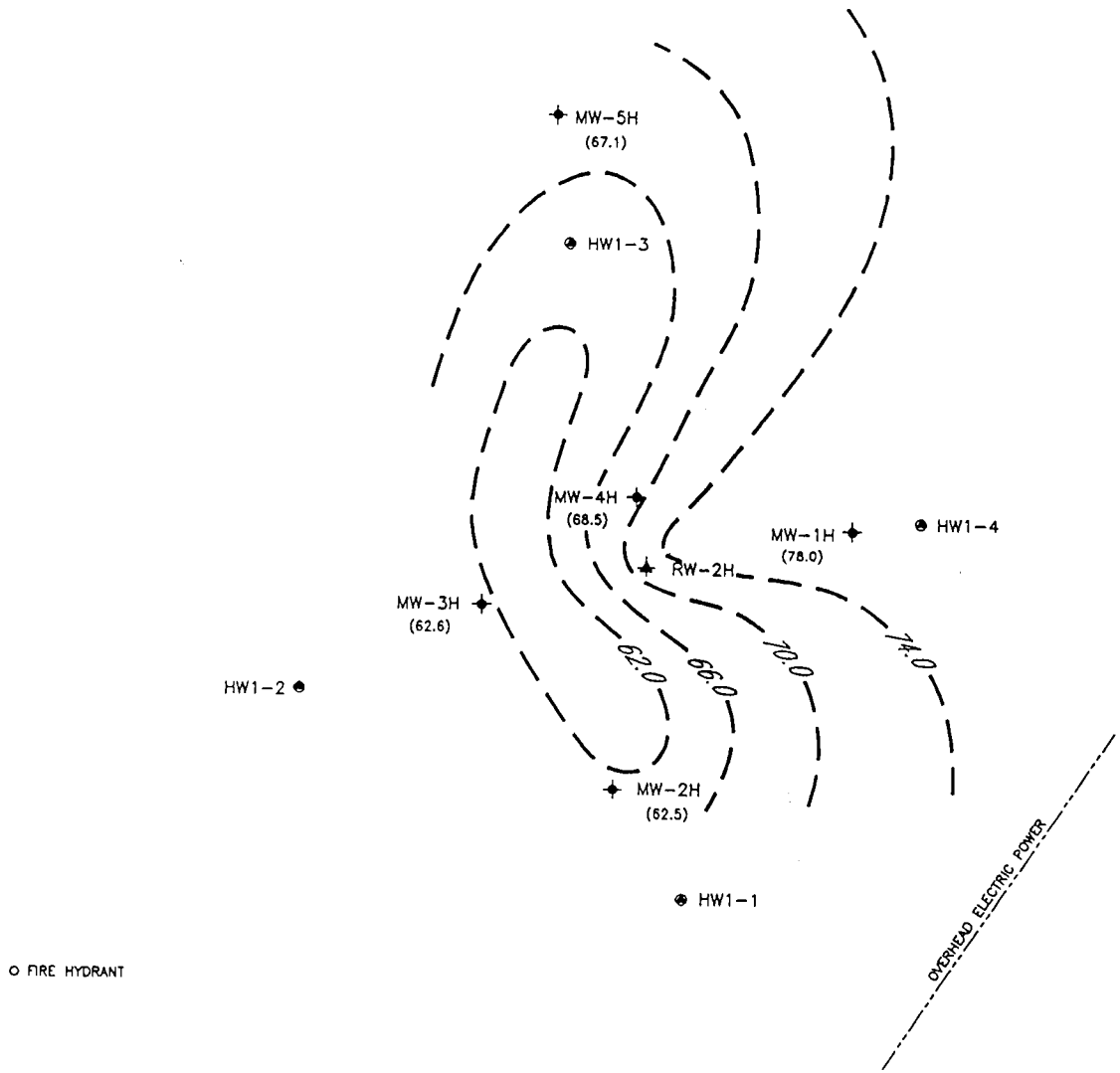
SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JULY 2, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: 830011098.210691	FIGURE:



LEGEND

- MONITORING WELL
- RECOVERY WELL
- HOT WATER INJECTION WELL
- GRADIENT LINE
- (67.1) TEMPERATURE IN DEGREES F

CONTOUR INTERVAL = 4.0 DEGREE F

N

0 10 20
SCALE FEET

SOURCE: BOBBITT SURVEYING, P.A. (6/21/93)

GROUNDWATER TECHNOLOGY
1244-B EXECUTIVE BLVD.
CHESAPEAKE, VA. 23320
(804) 436-7881

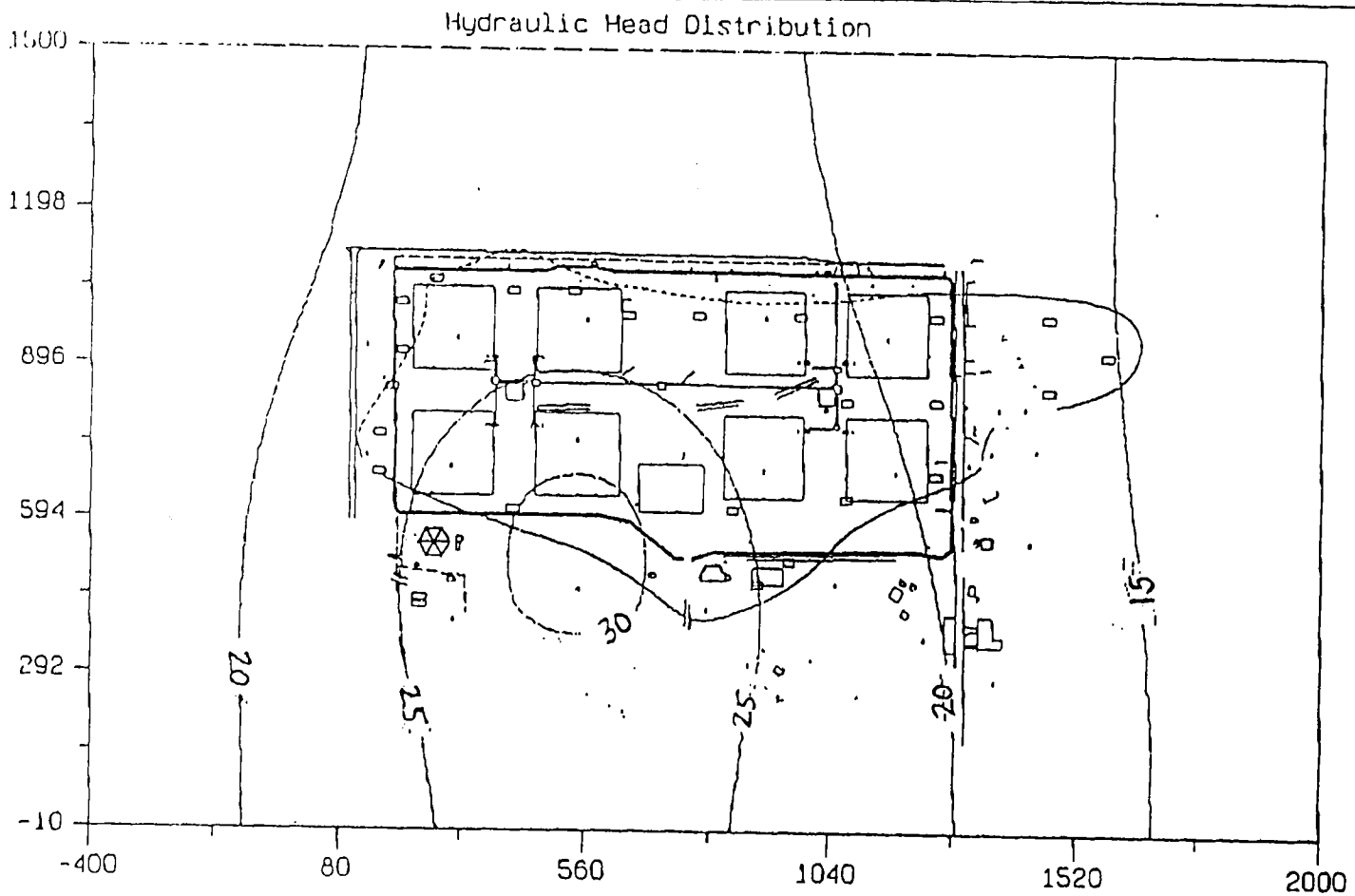
REV. NO.:	DRAWING DATE: 8/20/93	ACAD FILE: YORKSTE2

HOT WATER SYSTEM TEMPERATURE GRADIENT PLOT
JULY 6, 1993 (23' BELOW GRADE)

CLIENT: U.S. NAVY/FISC YORKTOWN			PM:
LOCATION: YORKTOWN, VIRGINIA			PE/RG:
DESIGNED: LR	DETAILED: PJC	PROJECT NO.: B30011098.210691	FIGURE:

APPENDIX I

FLOWPATH MODELING SCENARIOS



FLOWPATH

Copyright 1989-1992 by WHS

Steady State Flow

Min : 1.00E+01

Max : 3.19E+01

Inc : 5.00E+00

Units : [ft]

File : AAYORK

STATIC GROUNDWATER ELEVATIONS