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ENVIRONMENTAL MONITORING
OF M1A1 TANKS IN
SOUTH KOREA, HUNGARY, AND
FORT STEWART, GA

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Prepared for:
U.S. Army Armament Research, Development,
and Engineering Center
ATTN: AMSTA-AR-QAC-T
Picatinny Arsenal, NJ 07806-5000

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19. ABSTRACT (Continue on reverse if necessary and identify by block number) The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by U. S. Army Armament Research, Development and Engineering Center (ARDEC) to obtain temperature and humidity data of the ammunition storage racks of M1A1 tanks. Four tanks were instrumented in South Korea and Hungary and six tanks were instrumented in Ft. Stewart, GA. This report contains test results of the tanks monitored from June-December 1996.					
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TABLE OF CONTENTS

PART	PAGE NO.
1. INTRODUCTION.....	1-1
A. BACKGROUND	1-1
B. AUTHORITY	1-1
C. OBJECTIVE	1-1
D. CONCLUSION.....	1-1
2. ATTENDEES.....	2-1
3. TEST PROCEDURES	3-1
4. TEST RESULTS	4-1
5. PHOTOGRAPHS.....	5-1
6. GRAPHS.....	6-1

PART 1

INTRODUCTION

A. BACKGROUND. The U.S. Army Defense Ammunition Center (DAC), Validation Engineering Division (SIOAC-DEV), was tasked by U.S. Army Armament Research, Development and Engineering Center (ARDEC) to monitor ammunition storage conditions inside M1A1 tanks located in South Korea, Hungary, and Ft. Stewart, GA. This report contains test results of data obtained from June-December 1996.

B. AUTHORITY. The test was accomplished IAW mission responsibilities delegated by U.S. Army Armament Munitions and Chemical Command (AMCCOM), Rock Island, IL. Reference is made to the following:

1. Change 4, 4 October 1974, to AR740-1, 23 April 1973, Storage and Supply Activity Operation.

2. AMCCOM-R, 10-17, Mission and Major Functions of USADACS, 13 January 1986.

C. OBJECTIVE. The objective of the instrumentation was to obtain temperature and humidity data in the ammunition storage compartments of deployed tanks. U.S. Army Armament Research, Development and Engineering Center will apply the data obtained to provide information concerning chamberability and swelling of two designs of bourrelets.

D. CONCLUSION. The temperature and humidity in the stowage compartments of the tanks generally maintained higher temperature levels than ambient conditions provided. The temperature and humidity conditions of the semiready and ready storage compartments were similar. Hull storage experienced similar temperature conditions to the semiready and ready storage areas. The standing water, being common in the hull storage area, contributed to the generally higher hull storage area humidity than the semiready and ready storage areas.

PART 2

JUNE - DECEMBER 1996

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PART 3

TEST PROCEDURE

M1A1 tanks were instrumented at the following three sites: Fort Stewart, GA; Taborfalva Training Area, Hungary; and Camp Gary Owen, South Korea. Each tank was instrumented with three ACR data loggers. One data logger was placed in the tank ready rack, one data logger in the semiready rack, and one data logger in the hull stowage compartment. These data loggers collected temperature and humidity readings for these locations. The instrumented tanks continued to be used in normal operations, including maintenance. Additionally, a weather station was assembled at each location to record ambient conditions.

At the Fort Stewart site, six tanks were instrumented as described above. Readings were recorded every 10 minutes, 30 May - 1 November 1996. A weather station was operated onsite.

At Taborfalva Training Area, Hungary, four tanks were instrumented as described above. The data loggers recorded readings every 10 minutes. The initial data loggers were installed 24 June 1996. The program concluded 16 December 1996. A weather station was operated onsite.

The South Korea site had four tanks instrumented, each with three data loggers. Camp Gary Owen is located approximately 50 km east-northeast of Seoul and 325 km north of Taegu. The data loggers recorded temperature and humidity data every 30 minutes. The data loggers were initially installed 6 June 1996, with the program concluding 20 December 1996. The South Korea weather station was positioned at Ammunition Depot 2 (AD-2), located approximately 40 km southeast of Taegu.

PART 4

TEST RESULTS

Six M1A1 tanks were instrumented at Fort Stewart from 30 May - 31 October 1996. The ambient temperature during this timeframe ranged from 44 degrees Fahrenheit to 101 degrees Fahrenheit. The maximum semiready storage temperature of 112 degrees Fahrenheit was recorded in tank 206 on 23 June 1996. The maximum ready storage temperature recorded was 117 degrees Fahrenheit in tank 224 on 23 June 1996. The maximum hull storage temperature recorded was 108 degrees Fahrenheit in tank 206 on 24 June 1996 and tank 221 on 10 July 1996 (see part 6 for additional temperature data obtained at Fort Stewart).

The ambient humidity at Fort Stewart ranged from 14 to 100 percent. Readings of 100 percent were obtained during each month. Hull storage readings ranged from 37 to 100 percent, with the hull storage of five of the six tanks reaching 100 percent humidity. The remaining tank, tank 210, had a maximum hull storage humidity reading of 83 percent. Tank 210 was the only instrumented tank that did not show evidence of standing water in the hull storage area. Semiready storage readings ranged from 21 to 100 percent, with four of the six instrumented tanks reaching 100 percent humidity. The remaining tanks, tanks 210 and 213, had maximum ready storage readings of 88 and 83 percent, respectively. Ready storage humidity readings ranged from 29 to 100 percent, with three of the six instrumented tanks reaching 100 percent humidity. The remaining three tanks (tanks 210, 213, and 219) had maximum humidity readings of 79, 93, and 90 percent, respectively. No standing water was noted in the semiready or ready storage areas of any of the instrumented tanks (for additional humidity distribution data, see part 6).

From 24 June - 16 December 1996, four M1A1 tanks were instrumented at Taborfalva Training Area, Hungary. During this timeframe, the ambient temperature ranged from

20 degrees Fahrenheit to 93 degrees Fahrenheit. The maximum semiready storage temperature reading of 98 degrees Fahrenheit was recorded in tank 301 on 8 July 1996. The maximum ready storage temperature of 107 degrees Fahrenheit was also recorded in tank 301 on 8 July 1996. The maximum recorded hull storage temperature of 105 degrees Fahrenheit occurred in tank 301 on 4 July 1996.

The ambient humidity at Taborfalva Training Area ranged from 20 to 100 percent. Readings of 100 percent were obtained during each month of instrumentation. Hull storage readings ranged from 36 to 100 percent with three of the four instrumented tanks recording maximum readings of 100 percent. The remaining tank, tank 304, had a maximum recorded reading of 93 percent. Semiready storage readings ranged from 36 to 100 percent with the semiready storage of each instrumented tank reaching 100 percent for a period of time. The ready storage humidity readings ranged from 34 to 100 percent, with only tank 312 reaching 100 percent humidity. Each of the remaining three instrumented tanks had maximum humidity readings in the ready storage area in excess of 75 percent. Additional details for the temperature and humidity data obtained in Hungary are located in part 6.

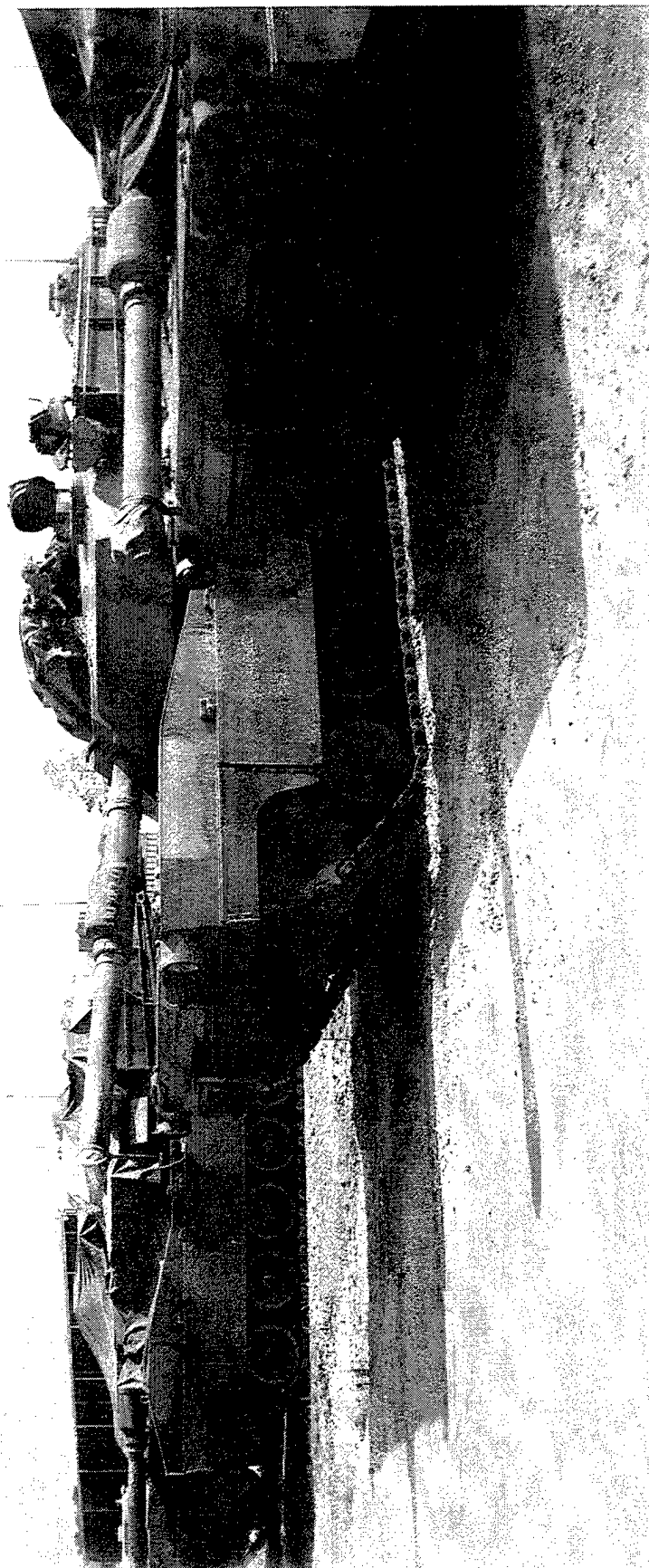
From 27 June - 20 August 1996, three M1A1 tanks at Camp Gary Owen, South Korea were each equipped with three data loggers. This timeframe is referred to as "Setup No. 1." Instead of replacing the removed data loggers, four sets of three data loggers were placed in four different M1A1 tanks, referred to as "Setup No. 2." Monitoring of these four tanks continued until the termination of the program on 18 December 1996. No ambient conditions at this location were obtained during this timeframe. Ambient conditions from AD-2 were used for data analysis. During this timeframe, ambient temperature conditions ranged from 14 to 100 degrees Fahrenheit. The maximum semiready storage temperature reading was 110 degrees Fahrenheit in tank A-42 on 1 August 1996. The maximum ready storage temperature was

104 degrees Fahrenheit in tank C-33 on 21 August 1996. The maximum hull storage temperature was 104 degrees Fahrenheit in tank C-33 on 21 August 1996.

The ambient humidity at AD-2 ranged from 15 to 100 percent. Readings of 100 percent were obtained during each month of instrumentation. Hull storage readings ranged from 33 to 100 percent with three of the four instrumented tanks in Setup No. 2 having readings of 100 percent. The remaining tank, tank A-14, had a maximum hull storage humidity reading of 76 percent. Semiready storage humidity readings ranged from 36 to 90 percent, with the semiready storage of six of the seven tanks that were instrumented providing readings in excess of 78 percent at a period of time. The ready storage humidity readings ranged from 28 to 98 percent, with the minimum peak humidity reading of any instrumented tank being 79 percent. Additional details for the temperature and humidity data obtained in South Korea are located in part 6.

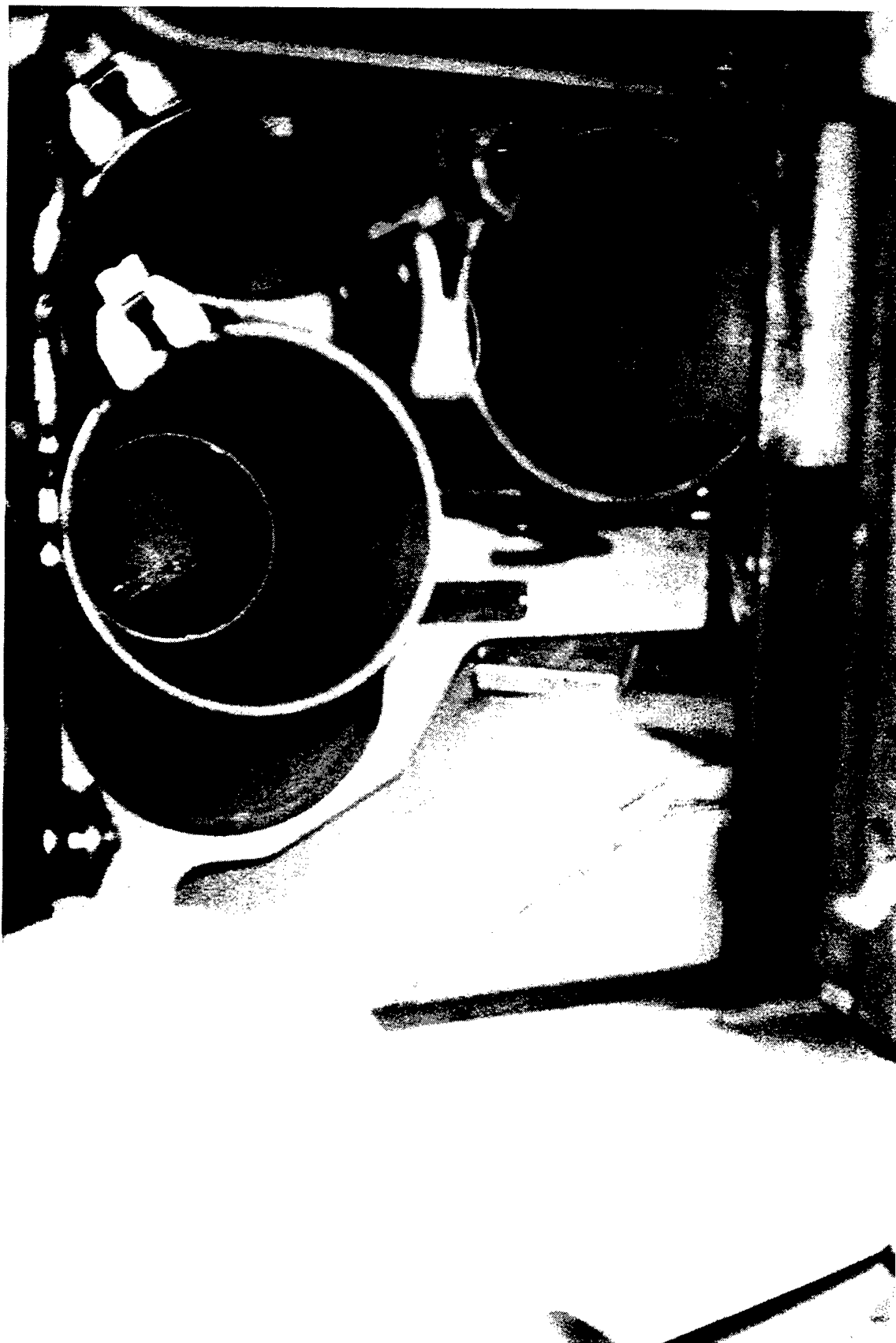
PART 5

PHOTOGRAPHS



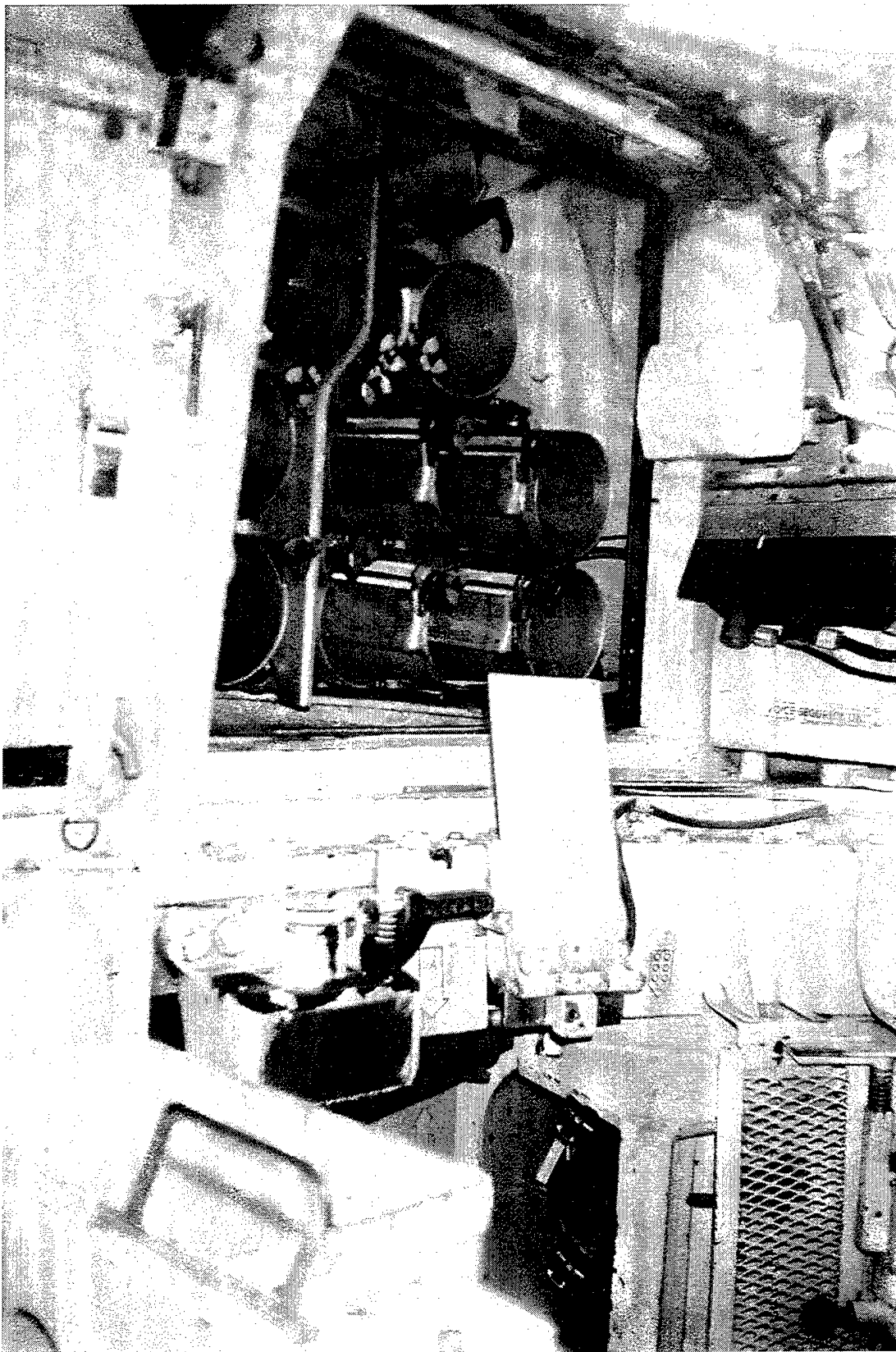
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PHOTO NO. AO317-SCN-96-155-3041. This photograph shows M1A1 tanks located at Fort Stewart.
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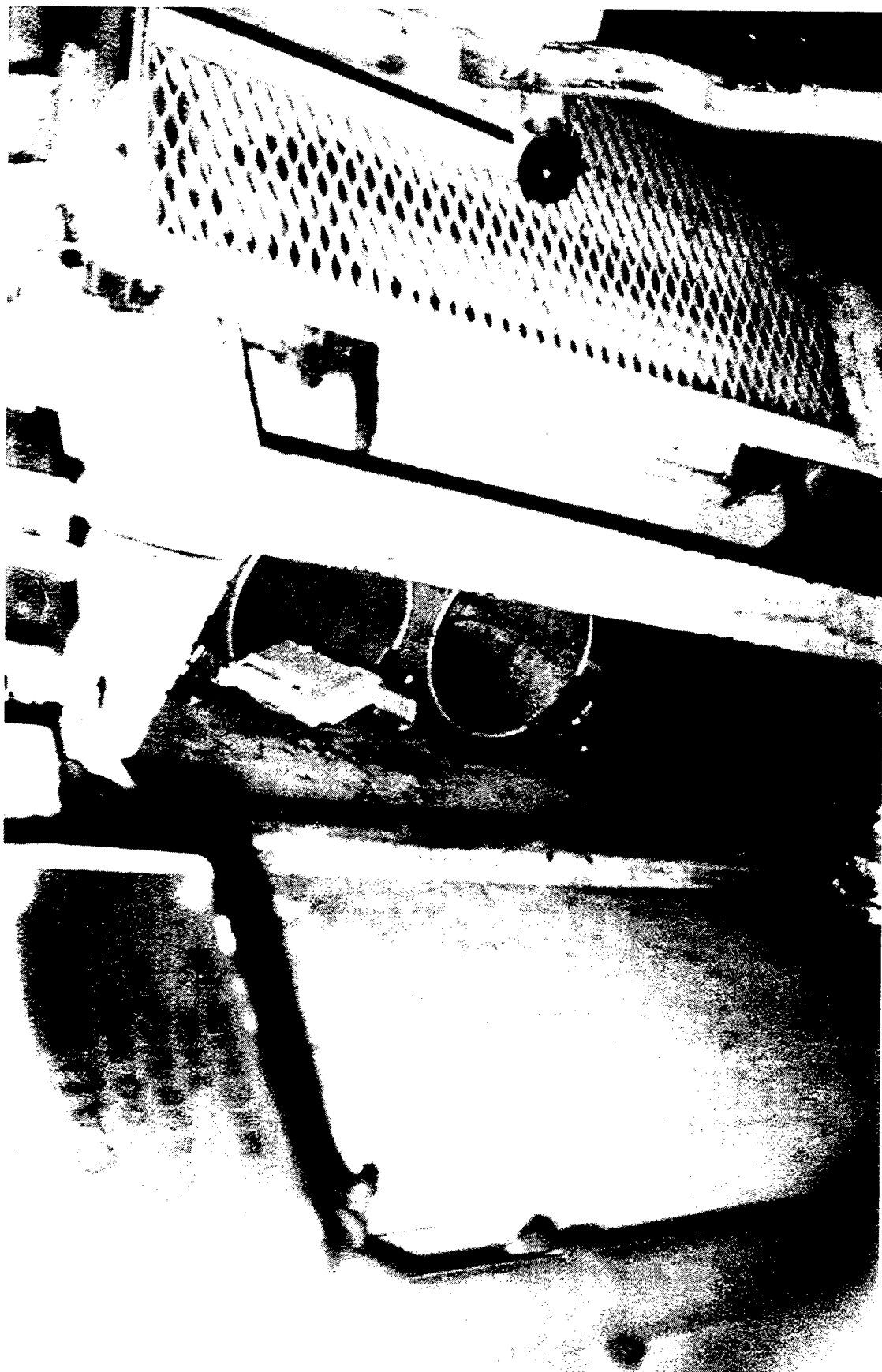
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PHOTO NO. AO317-SCN-96-155-3043. This photograph shows an ACR data logger located in the semiready rack of an M1A1 tank.



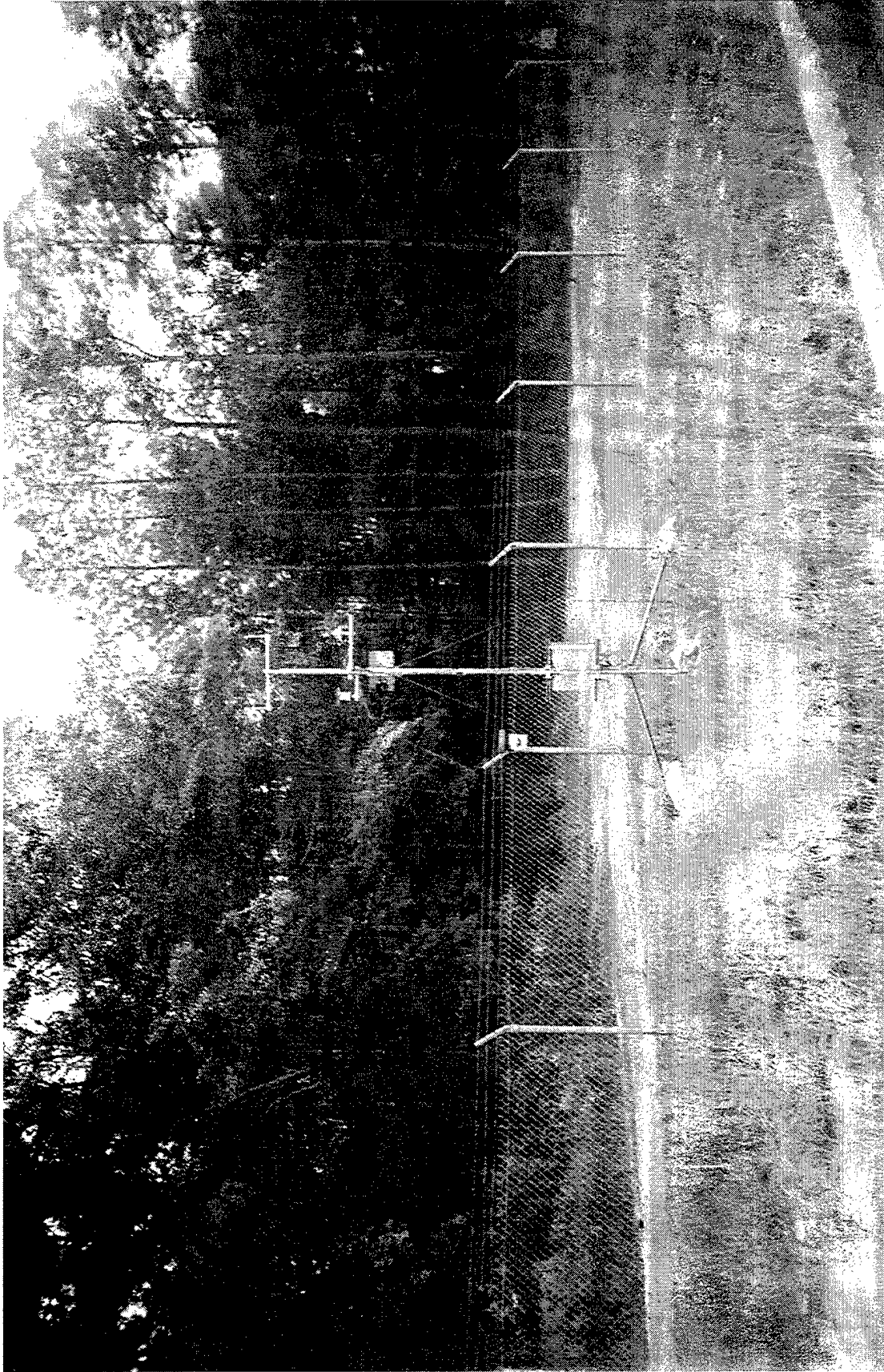
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PHOTO NO. AO317-SCN-96-155-3045. This photograph shows the ready rack of an M1A1 tank. An ACR data logger is located in the top right of the compartment.
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PHOTO NO. AO317-SCN-96-155-3040. This photograph shows an ACR data logger located in the hull rack of an M1A1 tank.



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PHOTO NO. AO317-SCN-96-155-3055. This photograph shows the weather station installed at Fort Stewart.

PART 6

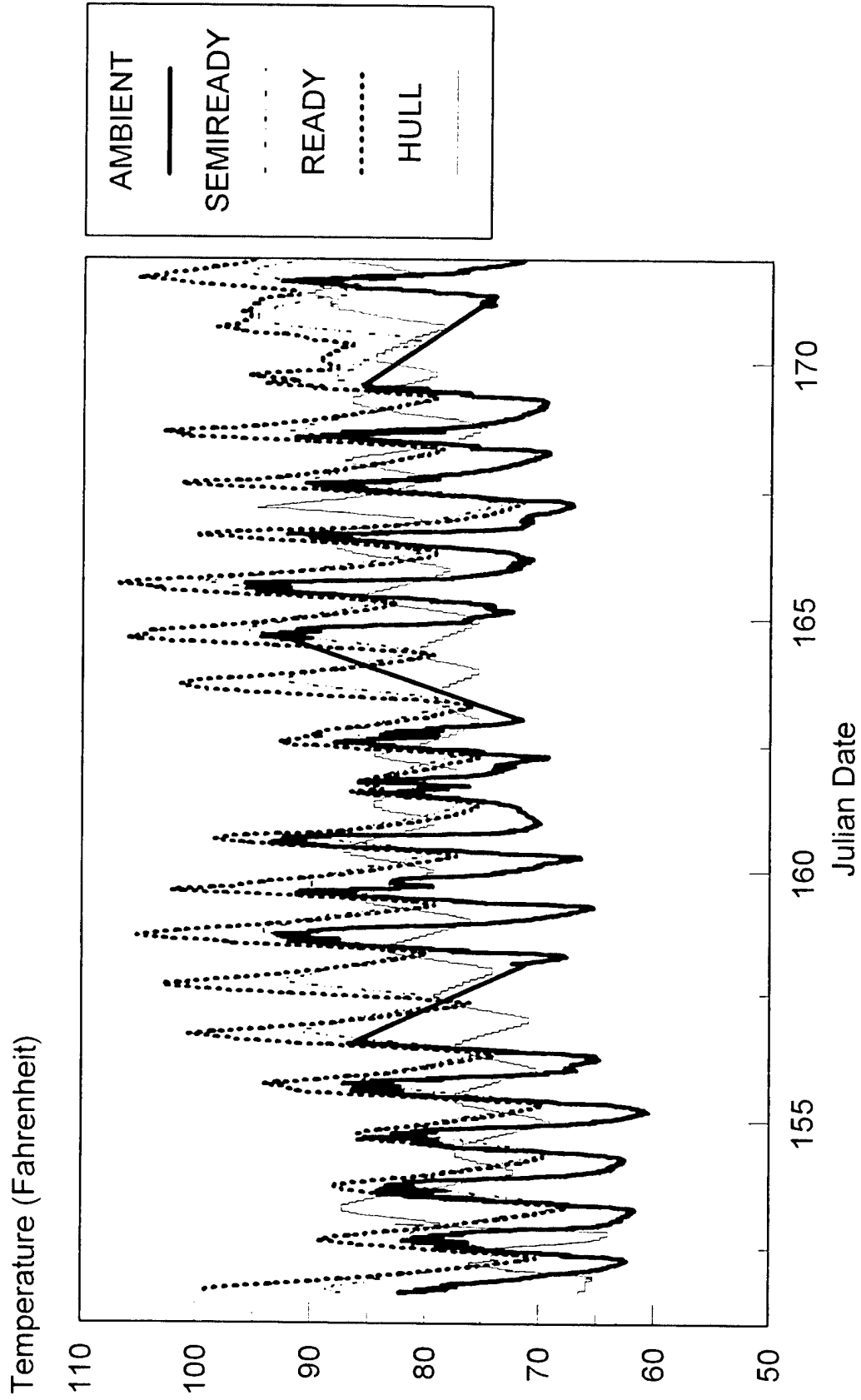
GRAPHS

FORT STEWART DATA

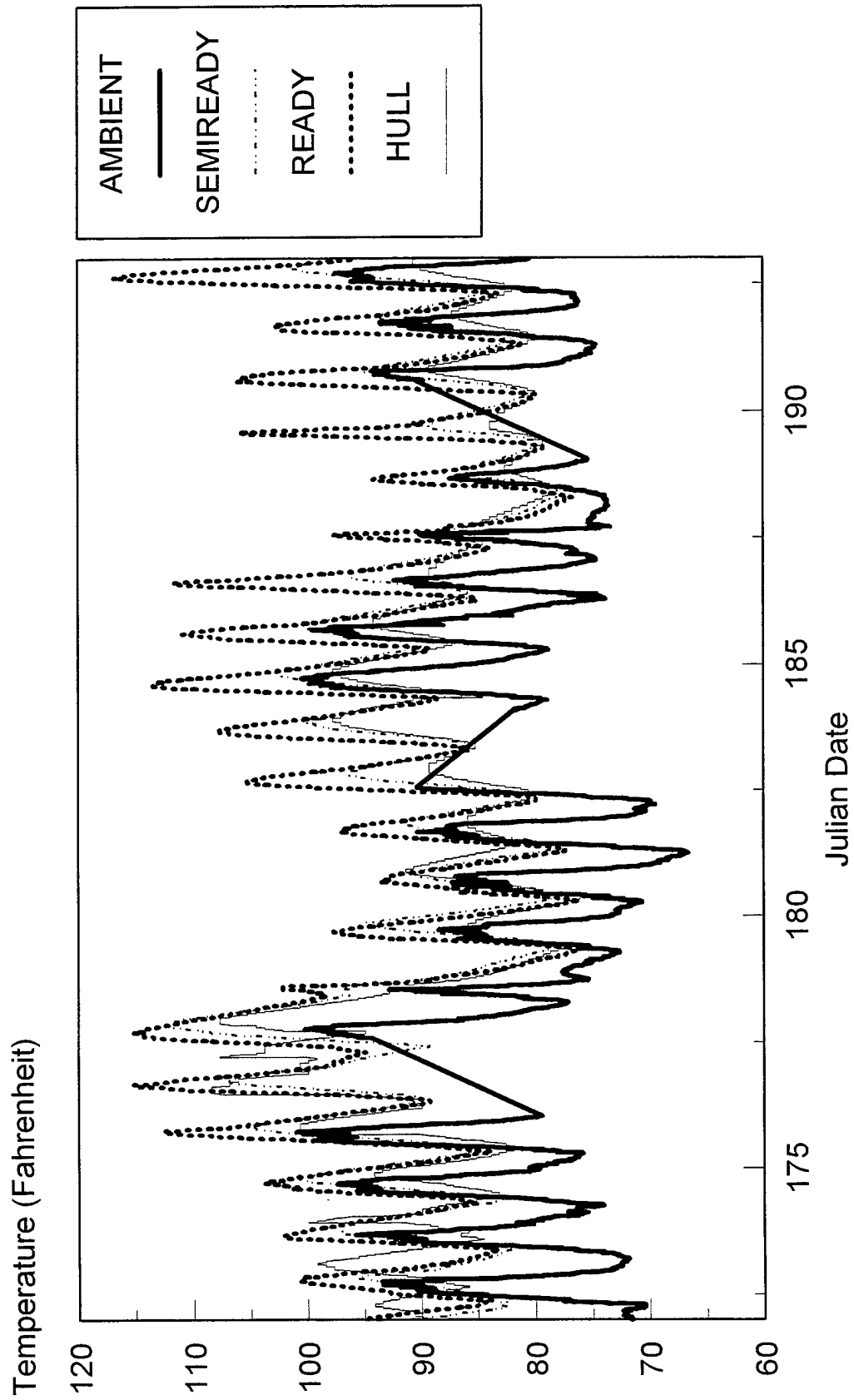
FT. STEWART M1A1 TANK MONITORING DATA

AMBIENT	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER
High Temperature	101	101	96	96	89
Low Temperature	60	71	68	58	44
High Humidity	100	100	100	100	100
Low Humidity	23	26	28	15	14
TANK 206					
SEMIREADY					
High Temperature	112	102	96	103	101
Low Temperature	68	76	76	72	56
High Humidity	94	68	61	100	81
Low Humidity	32	45	47	52	57
READY					
High Temperature	115	117	111	97	98
Low Temperature	68	75	75	72	55
High Humidity	92	63	55	100	100
Low Humidity	31	42	44	52	90
HULL					
High Temperature	108	98	98	95	89
Low Temperature	64	77	76	70	56
High Humidity	100	100	100	100	65
Low Humidity	50	65	79	45	45
TANK 210					
SEMIREADY					
High Temperature	108	100	NA	96	87
Low Temperature	69	85	NA	77	60
High Humidity	81	67	NA	87	88
Low Humidity	36	61	NA	77	63
READY					
High Temperature	116	113	108	110	94
Low Temperature	61	75	73	72	55
High Humidity	79	60	55	55	55
Low Humidity	29	42	43	43	43
HULL					
High Temperature	106	99	89	89	85
Low Temperature	70	77	74	73	56
High Humidity	50	83	80	80	57
Low Humidity	37	42	74	49	49
TANK 213					
SEMIREADY					
High Temperature	98	101	93	89	84
Low Temperature	69	77	75	72	55
High Humidity	81	83	84	88	87
Low Humidity	60	62	70	51	44
READY					
High Temperature	107	113	104	98	92
Low Temperature	69	76	73	68	54
High Humidity	83	67	61	93	78
Low Humidity	54	37	40	66	58
HULL					
High Temperature	107	107	107	101	87
Low Temperature	69	84	78	70	55
High Humidity	100	100	87	100	100
Low Humidity	86	53	84	75	87
TANK 219					
SEMIREADY					
High Temperature	101	104	97	104	93
Low Temperature	68	75	74	70	55
High Humidity	100	85	90	92	83
Low Humidity	47	55	69	49	55
READY					
High Temperature	111	112	NA	108	93
Low Temperature	71	85	NA	70	56
High Humidity	90	67	NA	88	77
Low Humidity	39	38	NA	57	55
HULL					
High Temperature	101	93	NA	98	84
Low Temperature	71	82	NA	69	54
High Humidity	100	100	NA	100	97
Low Humidity	84	52	NA	66	64
TANK 221					
SEMIREADY					
High Temperature	99	104	95	95	85
Low Temperature	69	77	74	72	58
High Humidity	100	95	59	92	92
Low Humidity	40	45	42	31	21
READY					
High Temperature	111	116	103	110	98
Low Temperature	68	70	75	70	57
High Humidity	100	100	94	100	84
Low Humidity	42	44	49	39	39
HULL					
High Temperature	98	108	93	92	97
Low Temperature	70	76	75	73	65
High Humidity	97	100	100	100	100
Low Humidity	59	85	94	54	74
TANK 224					
SEMIREADY					
High Temperature	102	90	NA	95	85
Low Temperature	69	85	NA	68	54
High Humidity	100	50	49	100	100
Low Humidity	73	44	44	43	69
READY					
High Temperature	117	109	110	102	94
Low Temperature	70	75	73	68	53
High Humidity	100	94	92	90	85
Low Humidity	64	71	69	75	68
HULL					
High Temperature	93	106	88	81	NA
Low Temperature	70	76	74	73	NA
High Humidity	97	97	97	100	NA
Low Humidity	59	56	84	94	NA

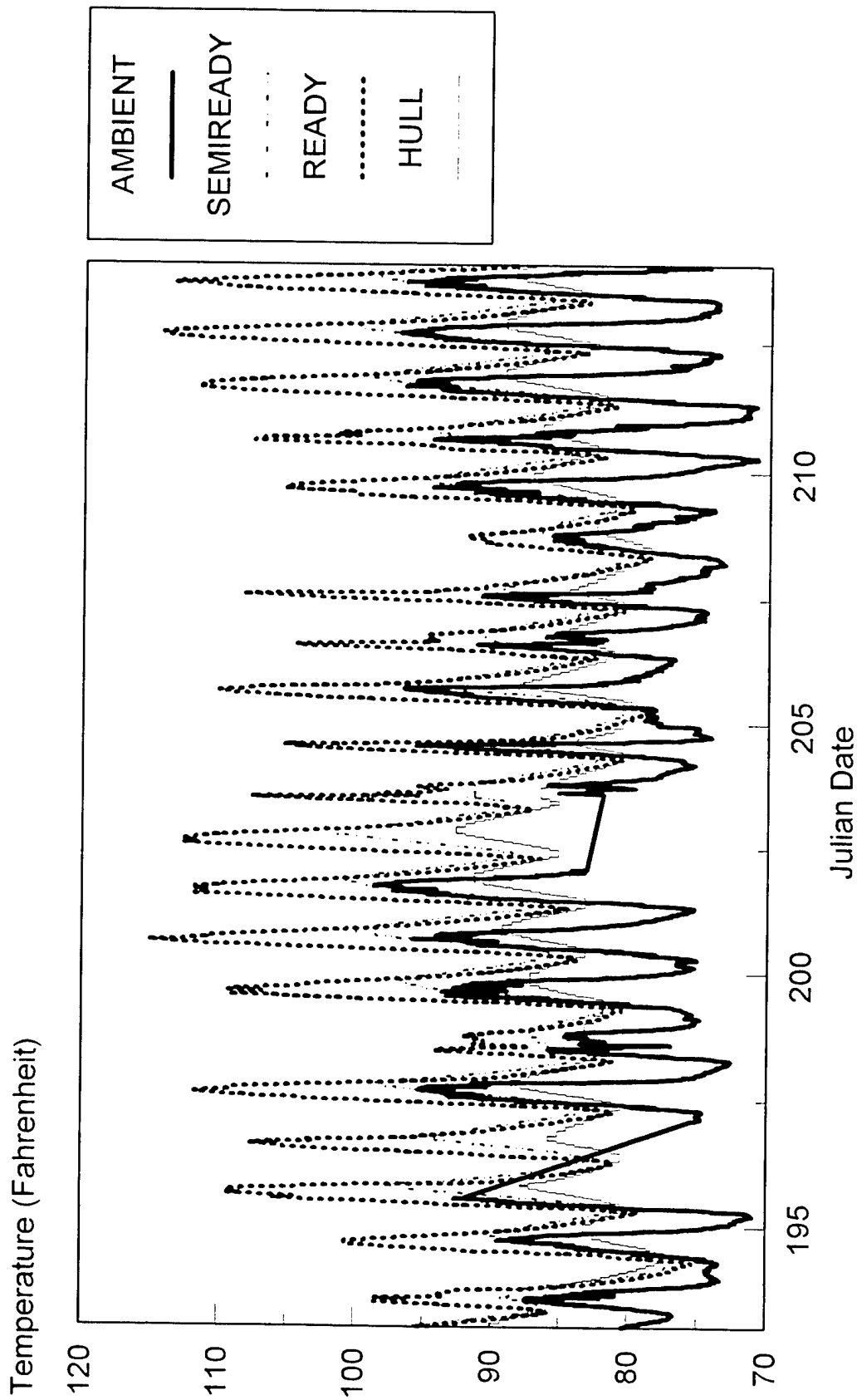
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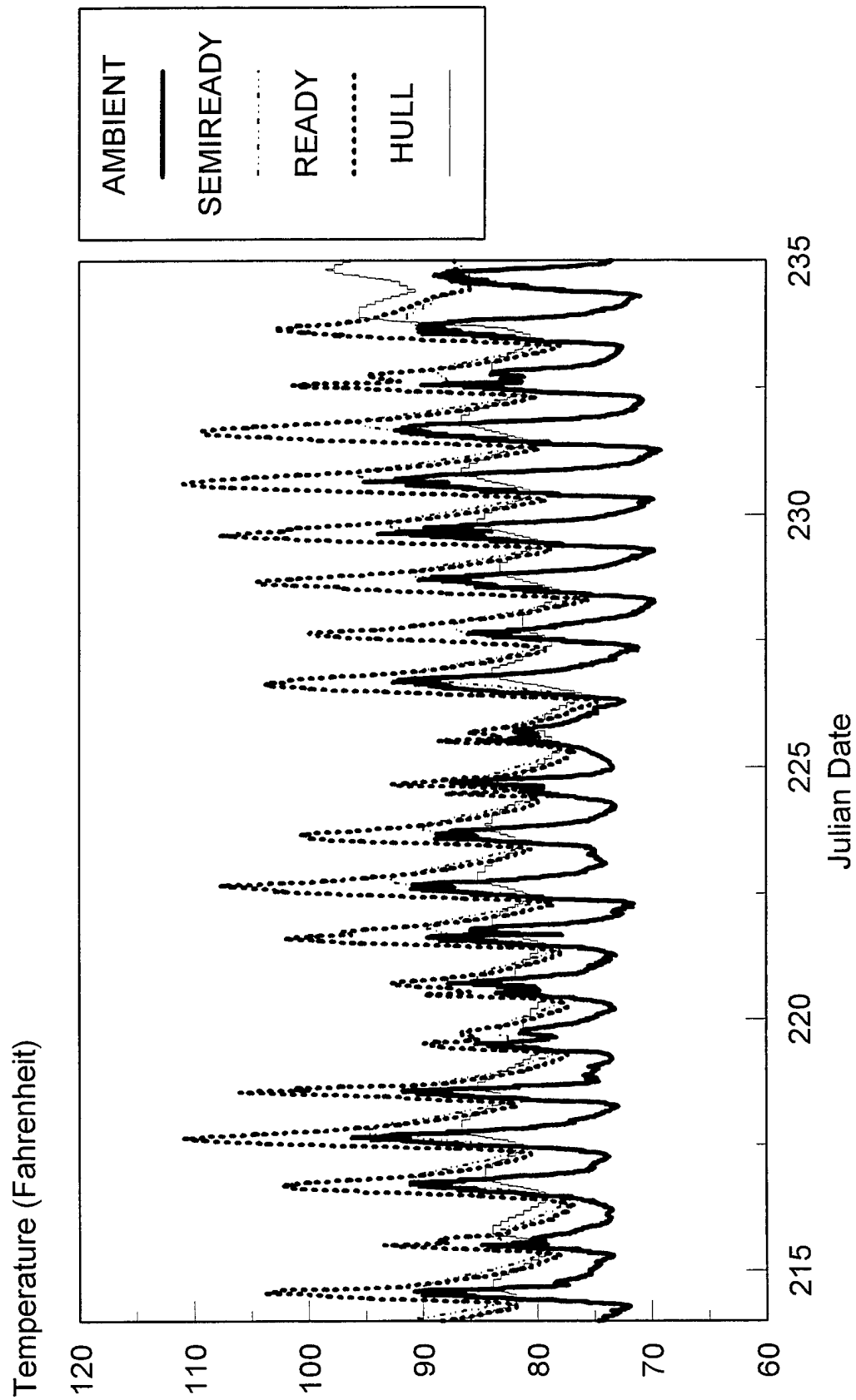
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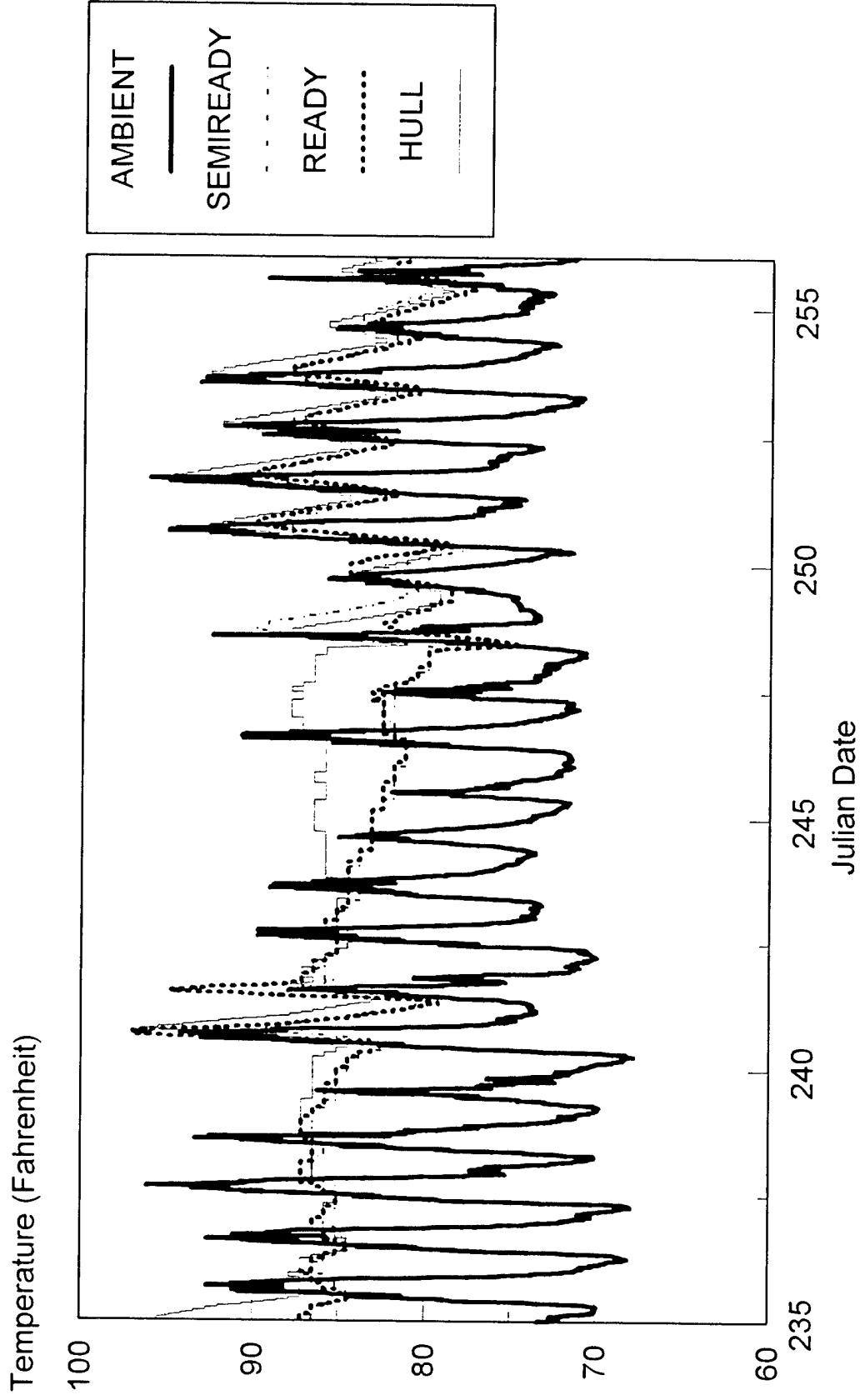
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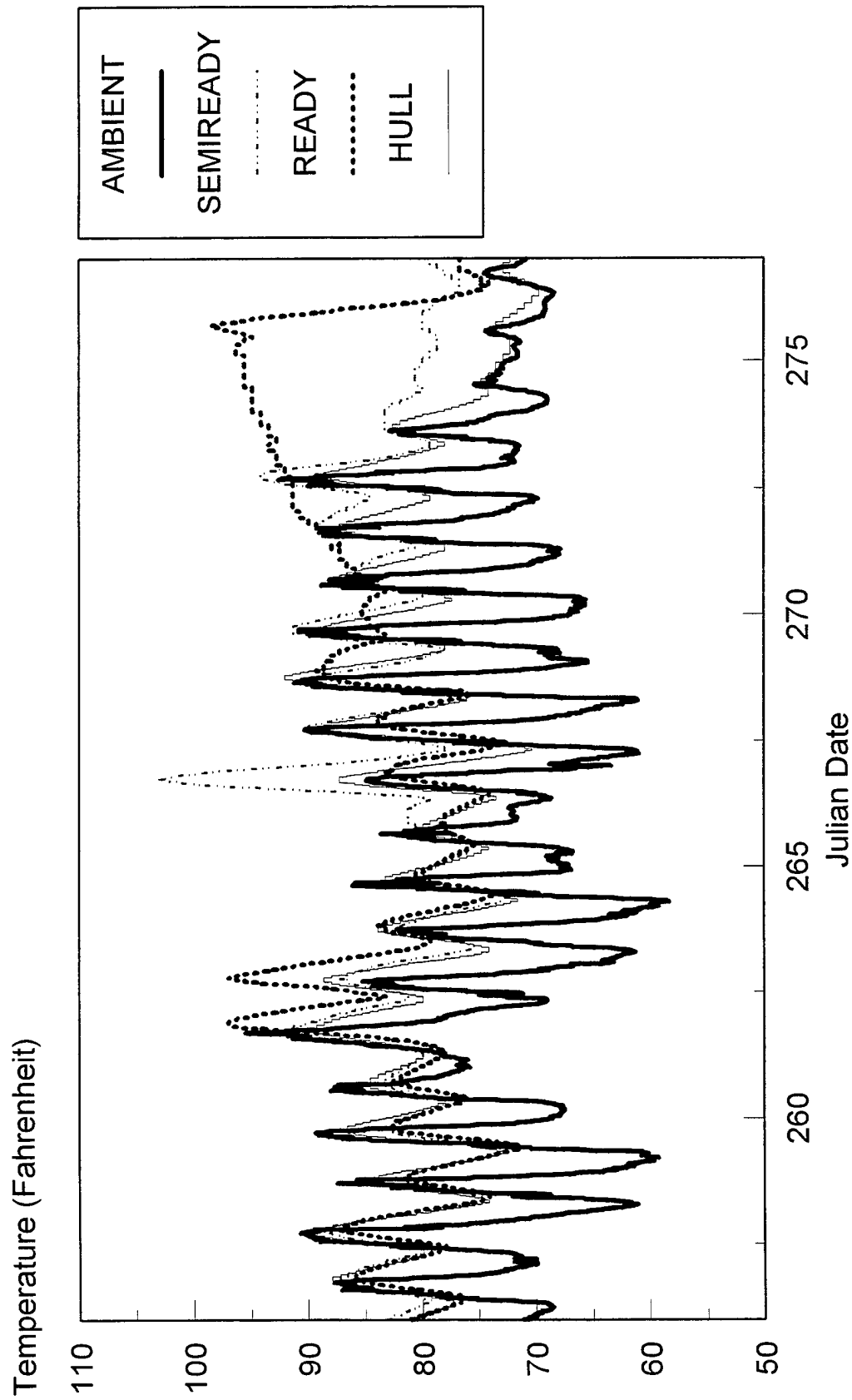
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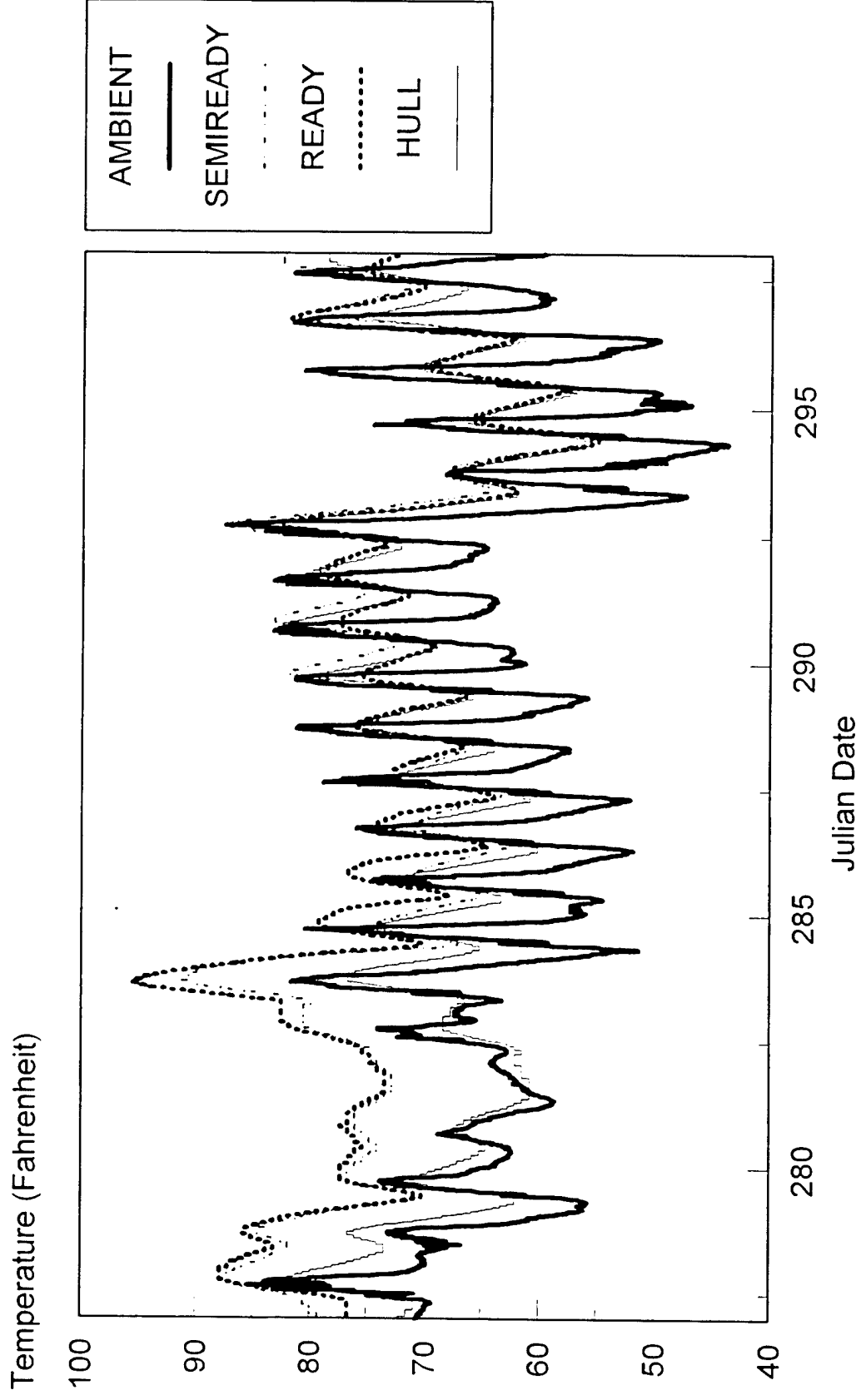
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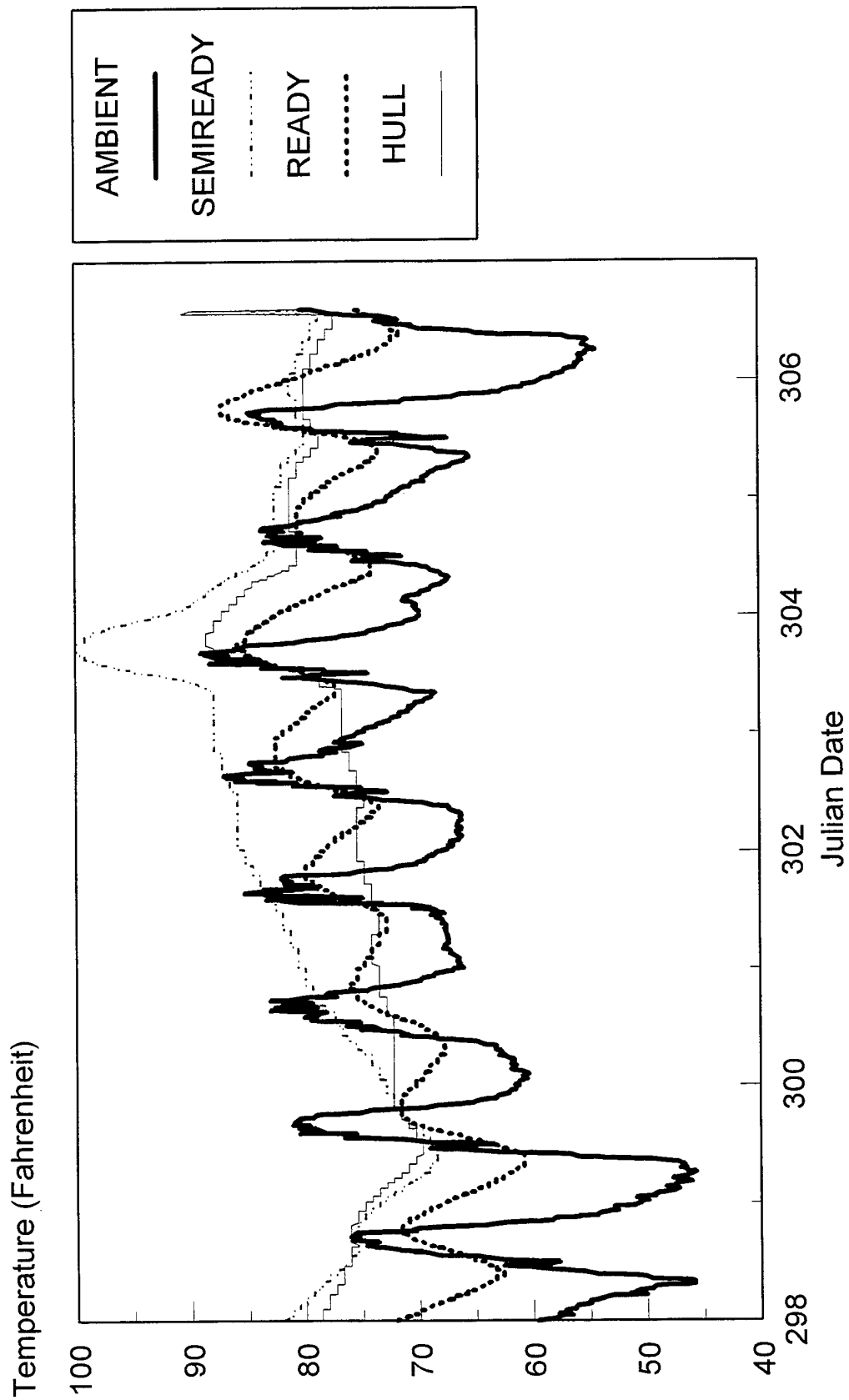
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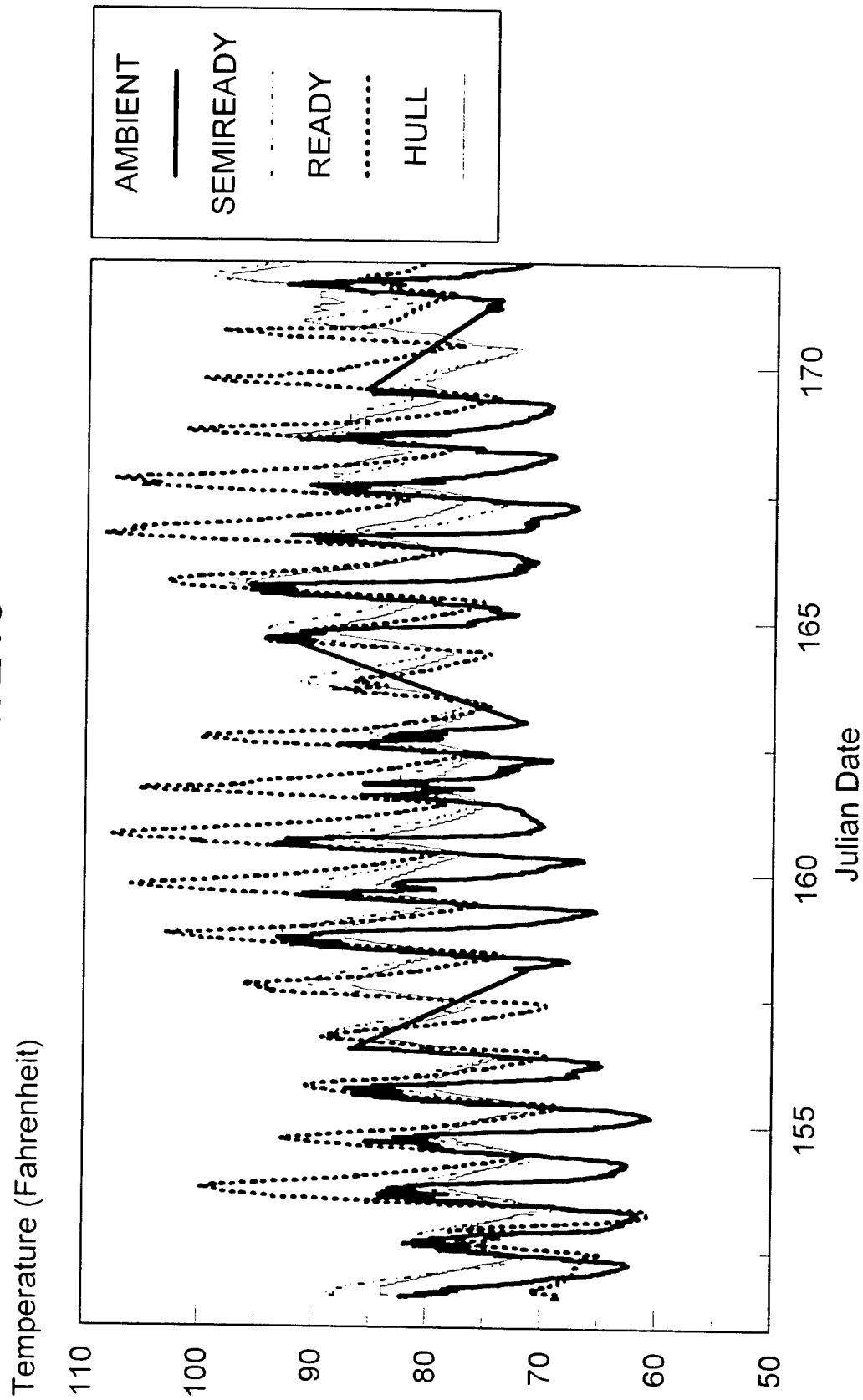
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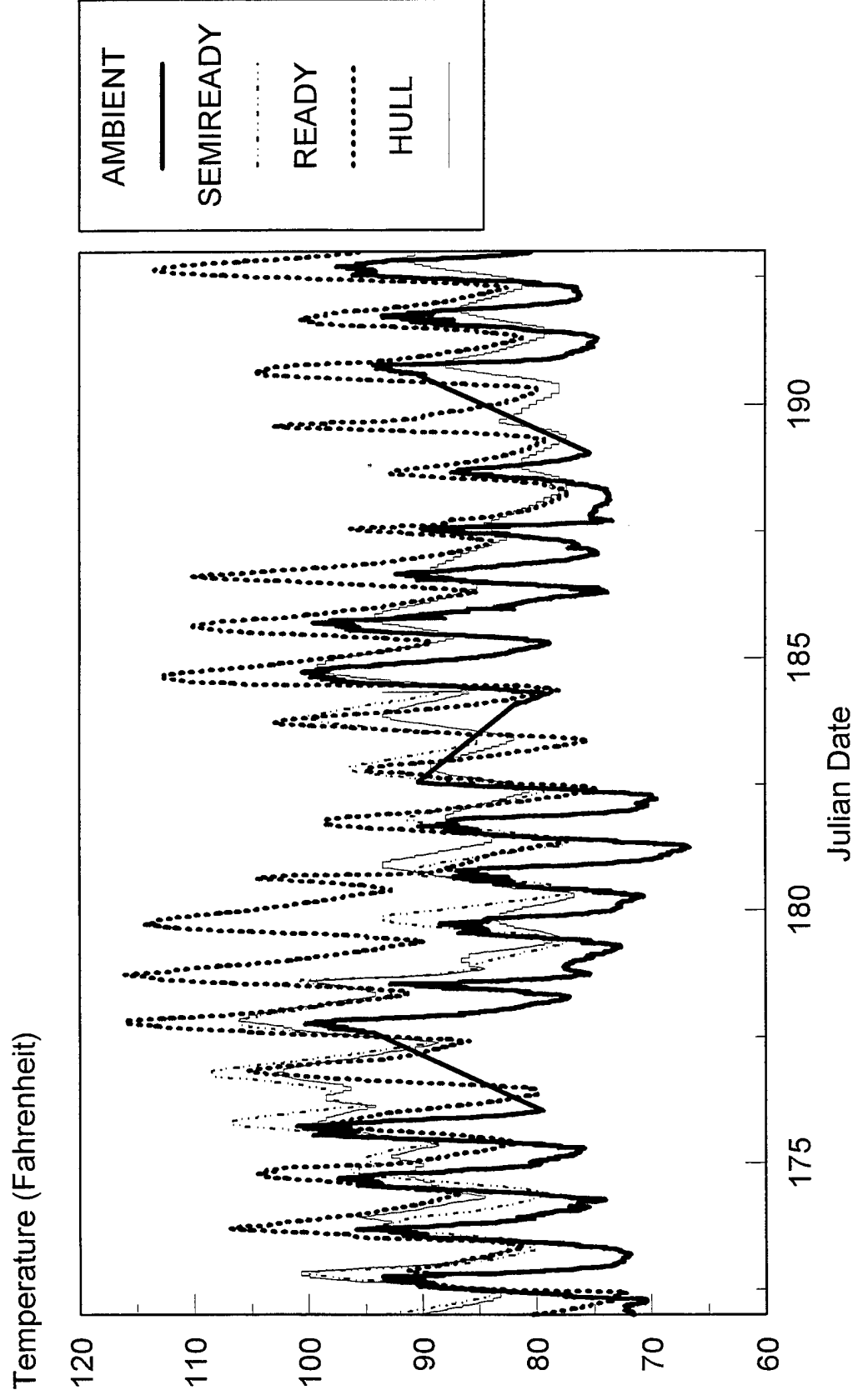
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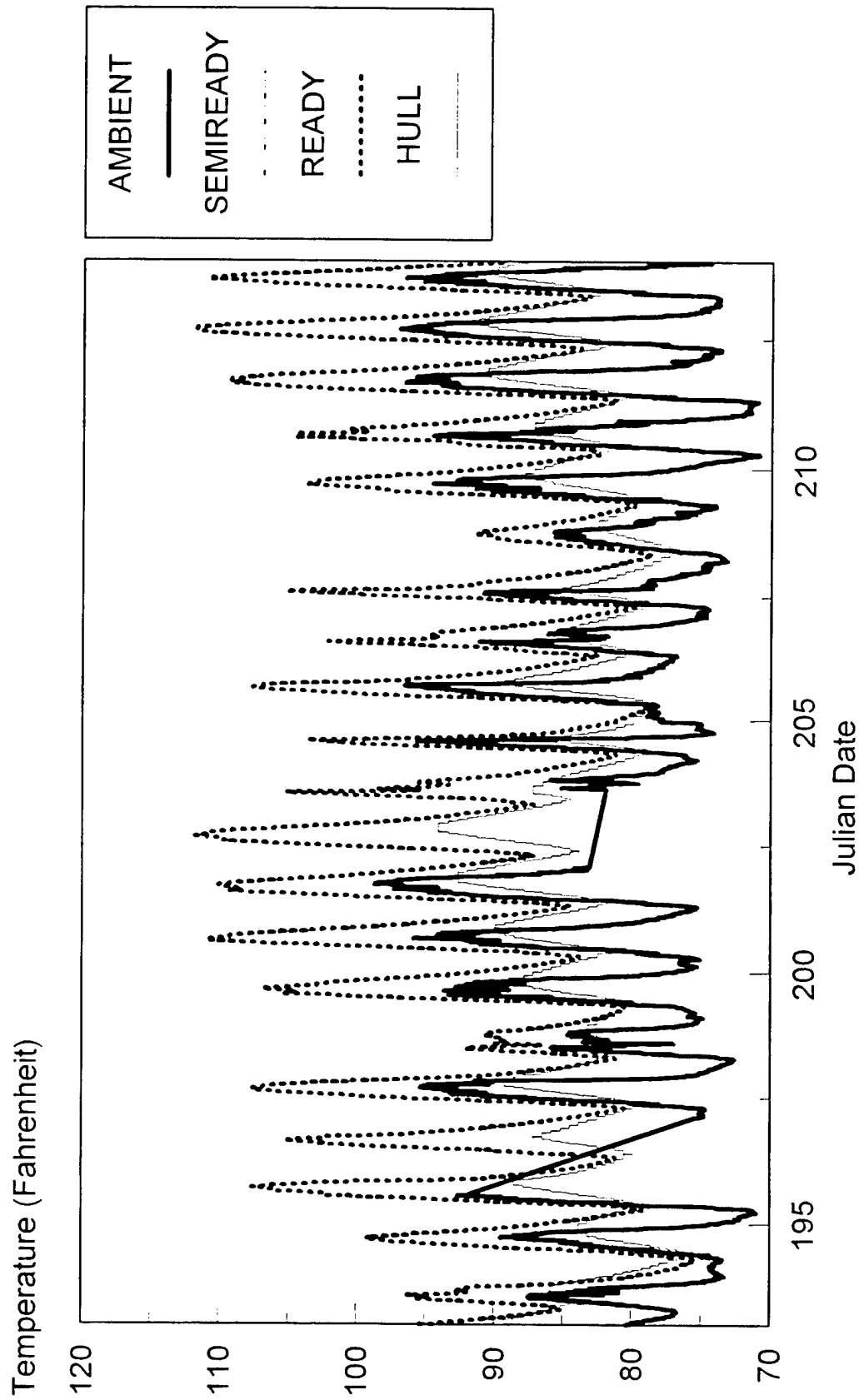
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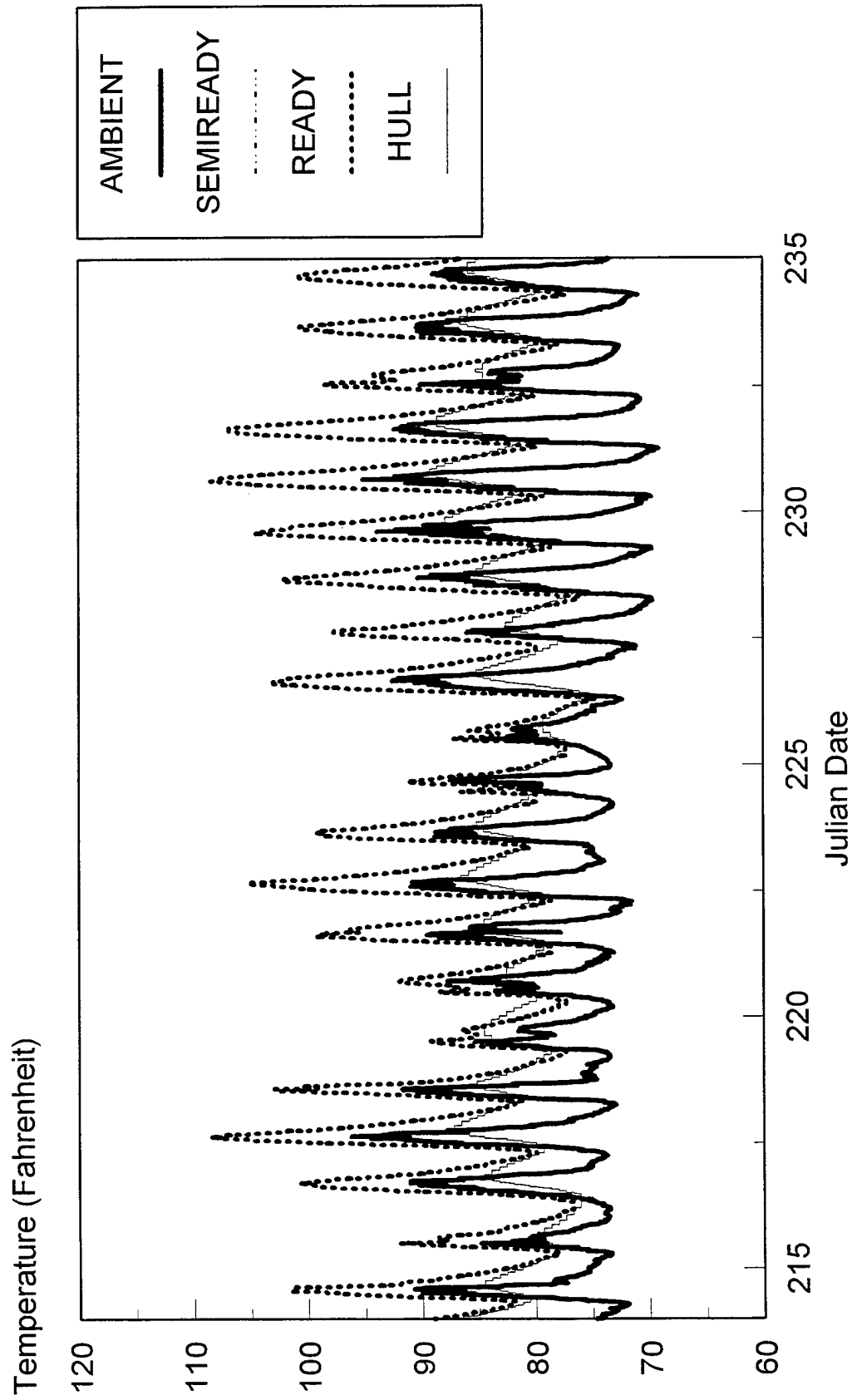
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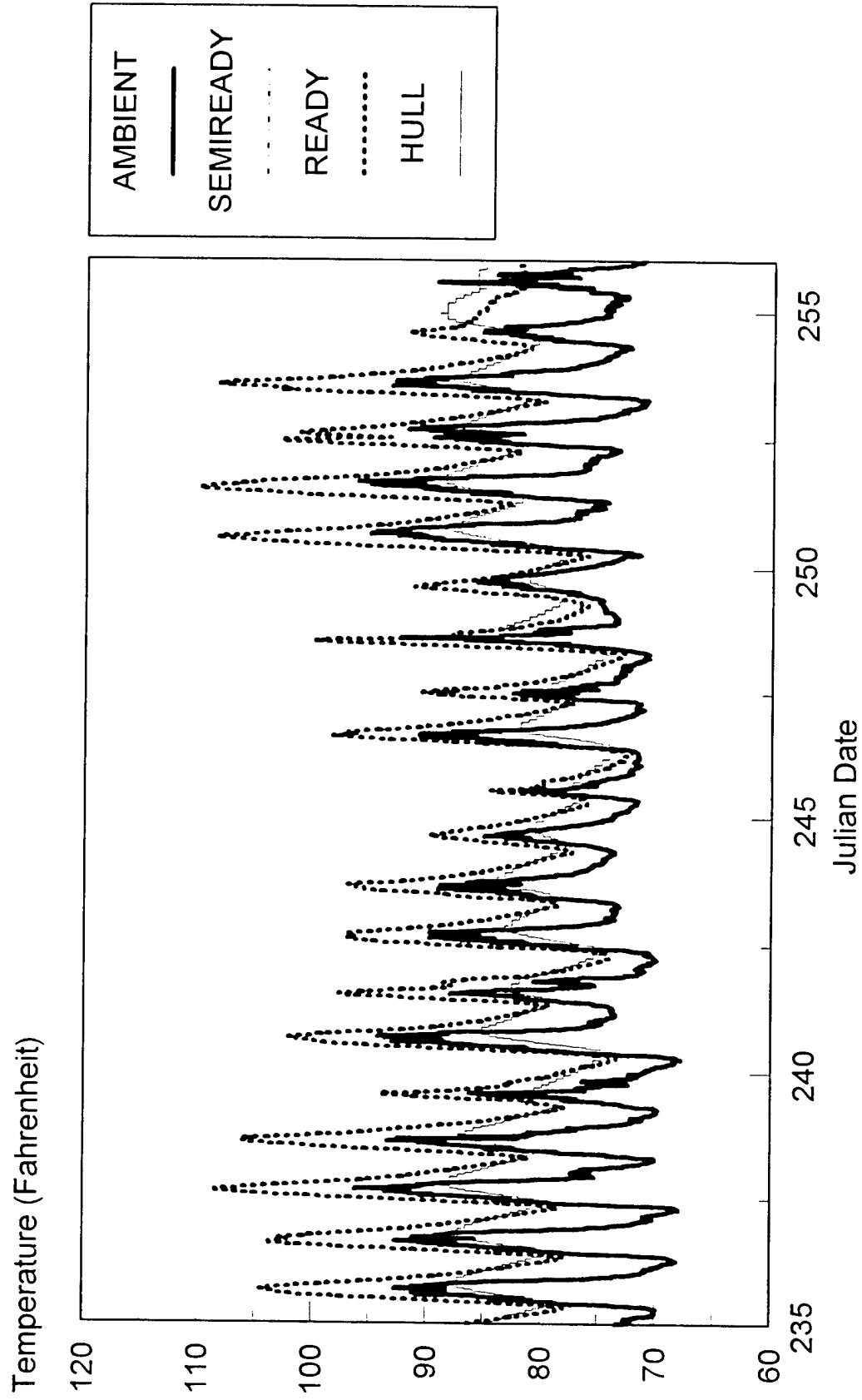
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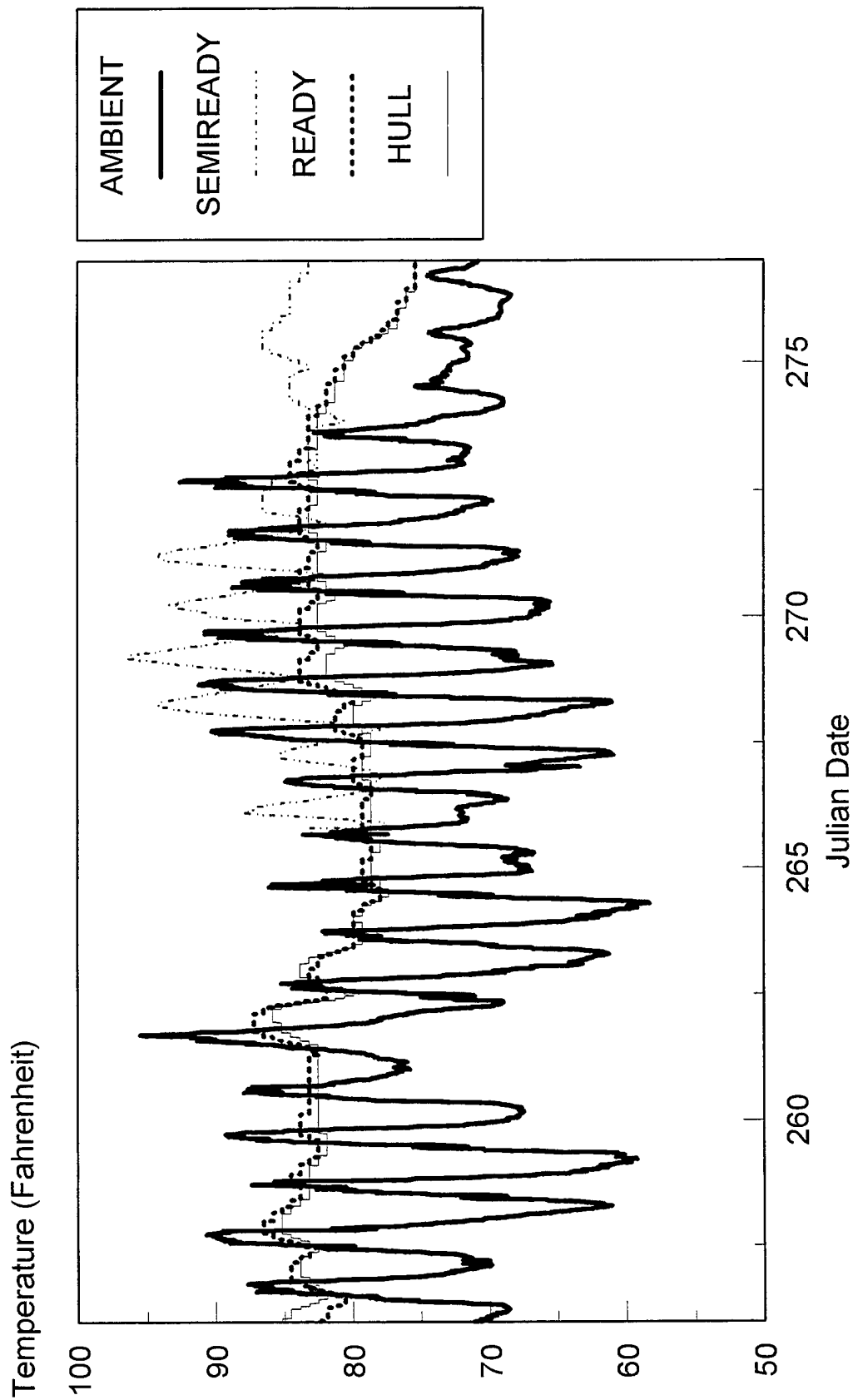
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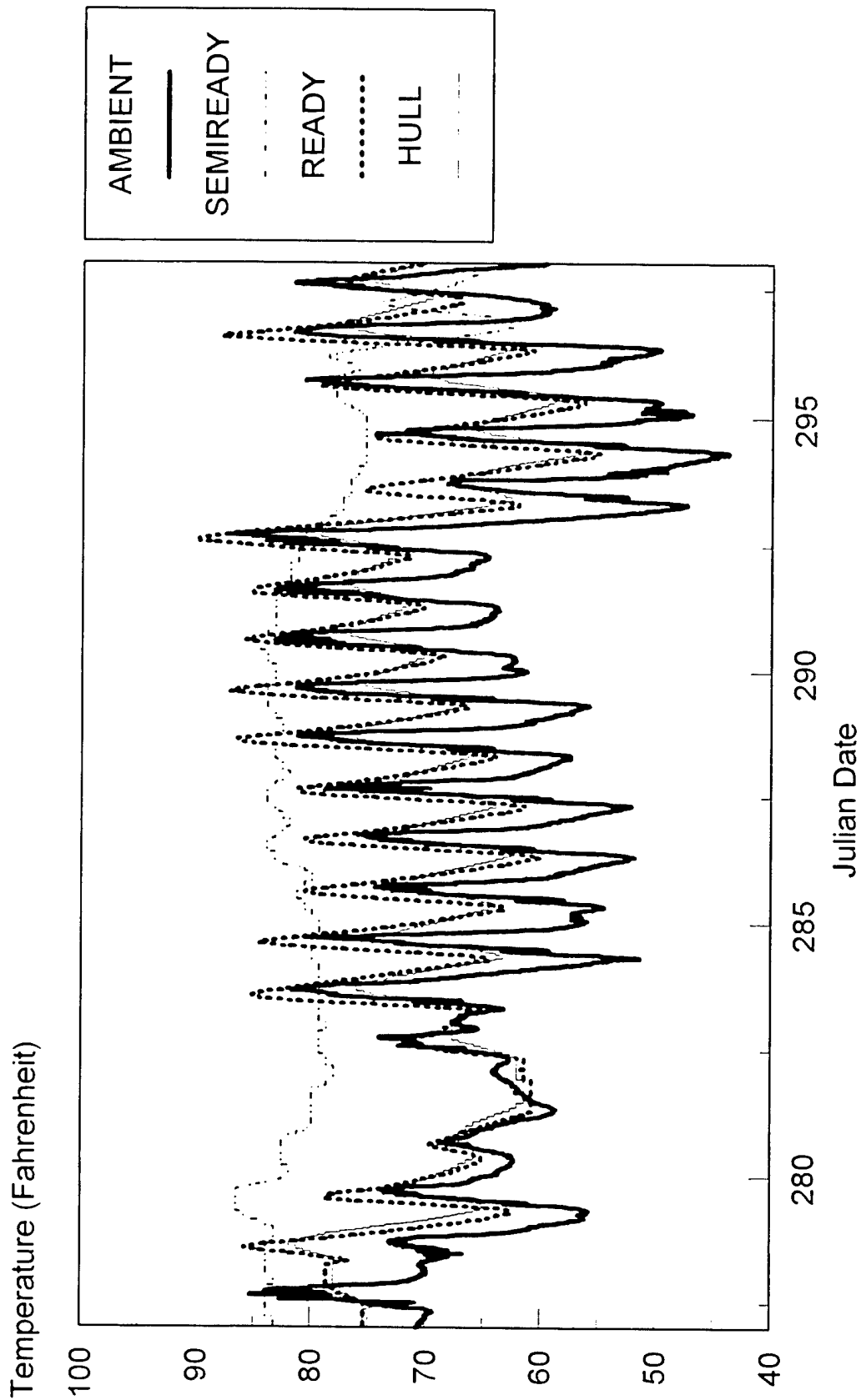
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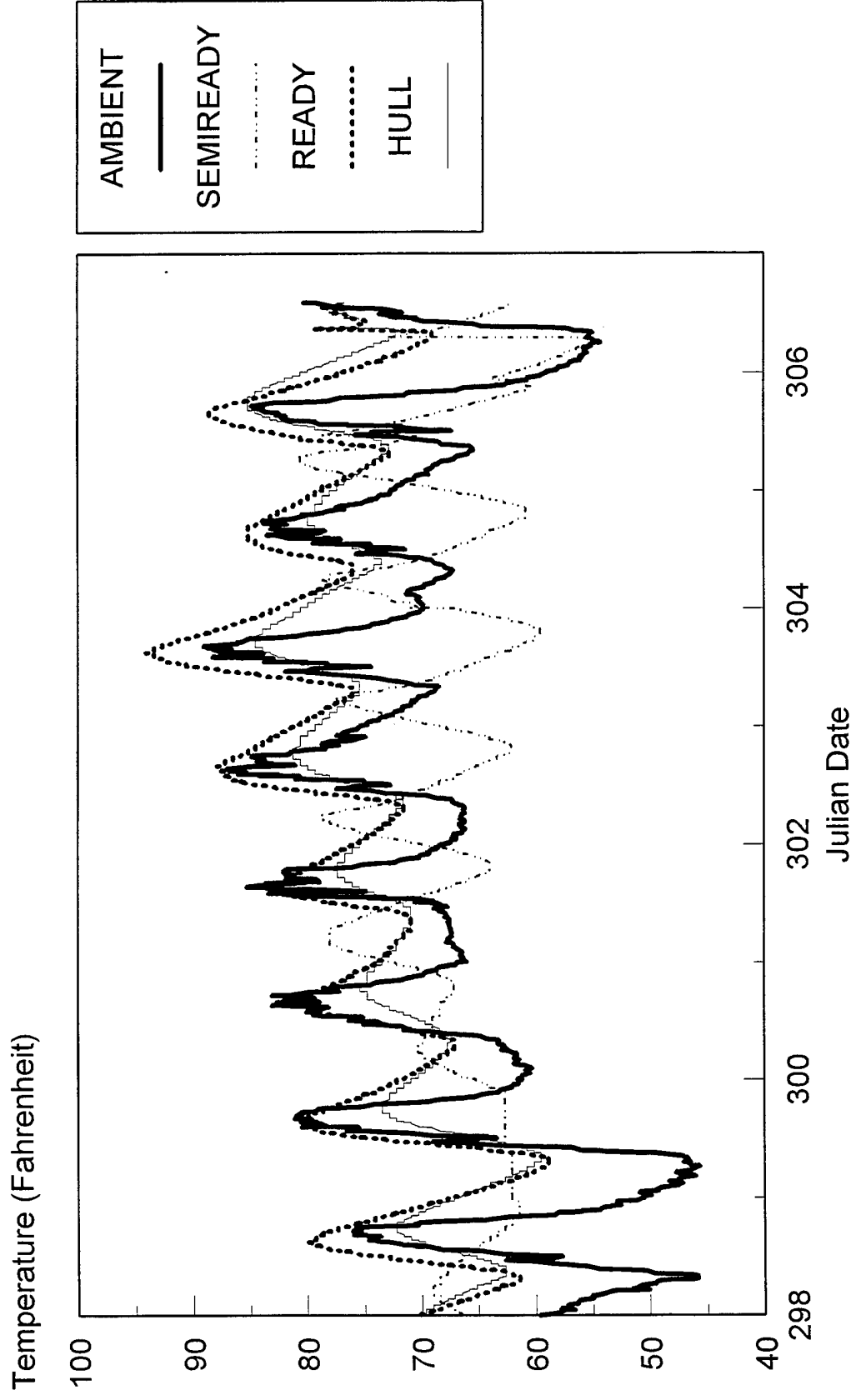
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Ft. Stewart, Georgia
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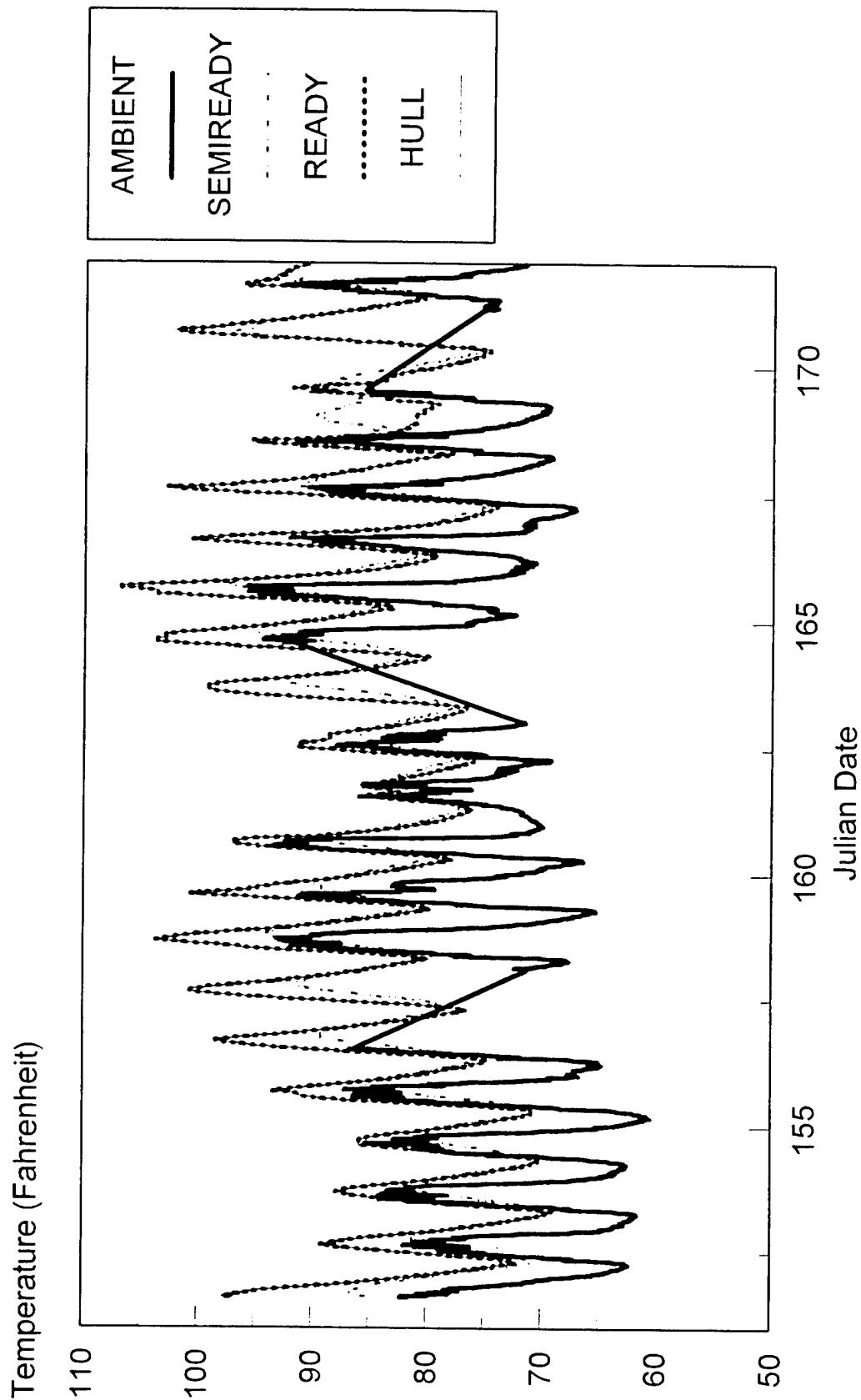
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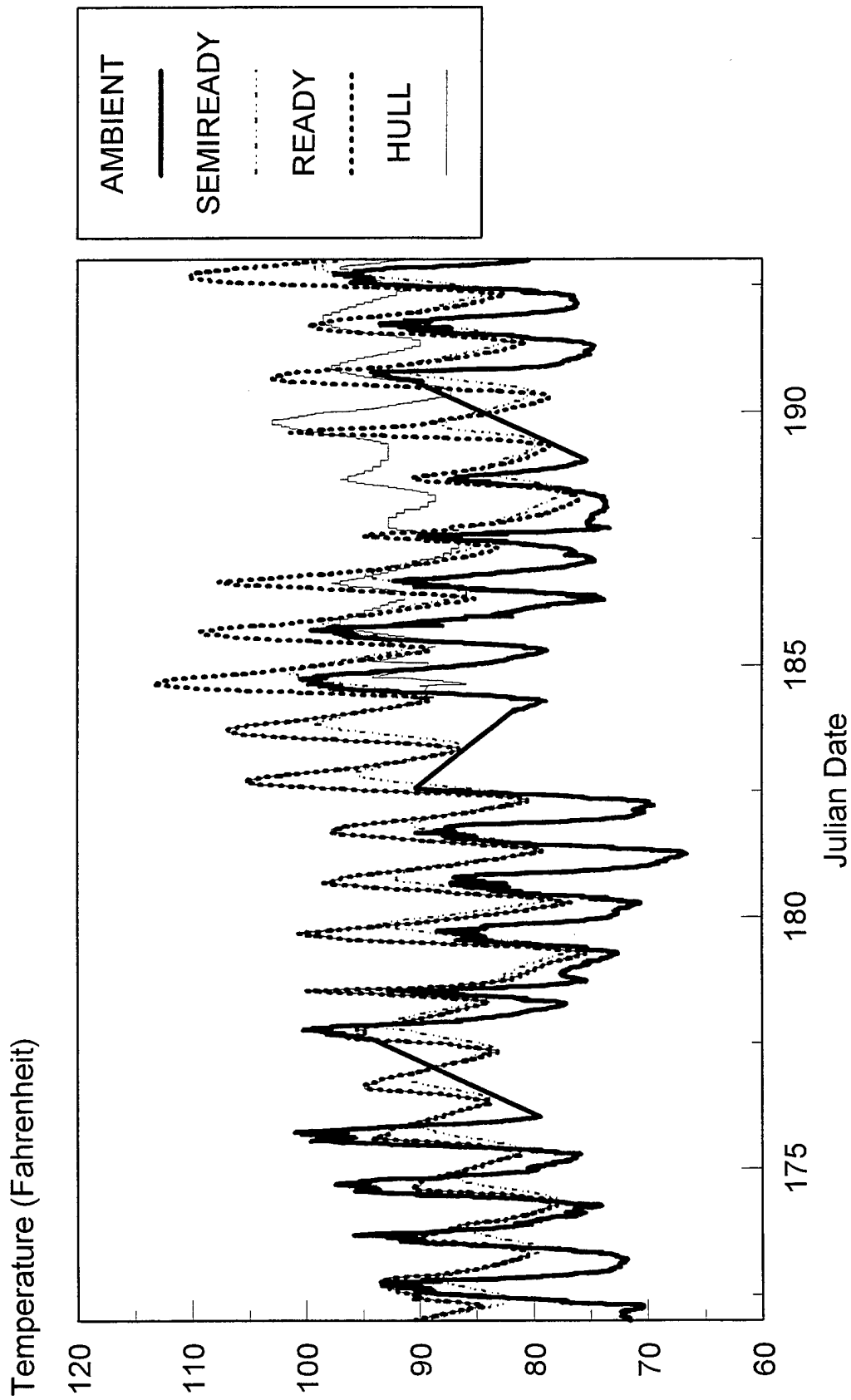
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Tank 210



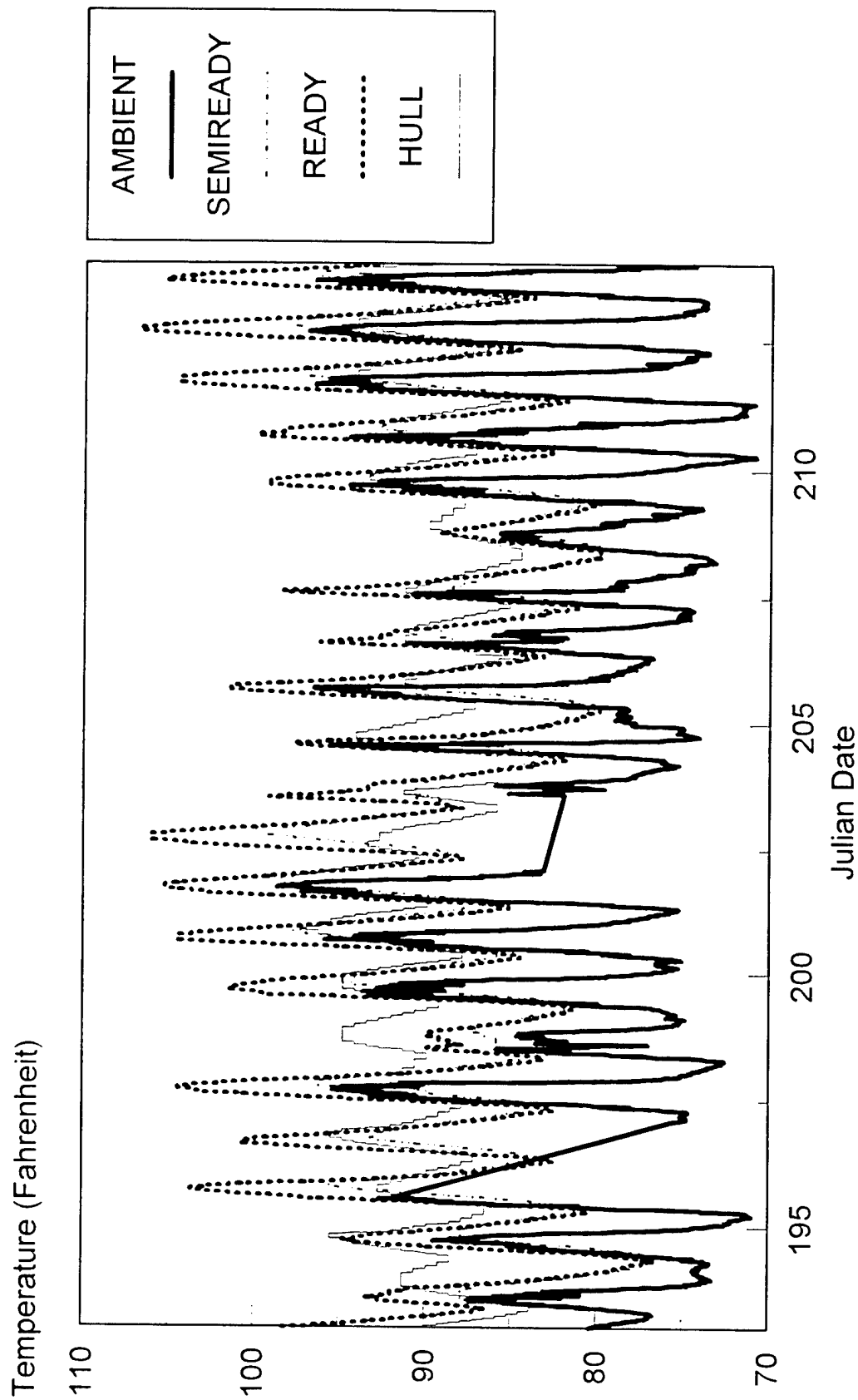
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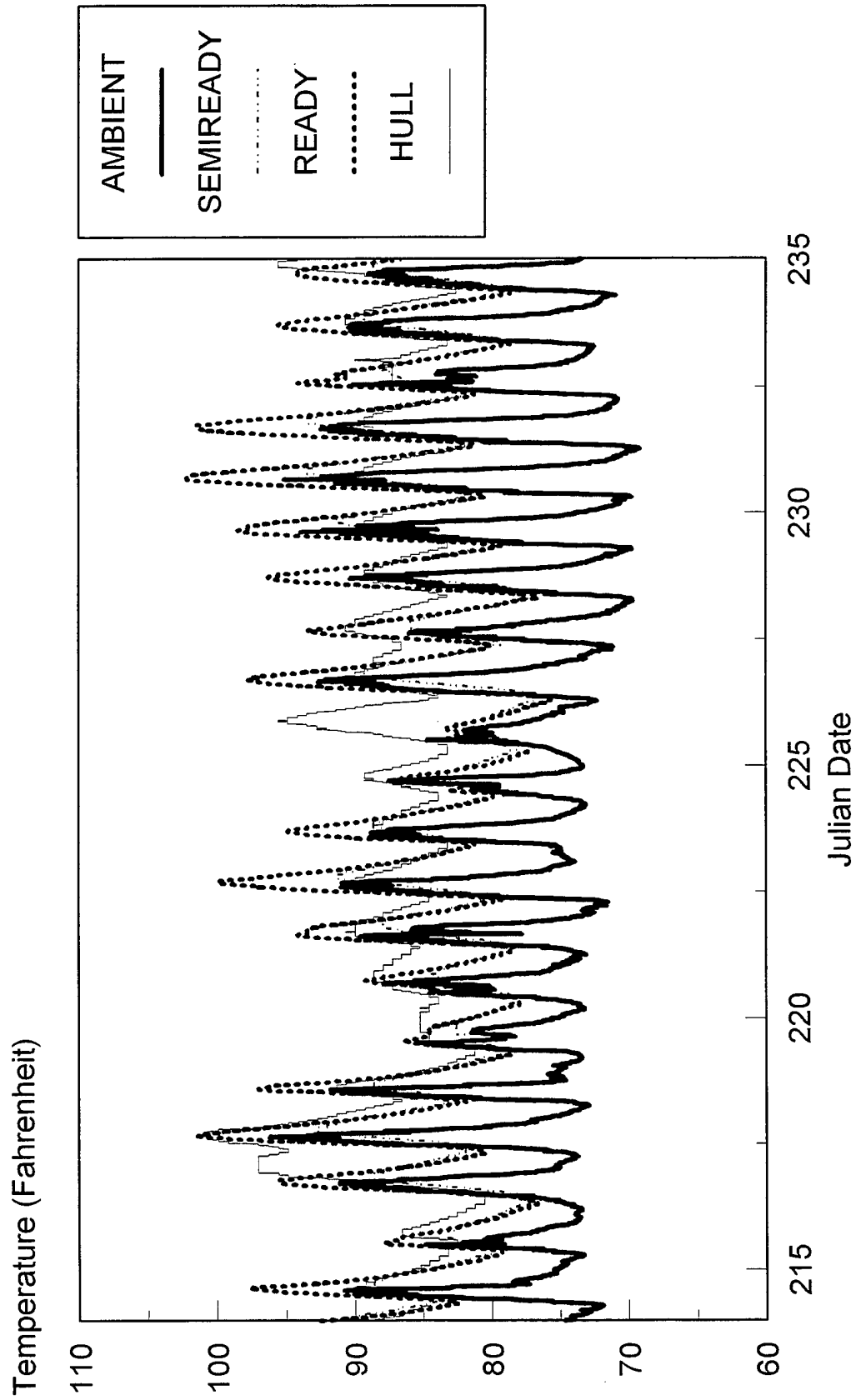
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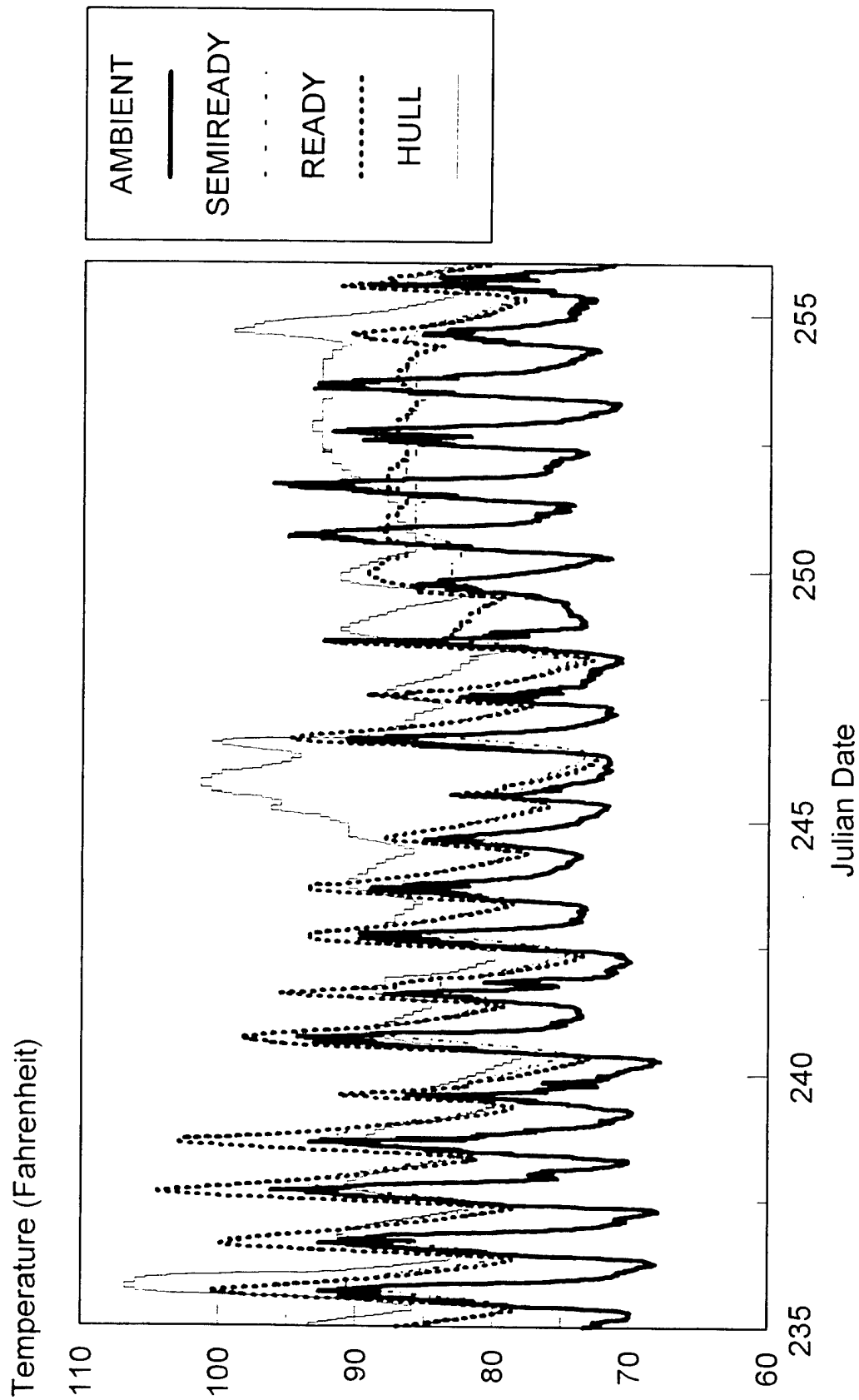
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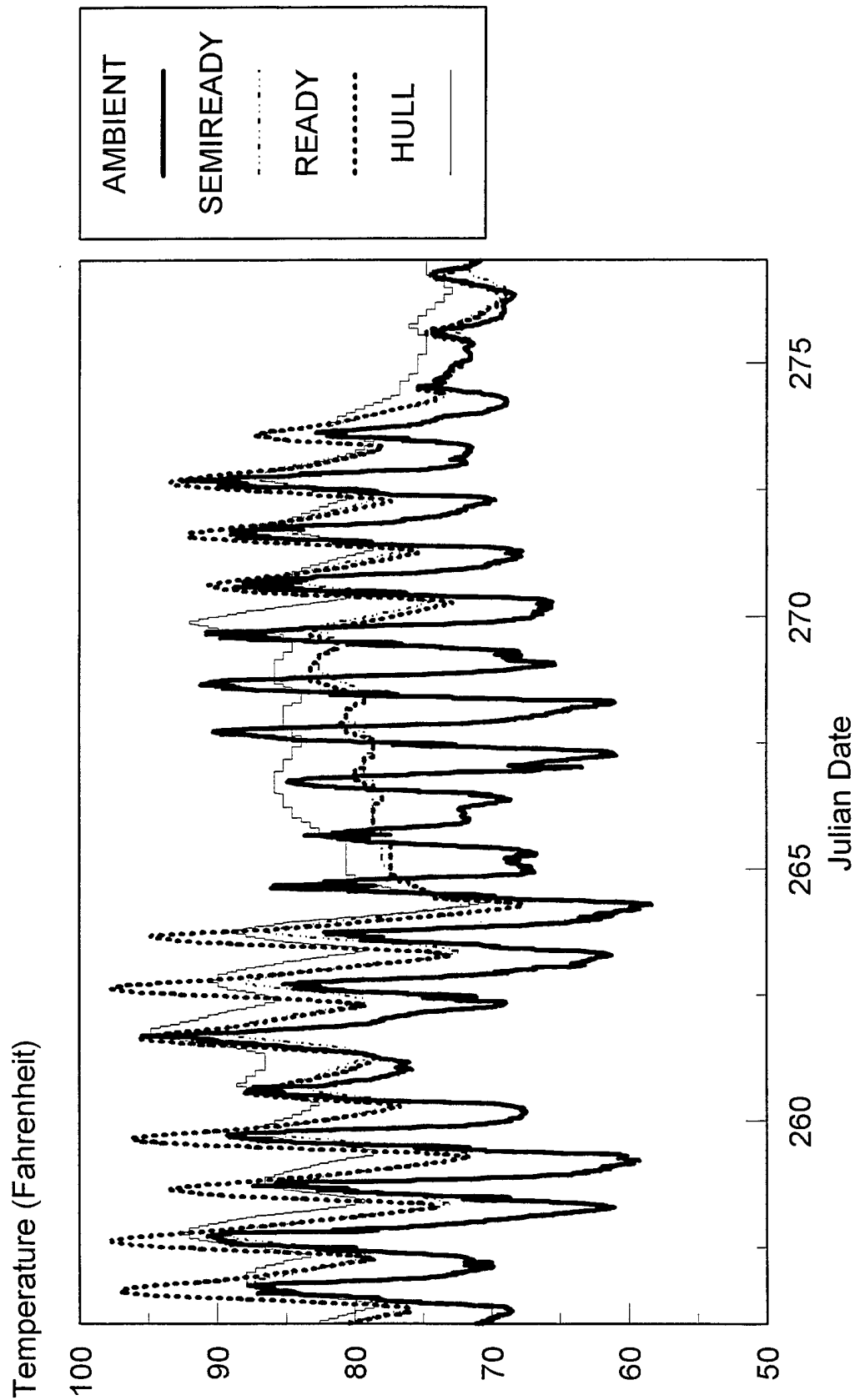
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Tank 213



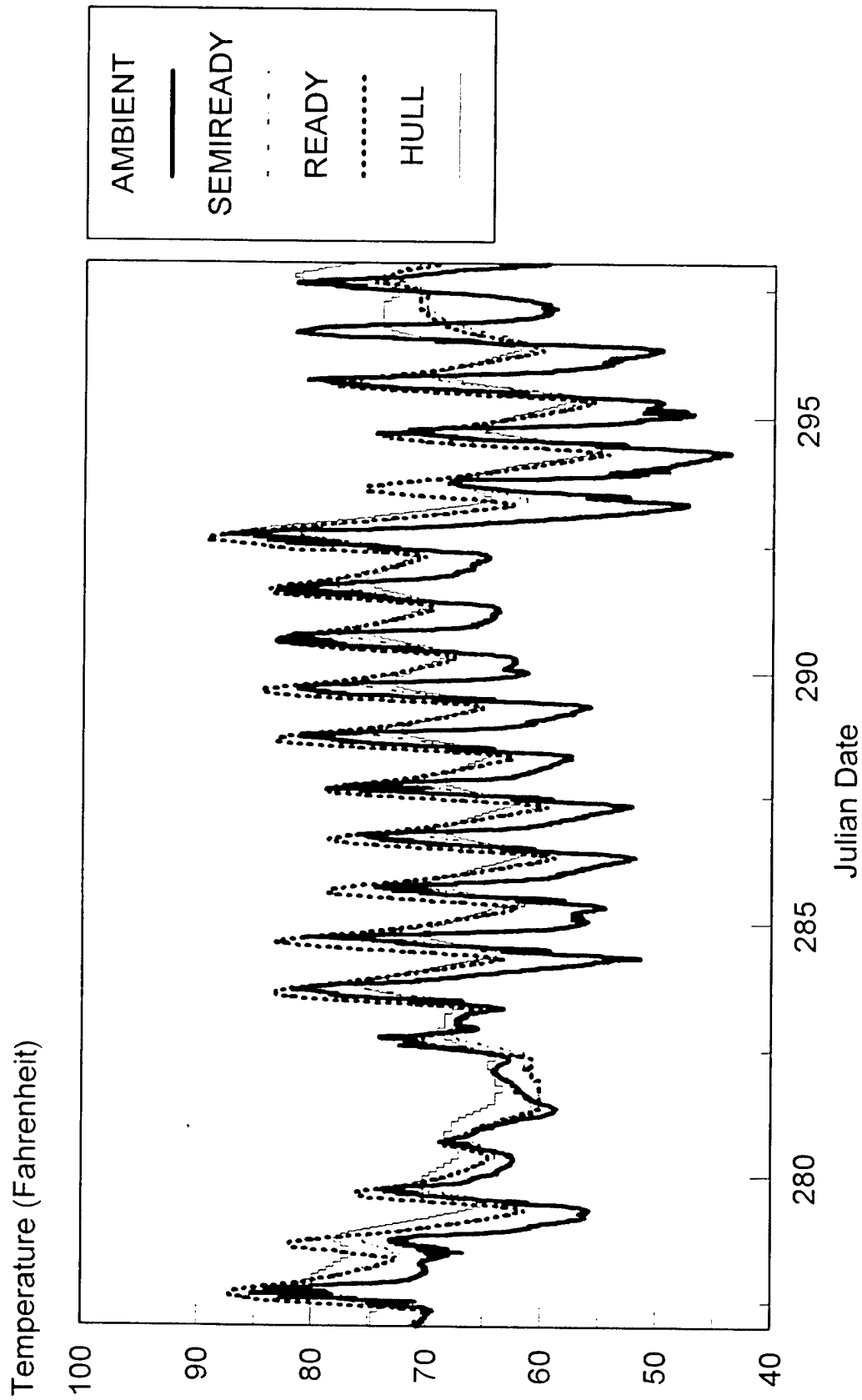
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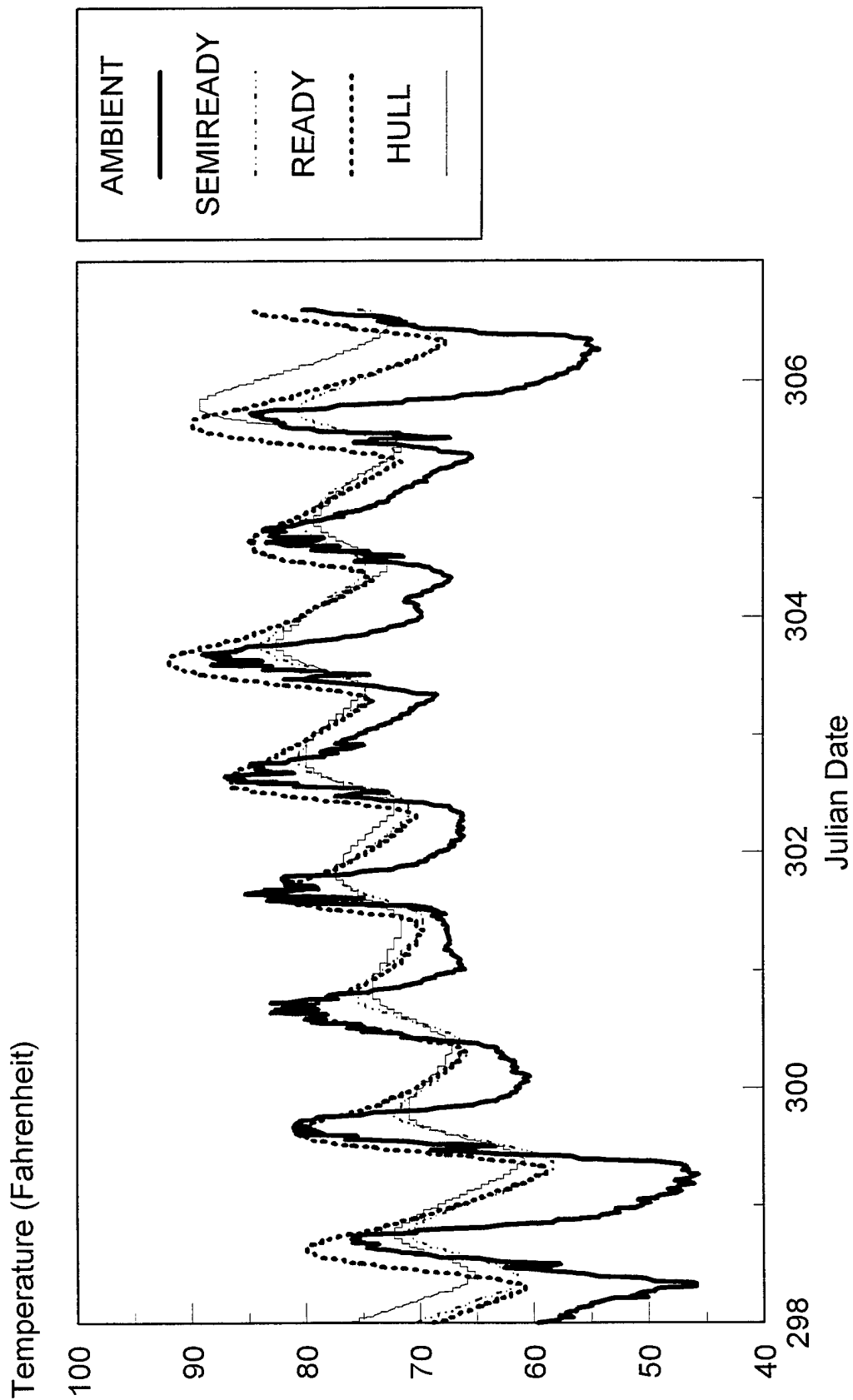
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Ft. Stewart, Georgia
Tank 213



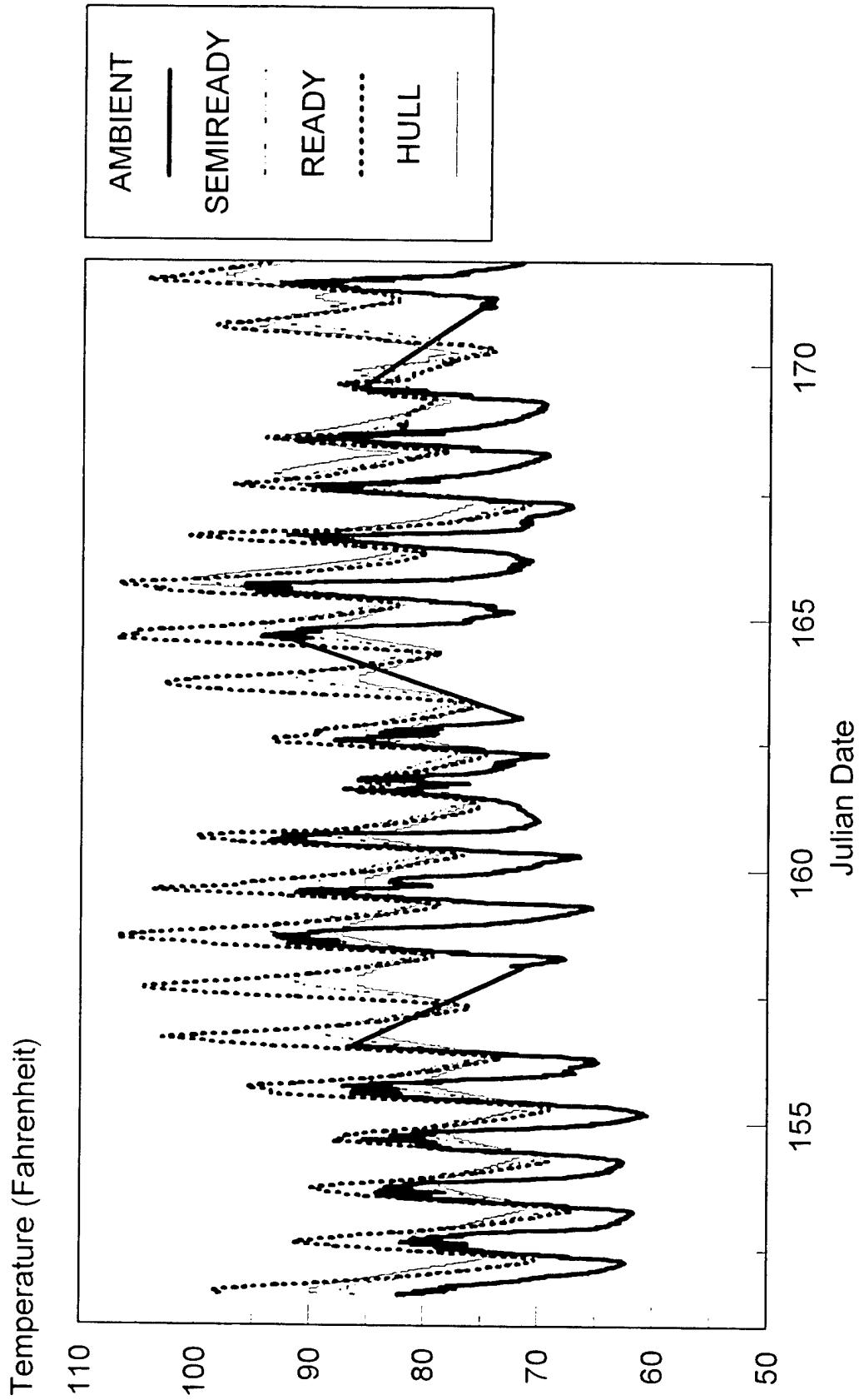
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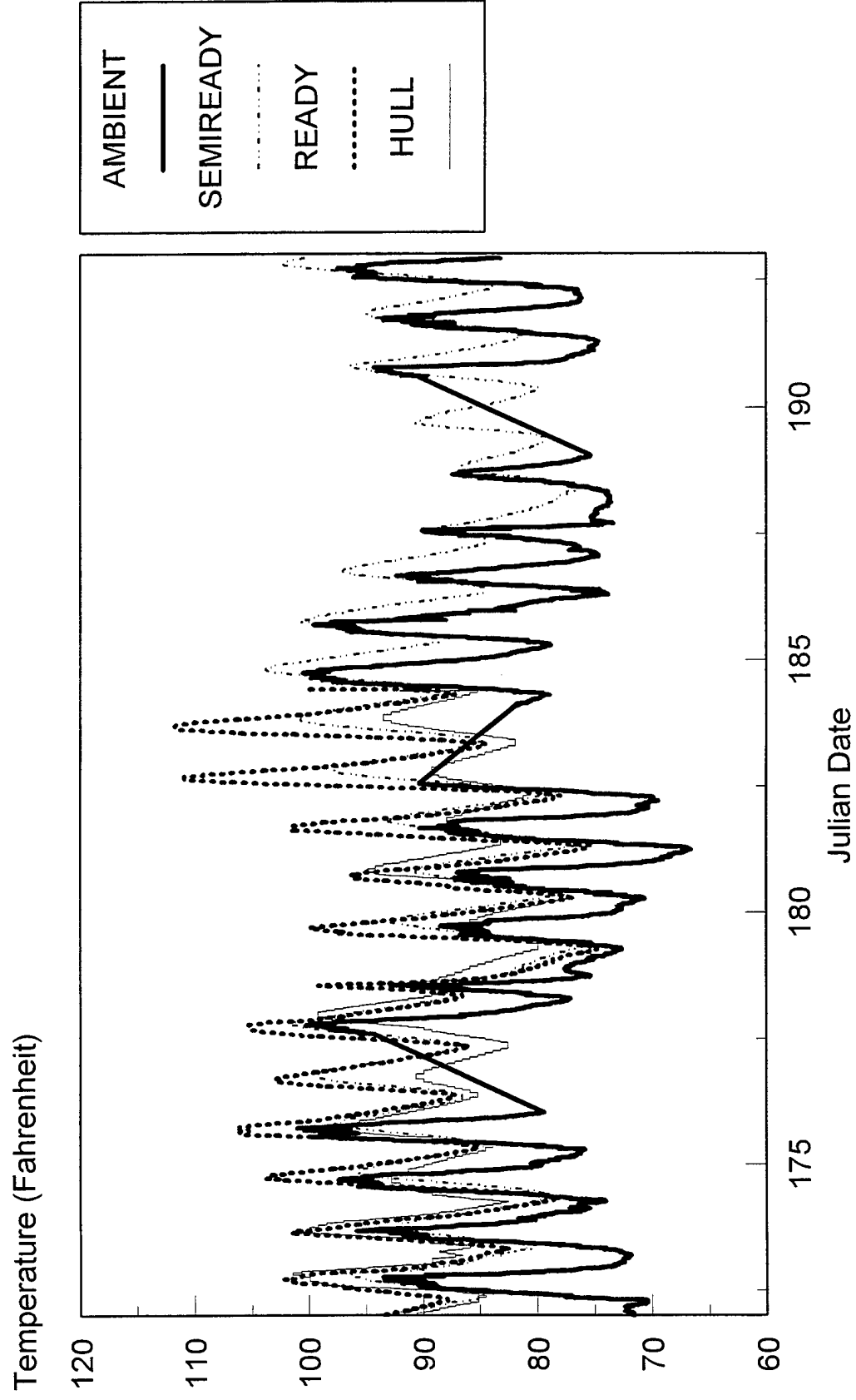
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 213



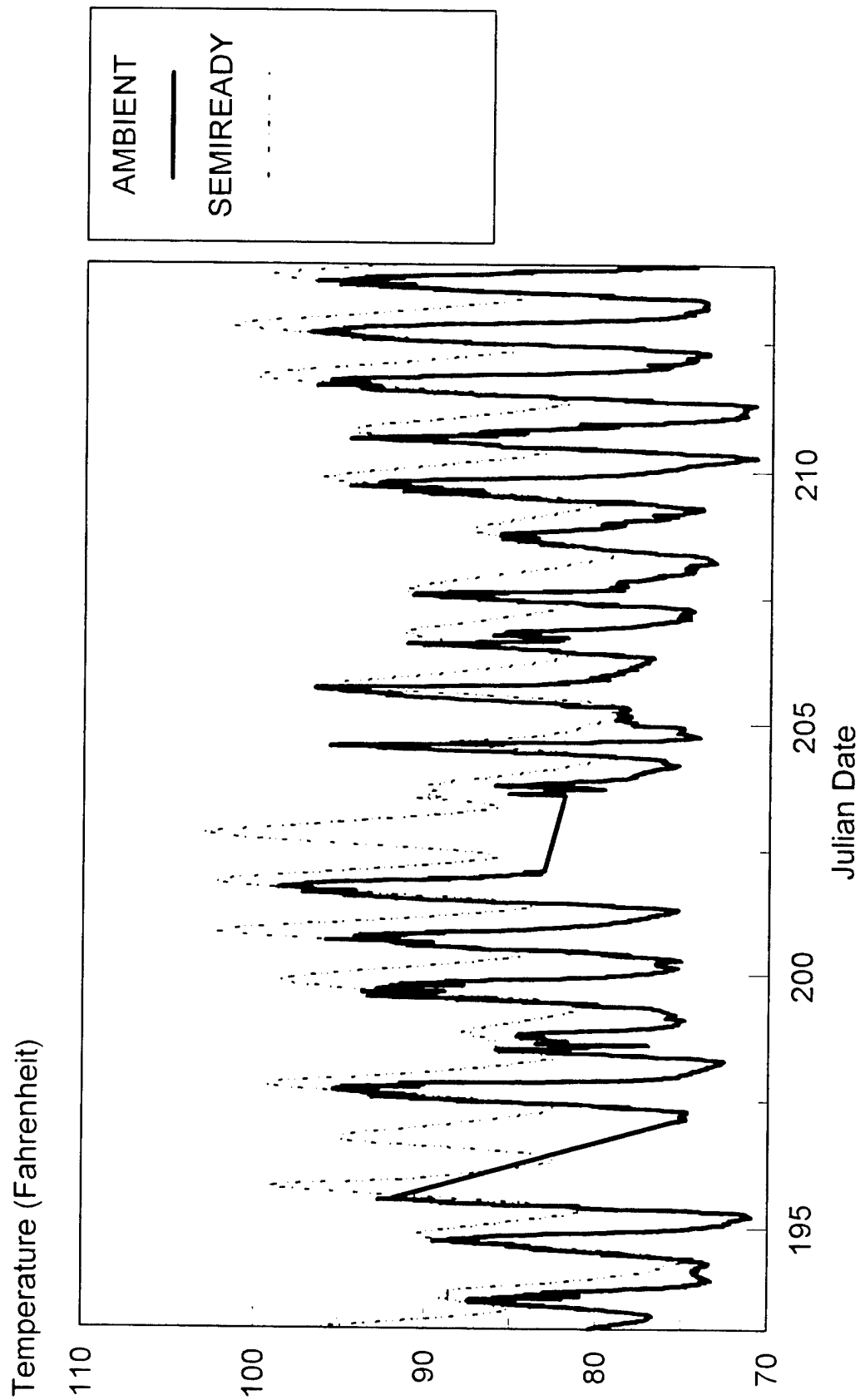
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



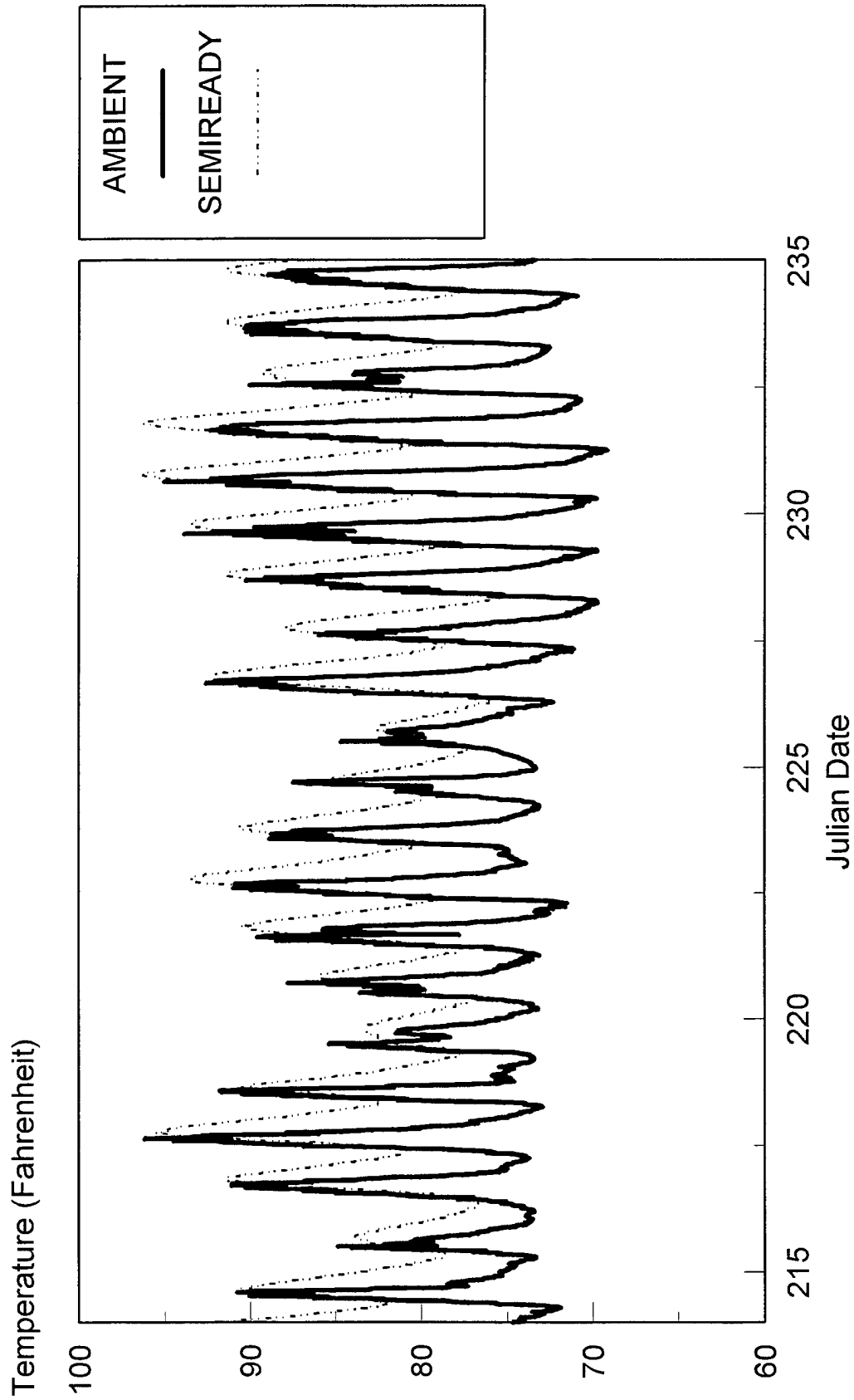
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



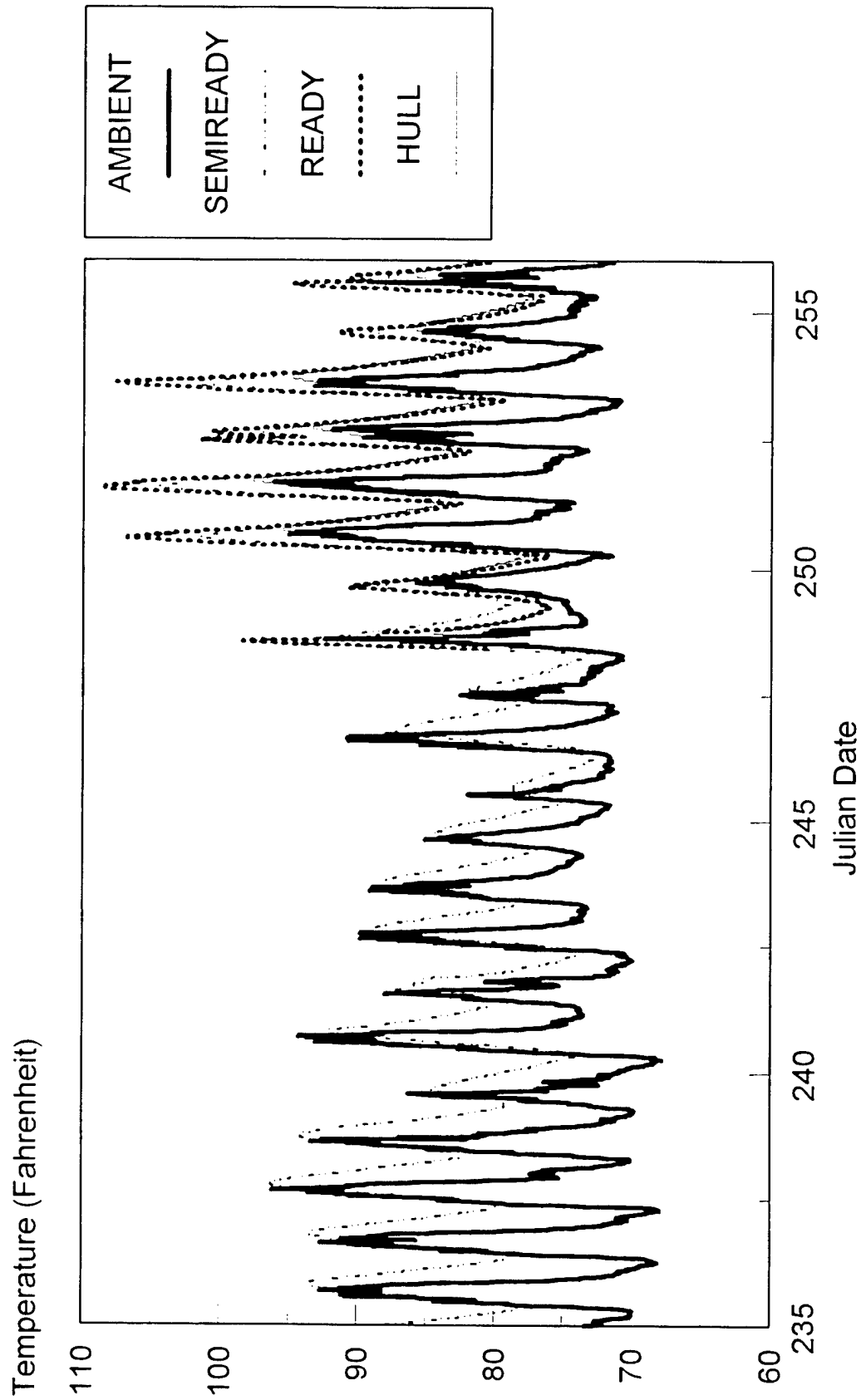
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



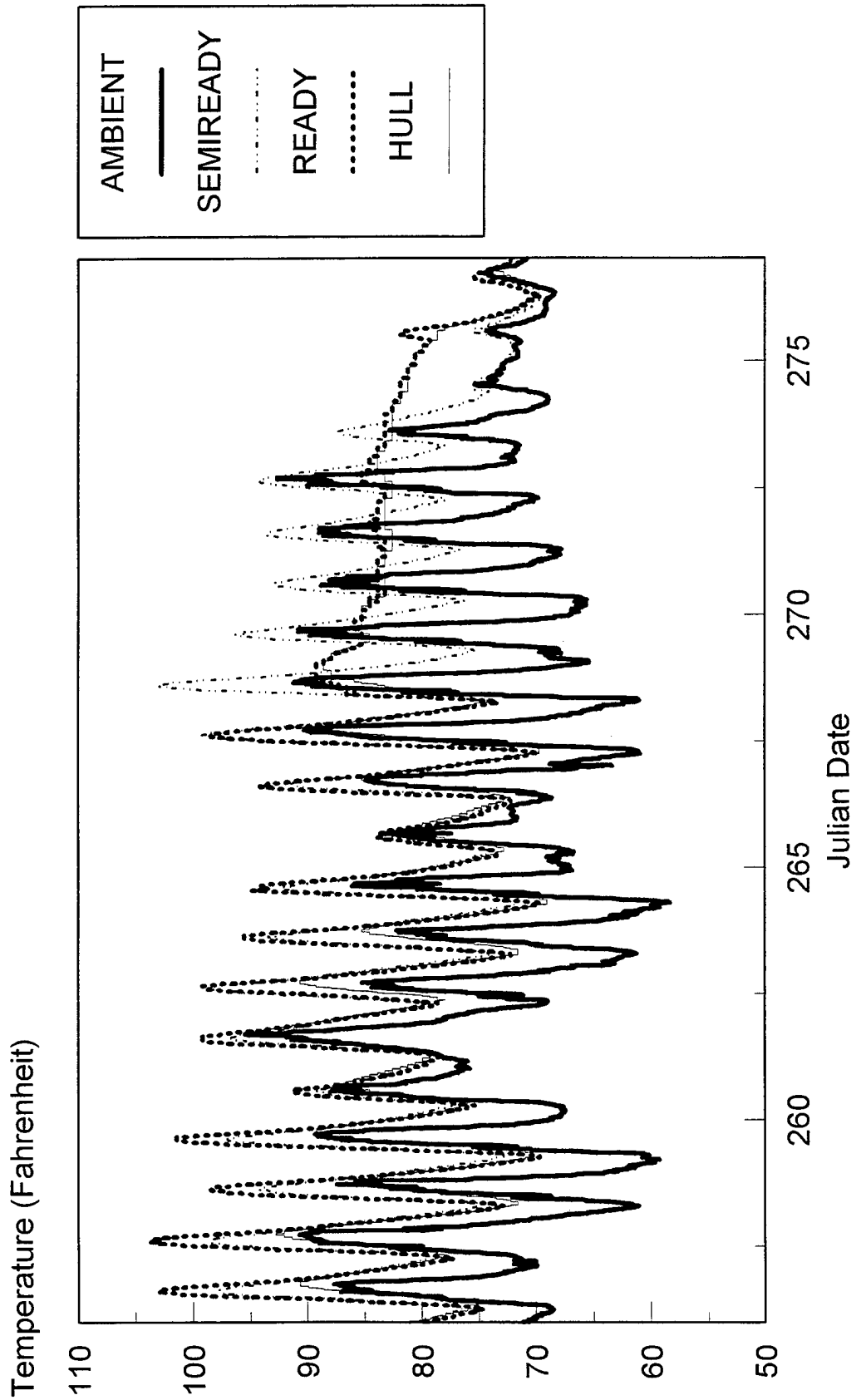
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



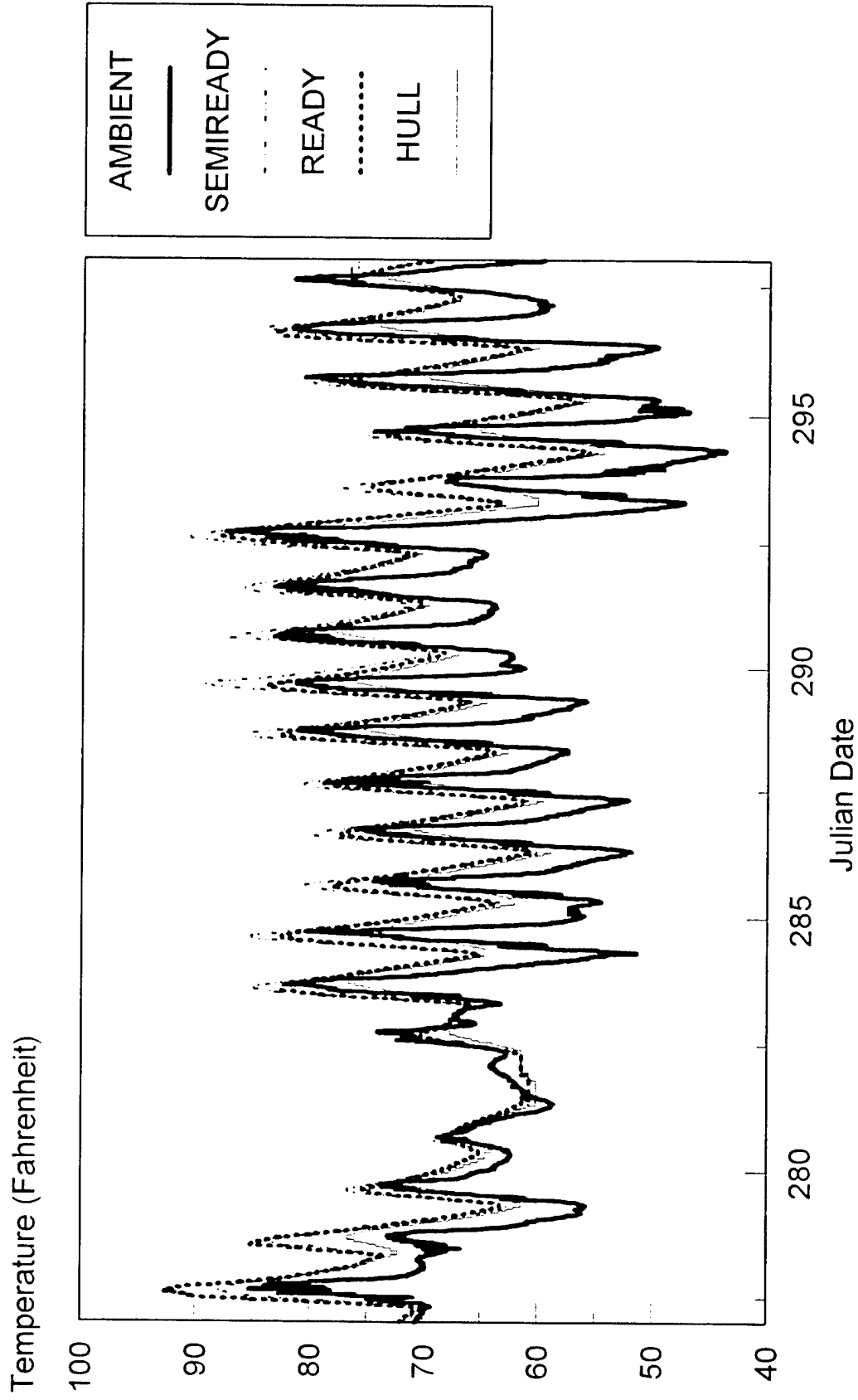
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



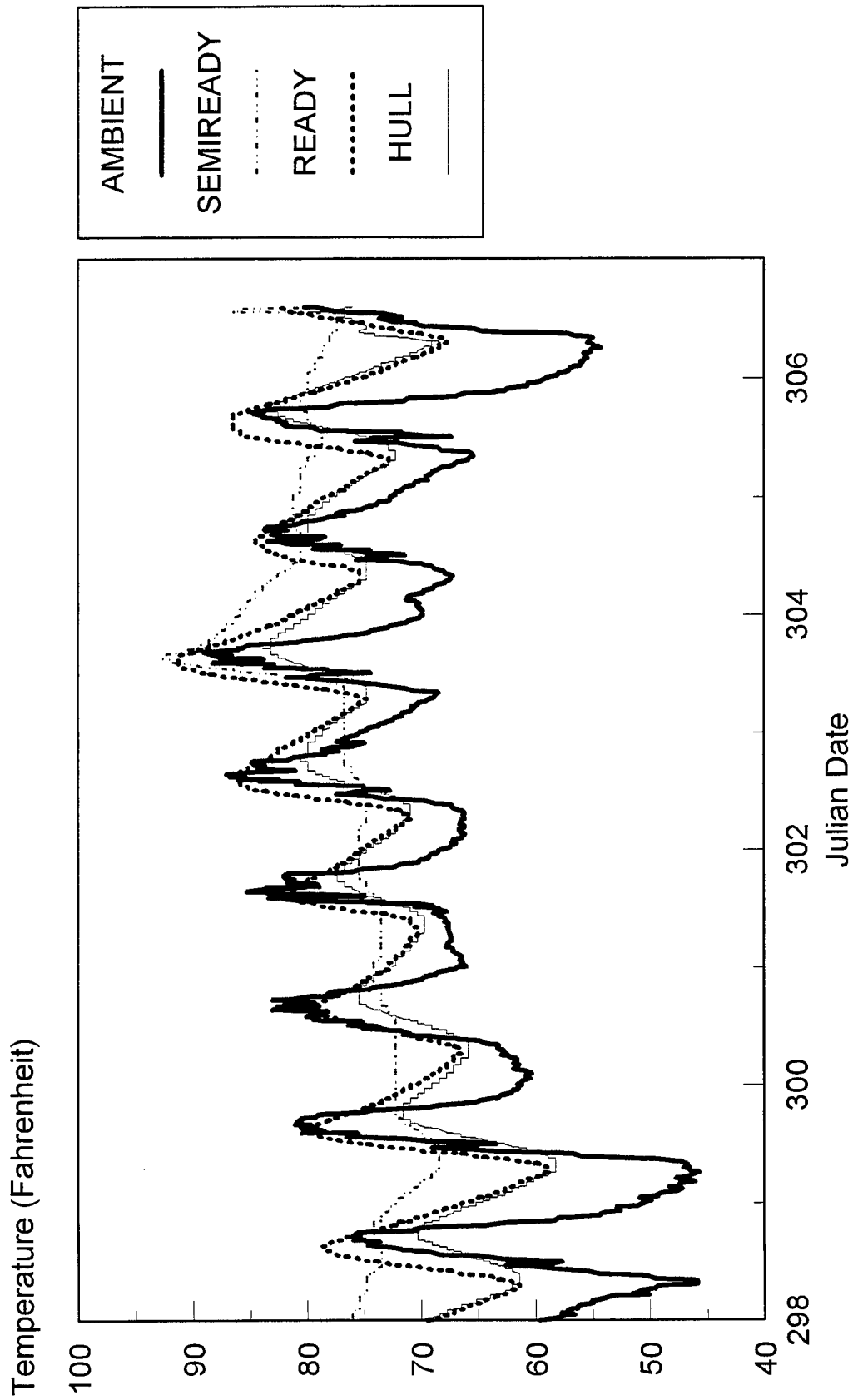
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 219



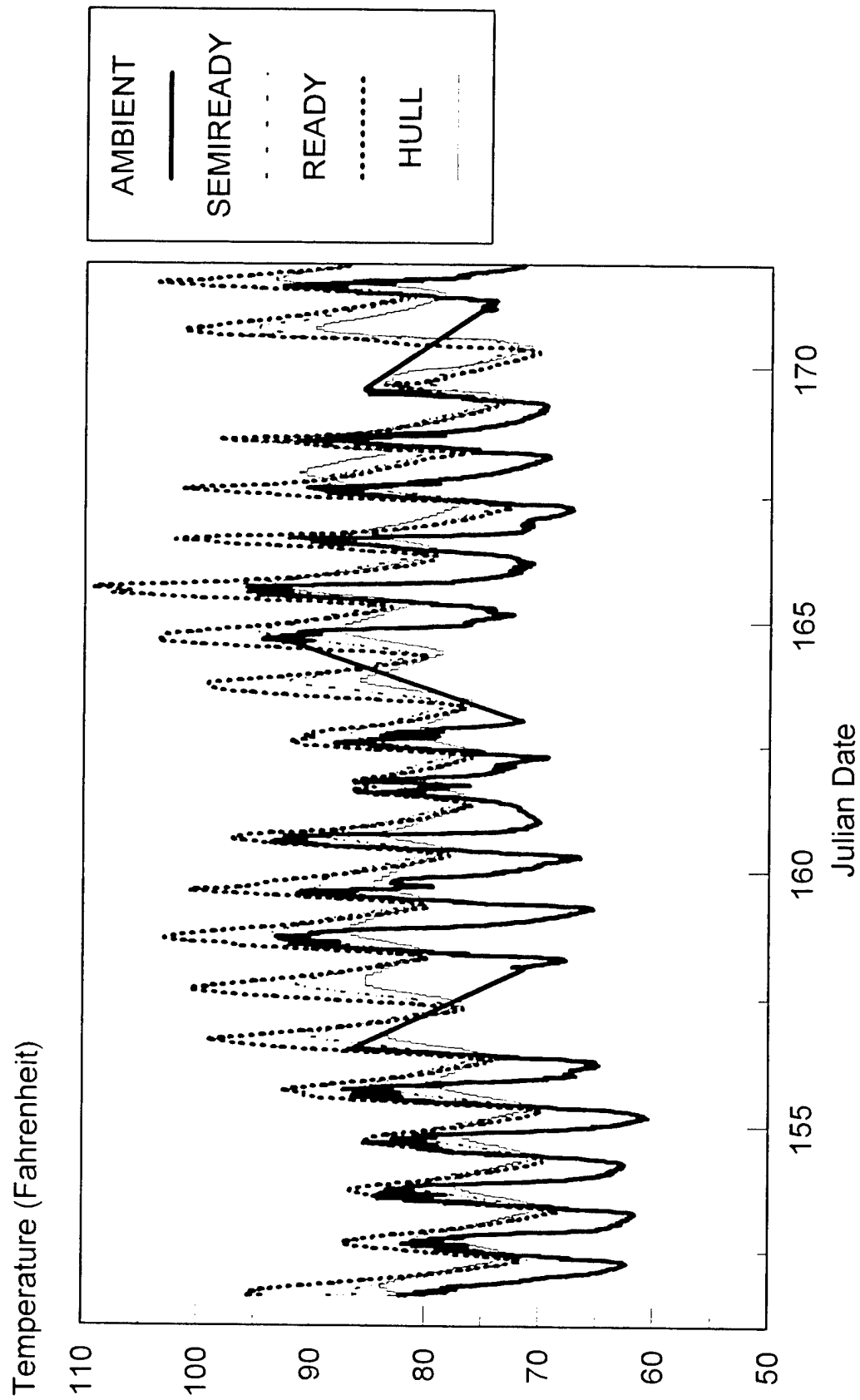
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 219



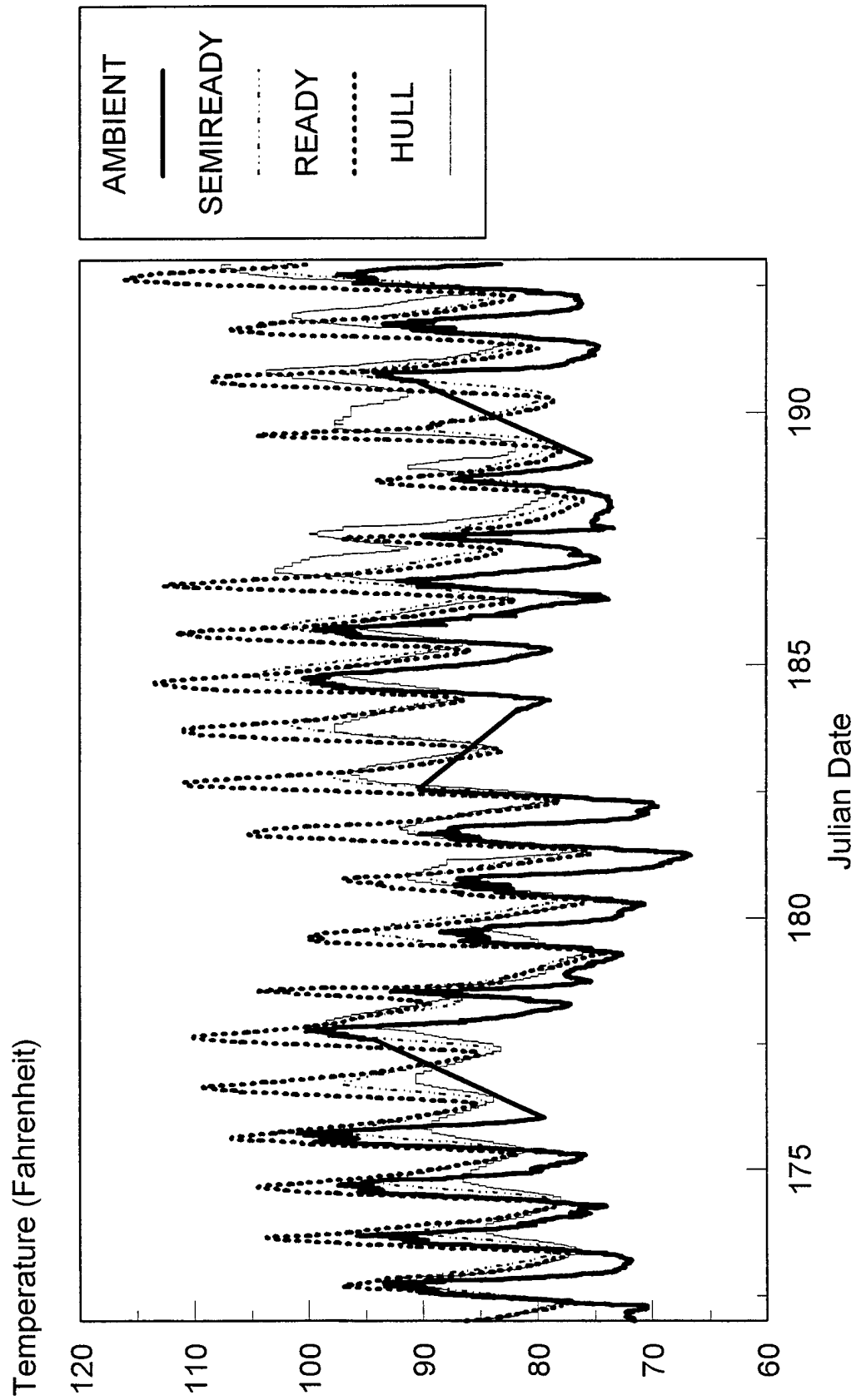
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 219



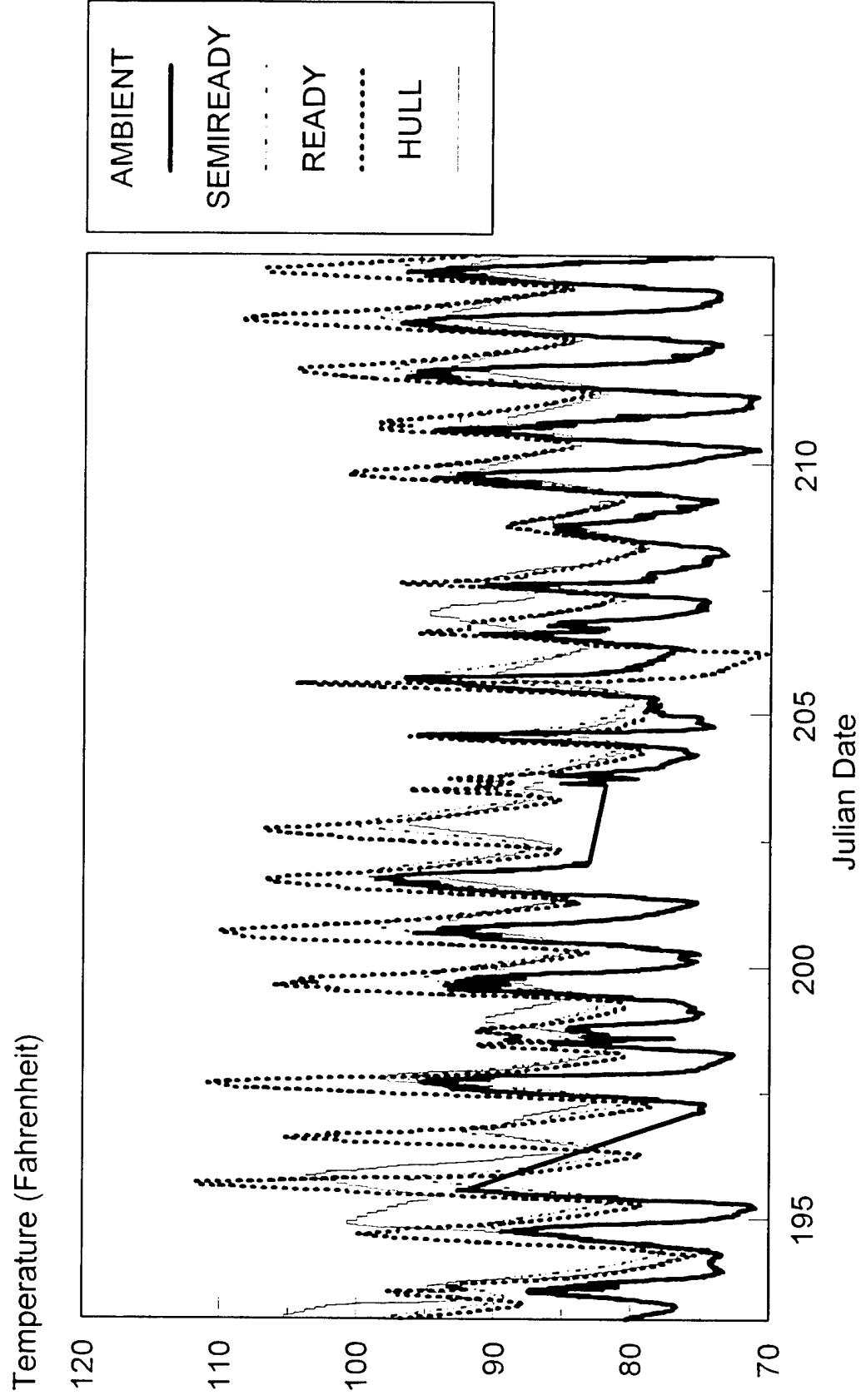
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 221



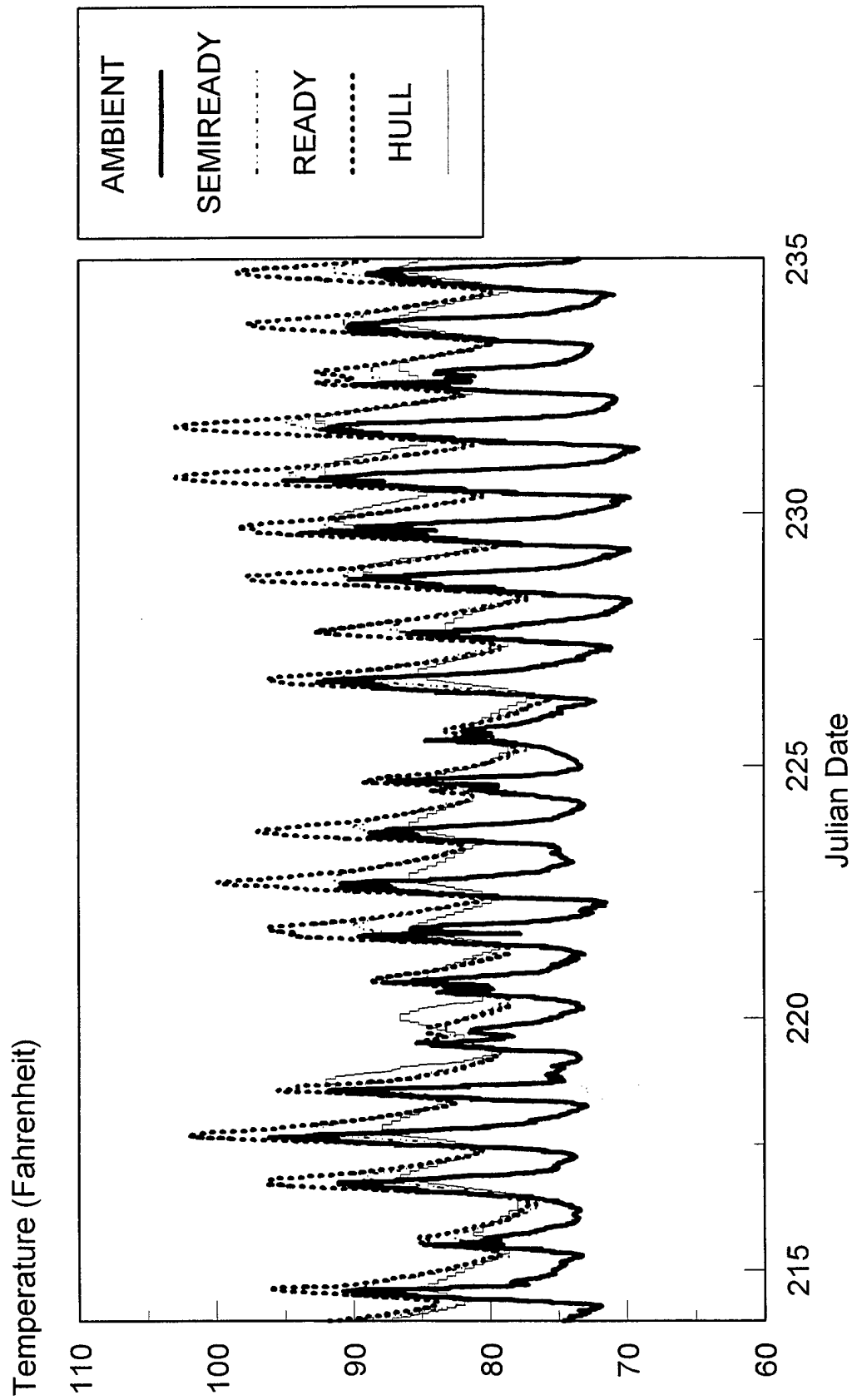
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 221



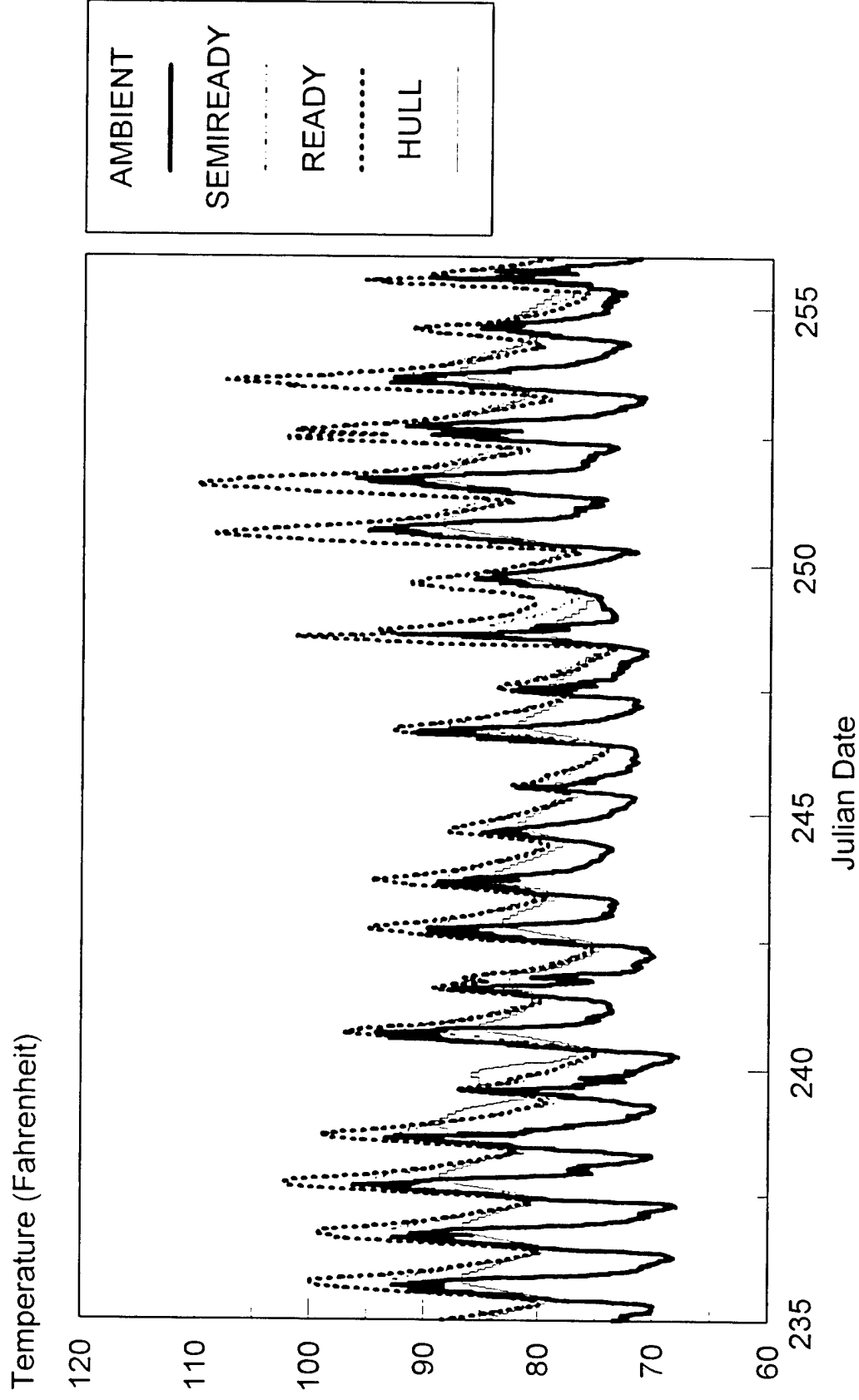
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 221



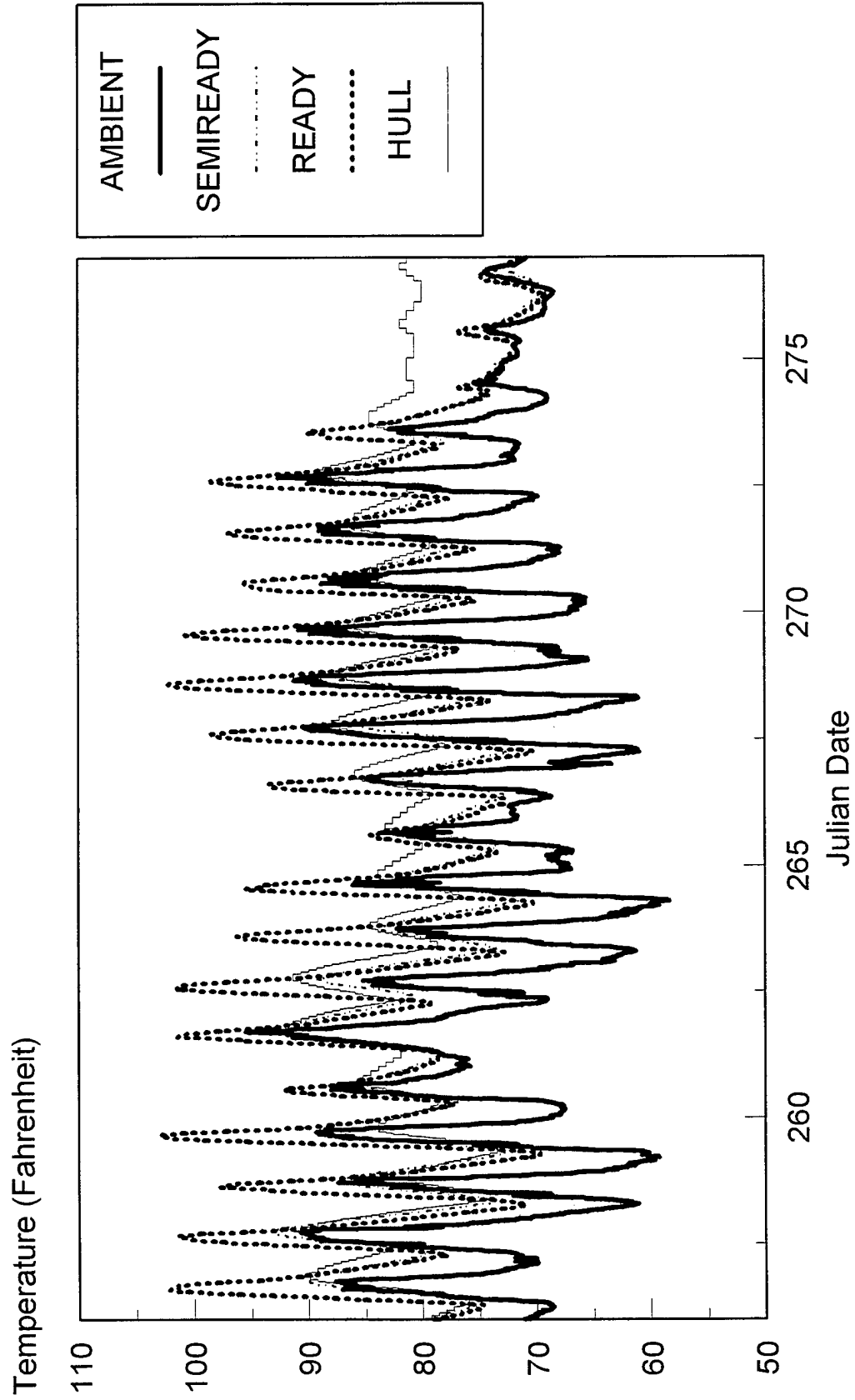
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 221



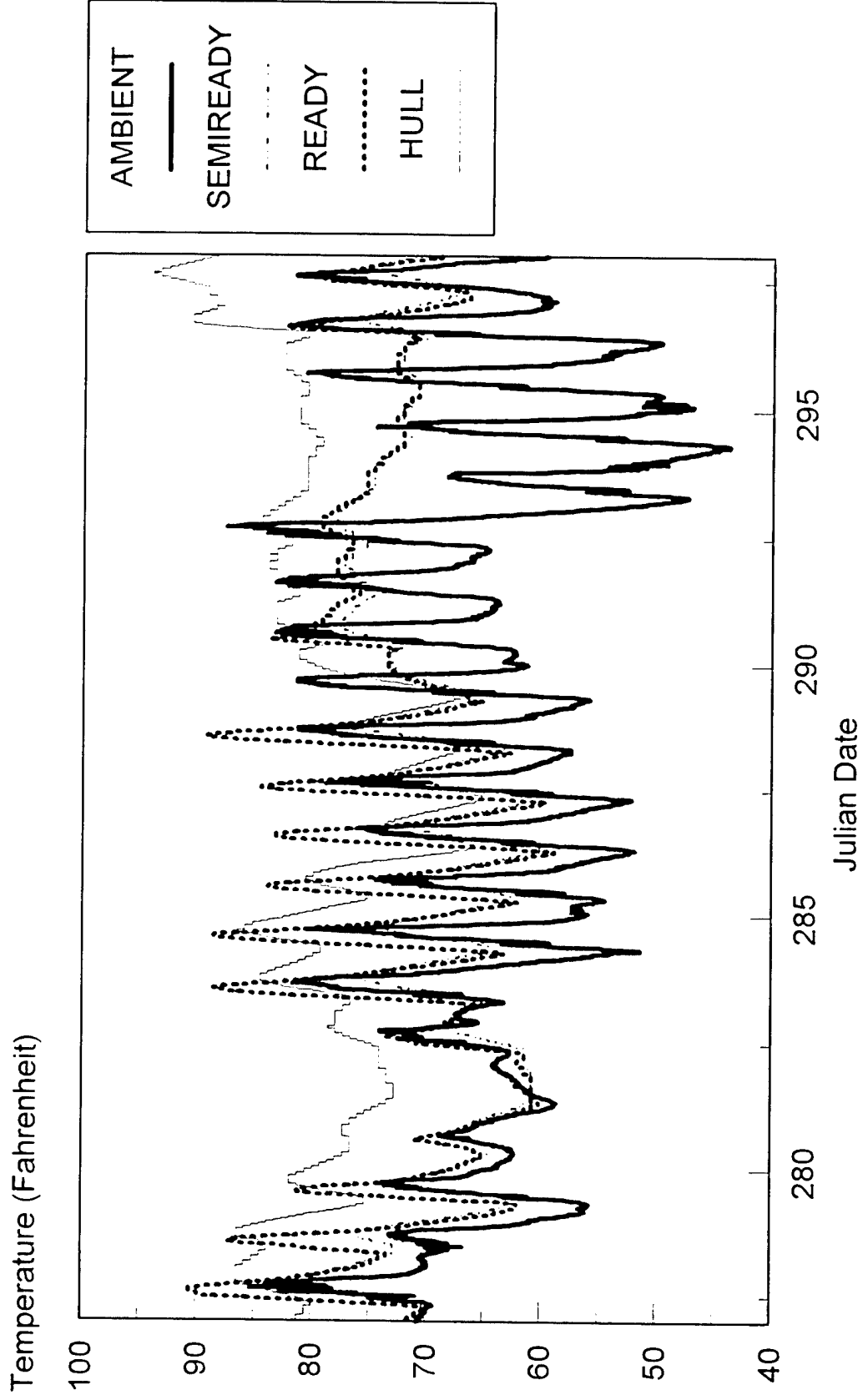
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 221



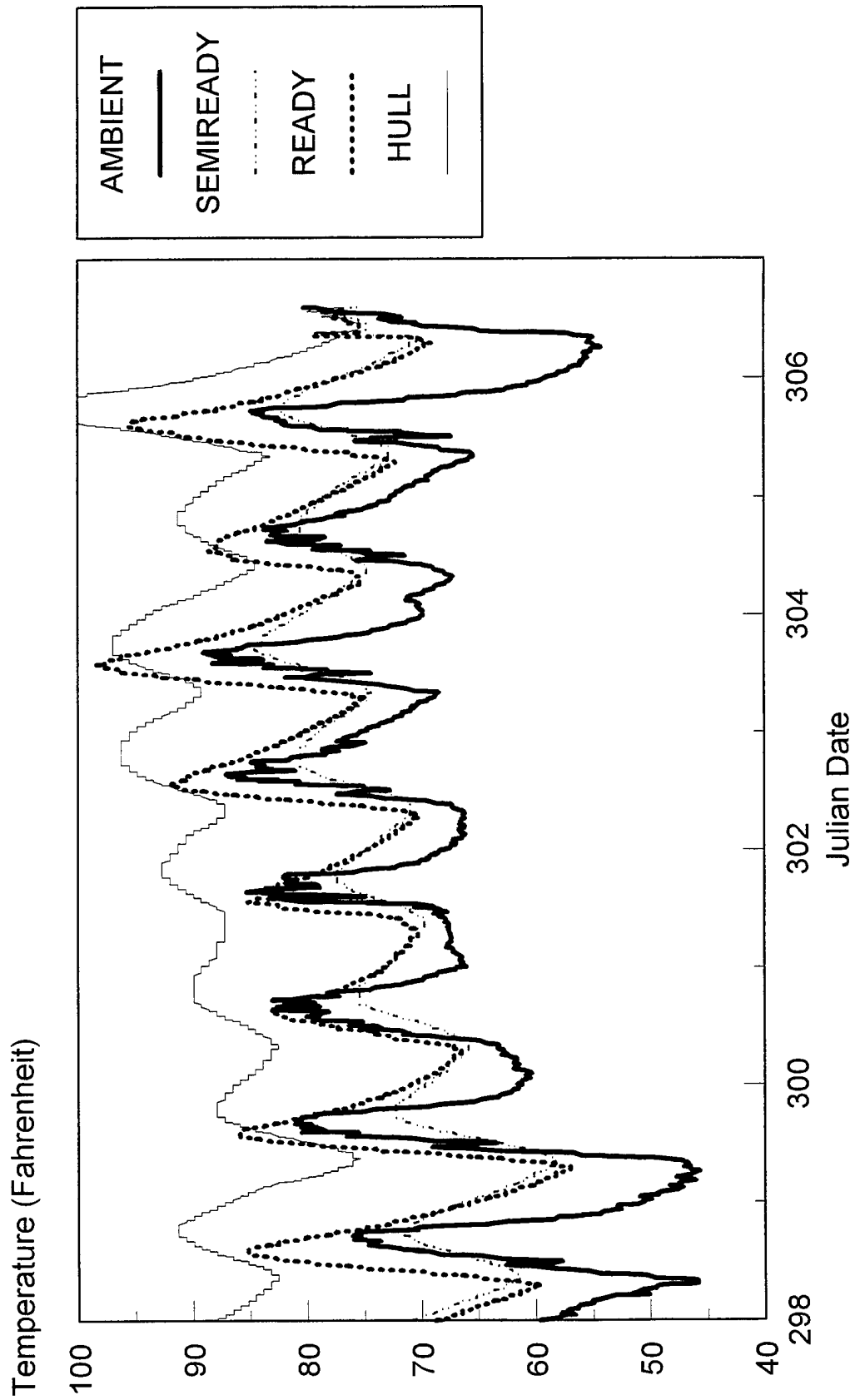
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 221



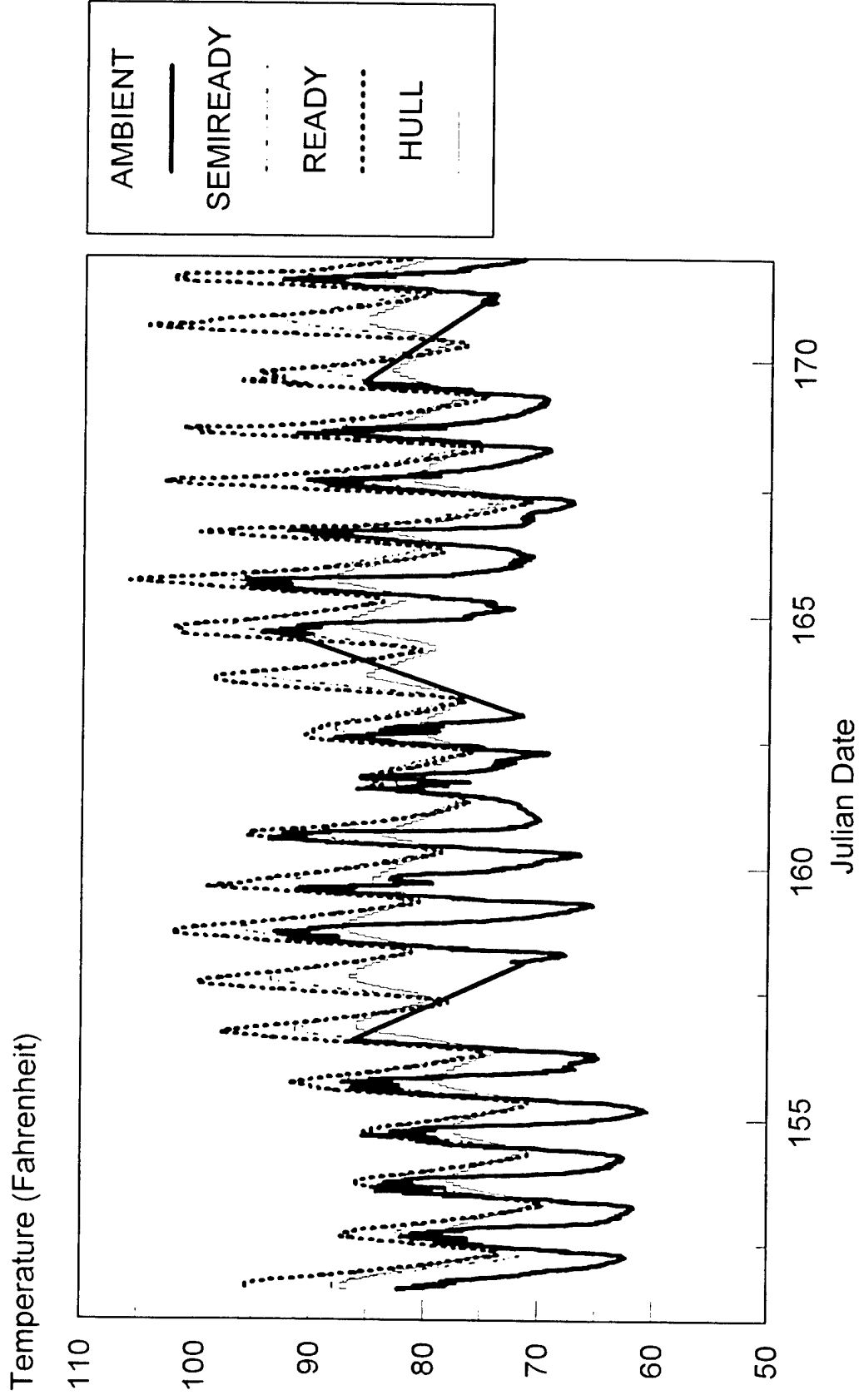
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 221



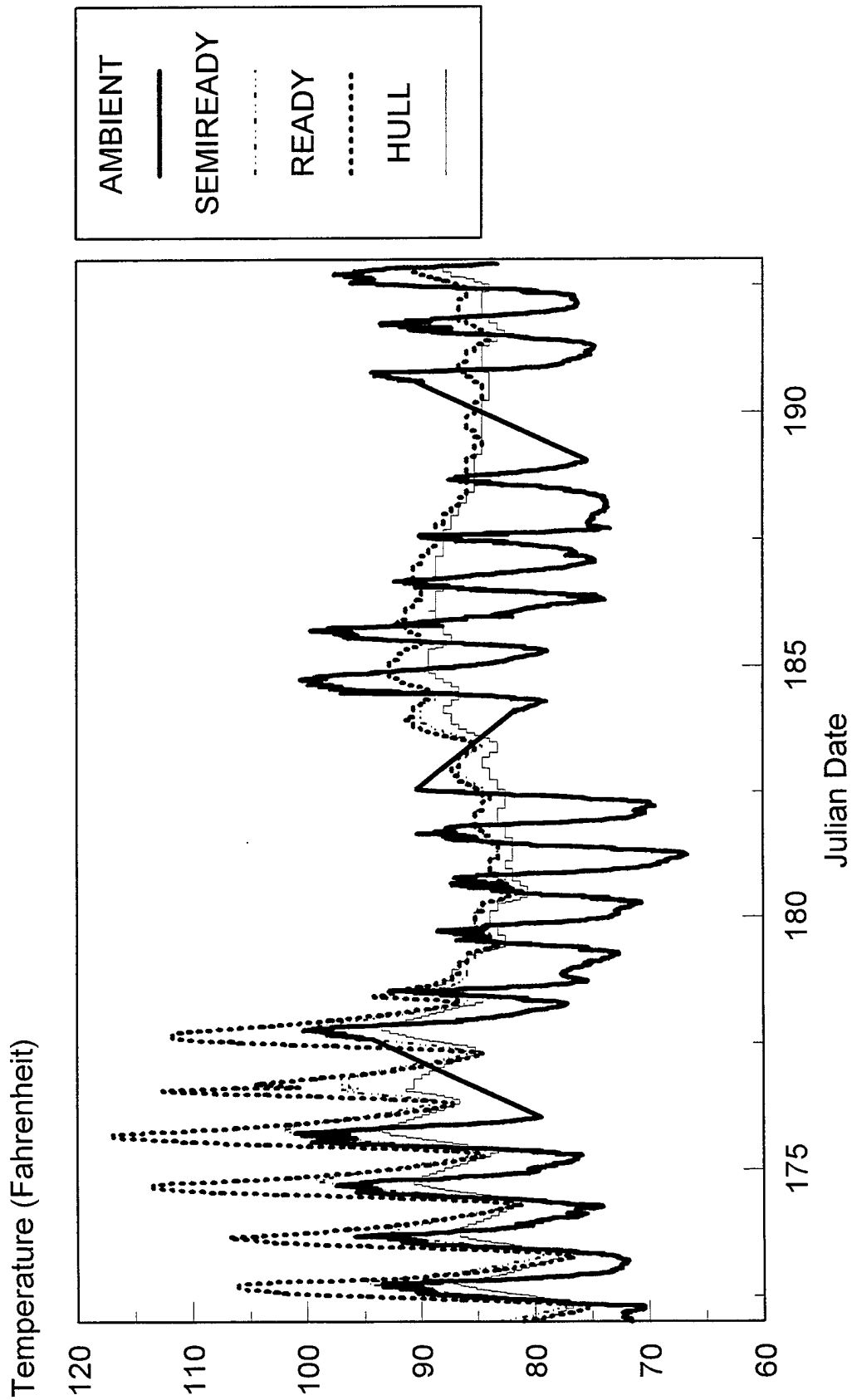
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 221



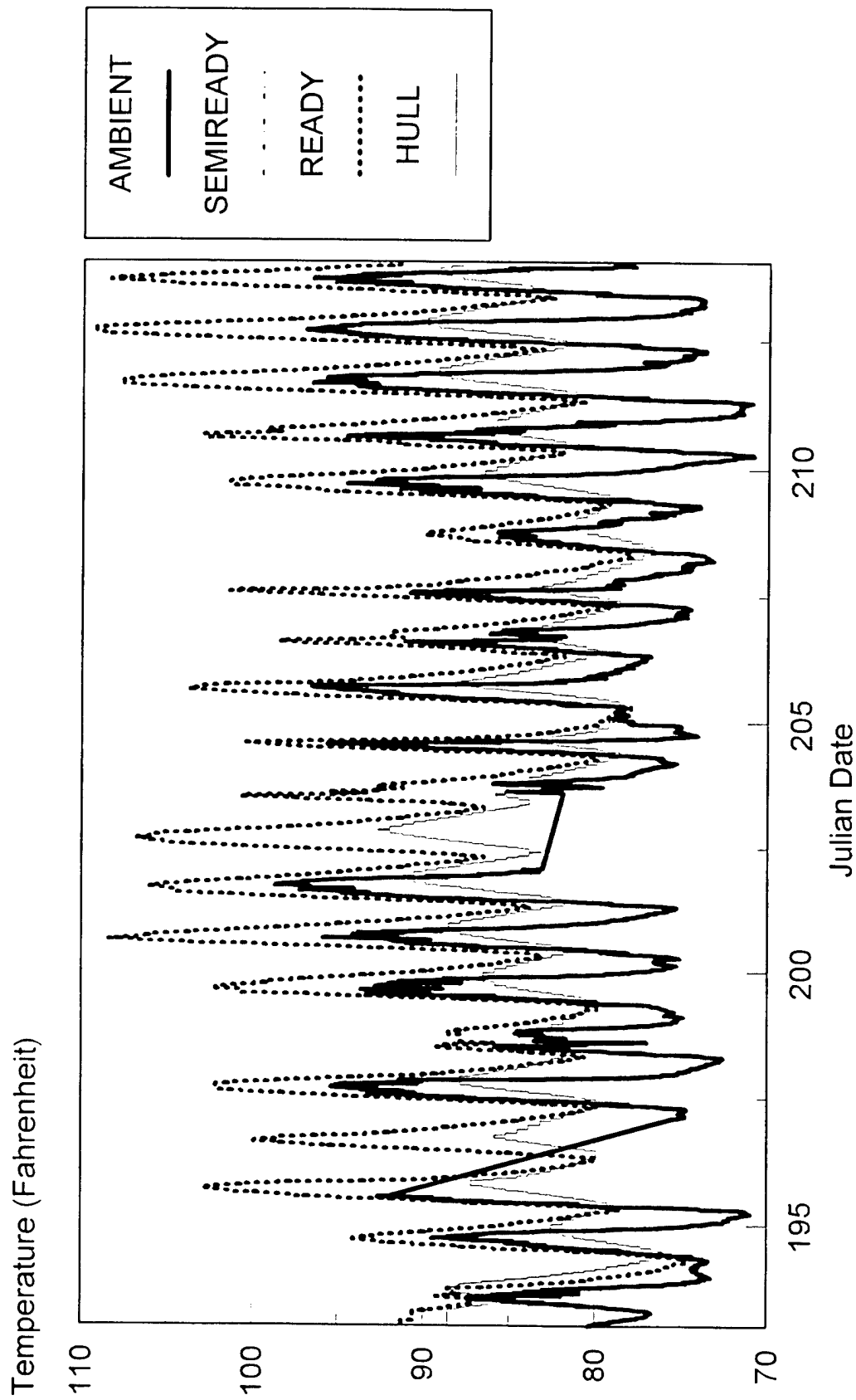
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



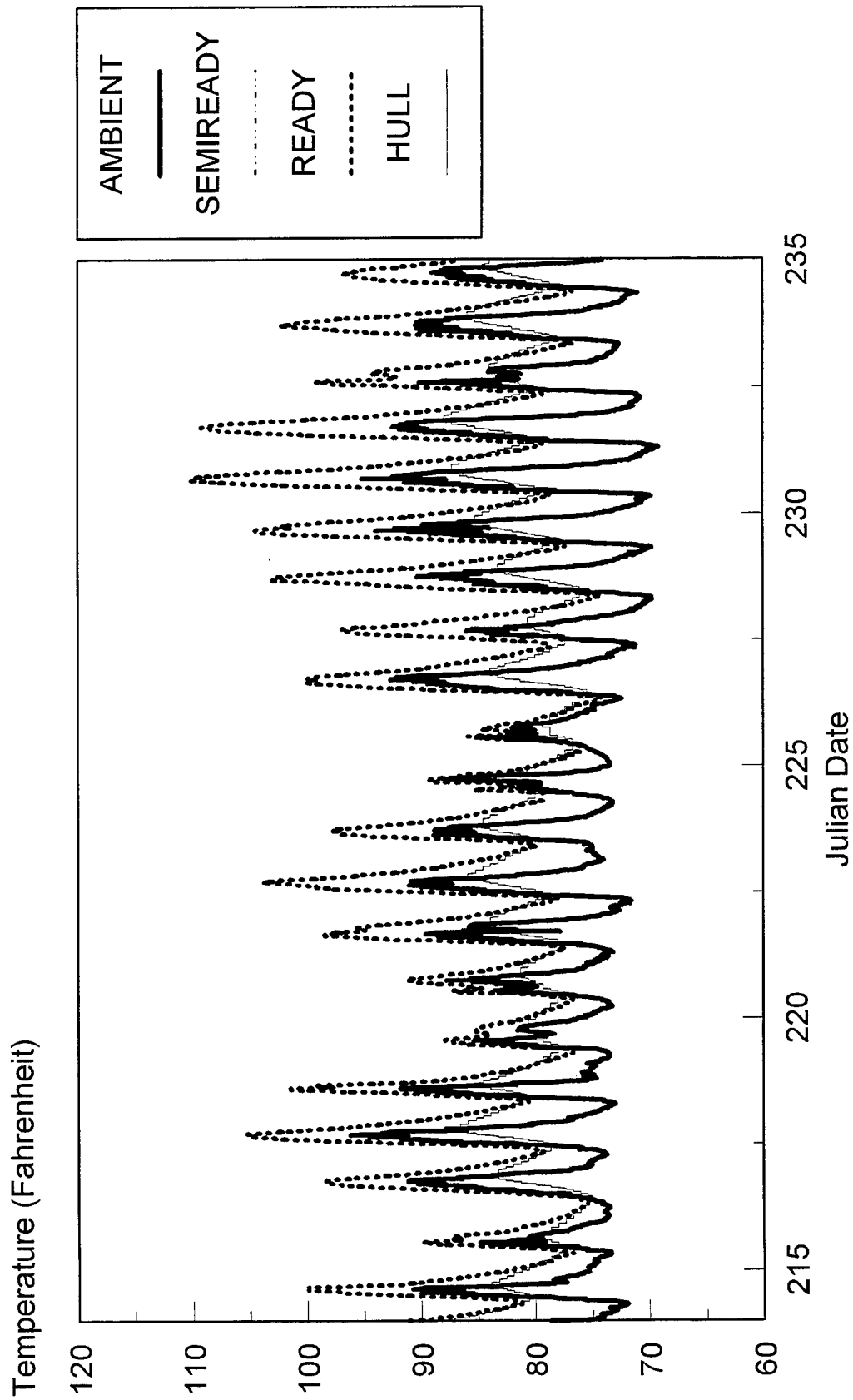
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



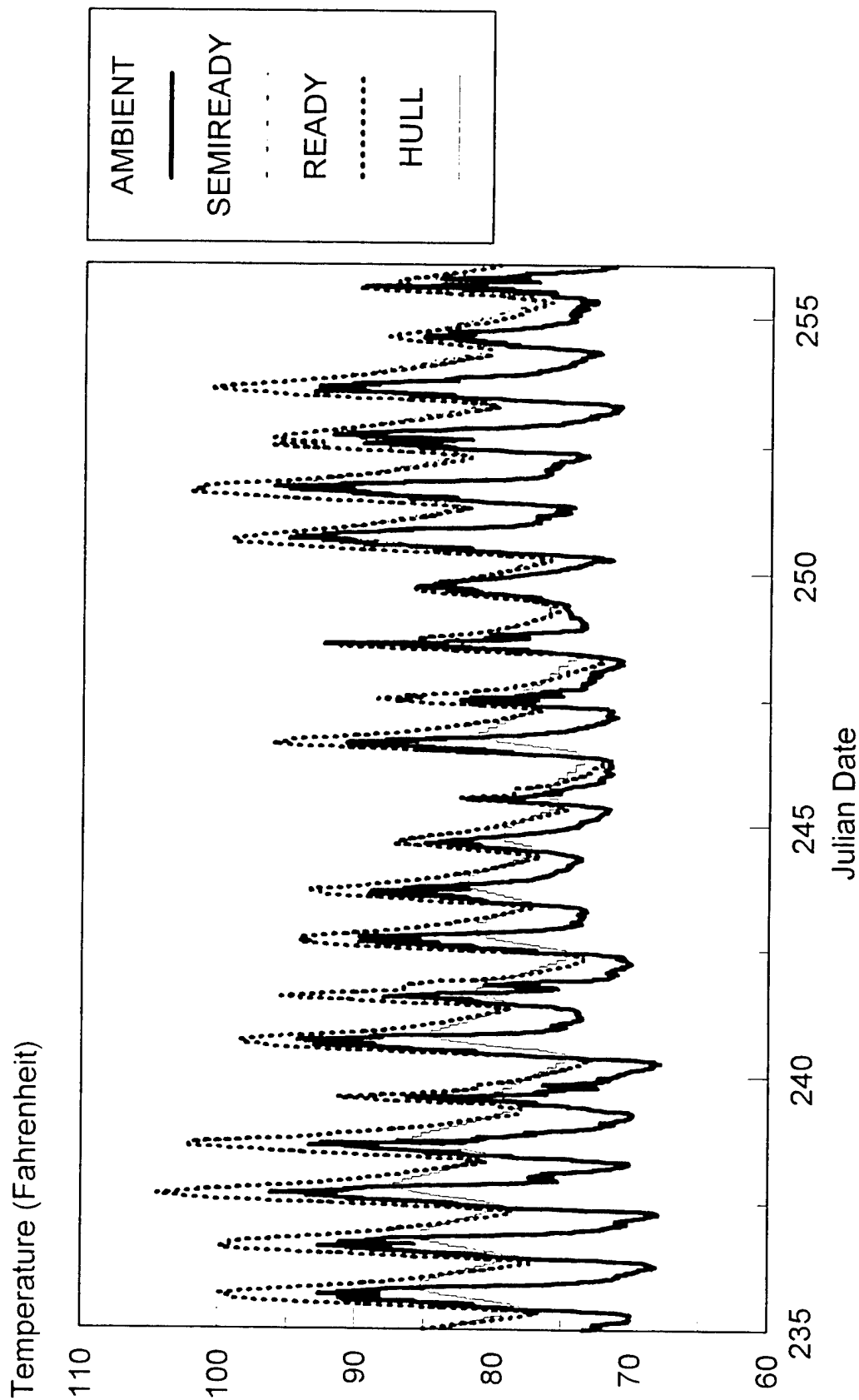
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 224



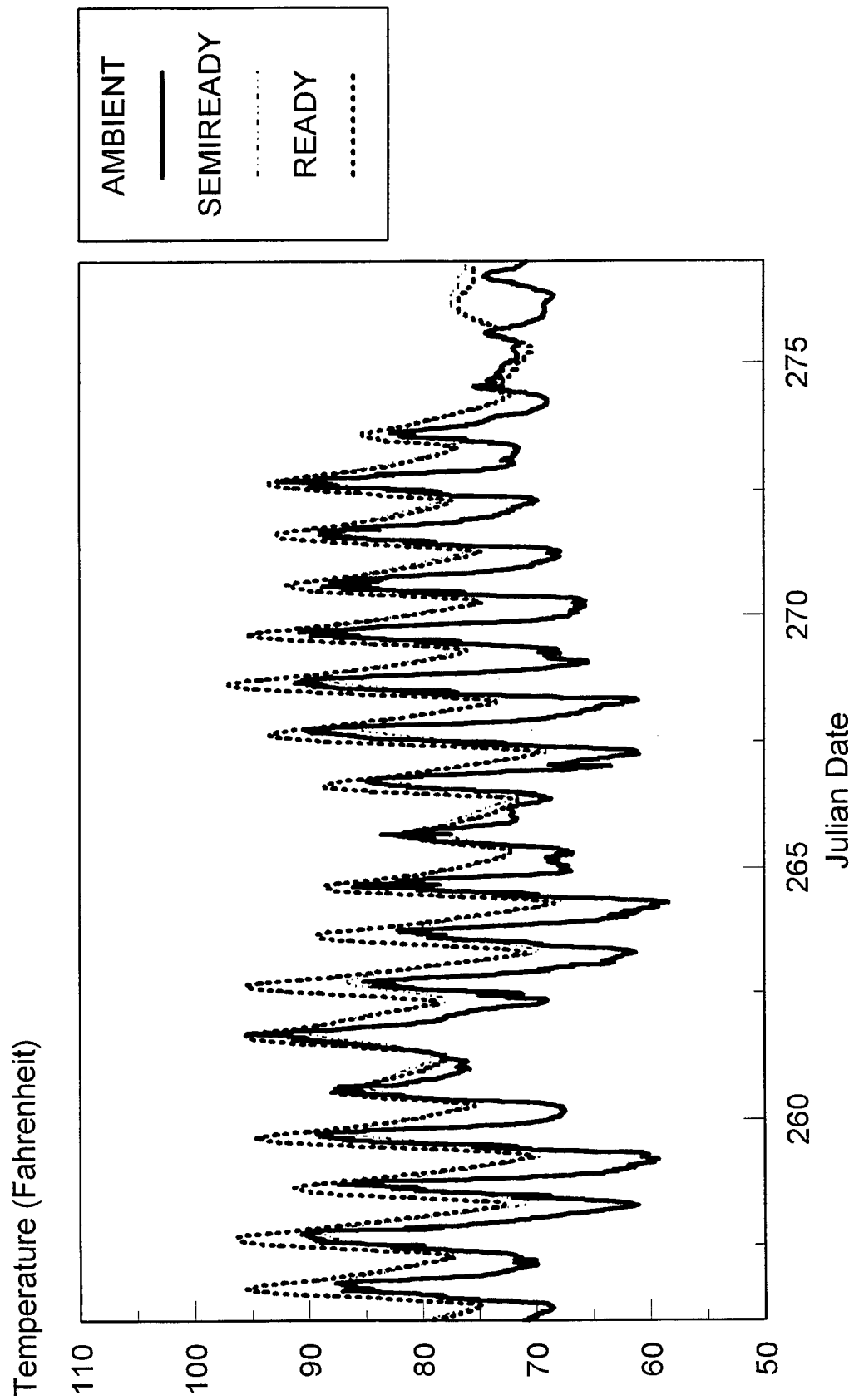
1996 M1A1 Tank Evaluation Ft. Stewart, Georgia Tank 224



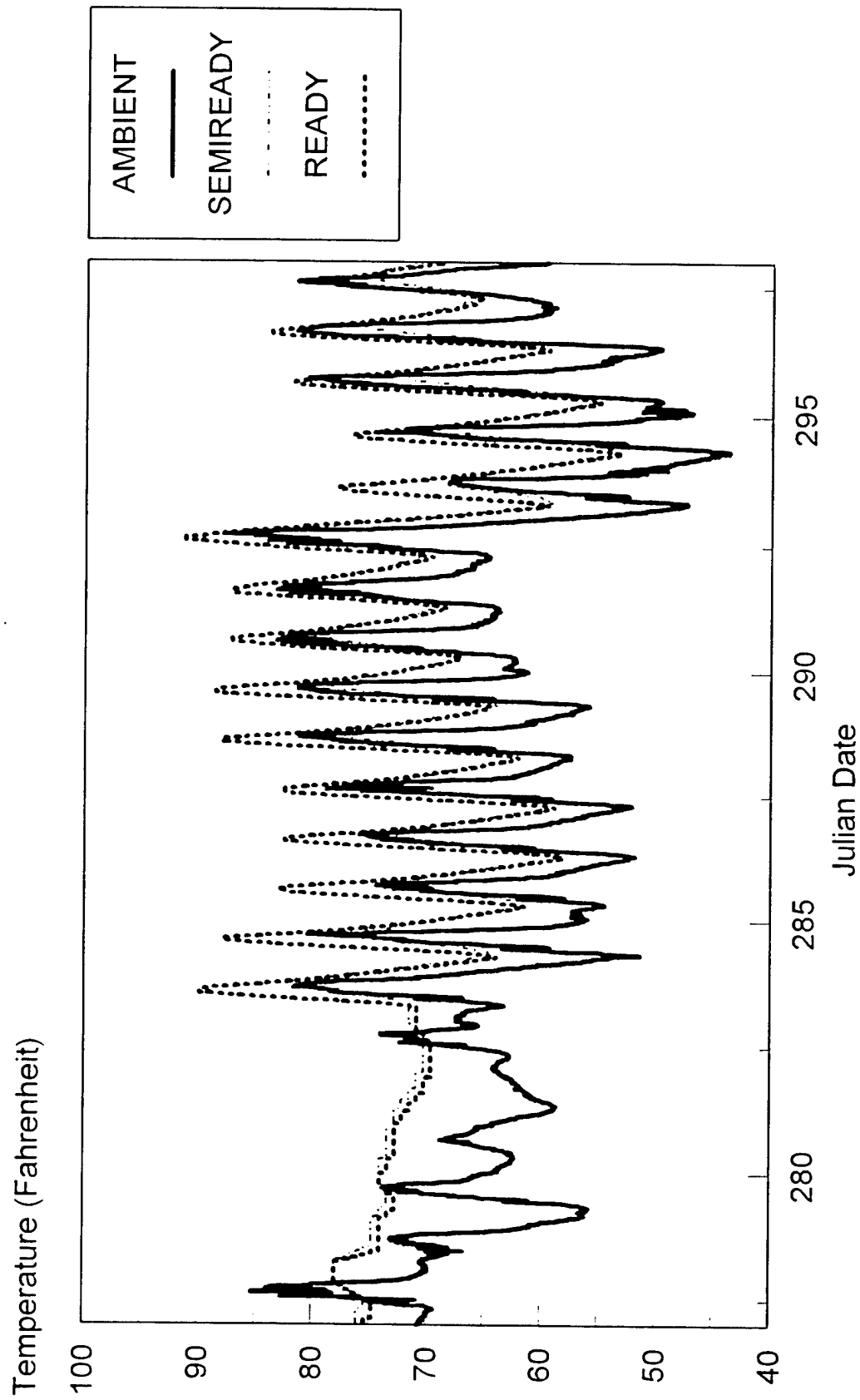
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



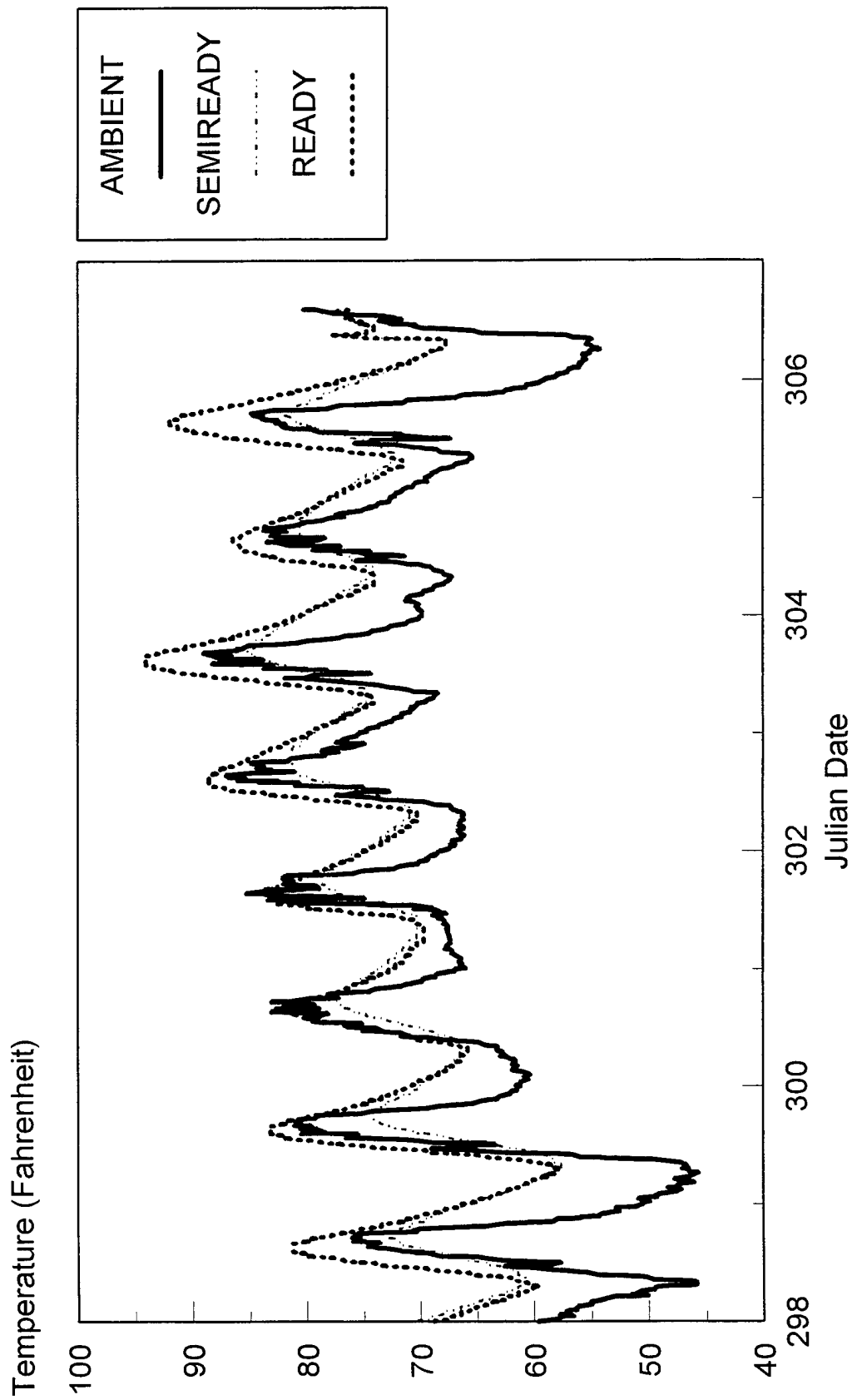
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



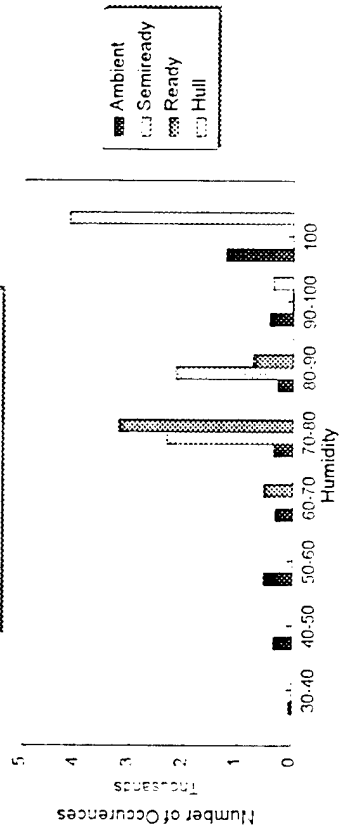
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



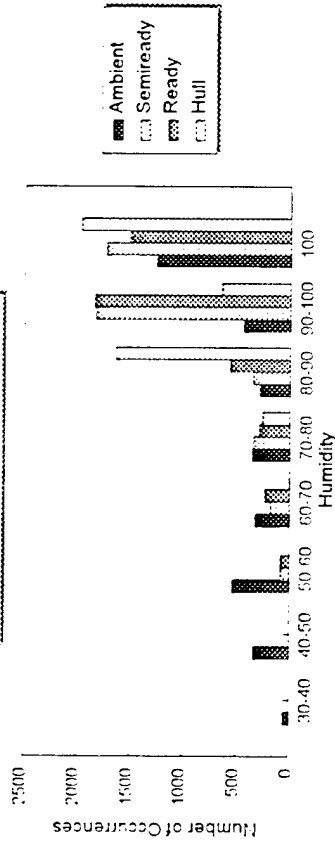
1996 M1A1 Tank Evaluation
Ft. Stewart, Georgia
Tank 224



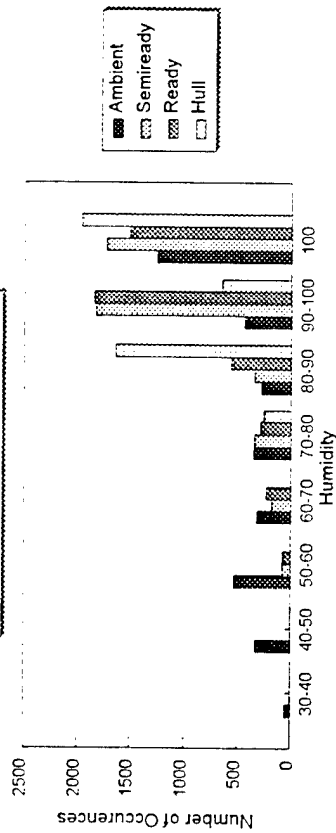
Ft. Stewart, Tank 213
June 1996



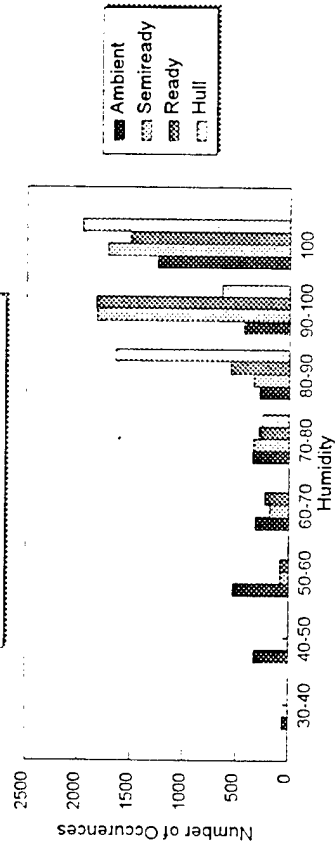
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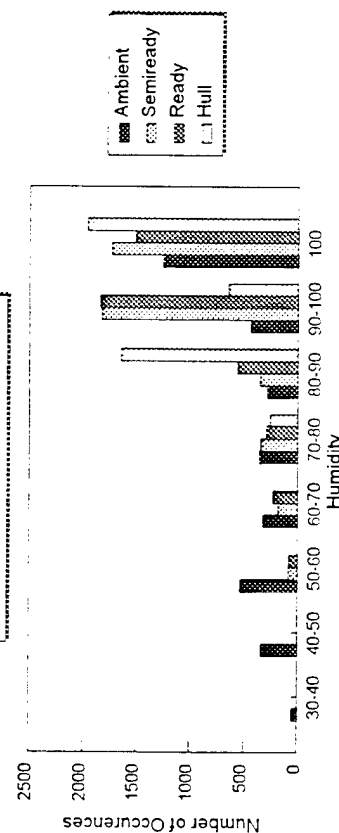
Ft. Stewart, Tank 206
June 1996



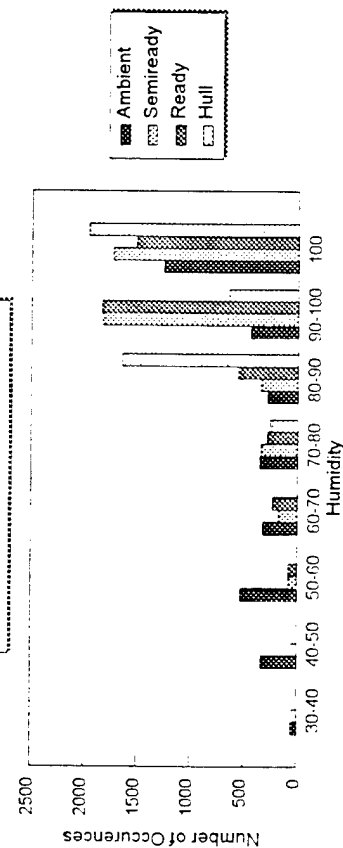
Ft. Stewart, Tank 210
June 1996



Ft. Stewart, Tank 219
June 1996

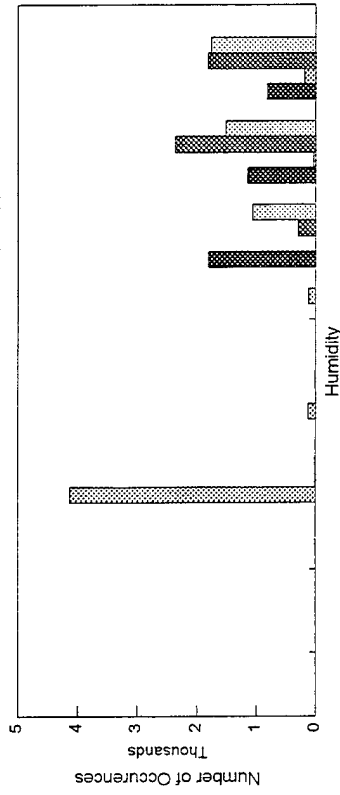


Ft. Stewart, Tank 221
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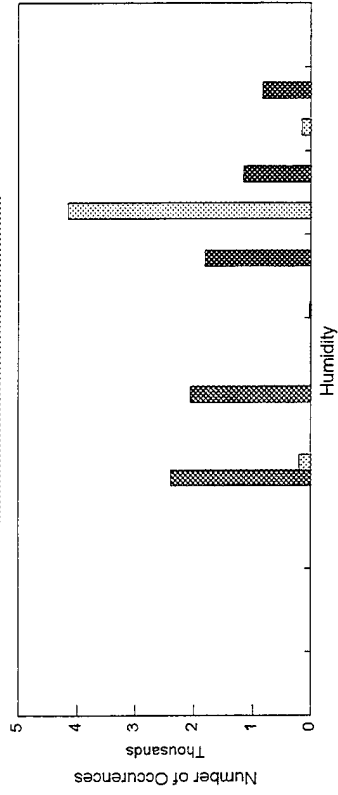
Ft. Stewart, Tank 224

July, 1996



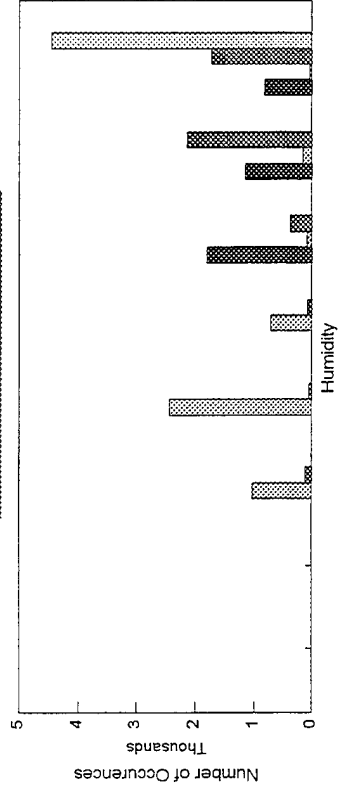
Ft. Stewart, Tank 210

July, 1996



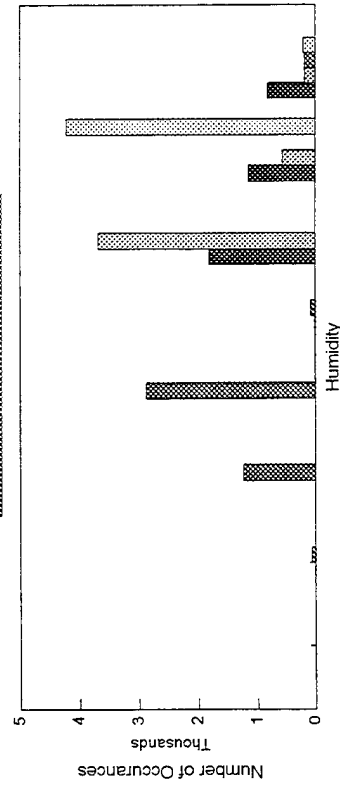
Ft. Stewart, Tank 221

July, 1996



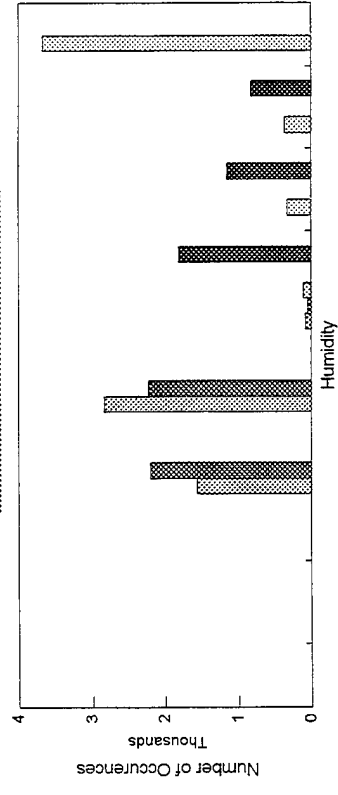
Ft. Stewart, Tank 213

July, 1996



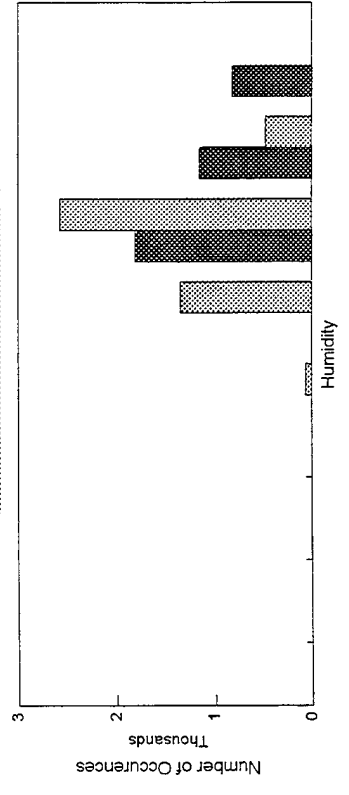
Ft. Stewart, Tank 206

July, 1996

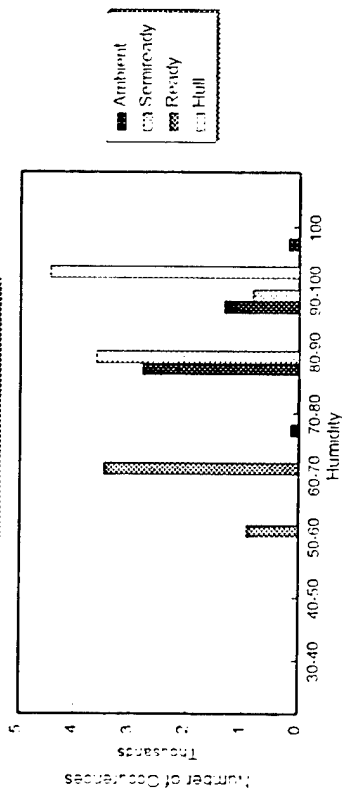


Ft. Stewart, Tank 219

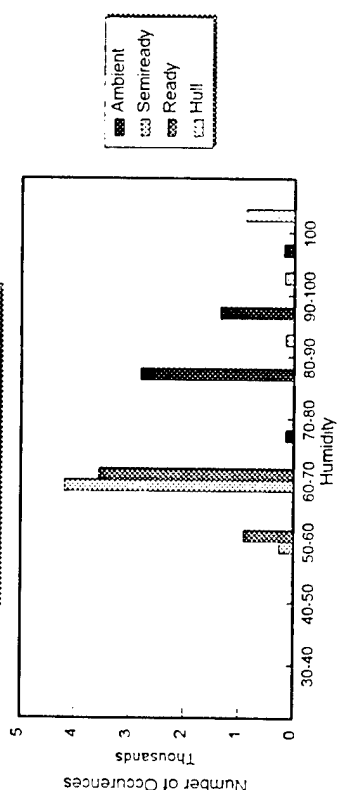
July, 1996



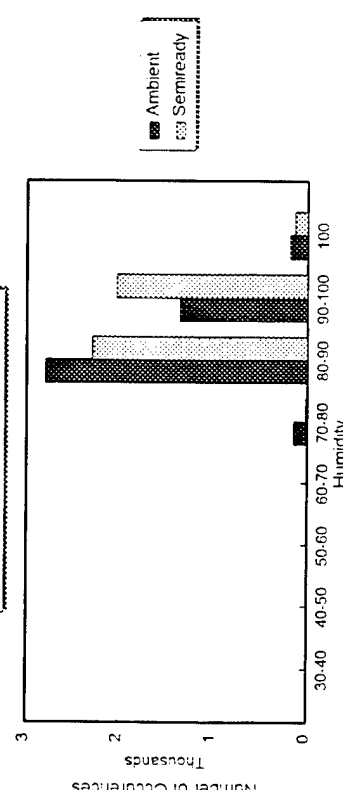
Ft. Stewart, Tank 213
August, 1996



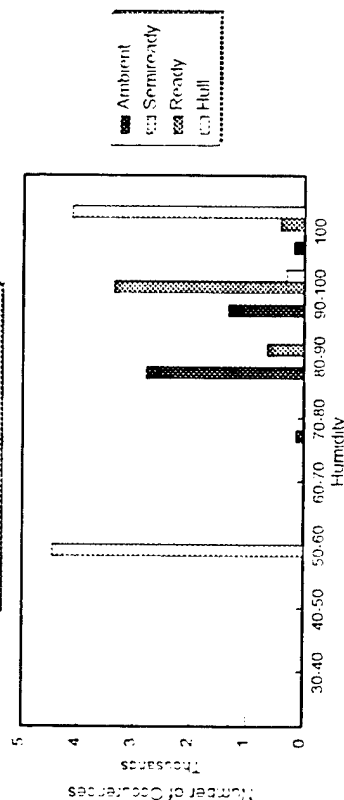
Ft. Stewart, Tank 206
August, 1996



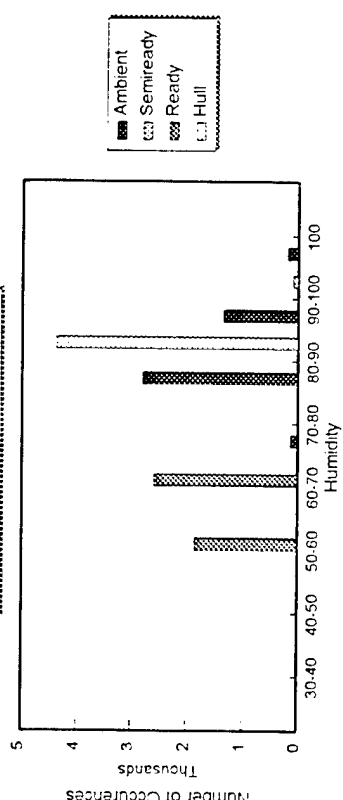
Ft. Stewart, Tank 219
August, 1996



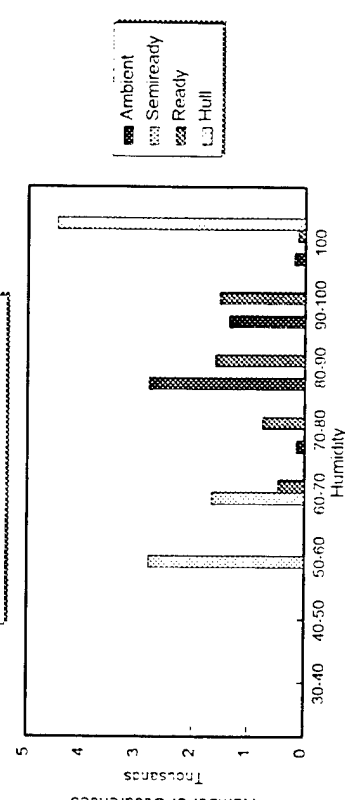
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August, 1996

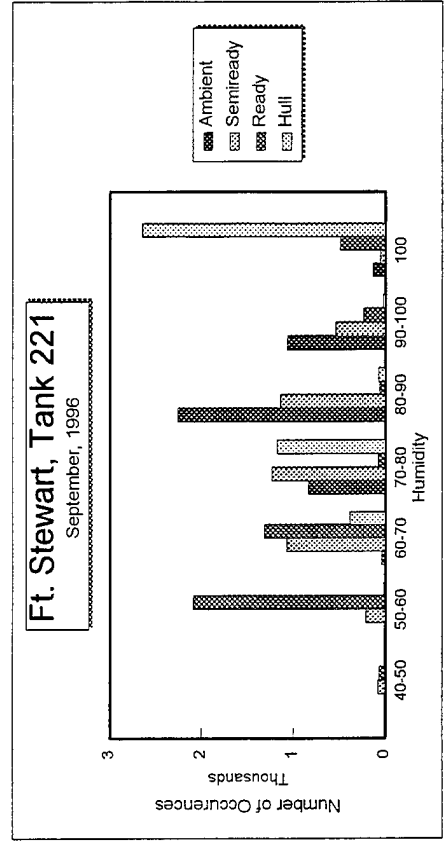
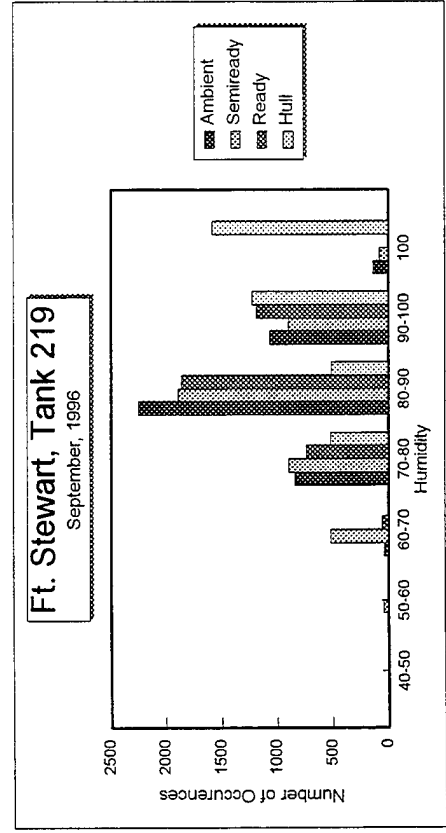
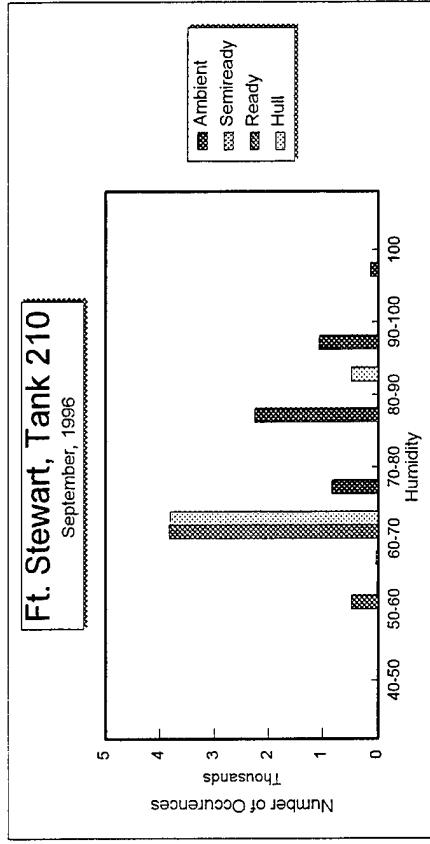
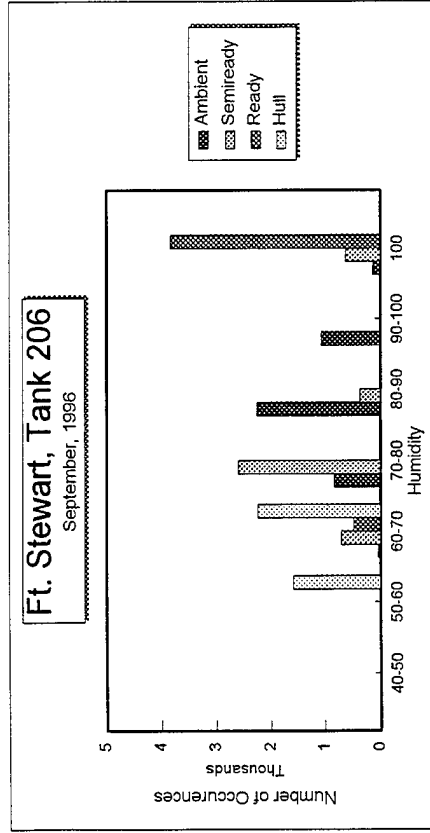
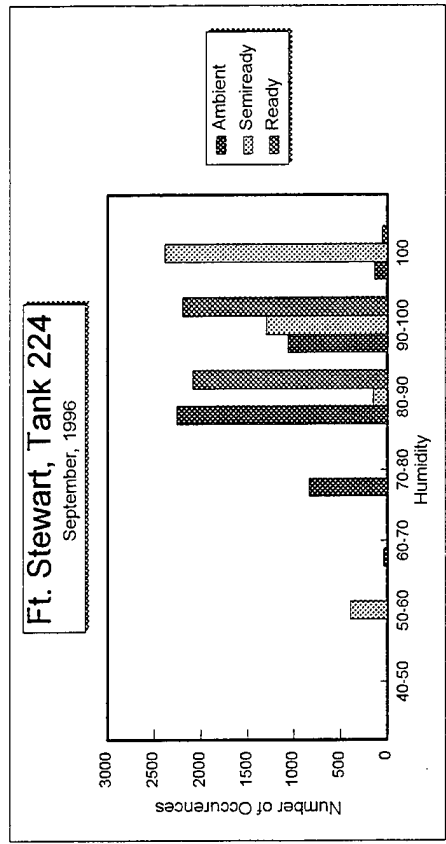
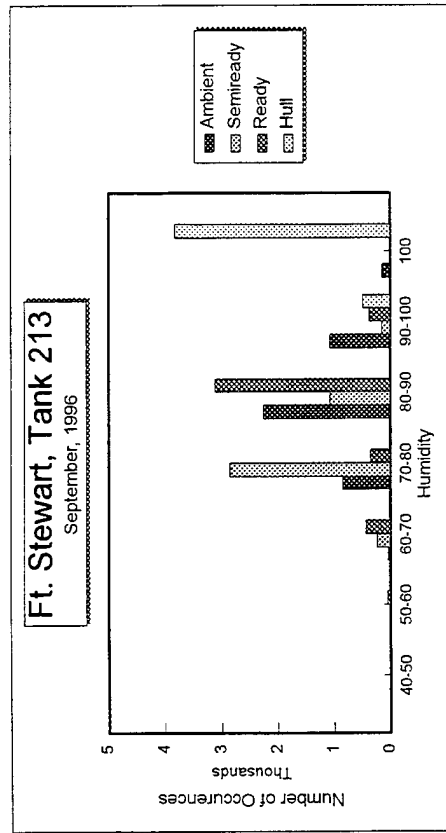


Ft. Stewart, Tank 210
August, 1996

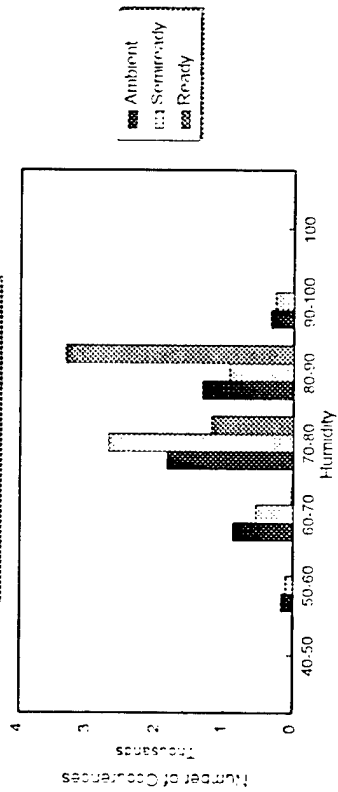


Ft. Stewart, Tank 221
August, 1996

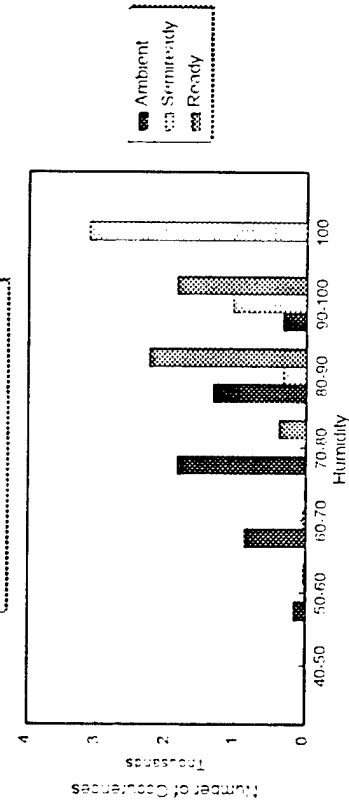




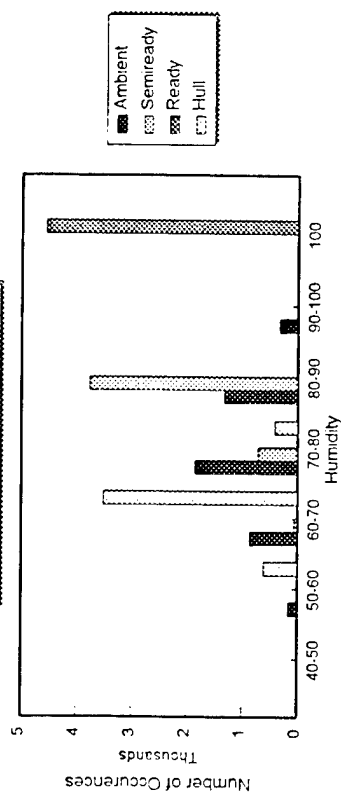
Ft. Stewart, Tank 213
October, 1996



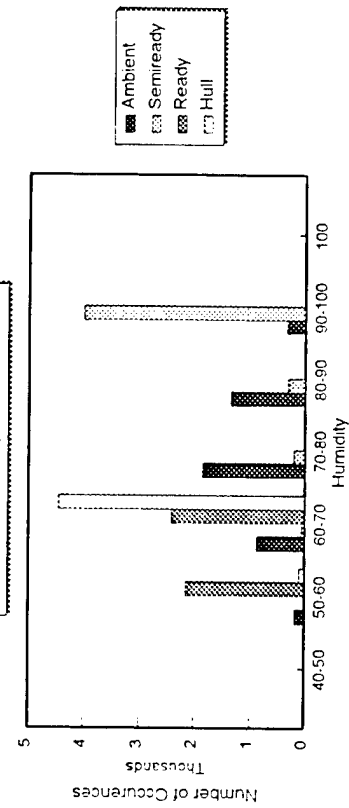
Ft. Stewart, Tank 224
October, 1996



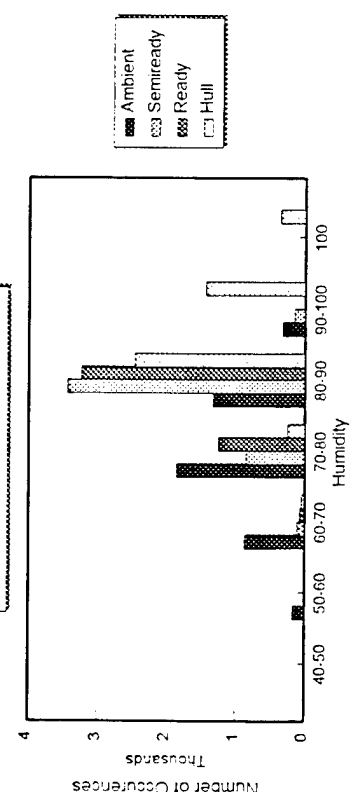
Ft. Stewart, Tank 206
October, 1996



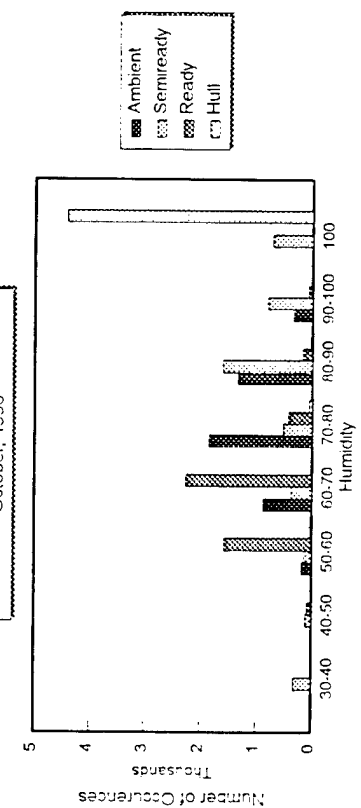
Ft. Stewart, Tank 210
October, 1996



Ft. Stewart, Tank 219
October, 1996



Ft. Stewart, Tank 221
October, 1996

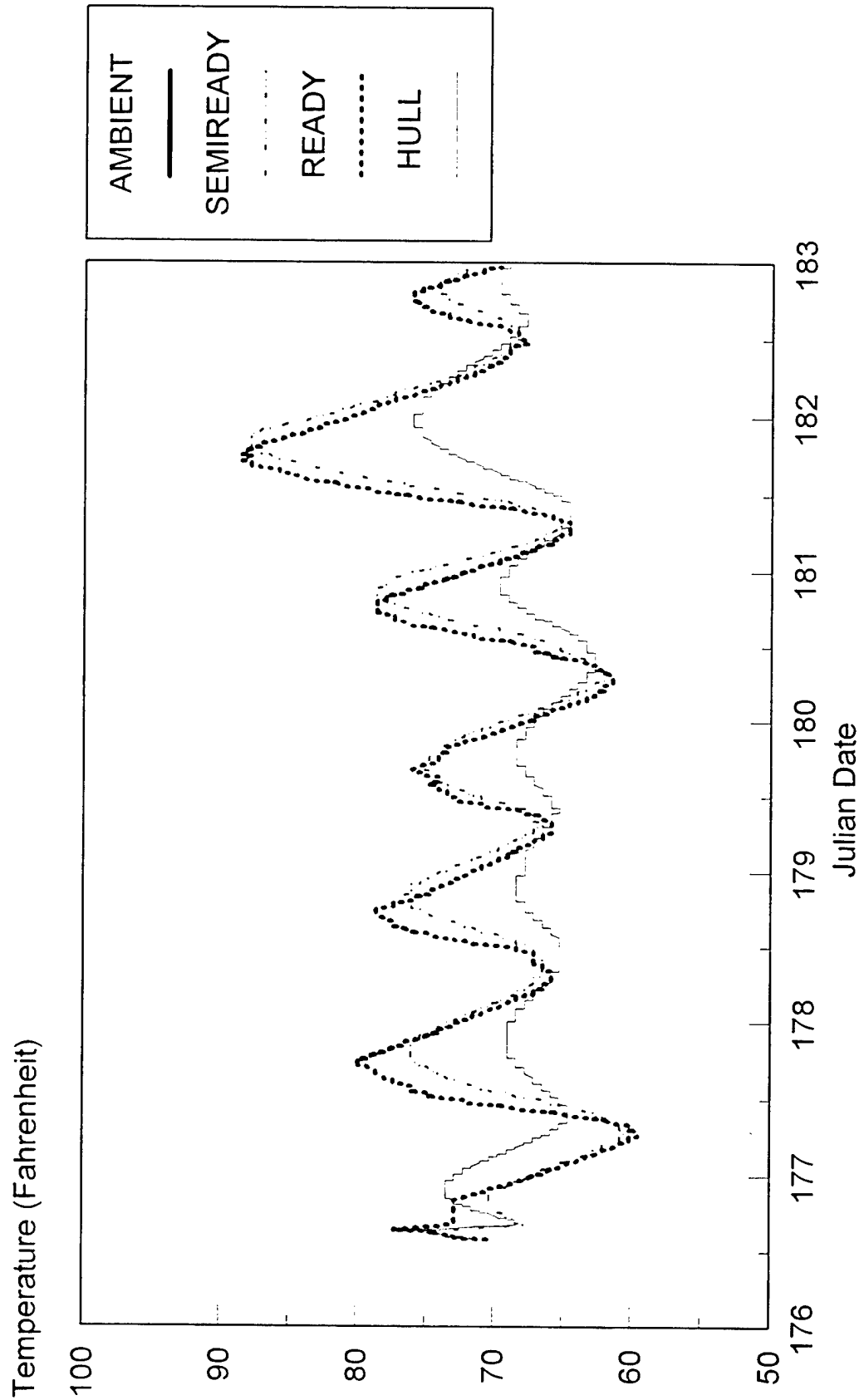


HUNGARY DATA

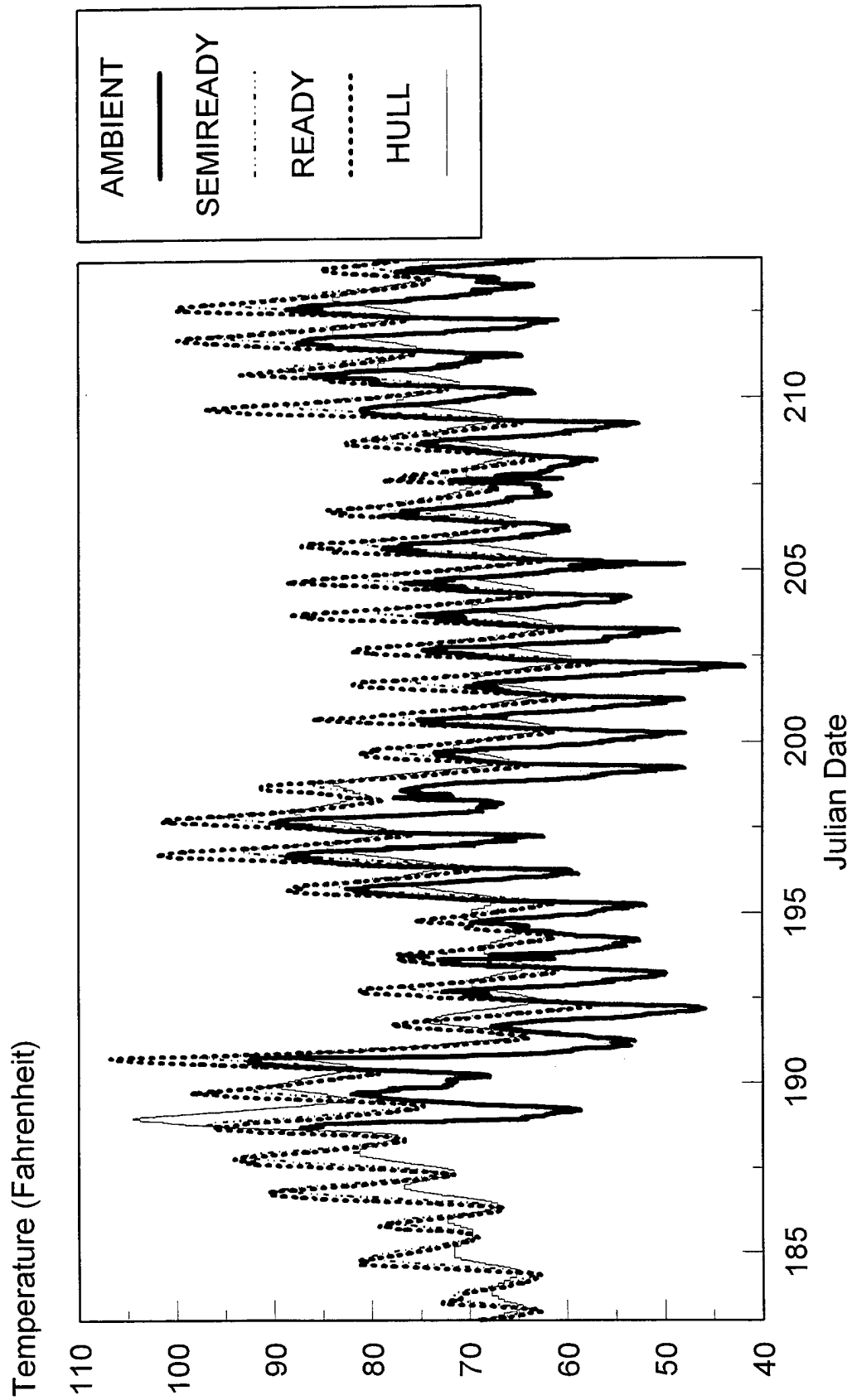
HUNGARY M1A1 TANK MONITORING DATA

AMBIENT	JUNE	JULY	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
High Temperature	NA	93	90	74	72	70	47
Low Temperature	NA	42	45	36	24	24	20
High Humidity	NA	100	100	100	100	100	100
Low Humidity	NA	25	20	37	38	34	59
TANK 301							
SEMIREADY							
High Temperature	88	98	94	77	70	64	46
Low Temperature	60	58	59	46	37	31	30
High Humidity	100	100	100	100	100	67	66
Low Humidity	54	85	36	56	52	53	55
READY							
High Temperature	89	107	101	81	75	63	51
Low Temperature	60	57	58	45	35	31	30
High Humidity	94	95	96	66	75	76	76
Low Humidity	47	59	35	51	52	57	56
HULL							
High Temperature	77	105	98	93	83	64	57
Low Temperature	63	60	62	49	35	34	31
High Humidity	100	100	100	100	100	68	69
Low Humidity	47	76	36	94	59	58	55
TANK 304							
SEMIREADY							
High Temperature	89	95	93	79	72	63	44
Low Temperature	60	58	58	48	37	33	28
High Humidity	100	100	100	75	70	63	59
Low Humidity	52	69	43	49	50	49	49
READY							
High Temperature	93	102	101	85	74	77	52
Low Temperature	59	57	57	48	37	34	29
High Humidity	92	94	95	84	70	62	62
Low Humidity	52	71	49	43	43	41	48
HULL							
High Temperature	98	89	96	87	77	58	52
Low Temperature	63	60	58	48	39	34	29
High Humidity	91	90	88	73	73	65	65
Low Humidity	48	76	46	48	51	50	51
TANK 306							
SEMIREADY							
High Temperature	83	94	91	76	74	65	45
Low Temperature	60	58	59	48	36	33	27
High Humidity	61	65	67	66	73	83	75
Low Humidity	51	52	39	45	46	47	33
READY							
High Temperature	89	104	97	83	77	70	46
Low Temperature	59	57	59	47	34	31	27
High Humidity	59	62	67	65	78	83	81
Low Humidity	47	44	40	42	41	40	51
HULL							
High Temperature	83	100	104	89	80	75	57
Low Temperature	63	62	68	53	35	34	29
High Humidity	100	100	100	100	100	94	92
Low Humidity	50	81	37	61	68	84	85
TANK 312							
SEMIREADY							
High Temperature	89	95	94	81	74	67	44
Low Temperature	59	58	58	46	39	29	28
High Humidity	99	99	100	79	97	94	92
Low Humidity	31	59	35	53	54	70	70
READY							
High Temperature	91	99	100	82	76	66	42
Low Temperature	60	56	56	46	36	29	27
High Humidity	94	100	97	82	100	97	94
Low Humidity	48	54	34	50	46	62	73
HULL							
High Temperature	94	93	102	97	89	73	42
Low Temperature	64	60	59	56	38	32	29
High Humidity	100	100	100	100	100	100	100
Low Humidity	47	89	37	67	51	90	94

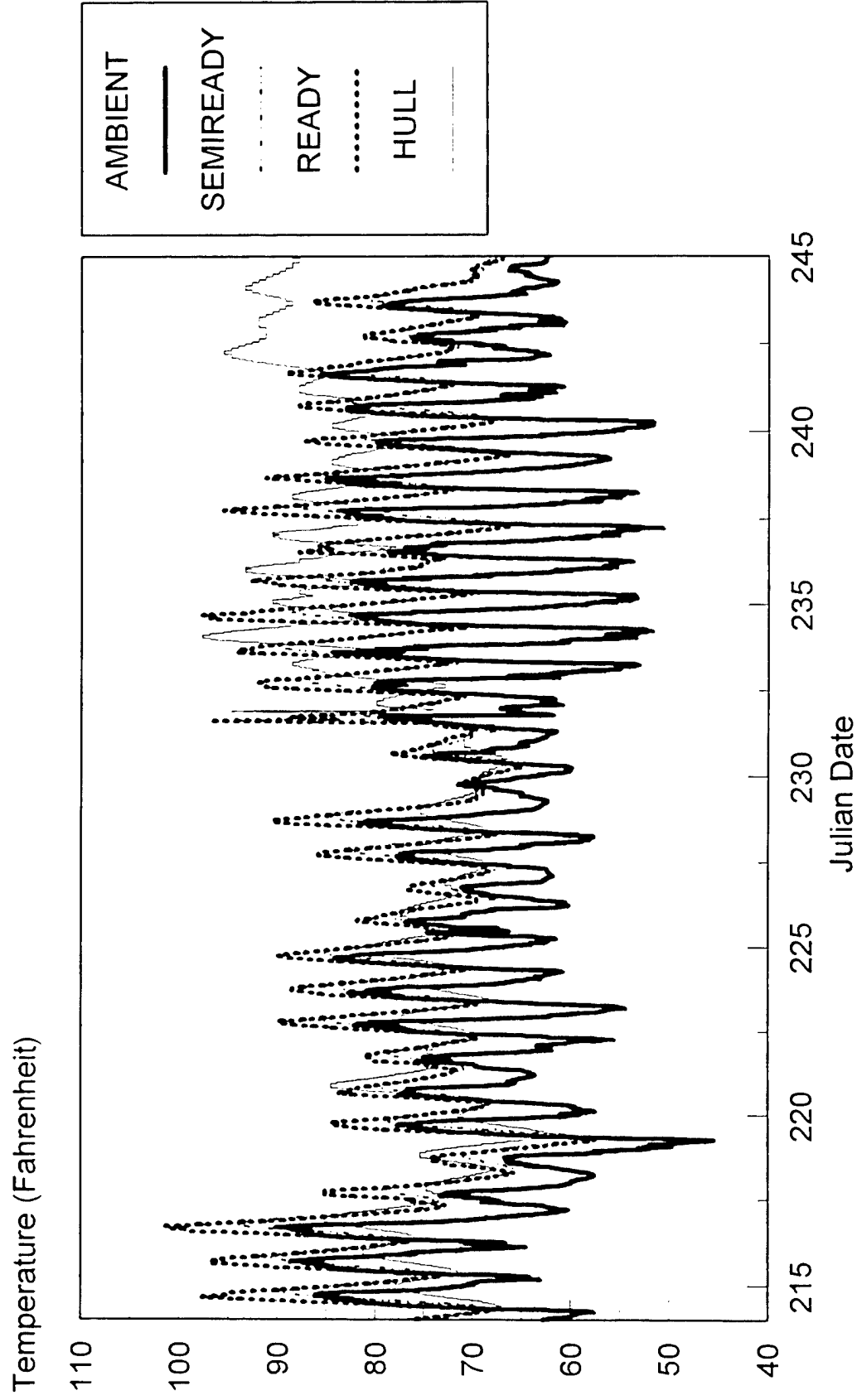
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 301



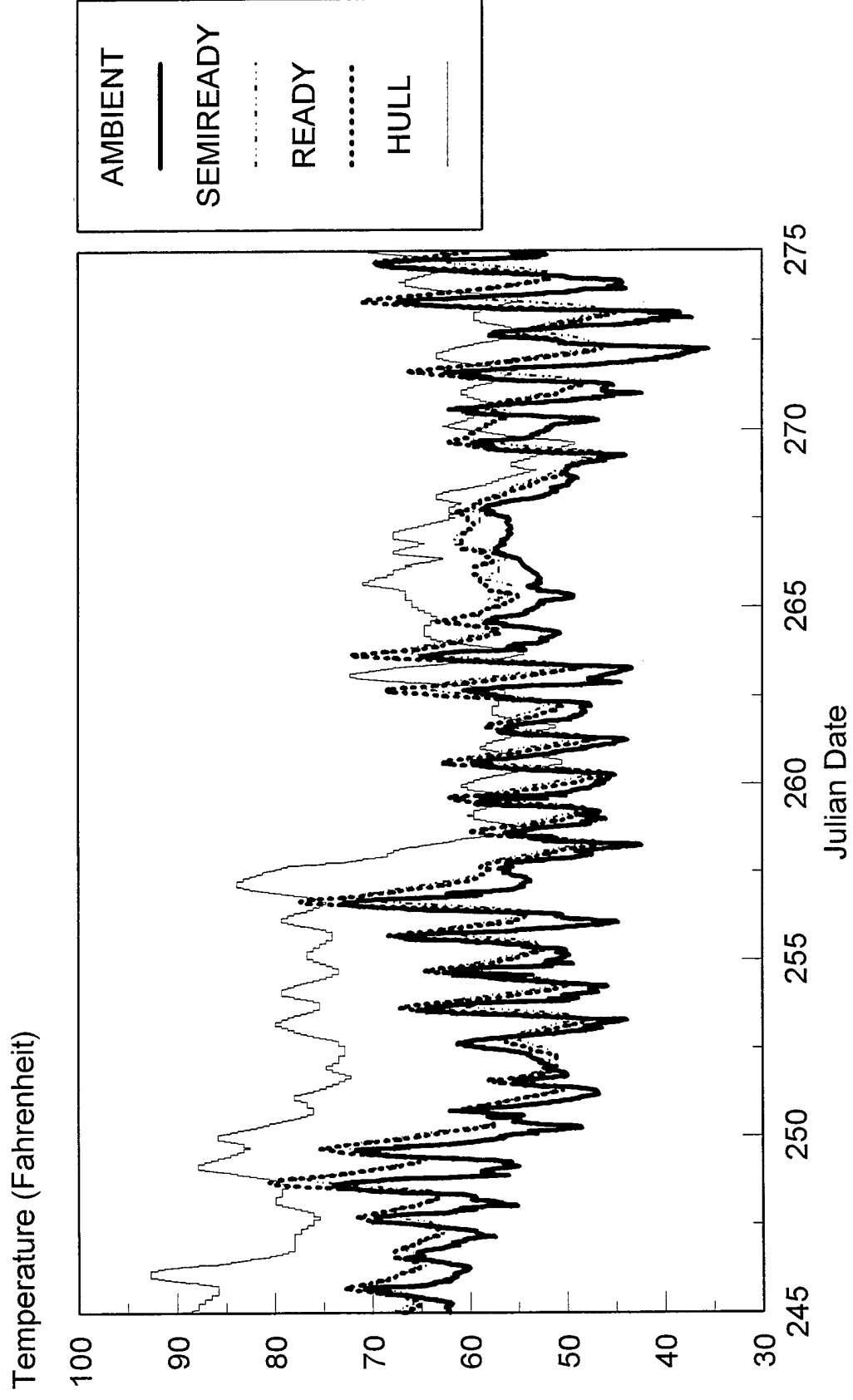
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 301



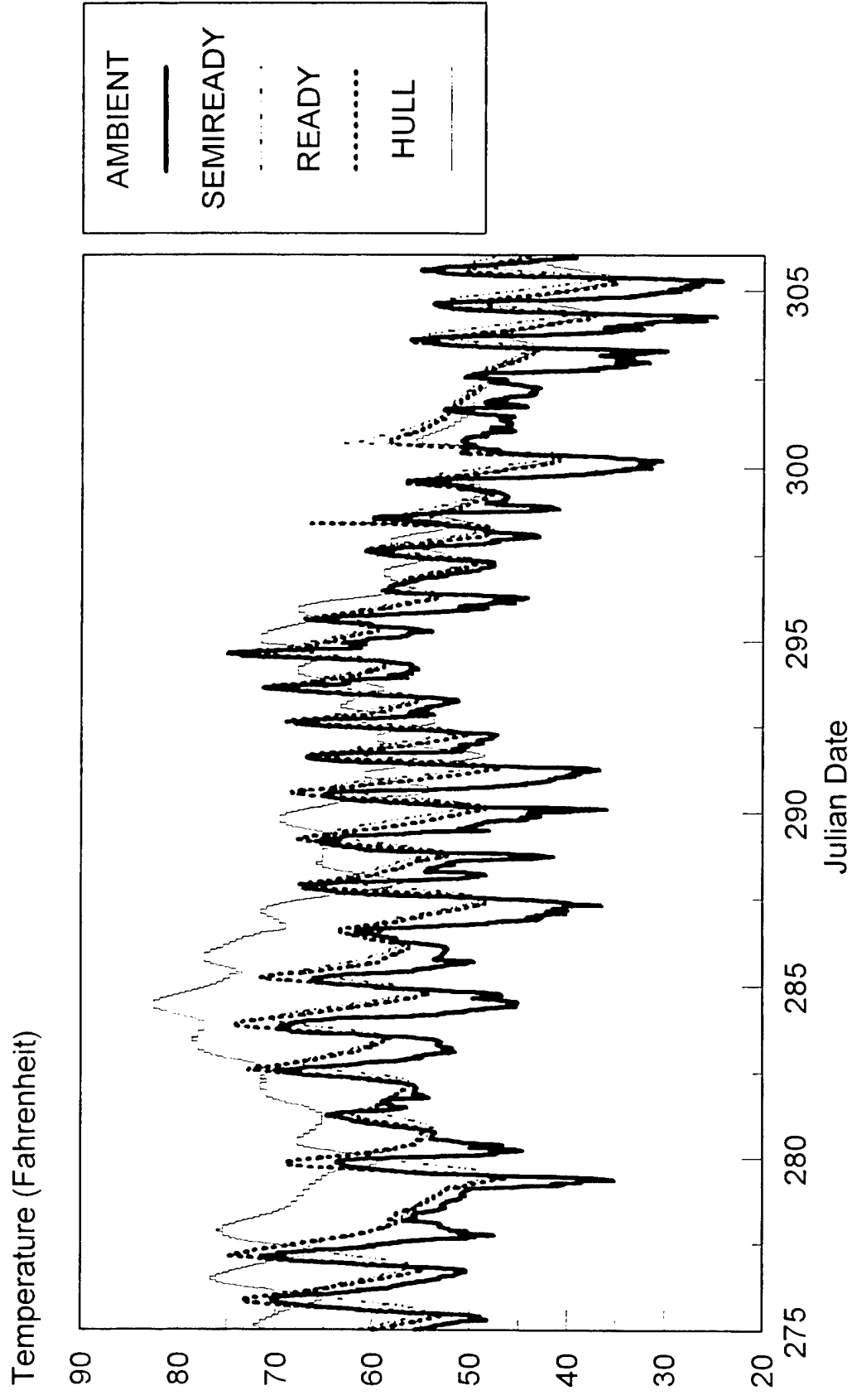
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 301



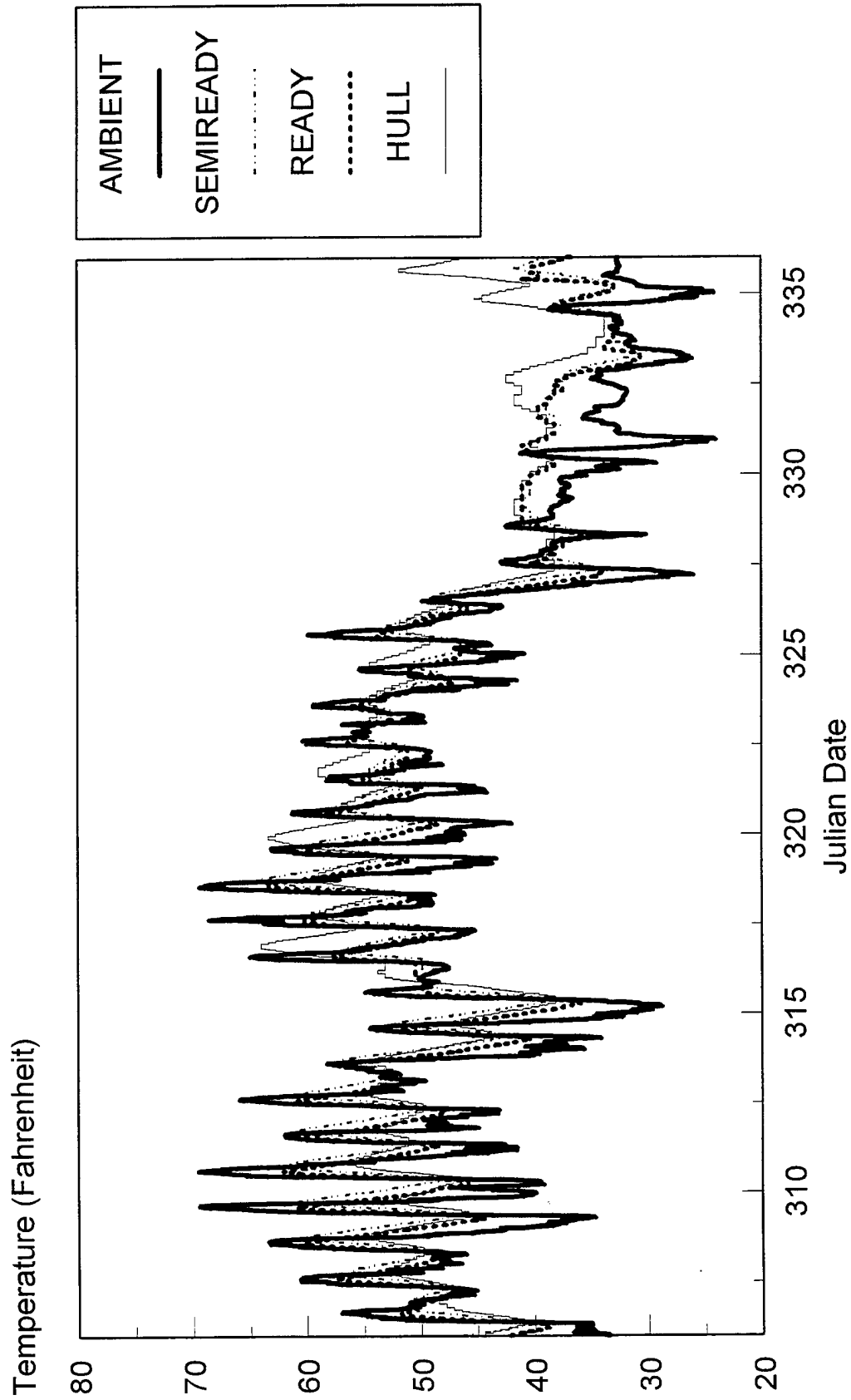
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 301



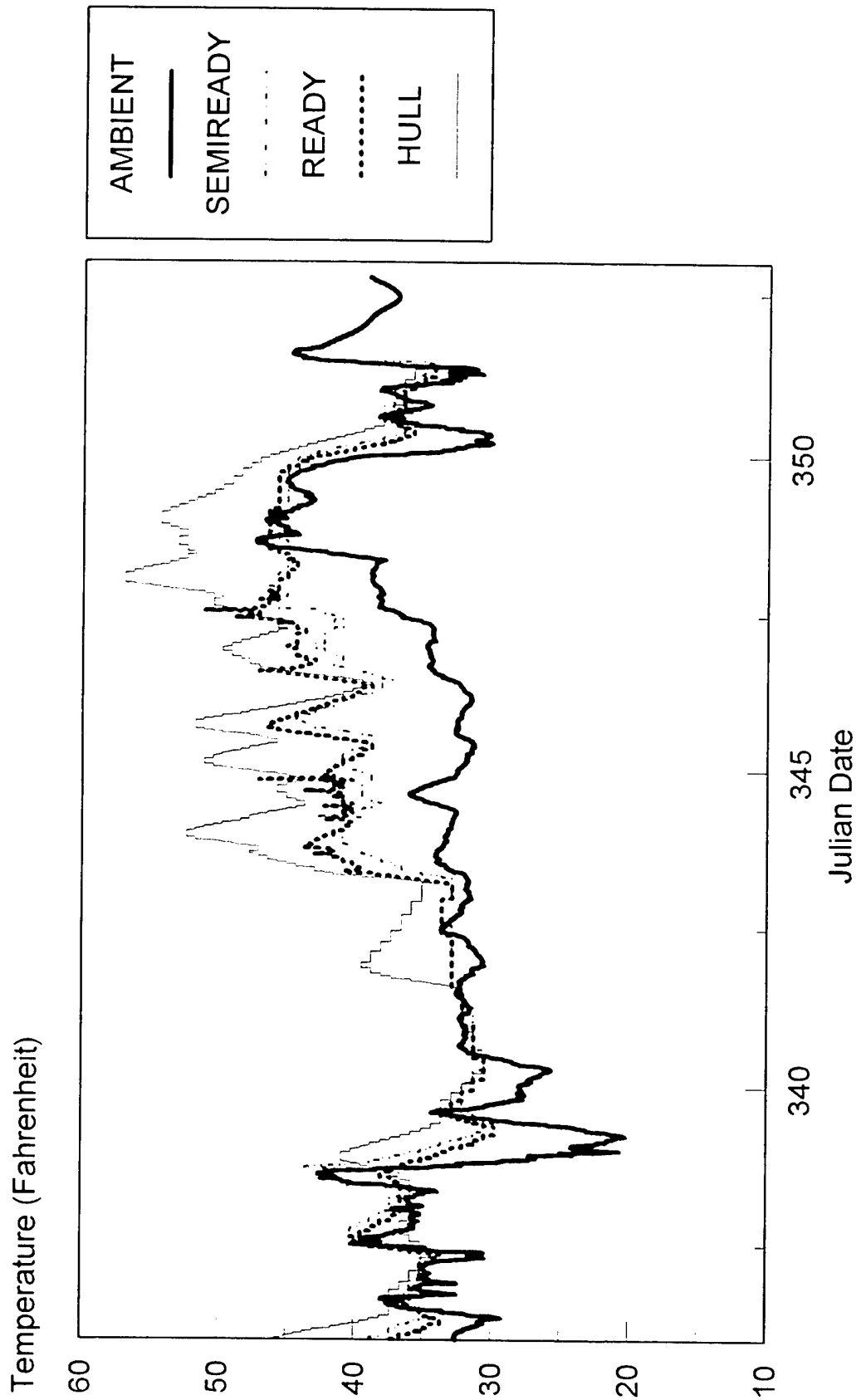
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 301



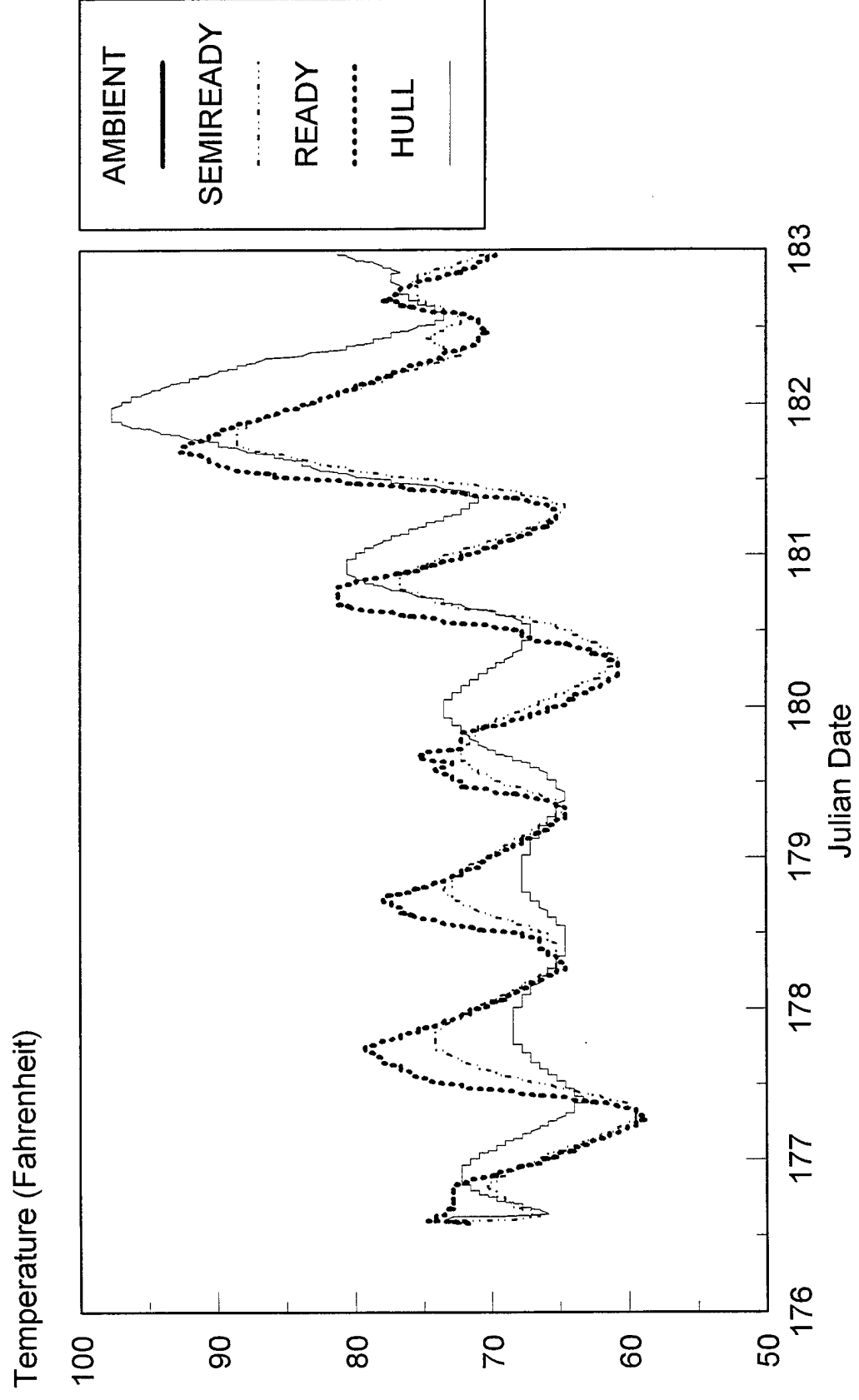
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 301



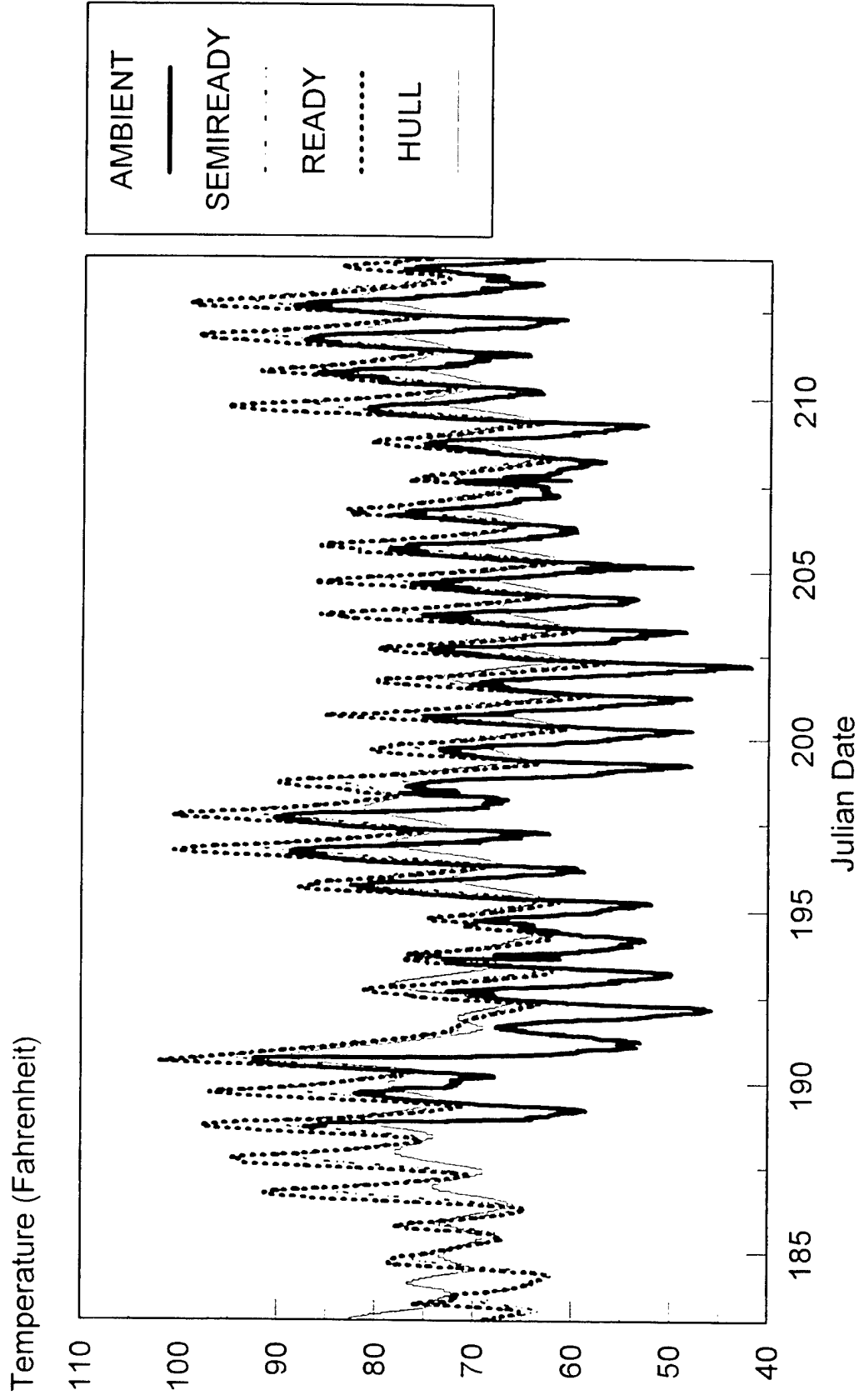
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 301



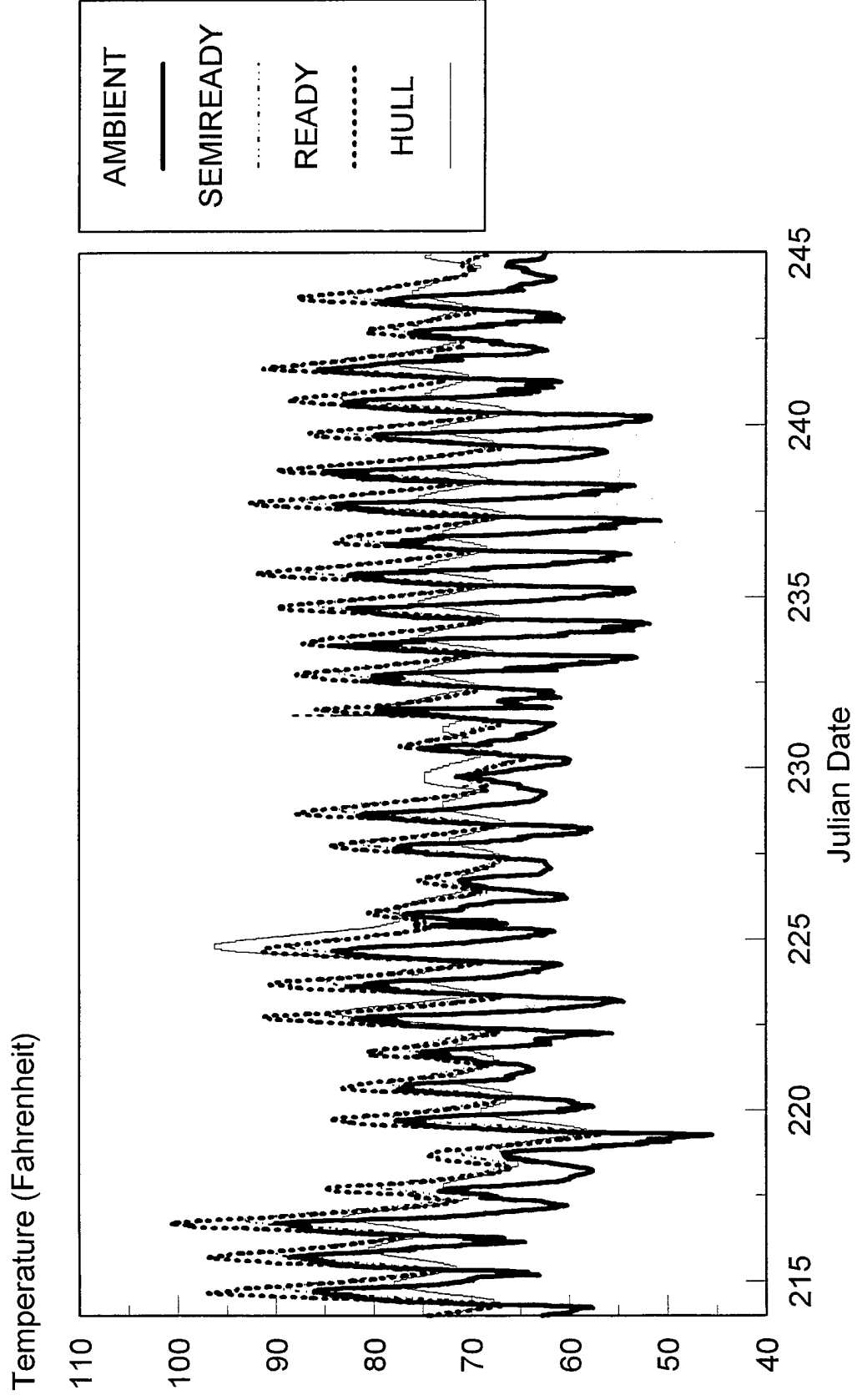
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



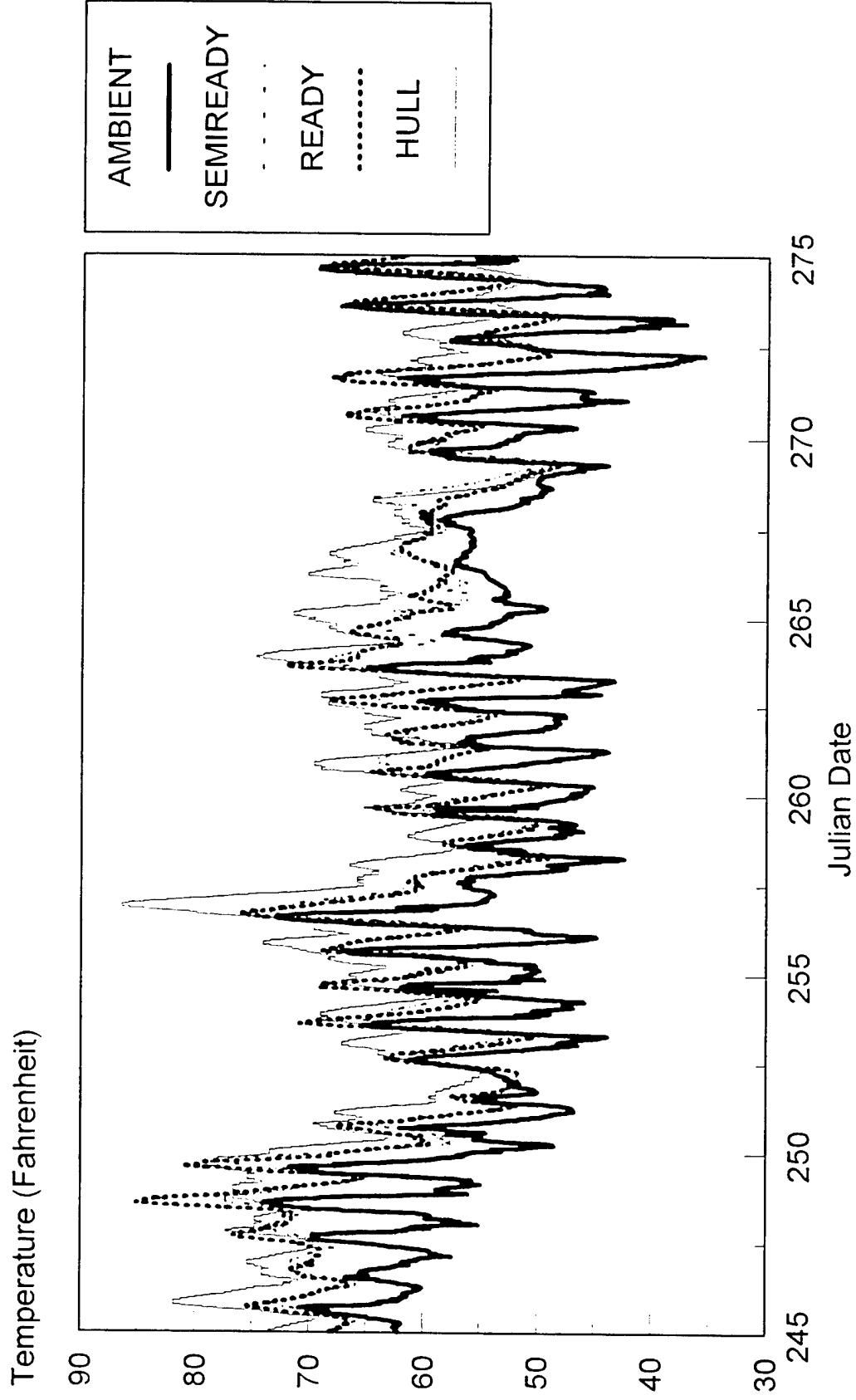
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



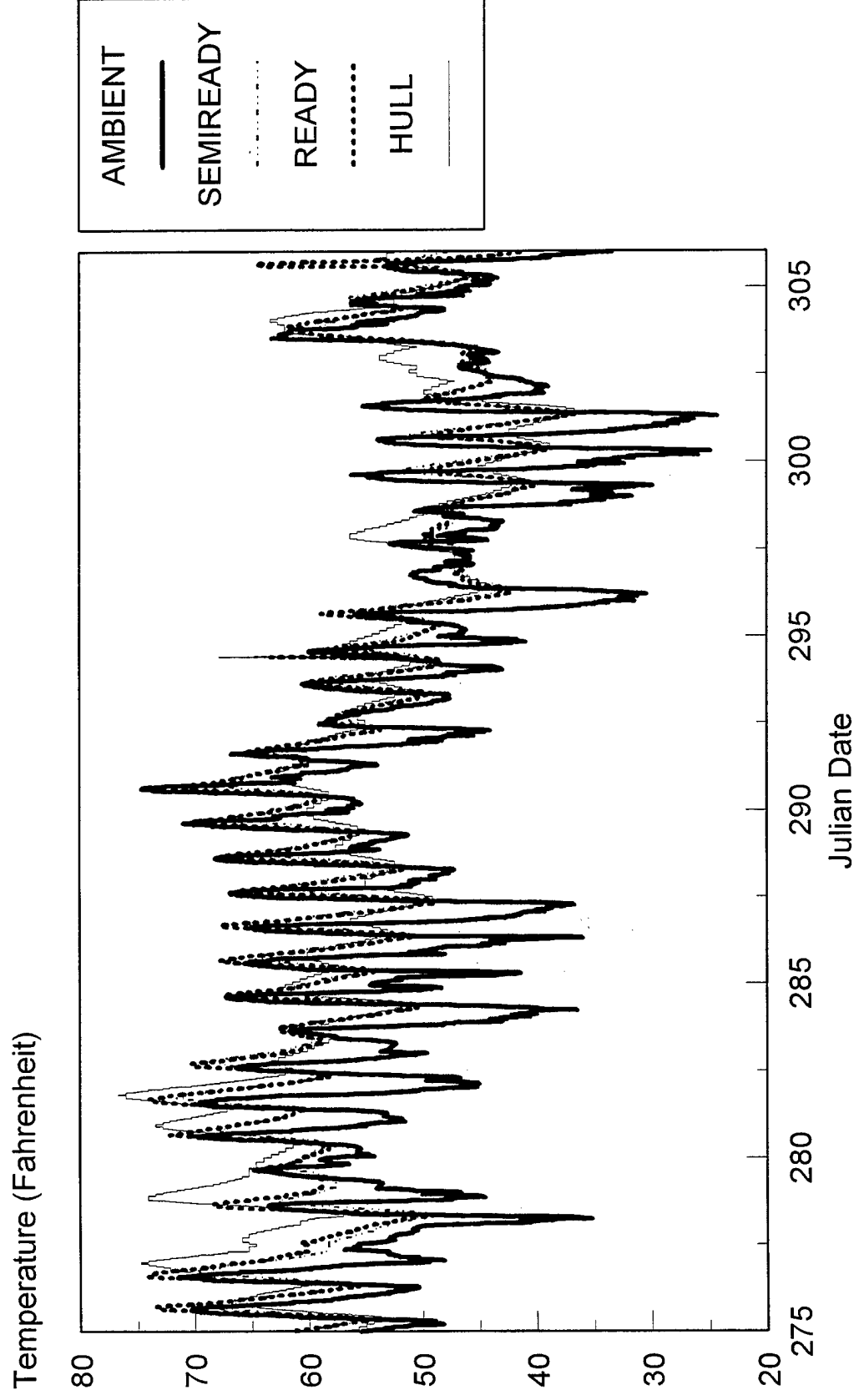
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



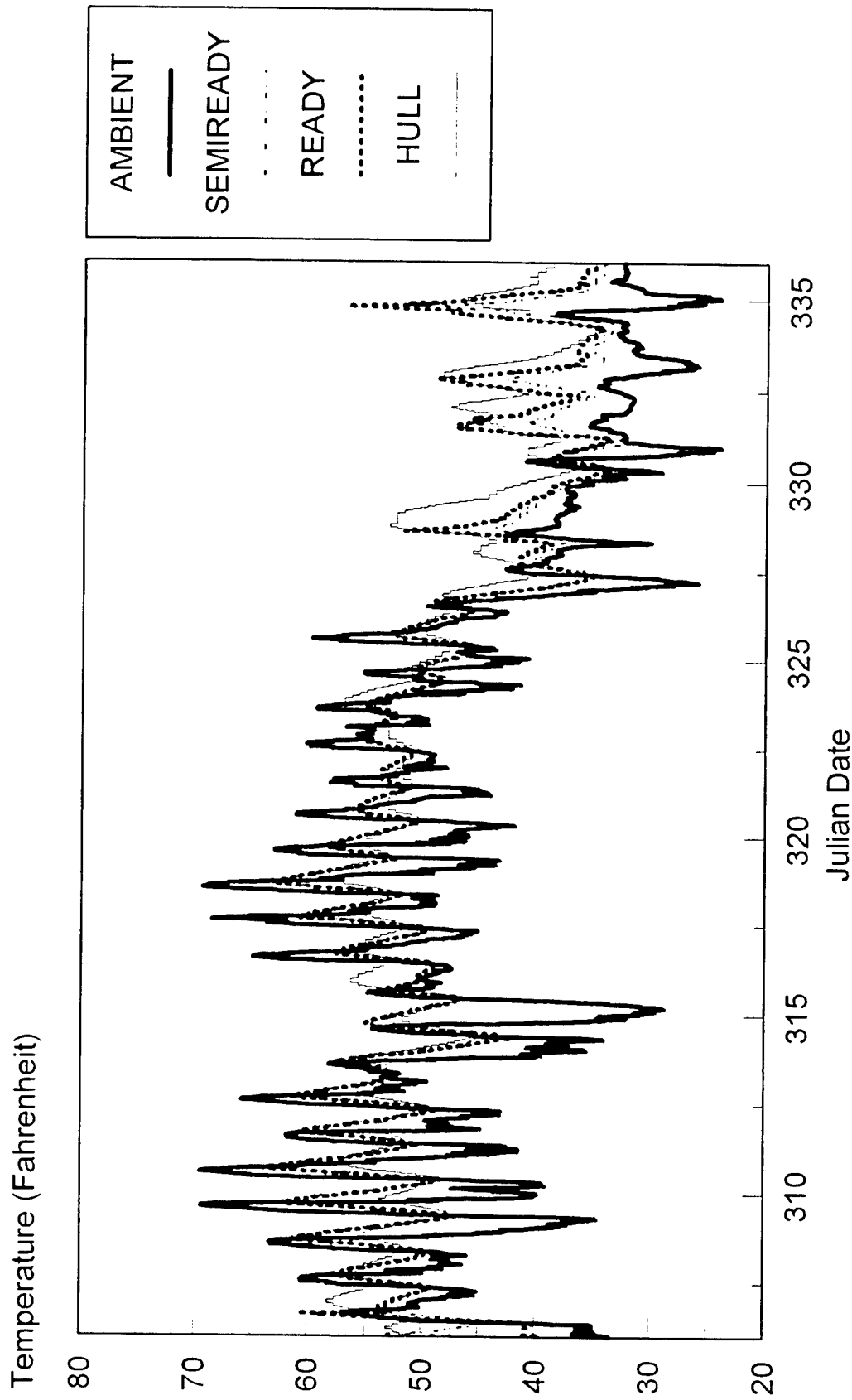
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



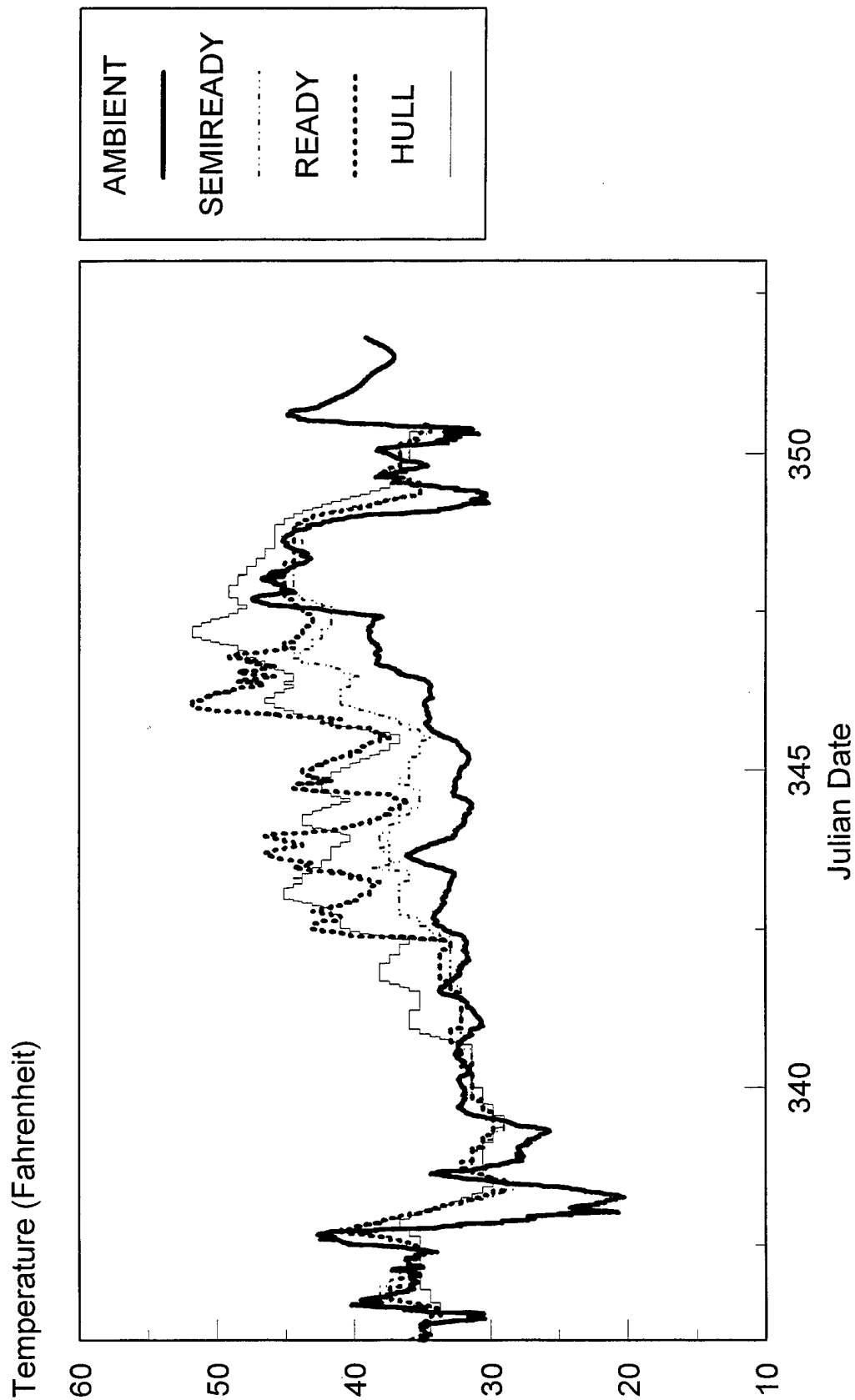
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



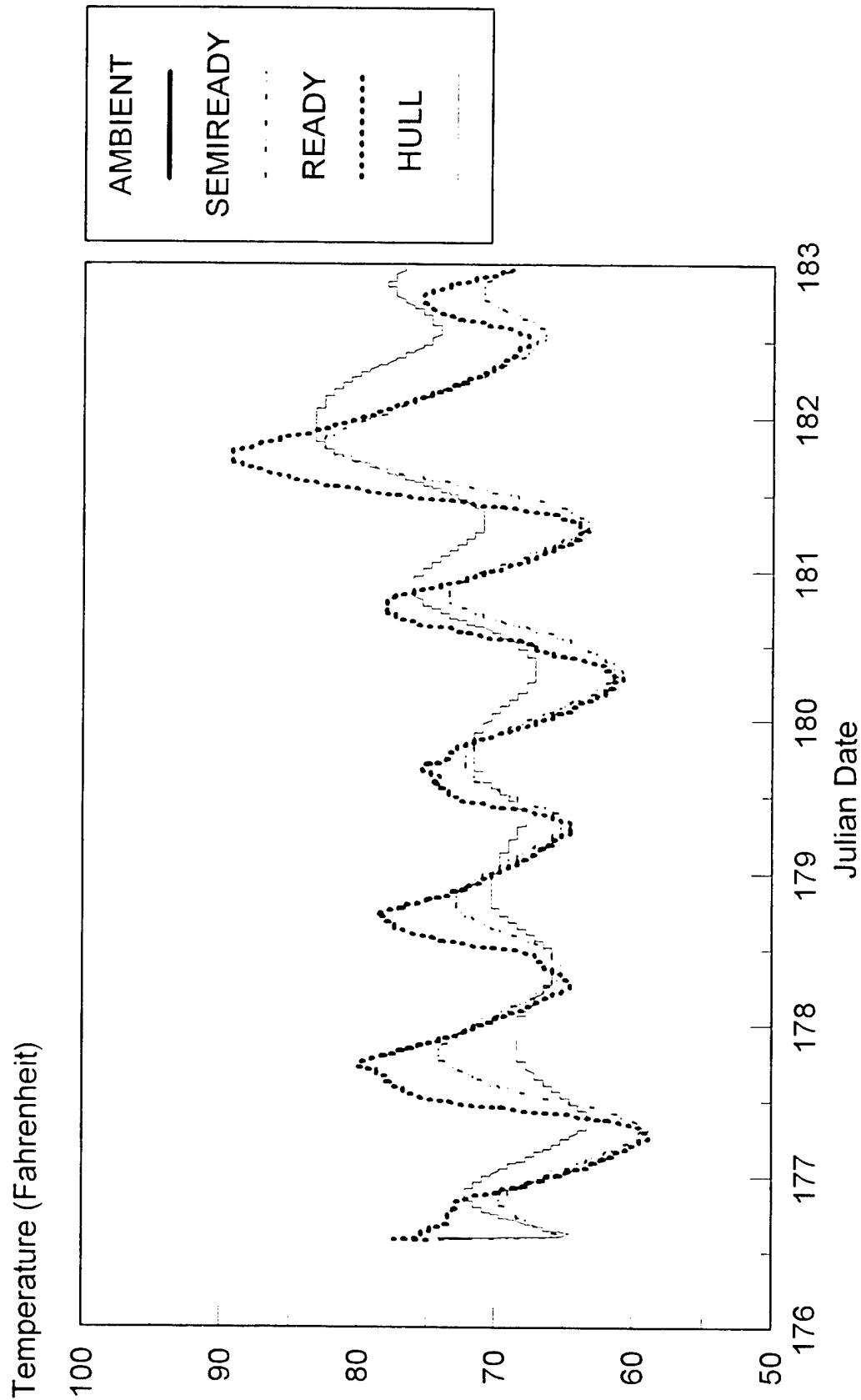
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 304



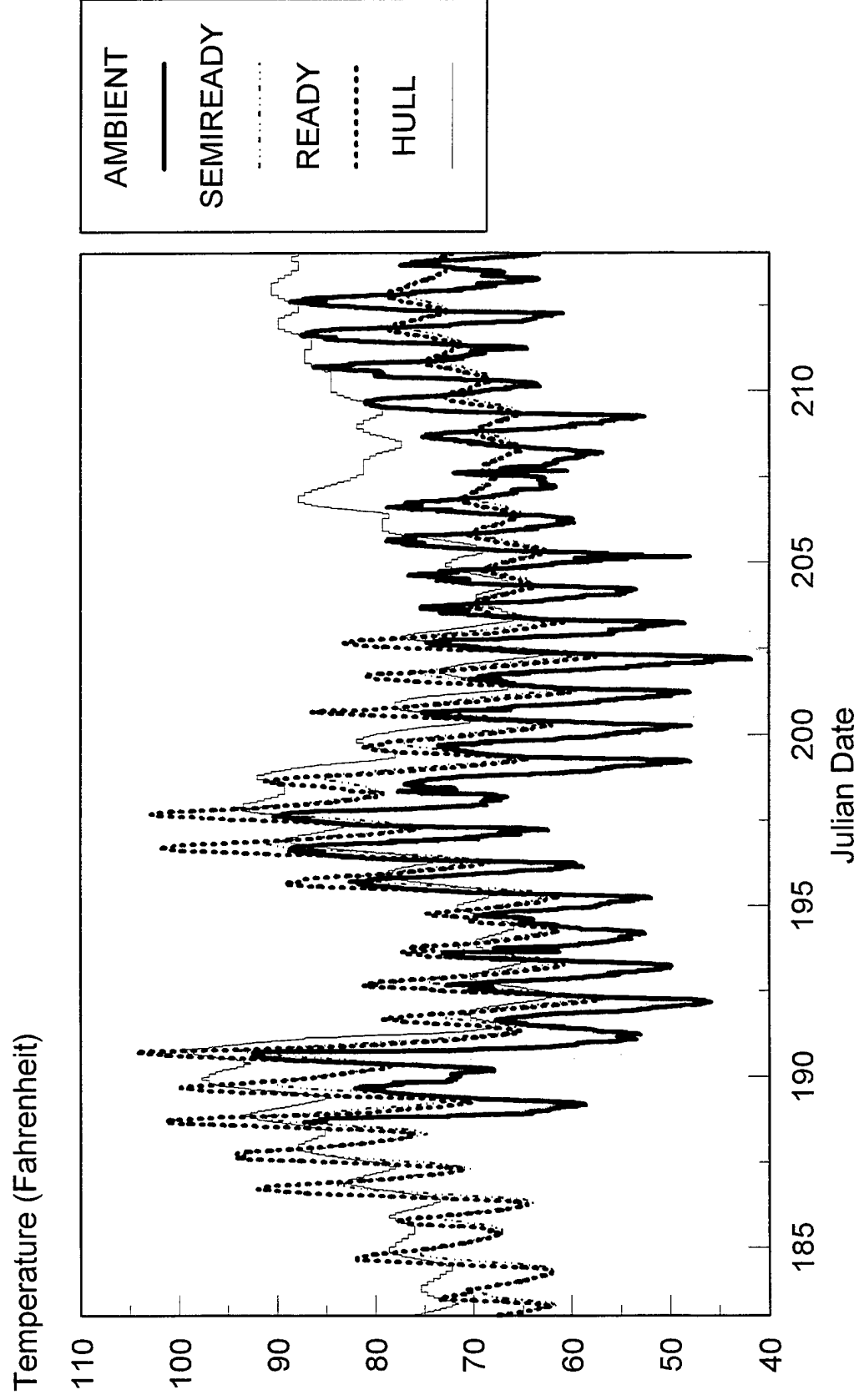
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 304



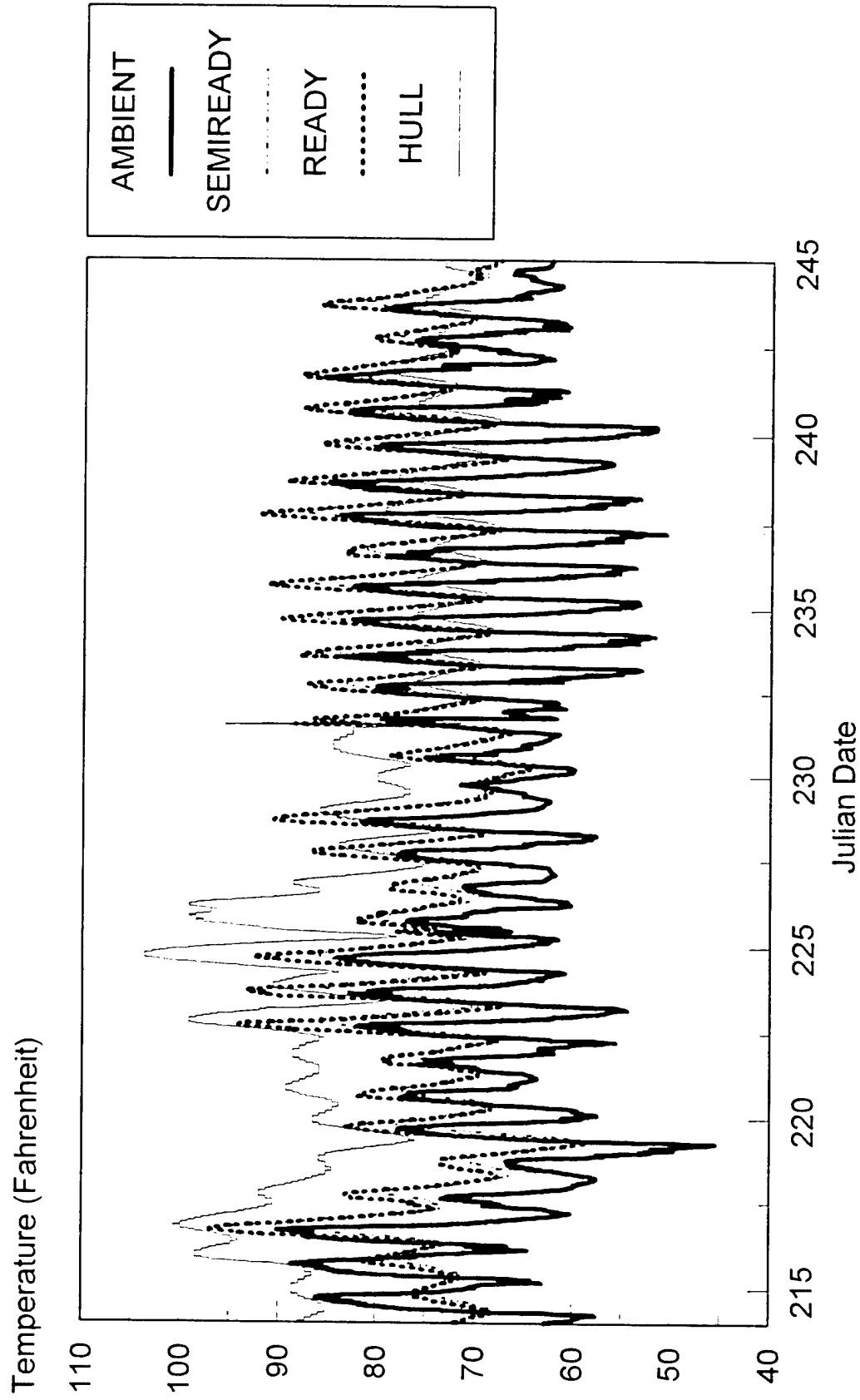
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 306



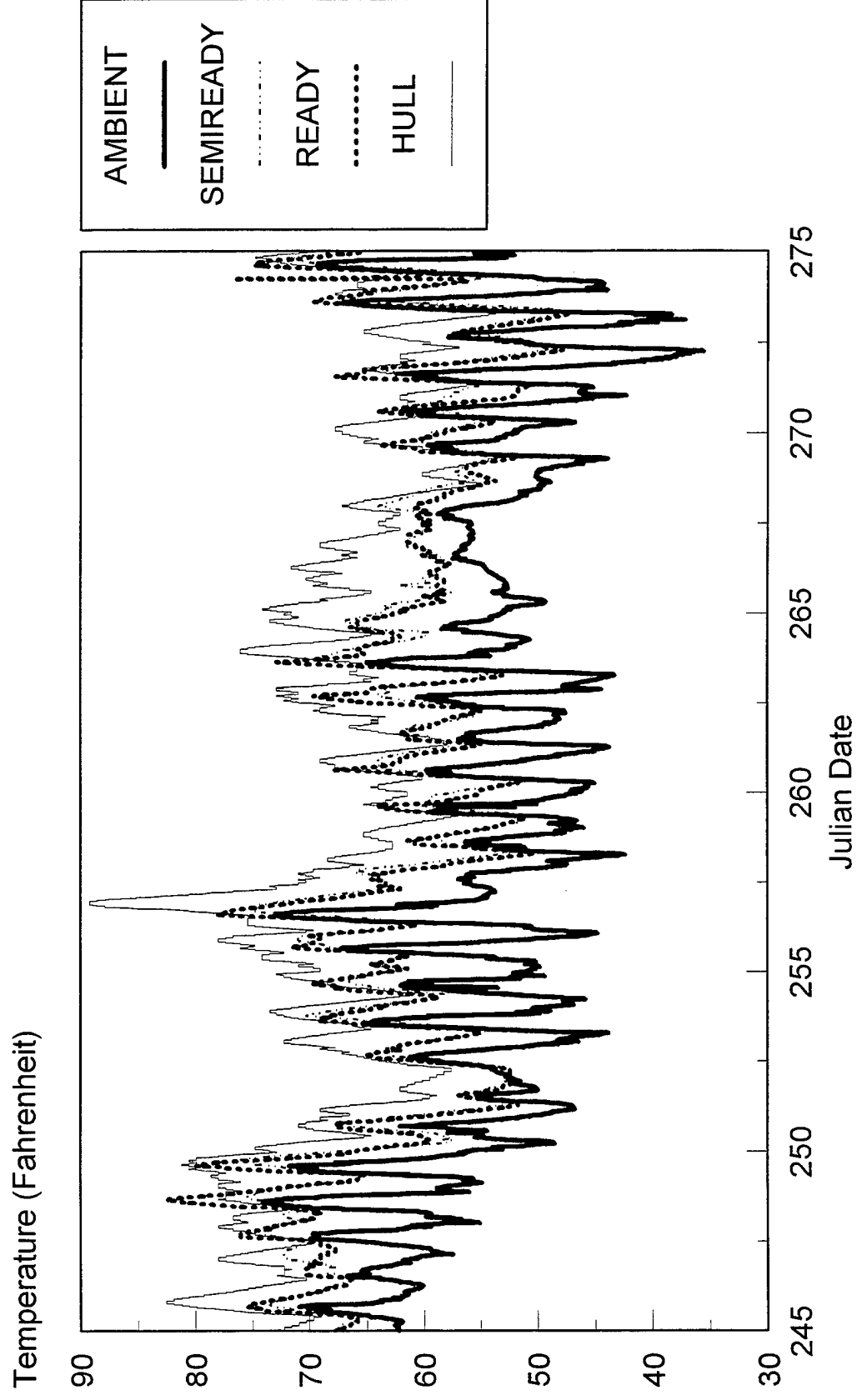
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 306



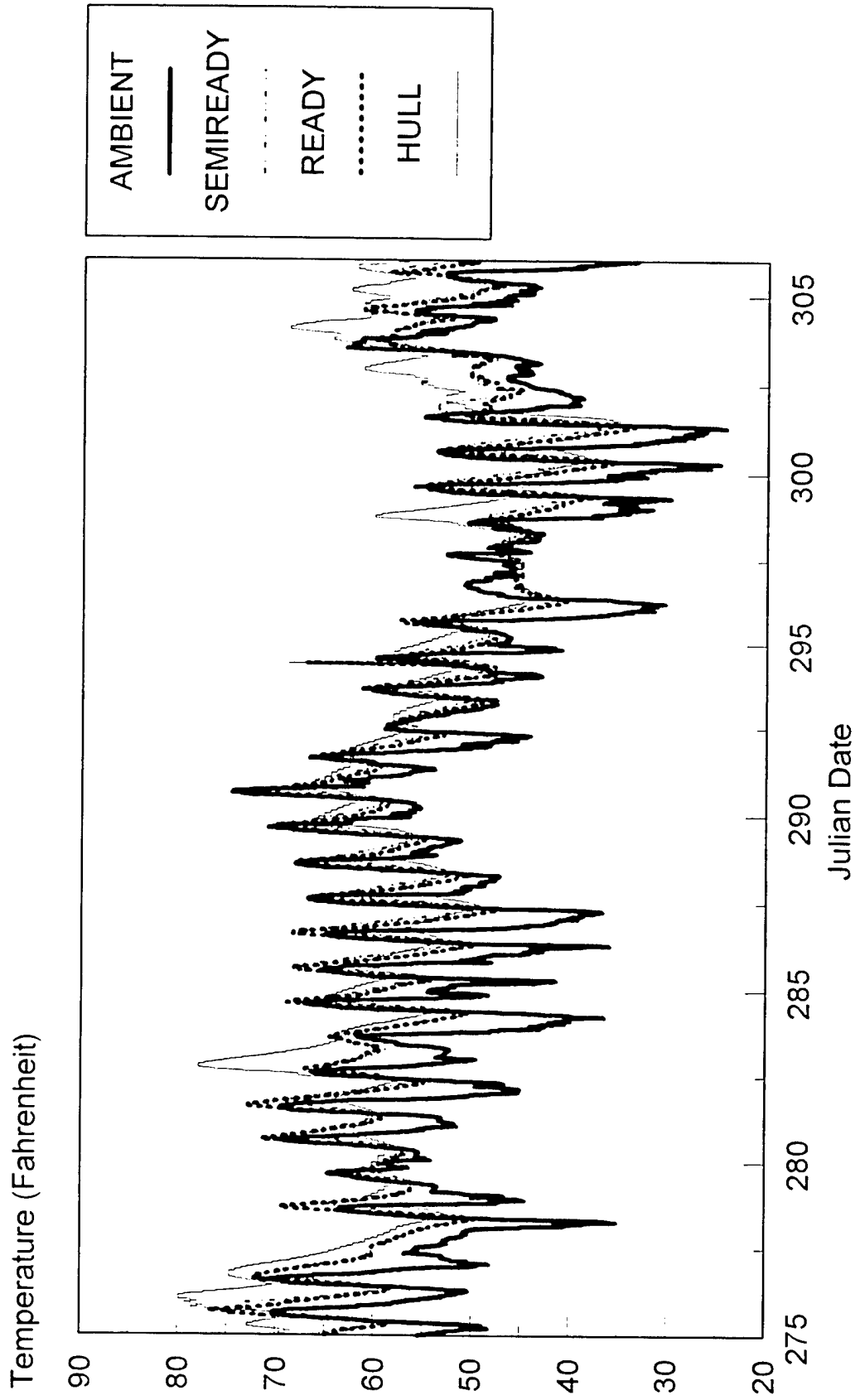
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 306



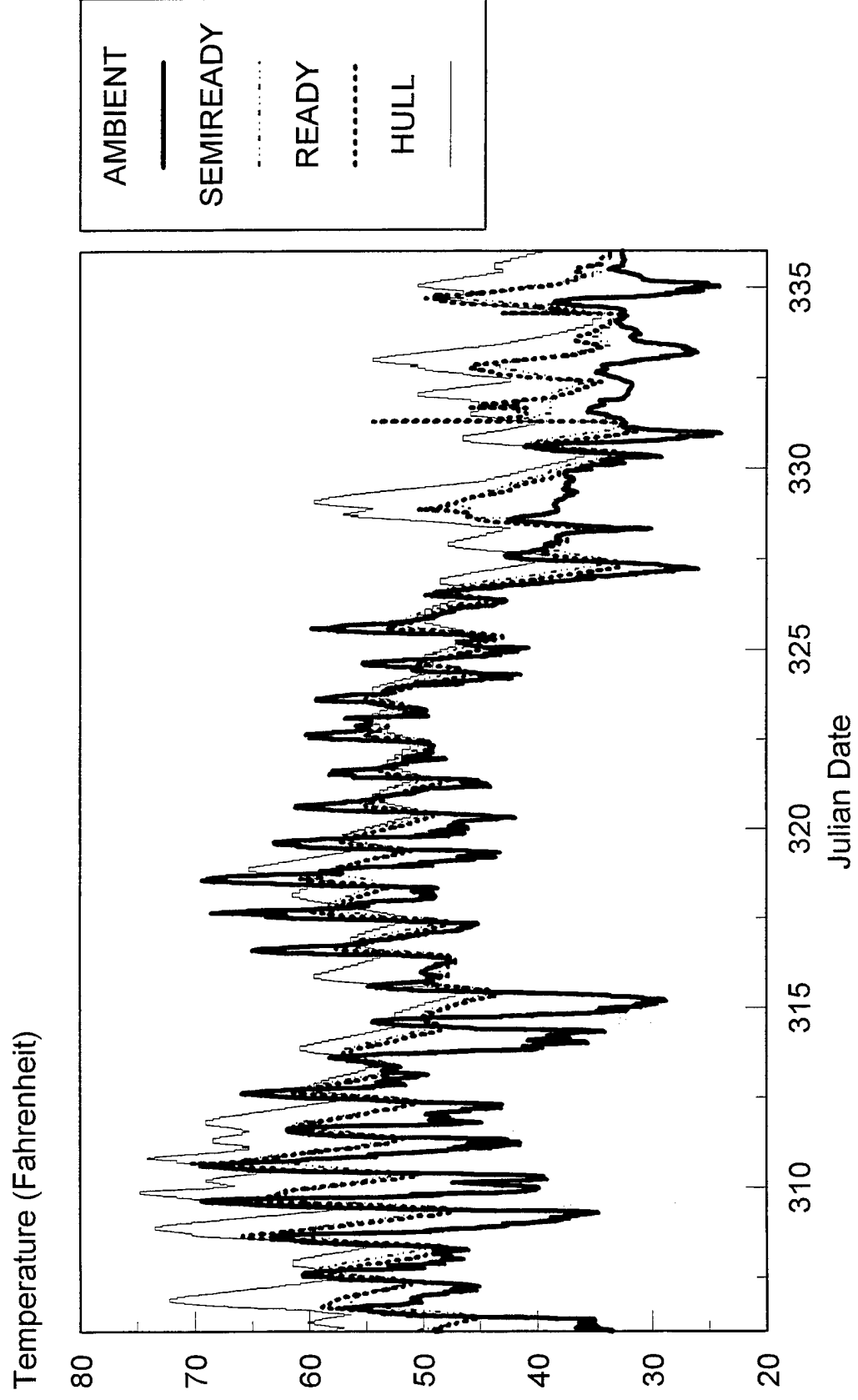
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 306



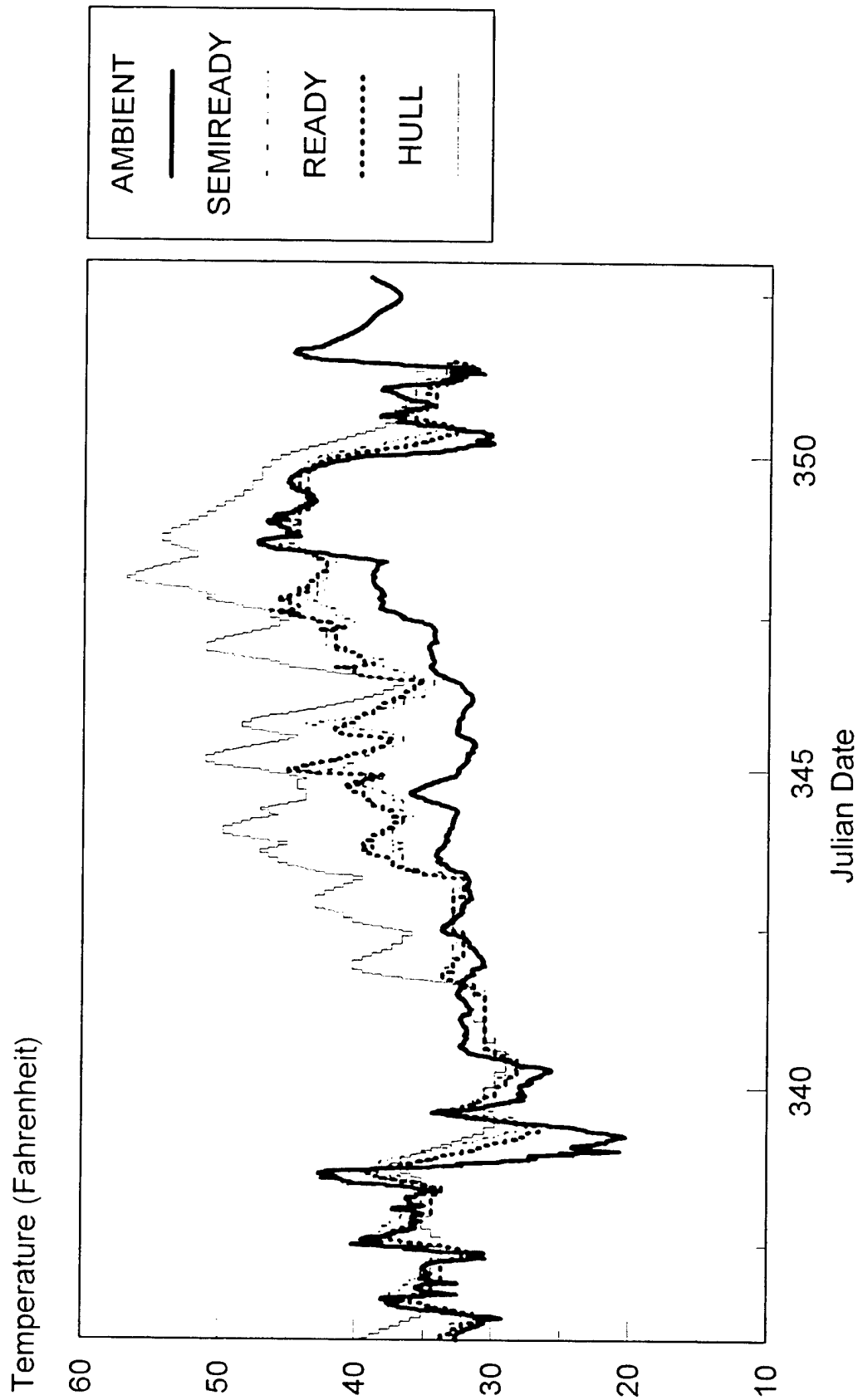
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 306



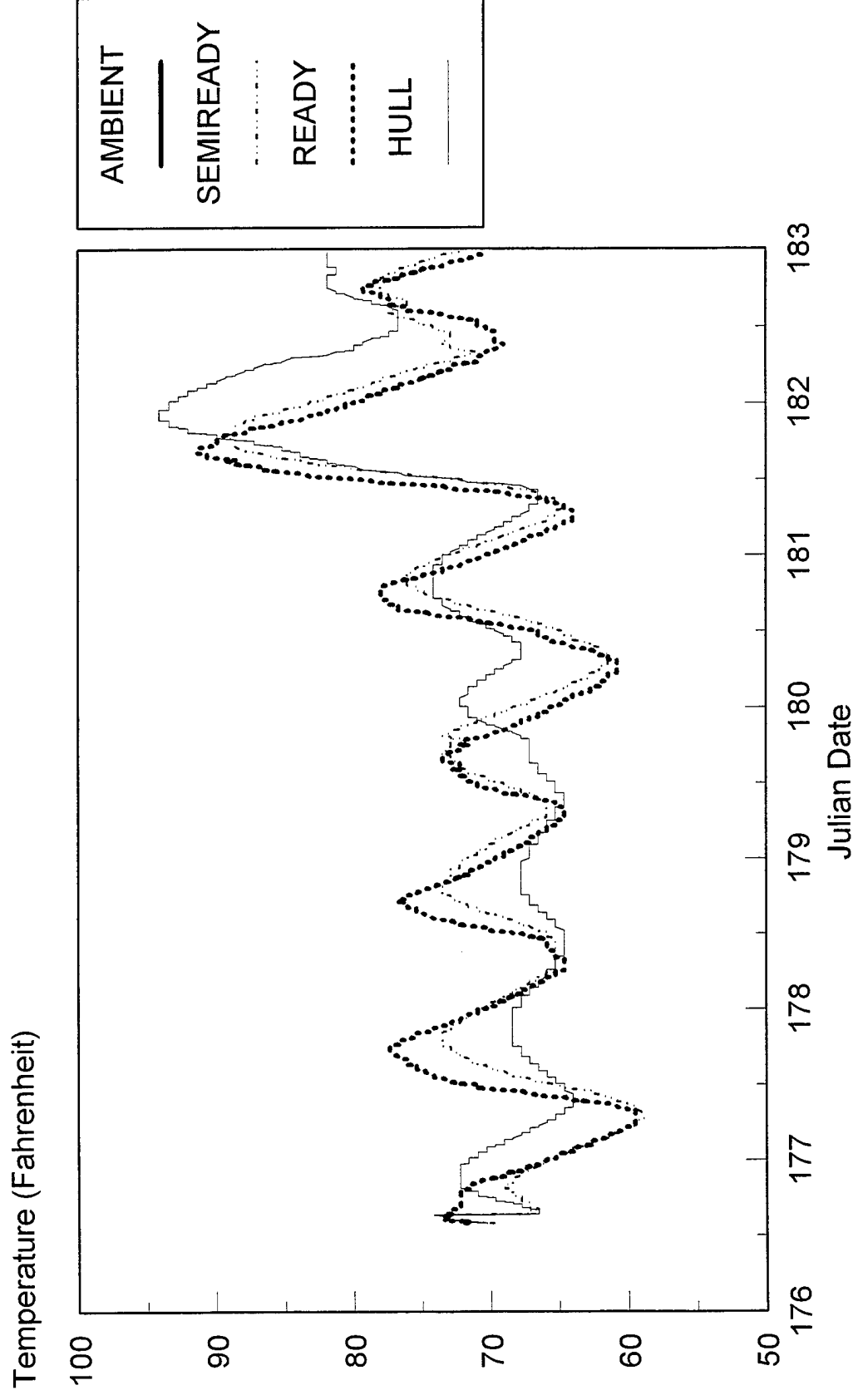
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 306



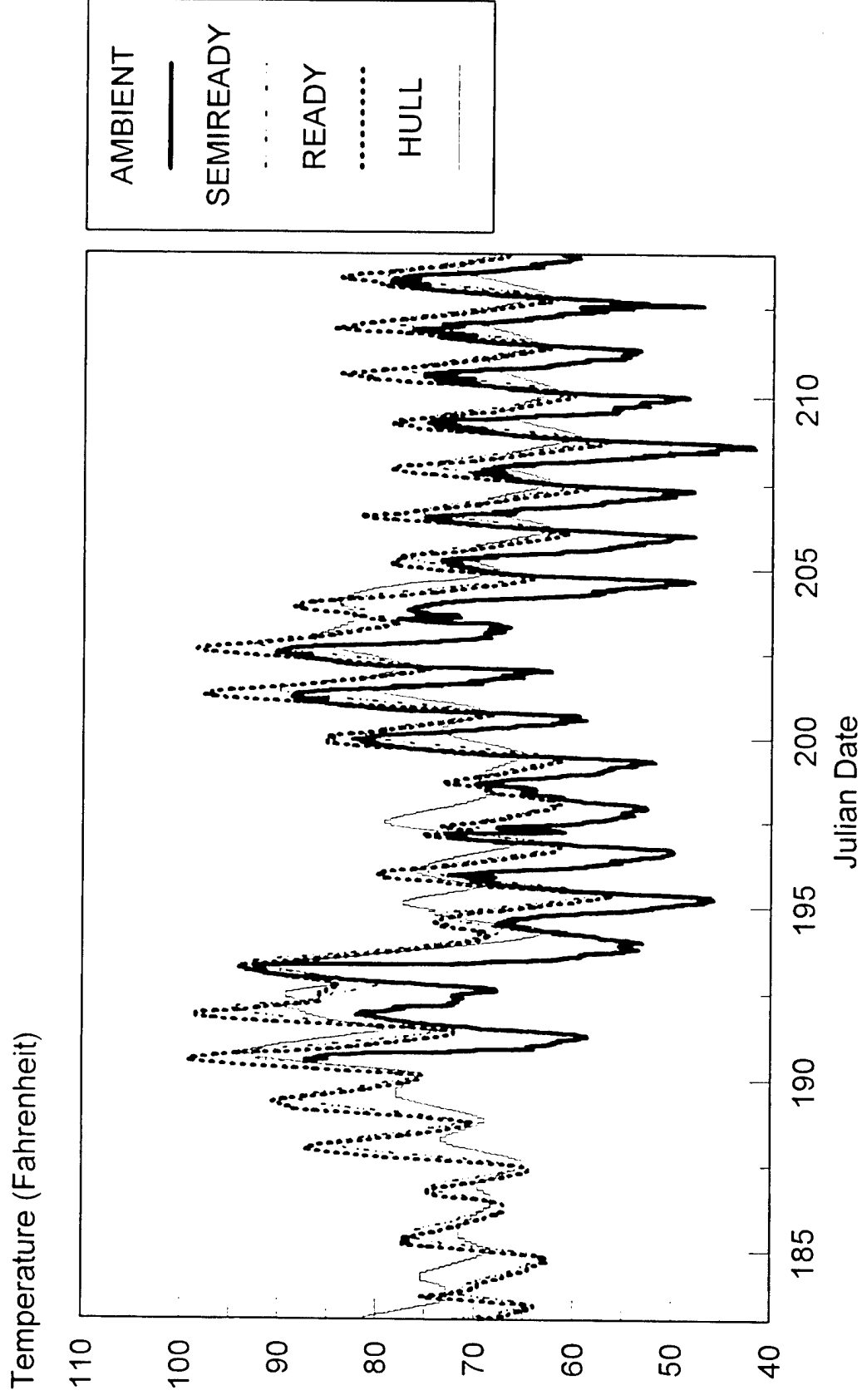
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 306



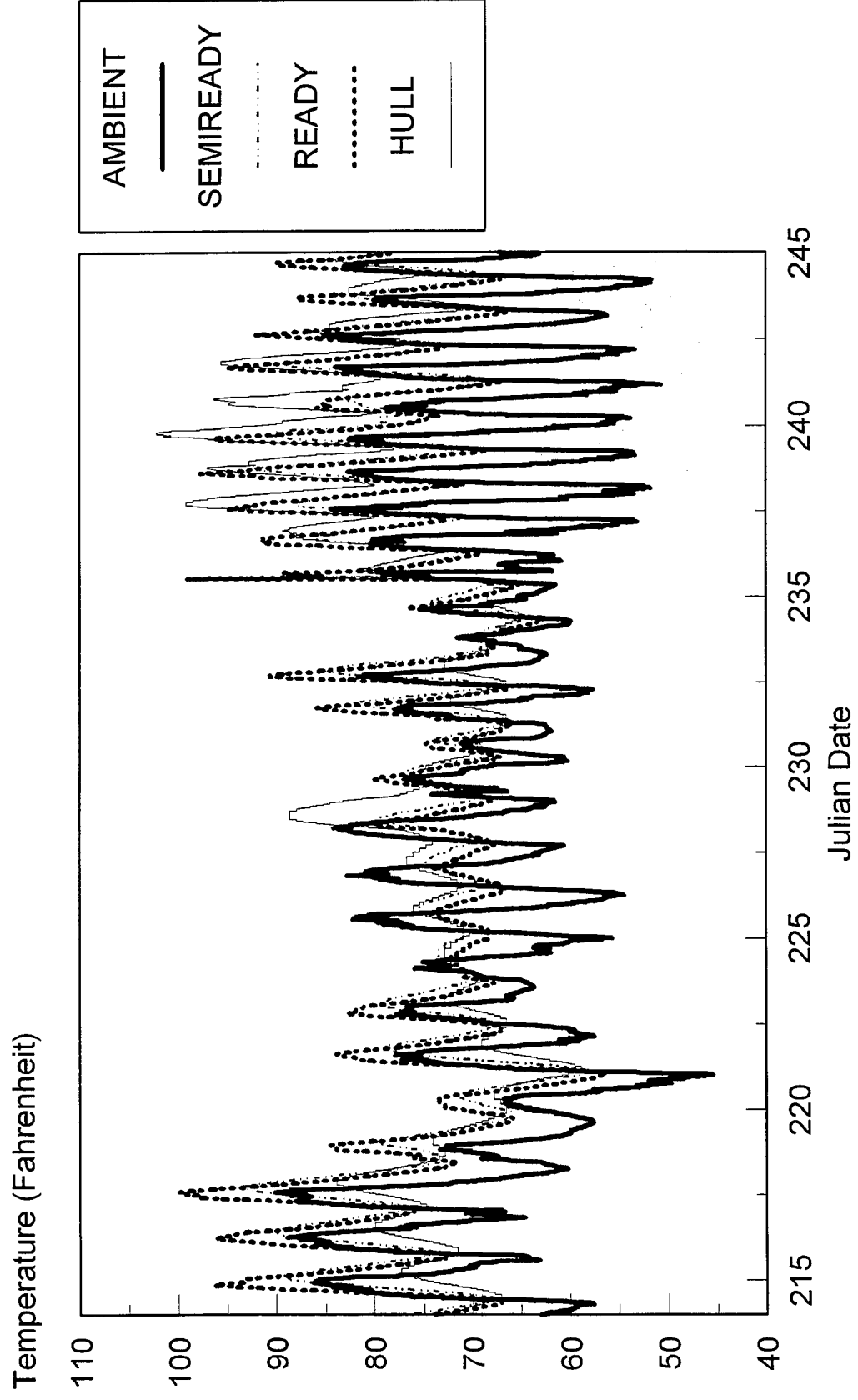
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 312



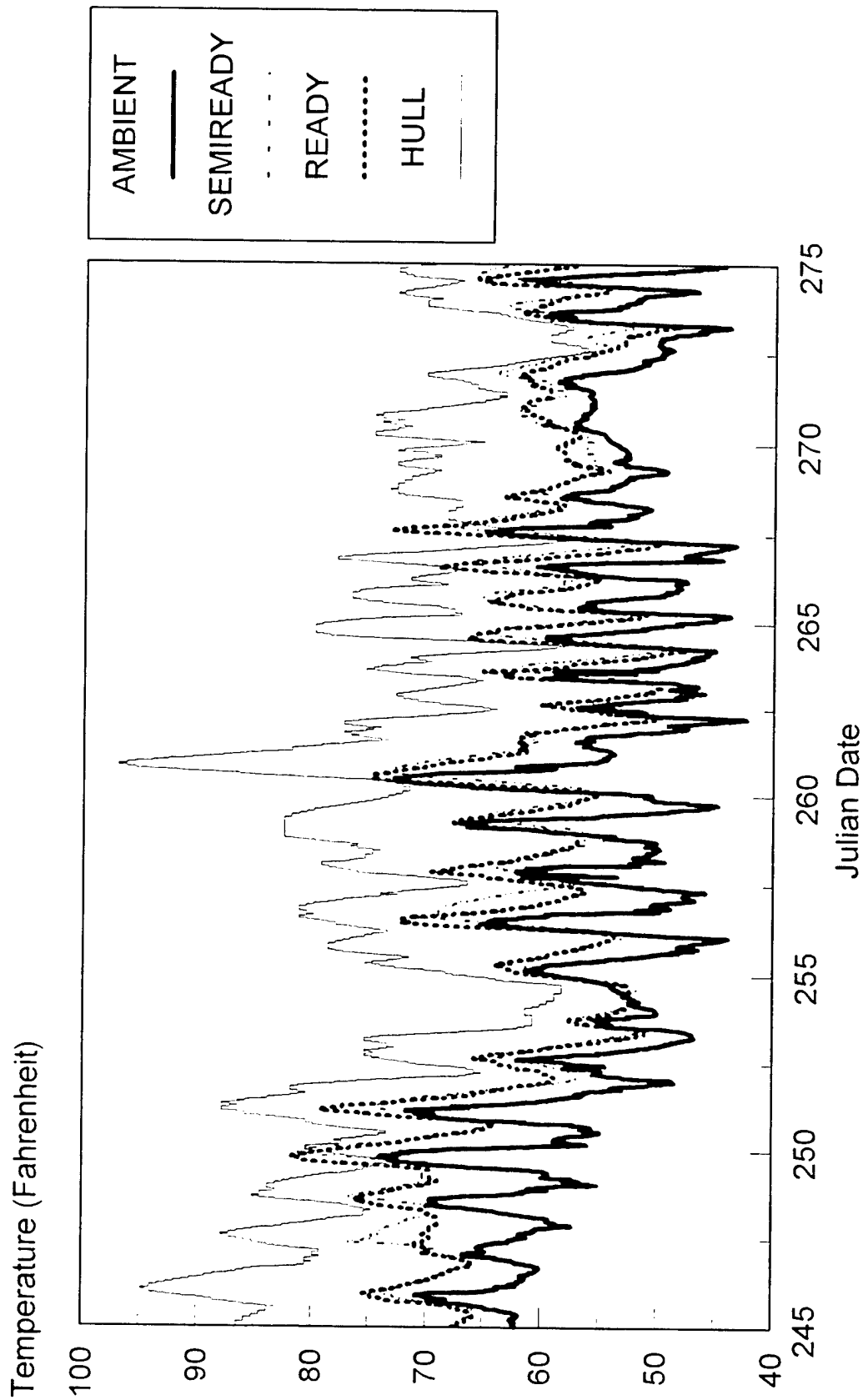
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 312



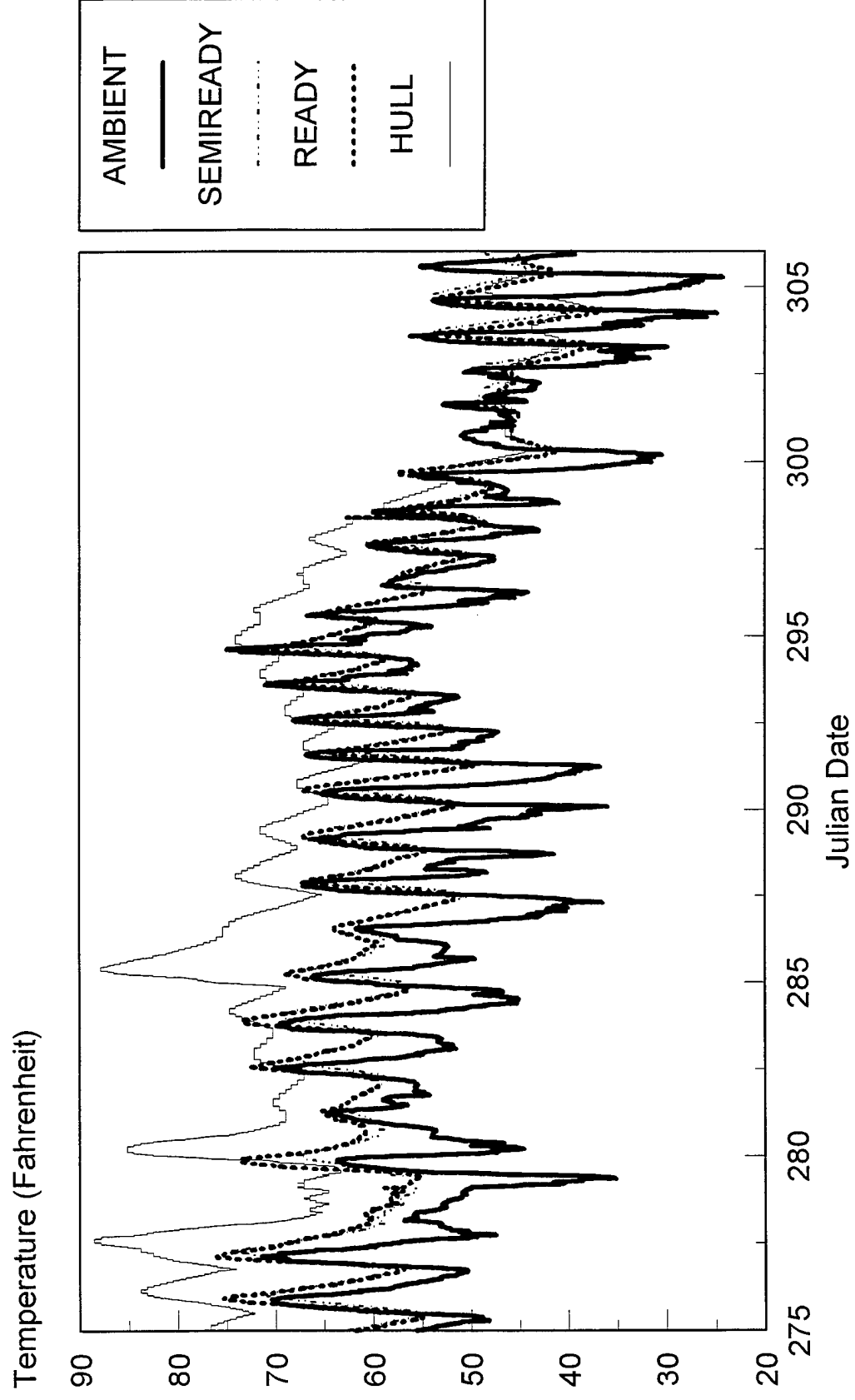
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 312



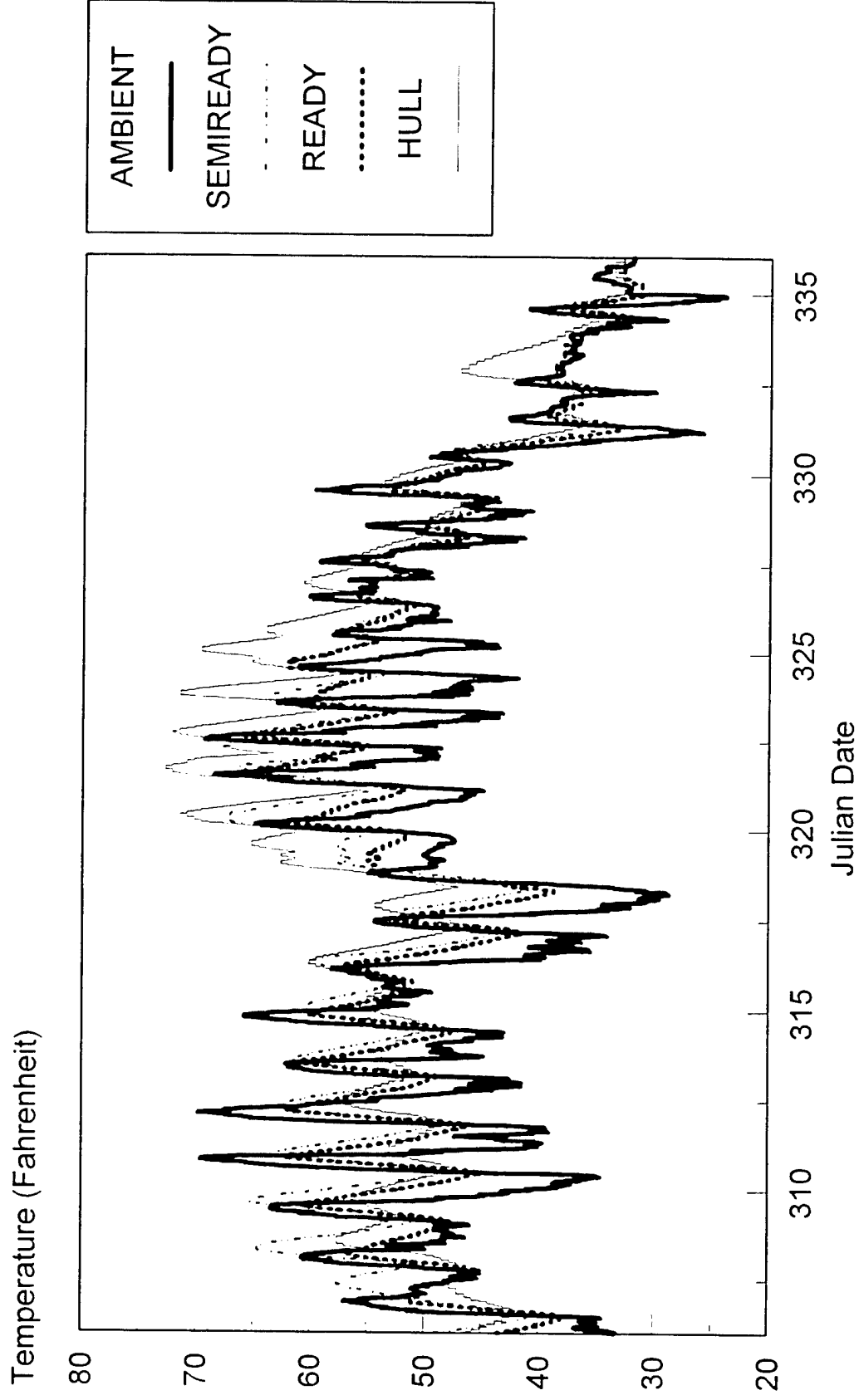
1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 312



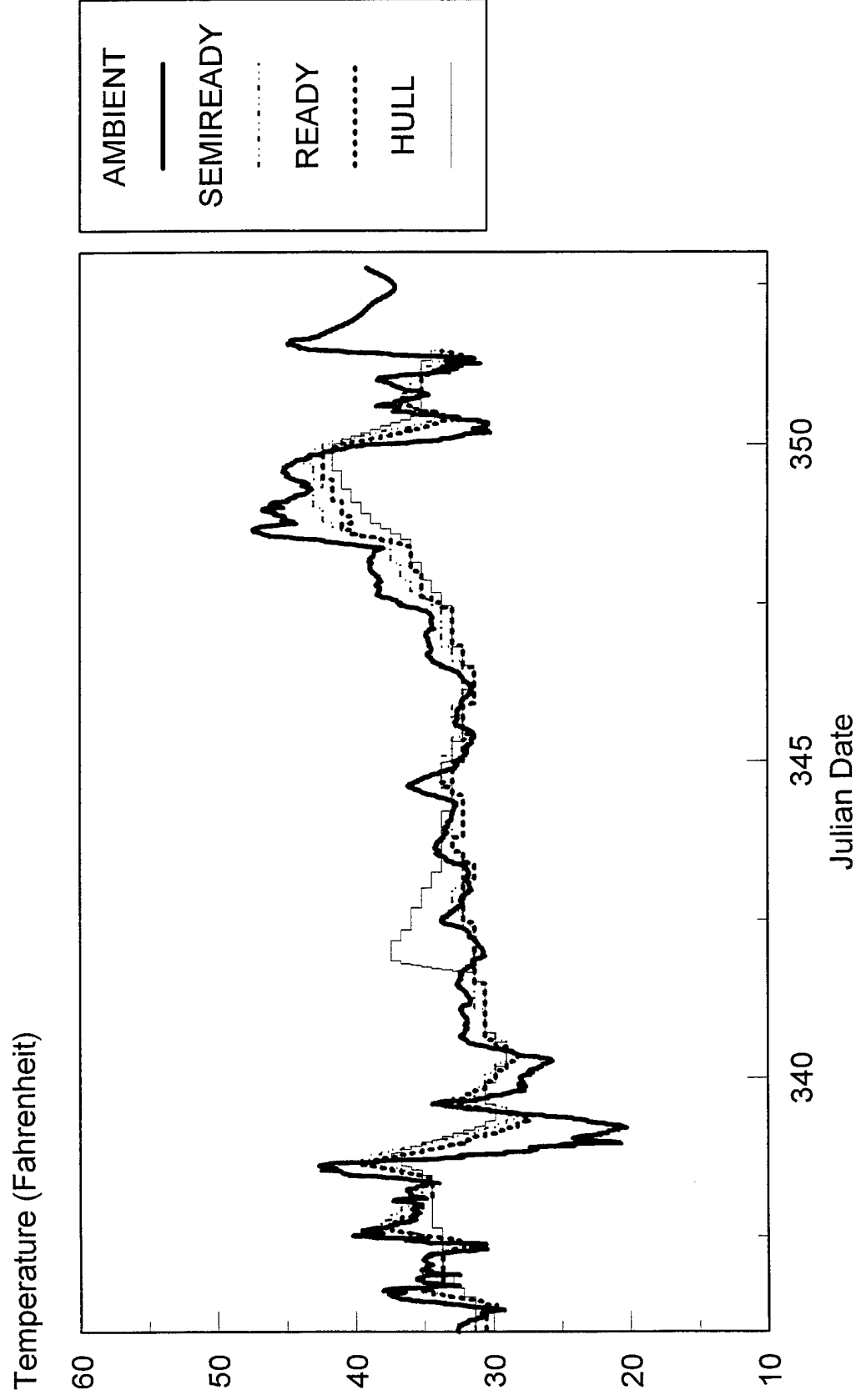
1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 312



1996 M1A1 Tank Evaluation Taborfalva Training Area, Hungary Tank 312

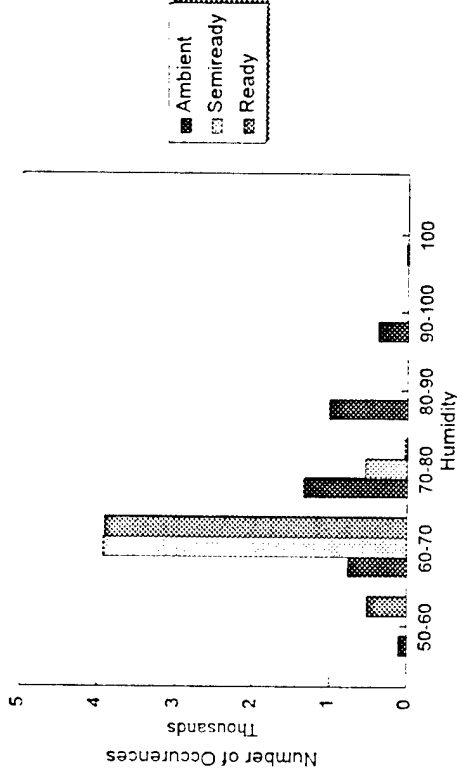


1996 M1A1 Tank Evaluation
Taborfalva Training Area, Hungary
Tank 312



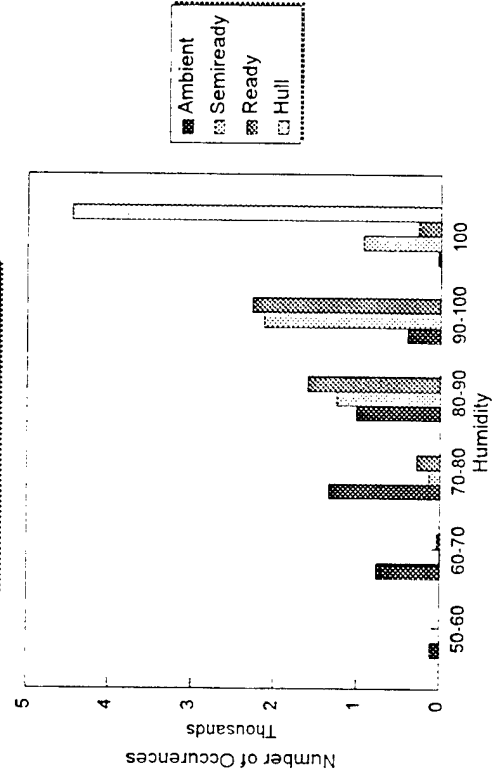
Hungary, Tank 306

July, 1996



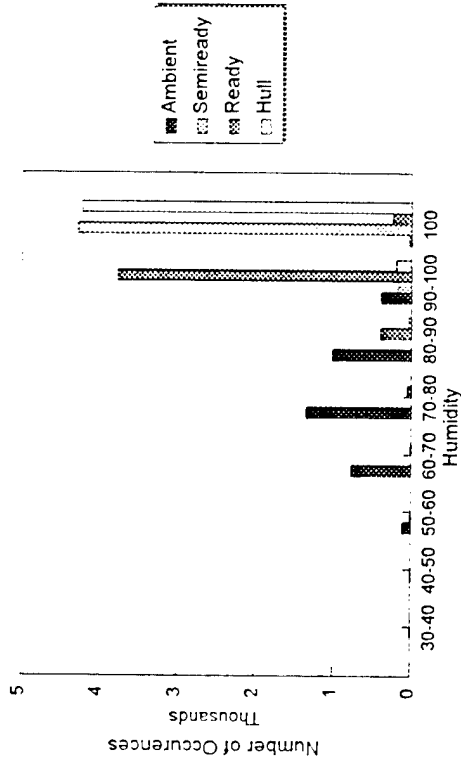
Hungary, Tank 312

July, 1996



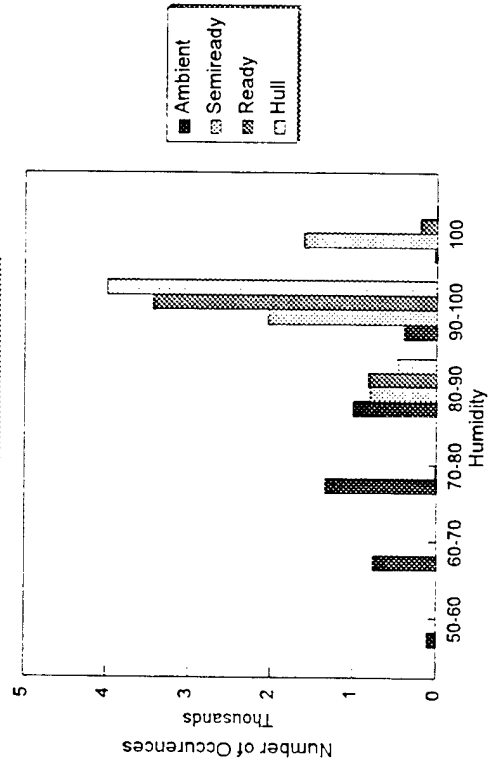
Hungary, Tank 301

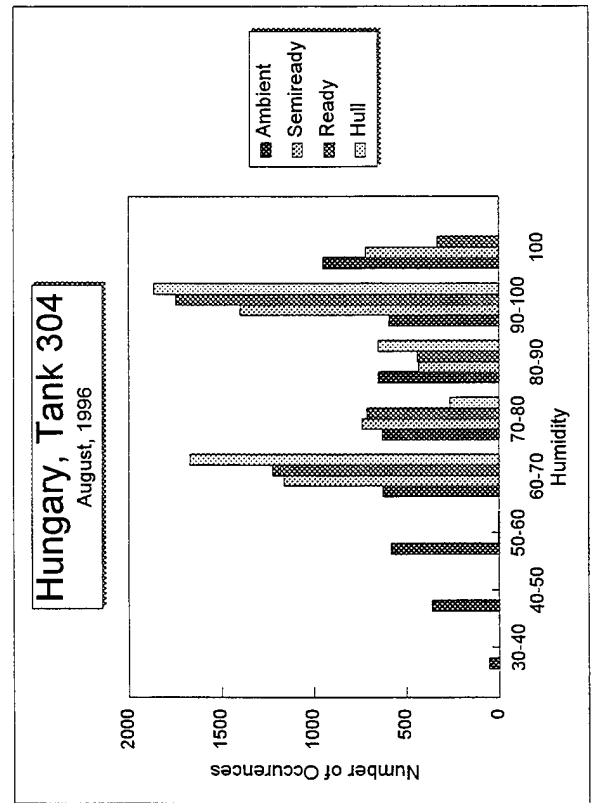
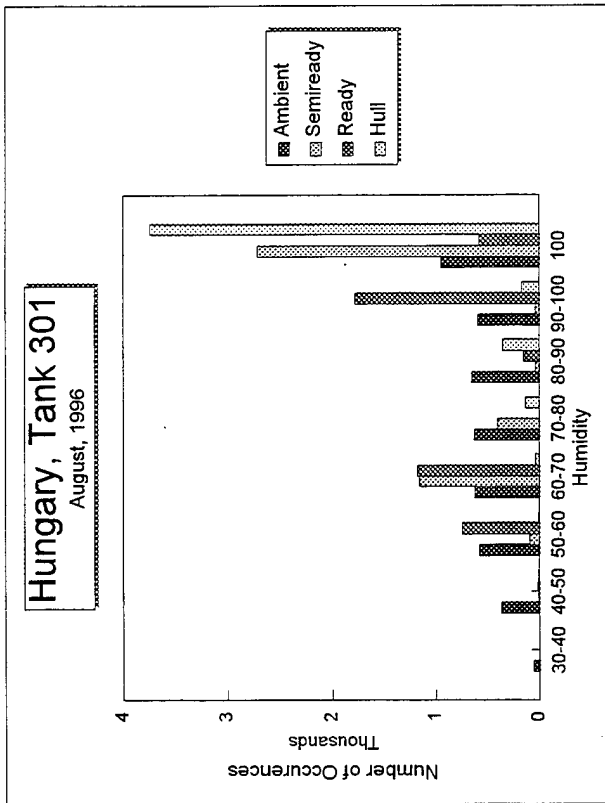
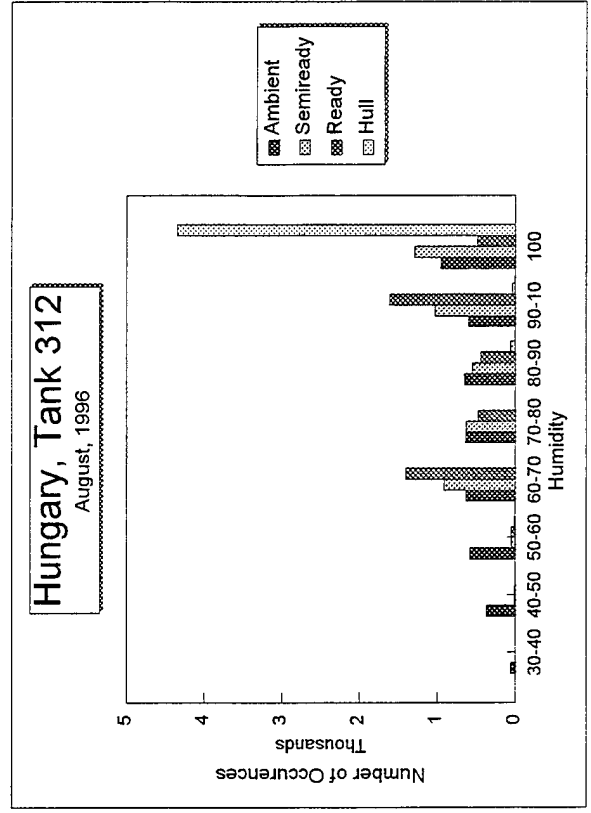
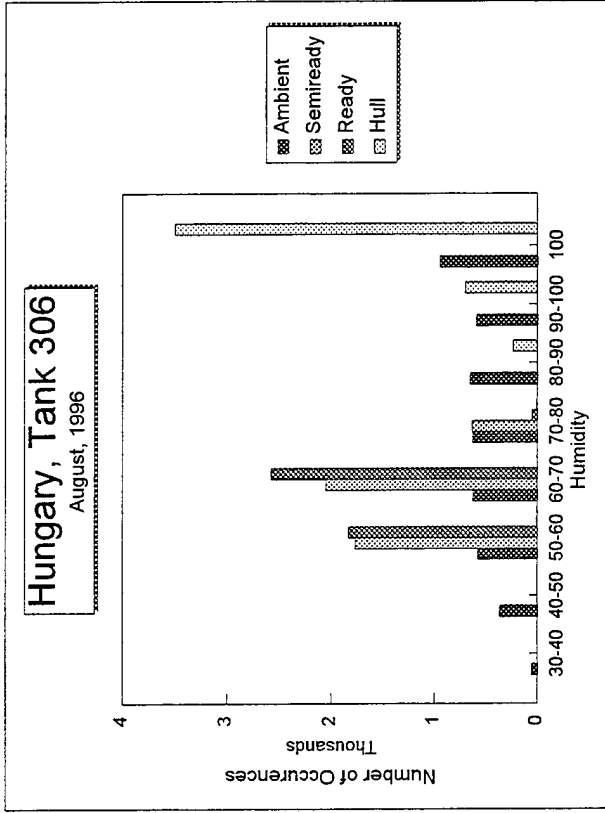
July, 1996



Hungary, Tank 304

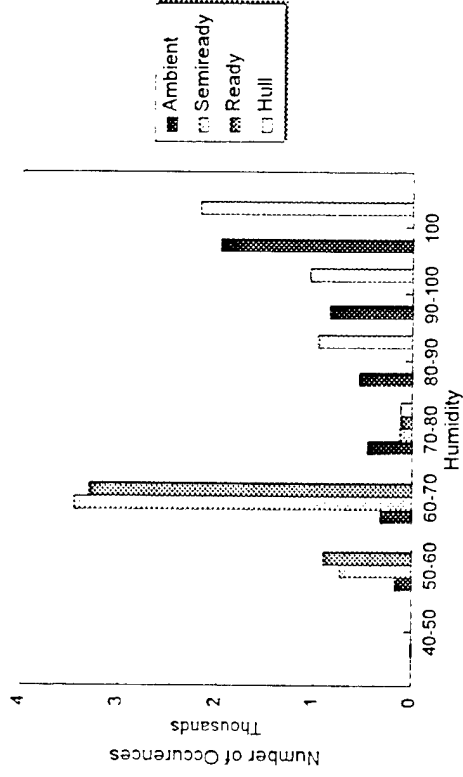
July, 1996





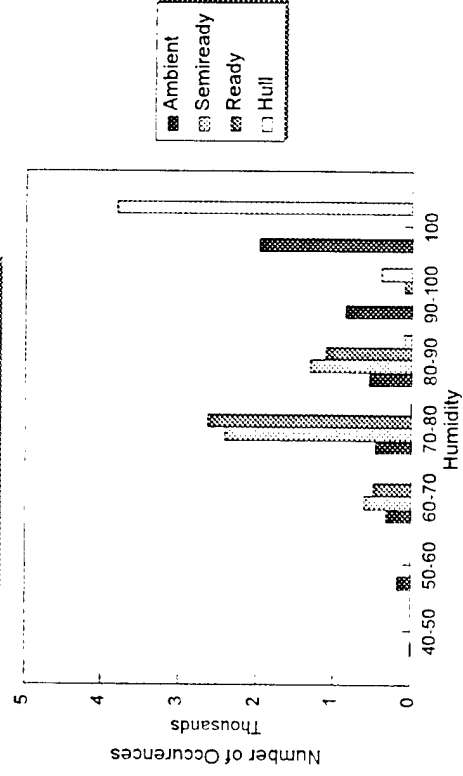
Hungary, Tank 306

September, 1996



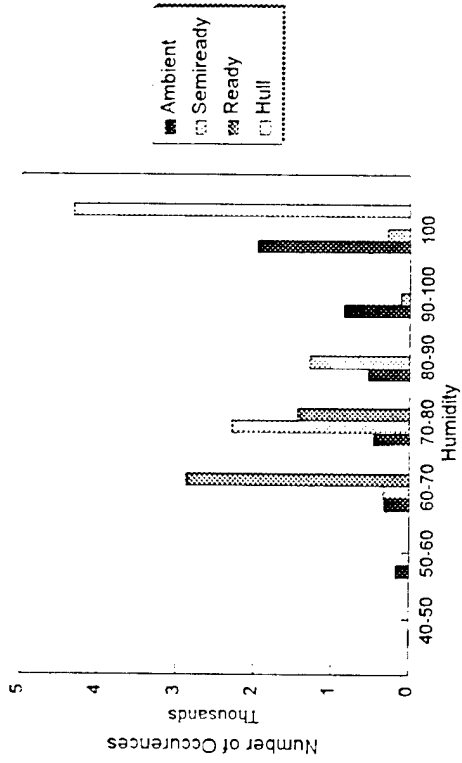
Hungary, Tank 312

September, 1996



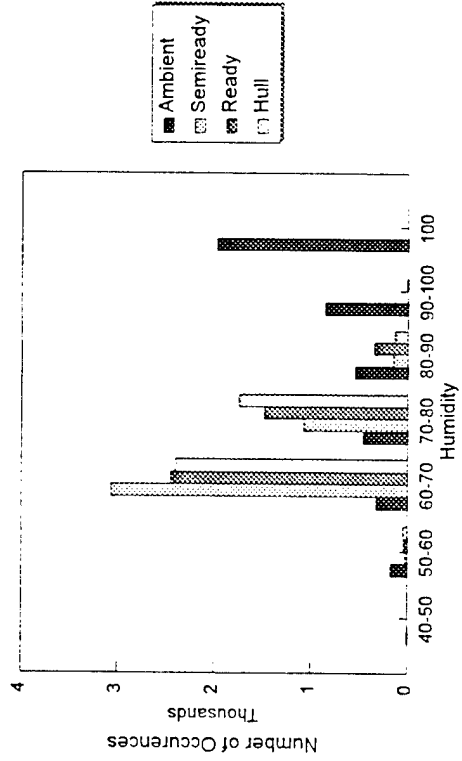
Hungary, Tank 301

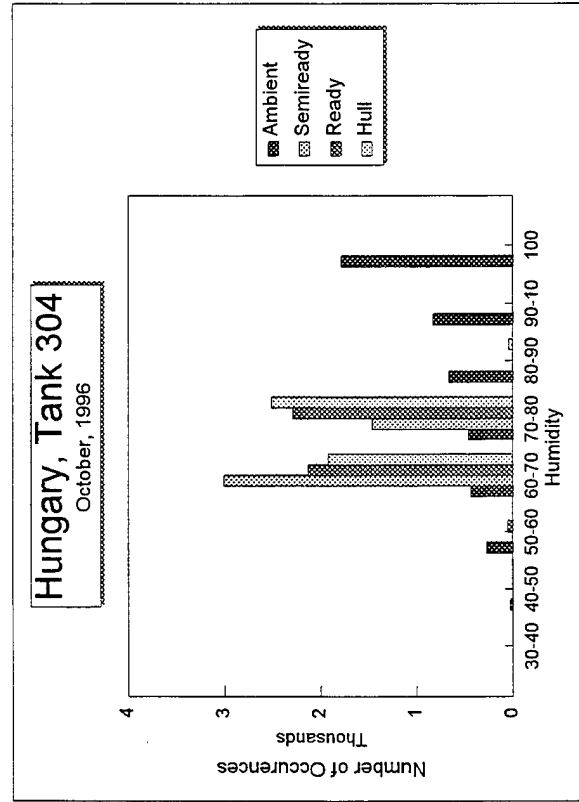
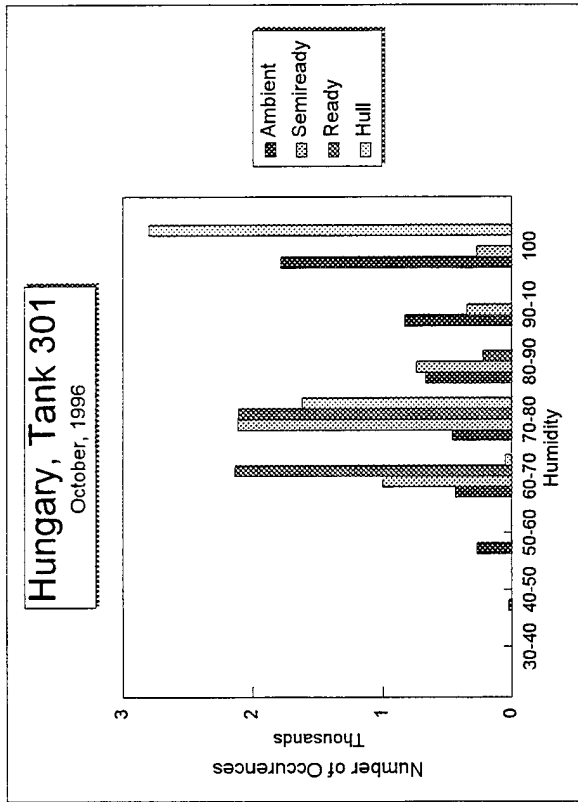
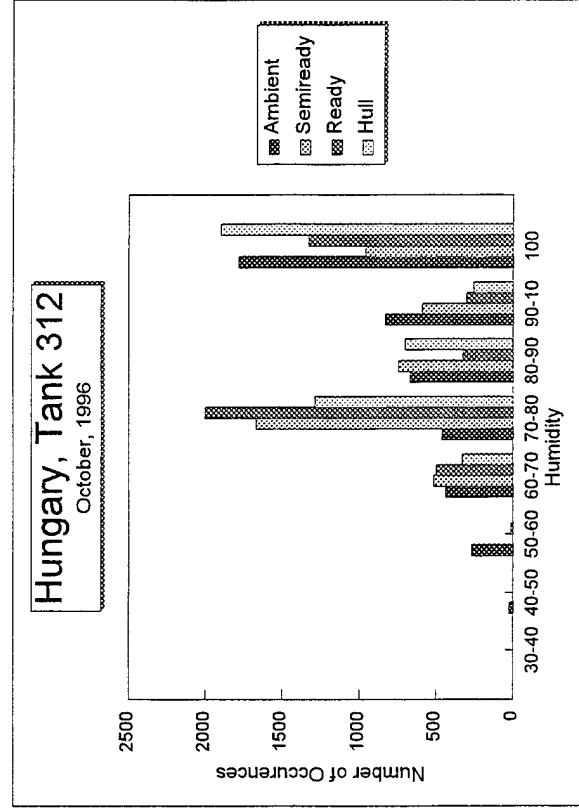
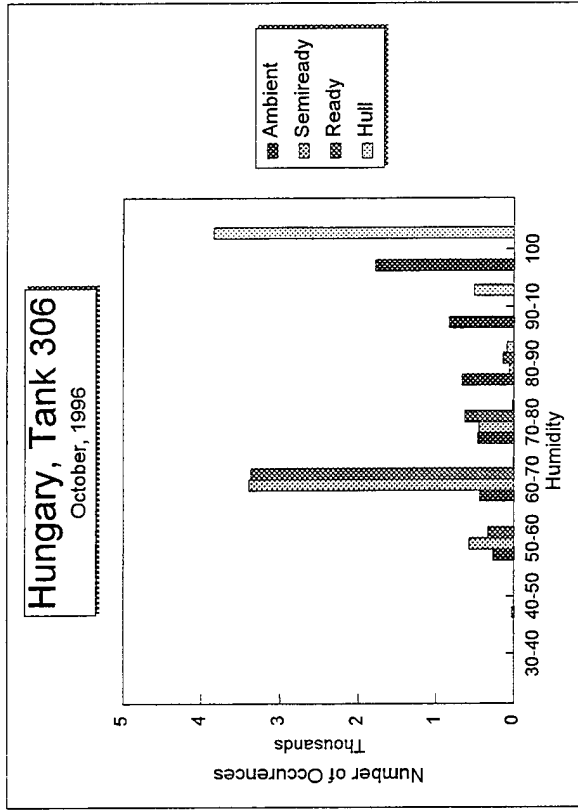
September, 1996



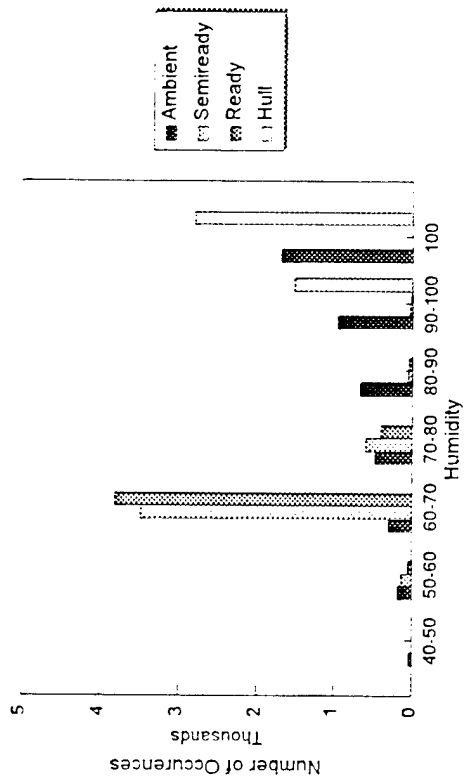
Hungary, Tank 304

September, 1996

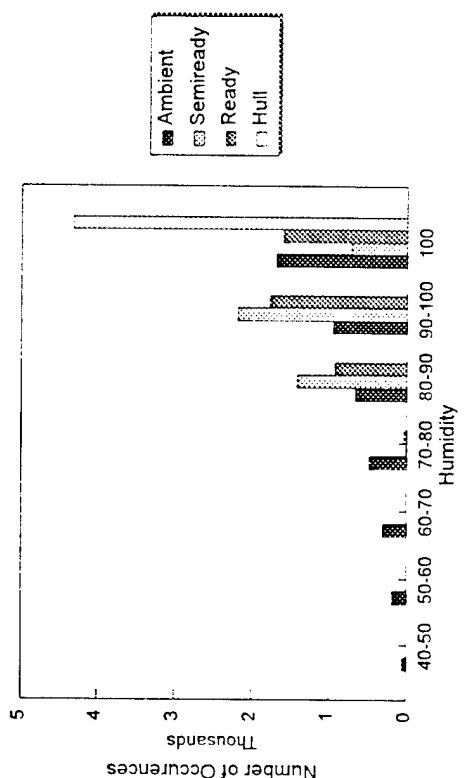




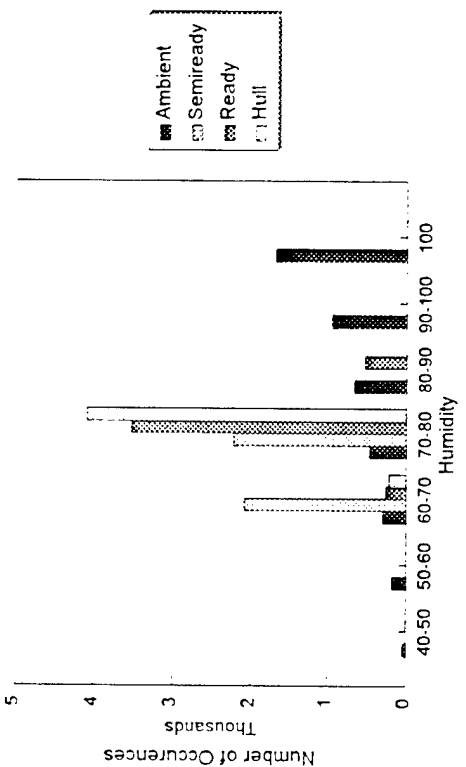
Hungary, Tank 306
November, 1996



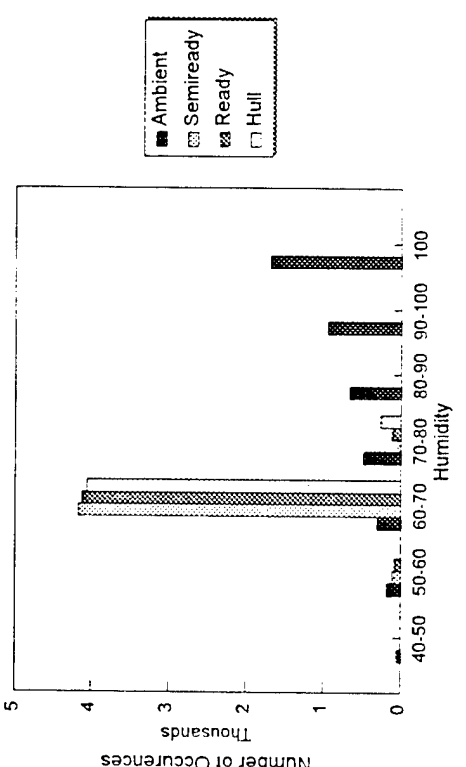
Hungary, Tank 312
November, 1996

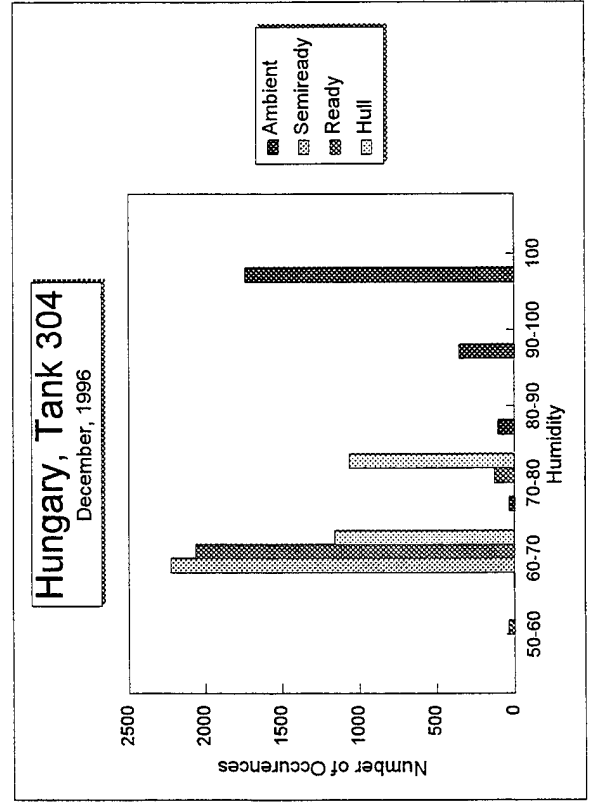
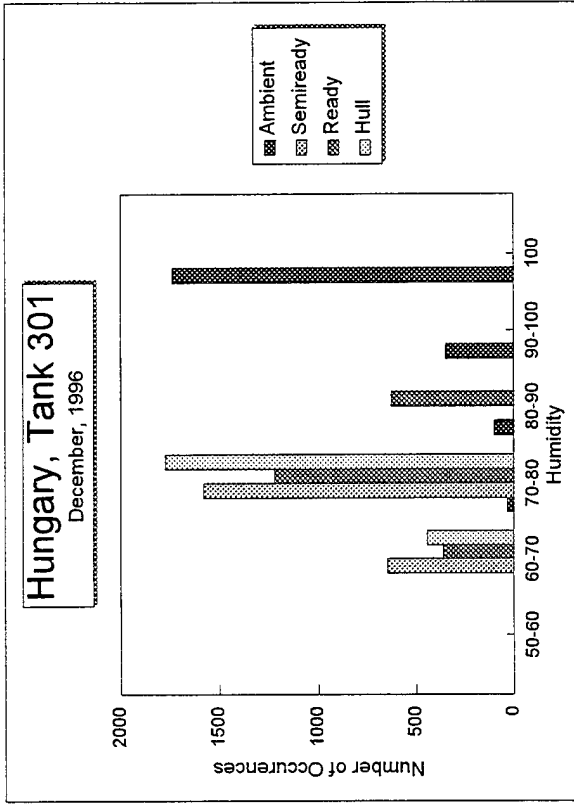
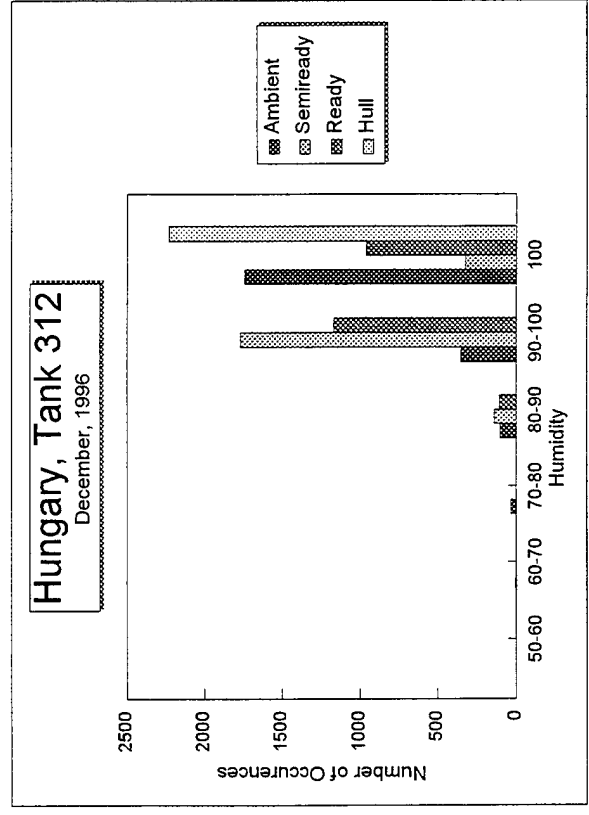
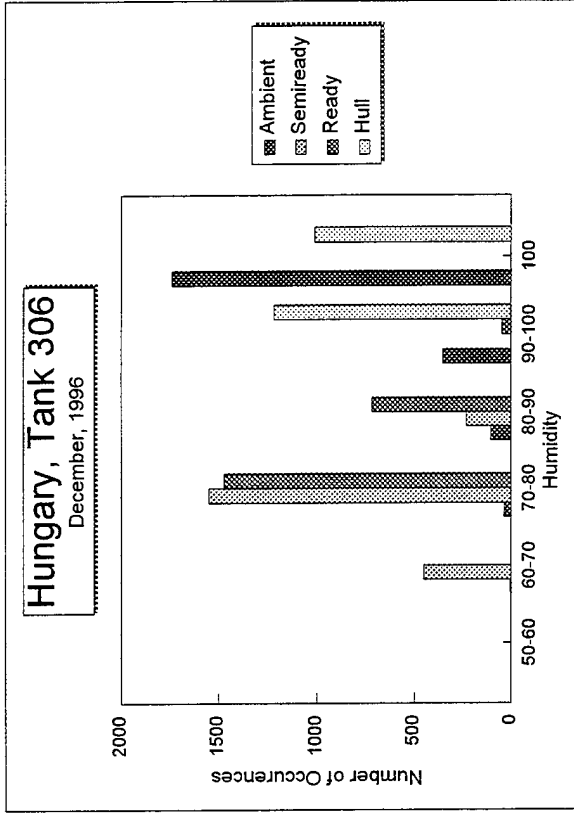


Hungary, Tank 301
November, 1996



Hungary, Tank 304
November, 1996





SOUTH KOREA SETUP NO. 1 DATA

SOUTH KOREA M1A1 TANK MONITORING DATA
SETUP #1 (JUNE 27 - AUGUST 20)

AMBIENT	JUNE	JULY	AUGUST
High Temperature	84	97	100
Low Temperature	61	59	66
High Humidity	100	100	100
Low Humidity	70	45	28

TANK A-24

SEMIREADY

High Temperature	75	83	93
Low Temperature	68	68	84
High Humidity	90	90	90
Low Humidity	85	72	78

READY

High Temperature	75	83	94
Low Temperature	68	68	85
High Humidity	88	88	88
Low Humidity	83	79	77

HULL

High Temperature	NA	NA	NA
Low Temperature	NA	NA	NA
High Humidity	NA	NA	NA
Low Humidity	NA	NA	NA

TANK A-42

SEMIREADY

High Temperature	80	97	110
Low Temperature	67	66	83
High Humidity	54	58	NA
Low Humidity	46	48	NA

READY

High Temperature	NA	NA	NA
Low Temperature	NA	NA	NA
High Humidity	NA	NA	NA
Low Humidity	NA	NA	NA

HULL

High Temperature	75	85	91
Low Temperature	68	67	81
High Humidity	59	63	NA
Low Humidity	56	51	NA

TANK A-44

SEMIREADY

High Temperature	75	87	103
Low Temperature	68	67	83
High Humidity	60	64	NA
Low Humidity	51	53	NA

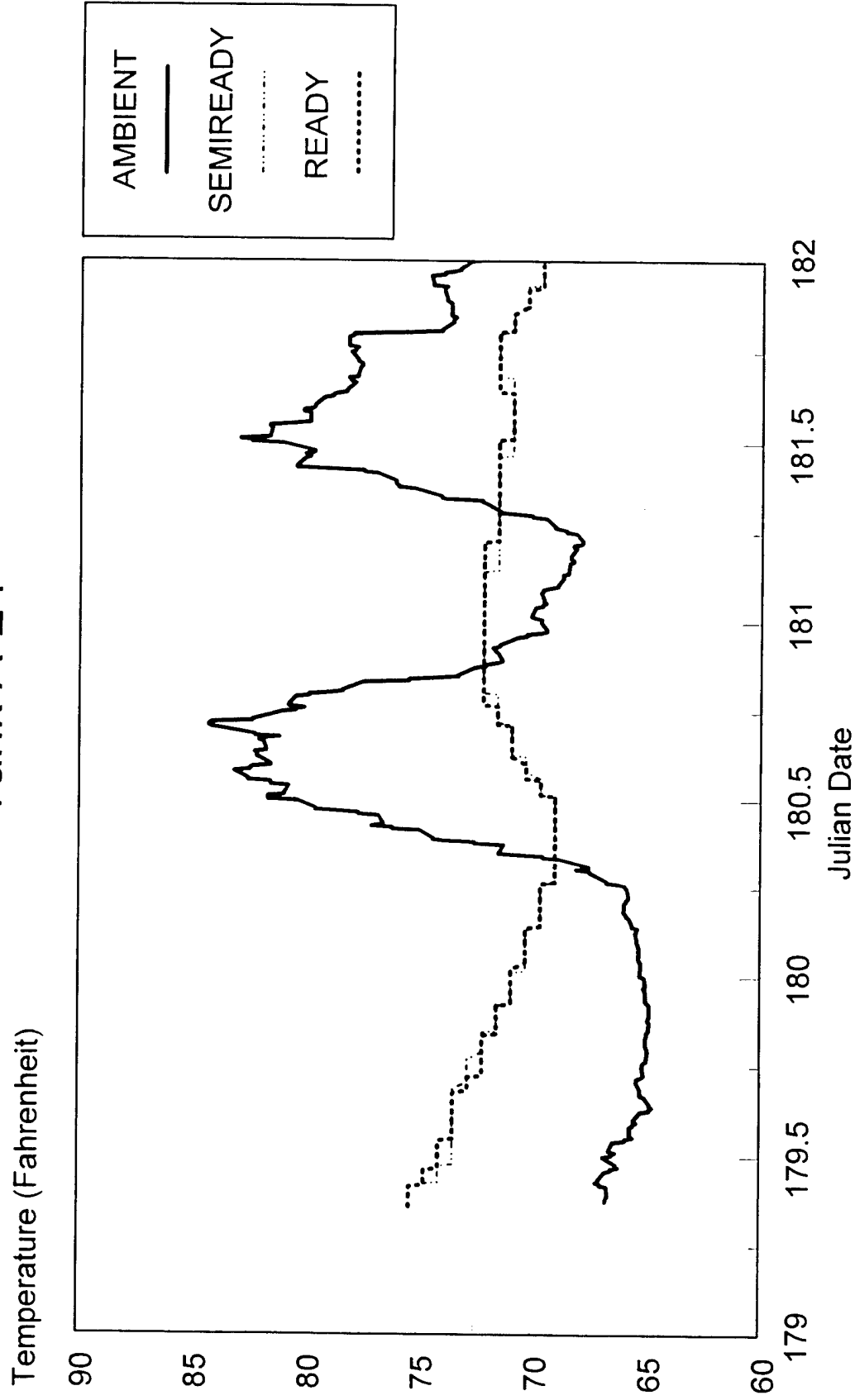
READY

High Temperature	NA	NA	NA
Low Temperature	NA	NA	NA
High Humidity	NA	NA	NA
Low Humidity	NA	NA	NA

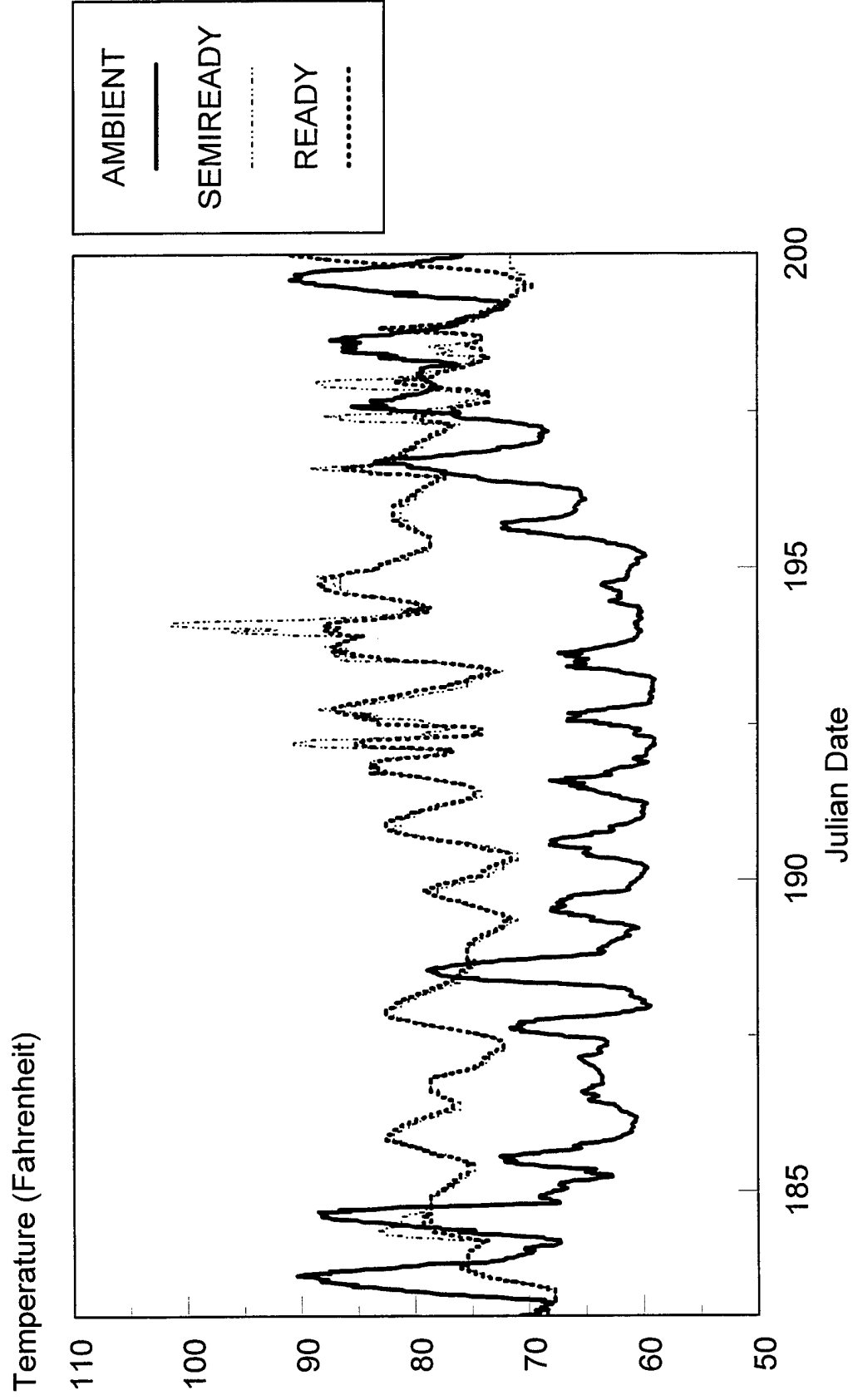
HULL

High Temperature	79	87	101
Low Temperature	68	68	83
High Humidity	64	68	NA
Low Humidity	56	56	NA

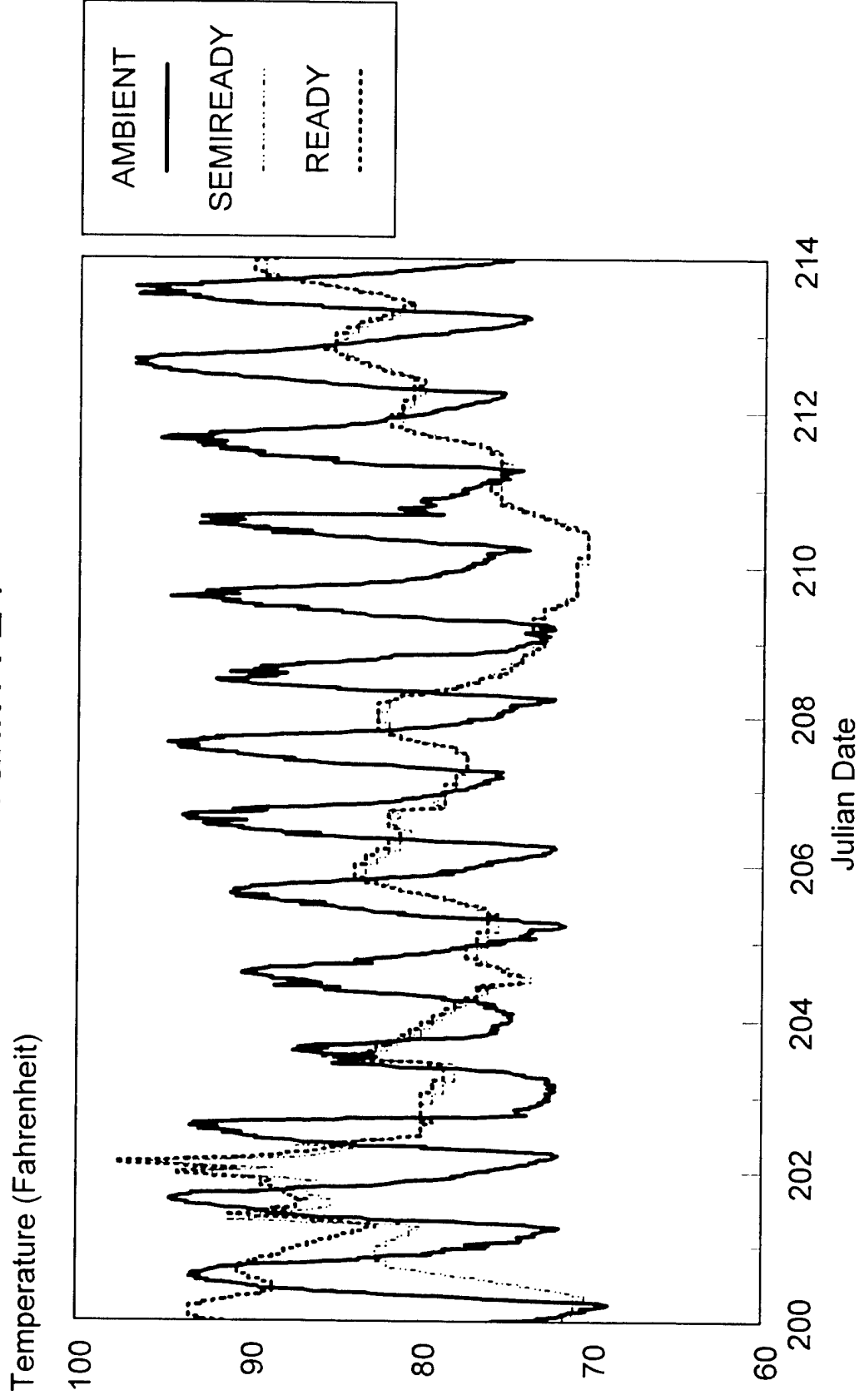
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-24



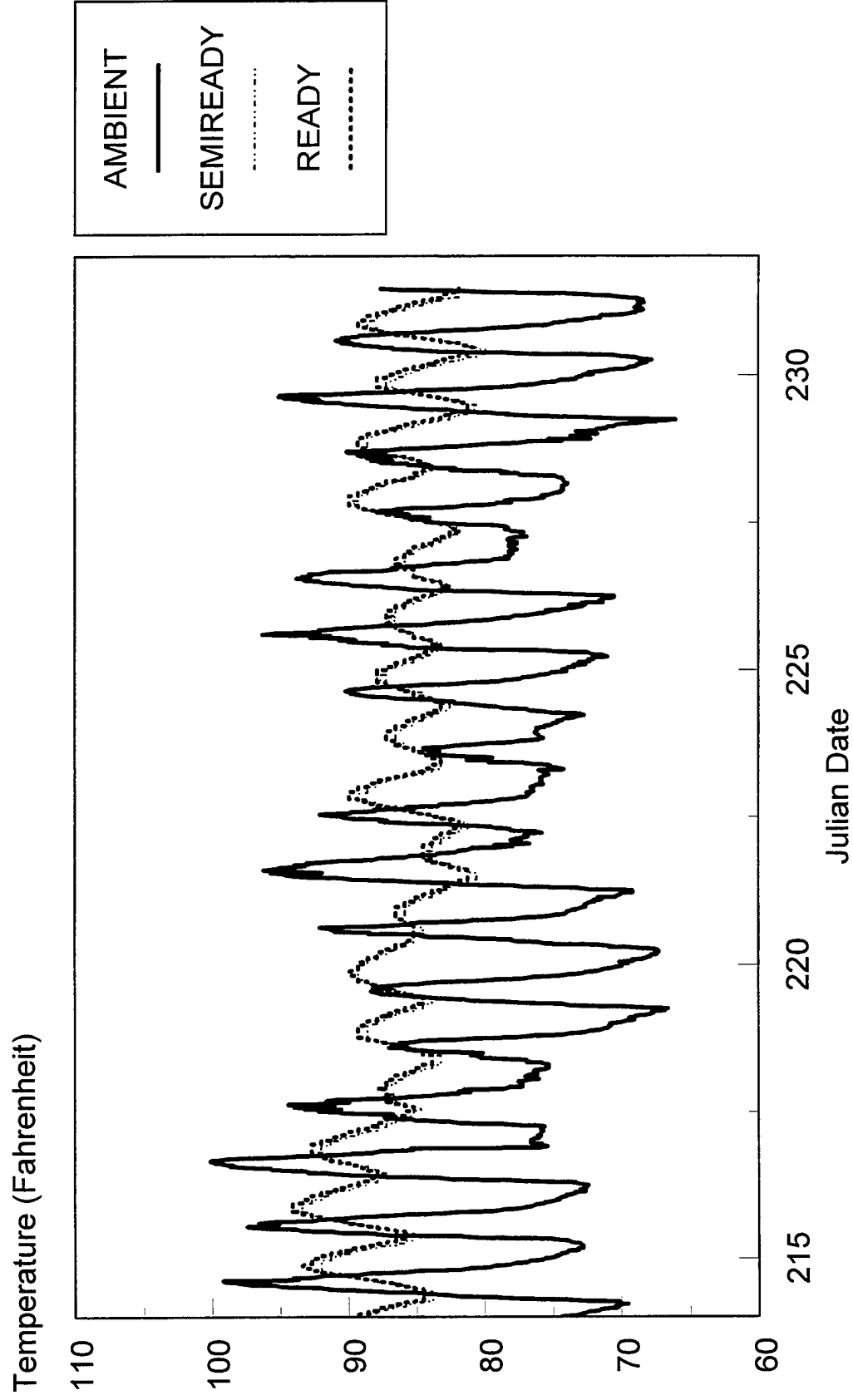
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-24



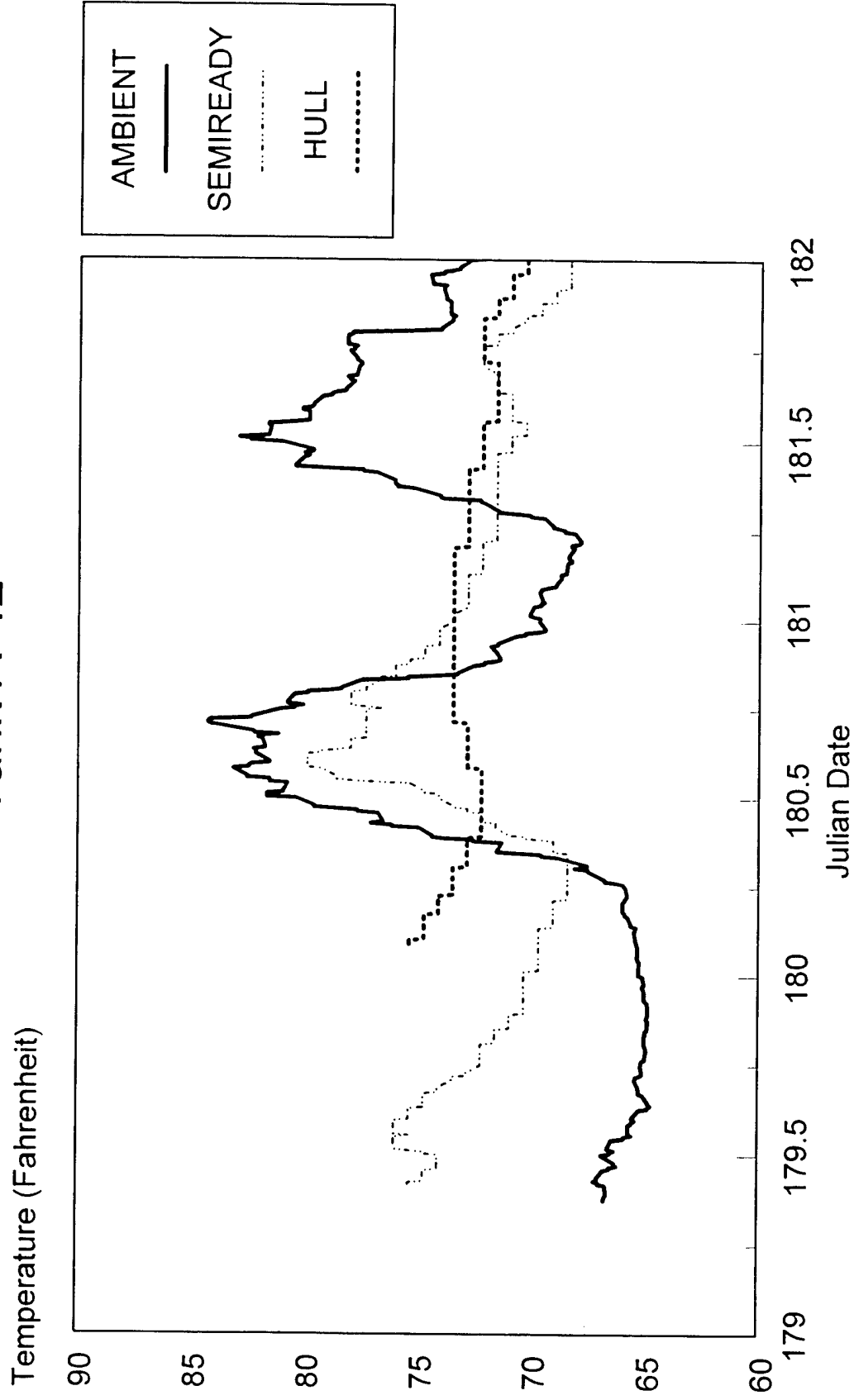
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-24



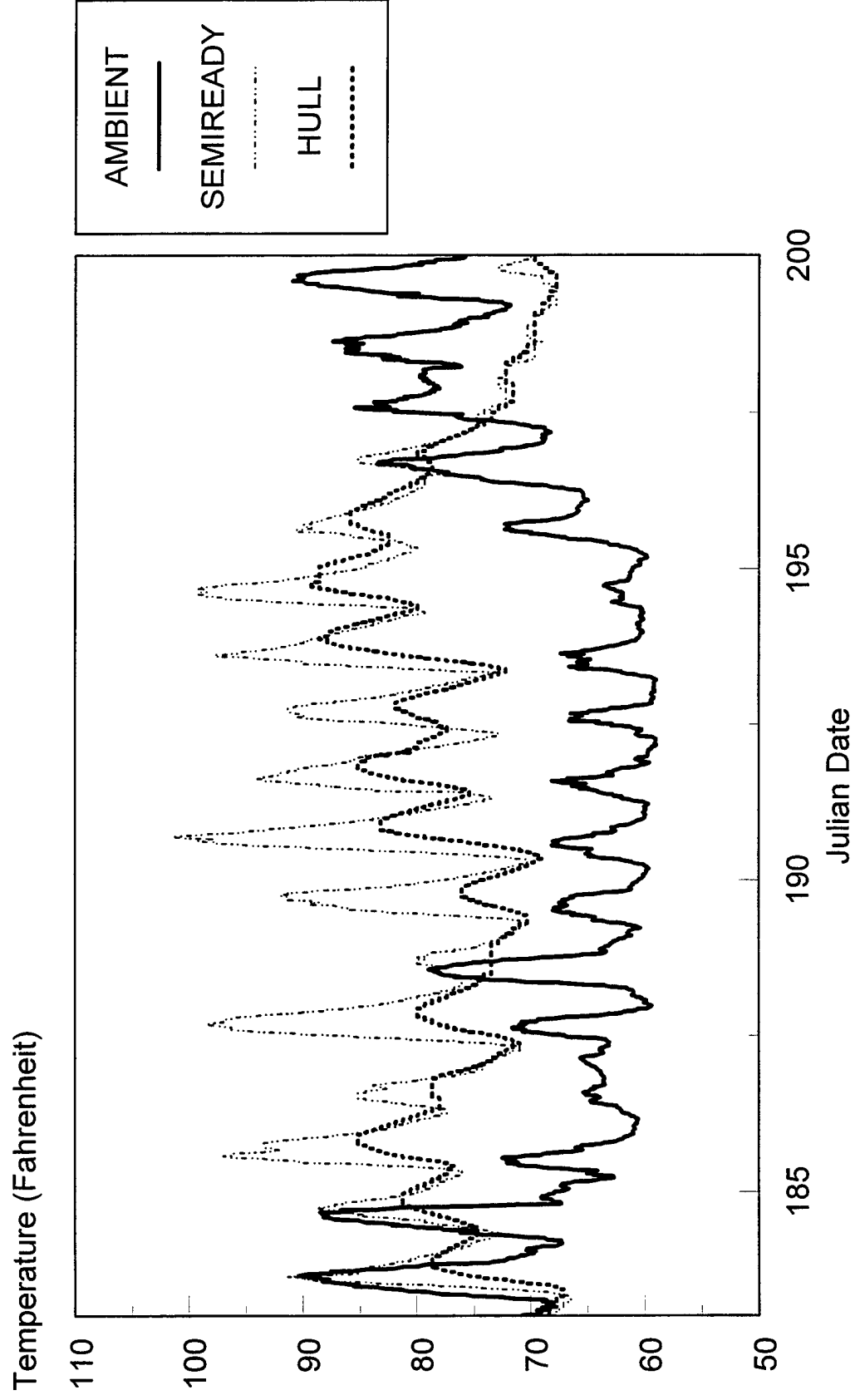
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-24



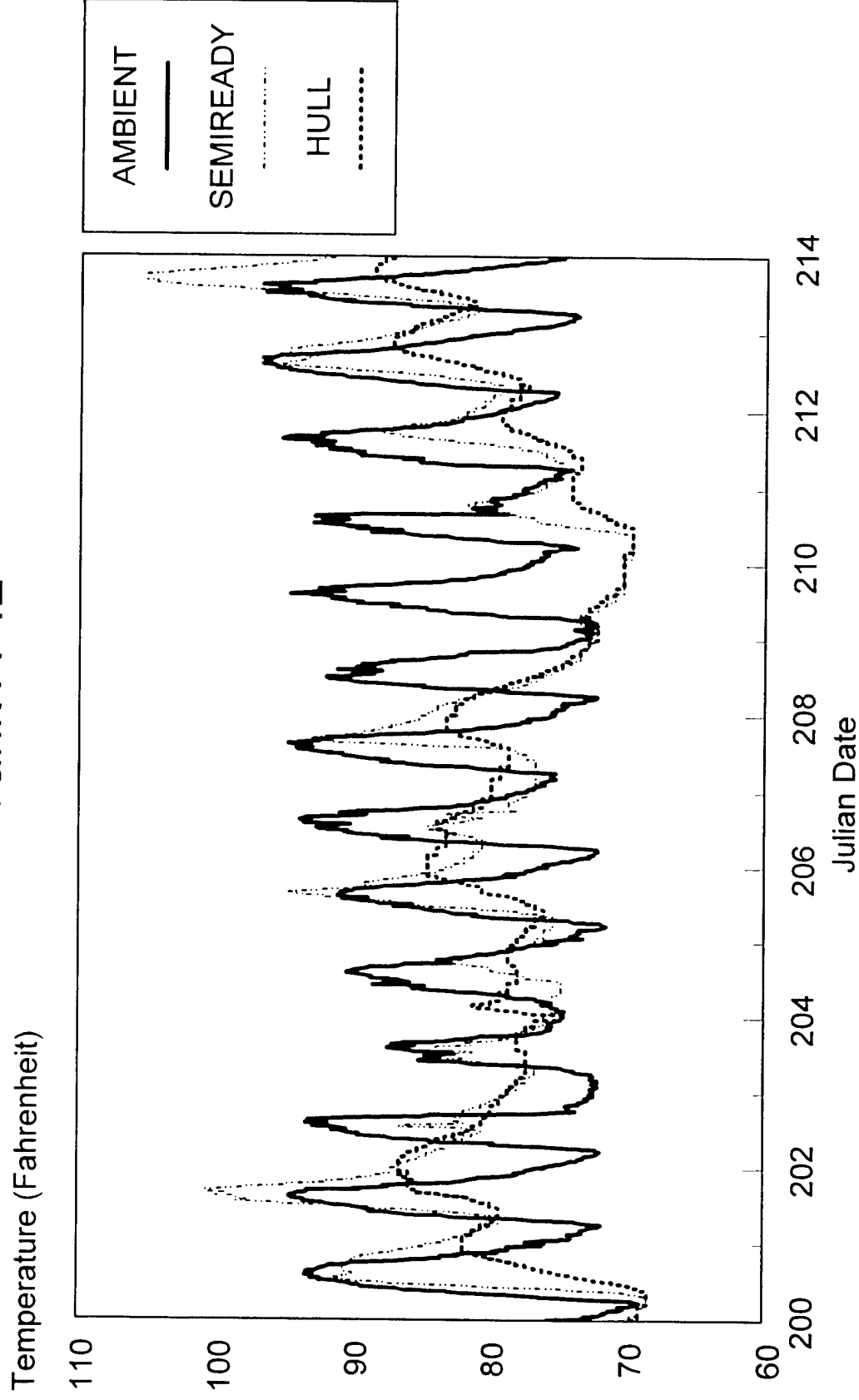
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-42



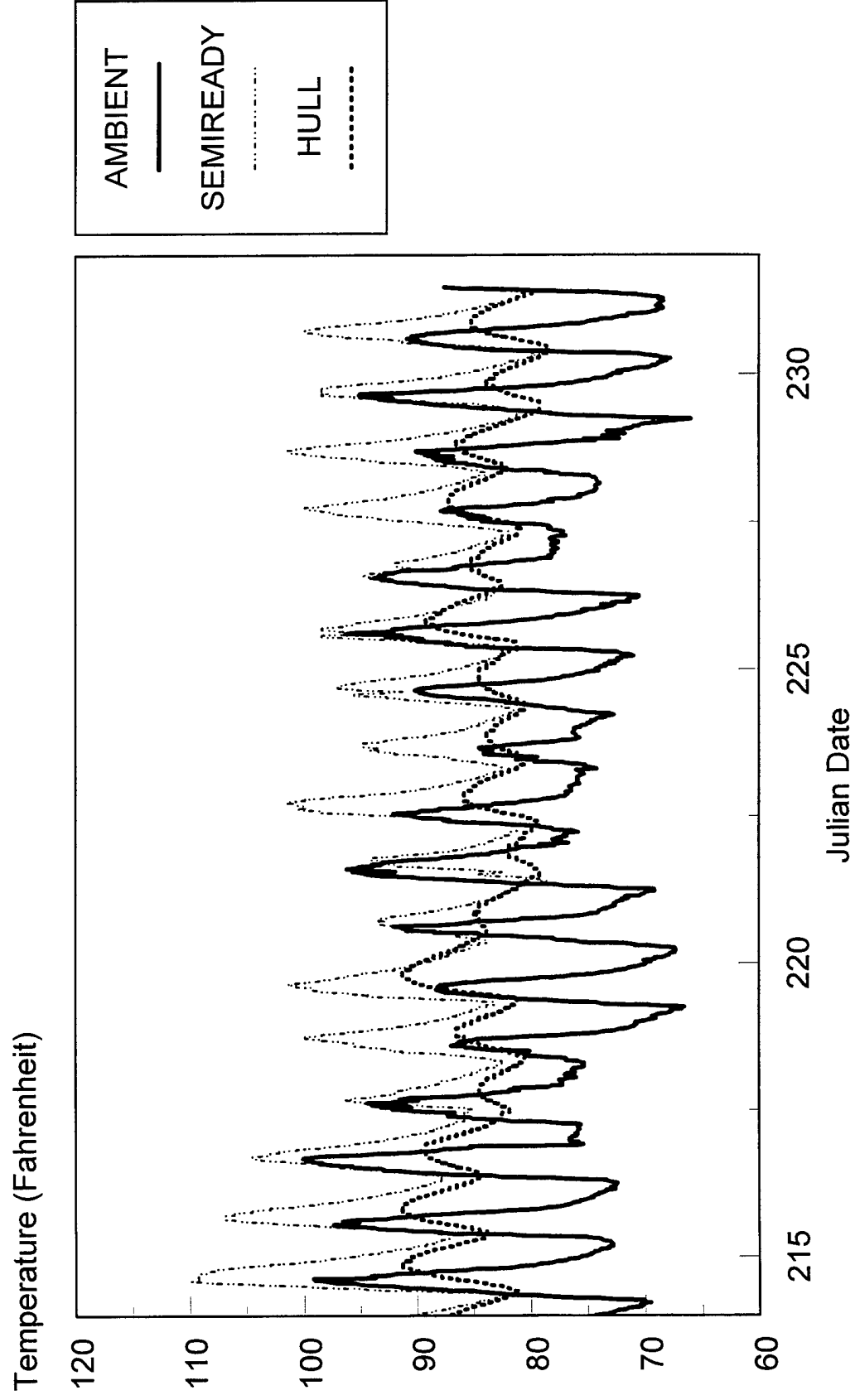
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-42



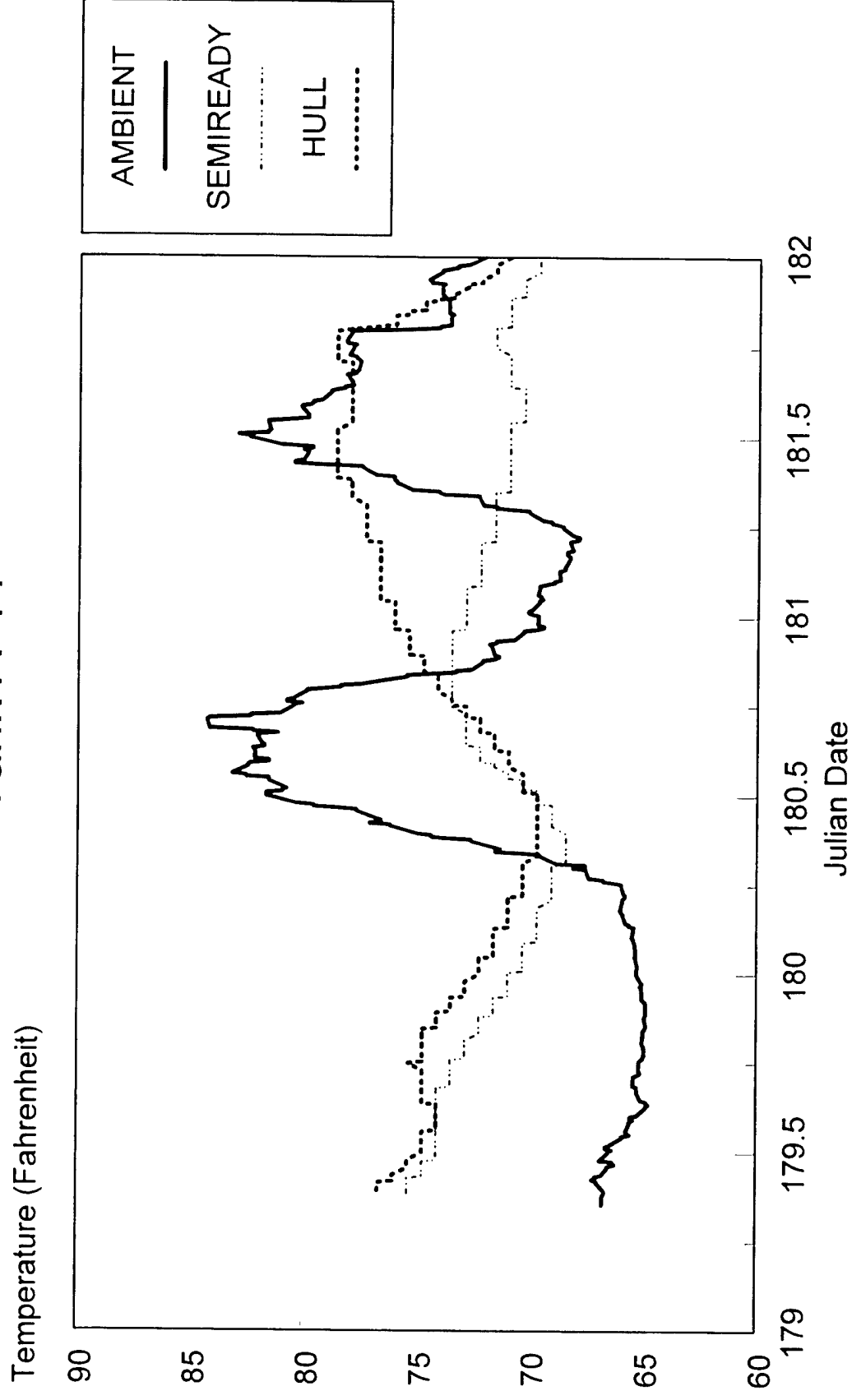
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-42



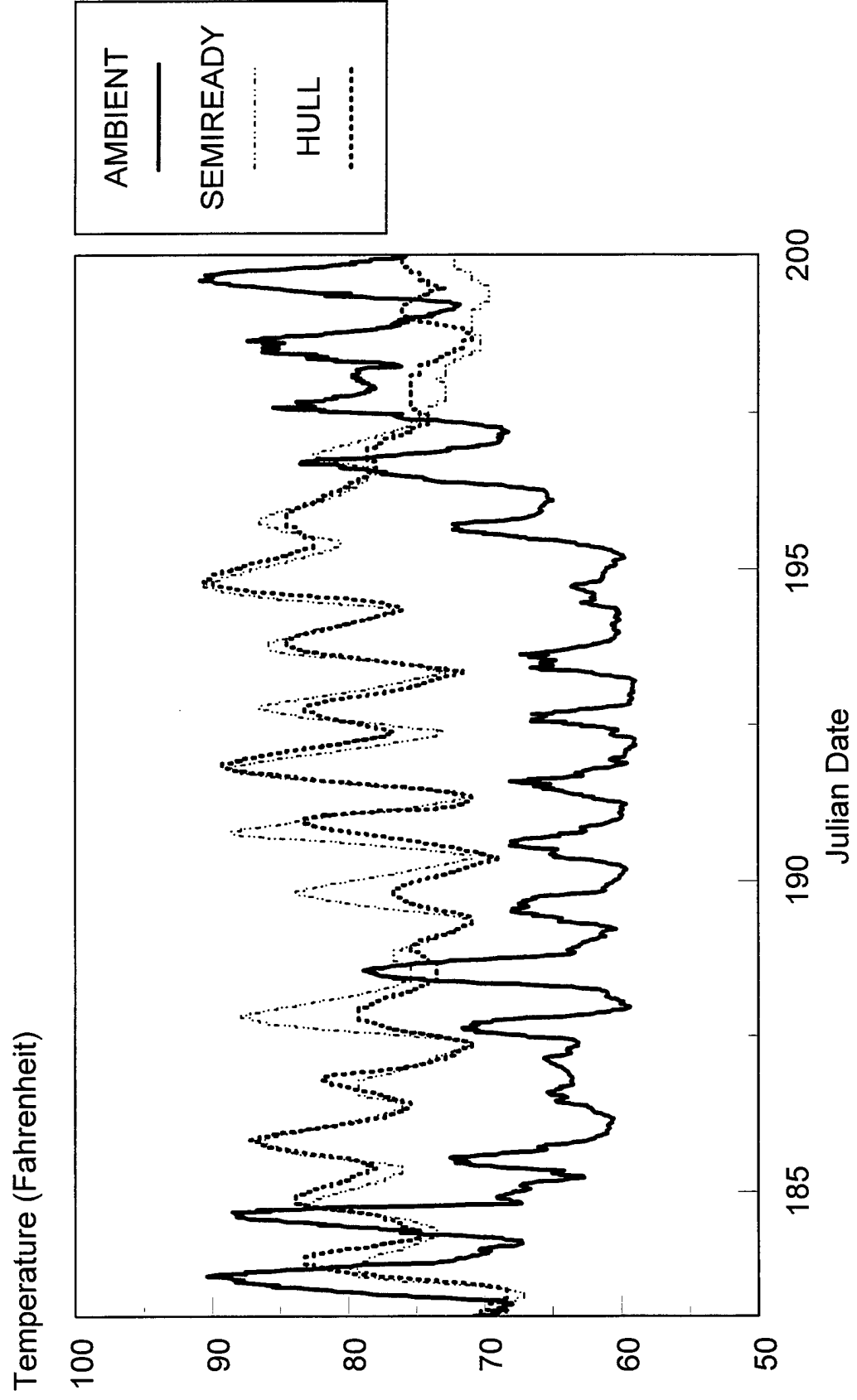
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-42



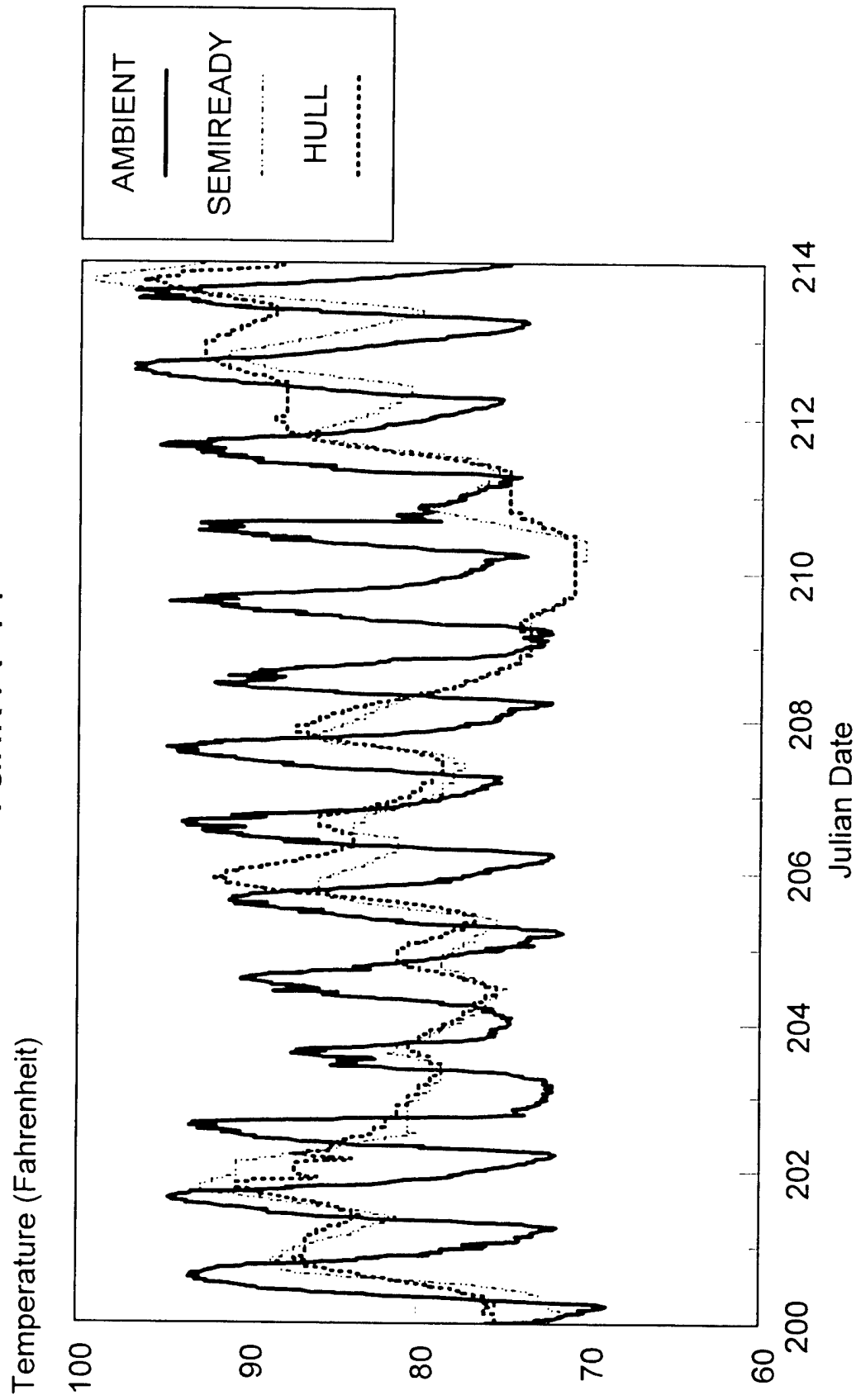
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-44



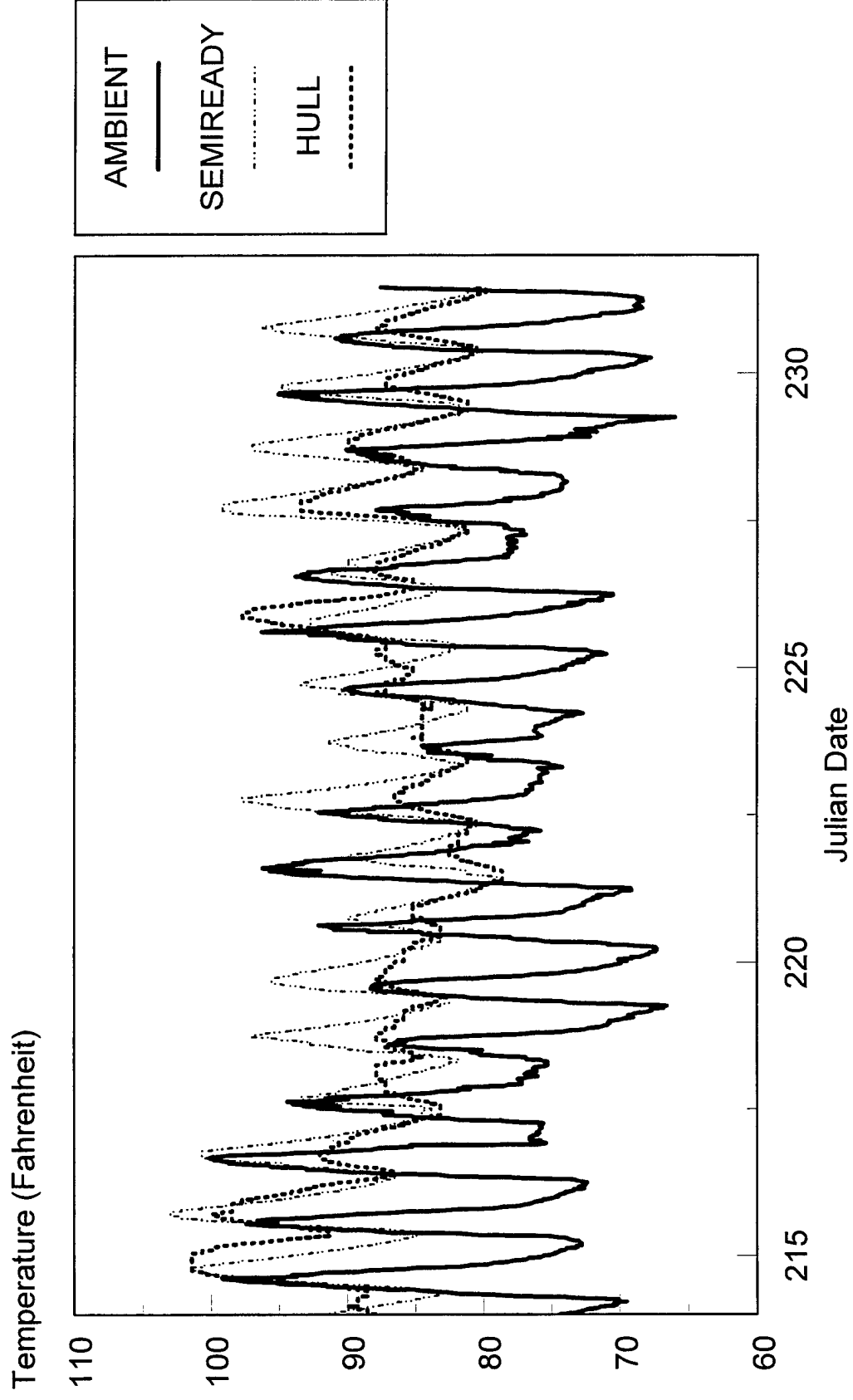
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-44



1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-44

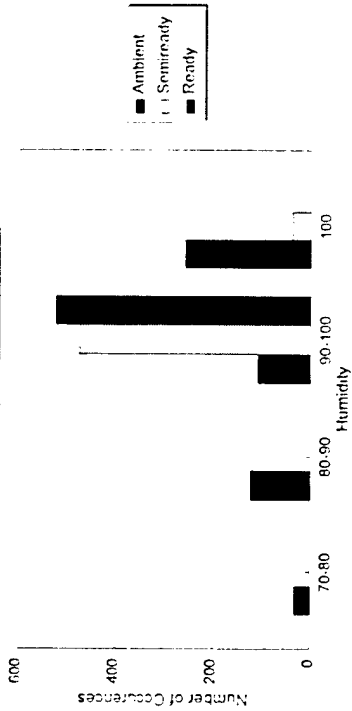


1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-44



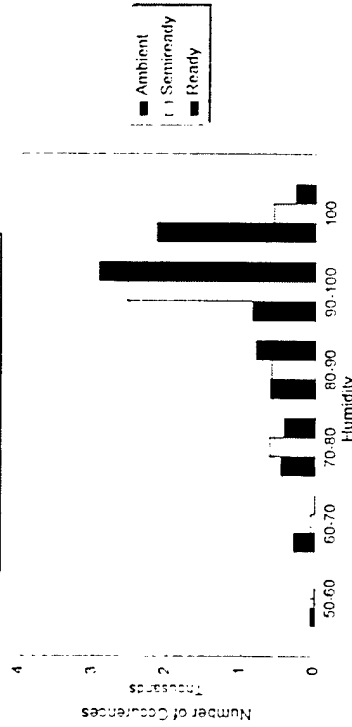
South Korea, Tank A-24

June, 1996



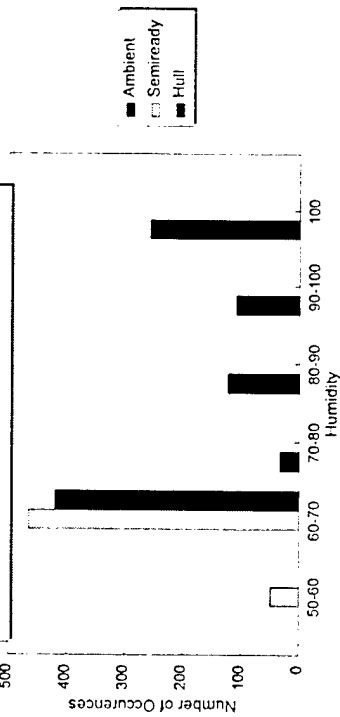
South Korea, Tank A-24

July, 1997



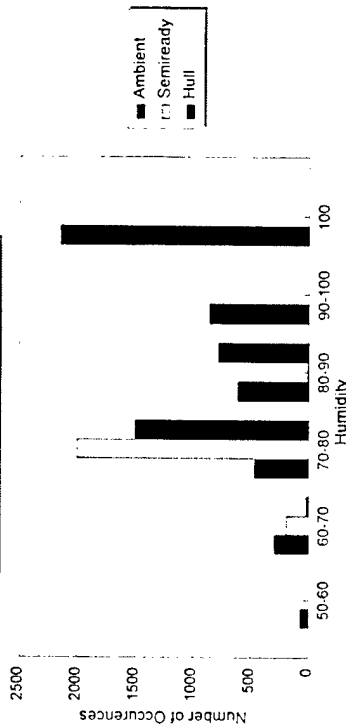
South Korea, Tank A-42

June, 1996



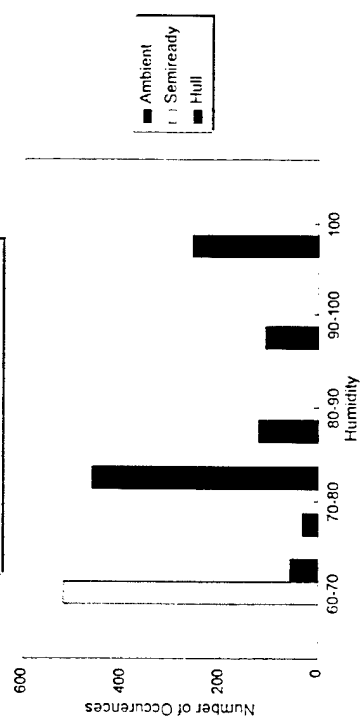
South Korea, Tank A-42

July, 1996



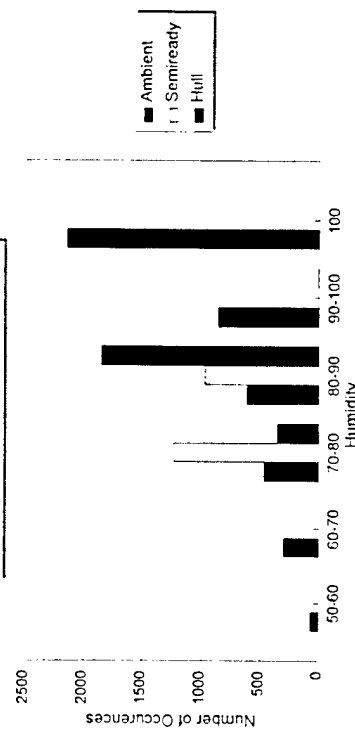
South Korea, Tank A-44

June, 1996



South Korea, Tank A-44

July, 1996

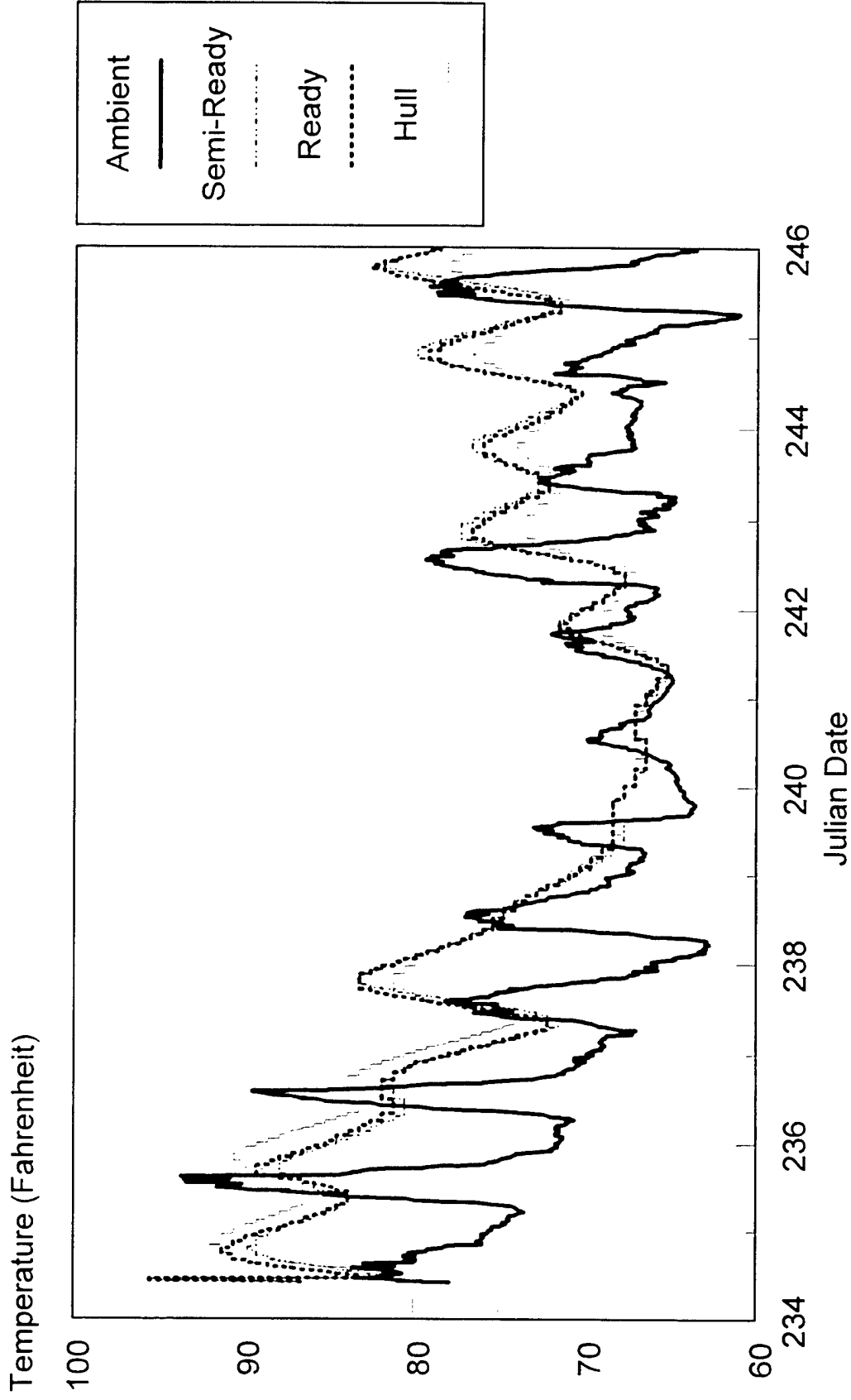


SOUTH KOREA SETUP NO. 2 DATA

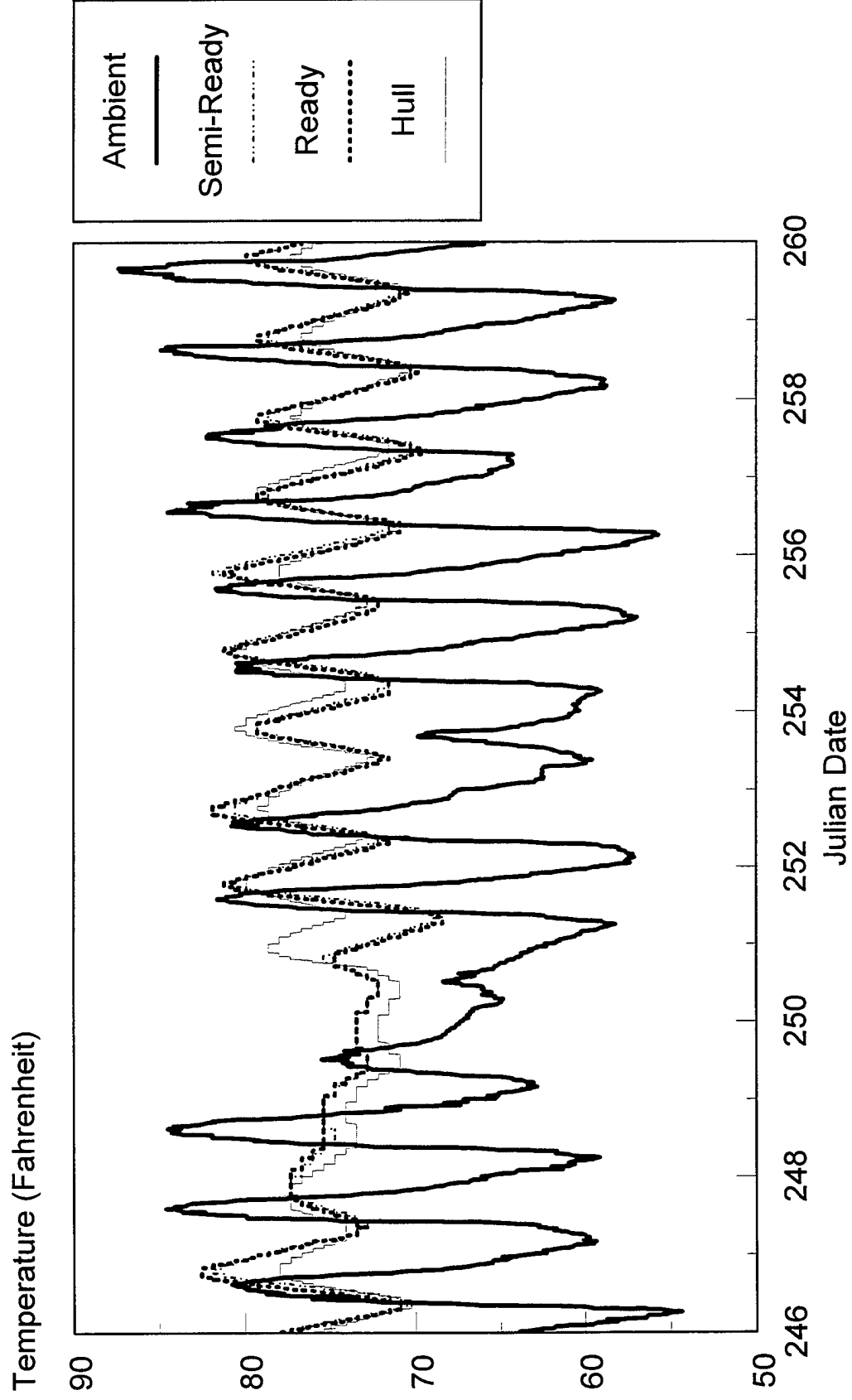
SOUTH KOREA M1A1 TANK MONITORING DATA
SETUP #2 (AUGUST 20 - DECEMBER 18)

AMBIENT	AUGUST	SEPTEMBER	OCTOBER	NOVEMBER	DECEMBER
High Temperature	97	87	80	67	59
Low Temperature	63	48	29	20	14
High Humidity	100	100	100	100	100
Low Humidity	33	30	15	19	24
TANK A-14					
SEMIREADY					
High Temperature	94	82	90	58	63
Low Temperature	65	68	38	24	15
High Humidity	54	53	77	87	66
Low Humidity	45	46	37	50	35
READY					
High Temperature	96	83	85	58	63
Low Temperature	65	68	38	26	15
High Humidity	52	50	60	80	64
Low Humidity	43	46	35	50	31
HULL					
High Temperature	95	81	83	65	67
Low Temperature	65	70	40	27	16
High Humidity	71	76	67	70	70
Low Humidity	49	63	33	53	32
TANK B-11					
SEMIREADY					
High Temperature	96	83	83	NA	NA
Low Temperature	65	70	50	NA	NA
High Humidity	62	62	61	NA	NA
Low Humidity	45	50	43	NA	NA
READY					
High Temperature	96	83	79	60	64
Low Temperature	65	70	49	23	14
High Humidity	61	60	66	98	72
Low Humidity	44	49	40	53	29
HULL					
High Temperature	97	73	93	65	67
Low Temperature	66	68	44	27	16
High Humidity	81	72	100	100	92
Low Humidity	44	46	43	69	37
TANK C-33					
SEMIREADY					
High Temperature	102	90	79	60	64
Low Temperature	65	68	40	23	14
High Humidity	75	73	76	79	56
Low Humidity	40	51	36	44	34
READY					
High Temperature	104	94	84	60	65
Low Temperature	65	68	38	23	14
High Humidity	80	75	76	75	64
Low Humidity	44	51	39	44	28
HULL					
High Temperature	104	85	81	NA	NA
Low Temperature	67	69	47	NA	NA
High Humidity	100	100	100	NA	NA
Low Humidity	42	92	39	NA	NA
TANK D-31					
SEMIREADY					
High Temperature	96	98	82	61	54
Low Temperature	68	70	40	24	15
High Humidity	54	78	81	62	62
Low Humidity	46	50	42	39	42
READY					
High Temperature	97	94	93	60	54
Low Temperature	65	72	38	21	13
High Humidity	79	52	76	76	66
Low Humidity	44	44	36	49	48
HULL					
High Temperature	94	91	82	67	72
Low Temperature	65	70	41	29	19
High Humidity	53	53	100	100	92
Low Humidity	45	45	39	71	47

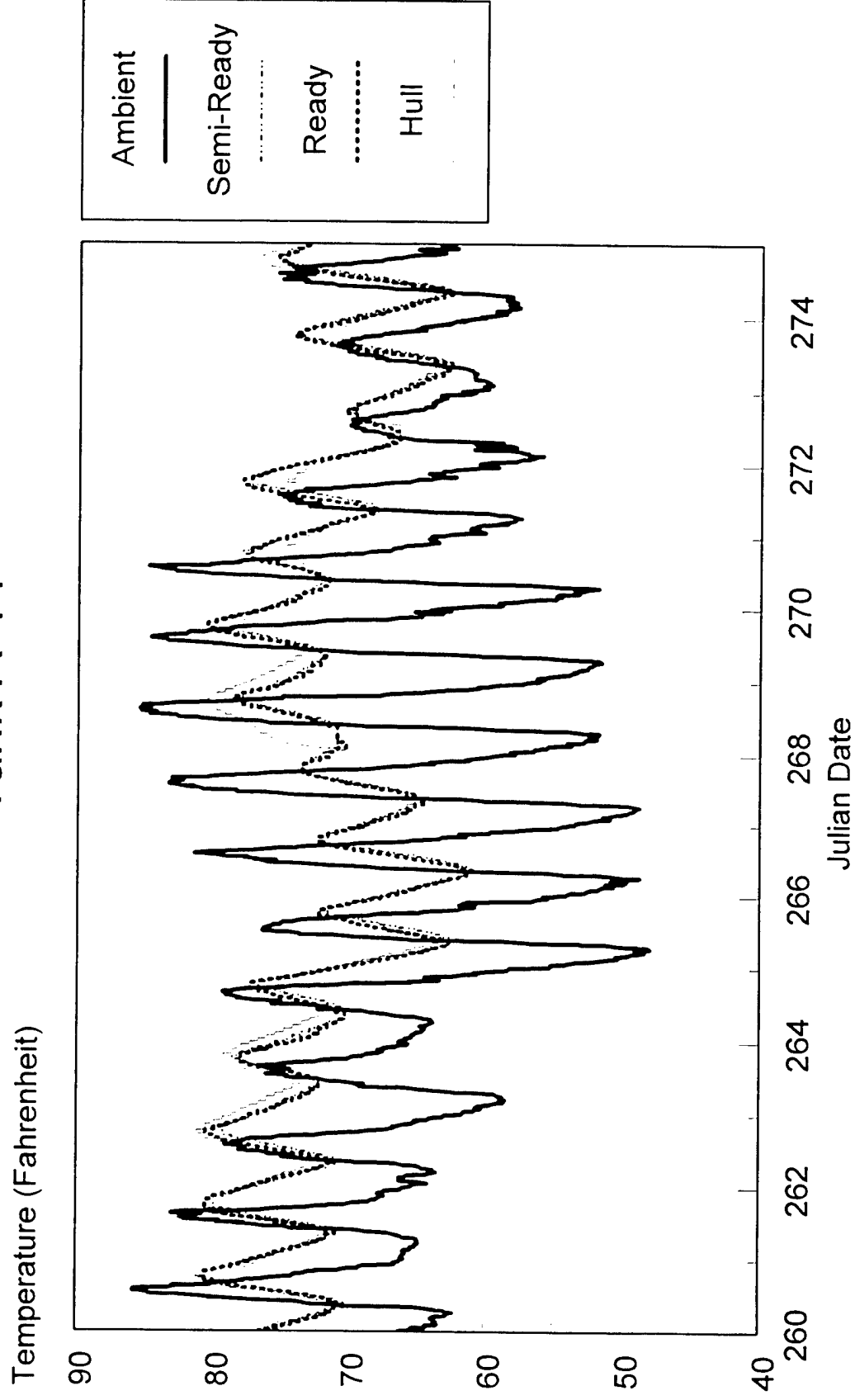
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-14



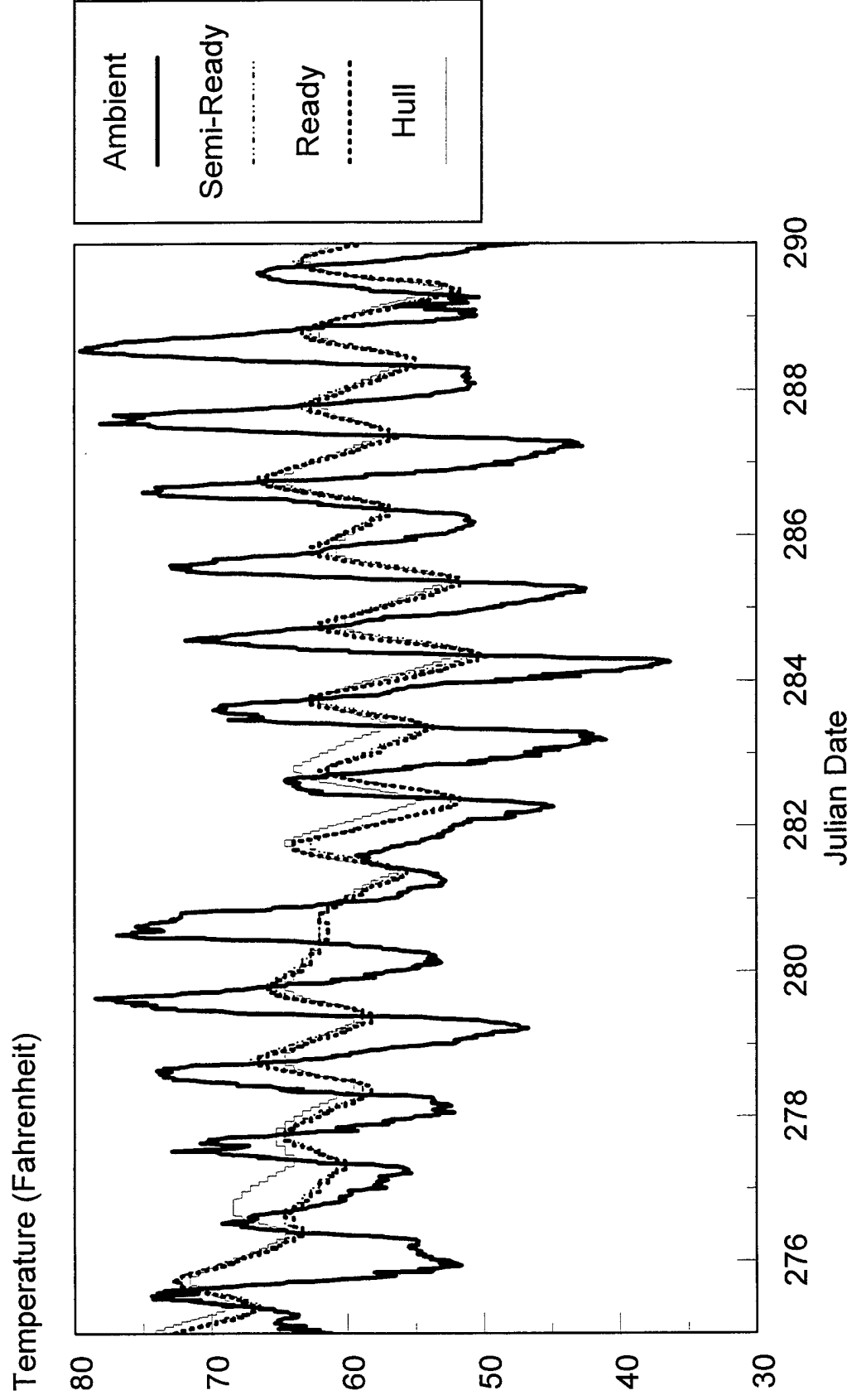
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-14



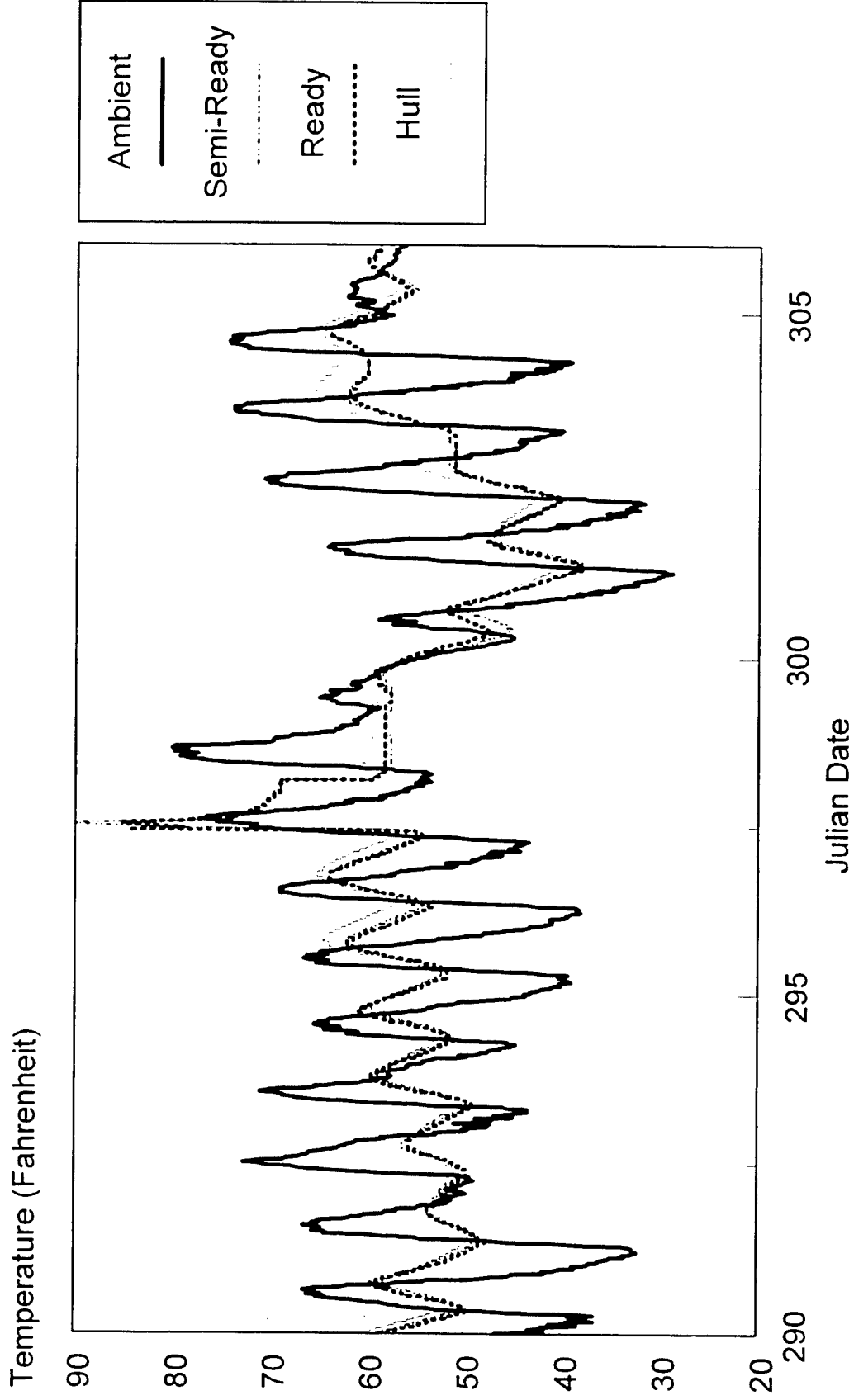
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-14



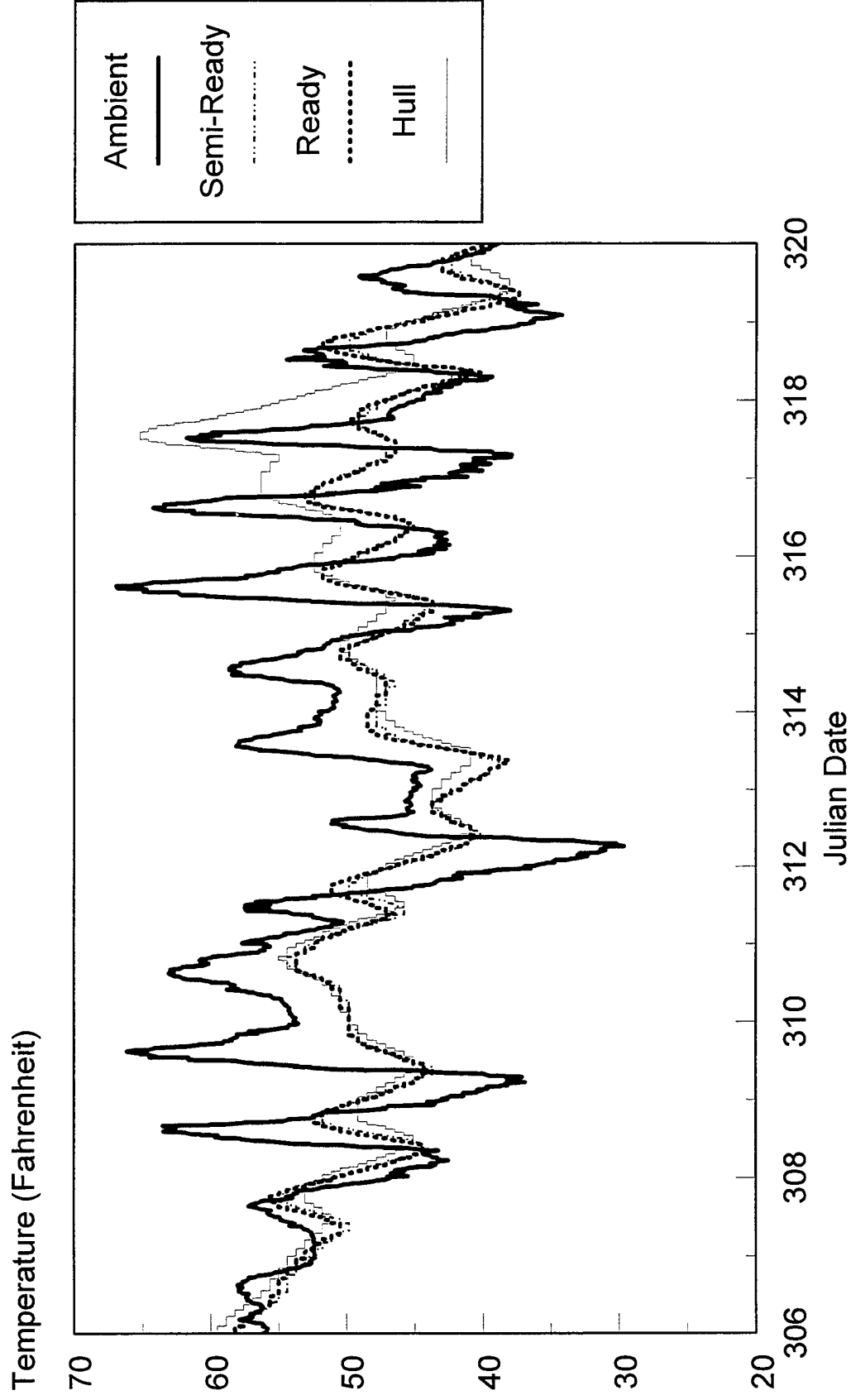
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-14



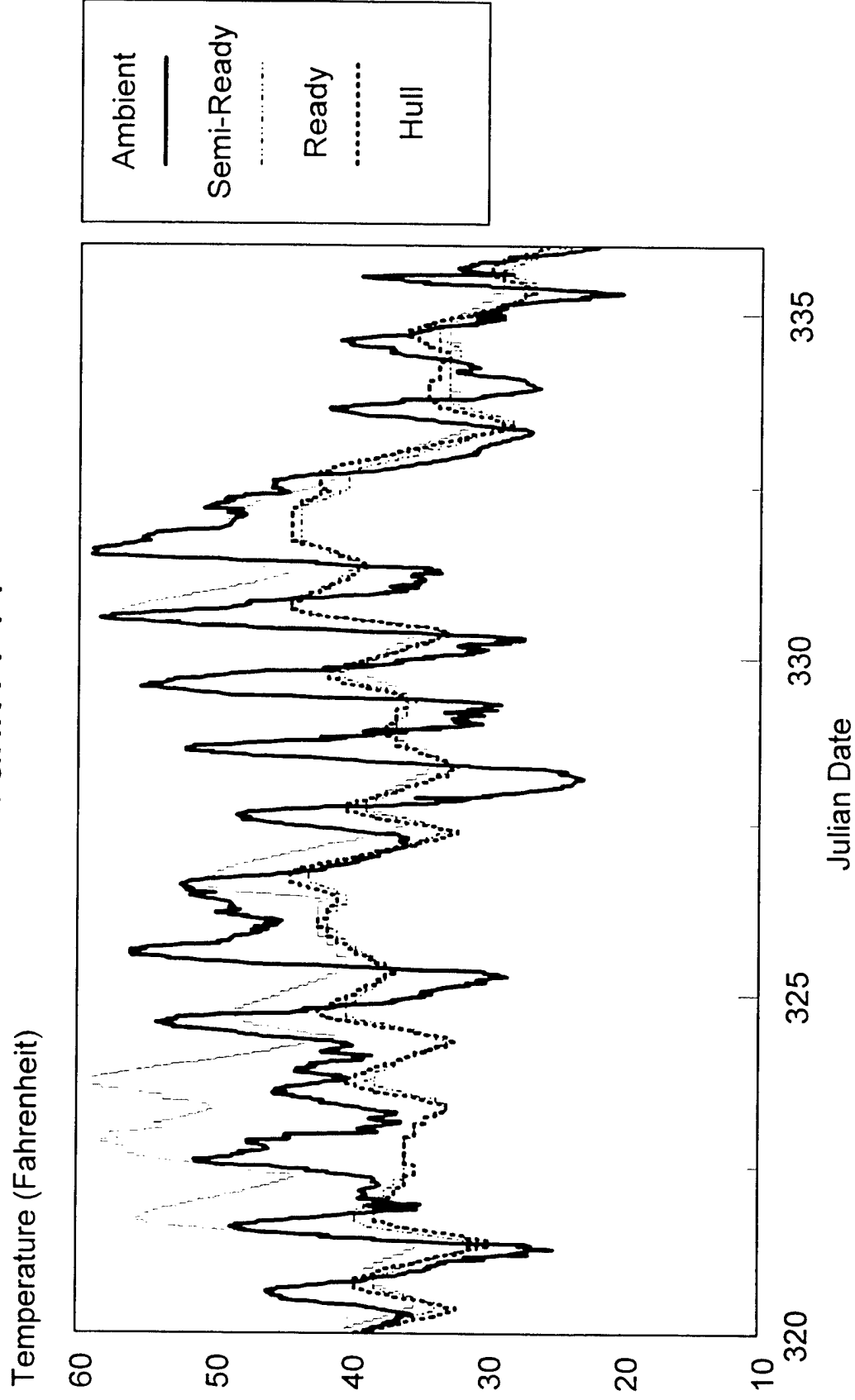
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-14



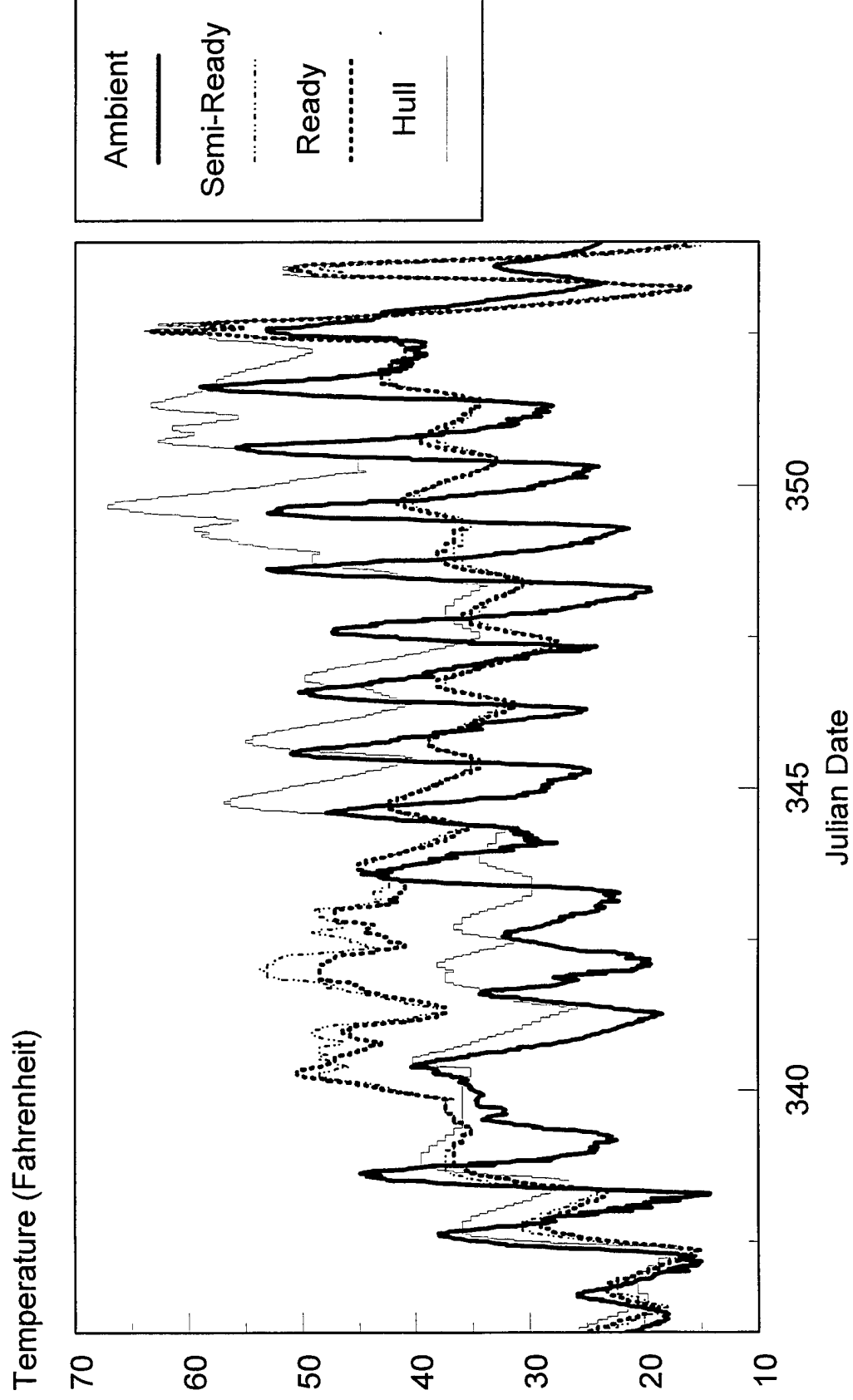
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-14



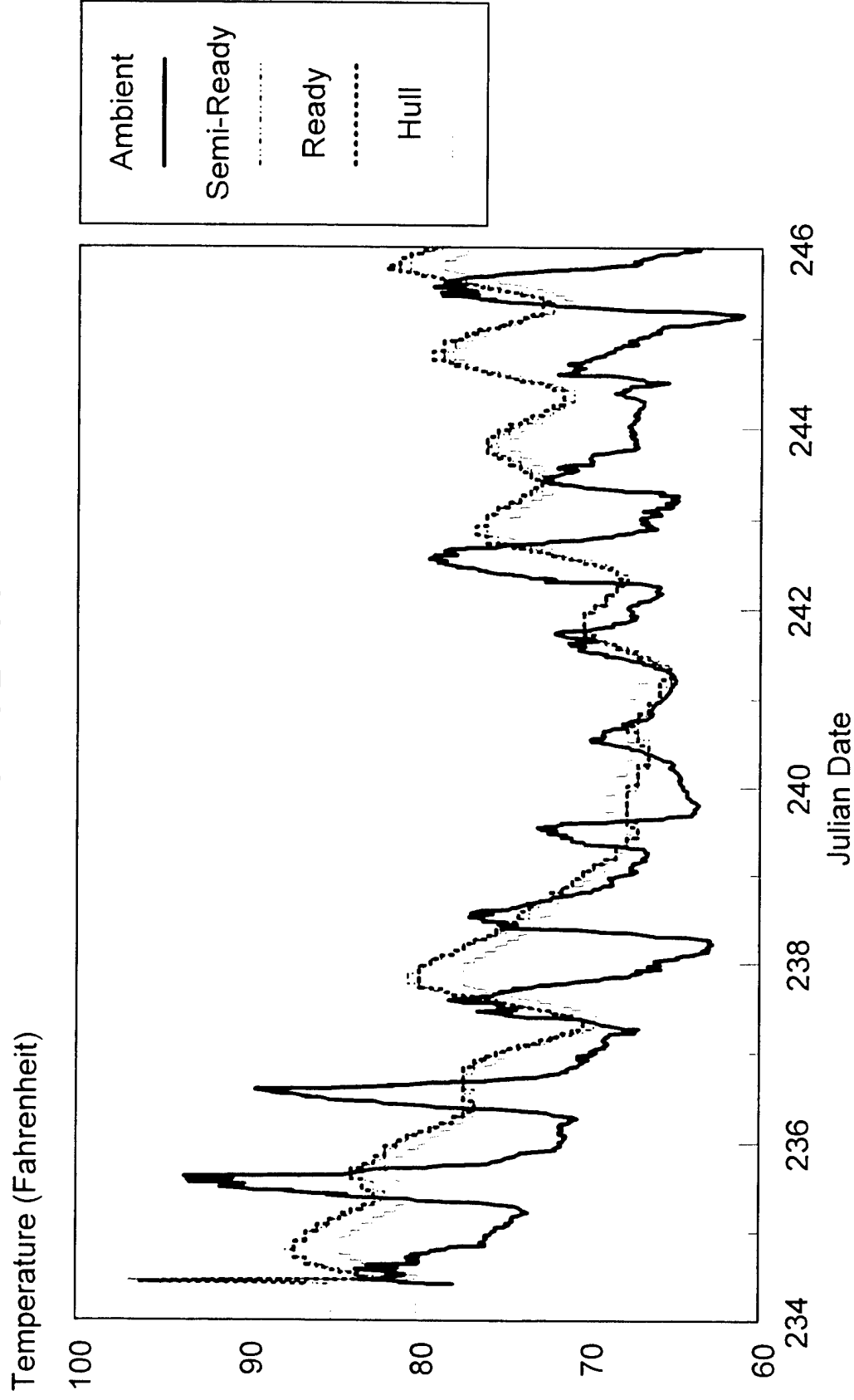
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank A-14



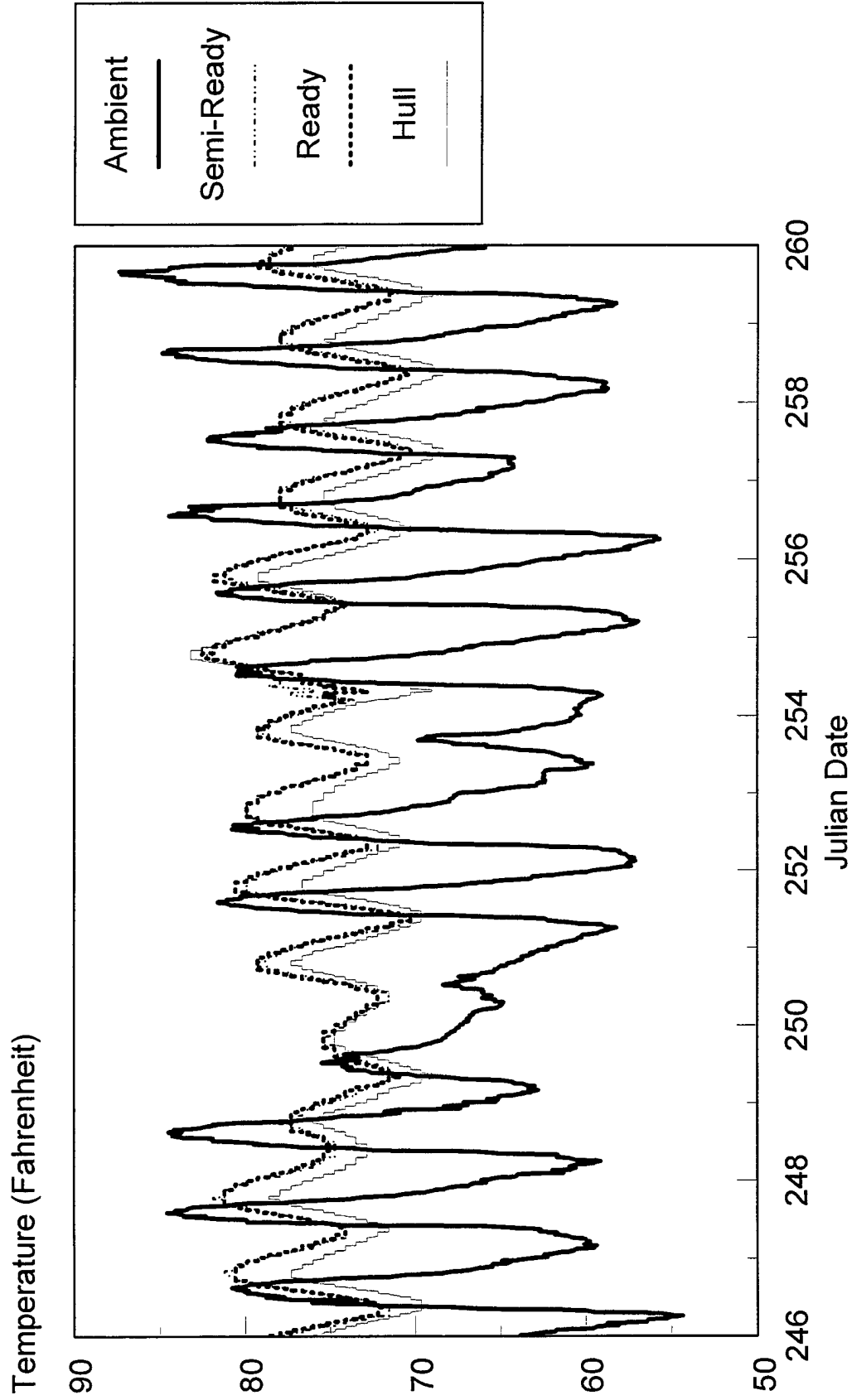
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank A-14



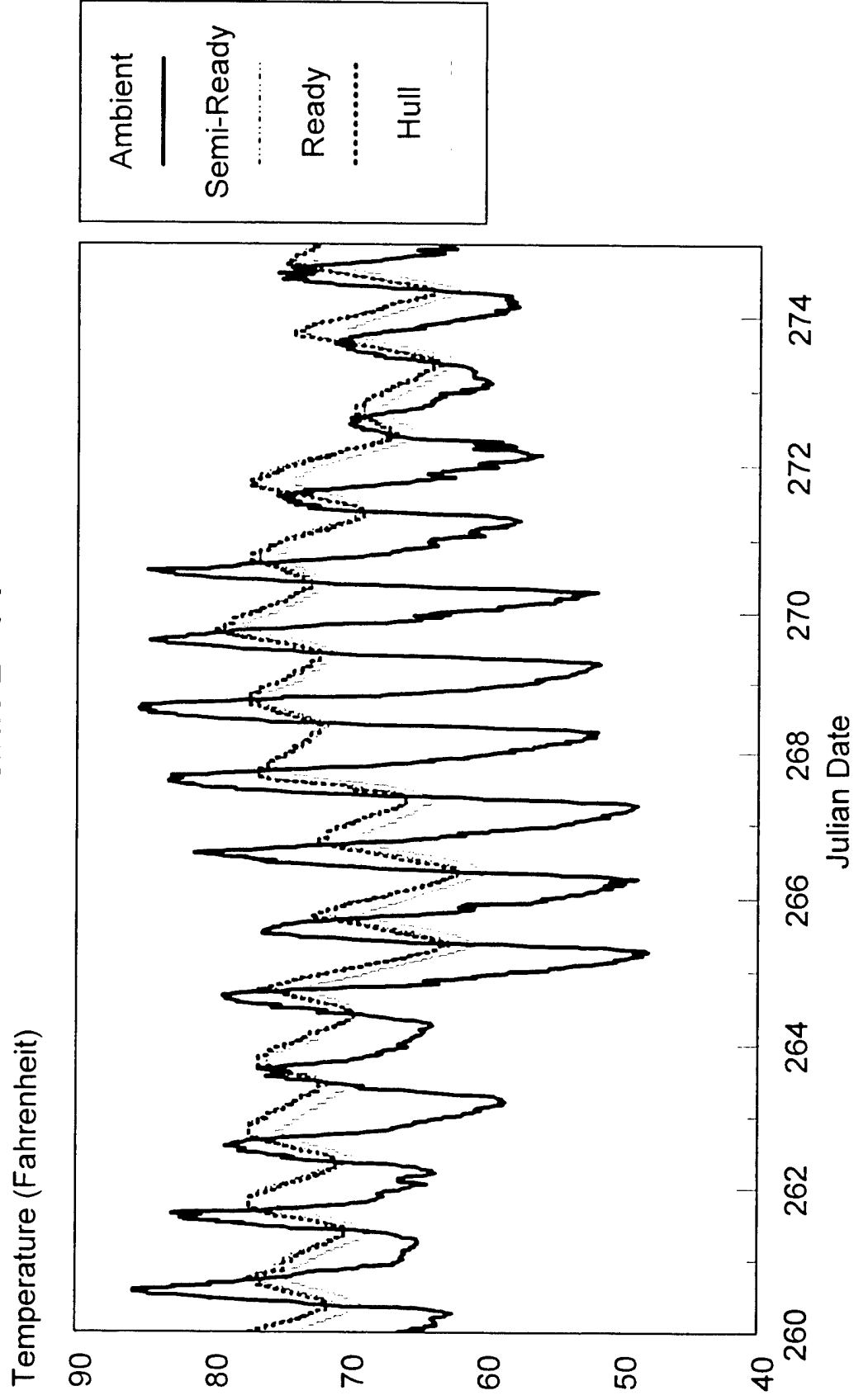
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank B-11



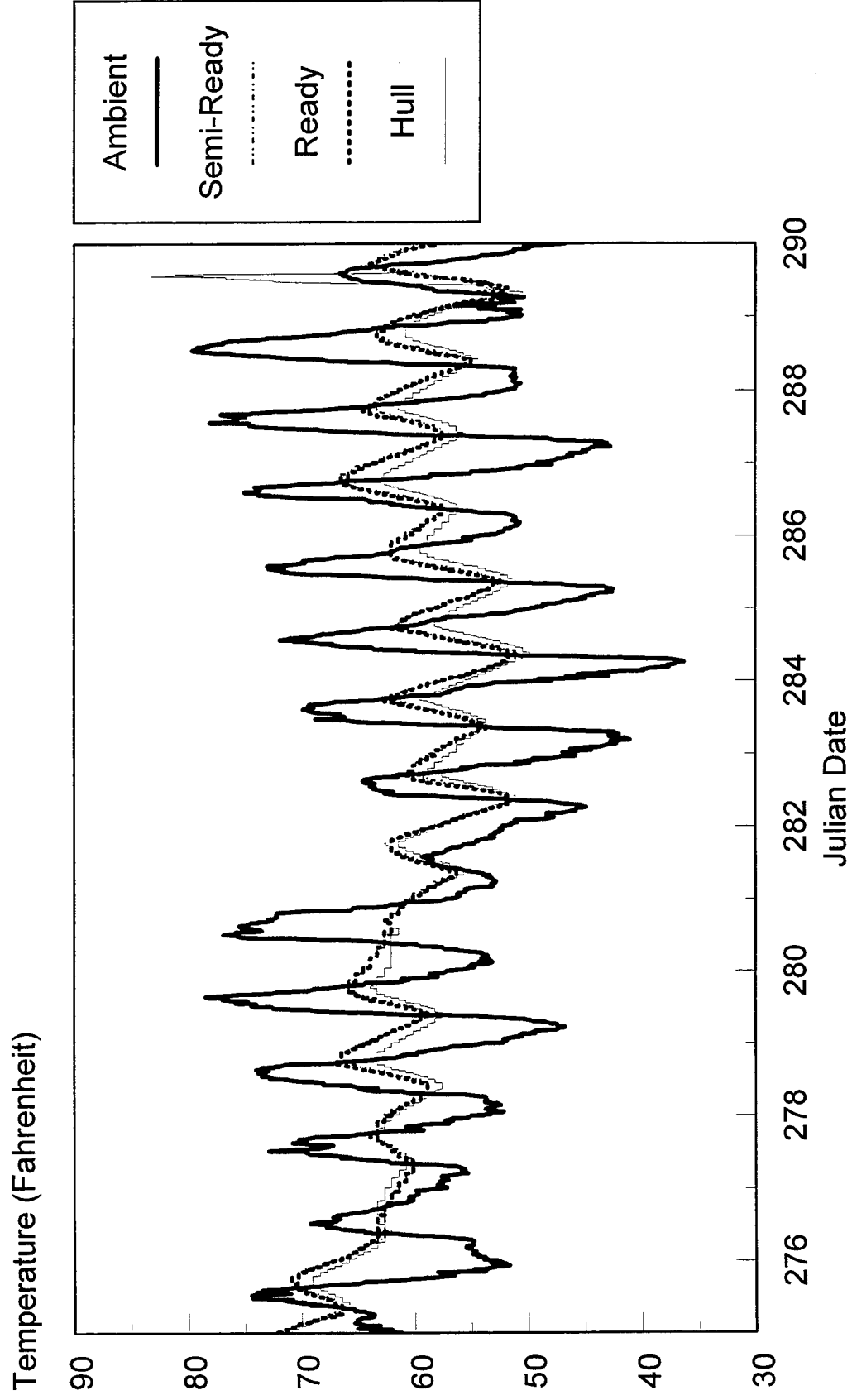
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank B-11



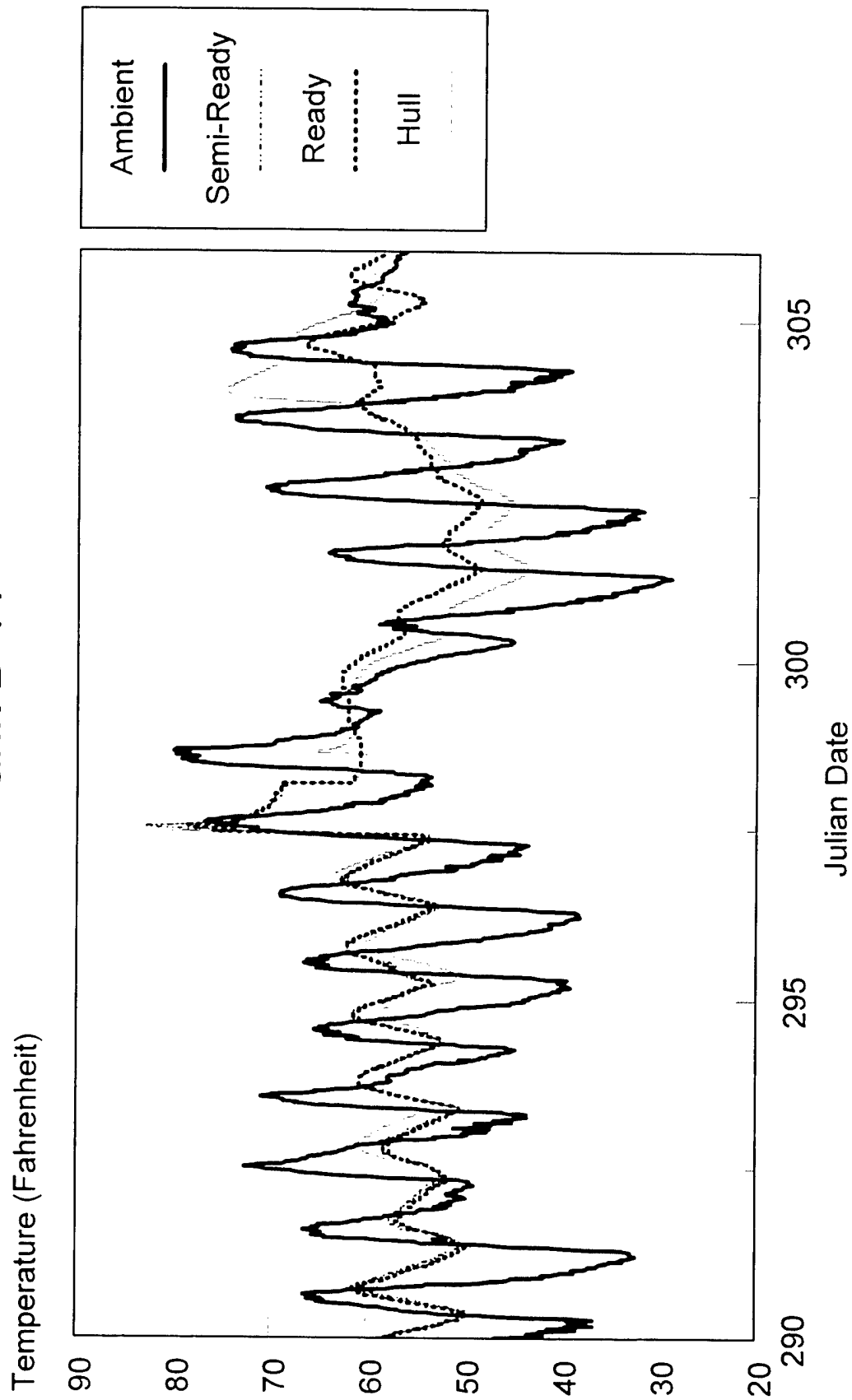
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank B-11



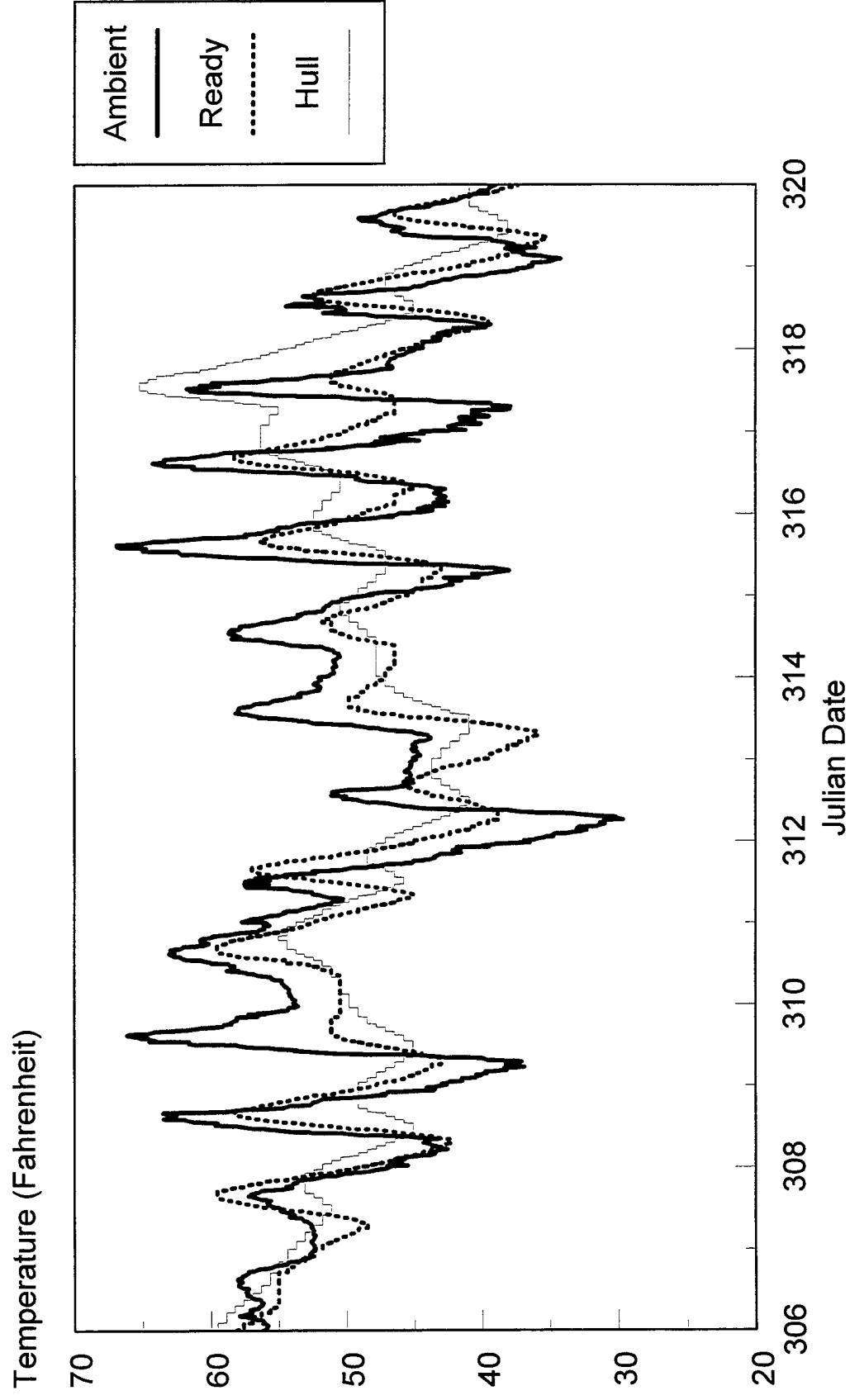
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank B-11



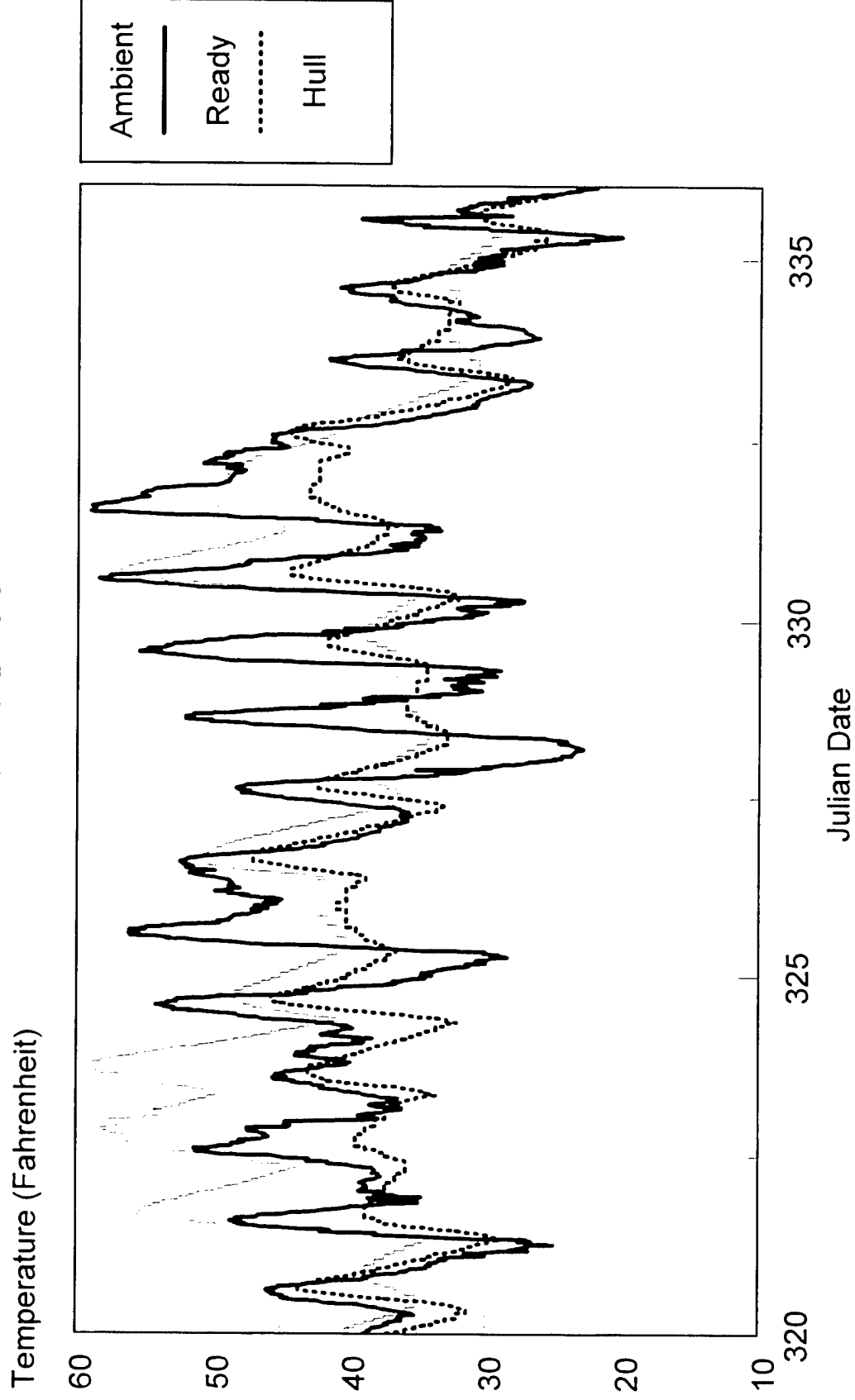
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank B-11



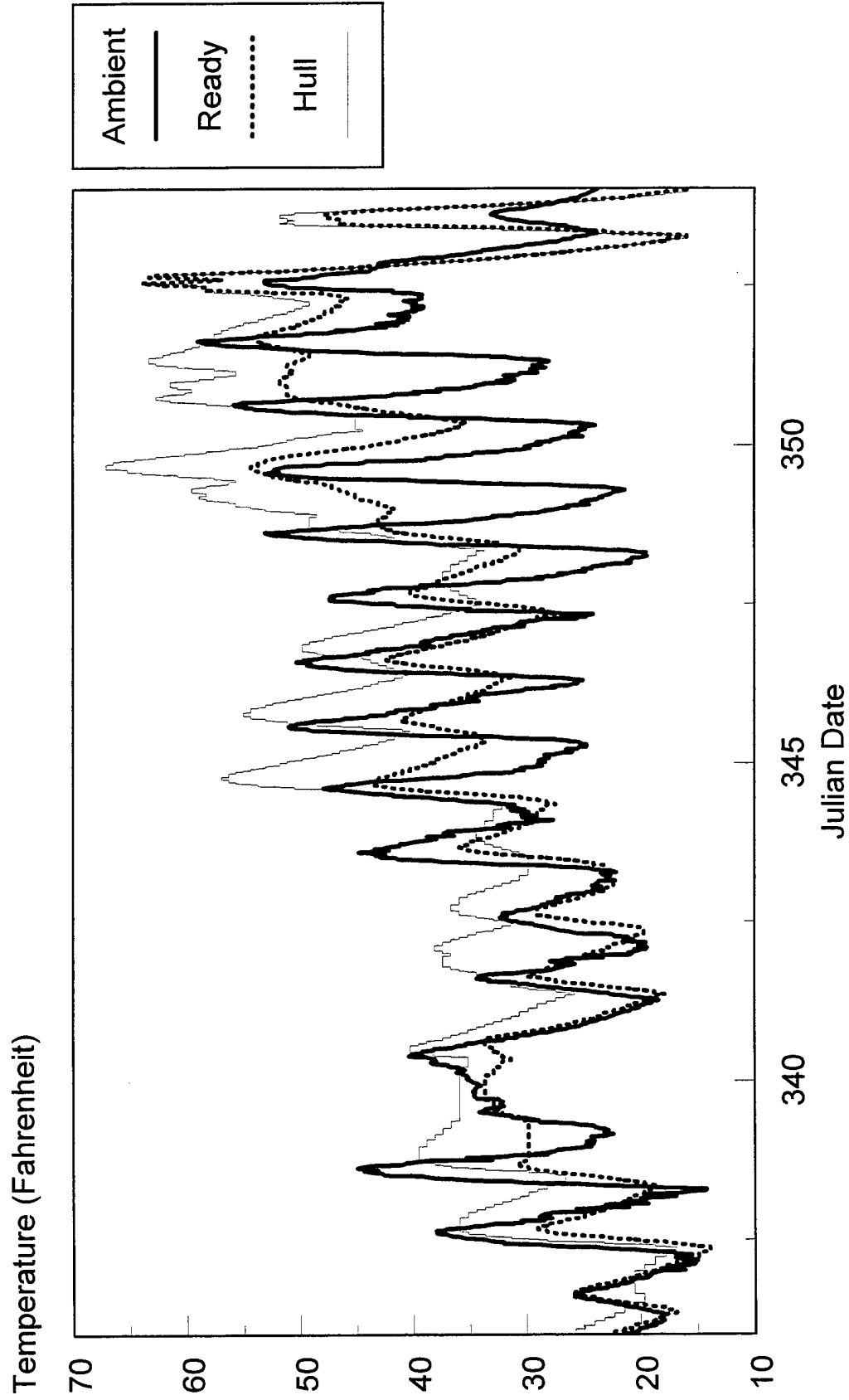
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank B-11



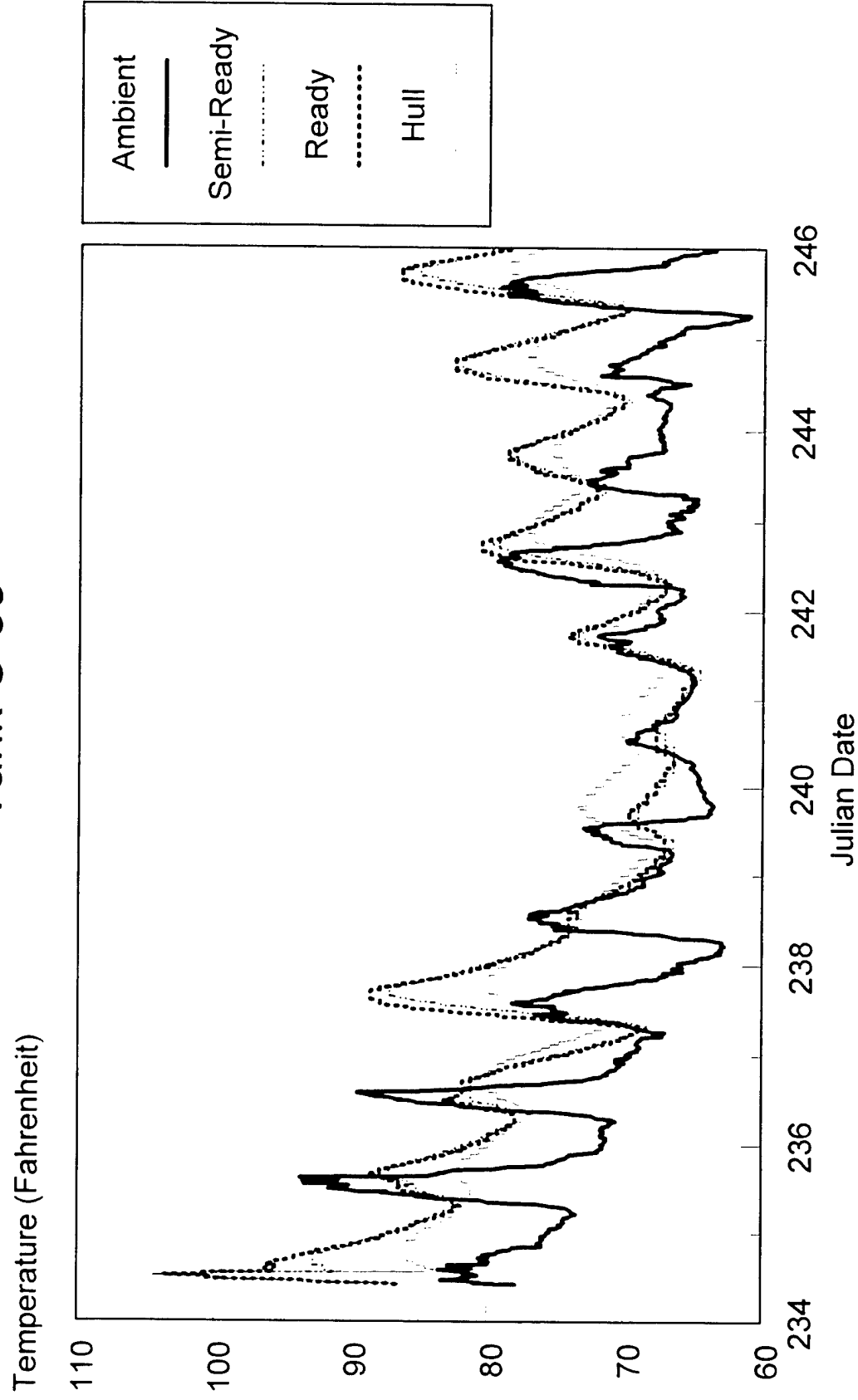
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank B-11



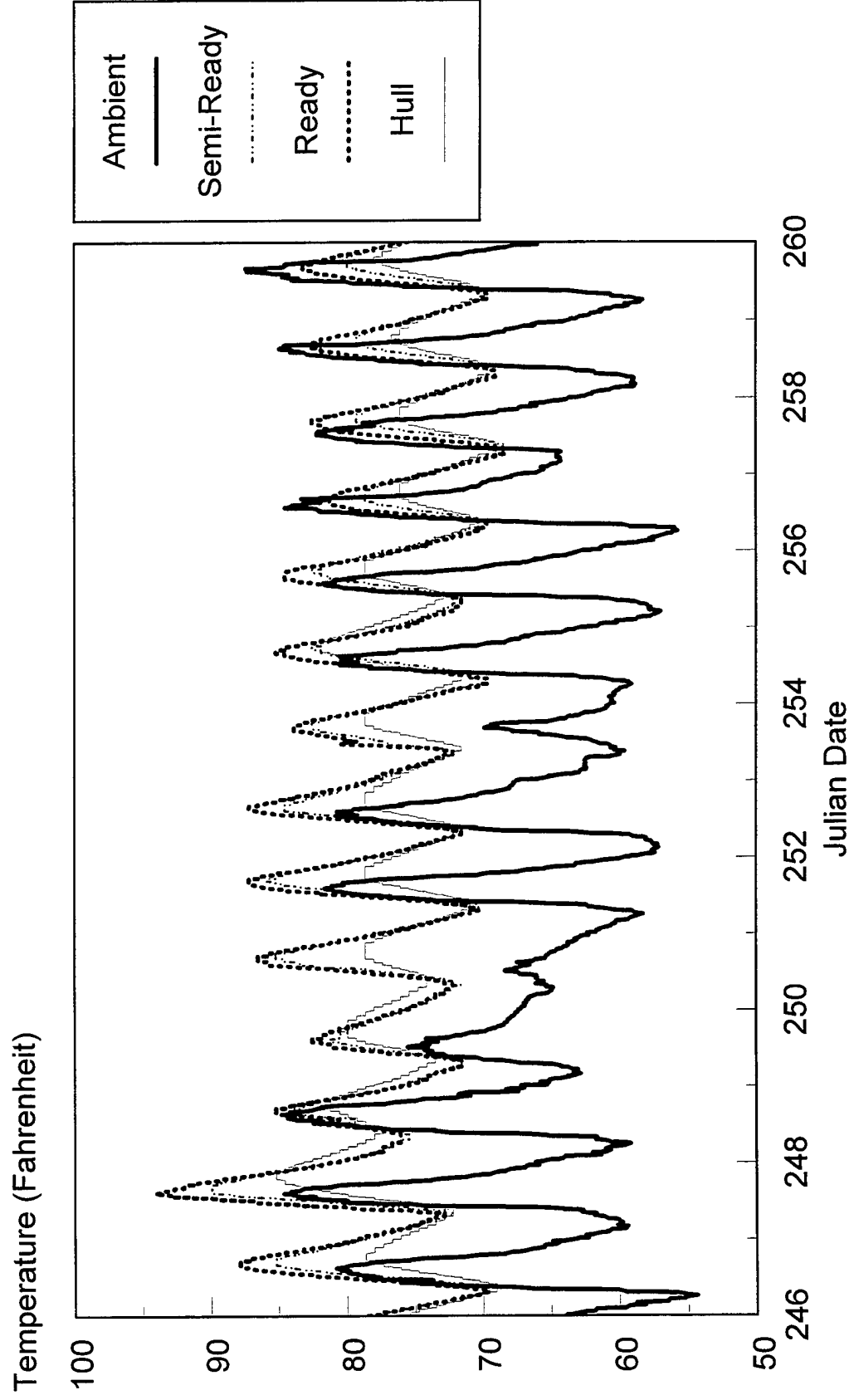
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank B-11



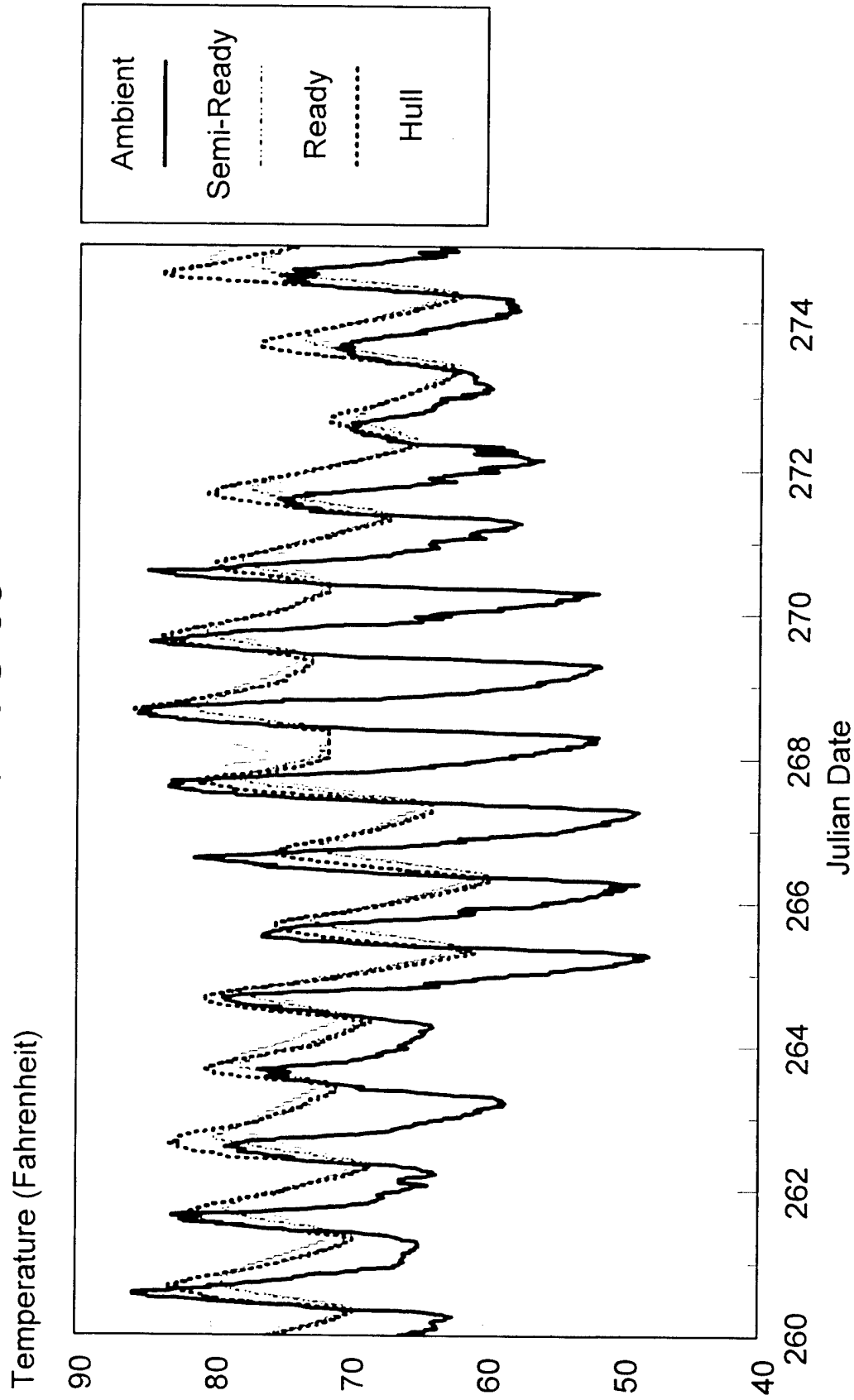
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank C-33



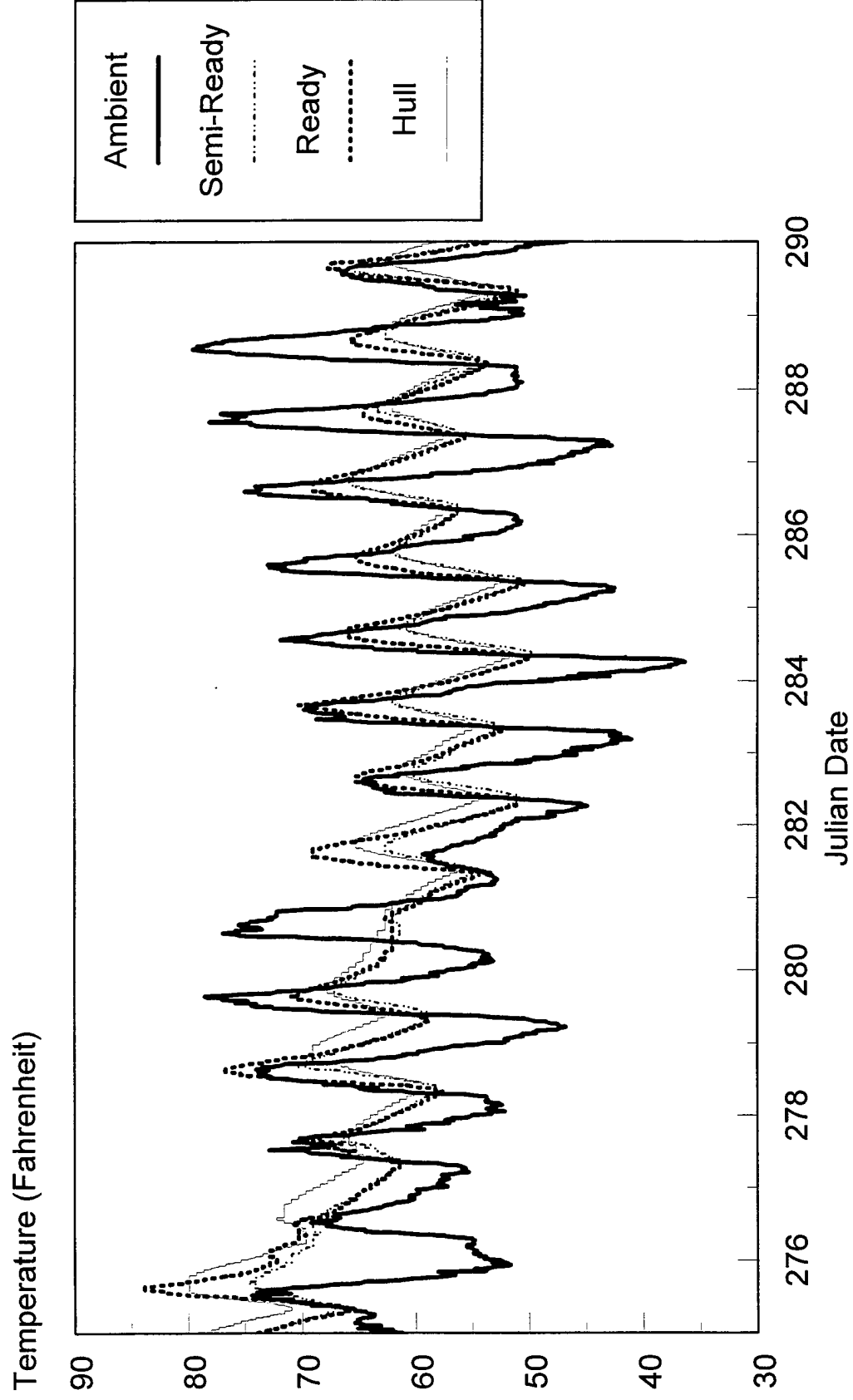
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank C-33



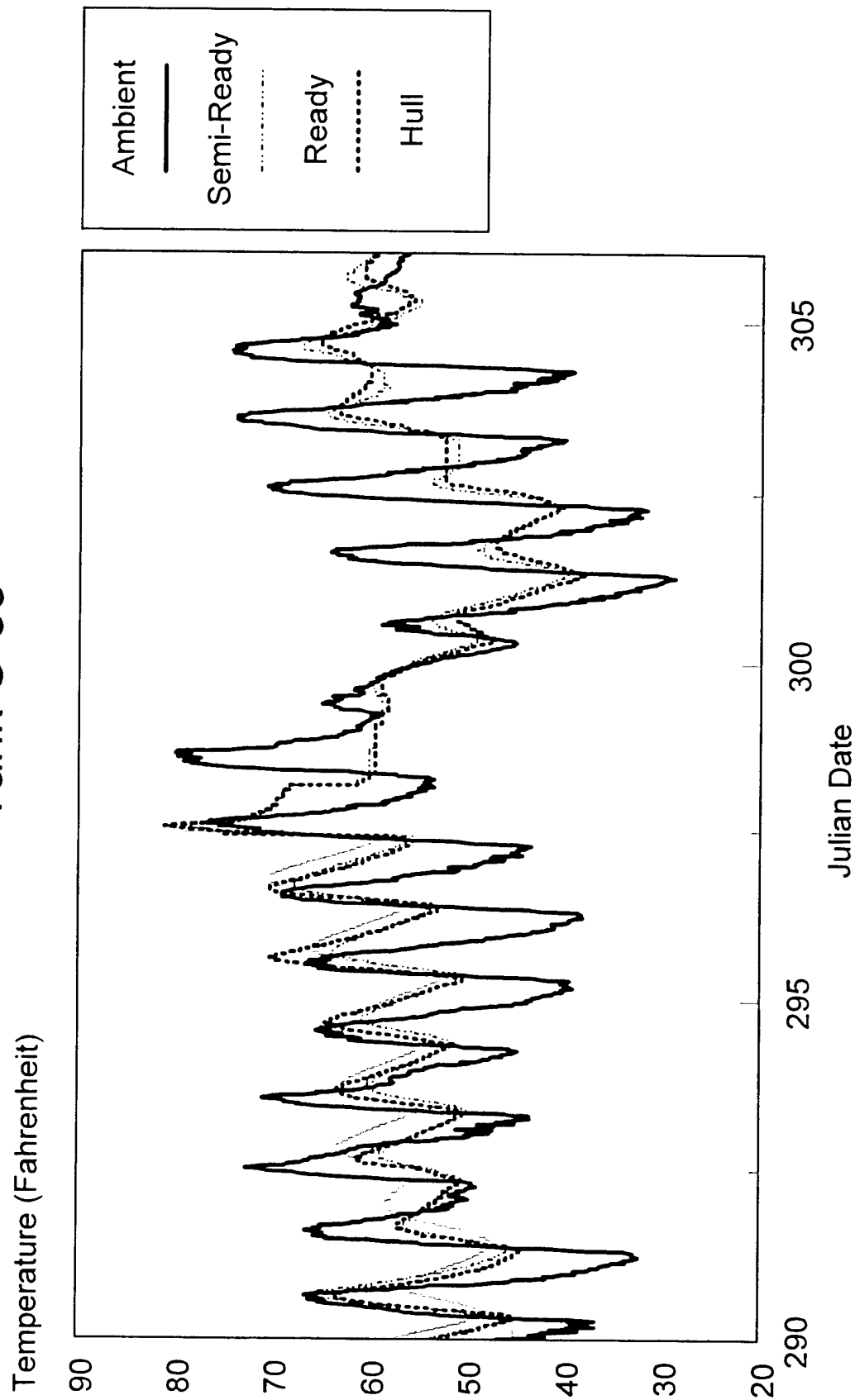
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank C-33



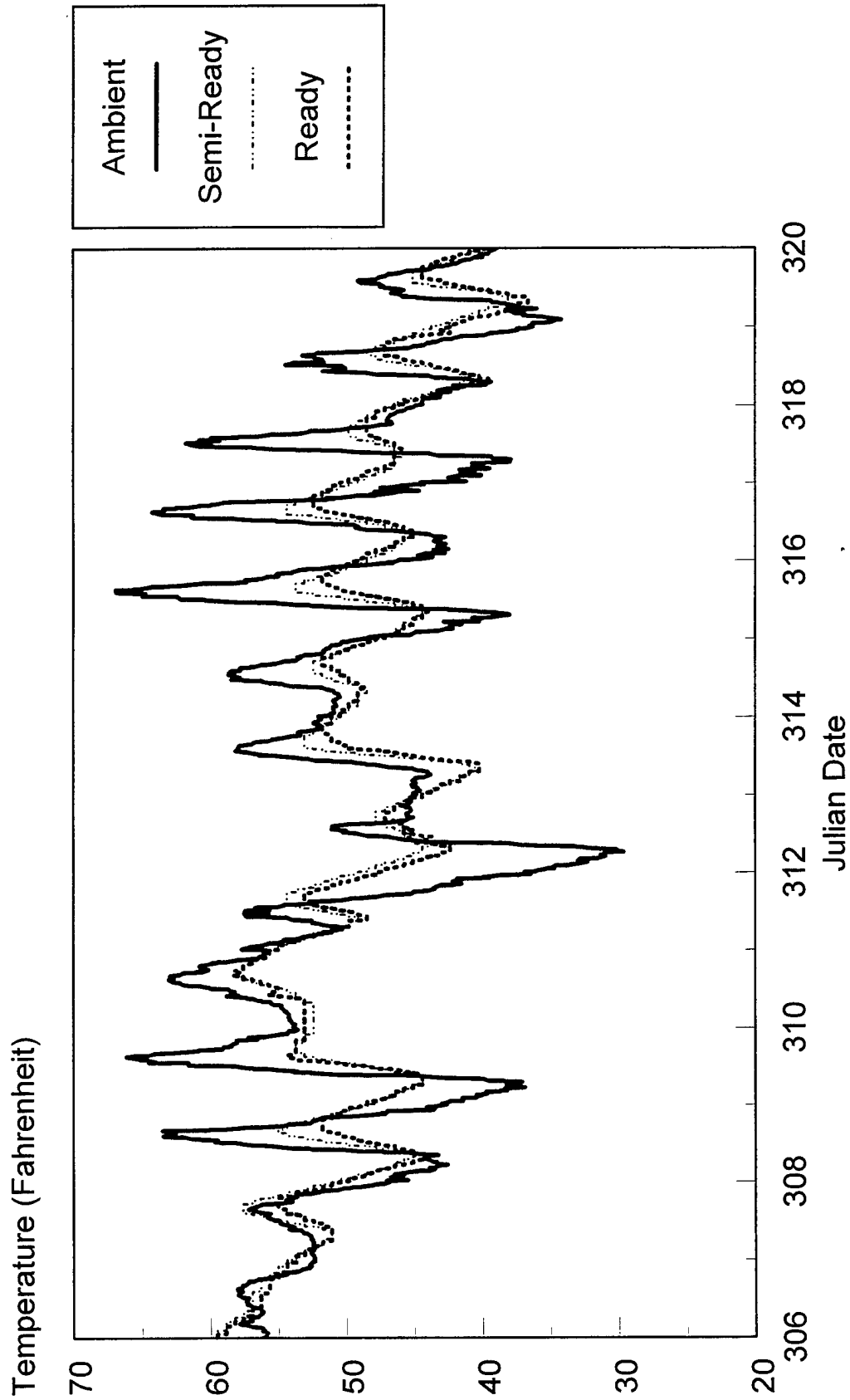
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank C-33



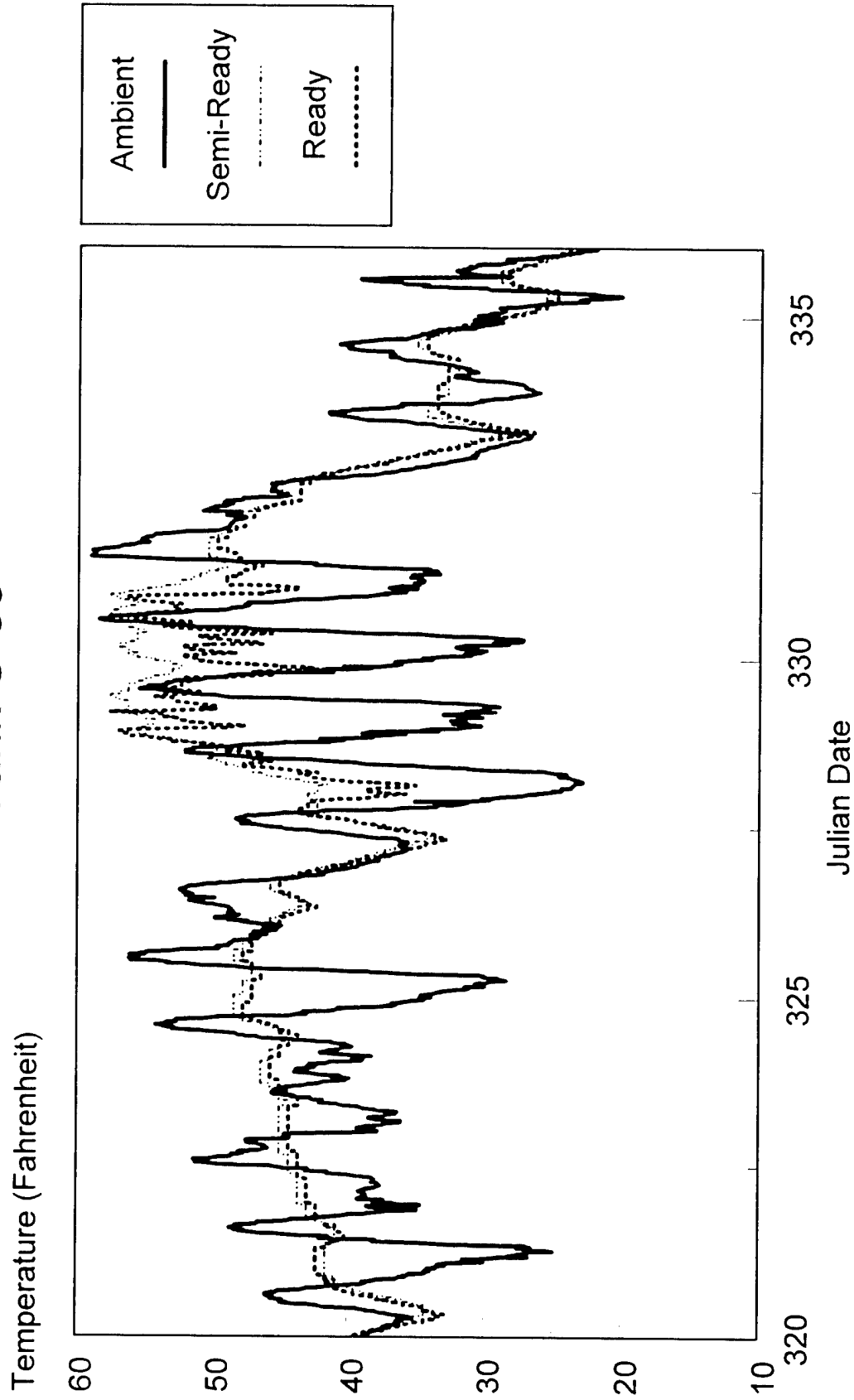
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Camp Gary Owen, South Korea
Tank C-33



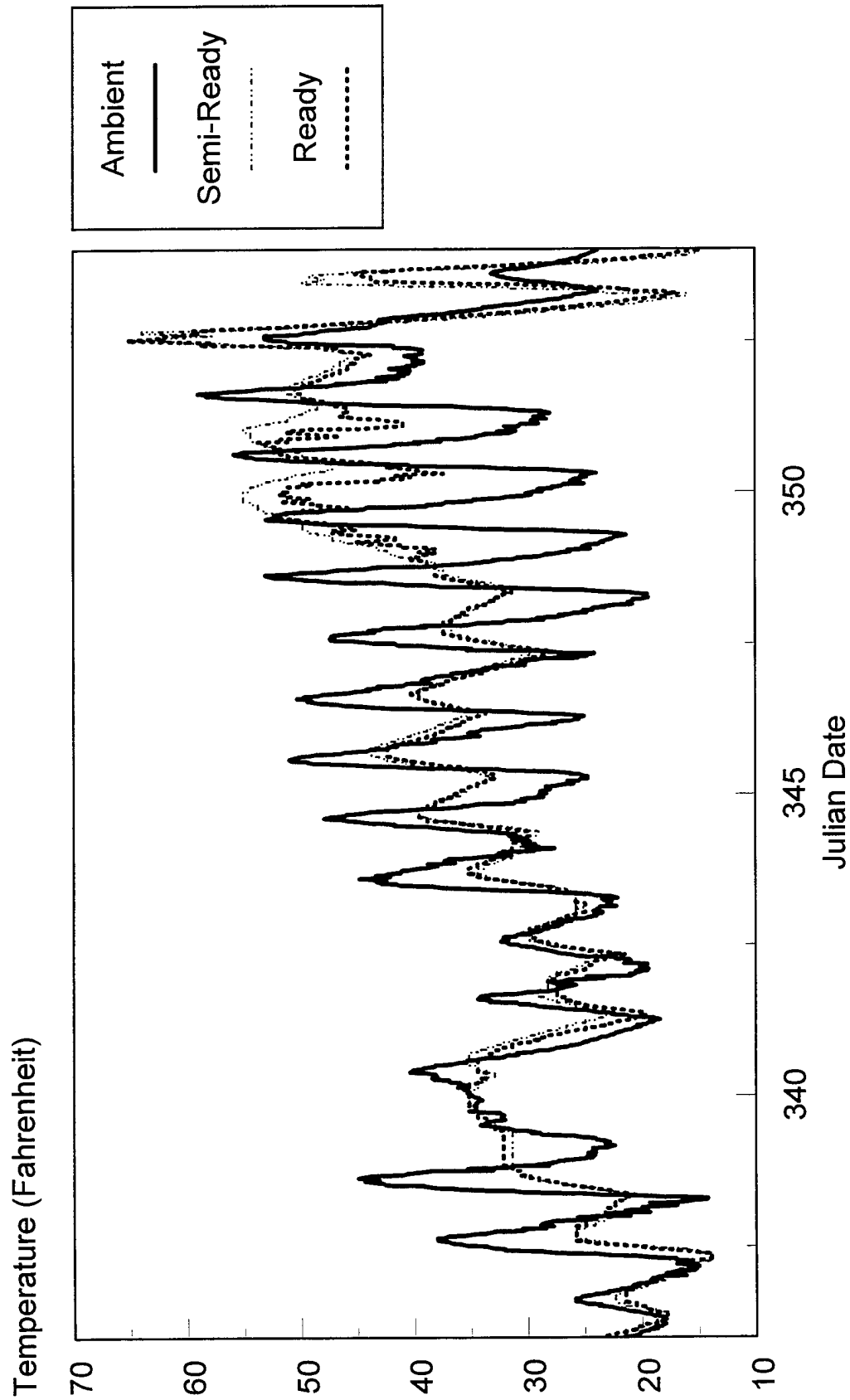
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Camp Gary Owen, South Korea
Tank C-33



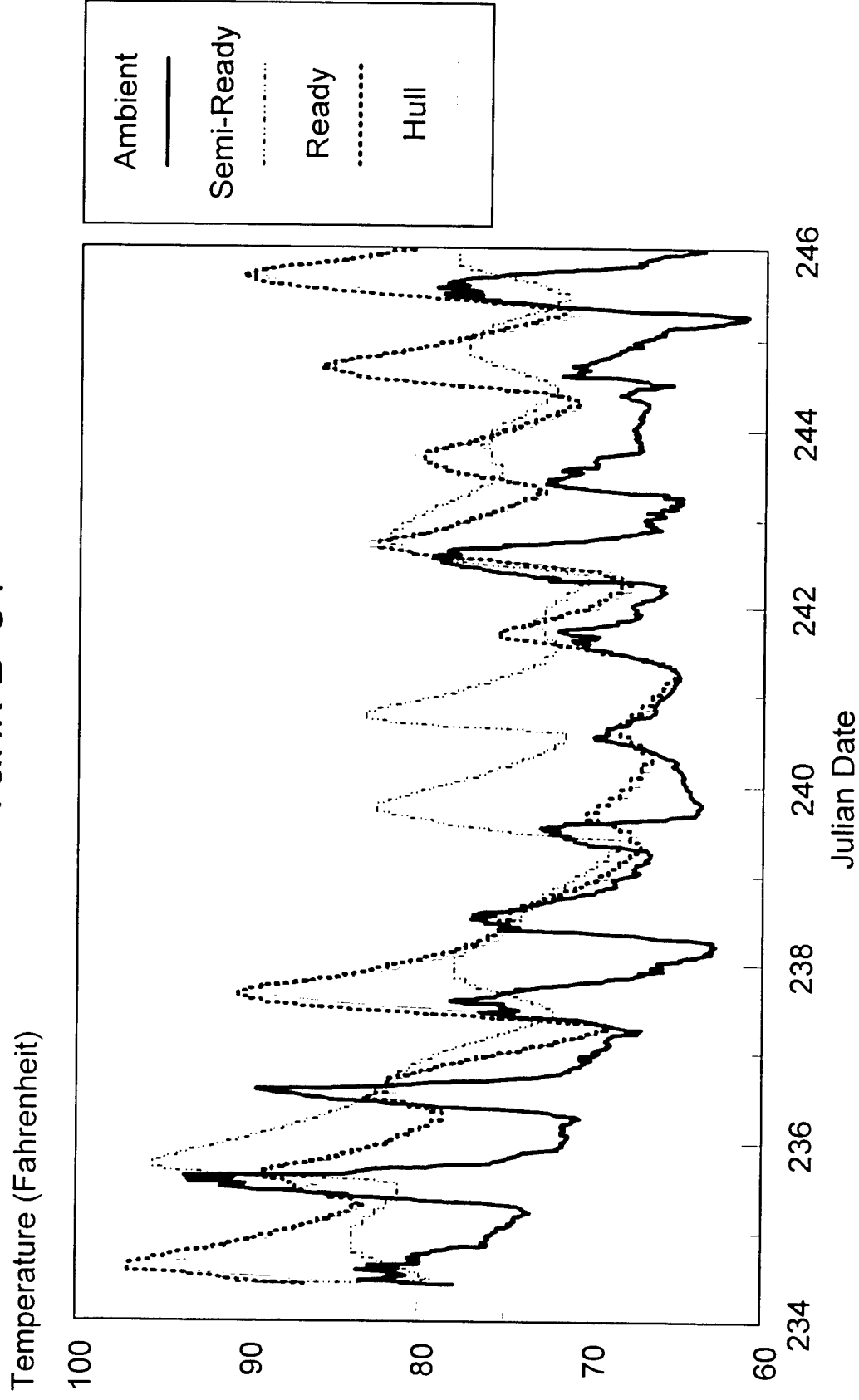
1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank C-33



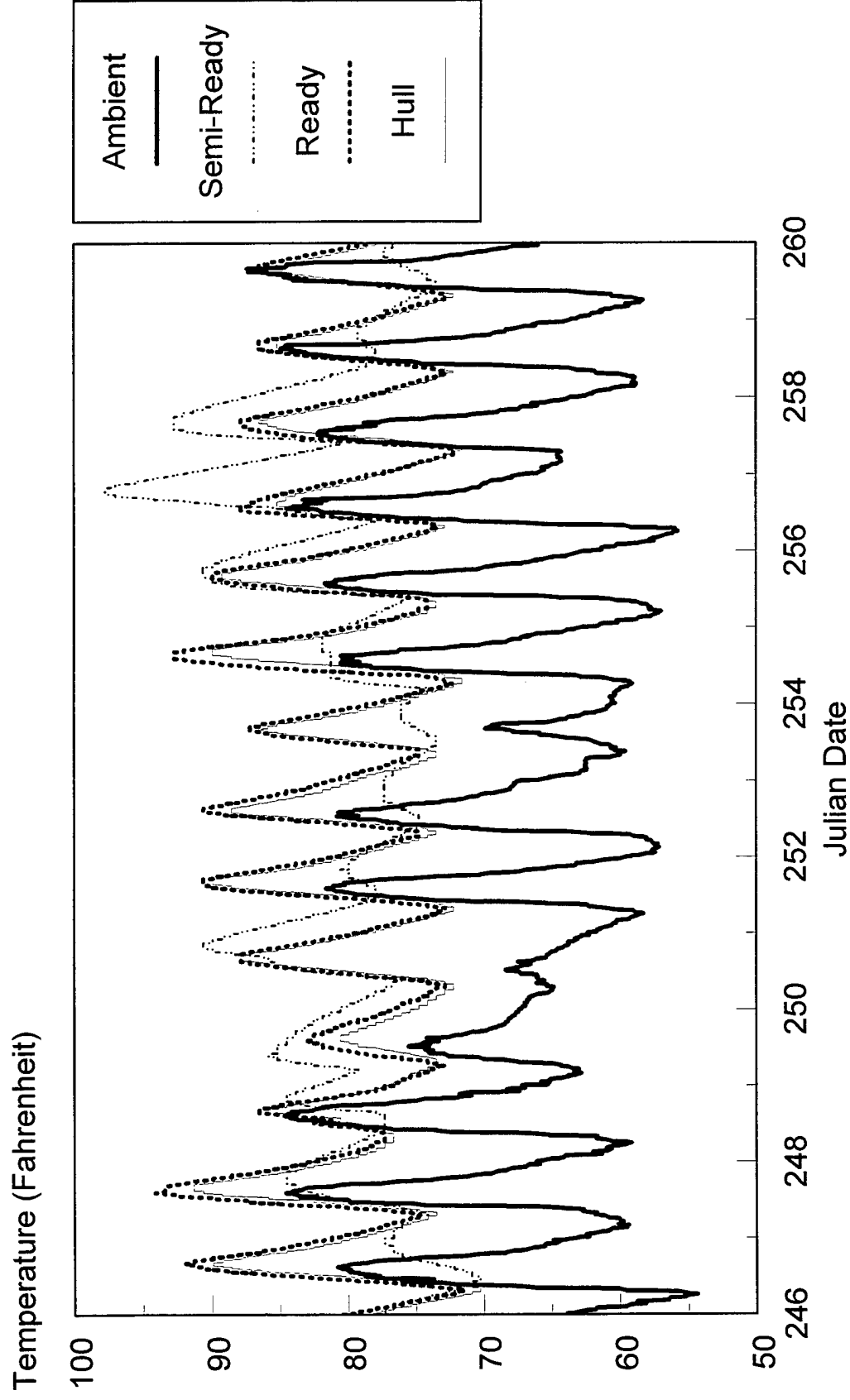
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank C-33



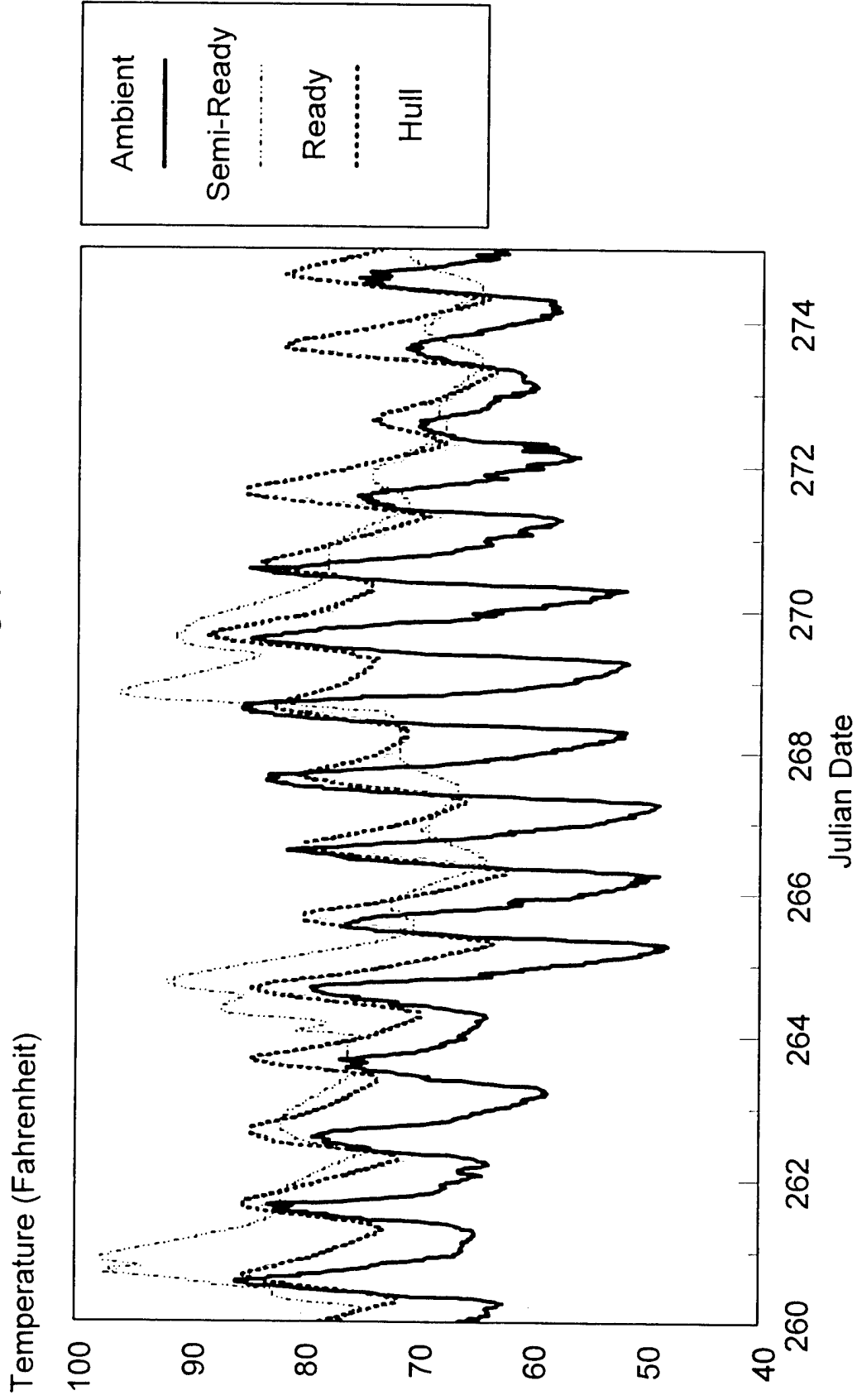
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank D-31



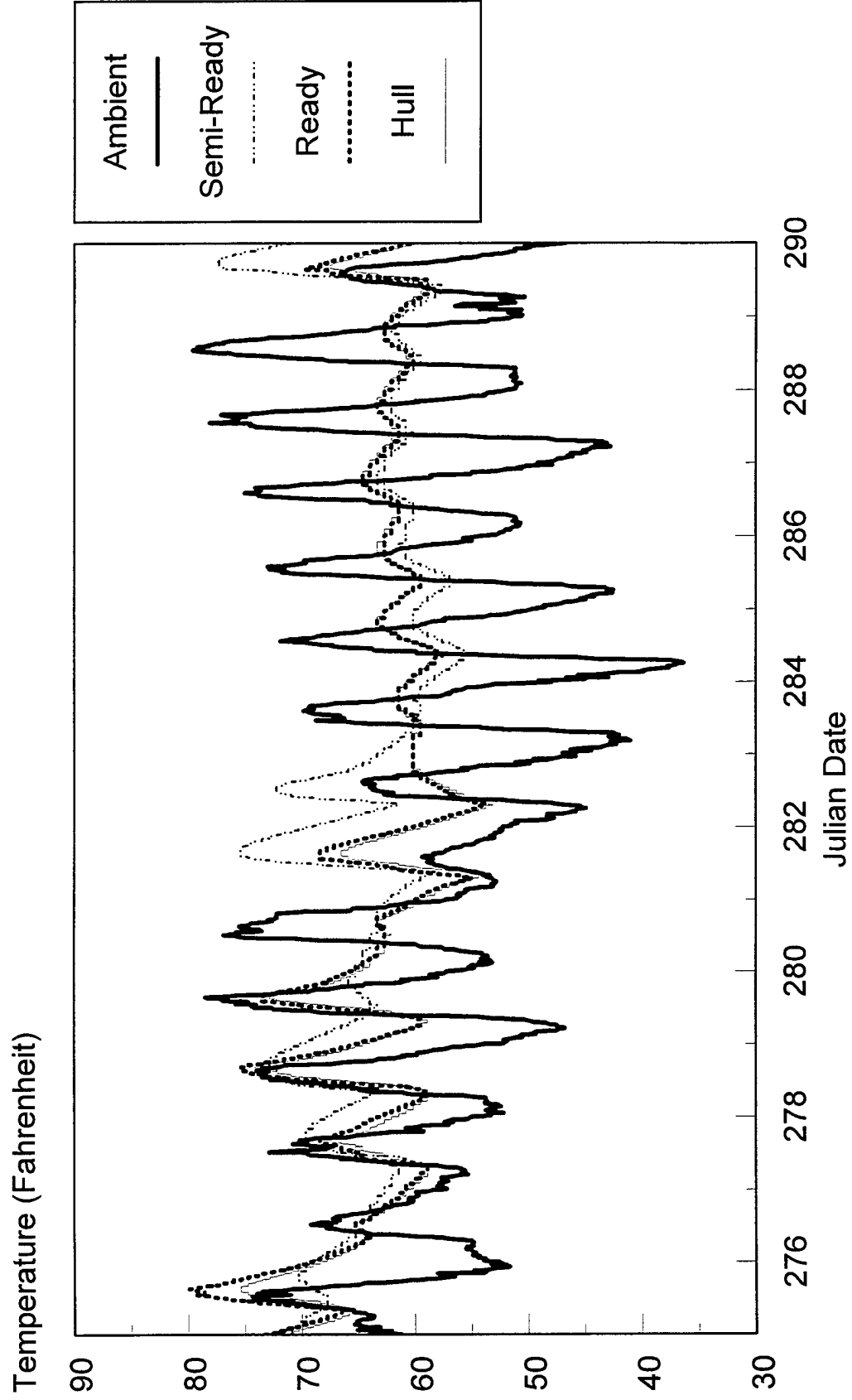
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Tank D-31



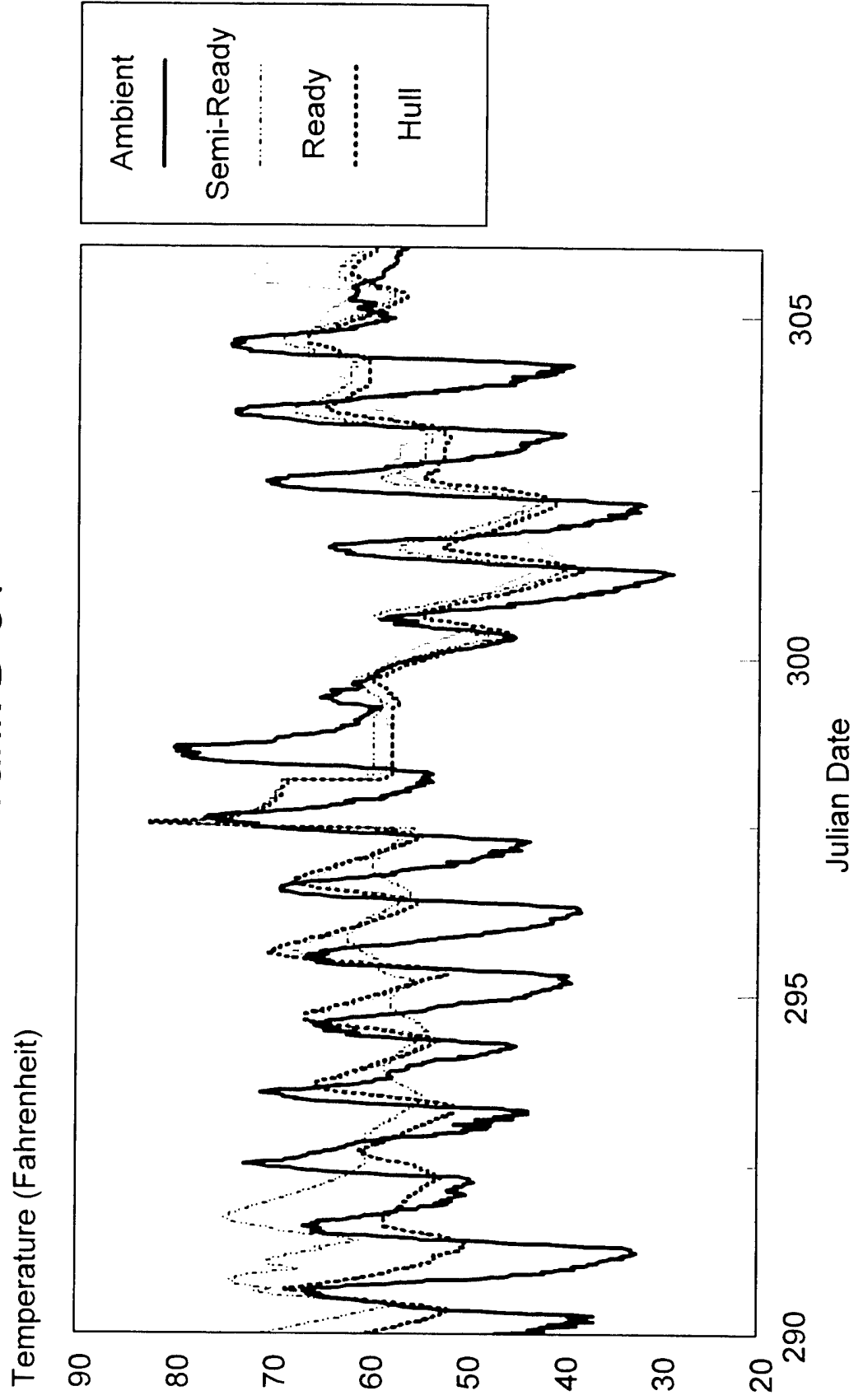
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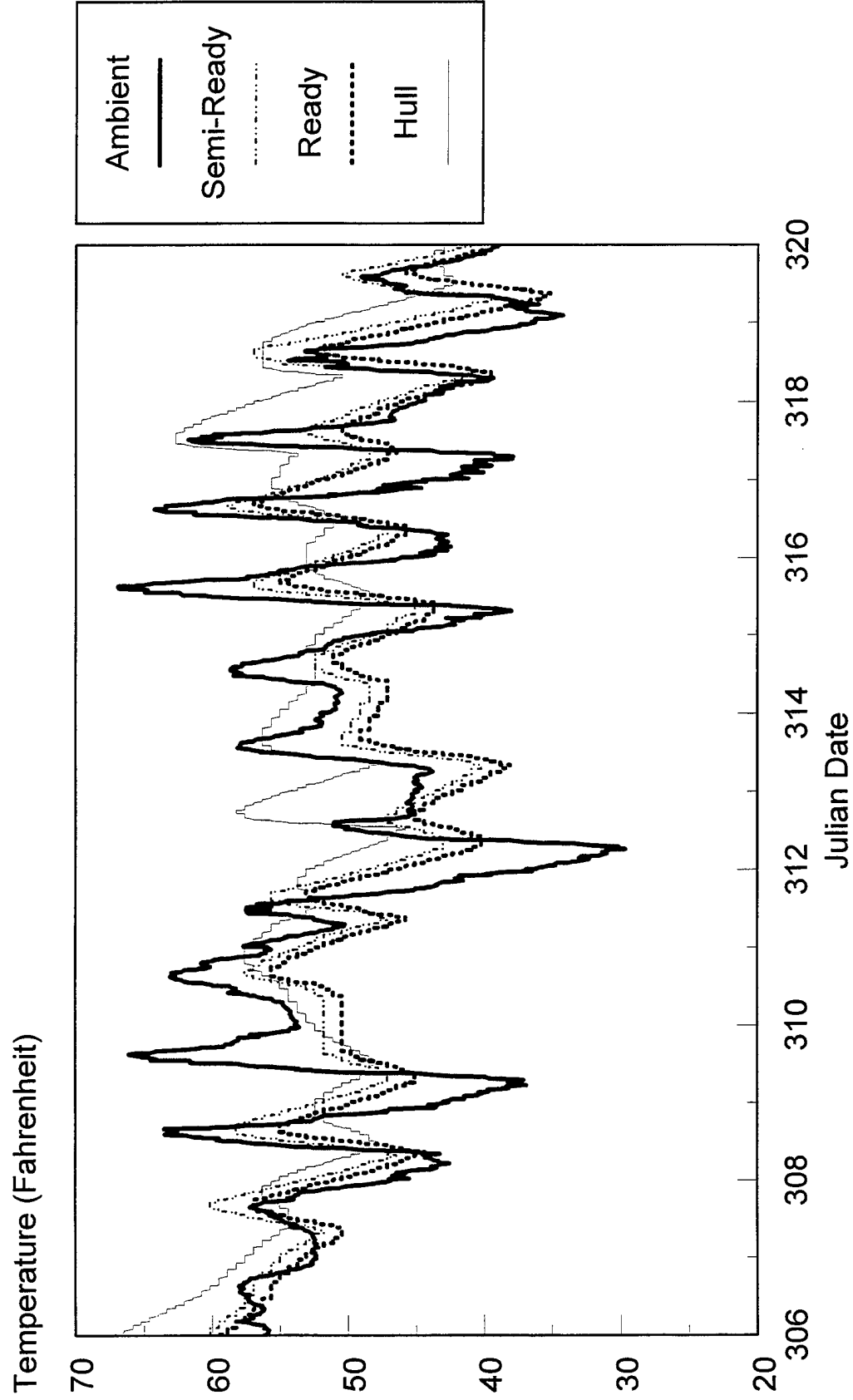
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Camp Gary Owen, South Korea
Tank D-31



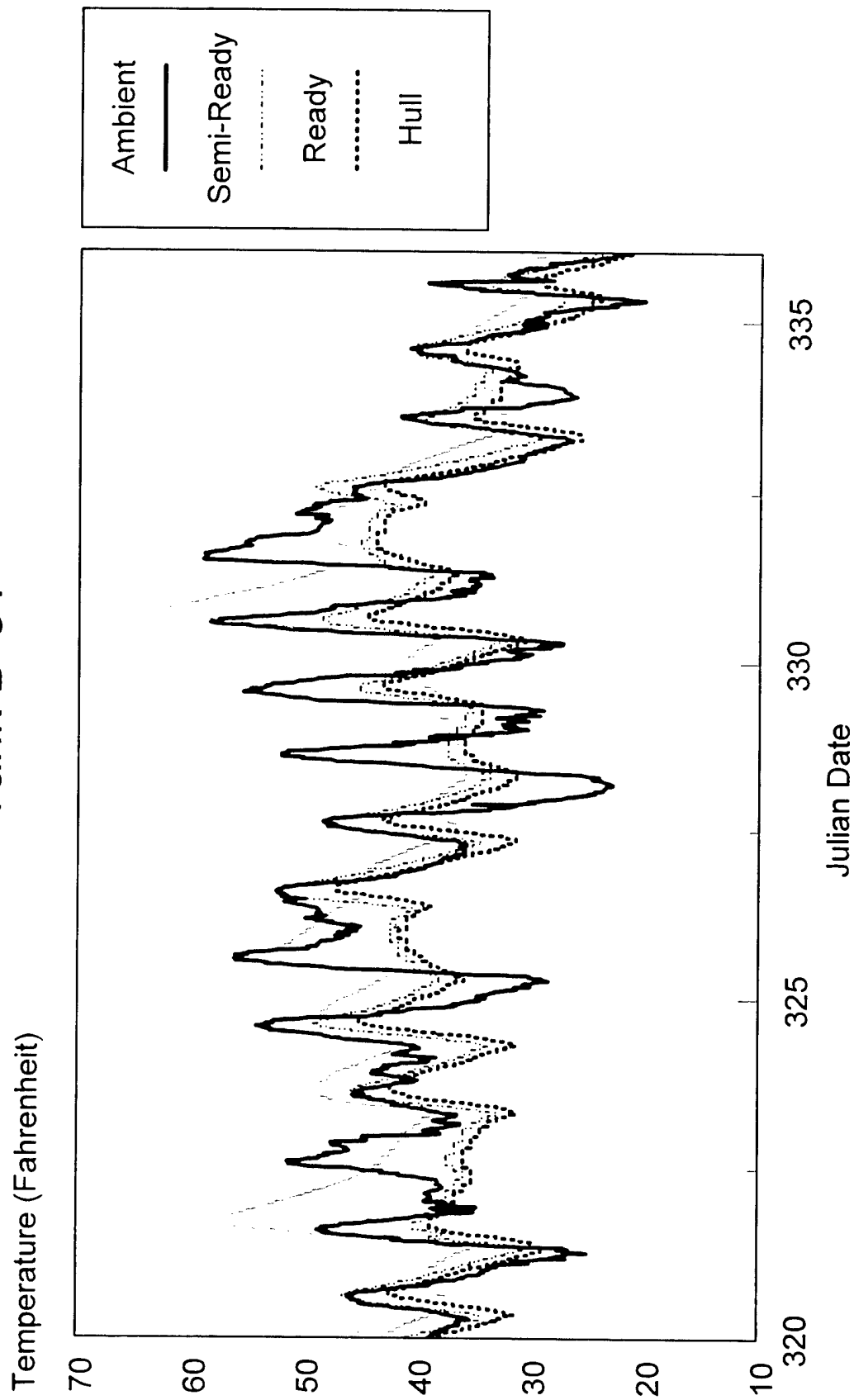
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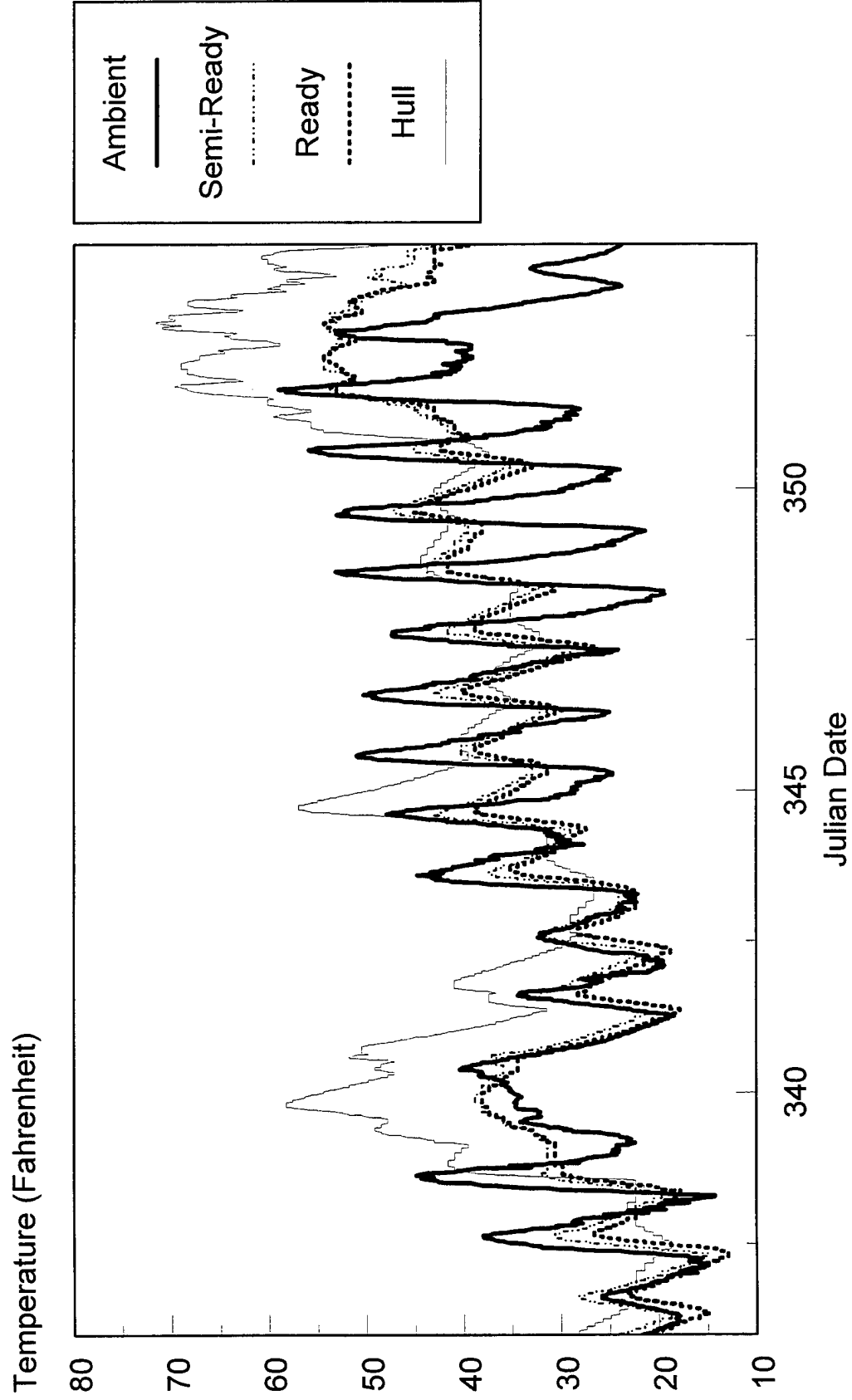
1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank D-31



1996 M1A1 Tank Evaluation Camp Gary Owen, South Korea Tank D-31

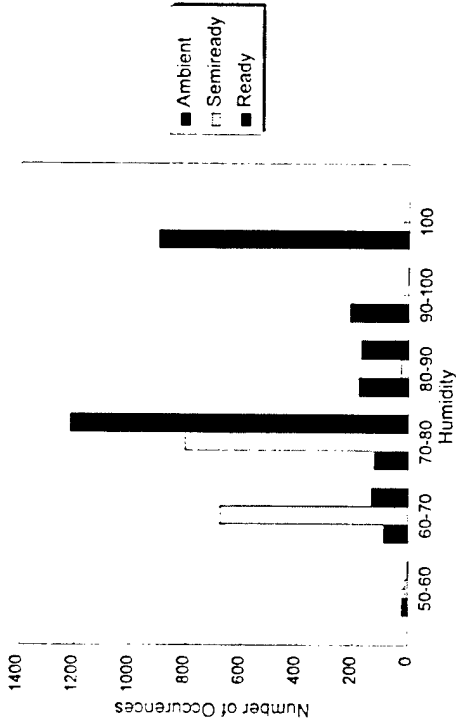


1996 M1A1 Tank Evaluation
Camp Gary Owen, South Korea
Tank D-31



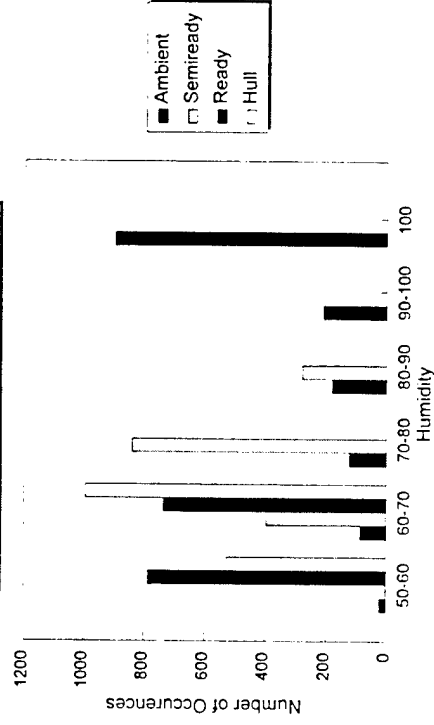
South Korea, Tank C-33

August, 1996



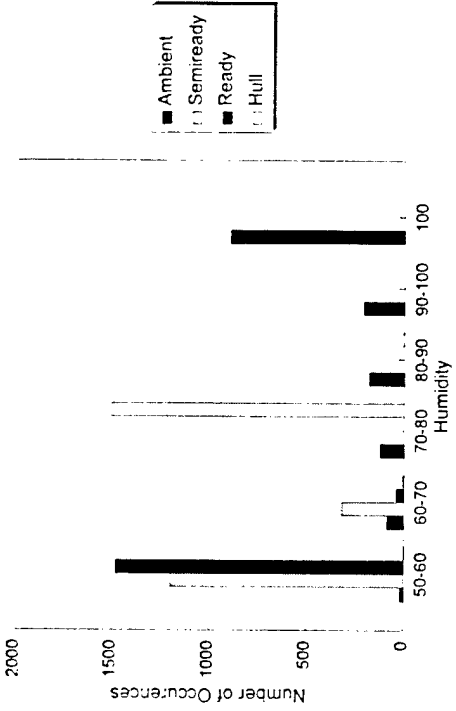
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August, 1996



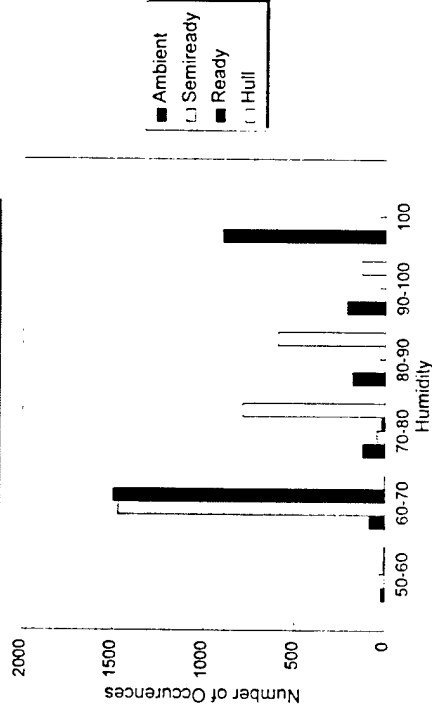
South Korea, Tank A-14

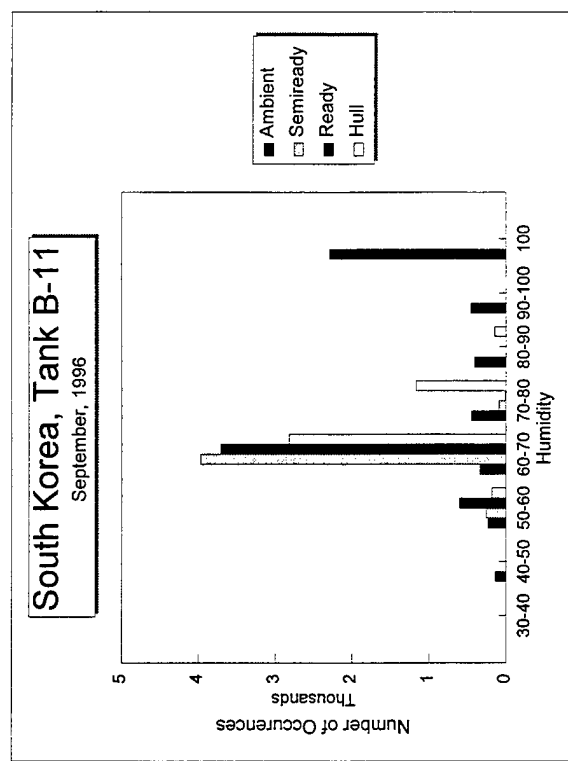
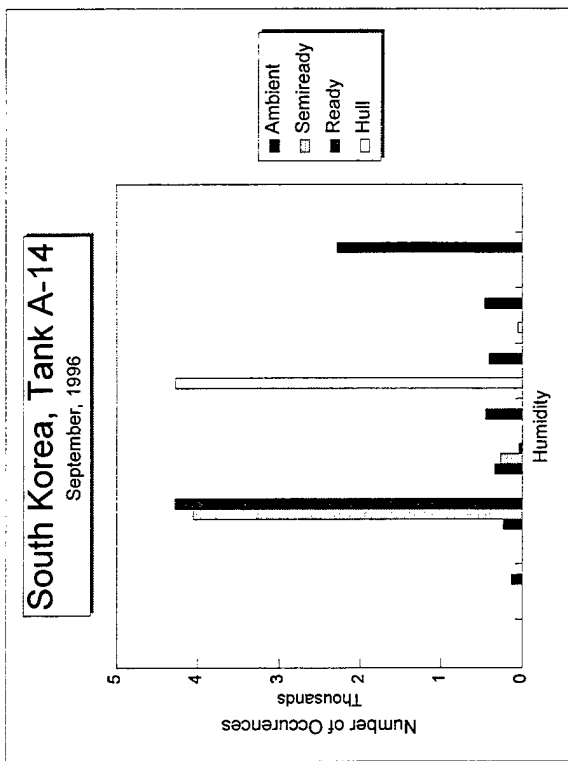
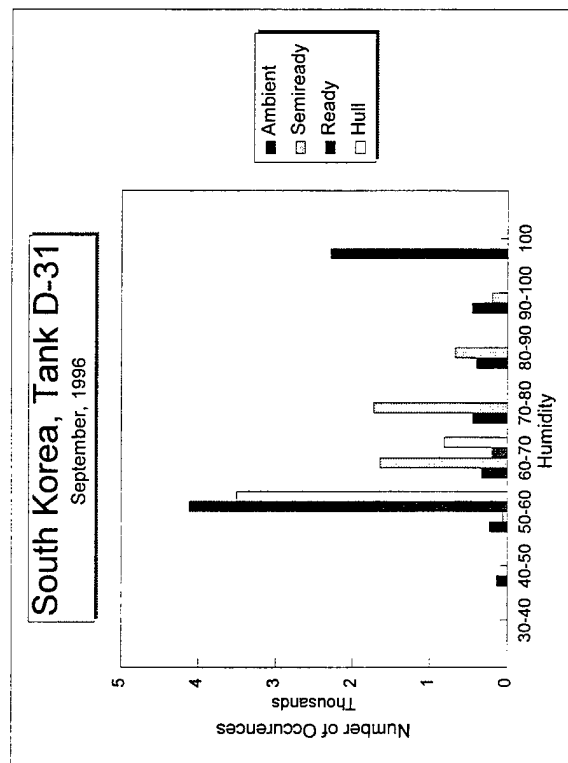
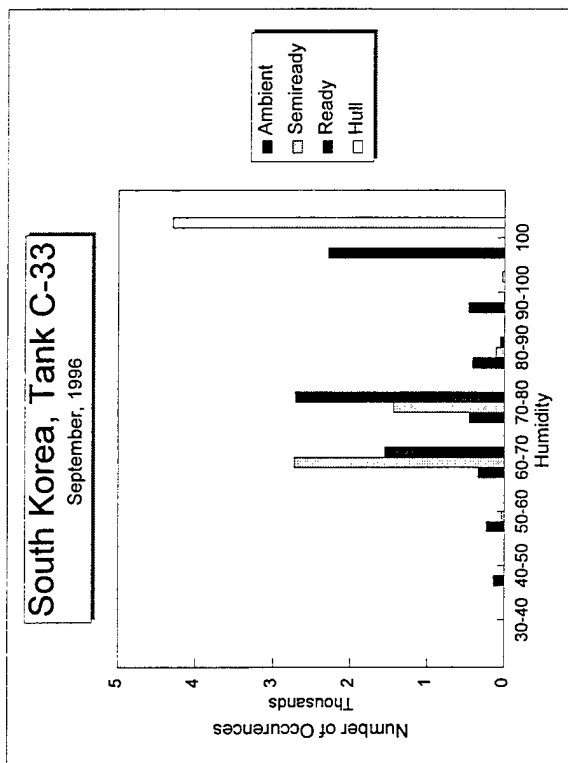
August, 1996



South Korea, Tank B-11

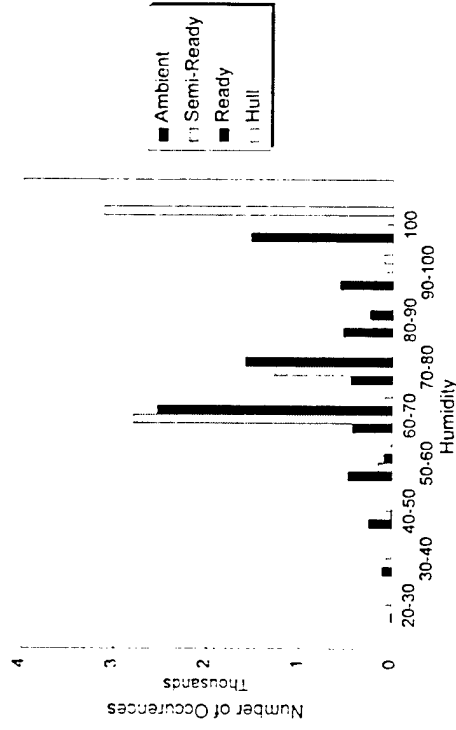
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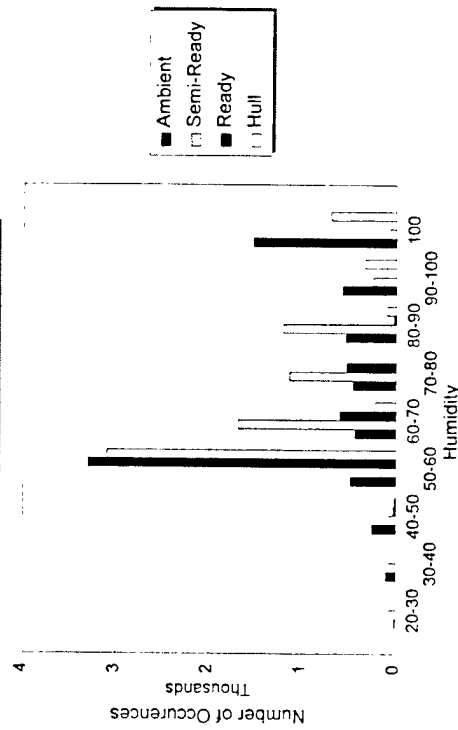
South Korea, Tank C-33

October, 1996



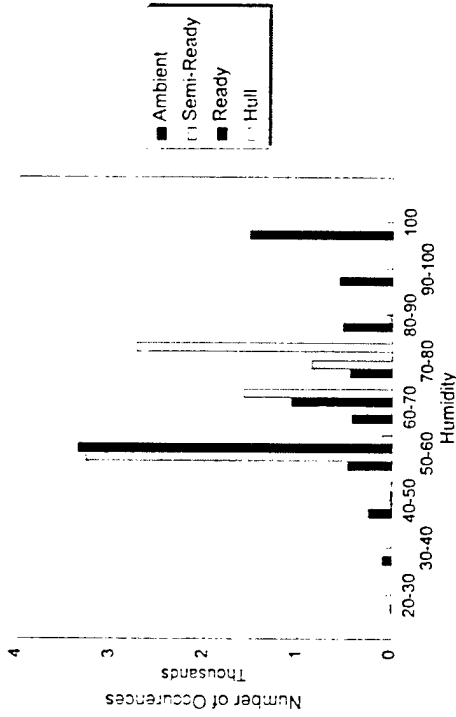
South Korea, Tank D-31

October, 1996



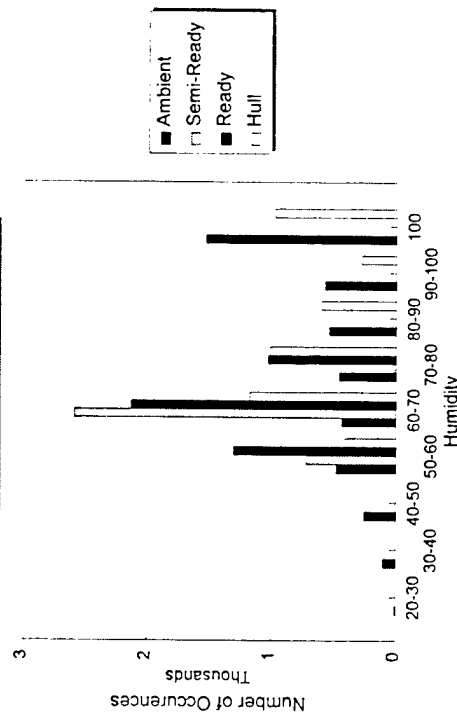
South Korea, Tank A-14

October, 1996

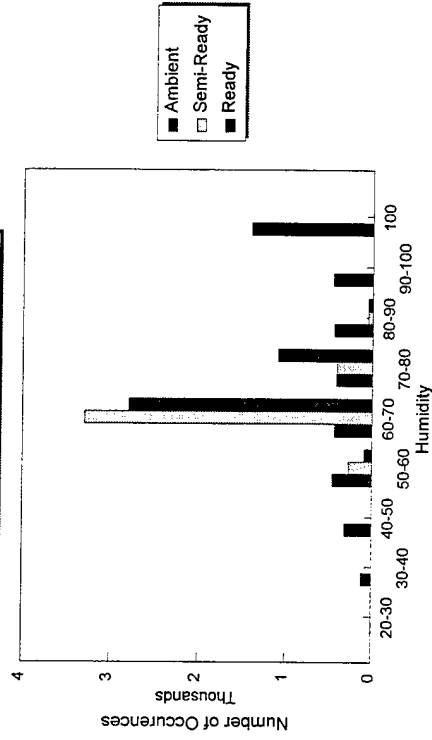


South Korea, Tank B-11

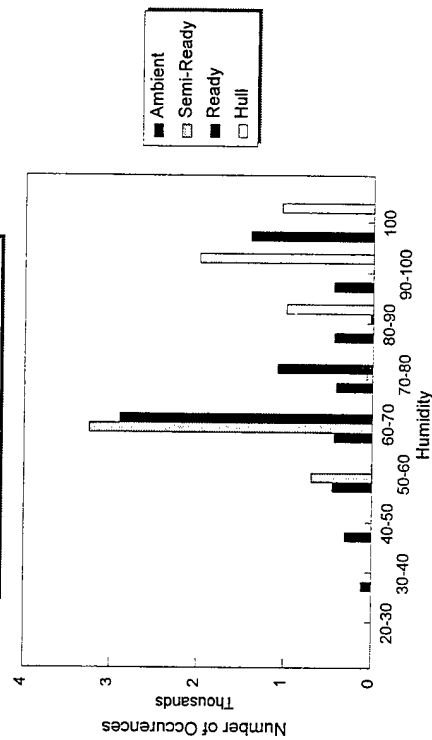
October, 1996



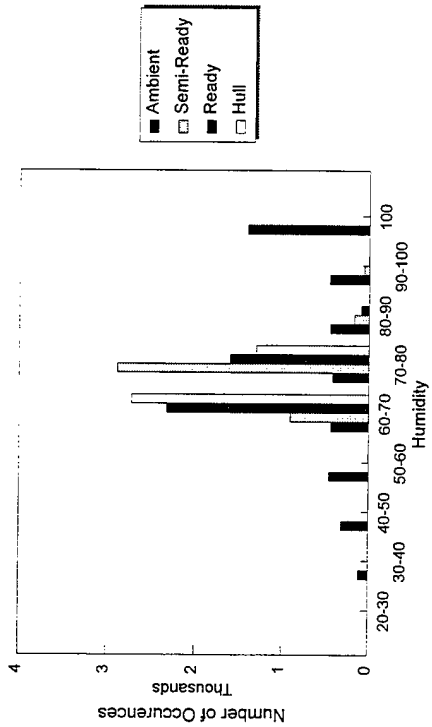
South Korea, Tank C-33
November, 1996



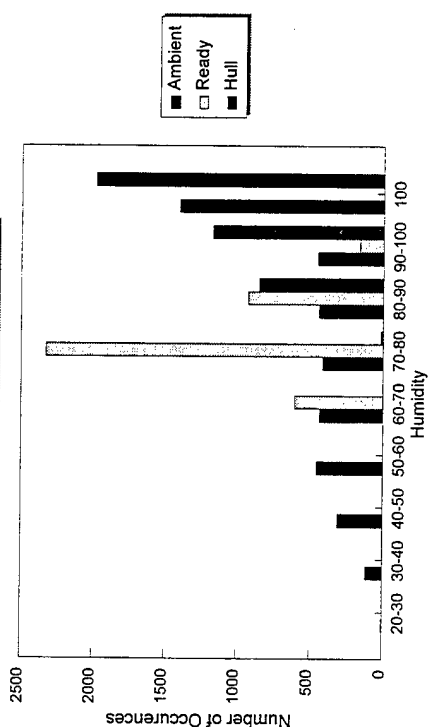
South Korea, Tank D-31
November, 1996



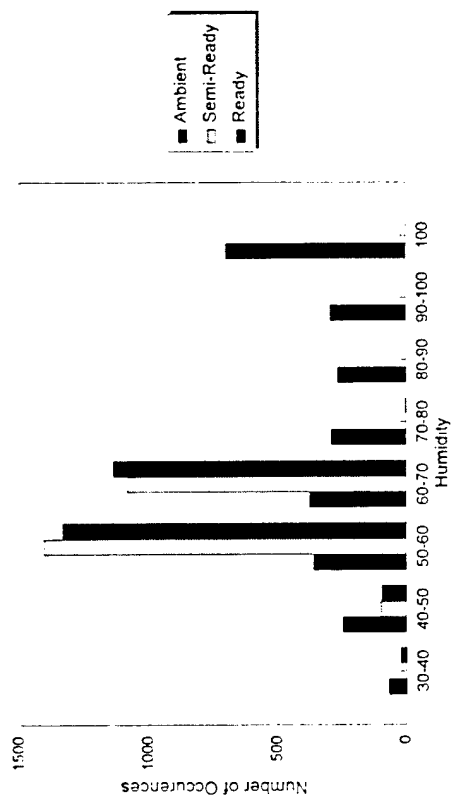
South Korea, Tank A-14
November, 1996



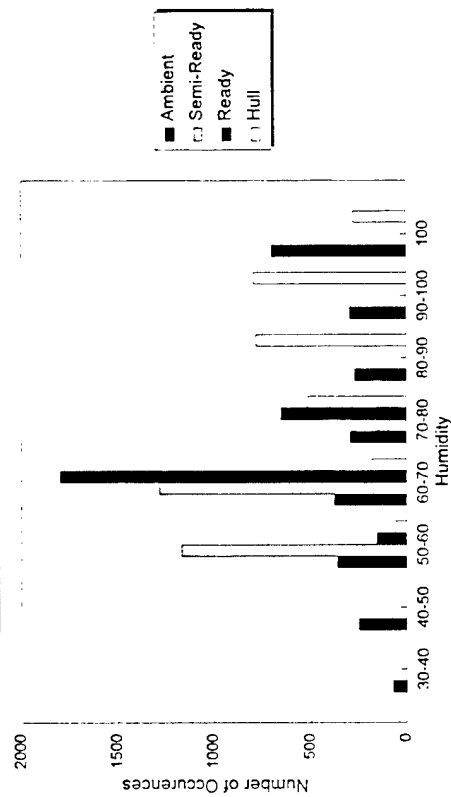
South Korea, Tank B-11
November, 1996



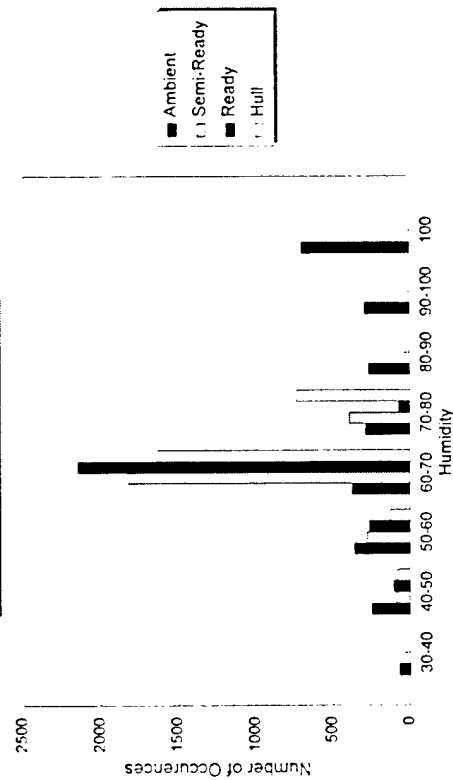
South Korea, Tank C-33
December, 1996



South Korea, Tank D-31
December, 1996



South Korea, Tank A-14
December, 1996



South Korea, Tank B-11
December, 1996

