

ALASKA RESOURCES LIBRARY

30455000096495



**SUSITNA
HYDROELECTRIC PROJECT**

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

**STAGED CONSTRUCTION
PRE-FILING CONSULTATION PACKAGE**

APPENDIX A
PHYSICAL HABITAT SIMULATION EXHIBITS

MAY 1985

ALASKA POWER AUTHORITY

ALASKA RESOURCES LIBRARY
U.S. DEPT. OF INTERIOR
JUN 27 1986

TK
1425
58
F472
no. 2738
A

SUSITNA HYDROELECTRIC PROJECT

STAGED CONSTRUCTION
PRE-FILING CONSULTATION PACKAGE

APPENDIX A

PHYSICAL HABITAT SIMULATION EXHIBITS

May 1985

ARLIS
Alaska Resources
Library & Information Services
Anchorage, Alaska

TABLE OF CONTENTS

RESERVOIR TEMPERATURES

1. Reserovir Temperature Simulations, Stage 1
2. Reservoir Temperature Simulations, Stage 2
3. Reservoir Temperature Simulations, License Application Project

RIVER TEMPERATURES

4. Simulated River Temperatures, Stage 1
5. Simulated River Temperatures, Stage 2
6. Simulated River Temperatures, License Application Project

RIVER ICE

7. River Ice Simulations, Stage 1
8. River Ice Simulations, Stage 2
9. Comparisons of River Ice Simulations for Staged Construction, Stage 1 and License Application Project
10. Comparisons of River Ice Simulations for Staged Construction, Stage 2 and License Application Project

RIVER FLOWS - 6%, 50%, and 90% EXCEEDANCE LEVELS

11. Susitna River Exceedence Flows (1996 Energy Demand)
12. Susitna River Exceedence Flows (2001 Energy Demand)
13. Susitna River Exceedence Flows (2002 Energy Demand)
14. Susitna River Exceedence Flows (2007 Energy Demand)
15. Susitna River Exceedence Flows (2008 Energy Demand)
16. Susitna River Exceedence Flows (2020 Energy Demand)

RIVER FLOWS - 1964, 1967, 1970, 1981, AND 1982

17. Susitna River Streamflows for 2001 Energy Demand
18. Susitna River Streamflows for 2002 Energy Demand

ARLIS
Alaska Resources
Library & Information Services
Anchorage, Alaska

LIST OF EXHIBITS

1. Reservoir Temperature Simulations, Staged Construction, Stage I, (Watana El. 2000), Projected Energy Demands for 2001, E-V1 Environmental Flow Requirements, Hydrological and Climatological Data for 1981-82.
2. Reservoir Temperature Simulations, Staged Construction, Stage II (Watana - El. 2000 and Devil Canyon), Projected Energy Demands for 2002, E-V1 Environmental Flow Requirements, Hydrological and Climatological data for 1981-82.
 - a. Devil Canyon Drawdown - 50 feet
Three Level Intake
 - b. Devil Canyon Drawdown - 50 feet
Two Level Intake
 - c. Devil Canyon Drawdown - 9 feet
3. Reservoir Temperature Simulations, License Application Project (Watana El. 2195, Devil Canyon El. 1455), Projected Energy Demands for 2020, Case C Flow Requirements, Hydrological and Climatological Data for 1981-82.
4. Simulated River Temperatures, Staged Construction, Stage I, (Watana El. 2000), Projected Energy Demands for 2001, E-V1 Environmental Flow Requirements, Hydrological and Climatological data for 1981-82.
 - a. River Mile 150
 - b. River Mile 130

- c. River Mile 100
-
- 5. Simulated River Temperatures Staged Construction, Stage II, (Watana El. 2000 - Devil Canyon El. 1455), Projected Energy Demands for 2002, E-V1 Environmental Flow Requirements, Hydrological and Meteorological Data for 1981-82.
 - a. Devil Canyon Drawdown - 50 feet
Three Level Intake
 - 1. River Mile 150
 - b. Devil Canyon Drawdown - 50 feet
Two Level Intake
 - 2. River Mile 130
 - c. Devil Canyon Drawdown - 9 feet
 - 3. River Mile 100
 - 6. Simulated River Temperatures, License Application Project (Watana El. 2185, Devil Canyon El. 1455), Projected Energy Demands for 2020, Case C Flow Requirements, Hydrological and Meteorological Data for 1981-82.
 - a. River Mile 150
 - b. River Mile 130
 - c. River Mile 100
 - 7. River Ice Simulations, Staged Construction - Stage 1 (Watana El. 2000), Projected Energy Demands for 2001, E-V1 Environmental Flow Requirements, Hydrological and Meteorological Data for 1981-82.

8. River Ice Simulations, Staged Construction - Stage II (Watana El. 2000, Devil Canyon El. 1455), Projected Energy Demands for 2002, E-V1 Environmental Flow Requirements, Hydrological and Meteorological Data for 1981-82.
 - a. Devil Canyon drawdown - 50 feet
Three Level Intake
 - b. Devil Canyon drawdown - 50 feet
Two Level Intake
 - c. Devil Canyon drawdown - 9 feet
9. Comparisons of River Ice Simulations for Staged Construction, Stage I and License Application Project, Projected Energy Demands for 2001.
10. Comparisons of River Ice Simulations for Staged Construction, Stage II and License Application Project, Projected Energy Demands for 2002.
11. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 1996 energy demands (Stage I).
 - a. 97% exceedance level flows
 - b. 50% exceedance level flows
 - c. 6% exceedance level flows
12. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 2001 energy demands (Stage I).

a. 97% exceedance level flows

b. 50% exceedance level flows

c. 6% exceedance level flows

13. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 2002 energy demands (Stage II).

a. 97% exceedance level flows

b. 50% exceedance level flows

c. 6% exceedance level flows

14. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 2007 energy demands (Stage II).

a. 97% exceedance level flows

b. 50% exceedance level flows

c. 6% exceedance level flows

15. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 2008 energy demands (Stage III).

a. 97% exceedance level flows

b. 50% exceedance level flows

c. 6% exceedance level flows

16. Comparisons of Susitna River Streamflows at Gold Creek for Natural Conditions for License Application Project and Staged Construction Concept for 2020 energy demands (Stage III).

a. 97% exceedance level flows

b. 50% exceedance level flows

c. 6% exceedance level flows

17. Comparisons of Susitna River streamflows at Gold Creek for Natural Conditions, for the License Application Project and for Staged Construction, projected energy demands for 2001 for hydrological conditions for

a. 1964

b. 1967

c. 1970

d. 1981

e. 1982

18. Comparisons of Susitna River streamflows at Gold Creek for Natural Conditions, for the License Application Project and for Staged Construction, projected energy demands for 2002 for hydrological conditions for

a. 1964

b. 1967

c. 1970

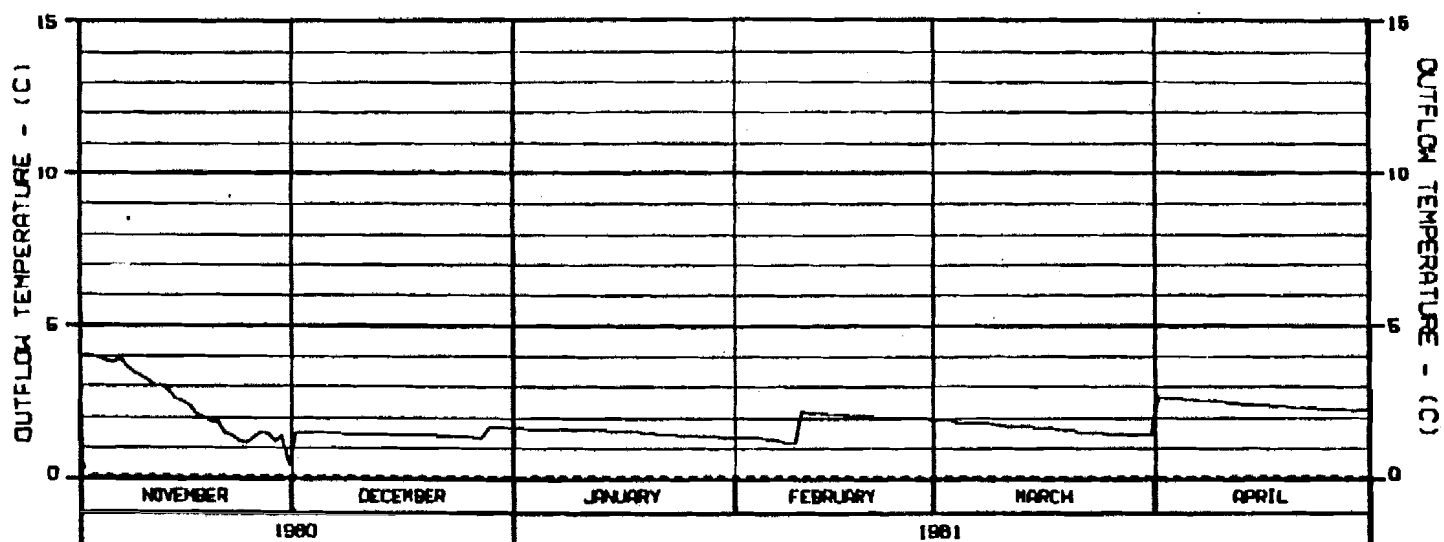
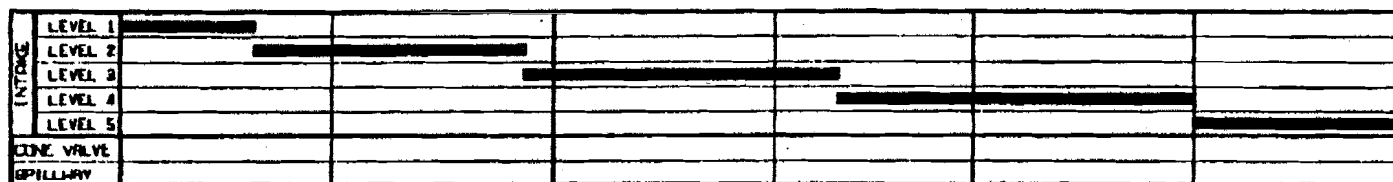
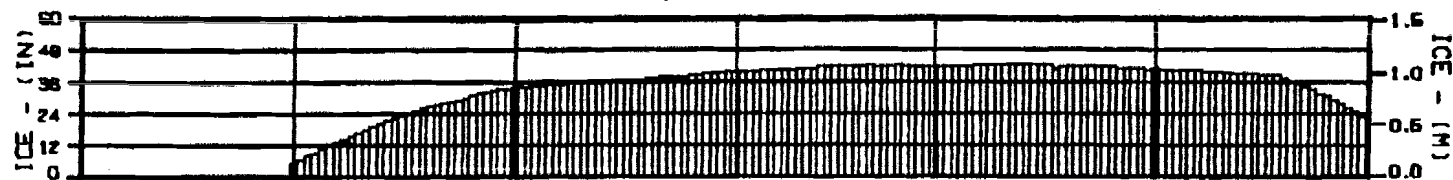
d. 1981

e. 1982

EXHIBIT 1

EXHIBIT 1

**RESERVOIR TEMPERATURE SIMULATIONS, STAGED CONSTRUCTION,
STAGE 1, (WATANA EL. 2000), PROJECTED ENERGY DEMANDS FOR
2001, E-VI ENVIRONMENTAL FLOW REQUIREMENTS, HYDROLOGICAL
AND CLIMATOLOGICAL DATA FOR 1981-82.**



LEGEND: CASE: WAB101L - WATANA OPERATION ALONE IN 2001
CASE E-VIS1 - NATURAL CONDITIONS AND LOWEST LEVEL
— PREDICTED OUTFLOW TEMPERATURE
- - - - - INFLOW TEMPERATURE

- NOTES:
1. INTAKE PORT LEVEL 1 AT EL. 1864.5 FT. (569.9 M)
 2. INTAKE PORT LEVEL 2 AT EL. 1826.5 FT. (567.4 M)
 3. INTAKE PORT LEVEL 3 AT EL. 1808.5 FT. (567.8 M)
 4. INTAKE PORT LEVEL 4 AT EL. 1860.5 FT. (564.2 M)
 5. INTAKE PORT LEVEL 5 AT EL. 1812.5 FT. (562.6 M)
 6. CONE VALVE AT ELEVATION 1791 FT (546.0 M)
 7. SPILLWAY CREST AT ELEVATION 2149 FT (654.7 M)

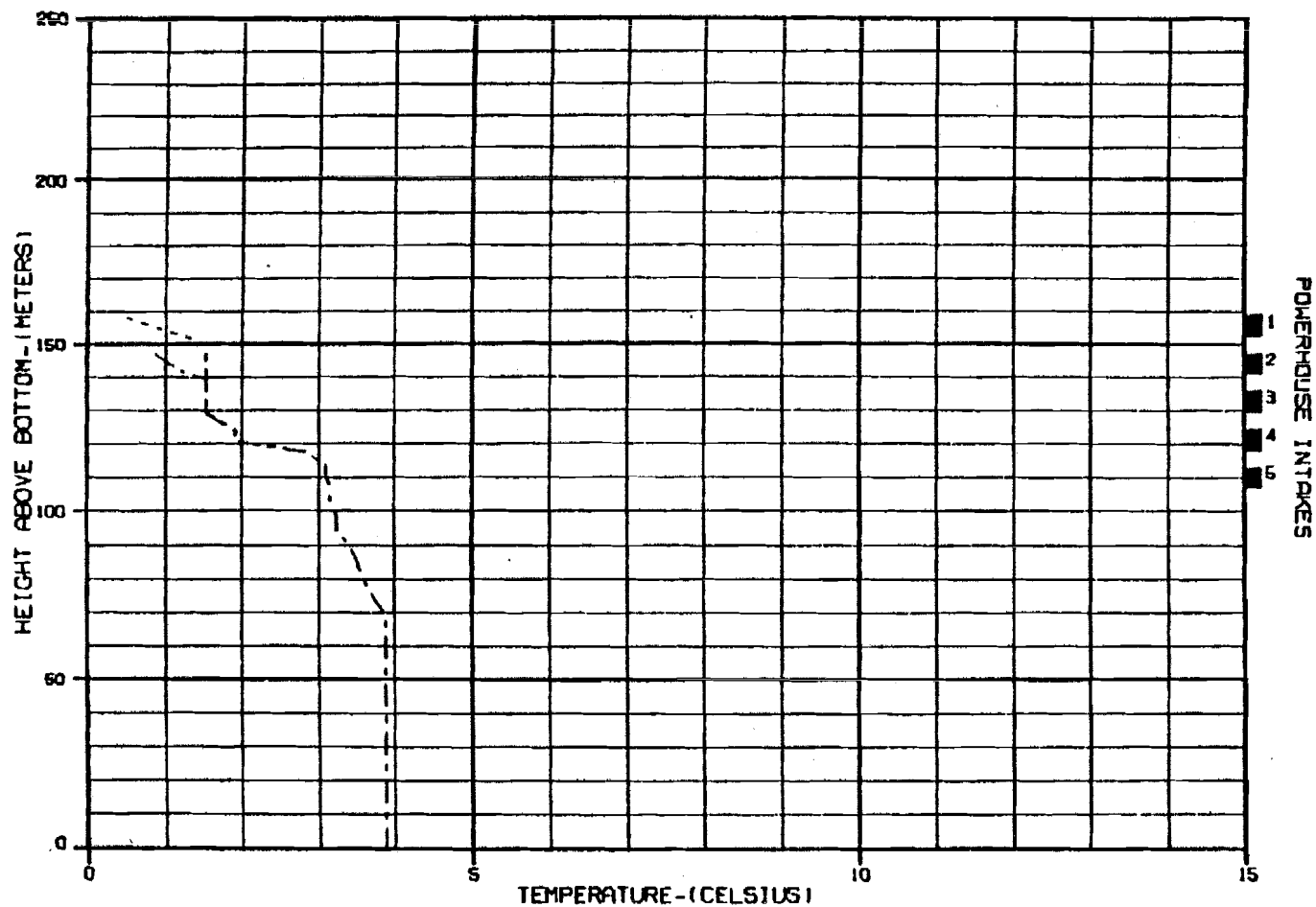
ALASKA POWER AUTHORITY

WATANA PROJECT DYKES MODEL

WATANA RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

WARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 98 APR 88 42-010-04



CASE: WAS8101L - WATANA OPERATION ALONE IN 2001 CASE E-VI 61
 NAT.COND.(80306-81304.82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1980
 - - - 1 DECEMBER 1980
 - . - . 1 JANUARY 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYNESM MODEL

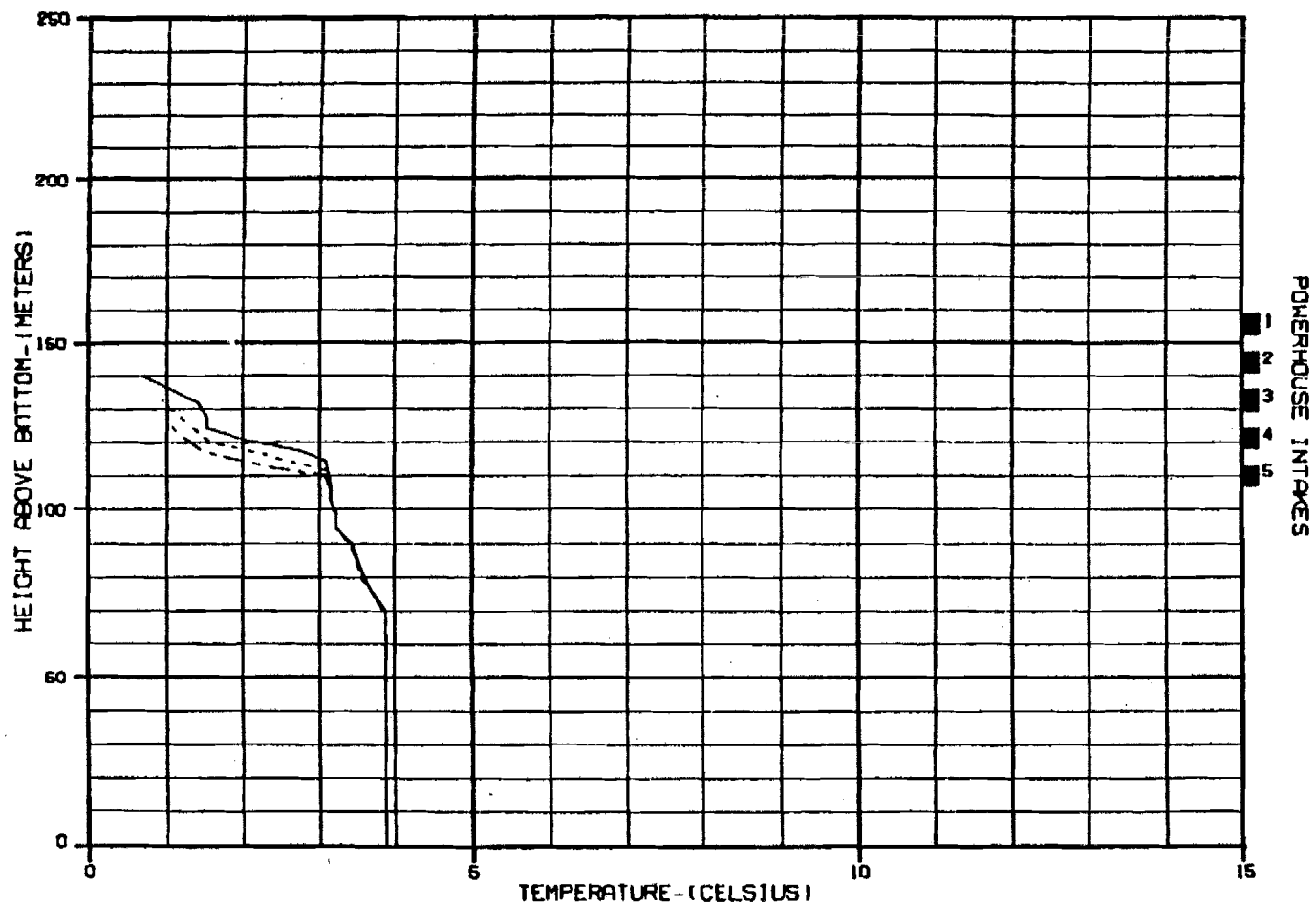
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

ENCLOS. ILLUSTRS

8 APR 88

42-010-04



CASE: ** WAS8101L - WATANA OPERATION ALONE IN 2001 **
 NAT.COND.(80306-81304.82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1981
 - - - 1 MARCH 1981
 - . - . 1 APRIL 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OWNERS MODEL

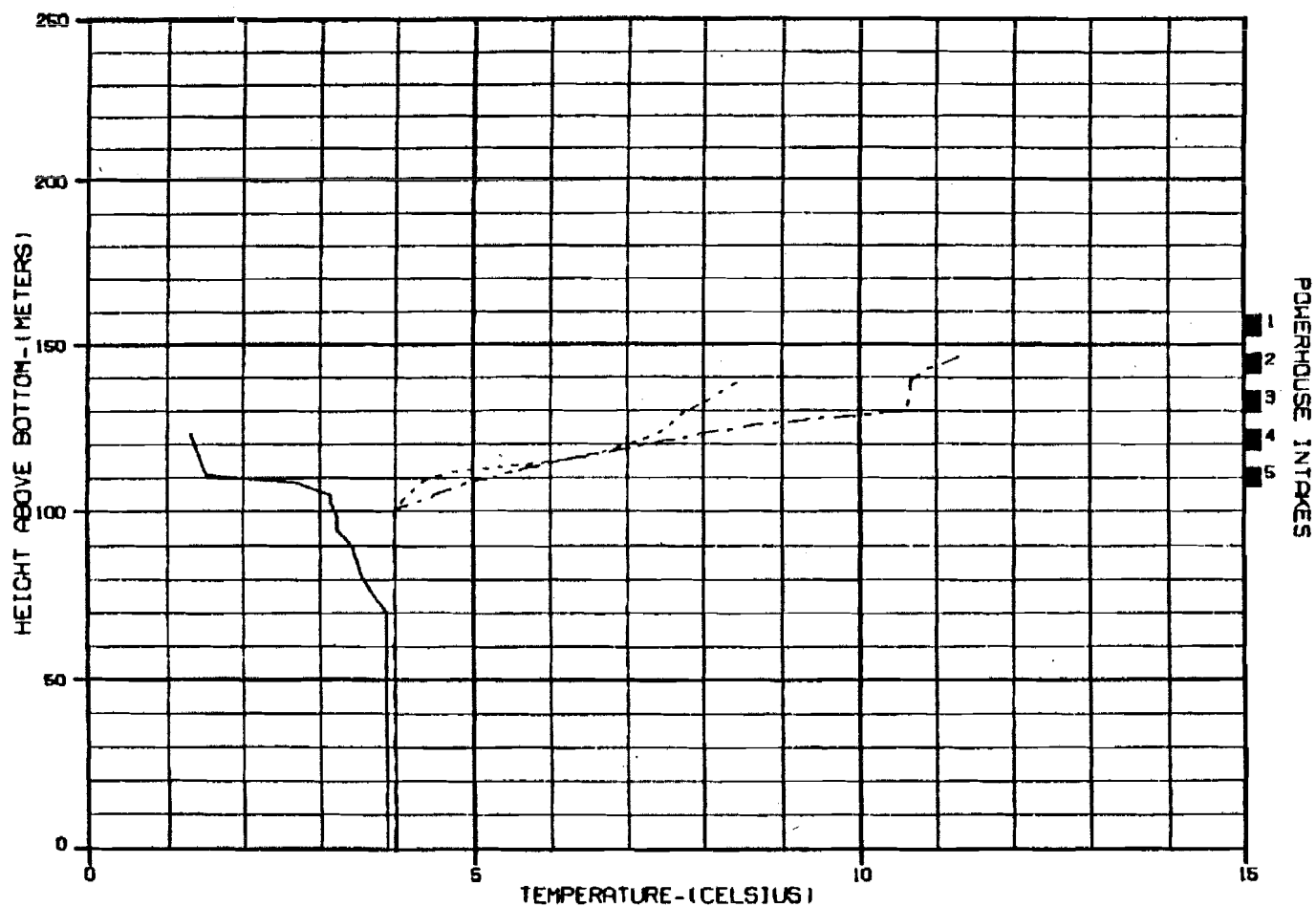
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHECKED: B.L.D.B.E.

8 APR 88

42-010-04



CASE: *** WAS8101L - WATANA OPERATION ALONE IN 2001 ***
 NAT.COND.(80306-81304,82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— 1 MAY 1981
 1 JUNE 1981
 - - - - 1 JULY 1981

ALASKA POWER AUTHORITY

SUBTNA PROJECT

DPRESH MODEL

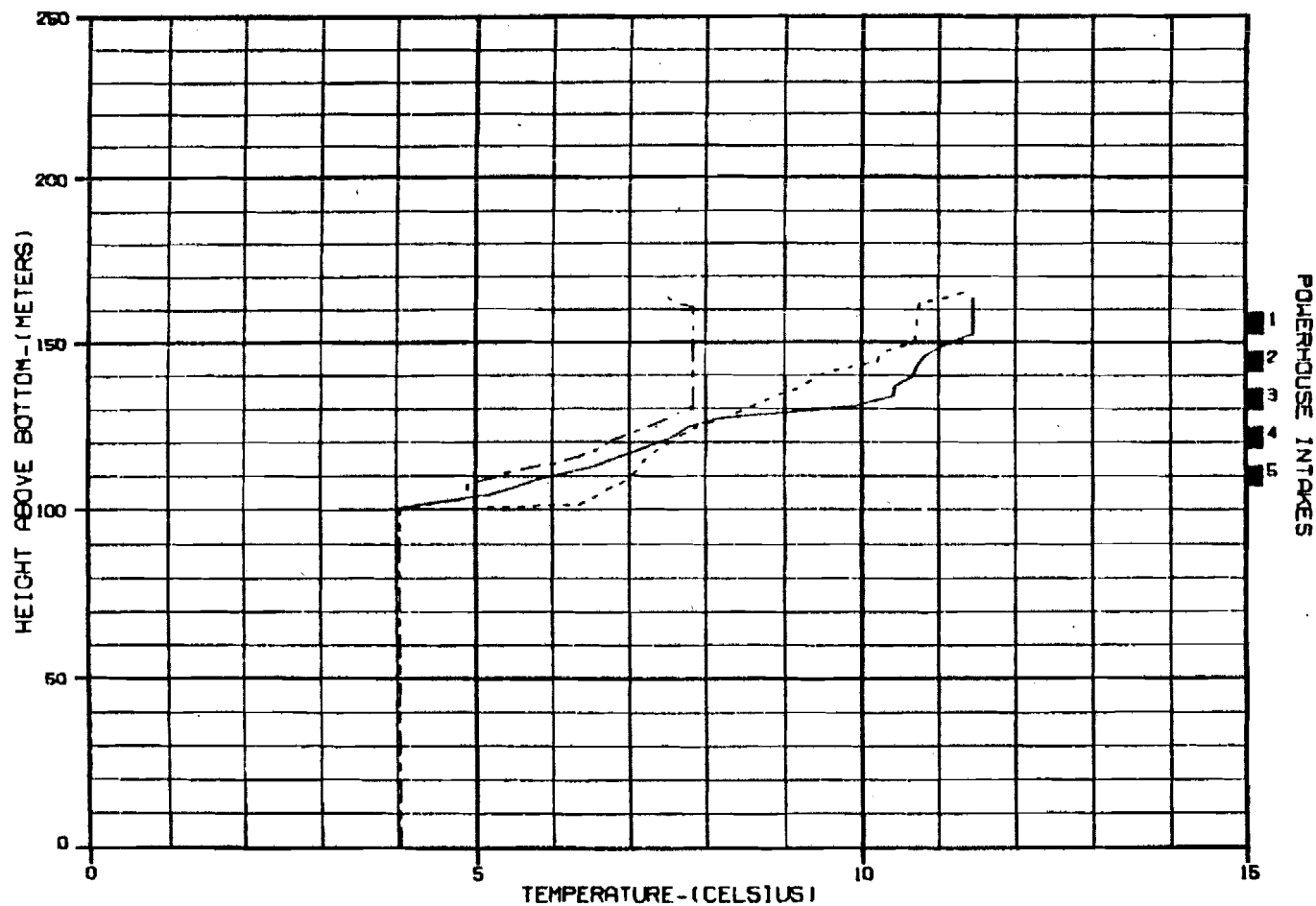
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHIEF: ILLINOIS

8 APR 88

42-010-04



CASE: ** WAS8101L - WATANA OPERATION ALONE IN 2001 **
 NAT.COND.(80306-81304.82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 AUGUST 1981
 - - - 1 SEPTEMBER 1981
 - - - 1 OCTOBER 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OVERSEAS MODEL

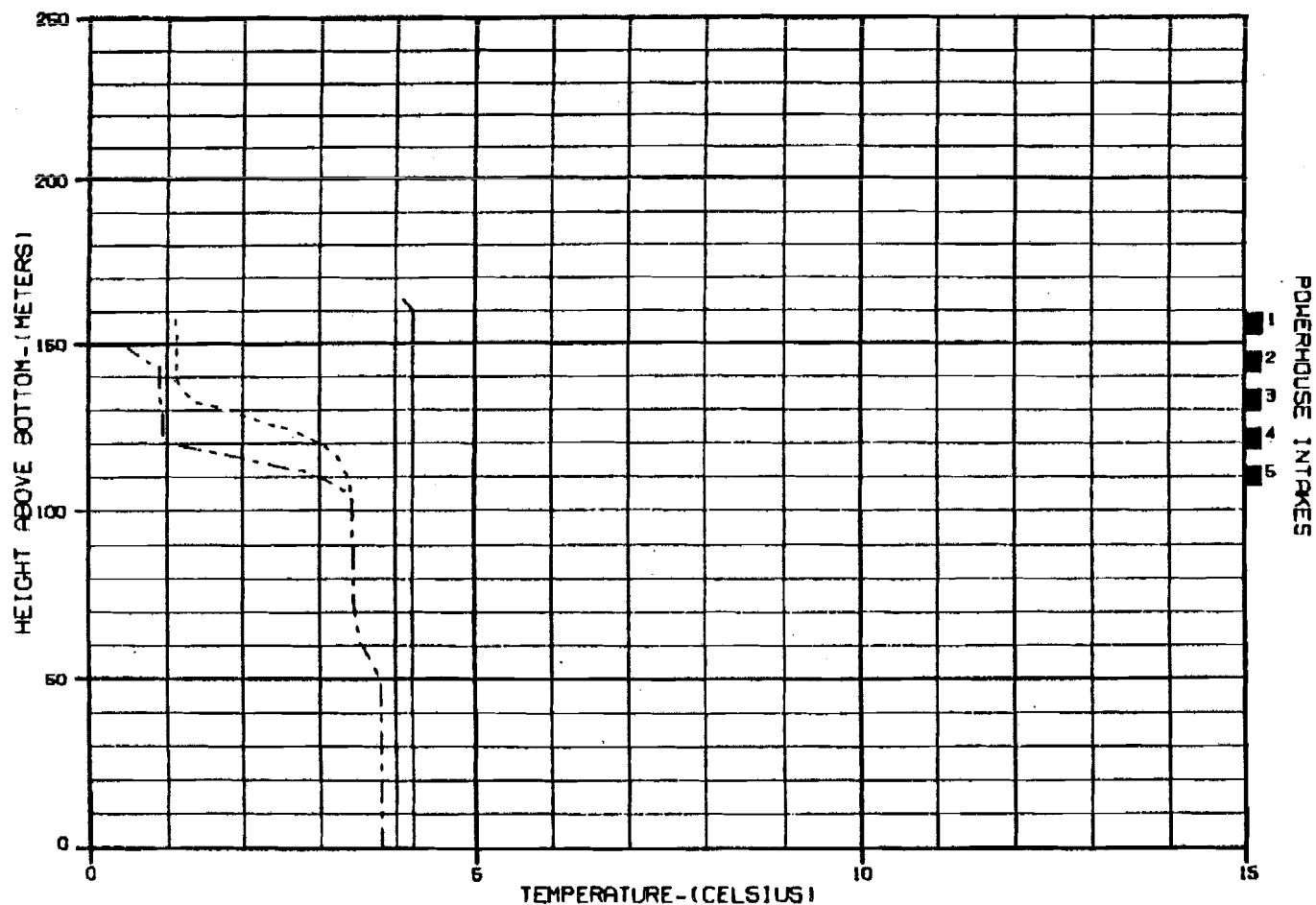
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 88

42-010-04



CASE: ■■ WAS8101L - WATANA OPERATION ALONE IN 2001 ■■
 NAT.COND.180306-81304.82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— 1 NOVEMBER 1981
 1 DECEMBER 1981
 - - - - 1 JANUARY 1982

ALASKA POWER AUTHORITY

SUSTAINA PROJECT

DYREDA MODEL

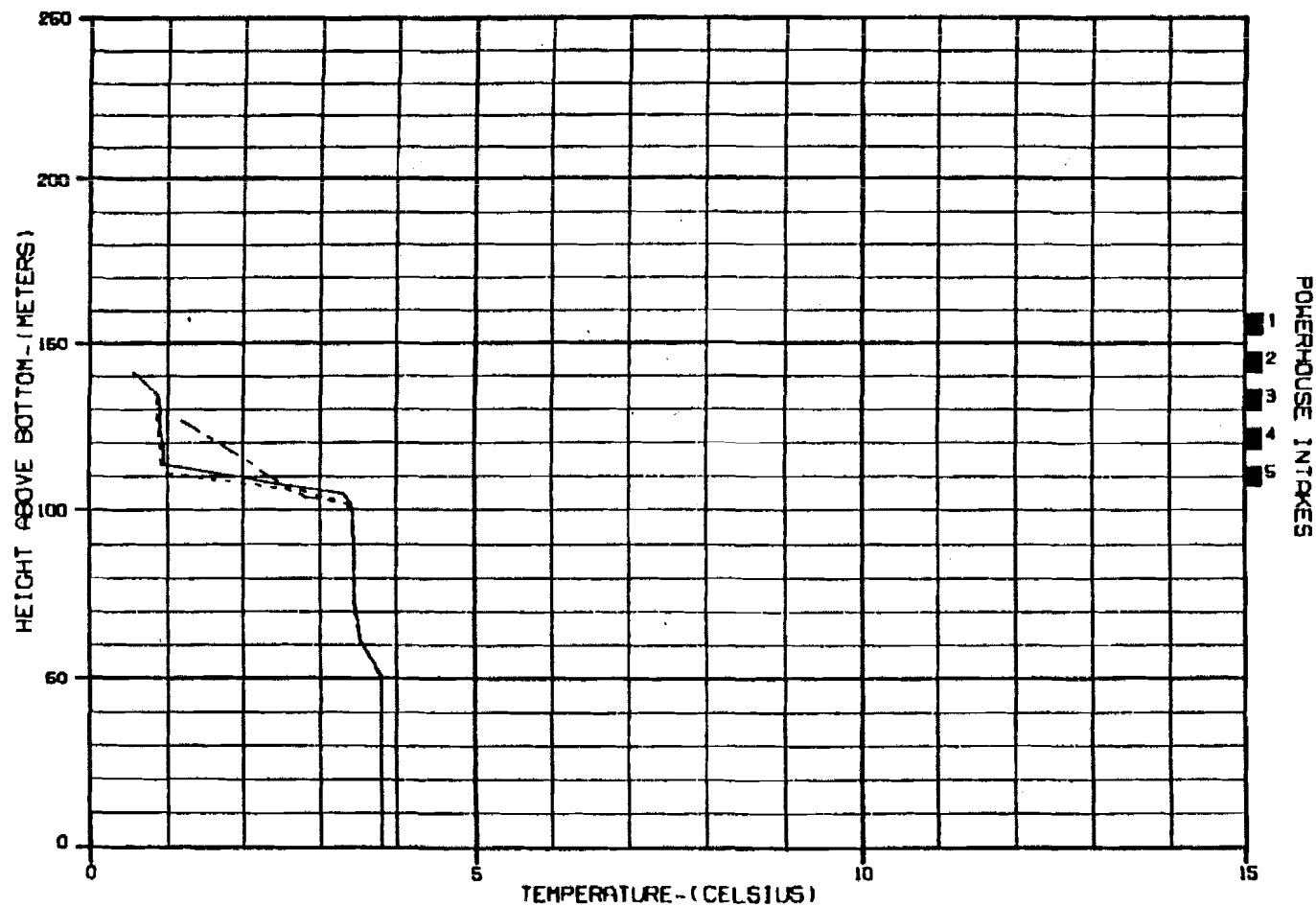
WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHECKED: ALL 1-818

8 APR 82

42-010-04



CASE: ■■ WAB8101L - WATANA OPERATION ALONE IN 2001 ■■
 NAT.COND.(80306-81304.82121-83120), LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

———— 1 FEBRUARY 1982
 - - - - - 1 MARCH 1982
 - . - . - 1 APRIL 1982

ALASKA POWER AUTHORITY

SUSTAINA PROJECT

DYRESM MODEL

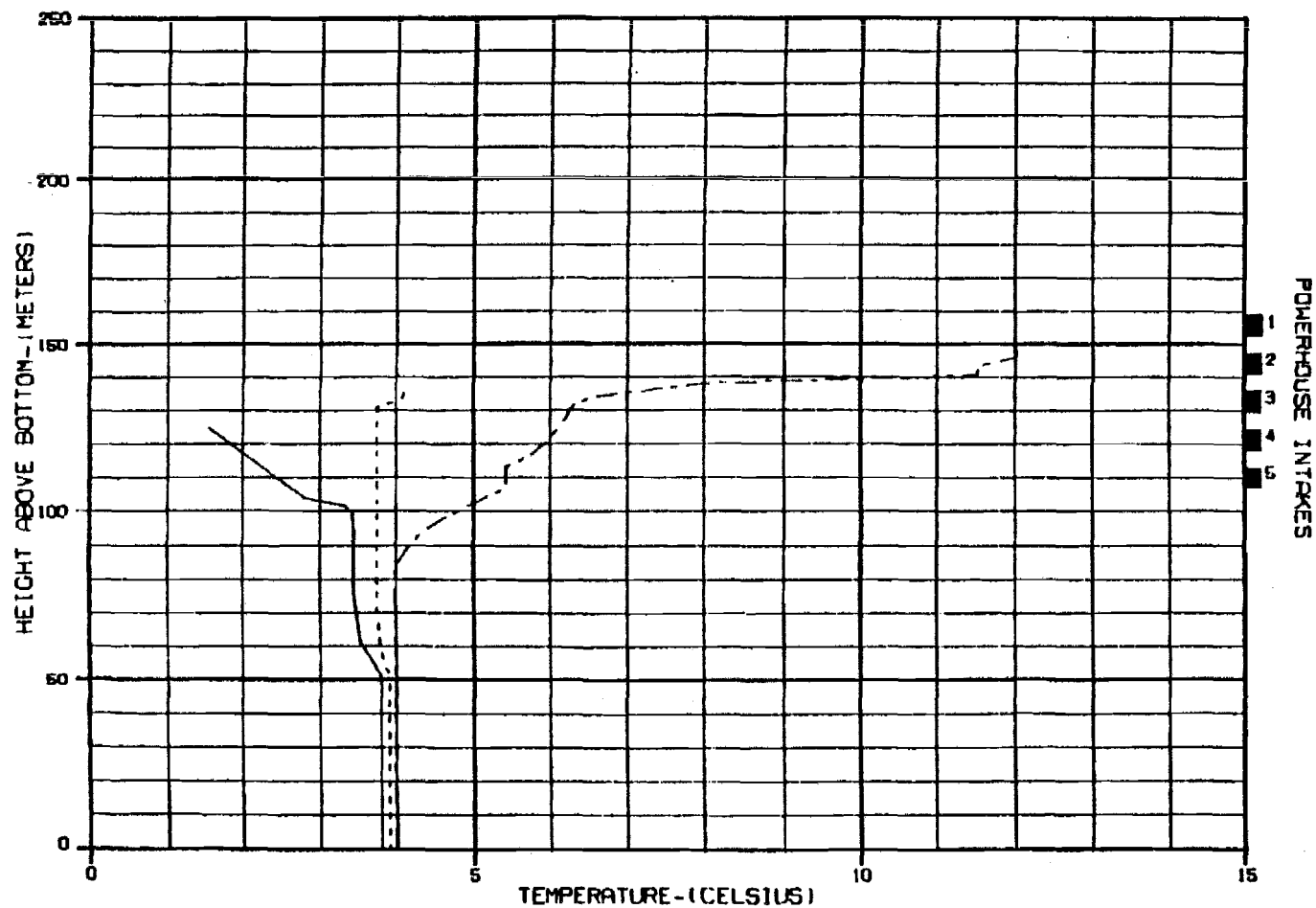
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 82

42-010-04



CASE: ■■ WAS8101L - WATANA OPERATION ALONE IN 2001 ■■
 NAT.COND.(80306-81304,82121-83120), LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 MAY 1982
 - - - - 1 JUNE 1982
 - . - . 1 JULY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYNESHA MODEL

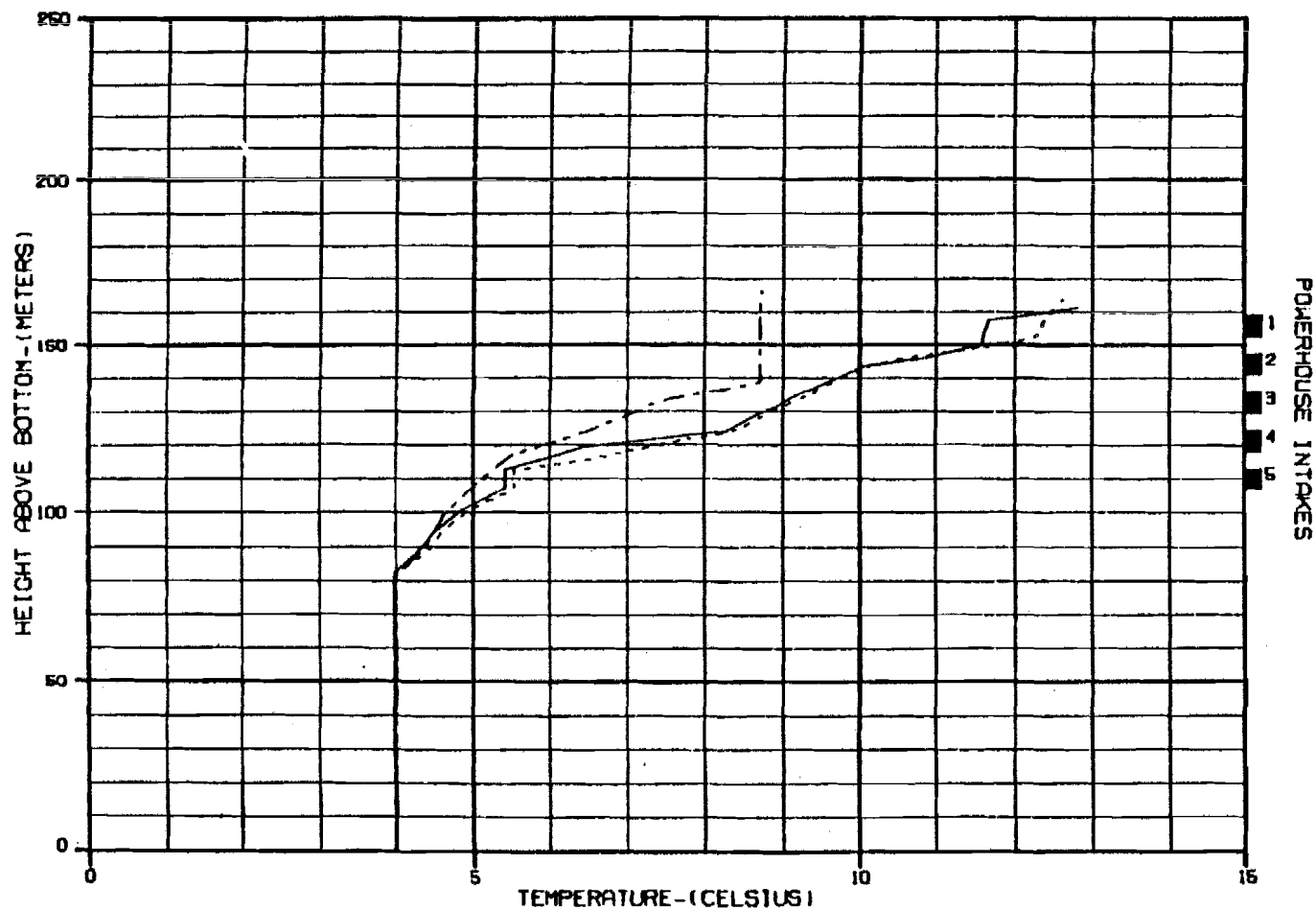
WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHECKED: ELL P. 1982

8 APR 82

42-010-04



CASE: ■■ WAS8101L - WATANA OPERATION ALONE IN 2001 ■■
 NAT.COND.(80306-81304.82121-83120). LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 AUGUST 1982
 1 SEPTEMBER 1982
 - - - - 1 OCTOBER 1982

ALASKA POWER AUTHORITY

SUBITNA PROJECT

DYRECK MODEL

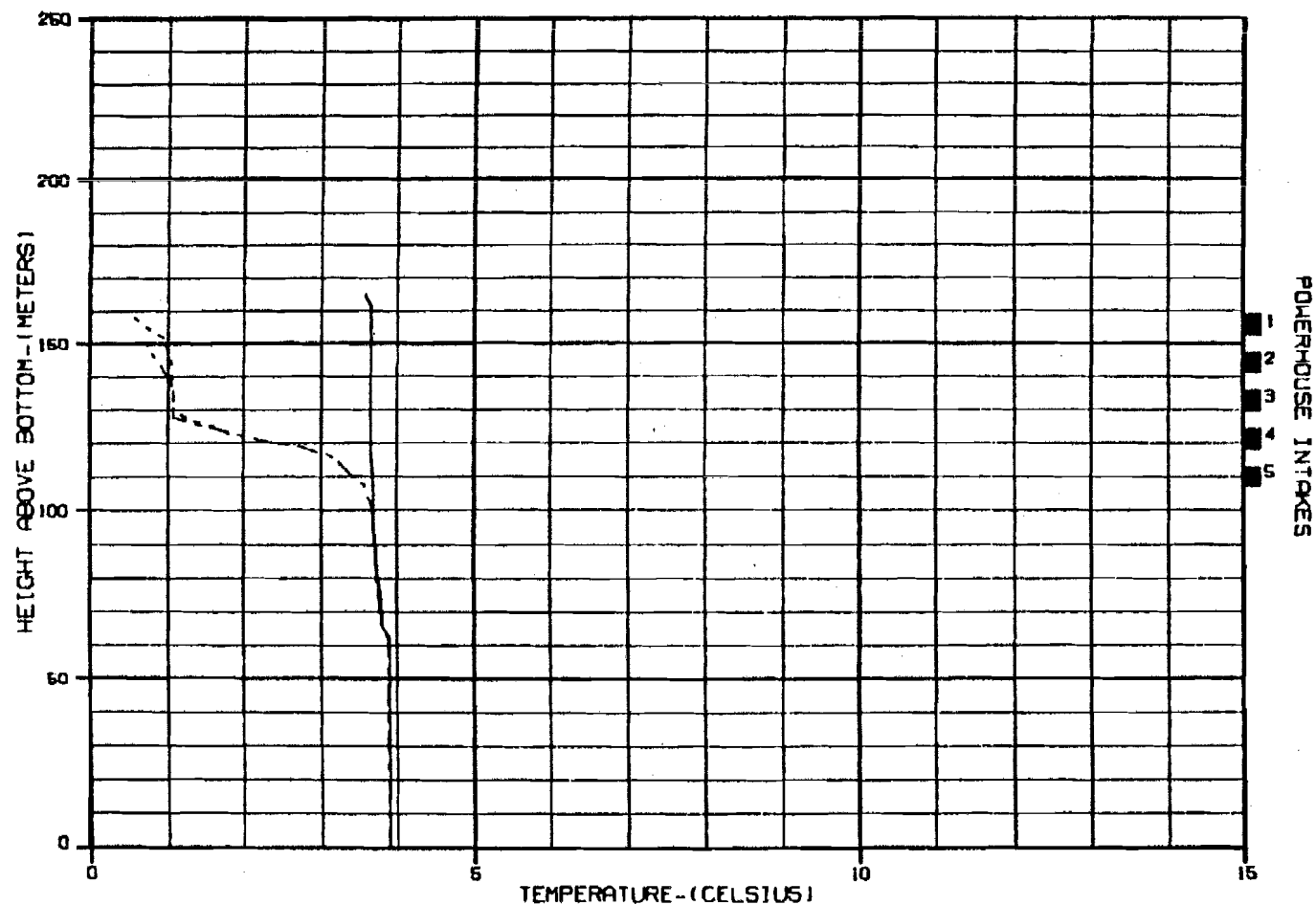
WATANA RESERVOIR
 TEMPERATURE PROFILES

HAZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 83

42-010-04



CASE: ■■ WAS8101L - WATANA OPERATION ALONE IN 2001 ■■
 NAT.COND.(80306-81304.82121-83120), LEVEL 5 (81305-82120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 NOVEMBER 1982
 1 DECEMBER 1982
 - . - . 1 JANUARY 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OVERSEAS MODEL

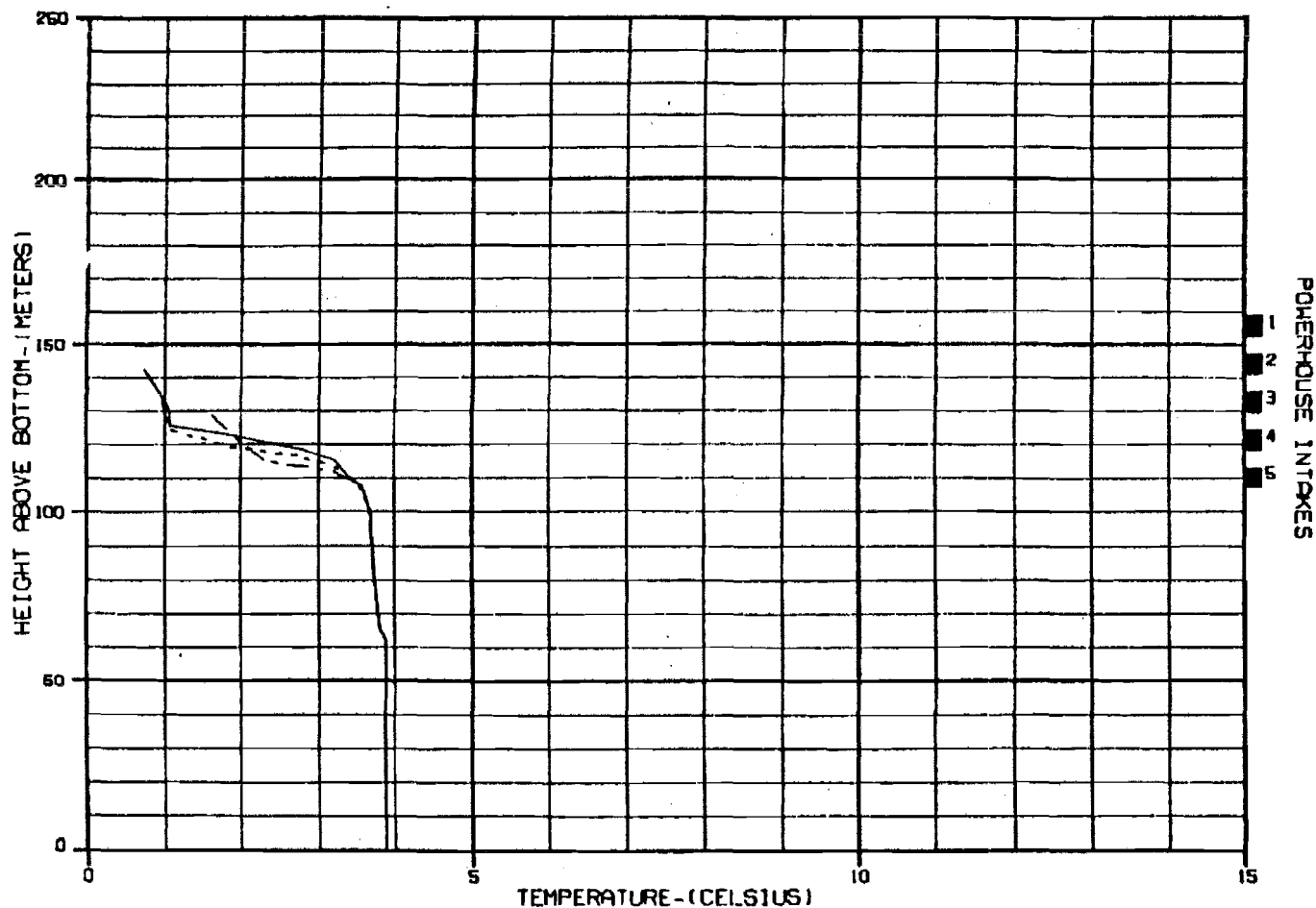
WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHICAGO - ILL. 60610

8 APR 83

42-010-04



CASE: ** WAS8101L - WATANA OPERATION ALONE IN 2001 **
 NAT.COND.(B0306-B1304.B2121-B3120). LEVEL 5 (B1305-B2120)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1983
 1 MARCH 1983
 - - - - - 1 APRIL 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

SYSTEM MODEL

WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 88

42-010-04

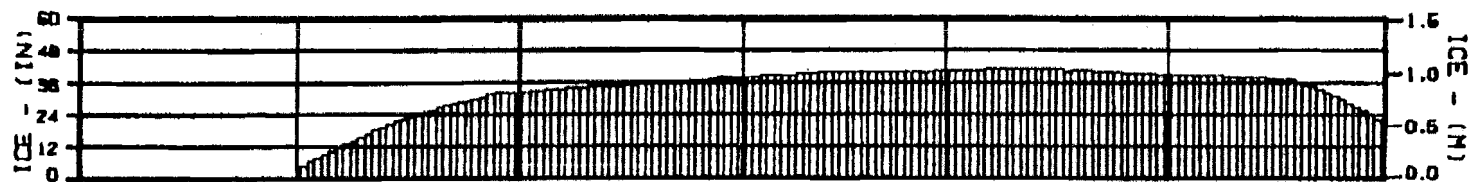
EXHIBIT 2

EXHIBIT 2

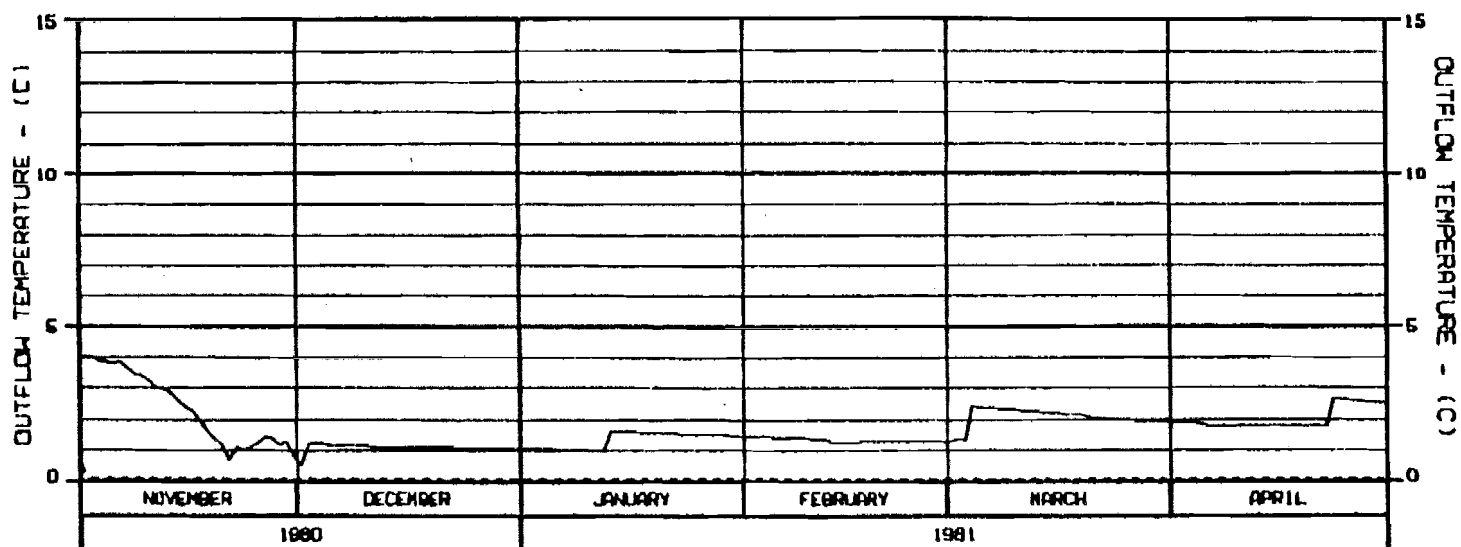
RESERVOIR TEMPERATURE SIMULATIONS, STAGED CONSTRUCTION,
STAGE 2 (WATANA - EL. 2000 AND DEVIL CANYON), PROJECTED
ENERGY DEMANDS FOR 2002, E-VI ENVIRONMENTAL FLOW REQUIRE-
MENTS, HYDROLOGICAL AND CLIMATOLOGICAL DATA FOR 1981-82.

- a. Devil Canyon Drawdown - 50 feet
Three Level Intake
- b. Devil Canyon Drawdown - 50 feet
Two Level Intake
- c. Devil Canyon Drawdown - 9 feet

EXHIBIT 2a



INTAKE	LEVEL 1					
	LEVEL 2					
	LEVEL 3					
	LEVEL 4					
	LEVEL 5					
	CONE VALVE					
	SPILLWAY					



LEGEND: PAGE 1 OF 1001020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI 62. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)
— PREDICTED OUTFLOW TEMPERATURE
- - - - - INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT EL. 1864.6 FT. (568.9 M)
2. INTAKE PORT LEVEL 2 AT EL. 1826.6 FT. (557.4 M)
3. INTAKE PORT LEVEL 3 AT EL. 1800.6 FT. (549.8 M)
4. INTAKE PORT LEVEL 4 AT EL. 1860.6 FT. (564.2 M)
5. INTAKE PORT LEVEL 5 AT EL. 1812.6 FT. (552.6 M)
6. CONE VALVE AT ELEVATION 1791 FT. (546.0 M)
7. SPILLWAY CREST AT ELEVATION 2148 FT. (654.7 M)

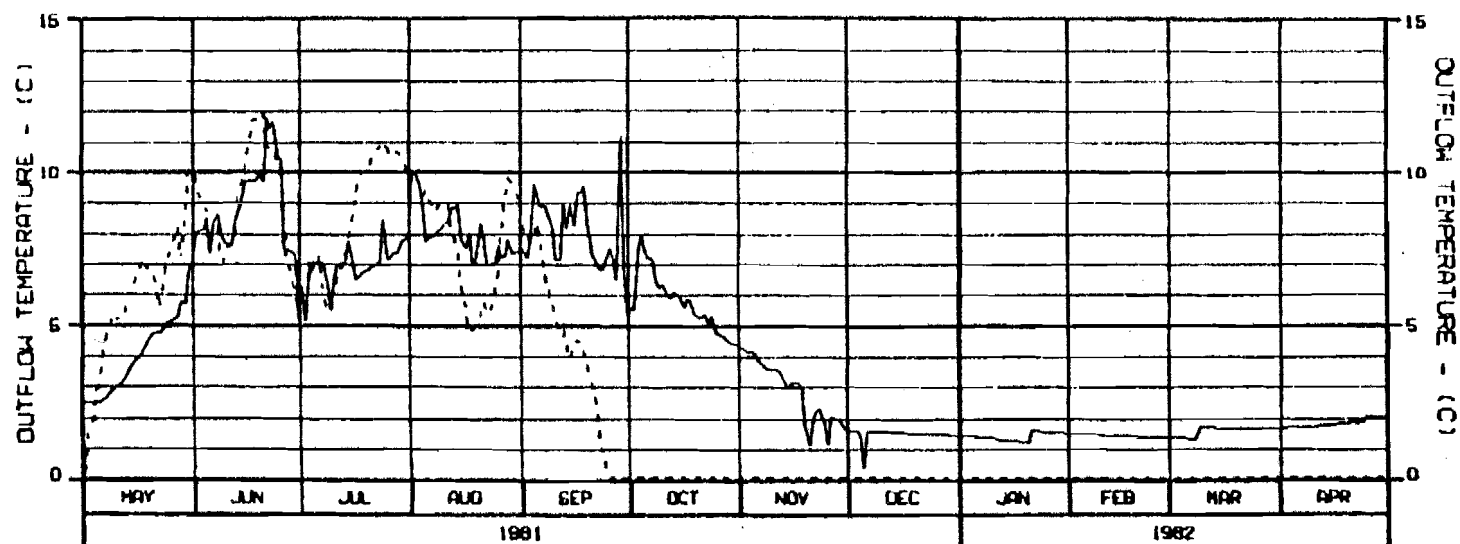
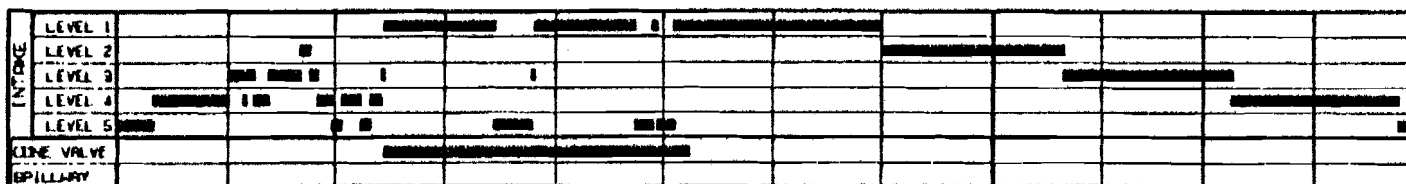
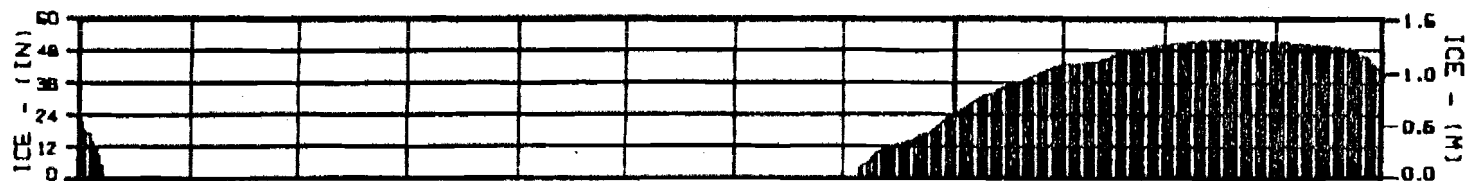
ALASKA POWER AUTHORITY

SUBMITTA PROJECT DYNASH MODEL

WATANA RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 6 APR 88 42-010-04



LEGEND: CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI B2. NATURAL CONDITIONS. DRAWDOWN - 50 FT. (15.24 M)
— PREDICTED OUTFLOW TEMPERATURE
- - - INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT EL. 1964.6 FT. (598.9 M)
2. INTAKE PORT LEVEL 2 AT EL. 1926.6 FT. (587.4 M)
3. INTAKE PORT LEVEL 3 AT EL. 1908.6 FT. (581.8 M)
4. INTAKE PORT LEVEL 4 AT EL. 1860.6 FT. (567.2 M)
5. INTAKE PORT LEVEL 5 AT EL. 1912.6 FT. (582.6 M)
6. CONE VALVE AT ELEVATION 1791 FT (546.0 M)
7. SPILLWAY CREST AT ELEVATION 2149 FT (654.7 M)

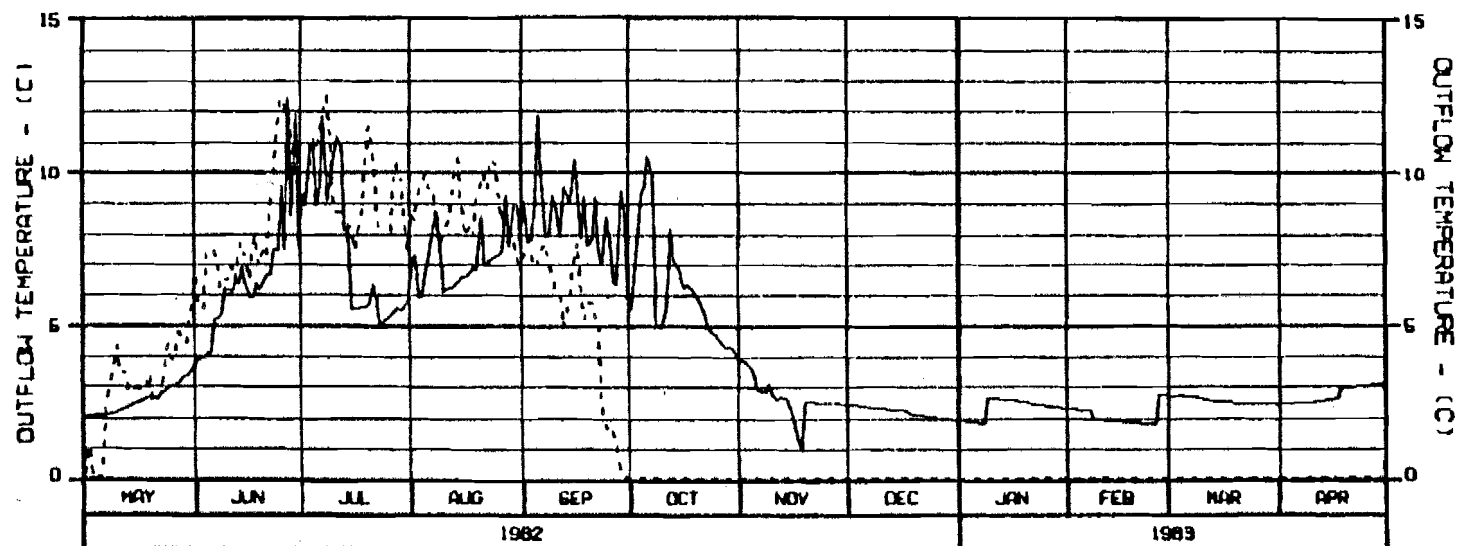
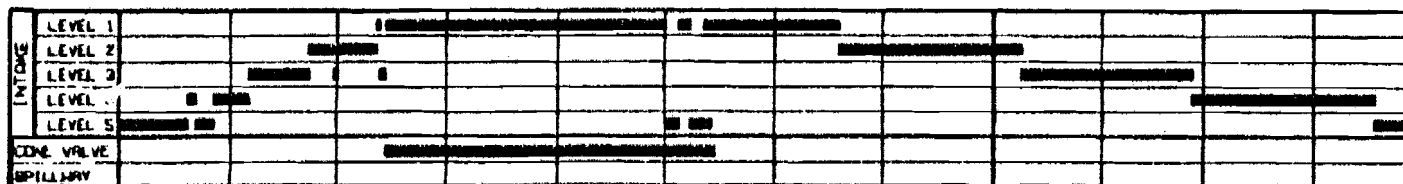
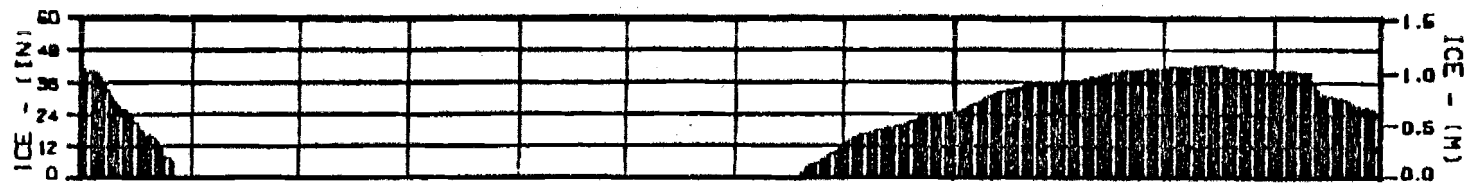
ALASKA POWER AUTHORITY

SUBMITTA PROJECT DYNESH MODEL

WATANA RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 8 APR 82 42-010-04



LEGEND: CASE 1 - WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (10C)
— PREDICTED OUTFLOW TEMPERATURE
- - - INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT EL. 1964.5 FT. (598.9 M)
2. INTAKE PORT LEVEL 2 AT EL. 1926.5 FT. (587.4 M)
3. INTAKE PORT LEVEL 3 AT EL. 1908.5 FT. (575.8 M)
4. INTAKE PORT LEVEL 4 AT EL. 1860.5 FT. (564.2 M)
5. INTAKE PORT LEVEL 5 AT EL. 1812.5 FT. (552.6 M)
6. CONE VALVE AT ELEVATION 1791 FT (546.0 M)
7. SPILLWAY CREST AT ELEVATION 2149 FT (654.7 M)

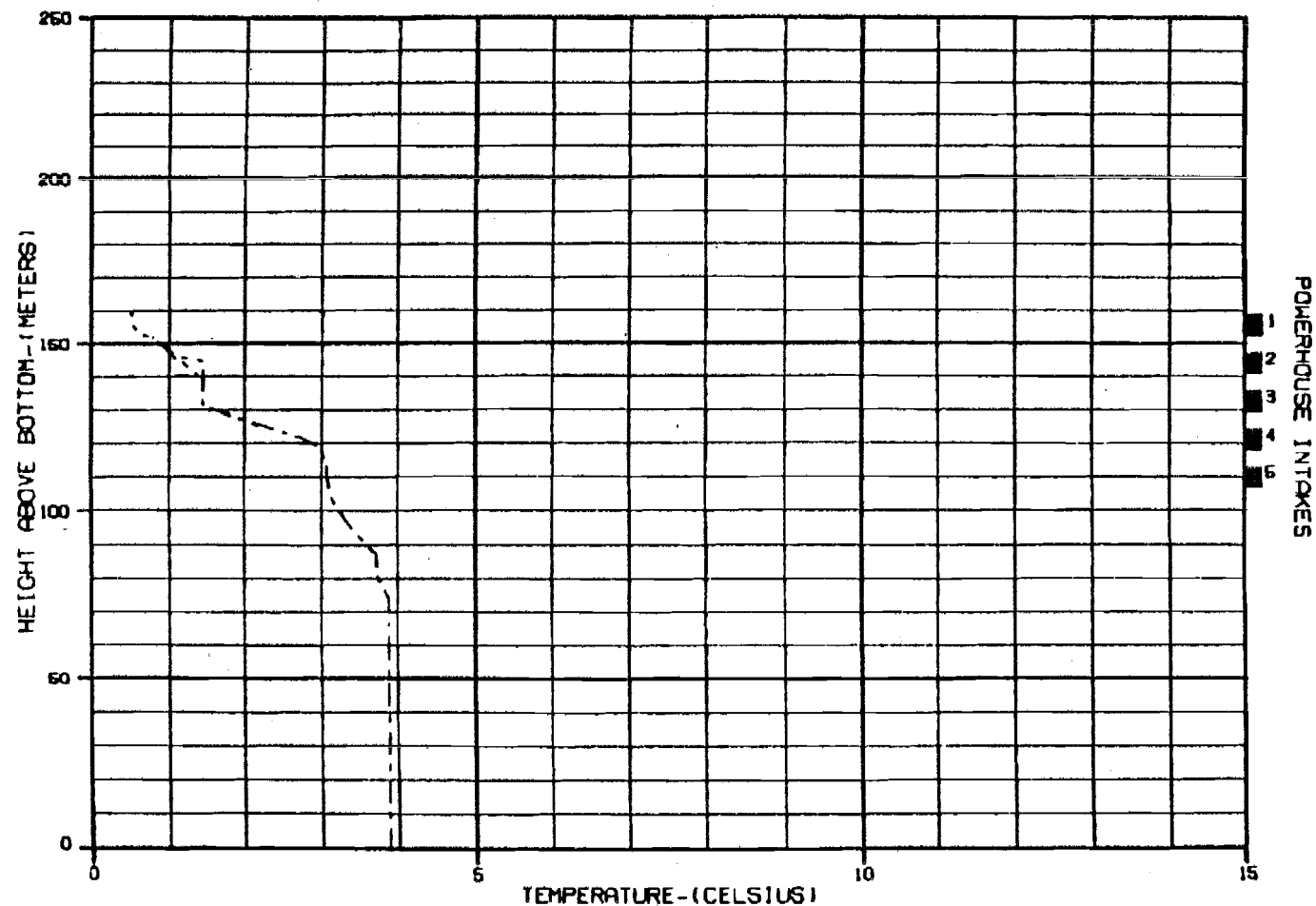
ALASKA POWER AUTHORITY

SUBSTRA PROJECT DYNESIM MODEL

WATANA RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60610 8 APR 83 42-010-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1980
... 1 DECEMBER 1980
- - - 1 JANUARY 1981

ALASKA POWER AUTHORITY

WATANA PROJECT

DYKES MODEL

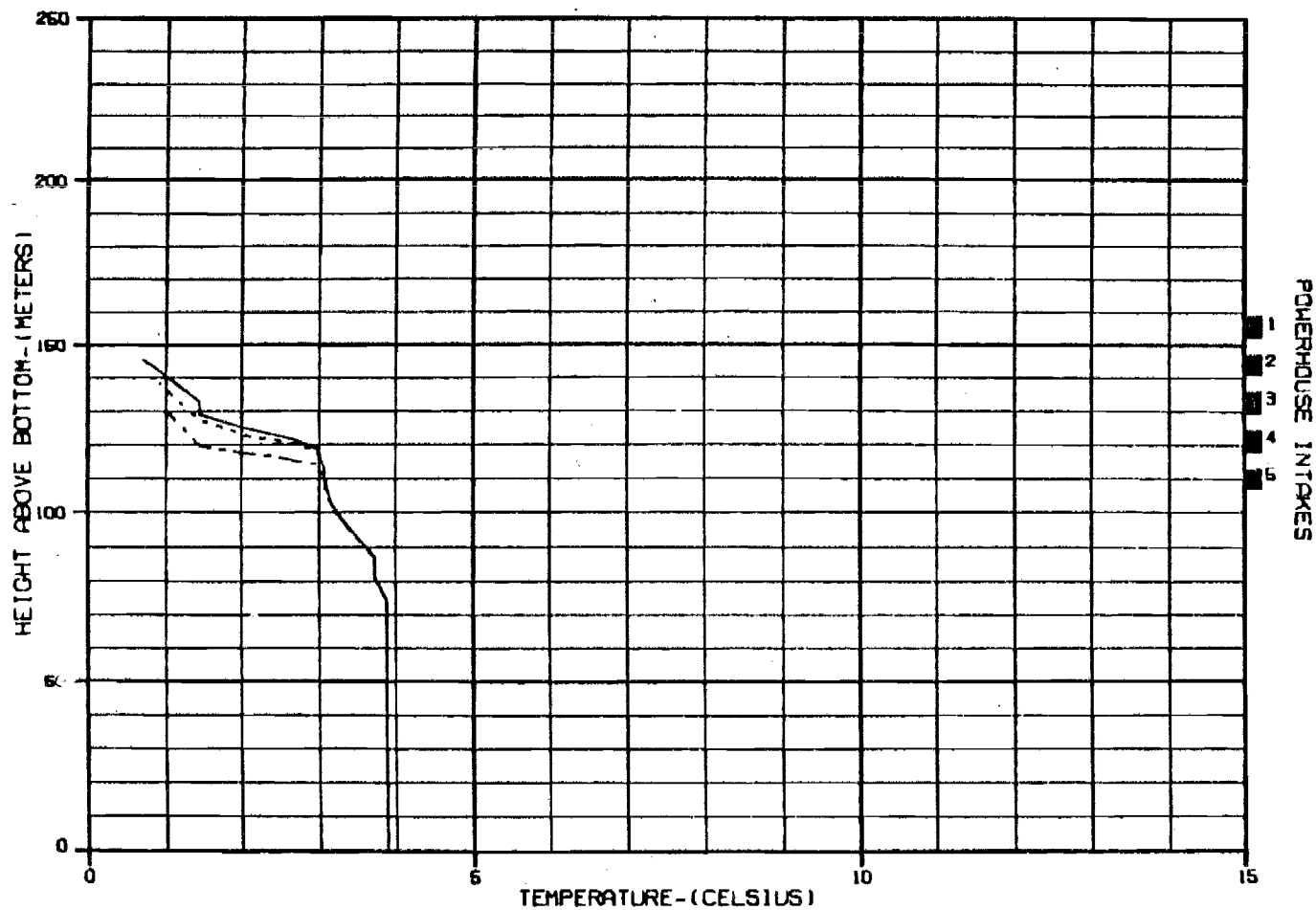
WATANA RESERVOIR
TEMPERATURE PROFILES

HAZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 81

42-D10-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1981
--- 1 MARCH 1981
-.- 1 APRIL 1981

ALASKA POWER AUTHORITY

SUSTAINA PROJECT

DYRESM MODEL

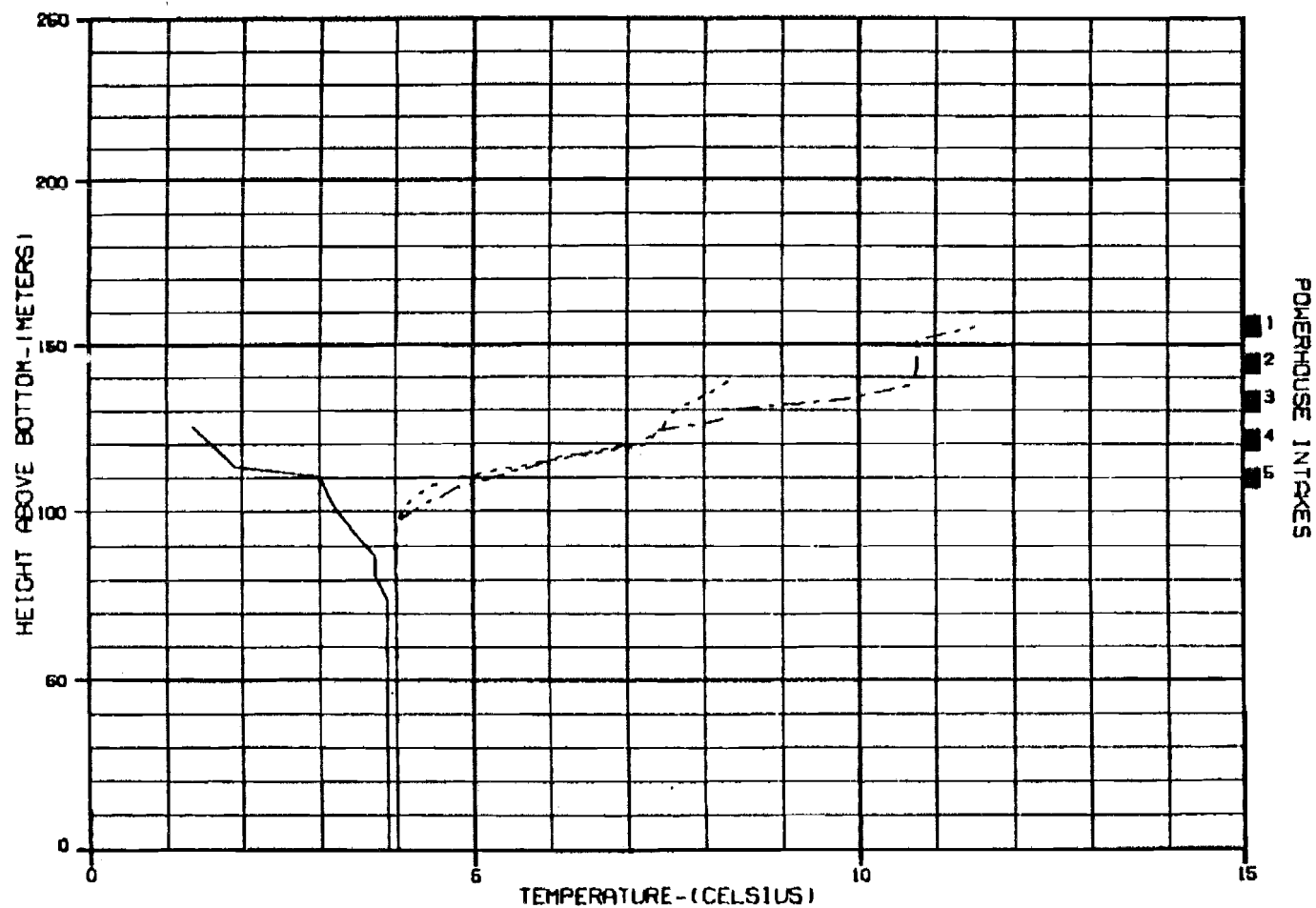
WATANA RESERVOIR
TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

DESIGNER: ELLIOTT

5/9/81

42-010-04



CASE: ■■ WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002 ■■
CASE E-VI S2, NATURAL CONDITIONS, DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 MAY 1981
- - - - 1 JUNE 1981
- . - . 1 JULY 1981

ALASKA POWER AUTHORITY

GUBITNA PROJECT

DYADON MODEL

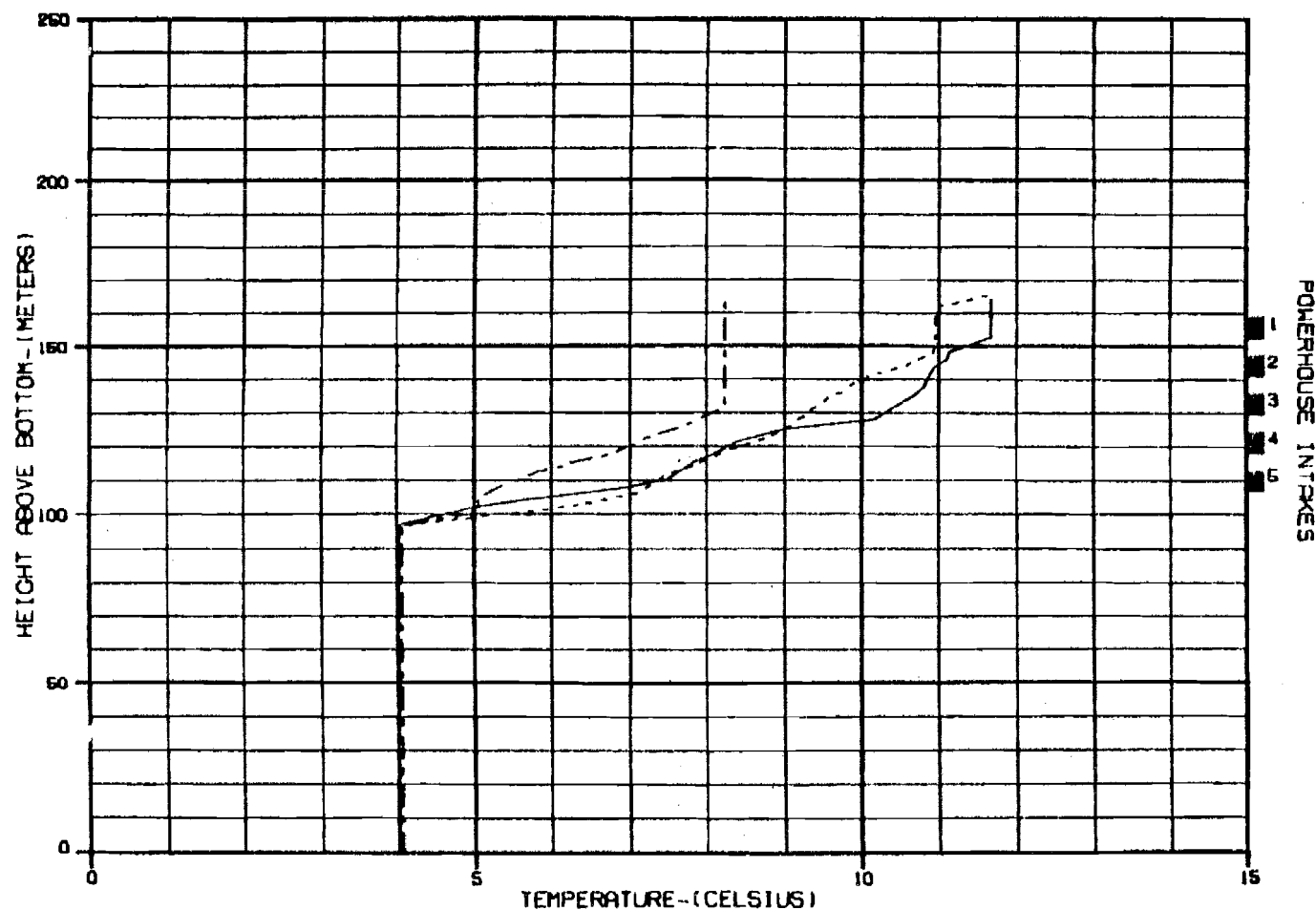
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DATE: 11/1/81

9 APR 81

42-010-04



CASE: ■■ WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002 ■■
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 AUGUST 1981
- - - - 1 SEPTEMBER 1981
- . - . 1 OCTOBER 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OWNERS MODEL

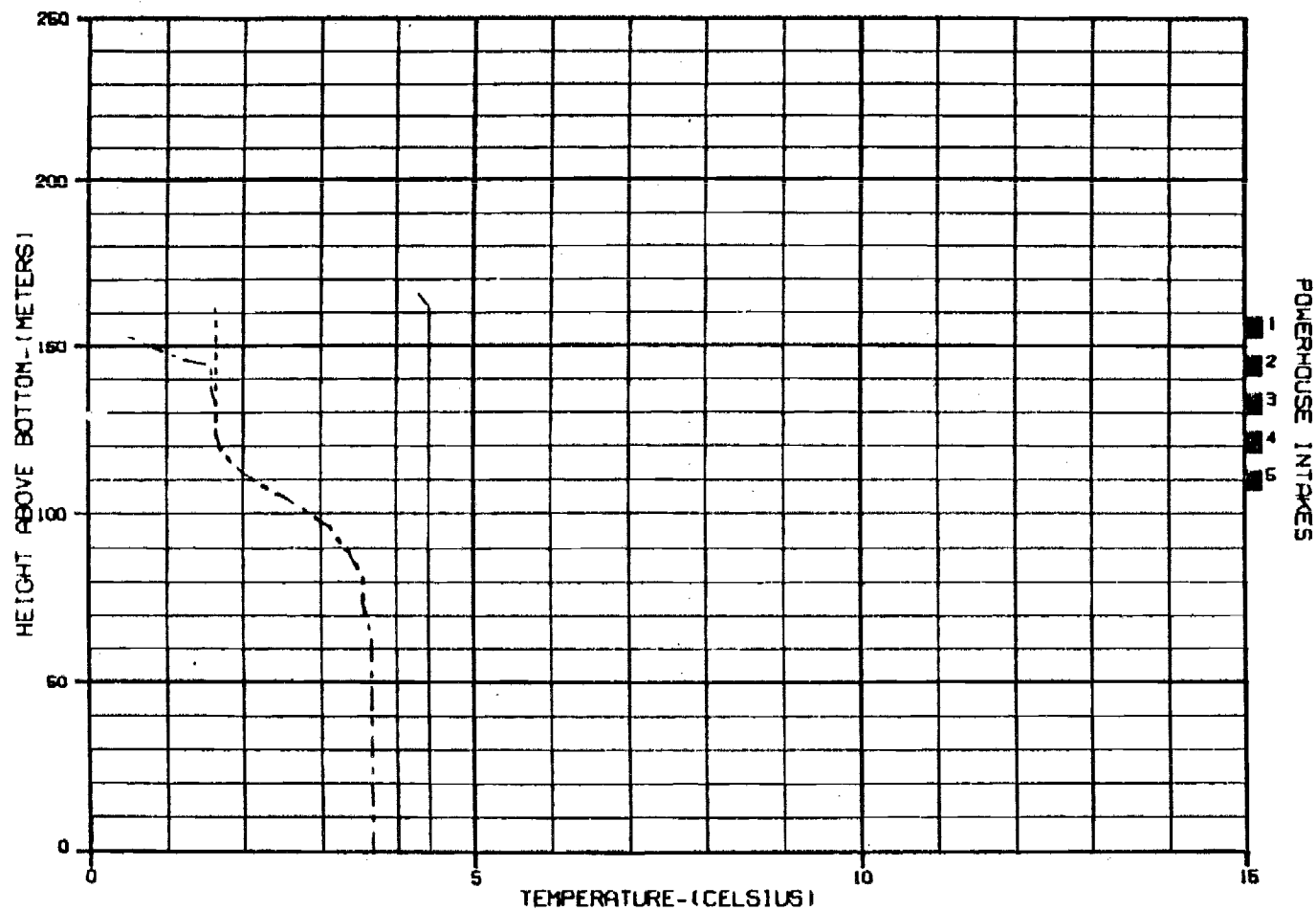
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHARTED: ILL. DATE

5 APR 88

42-010-04



CASE: ■■ WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002 ■■
CASE E-VI S2, NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1981
- - - 1 DECEMBER 1981
- · - 1 JANUARY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYDOSH MODEL

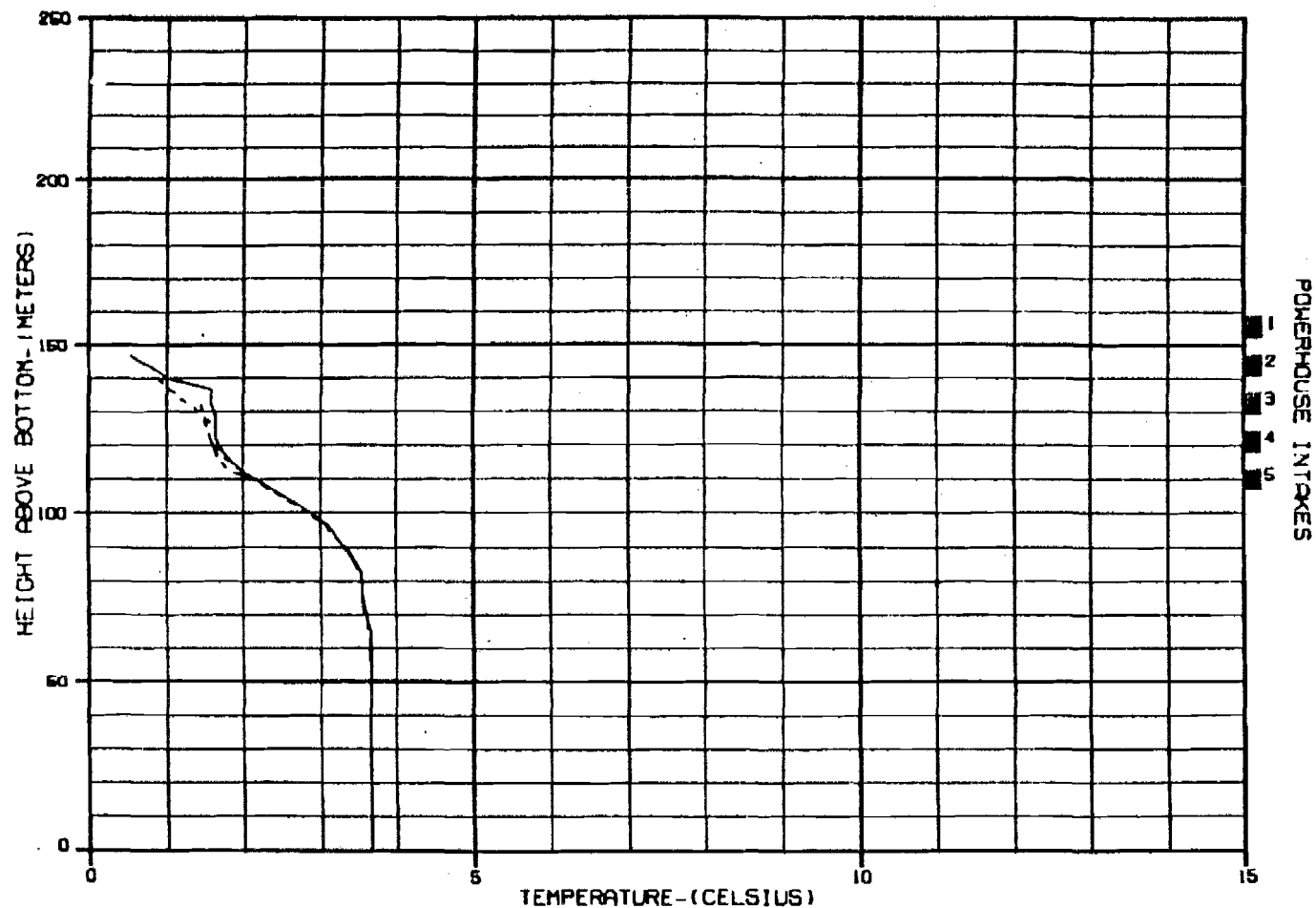
WATANA RESERVOIR
TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

5 APR 82

42-010-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1982
- - - 1 MARCH 1982
. . . 1 APRIL 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYKORSH MODEL

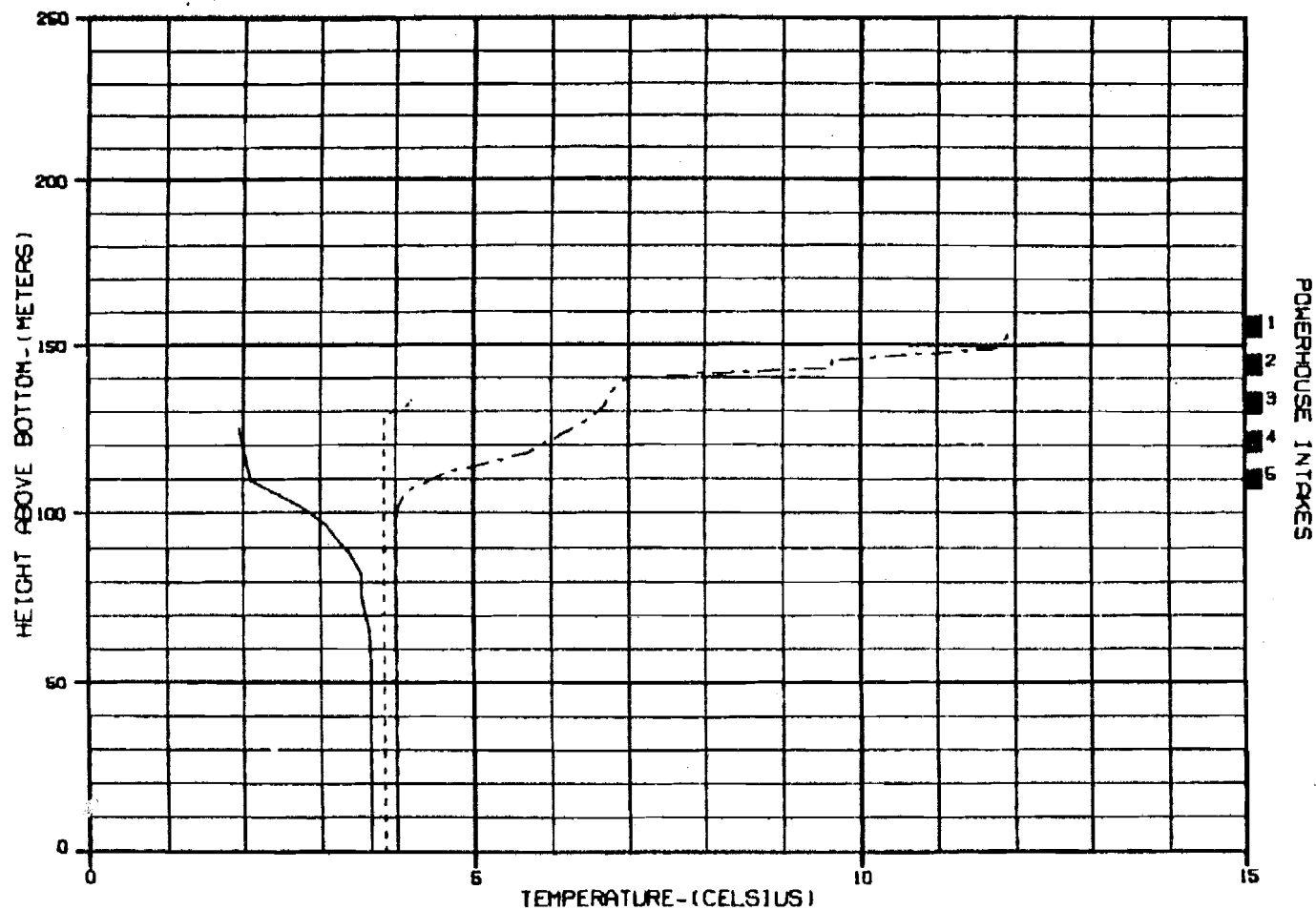
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHECKED: 04/10/82

5 APR 82

42-010-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 MAY 1982
- - - 1 JUNE 1982
- . - 1 JULY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYADEN MODEL

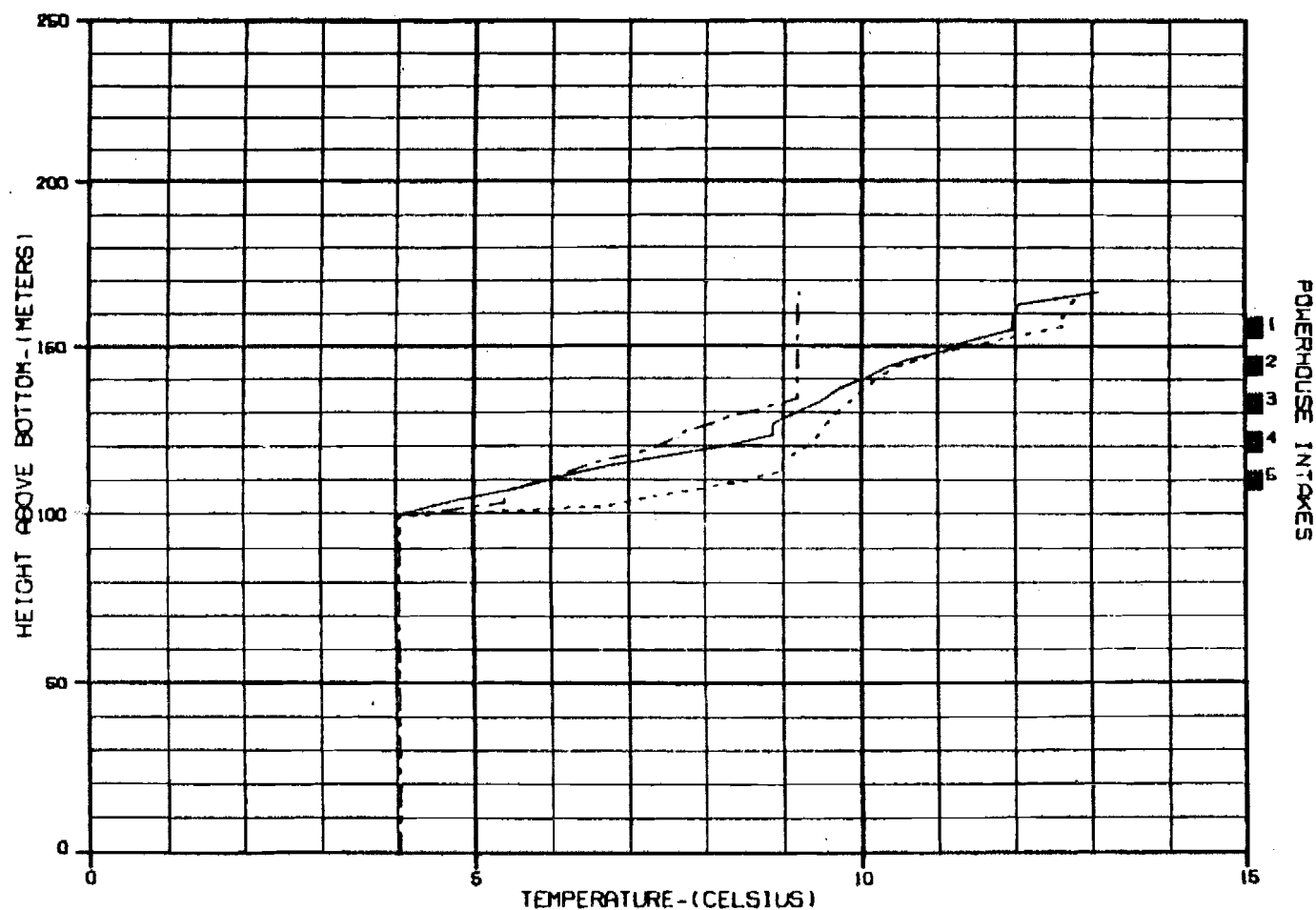
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHENG-ILLINOIS

8 MAY 88

42-010-04



CASE: ■■ WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 AUGUST 1982
... 1 SEPTEMBER 1982
- - - 1 OCTOBER 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYKES MODEL

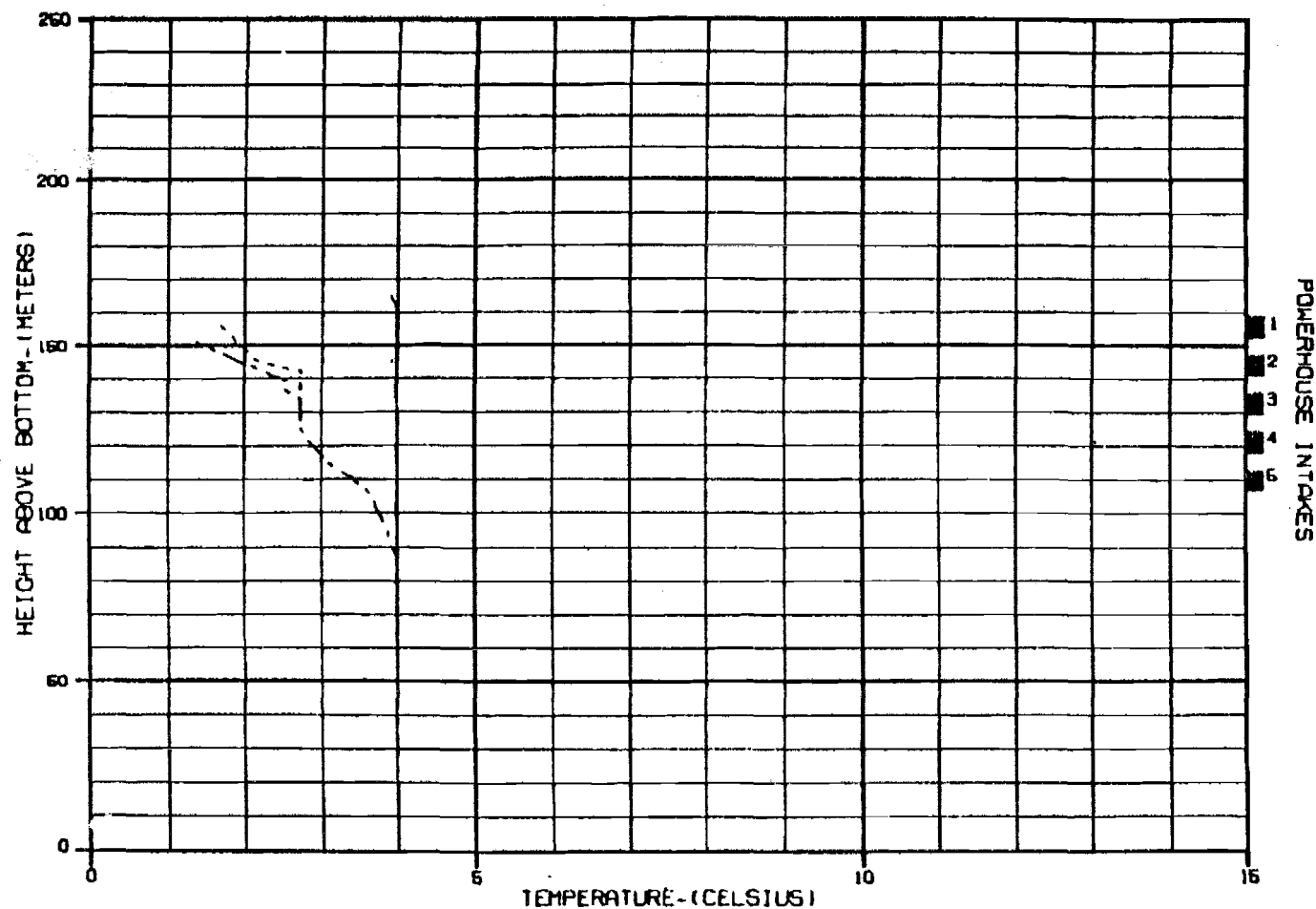
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHECKED: LLA 9-2078

8 APR 88

42-010-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1982
- - - 1 DECEMBER 1982
- . - 1 JANUARY 1983

ALASKA POWER AUTHORITY

SUBTINA PROJECT

OPERATION MODEL

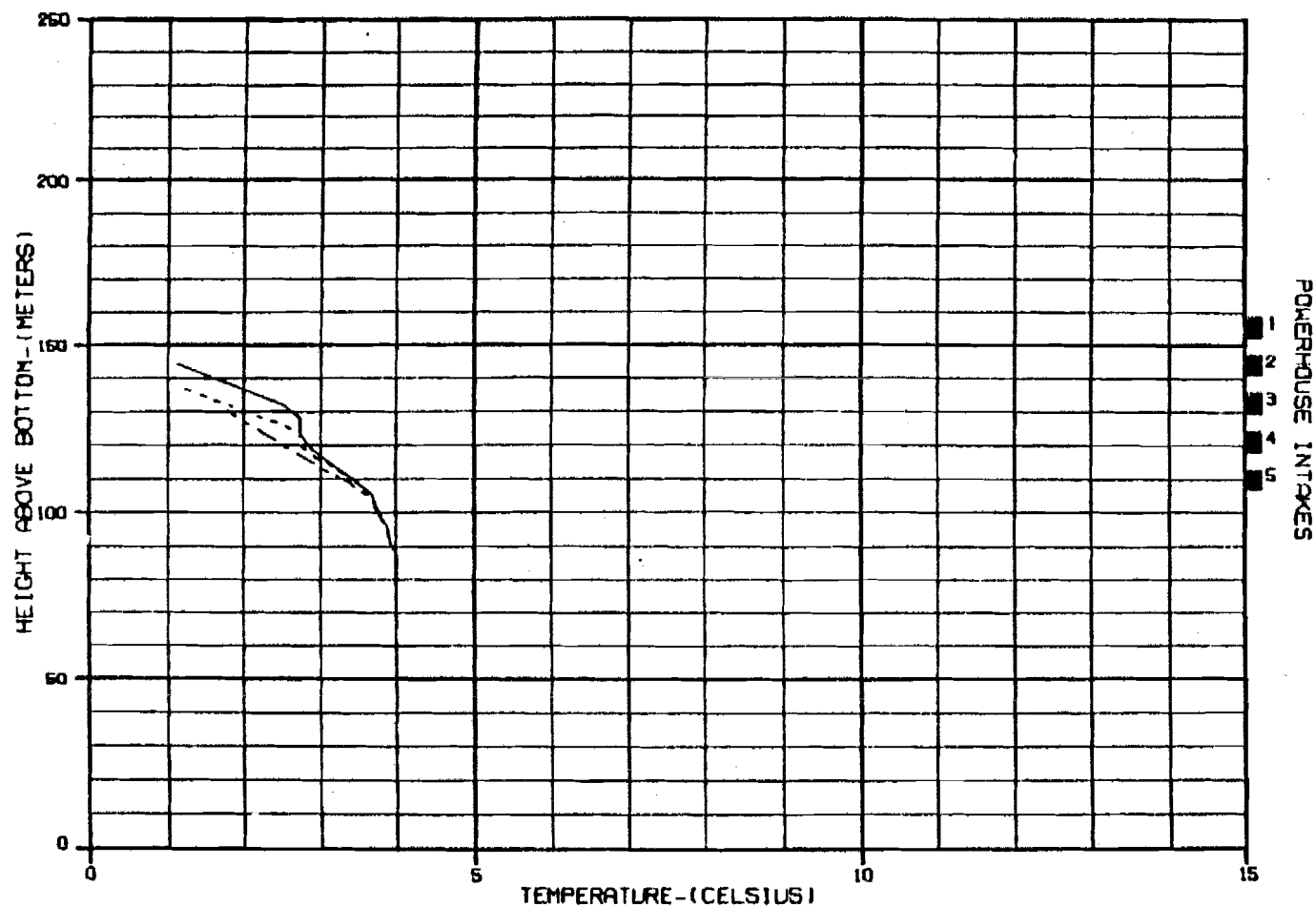
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

9 APR 83

42-010-04



CASE: WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1983
- - - 1 MARCH 1983
- . - . 1 APRIL 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYNOSY MODEL

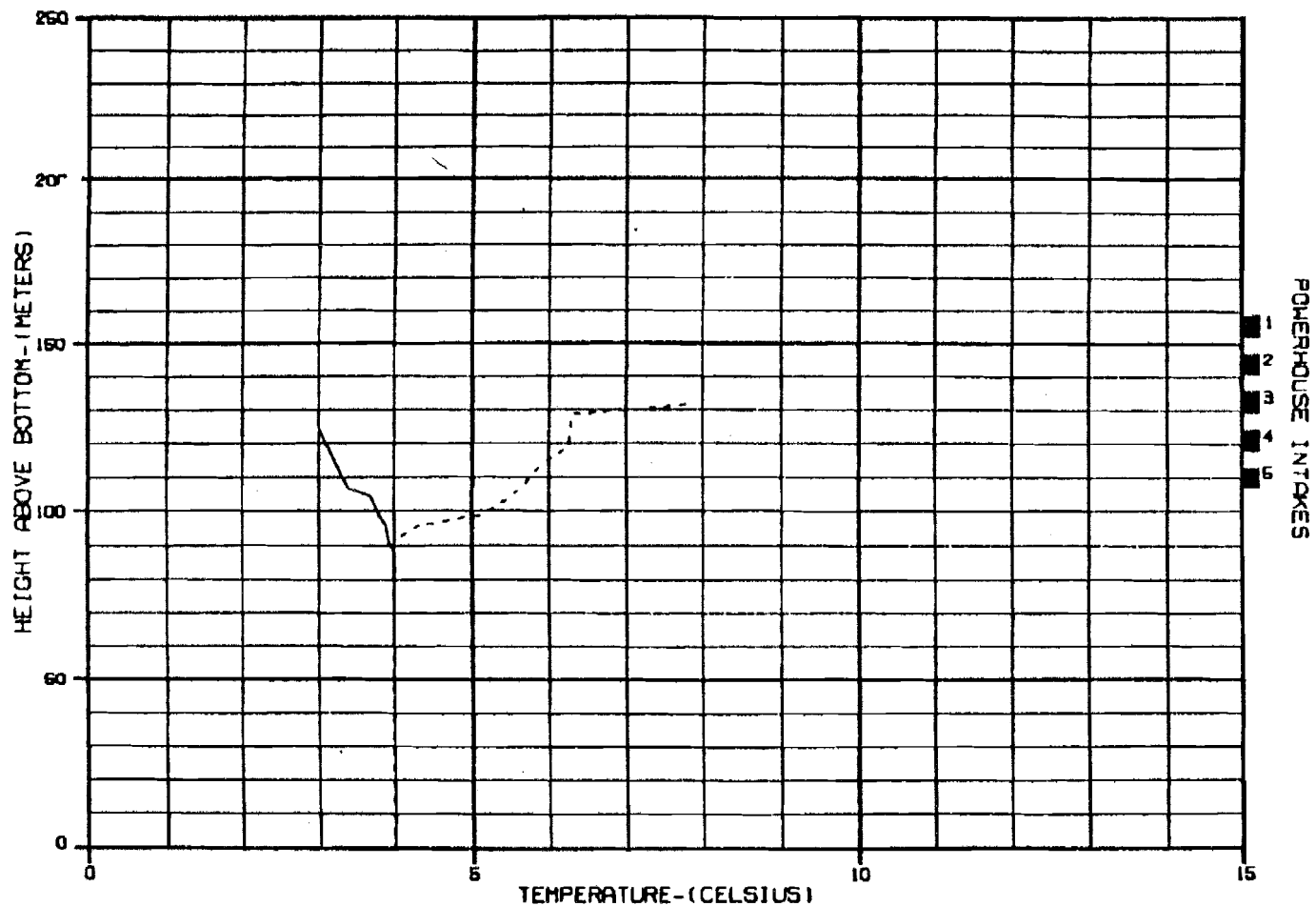
WATANA RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHIEF: ALL PAGES

6 APR 83

42-010-04



CASE: ■■ WAB1020 - WATANA OPERATION W/DEVIL CANYON IN 2002 ■■
 CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 MAY 1983
 - - - 1 JUNE 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYKES MODEL

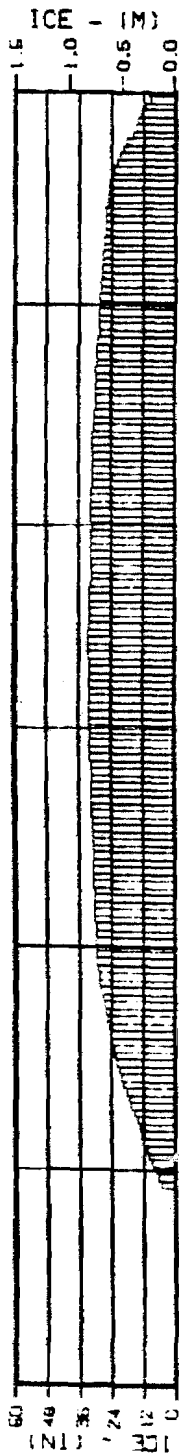
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

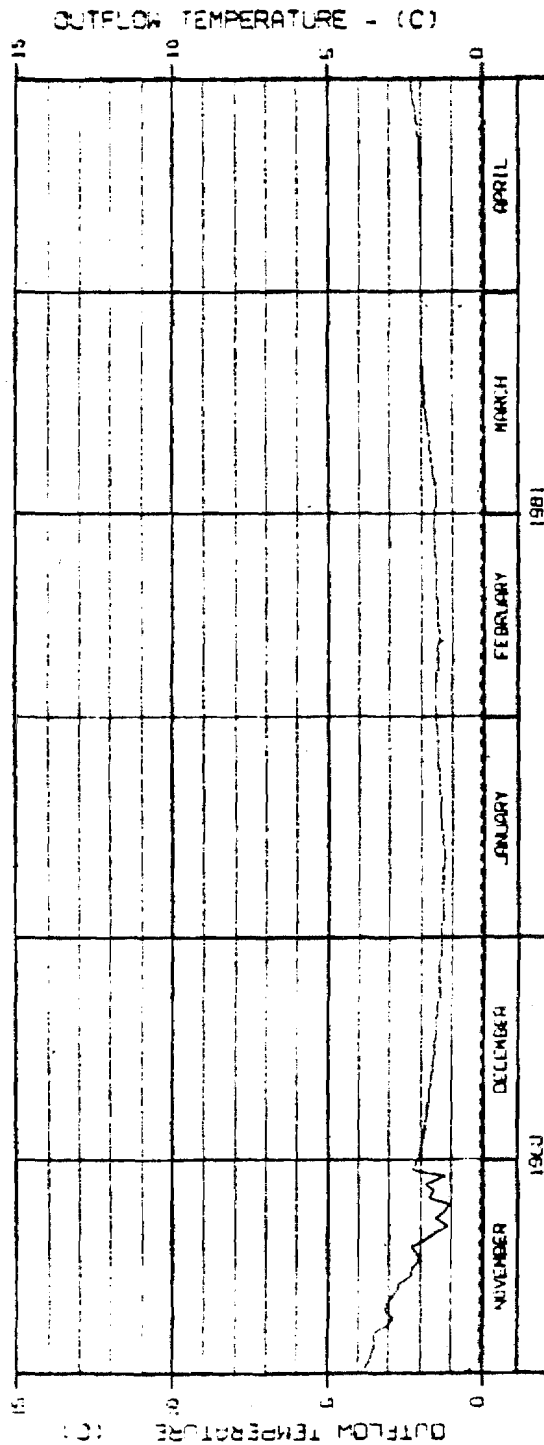
CHICAGO, ILLINOIS

8 APR 83

42-010-04



LEVEL	INTAKE	CONC. VALVE	SPILLWAY
LEVEL 1			
LEVEL 2			
LEVEL 3			
LEVEL 4			
LEVEL 5			
LEVEL 6			
LEVEL 7			
LEVEL 8			
LEVEL 9			
LEVEL 10			
LEVEL 11			
LEVEL 12			
LEVEL 13			
LEVEL 14			
LEVEL 15			
LEVEL 16			
LEVEL 17			
LEVEL 18			
LEVEL 19			
LEVEL 20			
LEVEL 21			
LEVEL 22			
LEVEL 23			
LEVEL 24			
LEVEL 25			
LEVEL 26			
LEVEL 27			
LEVEL 28			
LEVEL 29			
LEVEL 30			
LEVEL 31			
LEVEL 32			
LEVEL 33			
LEVEL 34			
LEVEL 35			
LEVEL 36			
LEVEL 37			
LEVEL 38			
LEVEL 39			
LEVEL 40			
LEVEL 41			
LEVEL 42			
LEVEL 43			
LEVEL 44			
LEVEL 45			
LEVEL 46			
LEVEL 47			
LEVEL 48			
LEVEL 49			
LEVEL 50			
LEVEL 51			
LEVEL 52			
LEVEL 53			
LEVEL 54			
LEVEL 55			
LEVEL 56			
LEVEL 57			
LEVEL 58			
LEVEL 59			
LEVEL 60			
LEVEL 61			
LEVEL 62			
LEVEL 63			
LEVEL 64			
LEVEL 65			
LEVEL 66			
LEVEL 67			
LEVEL 68			
LEVEL 69			
LEVEL 70			
LEVEL 71			
LEVEL 72			
LEVEL 73			
LEVEL 74			
LEVEL 75			
LEVEL 76			
LEVEL 77			
LEVEL 78			
LEVEL 79			
LEVEL 80			
LEVEL 81			
LEVEL 82			
LEVEL 83			
LEVEL 84			
LEVEL 85			
LEVEL 86			
LEVEL 87			
LEVEL 88			
LEVEL 89			
LEVEL 90			
LEVEL 91			
LEVEL 92			
LEVEL 93			
LEVEL 94			
LEVEL 95			
LEVEL 96			
LEVEL 97			
LEVEL 98			
LEVEL 99			
LEVEL 100			



LEGEND CASE 1 - DCB1020 - DEVIL CANYON OPERATION W/ATANKA IN 2002 M
CASE 2 - VI 62 - NATURAL CONDITIONS DRAINAGE - 50 FT. THREE INTAKE LEVEL
PREDICTED OUTFLOW TEMPERATURE
INFLOW TEMPERATURE

- NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1405 FT (434.34 M)
2. INTAKE PORT LEVEL 2 AT ELEVATION 1400 FT (426.72 M)
3. INTAKE PORT LEVEL 3 AT ELEVATION 1375 FT (419.10 M)
4. CONE VALVE AT ELEVATION 950 FT (290.76 M)
5. SPILLWAY CREST AT ELEVATION 1424 FT (427.84 M)

ALASKA POWER AUTHORITY

DEVELOPMENT PROJECT

DEVIL CANYON RESERVOIR

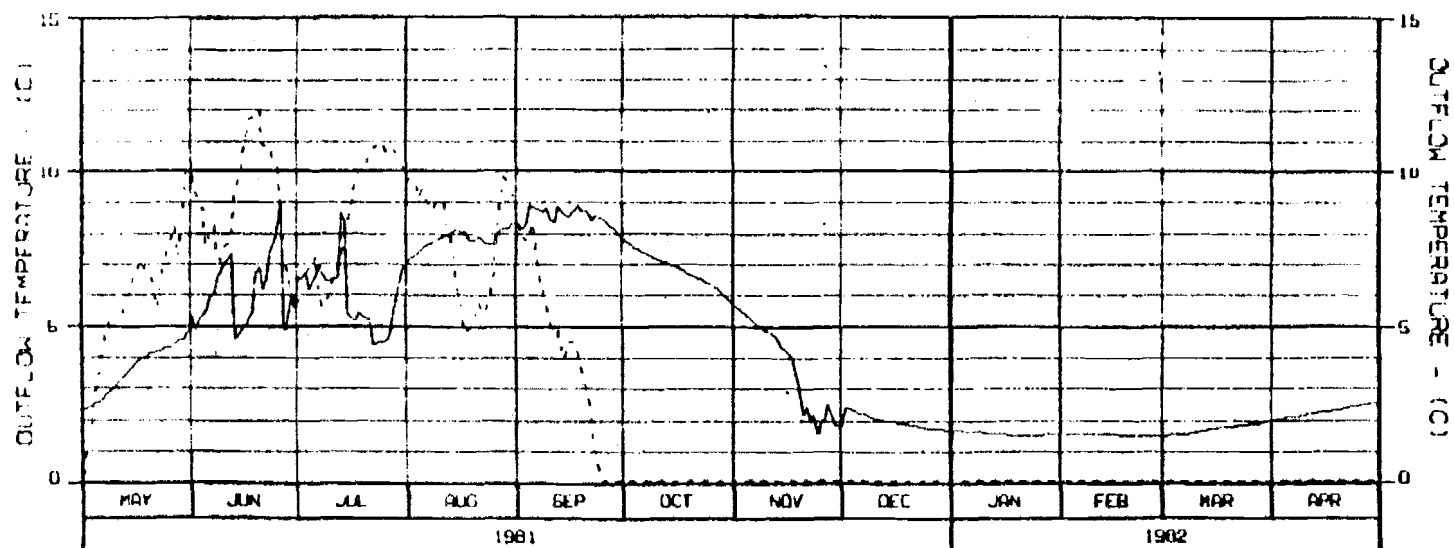
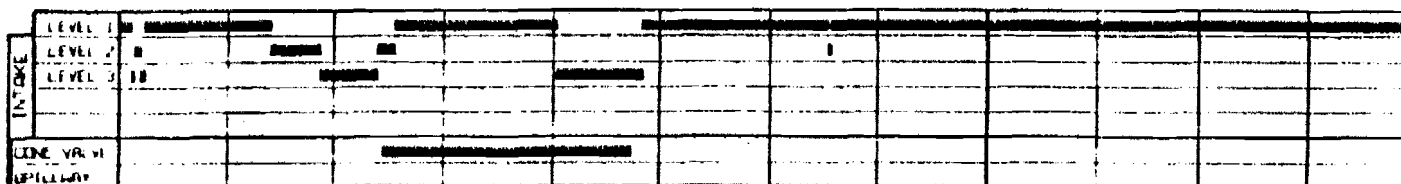
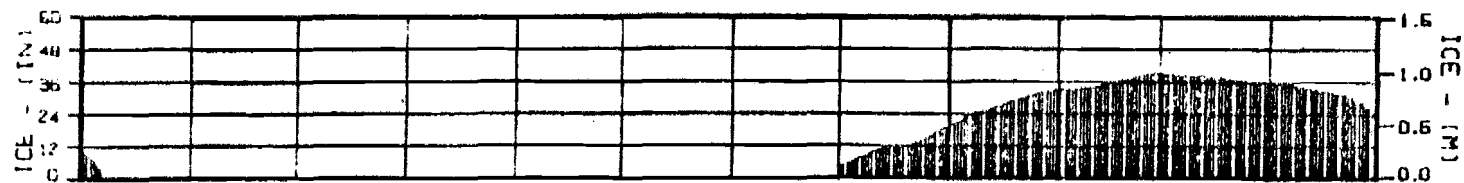
OUTFLOW TEMPERATURE

AND ICE GROWTH

HYDRA-EMASCO JOINT VENTURE

CALCULATED: JULY 1981

42-010-04



LEGEND: CASE 1 - DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
 CASE E-VI 62 - NATURAL CONDITIONS, DRAWDOWN - 50 FT. THREE INTAKE LEVEL
 — PREDICTED OUTFLOW TEMPERATURE
 --- INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.34 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 1400 FT (426.72 M)
 3. INTAKE PORT LEVEL 3 AT ELEVATION 1375 FT (419.10 M)
 4. CONE VALVE AT ELEVATION 950 FT (290.75 M)
 5. SPILLWAY CREST AT ELEVATION 1404 FT (427.84 M)

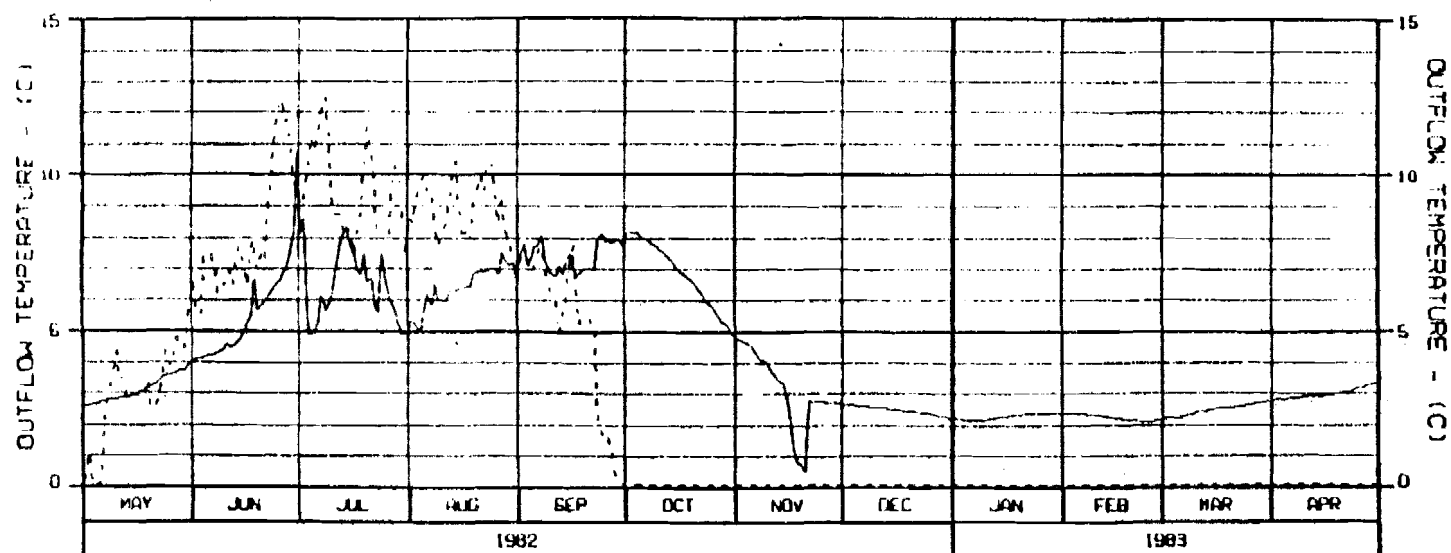
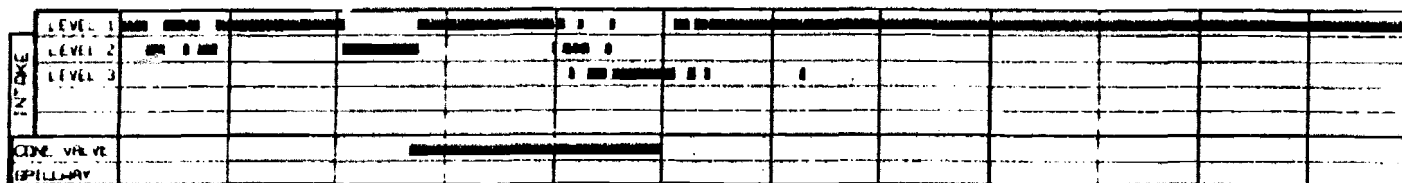
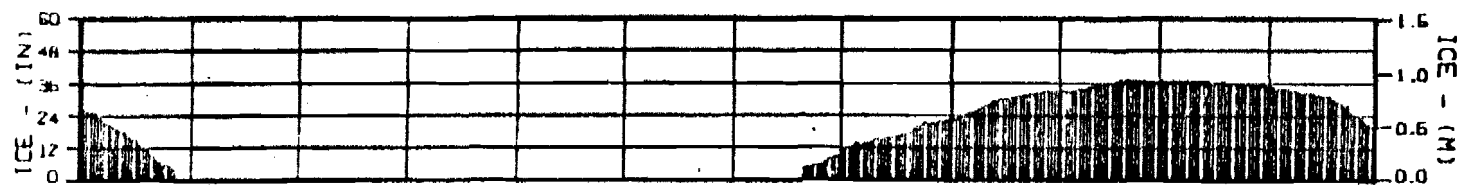
ALASKA POWER AUTHORITY

SUSTAINA PROJECT DYNESHA MODEL

DEVIL CANYON RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 8 APR 82 42-010-04



LEGEND: CASE: # DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 #
 CASE E-VI 62, NATURAL CONDITIONS, DRAWDOWN = 50 FT, THREE INTAKE LEVEL
 ——— PREDICTED OUTFLOW TEMPERATURE
 - - - - - INFLOW TEMPERATURE

- NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.94 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 1400 FT (426.72 M)
 3. INTAKE PORT LEVEL 3 AT ELEVATION 1375 FT (419.10 M)
 4. DAM VALVE AT ELEVATION 990 FT (301.76 M)
 5. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

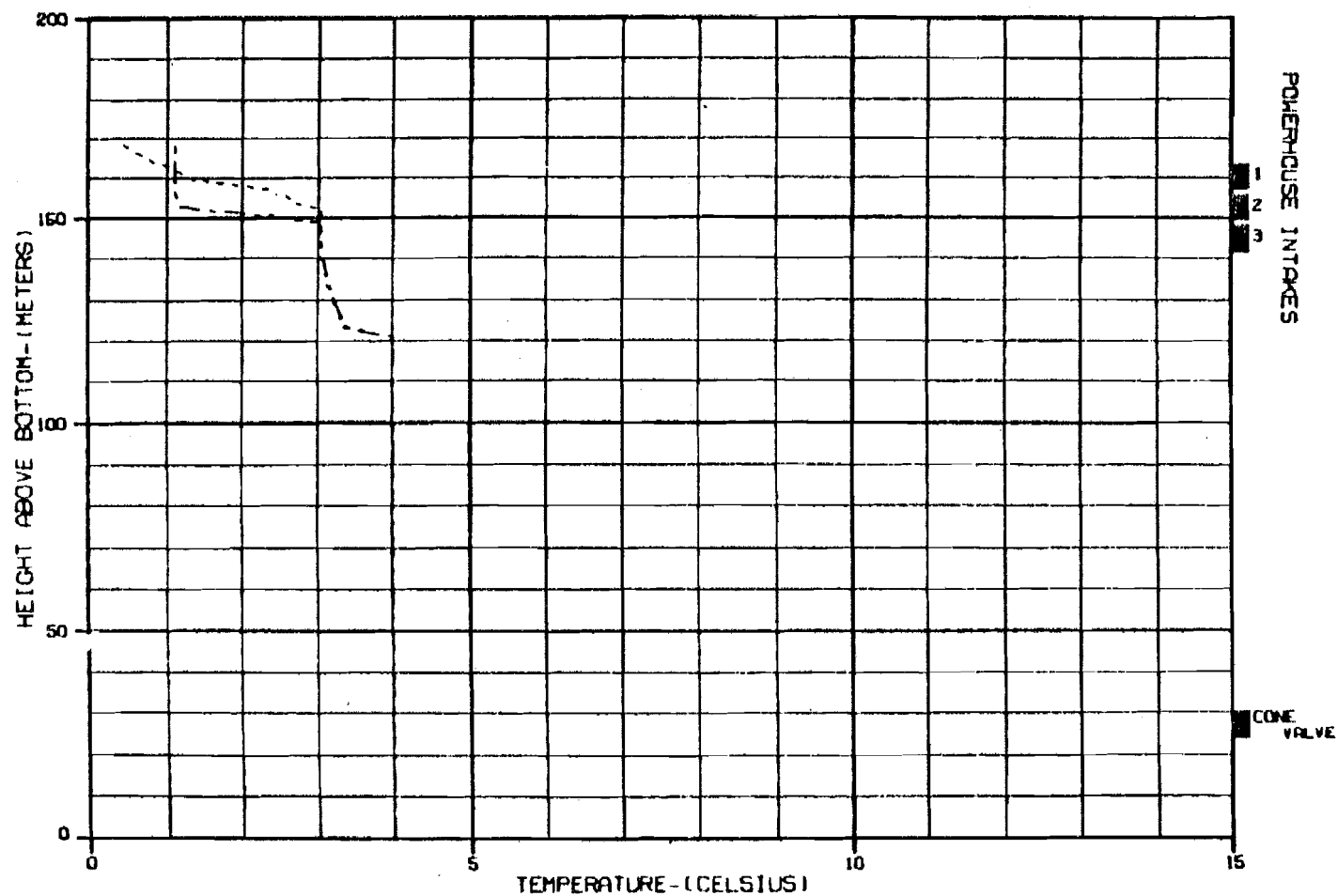
ALASKA POWER AUTHORITY

SUSTAINA PROJECT DYNESM MODEL

DEVIL CANYON RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHANGING THE FUTURE 8 APR 04 42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 NOVEMBER 1980
- - - - 1 DECEMBER 1980
- . - . 1 JANUARY 1981

ALASKA POWER AUTHORITY

SUBITMA PROJECT

DYKES MODEL

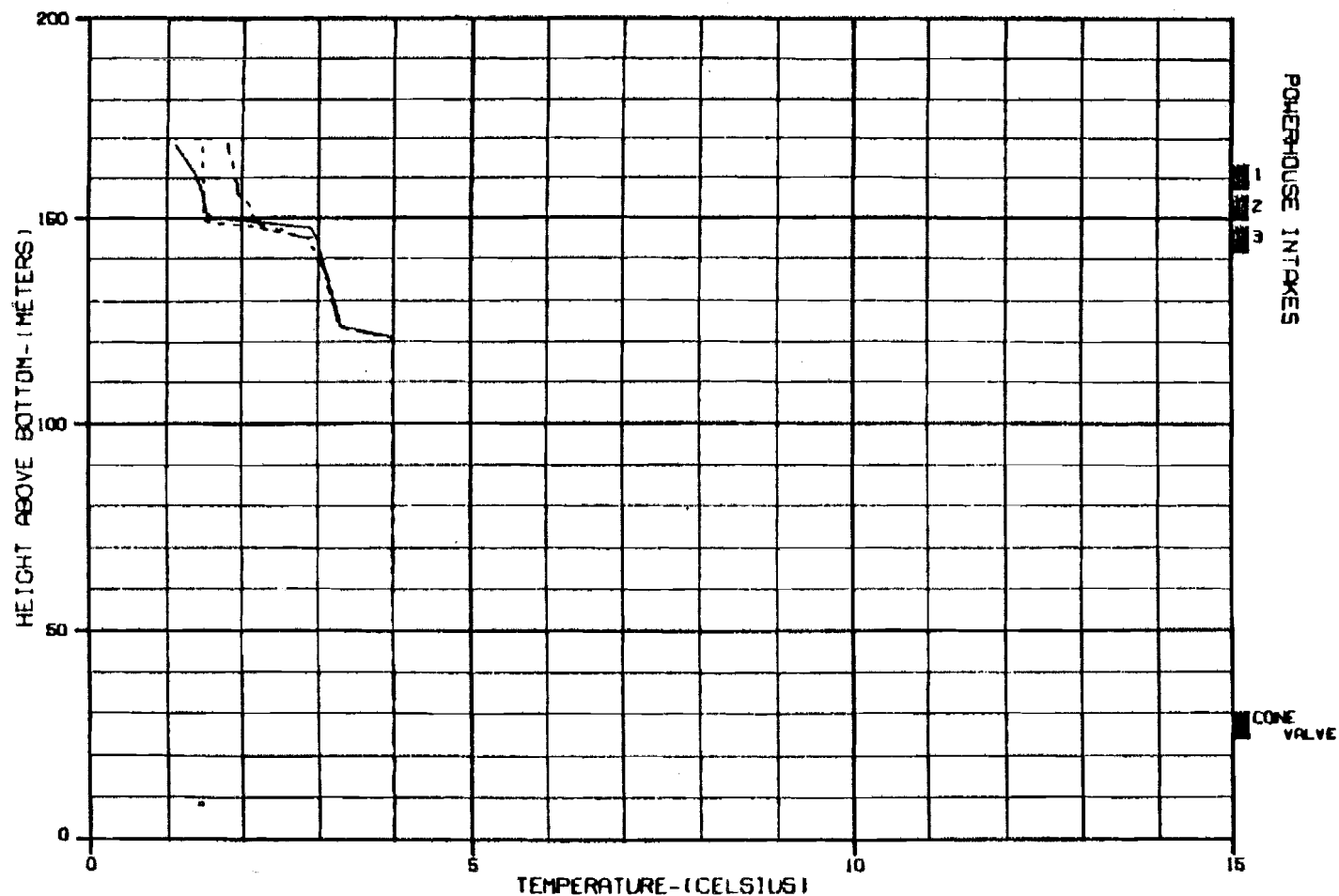
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 1981

42-010-04



CASE: ■■ DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1981
- - - 1 MARCH 1981
- · - 1 APRIL 1981

ALASKA POWER AUTHORITY

SUBITNA PROJECT

DYKEMA MODEL

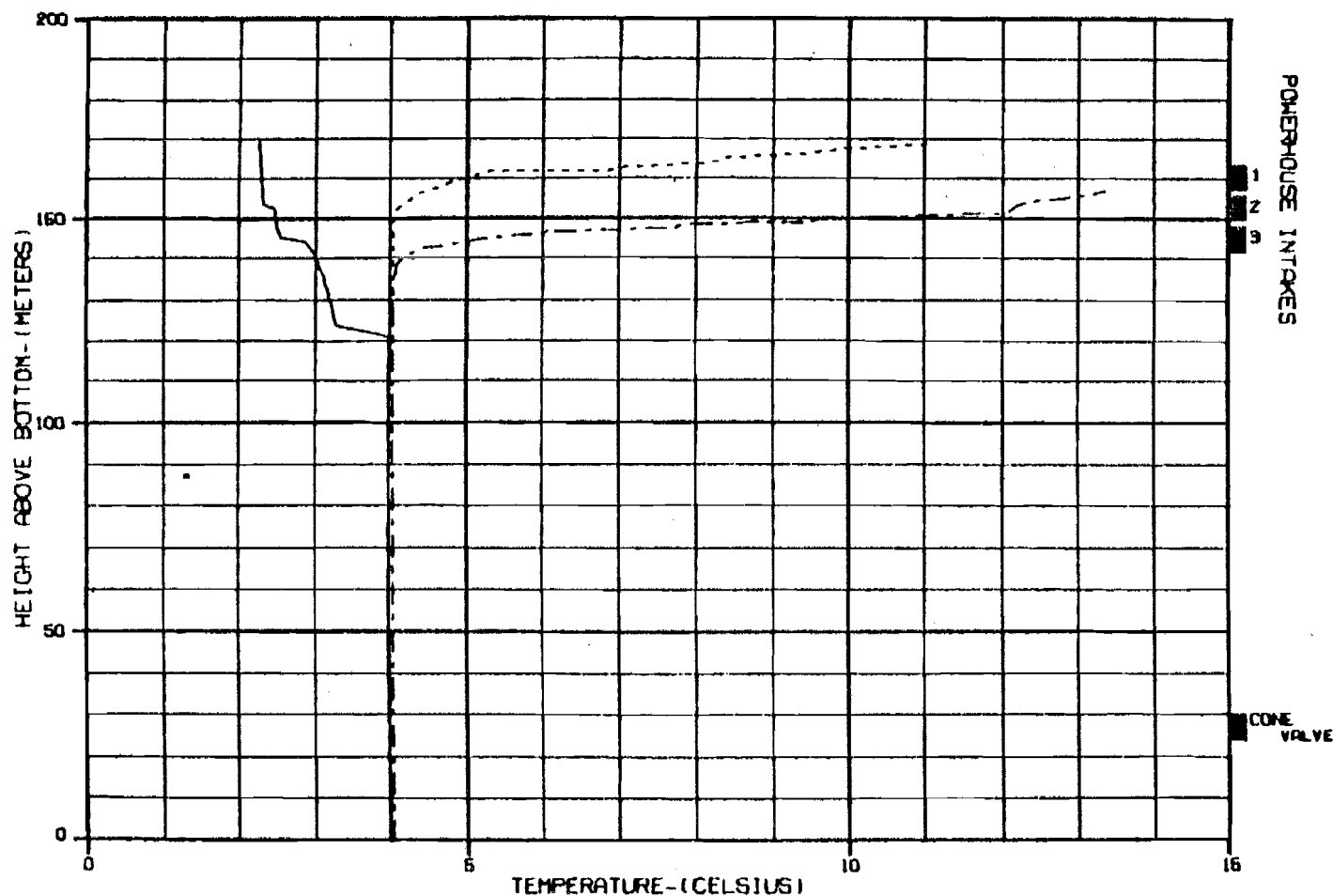
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

ENGINEER: S. L. HARRIS

3 APR 81

42-DIO-04



CASE: DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 MAY 1981
--- 1 JUNE 1981
... 1 JULY 1981

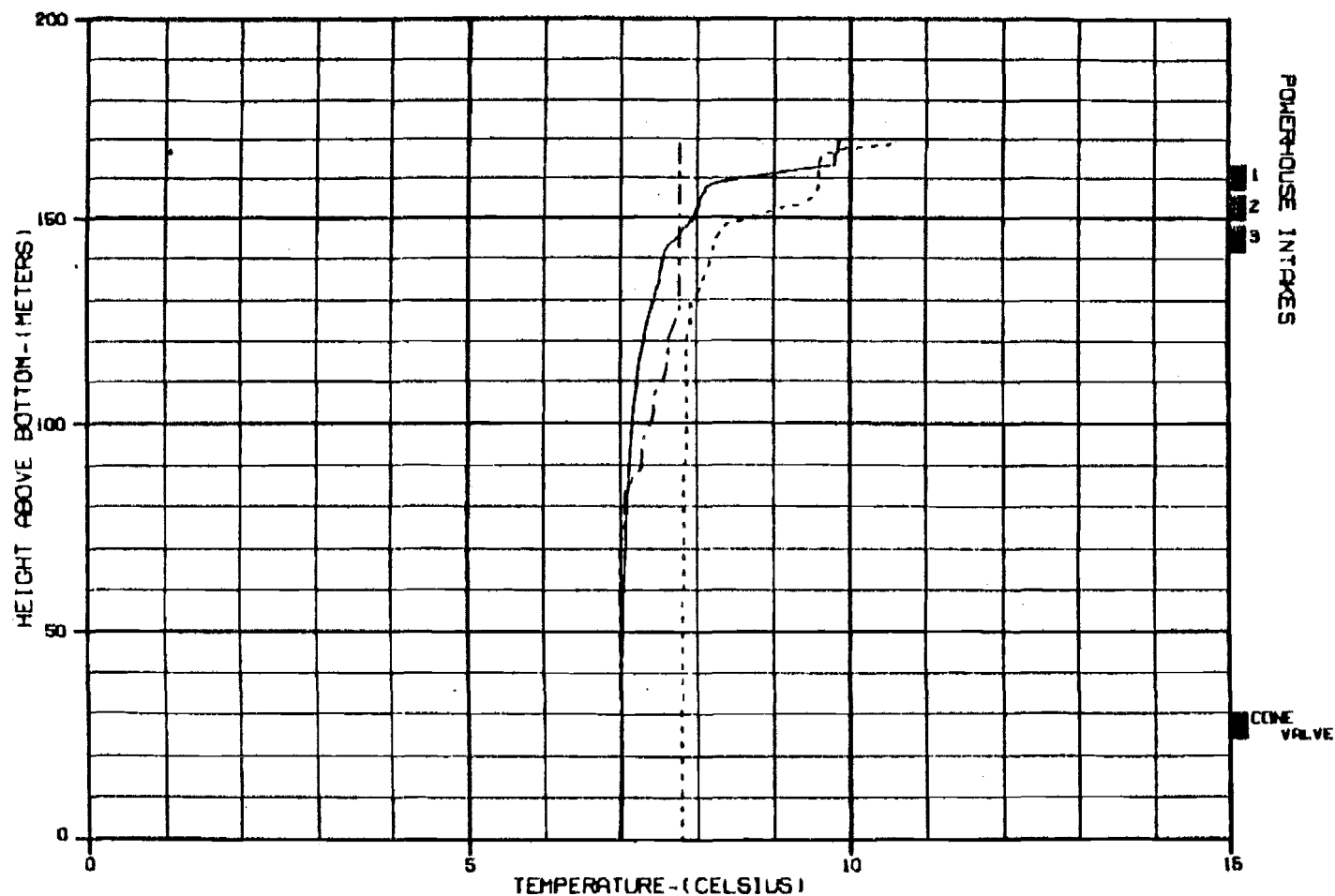
ALASKA POWER AUTHORITY

SUBMITTA PROJECT DIVISION MODEL

DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHIEF: B.L. HARRIS 8 APR 88 42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 AUGUST 1981
- - - 1 SEPTEMBER 1981
- . - 1 OCTOBER 1981

ALASKA POWER AUTHORITY

WATANA PROJECT

OPENESH MODEL

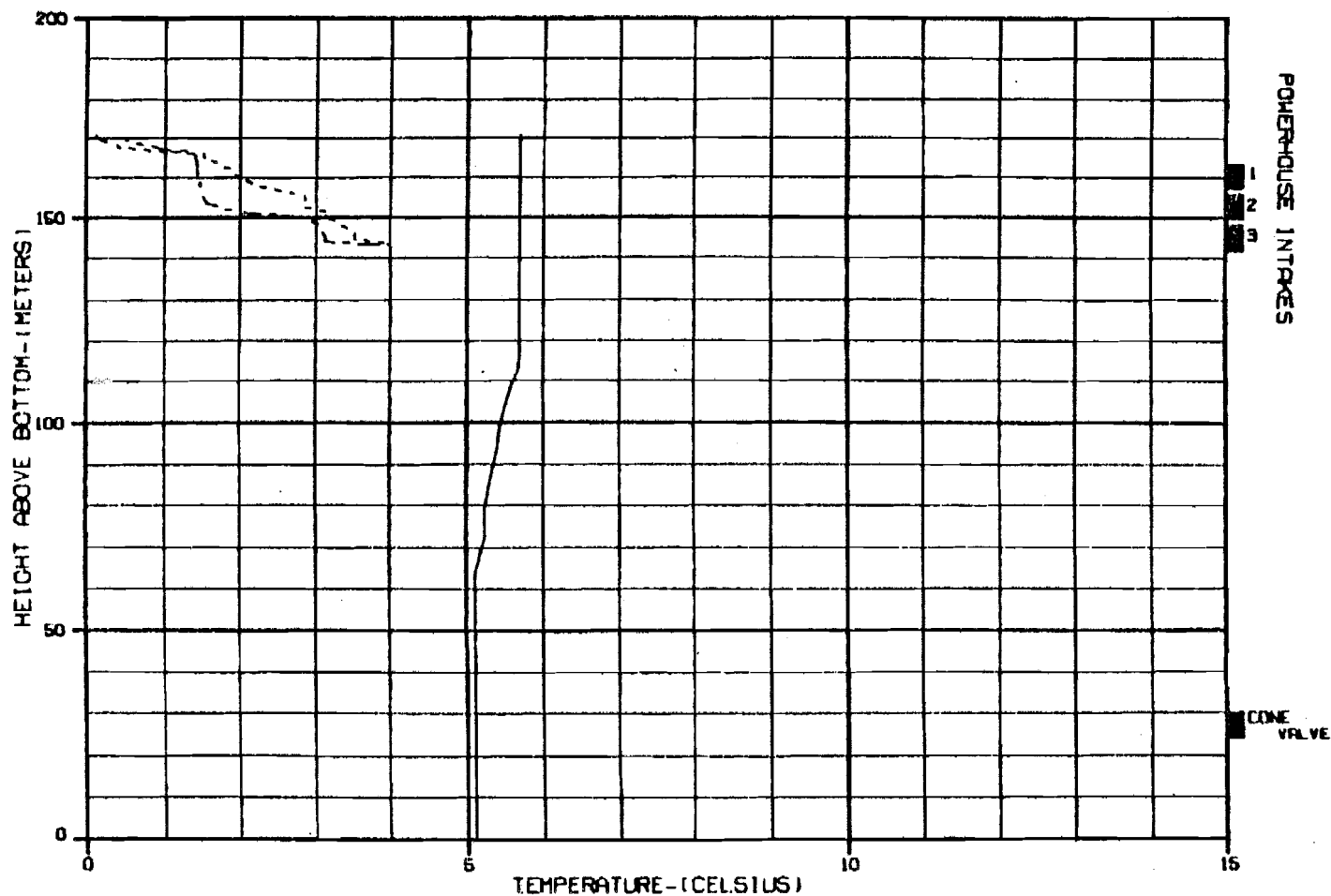
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

ENCLOSURE, ALL DRAWINGS

8 APR 88

42-D10-04



CASE: DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-VI SZ. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1981
- - - 1 DECEMBER 1981
. . . 1 JANUARY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

CHYRCH MODEL

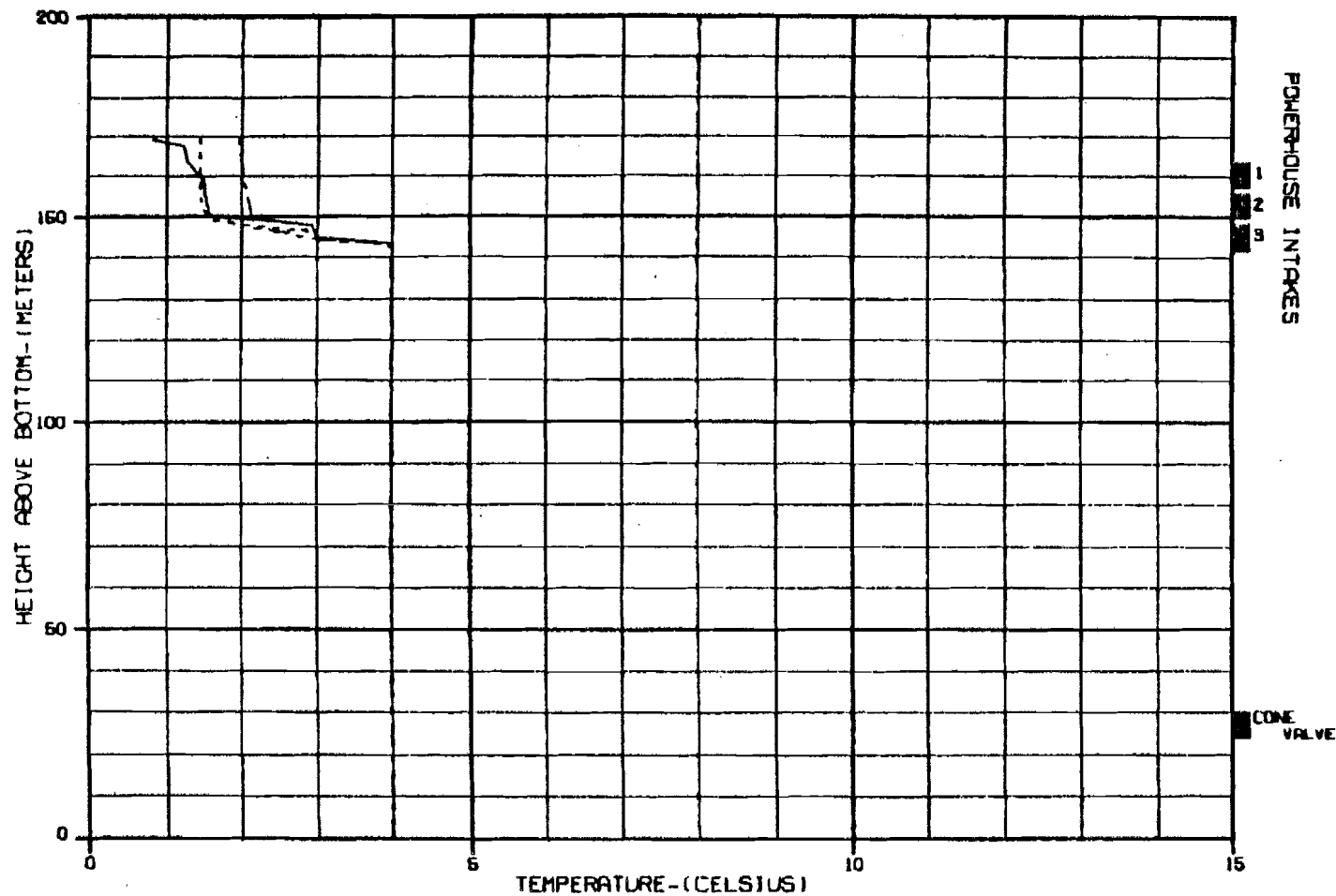
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HAZRA-EBASCO JOINT VENTURE

CHECKED: ILL. PHOTO

8 APR 82

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

———— 1 FEBRUARY 1982
..... 1 MARCH 1982
----- 1 APRIL 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYNASM MODEL

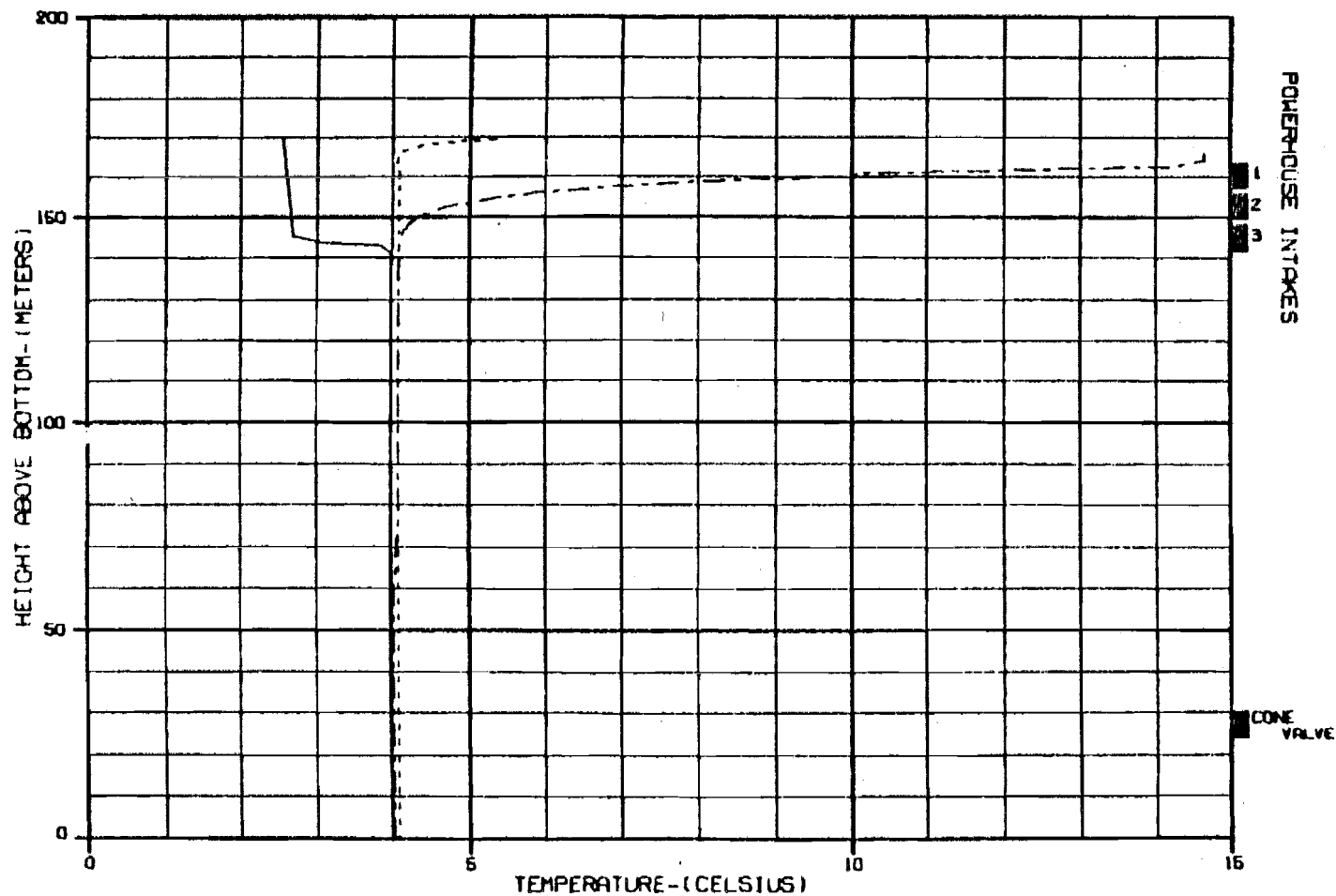
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

ENGINEER: ALL D-010

3 APR 82

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

———— 1 MAY 1982
- - - - - 1 JUNE 1982
- · - · - 1 JULY 1982

ALASKA POWER AUTHORITY

SUBITNA PROJECT

OVERSEEN MODEL

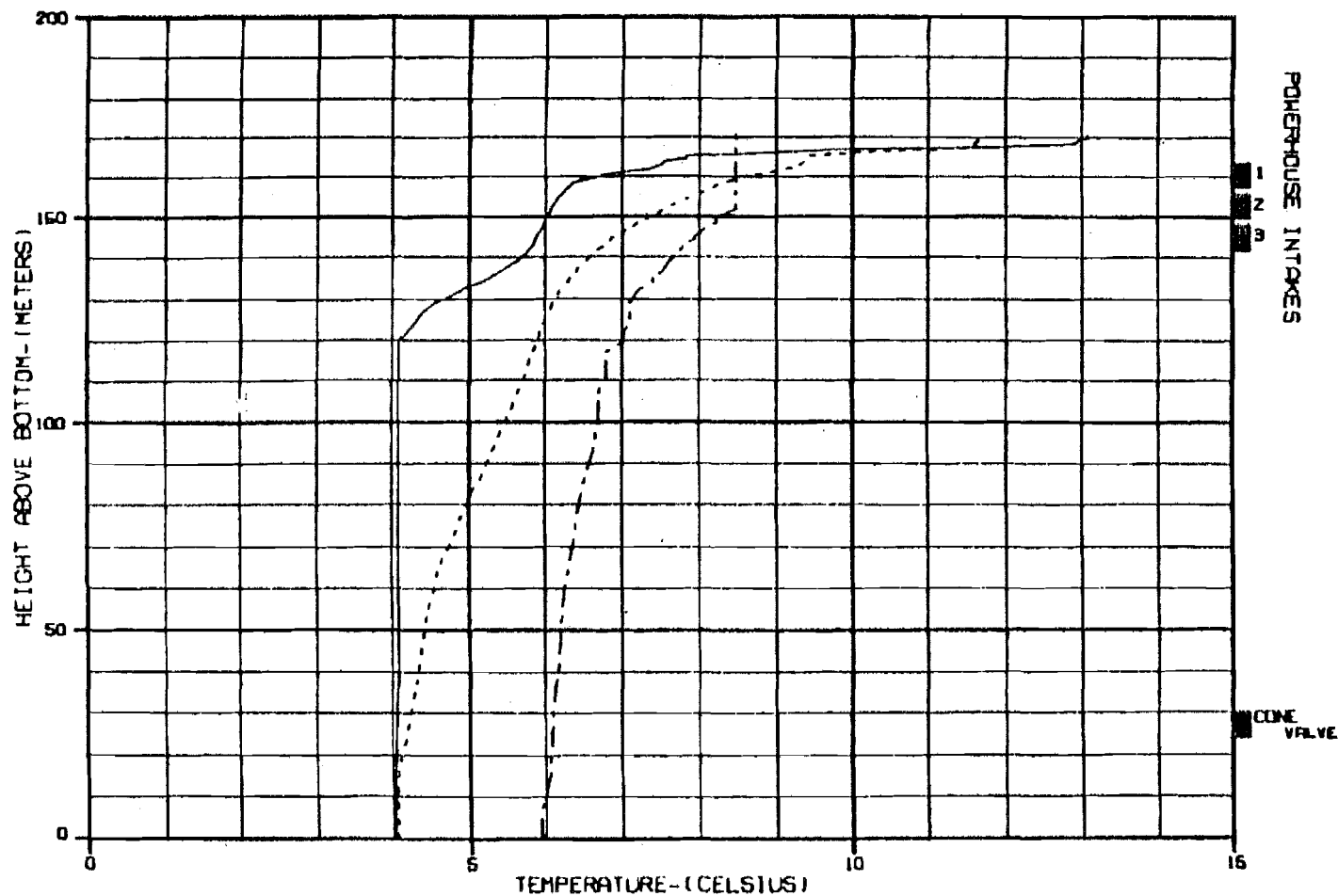
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHARTER: D.L.P. 10/10

5 APR 82

42-010-04



CASE: DCB102Q - DEVIL CANYON OPERATION W/WATANA IN 2002
 CASE E-V1 S2, NATURAL CONDITIONS, DRAWDOWN = 50 FT, 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 AUGUST 1982
 - - - 1 SEPTEMBER 1982
 - . - . 1 OCTOBER 1982

ALASKA POWER AUTHORITY

GUSTINA PROJECT

OUTREACH MODEL

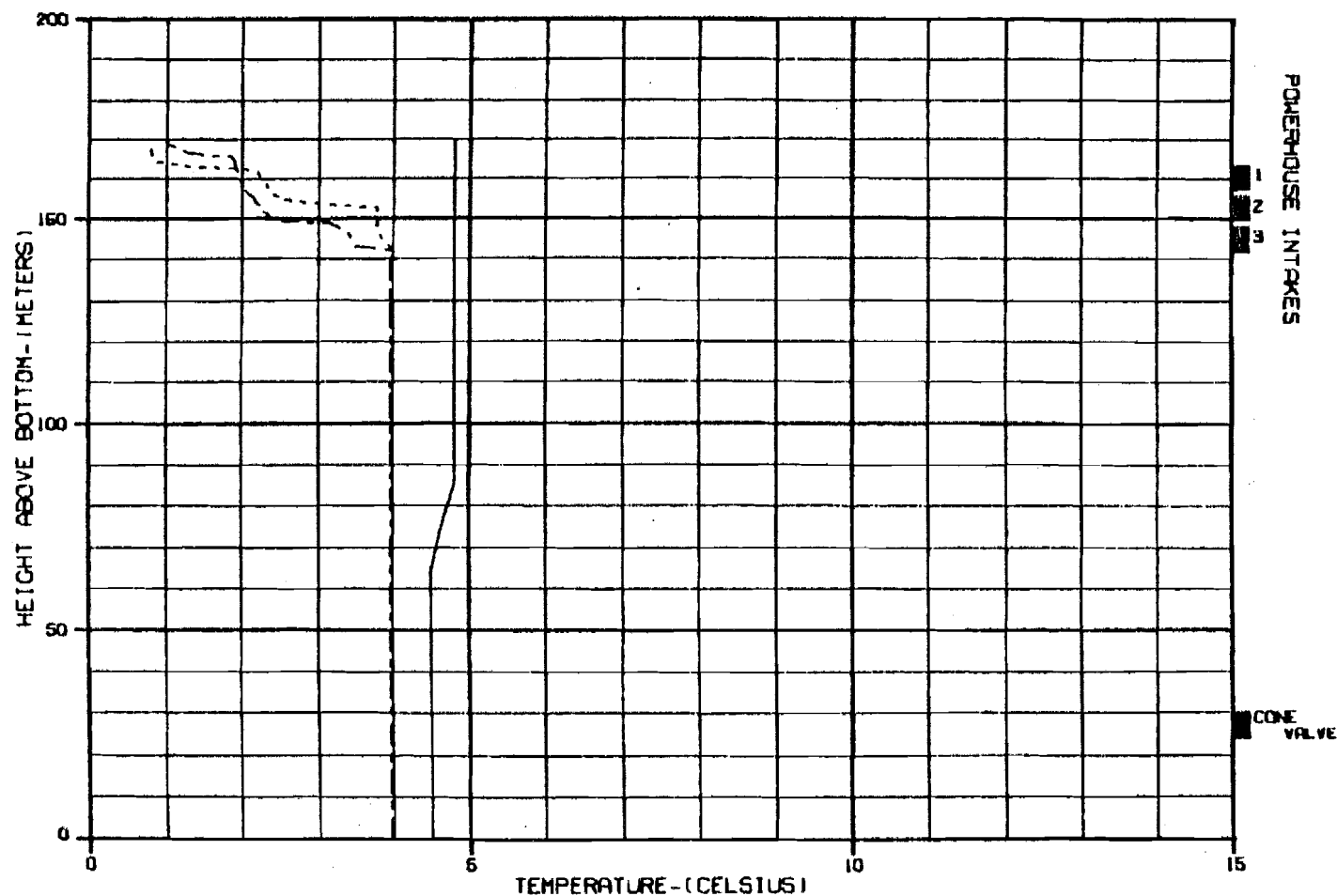
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HAZRA-EBAGCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 88

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1982
- - - 1 DECEMBER 1982
. . . 1 JANUARY 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OWNERS MODEL

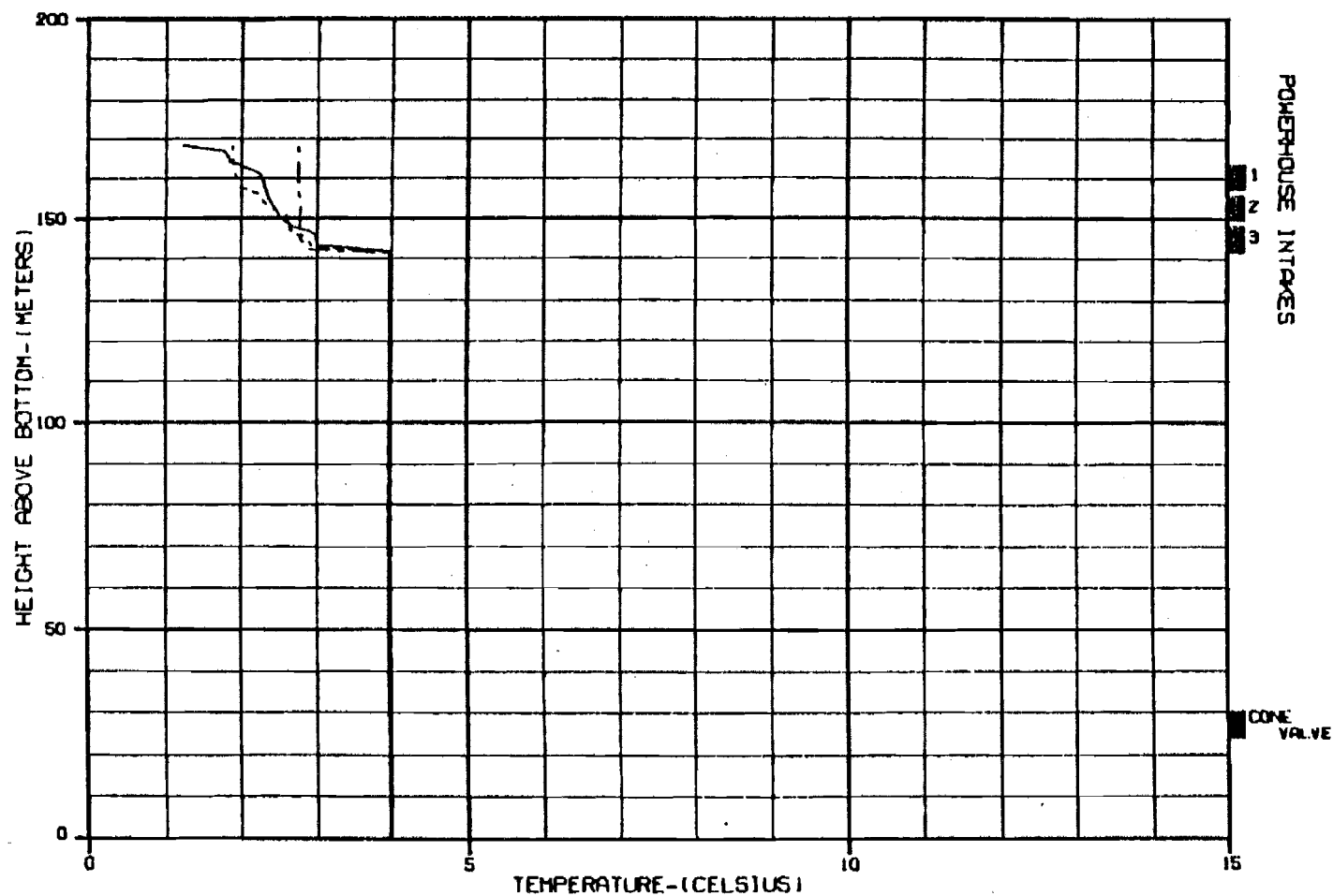
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHARGE: ILL-PROB

9 APR 88

42-010-04



CASE: ■■ DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND,

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1983
- - - 1 MARCH 1983
- . - 1 APRIL 1983

ALASKA POWER AUTHORITY

SUBITNA PROJECT

DYKES MODEL

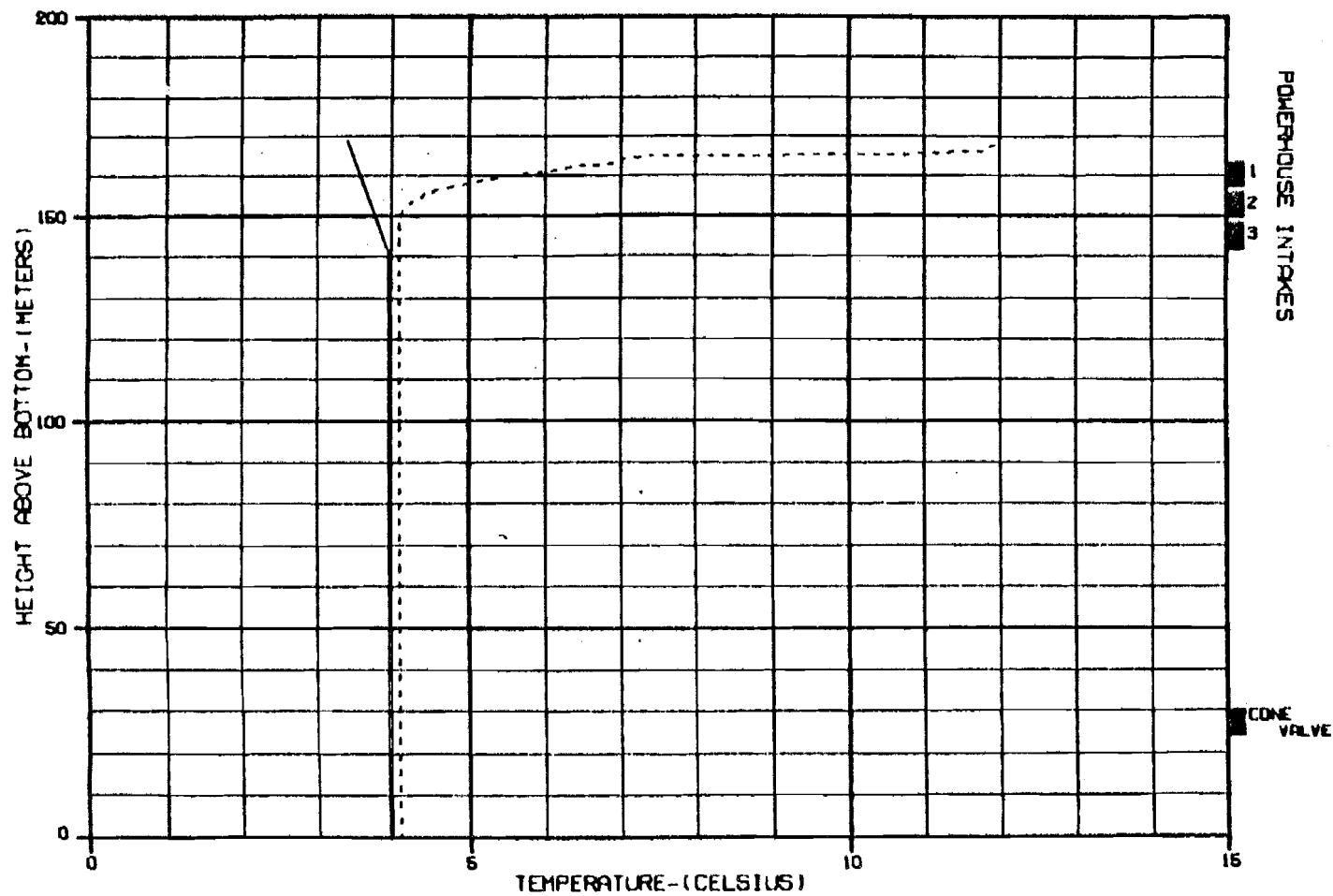
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HRZA-EBASCO JOINT VENTURE

DESIGN: ALLIANCE

8 APR 83

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V) SZ. NATURAL CONDITIONS. DRAWDOWN = 50 FT. 3 LEVELS

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 MAY 1983
- - - - 1 JUNE 1983

ALASKA POWER AUTHORITY

SUBITNA PROJECT

DYNASM MODEL

DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

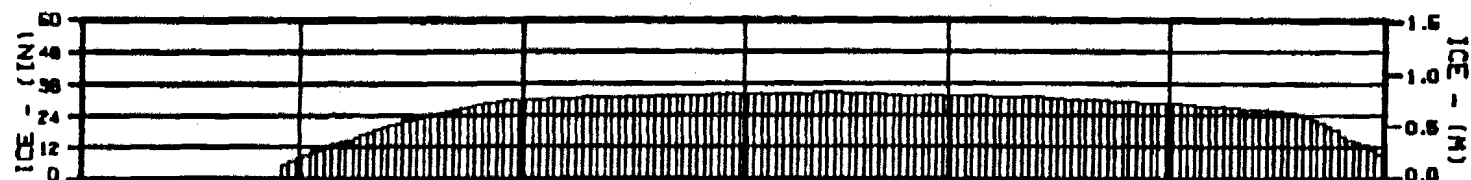
HARZA-EBRISCO JOINT VENTURE

ENRCHD. 11.10.1983

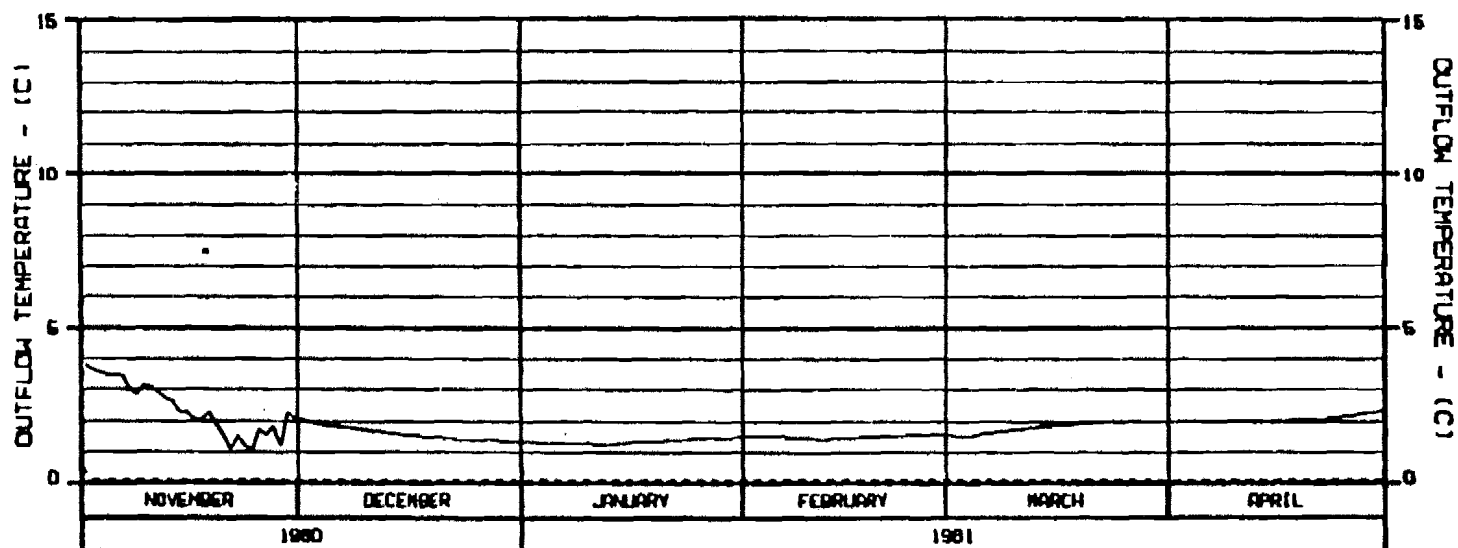
8 APR 84

42-010-04

EXHIBIT 2b



LEVEL 1					
LEVEL 2					
INTAKE					
CONE VALVE					
SPILLWAY					



LEGEND: CASE: 0081020 - DEVIL CANYON OPERATION W/HATANA IN 2002 IN
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (15.24 M) UPDATE
—— PREDICTED OUTFLOW TEMPERATURE
----- INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1425 FT (434.34 M)
2. INTAKE PORT LEVEL 2 AT ELEVATION 1275 FT (419.10 M)
3. CONE VALVE AT ELEVATION 990 FT (301.75 M)
4. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

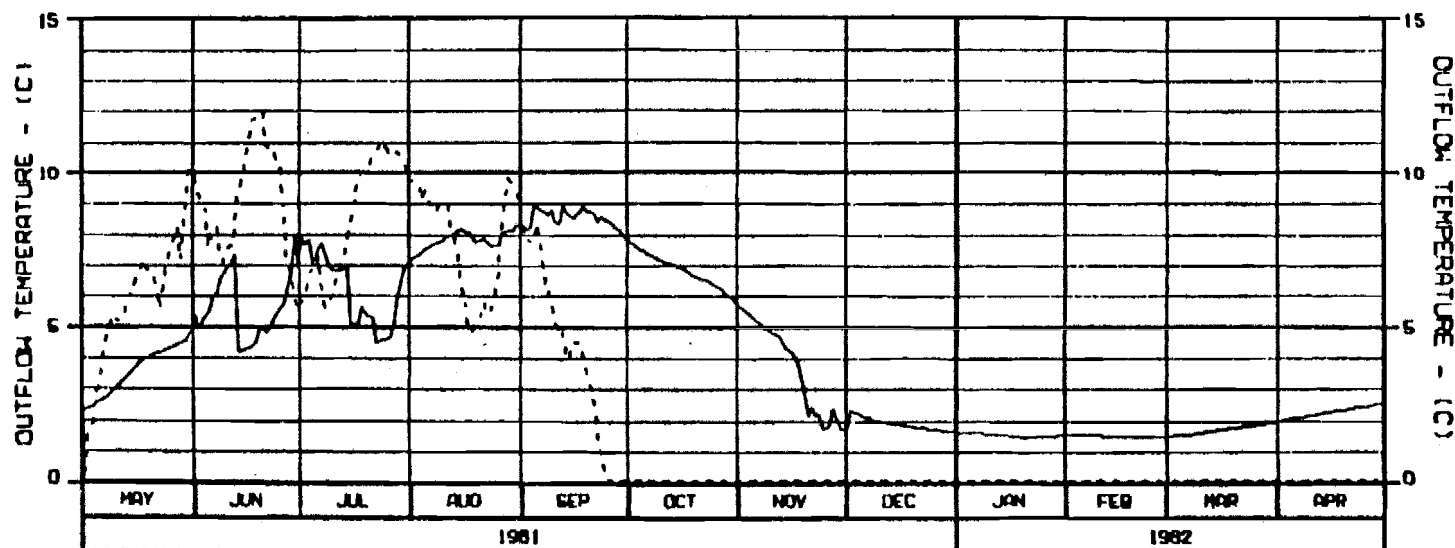
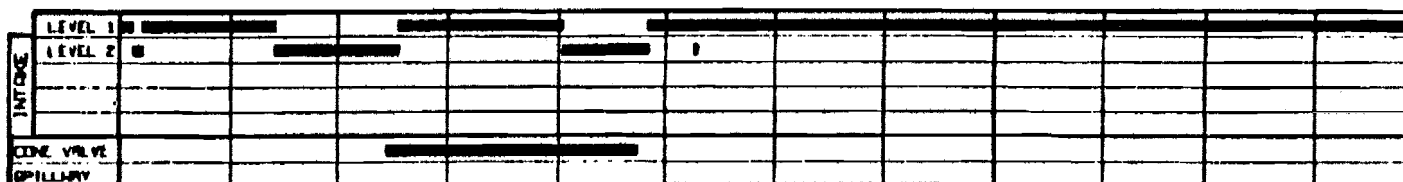
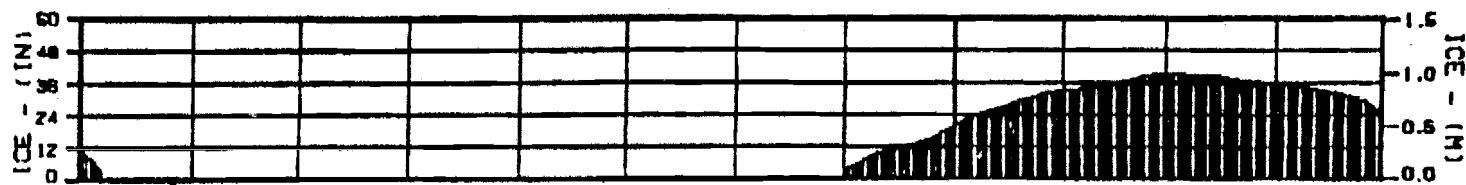
ALASKA POWER AUTHORITY

SUBMITTAL PROJECT DESIGN MODEL

DEVIL CANYON RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

WARZA-EBASCO JOINT VENTURE

DESIGN: ALLIANCE 8 1980 42-010-04



LEGEND: CASE: DC81020 - DEVIL CANYON OPERATION W/ATANA IN 2002
CASE E-VI 62. NATURAL CONDITIONS. DRAWDOWN = 60 FT. (DC) UPDATE
—— PREDICTED OUTFLOW TEMPERATURE
----- INFLOW TEMPERATURE

NOTE: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.94 M)
2. INTAKE PORT LEVEL 2 AT ELEVATION 1376 FT (419.10 M)
3. CONE VALVE AT ELEVATION 990 FT (301.75 M)
4. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

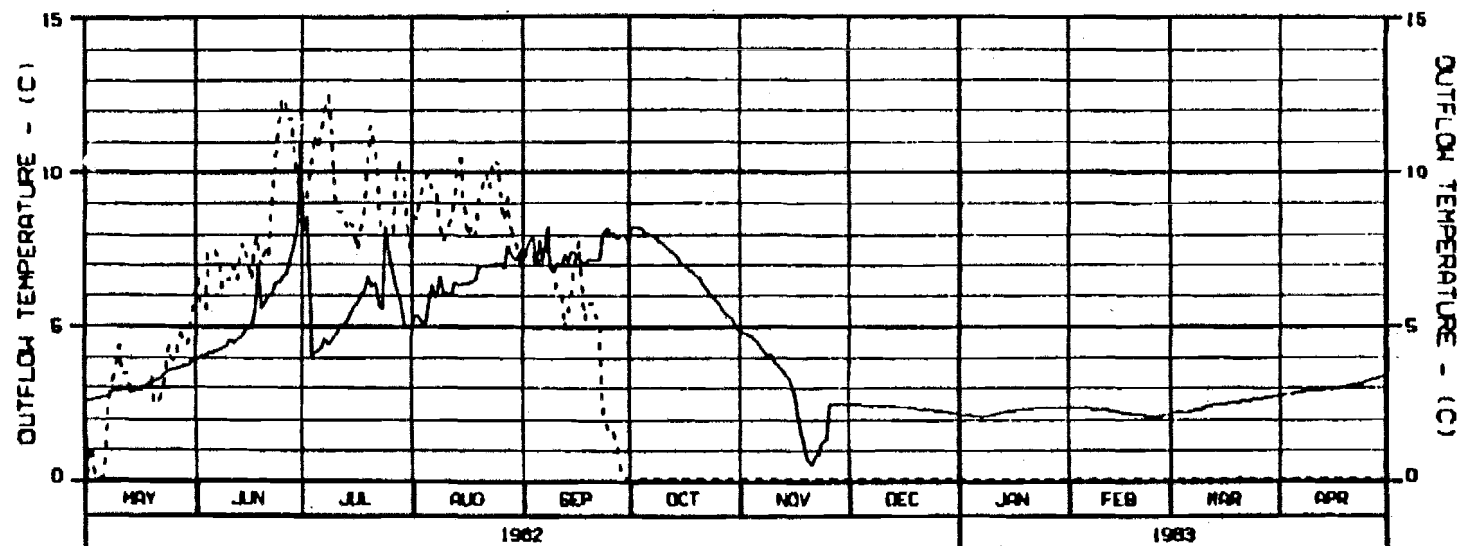
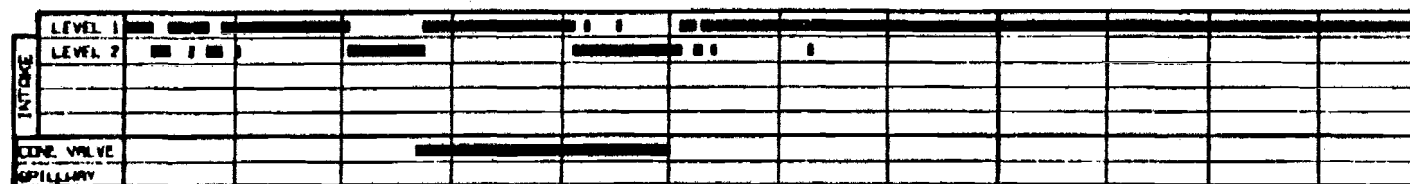
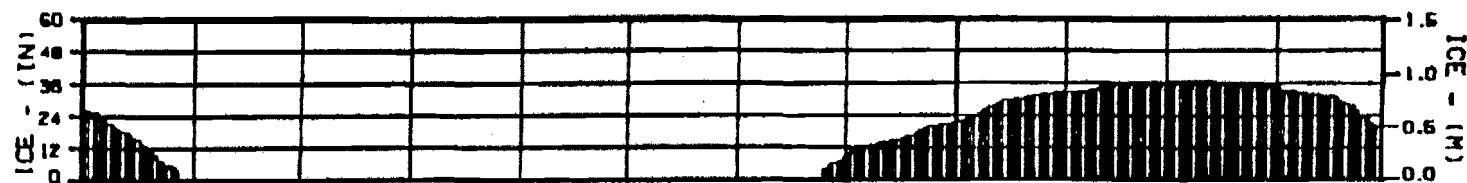
ALASKA POWER AUTHORITY

BUILDING PROJECT DYNOM MODEL

DEVIL CANYON RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

ENCLOSURE: 8/1/82 8/1/82 47-010-04



LEGEND: CASE: DC81020 - DEVIL CANYON OPERATION W/ATANA IN 2002
CASE E-VI 62, NATURAL CONDITIONS, DRAWDOWN = 60 FT. (DC) UPDATE
— PREDICTED OUTFLOW TEMPERATURE
- - - - - INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.94 M)
2. INTAKE PORT LEVEL 2 AT ELEVATION 1376 FT (419.10 M)
3. CONE VALVE AT ELEVATION 990 FT (301.75 M)
4. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

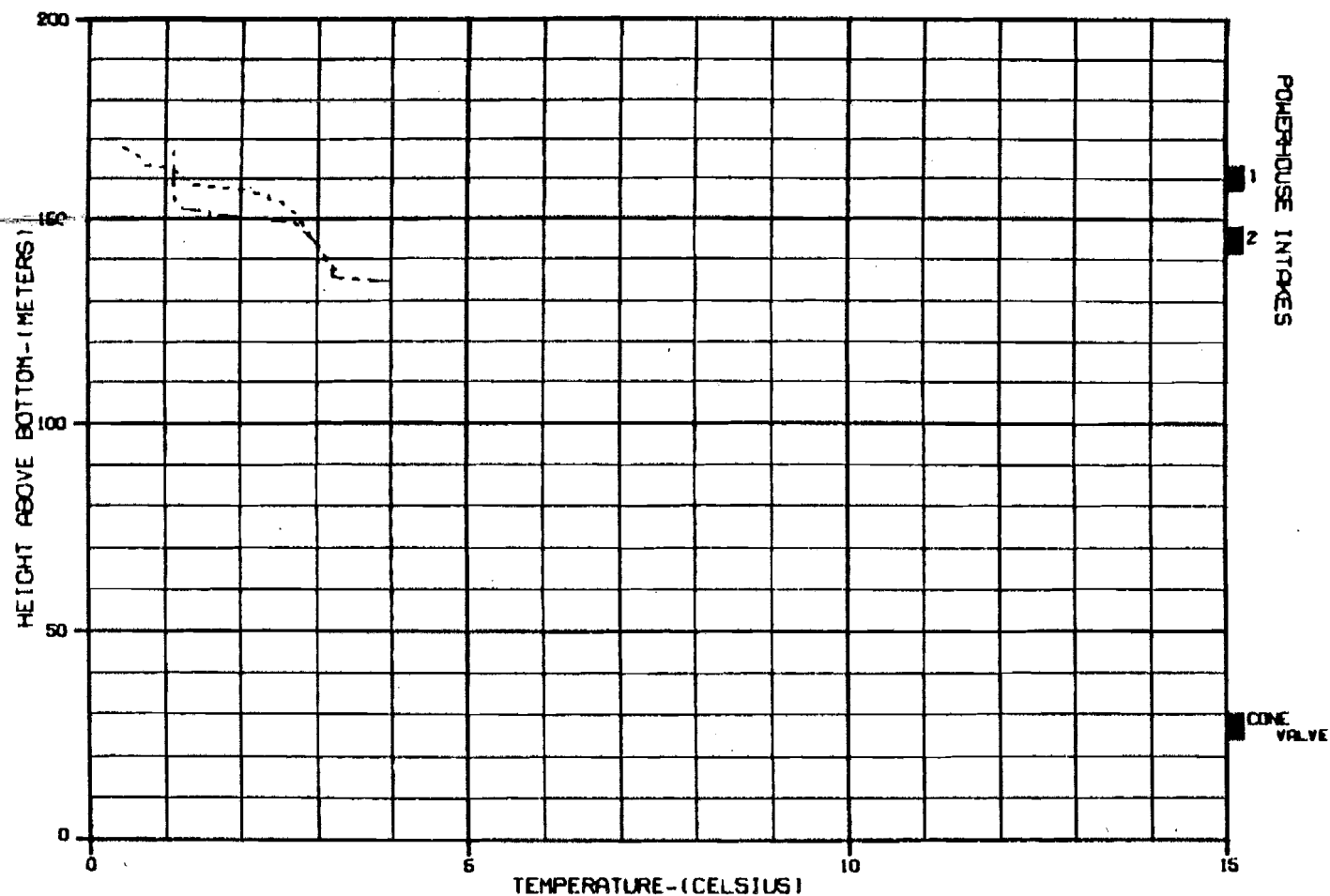
ALASKA POWER AUTHORITY

SUBMITTA PROJECT DYNCSH MODEL

DEVIL CANYON RESERVOIR
OUTFLOW TEMPERATURE
AND ICE GROWTH

HARZA-EBAGCO JOINT VENTURE

CHICAGO, ILLINOIS 6 APR 83 42-D10-04



CASE: ■■ DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-VI S2, NATURAL CONDITIONS, DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1980
- - - 1 DECEMBER 1980
- - - 1 JANUARY 1981

ALASKA POWER AUTHORITY

SUSTAINA PROJECT

DYNOSEM MODEL

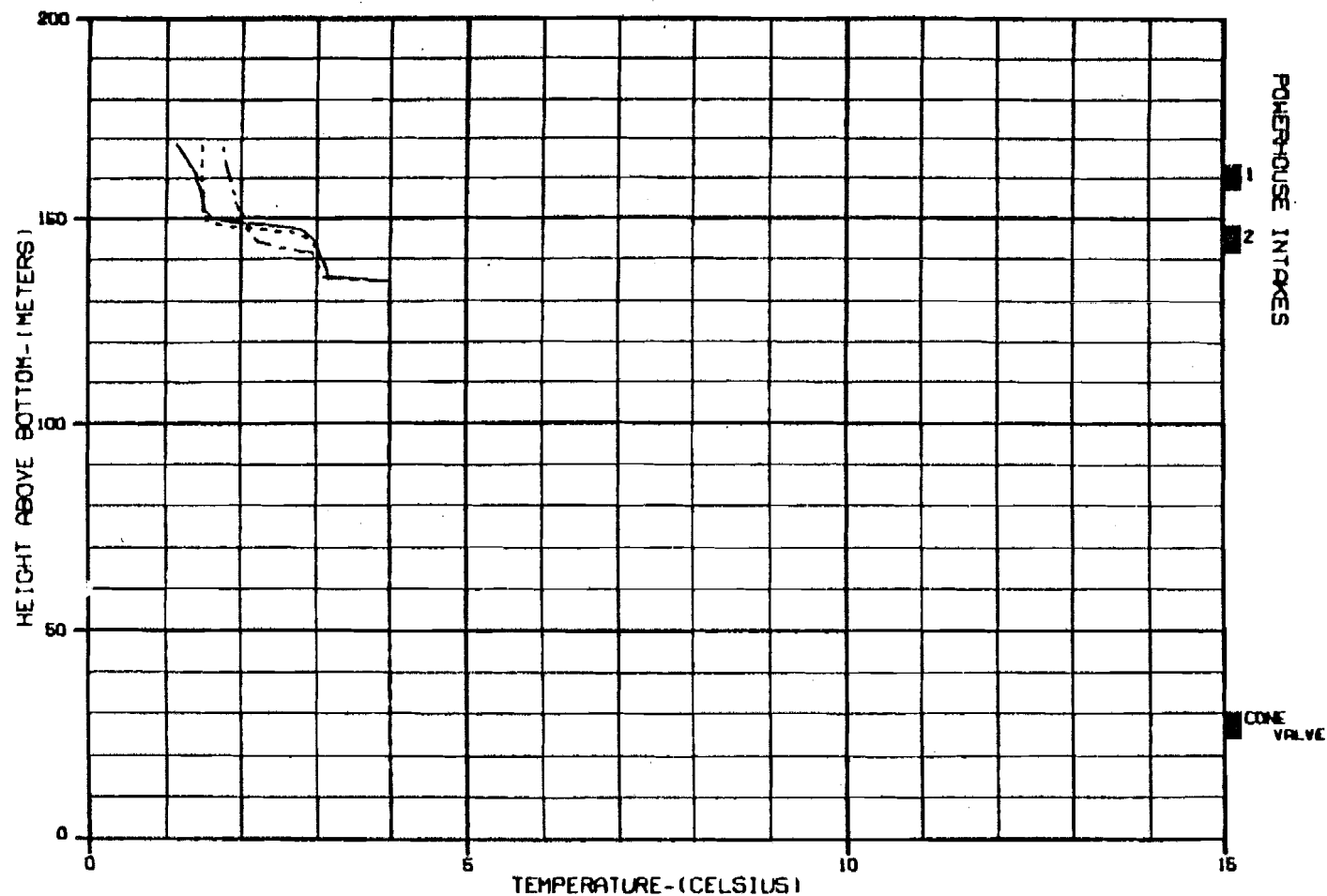
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 88

42-DIG-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-VI S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 FEBRUARY 1981
 1 MARCH 1981
 - - - - 1 APRIL 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DRAWDOWN MODEL

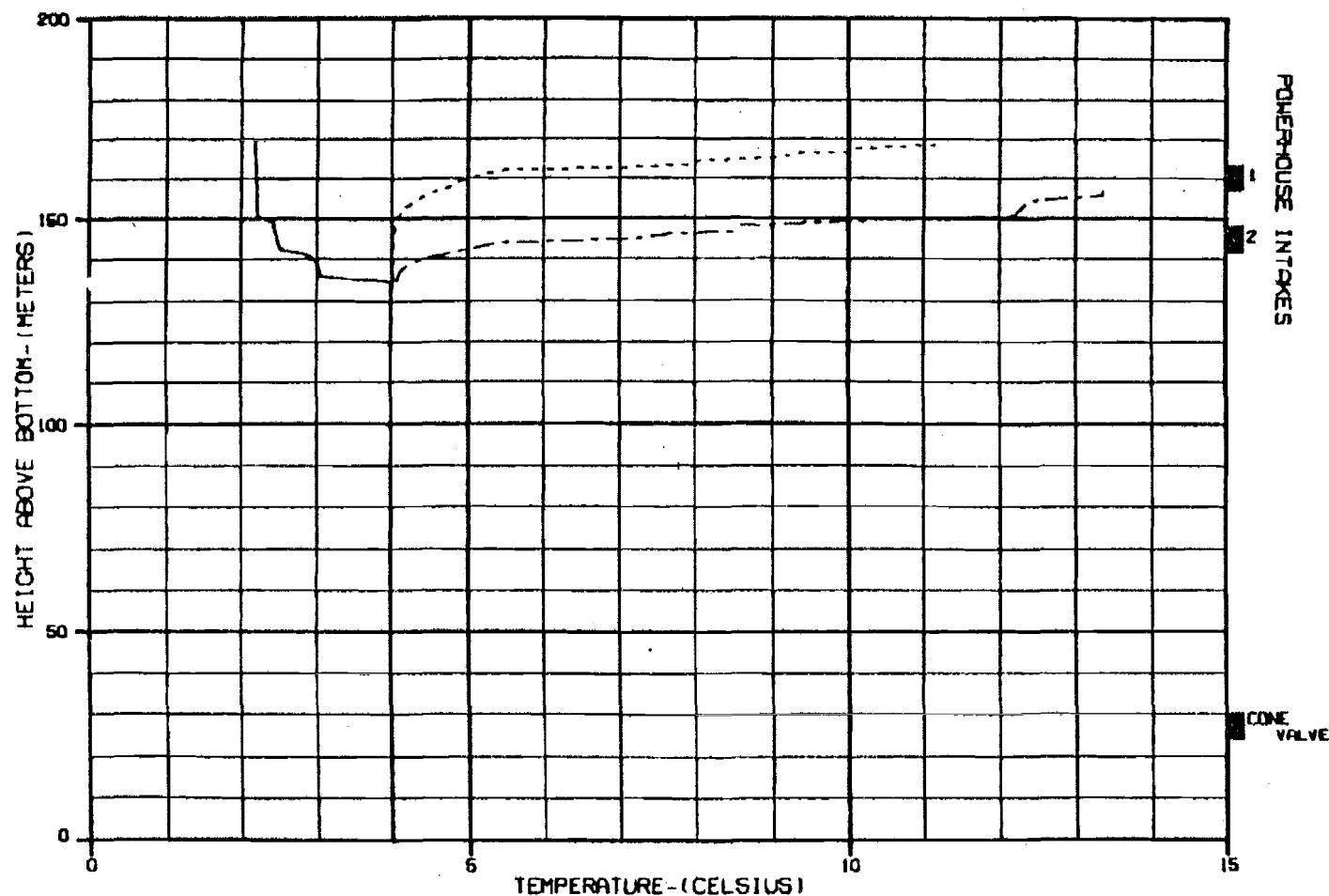
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60601

8 APR 81

42-010-04



CASE: DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 MAY 1981
--- 1 JUNE 1981
-.- 1 JULY 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OPERATION MODEL

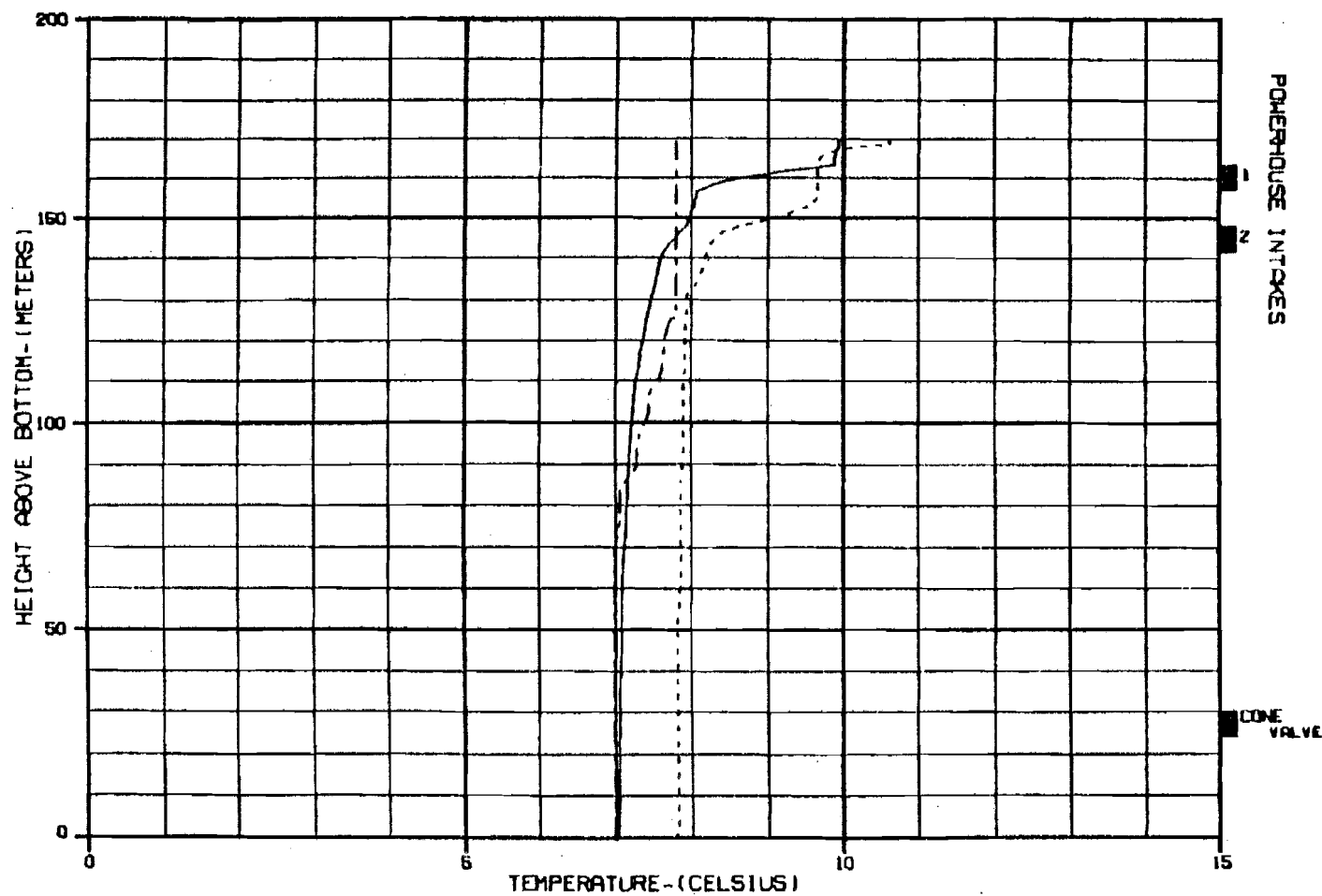
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHIEF: ALL-015

8 APR 81

42-010-04



CASE: DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 AUGUST 1981
- - - - 1 SEPTEMBER 1981
- . - . 1 OCTOBER 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OVERSEA MODEL

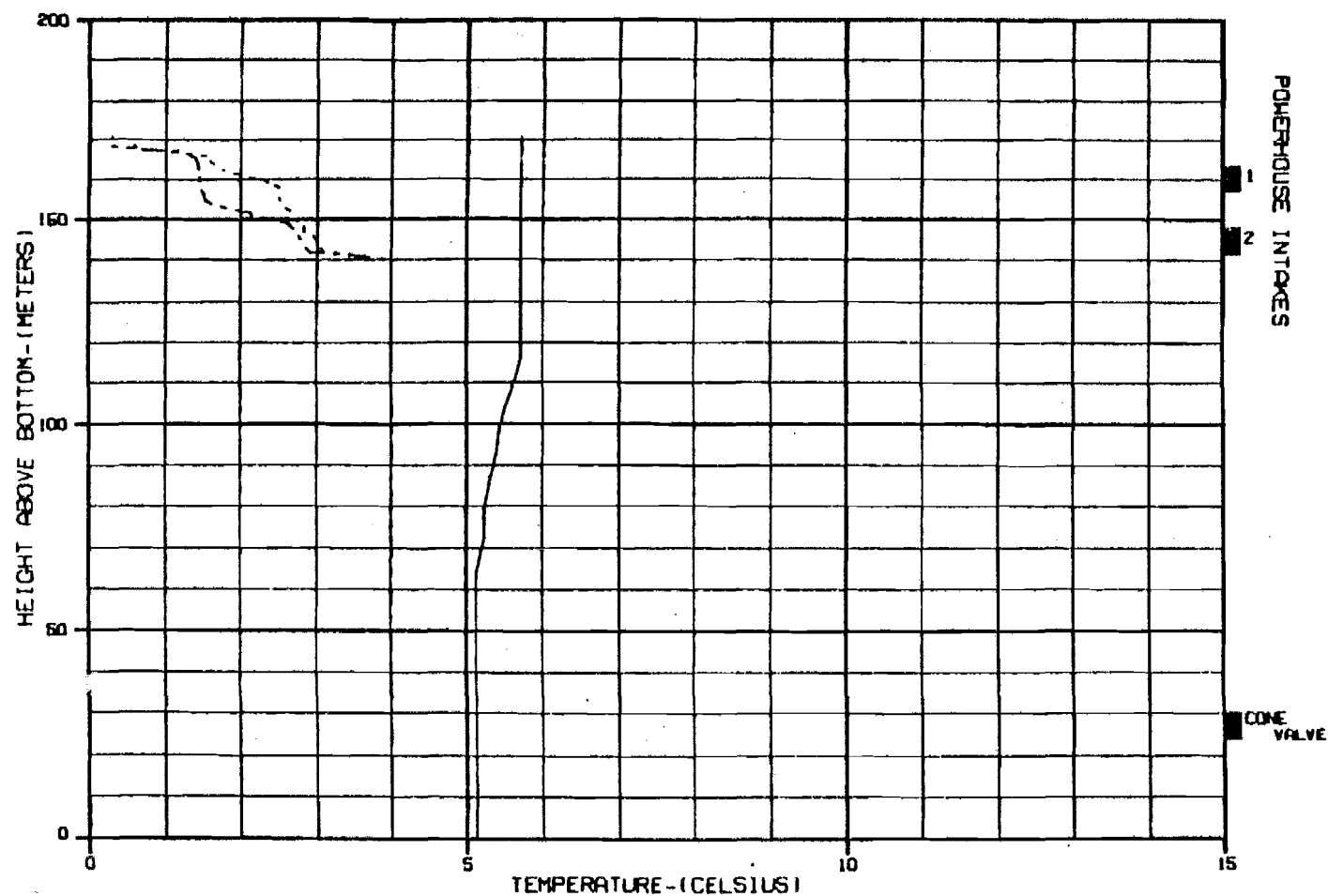
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHIEF: ELLIOTT

5 APR 88

42-010-04



CASE: ## DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ##
CASE E-VI SZ. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1981
- - - 1 DECEMBER 1981
- . - . 1 JANUARY 1982

ALASKA POWER AUTHORITY

BRITISH PROJECT

GYPSUM MODEL

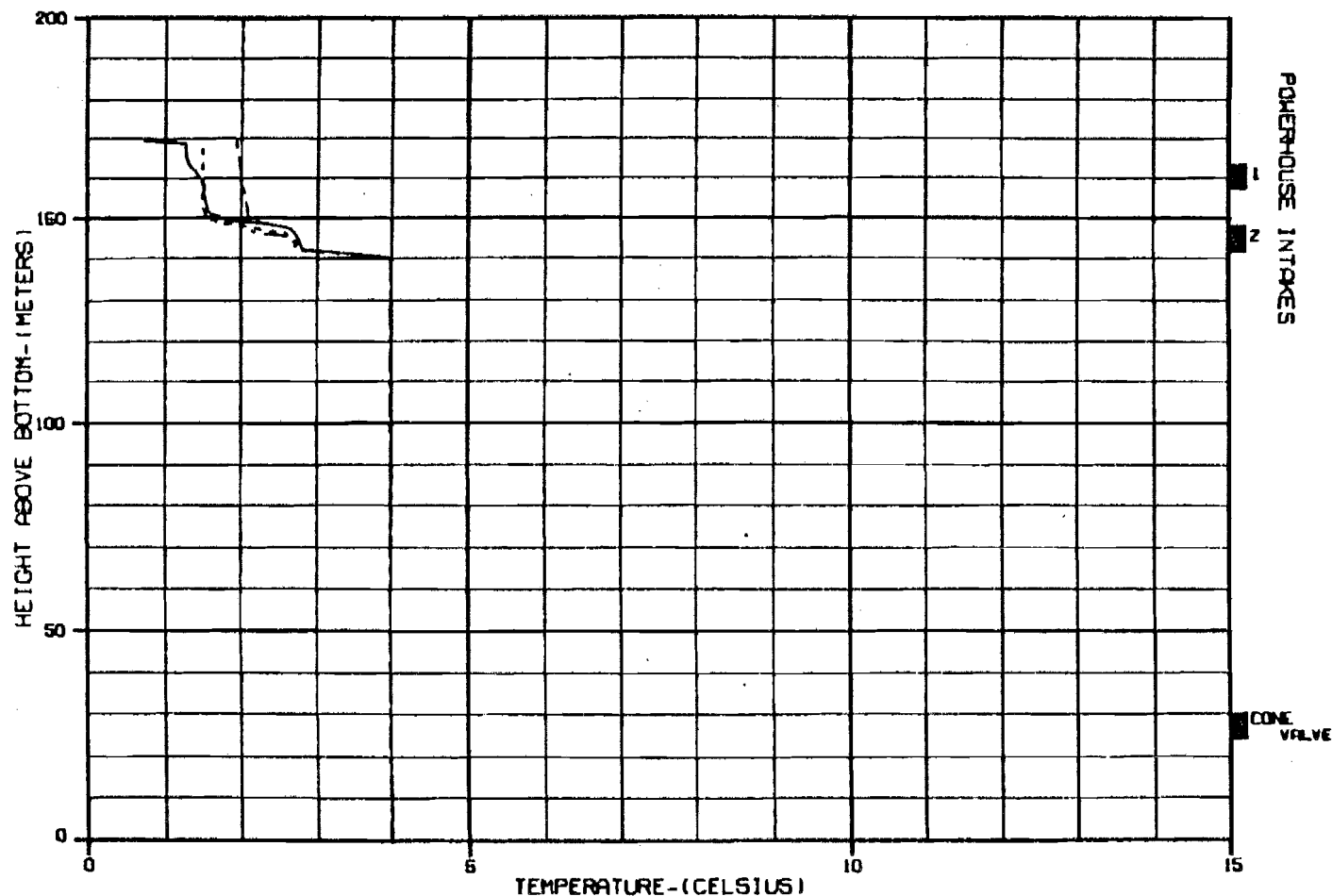
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

11 APR 82

42-010-04



CASE: DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-VI S2, NATURAL CONDITIONS, DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 FEBRUARY 1982
--- 1 MARCH 1982
-.- 1 APRIL 1982

ALASKA POWER AUTHORITY

SUSTAINA PROJECT

DYNOSH MODEL

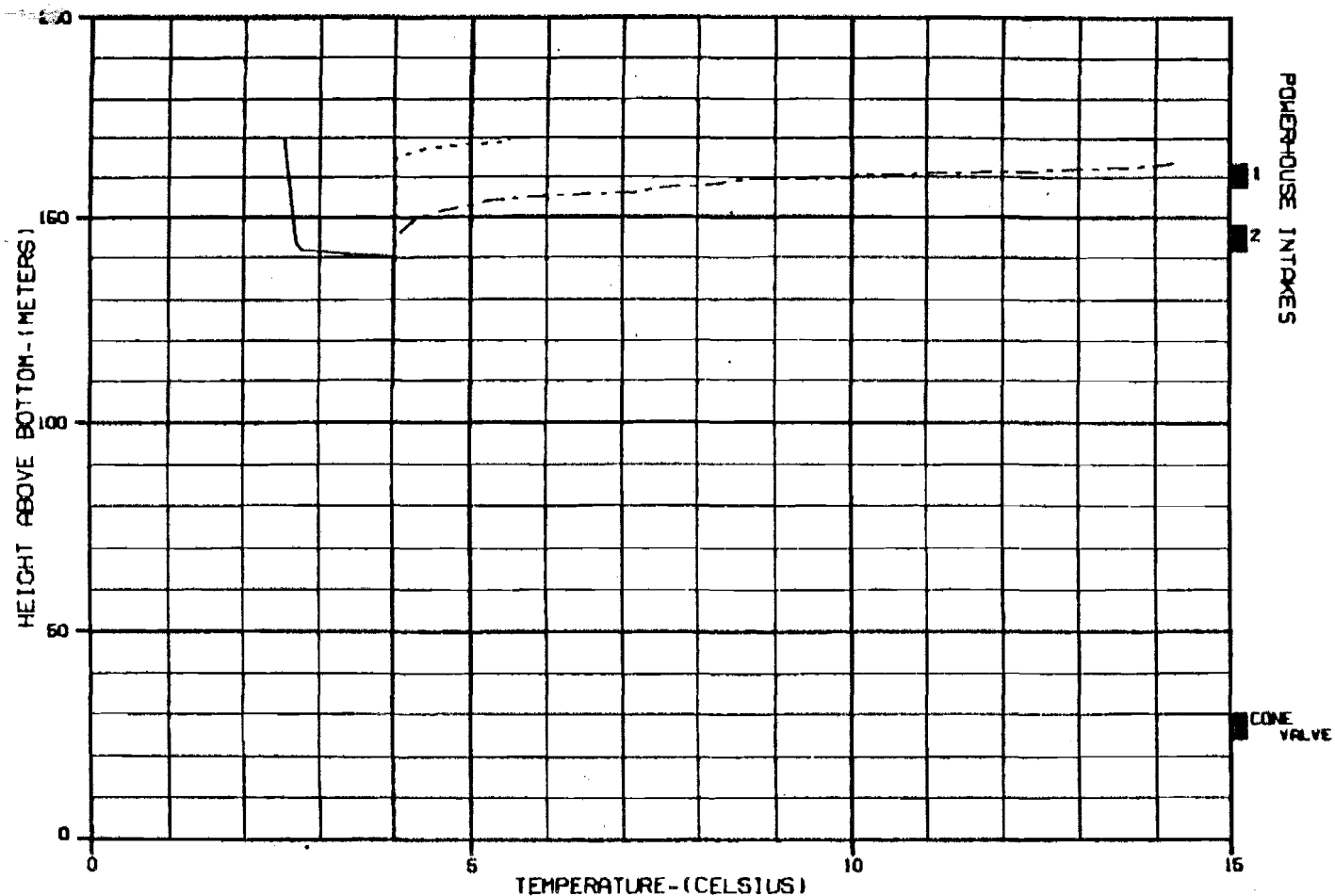
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGN: B.L. HARRIS

8 APR 82

42-010-04



CASE: DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 MAY 1982
... 1 JUNE 1982
- - - 1 JULY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DYKES MODEL

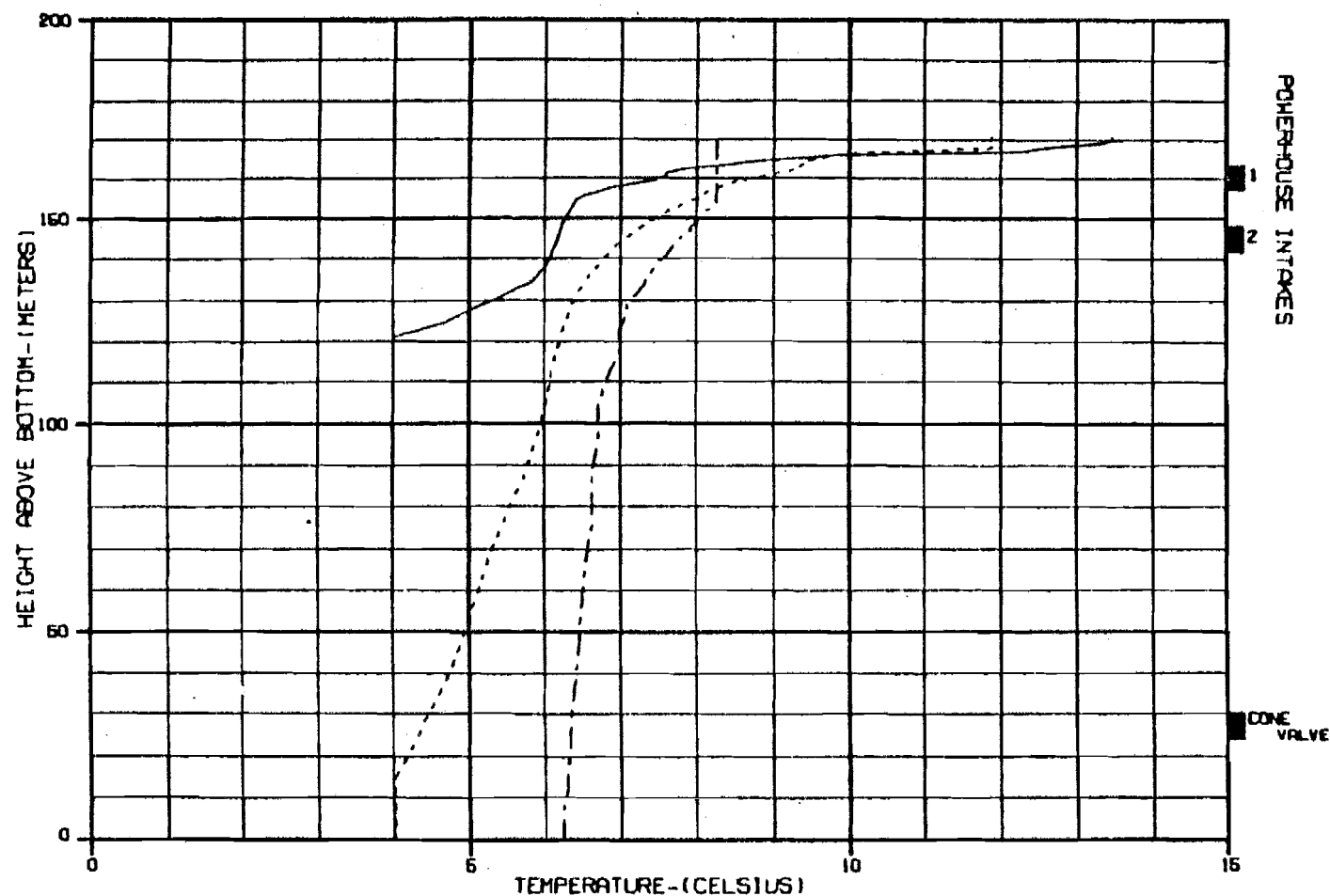
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 88

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

———— 1 AUGUST 1982
- - - - - 1 SEPTEMBER 1982
- - - - - 1 OCTOBER 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OUTRASH MODEL

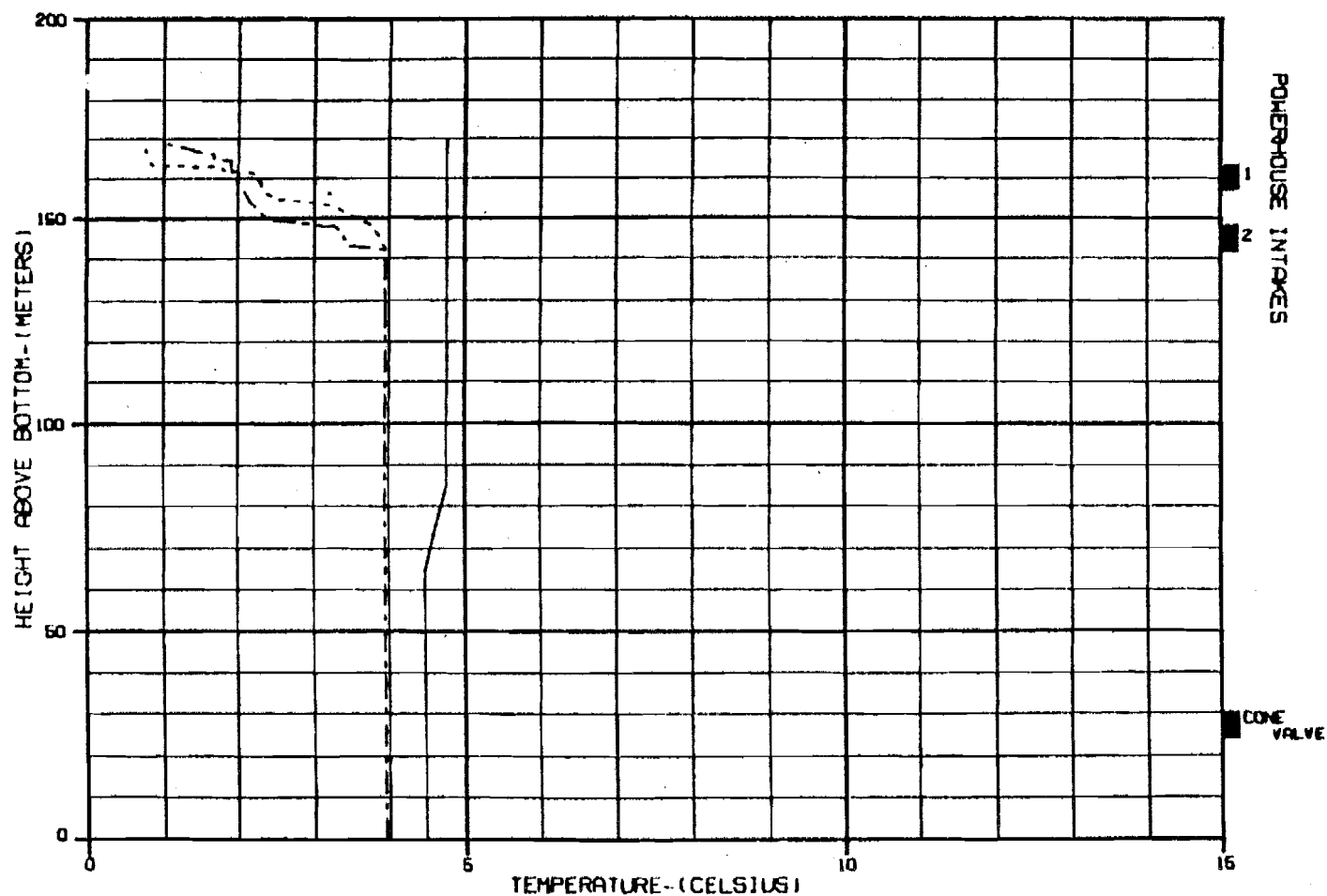
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 83

42-D10-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 NOVEMBER 1982
- - - 1 DECEMBER 1982
- · - 1 JANUARY 1983

ALASKA POWER AUTHORITY

SUBMITTAL PROJECT

DYKES MODEL

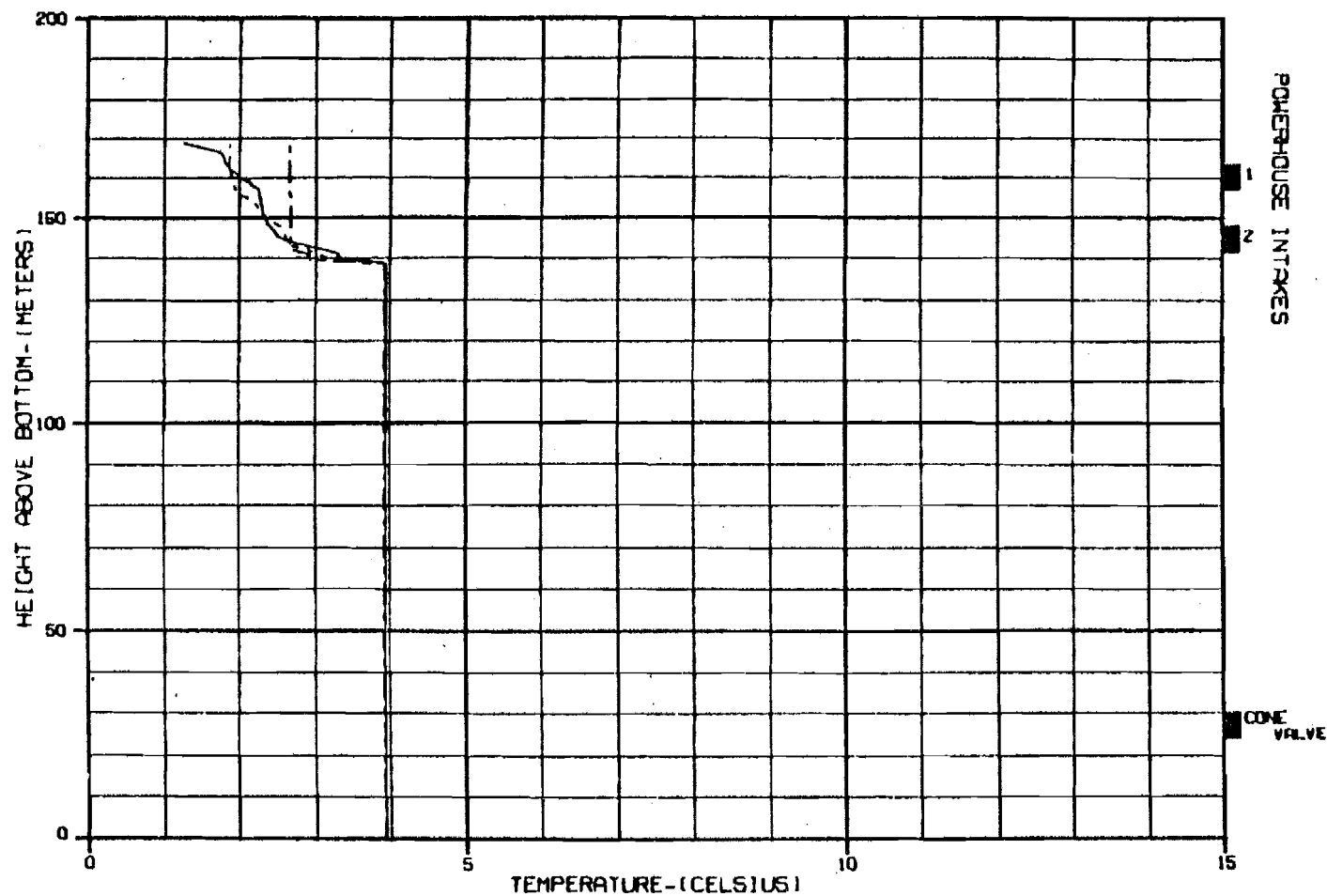
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HAZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

8 APR 83

42-010-04



CASE: ■■ DC81020 - DEVIL CANYON OPERATION W/WATANA IN 2002 ■■
CASE E-VI S2, NATURAL CONDITIONS, DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 FEBRUARY 1983
- - - - 1 MARCH 1983
- . - . 1 APRIL 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DEVIL CANYON

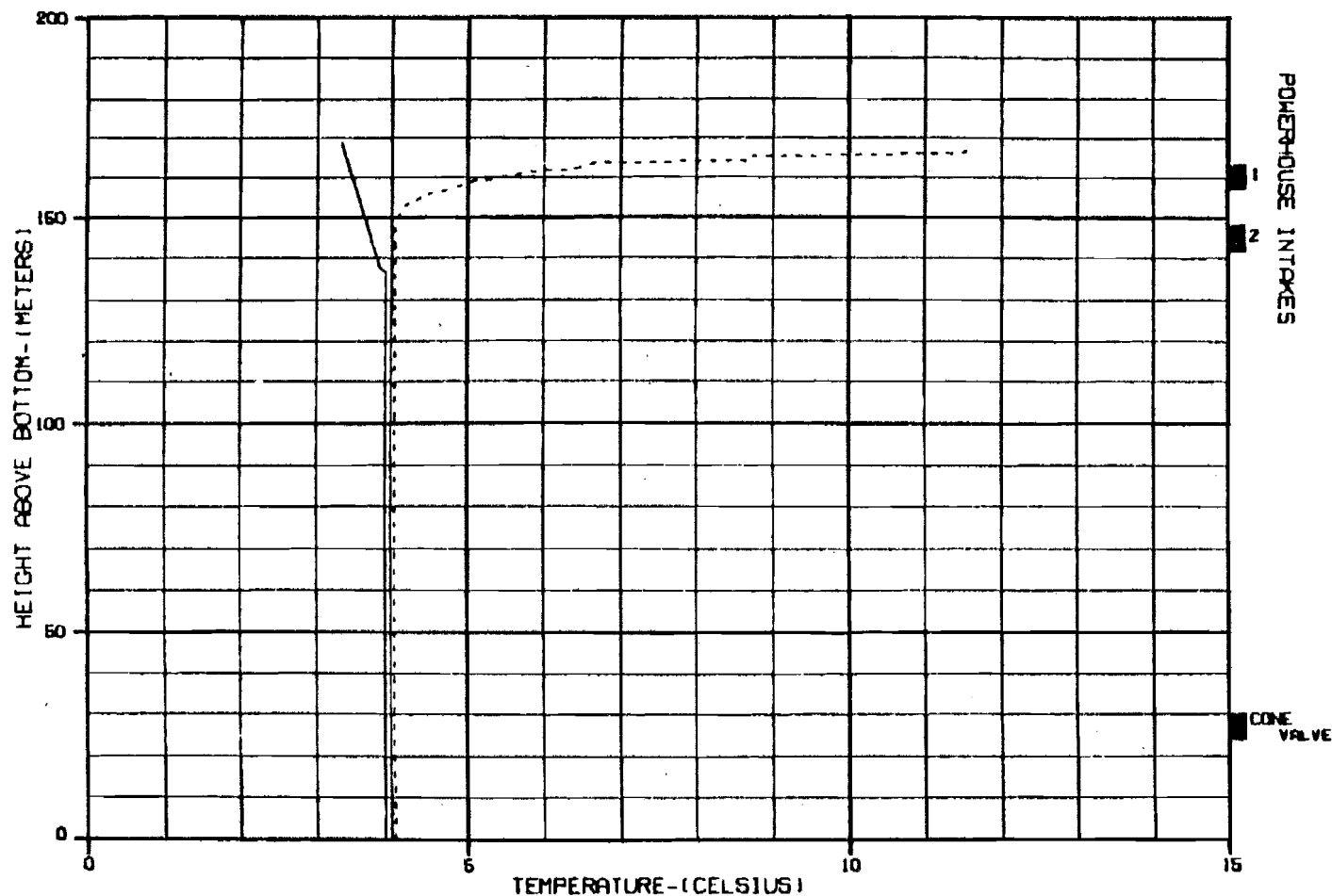
DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DC-1020, ALL-1-1-15

3 APR 83

42-010-04



CASE: ■■ DCB1020 - DEVIL CANYON OPERATION W/HATANA IN 2002 ■■
CASE E-V1 S2. NATURAL CONDITIONS. DRAWDOWN = 50 FT. (DC)

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 MAY 1983
- - - - 1 JUNE 1983

ALASKA POWER AUTHORITY

SUBITNA PROJECT

DYRESA MODEL

DEVIL CANYON RESERVOIR
TEMPERATURE PROFILES

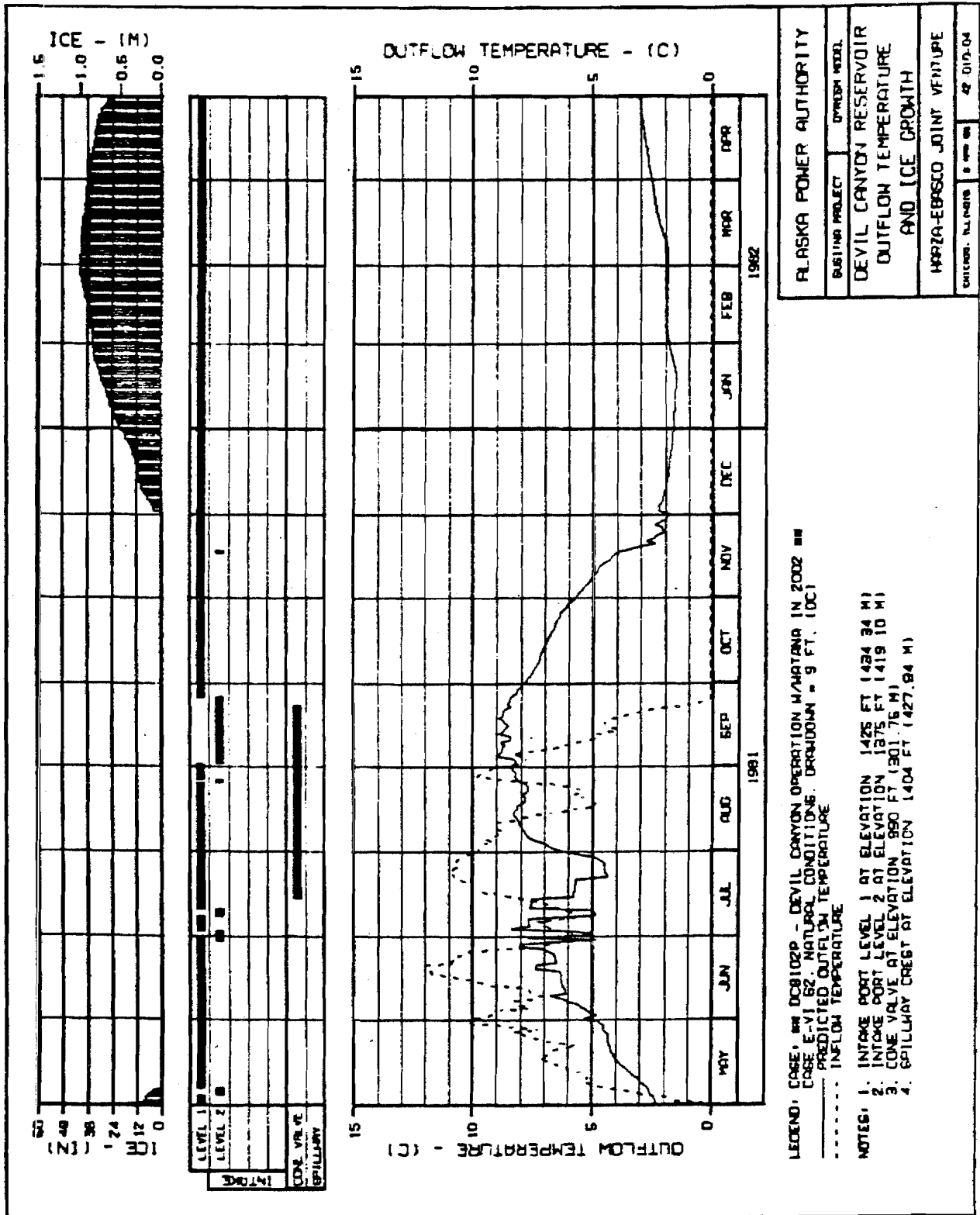
HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS

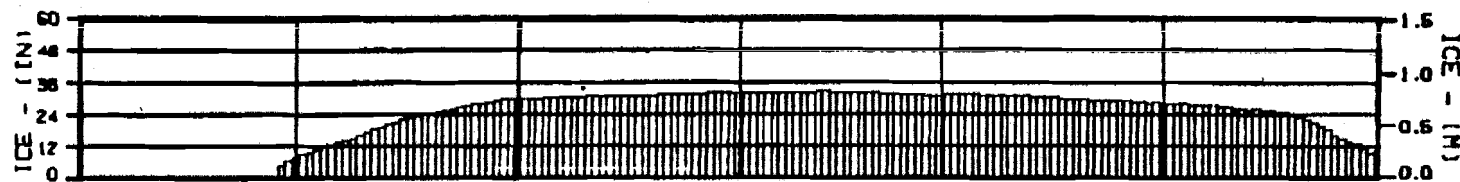
1 APR 83

42-010-04

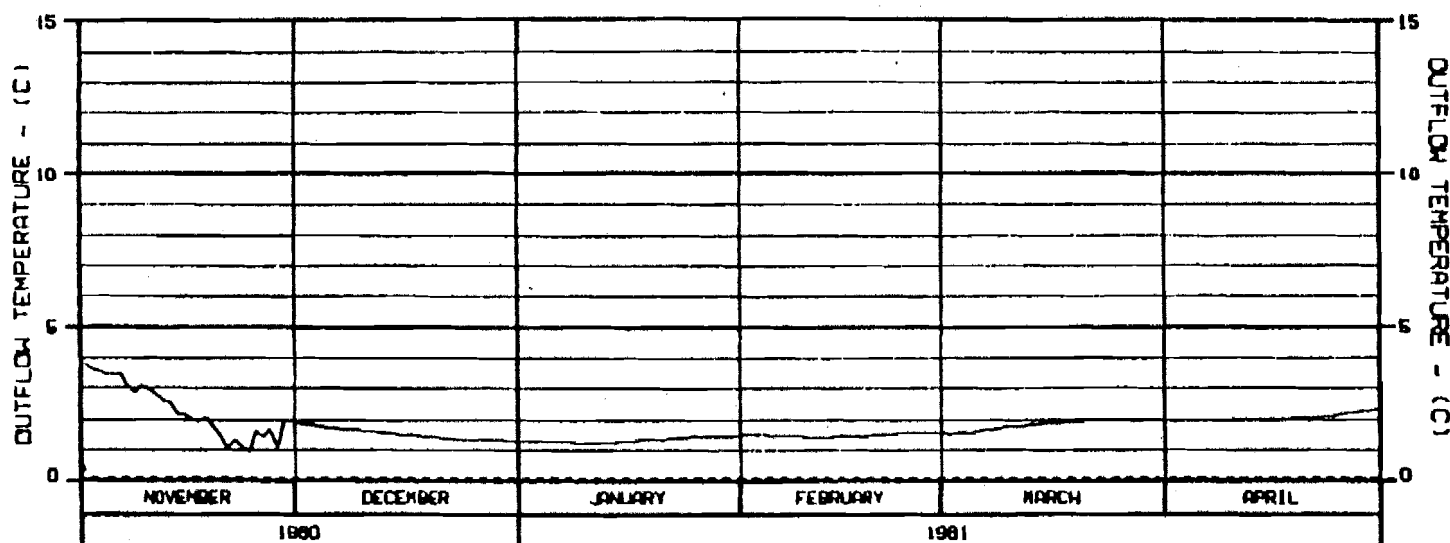
EXHIBIT 2c



ALASKA POWER AUTHORITY	
EXISTING PROJECT	DEVIL CANYON RESERVOIR
OUTFLOW TEMPERATURE AND ICE GROWTH	
HARZA-EBSCO JOINT VENTURE	
DATE: 01/12/04	BY: 01/12/04



LEVEL 1					
LEVEL 2					
INTAKE					
CON. VALVE					
SPILLWAY					



LEGEND: CASE: DC8102P - DEVIL CANYON OPERATION W/HATANA IN 2002
 CASE E-VI 62. NATURAL CONDITIONS. DRAWDOWN = 9 FT. (DC)
 ——— PREDICTED OUTFLOW TEMPERATURE
 - - - - - INFLOW TEMPERATURE

NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.24 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 1276 FT (419.10 M)
 3. CONE VALVE AT ELEVATION 990 FT (301.76 M)
 4. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

ALASKA POWER AUTHORITY

SUBMITTA PROJECT DYNOMIX MODEL

DEVIL CANYON RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

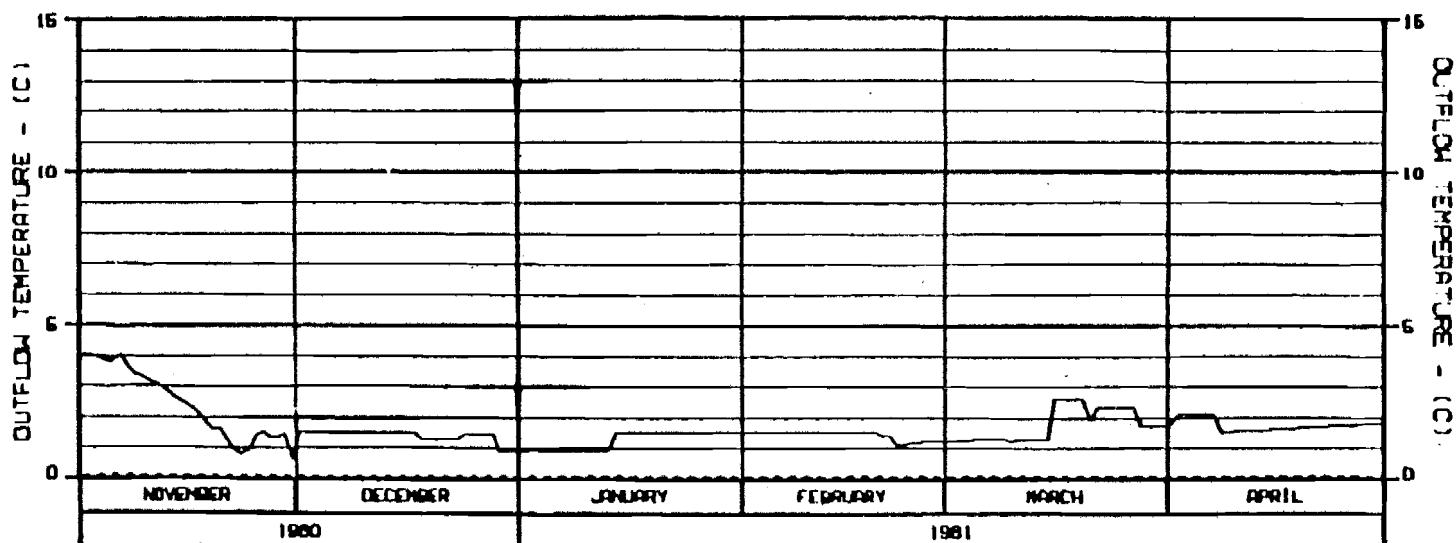
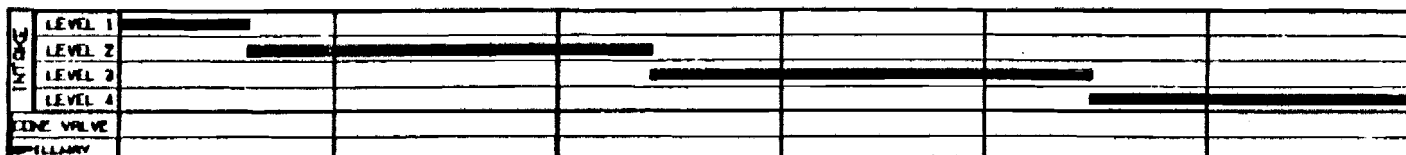
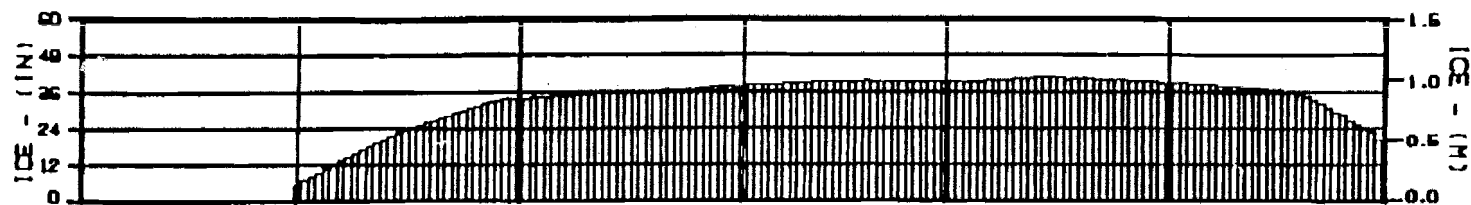
HARZA-EBASCO JOINT VENTURE

DESIGNED BY: H. J. H. 8 APR 81 42-010-04

EXHIBIT 3

EXHIBIT 3

**RESERVOIR TEMPERATURE SIMULATIONS, LICENSE APPLICATION
PROJECT (WATANA EL. 2185, DEVIL CANYON EL. 1455), PROJECTED
ENERGY DEMANDS FOR 2020, CASE C FLOW REQUIREMENTS,
HYDROLOGICAL AND CLIMATOLOGICAL DATA FOR 1981-82.**



LEGEND: CASE: NAB1182'200 - WATANA OPERATION WITH DEVIL CANYON IN 2020

— PREDICTED OUTFLOW TEMPERATURE
 - - - - - INFLOW TEMPERATURE

- NOTES:
1. INTAKE PORT LEVEL 1 AT ELEVATION 2161 FT (656.6 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 2114 FT (644.3 M)
 3. INTAKE PORT LEVEL 3 AT ELEVATION 2077 FT (633.1 M)
 4. INTAKE PORT LEVEL 4 AT ELEVATION 2040 FT (621.9 M)
 5. CONE VALVE AT ELEVATION 2040 FT (621.9 M)
 6. SPILLWAY CREST AT ELEVATION 2149 FT (654.7 M)

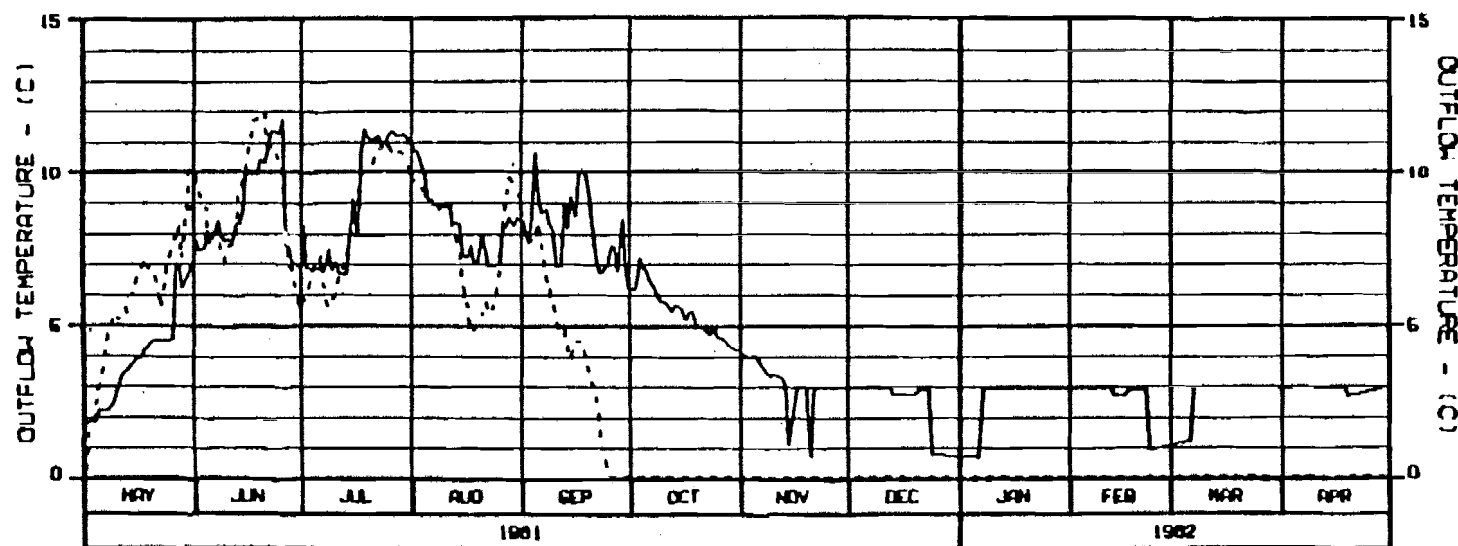
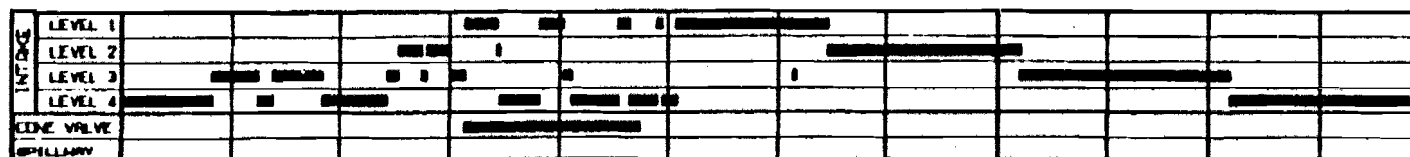
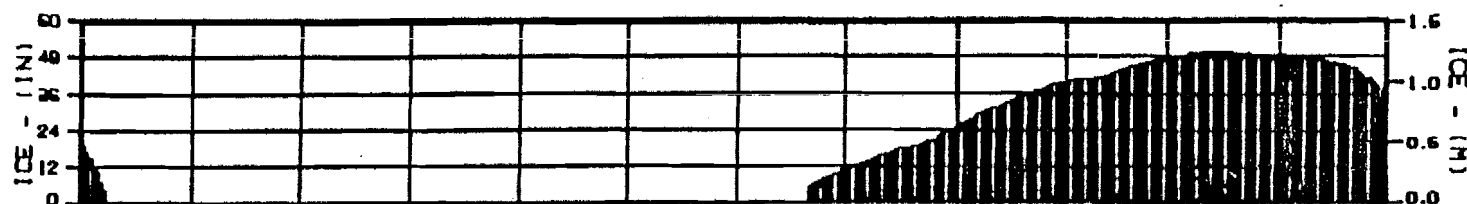
ALASKA POWER AUTHORITY

BUILDING PROJECT DYNOM MODEL

WATANA RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

DESIGNED BY: H. J. H. 8 JAN 81 40-245-24



LEGEND: CASE: ■ WAB11821208 - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■

— PREDICTED OUTFLOW TEMPERATURE
 - - - INFLOW TEMPERATURE

- NOTES:
1. INTAKE PORT LEVEL 1 AT ELEVATION 2161 FT (656.5 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 2114 FT (644.3 M)
 3. INTAKE PORT LEVEL 3 AT ELEVATION 2077 FT (633.1 M)
 4. INTAKE PORT LEVEL 4 AT ELEVATION 2040 FT (621.9 M)
 5. CONE VALVE AT ELEVATION 2040 FT (621.9 M)
 6. SPILLWAY CREST AT ELEVATION 2148 FT (654.7 M)

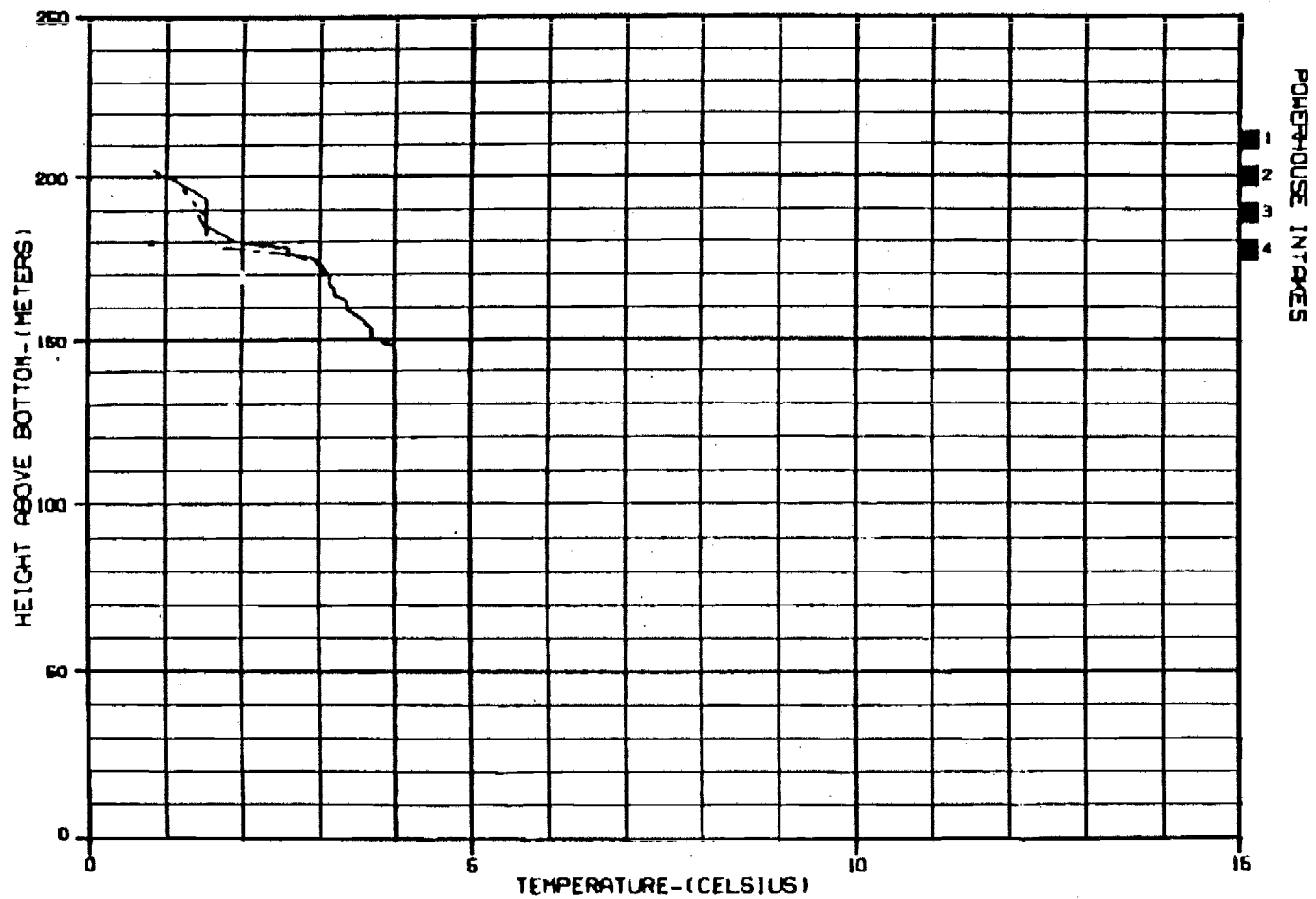
ALASKA POWER AUTHORITY

WATANA PROJECT DYNEMO MODEL

WATANA RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBASCO JOINT VENTURE

CHECKED: J.A. WHITE 9 JAN 84 48-040-04



CASE: ■■ W911B2120B - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■■

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— 1 FEBRUARY 1981
 2 MARCH 1981
 -.-.-.- 3 APRIL 1981

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

SYSTEM MODEL

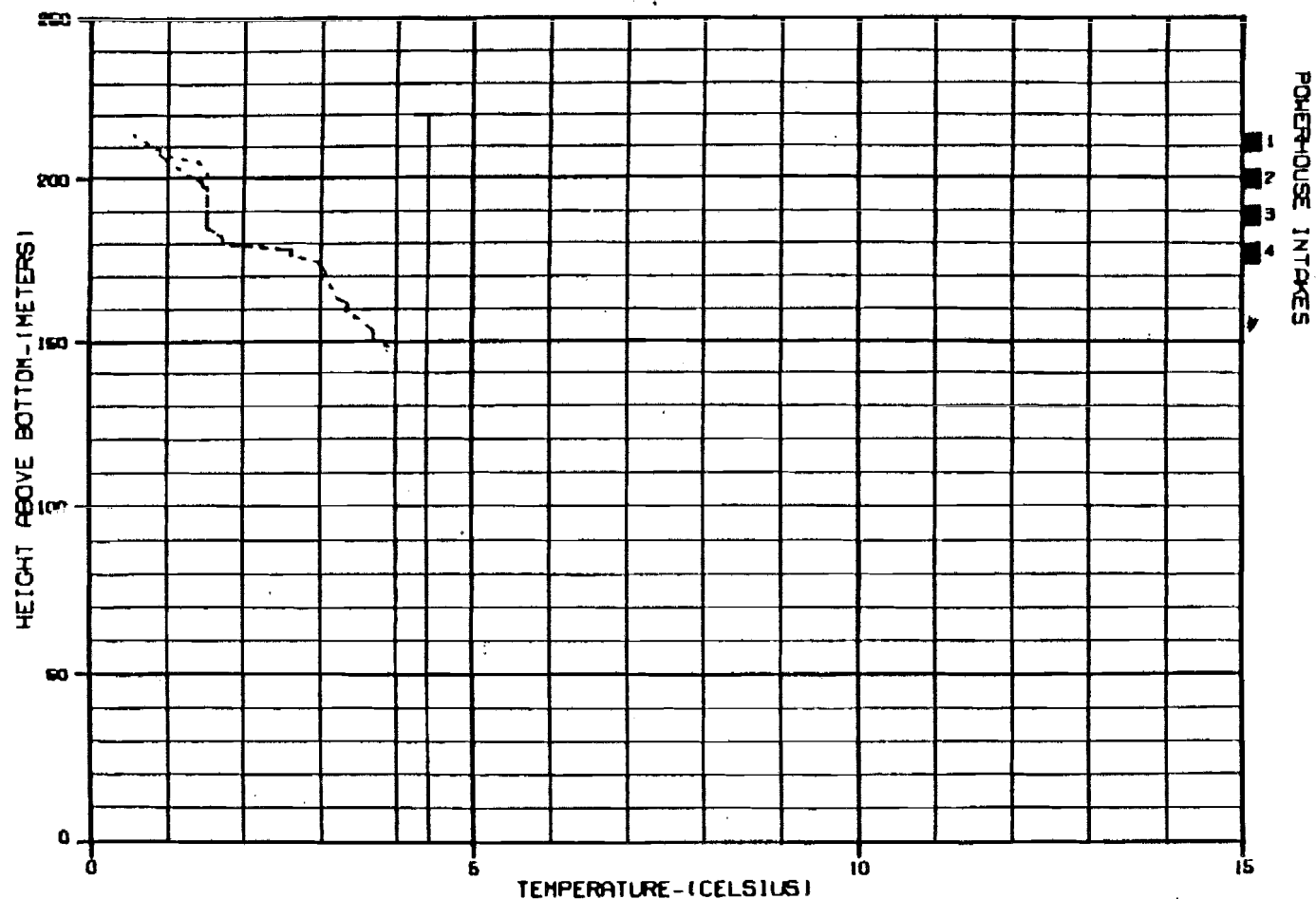
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGNED BY: E. J. JONES

8 JAN 81

42-010-04



CASE: WW WAB1(B2120B - WATANA OPERATION WITH DEVIL CANYON IN 2020 WW

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— NOVEMBER 1980
 - - - DECEMBER 1980
 - . - . - JANUARY 1981

ALASKA POWER AUTHORITY

BUILDING PROJECT

OPERATION MODEL

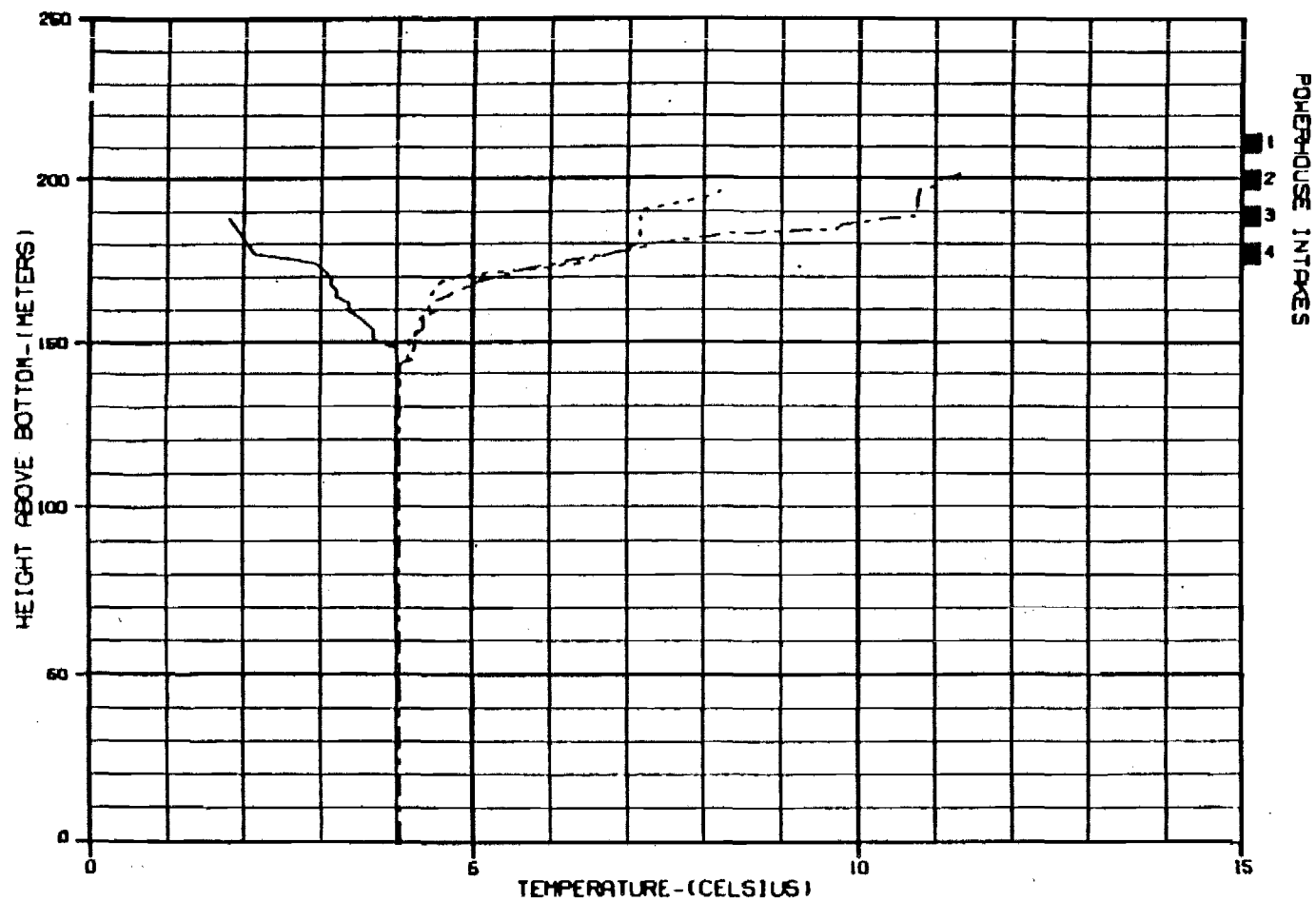
WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

DESIGNED BY: J. L. BROWN

DATE: 8 JAN 81

42-010-04



CASE: ■■ WAB11B2120B - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■■

LEGEND:

PREDICTED TEMPERATURE PROFILES.

—— 1 MAY 1981
 - - - - 1 JUNE 1981
 1 JULY 1981

ALASKA POWER AUTHORITY

WATANA PROJECT

DYKEM MODEL

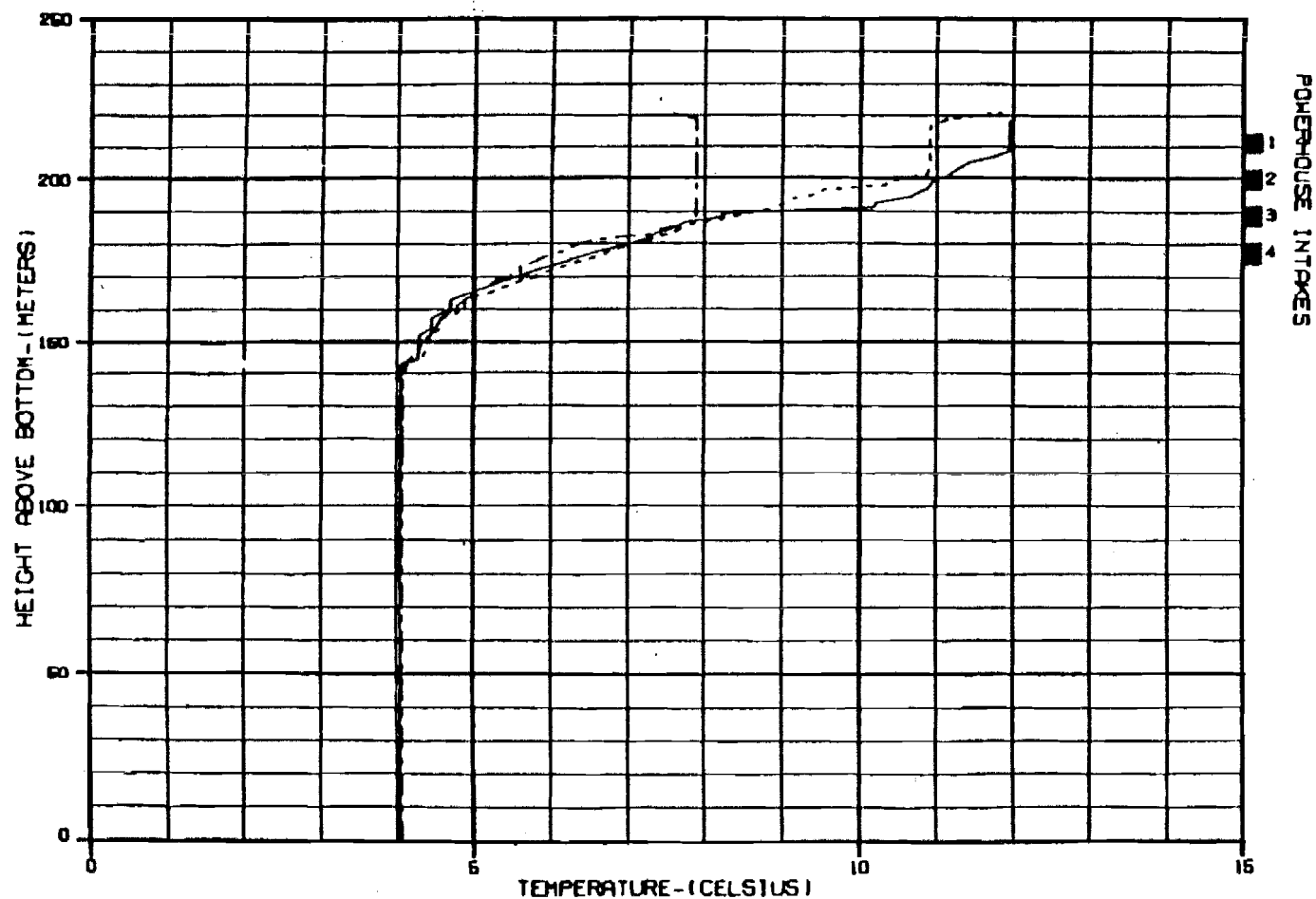
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGN - ALLIANCE

9 JAN 81

42-010-04



CASE: WAB11B21208 - WATANA OPERATION WITH DEVIL CANYON IN 2020

LEGEND:

PREDICTED TEMPERATURE PROFILES

— 1 AUGUST 1981
 1 SEPTEMBER 1981
 - . - . 1 OCTOBER 1981

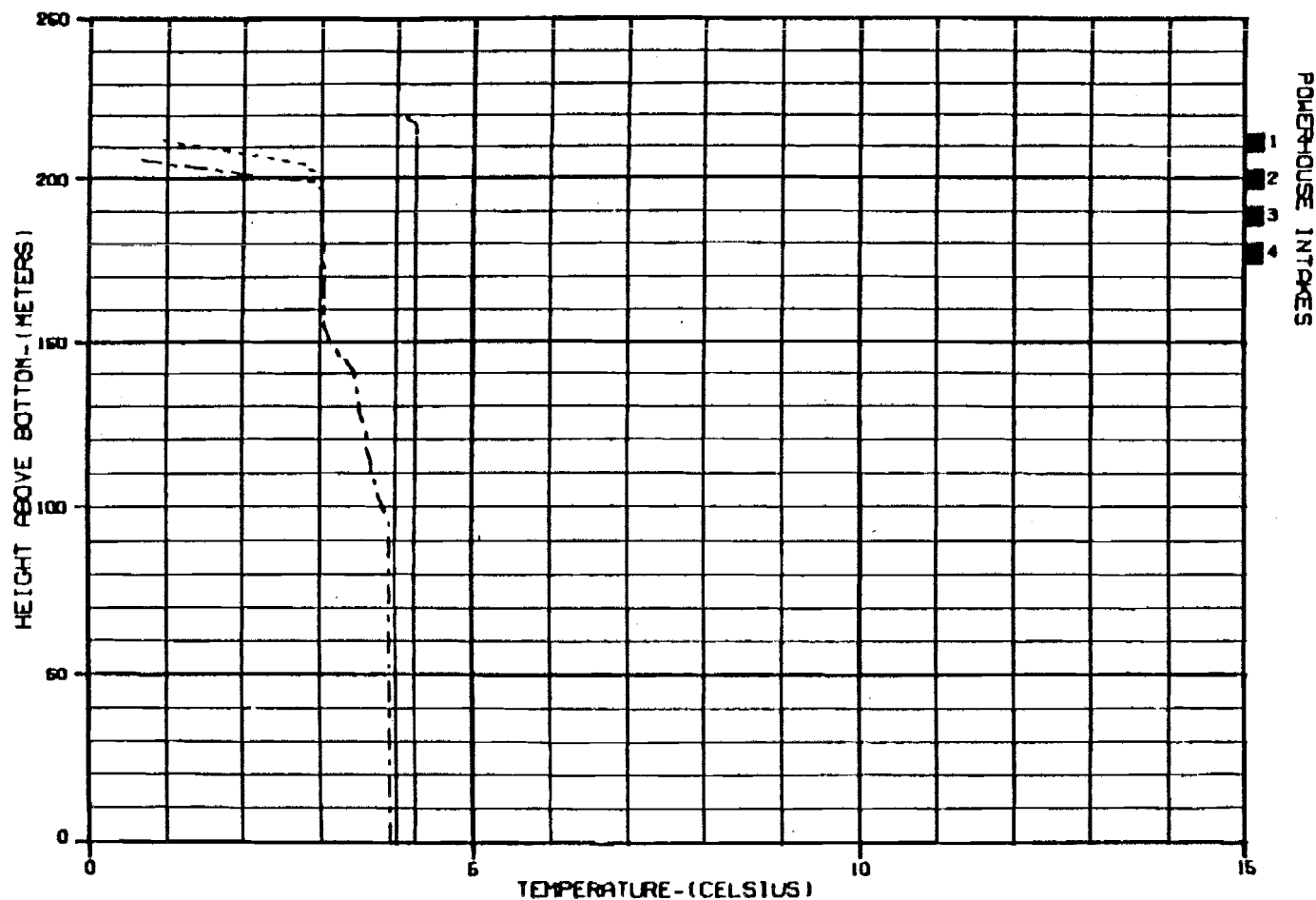
ALASKA POWER AUTHORITY

WATANA PROJECT DIVISION MODEL

WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

CHIEF: B. J. BROWN 8 JAN 84 42-010-04



CASE: WAB1182120B - WATANA OPERATION WITH DEVIL CANYON IN 2020

LEGEND:

PREDICTED TEMPERATURE PROFILES

— NOVEMBER 1981
 - - - DECEMBER 1981
 . . . JANUARY 1982

ALASKA POWER AUTHORITY

WATANA PROJECT

CYRENA MODEL

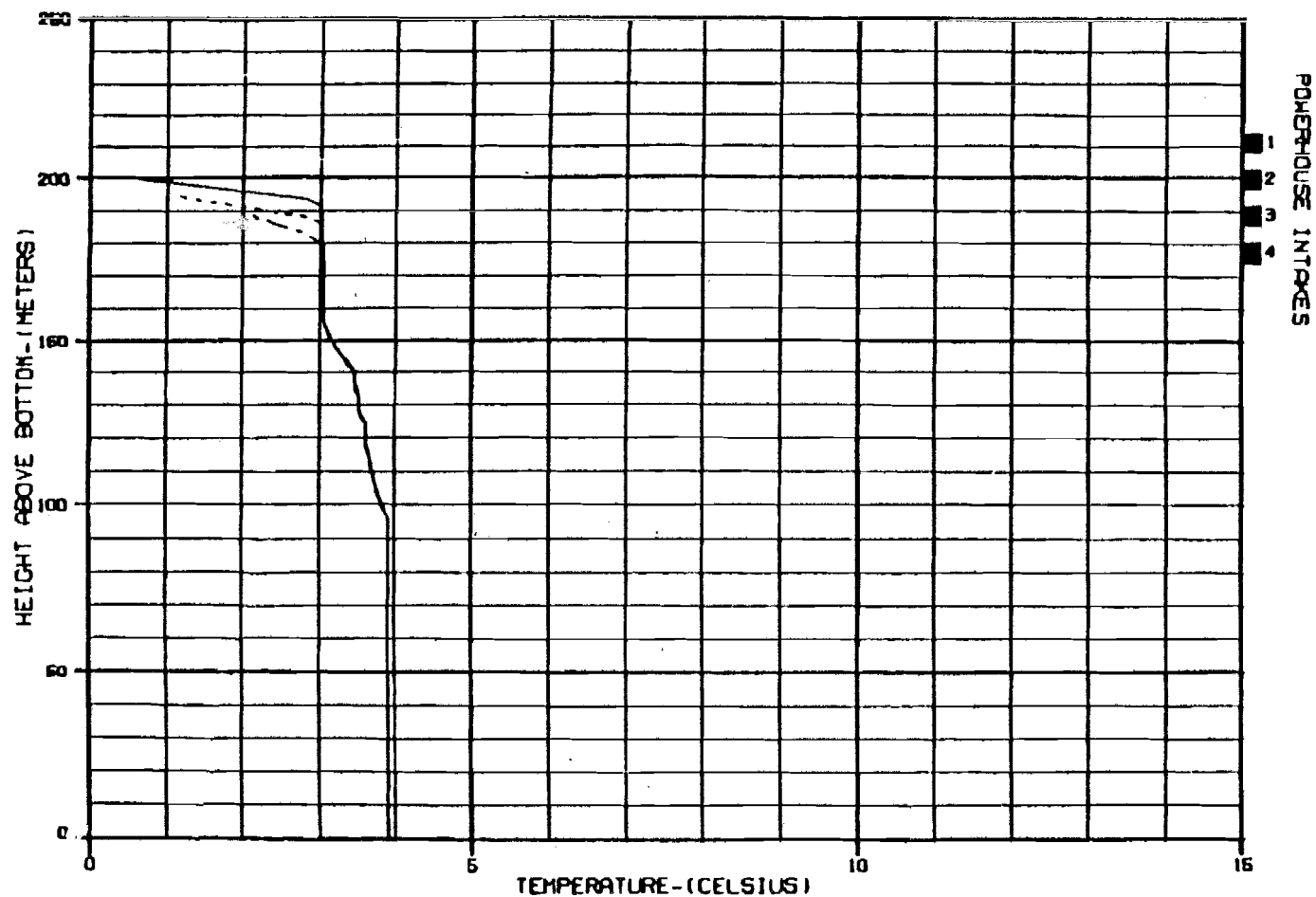
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

CHARTS: ALL SHEETS

8 JAN 84

48-010-04



CASE: WAB11B2120B - WATANA OPERATION WITH DEVIL CANYON IN 2020

LEGEND:

PREDICTED TEMPERATURE PROFILES

— 1 FEBRUARY 1982
 - - - 1 MARCH 1982
 . . . 1 APRIL 1982

ALASKA POWER AUTHORITY

BUSINESS PROJECT

DYNAMIC MODEL

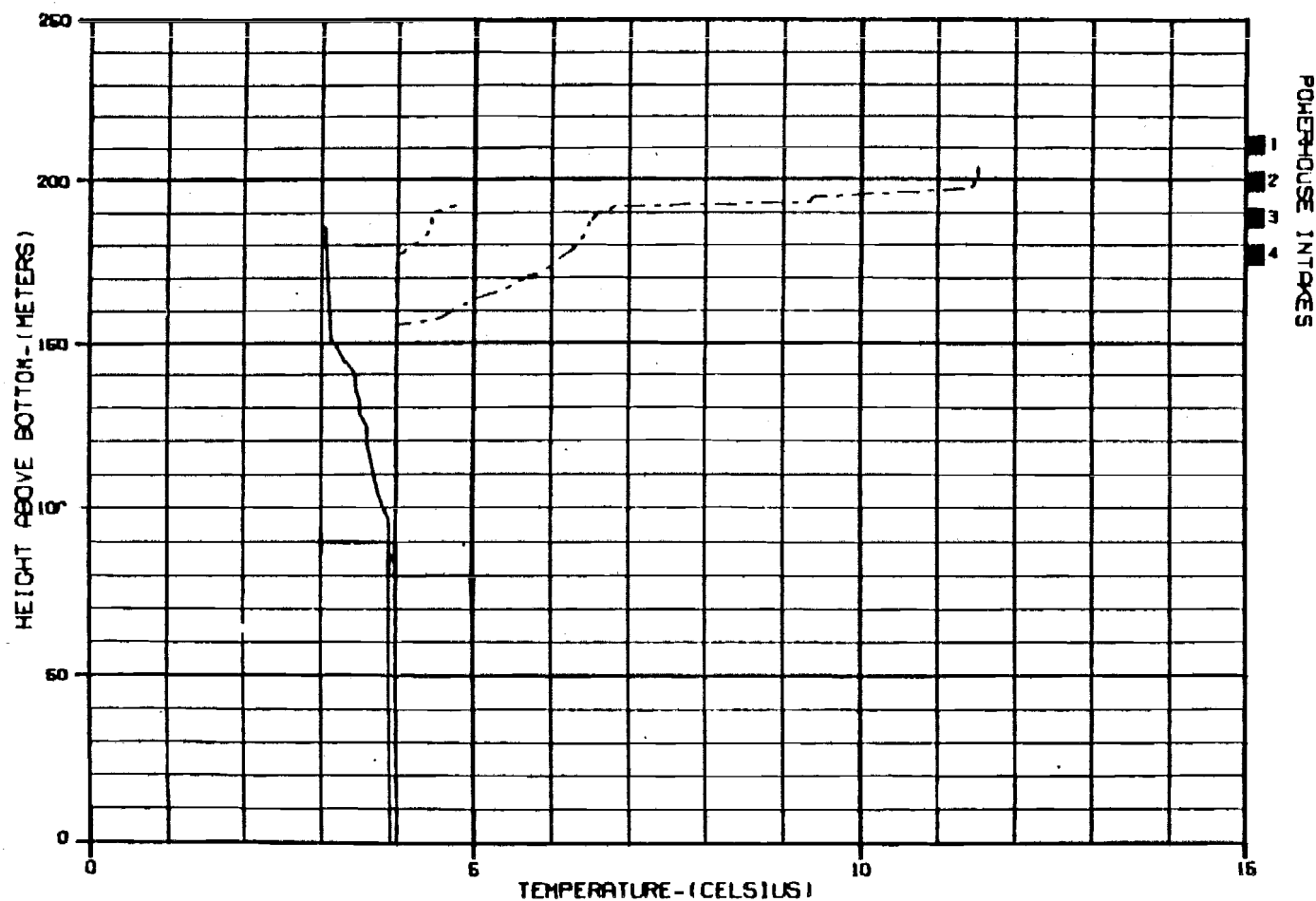
WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBRACCO JOINT VENTURE

DATE: 01-01-84

0 JAN 84

02-010-04



CASE: ■■ WAB11B2120B - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■■

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— 1 MAY 1982
 - - - - 1 JUNE 1982
 - · - · 1 JULY 1982

ALASKA POWER AUTHORITY

WATANA PROJECT

DYNAMIC MODEL

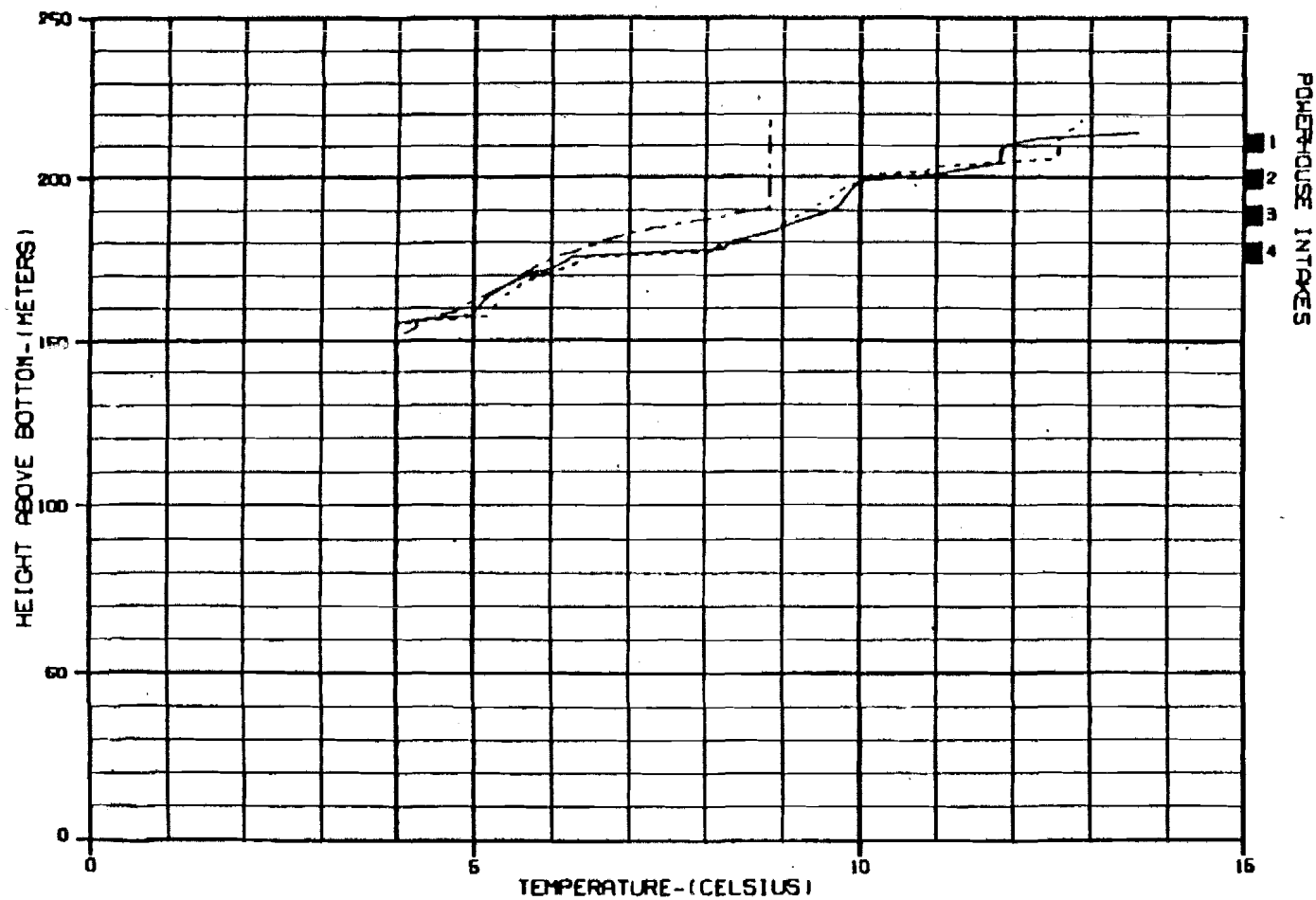
WATANA RESERVOIR
 TEMPERATURE PROFILES

WARZA-EBASCO JOINT VENTURE

DISCLOS. ALL RIGHTS

9 JAN 84

42-010-04



CASE: ■■ WAB11B21208 - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■■

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— AUGUST 1982
 SEPTEMBER 1982
 - - - - - OCTOBER 1982

ALASKA POWER AUTHORITY

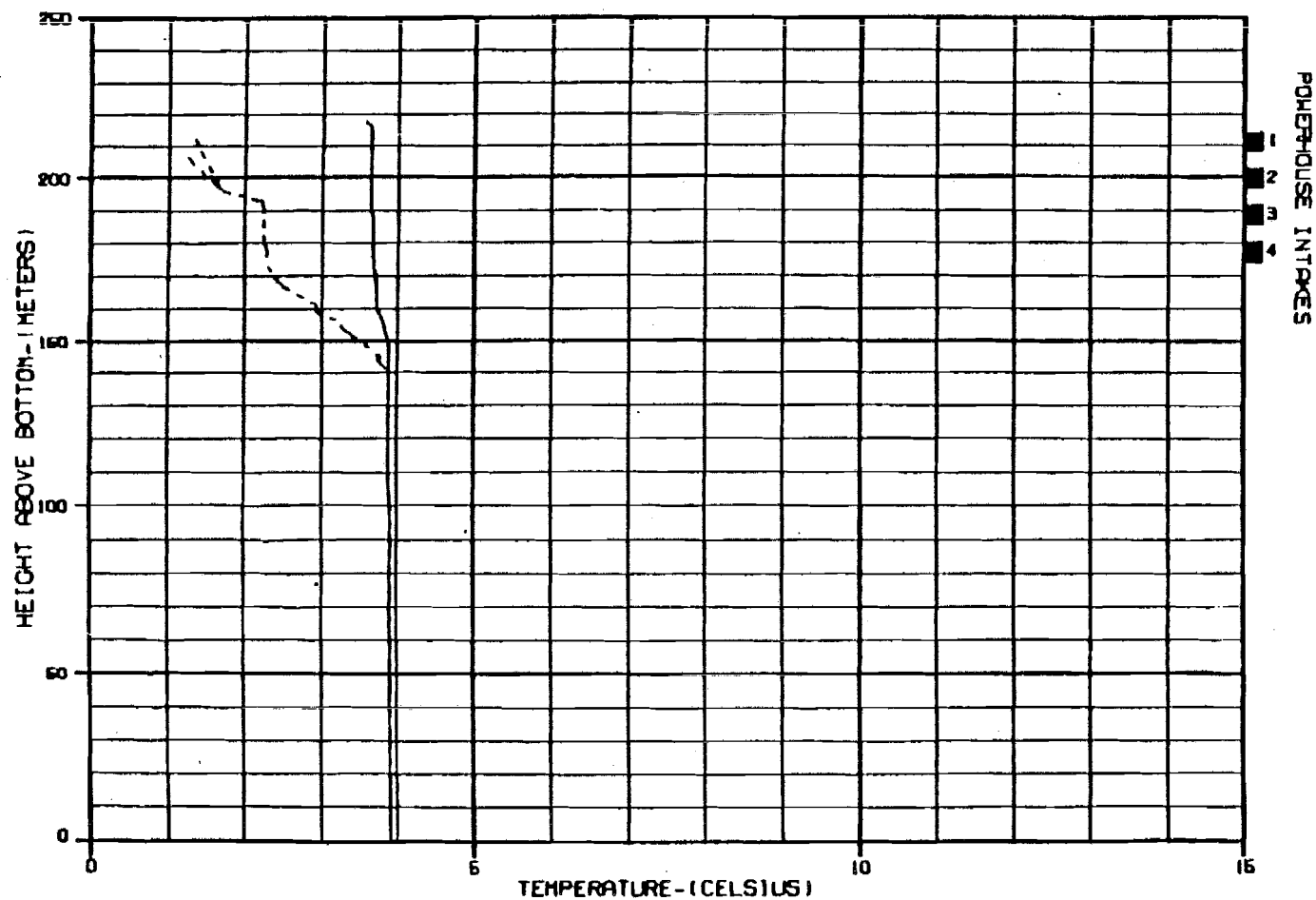
WATANA PROJECT

DYNEMO MODEL

WATANA RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGN: D.L. DAVIS 8 JAN 84 42-010-04



CASE: ■■ WAB11821208 - WATANA OPERATION WITH DEVIL CANYON IN 2020 ■■

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 NOVEMBER 1982
 1 DECEMBER 1982
 - - - - 1 JANUARY 1983

ALASKA POWER AUTHORITY

WATANA PROJECT

OPENING NO. 1

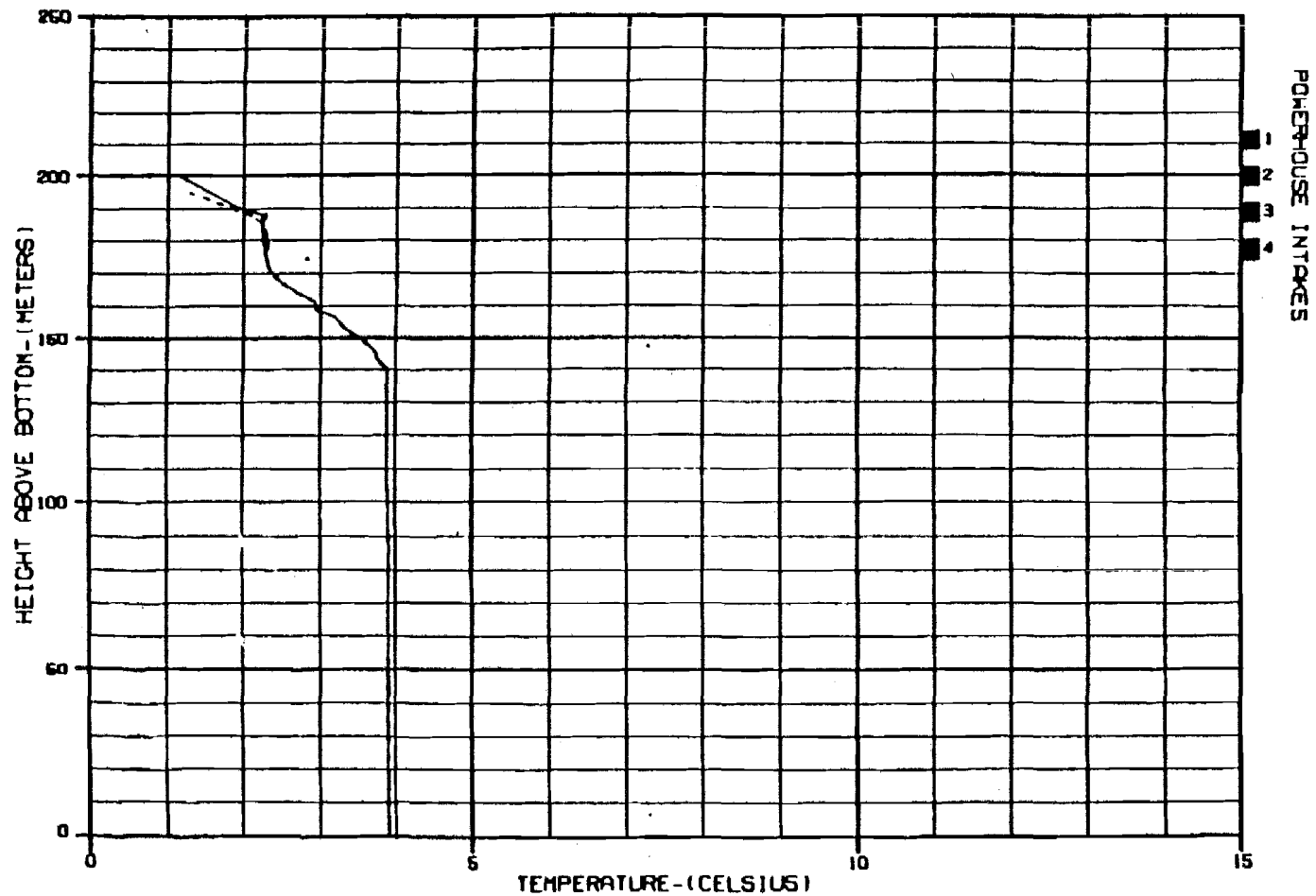
WATANA RESERVOIR
 TEMPERATURE PROFILES

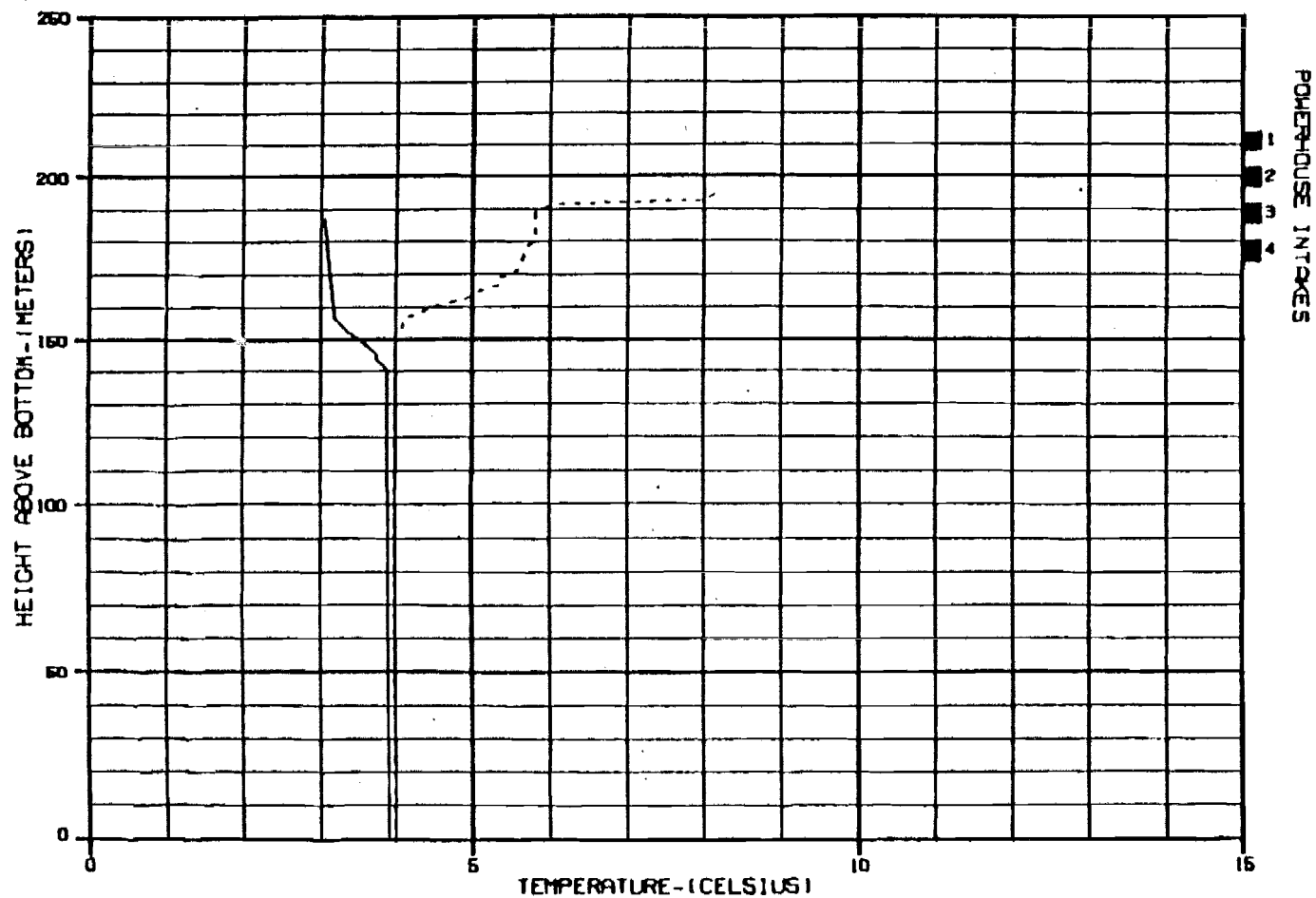
HARZA-EBASCO JOINT VENTURE

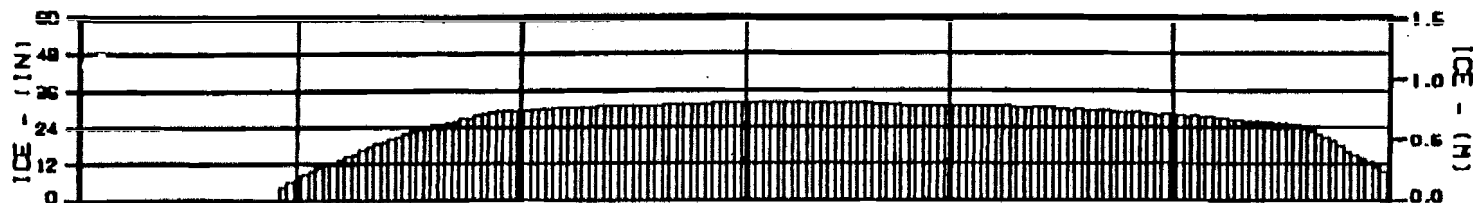
DESIGN: S.L. DAVIS

8 JAN 84

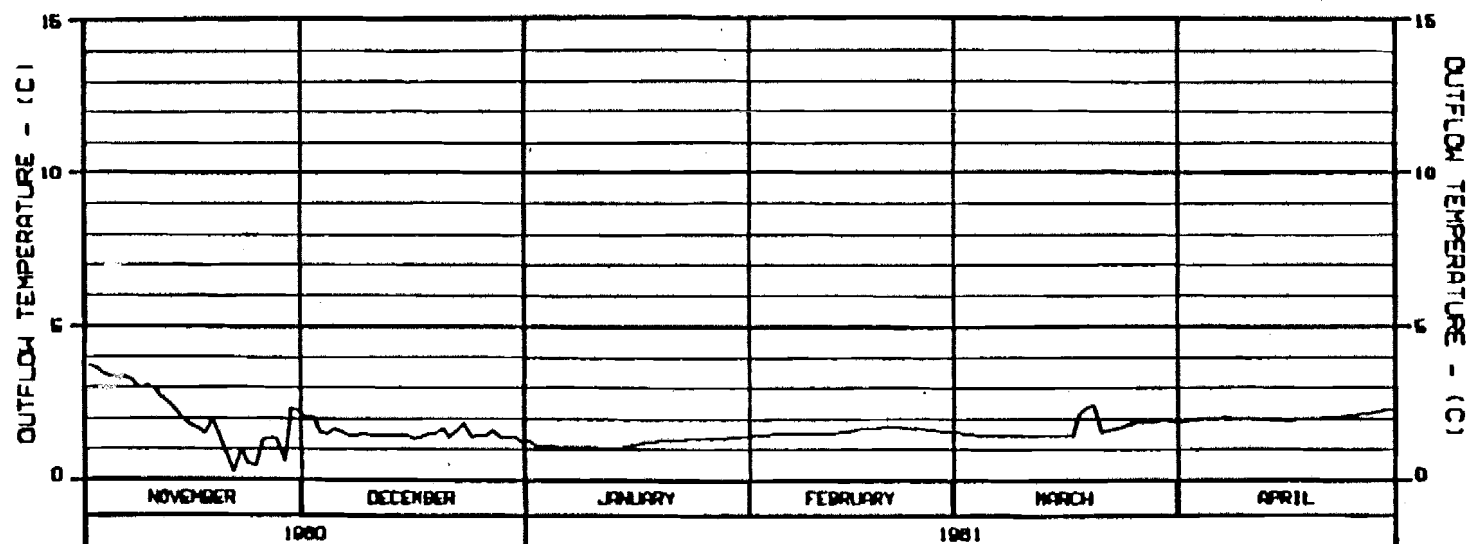
42-010-04







INTAKE	LEVEL 1					
	LEVEL 2					
CONE VALVE						
SPILLWAY						



LEGEND: CASE: DCB1182/208 - DEVIL CANYON OPERATION WITH NATANA IN 2020

— PREDICTED OUTFLOW TEMPERATURE FROM DEVIL CANYON RESERVOIR
 - - - - - INFLOW TEMPERATURE TO NATANA RESERVOIR

- NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.84 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 1376 FT (419.10 M)
 3. CONE VALVE AT ELEVATION 990 FT (301.76 M)
 4. SPILLWAY CREST AT ELEVATION 1404 FT (427.84 M)

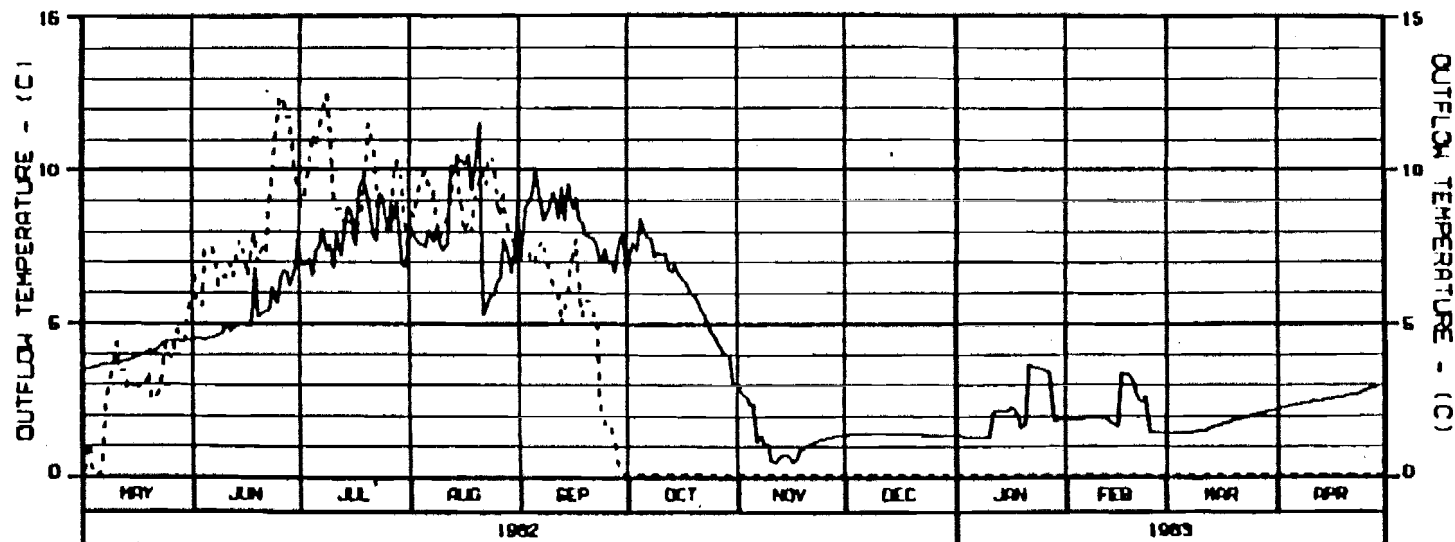
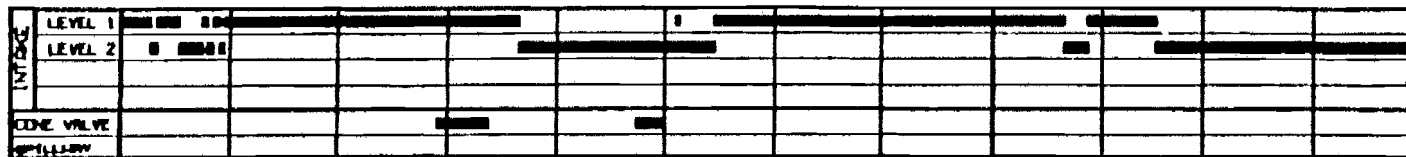
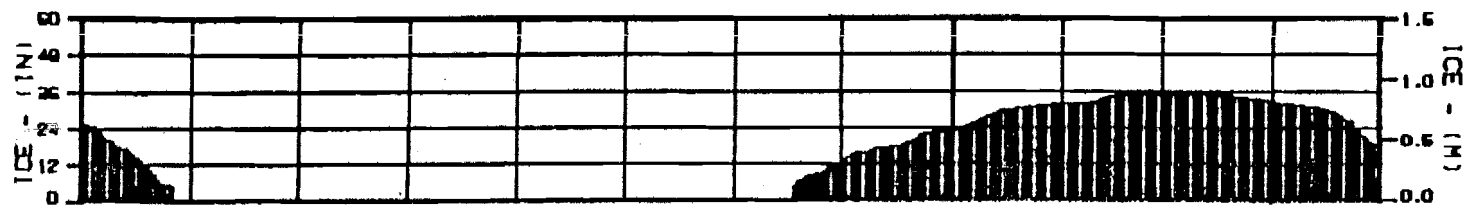
ALASKA POWER AUTHORITY

BUILDING PROJECT DYNOM MODEL

DEVIL CANYON RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBRACD JOINT VENTURE

DESIGN: D.L. PETERSON 20 JAN 81 1000.140 40-010-04



LEGEND: CASE: ■ DC811821208 - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■
 - WATANA WEATHER STATION DATA
 — PREDICTED OUTFLOW TEMPERATURE FROM DEVIL CANYON RESERVOIR
 - - - INFLOW TEMPERATURE TO WATANA RESERVOIR

NOTES: 1. INTAKE PORT LEVEL 1 AT ELEVATION 1426 FT (434.94 M)
 2. INTAKE PORT LEVEL 2 AT ELEVATION 1376 FT (419.10 M)
 3. CONE VALVE AT ELEVATION 980 FT (301.75 M)
 4. SPILLWAY CREST AT ELEVATION 1404 FT (427.94 M)

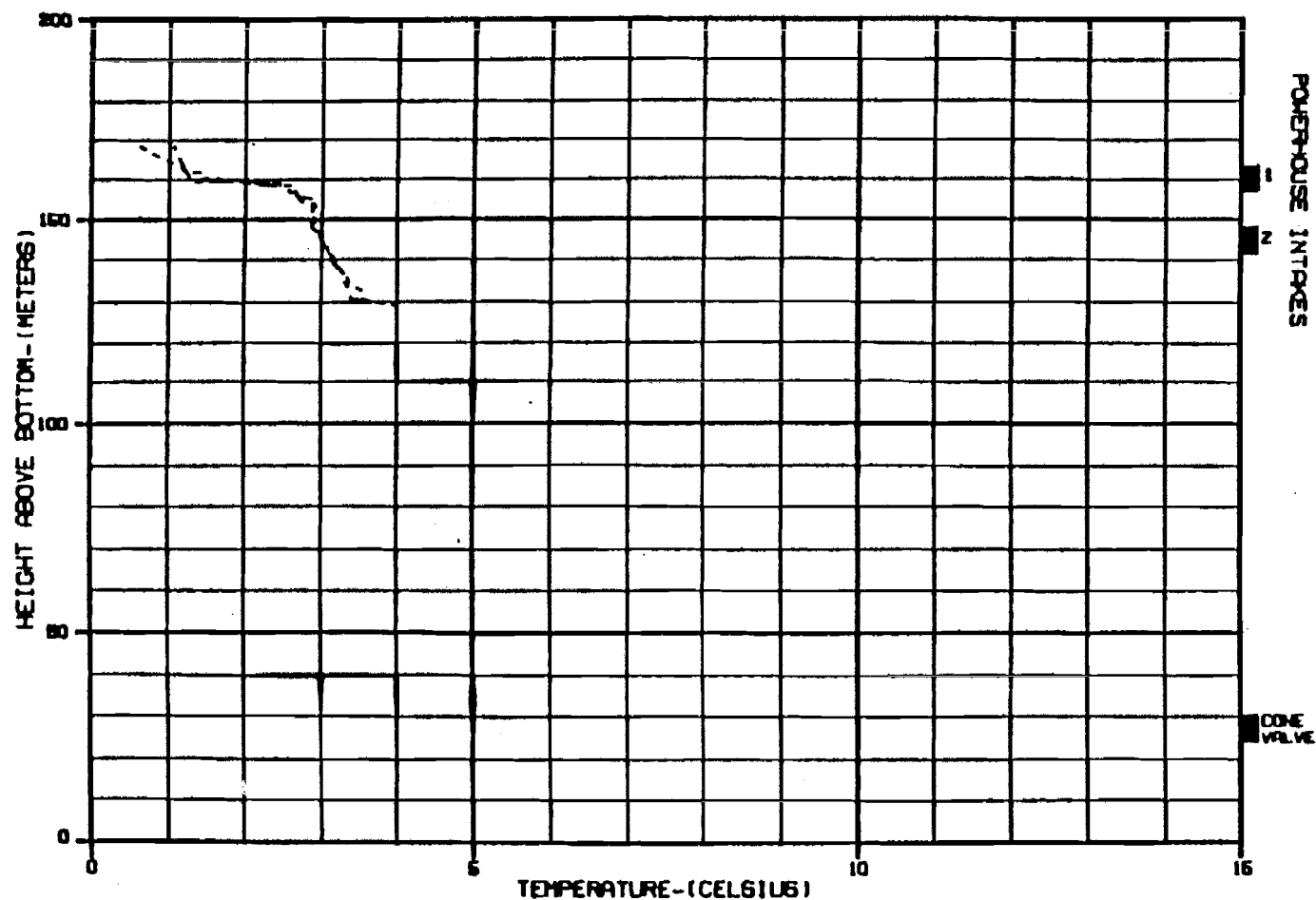
ALASKA POWER AUTHORITY

SUBITNA PROJECT DYNOM MODEL

DEVIL CANYON RESERVOIR
 OUTFLOW TEMPERATURE
 AND ICE GROWTH

HARZA-EBR600 JOINT VENTURE

DRAWN: S.L. 0-0000 0 JAN 84 0000.140 40-000-04



CASE: ■■ DCB1182120B - DEVIL CANYON OPERATION WITH NATANA IN 2020 ■■
 - NATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— | NOVEMBER 1980
 - - - - | DECEMBER 1980
 | JANUARY 1981

ALASKA POWER AUTHORITY

EXISTING PROJECT

DESIGN NEED

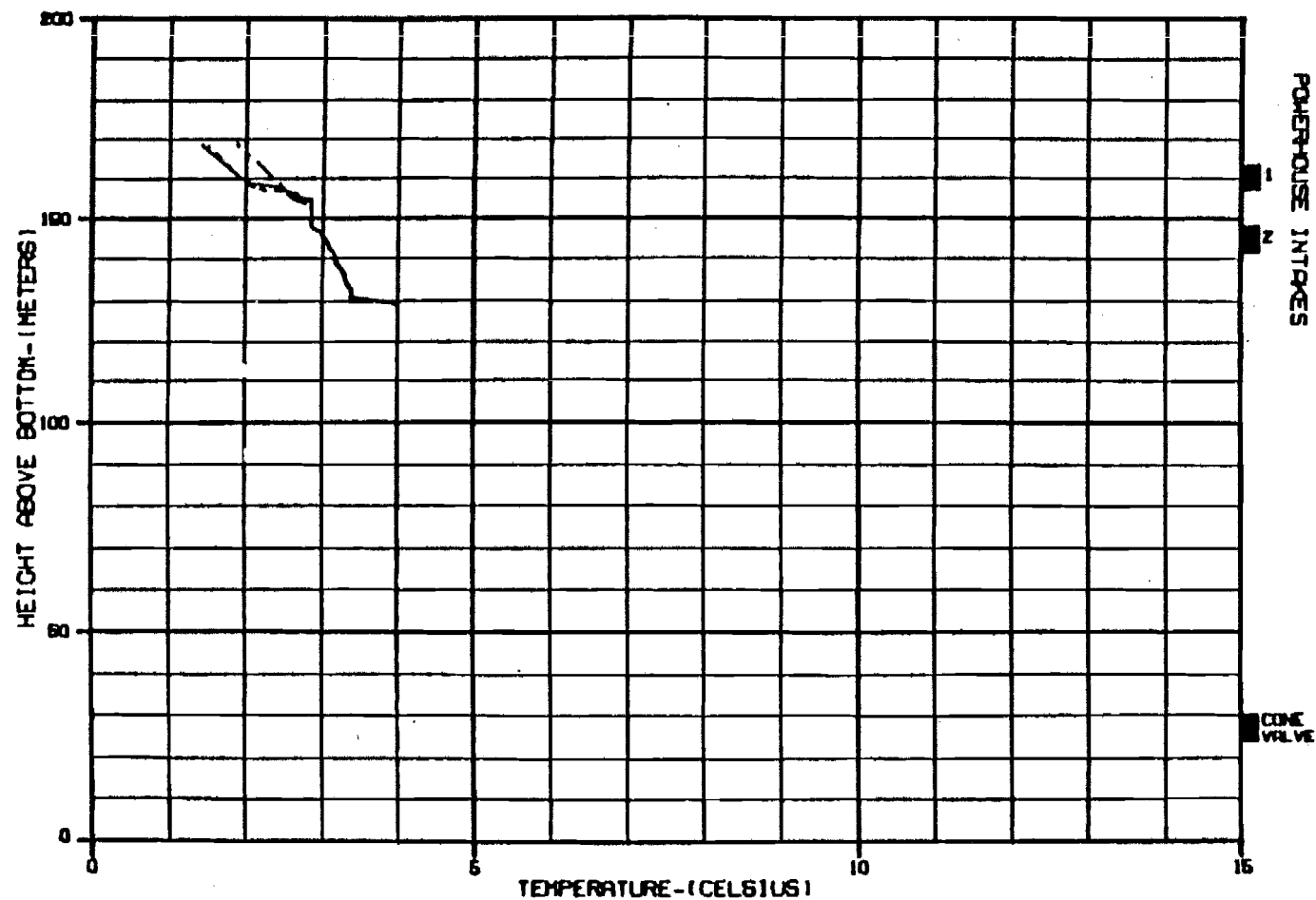
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBRACO JOINT VENTURE

WORKSHEET: ALPS-005

8 JAN 81

42-010-04



CASE: DCB11B2120B - DEVIL CANYON OPERATION WITH WATANA IN 2020
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— FEBRUARY 1981
 MARCH 1981
 - - - - - APRIL 1981

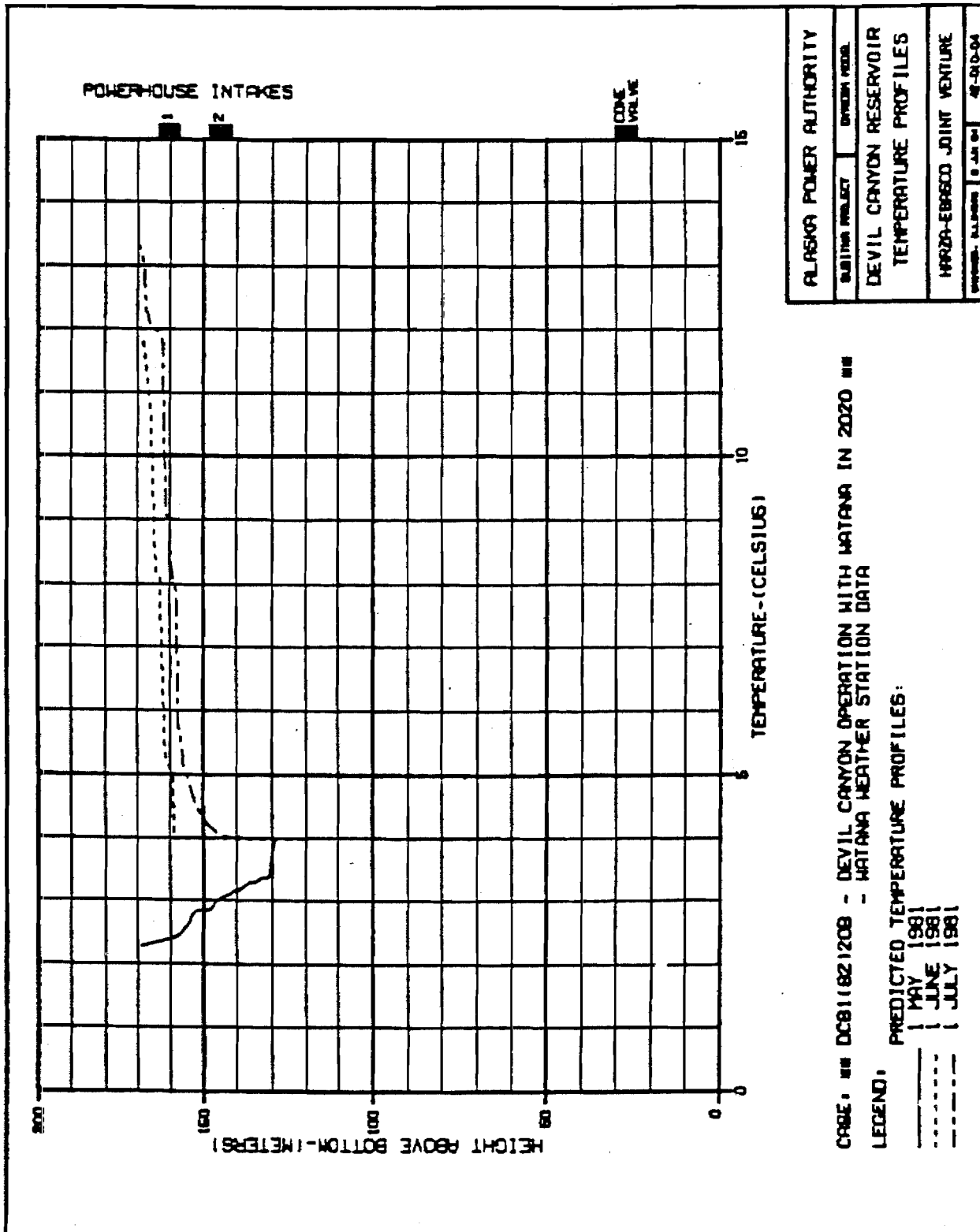
ALASKA POWER AUTHORITY

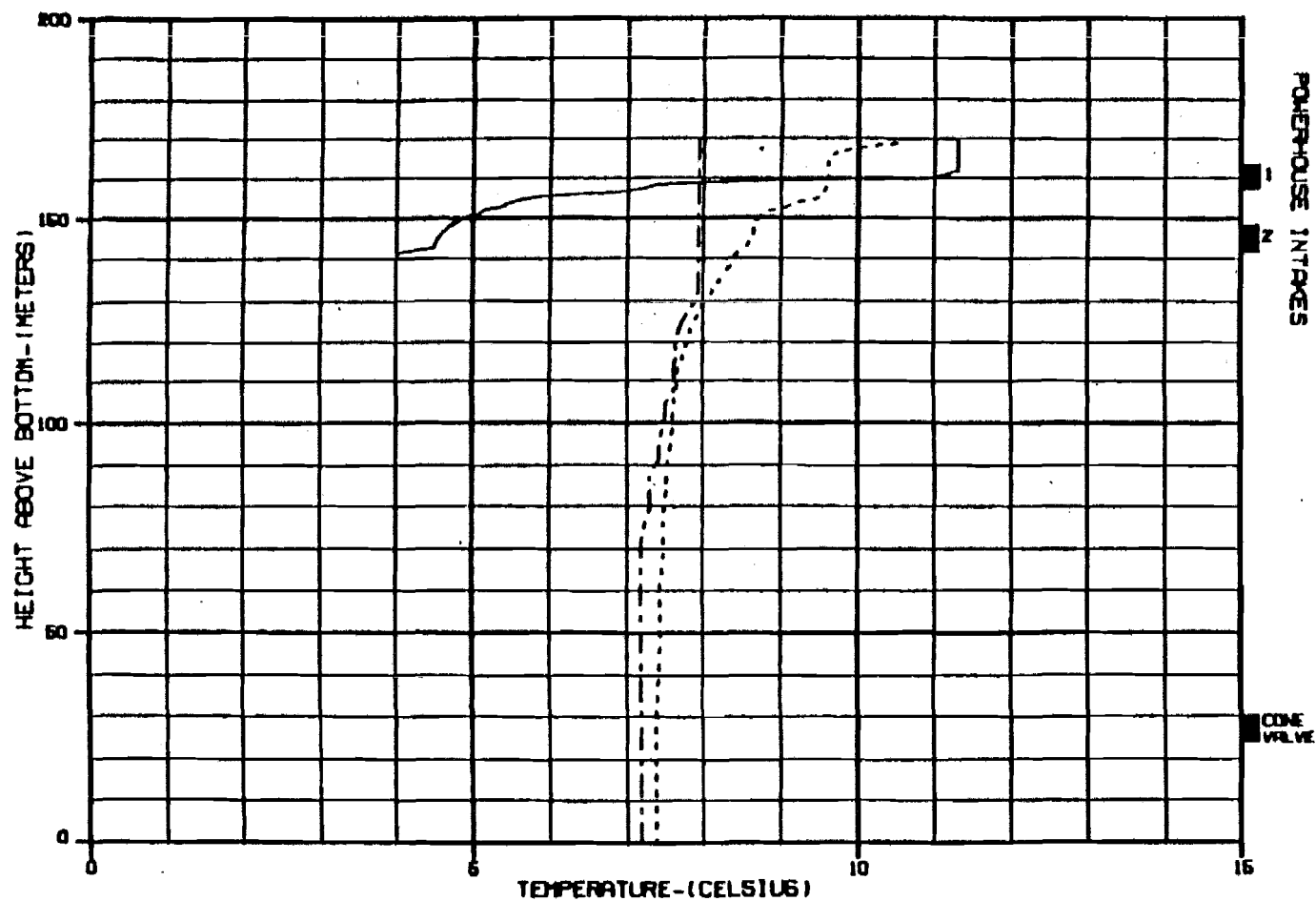
WATANA PROJECT OPERATOR

DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBRACO JOINT VENTURE

DESIGNED BY: J. J. J. 8 JAN 81 42-010-04





CASE: DCB11B2120B - DEVIL CANYON OPERATION WITH WATANA IN 2020
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— 1 AUGUST 1981
 1 SEPTEMBER 1981
 - - - - - 1 OCTOBER 1981

ALASKA POWER AUTHORITY

EXISTING PROJECT

DESIGN NO. 00

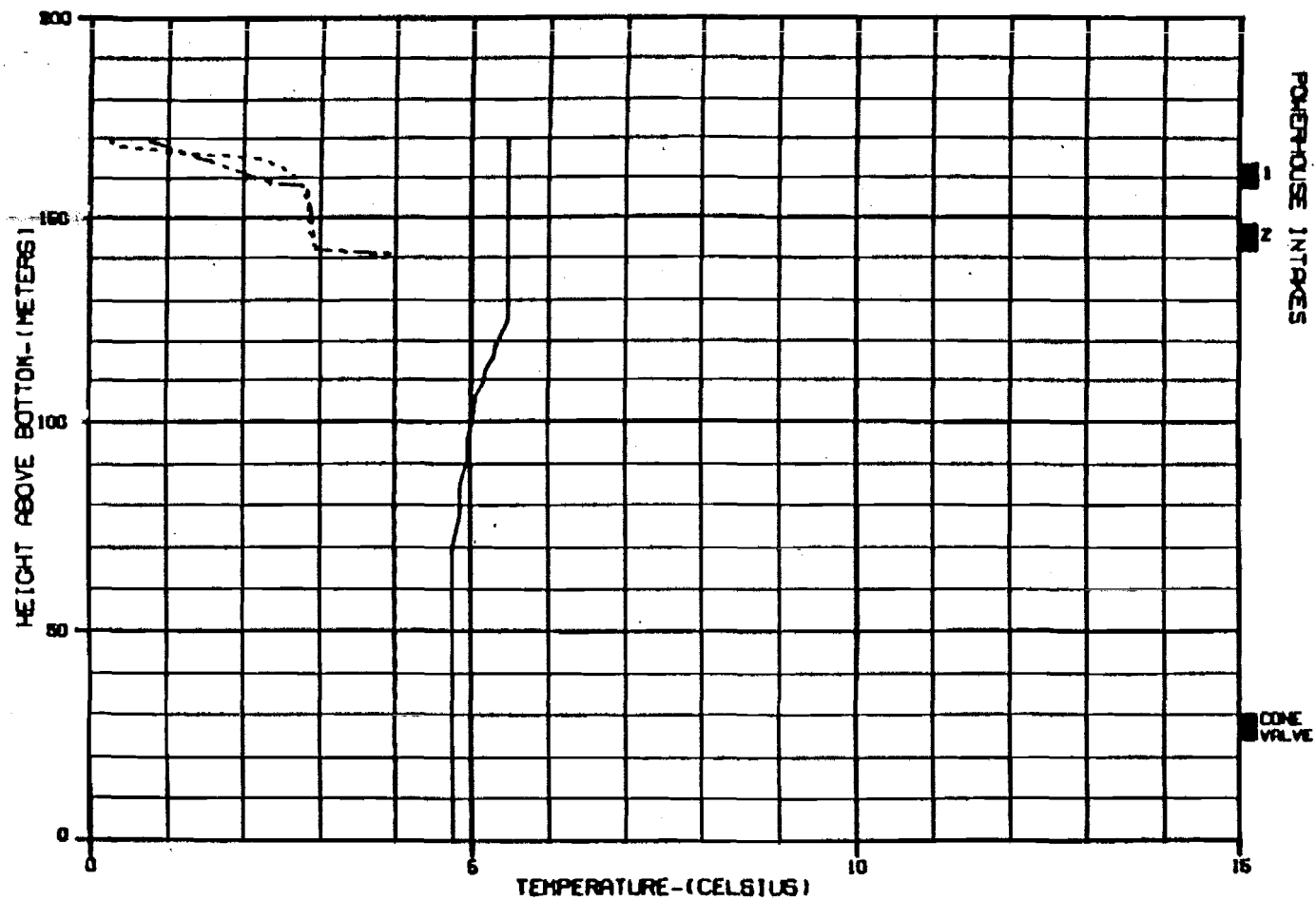
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBRACO JOINT VENTURE

DESIGN - ALP-00

1 JAN 81

42-010-04



CASE: ■■ DCB1182120B - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■■
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

————— | NOVEMBER 1981
 | DECEMBER 1981
 - - - - - | JANUARY 1982

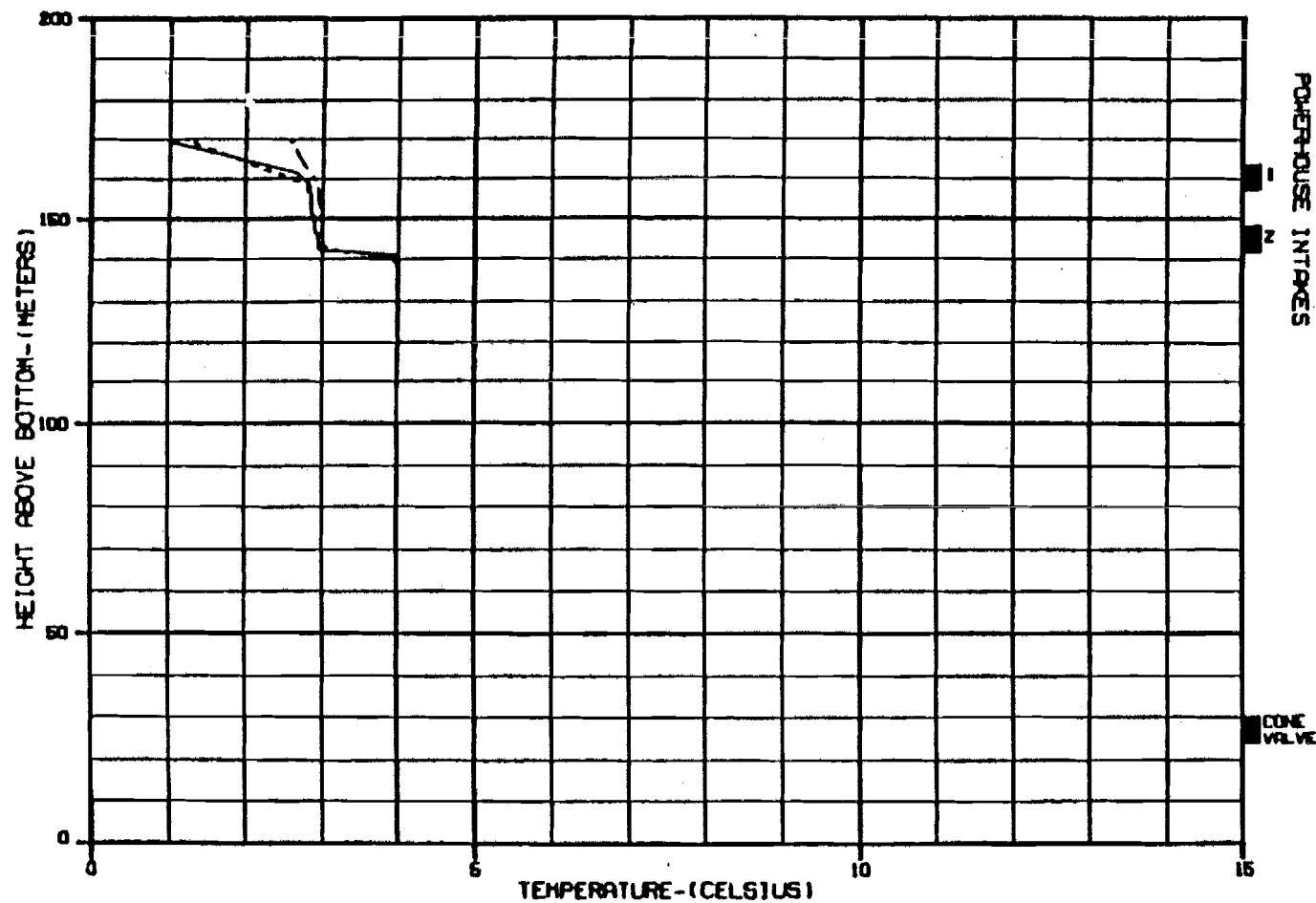
ALASKA POWER AUTHORITY

DEVELOPMENT PROJECT | DESIGN MODEL

DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

WARDA-BASCO JOINT VENTURE

DESIGNED BY: J. L. DAVIS | 8 JAN 82 | 42-010-04



CASE: DCB11821208 - DEVIL CANYON OPERATION WITH WATANA IN 2020
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

— FEBRUARY 1982
 MARCH 1982
 - - - - - APRIL 1982

ALASKA POWER AUTHORITY

DEVELOPMENT PROJECT

DEVIL CANYON RESERVOIR

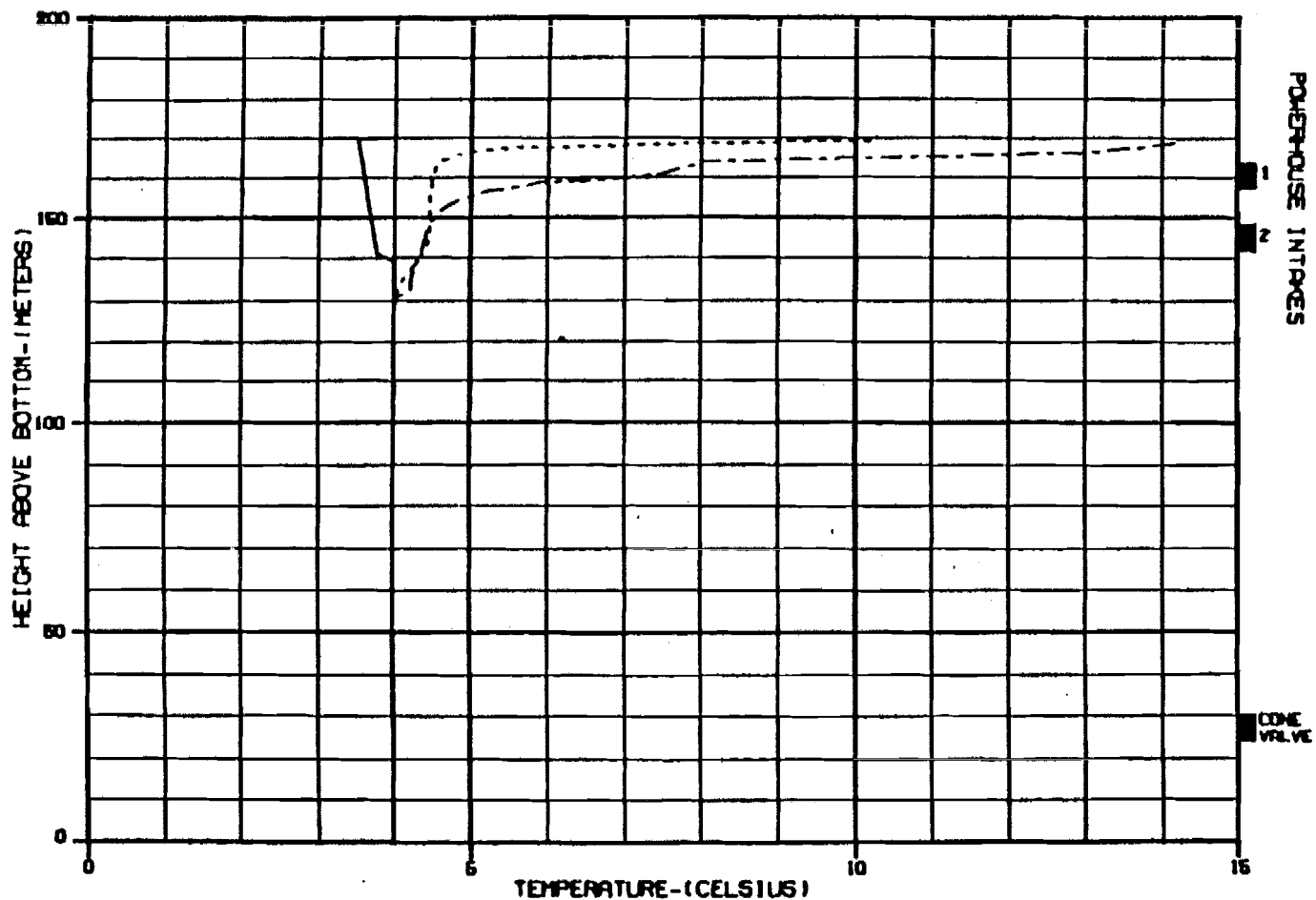
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGNED BY: H. J. JONES

DATE: 8 JAN 81

42-010-04



CASE: ■■ DCB1821208 - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■■
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— 1 MAY 1982
 1 JUNE 1982
 - - - - 1 JULY 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

CONCRETE VALVE

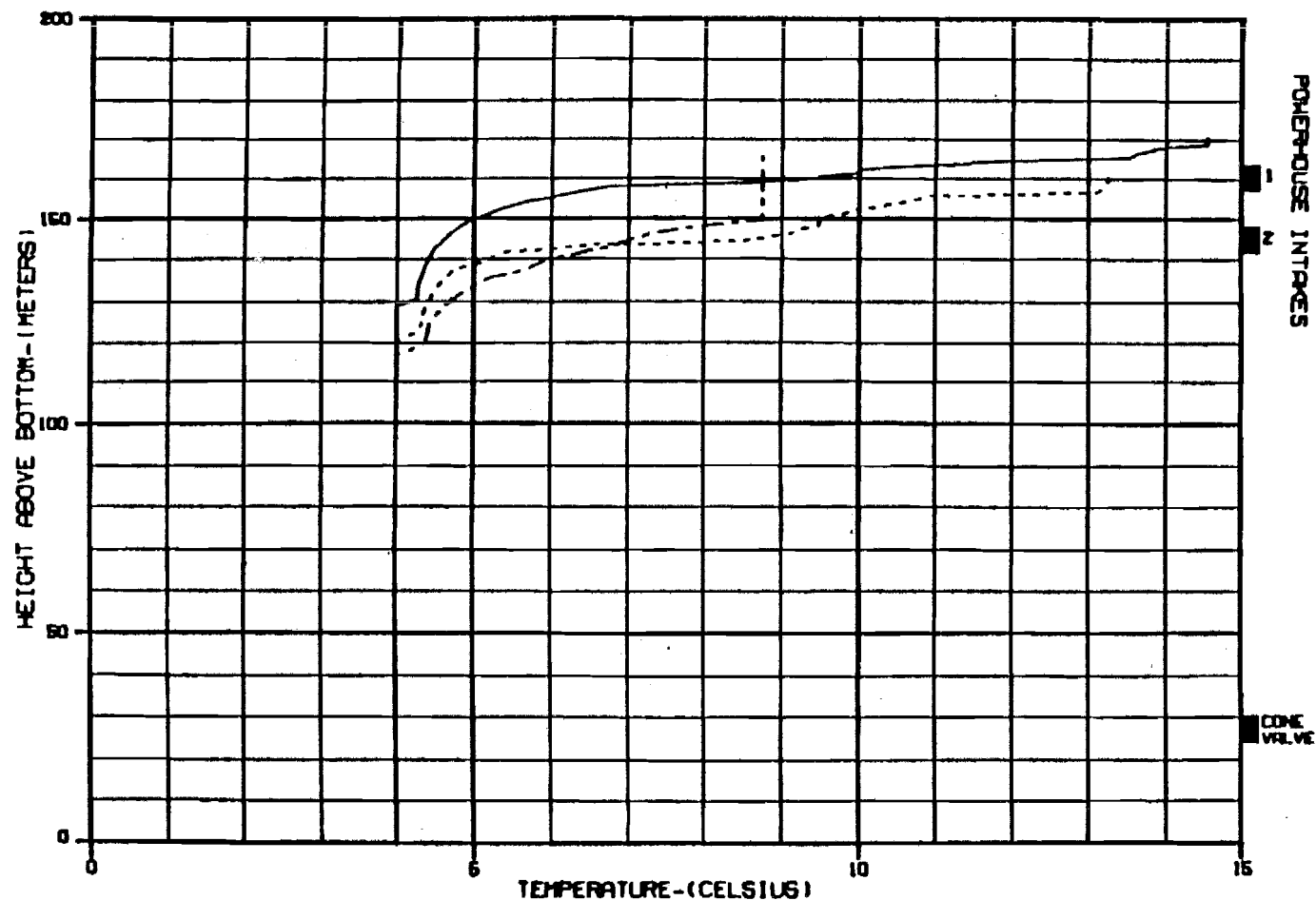
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HAZAR-EBAGCO JOINT VENTURE

DESIGNED BY: HAZAR

8 JAN 84

42-018-04



CASE: ■■ DC911821208 - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■■
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

——— | AUGUST 1982
 | SEPTEMBER 1982
 - - - - | OCTOBER 1982

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

OPERATION MODEL

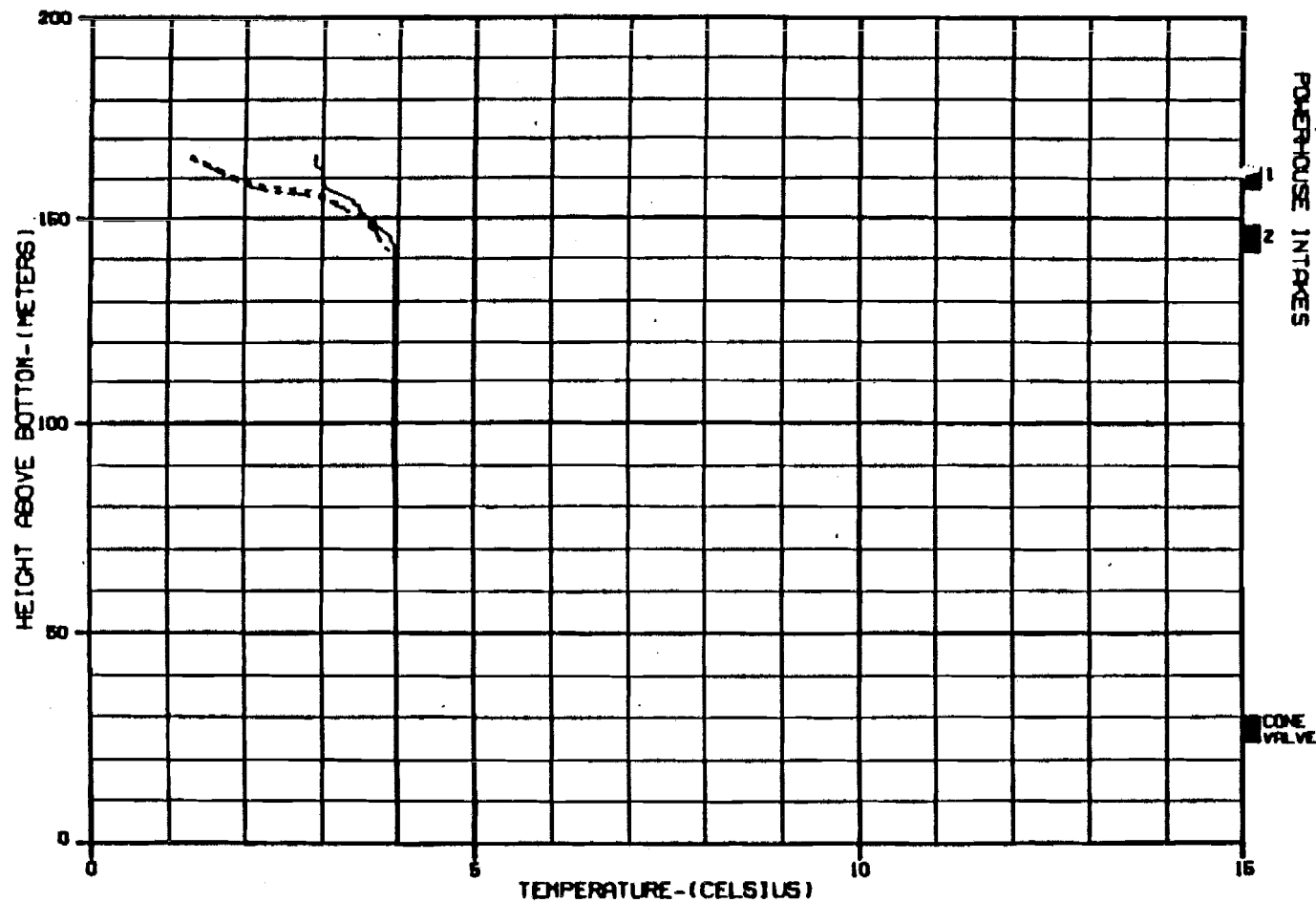
DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGNED BY: D. J. HARRIS

DATE: 10 JAN 84

42-010-04



CASE: ■■ DCB11B2120B - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■■
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

———— 1 NOVEMBER 1982
 - - - - - 1 DECEMBER 1982
 - . - . - 1 JANUARY 1983

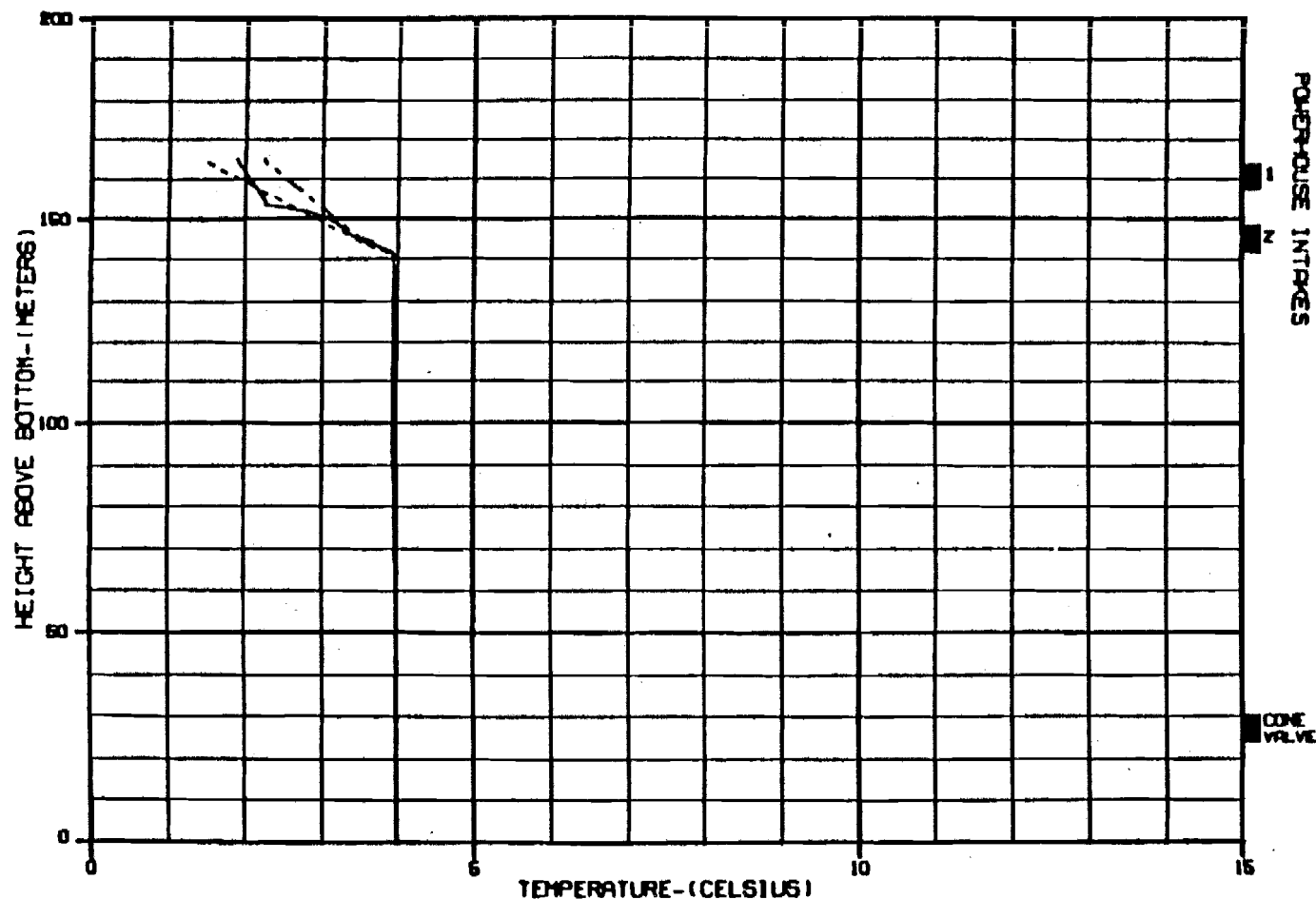
ALASKA POWER AUTHORITY

WATANA PROJECT | DYKIN HEDL

DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EBASCO JOINT VENTURE

DESIGN - ELBORN | 5 JAN 83 | 42-010-04



CASE: ■■ DC811821208 - DEVIL CANYON OPERATION WITH WATANA IN 2020 ■■
 - WATANA WEATHER STATION DATA

LEGEND:

PREDICTED TEMPERATURE PROFILES:

—— 1 FEBRUARY 1983
 1 MARCH 1983
 - - - - 1 APRIL 1983

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DEVIL CANYON

DEVIL CANYON RESERVOIR
 TEMPERATURE PROFILES

HARZA-EDBECO JOINT VENTURE

DESIGN: E.A. 1983

5 JAN 84

42-018-04

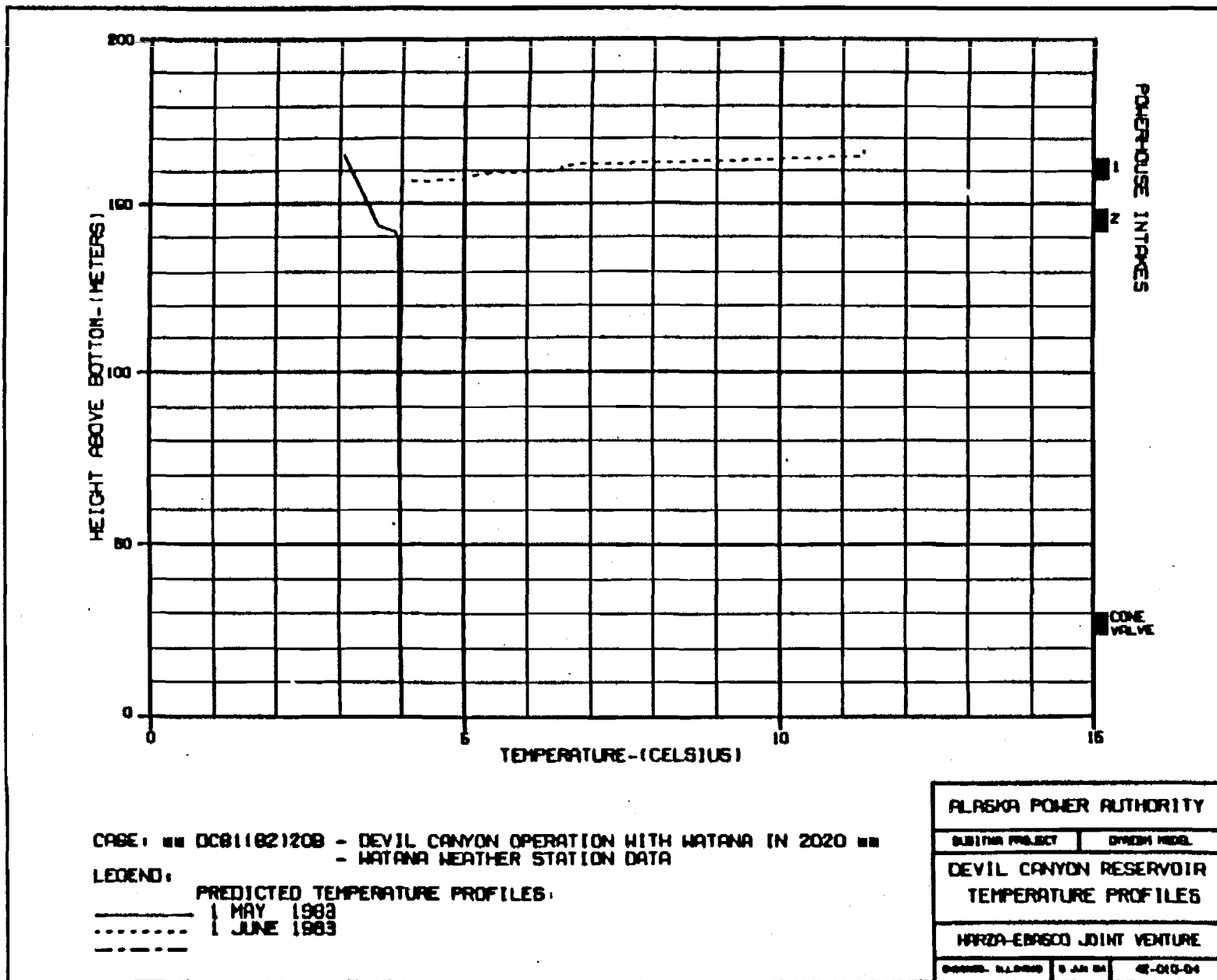


EXHIBIT 4

EXHIBIT 4

SIMULATED RIVER TEMPERATURES, STAGED CONSTRUCTION, STAGE 1,
(WATANA EL. 2000), PROJECTED ENERGY DEMANDS FOR 2001, E-VI
ENVIRONMENTAL FLOW REQUIREMENTS, HYDROLOGICAL AND
CLIMATOLOGICAL DATA FOR 1981-82.

**SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1981
2001 ENERGY DEMANDS
CASE E-VI FLOW REQUIREMENTS
STAGED CONSTRUCTION**

STAGE 1

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
184 ^{1/}	2.3	2.8	3.9	4.8	6.6	8.0	8.8	10.8	8.5	6.7	6.8	10.3	10.8	9.0
173	2.4	2.9	3.7	4.7	6.1	7.1	8.4	10.3	8.3	7.2	7.5	10.0	10.6	9.1
162	2.7	3.5	4.3	5.3	7.0	7.5	9.1	10.9	8.8	7.7	7.8	10.2	10.8	9.4
150	3.0	3.7	4.3	5.4	7.0	7.4	9.1	10.9	8.9	8.1	8.2	10.3	10.9	9.6
140	3.2	3.9	4.4	5.6	7.1	7.3	9.2	11.0	9.0	8.3	8.3	10.2	10.9	9.7
130	3.4	4.2	4.7	5.8	7.2	7.1	9.0	10.5	8.7	8.3	8.2	9.9	10.6	9.6
120	3.7	4.7	5.3	6.4	7.9	7.5	9.7	11.2	9.2	8.7	8.5	10.2	10.9	9.9
110	4.0	5.2	5.8	6.9	8.5	7.9	10.2	11.8	9.6	9.1	8.7	10.4	11.1	10.1
99 ^{2/}	4.3	5.7	6.3	7.4	9.1	8.3	10.7	12.2	10.0	9.5	9.0	10.6	11.3	10.4
98 ^{3/}	4.3	5.6	6.2	6.7	7.6	6.7	8.1	8.7	7.9	8.1	8.0	8.6	9.1	8.8
84 ^{4/}	4.6	6.3	7.1	7.4	8.5	7.2	8.9	9.6	8.6	8.7	8.5	9.1	9.5	9.4

River Mile	August				September				October				
	45	46	47	48	49	50	41	52	1	2	3	4	5
184 ^{1/}	7.9	7.7	7.5	8.6	8.7	7.9	8.2	7.0	6.5	5.7	5.3	4.6	4.1
173	8.1	7.8	7.6	8.7	8.7	7.8	8.1	6.6	6.0	5.4	4.8	4.1	3.5
162	8.2	7.9	7.8	8.8	8.8	7.9	8.1	6.4	5.7	5.3	4.6	4.0	3.0
150	8.5	8.2	8.0	9.0	9.0	8.0	8.1	6.4	5.6	5.2	4.6	3.9	2.9
140	8.7	8.3	8.1	9.2	9.0	8.0	8.1	6.2	5.4	5.1	4.4	3.7	2.5
130	8.8	8.2	8.2	9.2	9.0	7.9	8.0	6.0	5.1	4.9	4.2	3.5	2.1
120	9.0	8.3	8.3	9.4	9.1	8.0	8.0	5.8	5.0	4.8	4.1	3.4	1.7
110	9.2	8.4	8.5	9.6	9.3	8.1	8.0	5.7	4.8	4.7	4.0	3.3	1.4
99 ^{2/}	9.4	8.5	8.6	9.8	9.4	8.2	8.1	5.5	4.6	4.6	3.9	3.1	0.9
98 ^{3/}	8.6	7.7	8.0	8.5	7.9	7.2	6.7	4.3	3.8	4.0	3.4	2.8	0.7
84 ^{4/}	9.2	7.9	8.3	9.1	8.2	7.3	6.7	3.9	3.5	3.7	3.2	2.5	0.2

-
- ^{1/} At the Watana dam site
^{2/} Upstream of Susitna - Chulitna confluence
^{3/} Downstream of Susitna - Chulitna confluence
^{4/} At Sunshine stream gaging station

**SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1982
2001 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION**

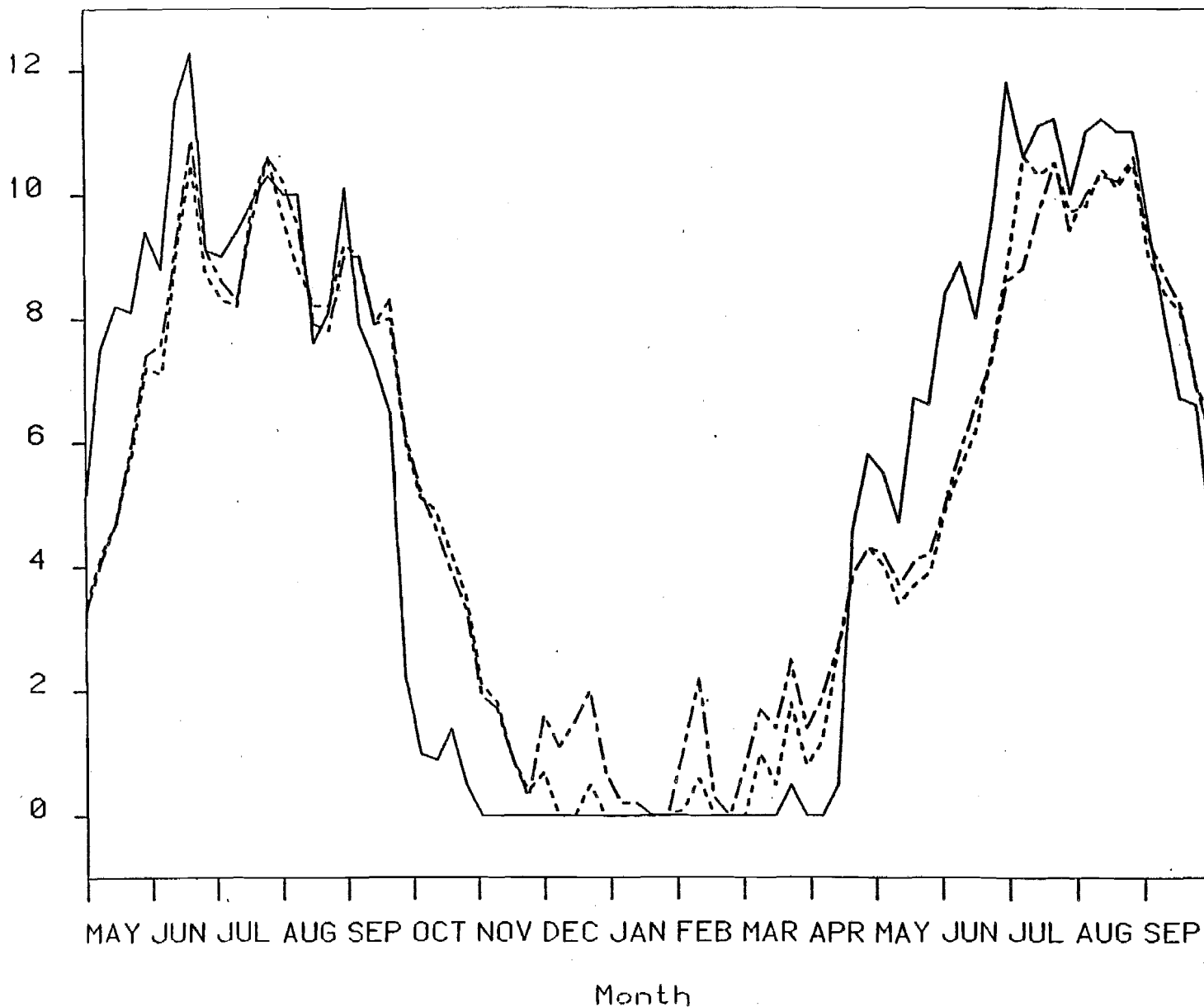
STAGE 1

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
184 ^{1/}	2.8	2.9	2.8	3.2	3.7	5.1	6.1	6.2	7.2	11.7	10.4	9.6	9.7	8.9
173	3.0	2.8	2.7	3.0	3.7	4.8	5.8	6.5	7.7	10.9	10.2	9.8	9.6	9.1
162	3.3	3.0	3.2	3.5	4.4	5.4	6.2	7.2	8.5	11.3	10.6	10.3	9.8	9.4
150	3.5	3.2	3.3	3.5	4.5	5.5	6.2	7.3	8.7	11.1	10.7	10.5	10.0	9.8
140	3.7	3.2	3.5	3.6	4.7	5.6	6.3	7.4	8.9	11.0	10.8	10.7	10.0	9.9
130	4.0	3.4	3.7	3.9	4.9	5.6	6.2	7.4	8.8	10.6	10.3	10.5	9.7	9.8
120	4.4	3.7	4.2	4.3	5.5	6.1	6.6	7.9	9.5	11.0	10.8	11.0	10.0	10.2
110	4.7	4.0	4.6	4.7	6.0	6.5	6.9	8.3	10.1	11.4	11.2	11.4	10.3	10.5
99 ^{2/}	5.1	4.3	5.1	5.1	6.5	6.9	7.3	8.8	10.6	11.8	11.6	11.8	10.5	10.9
98 ^{3/}	5.0	4.3	5.1	5.2	6.3	6.7	6.3	7.0	8.8	8.6	8.5	8.9	8.3	8.9
84 ^{4/}	5.4	4.7	5.8	5.9	7.2	7.7	6.8	7.9	9.9	9.3	9.2	9.7	9.0	9.7

River Mile	August				September			
	45	46	47	48	49	50	51	52
104 ^{1/}	9.4	9.3	9.8	8.4	8.3	8.4	7.3	6.9
173	9.6	9.5	10.0	8.5	8.2	8.2	7.0	6.6
162	9.9	9.7	10.2	8.7	8.3	8.2	7.0	6.6
150	10.2	10.0	10.4	8.9	8.4	8.2	7.1	6.6
140	10.4	10.1	10.5	9.0	8.5	8.2	7.0	6.6
130	10.4	10.1	10.5	9.0	8.4	8.1	6.9	6.4
120	10.8	10.4	10.9	9.3	8.6	8.1	7.0	6.4
110	11.1	10.7	11.1	9.5	8.7	8.2	7.0	6.4
99 ^{2/}	11.5	11.0	11.4	9.8	8.8	8.3	7.1	6.4
98 ^{3/}	9.1	8.7	9.1	7.7	7.4	6.8	5.5	5.4
84 ^{4/}	9.7	9.3	9.7	8.3	7.7	6.9	5.8	5.2

-
- ^{1/} Watana dam site
^{2/} Upstream of Chulitna - Susitna Confluence
^{3/} Downstream of Chulitna - Susitna confluence
^{4/} At Sunshine stream gaging station

D
e
g
r
e
e
s
C



NOTES:

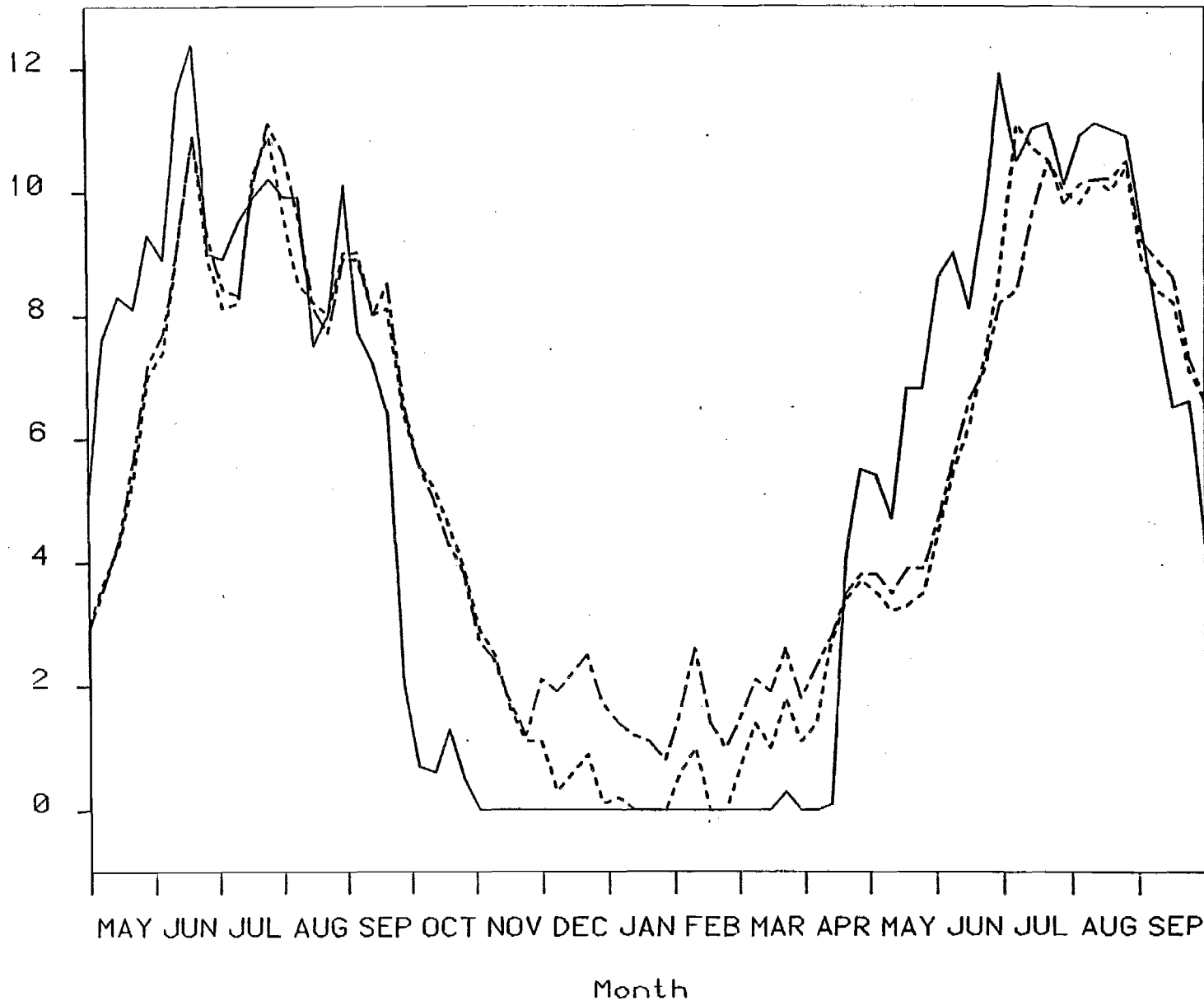
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 1
4. ENERGY DEMAND FOR 2001
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD NOVEMBER-APRIL SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - SIMULATED TEMPERATURES STAGE 1 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 130	
DATE: 10/1/82	BY: J. H. HARRIS
APPROVED: 10/1/82	DATE: 10/1/82

D
e
g
r
e
e
s
C



NOTES:

1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 1
4. ENERGY DEMAND FOR 2001
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD DECEMBER-MARCH SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - SIMULATED TEMPERATURES STAGE 1 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 150	
DATE: 10/1/82	BY: [Signature]
REVISION: 1.0	DATE: 10/1/82

EXHIBIT 5

EXHIBIT 5

SIMULATED RIVER TEMPERATURES, STAGED CONSTRUCTION, STAGE 2,
(WATANA EL. 2000 - DEVIL CANYON EL. 1455), PROJECTED ENERGY
DEMANDS FOR 2002, E-VI ENVIRONMENTAL FLOW REQUIREMENTS,
HYDROLOGICAL AND CLIMATOLOGICAL DATA FOR 1981-82.

- a. Devil Canyon Drawdown - 50 feet
Three Level Intake
- b. Devil Canyon Drawdown - 50 feet
Two Level Intake
- c. Devil Canyon Drawdown - 9 feet

EXHIBIT 5a

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1981
2002 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION

STAGE 2

50 FT DRAWDOWN AT DEVIL CANYON
3 LEVEL INTAKE

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.4	3.0	3.9	4.4	4.9	6.0	5.6	6.4	6.8	6.6	7.2	5.4	4.7	7.1
140	2.7	3.4	4.3	4.8	5.4	6.2	6.4	6.9	7.2	7.0	7.7	5.8	5.0	7.3
130	3.0	3.9	4.7	5.2	6.0	6.4	6.8	7.4	7.4	7.3	7.4	6.1	5.4	7.5
120	3.3	4.5	5.3	5.0	6.7	6.8	7.4	8.1	7.9	7.8	7.9	6.6	5.7	7.8
110	3.6	5.0	5.9	6.4	7.4	7.2	8.0	8.7	8.3	8.2	8.4	7.0	6.0	8.0
99 ^{2/}	3.9	5.5	6.4	7.0	8.1	7.5	8.6	9.3	8.8	8.7	8.9	7.5	6.3	8.3
98 ^{3/}	4.1	5.5	6.2	6.5	7.3	6.6	7.8	8.3	7.7	7.9	7.8	7.6	7.0	8.1
84 ^{4/}	4.4	6.3	7.1	7.3	8.3	7.2	8.6	9.2	8.5	8.6	8.4	8.4	8.1	8.9

River Mile	August				September				October				
	45	46	47	48	49	50	51	52	1	2	3	4	5
150 ^{1/}	7.8	8.1	7.8	8.2	8.7	8.7	8.7	8.3	7.5	7.1	6.8	6.3	5.7
140	8.0	8.2	7.9	8.4	8.8	8.7	8.7	8.0	7.2	6.9	6.5	6.1	5.2
130	8.1	8.1	8.0	8.5	8.8	8.6	8.6	7.6	6.7	6.5	6.1	5.7	4.5
120	8.3	8.3	8.1	8.7	8.9	8.6	8.6	7.4	6.4	6.3	5.8	5.3	3.9
110	8.5	8.4	8.3	8.9	9.1	8.7	8.6	7.2	6.1	6.0	5.6	5.1	3.3
99 ^{2/}	8.8	8.5	8.5	9.2	9.2	8.7	8.6	6.9	5.7	5.7	5.2	4.7	2.6
98 ^{3/}	8.3	7.6	7.8	8.2	7.8	7.5	6.9	5.0	4.2	4.3	4.1	3.5	1.8
84 ^{4/}	8.9	7.8	8.2	8.9	8.1	7.5	6.9	4.5	3.8	3.9	3.7	3.0	1.0

-
- ^{1/} Downstream of Devil Canyon Dam Site
^{2/} Upstream of Chulitna - Susitna confluence
^{3/} Downstream of Chulitna - Susitna confluence
^{4/} At Sunshine Stream gaging station

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1982
2002 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION

STAGE 2

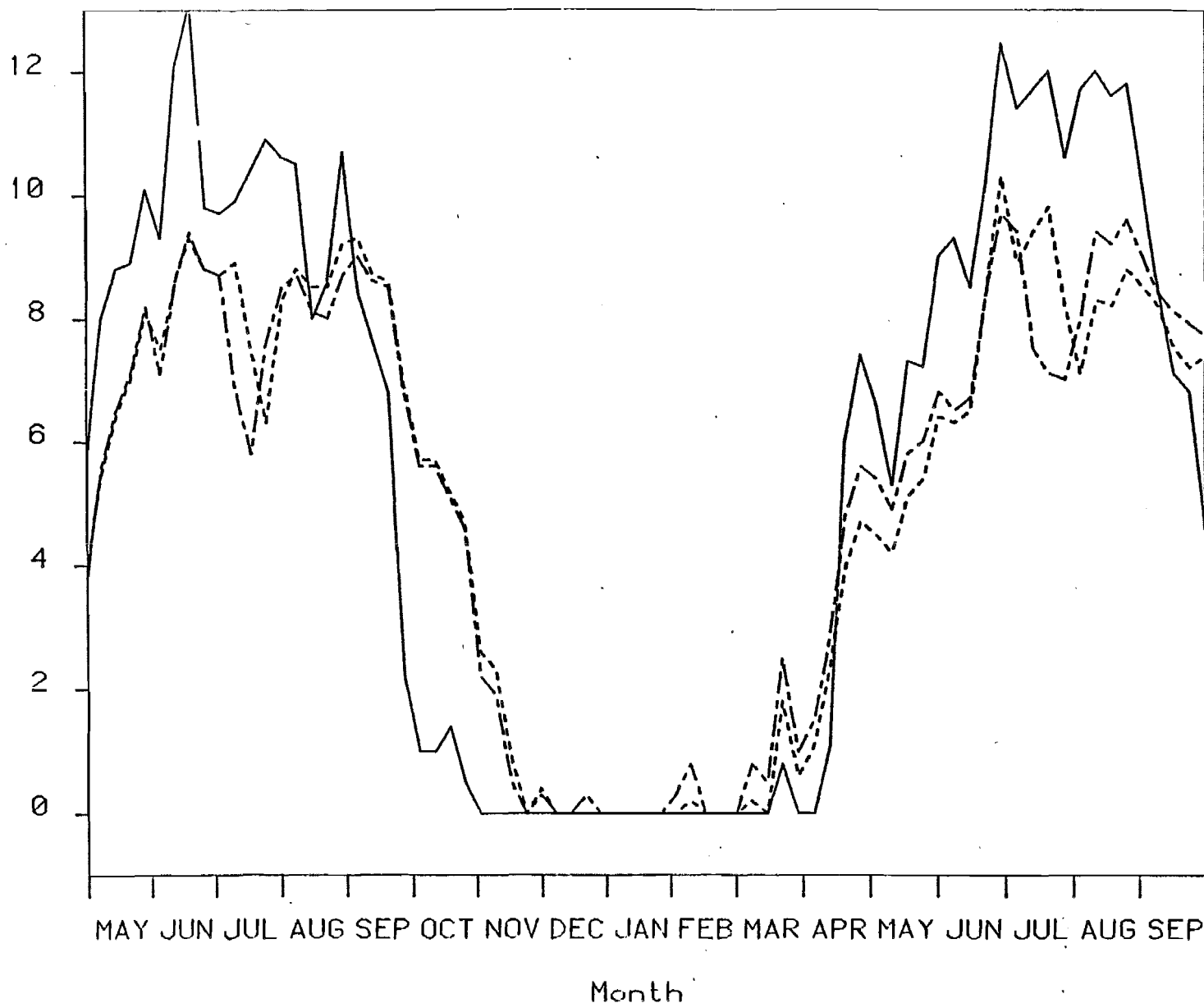
50 FT DRAWDOWN AT DEVIL CANYON
THREE LEVEL INTAKE

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.7	2.9	3.1	3.5	4.0	4.3	4.8	6.1	7.7	6.3	7.1	7.2	6.2	5.1
140	2.9	3.1	3.4	3.8	4.3	4.7	5.1	6.5	8.2	6.7	7.5	7.7	6.6	5.5
130	3.3	3.3	3.8	4.2	4.8	5.0	5.4	6.8	8.4	7.2	7.8	8.0	6.8	5.9
120	3.8	3.6	4.3	4.6	5.4	5.5	5.8	7.3	9.1	7.8	8.4	8.6	7.3	6.3
110	4.1	3.9	4.7	5.0	5.9	5.9	6.1	7.8	9.7	8.3	8.8	9.2	7.7	6.6
99 ^{2/}	4.5	4.2	5.1	5.4	6.4	6.3	6.5	8.4	10.3	8.9	9.4	9.8	8.2	7.1
98 ^{3/}	4.5	4.2	5.2	5.4	6.2	6.5	6.1	6.8	8.7	7.9	8.0	8.4	7.5	7.5
84 ^{4/}	5.0	4.6	5.9	6.0	7.2	7.6	6.7	7.8	9.8	8.7	8.9	9.3	8.4	8.7

River Mile	August				September			
	45	46	47	48	49	50	51	52
150 ^{1/}	6.1	6.4	7.0	7.2	7.6	7.1	7.0	7.9
140	6.5	6.7	7.3	7.4	7.7	7.2	7.0	7.9
130	6.9	7.0	7.6	7.6	7.8	7.2	7.0	7.6
120	7.3	7.4	8.0	7.9	7.9	7.3	7.1	7.5
110	7.7	7.7	8.4	8.1	8.0	7.4	7.1	7.5
99 ^{2/}	8.3	8.2	8.8	8.5	8.2	7.5	7.2	7.4
98 ^{3/}	7.9	7.7	8.1	7.2	7.1	6.5	5.8	5.8
84 ^{4/}	8.9	8.5	8.9	7.9	7.5	6.7	6.0	5.5

-
- ^{1/} Downstream of Devil Canyon Dam Site
^{2/} Upstream of Chulitna - Susitna confluence
^{3/} Downstream of Chulitna - Susitna confluence
^{4/} At Sunshine stream gaging station

D
S
E
E
C



NOTES:

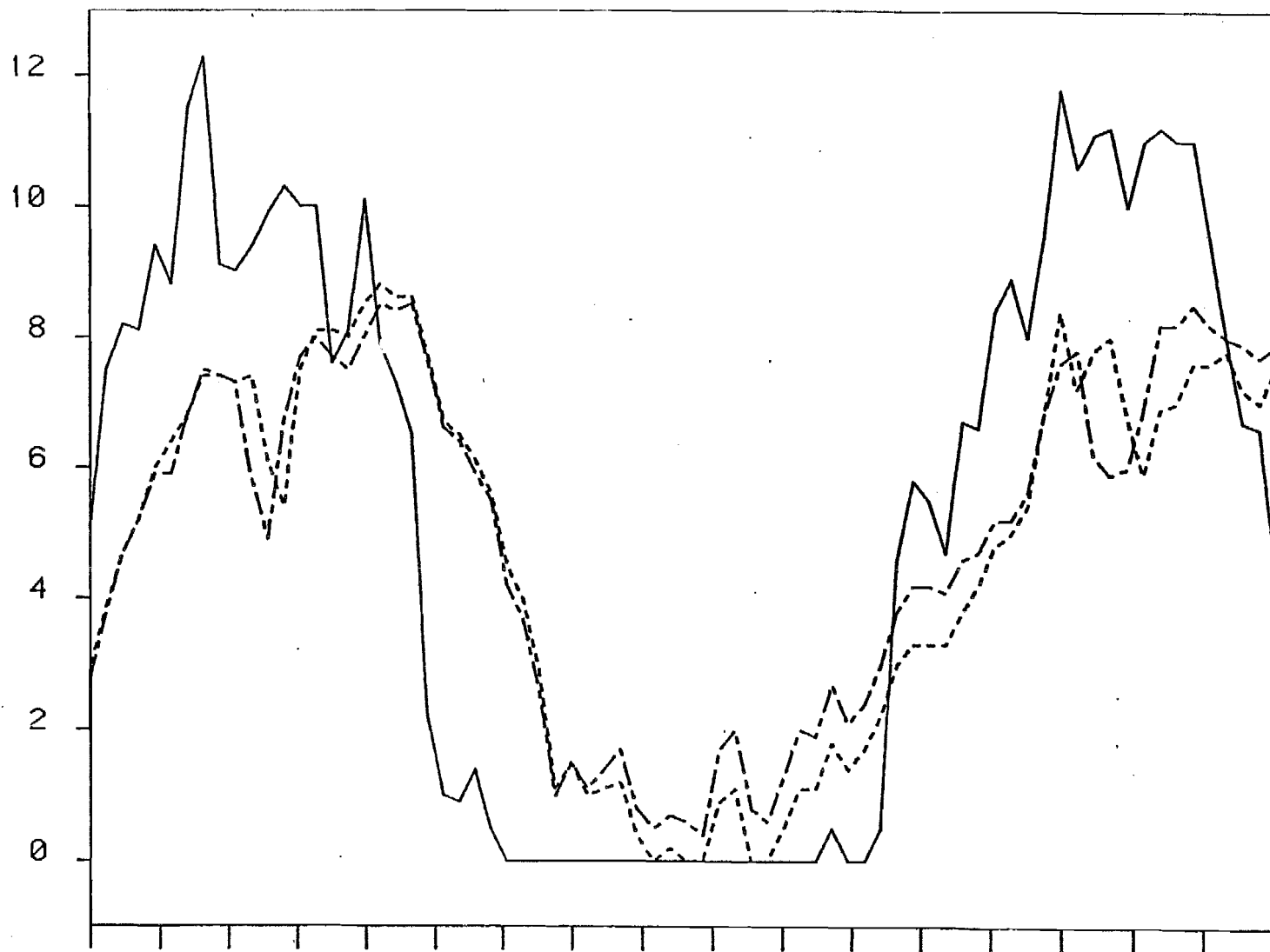
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD NOVEMBER-APRIL SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)
7. DEVIL CANYON DRAWDOWN OF 50 FEET-3 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 100	
DATE: 08/01/82	BY: J. H. HARRIS
REVISION: 0.001	DATE: 08/01/82

D
e
g
r
e
e
s
C



MAY JUN JUL AUG SEP OCT NOV DEC JAN FEB MAR APR MAY JUN JUL AUG SEP

Month

NOTES:

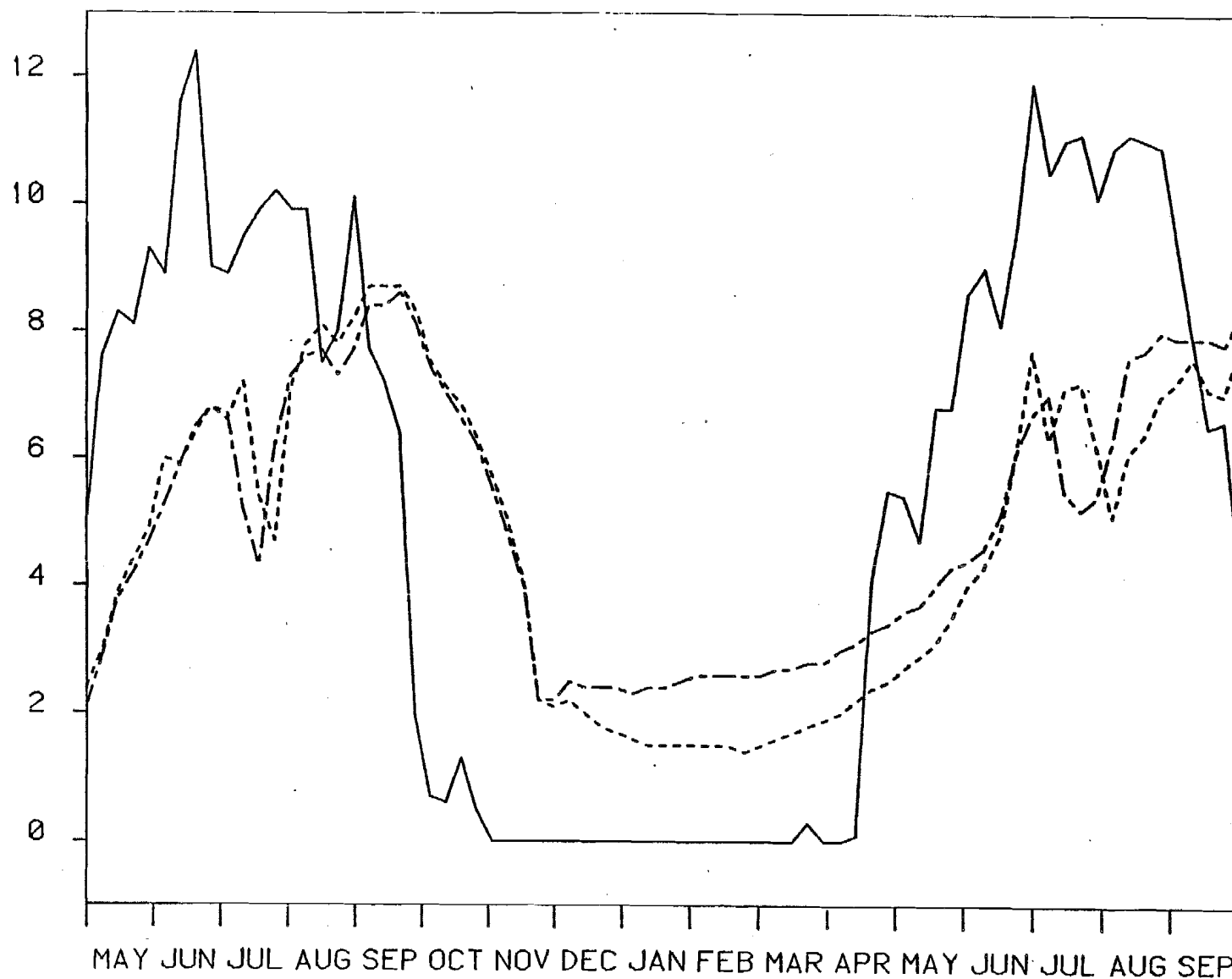
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD DECEMBER-MARCH SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)
7. DEVIL CANYON DRAWDOWN OF 50 FEET-3 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 130	
HANZA-WASANO NAME and TITLE ENGINEER, A.S.A.	DATE 8/79
APPROVED BY DATE 8/79	DRAWING NO. 100-100-100

D
e
g
r
e
e
s
C



NOTES:

1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. DEVIL CANYON DRAWDOWN OF 50 FEET-3 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- · · SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

Month

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 150	
DATE: 08/01/82	BY: [Signature]
APPROVED: [Signature]	DATE: 08/01/82

EXHIBIT 5b

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1981
2002 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION

STAGE 2

50 FT DRAWDOWN AT DEVIL CANYON
2 LEVEL INTAKE

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.5	3.0	3.9	4.3	4.9	6.0	5.6	4.9	6.4	7.6	7.0	5.4	4.9	7.2
140	2.7	3.4	4.2	4.7	5.4	6.3	6.0	5.5	6.8	8.0	7.5	5.8	5.2	7.4
130	3.0	3.9	4.7	5.2	6.0	6.4	6.5	6.2	7.1	8.1	7.4	6.1	5.5	7.6
120	3.3	4.5	5.3	5.8	6.7	6.8	7.2	6.9	7.6	8.5	7.9	6.6	5.8	7.9
110	3.6	5.0	5.8	6.4	7.4	7.2	7.7	7.6	8.1	8.9	8.3	7.0	6.1	8.1
99 ^{2/}	3.9	5.5	6.4	6.9	8.1	7.5	8.4	8.3	8.6	9.3	8.8	7.5	6.5	8.4
98 ^{3/}	4.1	5.5	6.2	6.5	7.3	6.6	7.7	8.0	7.7	8.1	7.7	7.6	7.1	8.1
84 ^{4/}	4.4	6.3	7.1	7.3	8.3	7.2	8.5	9.0	8.4	8.7	8.3	8.4	8.1	8.9

River Mile	August				September				October				
	45	46	47	48	49	50	51	52	1	2	3	4	5
150 ^{1/}	7.8	8.1	7.8	8.2	8.7	8.7	8.7	8.3	7.5	7.1	6.8	6.3	5.7
140	8.0	8.2	7.9	8.4	8.8	8.7	8.7	8.0	7.2	6.9	6.5	6.1	5.2
130	8.1	8.1	8.0	8.5	8.8	8.6	8.6	7.6	6.7	6.5	6.1	5.7	4.5
120	8.3	8.3	8.1	8.7	8.9	8.6	8.6	7.4	6.4	6.3	5.8	5.3	3.9
110	8.5	8.4	8.3	8.9	9.1	8.7	8.6	7.2	6.1	6.0	5.6	5.1	3.3
99 ^{2/}	8.8	8.5	8.5	9.2	9.2	8.7	8.6	6.9	5.7	5.7	5.2	4.7	2.6
98 ^{3/}	8.3	7.6	7.8	8.2	7.8	7.5	6.9	5.0	4.2	4.3	4.1	3.5	1.8
84 ^{4/}	8.9	7.8	8.2	8.9	8.1	7.5	6.9	4.5	3.8	3.9	3.7	3.0	1.0

-
- 1/ Downstream of Devil Canyon Dam Site
 - 2/ Upstream of Chulitna - Susitna confluence
 - 3/ Downstream of Chulitna - Susitna confluence
 - 4/ At Sunshine Stream gaging station

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1982
2002 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION

STAGE 2

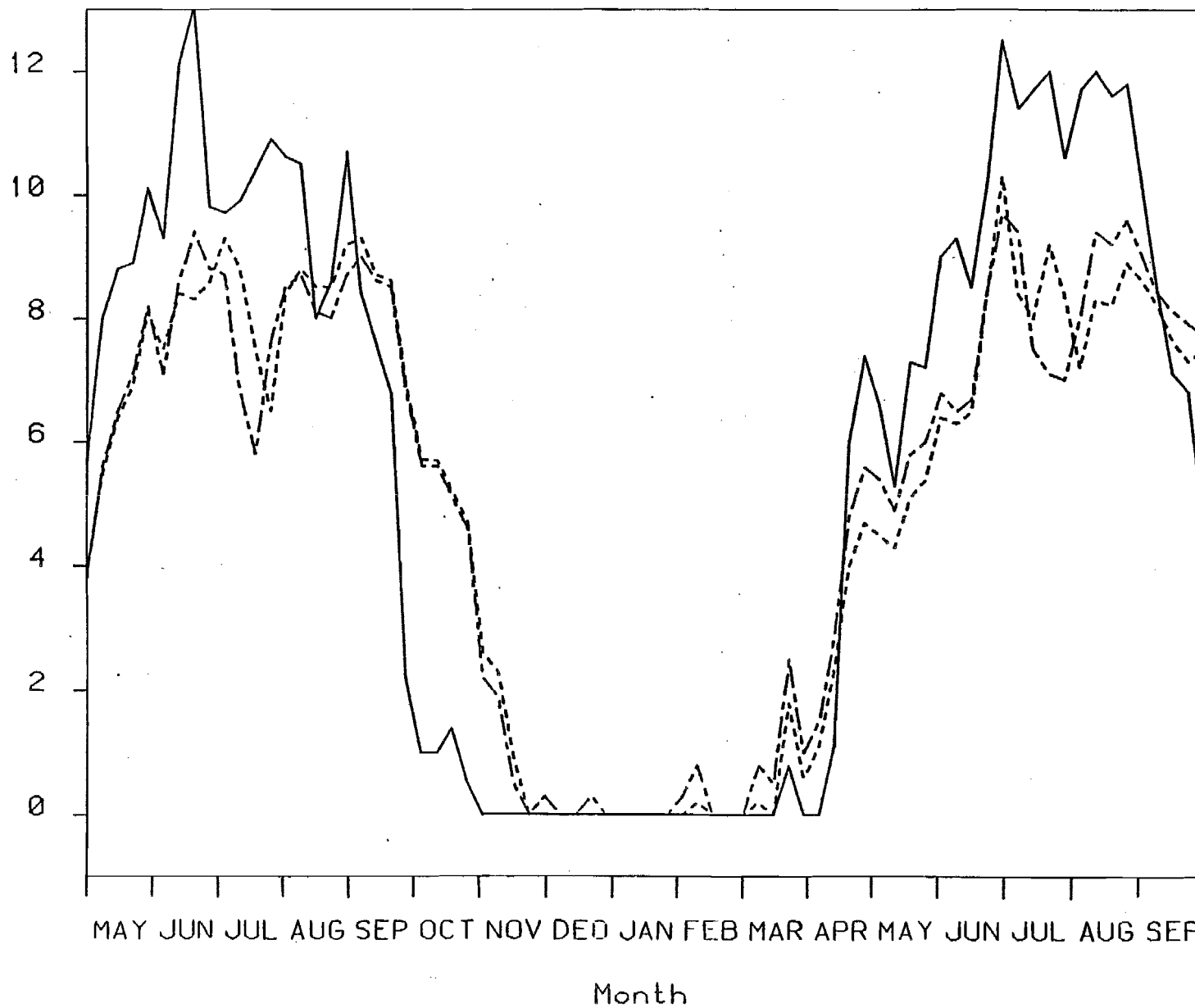
50 FT DRAWDOWN AT DEVIL CANYON
2 LEVEL INTAKE

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.7	2.9	3.1	3.5	3.9	4.3	4.8	6.2	7.8	5.5	5.0	6.3	6.5	5.2
140	2.9	3.1	3.4	3.8	4.3	4.6	5.1	6.5	8.2	6.1	5.6	6.8	6.9	5.5
130	3.3	3.4	3.8	4.2	4.8	5.0	5.4	6.8	8.4	6.6	6.1	7.3	7.1	5.9
120	3.8	3.7	4.3	4.6	5.3	5.5	5.8	7.4	9.1	7.2	6.8	7.9	7.5	6.4
110	4.1	4.0	4.7	5.0	5.8	5.9	6.1	7.9	9.7	7.8	7.4	8.5	7.9	6.7
99 ^{2/}	4.5	4.3	5.1	5.4	6.4	6.3	6.5	8.4	10.3	8.4	8.0	9.2	8.4	7.2
98 ^{3/}	4.5	4.2	5.2	5.4	6.2	6.5	6.1	6.8	8.7	7.7	7.6	8.2	7.6	7.5
84 ^{4/}	5.0	4.7	5.9	6.0	7.2	7.6	6.7	7.8	9.8	8.6	8.6	9.2	8.5	8.7

River Mile	August				September			
	45	46	47	48	49	50	51	52
150 ^{1/}	6.2	6.5	7.0	7.4	7.6	7.2	7.2	8.0
140	6.6	6.8	7.3	7.6	7.7	7.3	7.2	7.9
130	6.9	7.1	7.6	7.7	7.7	7.3	7.1	7.7
120	7.4	7.5	8.1	8.0	7.9	7.4	7.2	7.6
110	7.8	7.8	8.4	8.3	8.0	7.5	7.3	7.5
99 ^{2/}	8.3	8.2	8.9	8.6	8.2	7.6	7.3	7.5
98 ^{3/}	8.0	7.7	8.1	7.2	7.1	6.6	5.8	5.8
84 ^{4/}	8.9	8.6	8.9	7.9	7.5	6.8	6.0	5.5

-
- ^{1/} Downstream of Devil Canyon Dam Site
^{2/} Upstream of Chulitna - Susitna confluence
^{3/} Downstream of Chulitna - Susitna confluence
^{4/} At Sunshine Stream gaging station

D
E
G
R
E
E
S
C



NOTES:

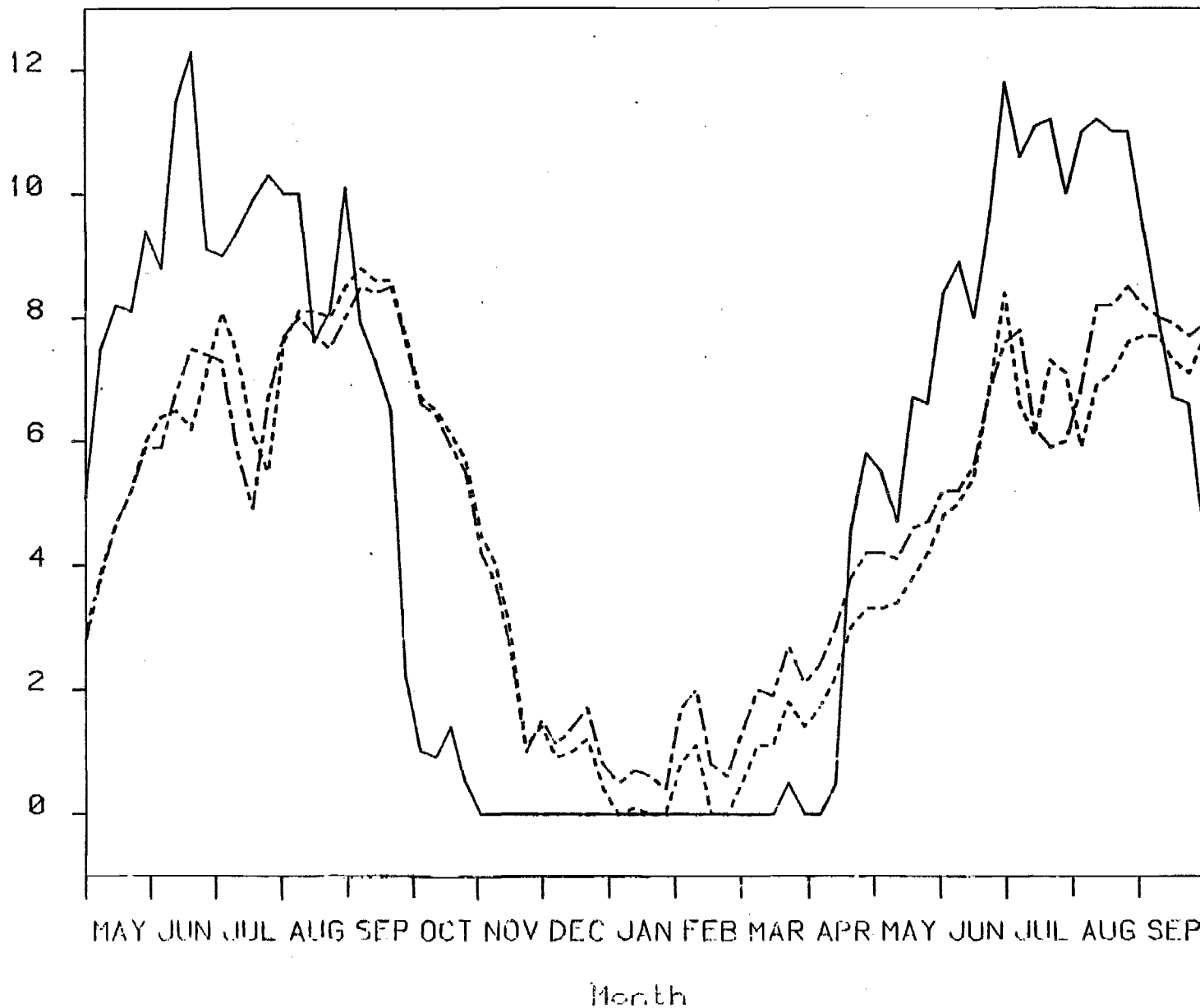
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD NOVEMBER-APRIL SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)
7. DEVIL CANYON DRAWDOWN OF 50 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 100	
AREA - GRADE SUSITNA RIVER SUSITNA, AK 99615	APPROVED DATE PREPARED BY

D
e
g
r
e
e
s
C



NOTES:

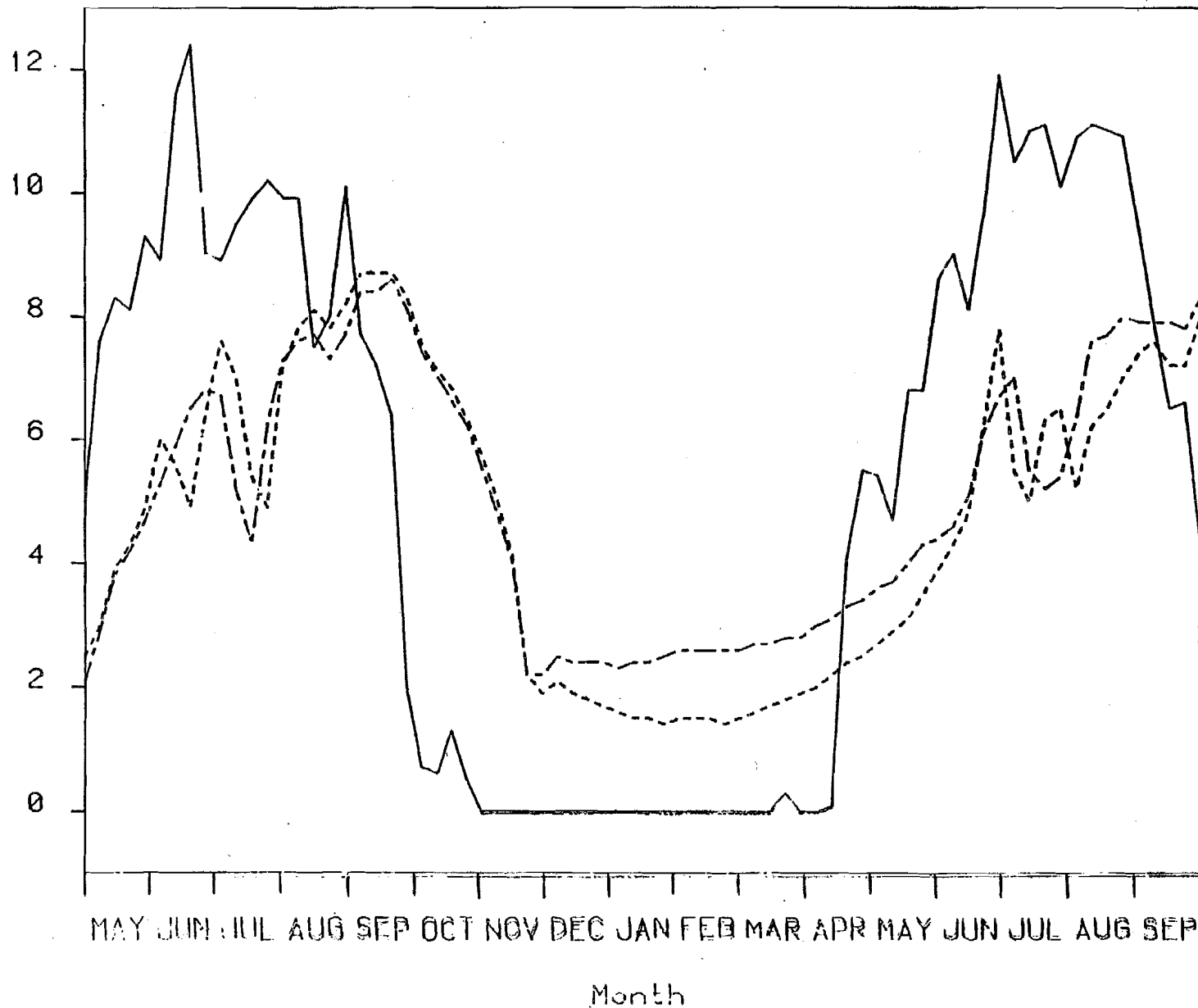
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD DECEMBER-MARCH SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER
7. DEVIL CANYON DRAWDOWN OF 50 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES	
RIVER MILE 130	
DATE: 10/1/82	BY: J. L. HARRIS
REVISION: 1/1/82	BY: J. L. HARRIS

C
O
O
L
I
N
G



NOTES:

1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. DEVIL CANYON DRAWDOWN OF 60 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
BRAINIA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES	
RIVER MILE 160	
DATE	BY
APPROVED BY	DATE

EXHIBIT 5c

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1981
2002 ENERGY DEMANDS
CASE E-VI FLOW REQUIREMENTS
STAGED CONSTRUCTION

STAGE 2

9 FT DRAWDOWN AT DEVIL CANYON

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.5	3.1	4.0	4.4	4.8	5.9	6.3	6.8	7.1	7.1	6.5	5.8	4.5	6.3
140	2.7	3.5	4.3	4.8	5.4	6.1	6.7	7.3	7.4	7.4	7.1	6.2	4.8	6.5
130	3.0	3.9	4.8	5.3	6.0	6.3	7.1	7.7	7.6	7.6	7.1	6.4	5.2	6.8
120	3.4	4.5	5.4	6.0	6.8	6.7	7.8	8.4	8.1	8.1	7.6	6.9	5.5	7.1
110	3.6	5.0	5.9	6.6	7.5	7.1	8.3	8.9	8.5	8.5	8.1	7.2	5.8	7.3
99 ^{2/}	4.0	5.5	6.5	7.2	8.2	7.4	8.8	9.6	9.0	8.9	8.6	7.7	6.2	7.7
98 ^{3/}	4.1	5.5	6.2	6.5	7.4	6.6	7.8	8.4	7.8	8.0	7.7	7.6	6.9	7.7
84 ^{4/}	4.5	6.3	7.1	7.3	8.3	7.1	8.7	9.3	8.5	8.6	8.3	8.5	8.0	8.6

River Mile	August				September				October				
	45	46	47	48	49	50	51	52	1	2	3	4	5
150 ^{1/}	7.9	8.2	7.8	8.3	8.7	8.7	8.7	8.3	7.5	7.1	6.8	6.3	5.7
140	8.1	8.3	8.0	8.5	8.8	8.7	8.7	8.1	7.2	6.9	6.5	6.1	5.2
130	8.2	8.2	8.0	8.6	8.8	8.6	8.6	7.7	6.7	6.5	6.1	5.7	4.5
120	8.5	8.4	8.2	8.8	9.0	8.6	8.6	7.4	6.4	6.3	5.8	5.3	3.9
110	8.6	8.5	8.3	9.0	9.1	8.7	8.6	7.2	6.1	6.1	5.6	5.1	3.3
99 ^{2/}	8.9	8.6	8.5	9.2	9.3	8.7	8.6	6.9	5.7	5.7	5.3	4.7	2.6
98 ^{3/}	8.3	7.7	7.9	8.2	7.8	7.5	6.9	5.0	4.2	4.3	4.1	3.5	1.8
84 ^{4/}	8.9	7.9	8.3	8.9	8.1	7.5	6.9	4.5	3.8	3.9	3.7	3.0	1.0

-
- ^{1/} Downstream of Devil Canyon Dam Site
^{2/} Upstream of Chulitna - Susitna confluence
^{3/} Downstream of Chulitna - Susitna confluence
^{4/} At Sunshine Stream gaging station

SUSITNA HYDROELECTRIC PROJECT
SIMULATED STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1982
2002 ENERGY DEMANDS
CASE E-V1 FLOW REQUIREMENTS
STAGED CONSTRUCTION

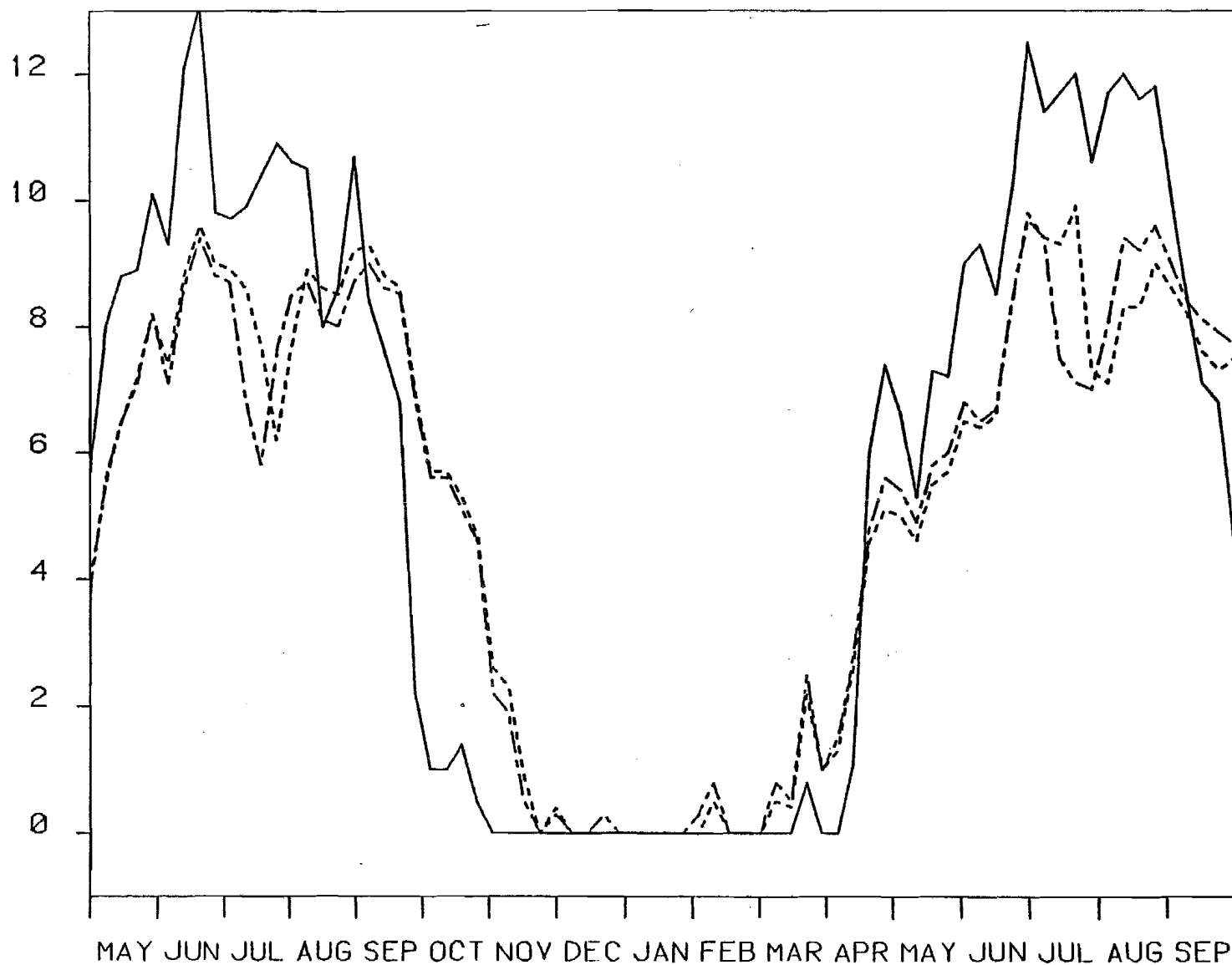
STAGE 2

9 FT DRAWDOWN AT DEVIL CANYON

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	3.2	3.4	3.6	3.9	4.2	4.4	5.0	6.2	6.9	6.9	7.0	7.3	5.4	5.2
140	3.4	3.5	3.8	4.2	4.6	4.8	5.3	6.6	7.4	7.4	7.5	7.8	5.7	5.5
130	3.8	3.7	4.2	4.5	5.0	5.1	5.5	6.8	7.8	7.7	7.7	8.1	6.1	5.9
120	4.2	4.0	4.6	4.9	5.5	5.6	5.9	7.4	8.5	8.3	8.3	8.7	6.5	6.3
110	4.6	4.3	5.0	5.3	6.0	6.0	6.3	7.9	9.1	8.8	8.8	9.3	6.8	6.7
99 ^{2/}	5.0	4.6	5.5	5.7	6.5	6.4	6.6	8.4	9.8	9.4	9.3	9.9	7.3	7.1
98 ^{3/}	4.9	4.4	5.3	5.5	6.3	6.5	6.1	6.8	8.5	8.0	8.0	8.4	7.2	7.5
84 ^{4/}	5.3	4.8	6.0	6.1	7.3	7.6	6.7	7.8	9.7	8.8	8.8	9.4	8.2	8.7

River Mile	August				September			
	45	46	47	48	49	50	51	52
150 ^{1/}	6.2	6.5	7.2	7.3	7.7	7.2	7.1	8.0
140	6.6	6.8	7.5	7.6	7.8	7.3	7.1	8.0
130	6.9	7.1	7.8	7.7	7.8	7.3	7.1	7.7
120	7.4	7.5	8.2	8.0	7.9	7.4	7.1	7.6
110	7.8	7.9	8.5	8.3	8.1	7.5	7.2	7.6
99 ^{2/}	8.3	8.3	9.0	8.6	8.2	7.6	7.3	7.5
98 ^{3/}	8.0	7.7	8.2	7.2	7.1	6.6	5.8	5.8
84 ^{4/}	8.9	8.6	9.0	7.9	7.5	6.8	6.0	5.5

-
- 1/ Downstream of Devil Canyon Dam Site
 - 2/ Upstream of Chulitna - Susitna confluence
 - 3/ Downstream of Chulitna - Susitna confluence
 - 4/ At Sunshine Stream gaging station



Month

NOTES:

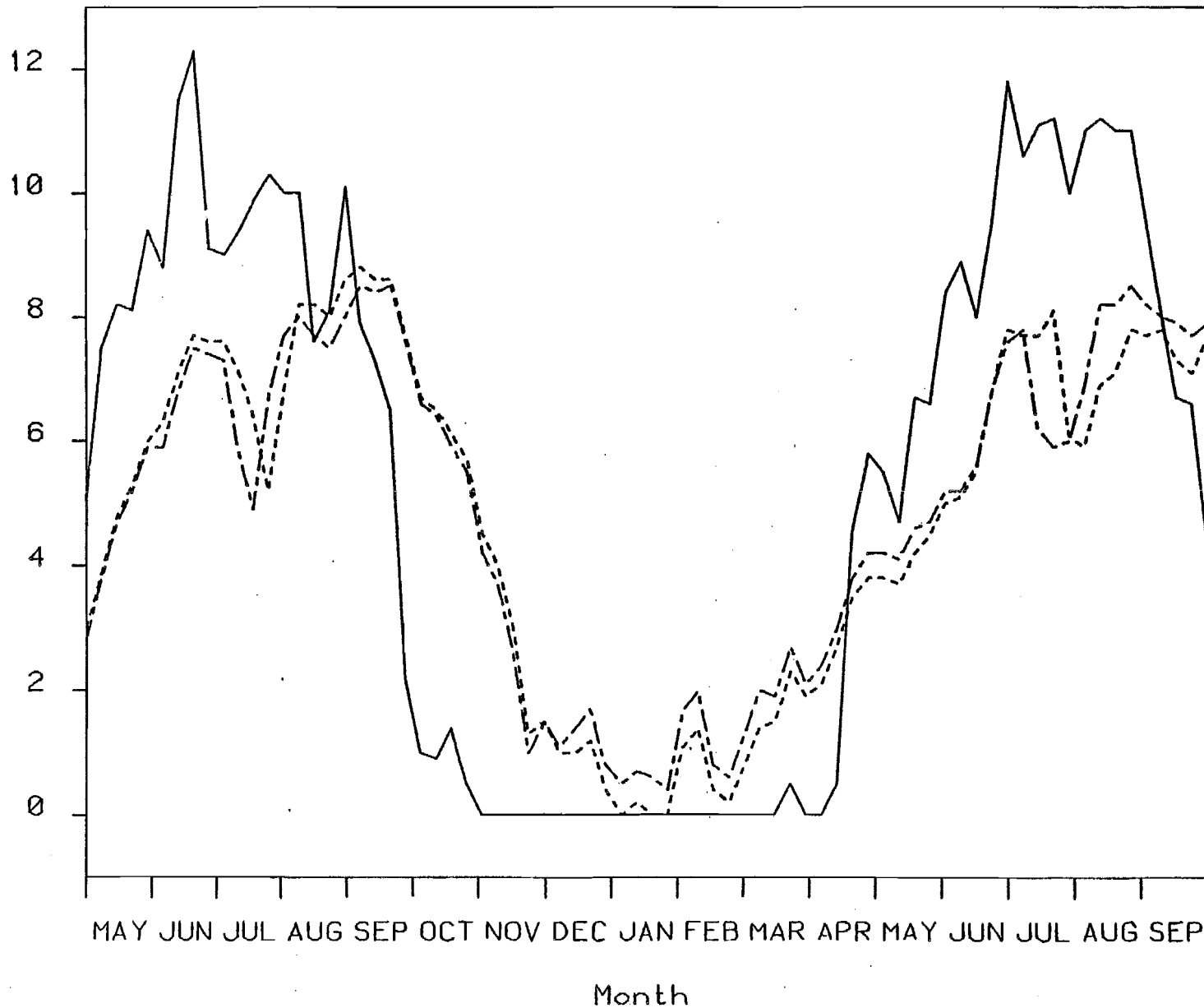
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD NOVEMBER-APRIL SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)
7. DEVIL CANYON DRAWDOWN OF 9 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SIMULATED SUSITNA RIVER TEMPERATURES RIVER MILE 100	
DATE: 08/01/82	BY: [Signature]
APPROVED: [Signature]	DATE: 08/01/82

D
e
g
r
e
e
s
C



NOTES:

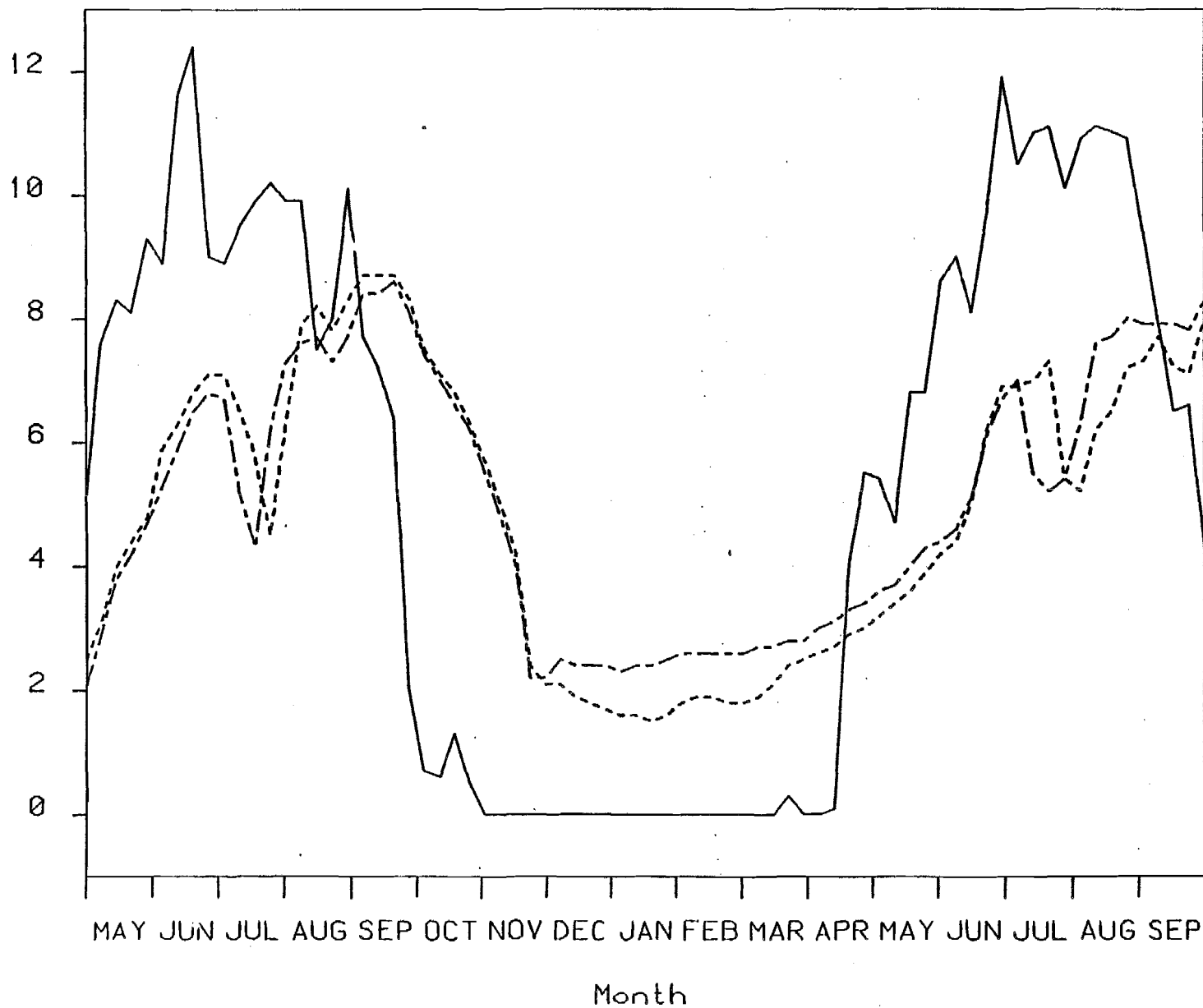
1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. TEMPERATURES SIMULATED BY SNTMP FOR PERIOD DECEMBER-MARCH SHOULD BE USED WITH CAUTION AS AN ICE COVER MAY EXIST ON RIVER AND SNTMP DOES NOT SIMULATE TEMPERATURES UNDER AN ICE COVER (SEE RIVER ICE SIMULATIONS)
7. DEVIL CANYON DRAWDOWN OF 9 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- . - . - SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSTINA HYDROELECTRIC PROJECT	
SIMULATED SUSTINA RIVER TEMPERATURES RIVER MILE 130	
DATE: 10/1/82	BY: [Signature]
APPROVED: [Signature]	DATE: 10/1/82

D
e
g
r
e
e
s
C



NOTES:

1. CLIMATOLOGICAL AND HYDROLOGICAL DATA PERIOD MAY 1981-SEPT. 1982
2. INFLOW TEMPERATURE MATCHING POLICY FOR MULTI-LEVEL INTAKE
3. STAGED CONSTRUCTION STAGE 2
4. ENERGY DEMAND FOR 2002
5. E-VI FLOW REQUIREMENTS
6. DEVIL CANYON DRAWDOWN OF 9 FEET-2 LEVELS OF SHUTTERS

LEGEND

- SIMULATED NATURAL TEMPERATURES
- - - SIMULATED TEMPERATURES LICENSE APPLICATION PROJECT
- · · SIMULATED TEMPERATURES STAGE 2 OF STAGED CONSTRUCTION

ALASKA POWER AUTHORITY		
SUBITNA HYDROELECTRIC PROJECT		
SIMULATED SUBITNA RIVER TEMPERATURES RIVER MILE 150		
NAME-NAME	DATE	REVISION NO.
DATE	DATE	DATE

EXHIBIT 6

EXHIBIT 6

SIMULATED RIVER TEMPERATURES, LICENSE APPLICATION PROJECT
(WATANA EL. 2185, DEVIL CANYON EL. 1455), PROJECTED ENERGY
DEMANDS FOR 2020, CASE C FLOW REQUIREMENTS, HYDROLOGICAL
AND CLIMATOLOGICAL DATA FOR 1981-82.

STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1981
ENERGY DEMAND: 2020

WATER WEEK NO.

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 ^{1/}	2.6	3.2	4.0	4.5	5.1	6.1	7.3	8.8	7.7	7.2	6.4	8.6	10.7	11.2
140	2.8	3.6	4.4	5.0	5.7	6.4	7.8	9.3	8.1	7.6	6.9	9.0	10.9	11.3
130	3.1	4.1	4.9	5.5	6.2	6.5	8.1	9.4	8.1	7.8	6.9	8.5	10.4	10.8
120	3.4	4.8	5.6	6.1	7.1	7.0	8.8	10.1	8.7	8.3	7.4	9.0	10.8	11.1
110	3.7	5.3	6.2	6.7	7.8	7.4	9.4	10.7	9.2	8.8	7.8	9.5	11.1	11.4
99 ^{2/}	4.0	5.8	6.7	7.3	8.5	7.8	10.0	11.3	9.7	9.3	8.3	9.9	11.4	11.6
98 ^{3/}	4.1	5.6	6.3	6.6	7.4	6.6	8.0	8.6	7.8	7.9	7.7	8.0	8.8	8.6
84 ^{4/}	4.5	6.4	7.2	7.3	8.4	7.2	8.8	9.5	8.5	8.6	8.3	8.8	9.3	9.5

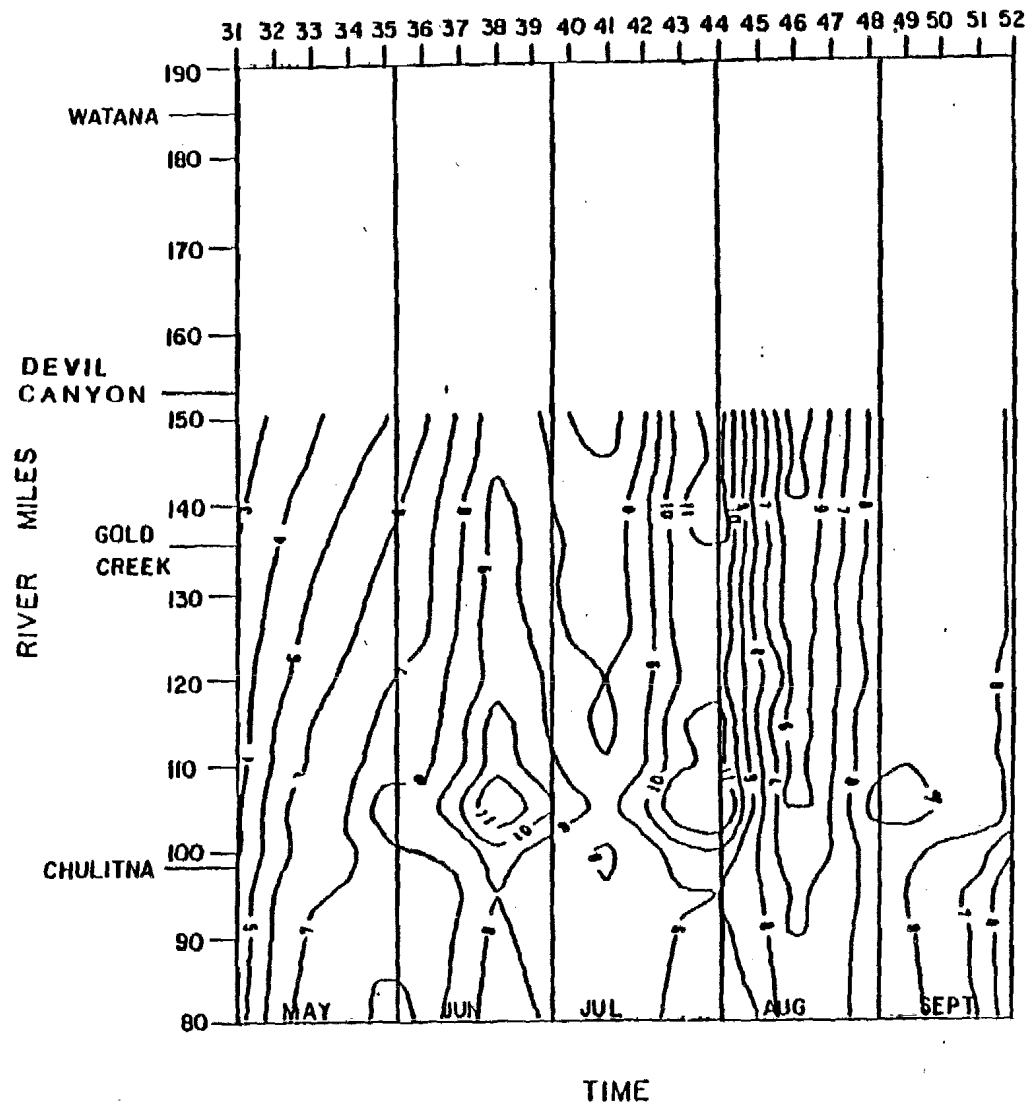
WATER WEEK NO.

River Mile	August				September				October				
	45	46	47	48	49	50	51	52	1	2	3	4	5
150 ^{1/}	6.1	5.1	6.9	8.0	8.4	8.4	8.6	8.4	7.6	7.2	6.8	6.3	5.5
140	6.4	5.3	7.1	8.2	8.5	8.5	8.6	8.2	7.4	7.0	6.6	6.0	5.1
130	6.6	5.5	7.2	8.3	8.5	8.4	8.5	7.8	7.0	6.8	6.3	5.7	4.6
120	7.0	5.6	7.4	8.5	8.7	8.4	8.5	7.6	6.7	6.6	6.1	5.5	4.1
110	7.3	5.8	7.5	8.7	8.9	8.5	8.5	7.3	6.5	6.4	5.9	5.3	3.7
99 ^{2/}	7.6	6.0	7.7	9.0	9.0	8.5	8.5	7.1	6.2	6.2	5.7	5.0	3.2
98 ^{3/}	7.7	6.4	7.4	8.1	7.7	7.4	6.9	5.1	4.8	5.0	4.6	4.0	2.5
84 ^{4/}	8.5	6.9	7.9	8.8	8.0	7.5	6.9	4.6	4.3	4.6	4.2	3.5	1.7

- ^{1/} Downstream of Devil Canyon Dam Site
^{2/} Upstream of Susitna - Chulitna confluence
^{3/} Downstream of Susitna - Chulitna confluence (full mixing assumed)
^{4/} At Sunshine stream gaging station at Parks Highway Bridge

MIDDLE SUSITNA RIVER - ISOTHERMS

WATER WEEKS (PLOTTED AT MID-WEEK)



NOTES :

1. TEMPERATURES IN °C.

WATANA/DEVIL CANYON, 2020 ENERGY DEMAND

SUMMER 1981 CLIMATE DATA

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

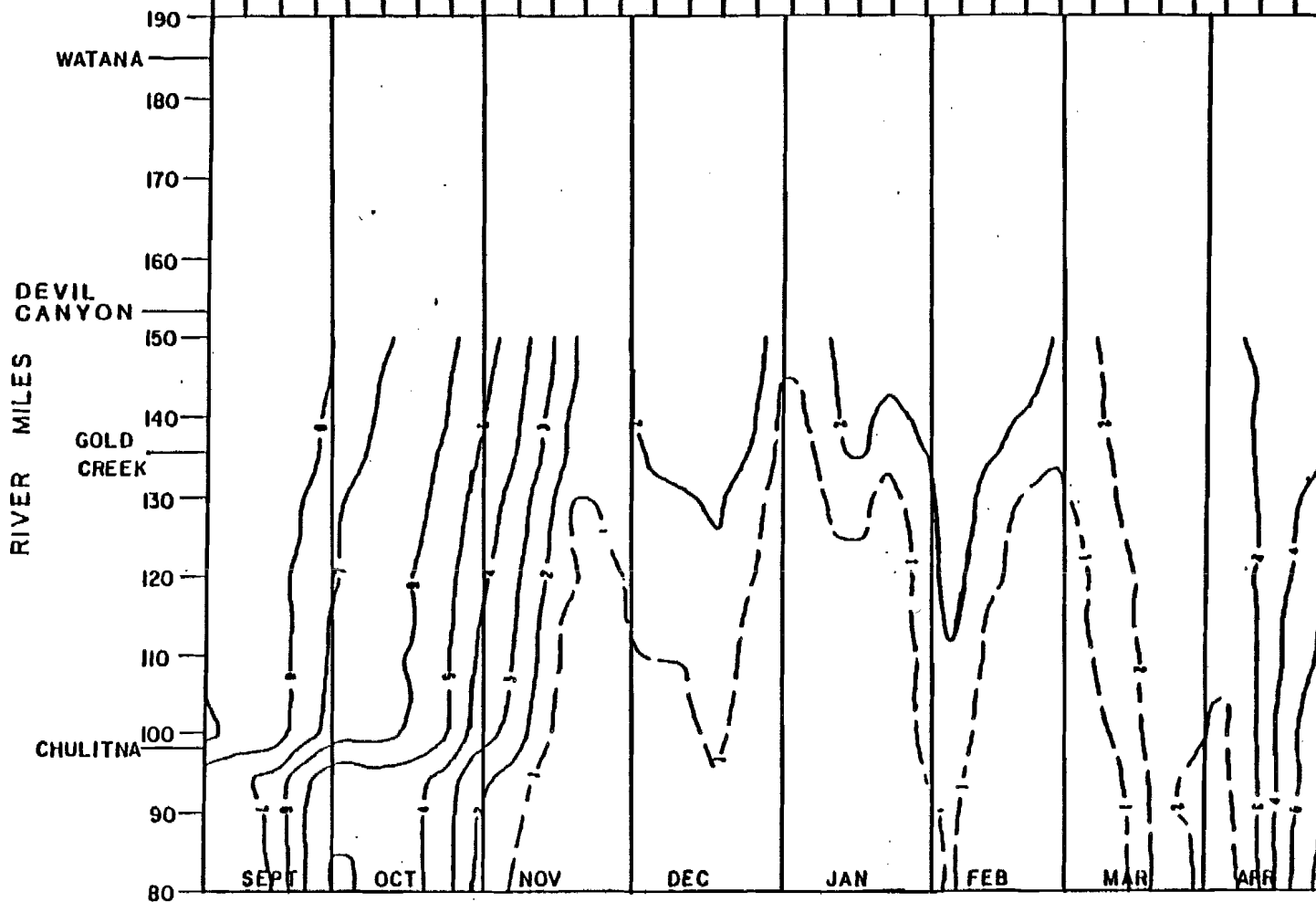
ARCTIC ENVIRONMENTAL
INFORMATION AND DATA
CENTER

HARZA-EBASCO
SUSITNA JOINT VENTURE

MIDDLE SUSITNA RIVER-ISOTHERMS

WATER WEEKS (PLOTTED AT MID-WEEK)

49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



NOTES :

1. TEMPERATURES IN °C.
 2. ICE SIMULATION NOT MADE FOR THIS CASE. TEMPERATURES FOR NOVEMBER THROUGH MARCH SHOULD NOT BE USED.
- NOTE SIMILARITY TO WATANA/DEVIL CANYON, 2002 WINTER 1981-1982.

TIME

WATANA/DEVIL CANYON, 2020 ENERGY DEMAND

WINTER 1981-1982 CLIMATE DATA

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

ARCTIC ENVIRONMENTAL
INFORMATION AND DATA
CENTER

HARZA-EBASCO
SUSITNA JOINT VENTURE

STREAM TEMPERATURES
WEATHER PERIOD: SUMMER 1982
ENERGY DEMAND: 2020

WATER WEEK NO.

River Mile	May					June				July				
	31	32	33	34	35	36	37	38	39	40	41	42	43	44
150 <u>1</u> /	3.6	3.8	4.0	4.4	4.6	4.7	5.0	5.8	6.8	7.3	7.8	8.9	8.7	7.6
140	3.8	3.9	4.3	4.6	4.9	5.0	5.4	6.3	7.4	7.9	8.3	9.5	9.0	8.0
130	4.2	4.1	4.6	4.9	5.3	5.3	5.6	6.6	7.8	8.2	8.4	9.4	8.6	8.2
120	4.5	4.4	5.1	5.3	5.9	5.9	6.0	7.2	8.6	8.9	9.1	10.1	9.1	8.8
110	4.9	4.6	5.5	5.7	6.5	6.4	6.5	7.8	9.3	9.5	9.7	10.7	9.6	9.4
99 <u>2</u> /	5.3	4.9	5.9	6.1	7.0	6.8	6.9	8.4	10.1	10.2	10.3	11.3	10.1	10.0
98 <u>3</u> /	5.1	4.6	5.5	5.6	6.4	6.7	6.1	6.7	8.5	8.0	8.0	8.6	7.7	8.3
84 <u>4</u> /	5.5	4.9	6.1	6.2	7.4	7.7	6.7	7.7	9.7	8.9	8.9	9.5	8.6	9.3

WATER WEEK NO.

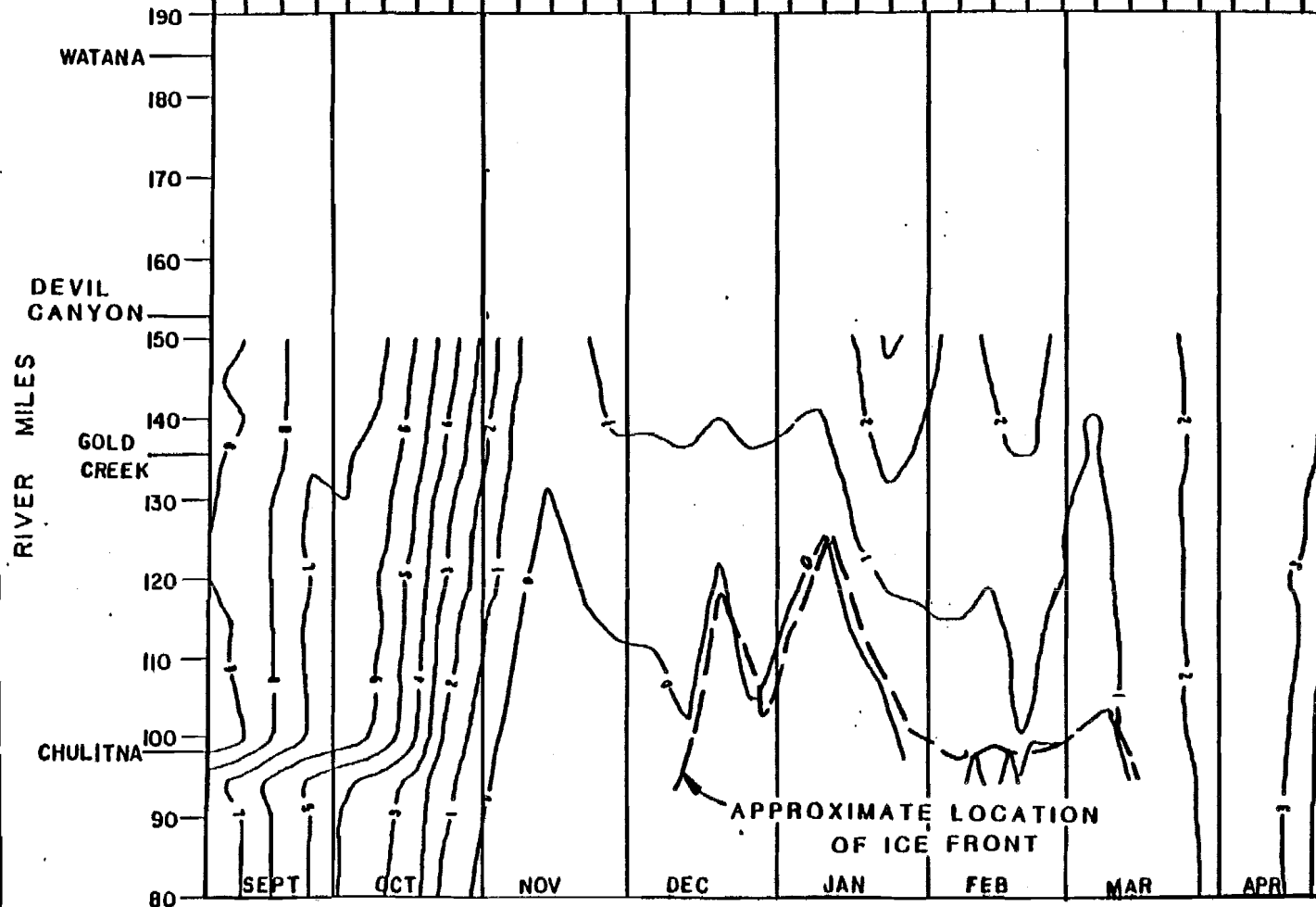
River Mile	August				September				October				
	45	46	47	48	49	50	51	52	1	2	3	4	5
150 <u>1</u> /	7.8	10.2	7.3	7.4	9.1	9.0	8.1	7.2	7.7	7.0	6.1	4.6	2.9
140	8.1	10.3	7.6	7.7	9.1	9.0	8.1	7.1	7.5	6.8	5.7	4.0	2.6
130	8.4	10.3	7.8	7.8	9.0	8.8	7.6	6.9	7.2	6.3	5.3	3.4	2.1
120	8.9	10.6	8.3	8.1	9.1	8.8	7.7	6.8	7.0	6.0	4.8	2.7	1.6
110	9.3	10.8	8.6	8.4	9.2	8.9	7.7	6.8	6.8	5.8	4.5	2.1	1.2
99 <u>2</u> /	9.8	11.1	9.1	8.7	9.3	8.9	7.7	6.7	6.6	5.4	4.0	1.4	0.7
98 <u>3</u> /	8.4	8.7	8.2	7.2	7.6	6.9	5.3	5.3	4.4	4.2	3.2	1.4	0.8
84 <u>4</u> /	9.3	9.4	9.0	7.9	7.8	7.0	5.7	5.1	3.7	3.5	2.4	0.7	0.3

- 1/ Downstream of Devil Canyon Dam Site
2/ Upstream of Susitna - Chulitna confluence
3/ Downstream of Susitna - Chulitna confluence (full mixing assumed)
4/ At Sunshine stream gaging station at Parks Highway Bridge

MIDDLE SUSITNA RIVER-ISOTHERMS

WATER WEEKS (PLOTTED AT MID-WEEK)

49 50 51 52 1 2 3 4 5 6 7 8 9 10 11 12 13 14 15 16 17 18 19 20 21 22 23 24 25 26 27 28 29 30



NOTES :

1. TEMPERATURES IN °C.
2. APPROXIMATE LOCATION OF ICE FRONT FROM RIVER ICE SIMULATION PLOTS.

TIME

WATANA/DEVIL CANYON, 2020 ENERGY DEMAND

WINTER 1982-1983 CLIMATE DATA

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

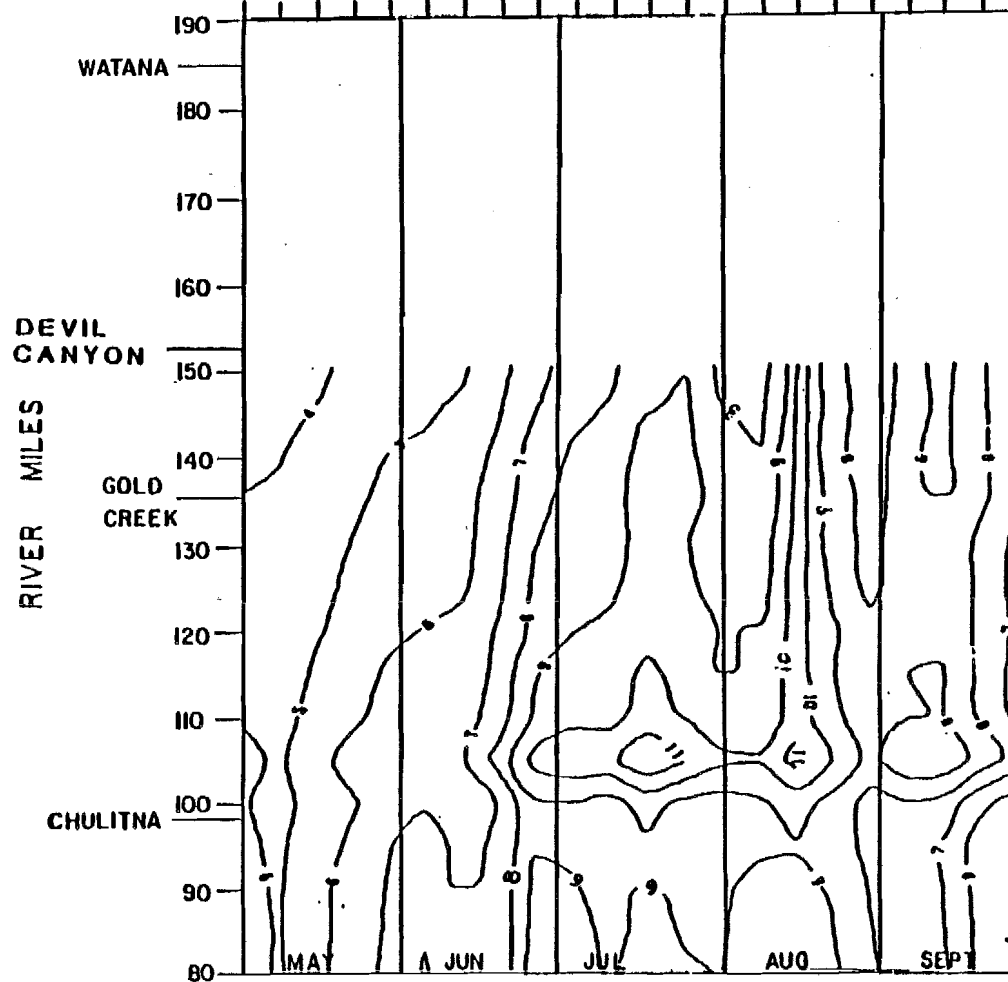
ARCTIC ENVIRONMENTAL
INFORMATION AND DATA
CENTER

HARZA-EBASCO
SUSITNA JOINT VENTURE

MIDDLE SUSITNA RIVER - ISOTHERMS

WATER WEEKS (PLOTTED AT MID-WEEK)

31 32 33 34 35 36 37 38 39 40 41 42 43 44 45 46 47 48 49 50 51 52



NOTES :

1. TEMPERATURES IN °C

TIME

WATANA/DEVIL CANYON, 2020 ENERGY DEMAND

SUMMER 1982 CLIMATE DATA

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

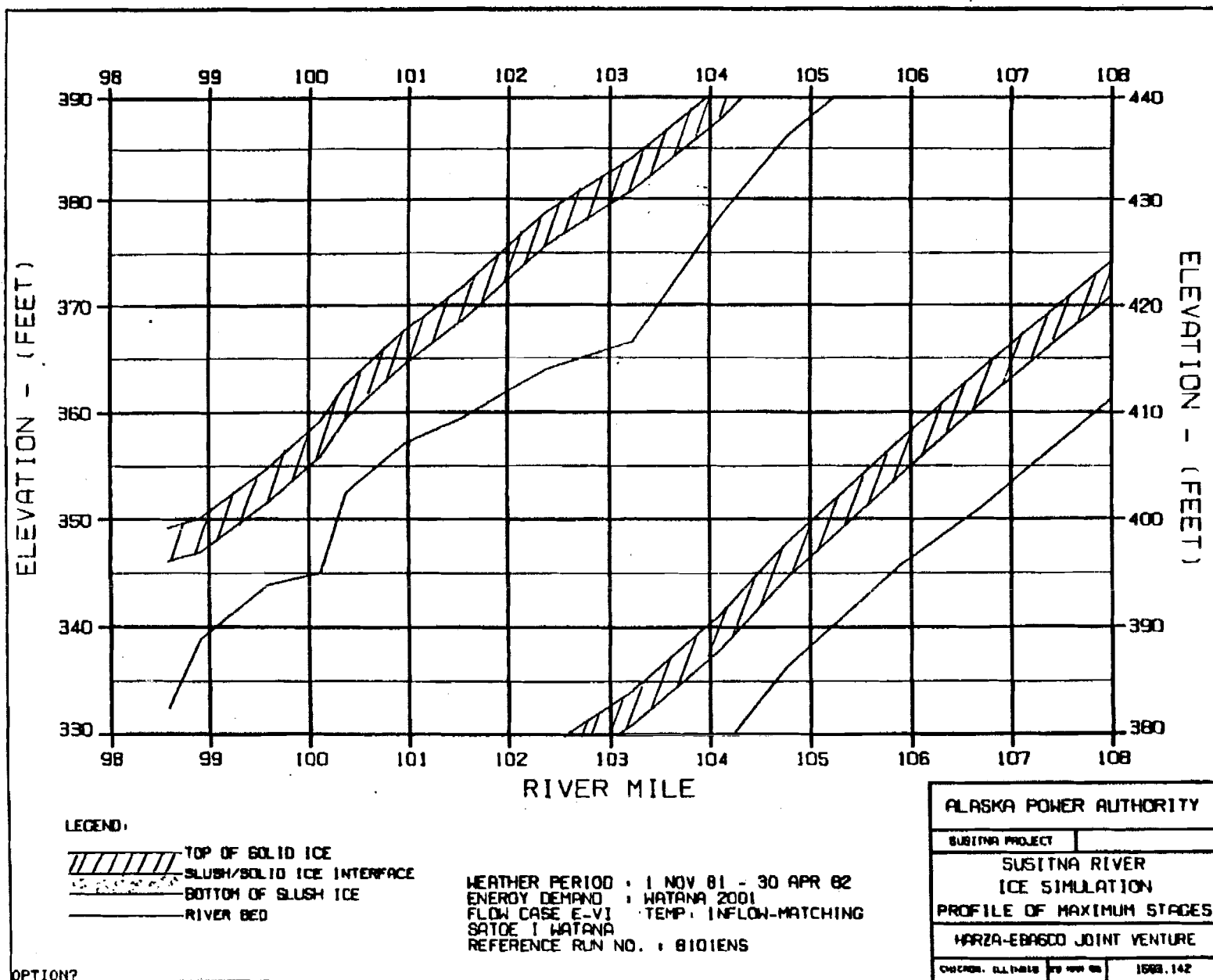
ARCTIC ENVIRONMENTAL
INFORMATION AND DATA
CENTER

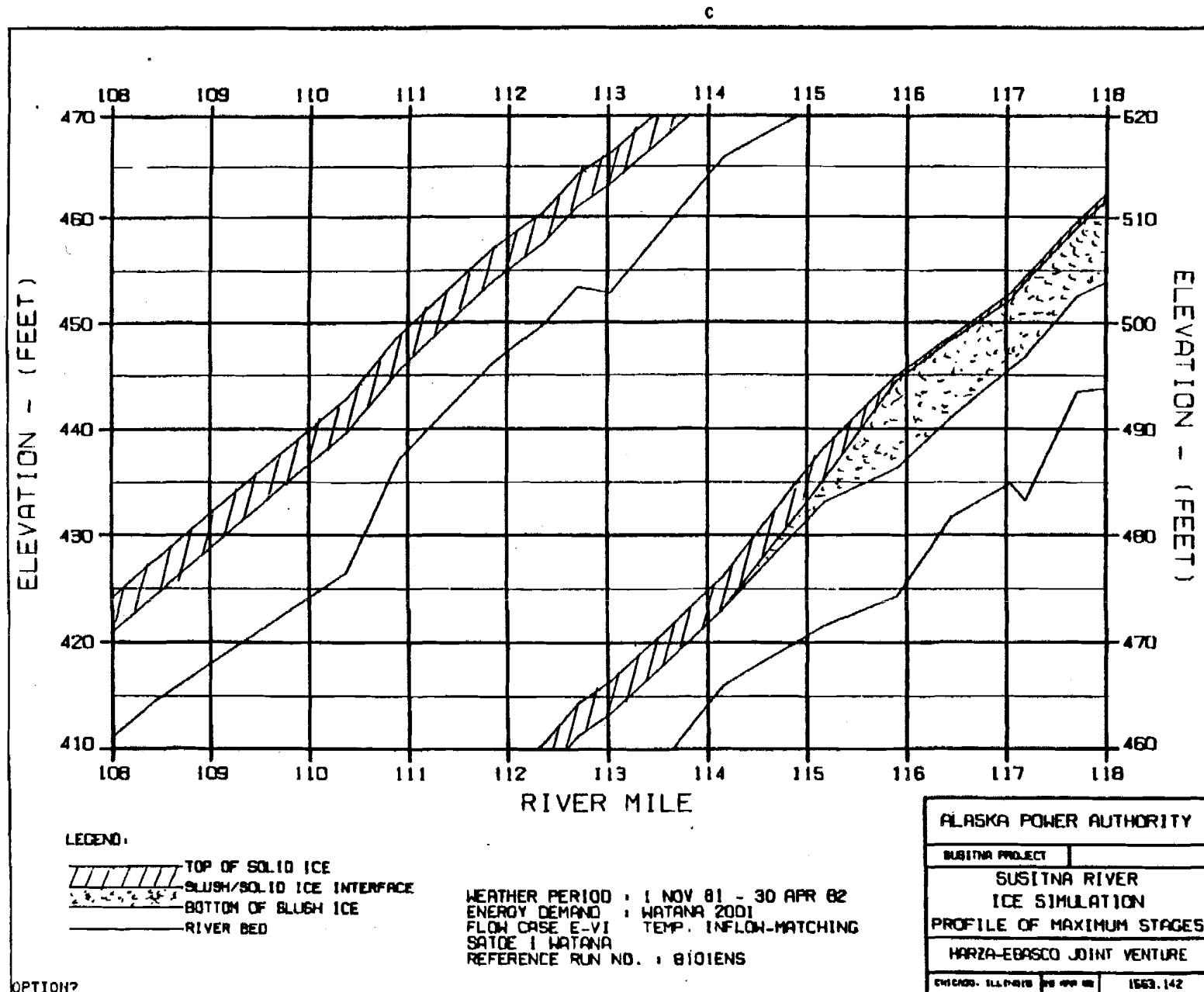
HARZA-EBASCO
SUSITNA JOINT VENTURE

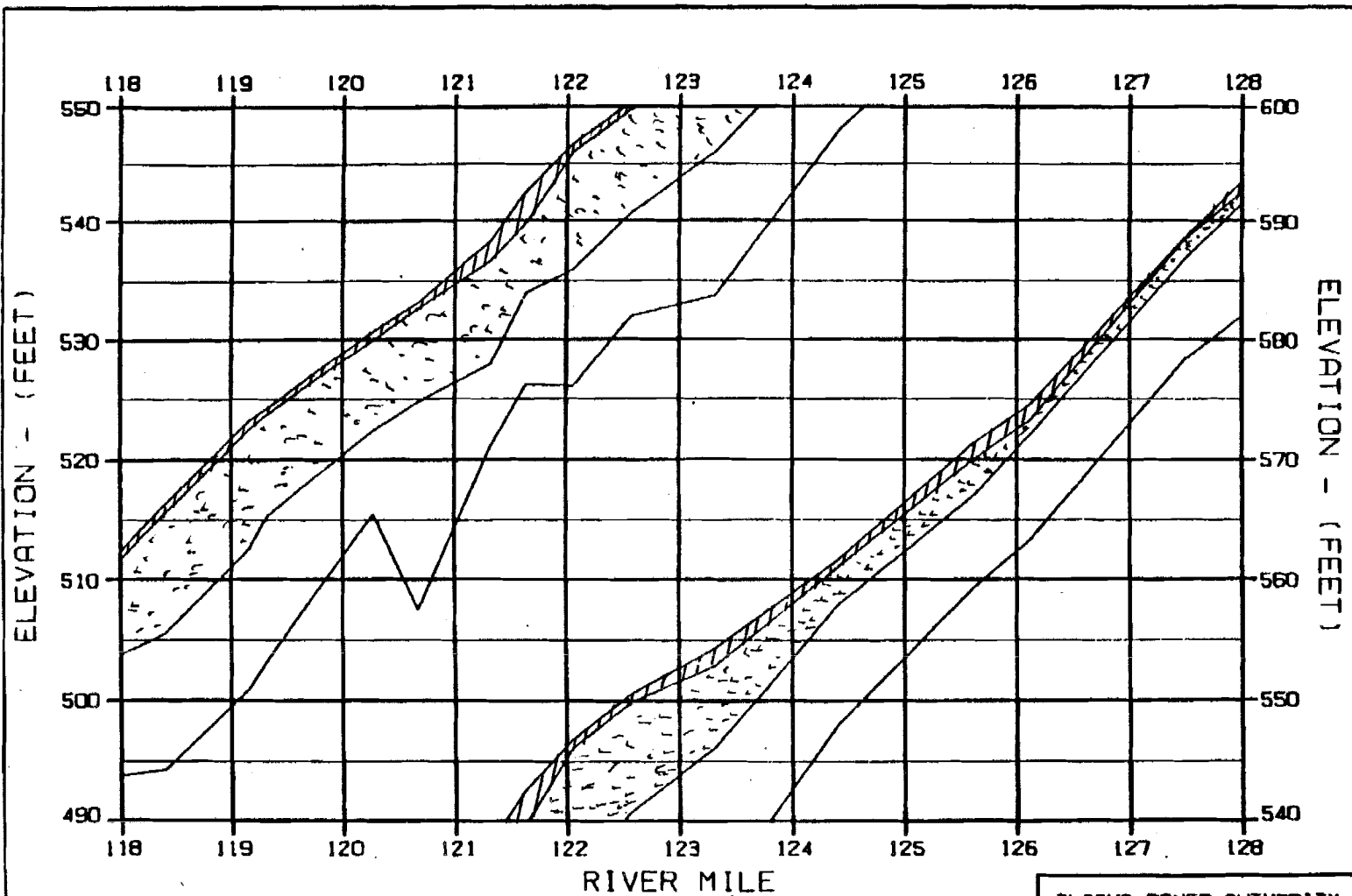
EXHIBIT 7

EXHIBIT 7

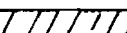
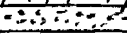
RIVER ICE SIMULATIONS, STAGED CONSTRUCTION - STAGE 1
(WATANA EL. 2000), PROJECTED ENERGY DEMANDS FOR 2001,
E-VI ENVIRONMENTAL FLOW REQUIREMENTS, HYDROLOGICAL AND
CLIMATOLOGICAL DATA FOR 1981-82.







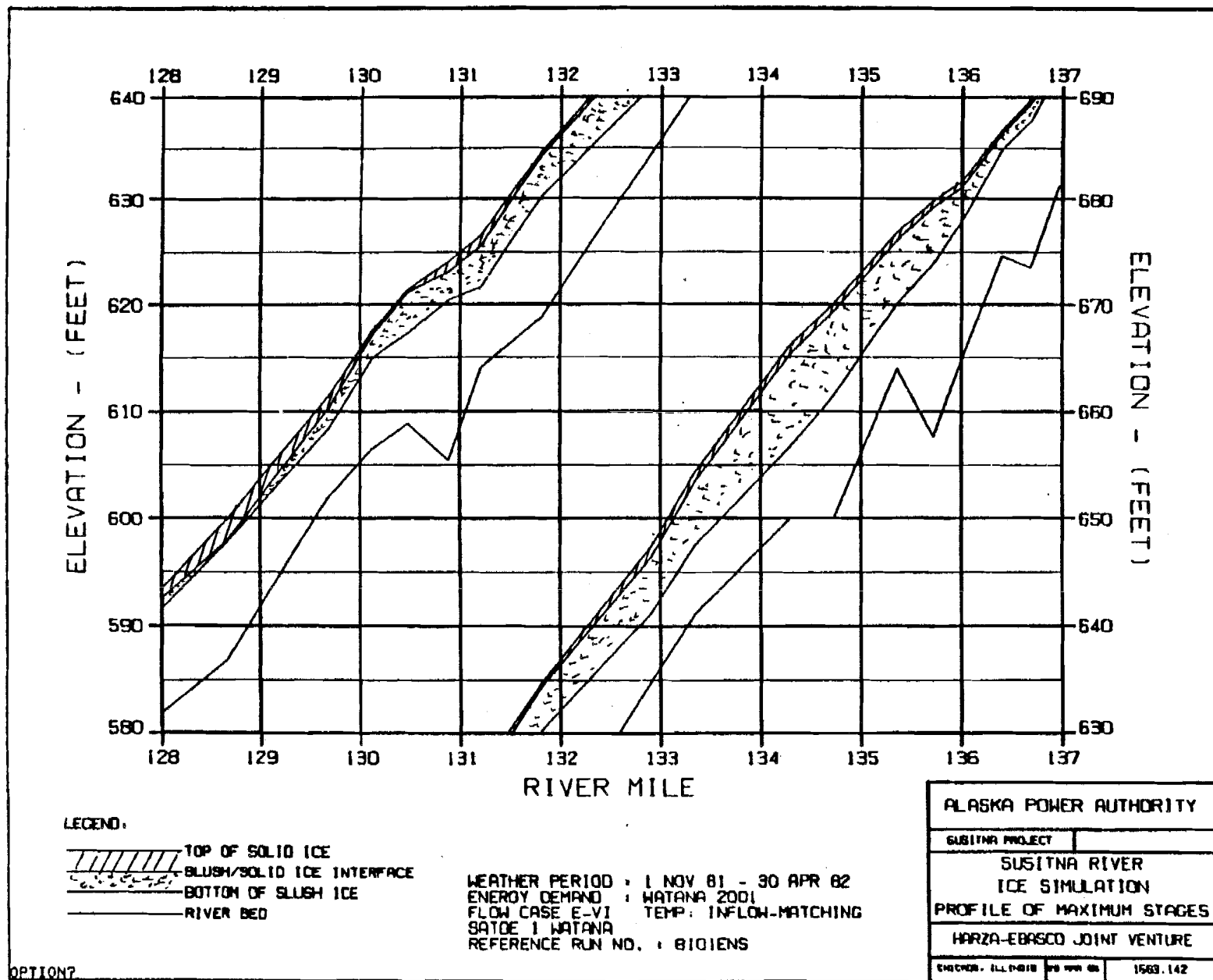
LEGEND:

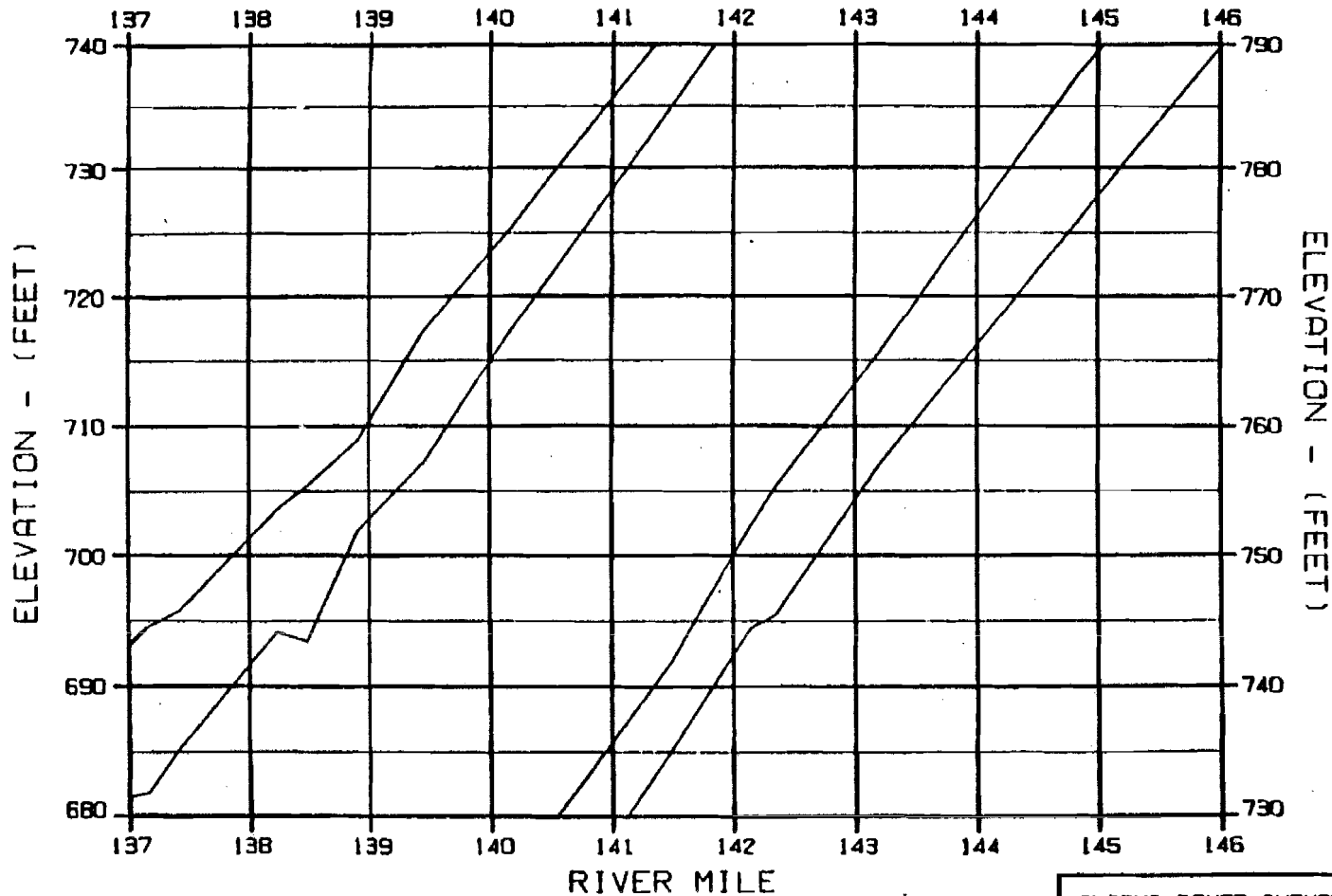
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE E-V1 TEMP. INFLOW-MATCHING
 SATGE I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
HARZA-EBASCO JOINT VENTURE		
CHICAGO, ILLINOIS	29 NOV 82	1563.142

OPTION?





LEGEND:

TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE E-V1 TEMP. INFLOW-MATCHING
 SATOE I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY

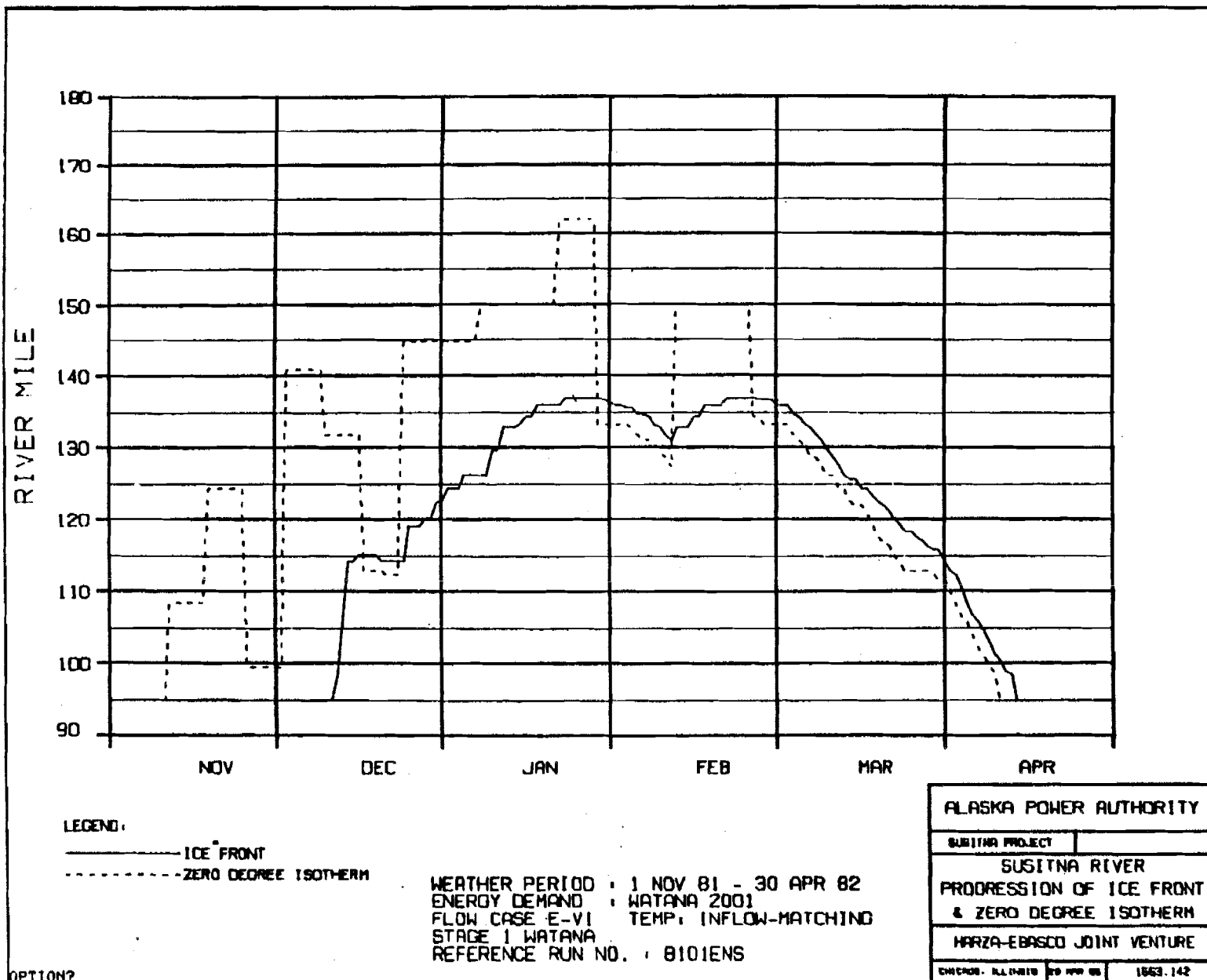
SUSITNA PROJECT

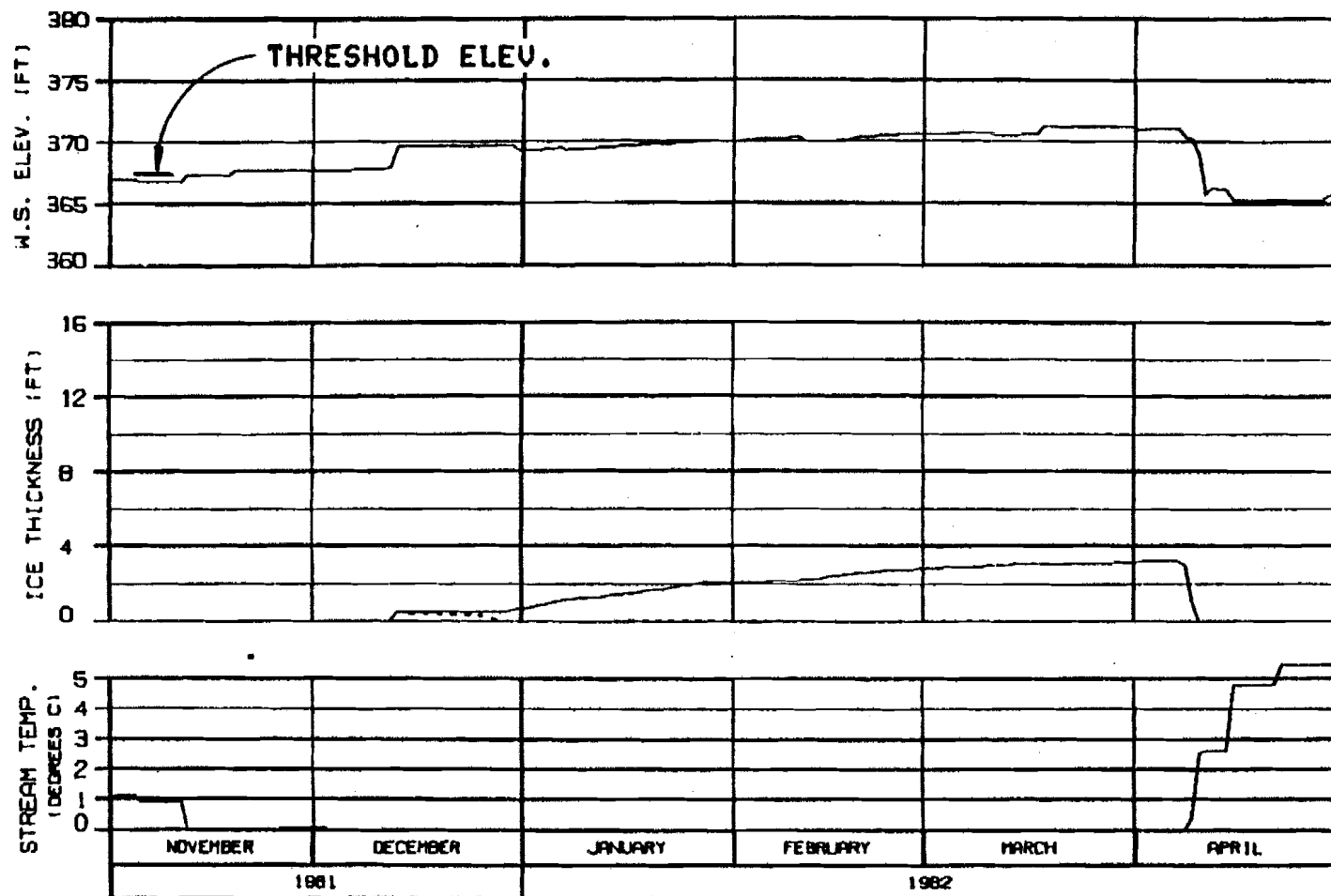
SUSITNA RIVER
 ICE SIMULATION
 PROFILE OF MAXIMUM STAGES

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60601-142

OPTION?





HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

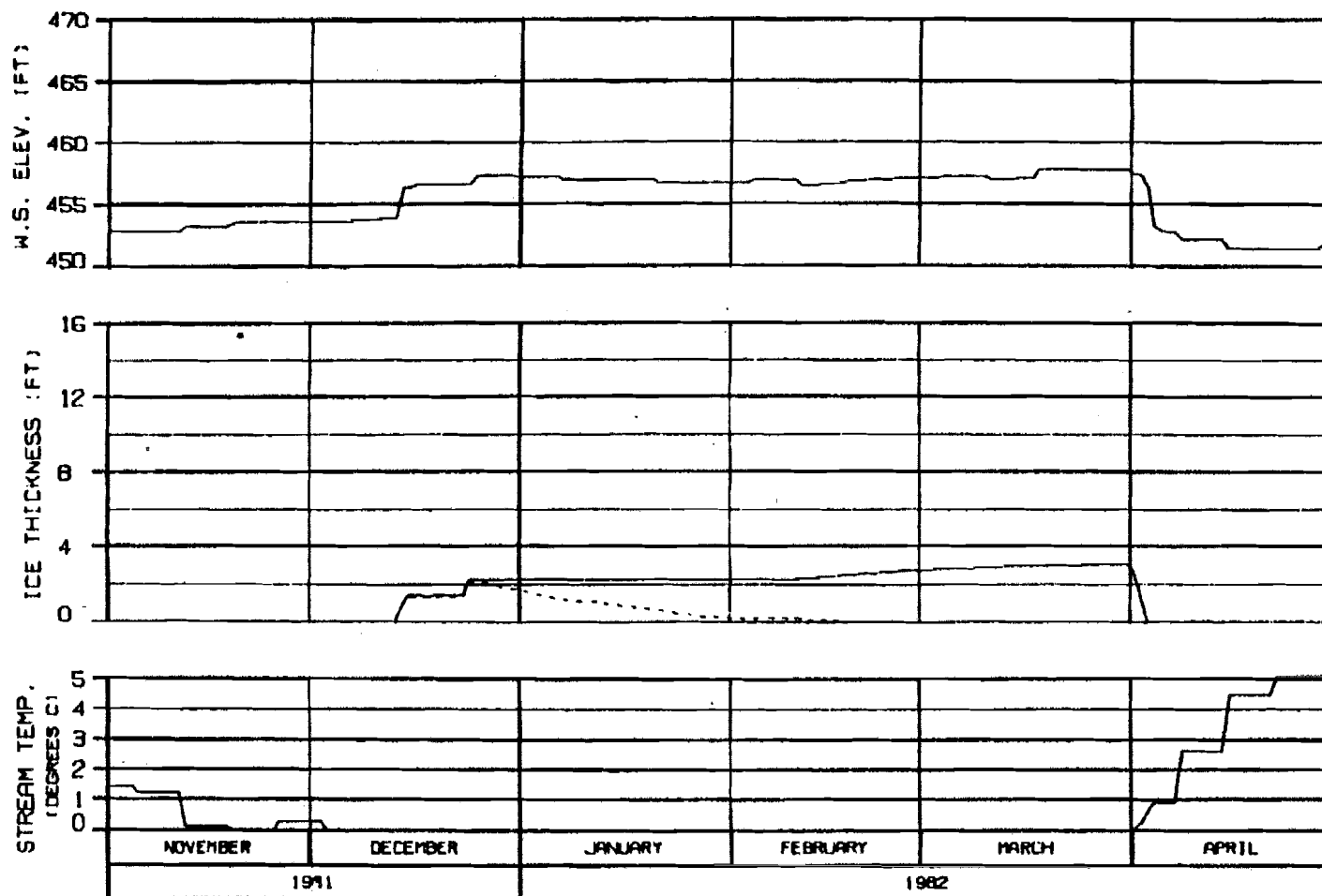
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HAZRA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60610 89 APR 82 1553.142



SIDE CHANNEL AT HEAD OF GASH CREEK

RIVER MILE : 112.00

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

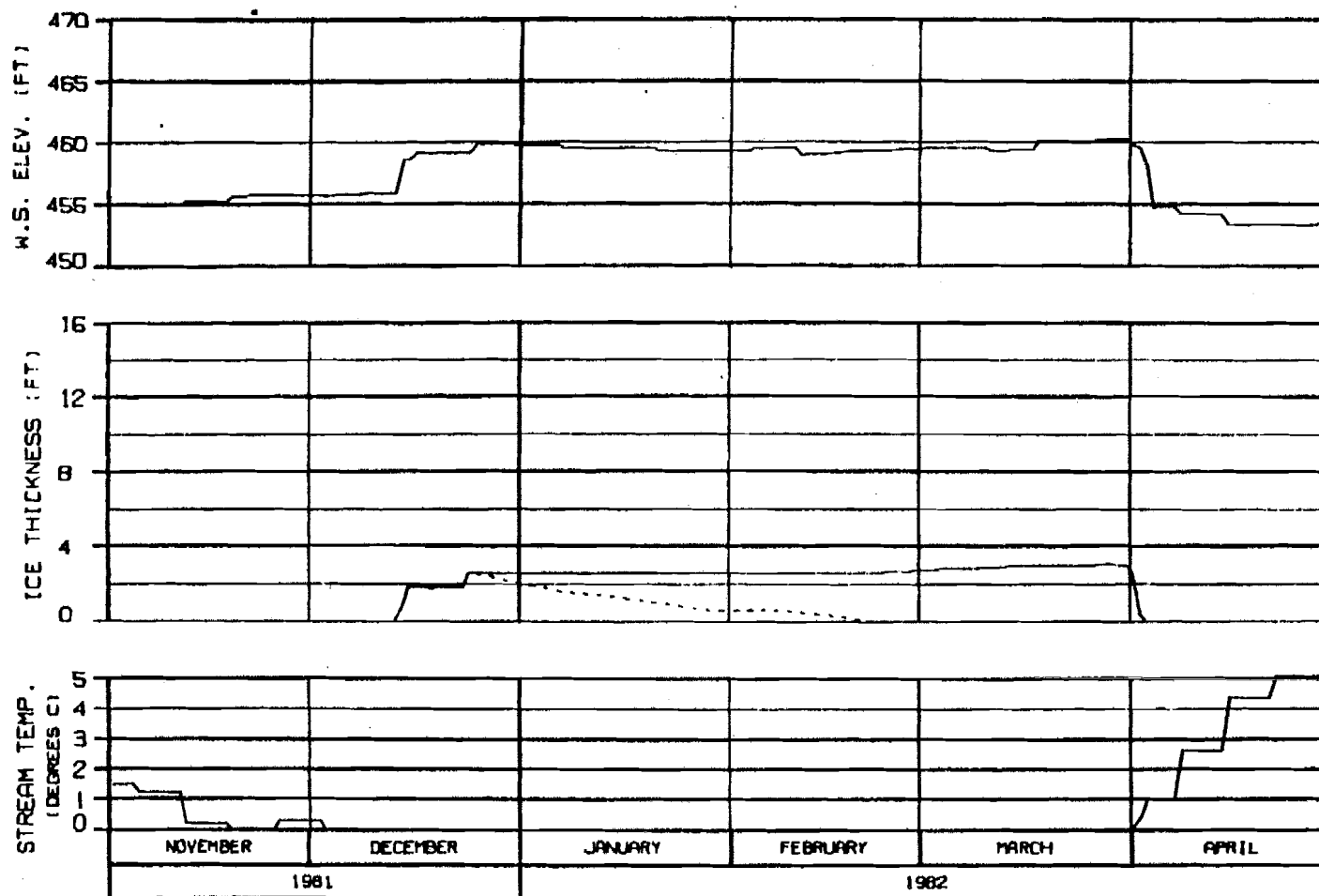
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HAZRA-EBASCO JOINT VENTURE

CHECKED: J.L. B. 8/19 7/8 1991 1563.142



MOUTH OF SLOUGH 6A

RIVER MILE : 112.34

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

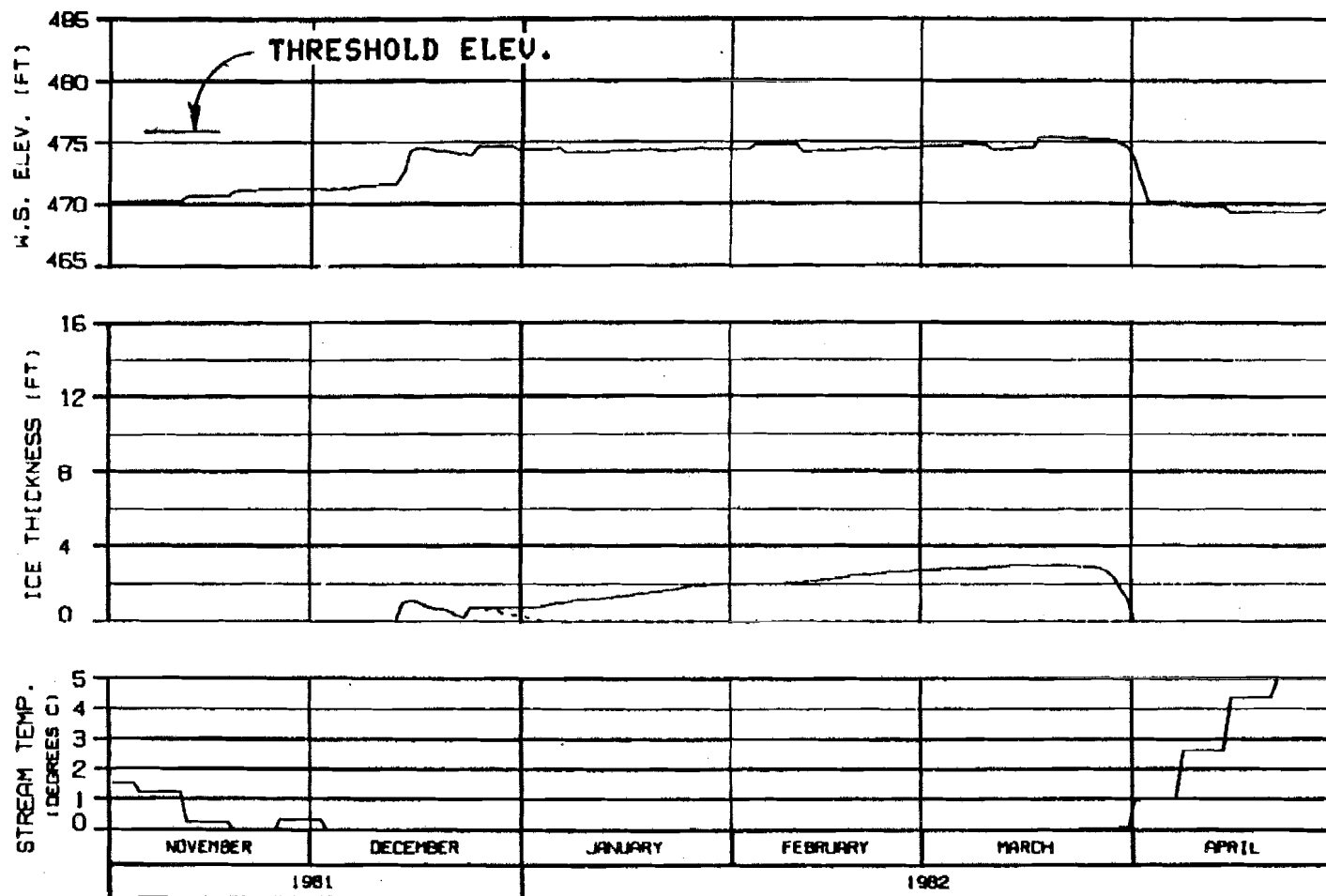
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHUCKER. ALL-D-818 70 APR 82 1063.142



HEAD OF SLOUGH 8 RIVER MILE : 114.10

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : B101ENS

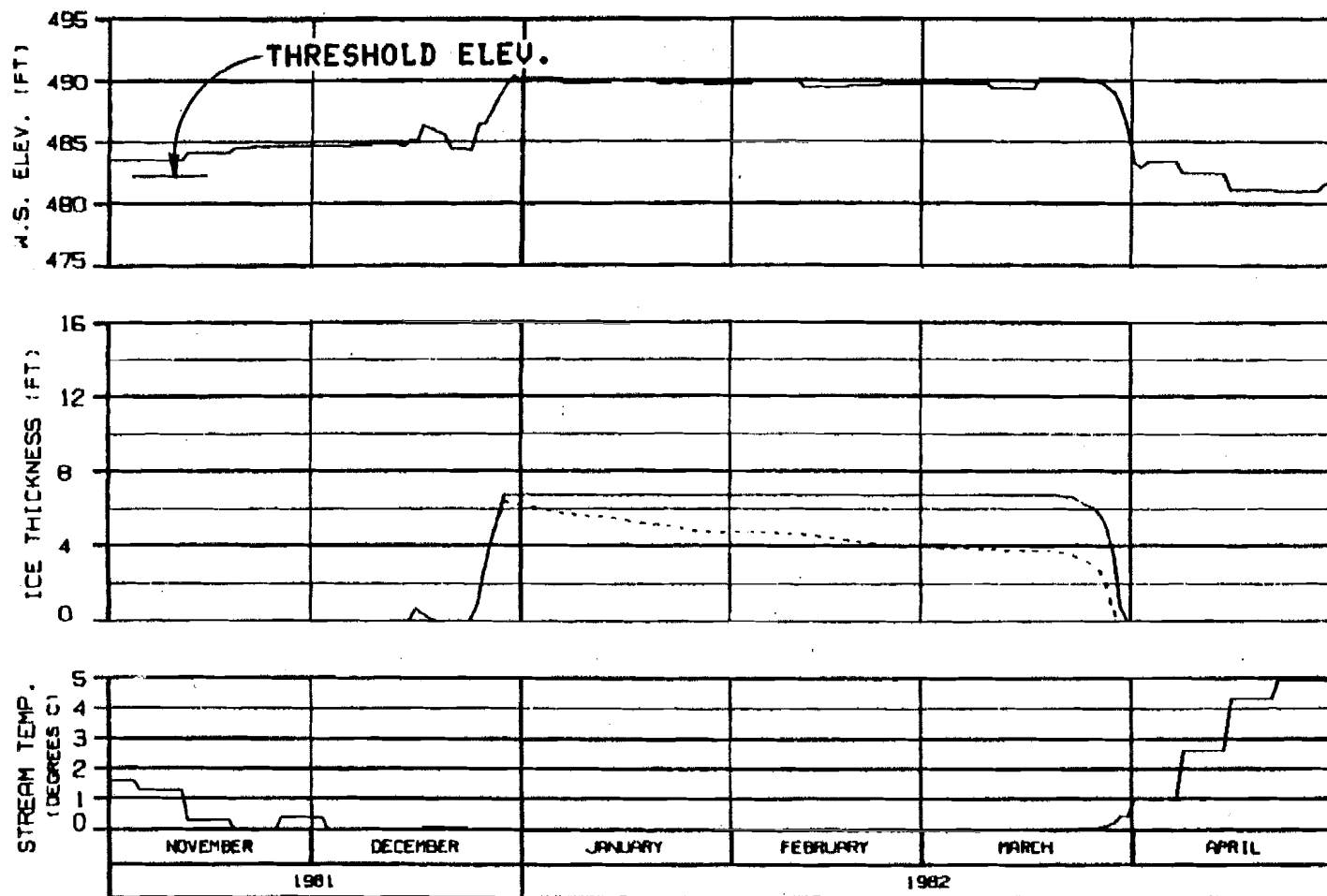
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60606 APR 82 1563.142



SIDE CHANNEL MSII

RIVER MILE : 115.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY

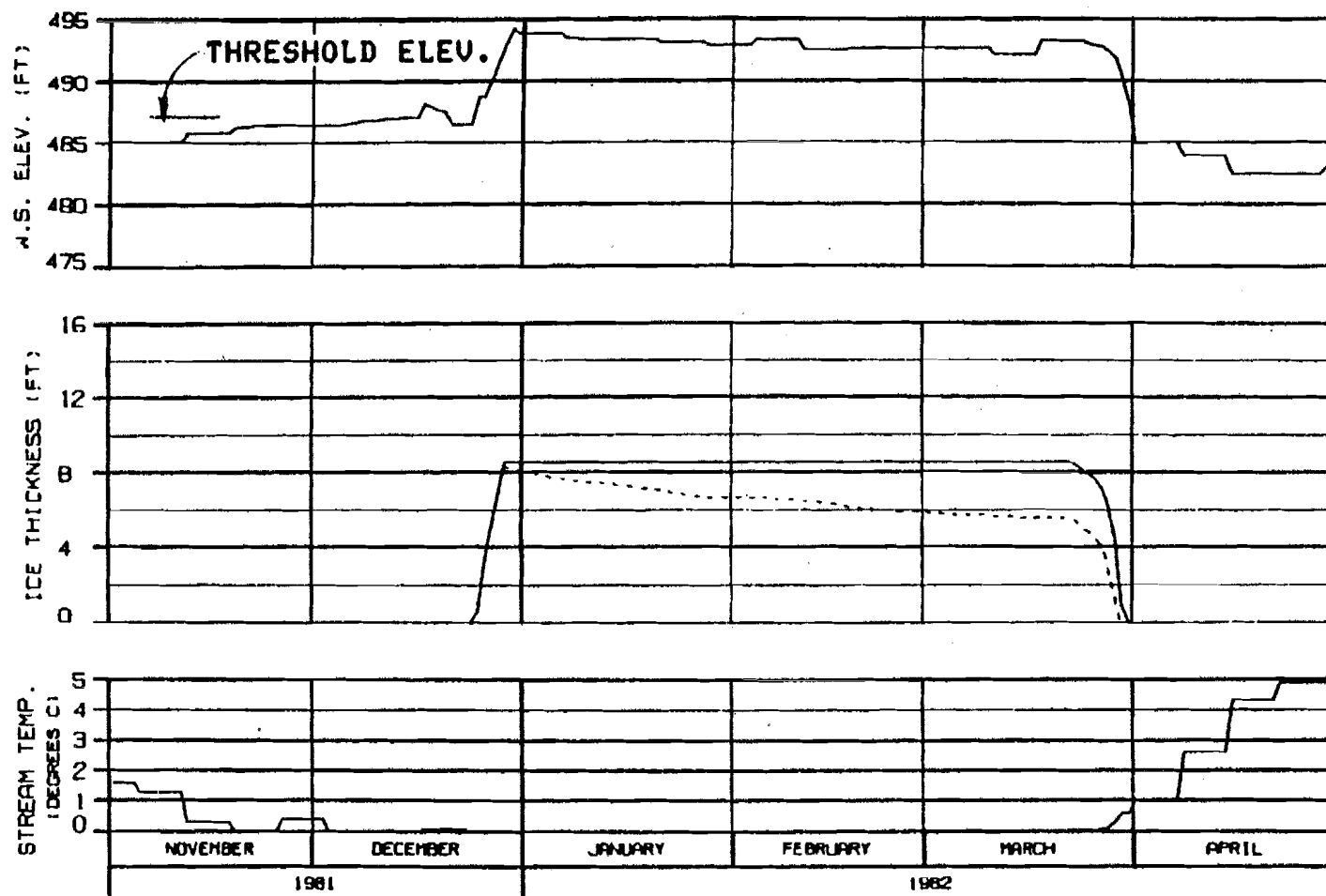
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICKEN - (LL 14-18) 18 APR 82 1863.142

OPTION?



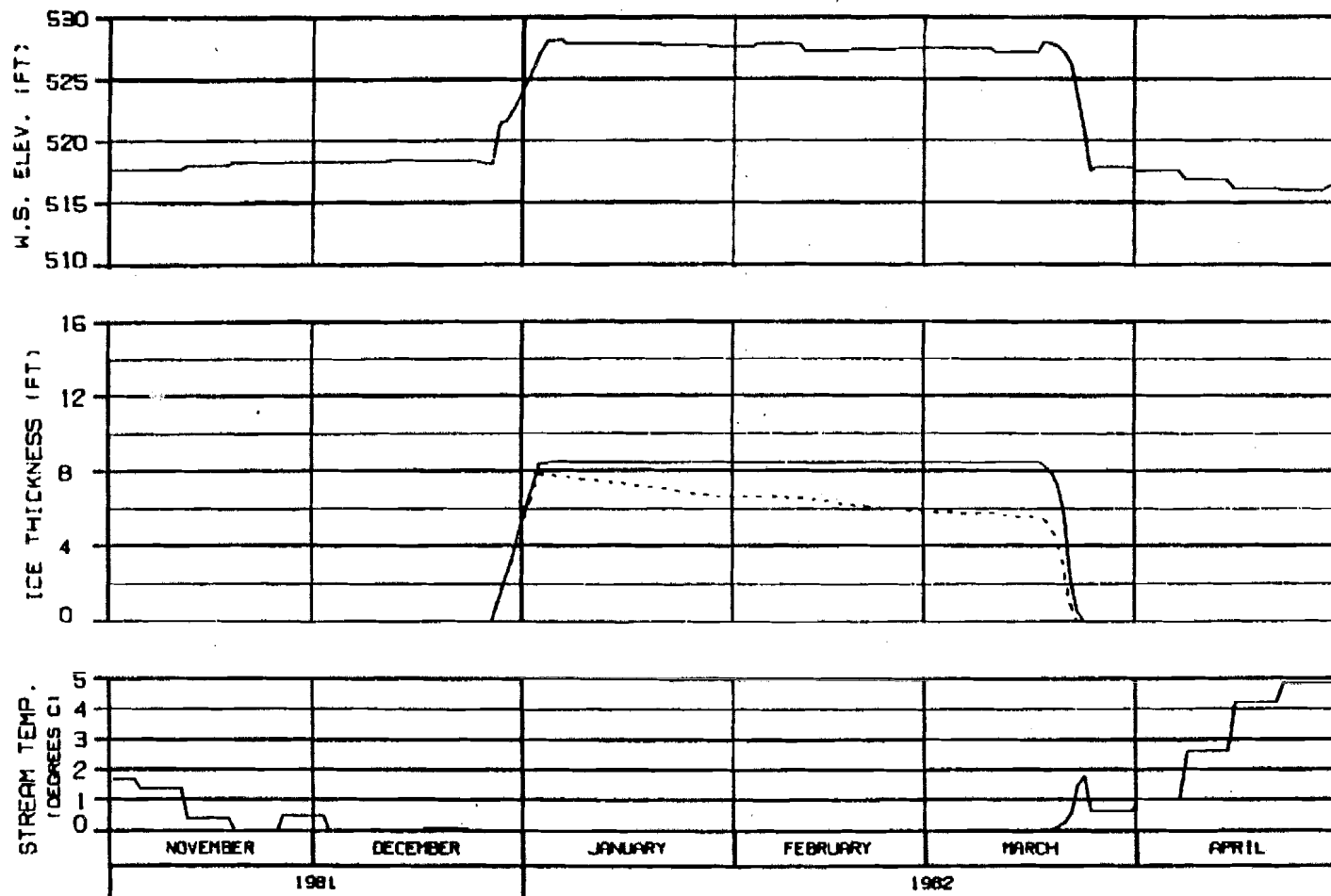
HEAD OF SIDE CHANNEL MSII

RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHIEF OF DIVISION	1663.142



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

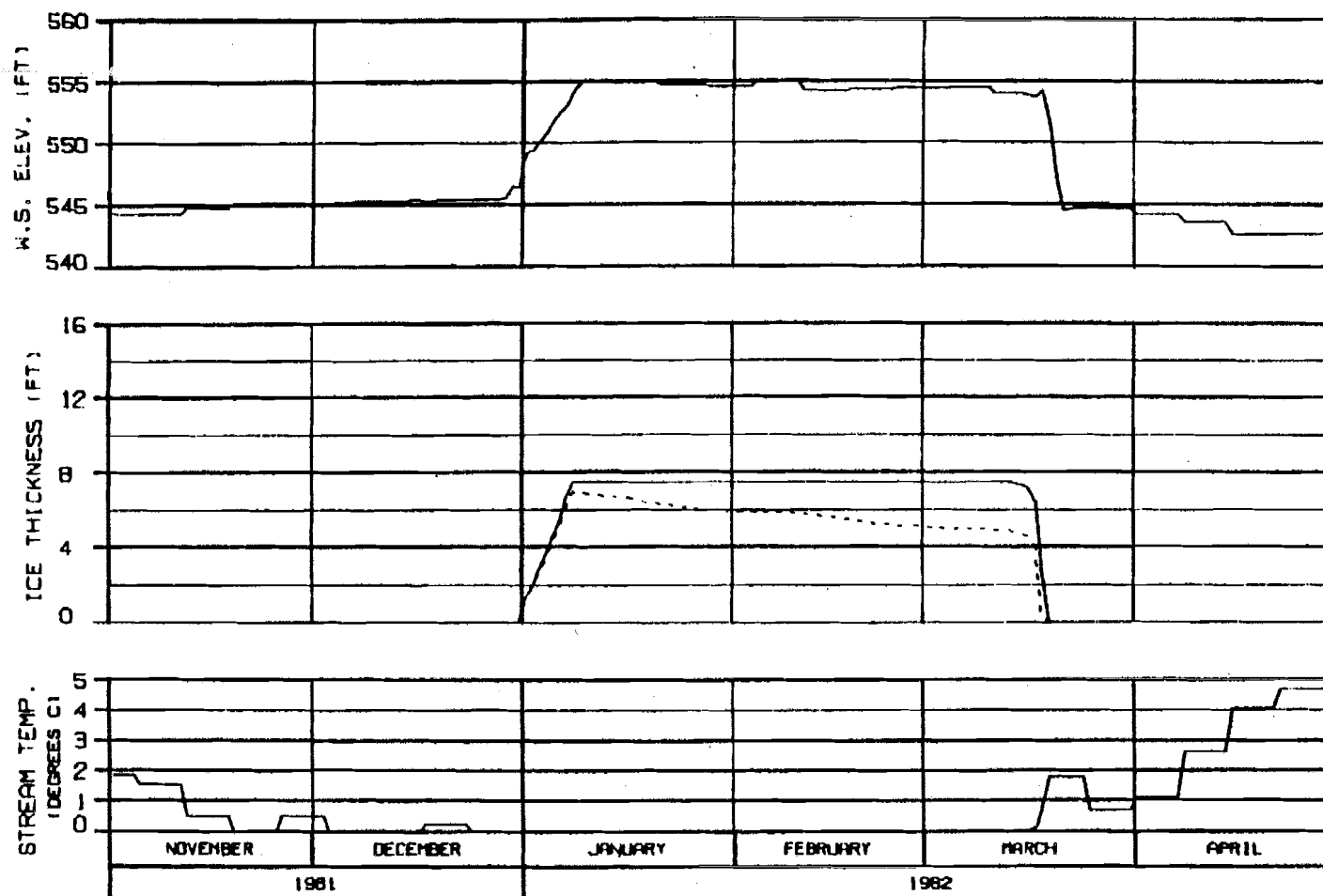
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CALCULATED BY: 11/11/81 10 APR 82 1553.142



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

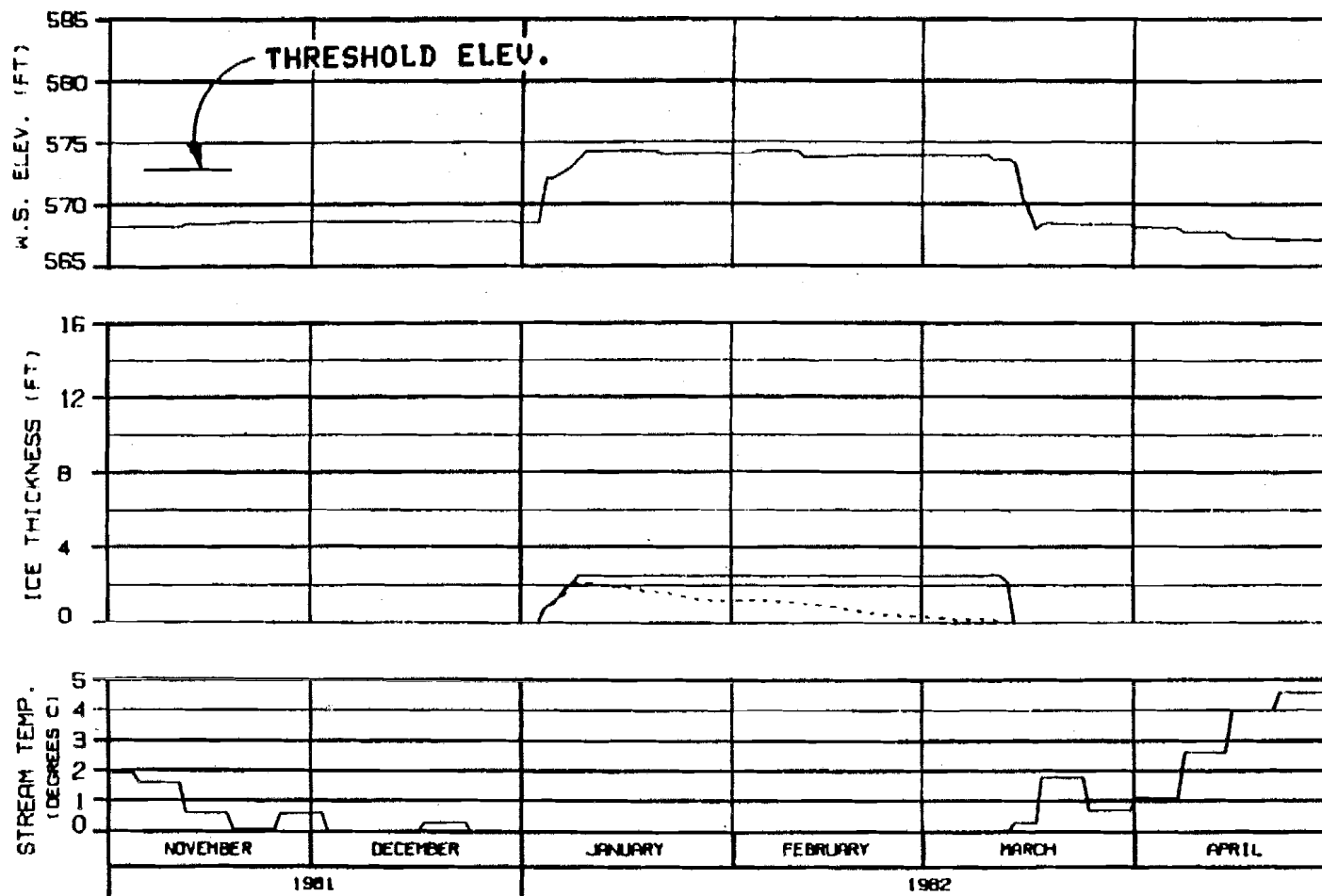
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60619 TEL: 312/467-1000 1563.142



HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

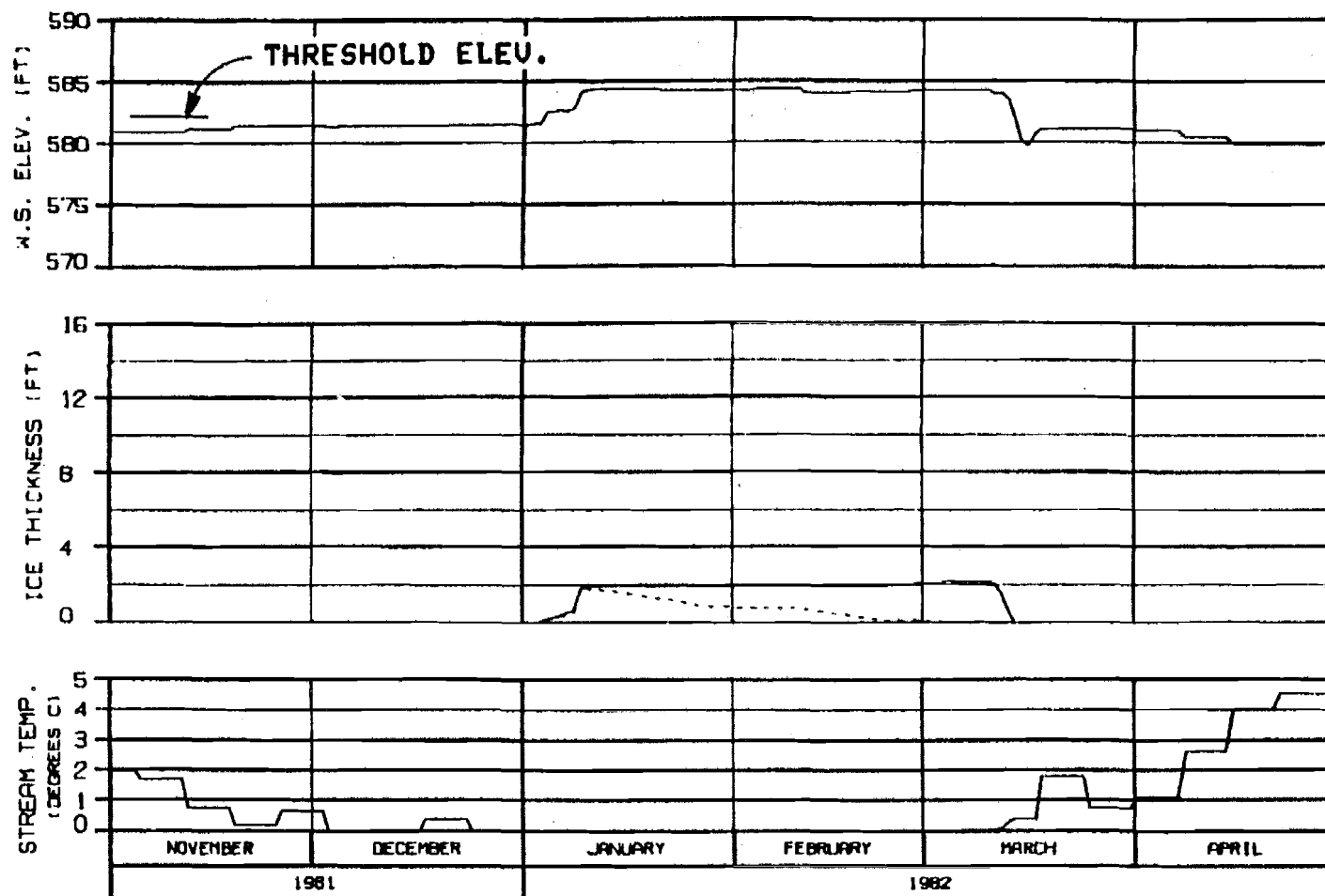
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60606 1653.142



HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

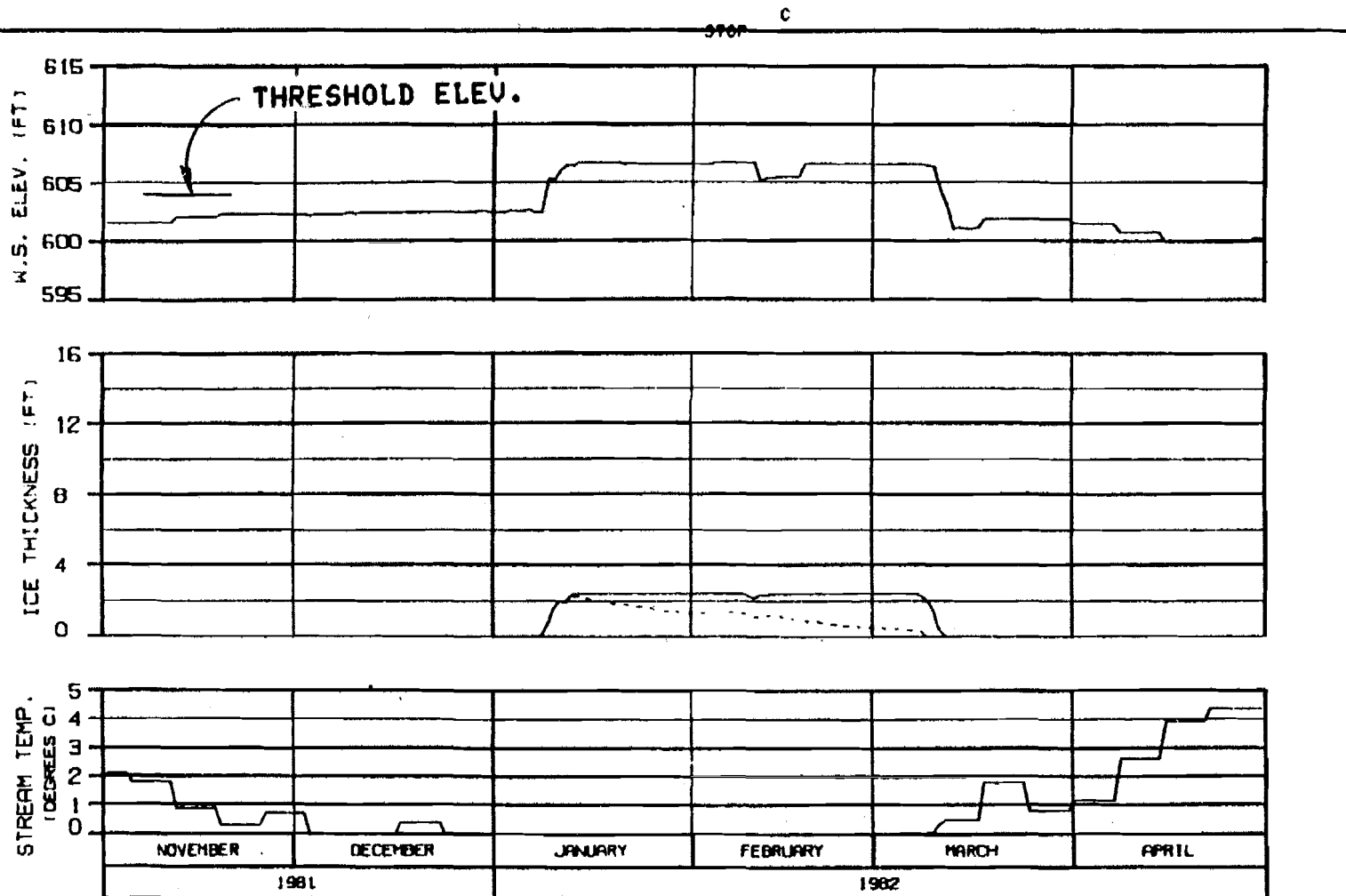
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHECKED: TLL IN-118 15 APR 82 1563.142



HEAD OF SLOUGH 9
RIVER MILE : 129.30

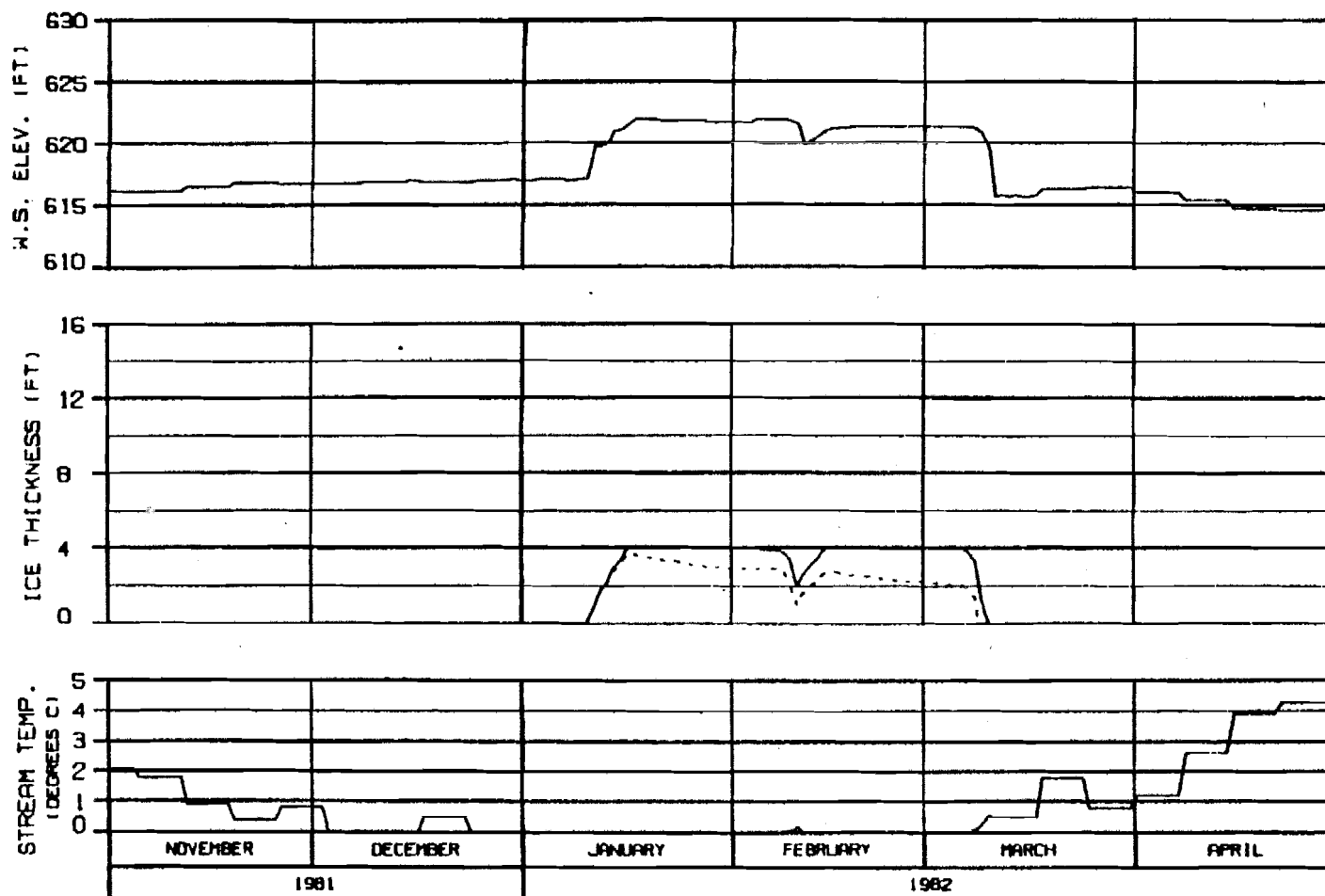
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60610	1563.142

OPTION?

OPTION?

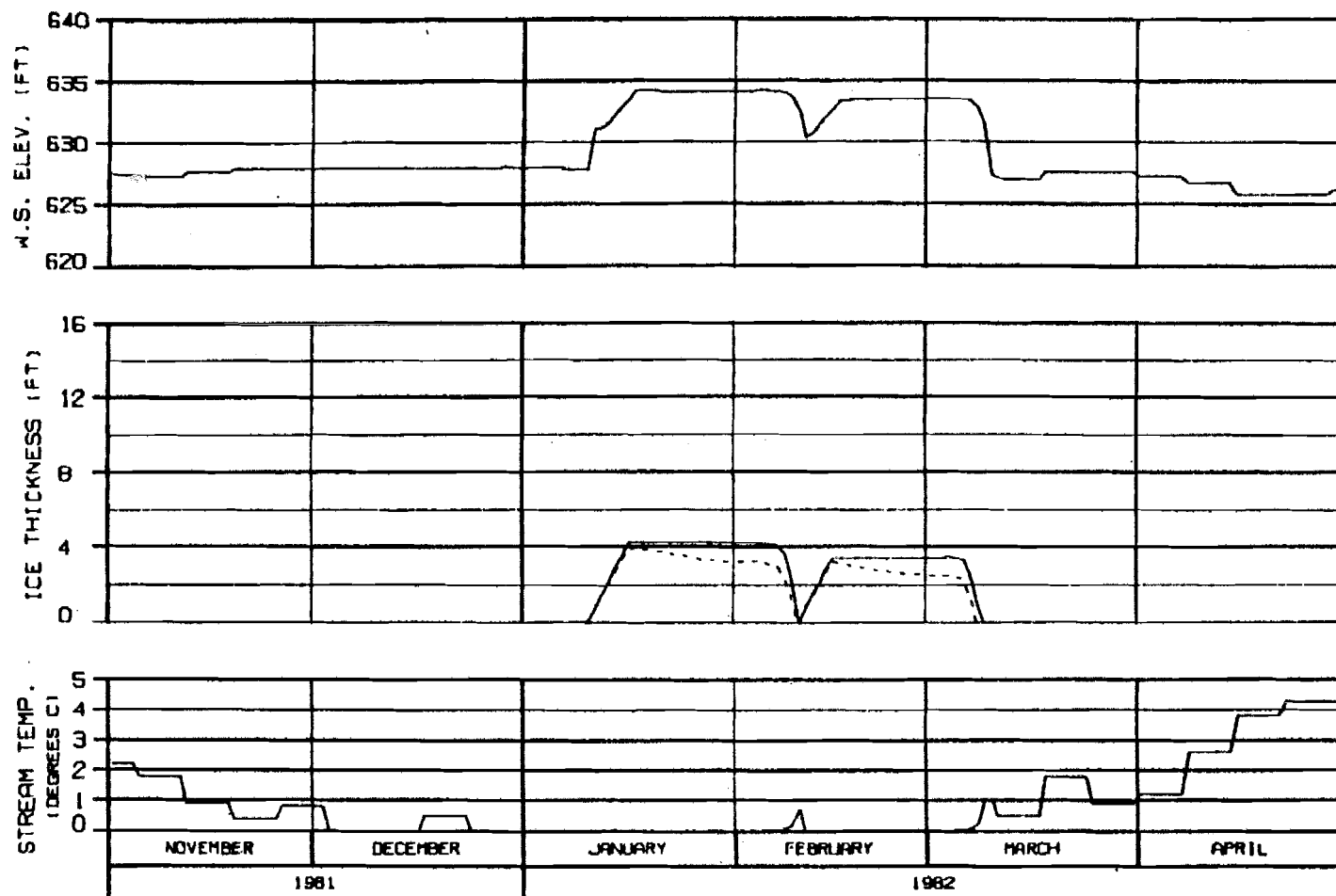


SIDE CHANNEL U/S OF SLOUGH 9
RIVER MILE : 130.60

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE I WATANA
REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGINEER: ELI HARTZ	NO APR 82 1553.142



SIDE CHANNEL U/S OF 4TH JULY CREEK
RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : BIDIENS

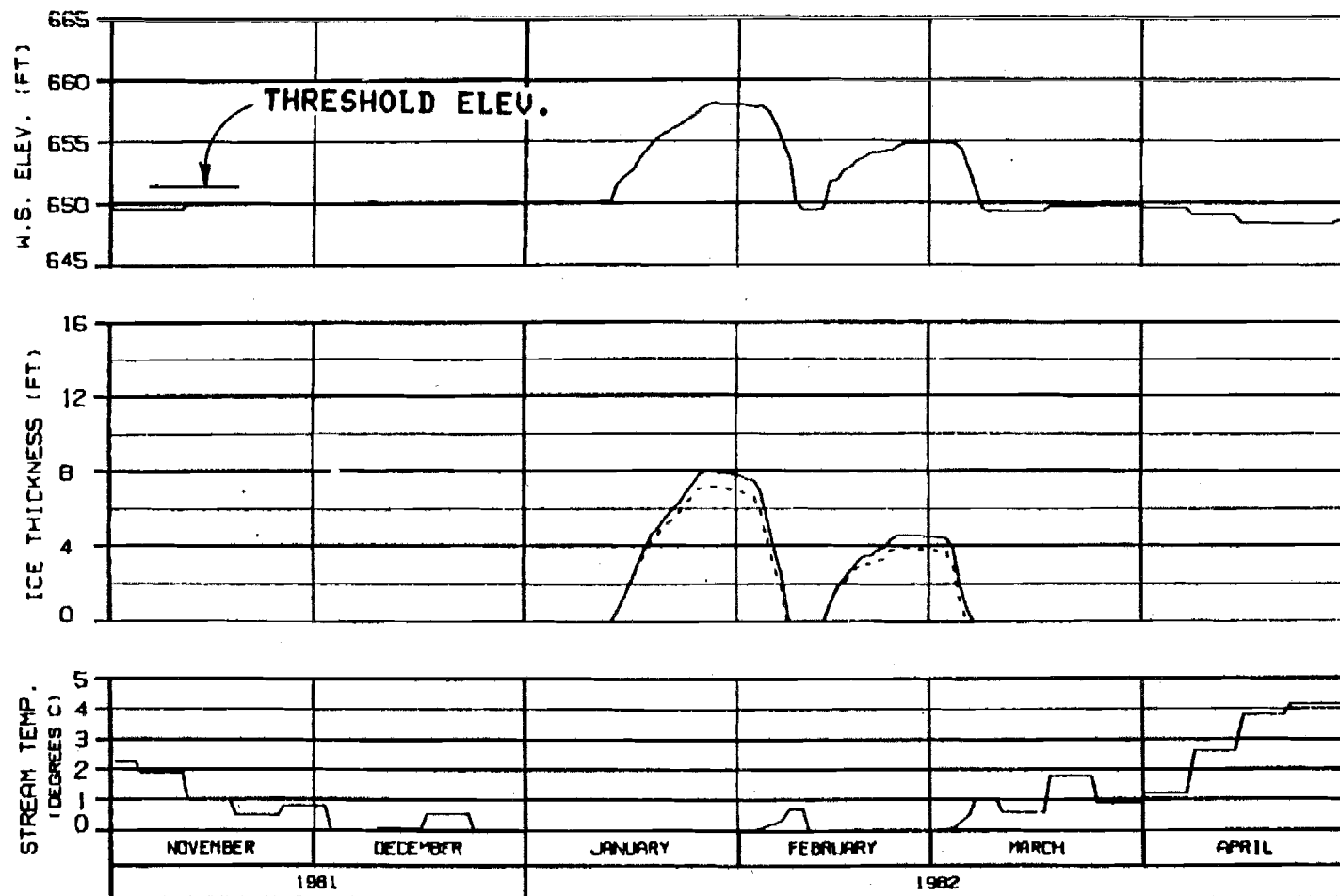
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARGE: ALLIANCE TO HAR 88 1563.142



HEAD OF SLOUGH 9A
RIVER MILE : 133.70

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

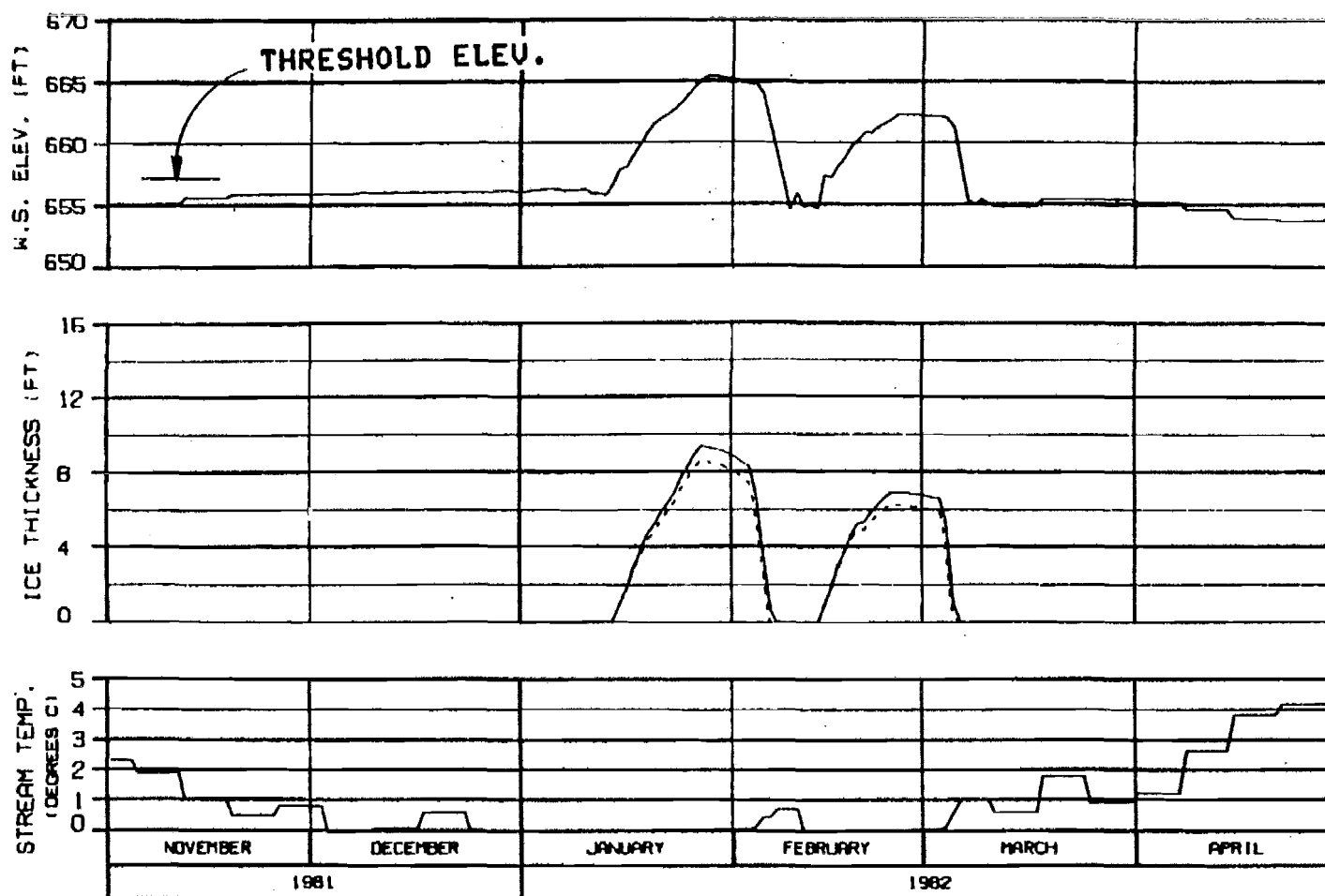
ALASKA POWER AUTHORITY

SUSITNA PROJECT

**SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY**

HARZA-EBASCO JOINT VENTURE

CHUCKER - ILL D-879 28 APR 82 1553.142



SIDE CHANNEL U/S OF SLOUGH 10
RIVER MILE : 134.30

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : 8101ENS

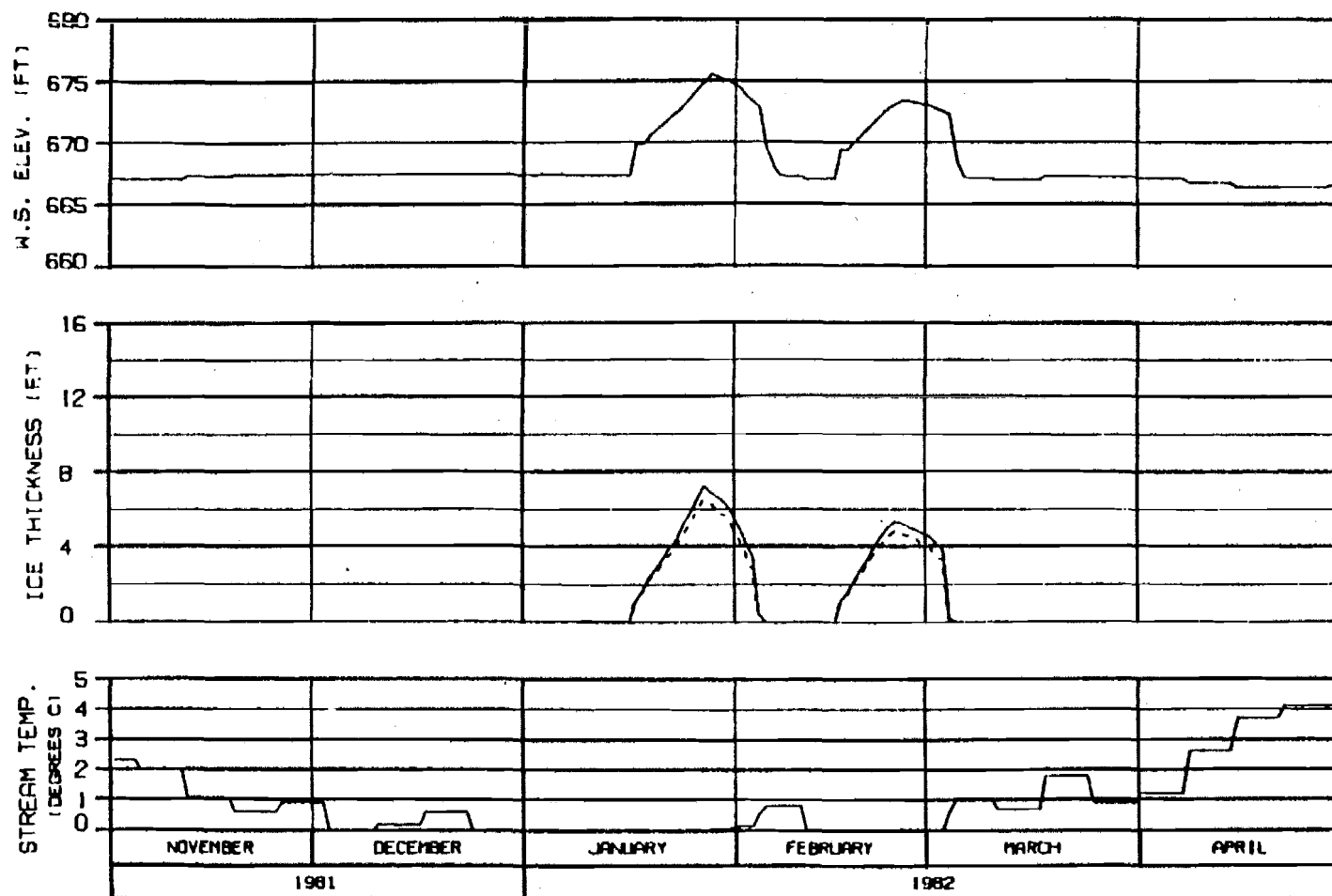
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60608 70 APR 82 1563.147



SIDE CHANNEL D/S OF SLOUGH 11

RIVER MILE : 135.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

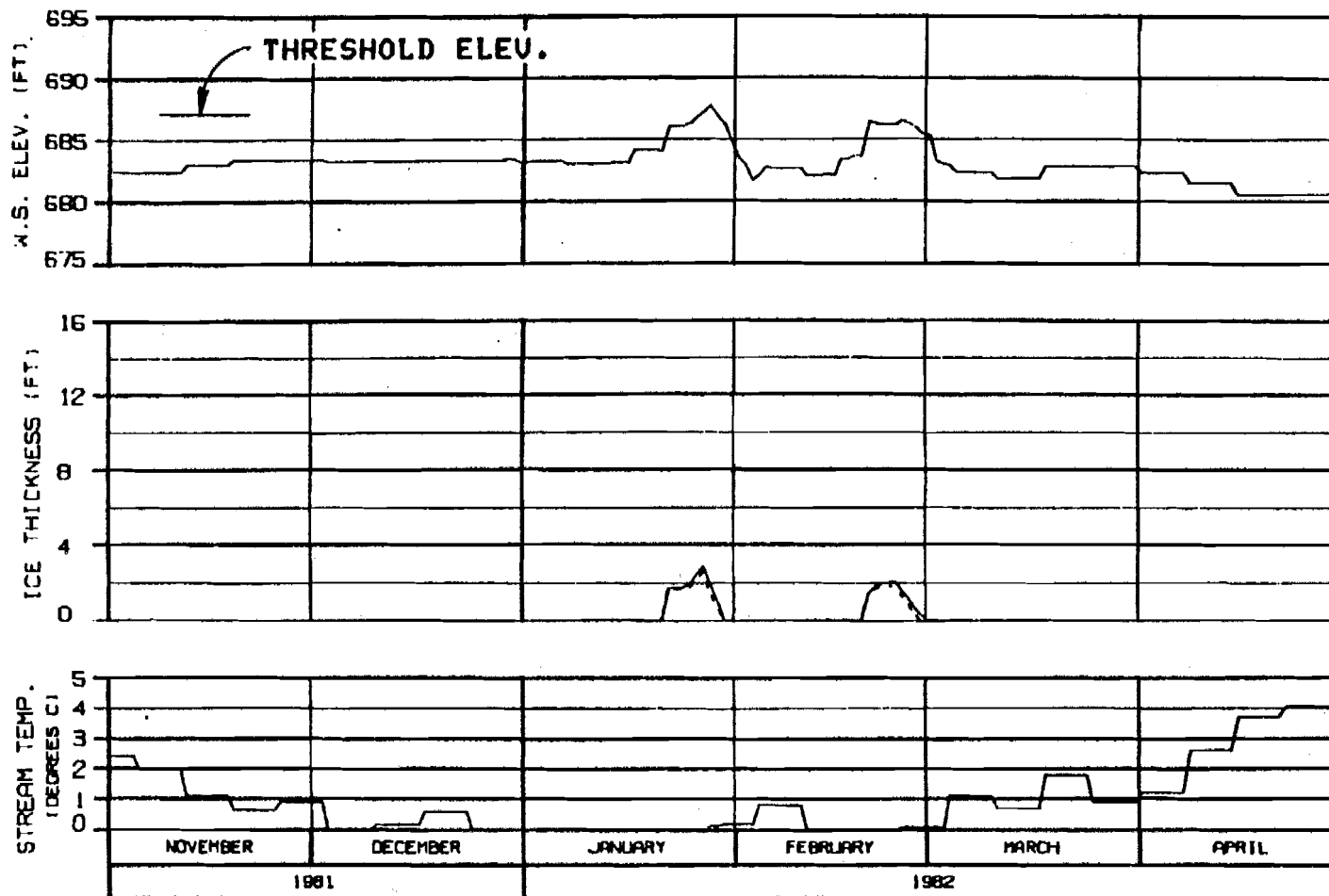
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHICHO. ALLINDS 15 APR 82 1553.142

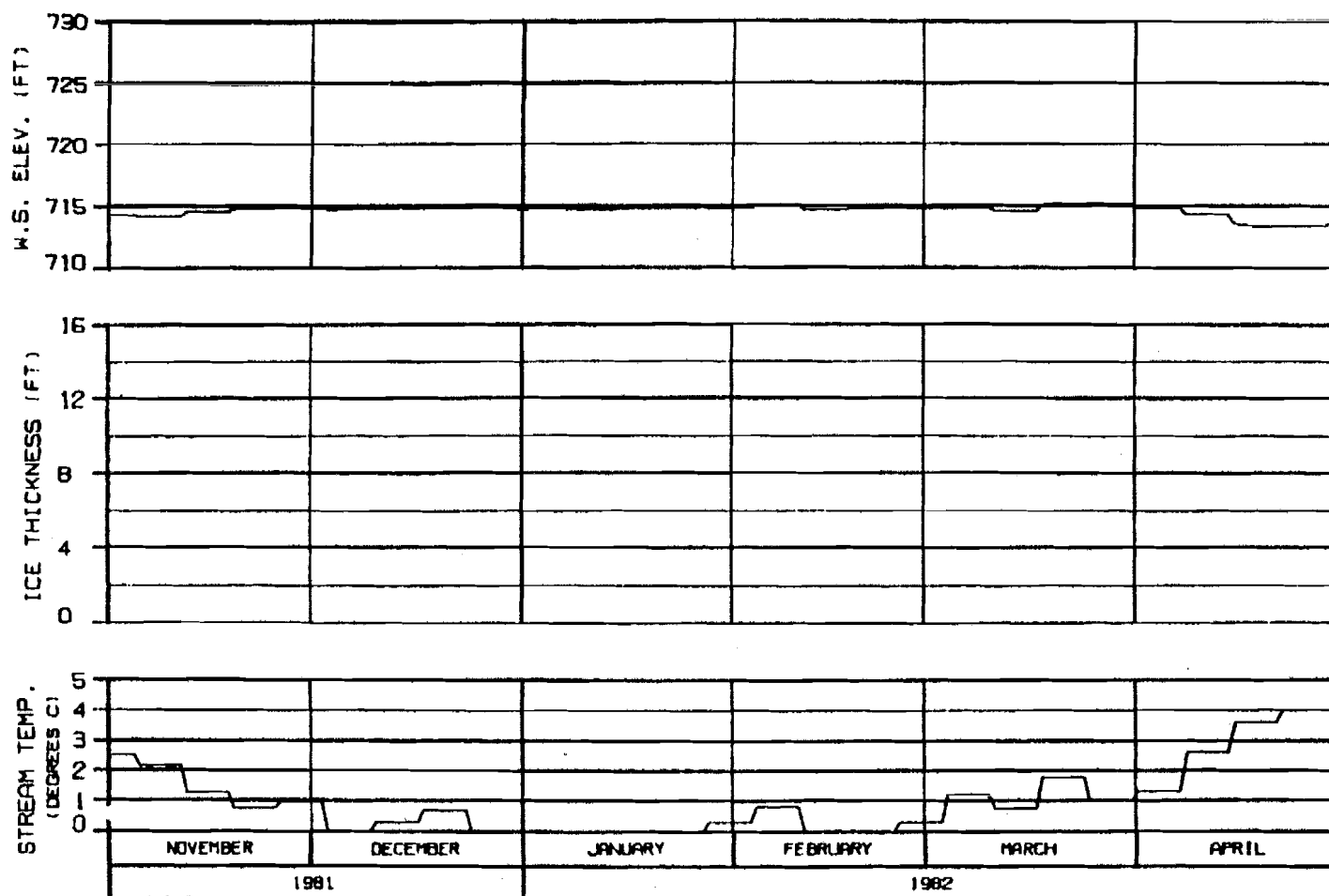


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHICAGO, ILL. 60619	20 APR 82	1663.142



HEAD OF SLOUGH 17
RIVER MILE : 139.30

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : 8101ENS

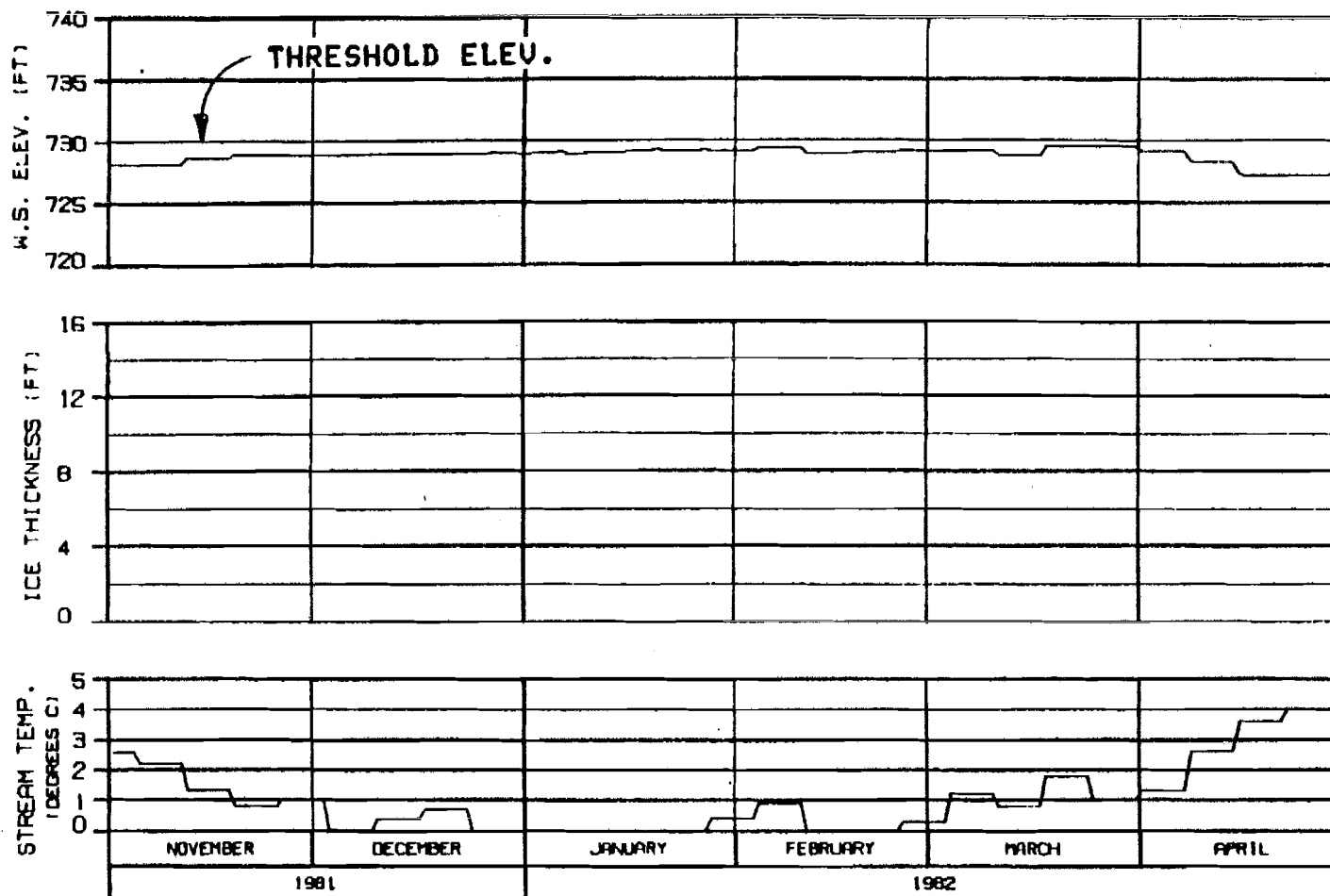
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 78 APR 82 1563.142



HEAD OF SLOUGH 20

RIVER MILE : 140.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

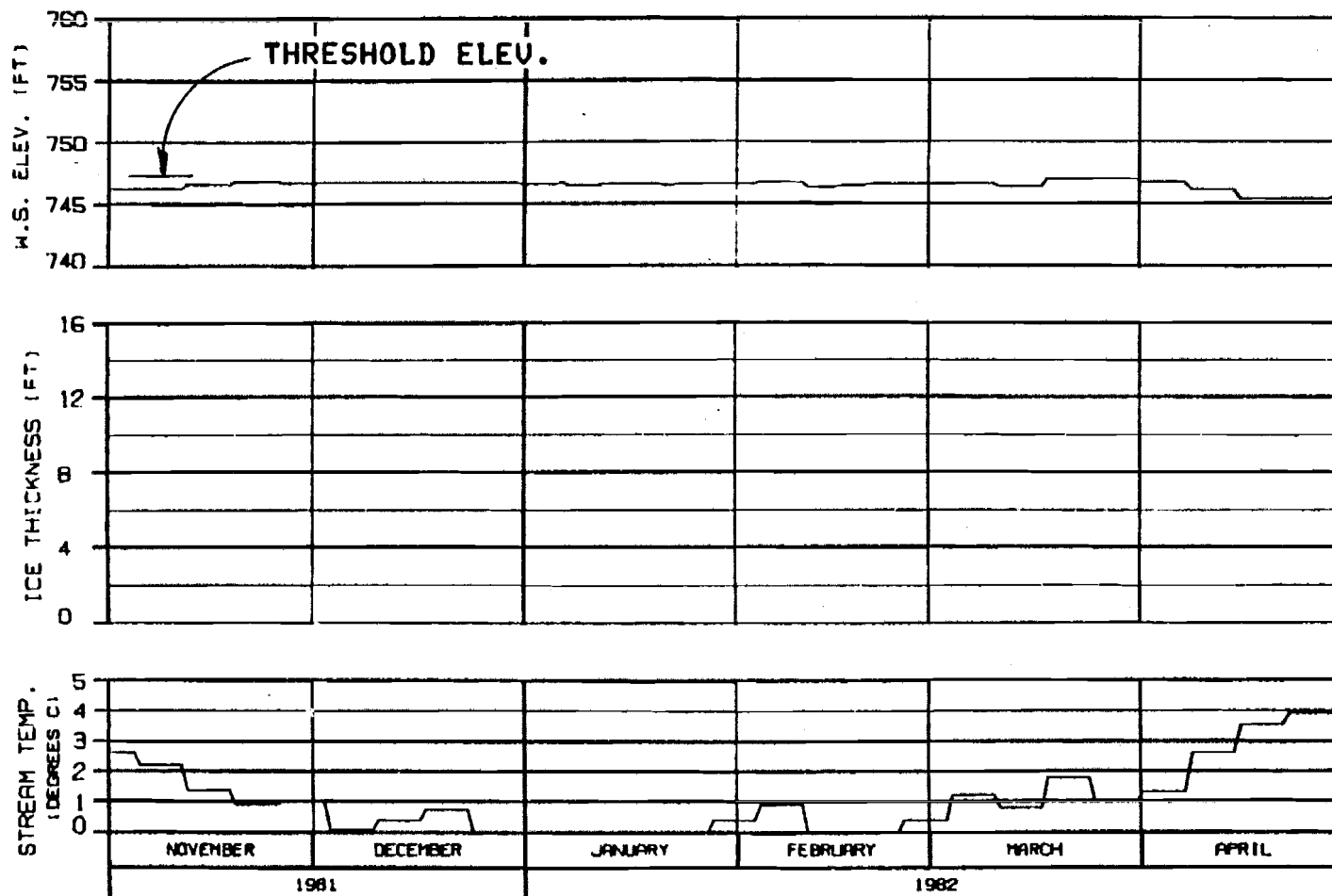
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 (ICE SIMULATION)
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

OWNER: ALTA-818 20 APR 82 1553.142



HEAD OF SLOUGH 21
RIVER MILE : 141.80

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : 8101ENS

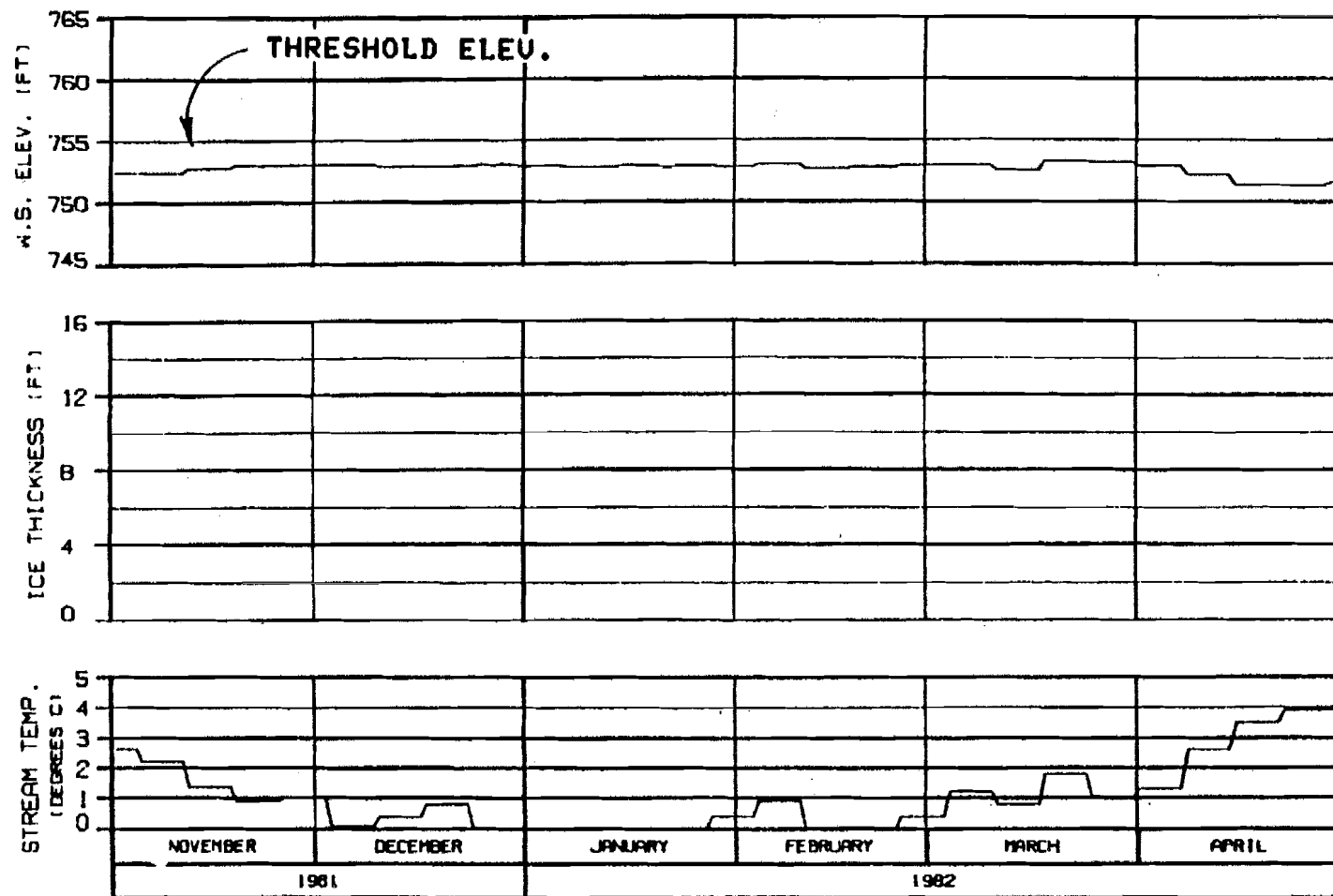
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF: J. L. HENDRICKS 1563.142



SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 142.20

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : 8101ENS

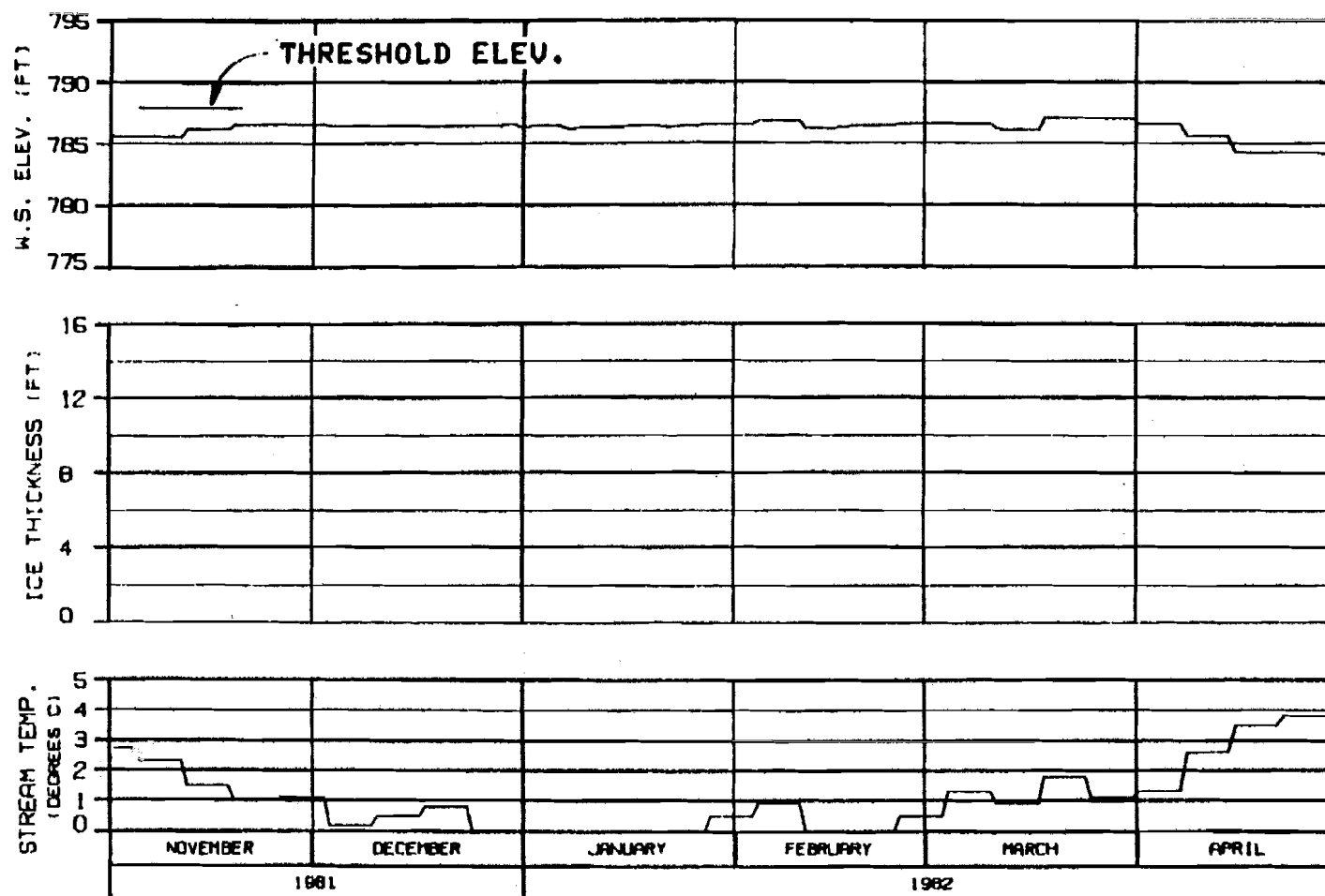
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

WARZA-EBASCO JOINT VENTURE

ENCLOS. ILLUSTR. 29 APR 82 1663.142



HEAD OF SLOUGH 22

RIVER MILE : 144.80

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA
REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60606 1563.142

OPTION?

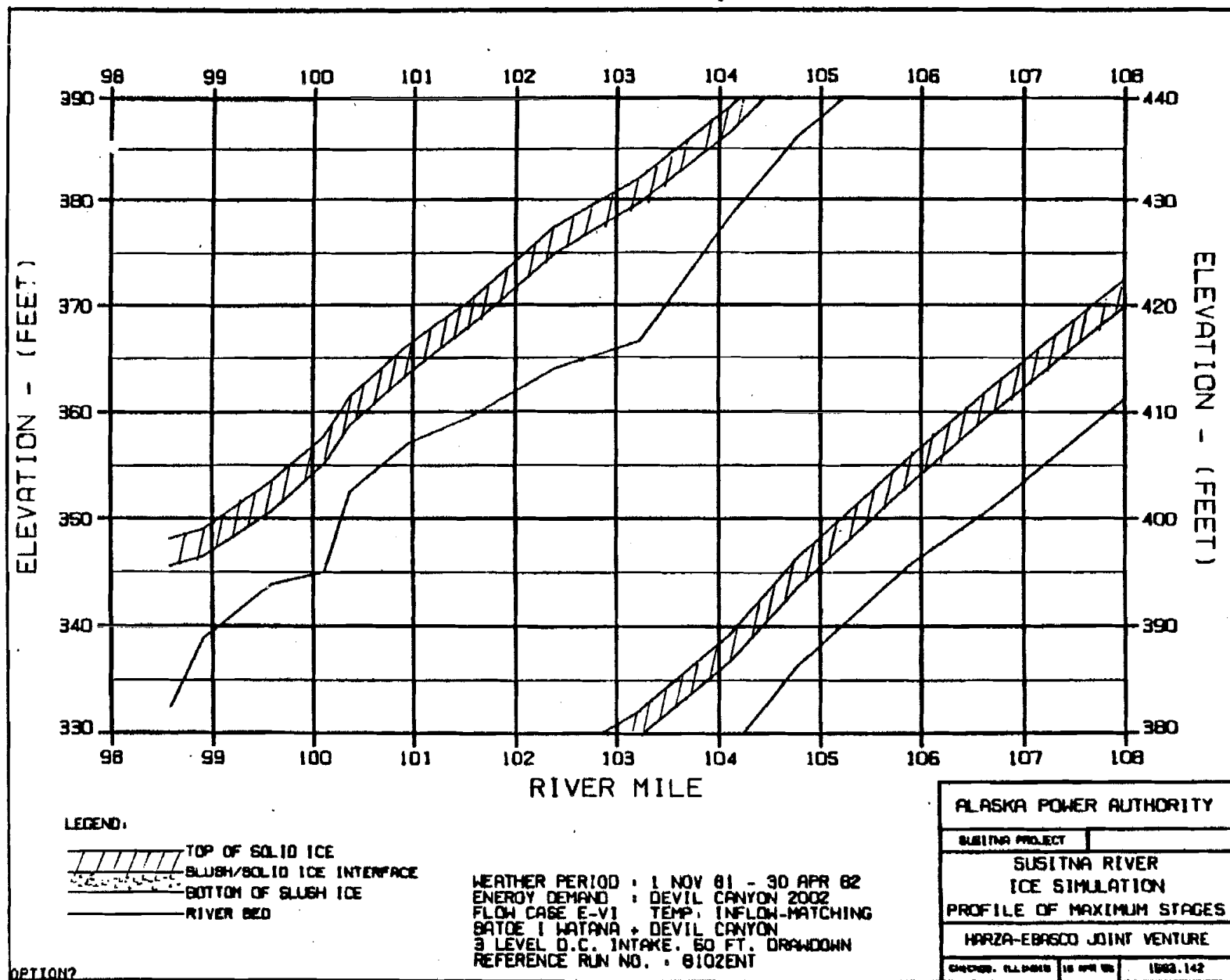
EXHIBIT 8

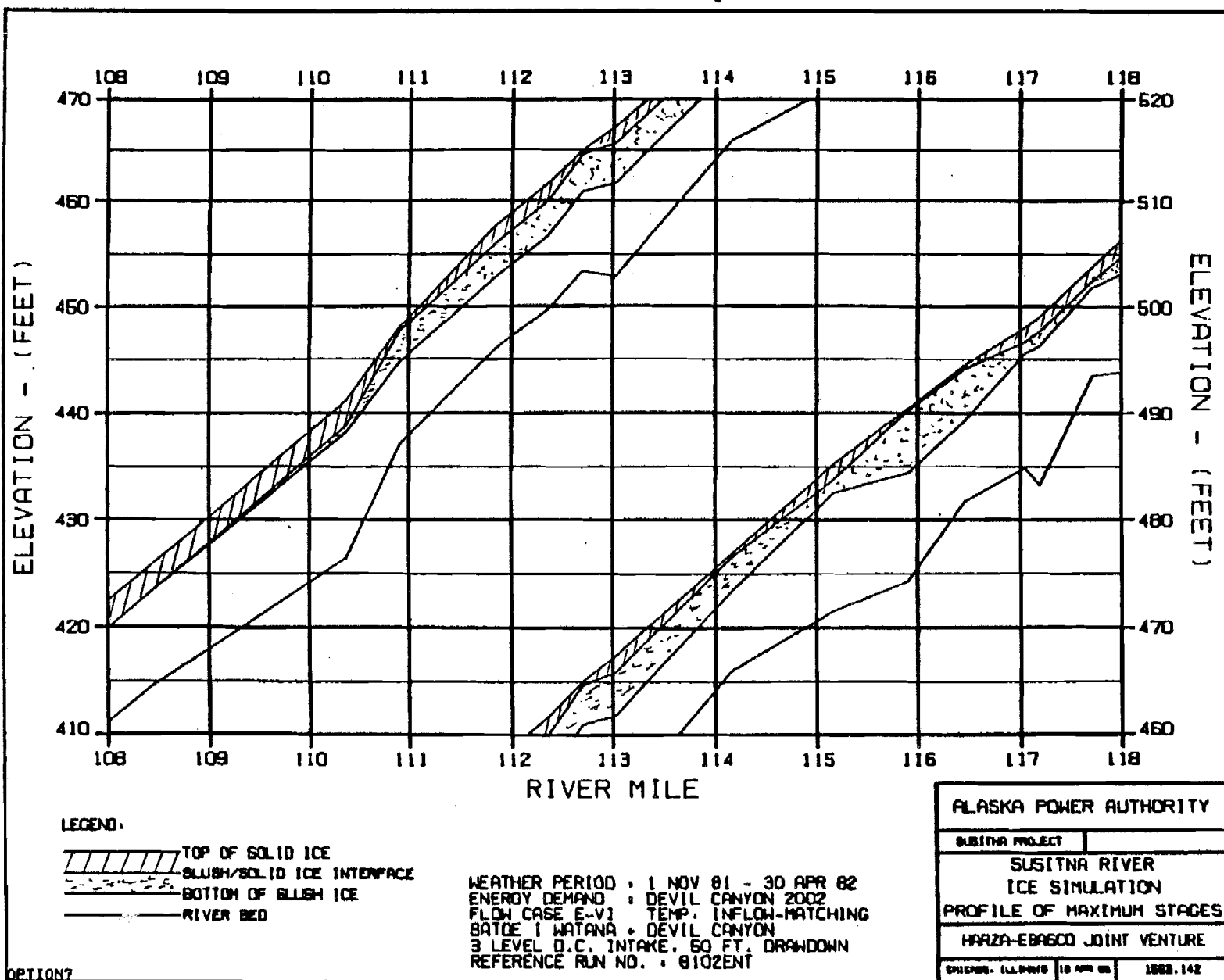
EXHIBIT 8

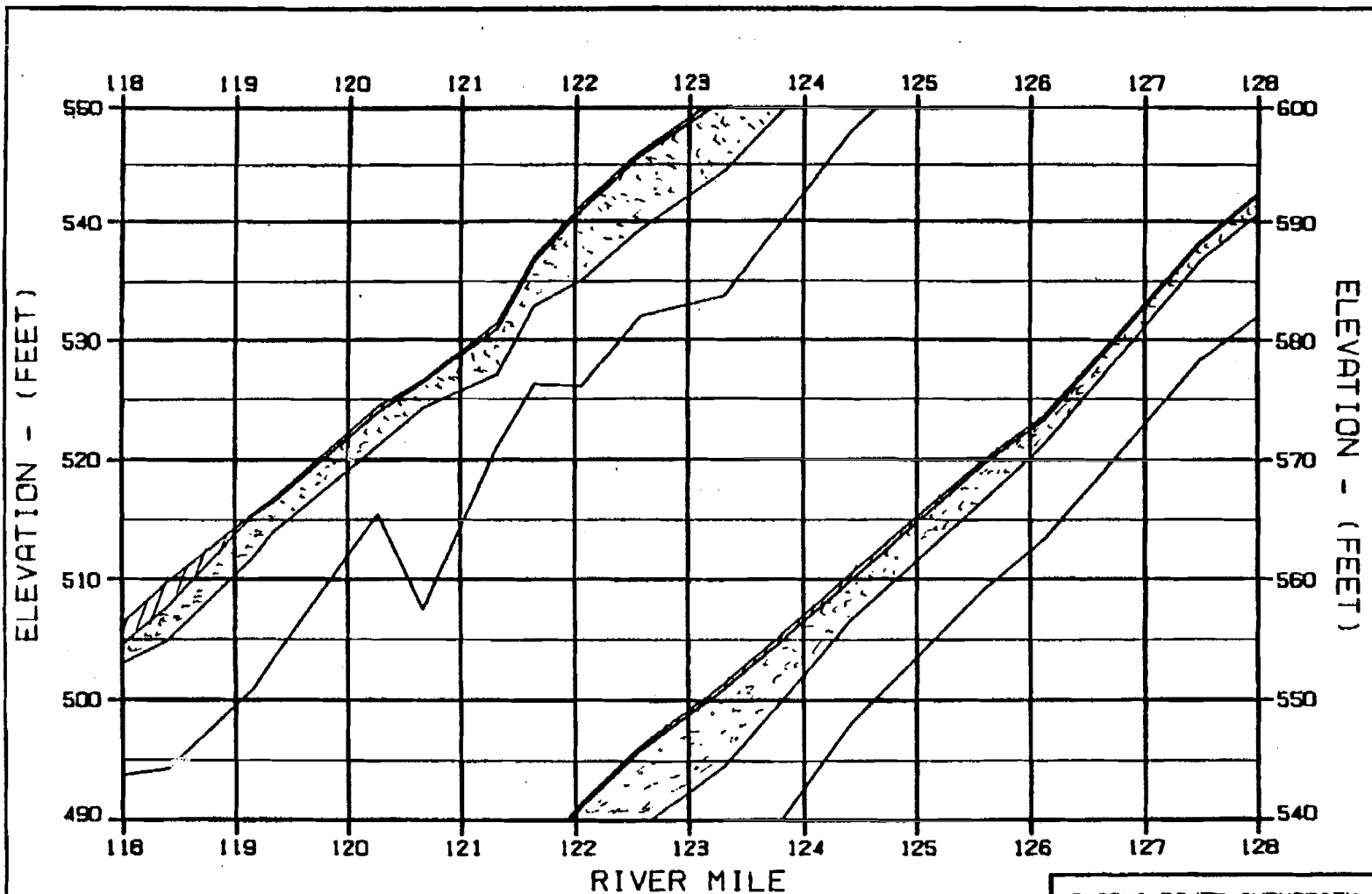
RIVER ICE SIMULATIONS, STAGED CONSTRUCTION - STAGE 2
(WATANA EL. 2000, DEVIL CANYON EL. 1455), PROJECTED ENERGY
DEMANDS FOR 2002, E-VI ENVIRONMENTAL FLOW REQUIREMENTS,
HYDROLOGICAL AND CLIMATOLOGICAL DATA FOR 1981-82.

- a. Devil Canyon drawdown - 50 feet
Three Level Intake
- b. Devil Canyon drawdown - 50 feet
Two Level Intake
- c. Devil Canyon drawdown - 9 feet

EXHIBIT 8a







LEGEND:

TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 SATOE I WATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE, 60 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

SUSITNA PROJECT

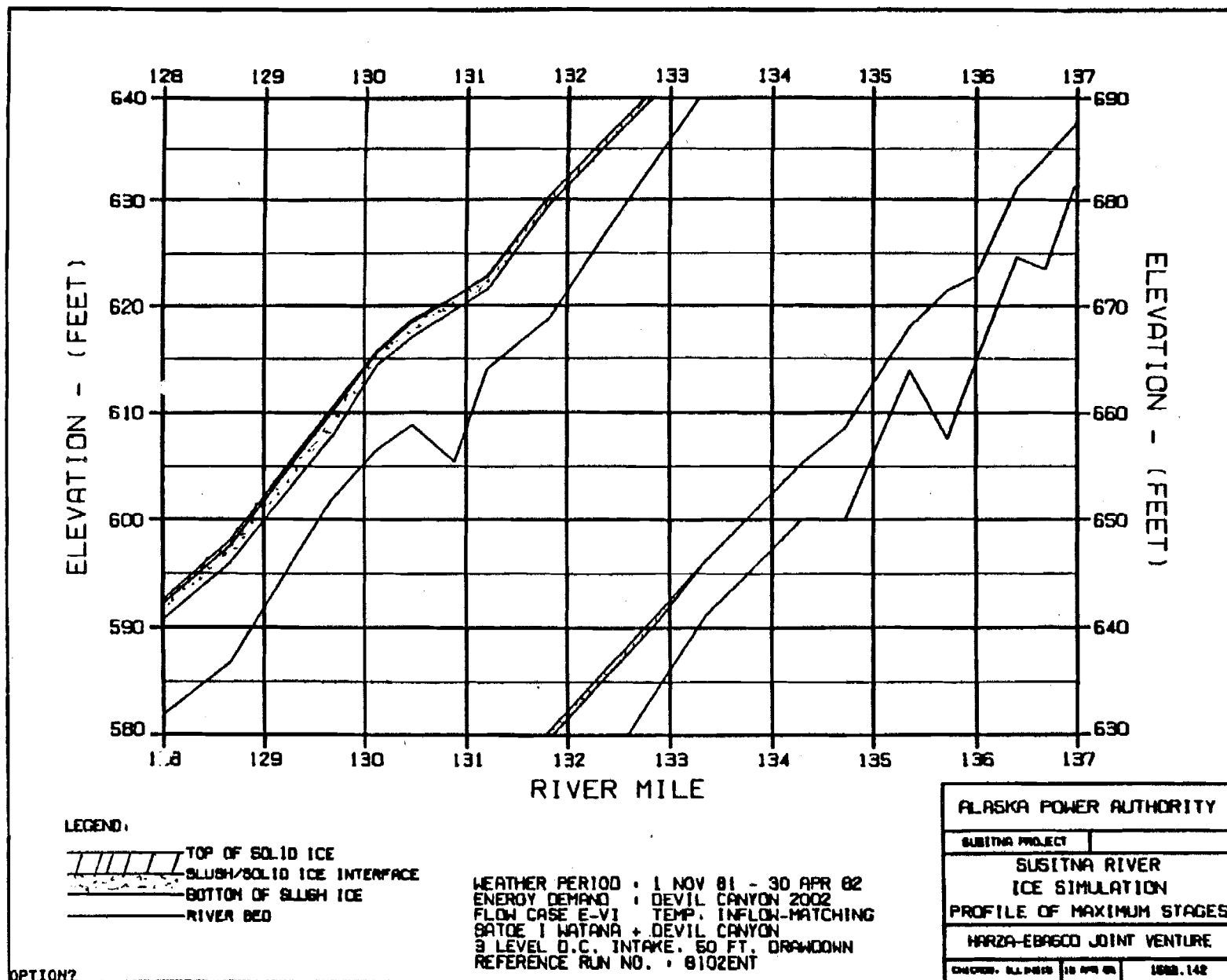
SUSITNA RIVER
 ICE SIMULATION
 PROFILE OF MAXIMUM STAGES

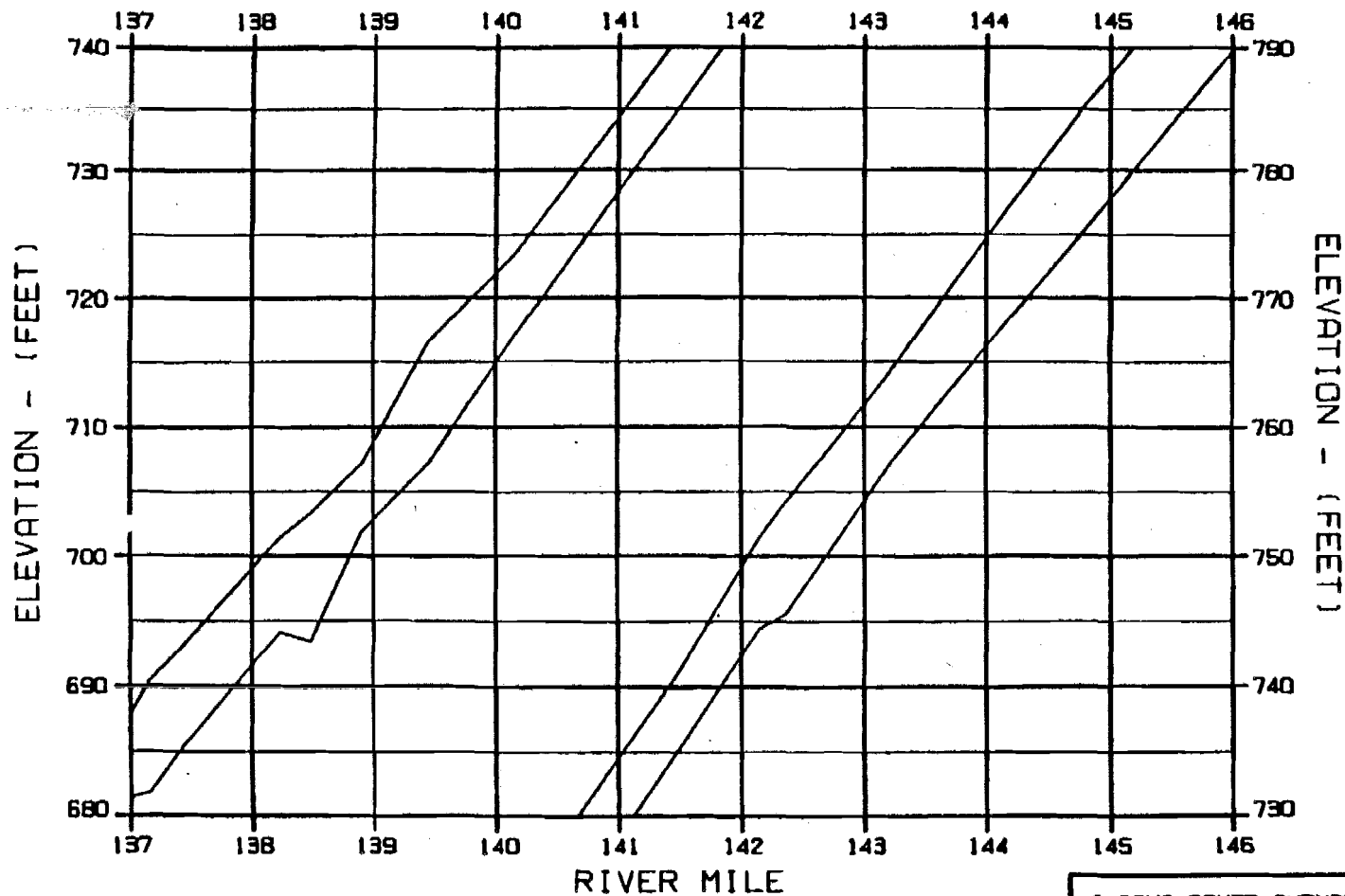
HARZA-EBASCO JOINT VENTURE

CHECKED: ALLIANCE 10 APR 82 1982, 142

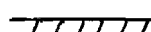
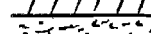
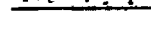
OPTION?

c





LEGEND:

-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 SATOE 1 WATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

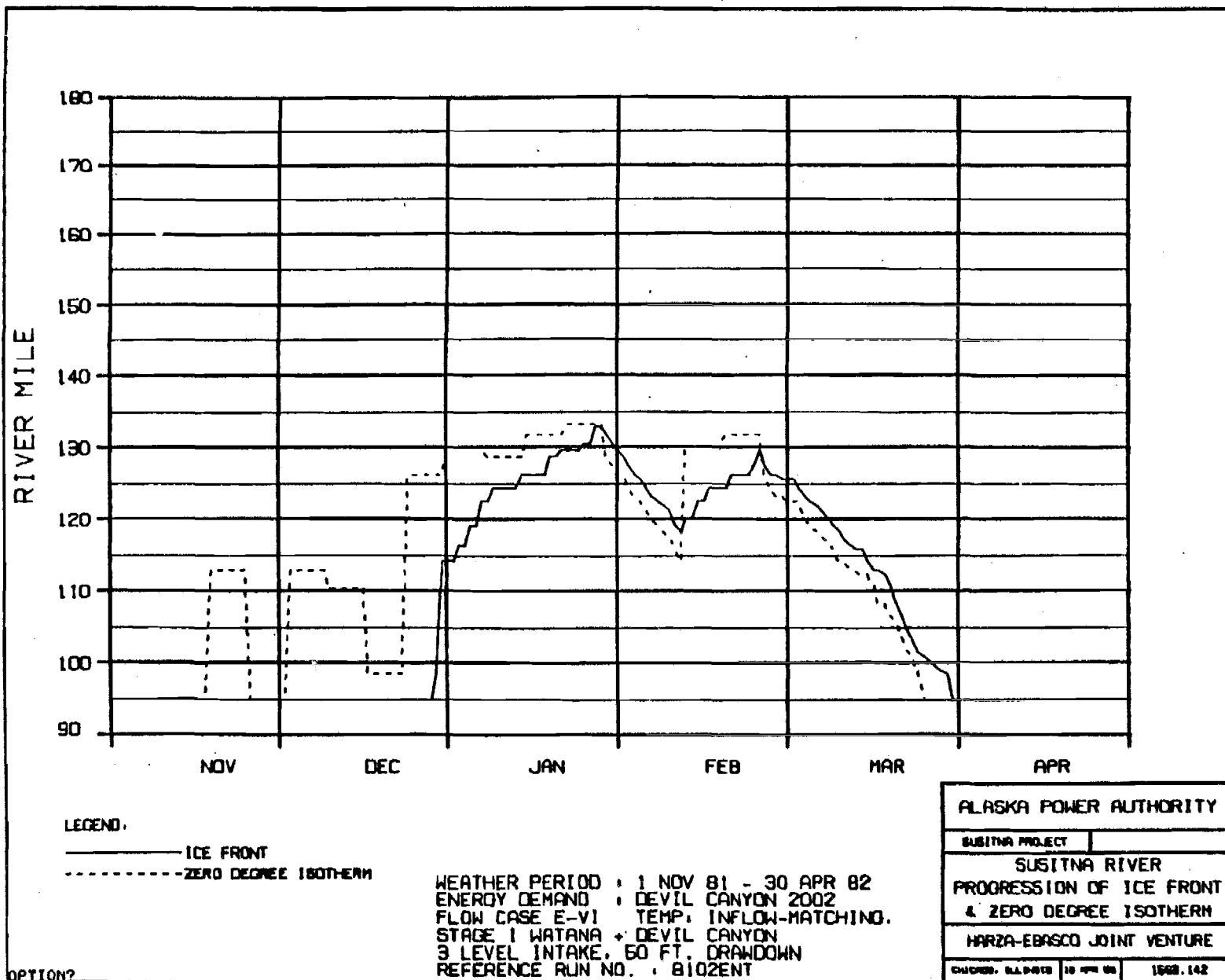
SUSITNA PROJECT

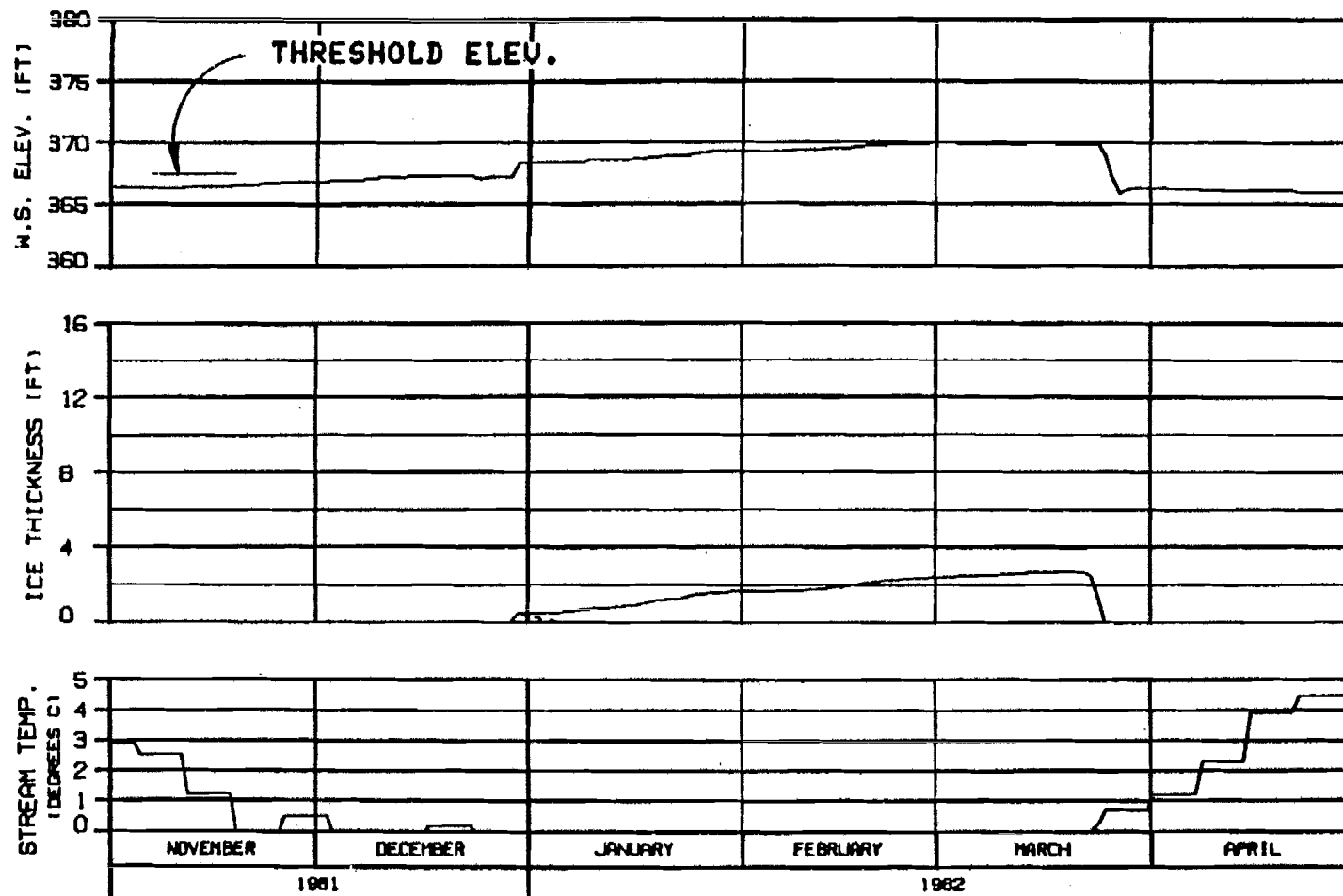
**SUSITNA RIVER
 ICE SIMULATION
 PROFILE OF MAXIMUM STAGES**

HARZA-EBASCO JOINT VENTURE

ENCLOSURE: AL-8000 10 APR 82 1000.142

OPTION2





HEAD OF WHISKERS SLOUGH RIVER MILE : 101.50

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 ~ 30 APR 82
CASE E-VI FLOWS TEMP, INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102NT

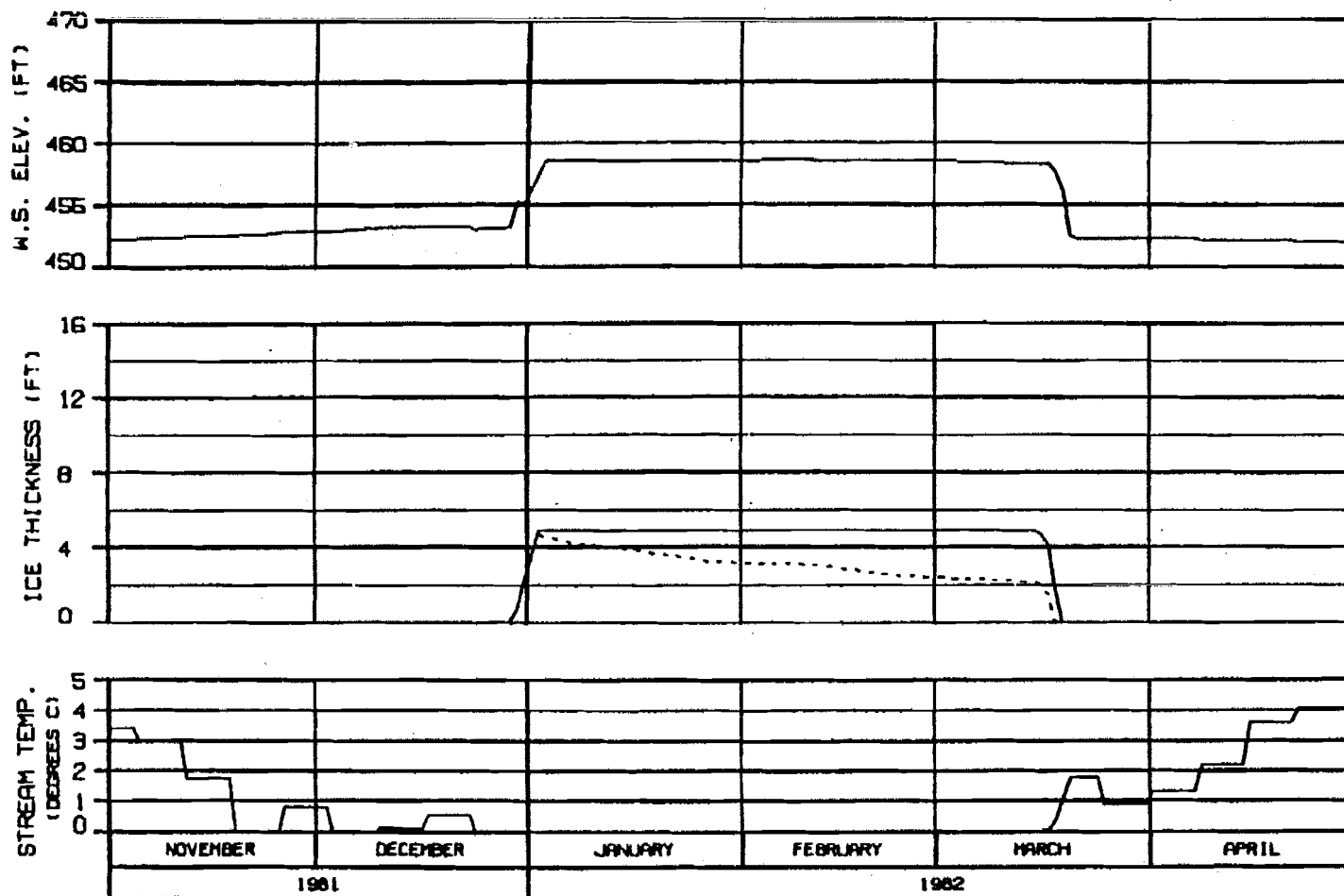
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

ENGINEER: ALP/MS 18 APR 82 1000.142



SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

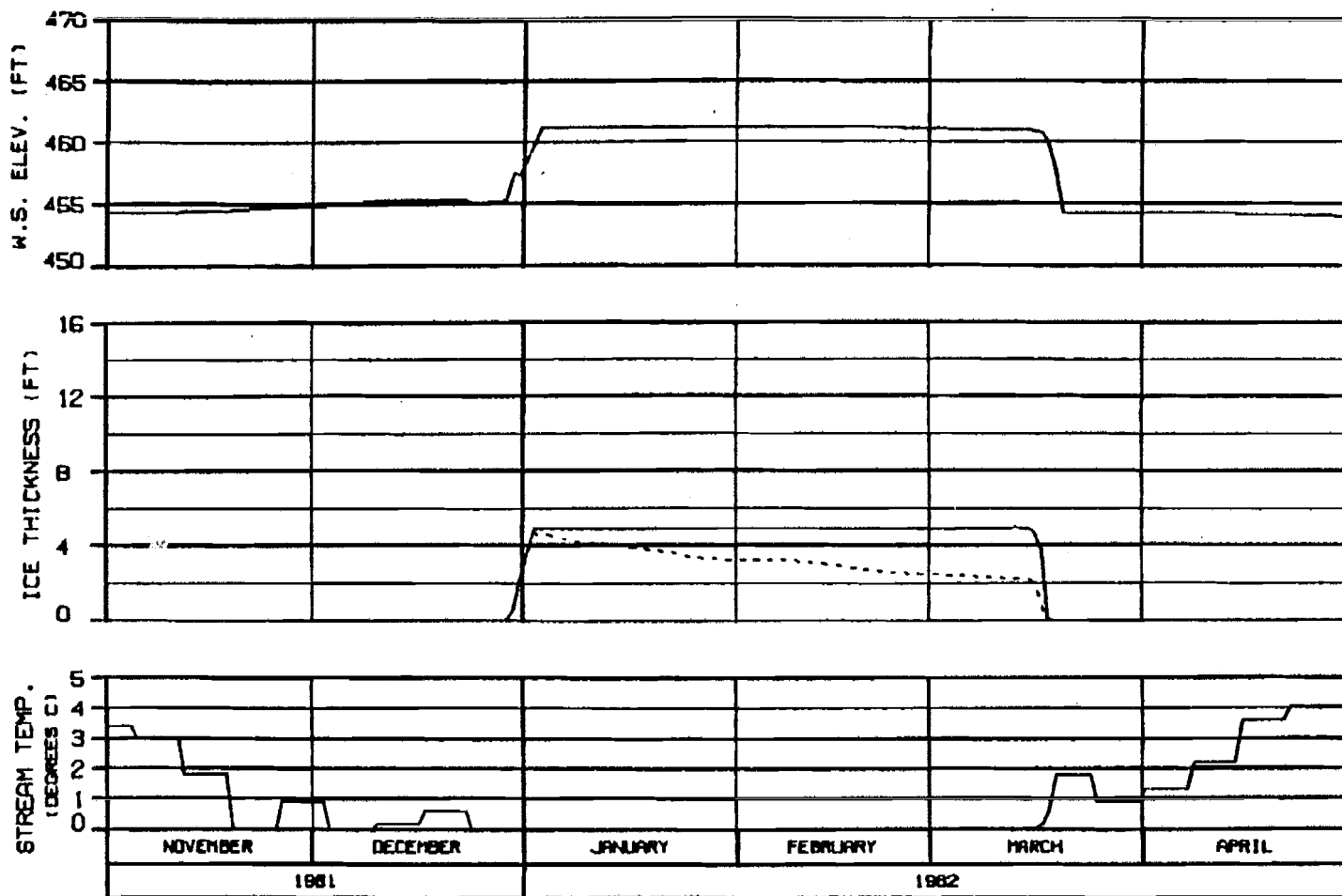
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHECKED: D.L.B.-BIB 18 APR 82 1583.142



MOUTH OF SLOUGH 6A
RIVER MILE : 112.34

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- BLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

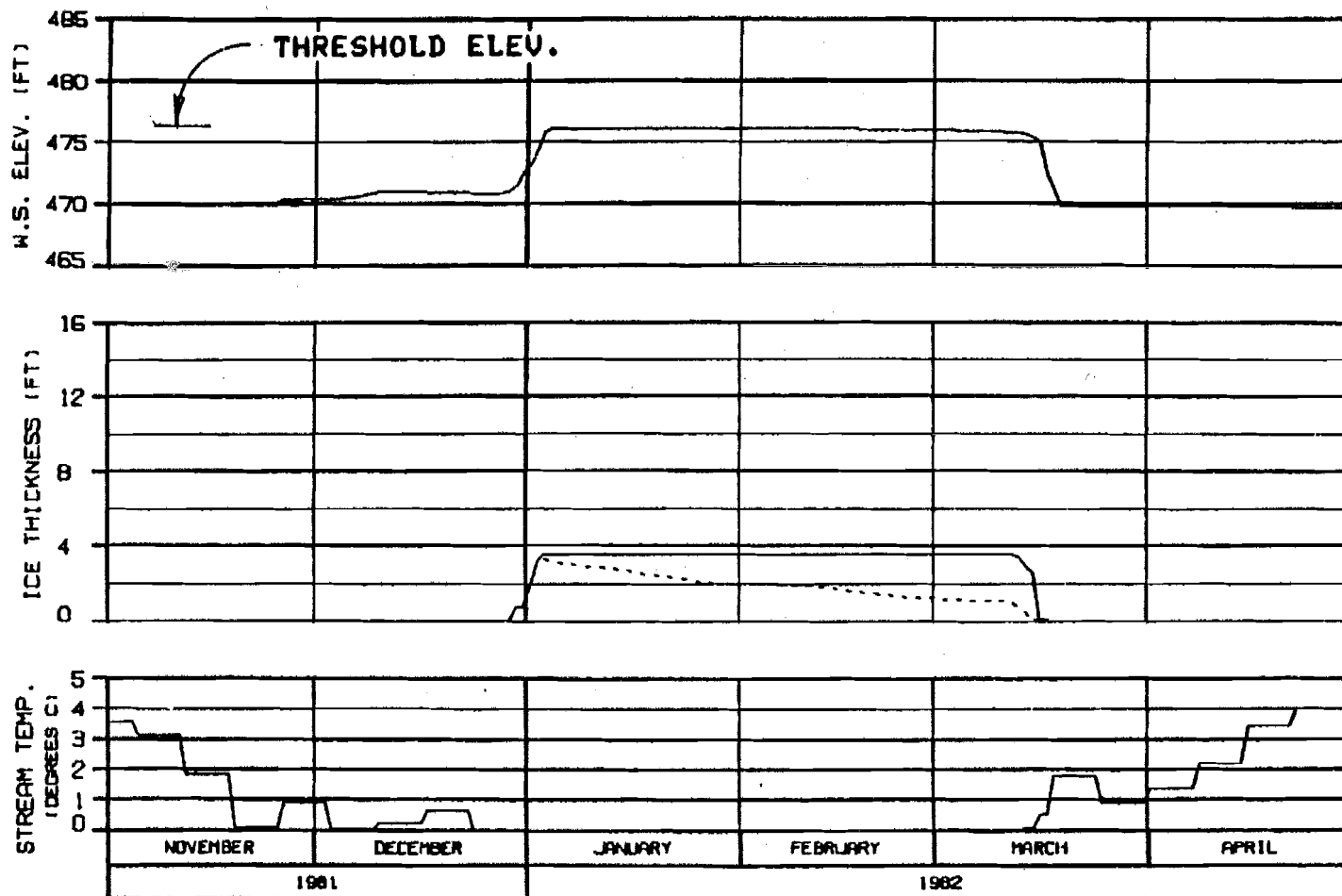
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EGASCO JOINT VENTURE

DRAWN: B.L.B. 10 APR 82 1000.142



HEAD OF SLOUGH 8
RIVER MILE : 114.10

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

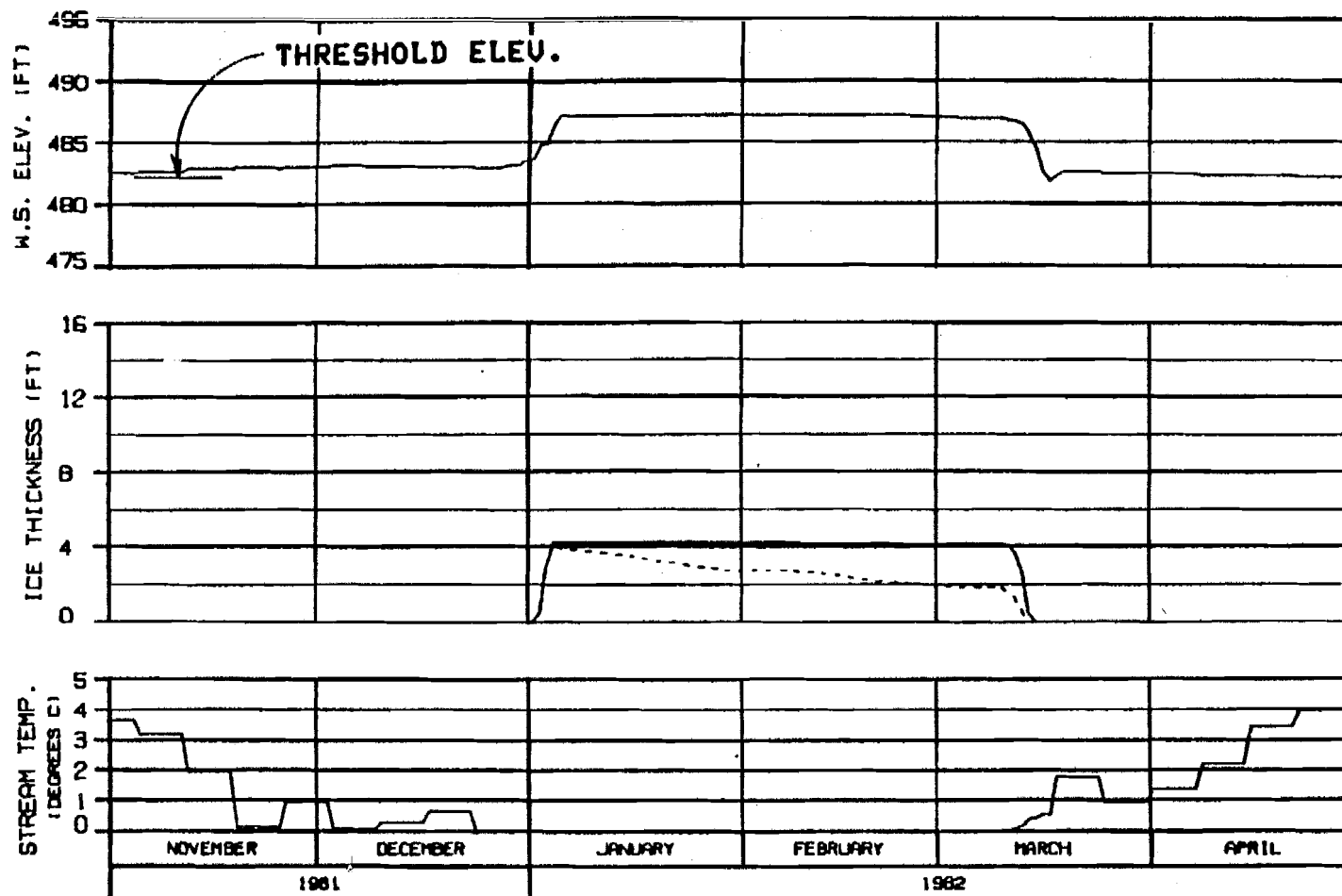
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HAZRA-EBASCO JOINT VENTURE

DESIGN: 11/04/81 15 APR 82 1500.142



SIDE CHANNEL MSII

RIVER MILE : 115.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

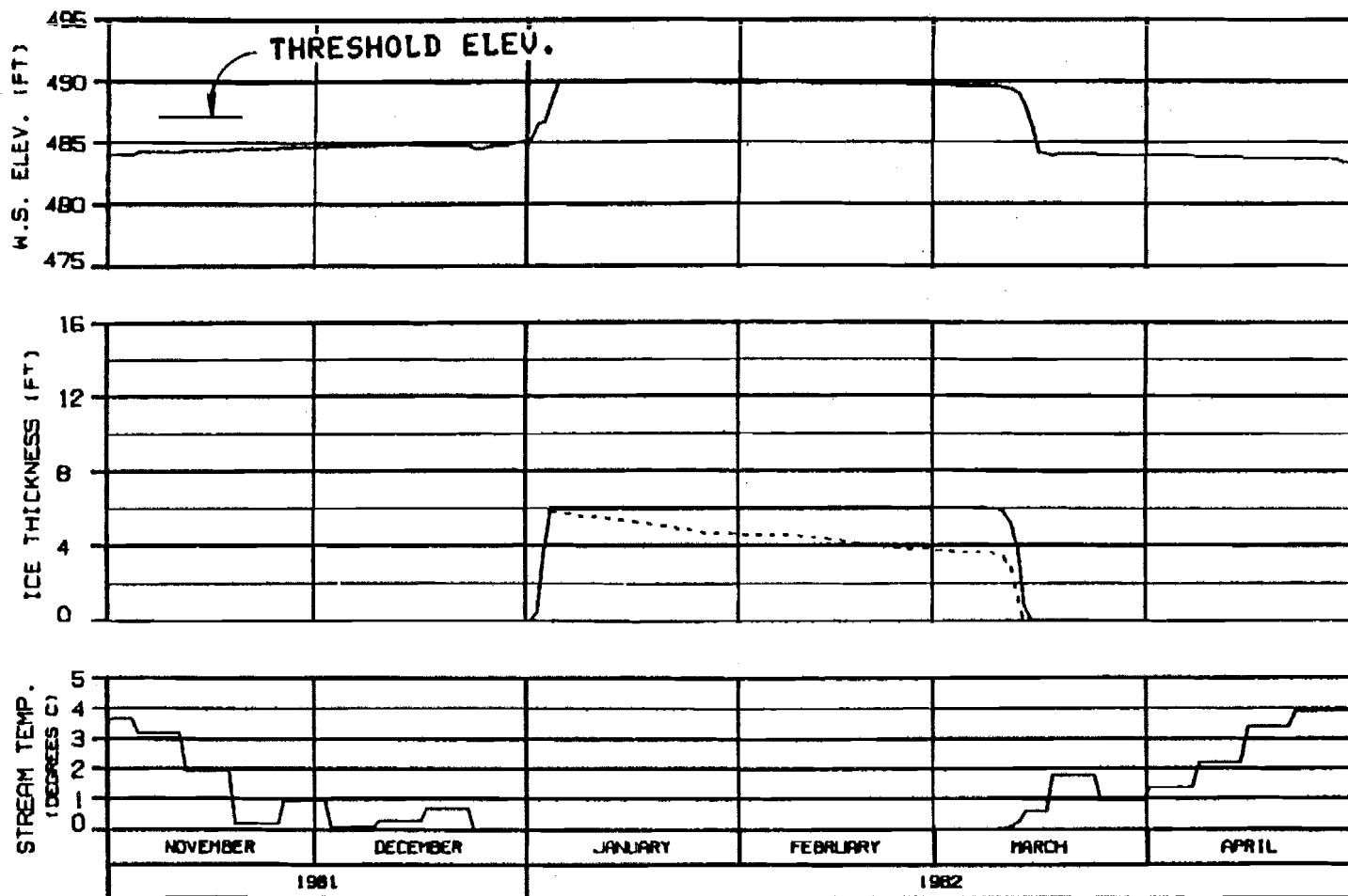
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARTER - 04-00-01 18 APR 82 1000.142



HEAD OF SIDE CHANNEL MSII

RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
 3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

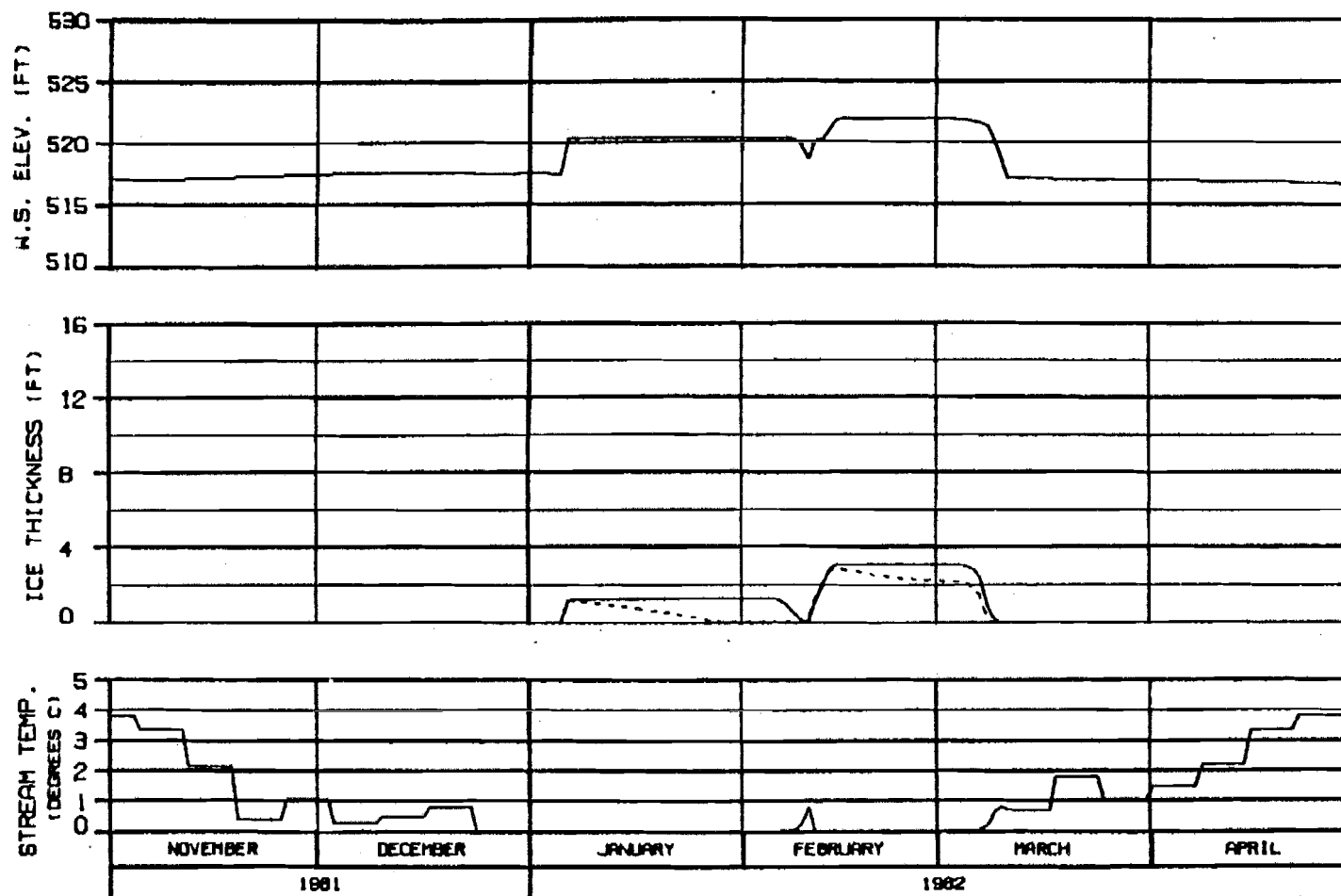
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARTED. ALL RIGHTS RESERVED 18 APR 82 1508.142



ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
 3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

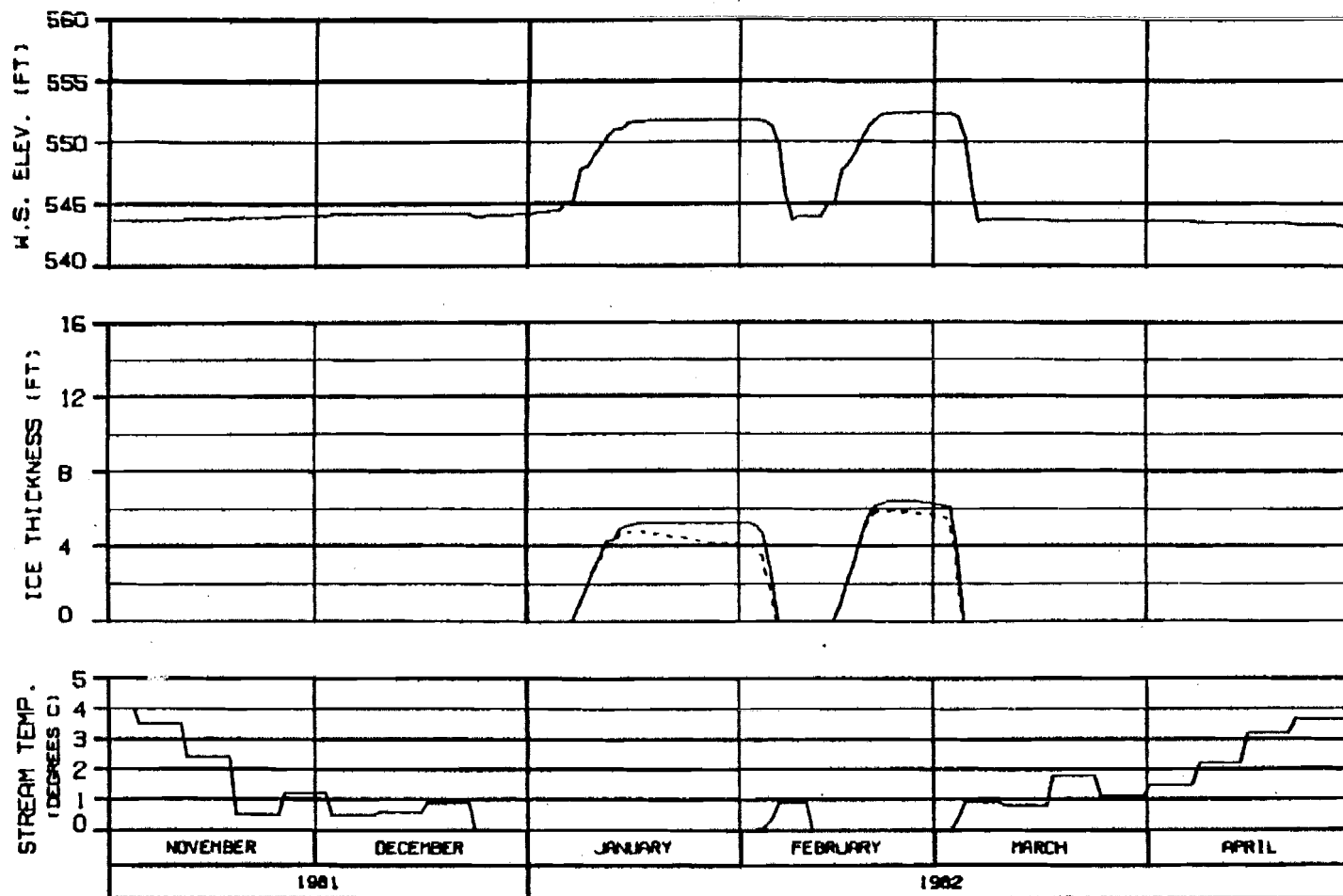
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: S.L. BROWN 10 APR 82 1588.142



HEAD OF MOOSE SLOUGH
RIVER MILE : 123.50

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- BLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
REFERENCE RUN NO. : 810ZENT

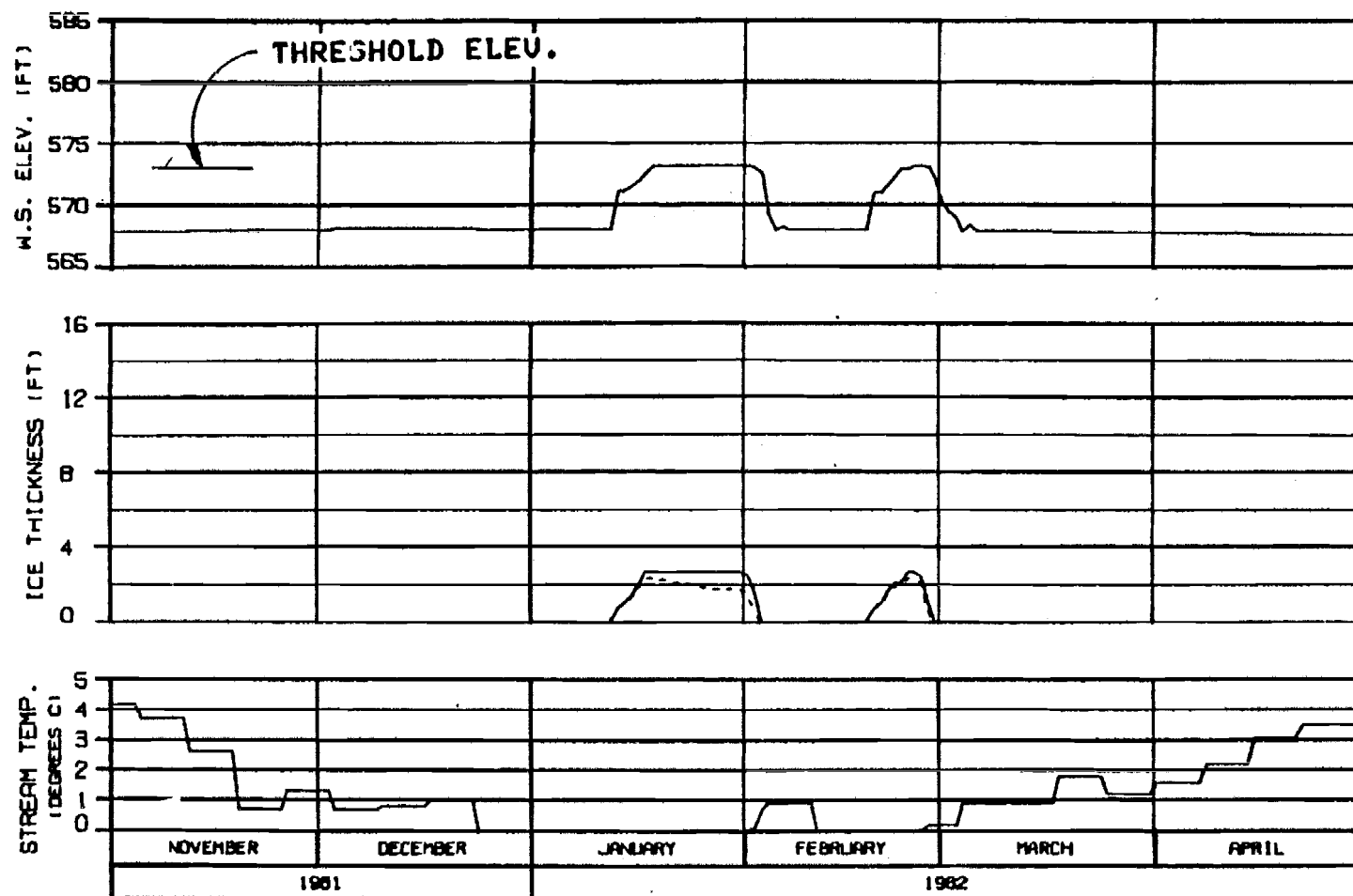
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF: J.L. BARRIS 10 APR 82 1003.142



HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 SLUGH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

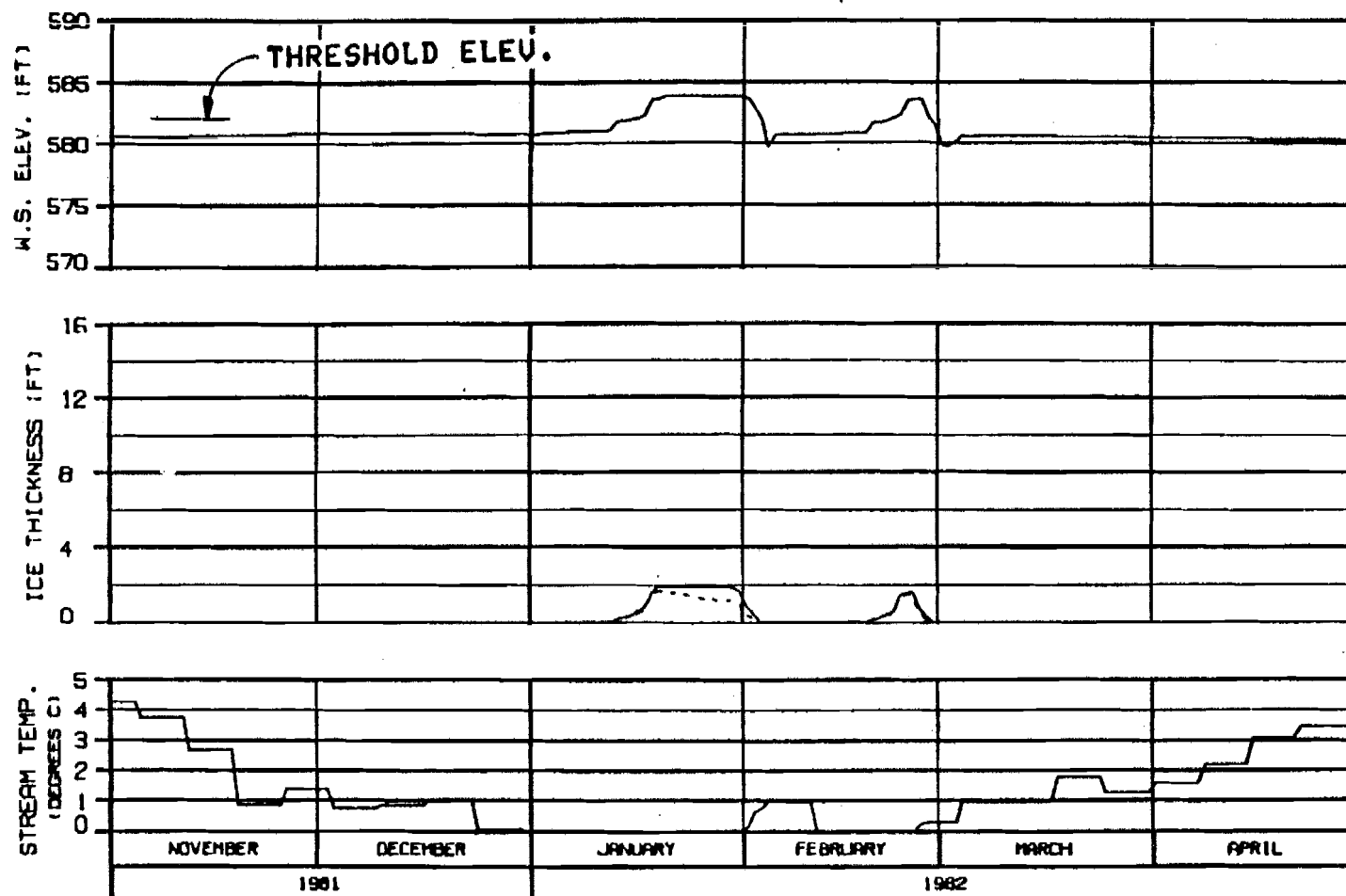
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARTED: ALL 9-8100 10 APR 82

1500.142



HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLOUGH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

SUSITNA PROJECT

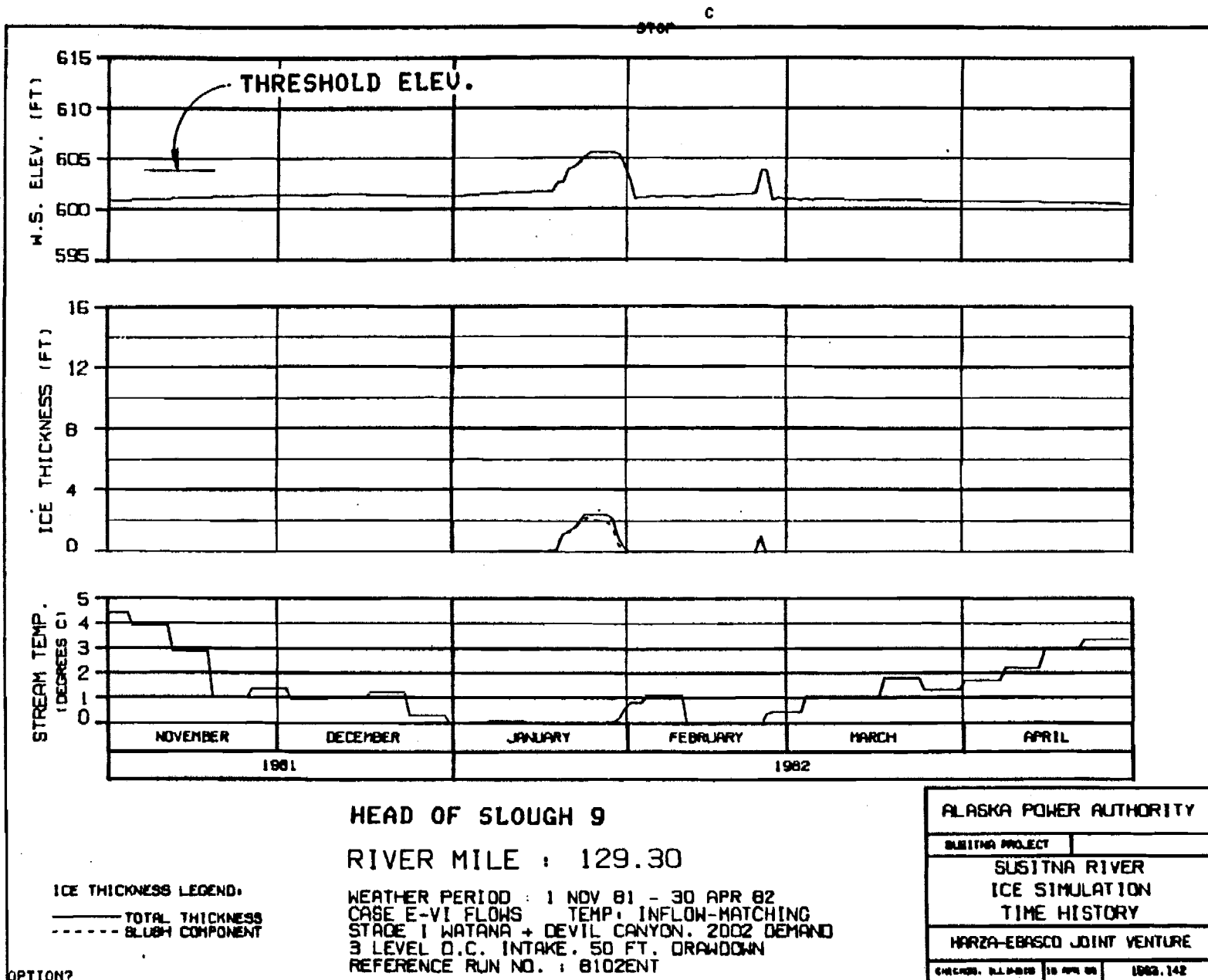
SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHIEF - ALLIANCE

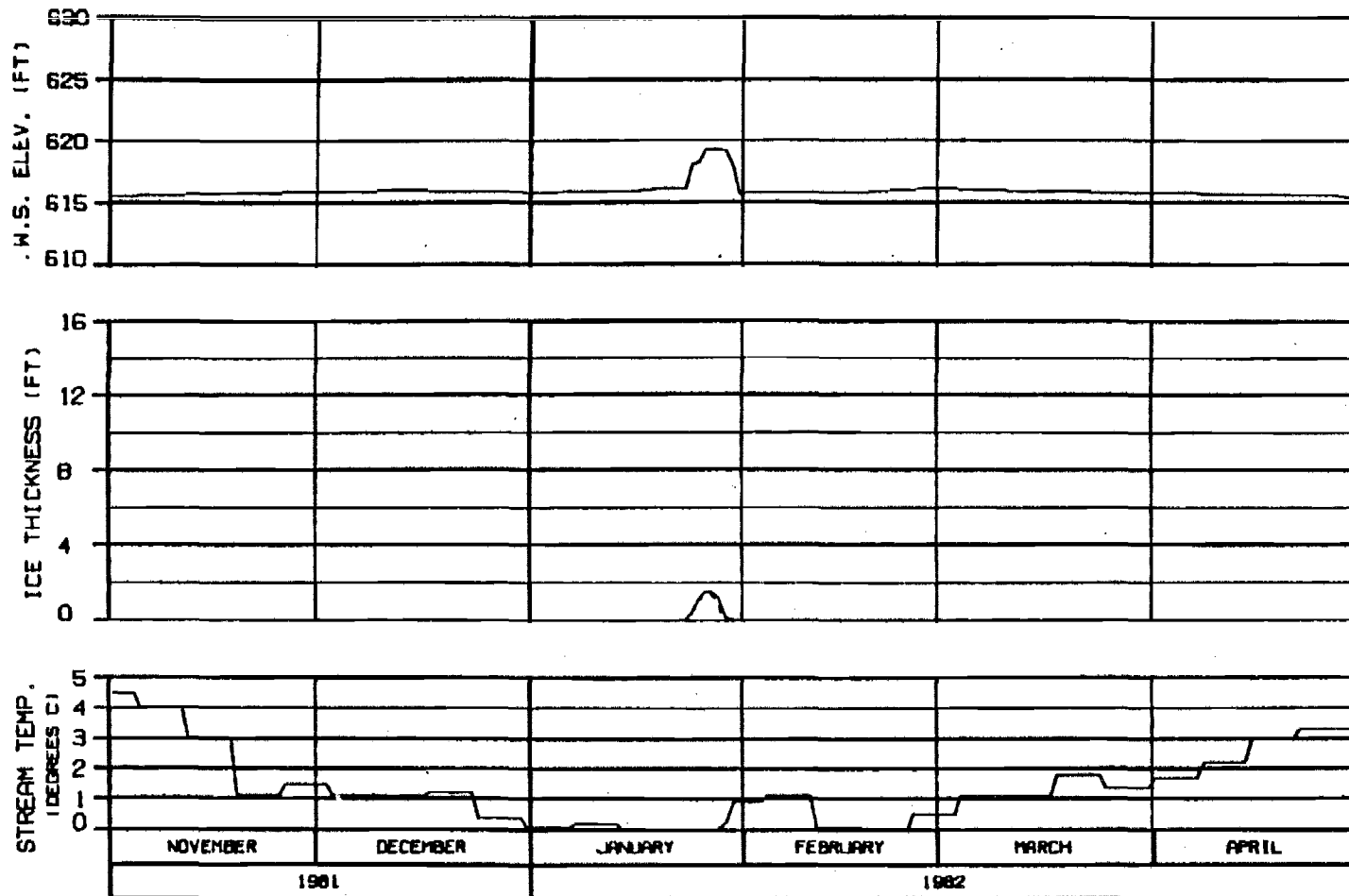
16 APR 82

1000.142



OPTION?

OPTION?



SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

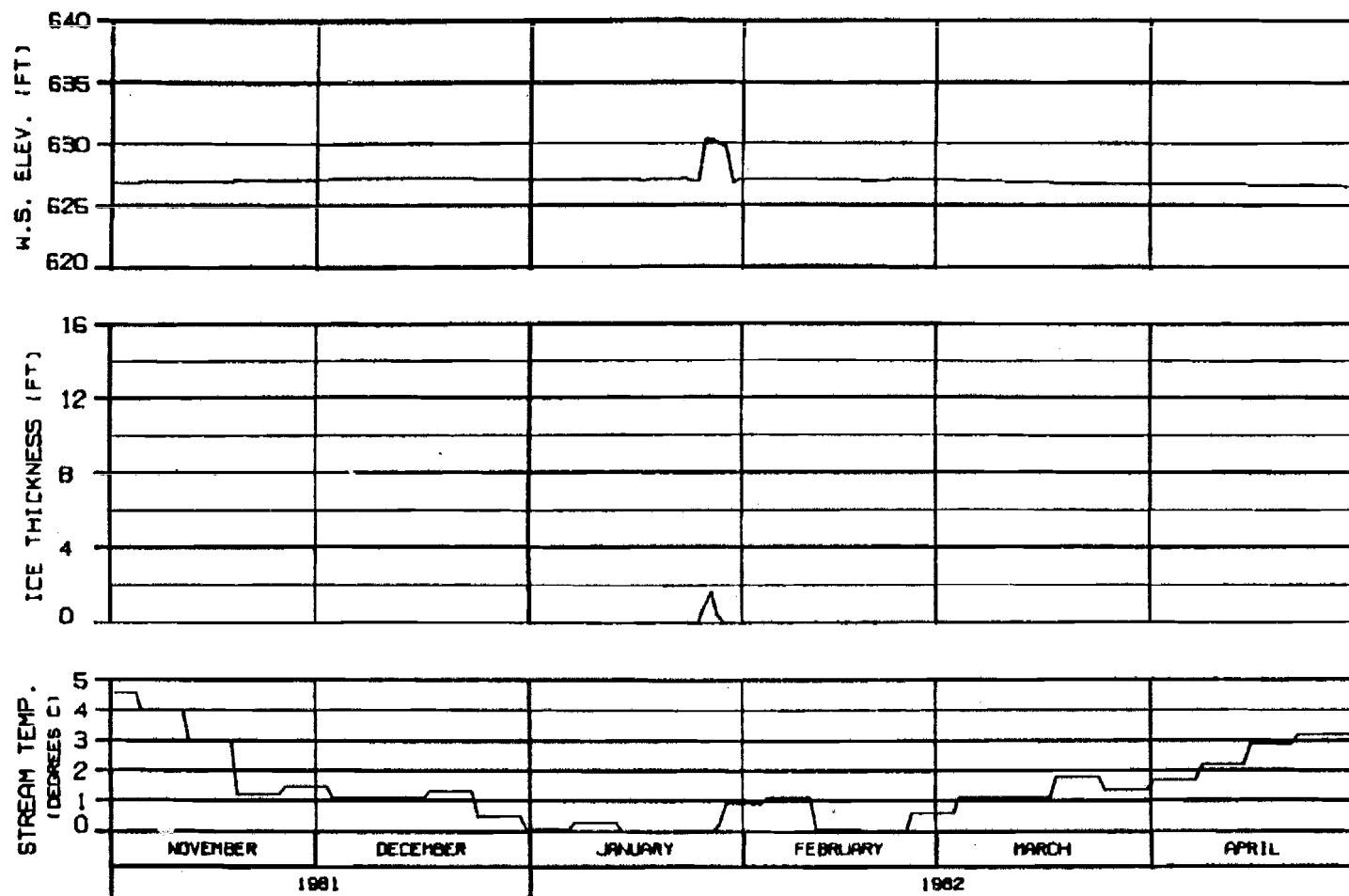
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 10 APR 82 1000.142



SIDE CHANNEL U/S OF 4TH JULY CREEK
RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

SUSITNA PROJECT

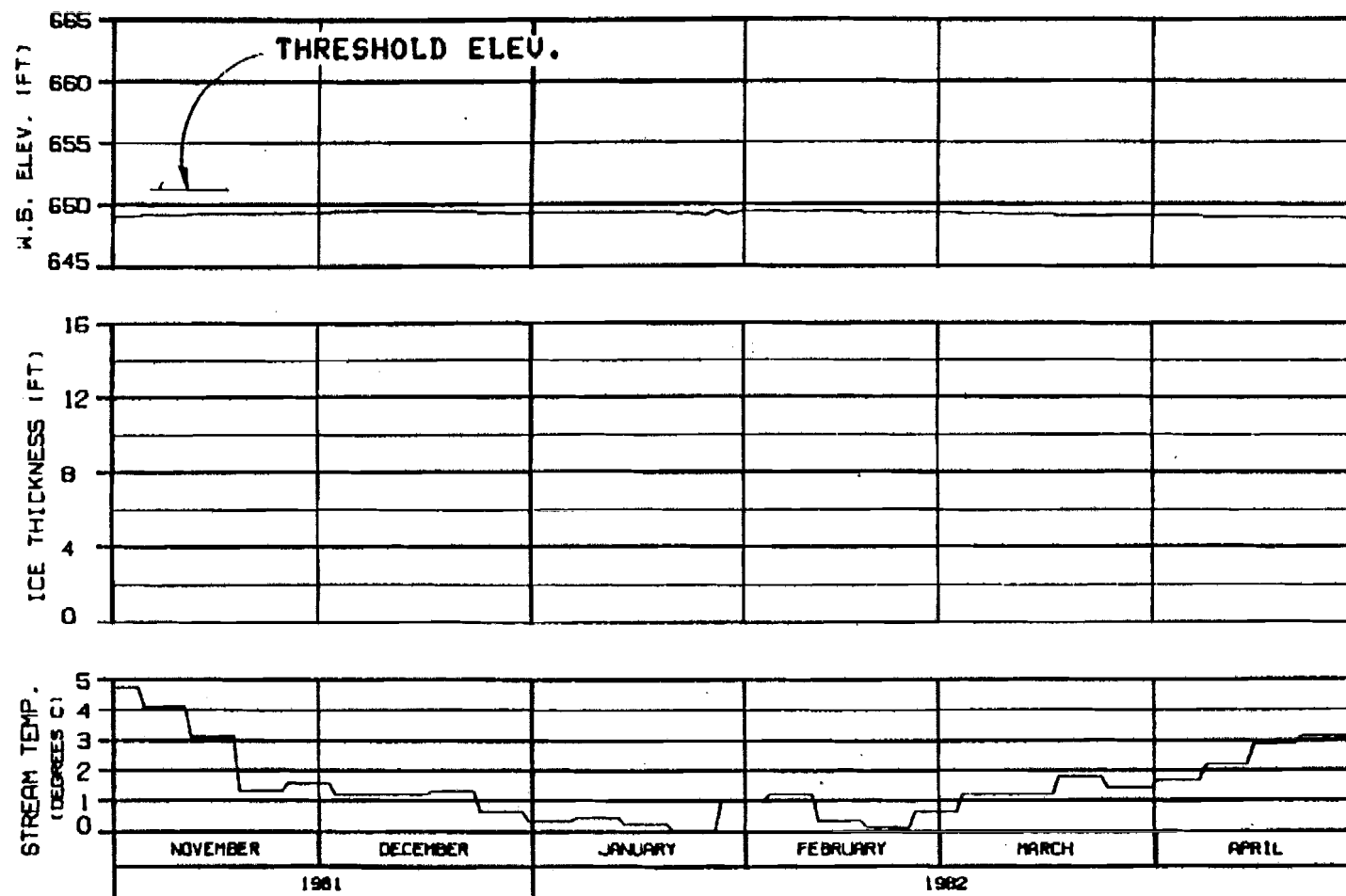
**SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY**

HARZA-EBASCO JOINT VENTURE

CHARTS - ALL DATA

18 APR 82

1000.142



HEAD OF SLOUGH 9A

RIVER MILE : 133.70

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

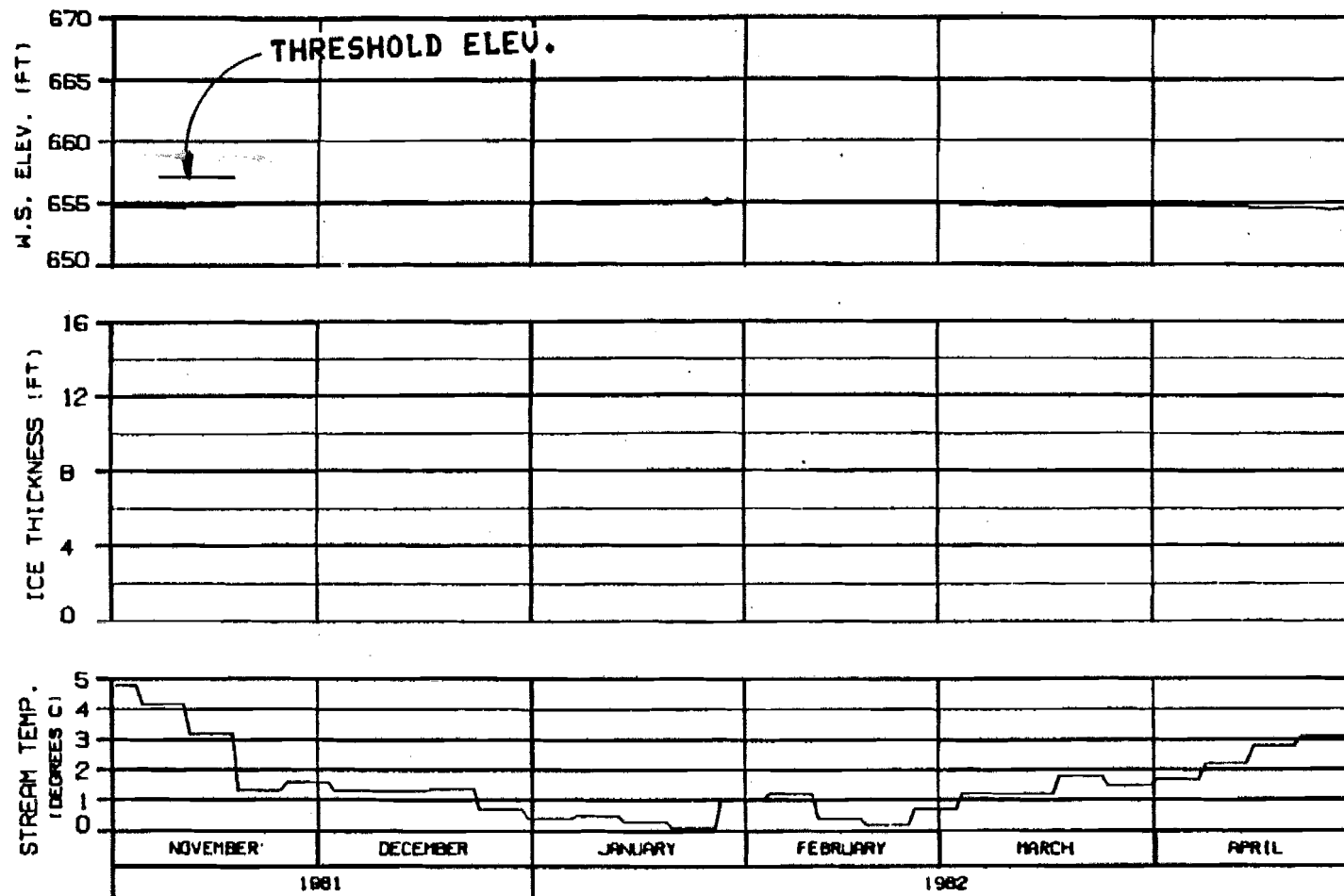
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHUCKO - EL-1010 10 APR 82 1000.142



SIDE CHANNEL U/S OF SLOUGH 10
RIVER MILE : 134.30

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

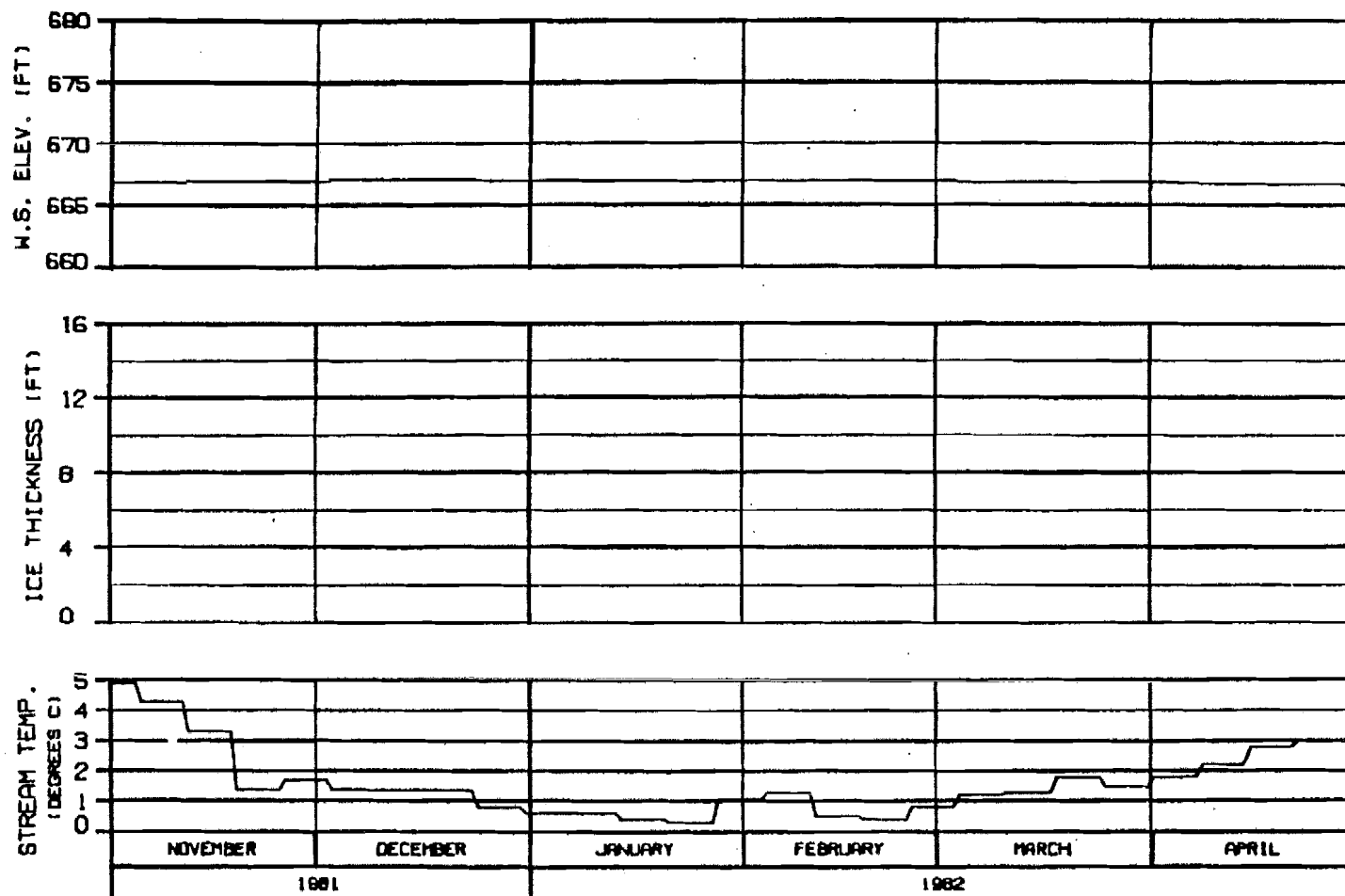
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

DRAWN: ALB-815 10 APR 82 1508.142

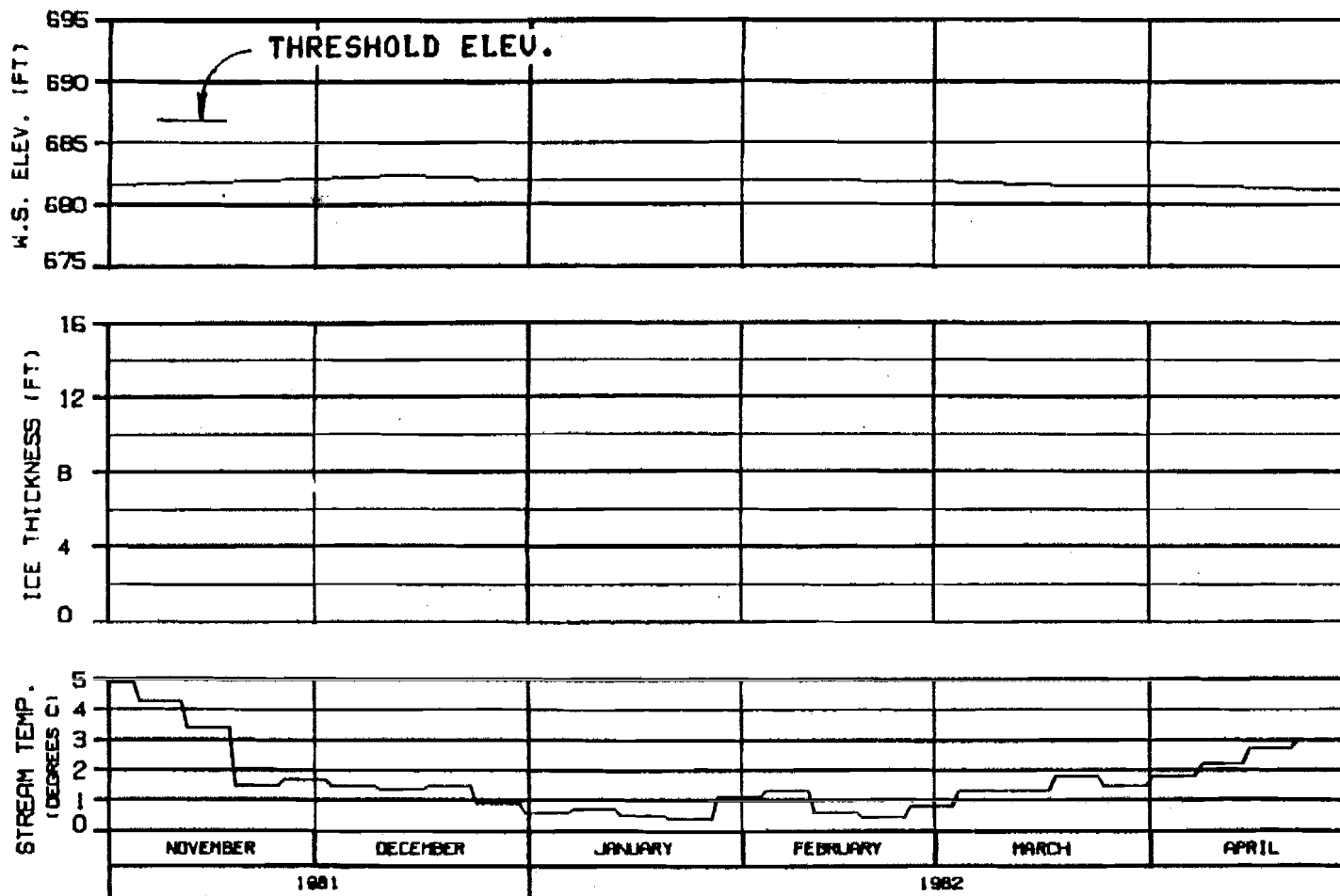


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
CHUCKER, ILLINOIS	18 APR 82	1582.142



HEAD OF SLOUGH 11
RIVER MILE : 136.50

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 810ZENT

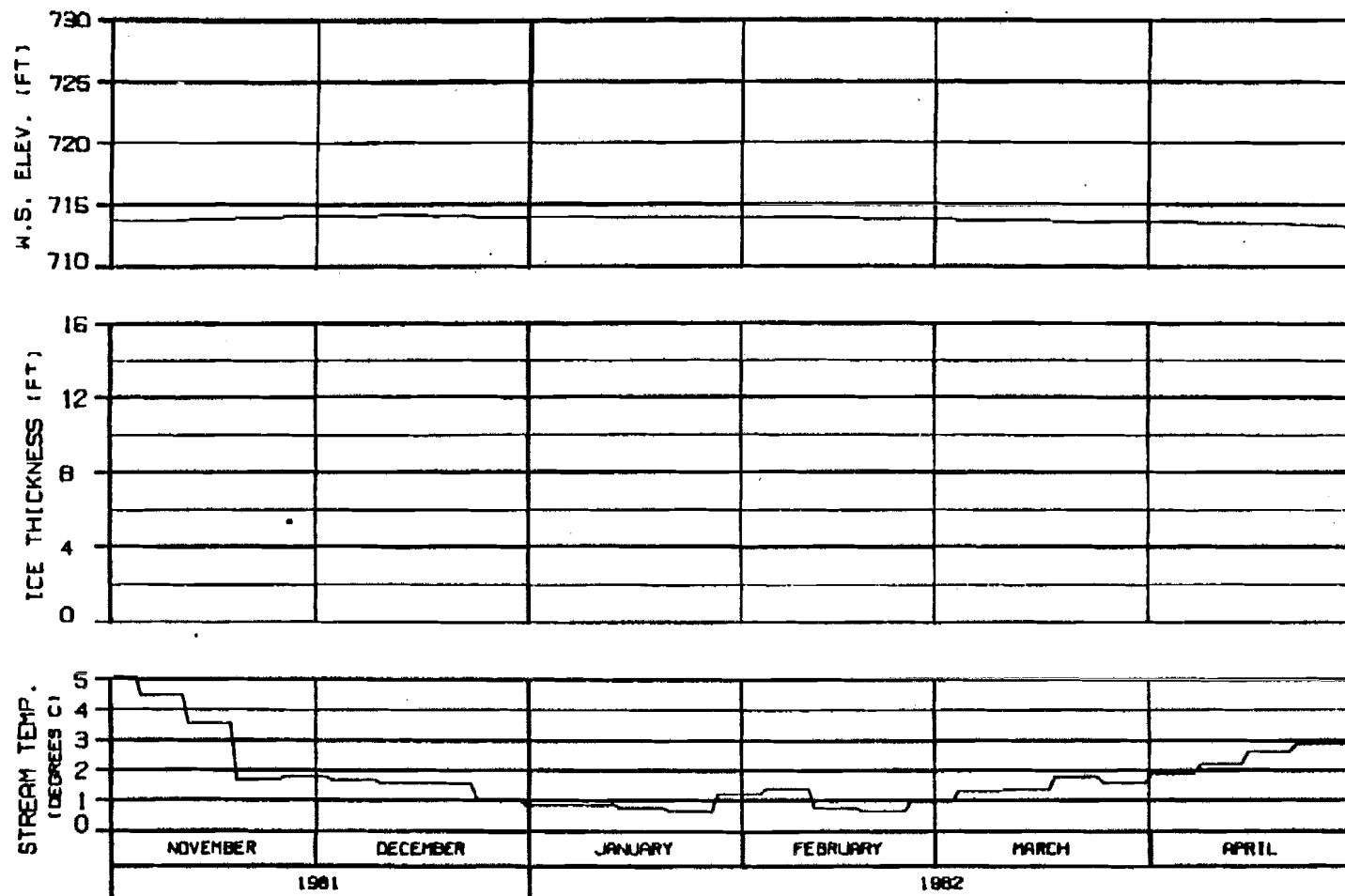
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

DESIGN: 11/1/81 10 APR 82 1500.142



HEAD OF SLOUGH 17

RIVER MILE : 139.30

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLOUGH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 810ZENT

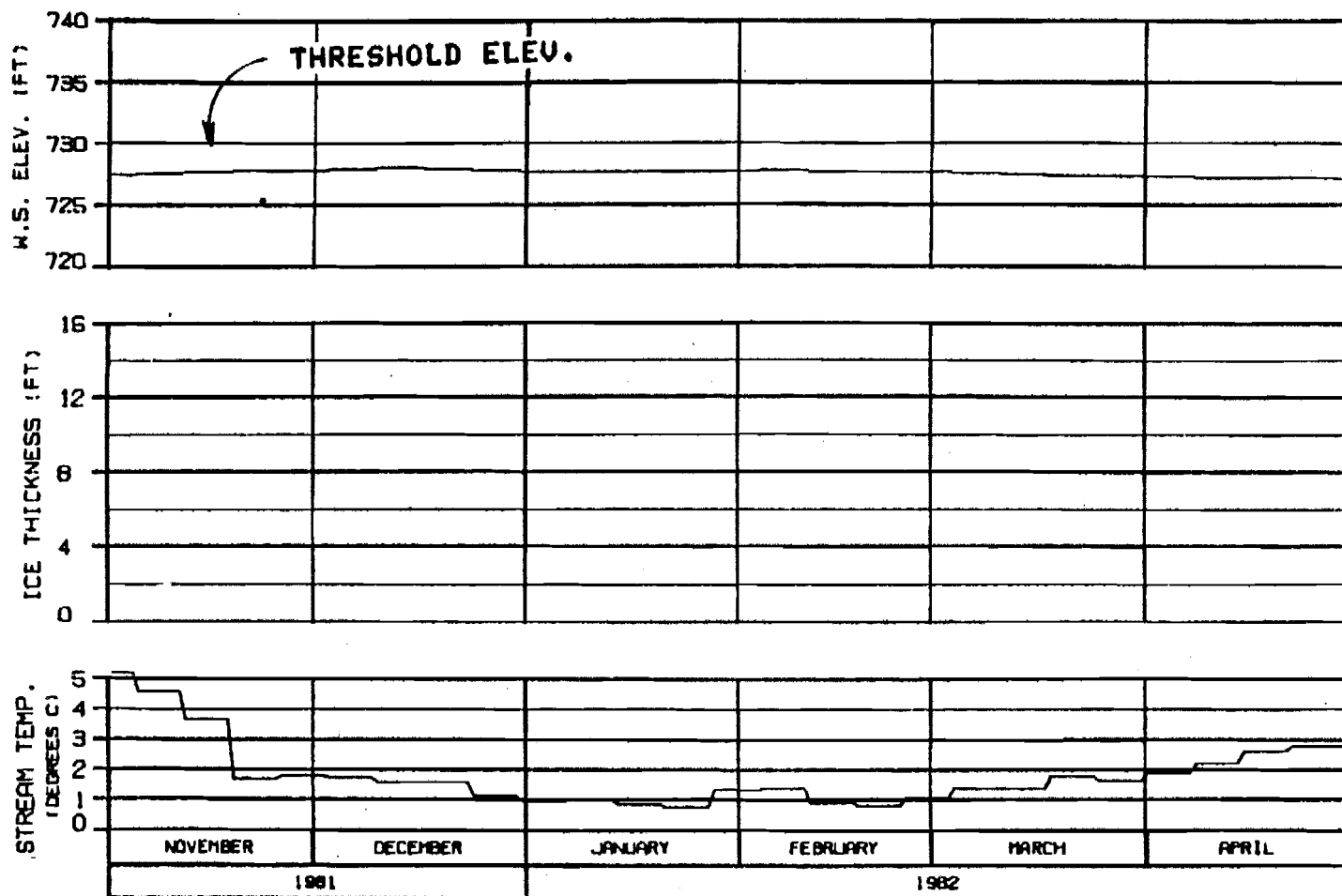
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: B.L. 10/10/82 10 APR 82 1003.142



HEAD OF SLOUGH 20

RIVER MILE : 140.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

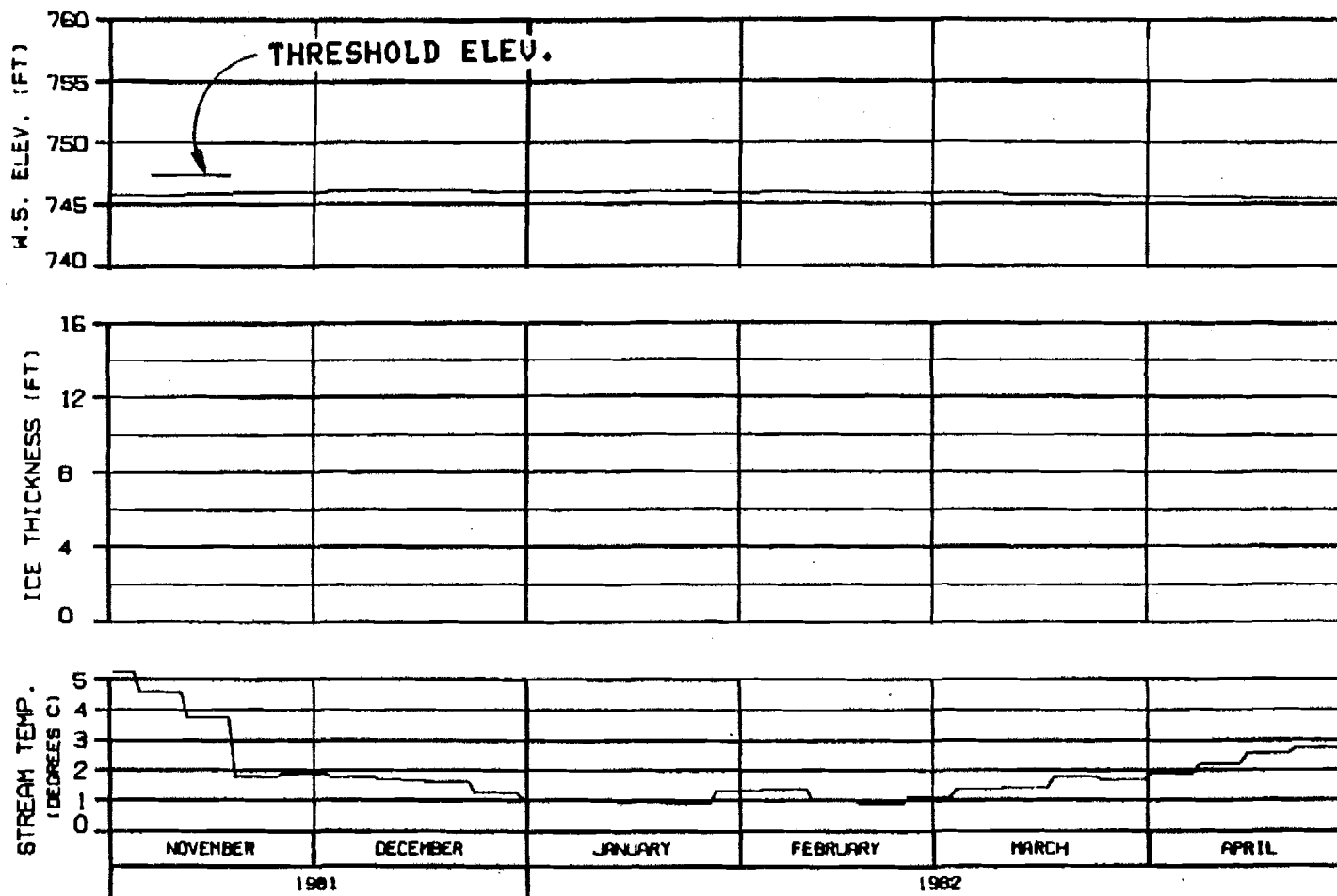
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: J.L.P. 18 APR 82 1508.142



SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

ICE THICKNESS LEGEND:

——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 NATANA + DEVIL CANYON. 2002 DEMAND
 3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

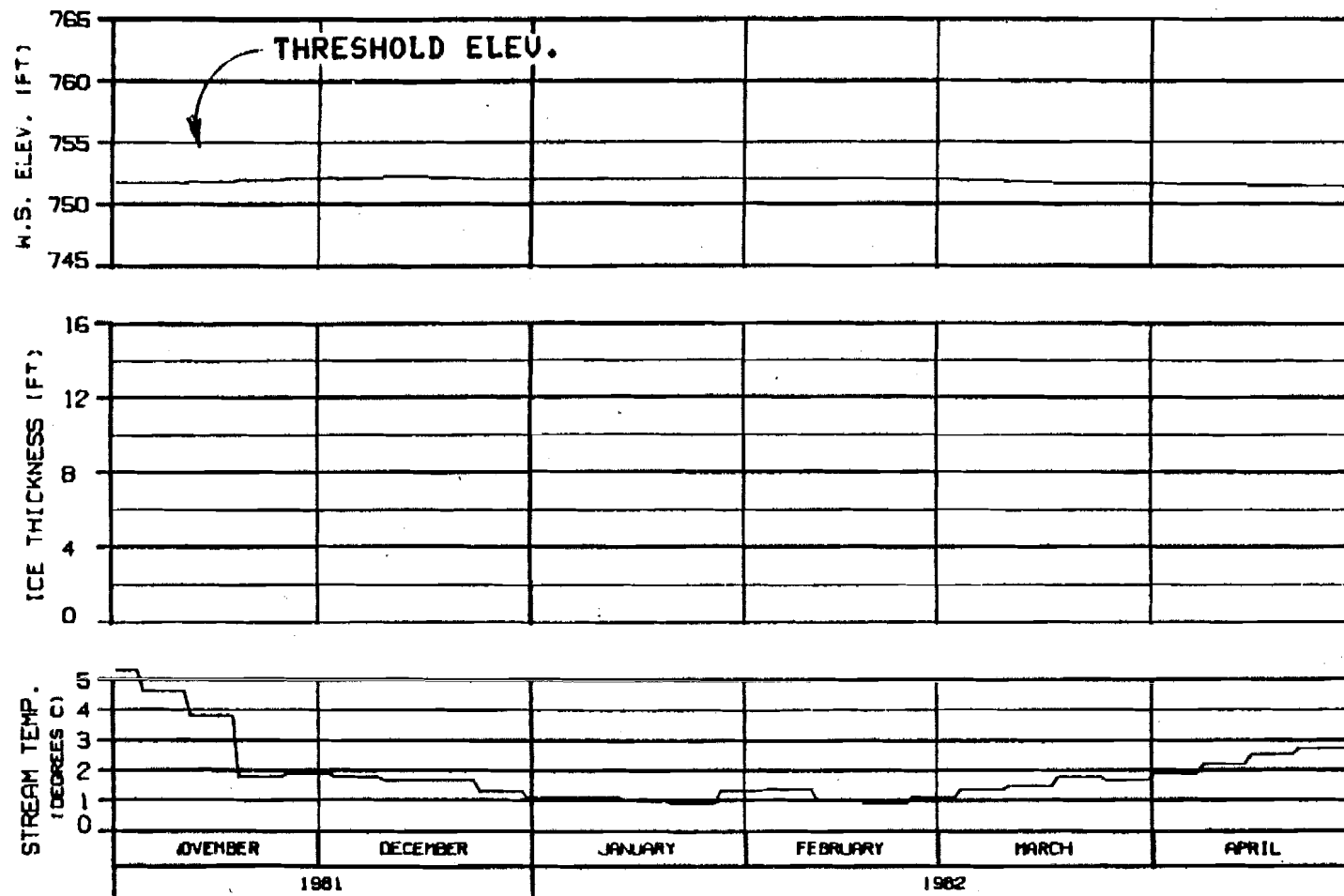
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: SLD/MSB 16 APR 82 1063.142



HEAD OF SLOUGH 21

RIVER MILE : 142.20

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENT

ALASKA POWER AUTHORITY

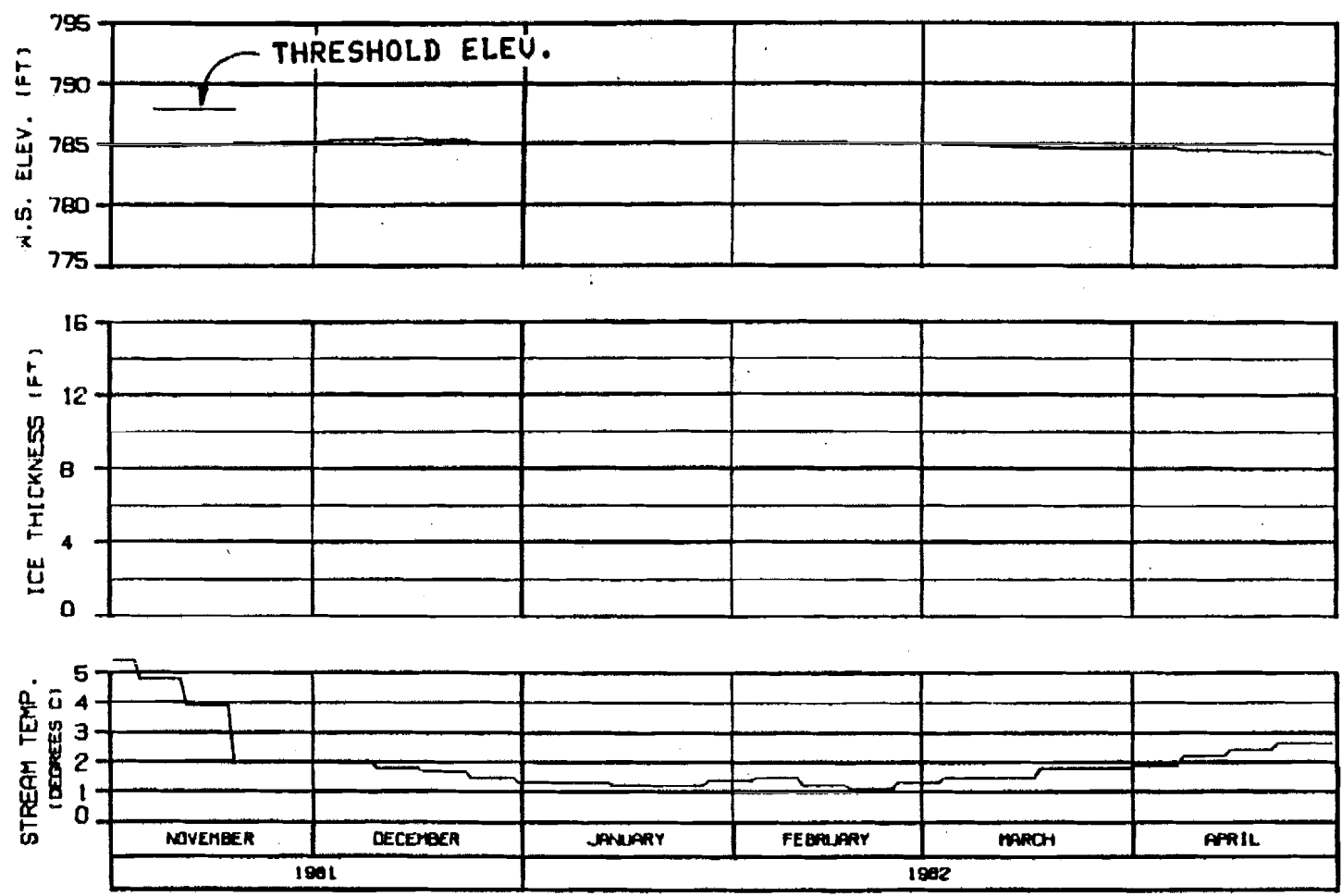
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: (ALL) 15 15 APR 82 1500.142

C



HEAD OF SLOUGH 22
RIVER MILE : 144.80

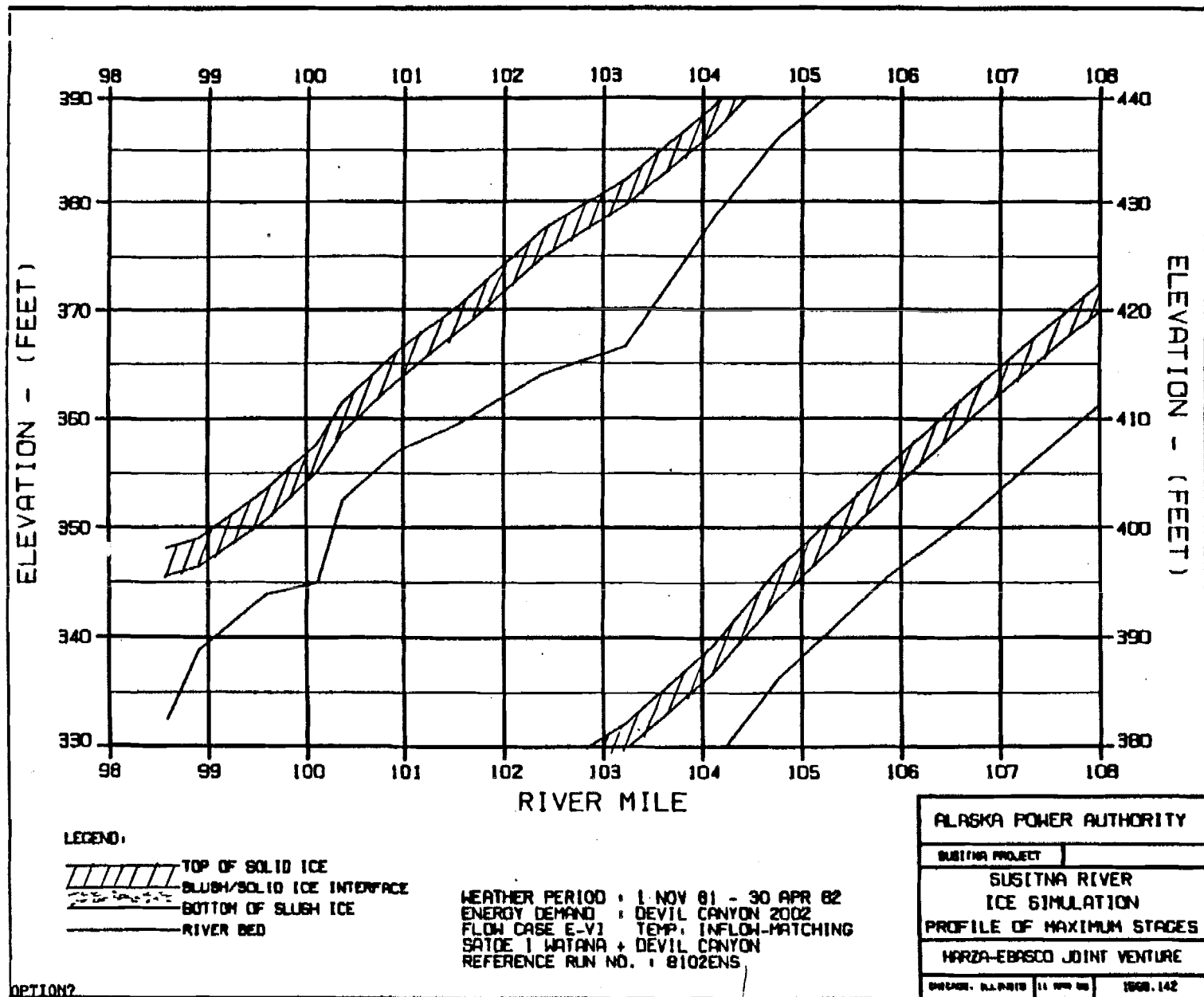
ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENT

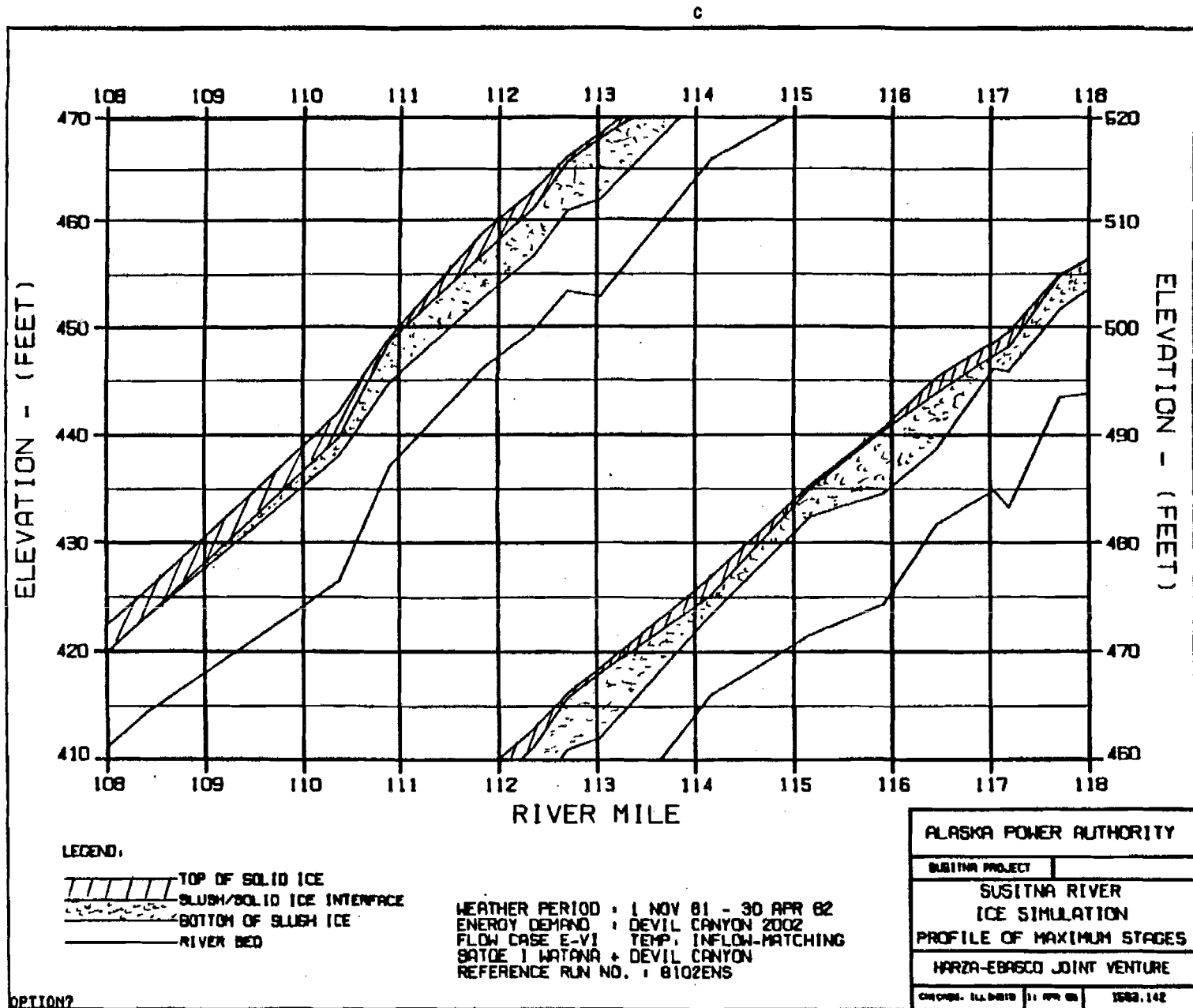
ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60610	16 APR 82 1503.142

OPTION?

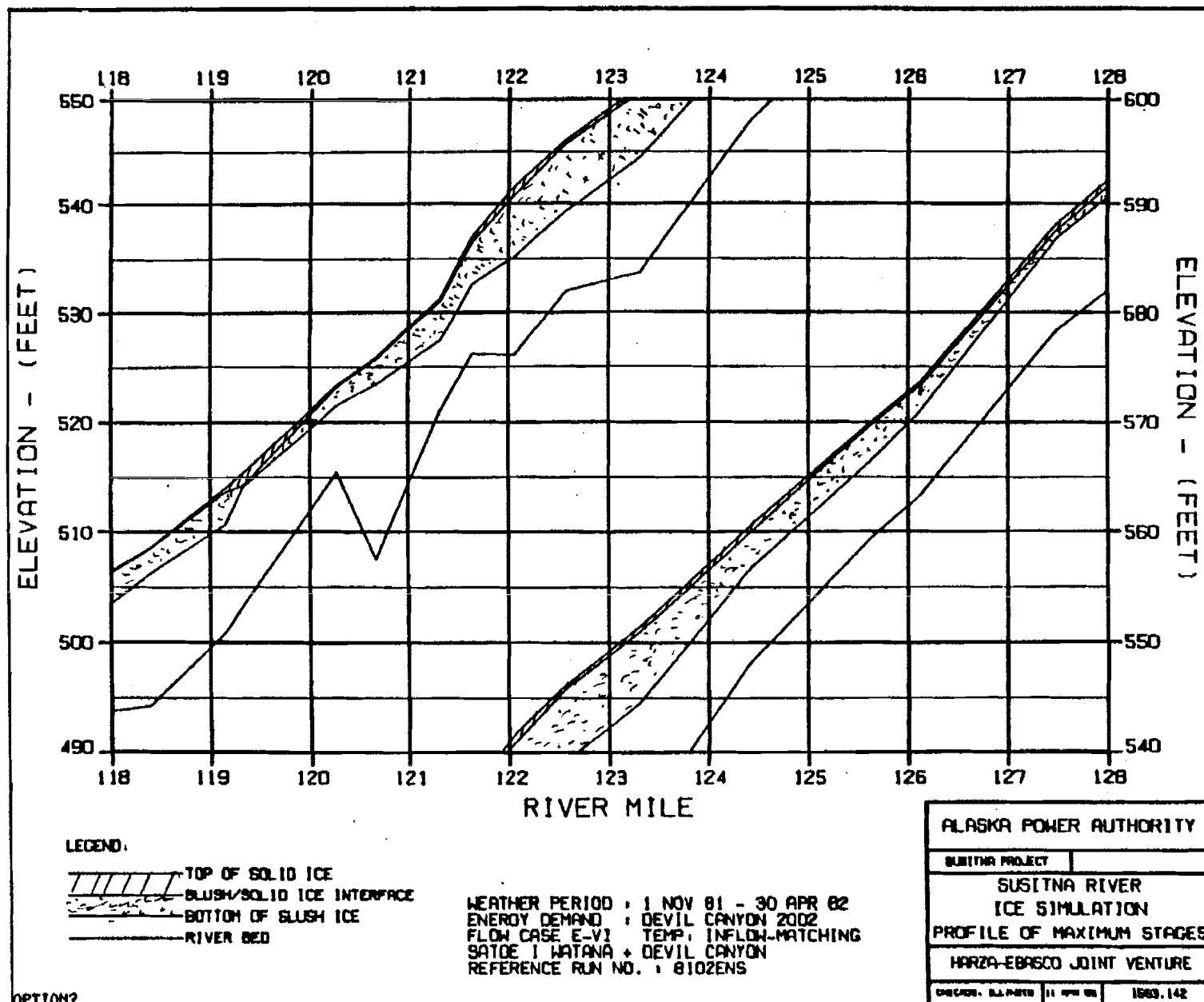
EXHIBIT 8b

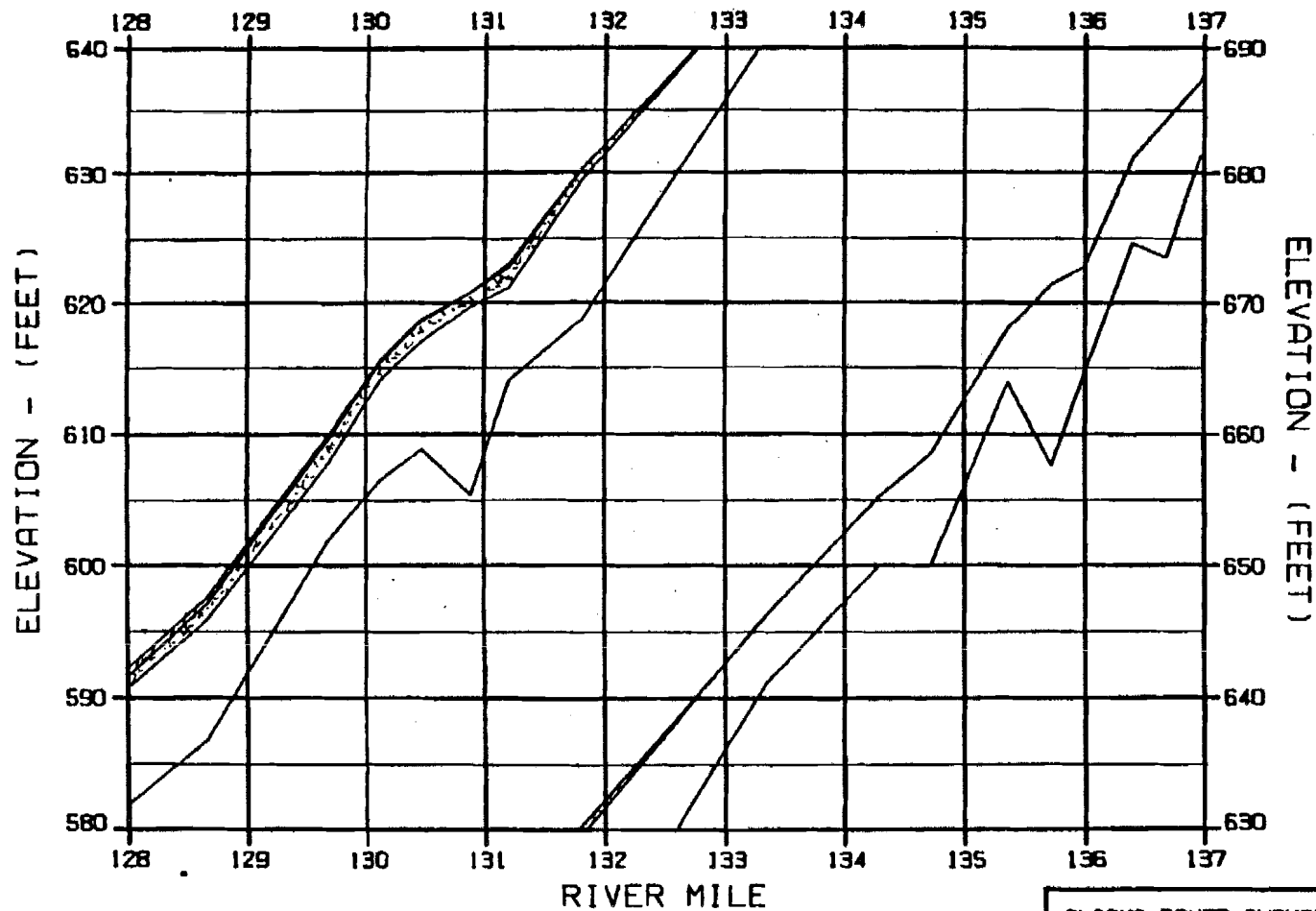


50' DEPTH
 1.1% INFLUX



C





LEGEND.

TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 SATOE I WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY

SUSITNA PROJECT

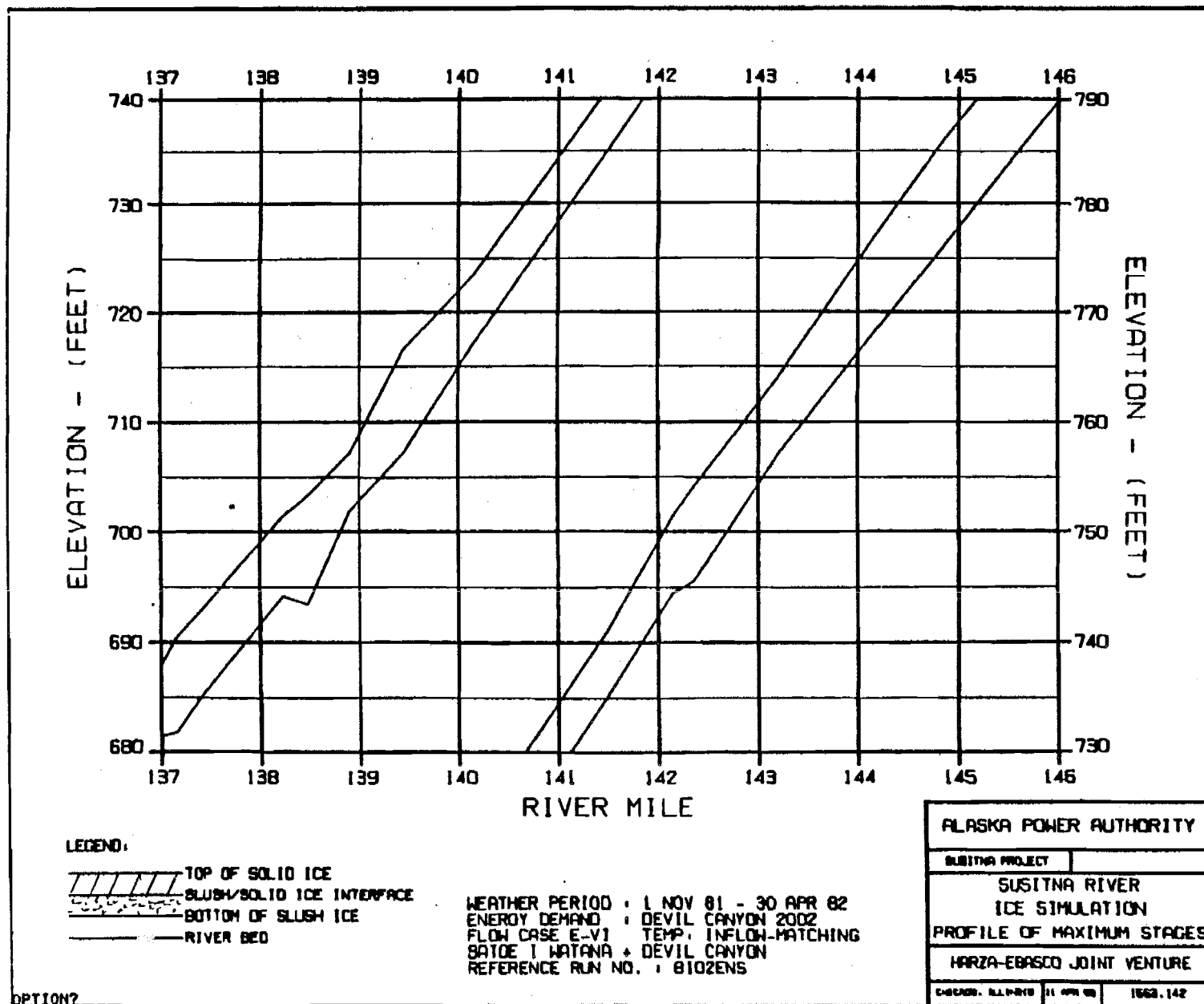
SUSITNA RIVER
 ICE SIMULATION
 PROFILE OF MAXIMUM STAGES

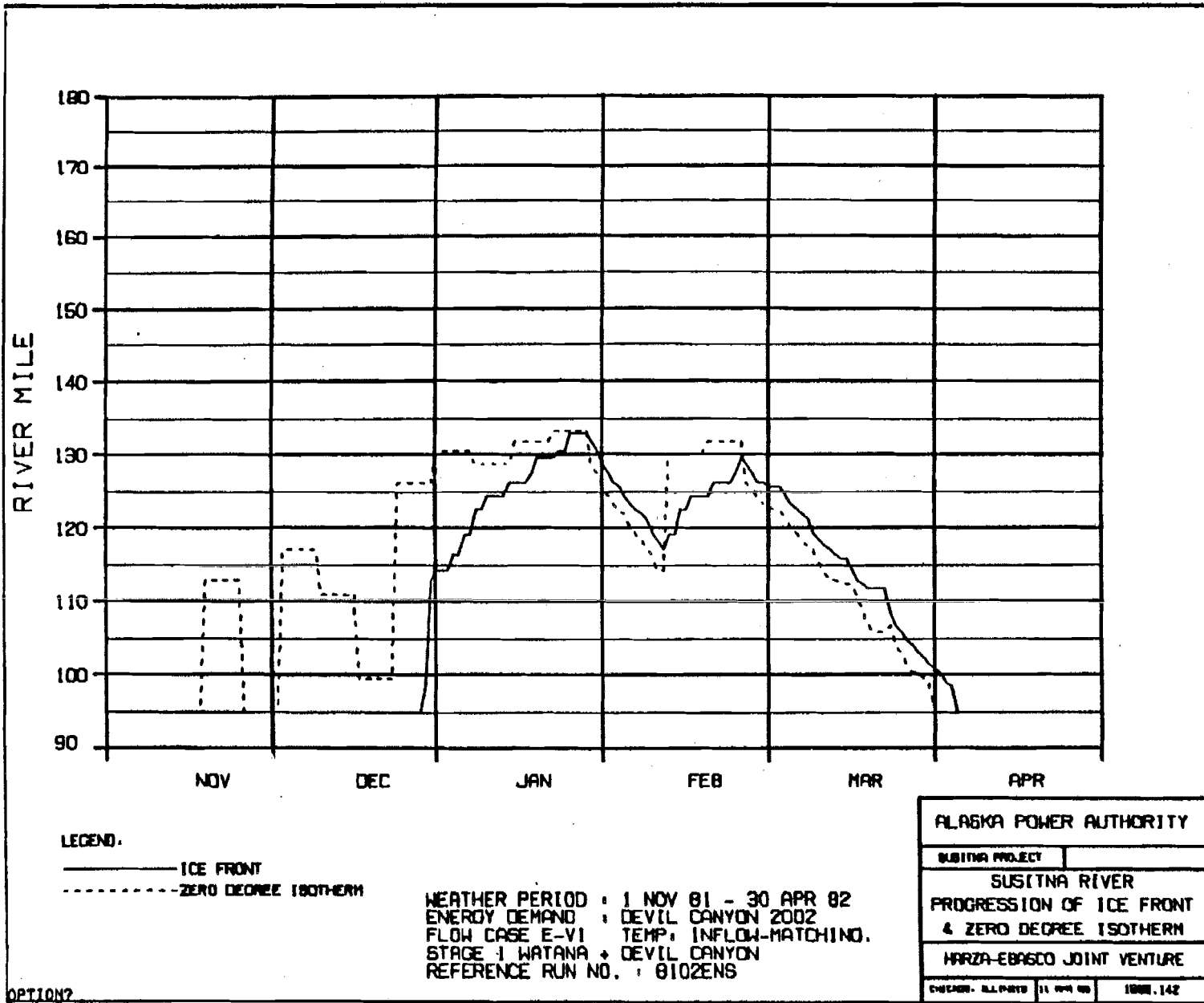
HARZA-EBASCO JOINT VENTURE

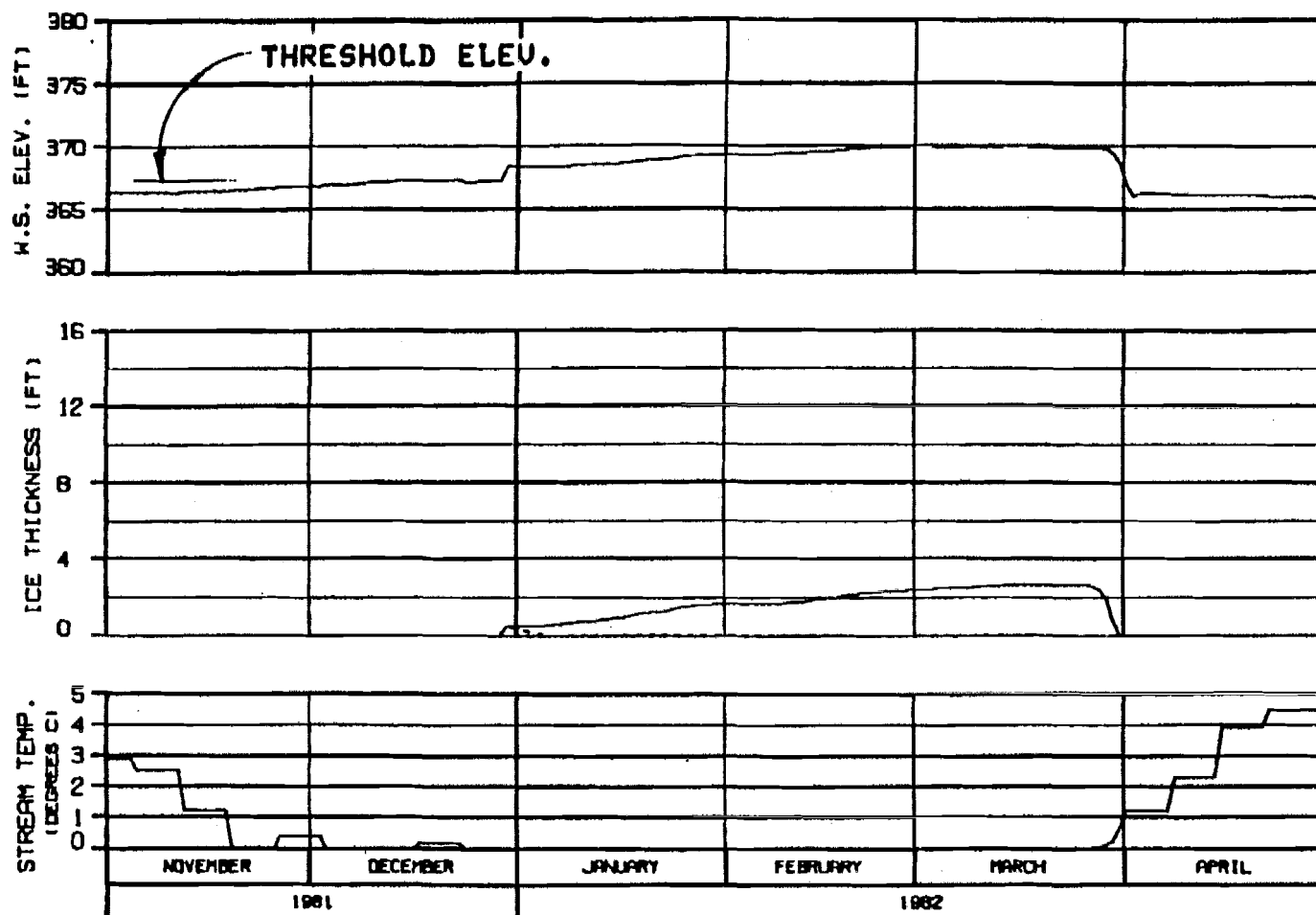
DESIGN - ALASKA 11 APR 82 1503.142

OPTION?

c







HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : B102ENS

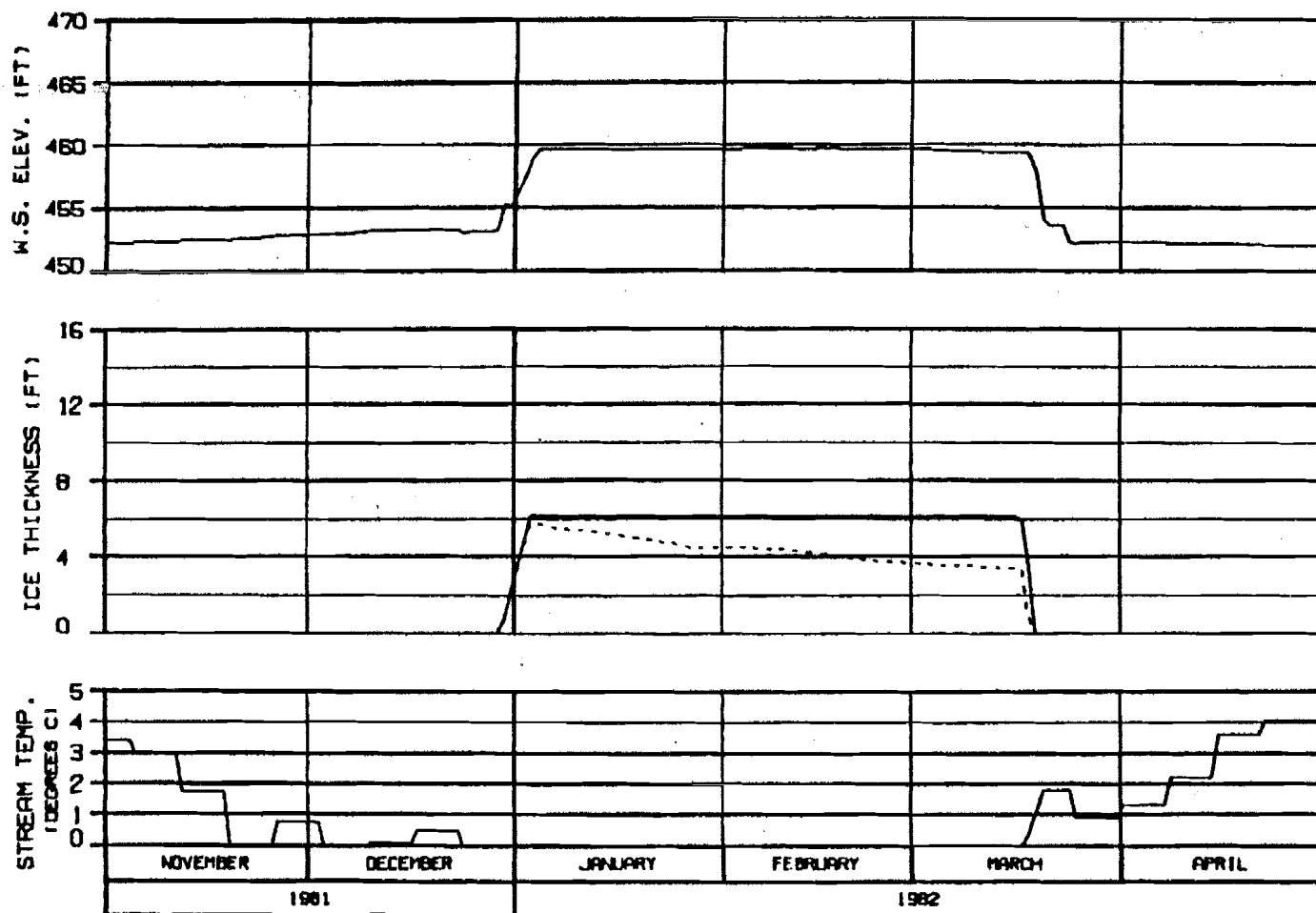
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICHO - ALL DATES 11 APR 82 1508.142



SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

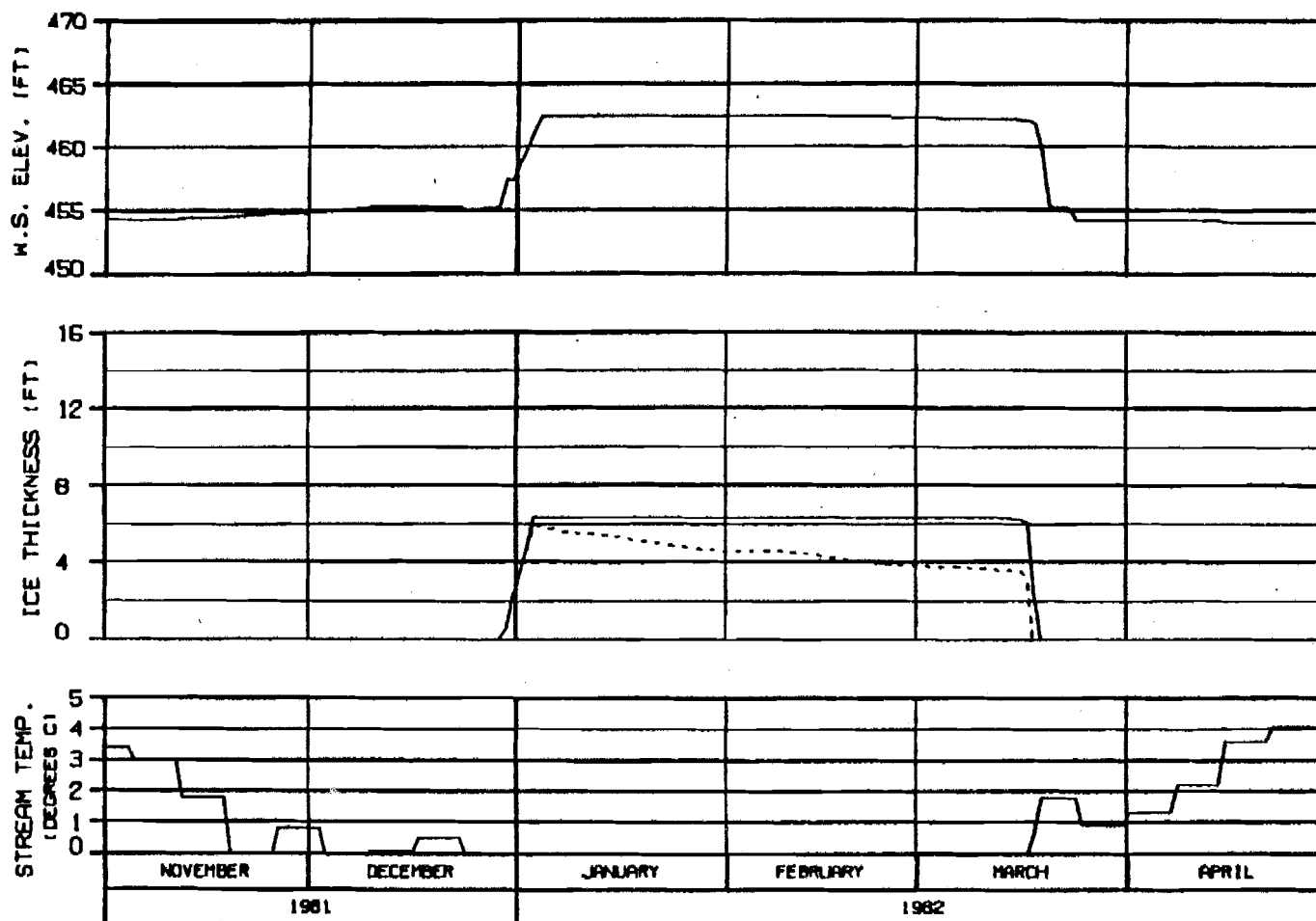
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARGE: 11 APR 82 1500.142



MOUTH OF SLOUGH 6A
RIVER MILE : 112.34

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP, INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 810ZENS

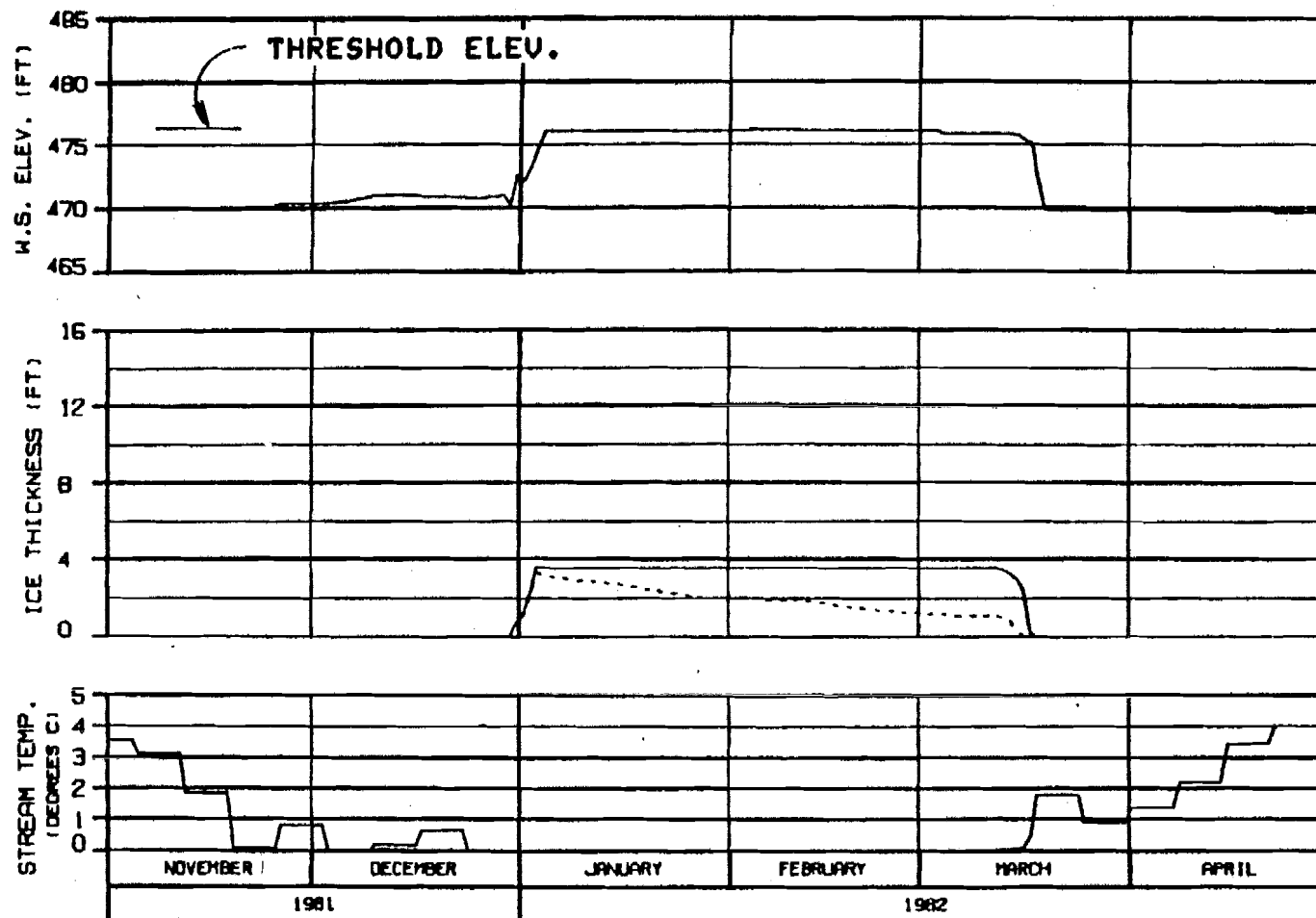
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 11 APR 82 1528.142



HEAD OF SLOUGH 8
RIVER MILE : 114.10

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 810ZENS

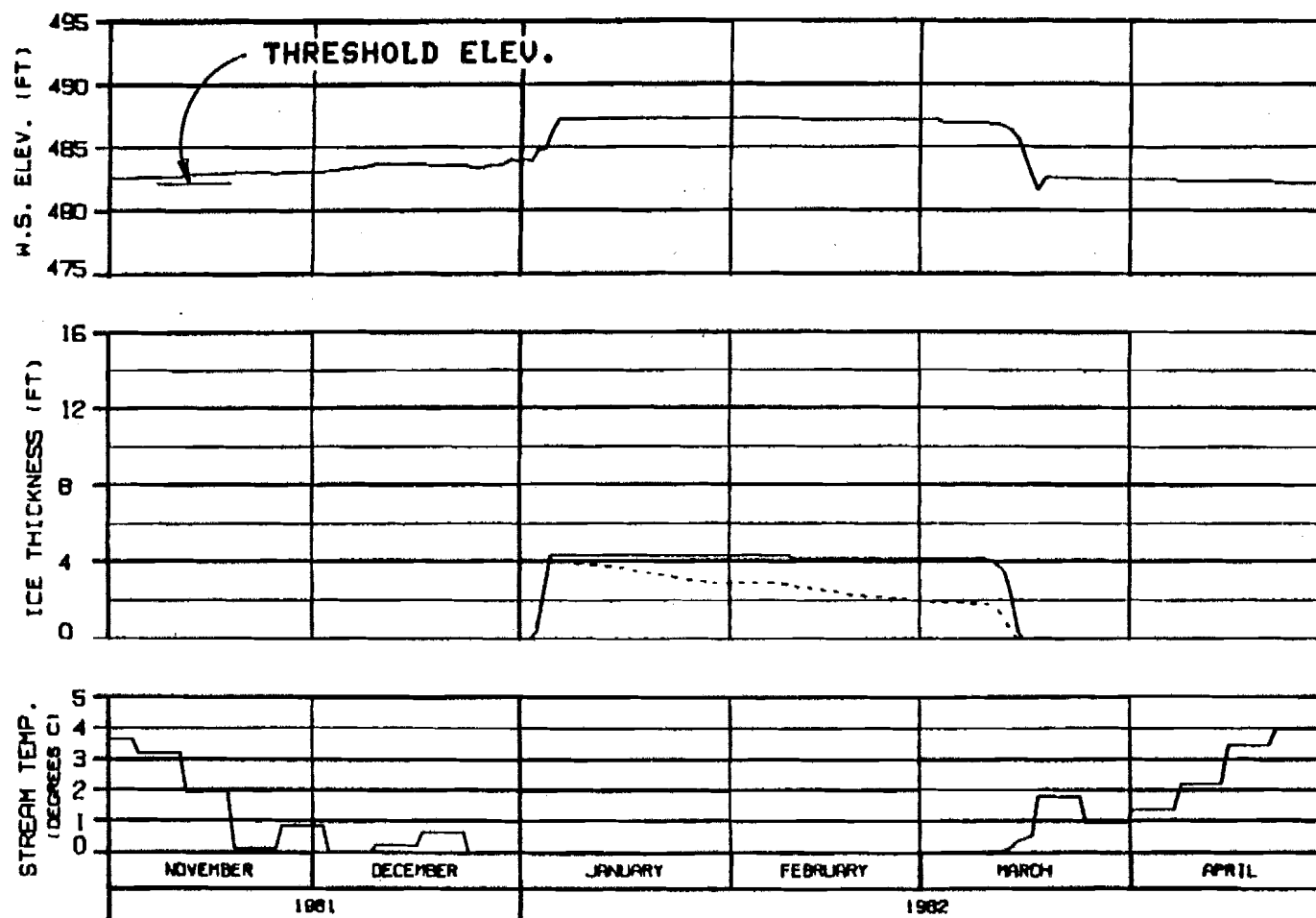
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICHO, ALASKA 11 APR 82 1983.142



SIDE CHANNEL MSII
RIVER MILE : 115.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

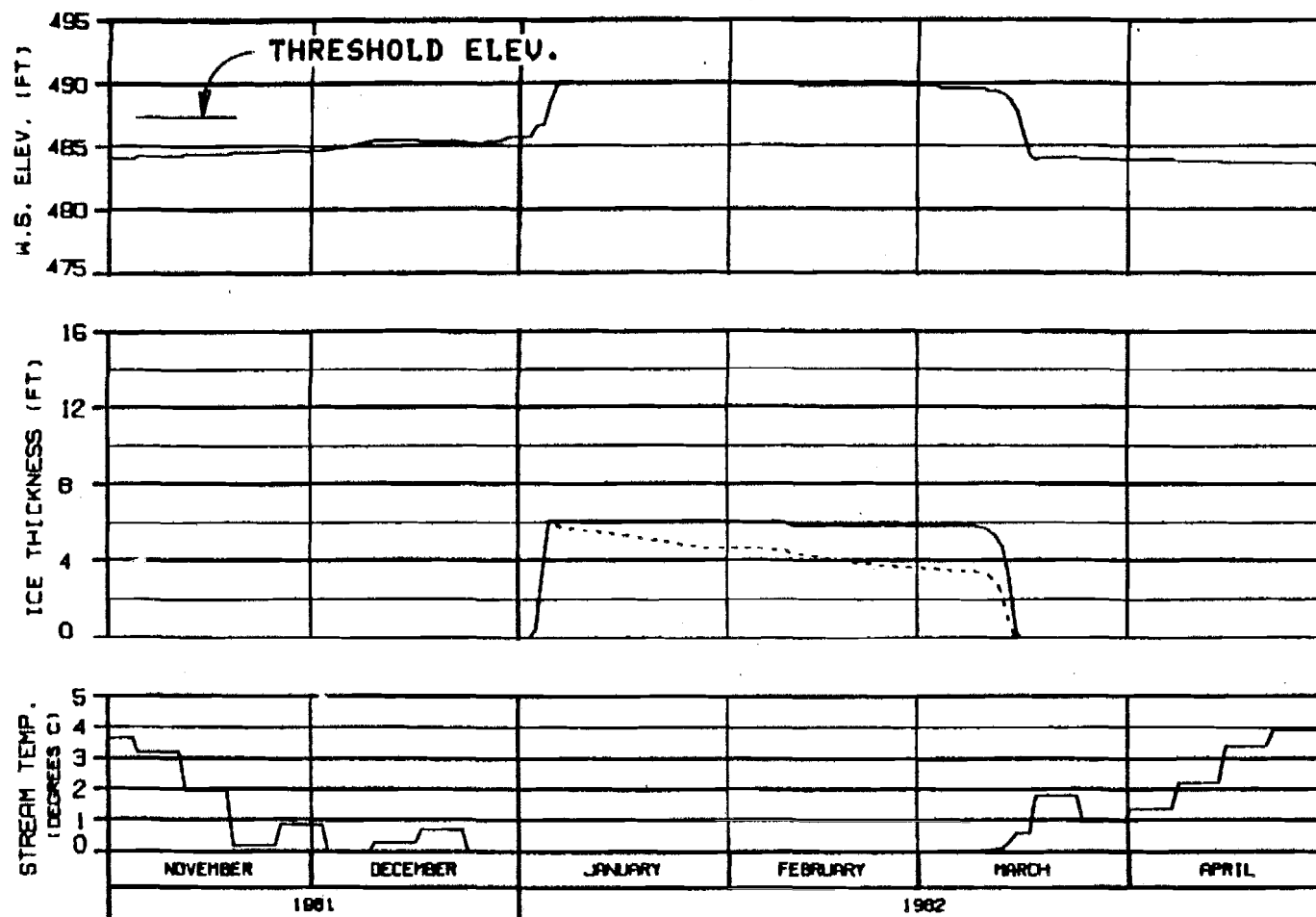
ALASKA POWER AUTHORITY

SUSITNA PROJECT

**SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY**

WARZA-EBR600 JOINT VENTURE

ENCLOSURE - ALL SHEETS 11 APR 82 1563.142



HEAD OF SIDE CHANNEL MSII

RIVER MILE : 115.90

ICE THICKNESS LEGEND:

———— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

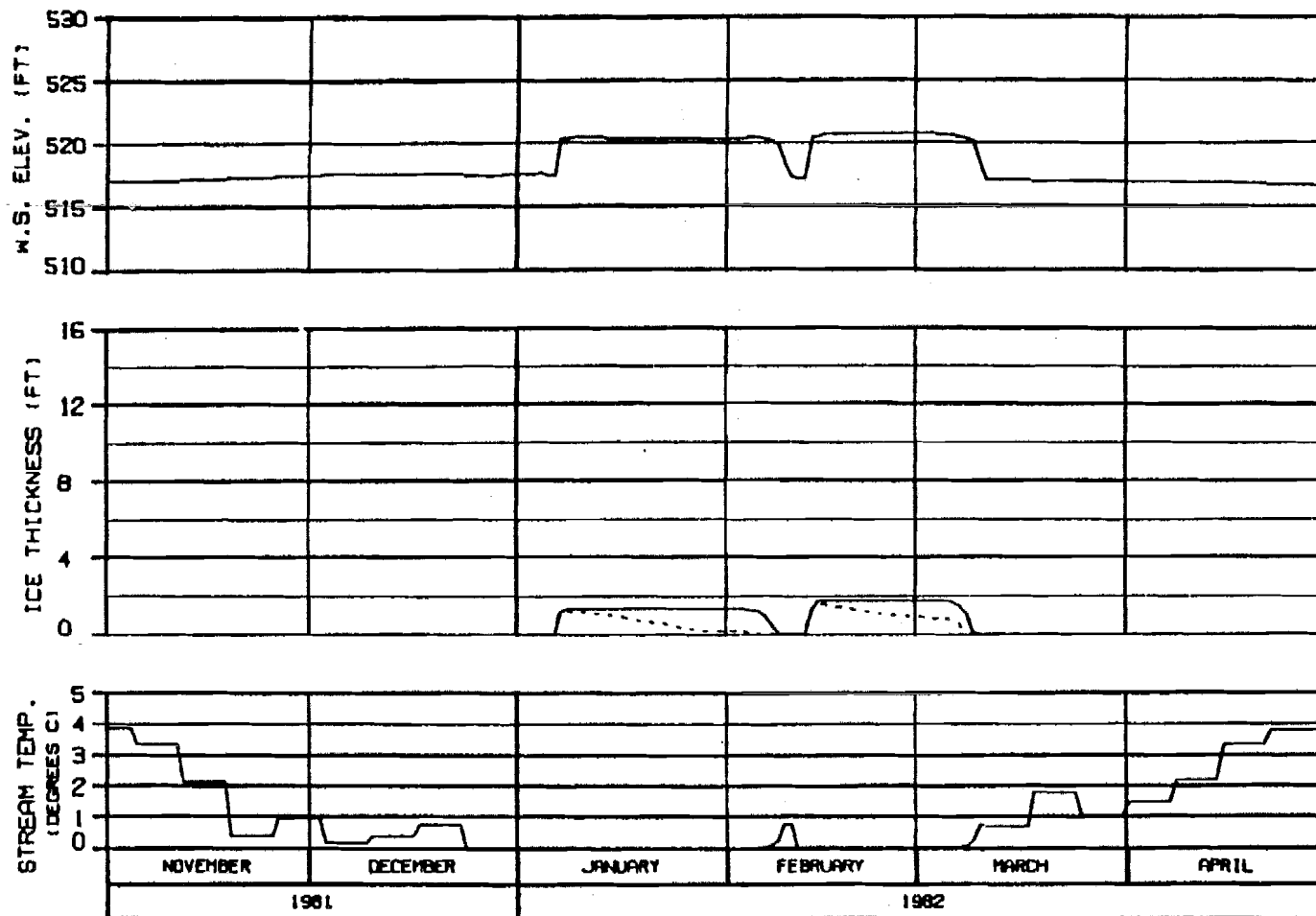
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBAGCO JOINT VENTURE

CHECKED: 11/1/81 BY: 11/1/81 1563.142



ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - BLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

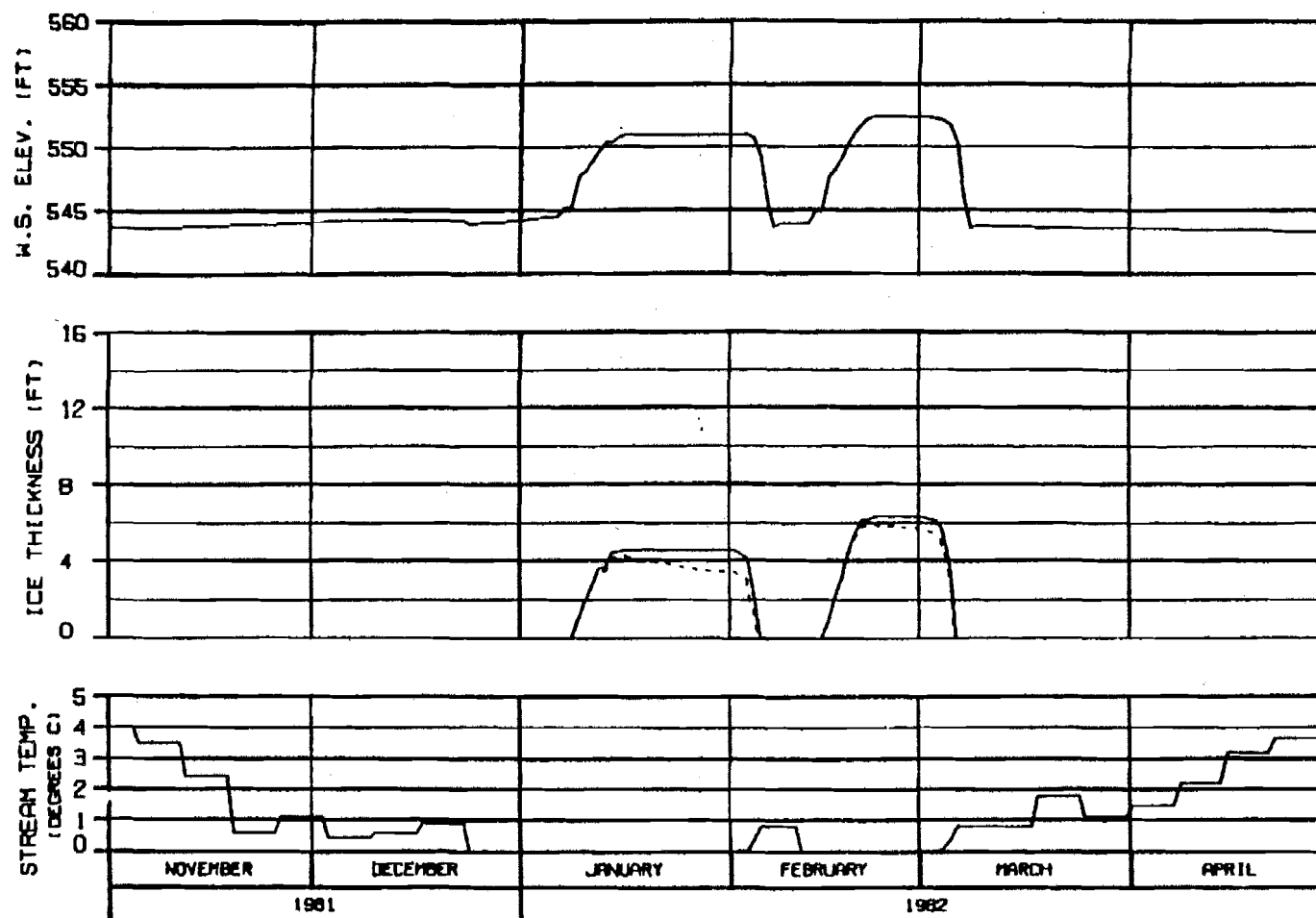
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 11 APR 82 1600.142



HEAD OF MOOSE SLOUGH RIVER MILE : 123.50

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE I WATANA + DEVIL CANYON
REFERENCE RUN NO. : 810ZENS

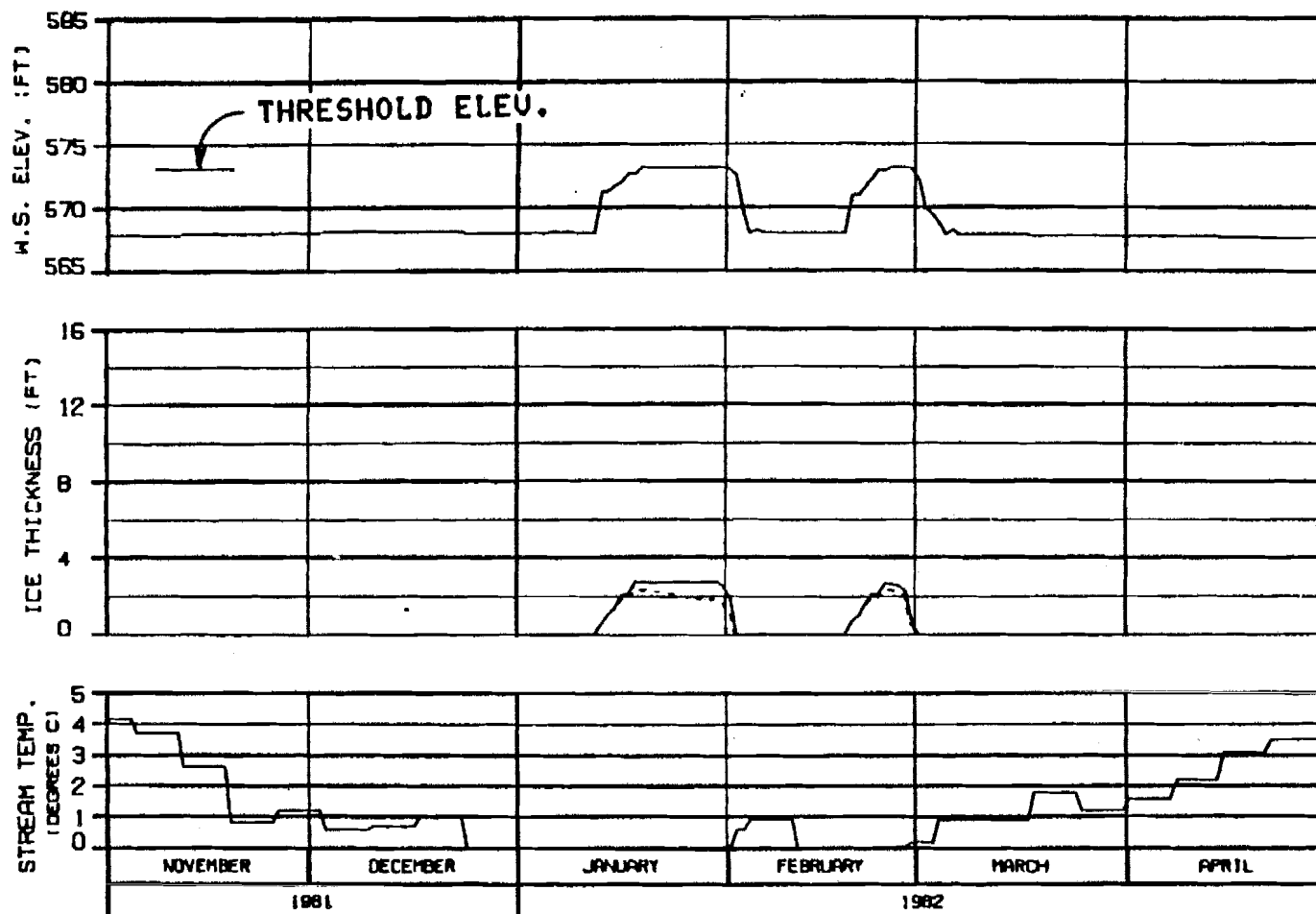
ALASKA POWER AUTHORITY

SUSTITNA PROJECT

SUSTITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: ELLIOTT 11 APR 82 1503.142



HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

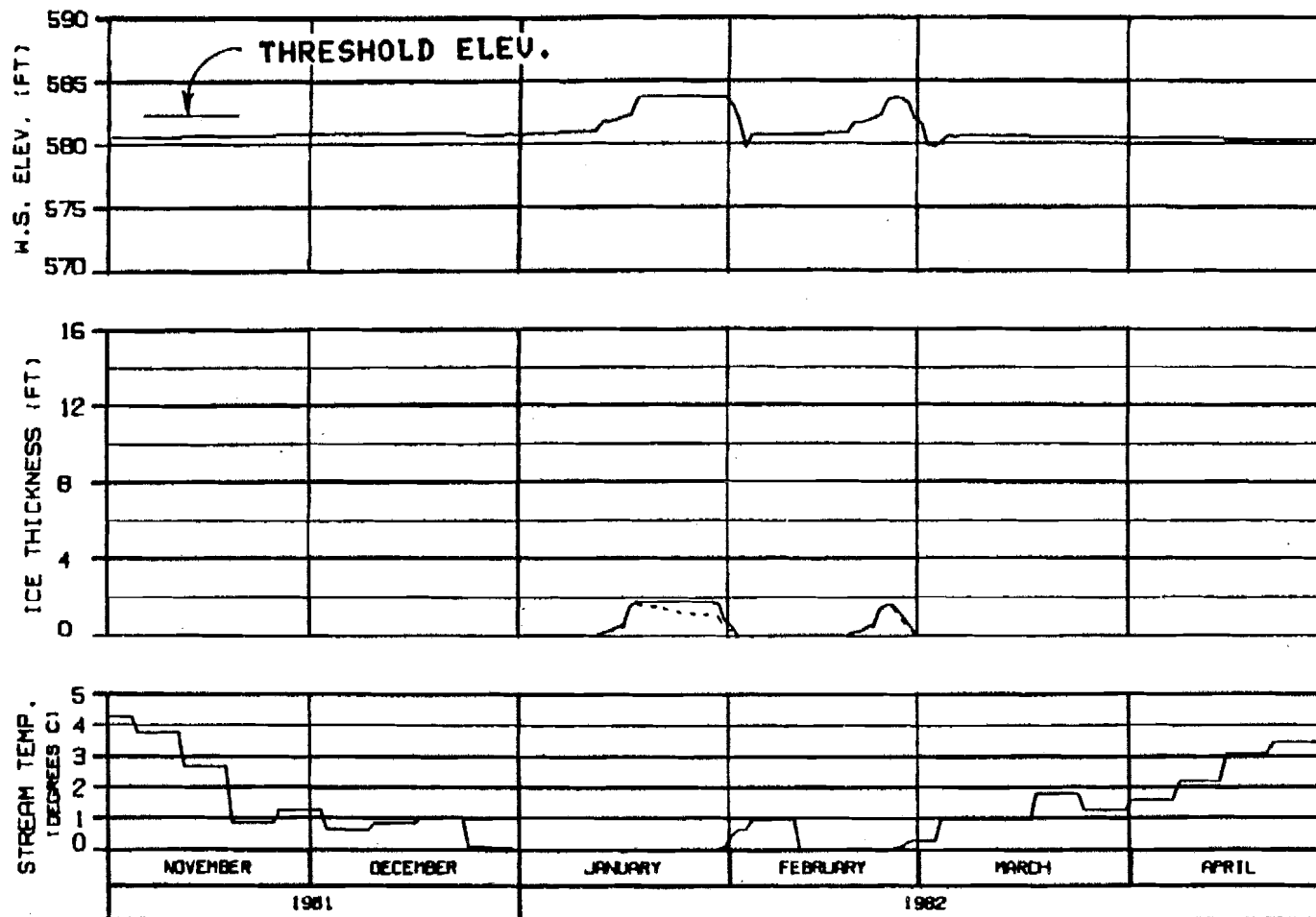
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60610 11 APR 82 1503.142



HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 810ZENS

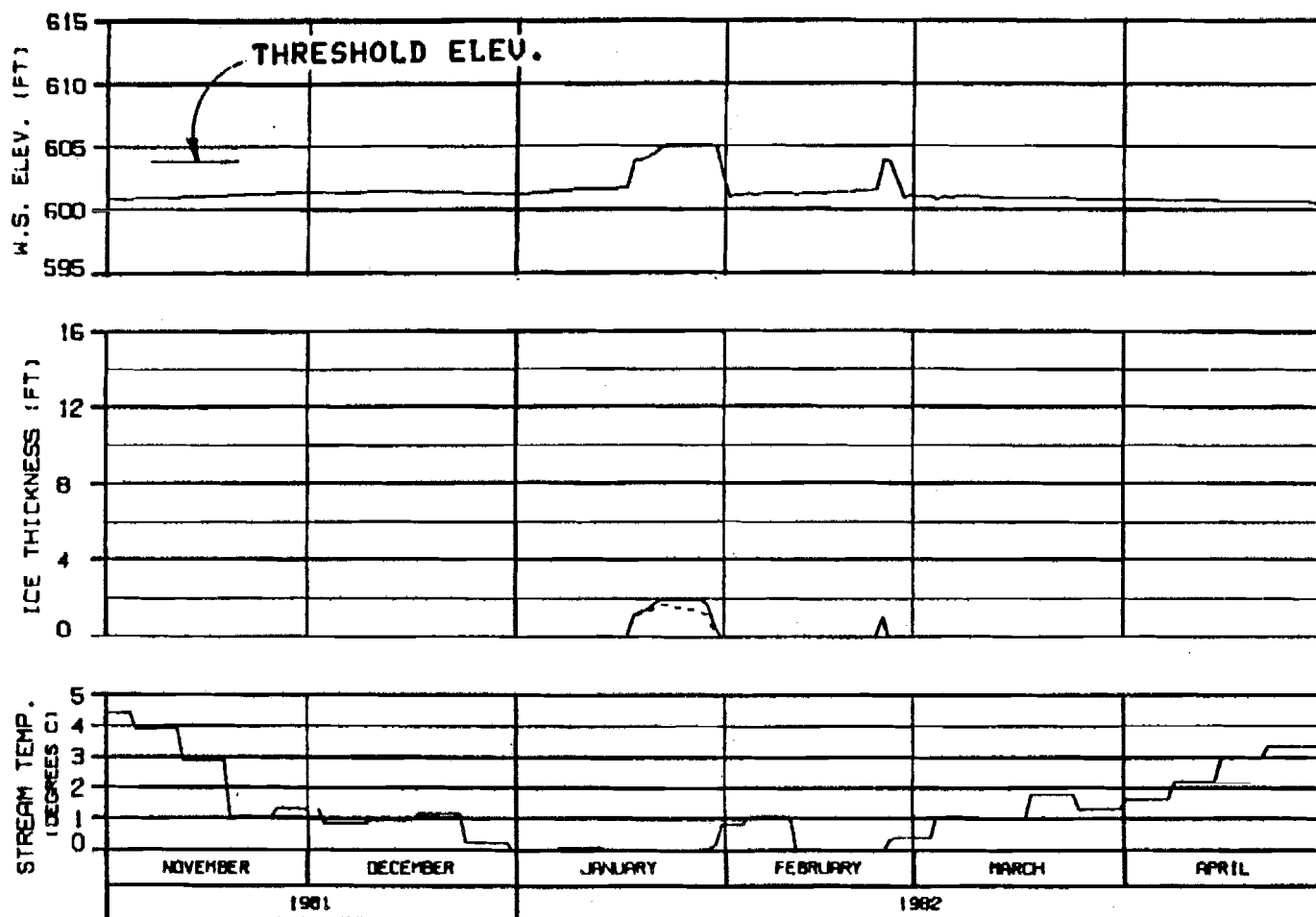
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HAZARDOUS JOINT VENTURE

CHIEF: ELLIOTT 11 APR 82 1003.142



HEAD OF SLOUGH 9
RIVER MILE : 129.30

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- BLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP, INFLOW-MATCHING
STAGE I WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY

SUSITNA PROJECT

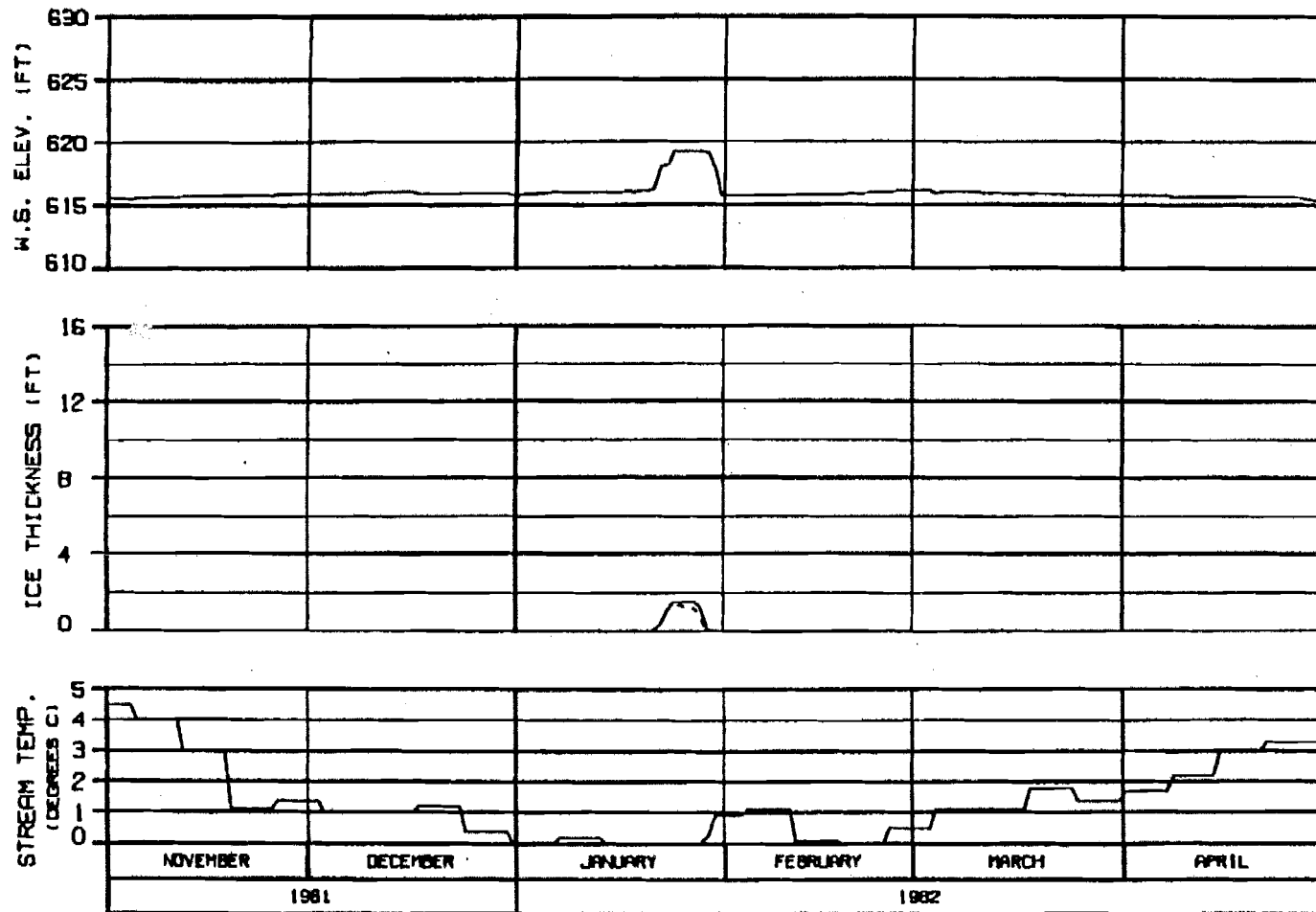
**SUSITNA RIVER
ICE SIMULATION
TIME HISTORY**

HAZRA-EBASCO JOINT VENTURE

CHECKED: ALL DATA 11 APR 82 1982.142

OPTION?

OPTION?



SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

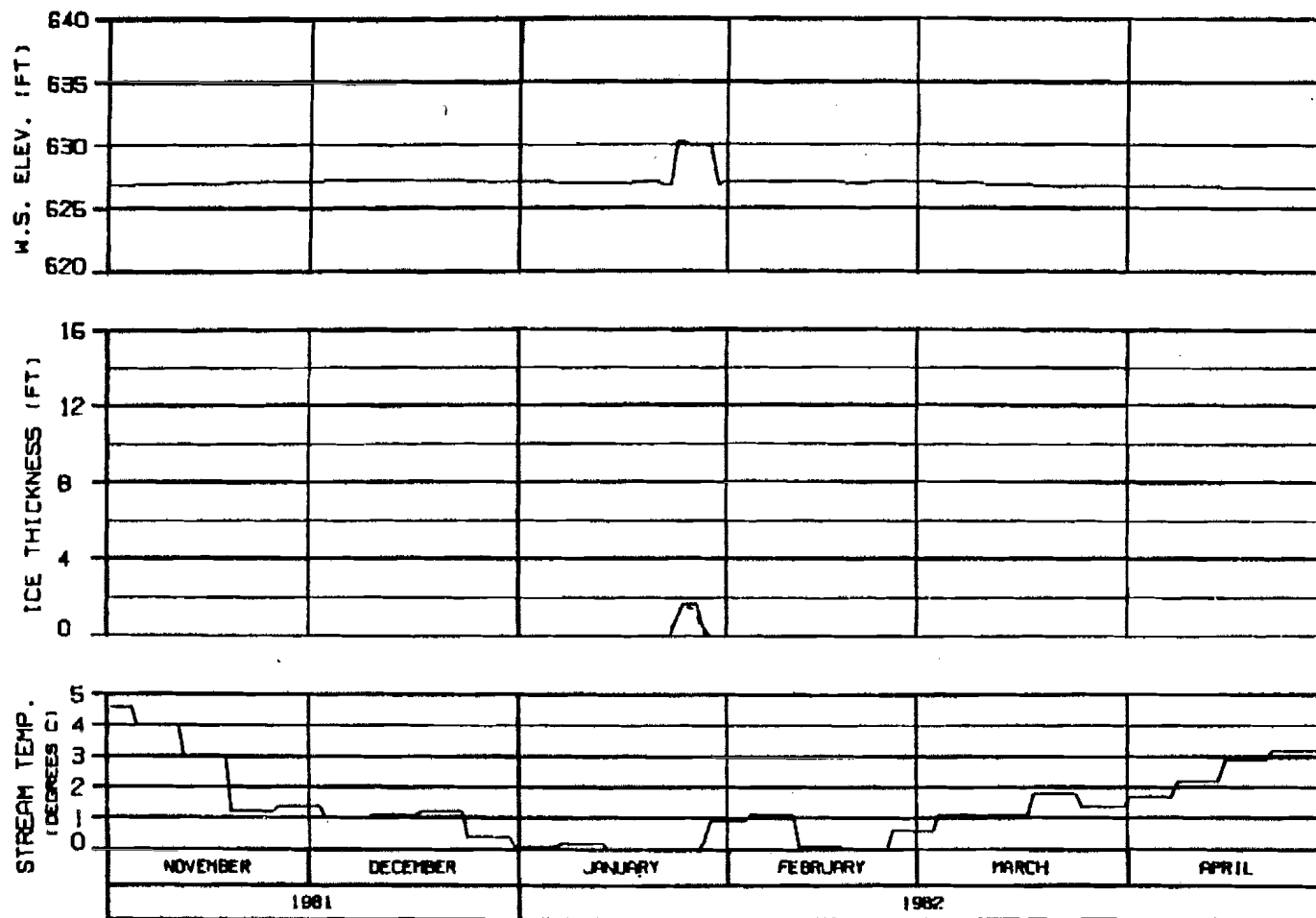
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: ALL PLOTS 11 APR 82 1500, 142



SIDE CHANNEL U/S OF 4TH JULY CREEK

RIVER MILE : 131.80

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

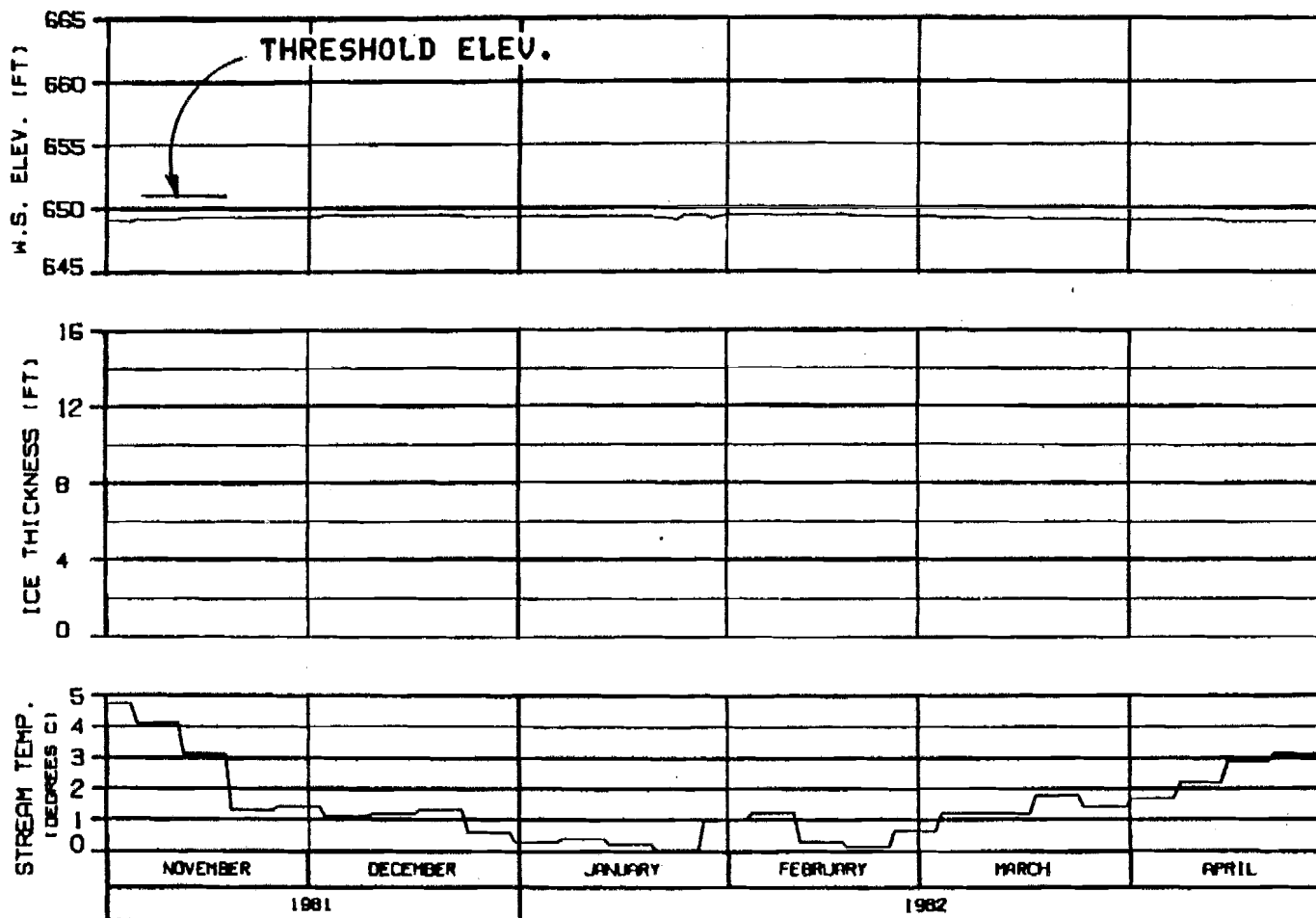
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHEGOK, ALASKA 11 APR 82 1553.142



HEAD OF SLOUGH 9A
RIVER MILE : 133.70

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

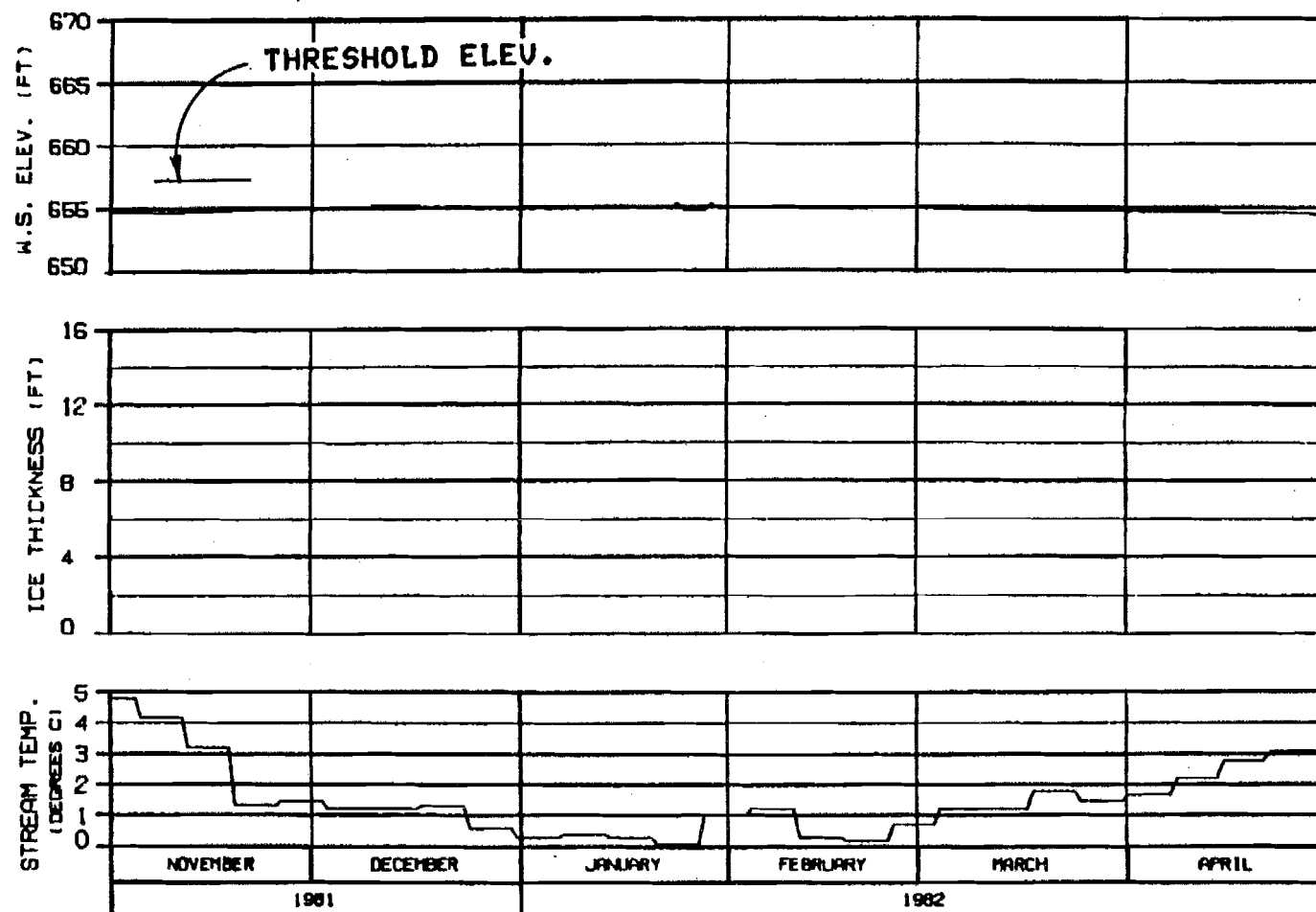
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

ENCLOS. 81-1418 11 APR 82 1503.142



ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 ----- SLUSH COMPONENT

SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102EN5

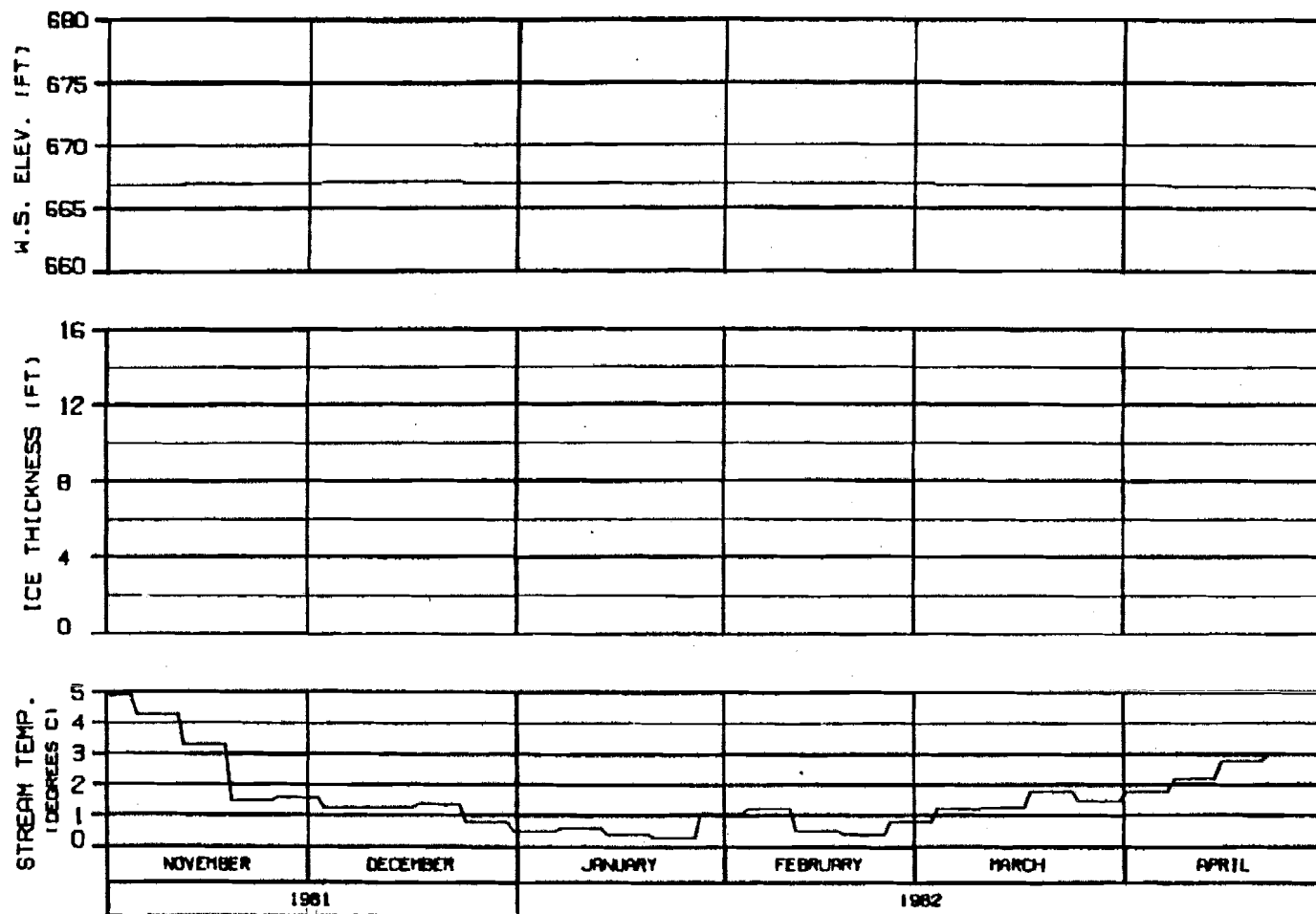
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHECKED: B.L.P. DATE: 11 APR 82 1588.142



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

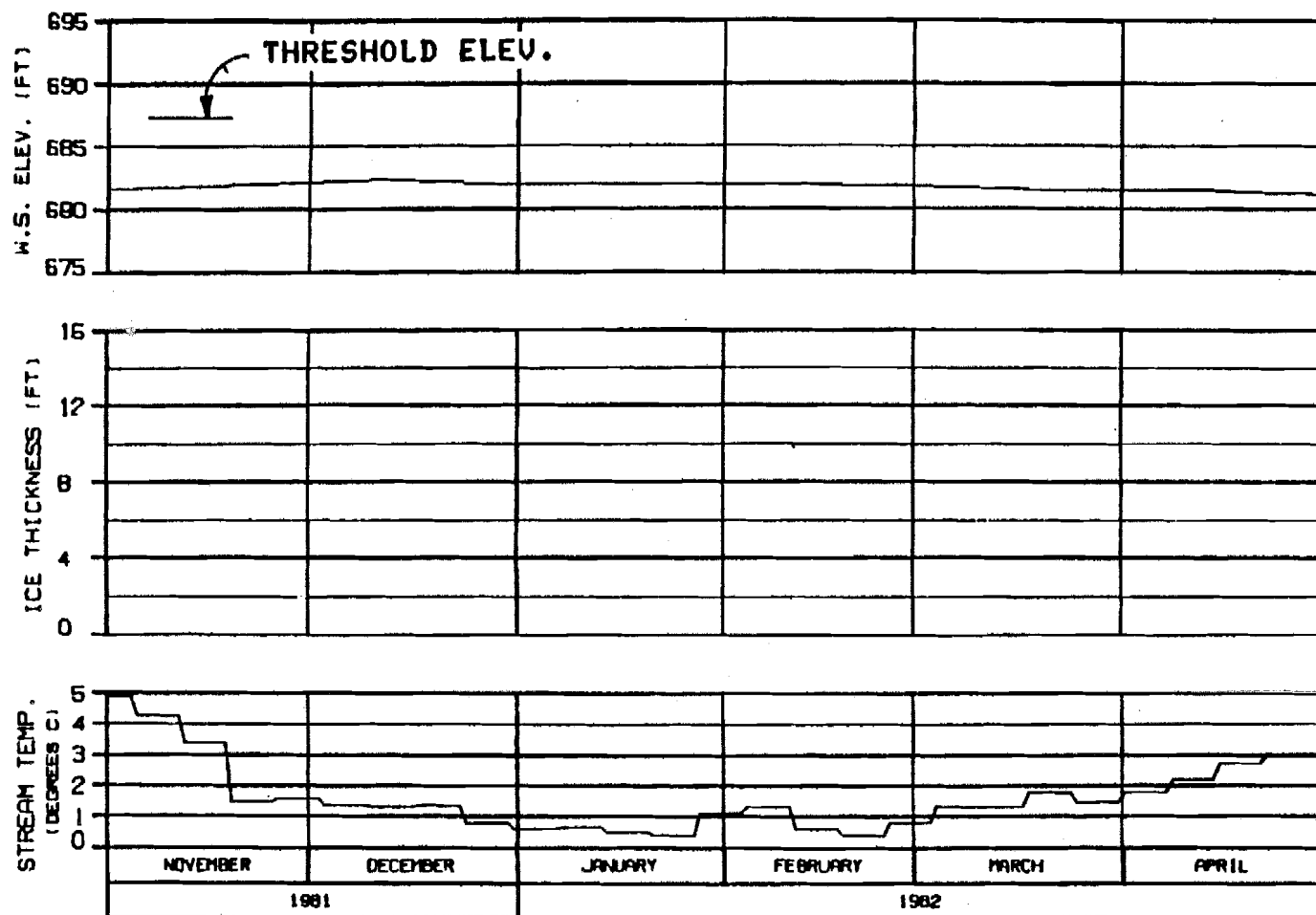
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF: B. L. HARRIS 11 APR 82 1563.142



HEAD OF SLOUGH 11
RIVER MILE : 136.50

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102EN5

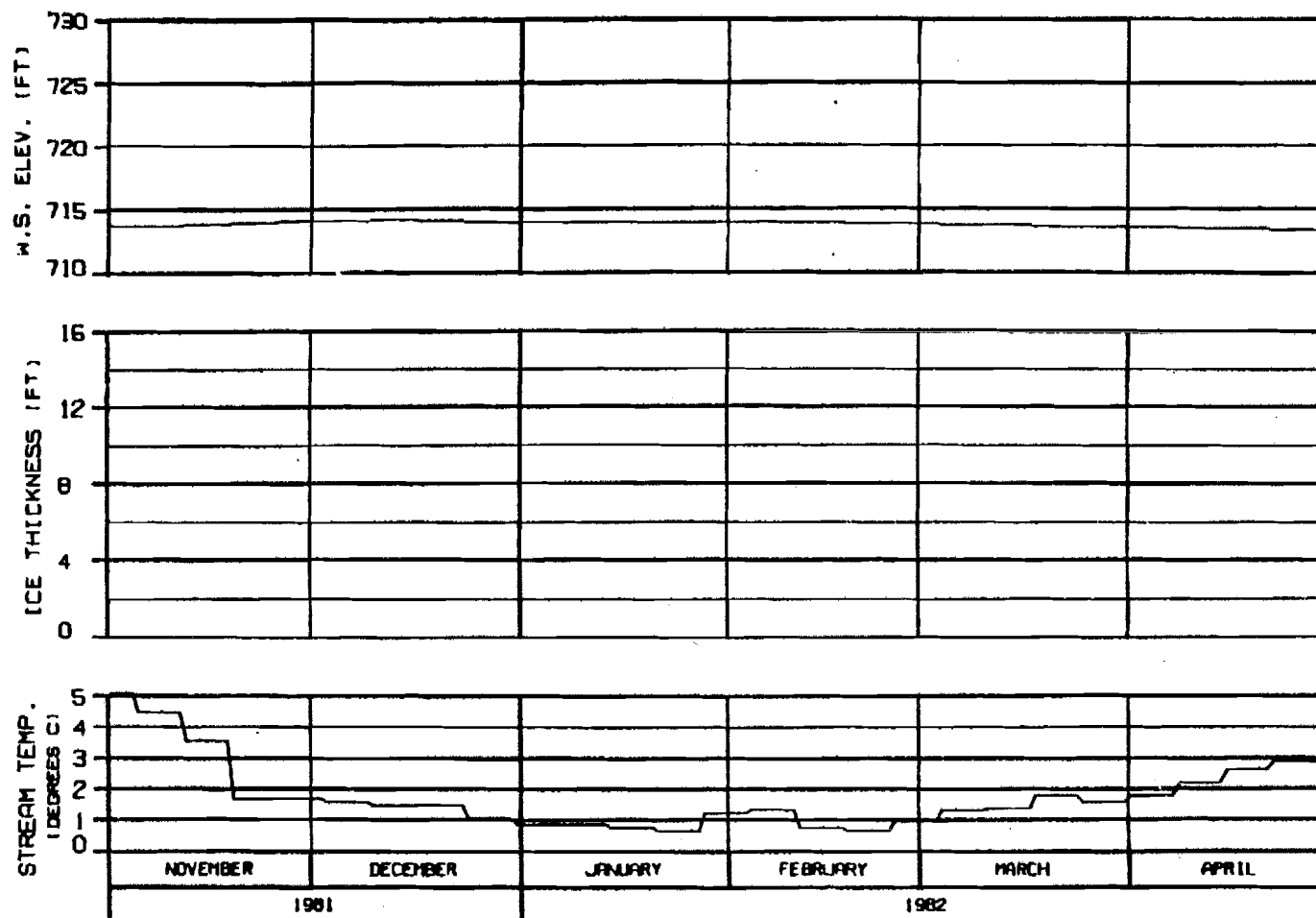
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF: J. L. DAVIS 11 APR 82 1003.142



HEAD OF SLOUGH 17
RIVER MILE : 139.30

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

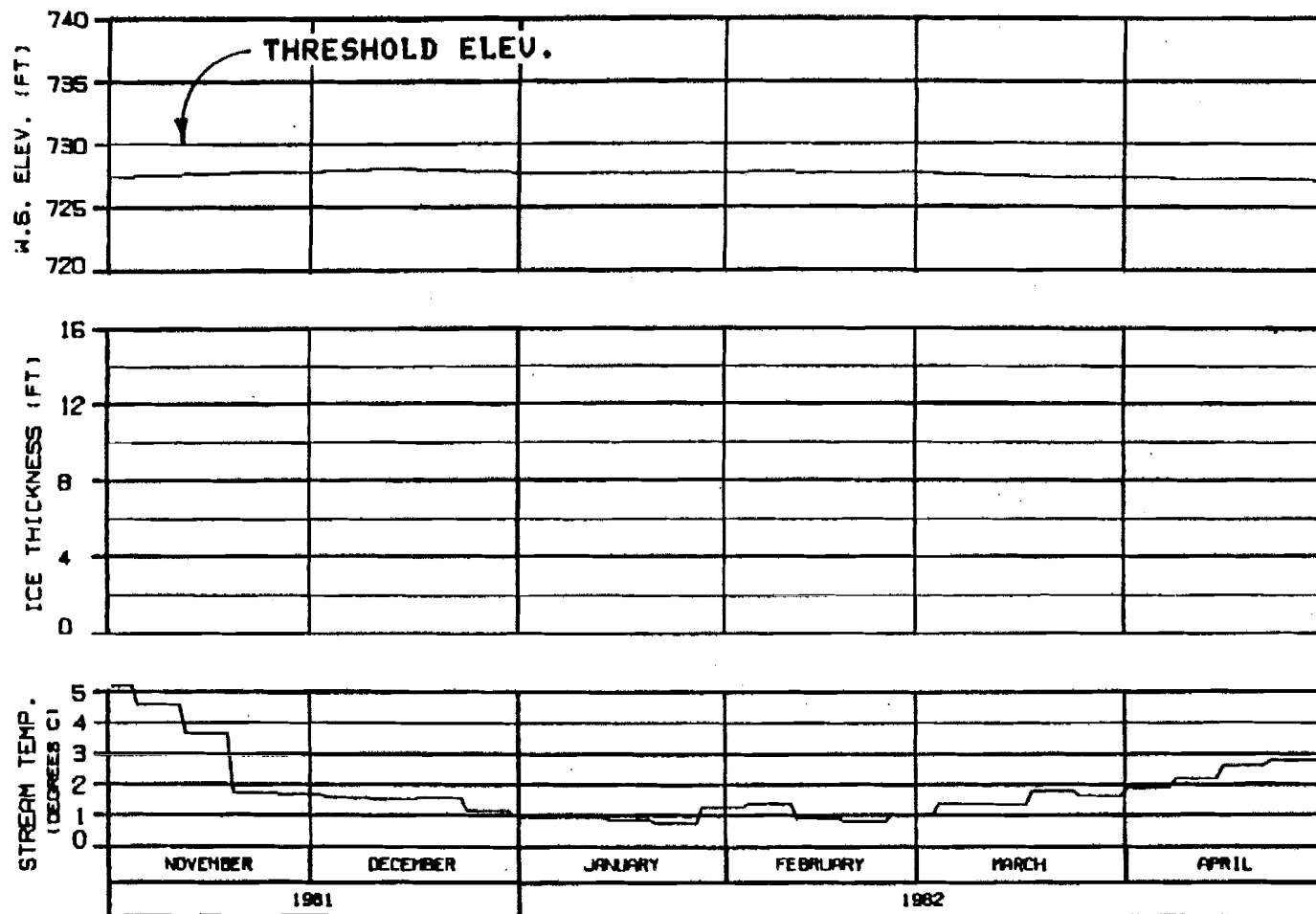
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

DRAWN: ALP/STB 11 APR 82 1583, 142



HEAD OF SLOUGH 20

RIVER MILE : 140.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 ----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102EN5

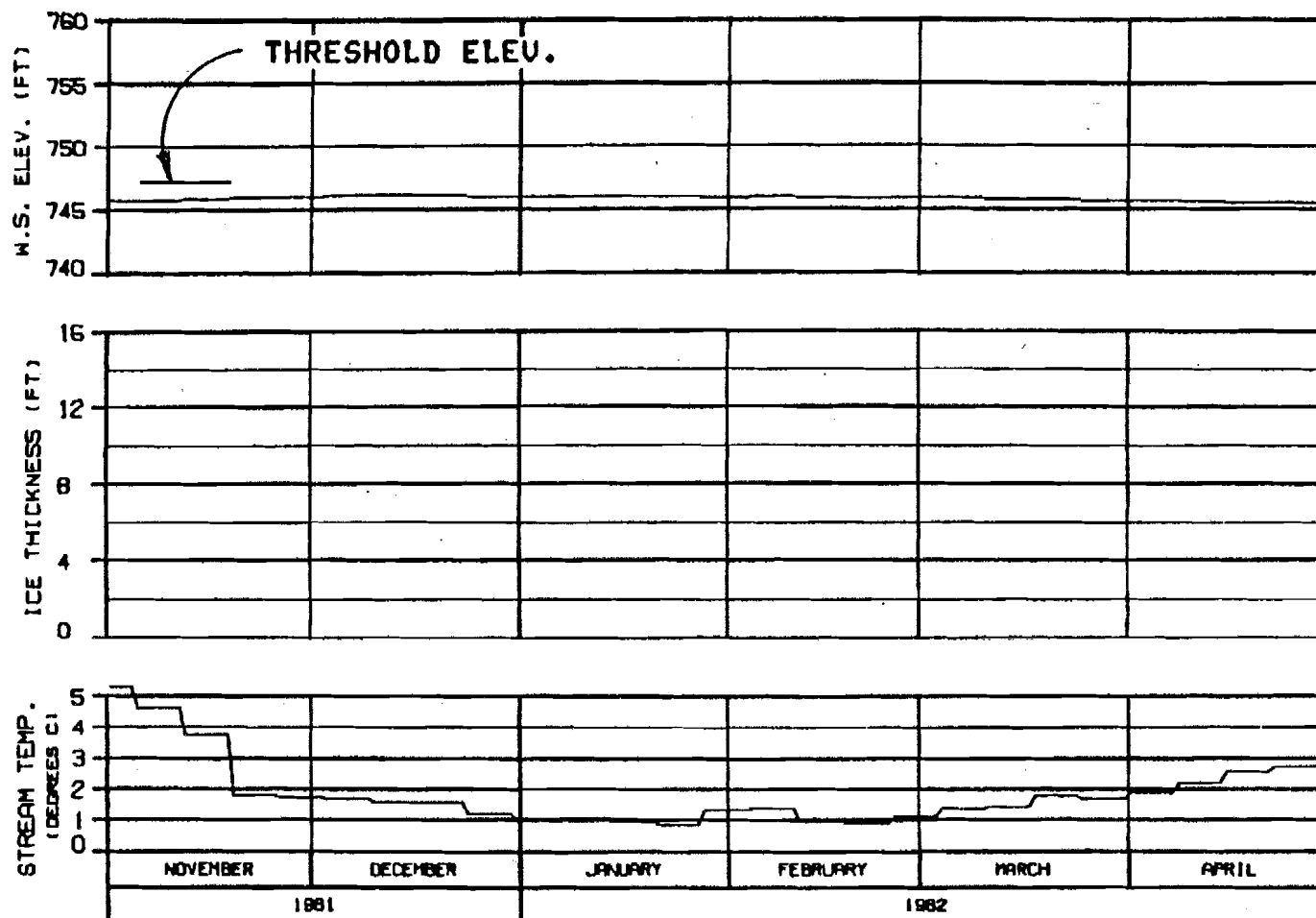
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 11 APR 82 1063.142



SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP. INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

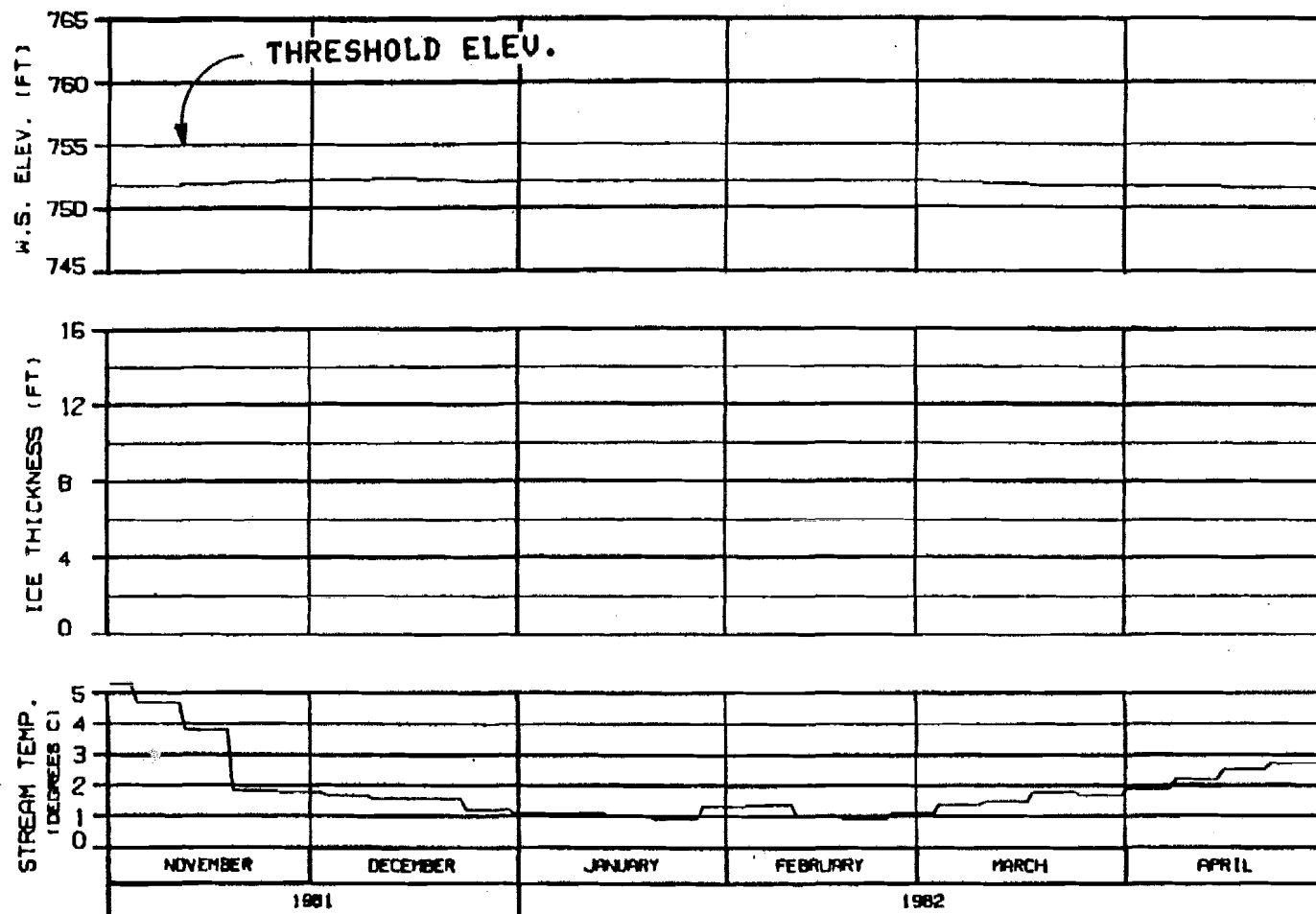
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHILKAT - ILLWACO 11 APR 82 1523.142



HEAD OF SLOUGH 21
RIVER MILE : 142.20

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY

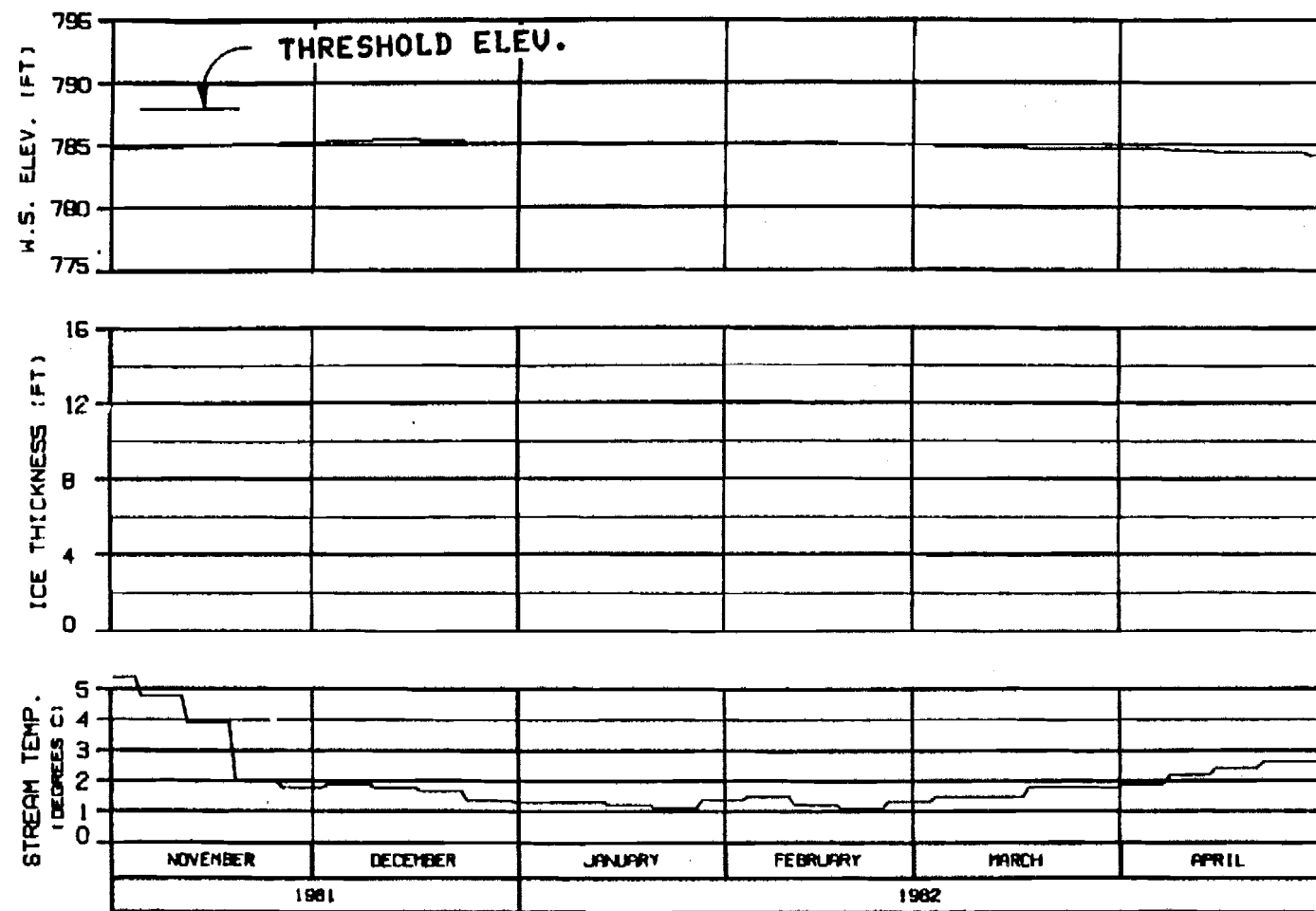
SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HAZARDOUS JOINT VENTURE

CHICAGO, ILLINOIS 11 APR 82 1553.142

C



HEAD OF SLOUGH 22
RIVER MILE : 144.80

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

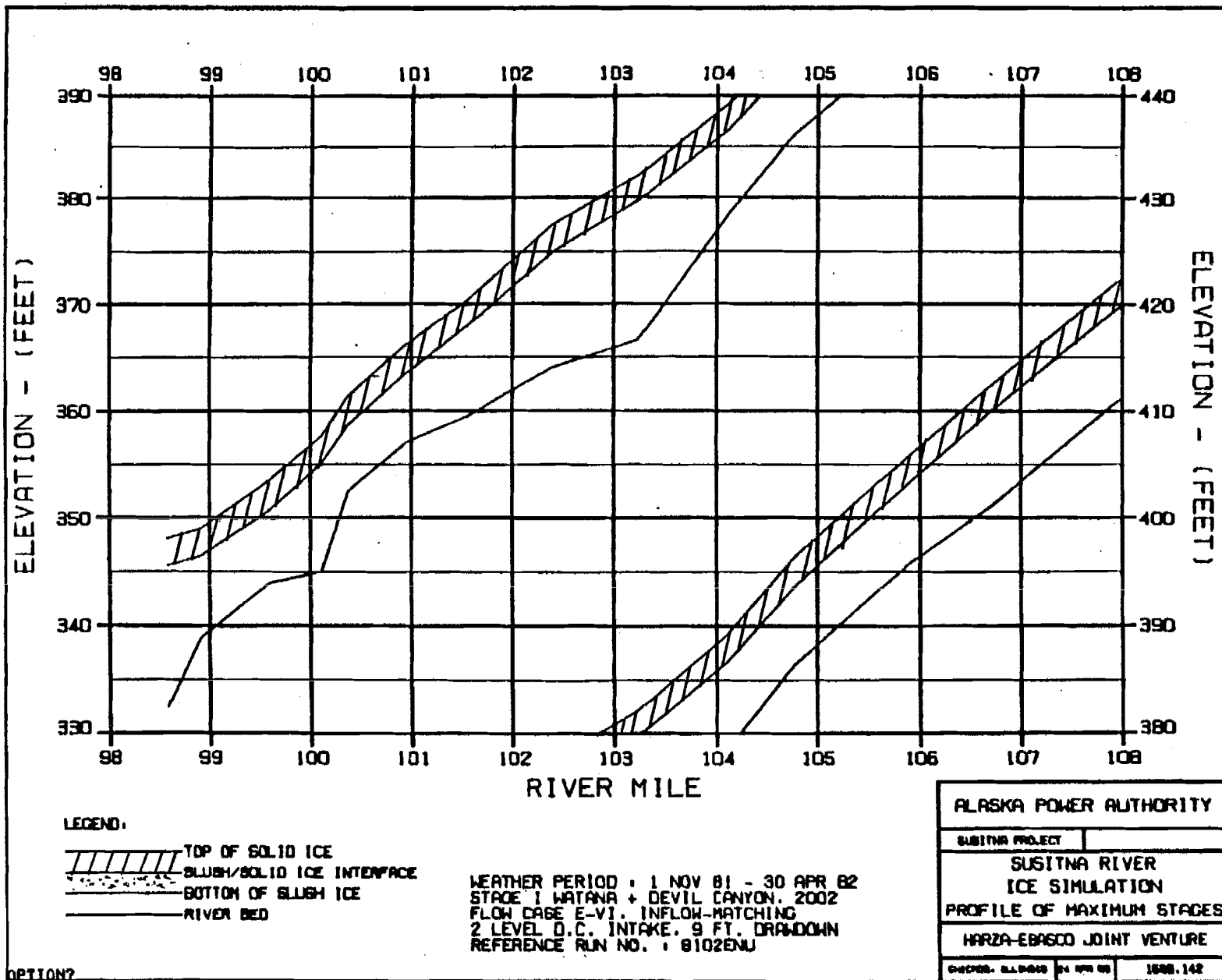
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE 1 WATANA + DEVIL CANYON
REFERENCE RUN NO. : 8102ENS

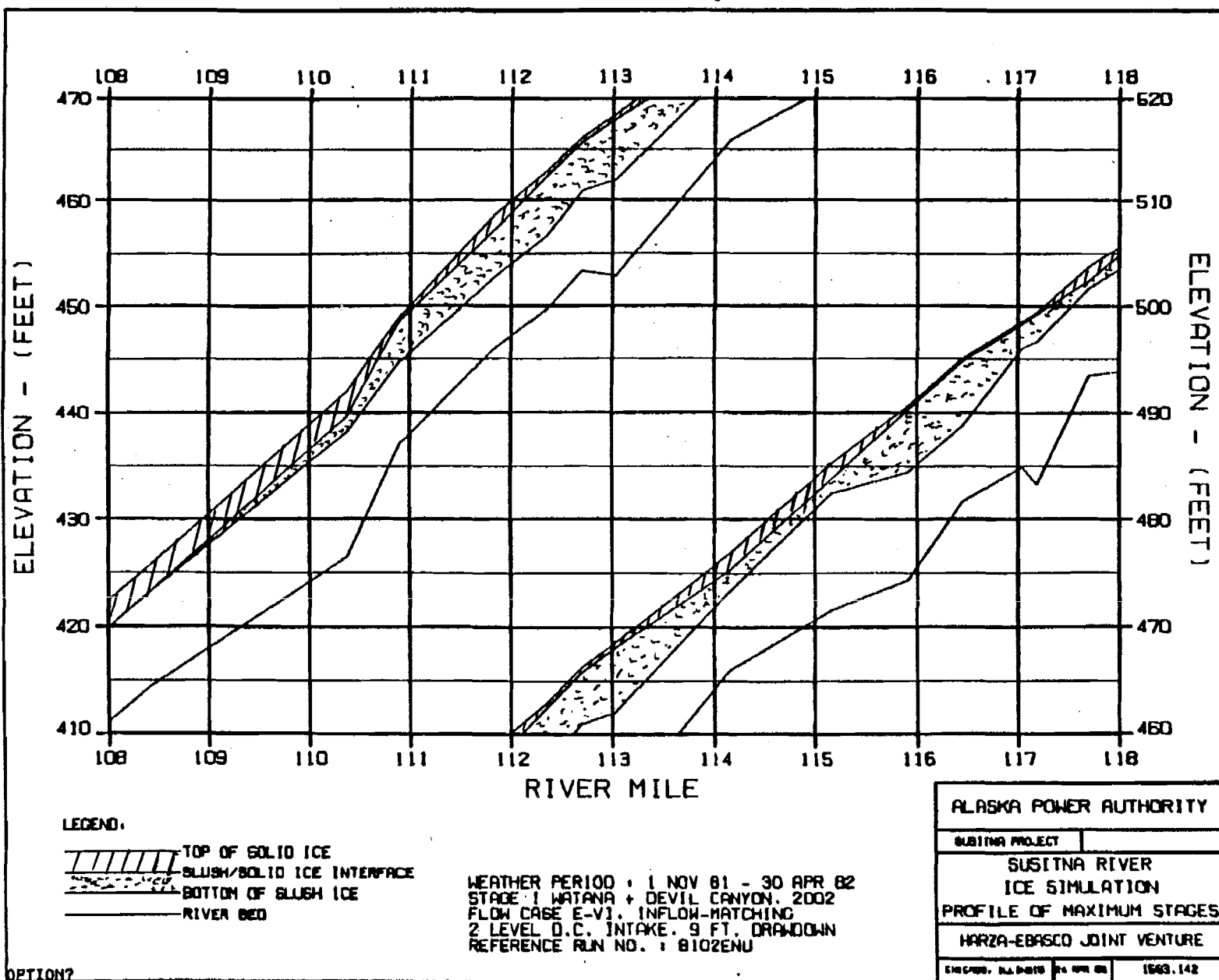
ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHECKED - ALL DATA	11 APR 82	1982.142

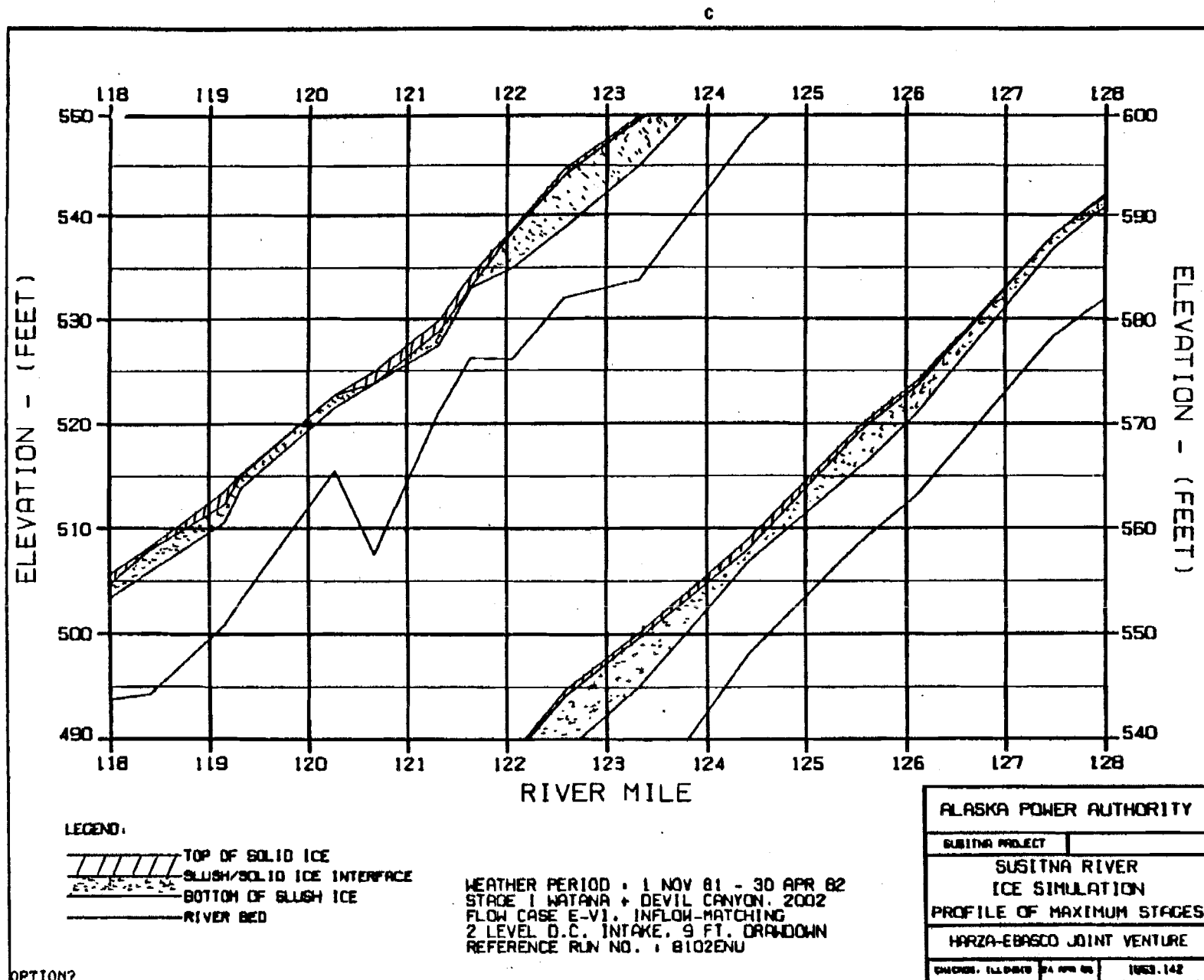
OPTION?

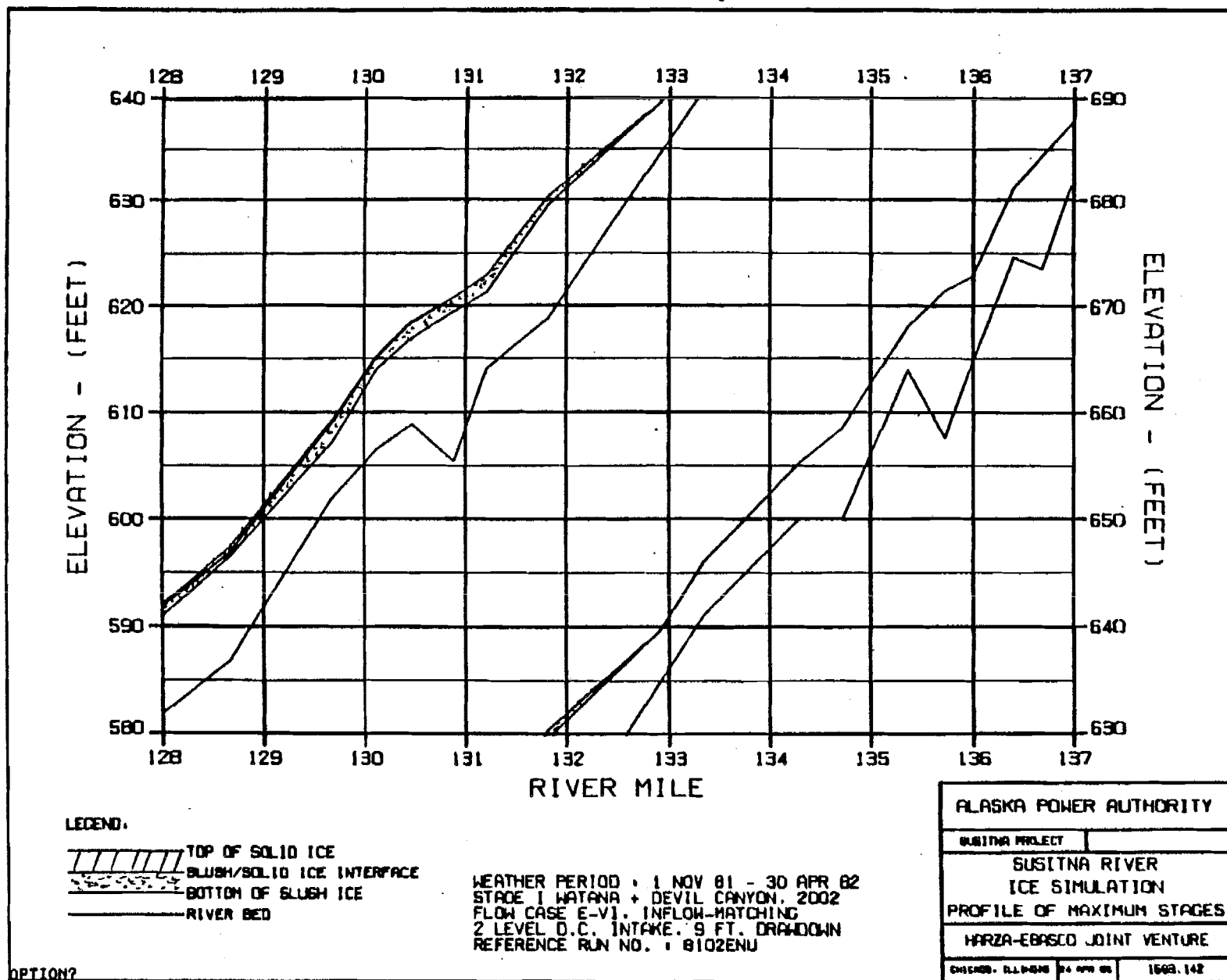
EXHIBIT 8c

c

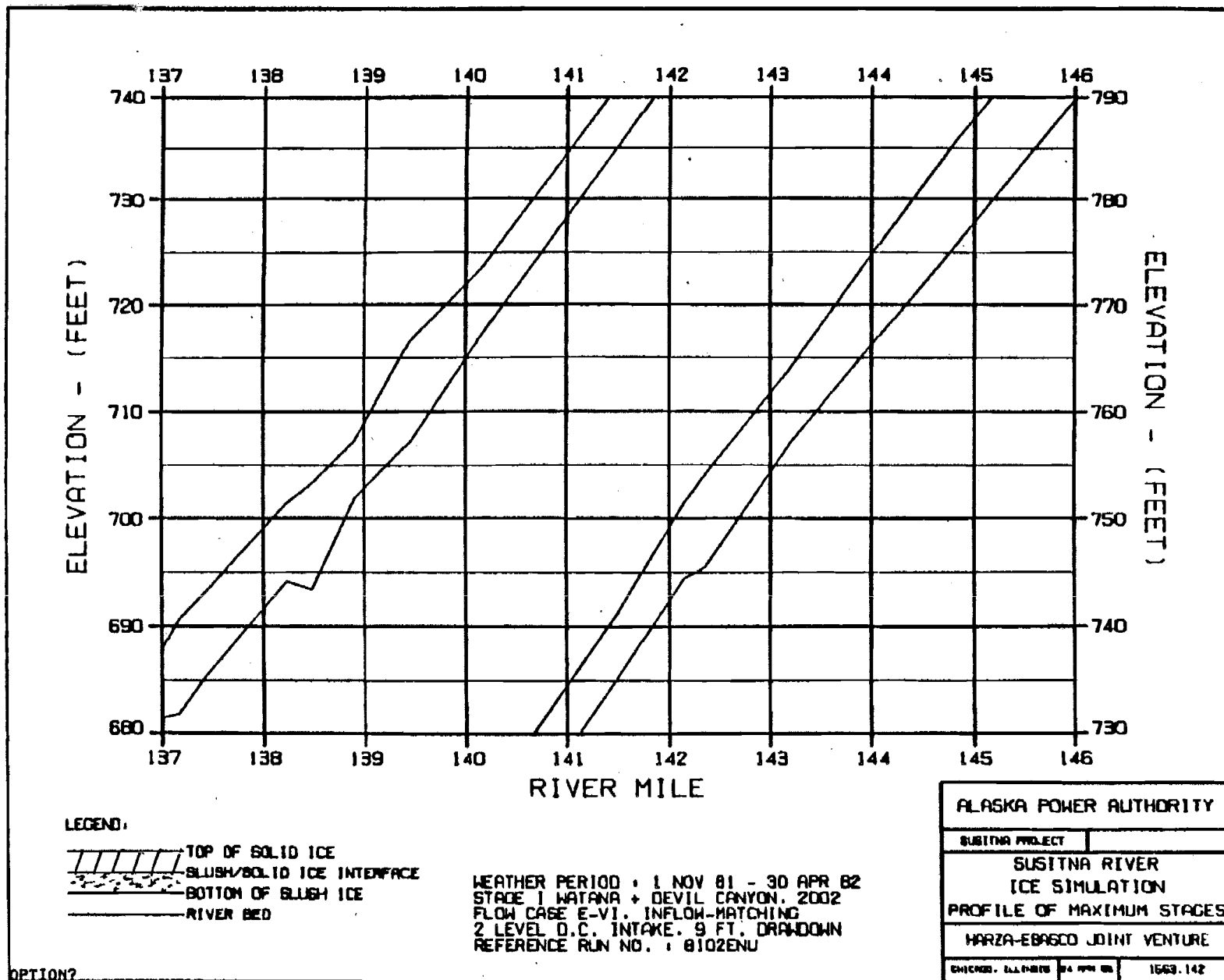


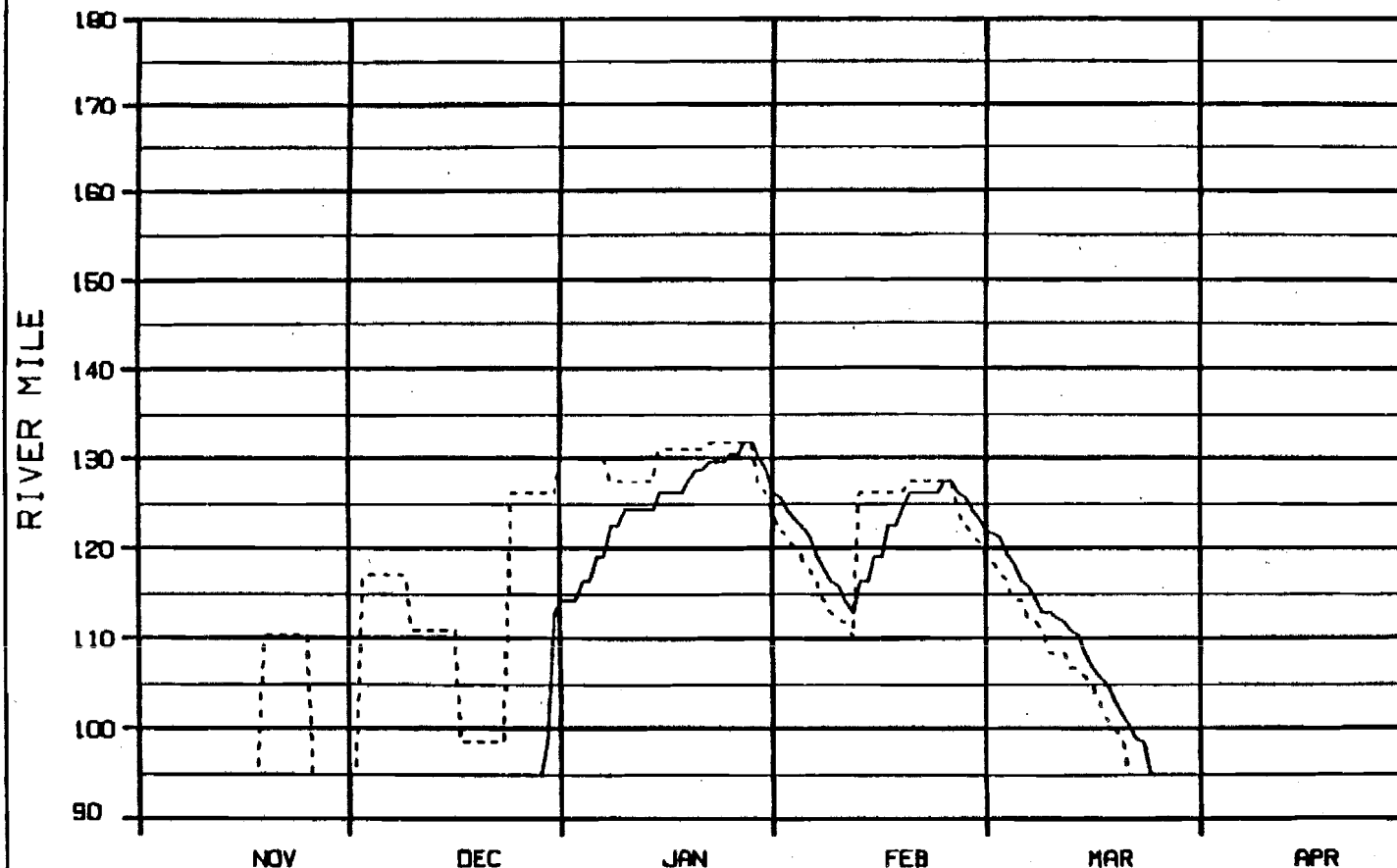






c





LEGEND:

— ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON 2002
 FLOW CASE E-VI . INFLOW-MATCHING
 2 LEVEL D.C. INTAKE . 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 PROGRESSION OF ICE FRONT
 & ZERO DEGREE ISOTHERM

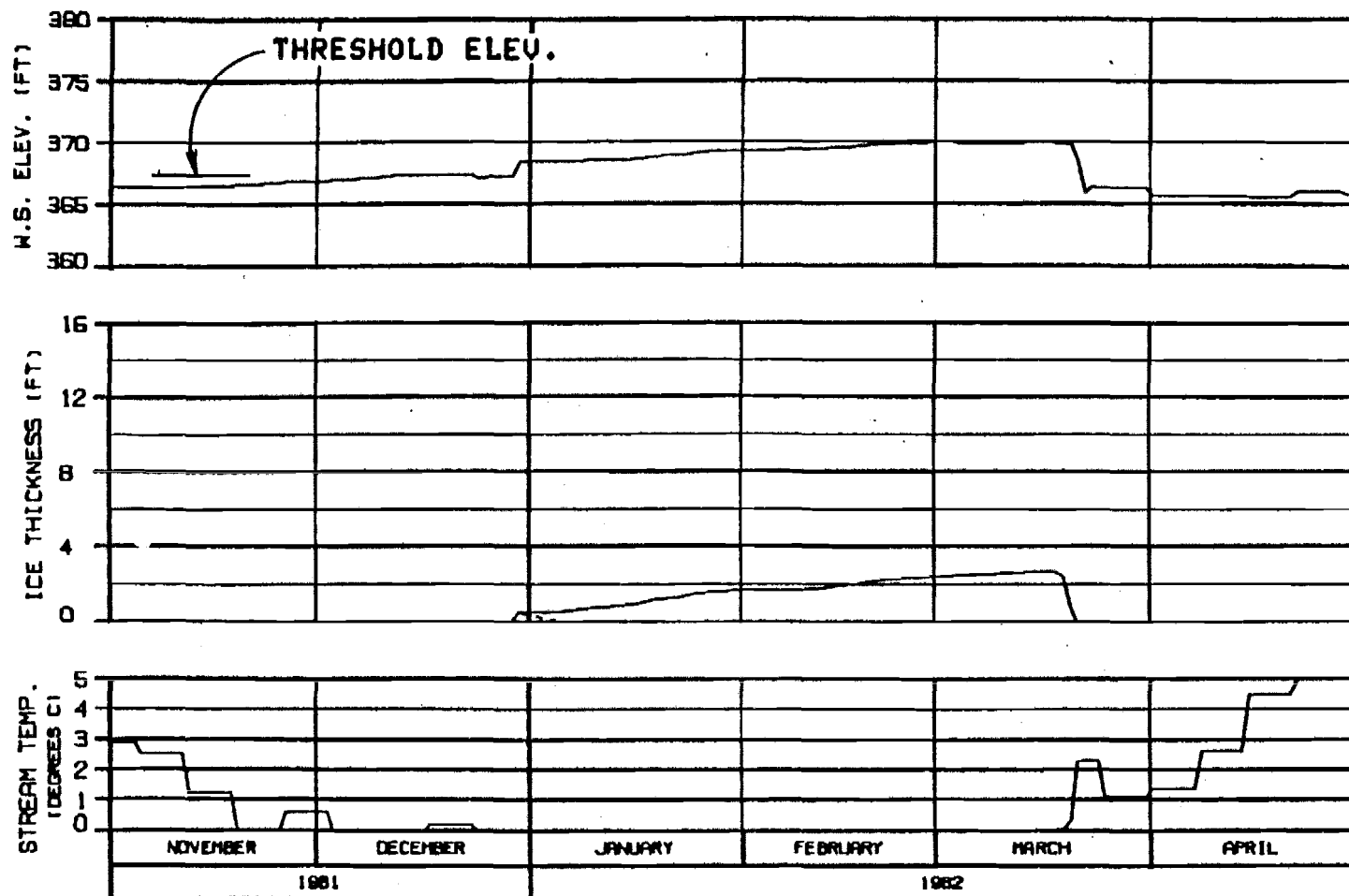
WARZA-EBASCO JOINT VENTURE

DRAWING: 1503.142

15 APR 82

1503.142

OPTION?



HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : B10ZENU

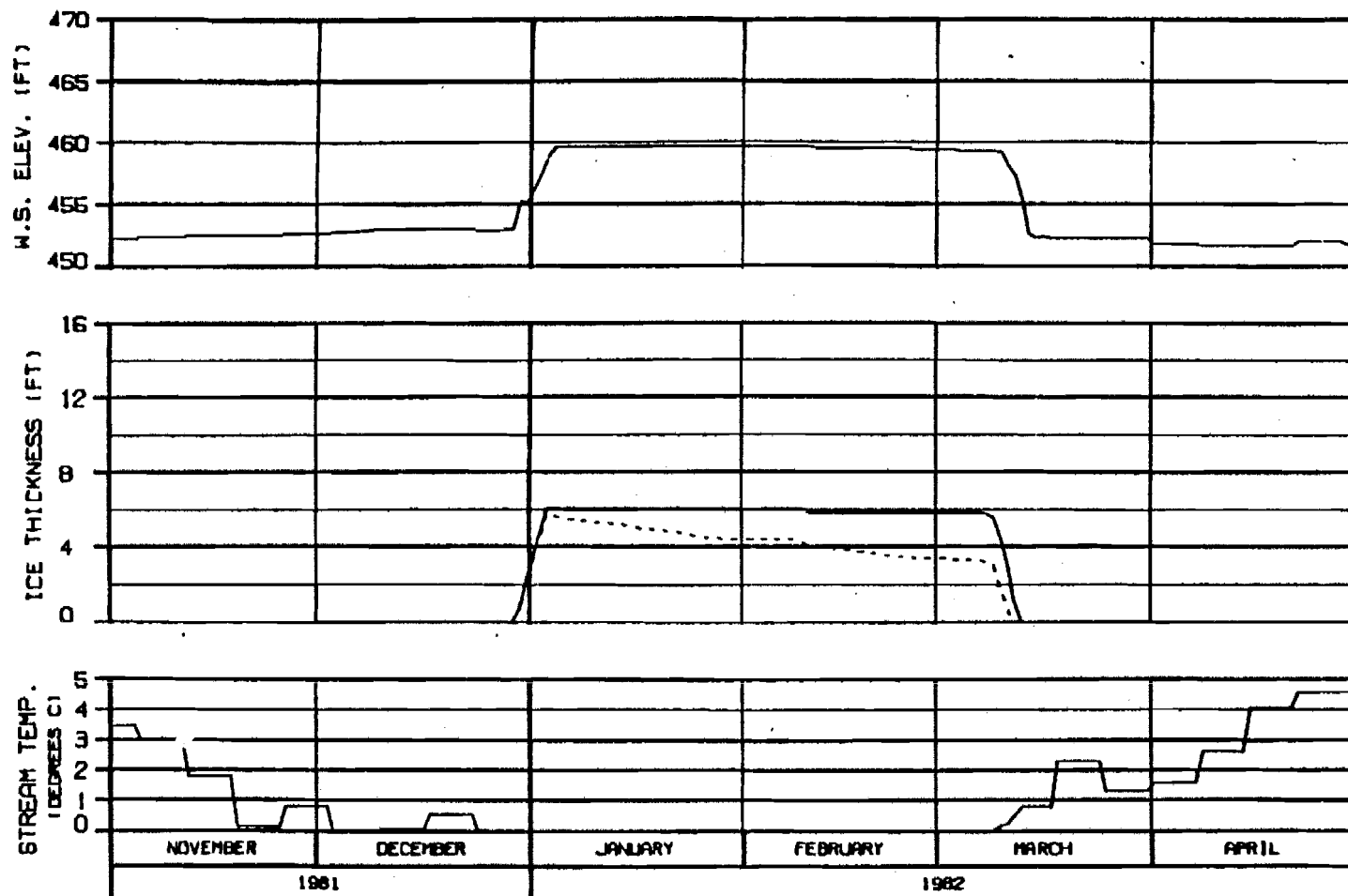
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF: AL DAVIS 24 APR 82 1588.142



SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

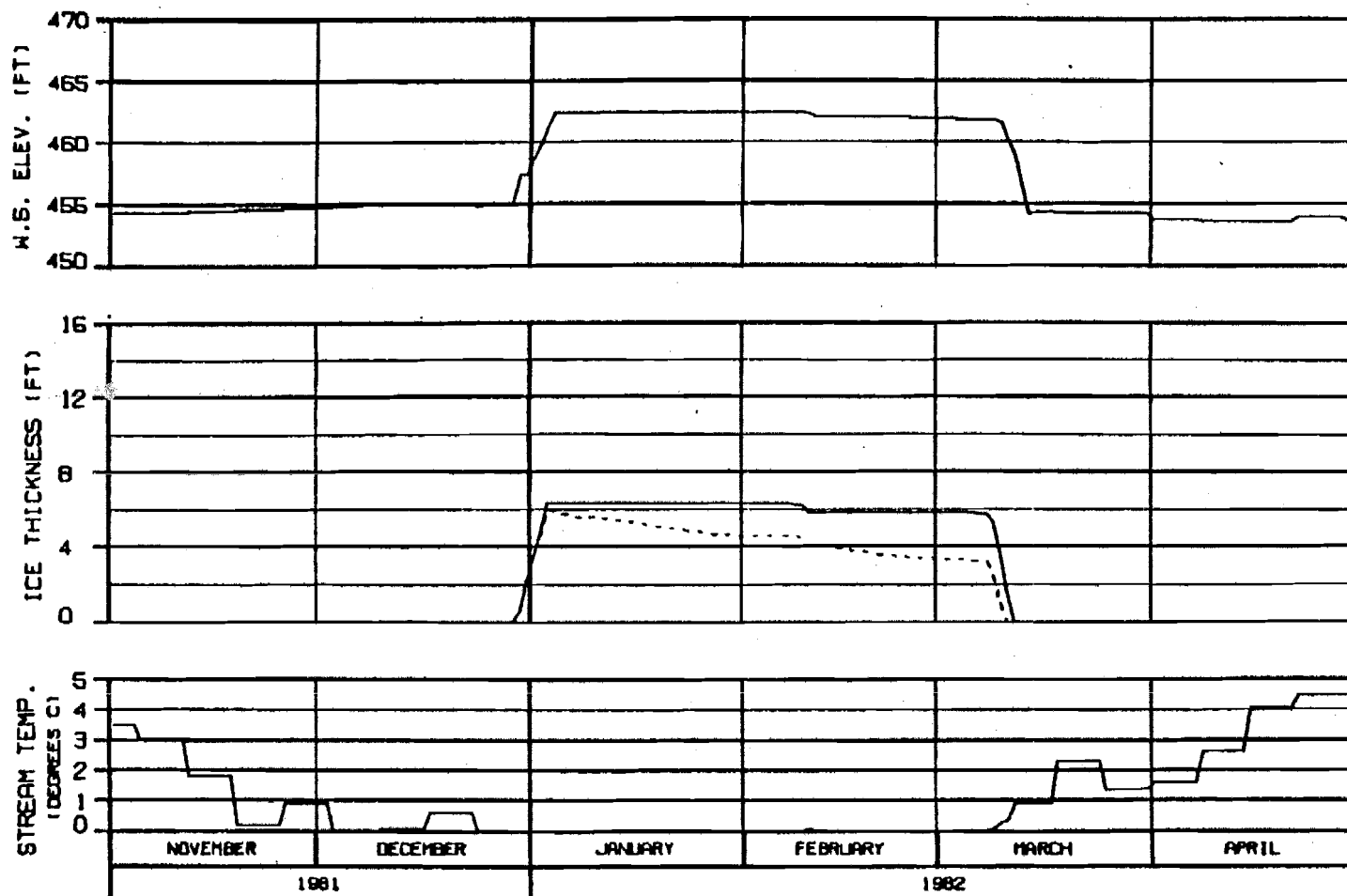
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHGNOB, ILLINETS 24 APR 82 1653.142



MOUTH OF SLOUGH 6A

RIVER MILE : 112.34

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

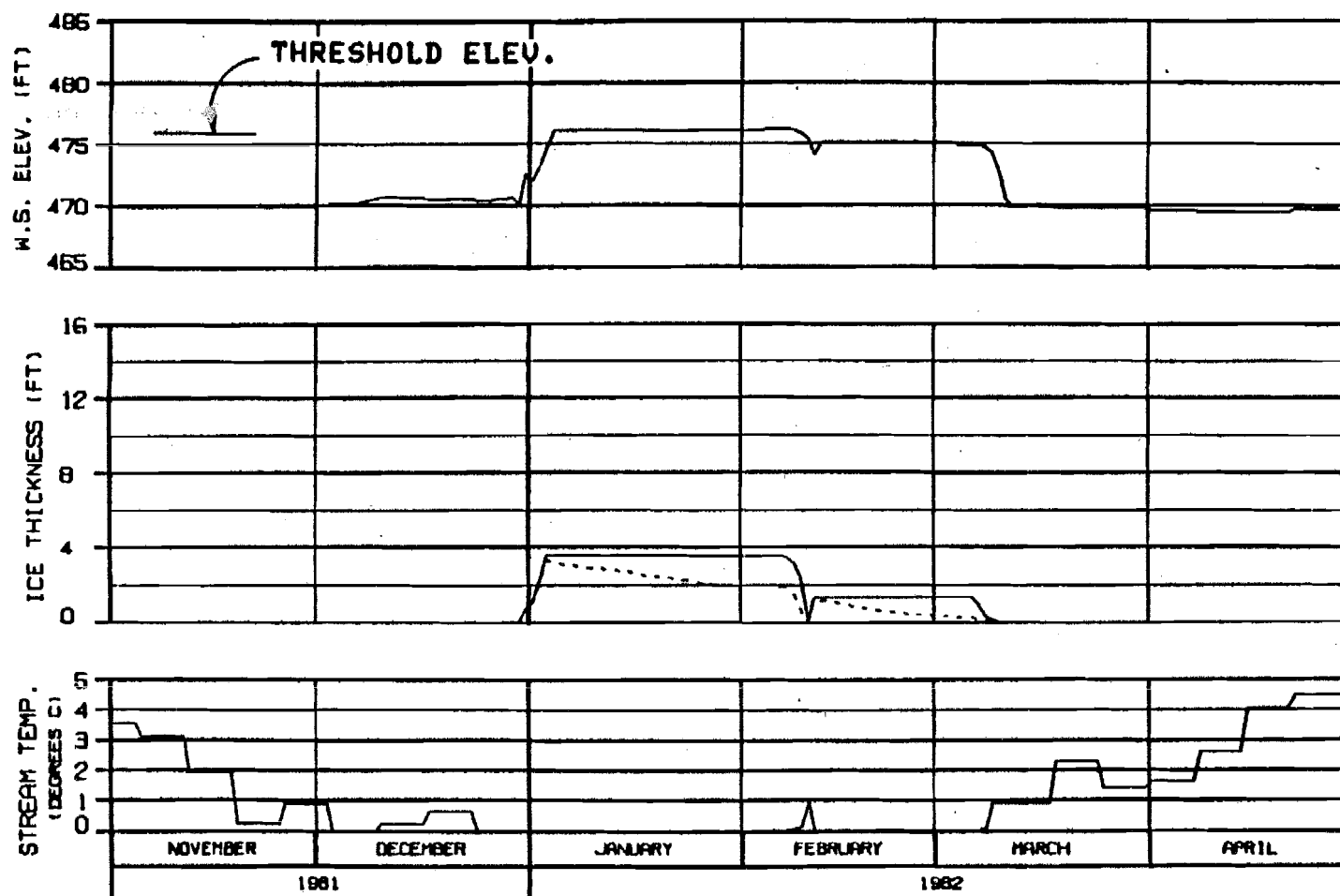
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHIEF - ILLINOIS 24 APR 82 1553.142



HEAD OF SLOUGH 8

RIVER MILE : 114.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

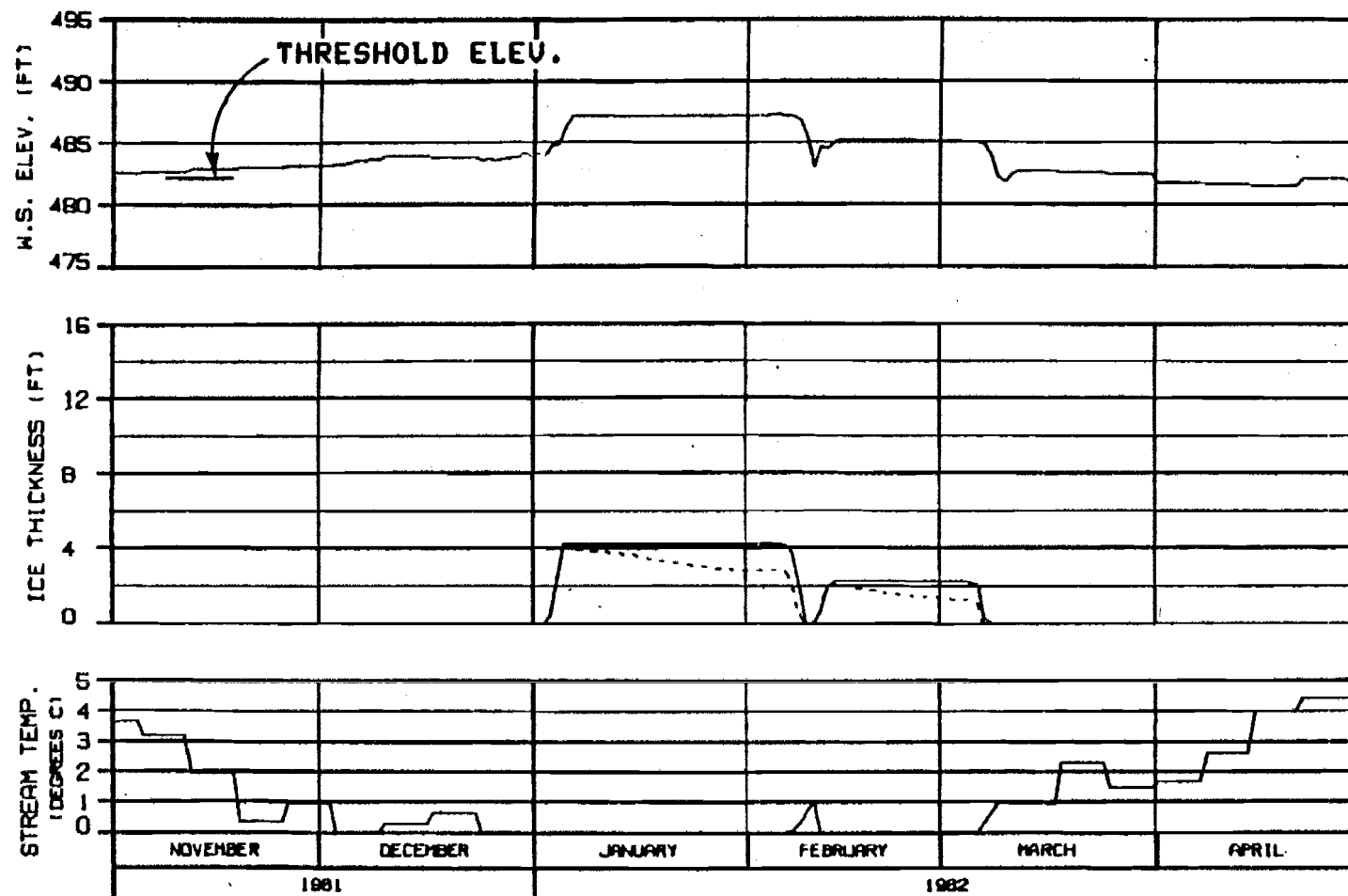
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

DATE: 11-10-81 BY: JRS 1982.142



SIDE CHANNEL MSII

RIVER MILE : 115.50

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - BLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

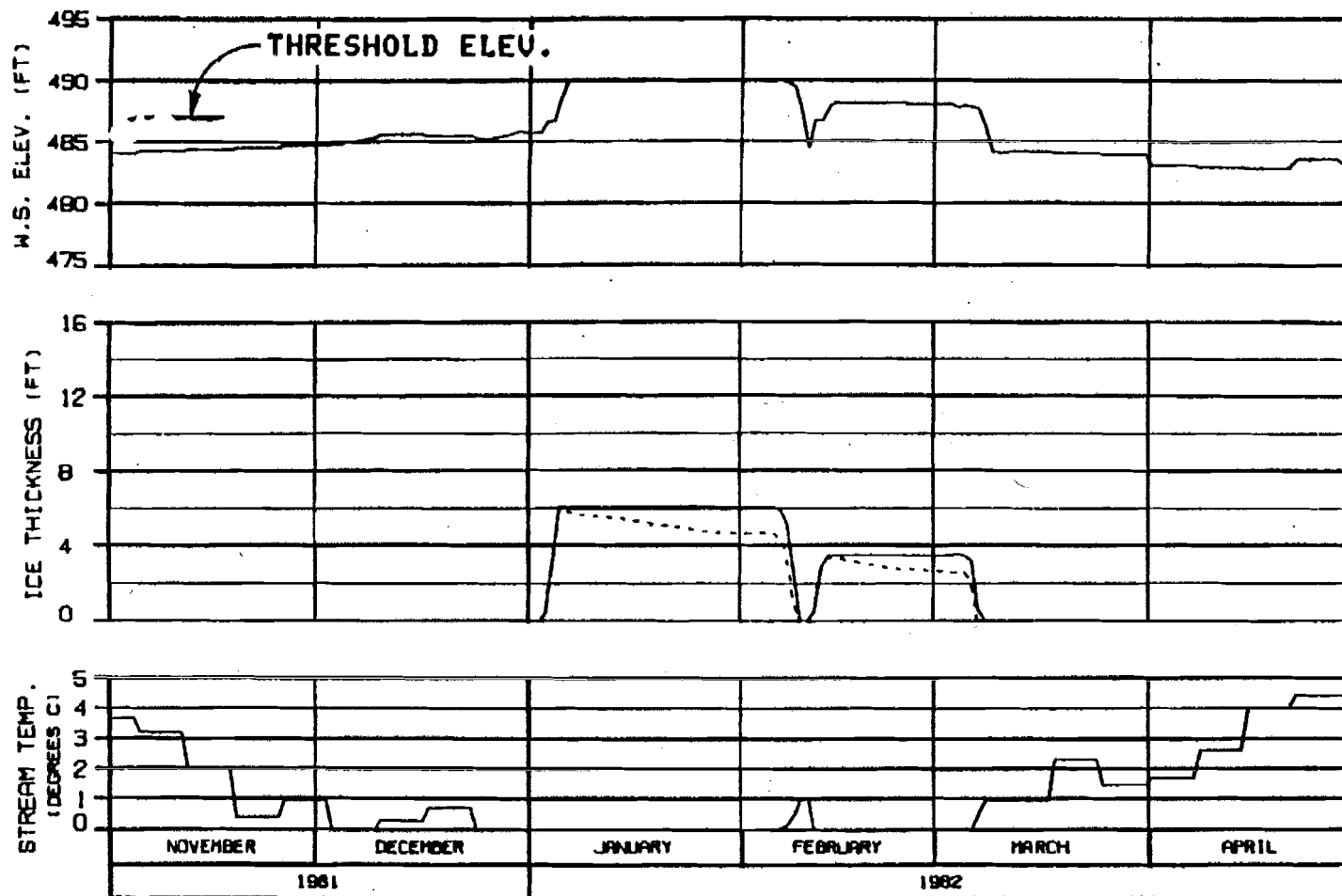
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHARGE: 1155015 24 APR 82 1553.142



HEAD OF SIDE CHANNEL MSII

RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : B10ZENU

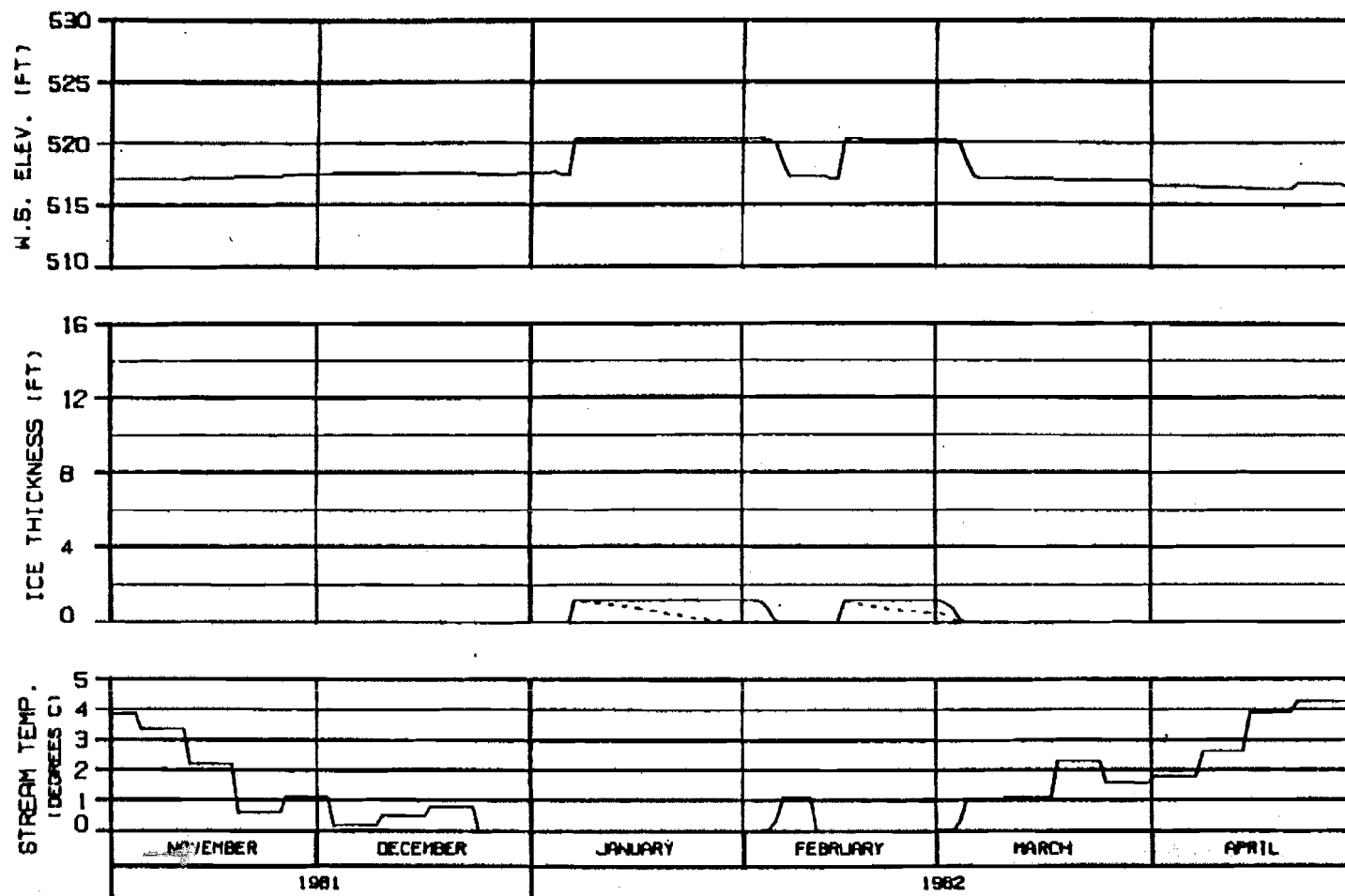
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHUCKER, BLANKEN 24 APR 82 1563.142



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, (INFLOW-MATCH) NO
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

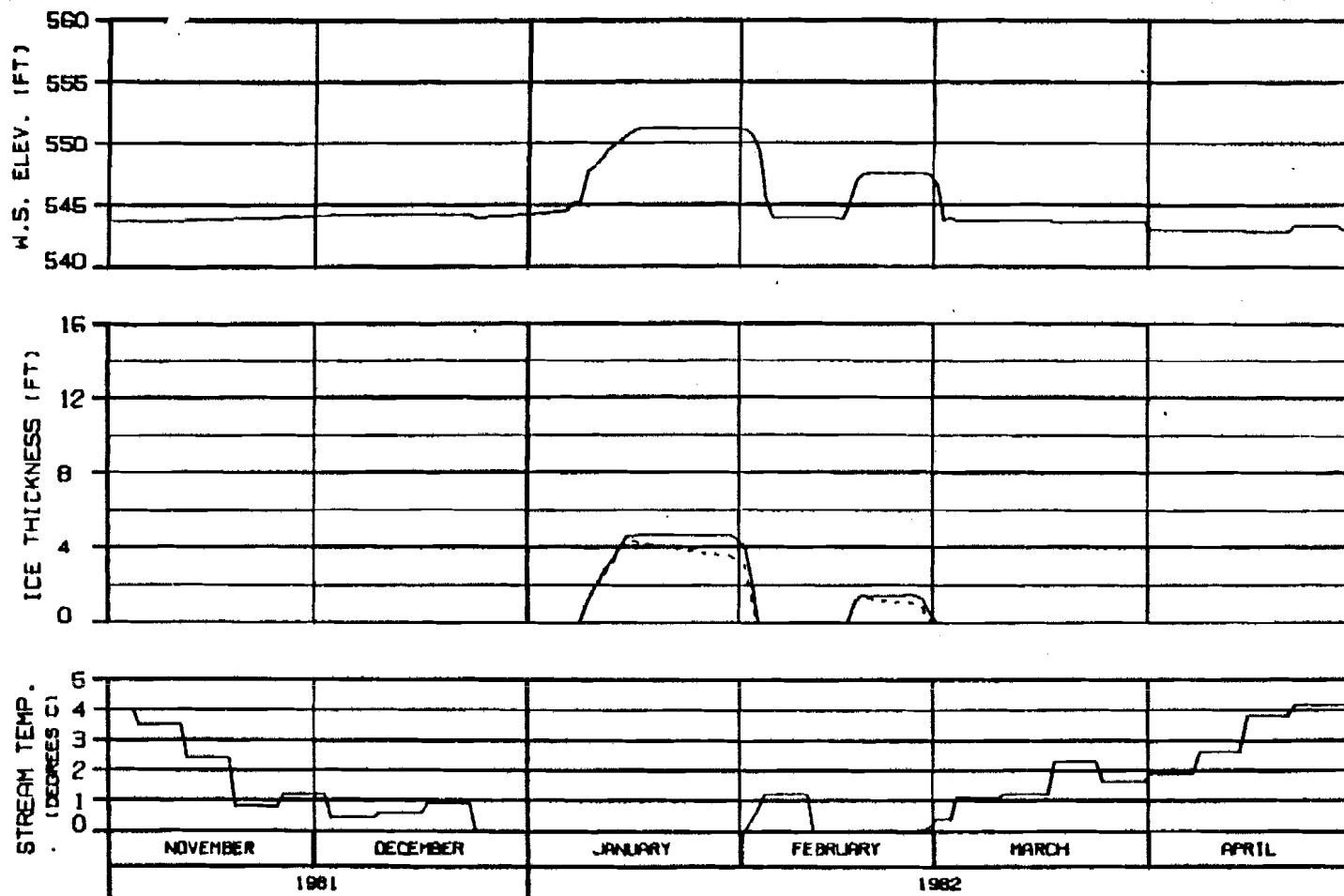
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHIEF: D.L. HUBBARD 24 APR 82 1563.142



HEAD OF MOOSE SLOUGH
RIVER MILE : 123.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : B102ENU

ALASKA POWER AUTHORITY

SUSITNA PROJECT

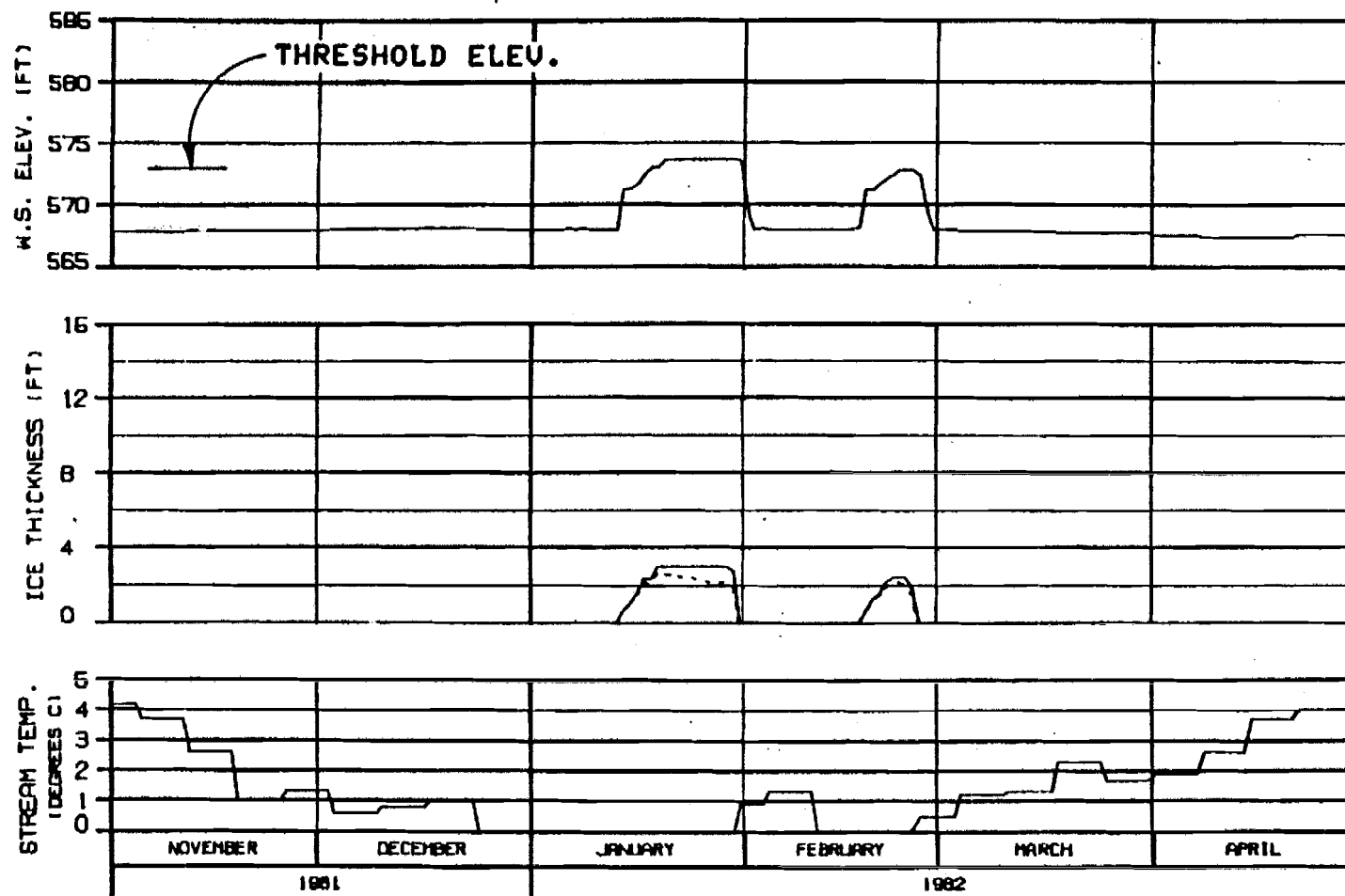
SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60610

24 APR 82

1553.142



HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

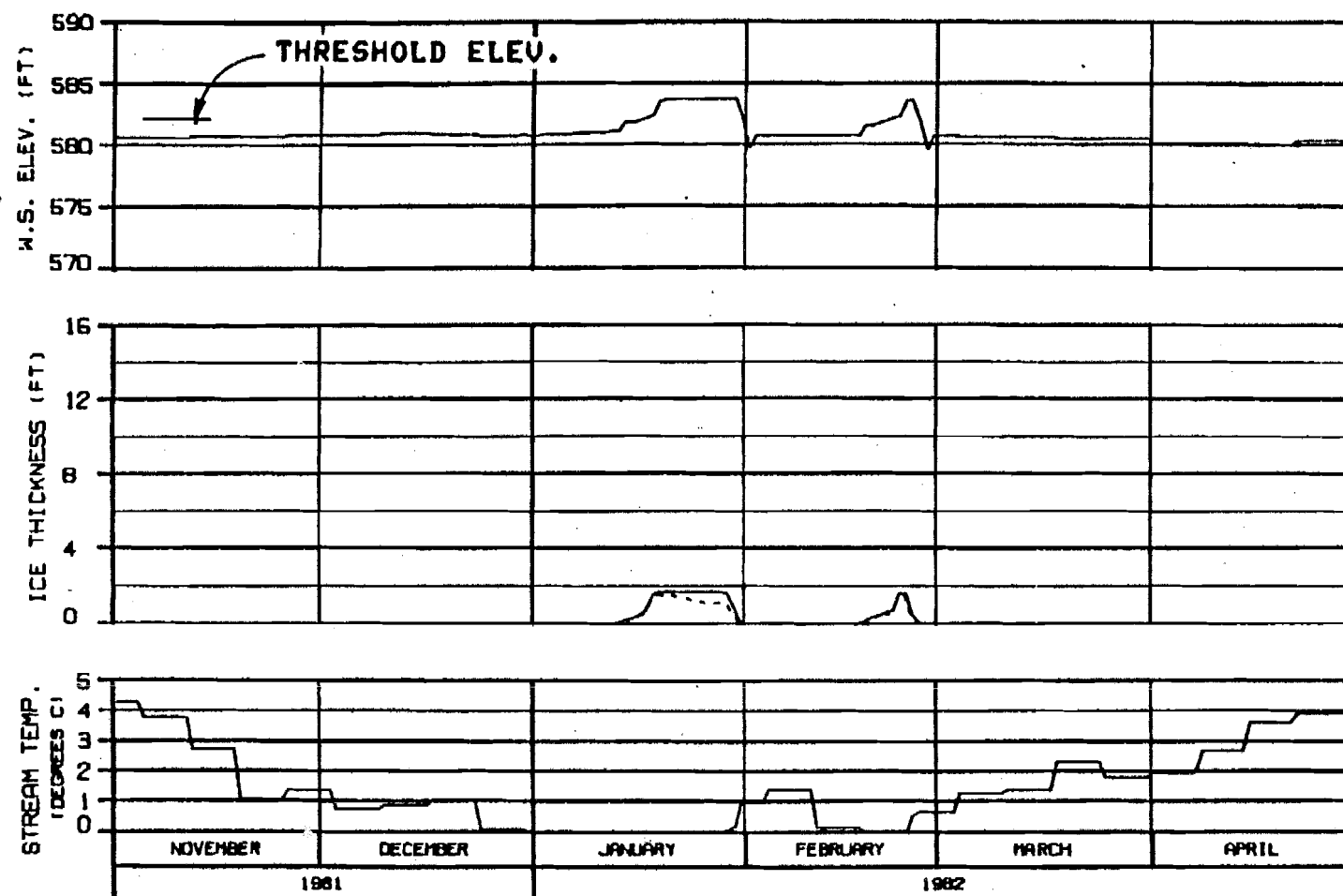
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL 60610 24 APR 82 1508.142



HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 810ZENU

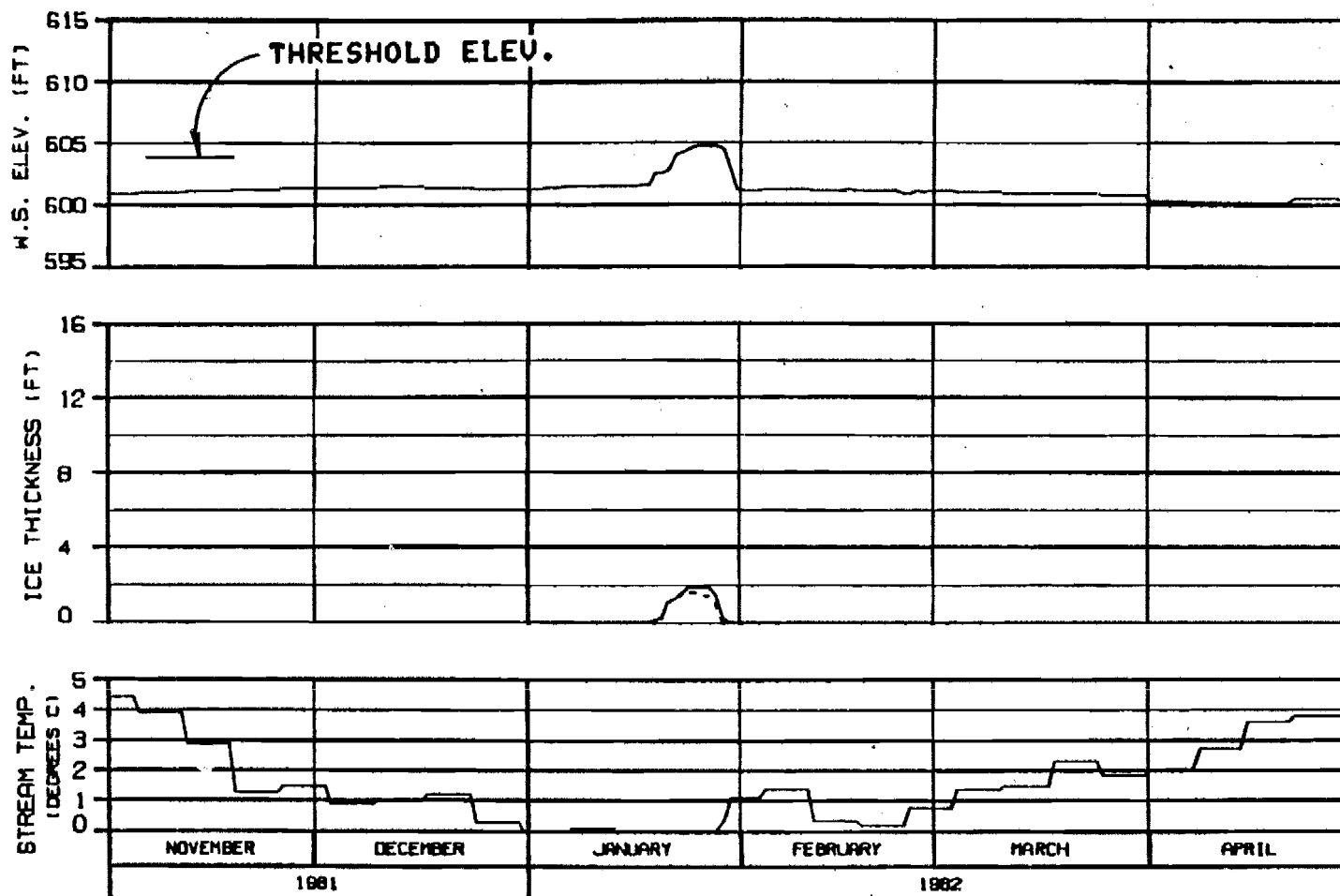
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: ALLAN B. [signature] 1562.142



HEAD OF SLOUGH 9

RIVER MILE : 129.30

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
STAGE 1 WATANA + DEVIL CANYON, 2002
CASE E-VI FLOWS, INFLOW-MATCHING
2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY

SUSITNA PROJECT

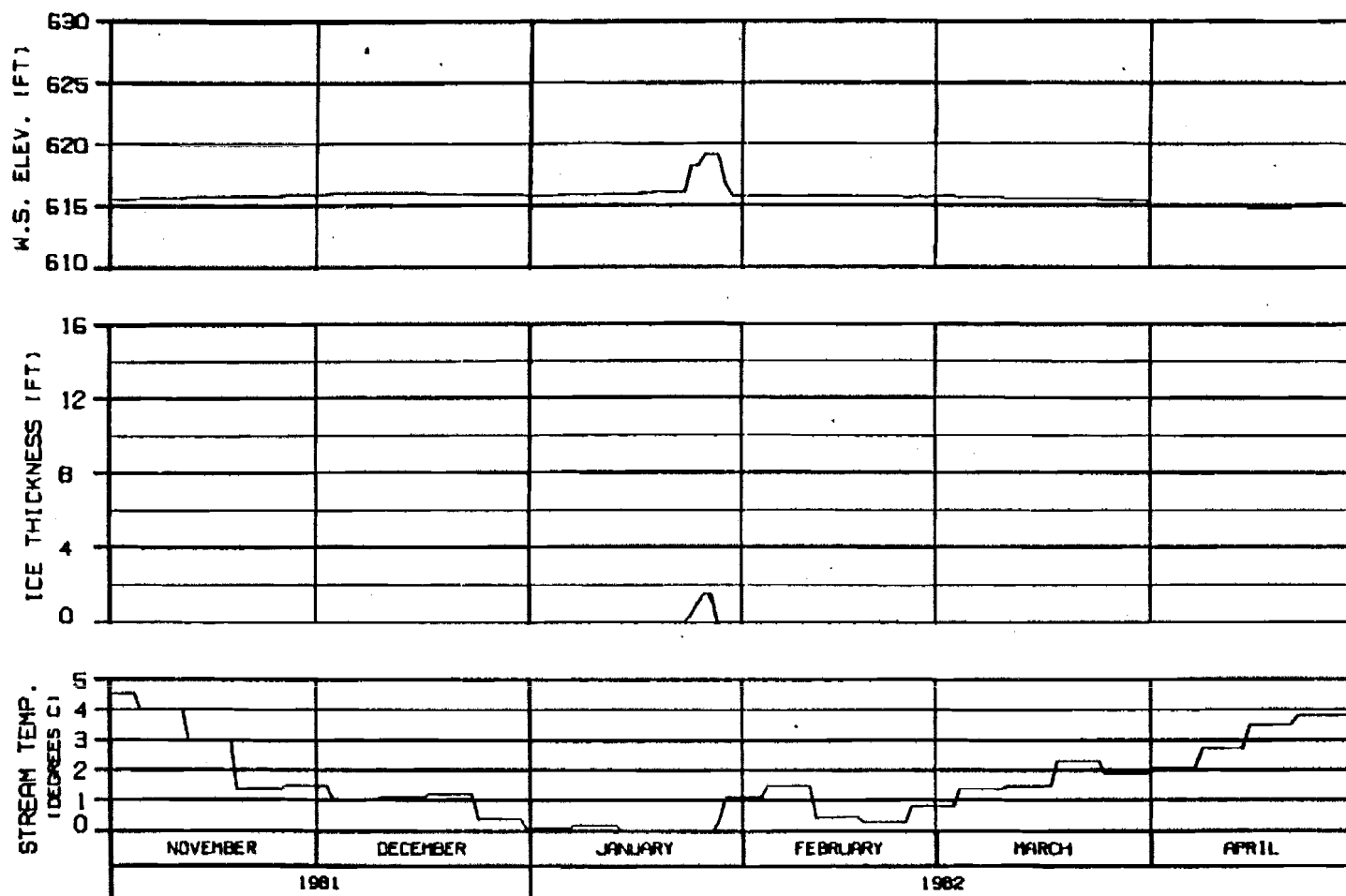
SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHANGES: 01-04-82 04 APR 82 1553.142

OPTION?

OPTION?



SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY

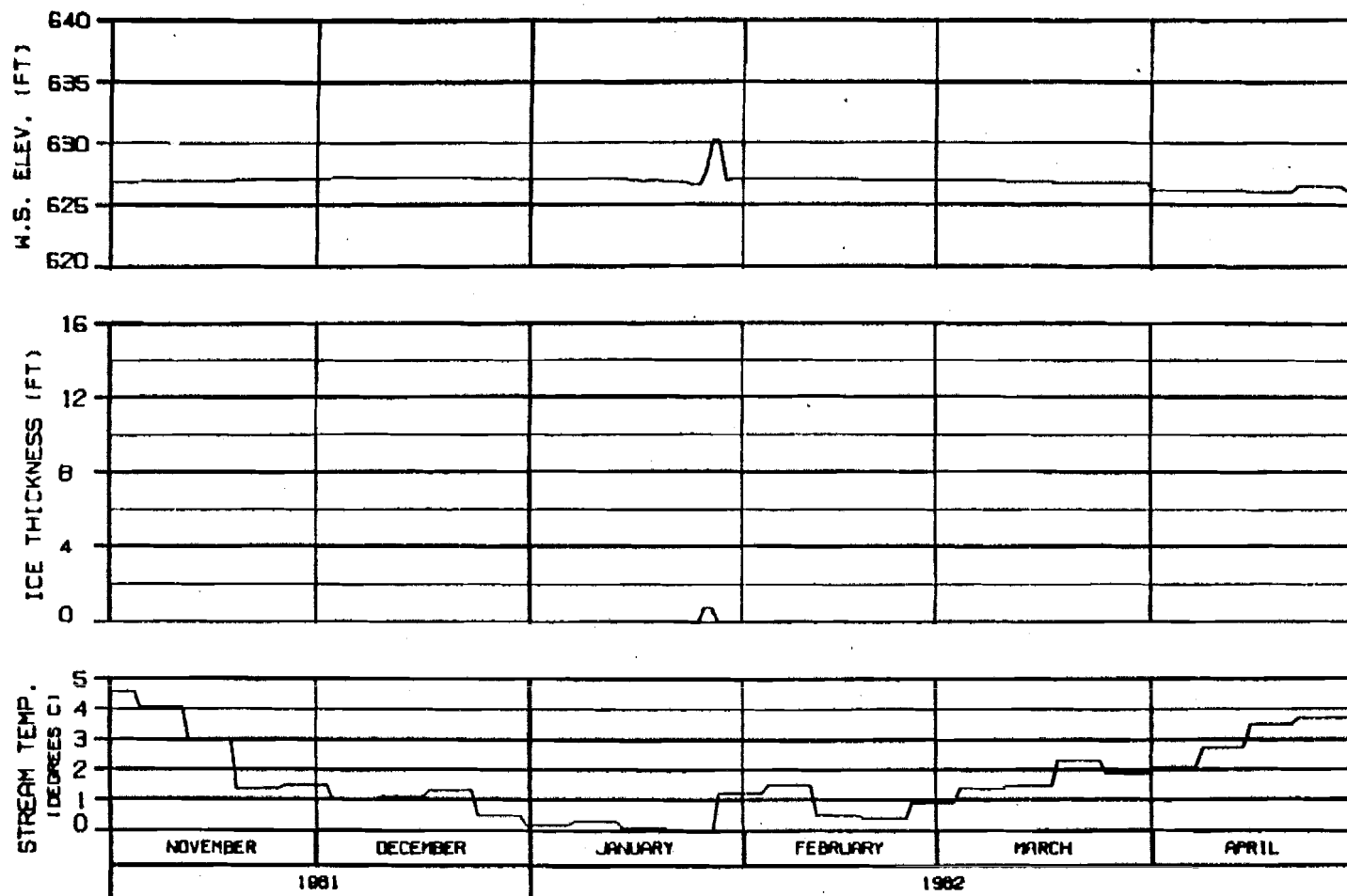
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO - ELLINGBOE

1653.142



SIDE CHANNEL U/S OF 4TH JULY CREEK
RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE I WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

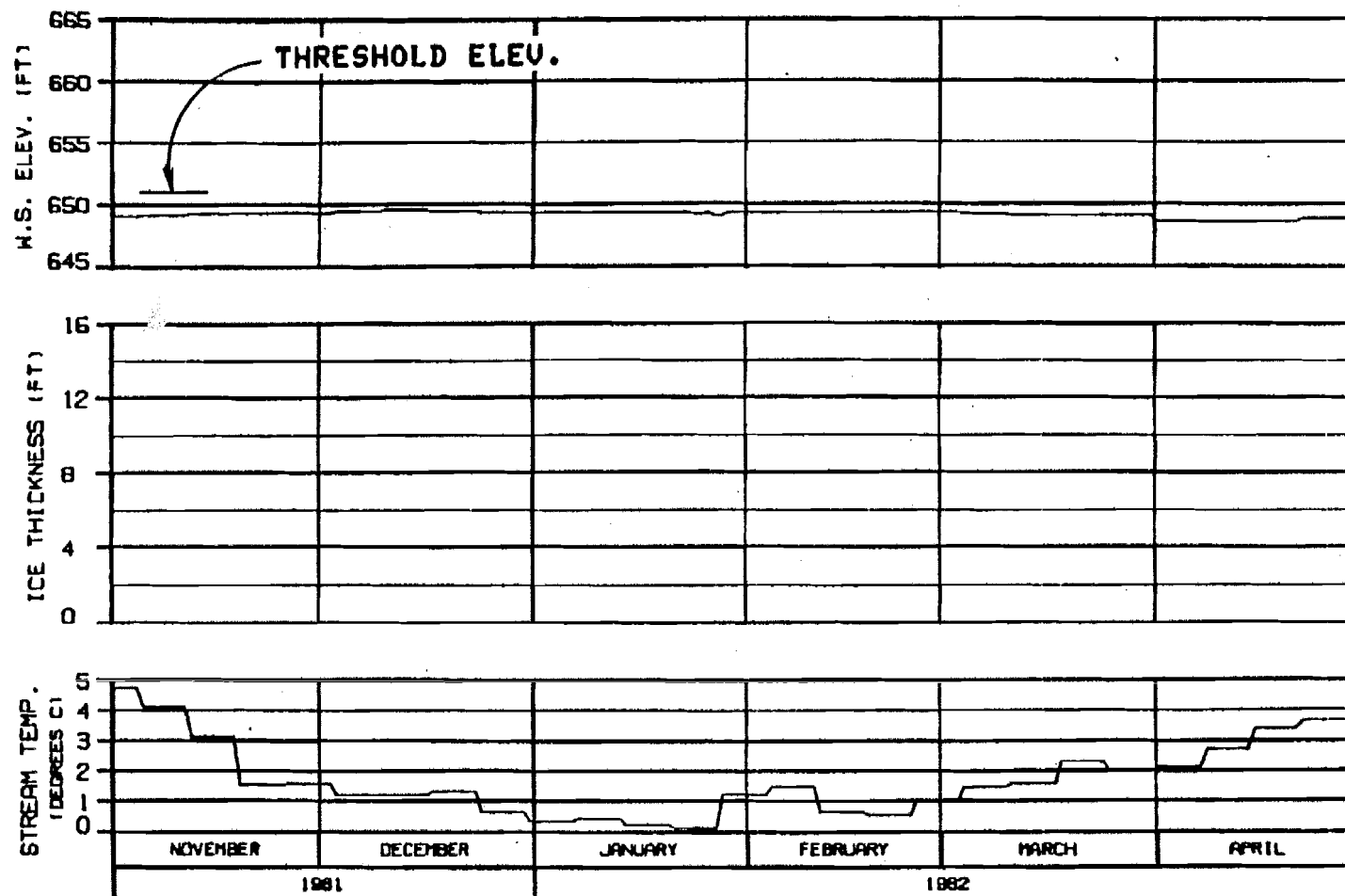
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHECKED: JLL/04/82 BY: JLL/04/82 1553.142



HEAD OF SLOUGH 9A RIVER MILE : 133.70

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

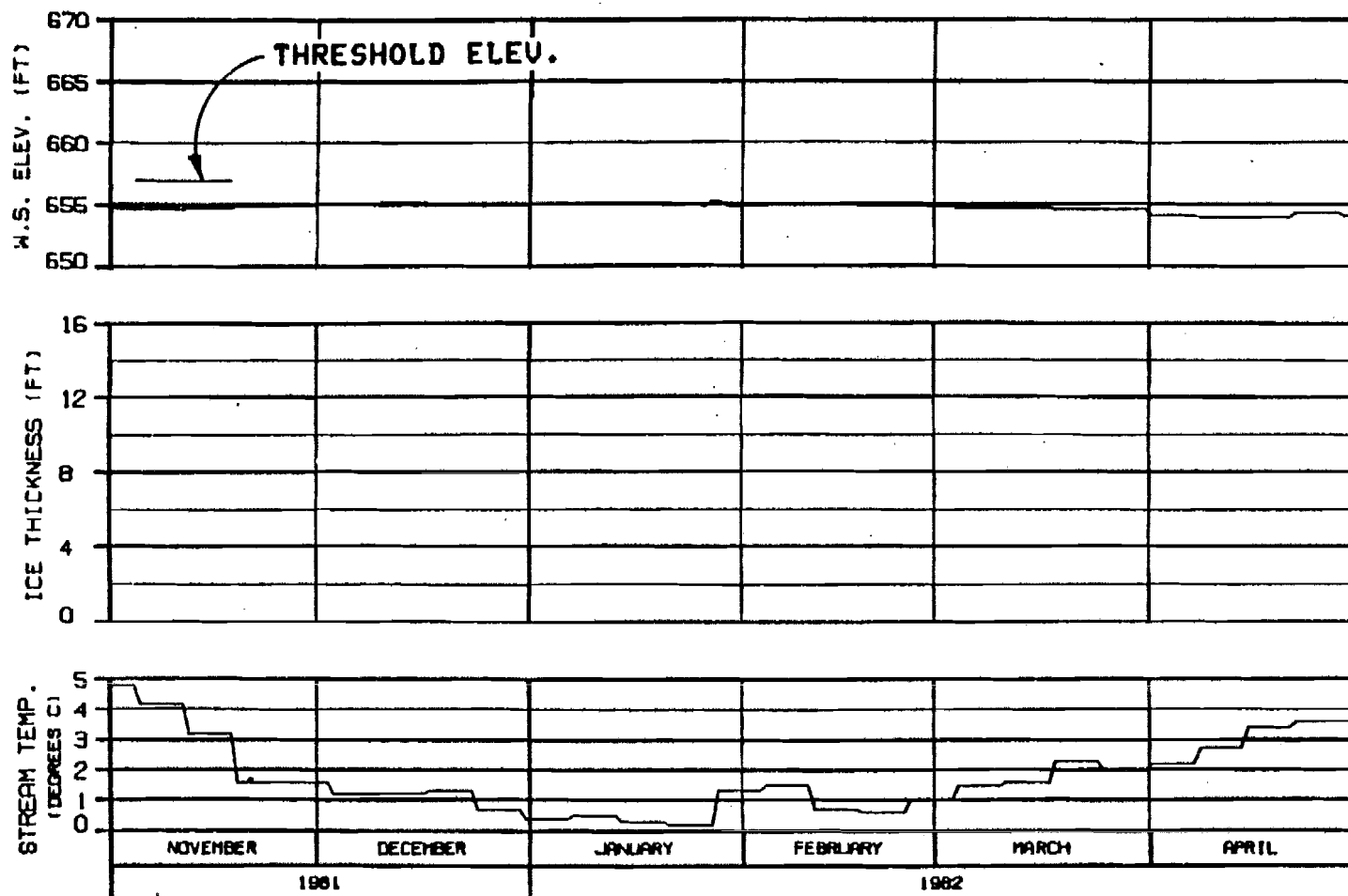
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

DATE: 11/1/81 TO 4/30/82 1000, 142



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL U/S OF SLOUGH 10
RIVER MILE : 134.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL O.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

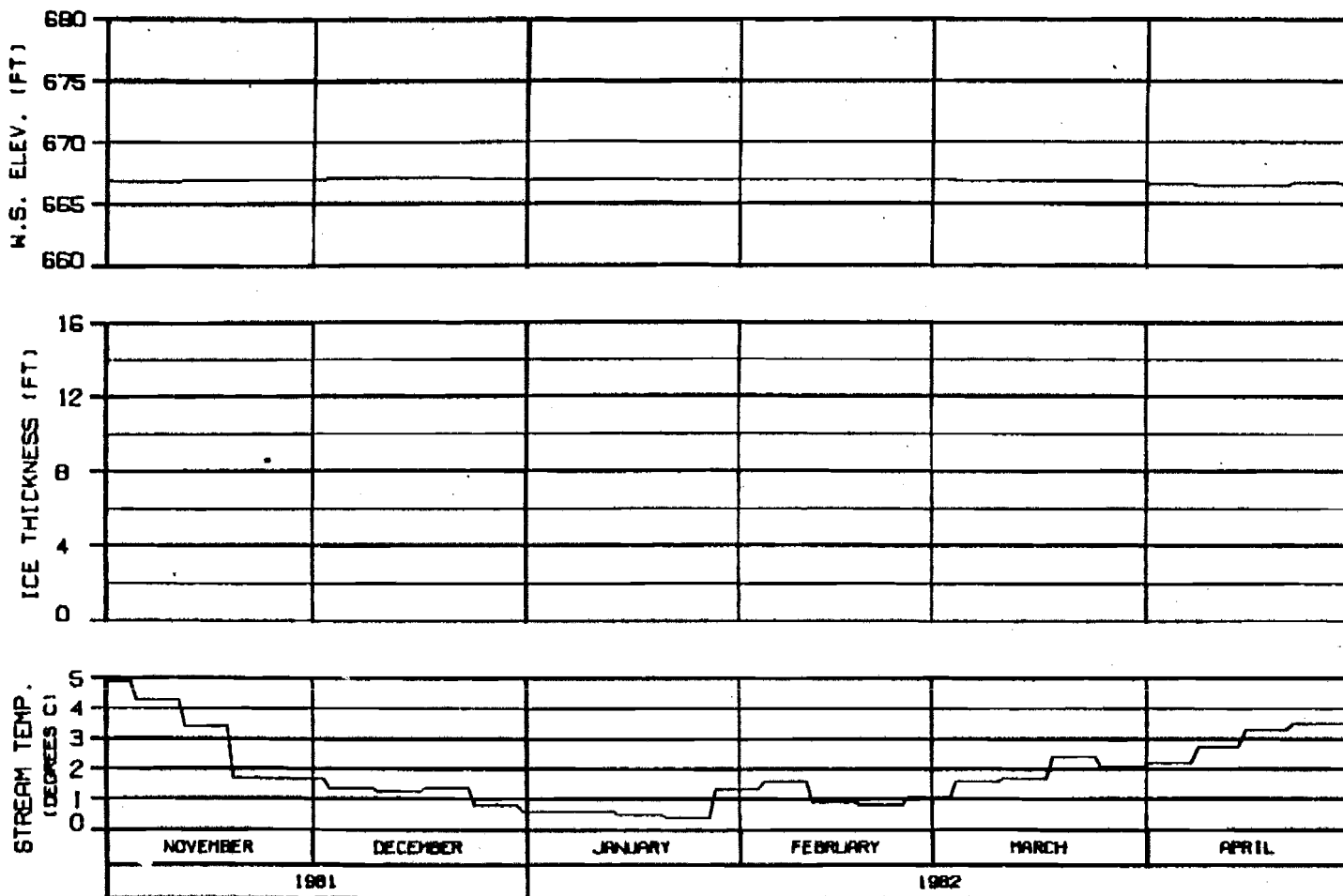
ALASKA POWER AUTHORITY

SUSITNA PROJECT

**SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY**

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 60601 APR 82 1500.142



ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 SLUSH COMPONENT

SIDE CHANNEL D/S OF SLOUGH 11

RIVER MILE : 135.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE I WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY

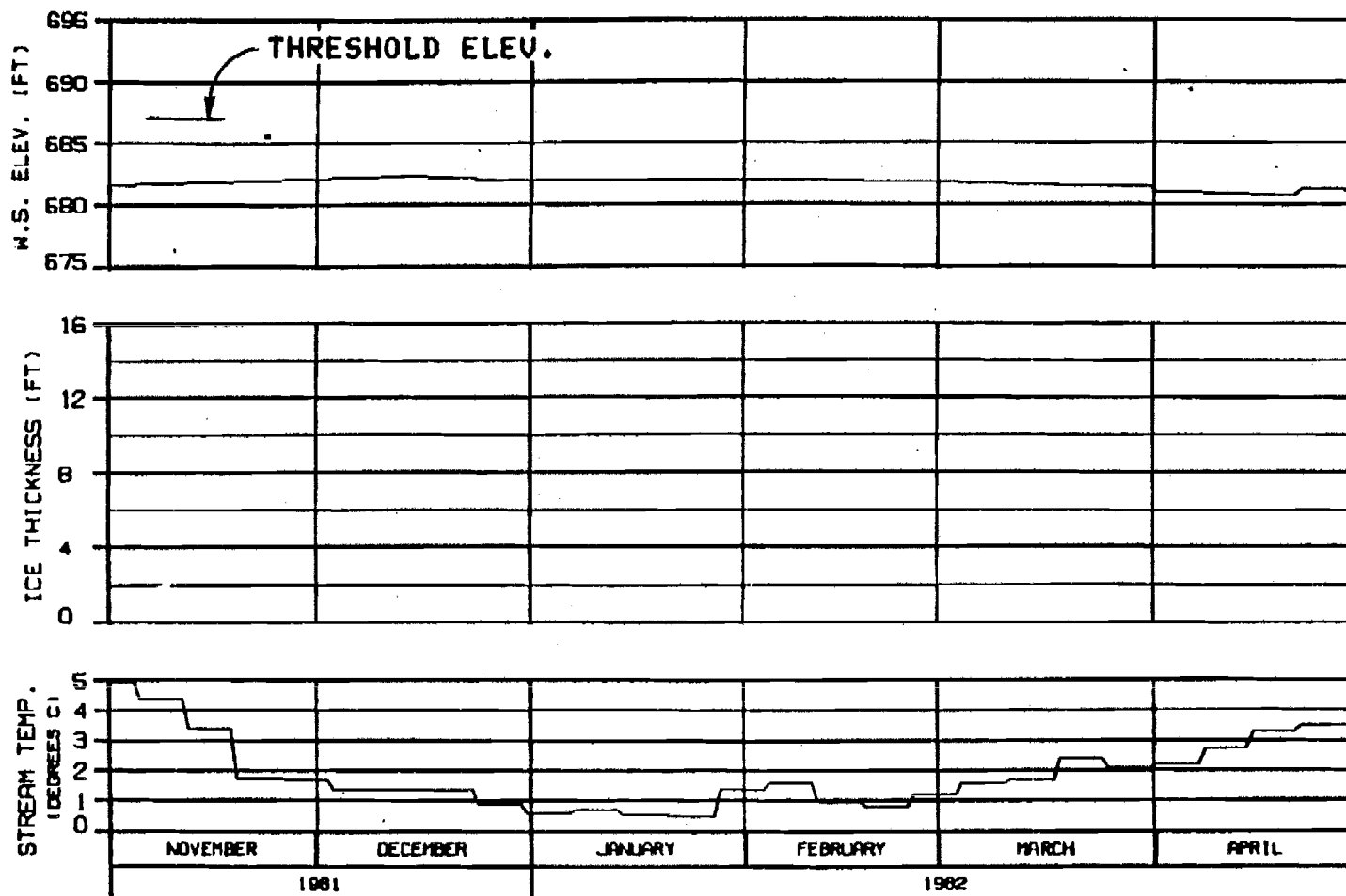
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHGNOB. ALL DATA 24 APR 82 1500.142

m>0



HEAD OF SLOUGH 11
RIVER MILE : 136.50

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
STAGE 1 WATANA + DEVIL CANYON, 2002
CASE E-VI FLOWS, INFLOW-MATCHING
2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENU

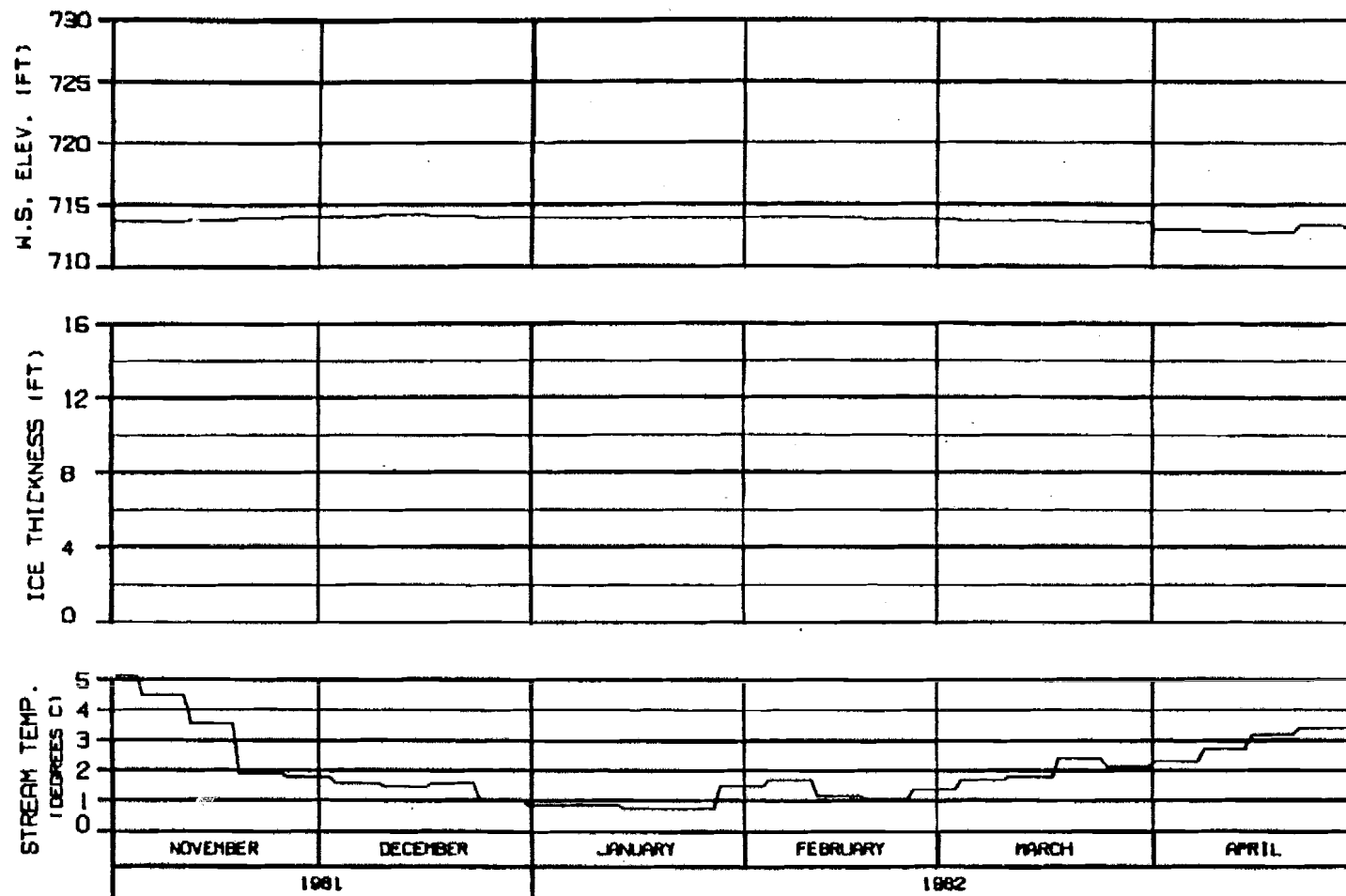
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHGNO. 01.04.82 24 APR 82 1553.142



HEAD OF SLOUGH 17 RIVER MILE : 139.30

ICE THICKNESS LEGEND:
——— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
STAGE 1 WATANA + DEVIL CANYON, 2002
CASE E-VI FLOWS, INFLOW-MATCHING
2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENU

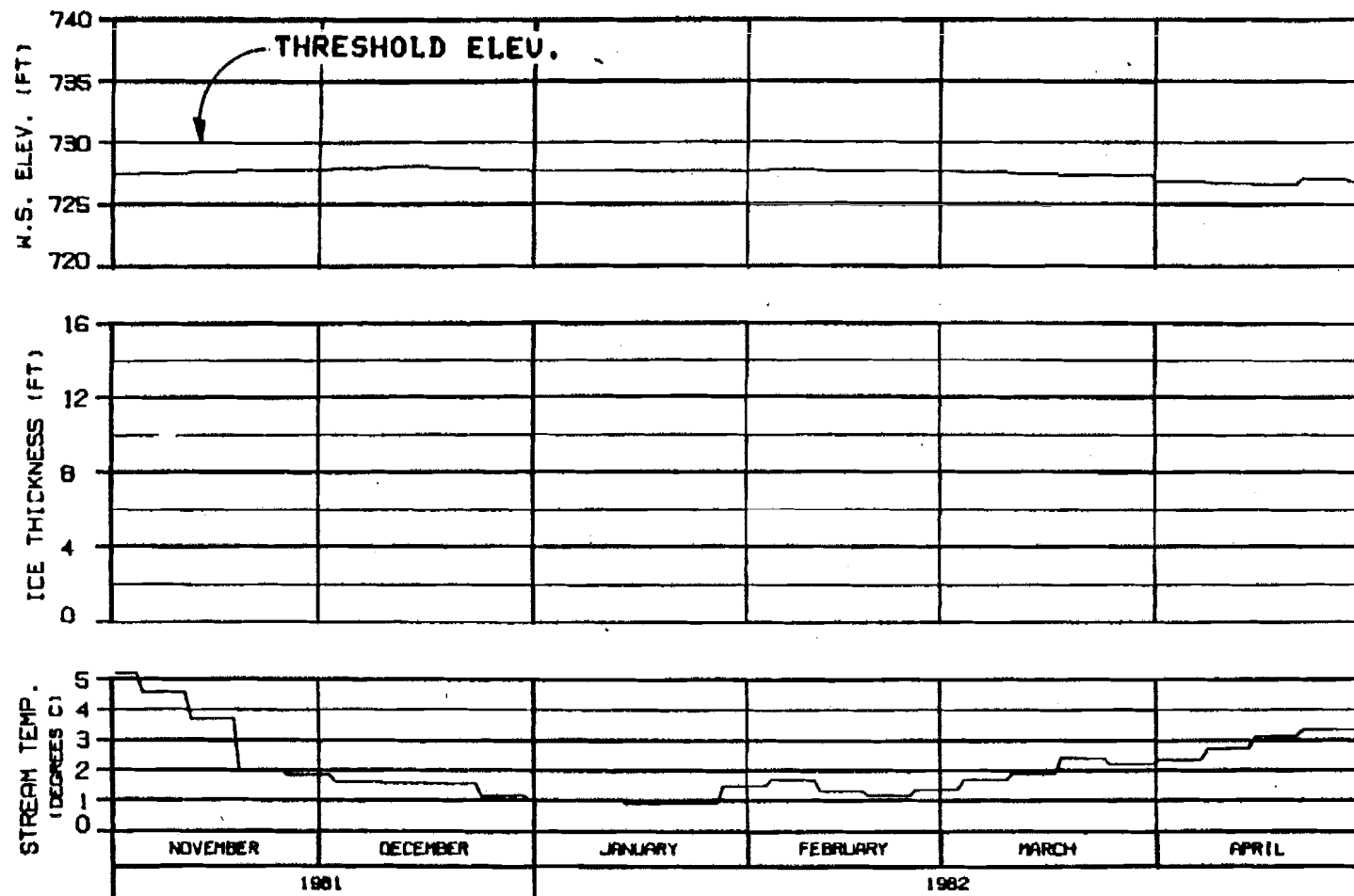
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHUCKER, B.L. 10-10 24 APR 82 1583.142



HEAD OF SLOUGH 20
RIVER MILE : 140.50

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
STAGE 1 WATANA + DEVIL CANYON, 2002
CASE E-VI FLOWS, INFLOW-MATCHING
2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
REFERENCE RUN NO. : 810ZENU

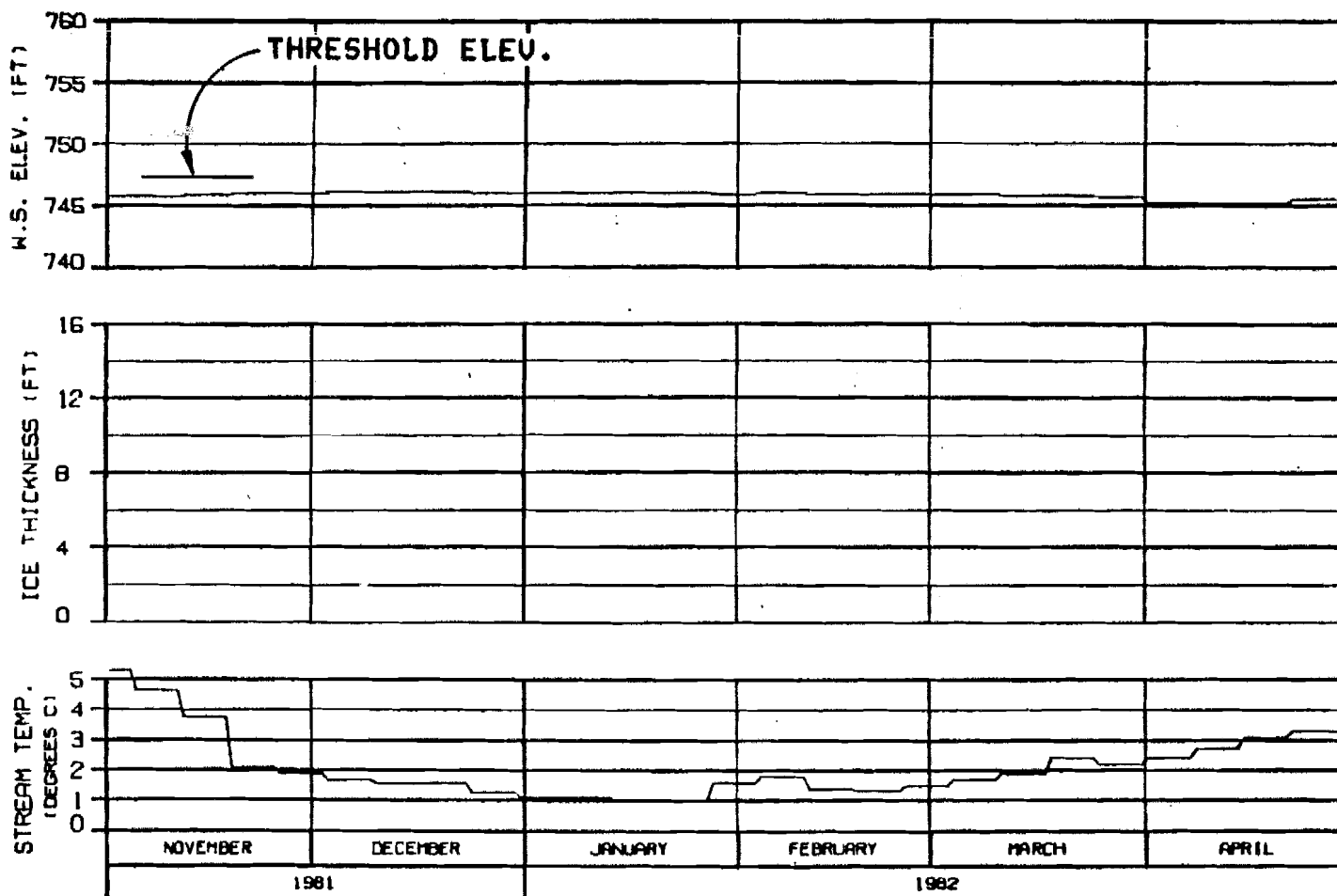
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHECKED: B.L. 0-070 BY: 04 APR 82 1503.142



SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

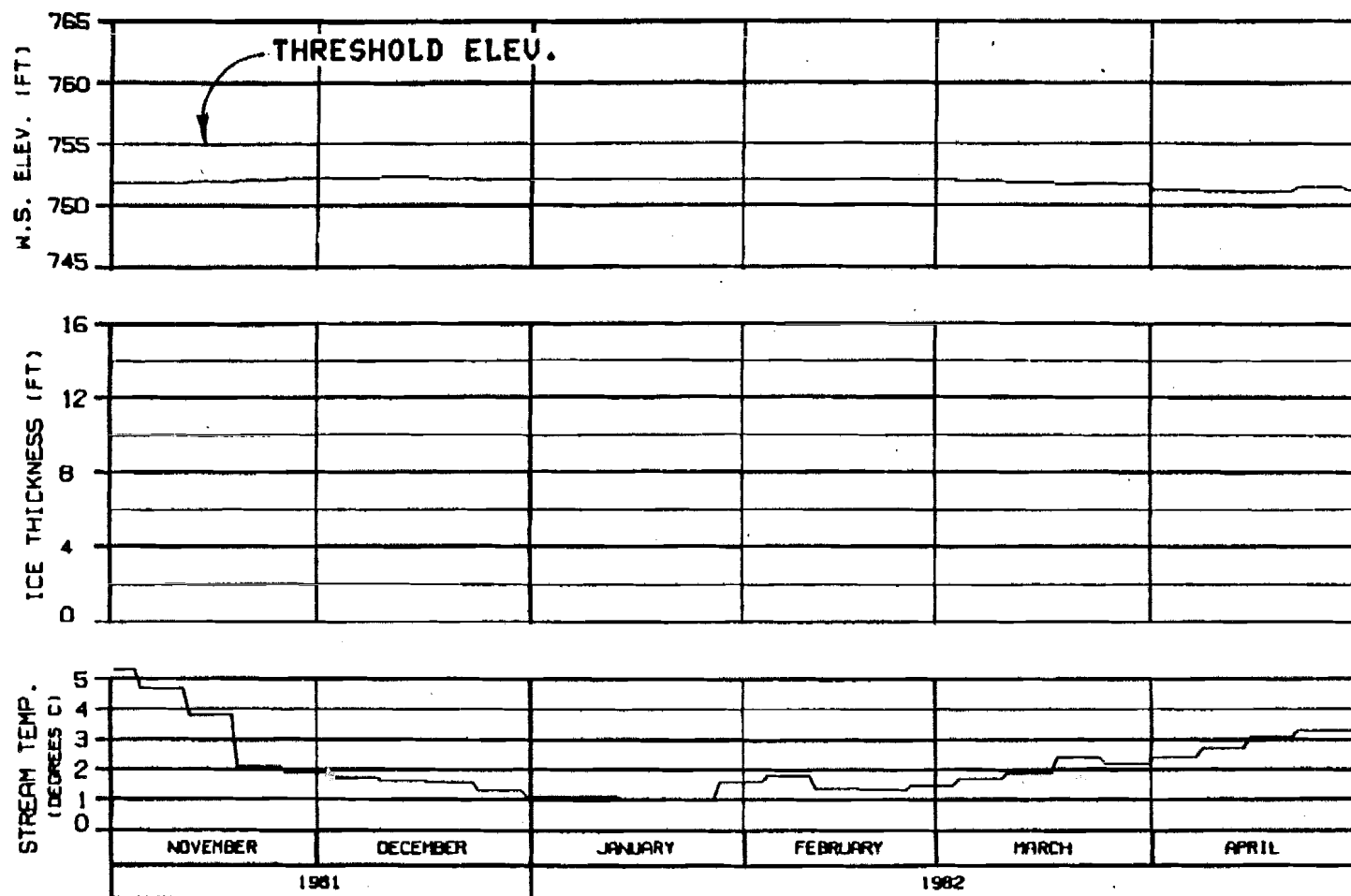
ALASKA POWER AUTHORITY

SUSTINA PROJECT

**SUSTINA RIVER
 ICE SIMULATION
 TIME HISTORY**

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL 60618 24 APR 82 1553.142



HEAD OF SLOUGH 21
RIVER MILE : 142.20

ICE THICKNESS LEGEND:
—— TOTAL THICKNESS
----- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
STAGE 1 WATANA + DEVIL CANYON, 2002
CASE E-VI FLOWS, INFLOW-MATCHING
2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
REFERENCE RUN NO. : 8102ENU

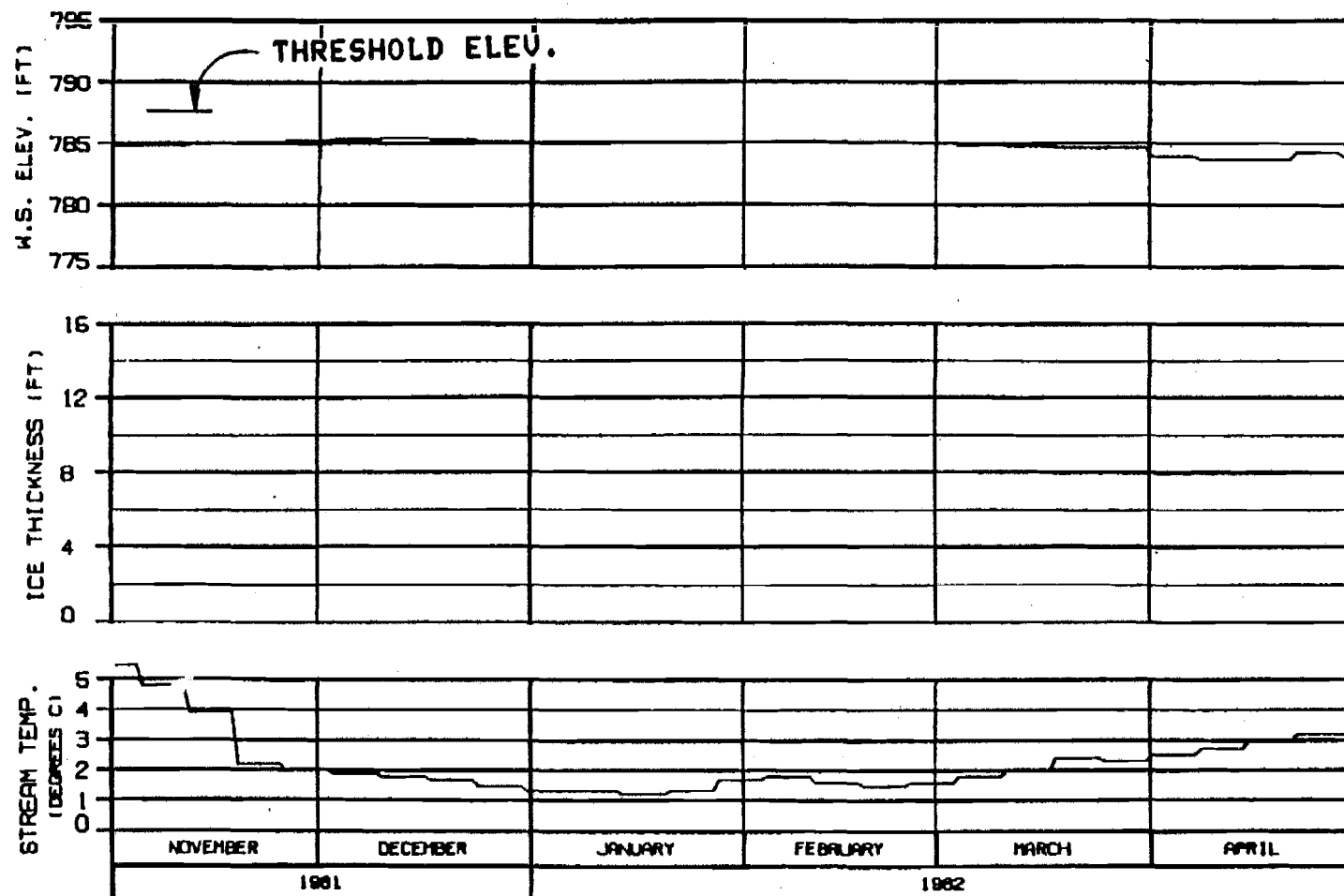
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHICAGO, ILL. 60619 24 APR 82 1553.142



HEAD OF SLOUGH 22

RIVER MILE : 144.80

ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE I WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS. INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

MARZA-EBASCO JOINT VENTURE

CHICAGO, ILLINOIS 24 APR 82 1862.142

OPTION?

EXHIBIT 9

EXHIBIT 9

COMPARISONS OF RIVER ICE SIMULATIONS FOR STAGED
CONSTRUCTION, STAGE 1 AND LICENSE APPLICATION PROJECT,
PROJECTED ENERGY DEMANDS FOR 2001.

SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED RIVER STAGES
 WATANA ONLY: 2001 ENERGY DEMAND
 FLOW CASE E-VI FLOWS, INFLOW-MATCHING
 WINTER 1981-82

STAGE 1

<u>Slough or Side Channel</u>	<u>River Mile</u>	<u>Threshold Elevation</u>	<u>Stage 1 Simulated Natural Conditions</u>	<u>Stage 1 FERC License Concept</u>	<u>Stage 1 Staged Construction Concept</u>
Whiskers	101.5	367	<u>368</u>	<u>371</u>	<u>371</u>
Gash Creek	112.0	453	<u>455</u>	<u>458</u>	<u>458</u>
6A	112.3	(Upland)	457	460	460
8	114.1	476	472	475	475
MSII	115.5	482	<u>484</u>	<u>488</u>	<u>490</u>
MSII	115.9	487	486	<u>490</u>	<u>494</u>
Curry	120.0	(Upland)	523	<u>524</u>	<u>528</u>
Moose	123.5	548	<u>549</u>	<u>552</u>	<u>555</u>
8A West	126.1	573	<u>571</u>	<u>575</u>	<u>574</u>
8A East	127.1	582	<u>583</u>	<u>585</u>	<u>584</u>
9	129.3	604	<u>606</u>	<u>607</u>	<u>607</u>
9 u/s	130.6	617	<u>620</u>	<u>621</u>	<u>622</u>
4th July	131.8	626	<u>629</u>	<u>633</u>	<u>634</u>
9A	133.7	651	<u>651</u>	<u>654</u>	<u>658</u>
10 u/s	134.3	657	<u>657</u>	<u>660</u>	<u>665</u>
11 d/s	135.3	667	<u>670</u>	<u>668</u>	<u>675</u>
11	136.5	687	<u>683</u>	<u>684</u>	<u>688</u>
17	139.3	(Upland)	---	715	715
20	140.5	730	---	729	729
21 (A6)	141.8	747	---	747	747
21	142.2	755	---	754	753
22	144.8	788	---	787	787
Ice Front Starting Date				12-28	12-12
Maximum Ice Front Extent (River Mile)				134	137
Melt-out Date				3-23	4-12

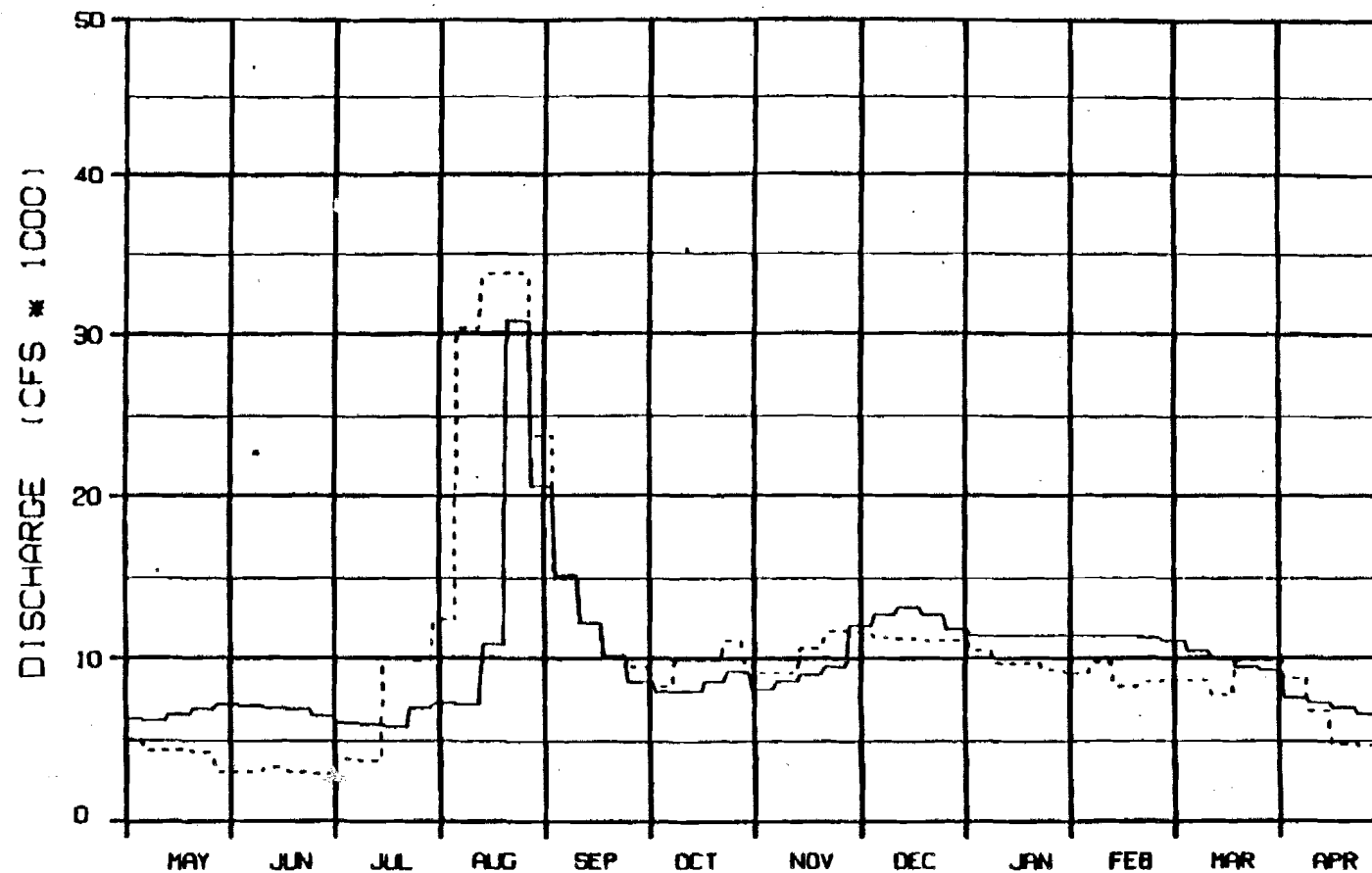
NOTES:

- 1 Indicates locations wher. maximum river stage equals or exceeds a known slough threshold elevation.
2. All river stages in feet.

SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED TOTAL ICE THICKNESS
 WATANA ONLY: 2001 ENERGY DEMAND
 FLOW CASE E-VI FLOWS, INFLOW-MATCHING
 WINTER 1981-82

STAGE 1

<u>Slough or Side Channel</u>	<u>River Mile</u>	<u>Threshold Elevation</u>	<u>Stage 1 FERC License Concept</u>	<u>Stage 1 Staged Construction Concept</u>
Whiskers	101.5	367	3	3
Gash Creek	112.0	453	2	3
6A	112.3	(Upland)	2	3
8	114.1	476	2	3
MSII	115.5	482	3	5
MSII	115.9	487	3	9
Curry	120.0	(Upland)	4	9
Moose	123.5	548	4	7
8A West	126.1	573	2	3
8A East	127.1	582	2	2
9	129.3	604	2	3
9 u/s	130.6	617	2	4
4th July	131.8	626	3	4
9A	133.7	651	2	8
10 u/s	134.3	657	2	9
11 d/s	135.3	667		7
11	136.5	687		3
17	139.3	(Upland)		
20	140.5	730		
21 (A6)	141.8	747		
21	142.2	755		
22	144.8	788		



LEGEND.

—— HIGH WATANA
 ---- STAGE 1 WATANA

WATANA DISCHARGES
 HIGH WATANA VS. STAGE 1
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2001 FLOWS : CASE E-VI
 OPERATING POLICY : INFLOW-MATCHING
 REFERENCE RUN NO. : WAB1011, WAB101L

OPTION?

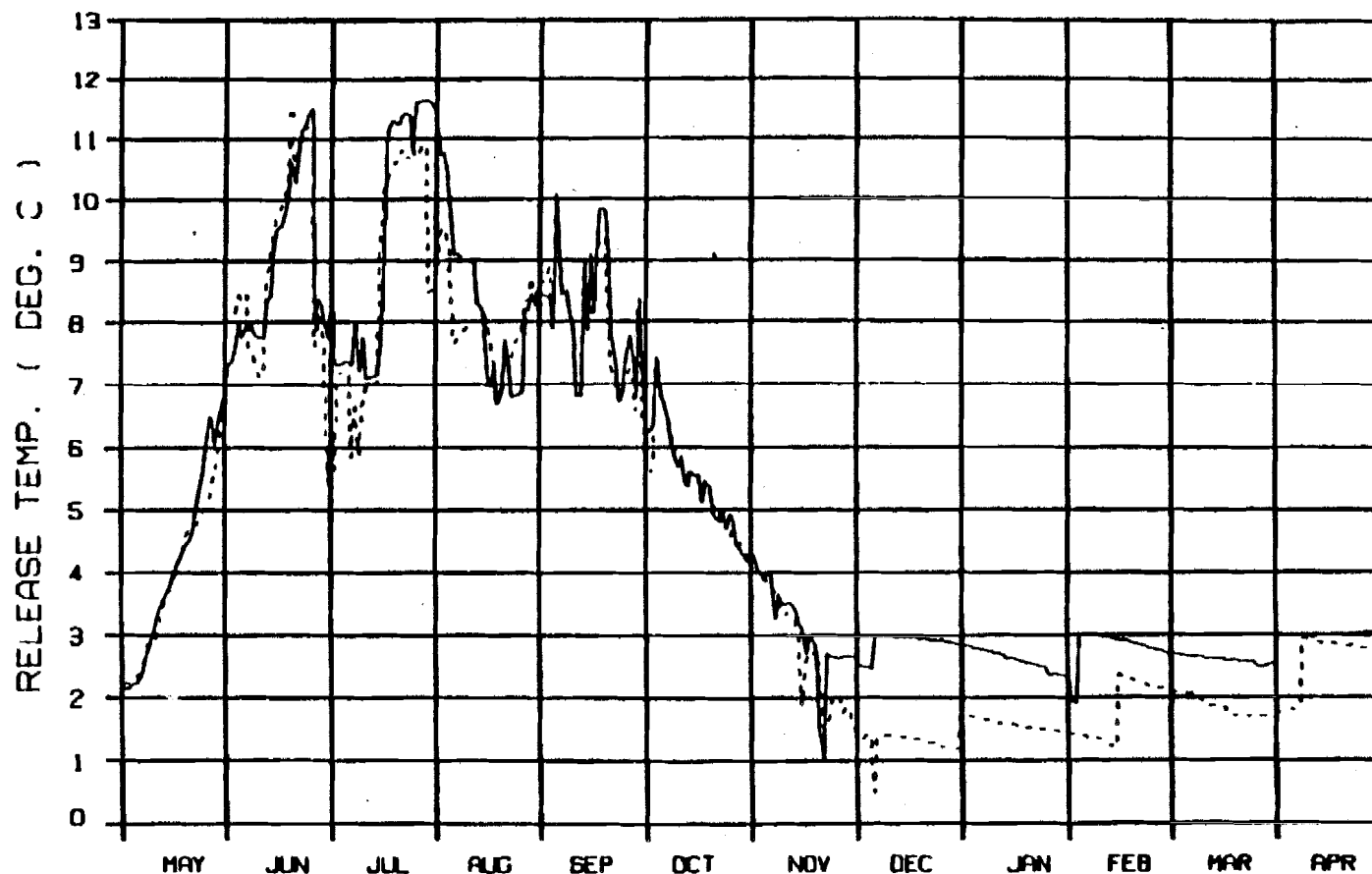
ALASKA POWER AUTHORITY

SUBMITTER PROJECT

WATANA RESERVOIR
 SIMULATED DISCHARGES
 HIGH DAM VS. STAGE 1

WARZA-EBASCO JOINT VENTURE

CHECKED: ALLIANCE FOR APP 88 1003.142



LEGEND:

—— HIGH WATANA
 - - - - STAGE I WATANA

WATANA RELEASE TEMPERATURES
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2001 FLOWS, CASE E-VI
 OPERATING POLICY : INFLOW-MATCHING
 HIGH WATANA VS. STAGE I
 REFERENCE RUN NO. : WAB1011, WAB101L

ALASKA POWER AUTHORITY

WATANA PROJECT

WATANA RESERVOIR
 SIMULATED RELEASE TEMPS
 HIGH DAM VS. STAGE I

WARZA-EBASCO JOINT VENTURE

DATE: 11/1/82 10:40 AM 1000.142

OPTION?

EXHIBIT 10

EXHIBIT 10

COMPARISONS OF RIVER ICE SIMULATIONS FOR STAGED
CONSTRUCTION, STAGE 2 AND LICENSE APPLICATION PROJECT,
PROJECTED ENERGY DEMANDS FOR 2002.

SUSITNA HYDROELECTRIC PROJECT
MAXIMUM SIMULATED RIVER STAGES
WINTER 1981-82
FLOW CASE E-VI, INFLOW-MATCHING
2002 ENERGY DEMANDS

STAGE 2

<u>Slough or Side Channel</u>	<u>River Mile</u>	<u>Threshold Elevation</u>	<u>Simulated Natural Conditions</u>	<u>Stage 2 FERC License Concept</u>	<u>Stage 2 Staged Construction Concept</u>
Whiskers	101.5	367	<u>368</u>	<u>369</u>	<u>370</u>
Gash Creek	112.0	453	<u>455</u>	<u>456</u>	<u>459</u>
6A	112.3	(Upland)	457	459	461
8	114.1	476	<u>472</u>	<u>476</u>	<u>476</u>
MSII	115.5	482	<u>484</u>	<u>485</u>	<u>487</u>
MSII	115.9	487	486	<u>488</u>	<u>490</u>
Curry	120.0	(Upland)	523	520	522
Moose	123.5	548	<u>549</u>	<u>548</u>	<u>553</u>
8A West	126.1	573	571	571	<u>573</u>
8A East	127.1	582	<u>583</u>	581	<u>584</u>
9	129.3	604	<u>606</u>	601	<u>606</u>
9 u/s	130.6	617	<u>620</u>	616	<u>619</u>
4th July	131.8	626	<u>629</u>	<u>627</u>	<u>630</u>
9A	133.7	651	<u>651</u>	649	649
10 u/s	134.3	657	<u>657</u>	655	655
11 d/s	135.3	667	<u>670</u>	<u>667</u>	<u>667</u>
11	136.5	687	683	682	682
17	139.3	(Upland)	-	714	714
20	140.5	730	-	728	728
21 (A6)	141.8	747	-	746	746
21	142.2	755	-	752	752
22	144.8	788	-	785	785
LRX-3 Ice Front Starting Date				12-30	12-29
Maximum Ice Front Extent (River Mile)				126	133
Melt-out Date				3-19	4-1

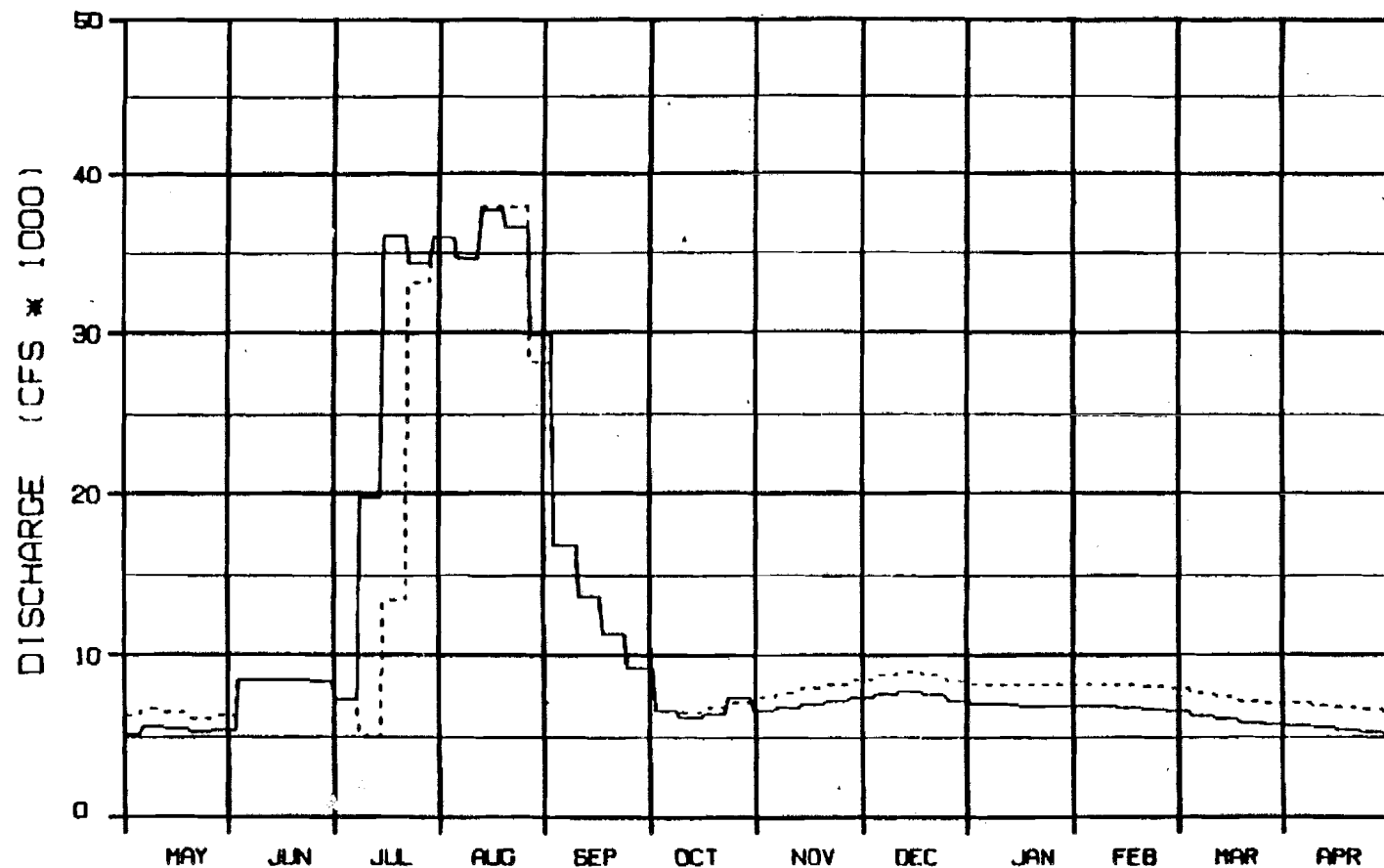
NOTES:

1. Indicates locations where maximum river stage equals or exceeds a known slough threshold elevation.
2. All river stages in feet.

SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED RIVER STAGES
 WINTER 1981-82
 FLOW CASE E-VI, INFLOW-MATCHING
 2002 ENERGY DEMANDS

STAGE 2

<u>Slough or Side Channel</u>	<u>River Mile</u>	<u>Threshold Elevation</u>	<u>Stage 2 FERC License Concept</u>	<u>Stage 2 Staged Construction Concept</u>
Whiskers	101.5	367	3	3
Gash Creek	112.0	453	3	5
6A	112.3	(Upland)	4	5
8	114.1	476	4	3
MSII	115.5	482	3	4
MSII	115.9	487	4	6
Curry	120.0	(Upland)	1	3
Moose	123.5	548	3	7
8A West	126.1	573	1	3
8A East	127.1	582		2
9	129.3	604		3
9 u/s	130.6	617		2
4th July	131.8	626		2
9A	133.7	651		
10 u/s	134.3	657		
11 d/s	135.3	667		
11	136.5	687		
17	139.3	(Upland)		
20	140.5	730		
21 (A6)	141.8	747		
21	142.2	755		
22	144.8	788		



LEGEND:

———— D.C. WITH HIGH WATANA
 - - - - - D.C. WITH STAGE 1 WATANA

DEVIL CANYON DISCHARGES
 HIGH WATANA VS. STAGE 1 WATANA
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOW CASE : E-VI
 OPERATING POLICY : INFLOW-MATCHING
 3 INTAKE LEVELS, 50 FT DRAWDOWN AT D.C.
 REFERENCE RUN NO. - DC8102L, DC8102Q

OPTION?

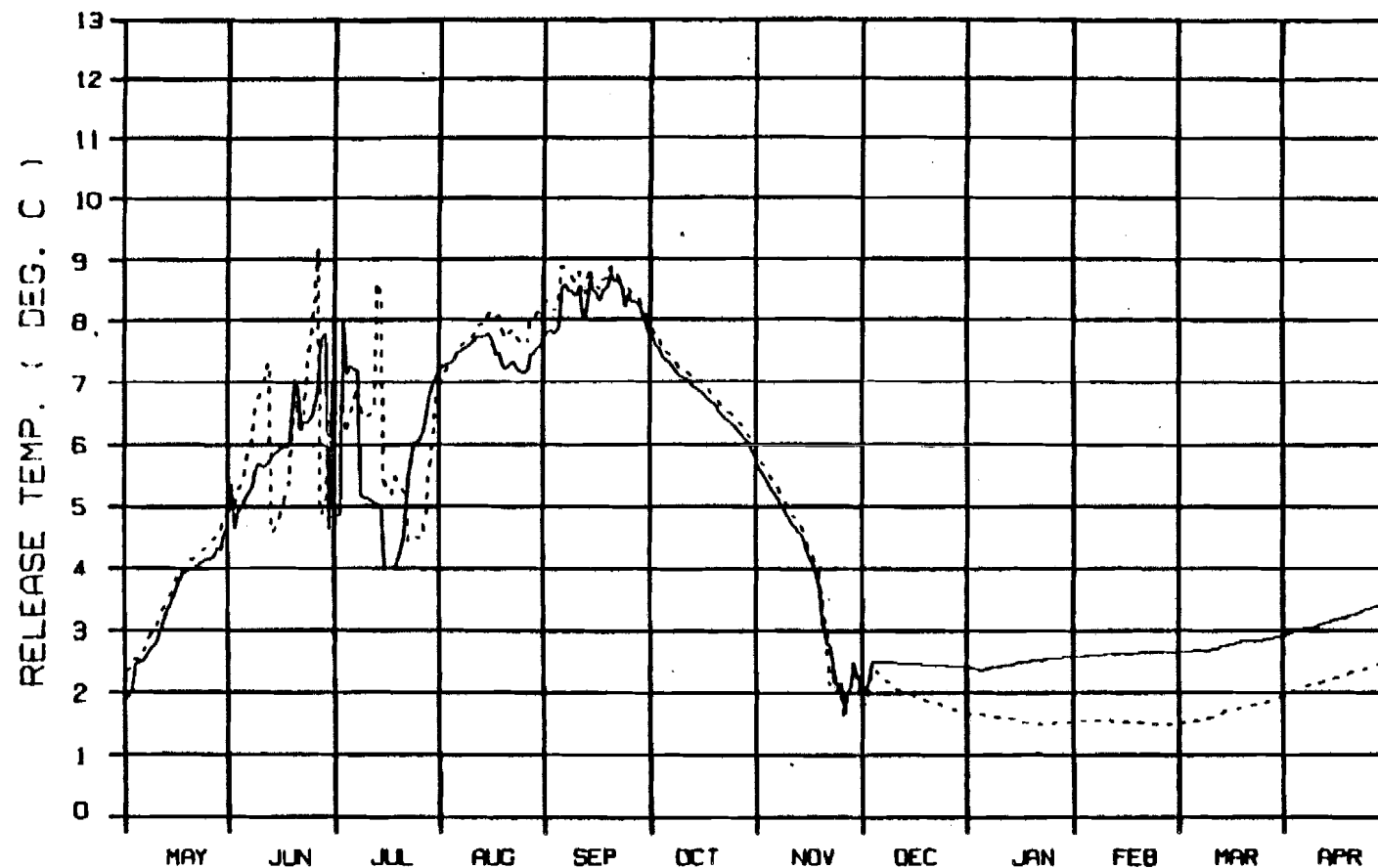
ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DEVIL CANYON RESERVOIR
 SIMULATED DISCHARGES
 HIGH WATANA VS. STAGE 1

HARZA-EBASCO JOINT VENTURE

DISCHARGE, ILLINOIS 18 APR 82 1543.142



LEGEND:

—— D.C. WITH HIGH NATANA
 - - - D.C. WITH STAGE 1 NATANA

DEVIL CANYON RELEASE TEMPERATURES
 HIGH NATANA VS. STAGE 1 NATANA
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOWS, CASE E-VI
 OPERATING POLICY : INFLOW-MATCHING
 3 INTAKE LEVELS, 50 FT DRAWDOWN AT D.C.
 REFERENCE RUN NO. : DC8102L, DC81020

OPTION?

ALASKA POWER AUTHORITY

SUBMITTA PROJECT

DEVIL CANYON RESERVOIR
 SIMULATED RELEASE TEMPS
 HIGH NATANA VS. STAGE 1

WARZA-EBASCO JOINT VENTURE

CHIEF: T. L. HART 18 APR 82 1503-142

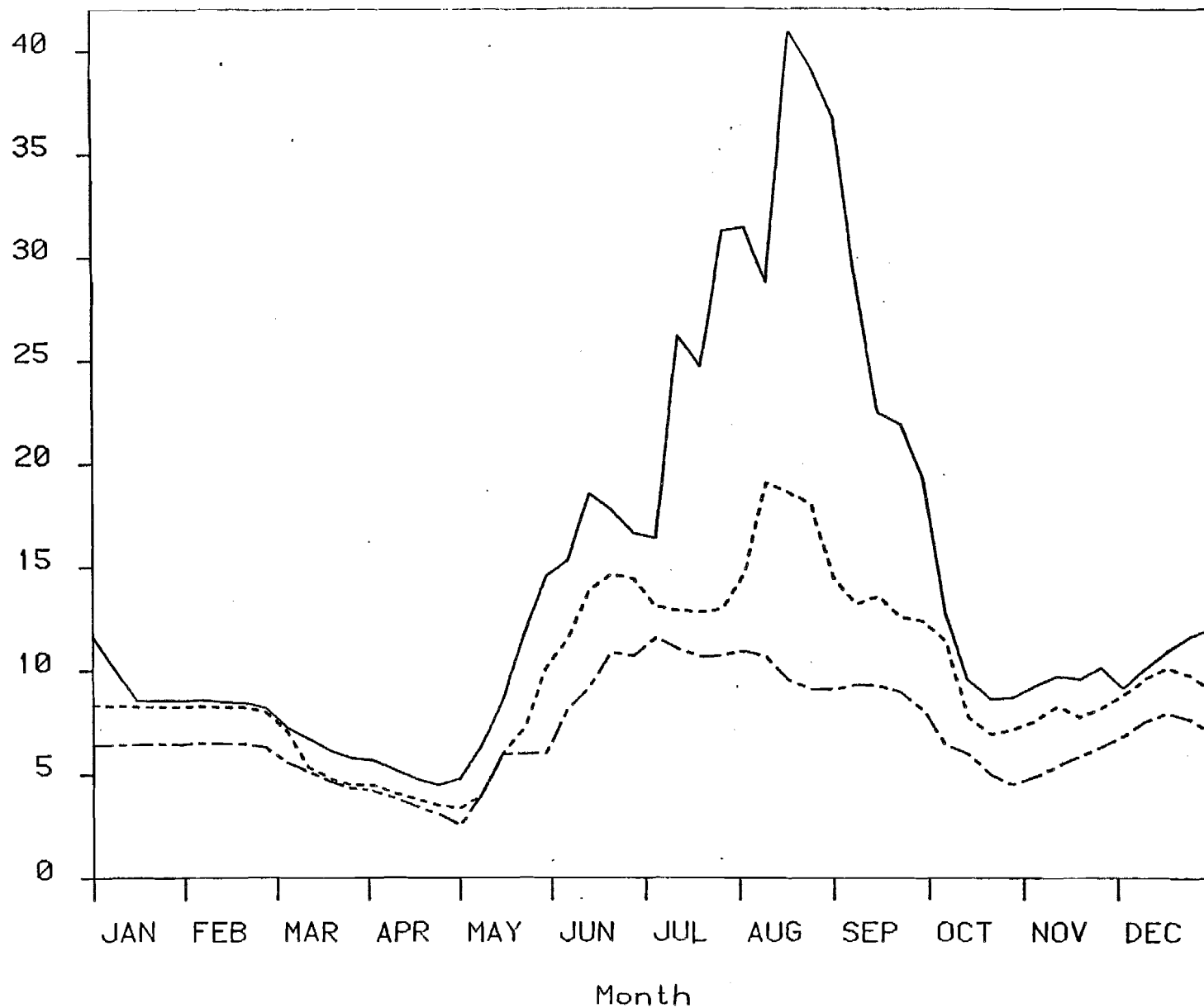
EXHIBIT 11

EXHIBIT 11

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR LICENSE APPLICATION PROJECT
AND STAGED CONSTRUCTION CONCEPT FOR 1996 ENERGY DEMANDS
(STAGE 1)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 1996
4. E-VI FLOW REQUIREMENTS

LEGEND

- 6% EXCEEDENCE FLOWS
- - - 50% EXCEEDENCE FLOWS
- ... 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 6%, 50% AND 97% OF THE TIME AT GOLD CREEK	
DATE: 08/08/96	BY: J. H. HARRIS
REVISION: 02/08/96	DATE: 02/08/96

THOUSANDS

25

20

15

10

5

0

E-VI MAXIMUM FLOW
REQUIREMENTS

MAXIMUM FLOW=35,000 cfs

E-VI MINIMUM FLOW
REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 1996
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

SUSITNA RIVER STREAMFLOWS
EXCEEDED
97% OF THE TIME
AT GOLD CREEK

WATER-RESOURCES
DIVISION
ANCHORAGE, ALASKA

APPROVED

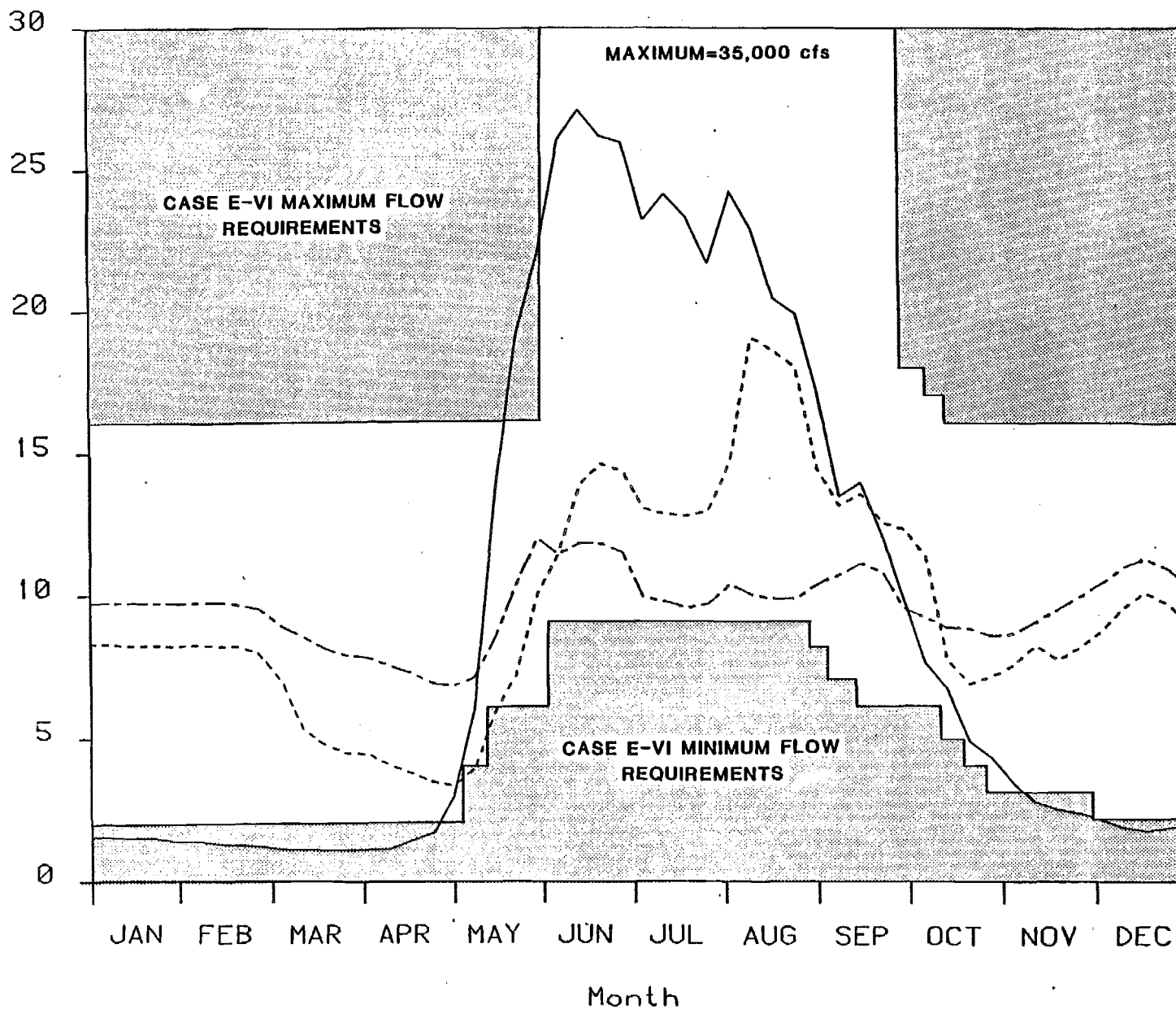
DATE

REVIEWED

DATE

Discharge in cfs

THOUSANDS



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 1996
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- · · FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY	
SUSTNA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 80% OF THE TIME AT GOLD CREEK	
REVIEWED BY: DATE:	APPROVED BY: DATE:

Discharges

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 1996
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
SUSITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK		
DATE: 08/08/00	BY: J. J. J.	REVIEWED BY: J. J. J.
APPROVED: J. J. J.	DATE: 08/08/00	REVIEWED: J. J. J.

EXHIBIT 12

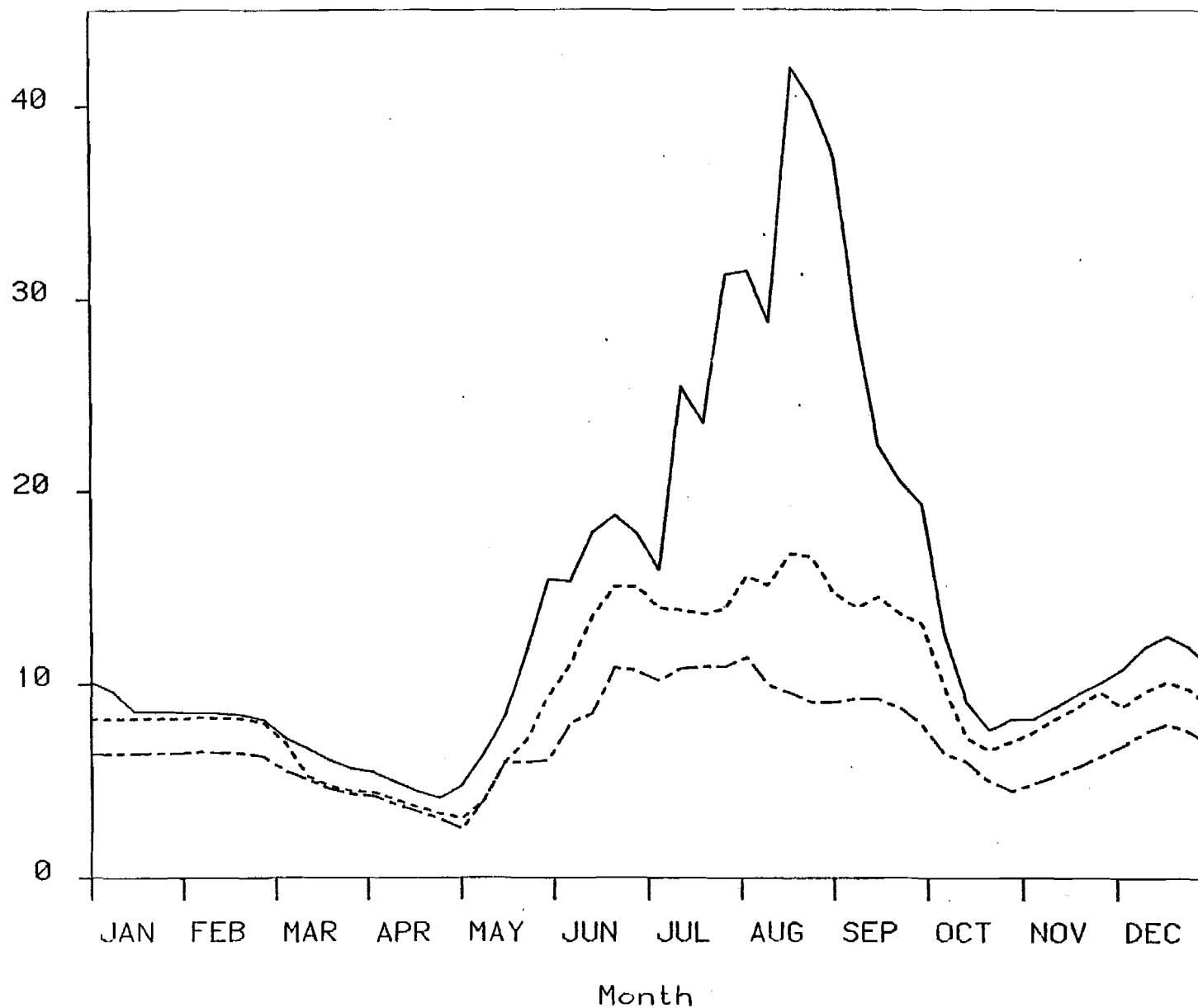
EXHIBIT 12

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR LICENSE APPLICATION PROJECT
AND STAGED CONSTRUCTION CONCEPT FOR 2001 ENERGY DEMANDS
(STAGE 1)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS

Discharge in cfs



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 2001
4. E-VI FLOW REQUIREMENTS

LEGEND

- 6% EXCEEDENCE FLOWS
- - - 50% EXCEEDENCE FLOWS
- · - 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 6%, 50% AND 97% OF THE TIME AT GOLD CREEK	
AREA - WASHO	DATE
APPROVED, ALASKA	APPROVED, ALASKA

THOUSANDS

25

20

15

10

5

0

E-VI MAXIMUM FLOW
REQUIREMENTS

MAXIMUM FLOW=35,000 cfs

E-VI MINIMUM FLOW
REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 2001
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK	
BARZA-THORNDYKE	DATE
REVISIONS, IF ANY	DATE

Discharge in cfs

THOUSANDS

30

25

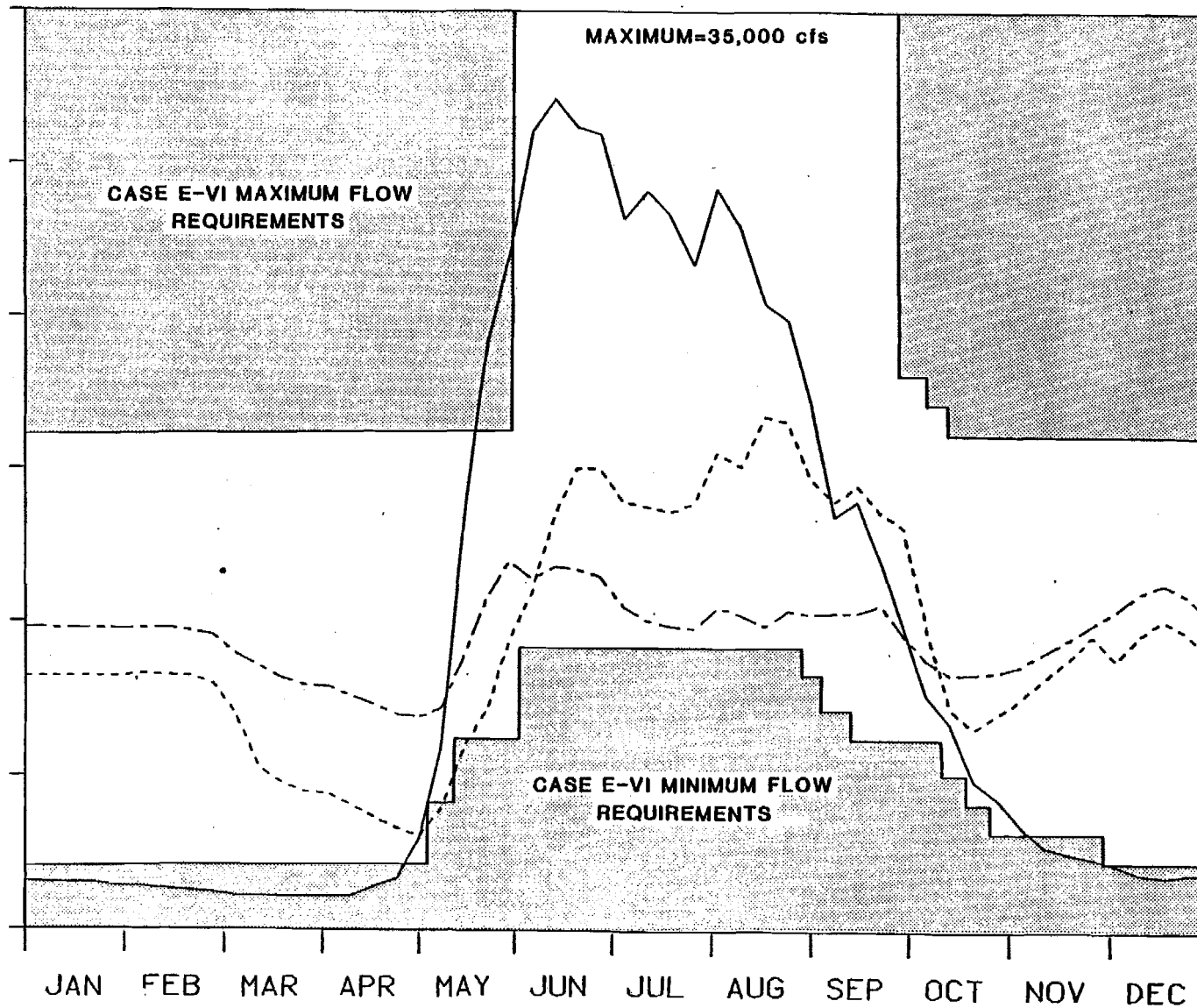
20

15

10

5

0



Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 2001
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- ... FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY	
SUBITNA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
BARRETT-BRADDO SUSTAINMENT DIVISION	DATE
RESPONSE, B.A.A.	REVISION NO.

Discharge in cfs

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 1
3. PROJECTED ENERGY DEMANDS FOR 2001
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 1

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 5% OF THE TIME AT GOLD CREEK	
BARBARA L. BRADDOCK SUSITNA RIVER PROJECT	APPROVED
APPROVED, 12 MAR 88	DATE

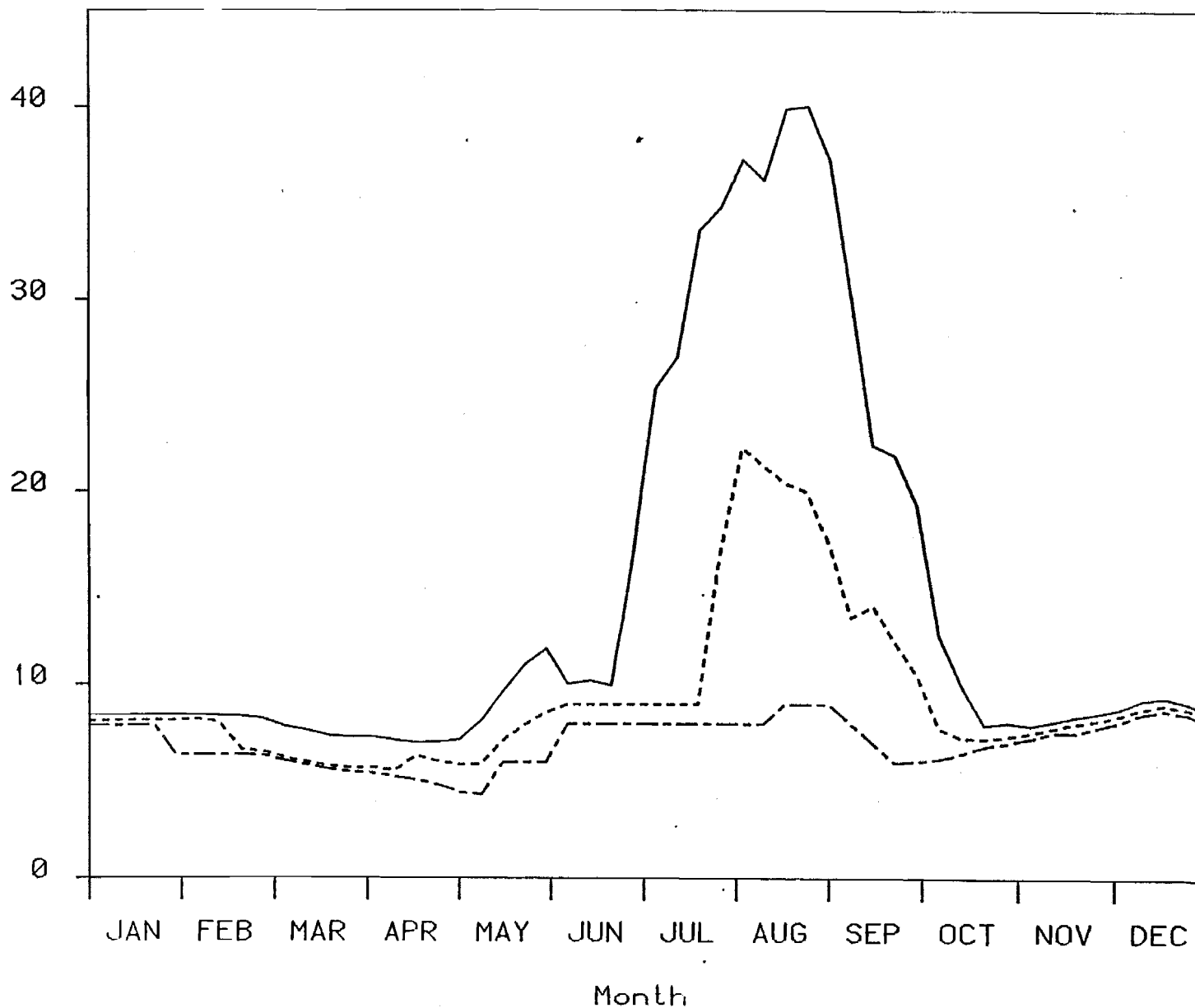
EXHIBIT 13

EXHIBIT 13

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR STAGED CONSTRUCTION CONCEPT
FOR 2002 ENERGY DEMANDS (STAGE 2)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2002
4. E-VI FLOW REQUIREMENTS

LEGEND

- 6% EXCEEDENCE FLOWS
- - - 50% EXCEEDENCE FLOWS
- . - 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
SUSITNA RIVER STREAMFLOWS EXCEEDED 6%, 50% AND 97% OF THE TIME AT GOLD CREEK		
DATE: 10/1/83	BY: J. H. HARRIS	REVIEWED BY: J. H. HARRIS

Discharge in cfs

THOUSANDS

25

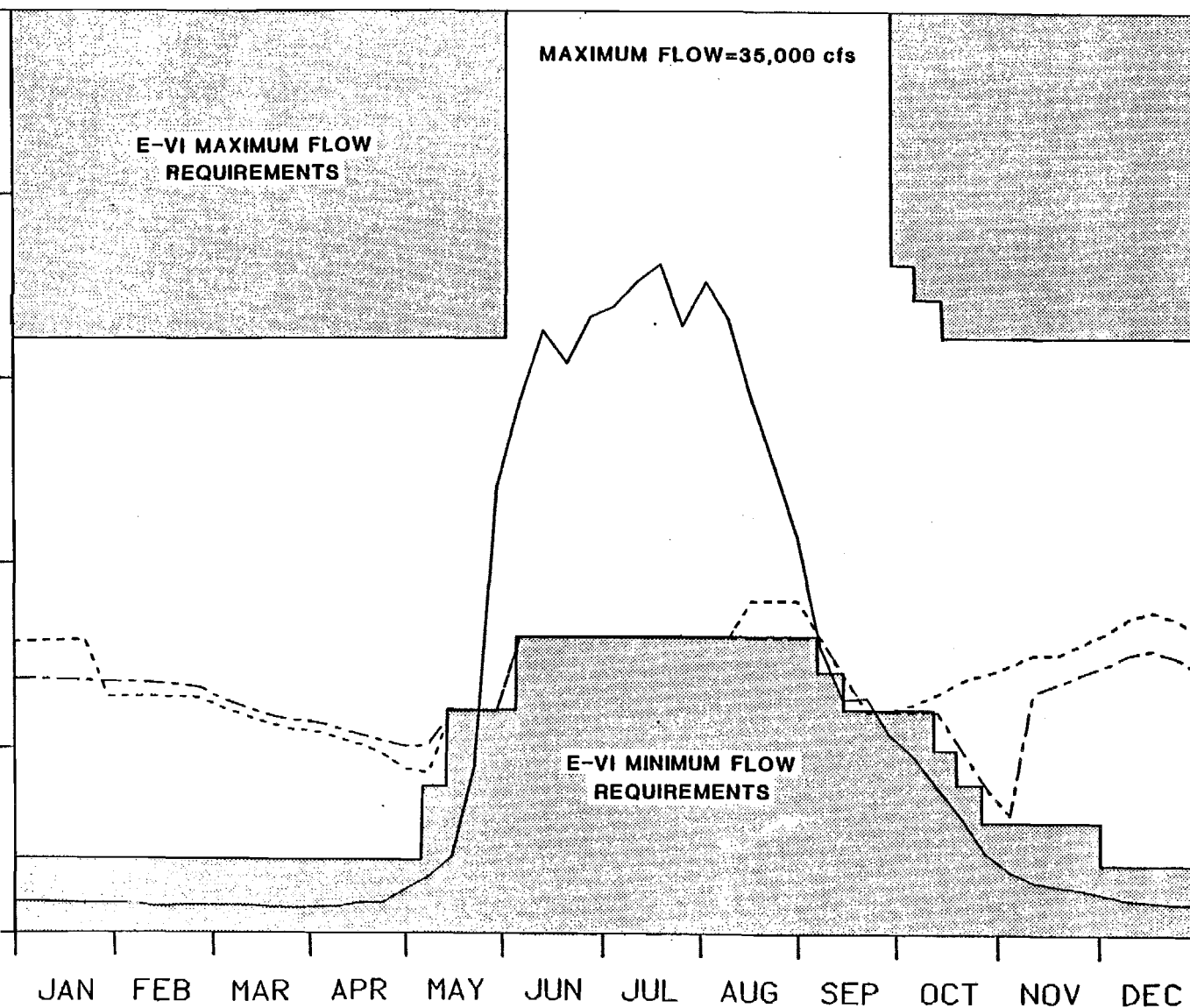
20

15

10

5

0



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2002
4. E-VI FLOW REQUIREMENTS
5. DEVIL CANYON DRAWDOWN OF 50 FEET

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 2

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

**SUSITNA RIVER STREAMFLOWS
EXCEEDED
97% OF THE TIME
AT GOLD CREEK**

DATE: 10/1/02	BY: J. H. HARRIS	FOR: A. J. HARRIS
REVISION: 1.0	DATE: 10/1/02	BY: J. H. HARRIS

Discharge (cfs)

THOUSANDS

30

25

20

15

10

5

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

MAXIMUM=35,000 cfs

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2002
4. E-VI FLOW REQUIREMENTS
5. DEVIL CANYON DRAWDOWN OF 50 FEET

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 2

ALASKA POWER AUTHORITY	
SUSTINA HYDROELECTRIC PROJECT	
SUSTINA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
BARBARA BRADDOCK SUSTINA RIVER PROJECT	APPROVED BY DATE
APPROVED BY DATE	DATE

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2002
4. E-VI FLOW REQUIREMENTS
5. DEVIL CANYON DRAWDOWN OF 50 FEET

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK	
TABLE 1-1	APPENDIX
DATE: 11/11/84	DATE: 11/11/84

EXHIBIT 14

EXHIBIT 14

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR STAGED CONSTRUCTION CONCEPT
FOR 2007 ENERGY DEMANDS (STAGE 2)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS

40

35

30

25

20

15

10

5

0

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Months

NOTES:

1. HYDROLOGICAL DATA
FROM PERIOD 1950-1983

2. STAGED CONSTRUCTION
STAGE 2

3. PROJECTED ENERGY
DEMANDS FOR 2007

4. E-VI FLOW REQUIREMENTS

LEGEND

— 6% EXCEEDENCE FLOWS

- - - 50% EXCEEDENCE FLOWS

- - - 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY

SUBITNA HYDROELECTRIC PROJECT

SUBITNA RIVER STREAMFLOWS
EXCEEDED 6%, 50% AND 97%
OF THE TIME AT GOLD CREEK

HARVEY BRADDO

SENIOR CIVIL ENGINEER

ANCHORAGE, ALASKA

DATE

10/1/07

PROJECT NO.

100000000

THOUSANDS

25

20

15

10

5

0

E-VI MAXIMUM FLOW
REQUIREMENTS

MAXIMUM FLOW=35,000 cfs

E-VI MINIMUM FLOW
REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK	
DATE: 10/1/00	BY: J. J. J.
APPROVED: J. J. J.	DATE: 10/1/00

D
i
s
c
h
a
r
g
e
i
n
g
s

THOUSANDS

25

20

15

10

5

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

MAXIMUM FLOW=35,000 cfs

E-VI MAXIMUM FLOW
REQUIREMENTS

E-VI MINIMUM FLOW
REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
BUSITNA HYDROELECTRIC PROJECT	
BUSITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK	
AREA-38400	DATE
WATERWAY, ALASKA	WATERWAY, ALASKA

Discharge in cfs

THOUSANDS

30

25

20

15

10

5

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

MAXIMUM=35,000 cfs

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

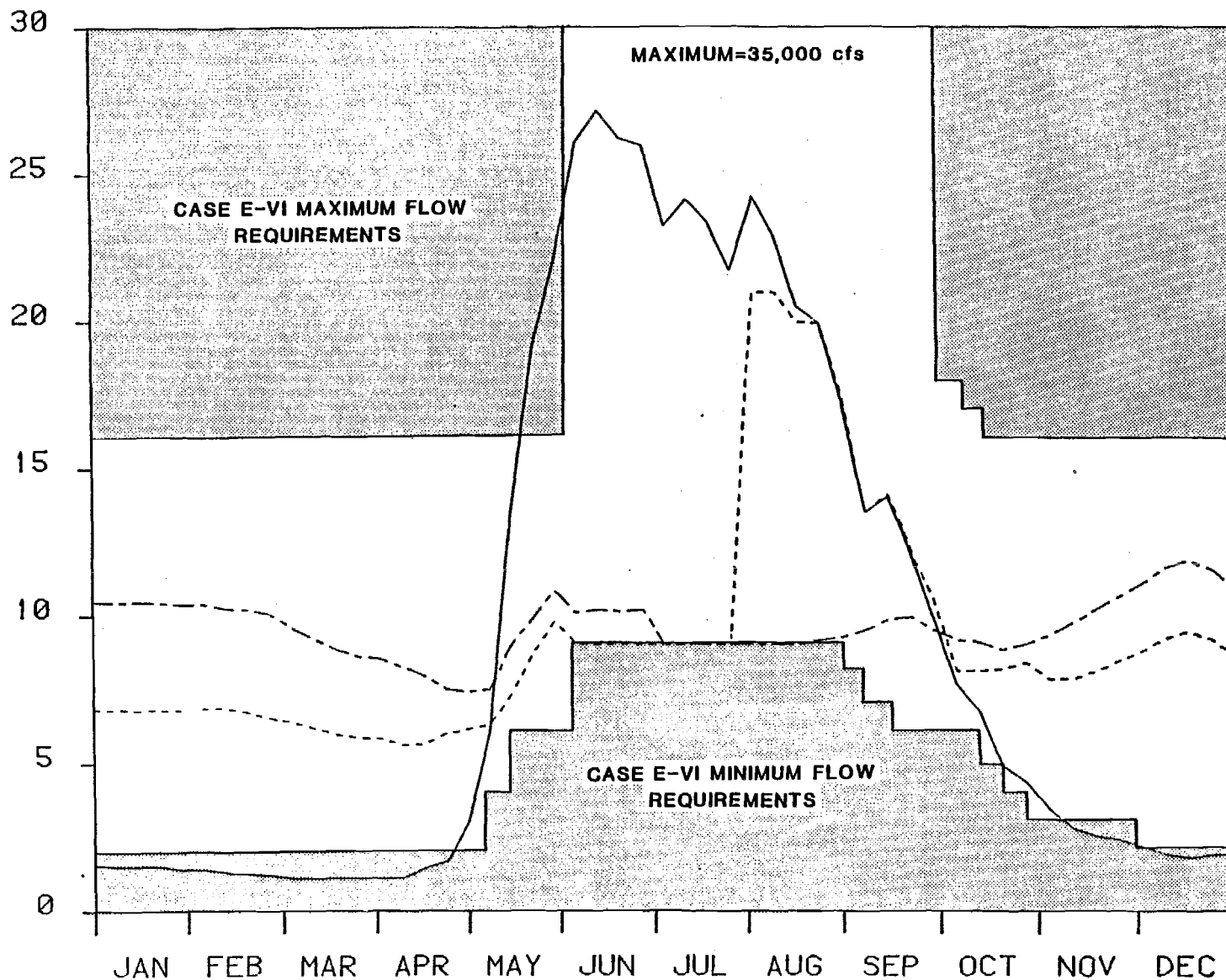
LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
BUSITNA HYDROELECTRIC PROJECT	
BUSITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
ANALYST: [blank]	DATE: [blank]
APPROVED BY: [blank]	DATE: [blank]

Discharge in cfs

THOUSANDS



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- · · FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
SUSITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK		
DATE: 10/1/88	BY: J. H. HARRIS	REVIEWED BY: J. H. HARRIS

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUBITNA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK	
BARRE-GRAND	2007
BARRE-GRAND	2007

D
i
s
c
h
a
r
g
e
i
n
c
f
s

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW
REQUIREMENTS

CASE E-VI MINIMUM FLOW
REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 2
3. PROJECTED ENERGY DEMANDS FOR 2007
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2007 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK	
NAME: BRADDO	DATE: 10/1/03
REVIEWER: G. JAMES	DATE: 10/1/03

EXHIBIT 15

EXHIBIT 15

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR LICENSE APPLICATION PROJECT
AND STAGED CONSTRUCTION CONCEPT FOR 2008 ENERGY DEMANDS
(Stage 3)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS

40

35

30

25

20

15

10

5

0

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Months

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- 6% EXCEEDENCE FLOWS
- - - 50% EXCEEDENCE FLOWS
- - - 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

SUSITNA RIVER STREAMFLOWS
EXCEEDED 6%, 50% AND 97%
OF THE TIME AT GOLD CREEK

AREA-00000

DATE AND LOCATION

REVISIONS, IF ANY

DATE

BY

DATE

BY

Discharge in cfs

THOUSANDS

25

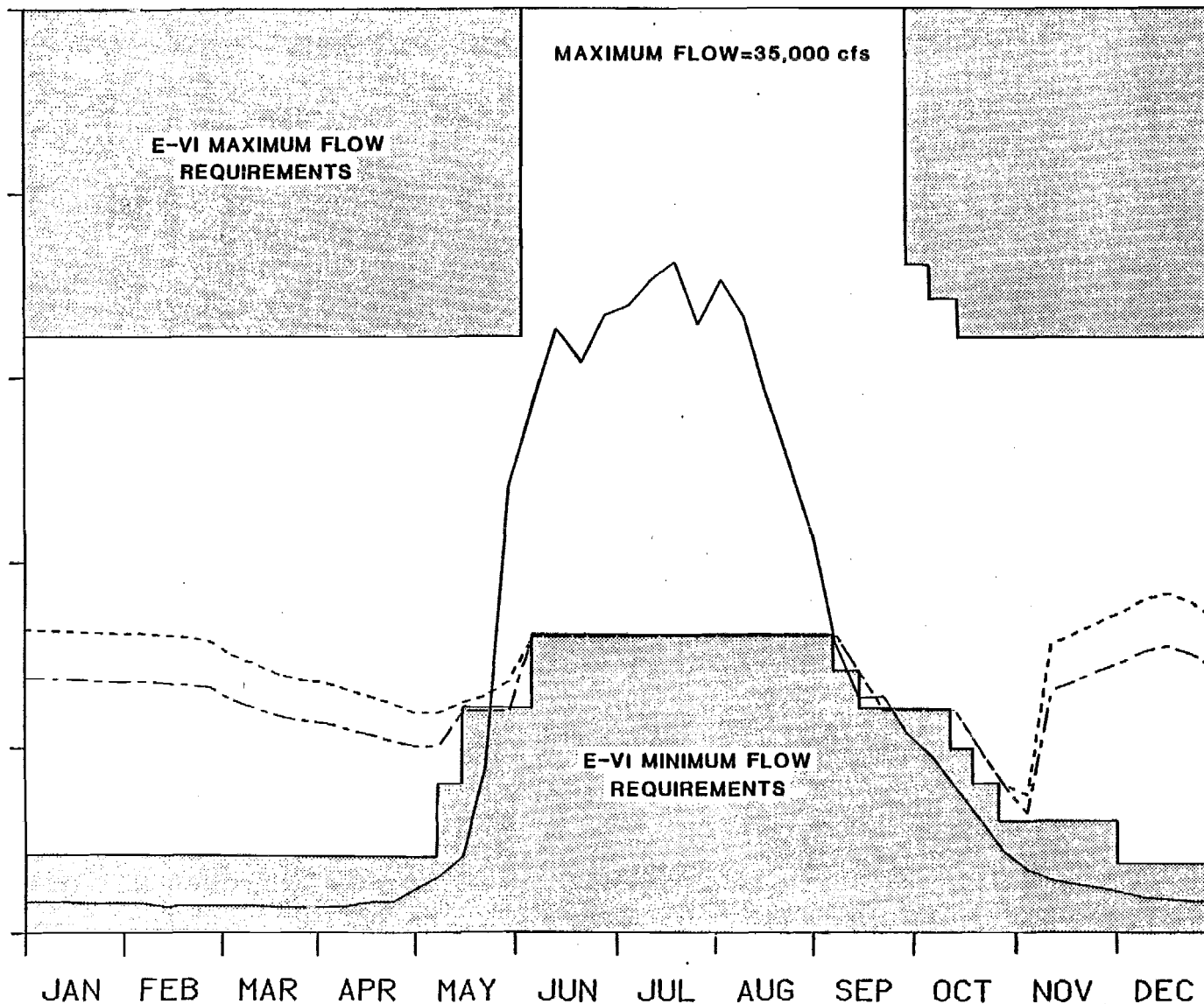
20

15

10

5

0



MAXIMUM FLOW=35,000 cfs

E-VI MAXIMUM FLOW REQUIREMENTS

E-VI MINIMUM FLOW REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- FLOWS FOR LICENSE APPLICATION PROJECT (2008 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK	
ANALYST: [blank]	DATE: [blank]
REVIEWER: [blank]	DATE: [blank]

Months

THOUSANDS

25

20

15

10

5

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

MAXIMUM FLOW=35,000 cfs

E-VI MAXIMUM FLOW REQUIREMENTS

E-VI MINIMUM FLOW REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2008 ENERGY DEMANDS)

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

SUSITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK

DATE: 11/11/08	BY: [Signature]	FOR: [Signature]
FARMINGTON, ALASKA		

Months

D
i
s
t
r
i
b
u
t
i
o
n

Discharge in cfs

THOUSANDS

30

25

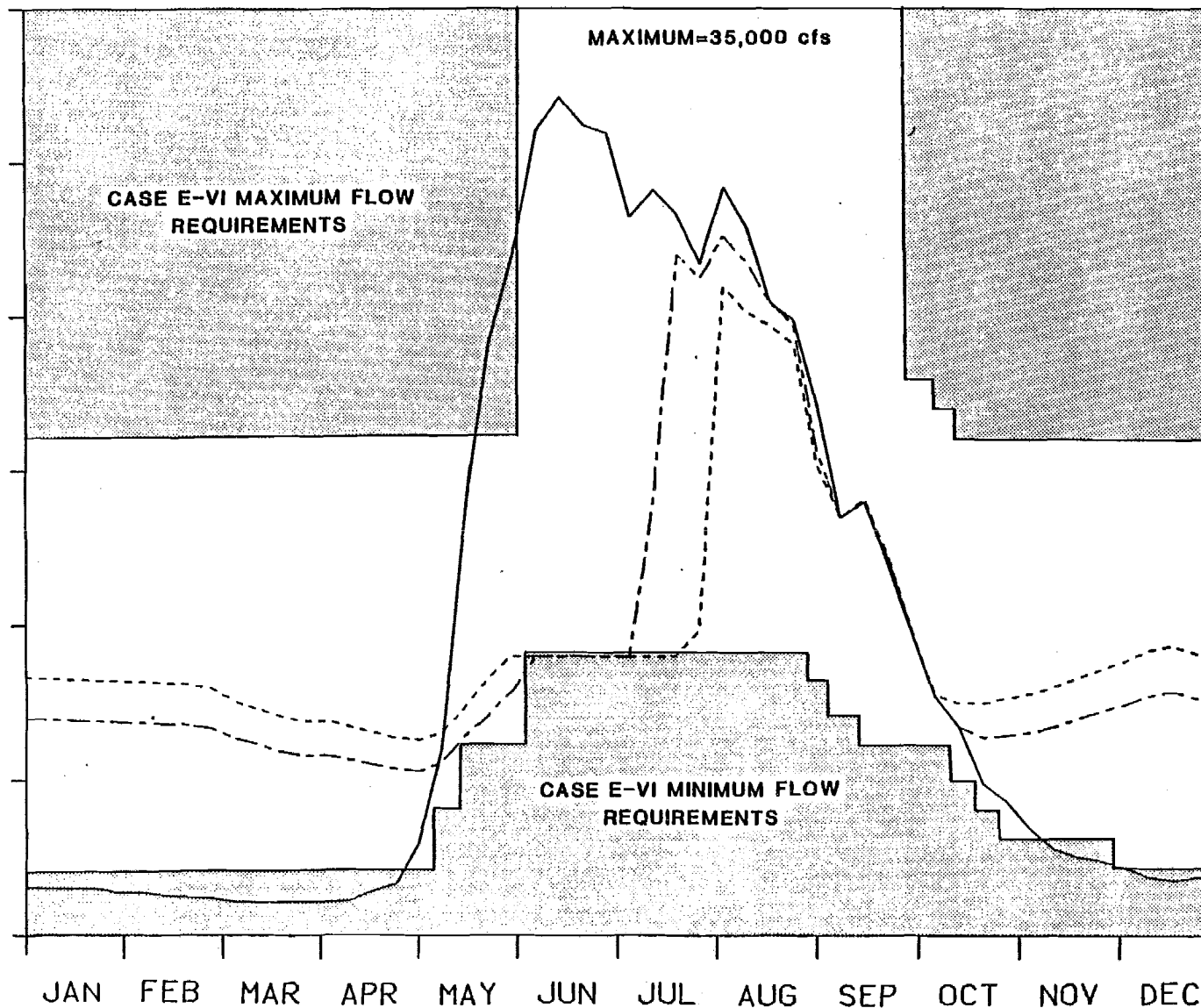
20

15

10

5

0



MAXIMUM=35,000 cfs

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

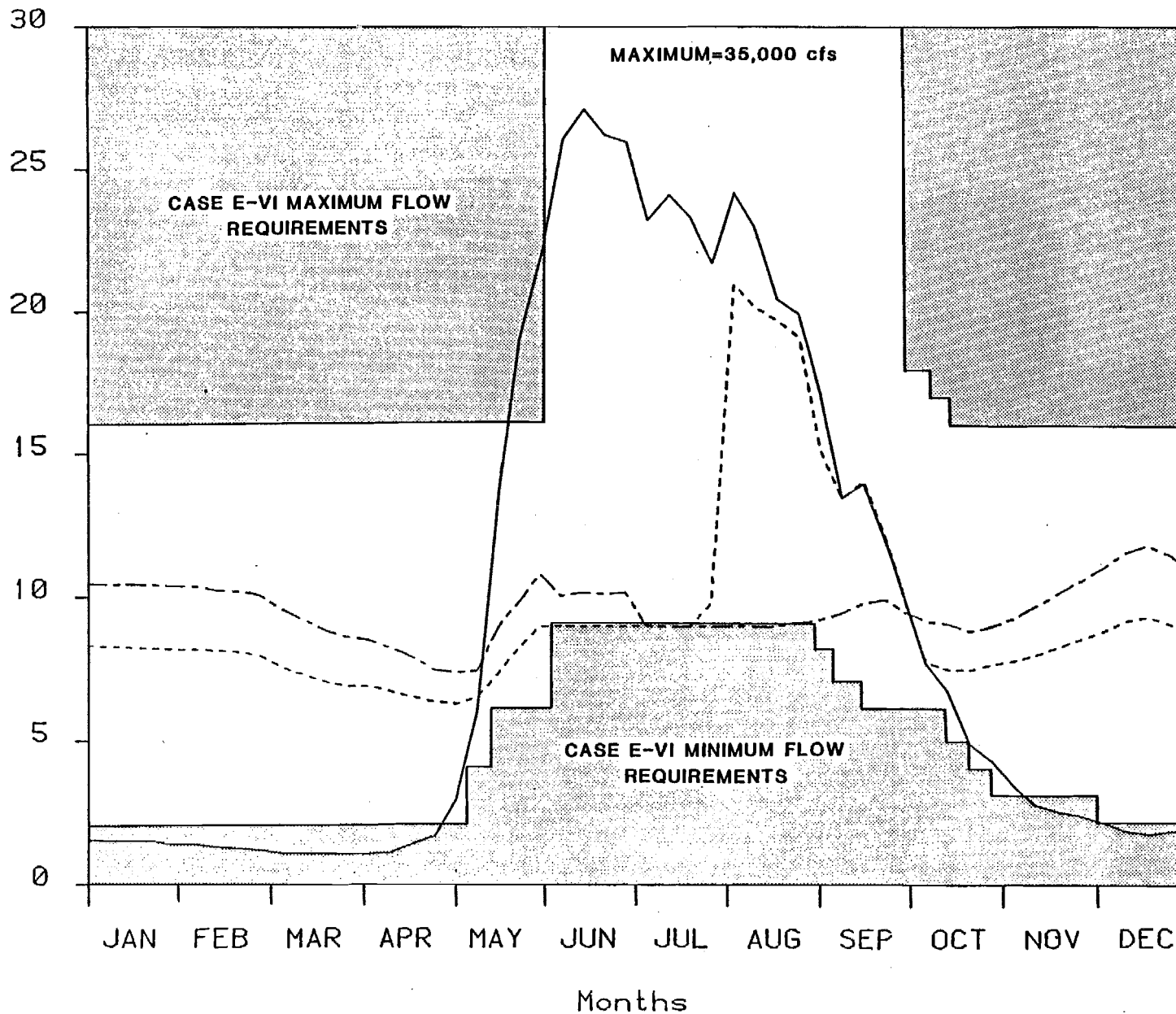
LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- ... FLOWS FOR STAGED CONSTRUCTION (2008 ENERGY DEMANDS)

Months

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
DATE: 10/1/00	BY: J. H. HARRIS
REVISION: 0.1	DATE: 10/1/00

THOUSANDS



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- ... FLOWS FOR STAGED CONSTRUCTION (2008 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
HARRIS-SOLANO SUSITNA RIVER PROJECT	APPROVED
RECOMMENDED, 2008	DATE
	APPROVED BY

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2002 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2008 ENERGY DEMANDS)

ALASKA POWER AUTHORITY	
SUBITNA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 8% OF THE TIME AT GOLD CREEK	
NAME: [REDACTED]	DATE: [REDACTED]
APPROVED: [REDACTED]	DATE: [REDACTED]

Discharge in cfs

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Months

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2008
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT (2020 ENERGY DEMANDS)
- - - FLOWS FOR STAGED CONSTRUCTION (2008 ENERGY DEMANDS)

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
SUSITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK		
MANAGE-DESIGNED	APPROVED	
DATE	DATE	DATE

EXHIBIT 16

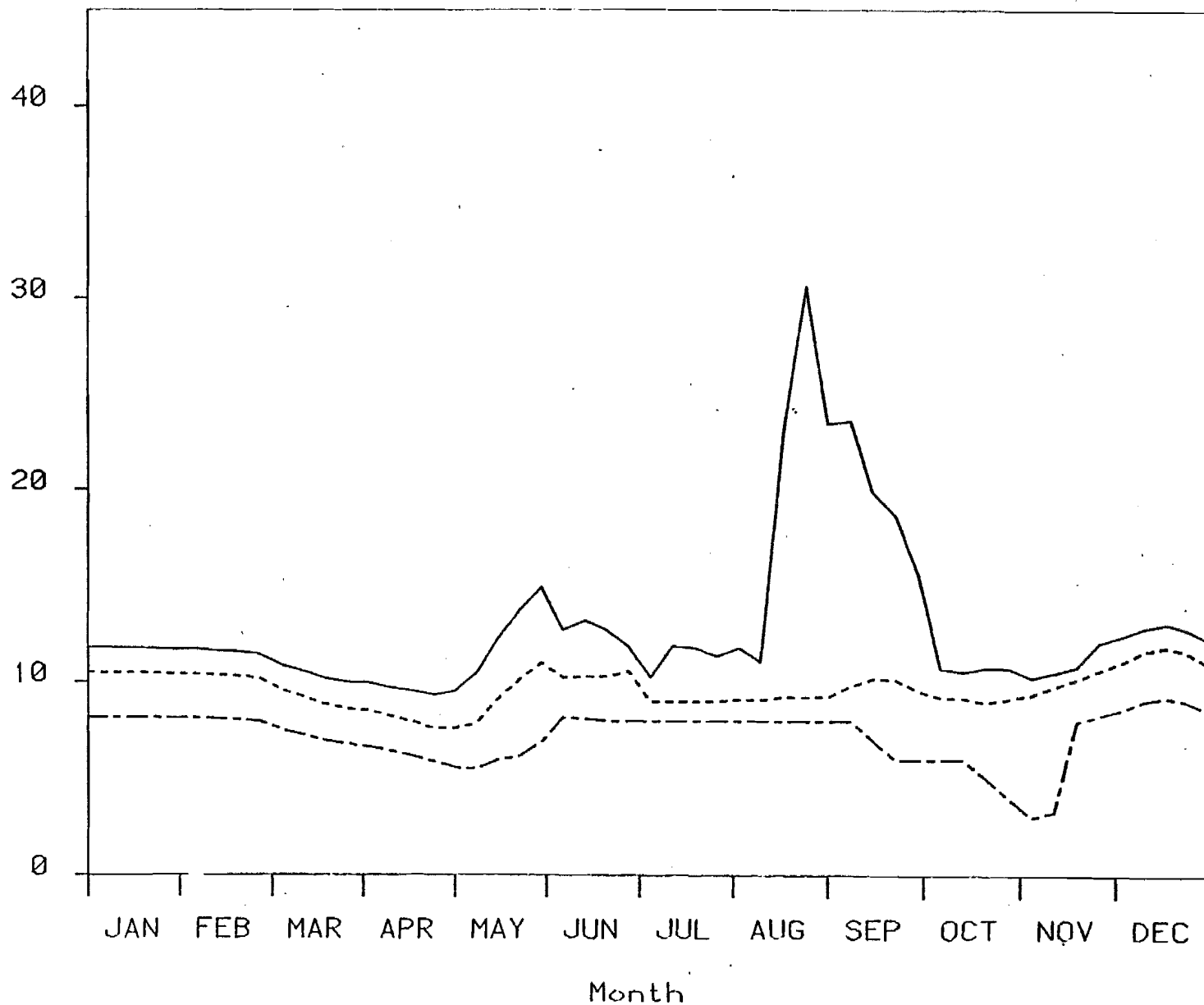
EXHIBIT 16

COMPARISONS OF SUSITNA RIVER STREAMFLOWS AT GOLD CREEK
FOR NATURAL CONDITIONS FOR LICENSE APPLICATION PROJECT
AND STAGED CONSTRUCTION CONCEPT FOR 2020 ENERGY DEMANDS
(STAGE 3)

- a. 97% exceedance level flows
- b. 50% exceedance level flows
- c. 6% exceedance level flows

THOUSANDS

Discharges in cfs



NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2020
4. E-VI FLOW REQUIREMENTS

LEGEND

- 6% EXCEEDENCE FLOWS
- - - 50% EXCEEDENCE FLOWS
- . - 97% EXCEEDENCE FLOWS

ALASKA POWER AUTHORITY	
SUSTINA HYDROELECTRIC PROJECT	
SUBITNA RIVER STREAMFLOWS EXCEEDED 6%, 50% AND 97% OF THE TIME AT GOLD CREEK	
BARBARA J. CHANDLER Hydro. Engr. License No. 1000	APPROVED DATE
ENGINEER-IN-CHARGE AL. REG. NO.	APPROVED BY DATE

THOUSANDS

25

20

15

10

5

0

E-VI MAXIMUM FLOW
REQUIREMENTS

MAXIMUM FLOW=35,000 cfs

E-VI MINIMUM FLOW
REQUIREMENTS

LINES ARE COINCIDENT FOR
STAGED CONSTRUCTION
AND LICENSE APPLICATION
PROJECT

NOTES:

1. HYDROLOGICAL DATA
FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION
STAGE 3
3. PROJECTED ENERGY
DEMANDS FOR 2020
4. E-VI FLOW REQUIREMENTS

LEGEND

- SIMULATED NATURAL
TEMPERATURES
- - - SIMULATED TEMPERATURES
LICENSE APPLICATION
PROJECT
- - - SIMULATED TEMPERATURES
STAGE 1 OF STAGED
CONSTRUCTION

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Month

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 97% OF THE TIME AT GOLD CREEK	
WATER YEAR 1984-1985	PERIOD JULY 1 - JUNE 30
DATE JULY 1, 1985	BY JULY 1, 1985

Discharge in cfs

THOUSANDS

30

25

20

15

10

5

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

MAXIMUM=35,000 cfs

CASE E-VI MINIMUM FLOW REQUIREMENTS

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2020
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 3

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 50% OF THE TIME AT GOLD CREEK	
MADELA-BRANDS DATE: 10/1/84	APPROVED: 10/1/84

THOUSANDS

60

50

40

30

20

10

0

CASE E-VI MAXIMUM FLOW REQUIREMENTS

CASE E-VI MINIMUM FLOW REQUIREMENTS

LINE ARE COINCIDENT FOR LICENSE APPLICATION PROJECT AND STAGED CONSTRUCTION

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

NOTES:

1. HYDROLOGICAL DATA FROM PERIOD 1950-1983
2. STAGED CONSTRUCTION STAGE 3
3. PROJECTED ENERGY DEMANDS FOR 2020
4. E-VI FLOW REQUIREMENTS

LEGEND

- NATURAL CONDITION
- - - FLOWS FOR LICENSE APPLICATION PROJECT
- - - FLOWS FOR STAGED CONSTRUCTION STAGE 3

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
SUSITNA RIVER STREAMFLOWS EXCEEDED 6% OF THE TIME AT GOLD CREEK	
DATE: 10/1/83	BY: J. H. HARRIS
REVIEWED: 10/1/83	BY: J. H. HARRIS

EXHIBIT 17

EXHIBIT 17

COMPARISONS OF SUSITNA RIVER STREAMFLOWS
AT GOLD CREEK FOR NATURAL CONDITIONS,
FOR THE LICENSE APPLICATION PROJECT
AND FOR STAGED CONSTRUCTION FOR
PROJECTED ENERGY DEMANDS FOR 2001 FOR
HYDROLOGICAL CONDITIONS FOR:

- a. 1964
- b. 1967
- c. 1970
- d. 1981
- e. 1982

D
i
s
c
h
a
r
g
e
i
n
c
f
s

THOUSANDS

80

70

60

50

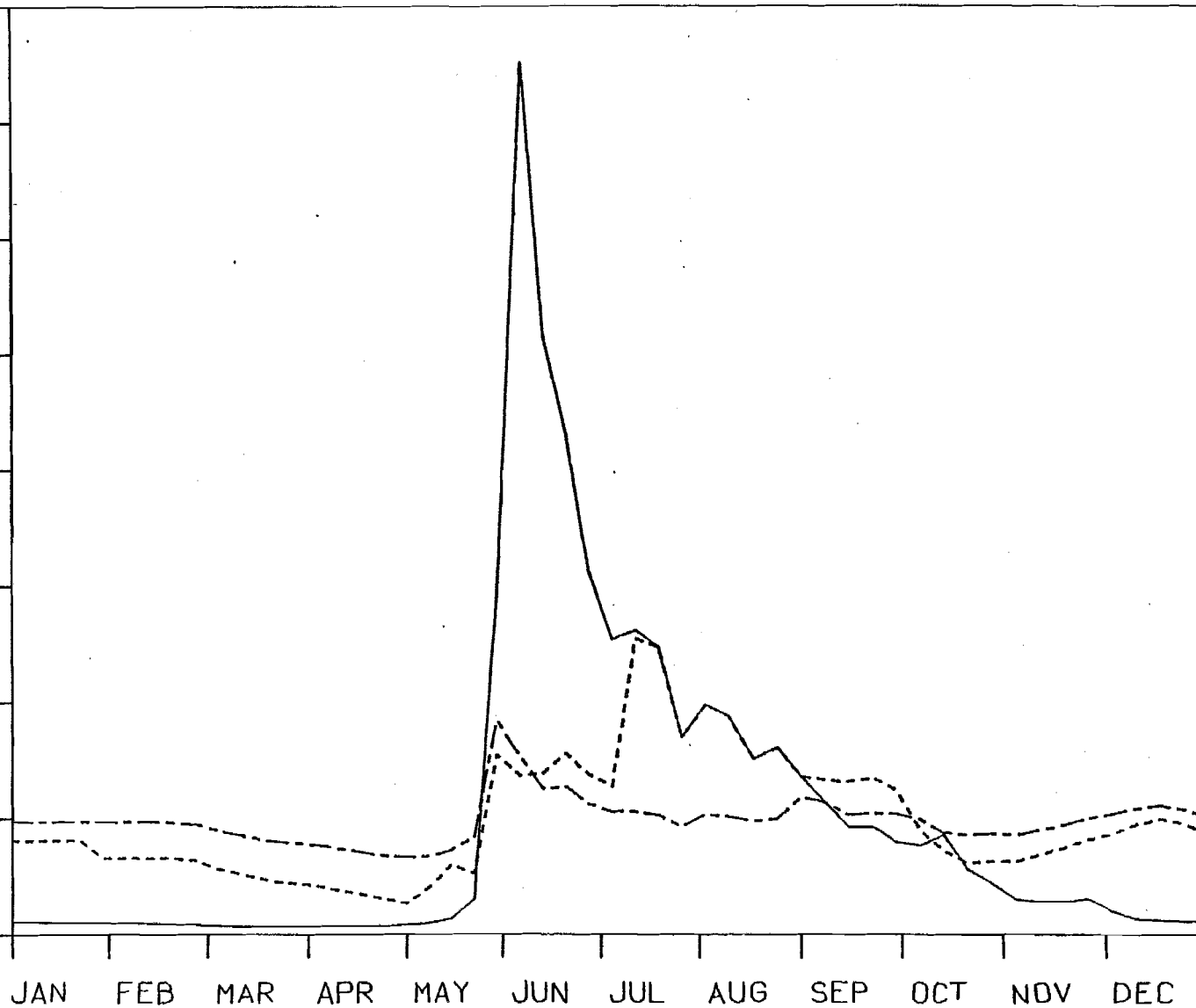
40

30

20

10

0

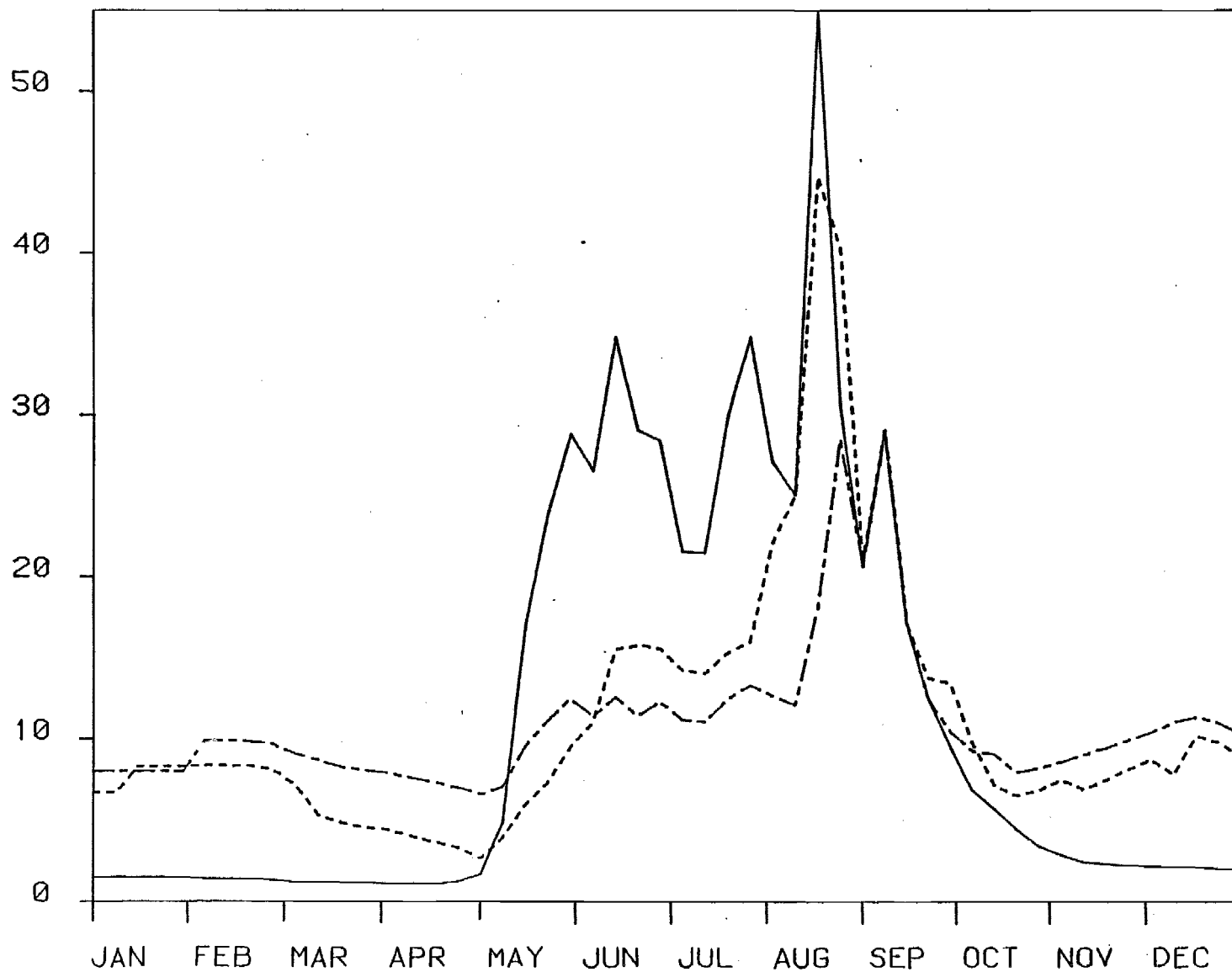


LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- · · STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
AVERAGE WEEKLY SUSITNA RIVER FLOWS AT GOLD CREEK FOR 1964 HYDROLOGY FOR 2001 ENERGY DEMANDS STAGED CONSTRUCTION	
BARBARA THORNDYKE Hydrology and Planning June 1988, 10 pages	APPROVED: _____ DATE: _____ DRAWN BY: _____

THOUSANDS



LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
AVERAGE WEEKLY SUSITNA RIVER FLOWS AT GOLD CREEK FOR 1967 HYDROLOGY FOR 2001 ENERGY DEMANDS STAGED CONSTRUCTION	
DATE: 10/1/80	BY: J. H. HARRIS
REVISION: 1	DATE: 10/1/80

Month

Discharge in cfs

D
i
s
c
h
a
r
g
e
i
n
c
f
s

THOUSANDS

30

25

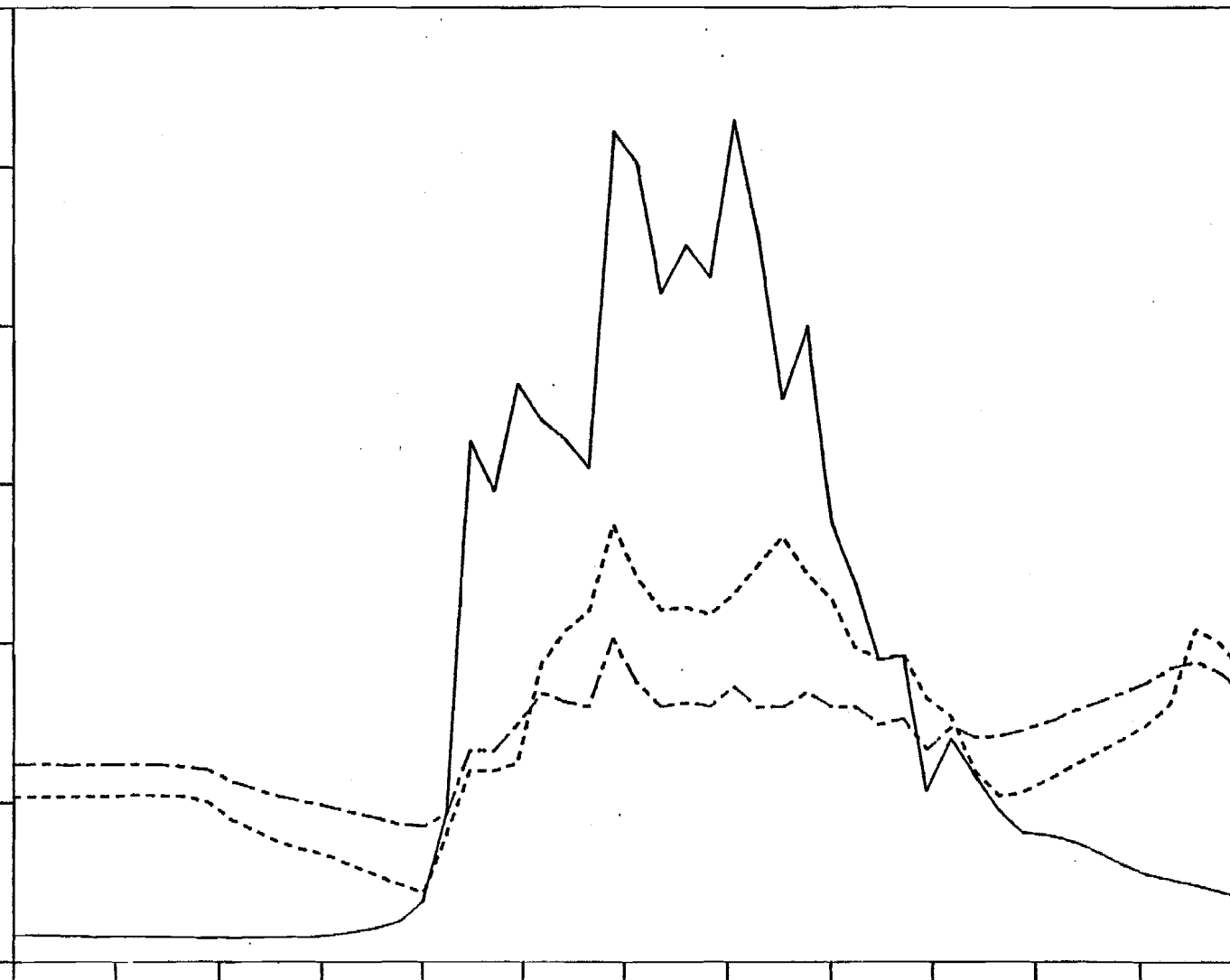
20

15

10

5

0



JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Month

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
AVERAGE WEEKLY SUSITNA RIVER FLOWS AT GOLD CREEK FOR 1970 HYDROLOGY FOR 2001 ENERGY DEMANDS STAGED CONSTRUCTION		
NAME: []	DATE: []	BY: []
REVISION: []	DATE: []	BY: []

THOUSANDS

50

40

30

20

10

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY	
EUSTINA HYDROELECTRIC PROJECT	
AVERAGE WEEKLY SUBITNA RIVER FLOWS AT GOLD CREEK FOR 1981 HYDROLOGY	
FOR 2001 ENERGY DEMAND	
STAGED CONSTRUCTION	
Prepared by: []	Checked by: []
Reviewed by: []	Approved by: []

Discharges in cfs

D
i
s
c
h
a
r
g
e
i
n
c
f
s

THOUSANDS

30

25

20

15

10

5

0

JAN FEB MAR APR MAY JUN JUL AUG SEP OCT NOV DEC

Month

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY		
SUBITNA HYDROELECTRIC PROJECT		
AVERAGE WEEKLY SUBITNA RIVER		
FLOWS AT GOLD CREEK		
FOR 1982 HYDROLOGY		
FOR 2001 ENERGY DEMANDS		
STAGED CONSTRUCTION		
BARRETT - BRADDOCK	APPROVED	REVIEWED BY
ENGINEER, AS AREA	DATE	DATE

EXHIBIT 18

EXHIBIT 18

COMPARISONS OF SUSITNA RIVER STREAMFLOWS
AT GOLD CREEK FOR NATURAL CONDITIONS,
FOR THE LICENSE APPLICATION PROJECT
AND FOR STAGED CONSTRUCTION FOR
PROJECTED ENERGY DEMANDS FOR 2002 FOR
HYDROLOGICAL CONDITIONS FOR:

- a. 1964
- b. 1967
- c. 1970
- d. 1981
- e. 1982

Discharges in cfs

THOUSANDS

80

70

60

50

40

30

20

10

0

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Month

LEGEND

- NATURAL CONDITION
- LICENSE APPLICATION PROJECT
- STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY

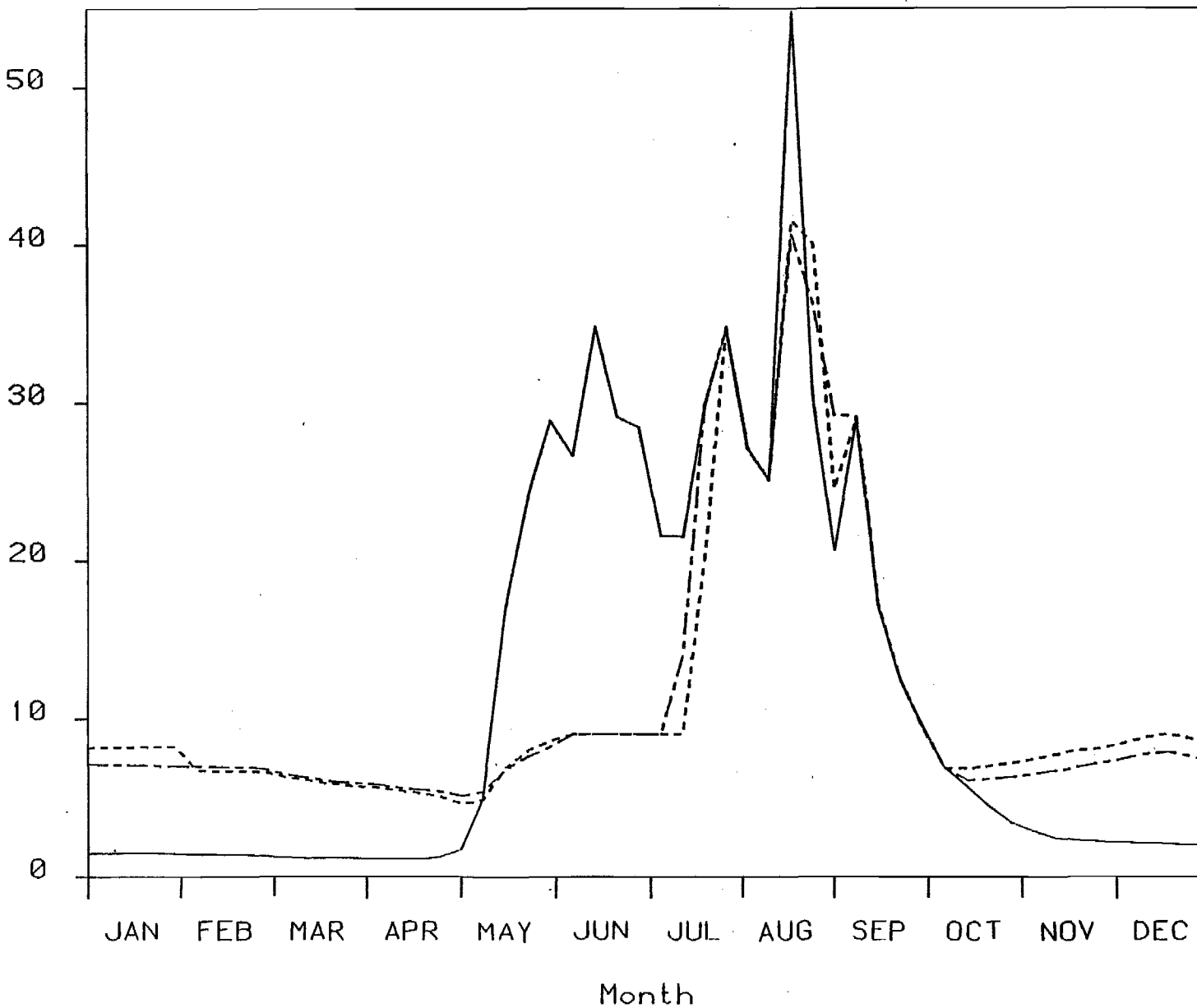
SUSITNA HYDROELECTRIC PROJECT

AVERAGE WEEKLY SUSITNA RIVER
FLOWS AT GOLD CREEK
FOR 1964 HYDROLOGY
FOR 2002 ENERGY DEMANDS
STAGED CONSTRUCTION

NAME: RABAGO	DATE:	REVISED BY:
REVISION: 1.0	DATE:	REVISED BY:

THOUSANDS

Discharge in thousands



LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY		
SUSITNA HYDROELECTRIC PROJECT		
AVERAGE WEEKLY SUSITNA RIVER FLOWS AT GOLD CREEK FOR 1967 HYDROLOGY FOR 2002 ENERGY DEMANDS STAGED CONSTRUCTION		
MADELA-1000000	APPROVED	
DATE	DATE	DATE
APPROVED, AS PER		

Discharge in cfs

THOUSANDS

30

25

20

15

10

5

0

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Month

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

AVERAGE WEEKLY SUSITNA RIVER
FLOWS AT GOLD CREEK
FOR 1970 HYDROLOGY
FOR 2002 ENERGY DEMANDS
STAGED CONSTRUCTION

WATER RESOURCES DIVISION	DATE	BY
APPROVED		
APPROVED		

THOUSANDS

50

40

30

20

10

0

JAN

FEB

MAR

APR

MAY

JUN

JUL

AUG

SEP

OCT

NOV

DEC

Month

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT

ALASKA POWER AUTHORITY	
SUBITNA HYDROELECTRIC PROJECT	
AVERAGE WEEKLY SUBITNA RIVER	
FLOWS AT GOLD CREEK	
FOR 1981 HYDROLOGY	
FOR 2002 ENERGY DEMANDS	
STAGED CONSTRUCTION	
DATE: _____	BY: _____
APPROVED: _____	DATE: _____

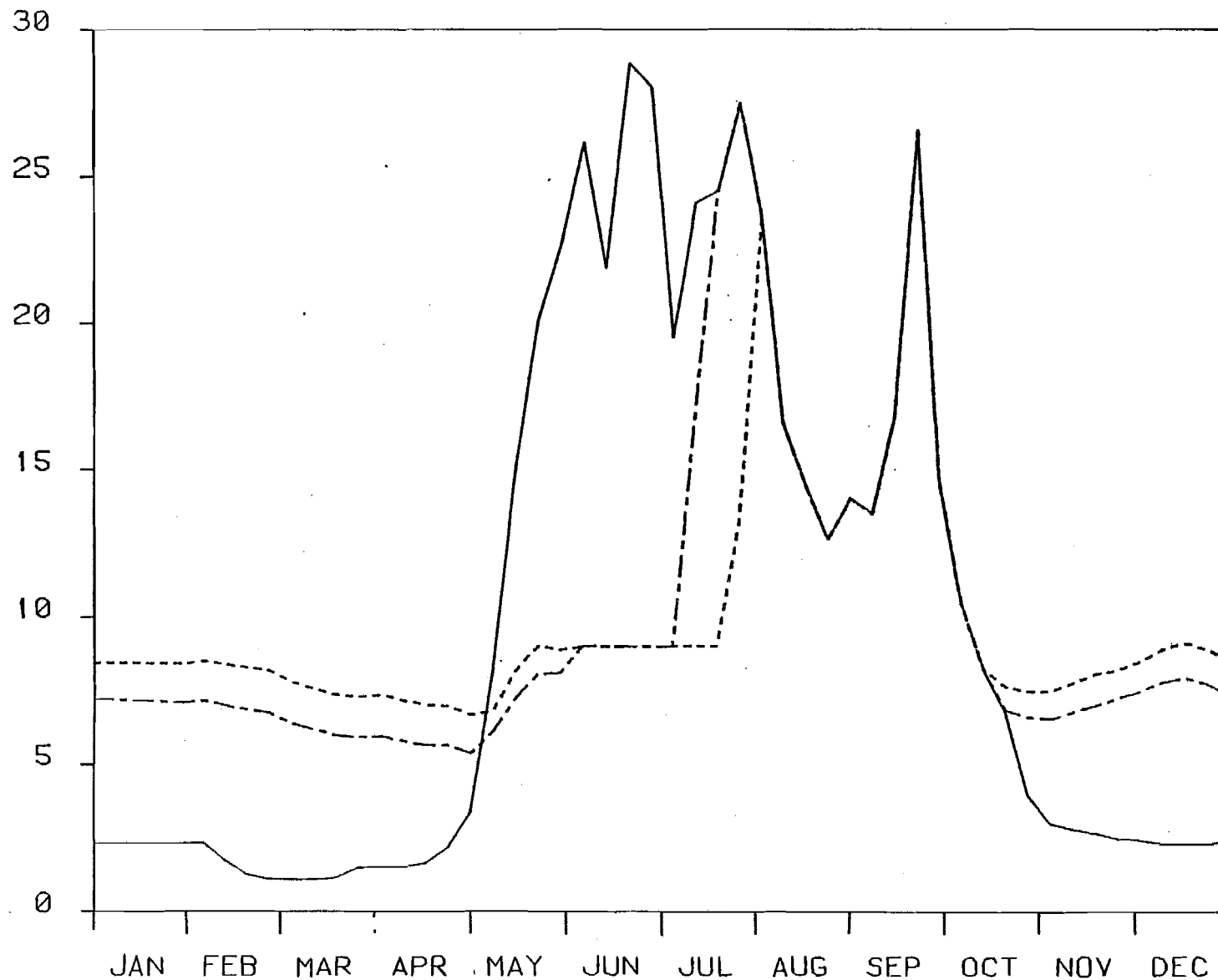
Discharges in cfs

Discharge (thousands)

THOUSANDS

LEGEND

- NATURAL CONDITION
- - - LICENSE APPLICATION PROJECT
- - - STAGED CONSTRUCTION PROJECT



Month

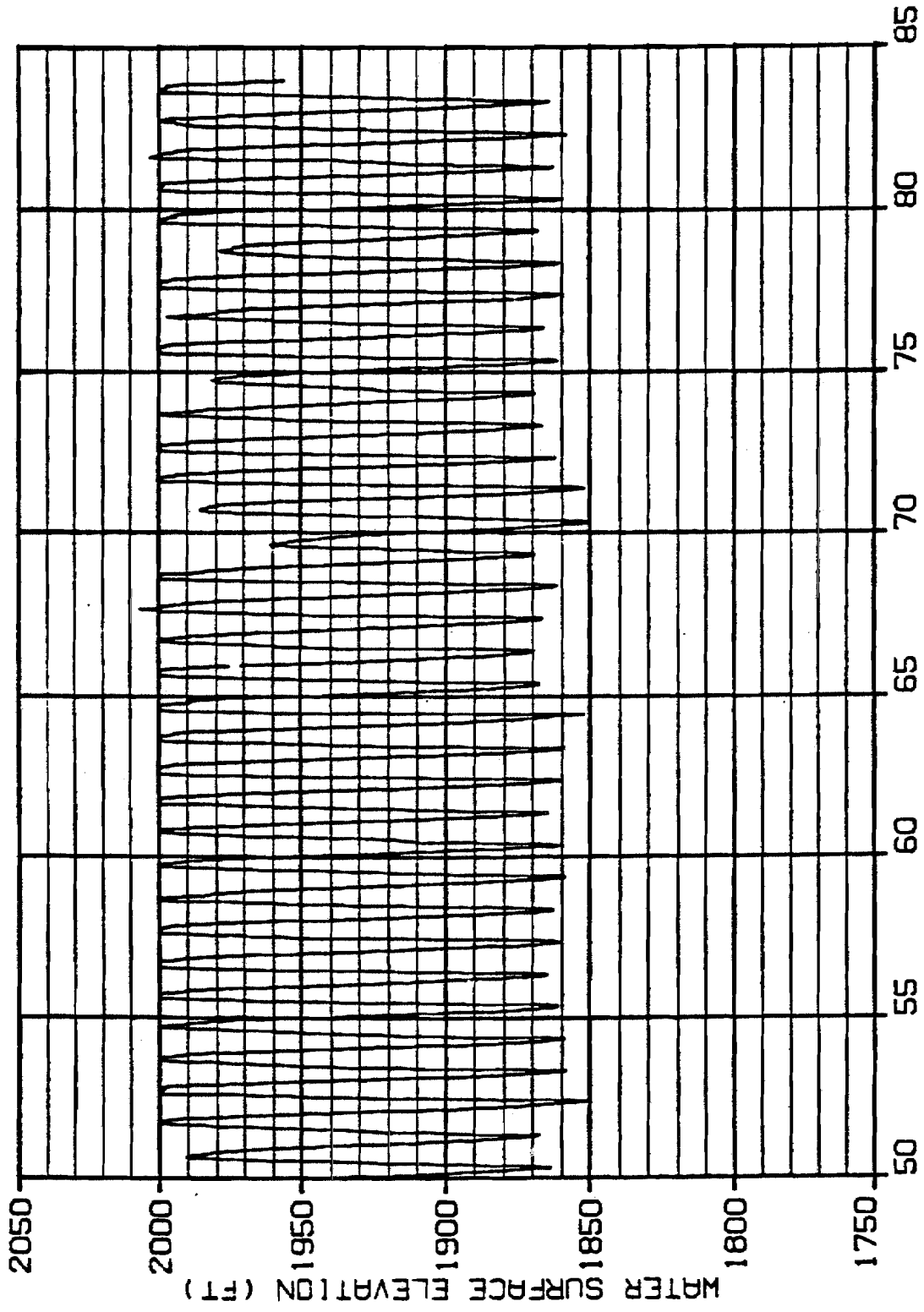
ALASKA POWER AUTHORITY	
SUSITNA HYDROELECTRIC PROJECT	
AVERAGE WEEKLY SUSITNA RIVER FLOWS AT GOLD CREEK FOR 1982 HYDROLOGY FOR 2002 ENERGY DEMANDS STAGED CONSTRUCTION	
TABLE: 1982-1983	DATE: 10/1/83
BY: J. H. HARRIS	APPROVED: [Signature]

EXHIBIT 19

WATANA WATER SURFACE ELEVATION

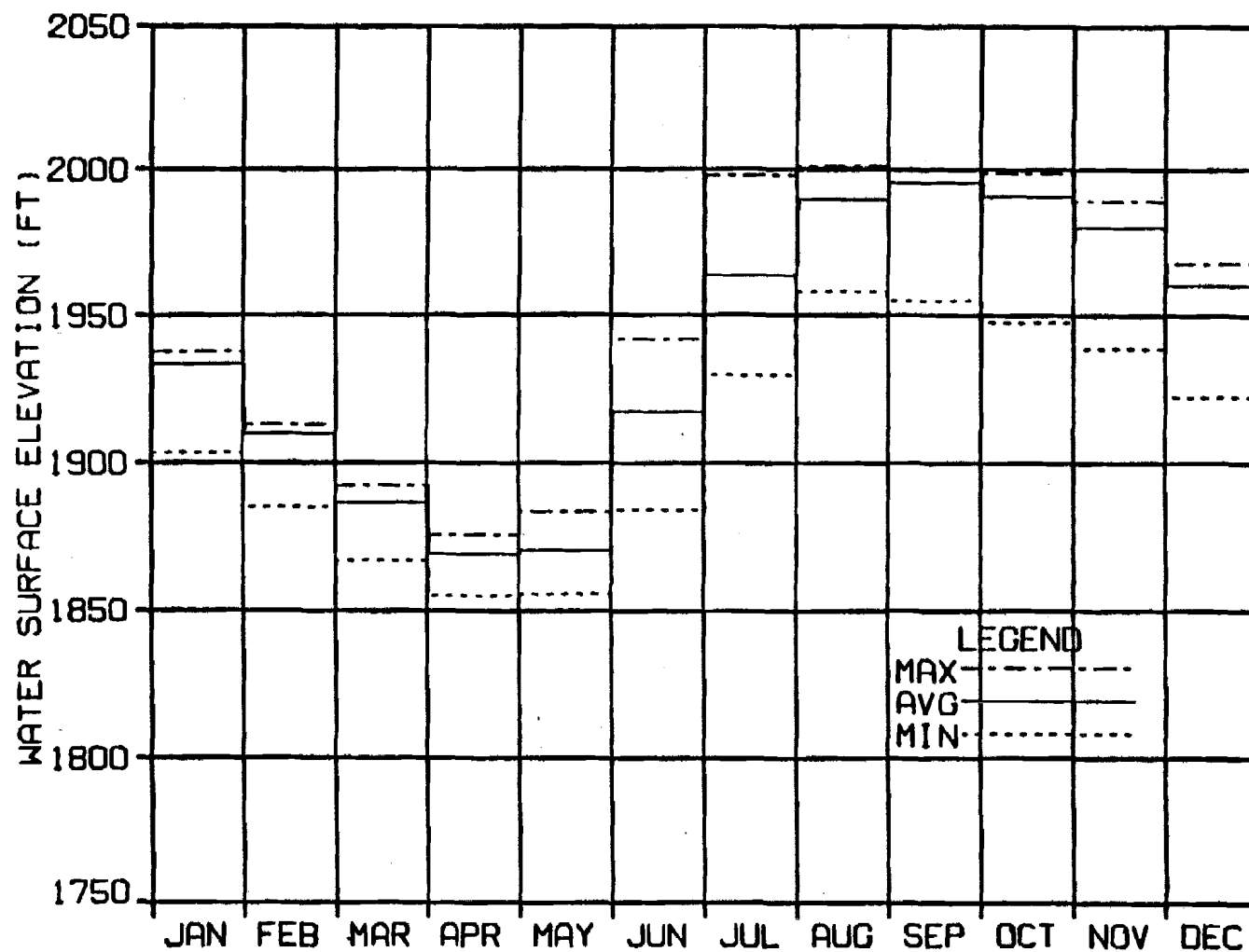
STAGE 1. LOAD YEAR 1996

WATANA 2000 FT. NO DEVIL CANYON



WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY

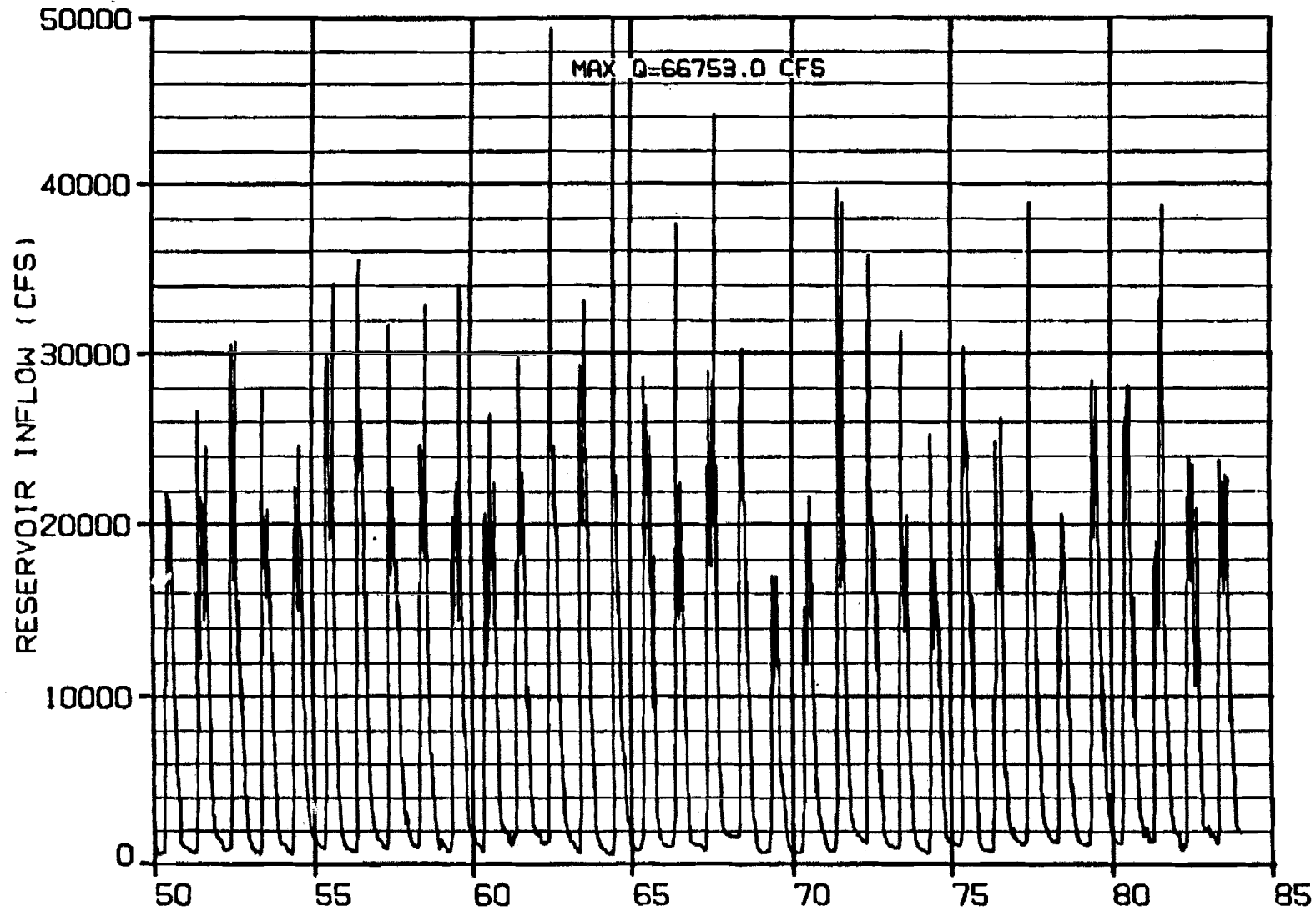
STAGE 1. LOAD YEAR 1996
WATANA 2000 FT. NO DEVIL CANYON



WATANA RESERVOIR INFLOW

STAGE 1, LOAD YEAR 1996

WATANA 2000 FT. NO DEVIL CANYON



WATANA RESERVOIR OUTFLOW

STAGE 1. LOAD YEAR 1996

WATANA 2000 FT. NO DEVIL CANYON

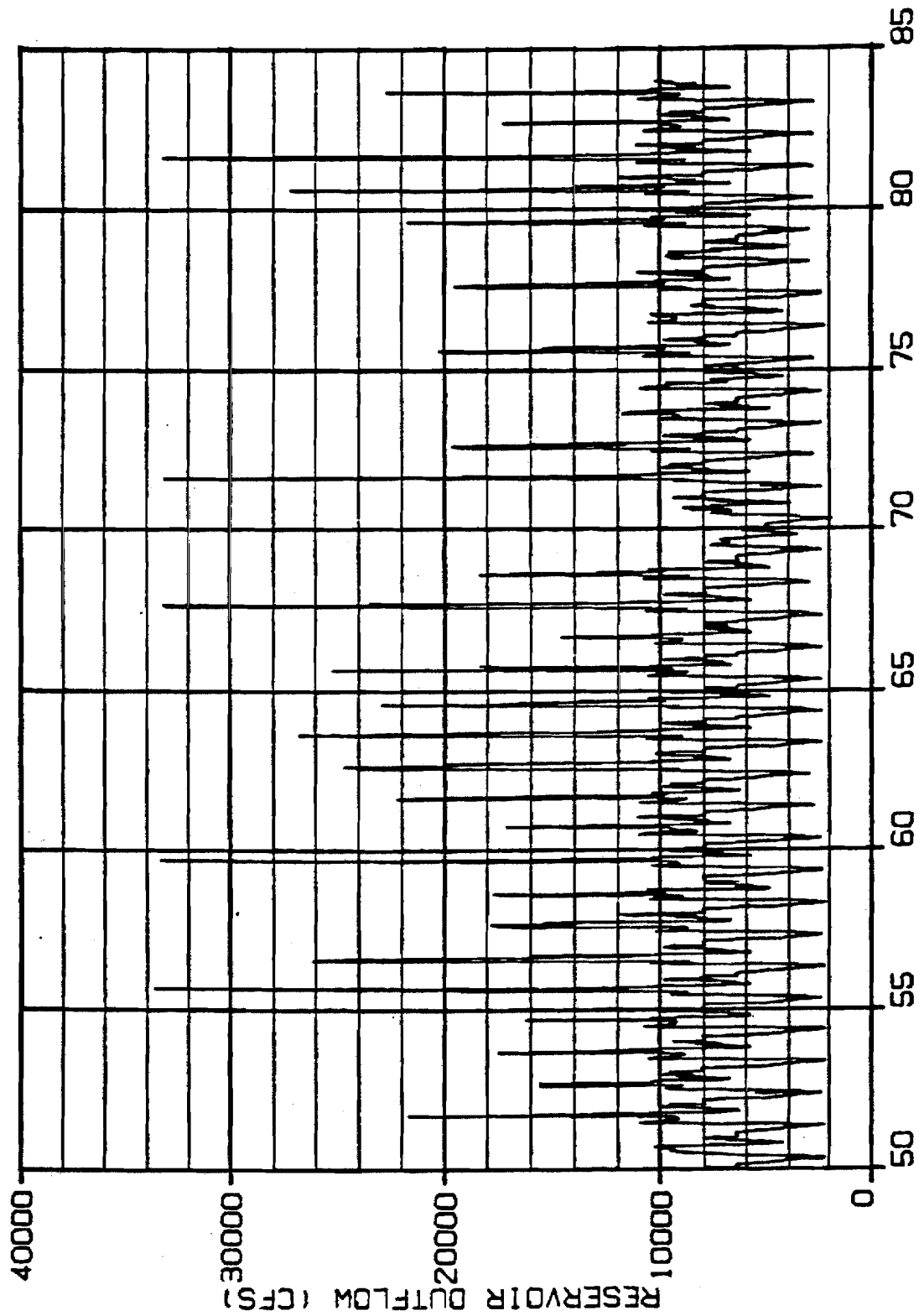
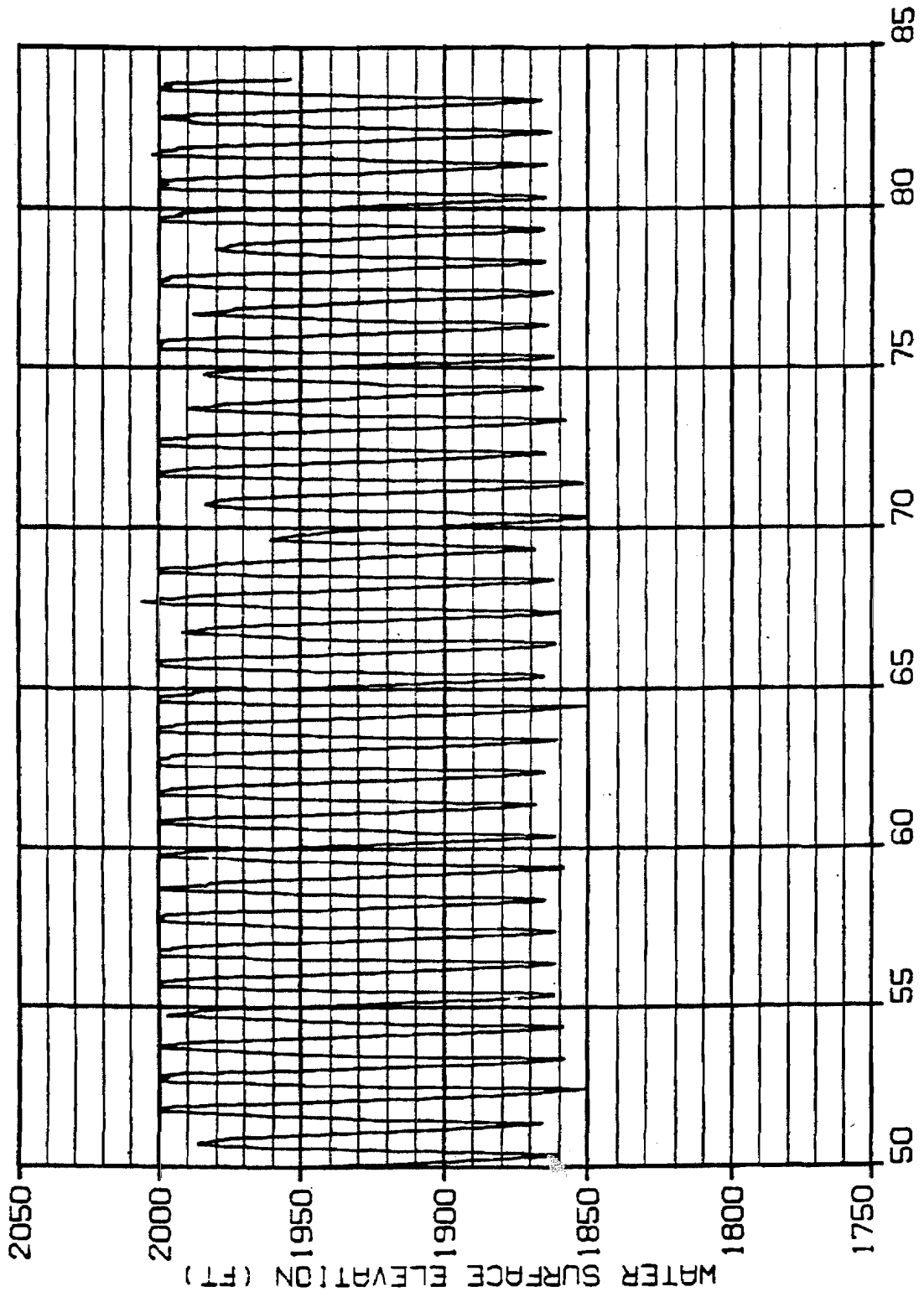
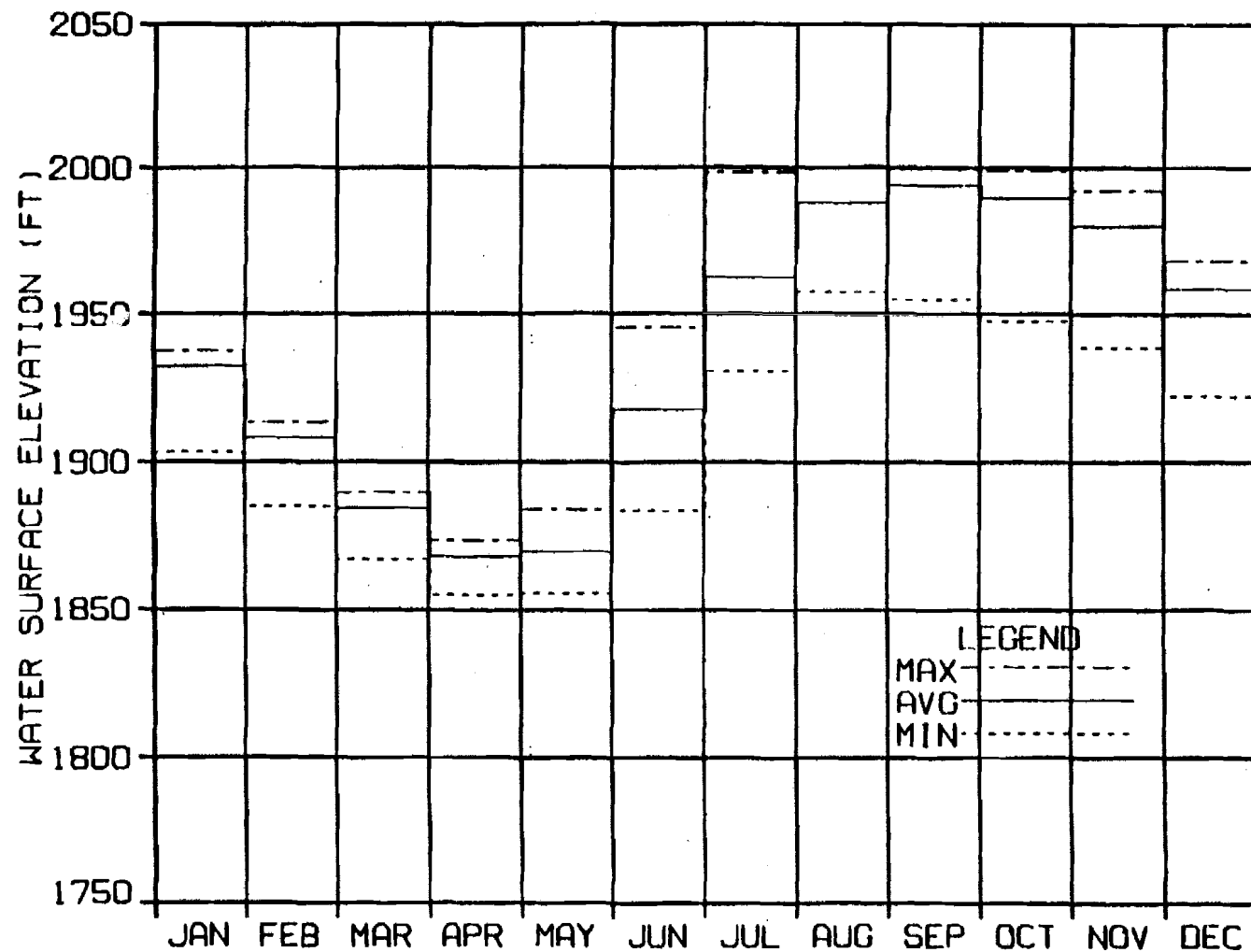


EXHIBIT 20

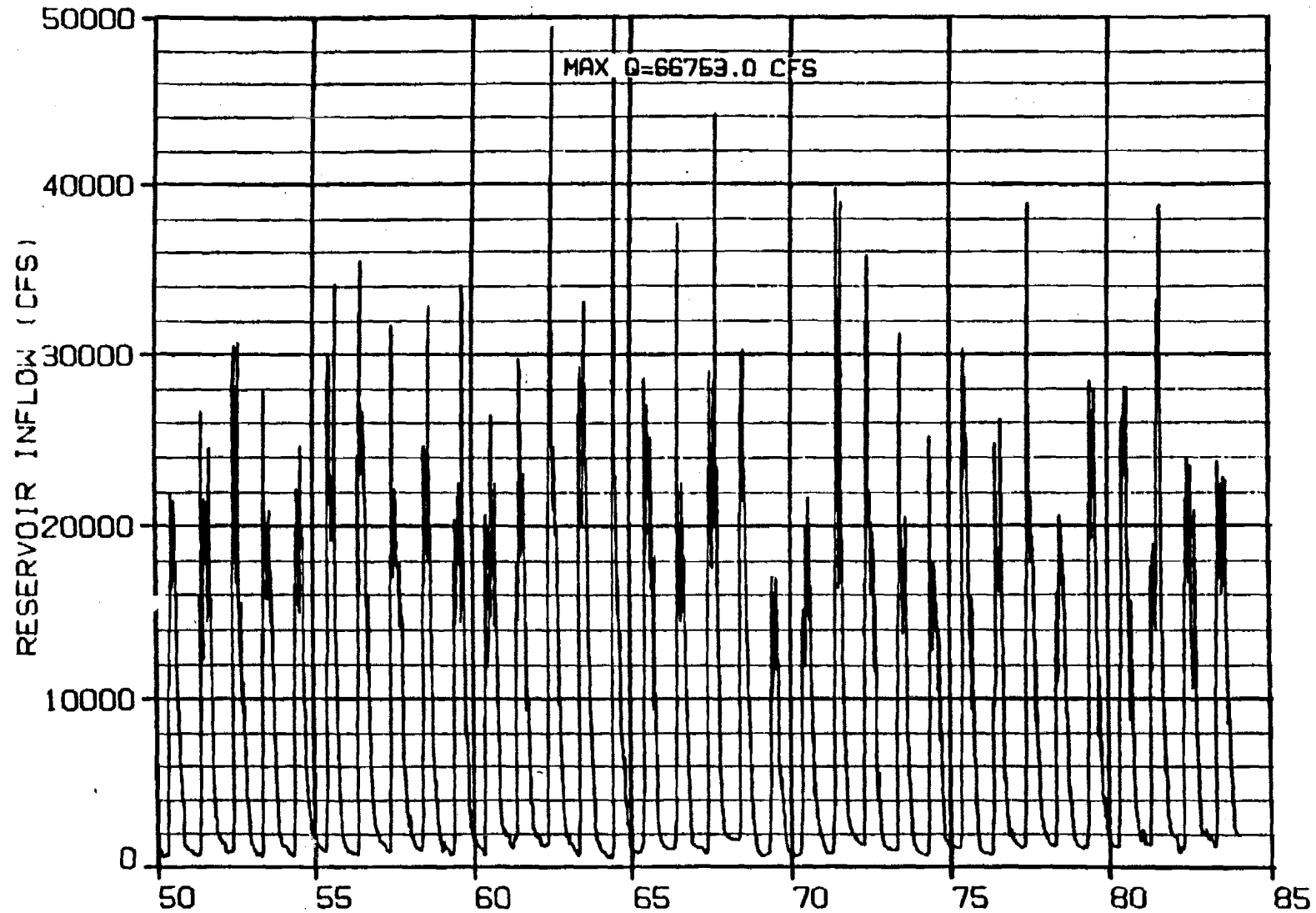
WATANA WATER SURFACE ELEVATION STAGE 1, LOAD YEAR 2001 WATANA 2000 FT. NO DEVIL CANYON



WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY STAGE I, LOAD YEAR 2001 WATANA 2000 FT. NO DEVIL CANYON



WATANA RESERVOIR INFLOW
STAGE 1, LOAD YEAR 2001
WATANA 2000 FT, NO DEVIL CANYON



WATANA RESERVOIR OUTFLOW
STAGE I. LOAD YEAR 2001
WATANA 2000 FT. NO DEVIL CANYON

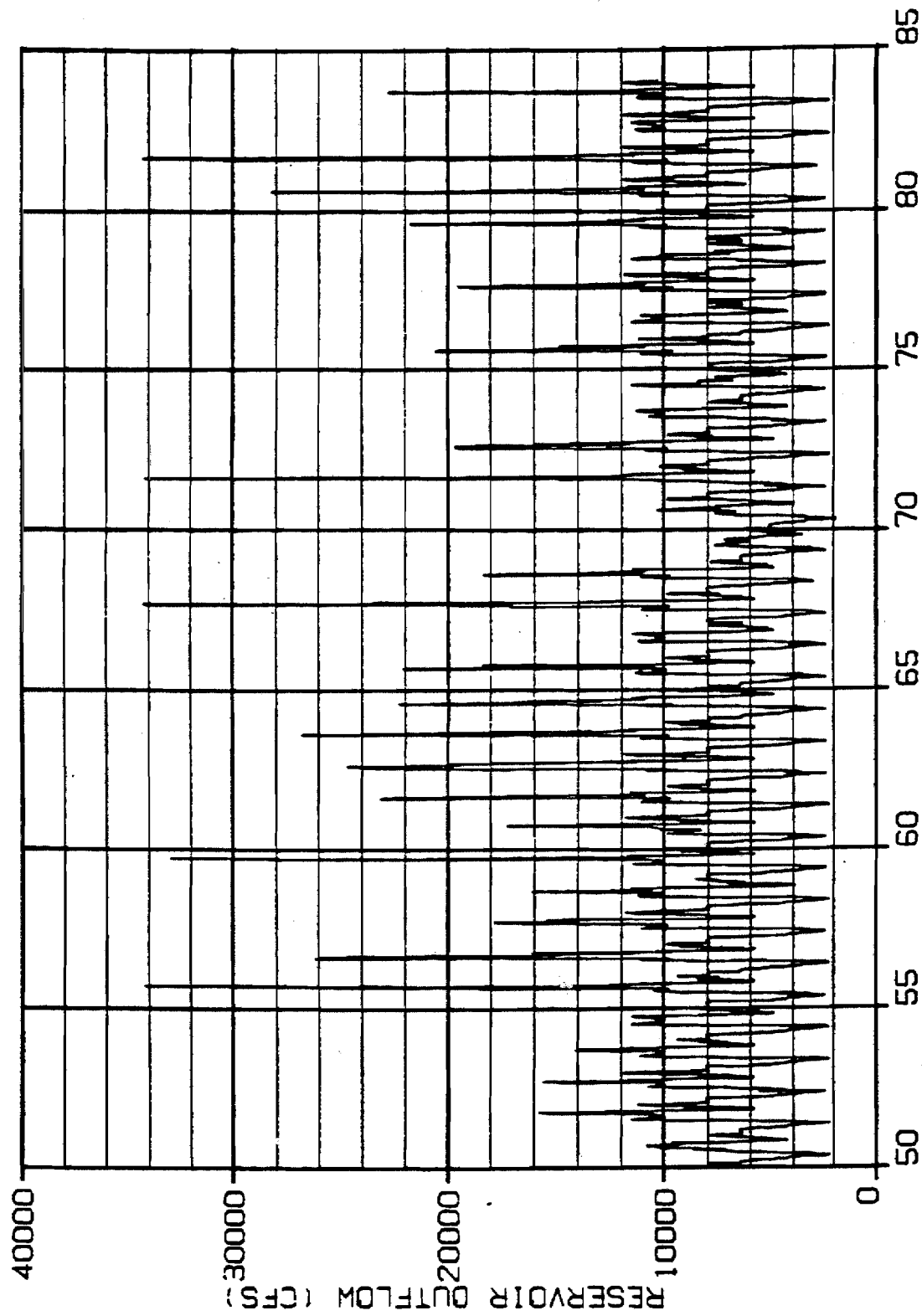
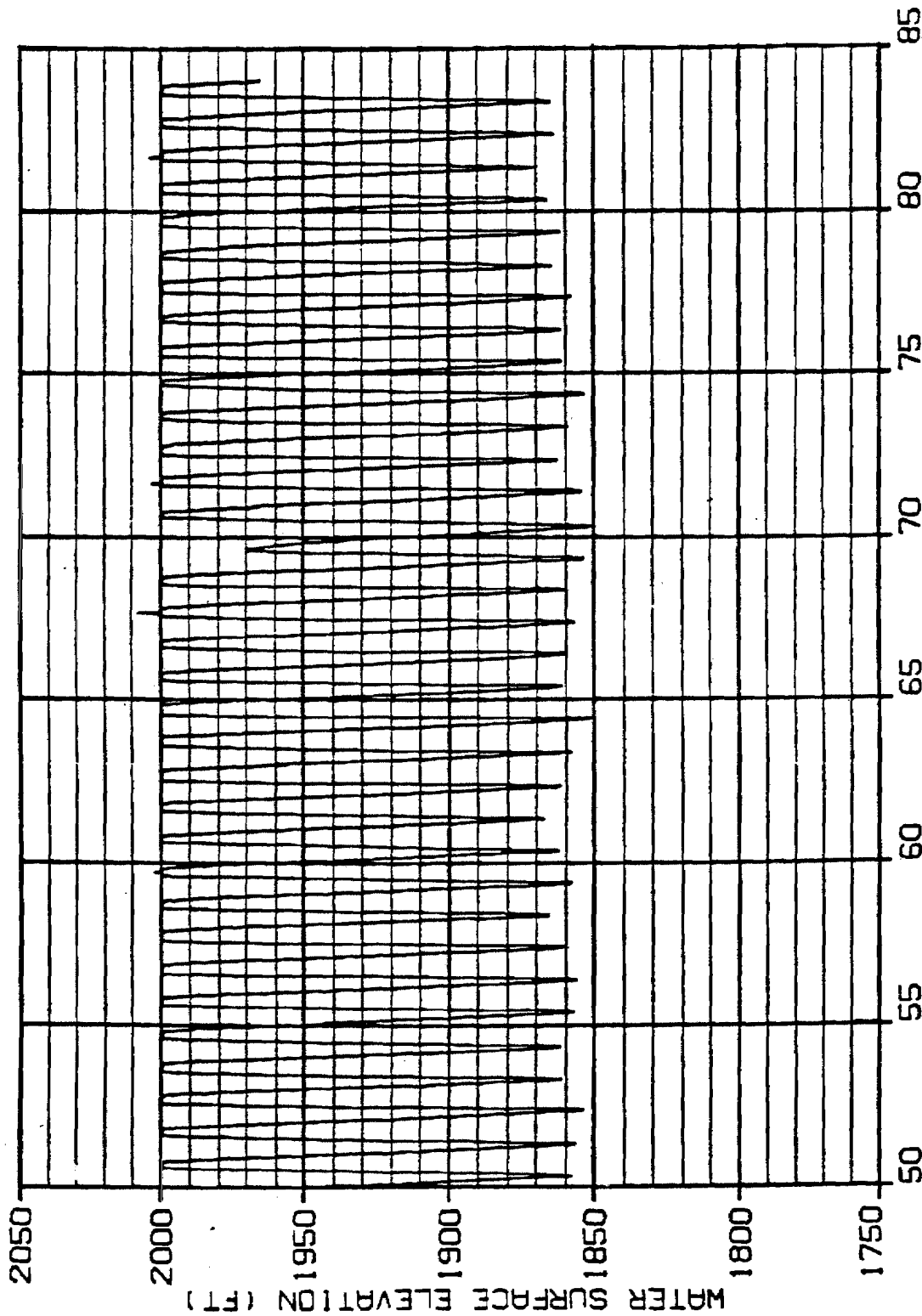


EXHIBIT 21

WATANA WATER SURFACE ELEVATION

STAGE II. LOAD YEAR 2002

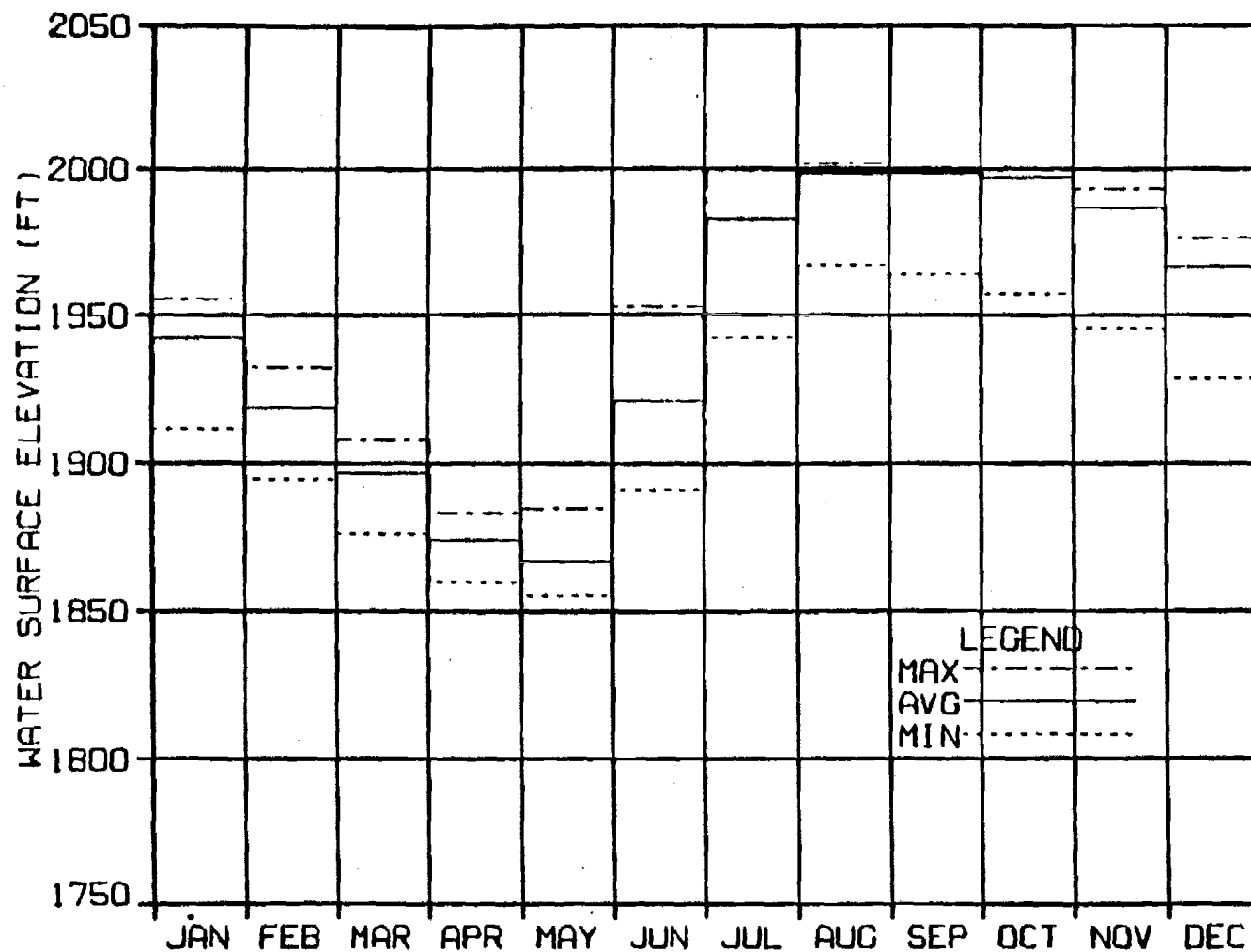
WATANA 2000 FT. DEVIL CANYON 1455 FT. (DRAWDOWN 50')



WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY

STAGE II. LOAD YEAR 2002

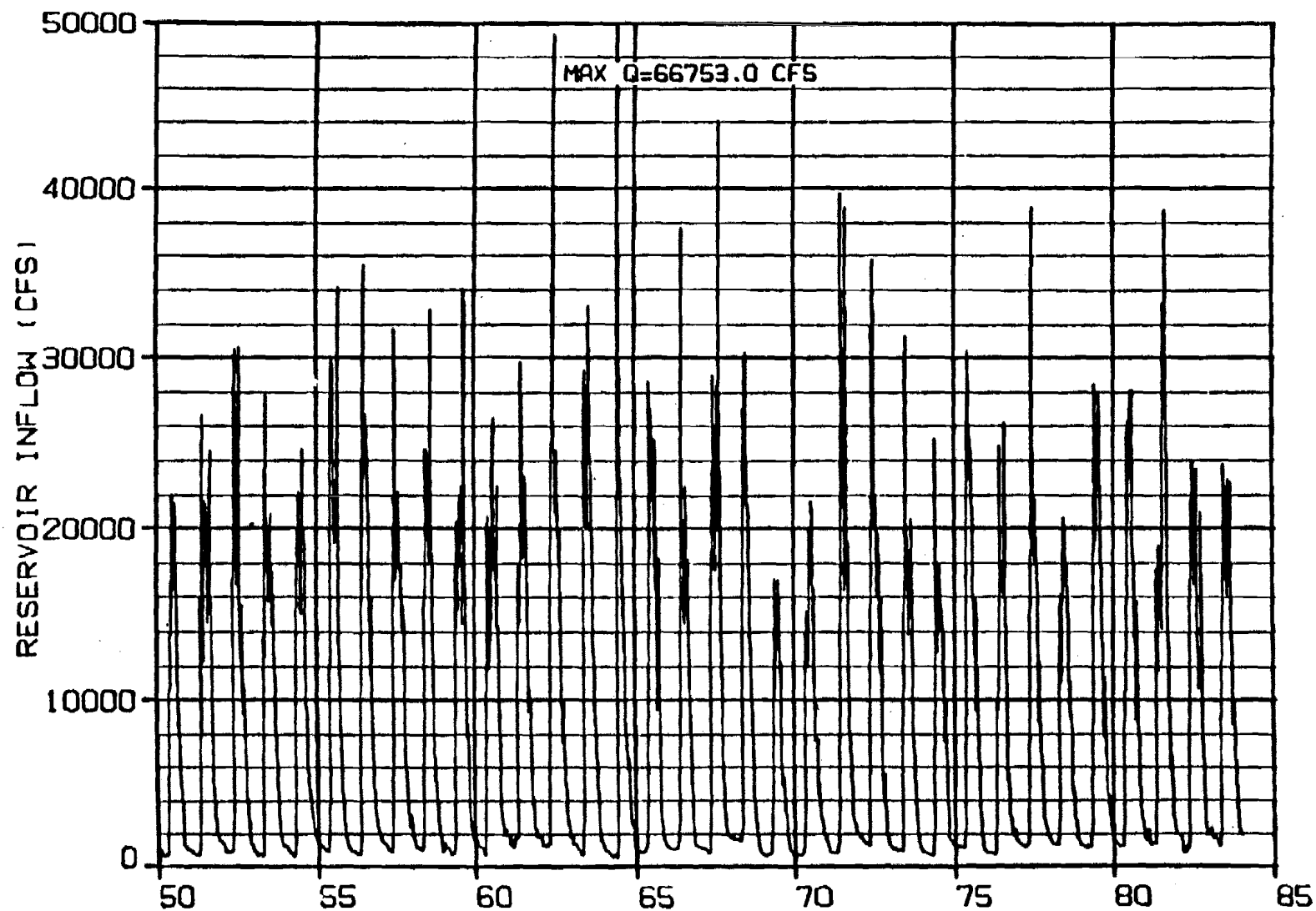
WATANA 2000 FT. DEVIL CANYON 1455 FT. (DRAWDOWN 50')



HARZA-EBASCO SUSITNA JOINT VENTURE

ALASKA POWER AUTHORITY

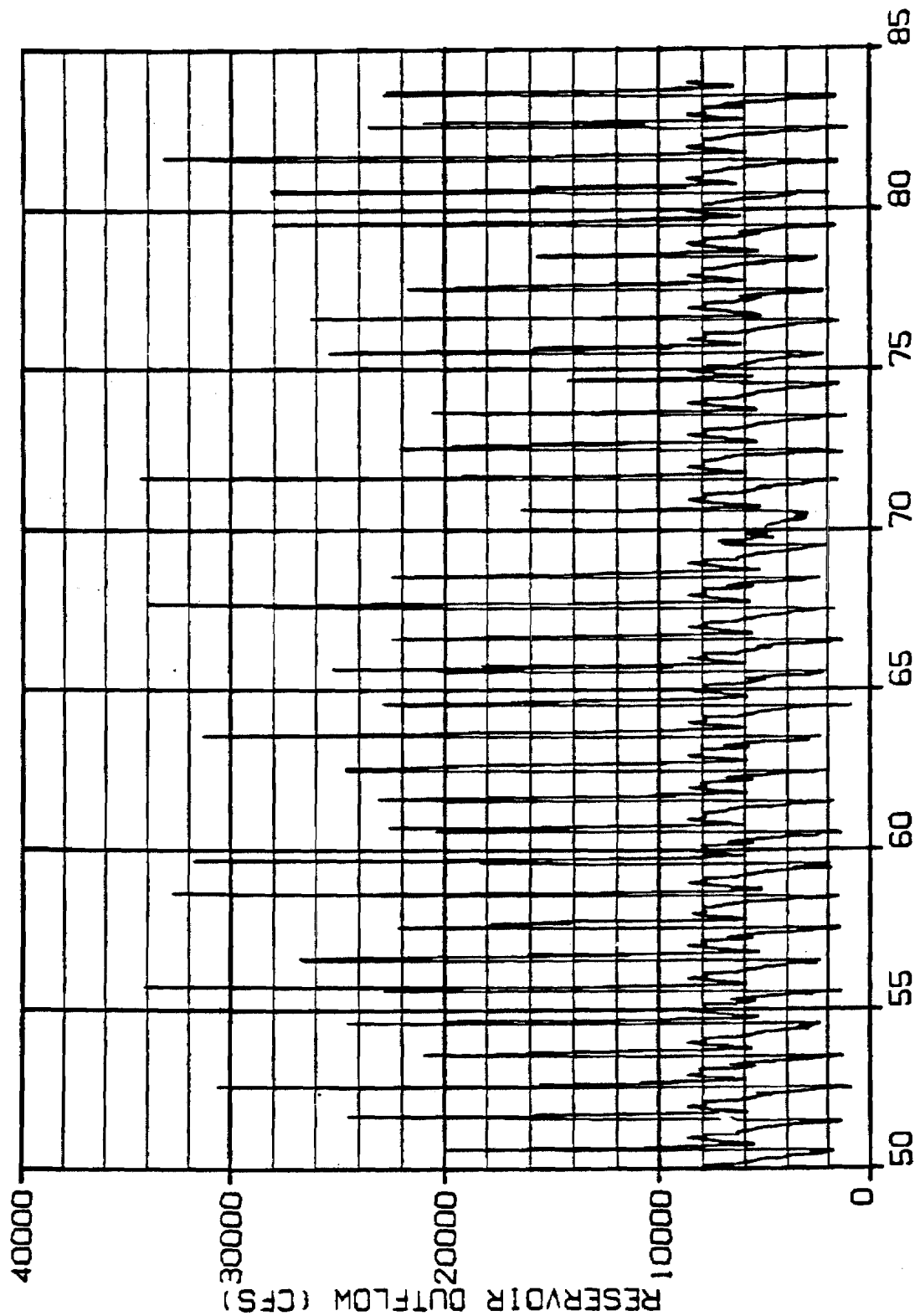
WATANA RESERVOIR INFLOW
STAGE II, LOAD YEAR 2002
WATANA 2000 FT, DEVIL CANYON 1455 FT. (DRAWDOWN 50')



WATANA RESERVOIR OUTFLOW

STAGE II. LOAD YEAR 2002

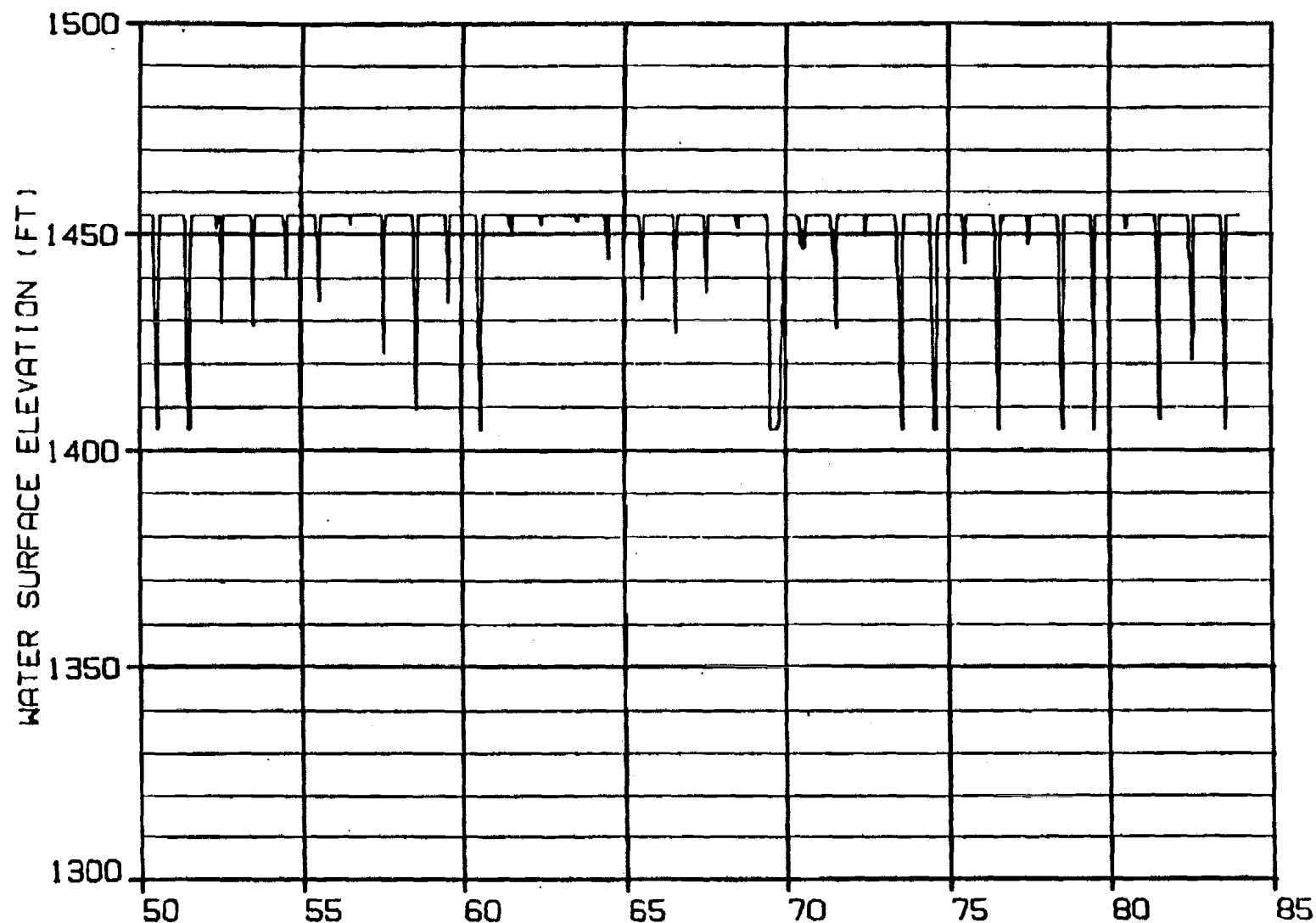
WATANA 2000 FT. DEVIL CANYON 1455 FT. (DRAWDOWN 50')



DEVIL CANYON WATER SURFACE ELEVATION

STAGE II, LOAD YEAR 2002

WATANA. 2000 FT. DEVIL CANYON 1455 FT. (DRAWDOWN 50')

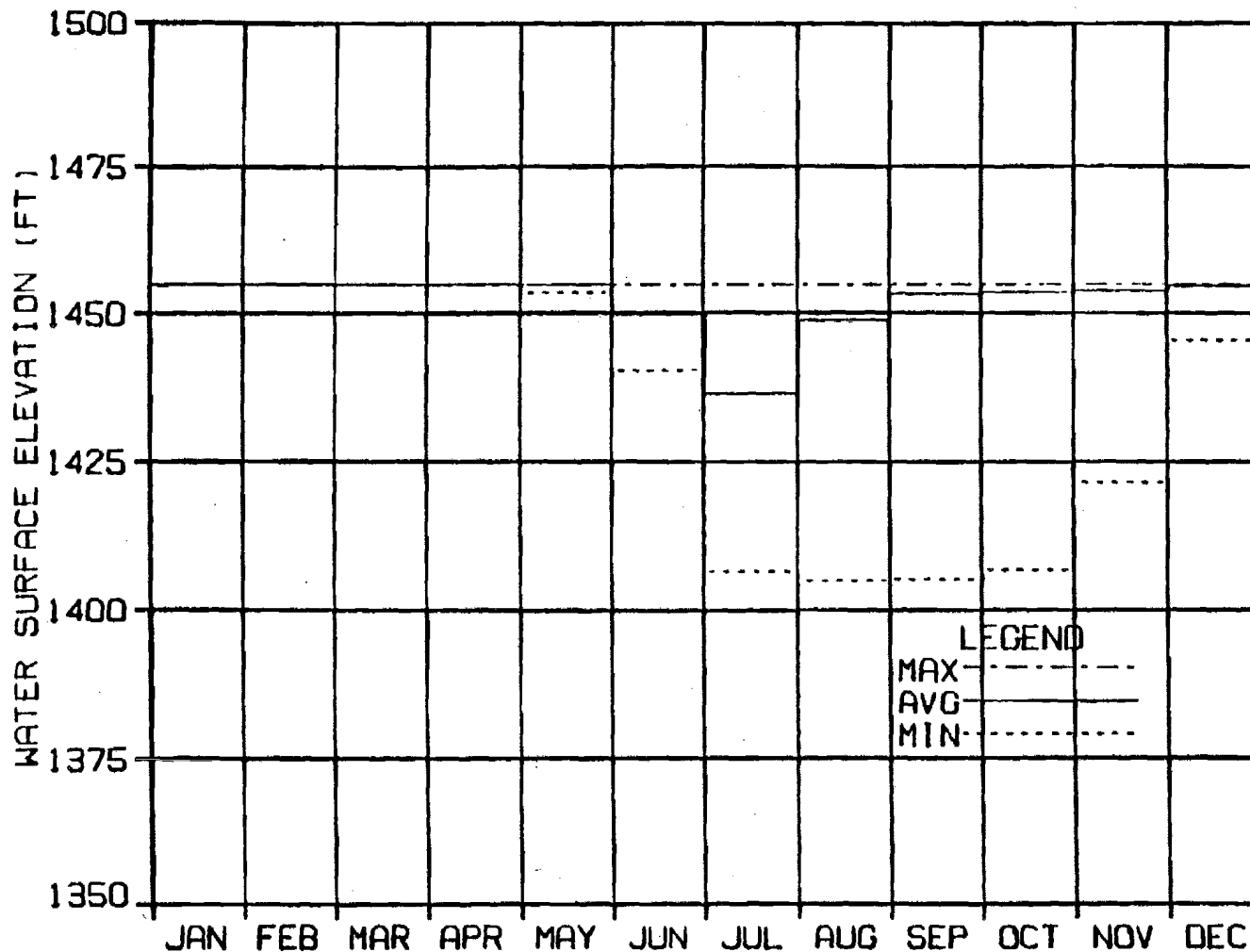


DEVIL CANYON WATER SURFACE ELEVATION

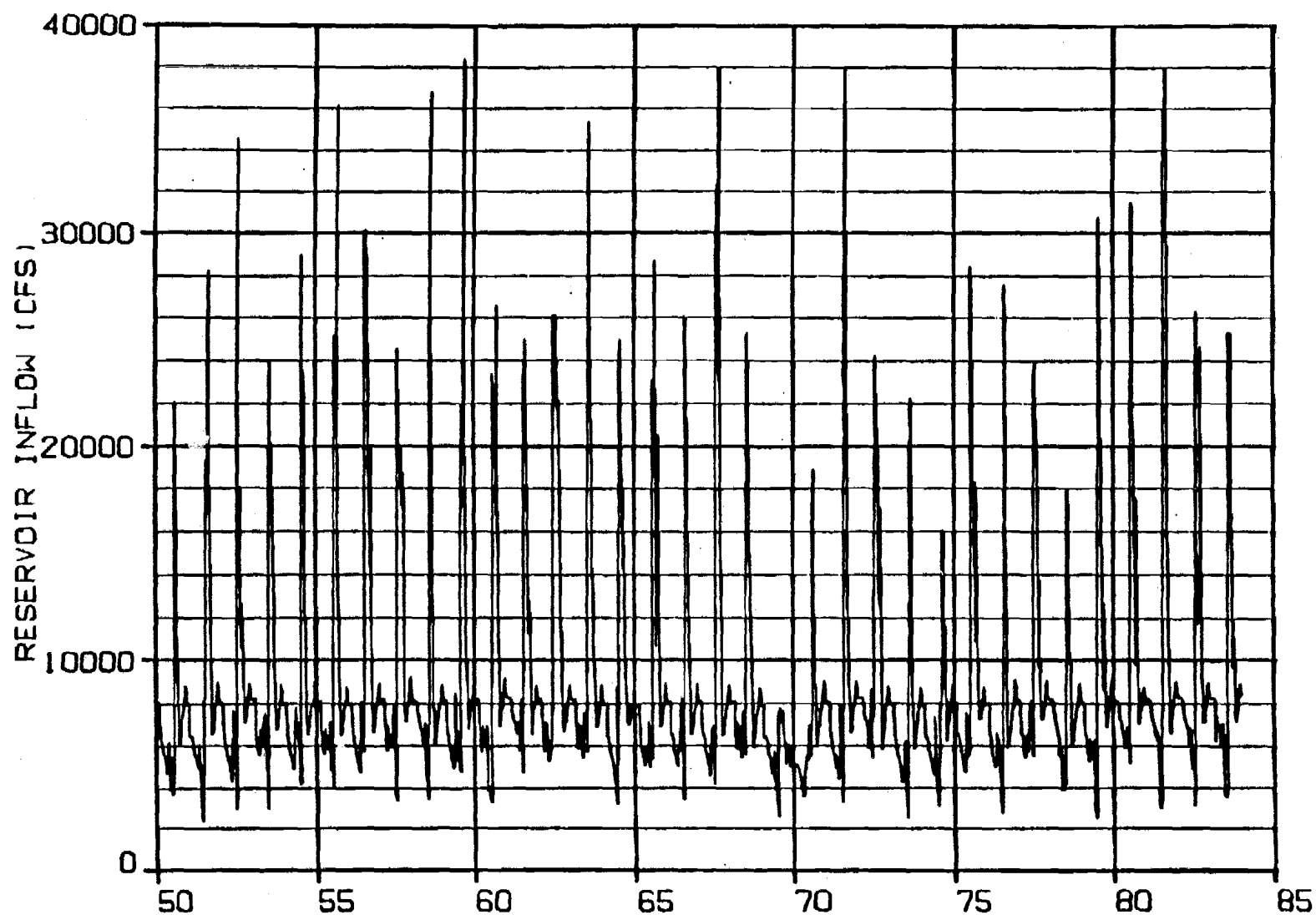
MONTHLY SUMMARY

STAGE II, LOAD YEAR 2002

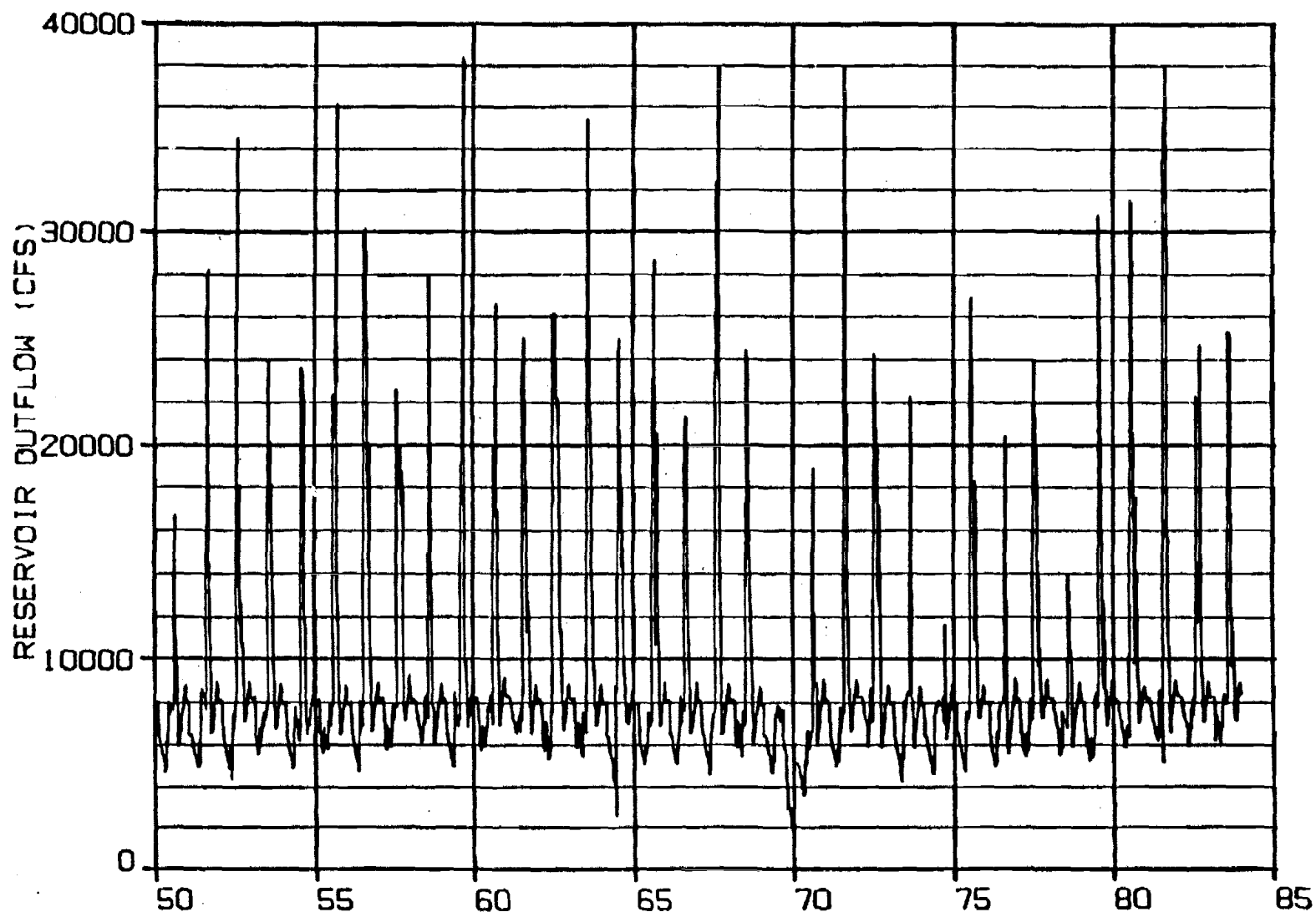
WATANA 2000 FT, DEVIL CANYON 1455 FT. (DRAWDOWN 50')



DEVIL CANYON RESERVOIR INFLOW
STAGE II, LOAD YEAR 2002
WATANA 2000 FT., DEVIL CANYON 1455 FT. (DRAWDOWN 50')



DEVIL CANYON RESERVOIR OUTFLOW
STAGE II, LOAD YEAR 2002
WATANA 2000 FT. DEVIL CANYON 1455 FT. (DRAWDOWN 50')



HARZA-EBASCO SUSITNA JOINT VENTURE

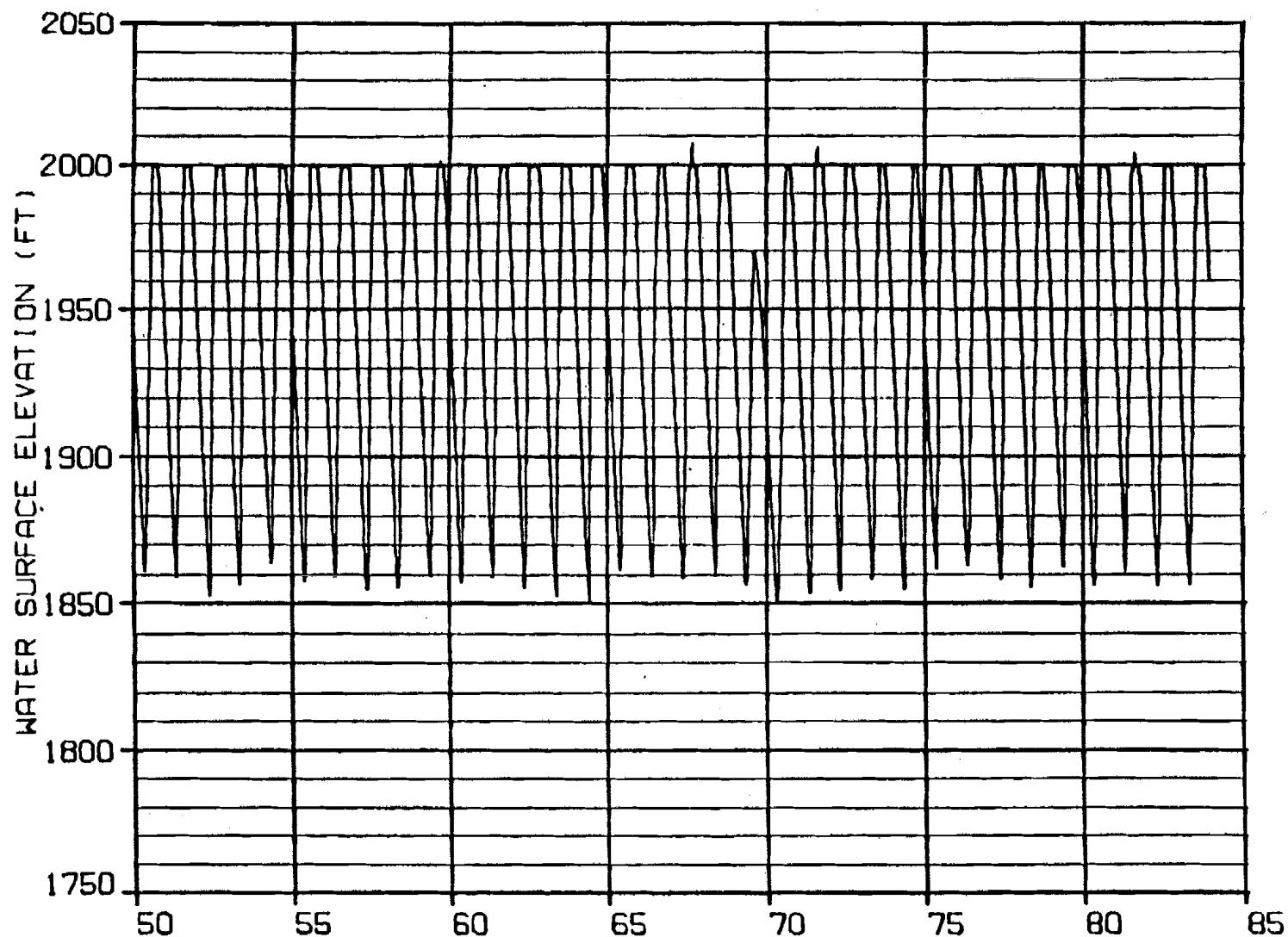
ALASKA POWER AUTHORITY

EXHIBIT 22

WATANA WATER SURFACE ELEVATION

STAGE II, LOAD YEAR 2007

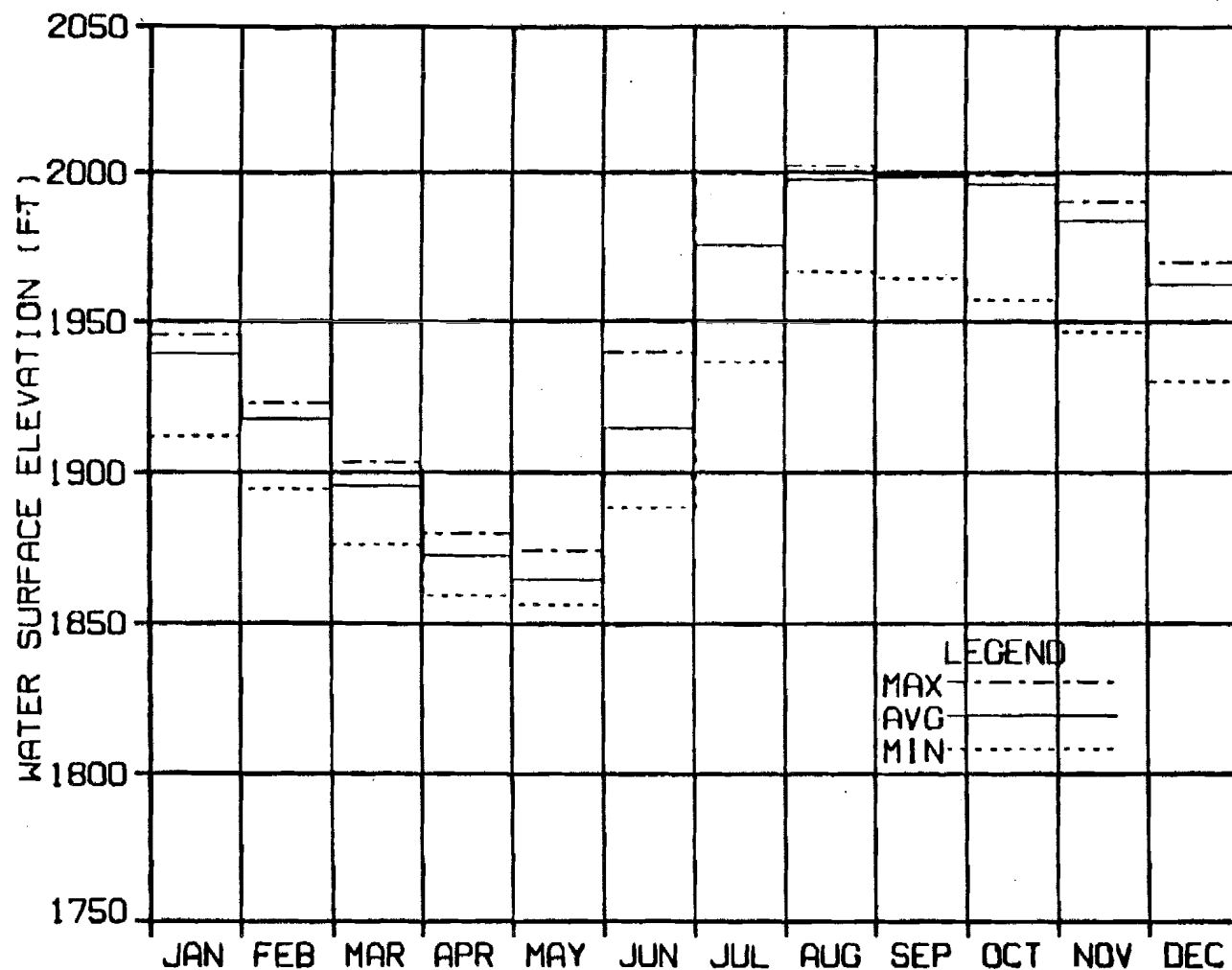
WATANA 2000 FT, DEVIL CANYON 1455 FT.



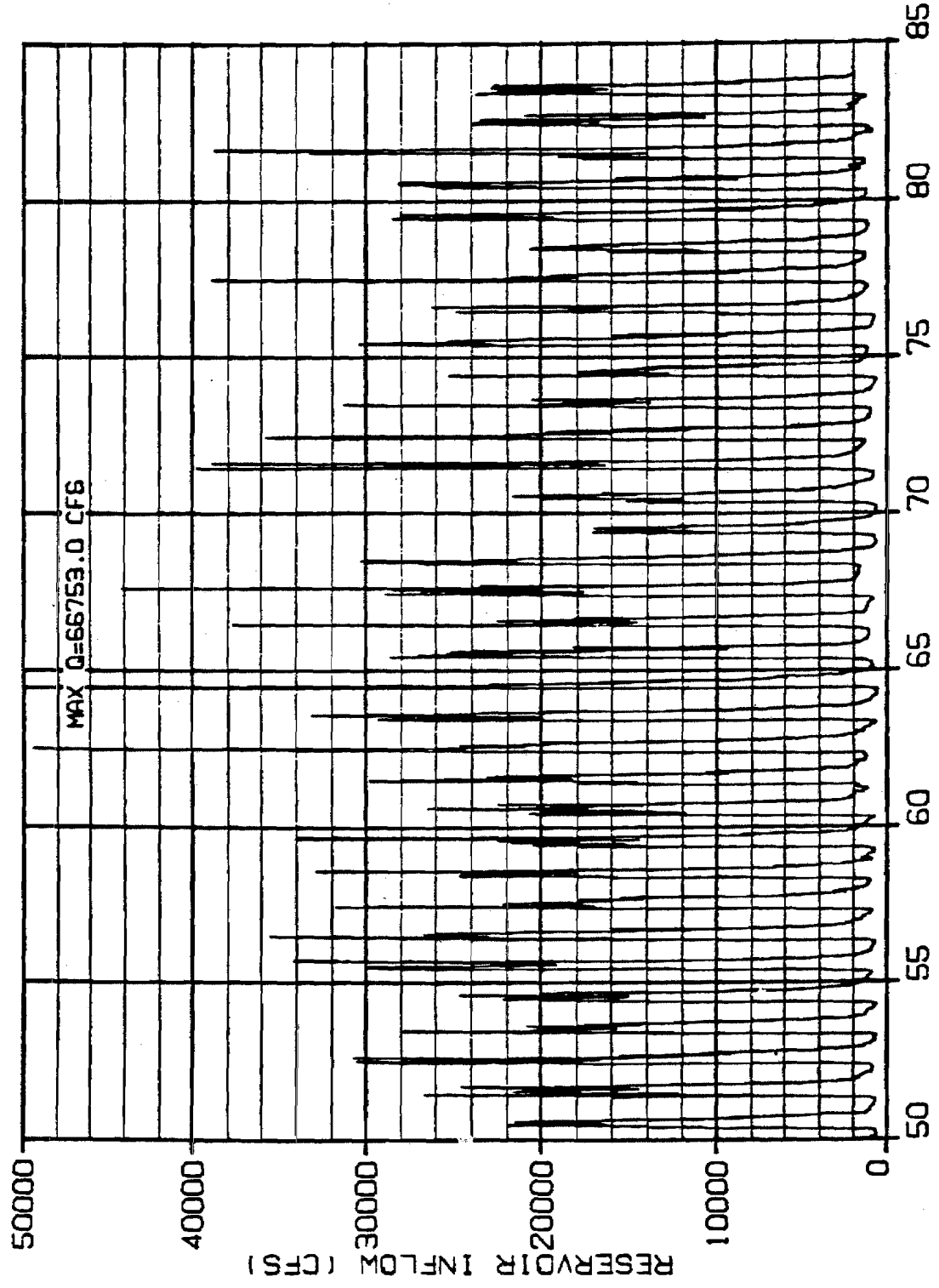
WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY

STAGE II, LOAD YEAR 2007

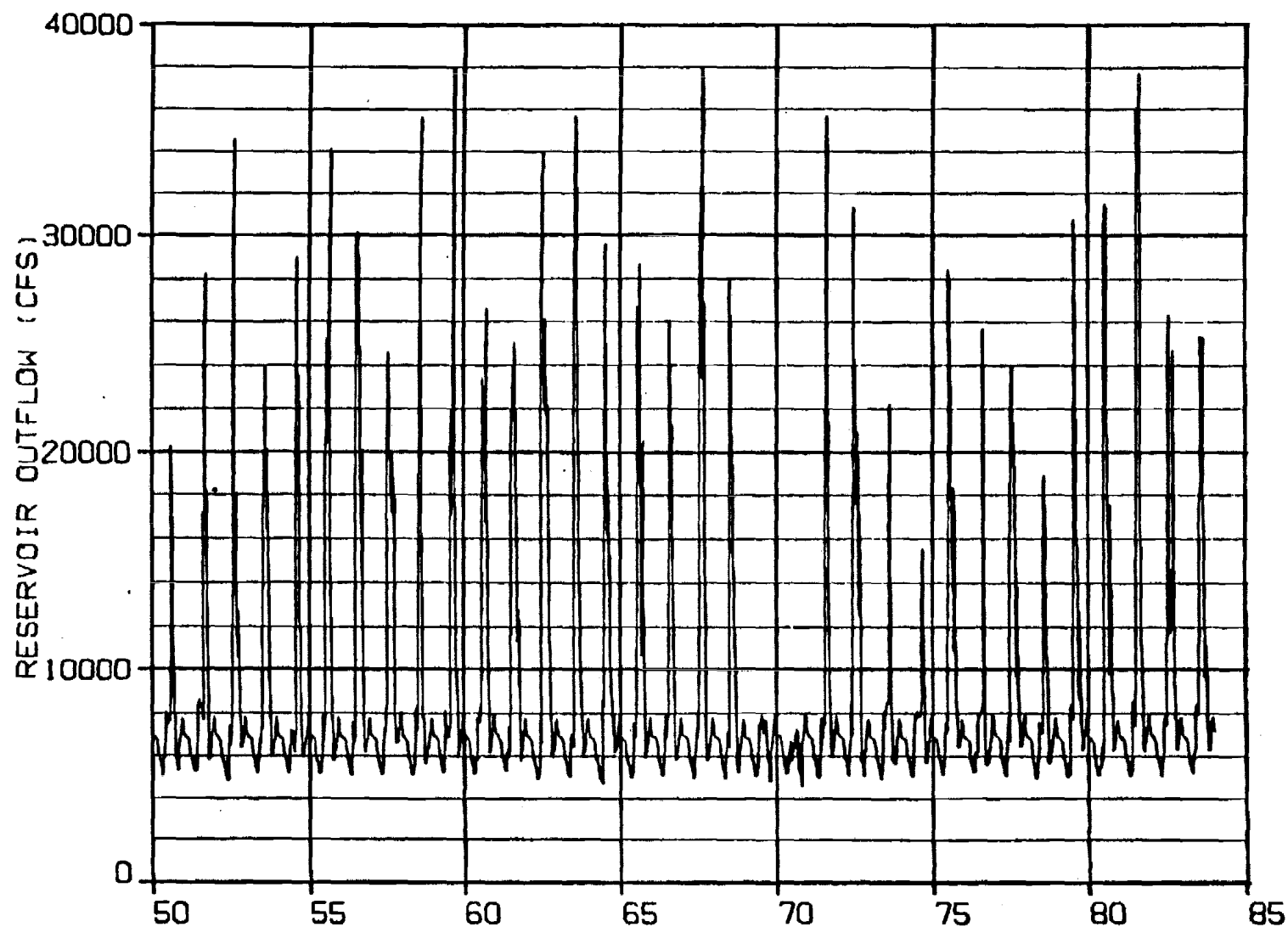
WATANA 2000 FT. DEVIL CANYON 1455 FT.



WATANA RESERVOIR INFLOW
STAGE II. LOAD YEAR 2007
WATANA 2000 FT. DEVIL CANYON 1455 FT.



WATANA RESERVOIR OUTFLOW
STAGE II, LOAD YEAR 2007
WATANA 2000 FT. DEVIL CANYON 1455 FT.



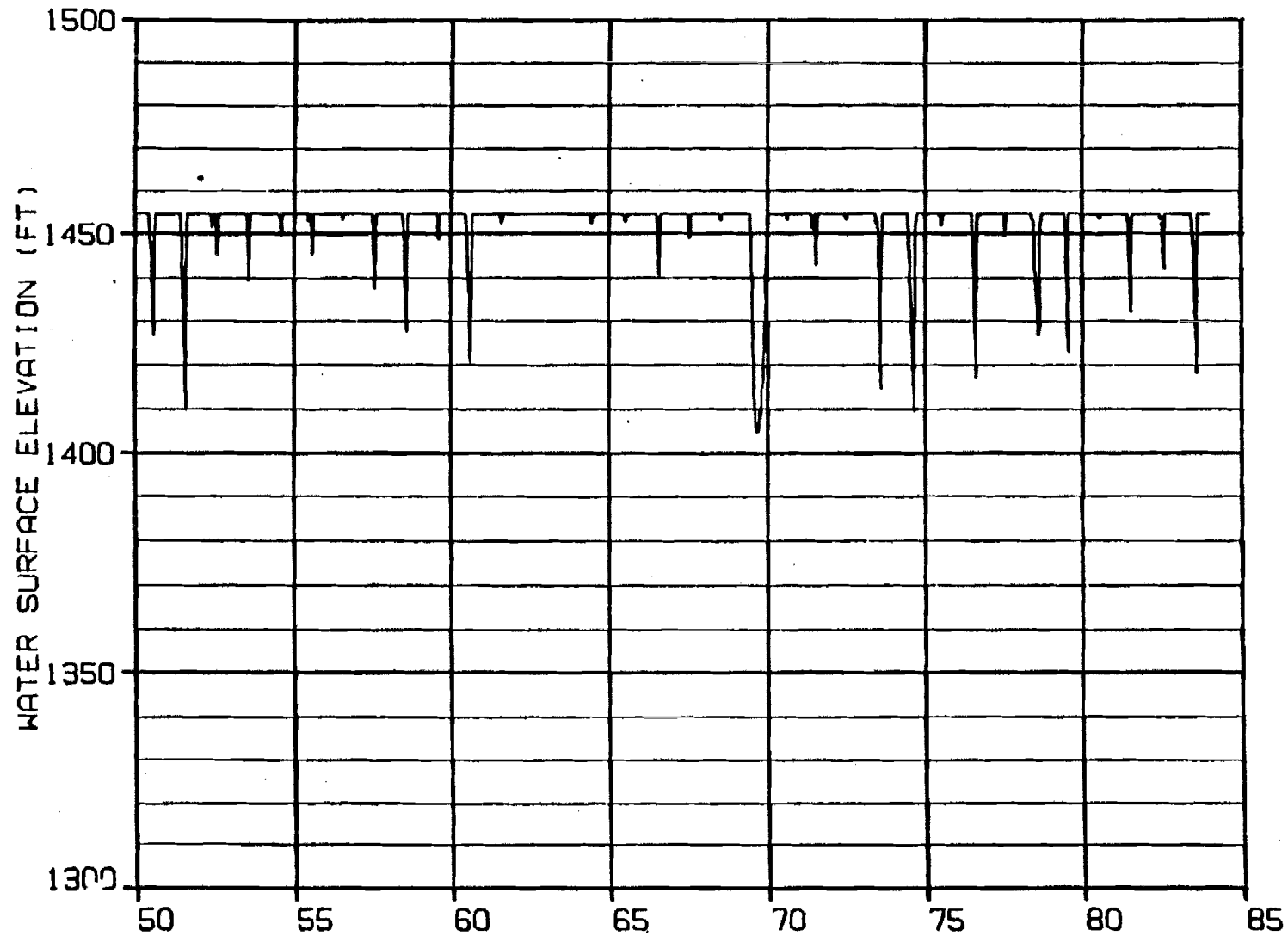
HARZA-EBASCO SUSITNA JOINT VENTURE

ALASKA POWER AUTHORITY

DEVIL CANYON WATER SURFACE ELEVATION

STAGE II, LOAD YEAR 2007

WATANA 2000 FT, DEVIL CANYON 1455 FT.



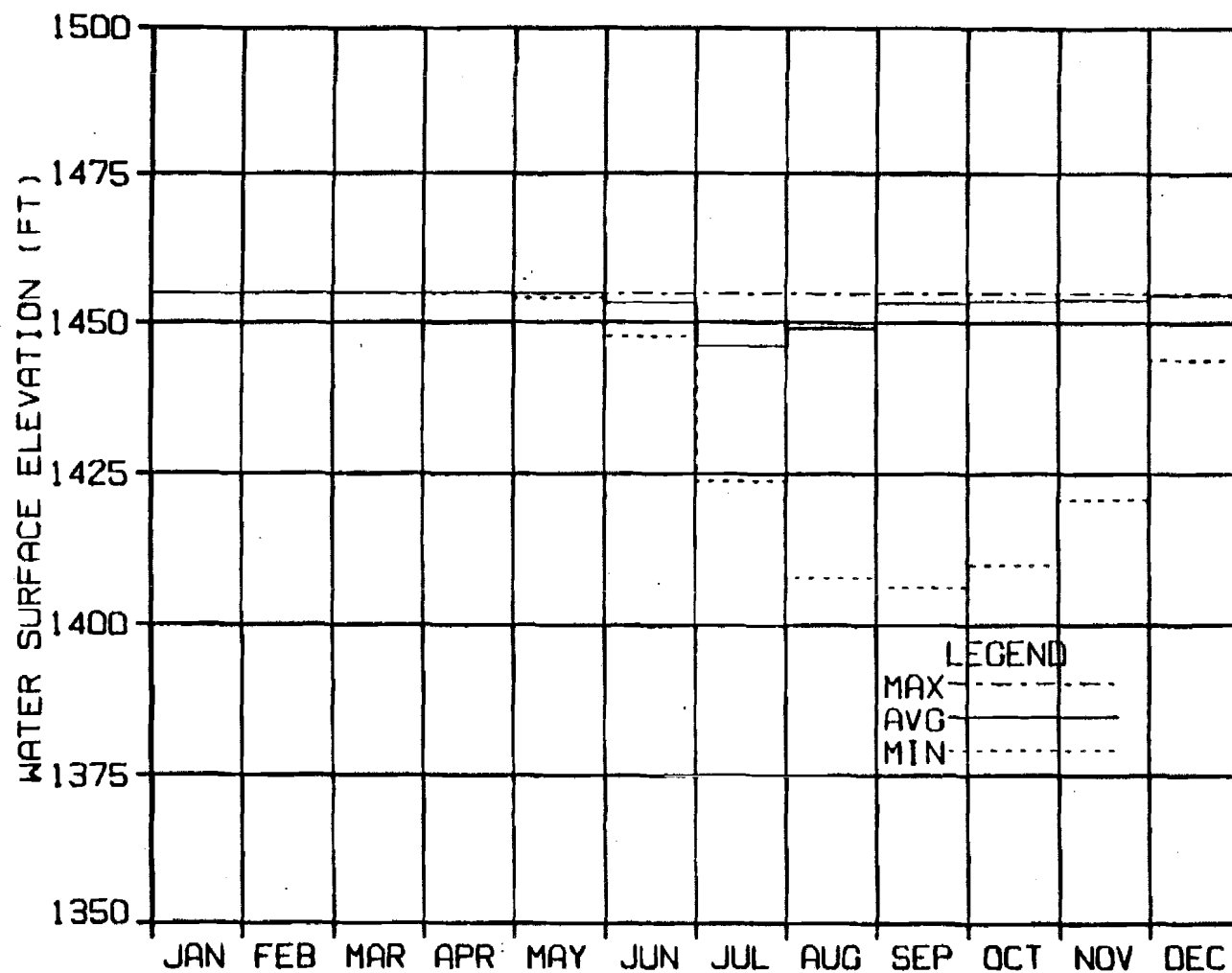
HARZA-EBASCO SUSITNA JOINT VENTURE

ALASKA POWER AUTHORITY

DEVIL CANYON WATER SURFACE ELEVATION MONTHLY SUMMARY

STAGE II, LOAD YEAR 2007

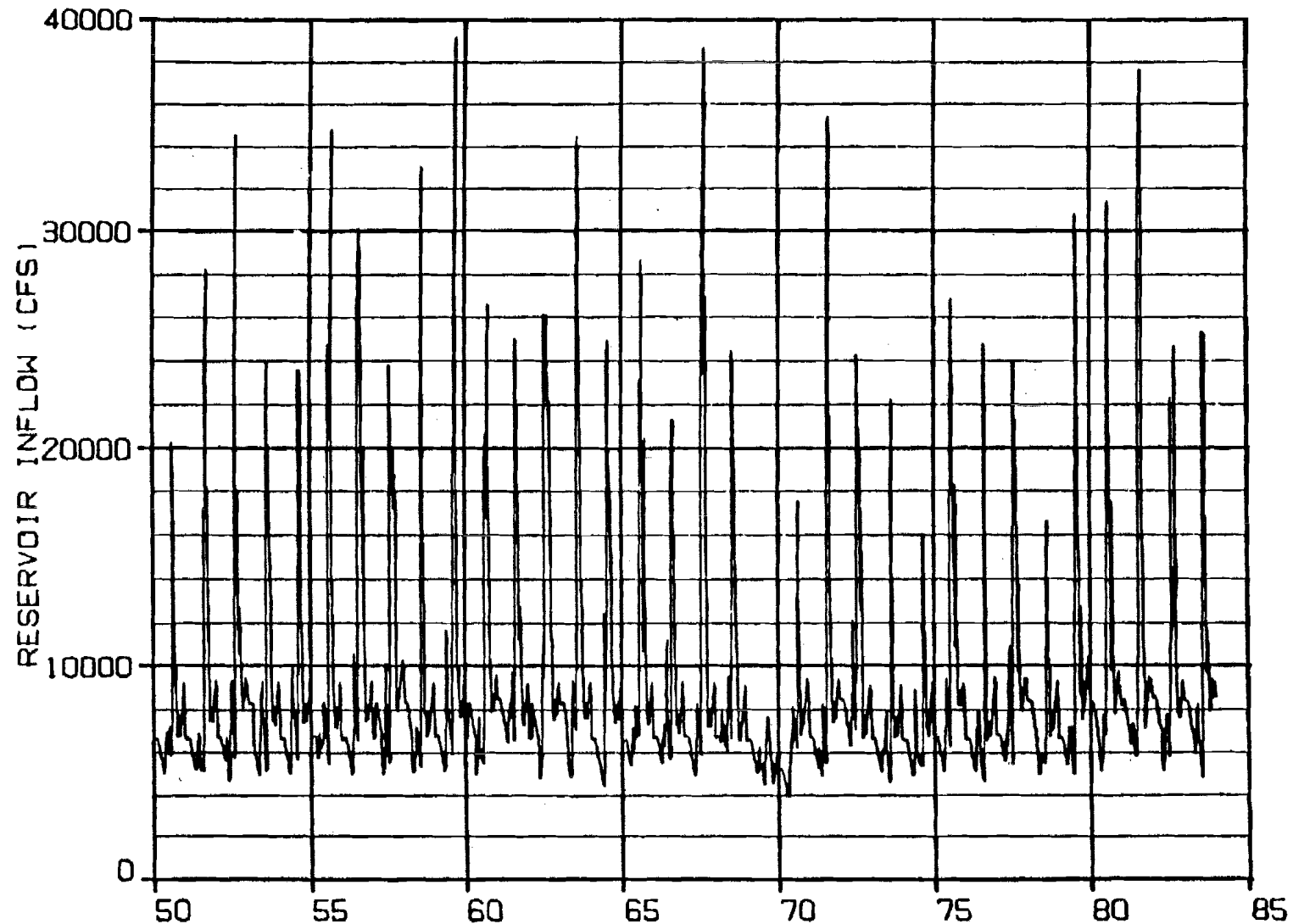
WATANA 2000 FT. DEVIL CANYON 1455 FT.



HARZA-EBASCO SUSITNA JOINT VENTURE

ALASKA POWER AUTHORITY

DEVIL CANYON RESERVOIR INFLOW
STAGE II, LOAD YEAR 2007
WATANA 2000 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON RESERVOIR OUTFLOW
STAGE II, LOAD YEAR 2007
WATANA 2000 FT, DEVIL CANYON 1455 FT.

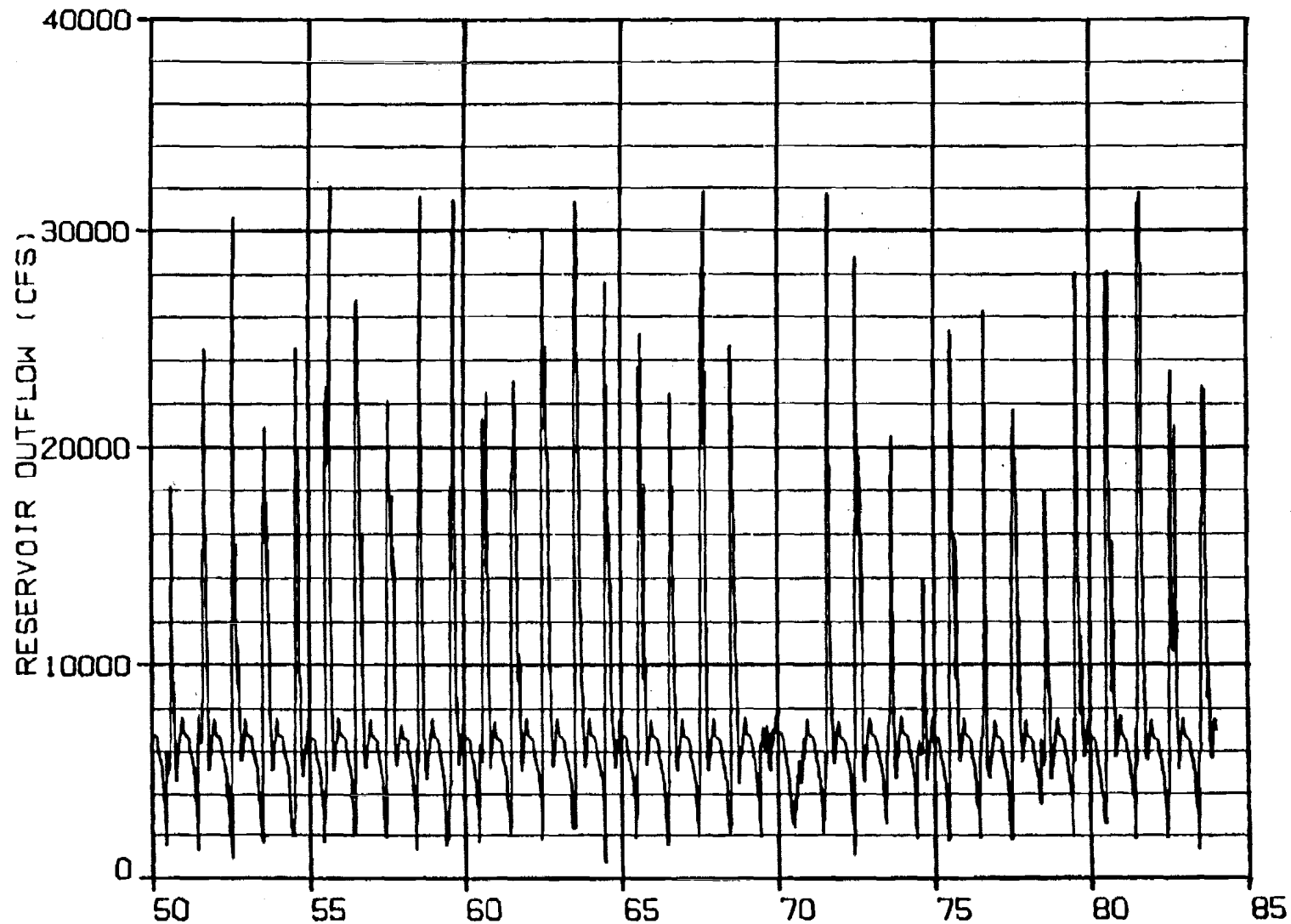
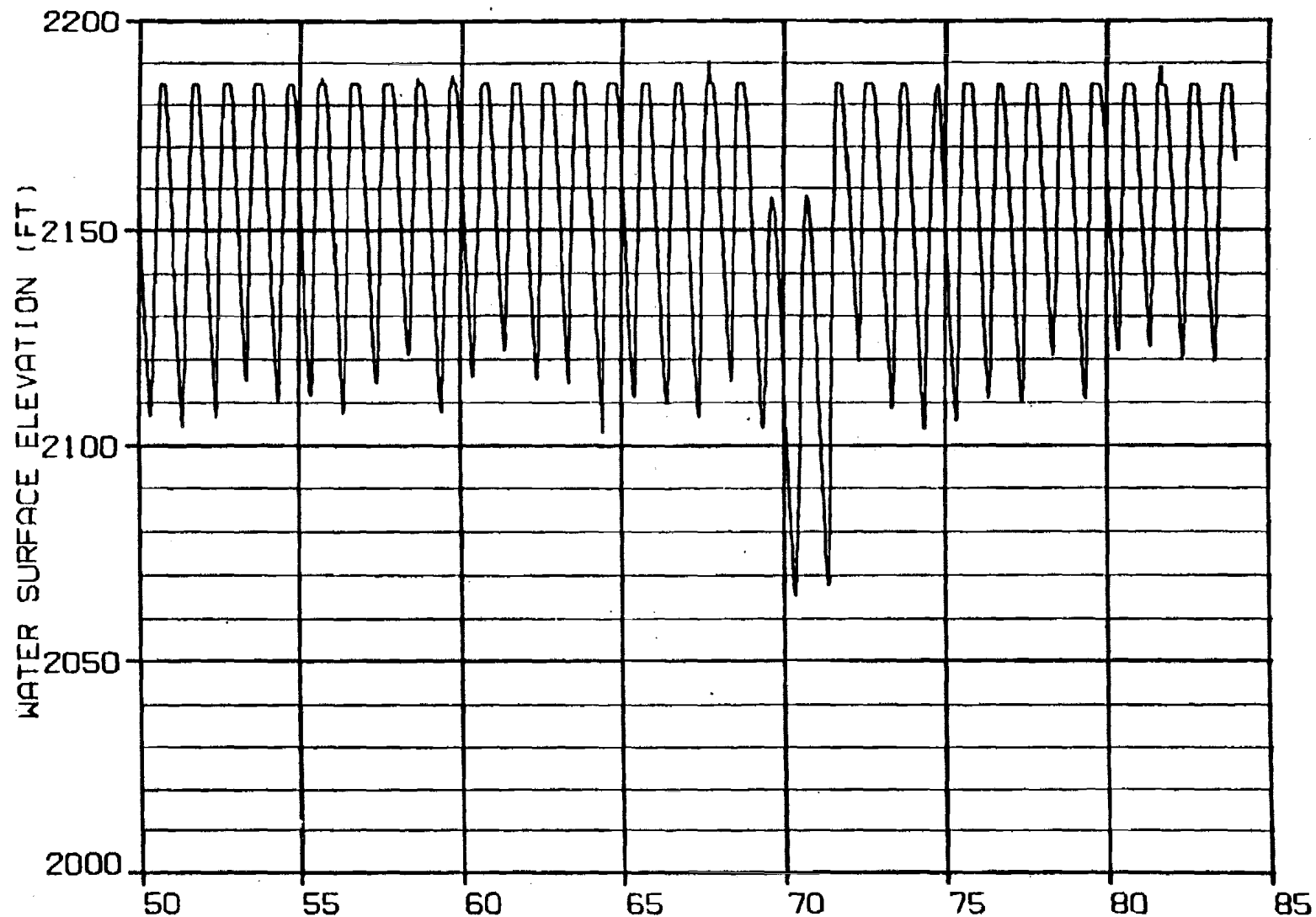


EXHIBIT 23

WATANA WATER SURFACE ELEVATION

STAGE III. LOAD YEAR 2008

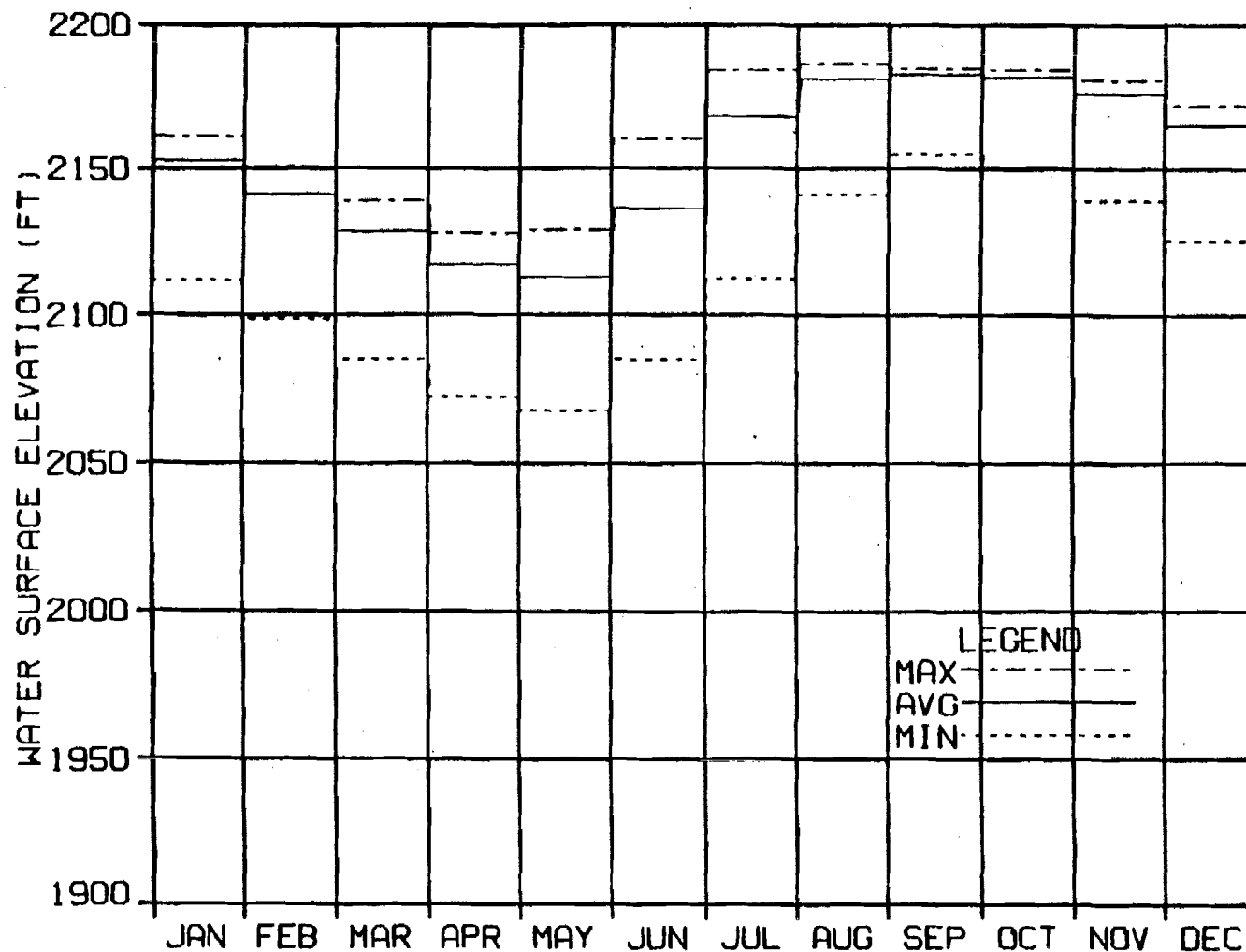
WATANA 2185 FT. DEVIL CANYON 1455 FT.



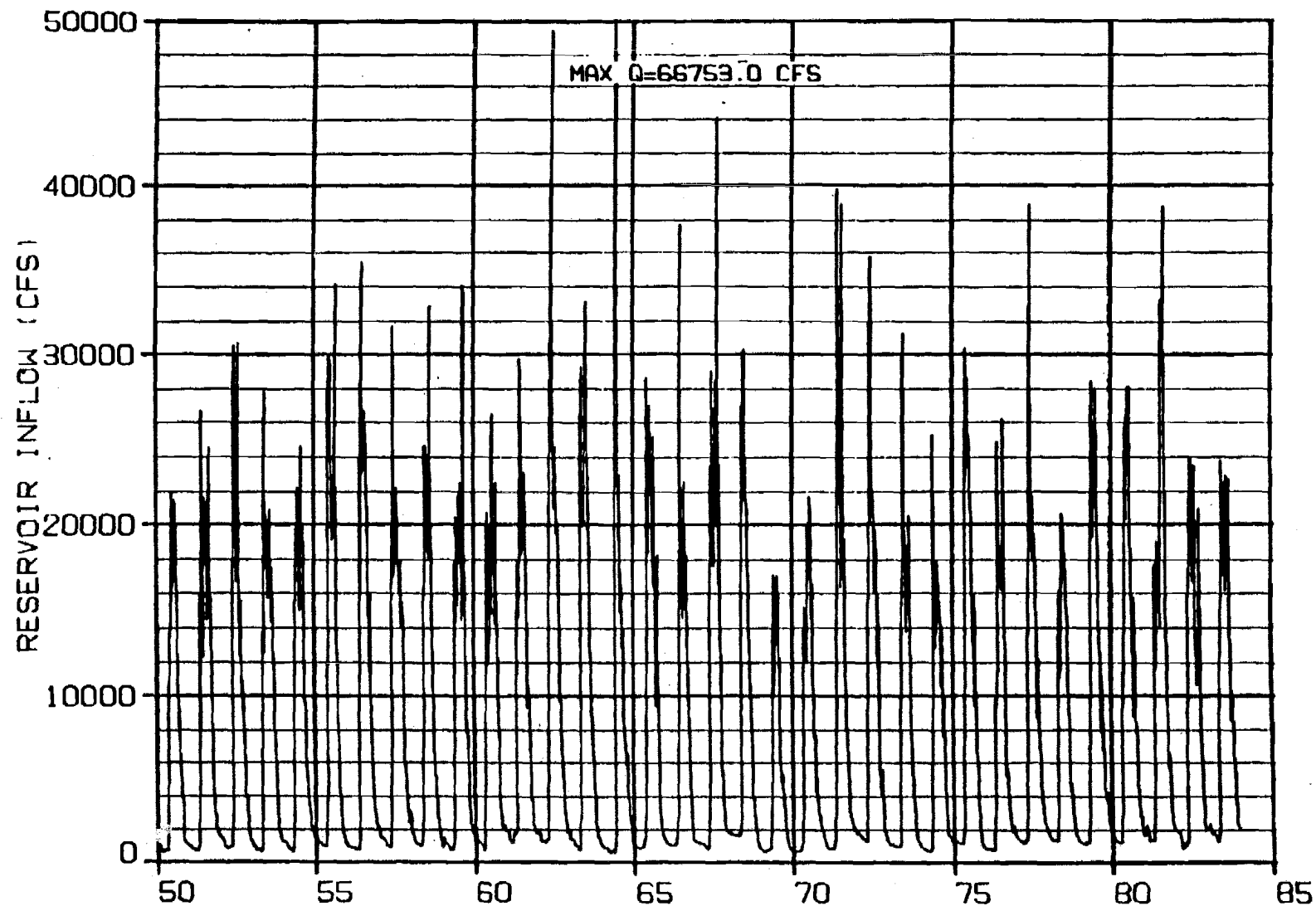
WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY

STAGE III, LOAD YEAR 2008

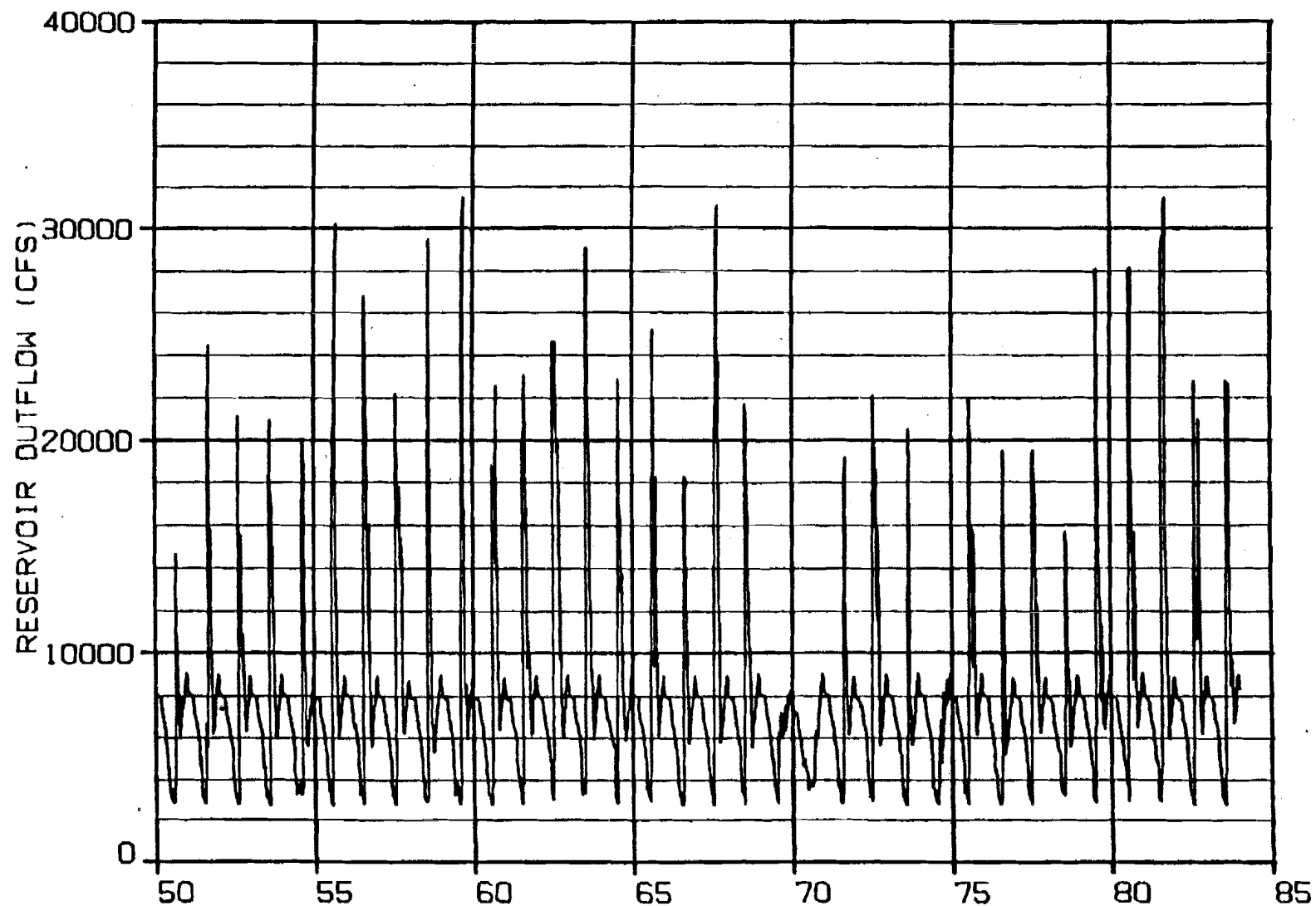
WATANA 2185 FT., DEVIL CANYON 1455 FT.



WATANA RESERVOIR INFLOW
STAGE III, LOAD YEAR 2008
WATANA 2185 FT. DEVIL CANYON 1455 FT.



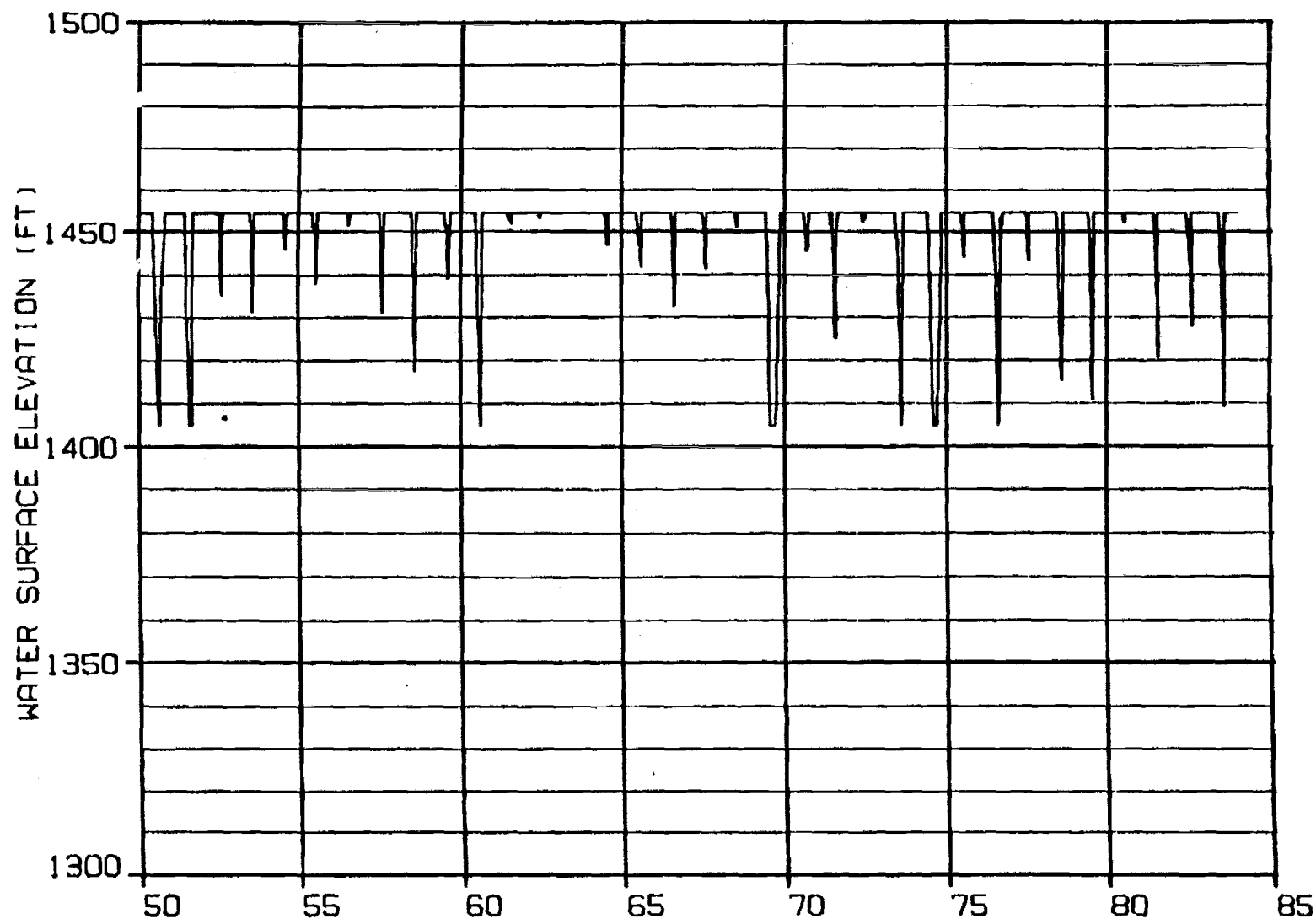
WATANA RESERVOIR OUTFLOW
STAGE III, LOAD YEAR 2008
WATANA 2185 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON WATER SURFACE ELEVATION

STAGE III. LOAD YEAR 2008

WATANA 2185 FT. DEVIL CANYON 1455 FT.

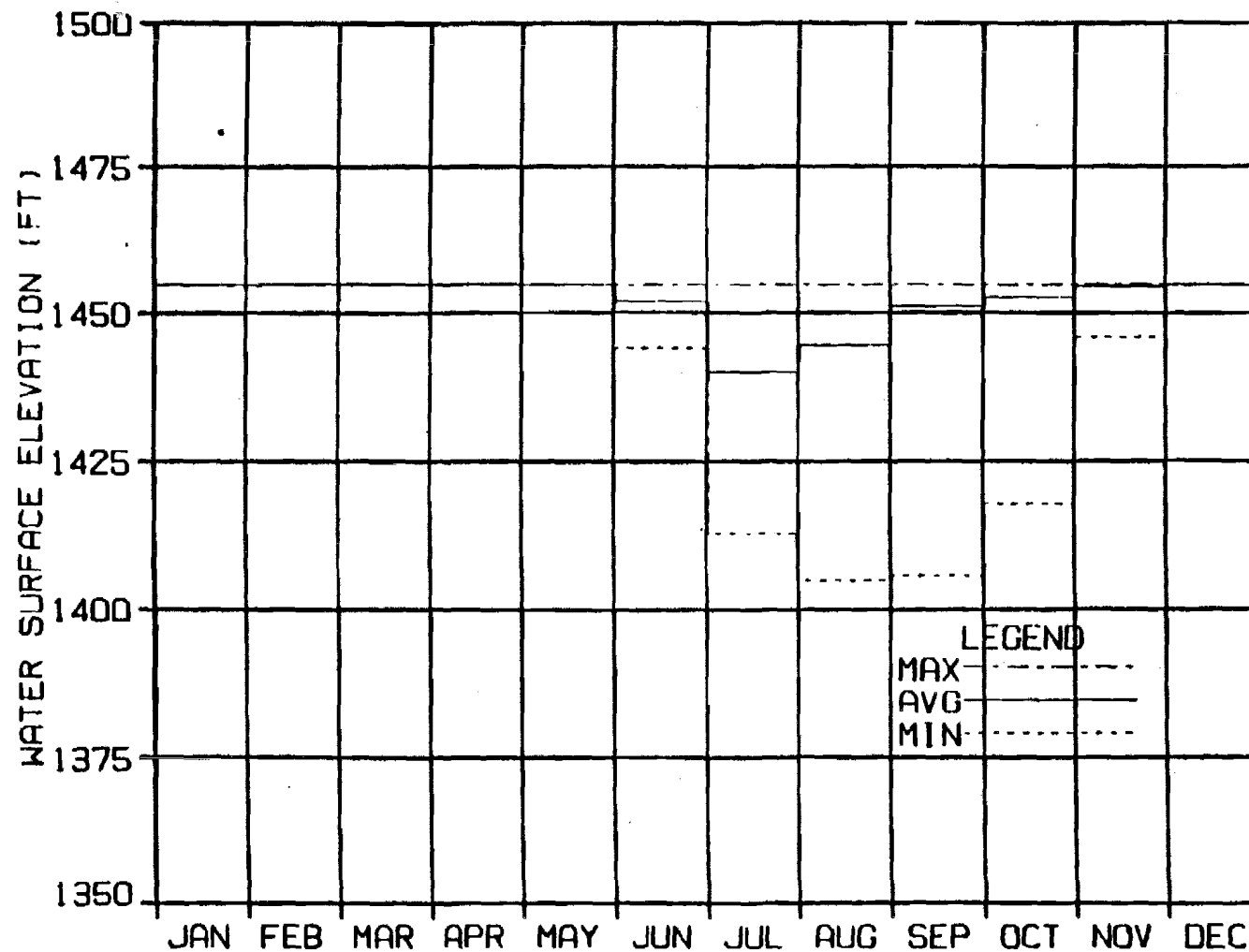


DEVIL CANYON WATER SURFACE ELEVATION

MONTHLY SUMMARY

STAGE III, LOAD YEAR 2008

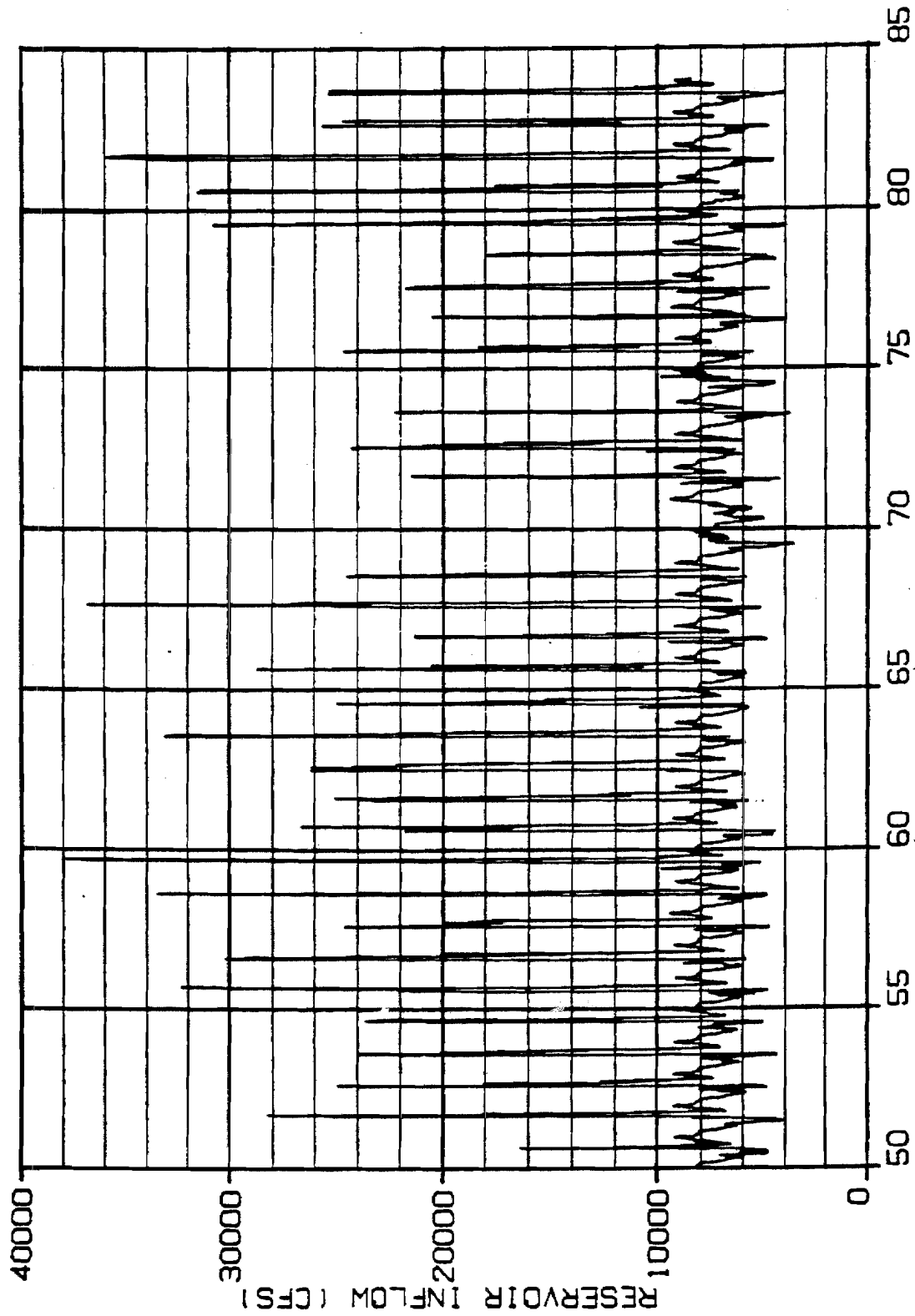
WATANA 2185 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON RESERVOIR INFLOW

STAGE III, LOAD YEAR 2008

WATANA 2185 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON RESERVOIR OUTFLOW

STAGE III, LOAD YEAR 2008

WATANA 2185 FT. DEVIL CANYON 1455 FT.

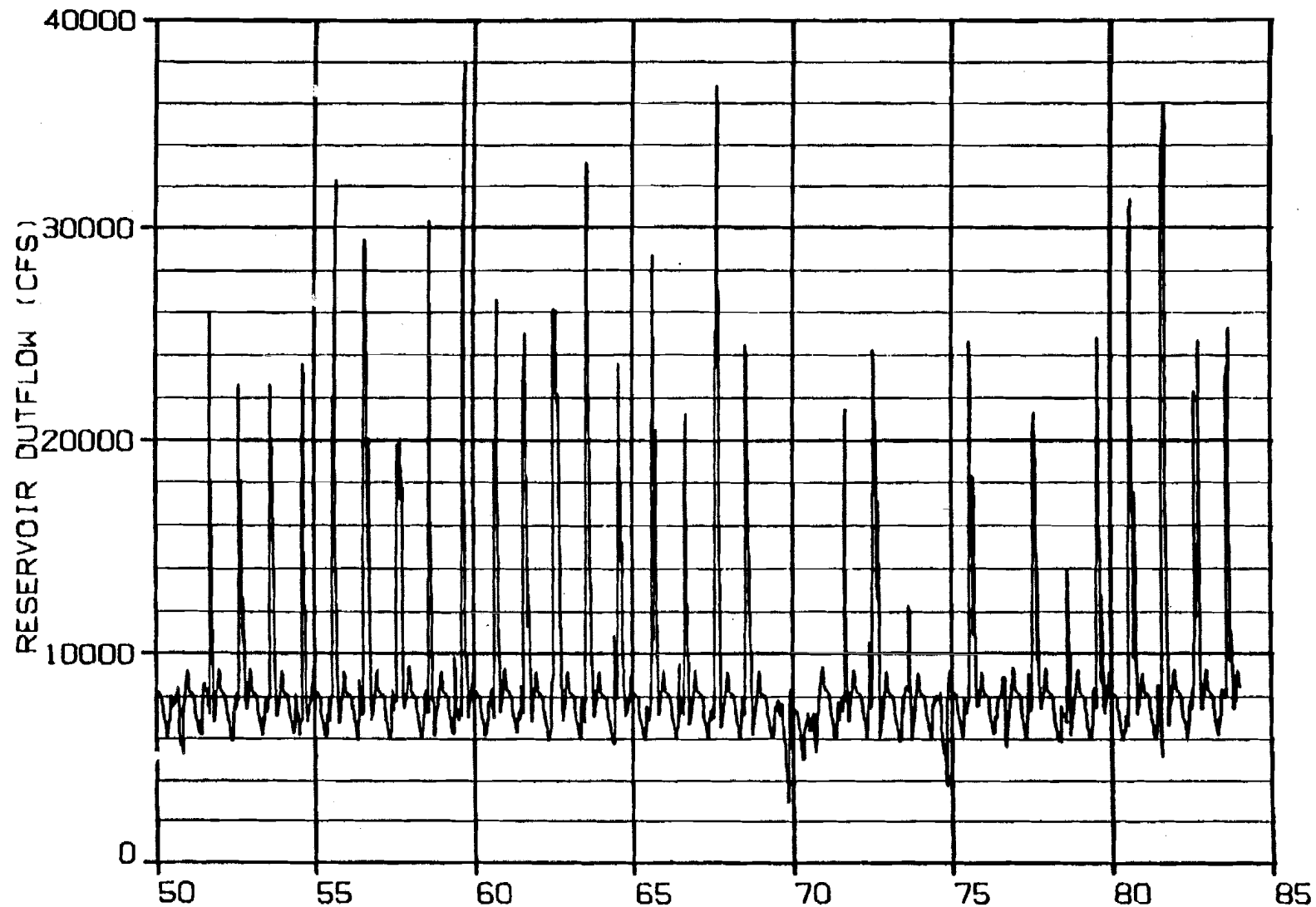
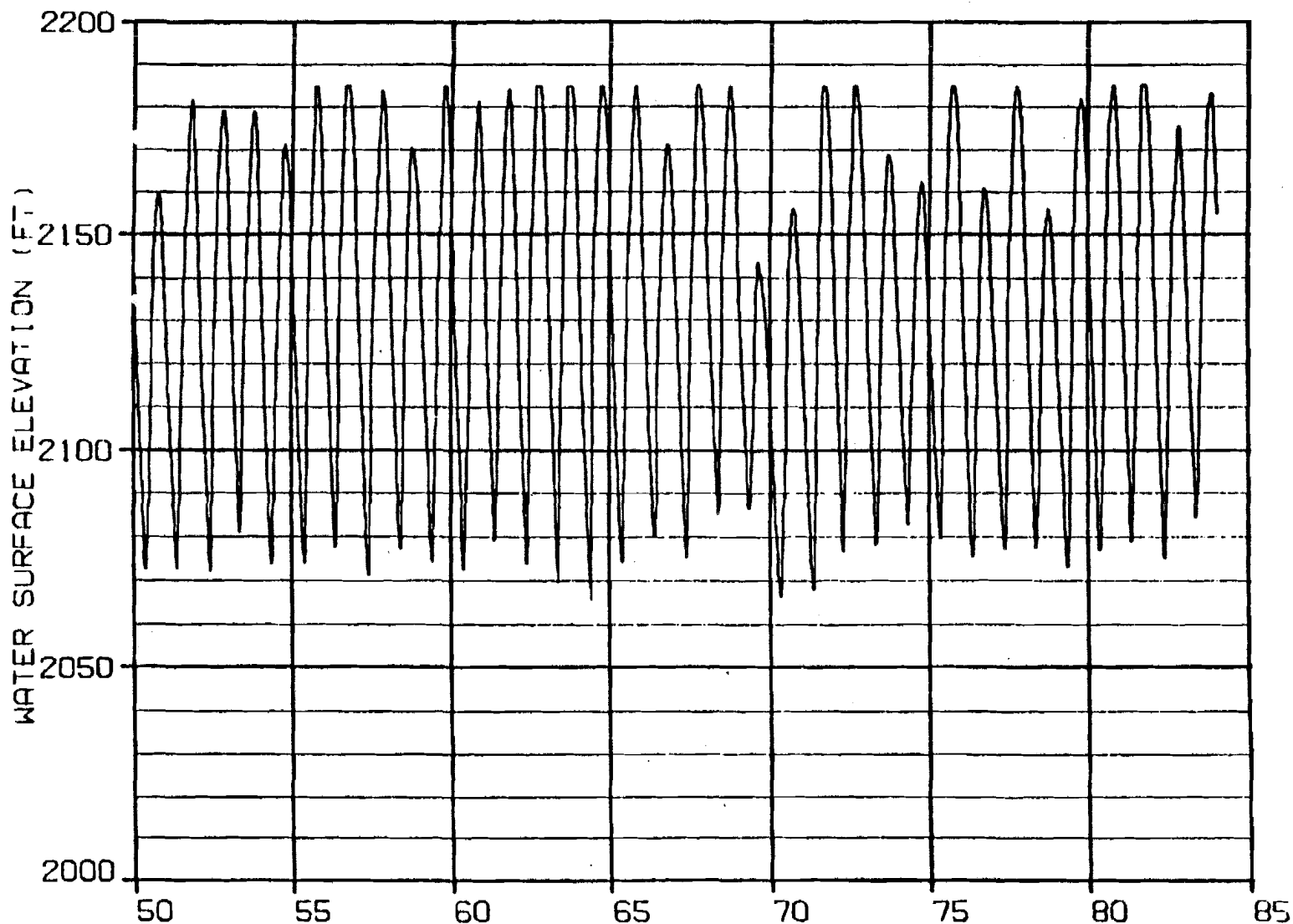


EXHIBIT 24

WATANA WATER SURFACE ELEVATION

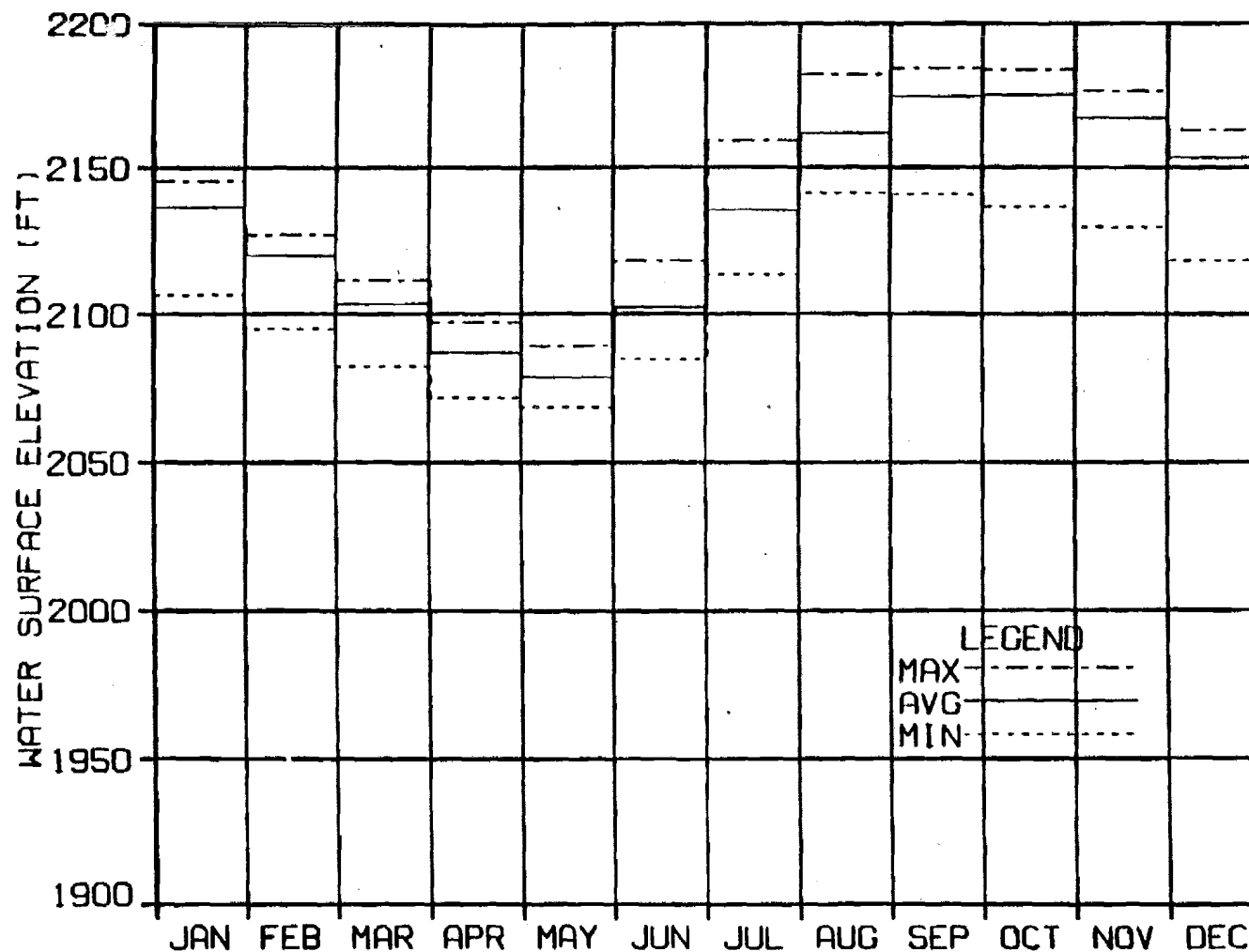
STAGE III, LOAD YEAR 2020

WATANA 2185 FT. DEVIL CANYON 1455 FT.

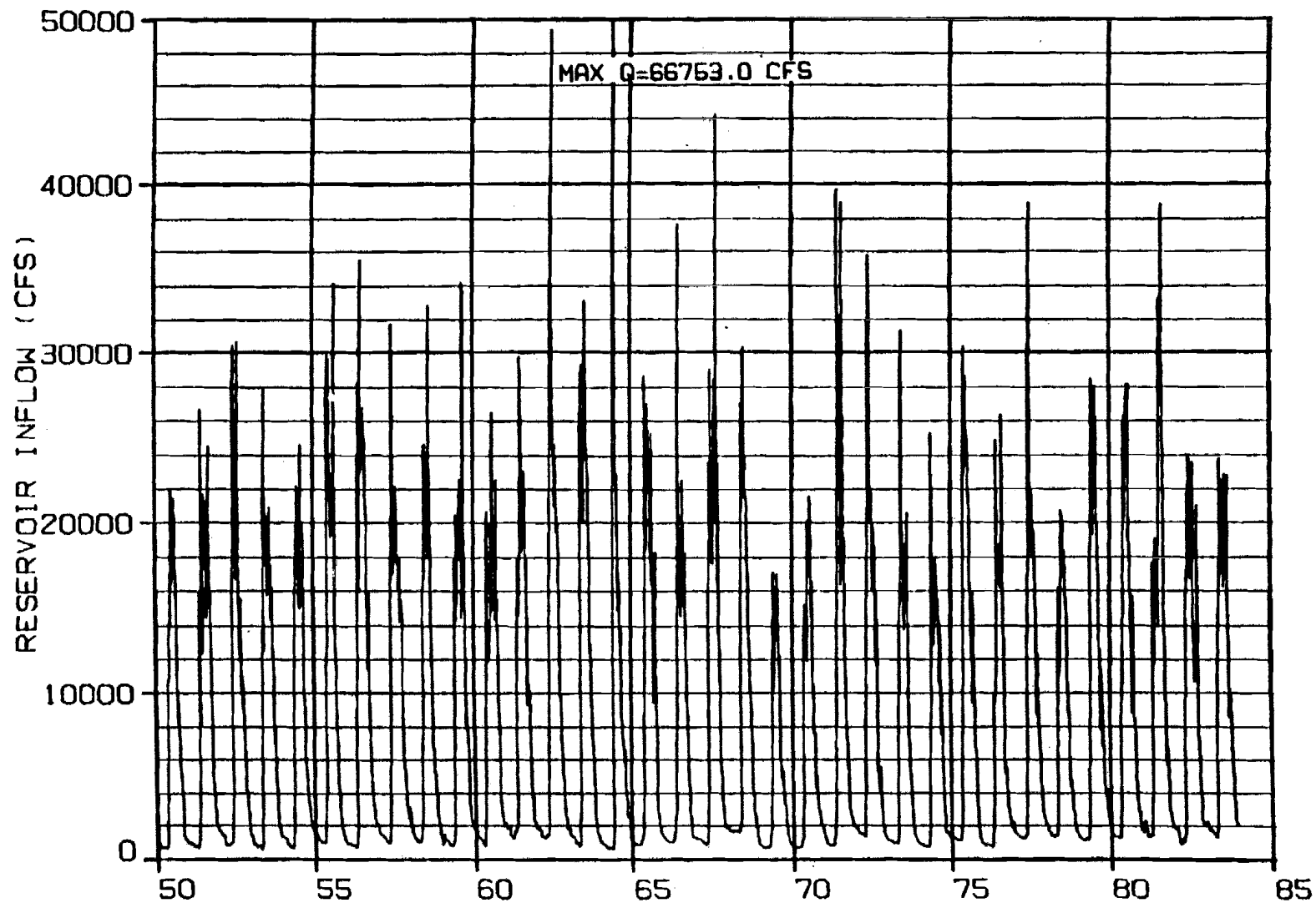


WATANA WATER SURFACE ELEVATION MONTHLY SUMMARY

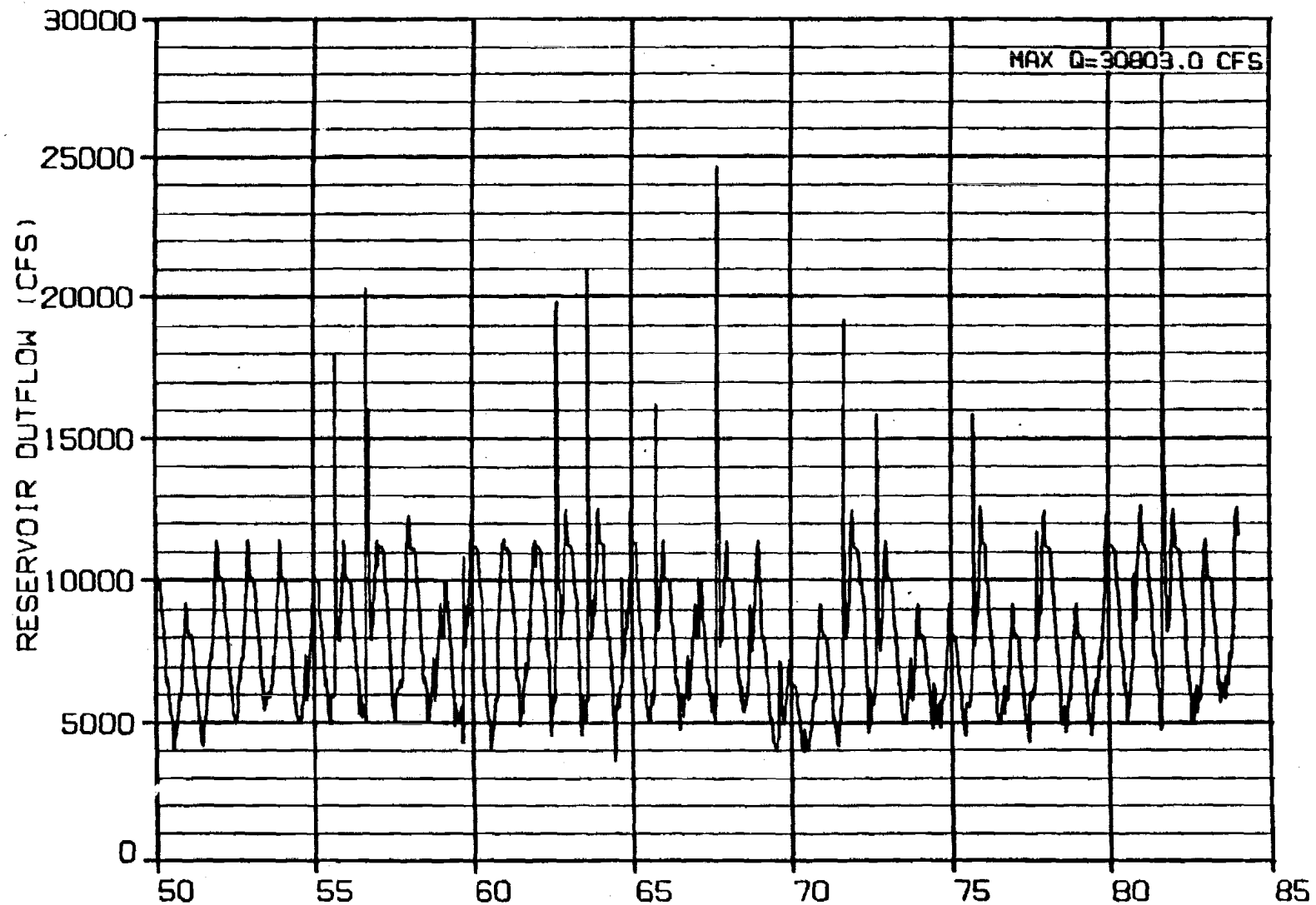
STAGE III, LOAD YEAR 2020
WATANA 2185 FT., DEVIL CANYON 1455 FT.



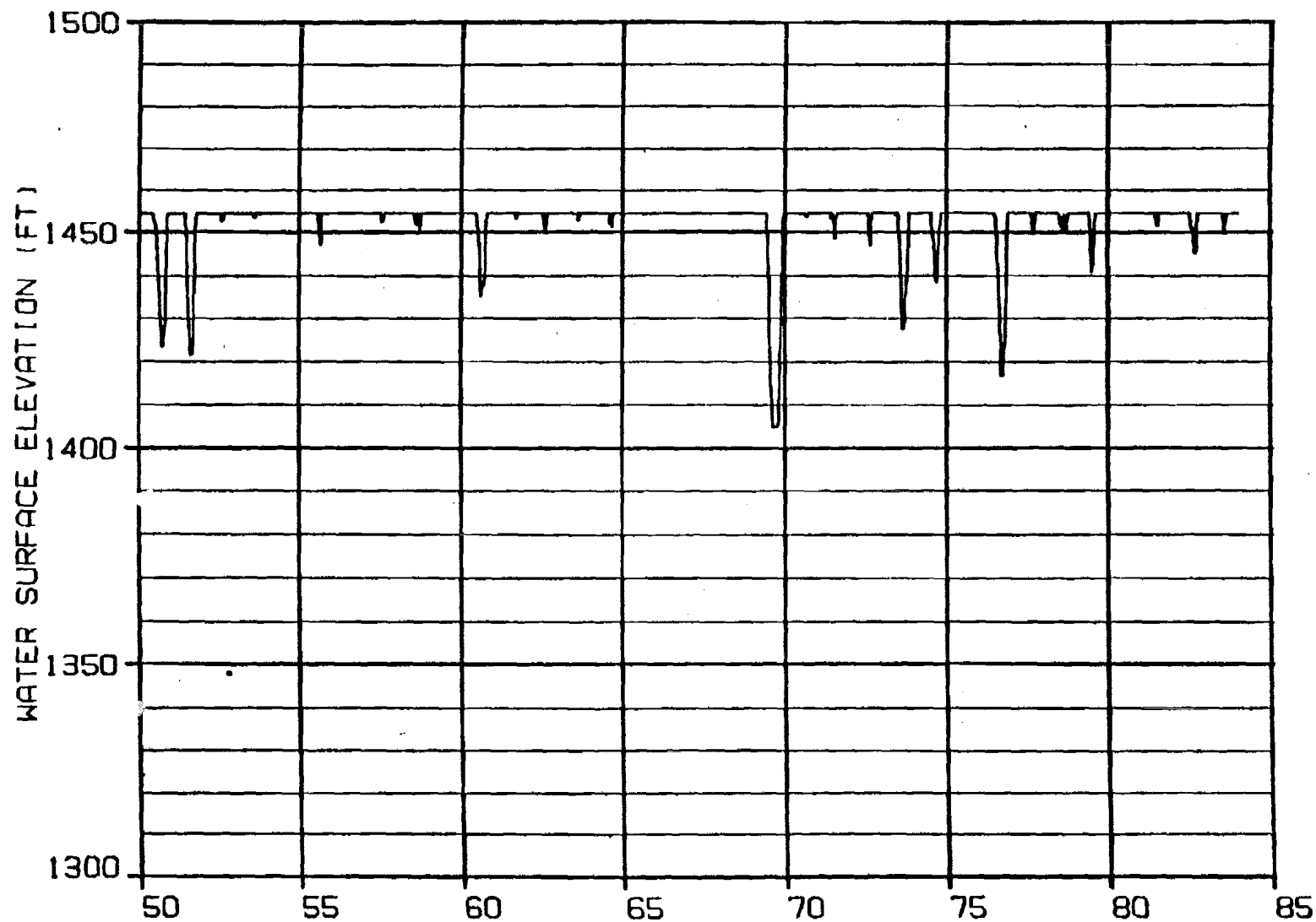
WATANA RESERVOIR INFLOW
STAGE III. LOAD YEAR 2020
WATANA 2185 FT. DEVIL CANYON 1455 FT.



WATANA RESERVOIR OUTFLOW
STAGE III. LOAD YEAR 2020
WATANA 2185 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON WATER SURFACE ELEVATION
STAGE III. LOAD YEAR 2020
WATANA 2185 FT. DEVIL CANYON 1455 FT.

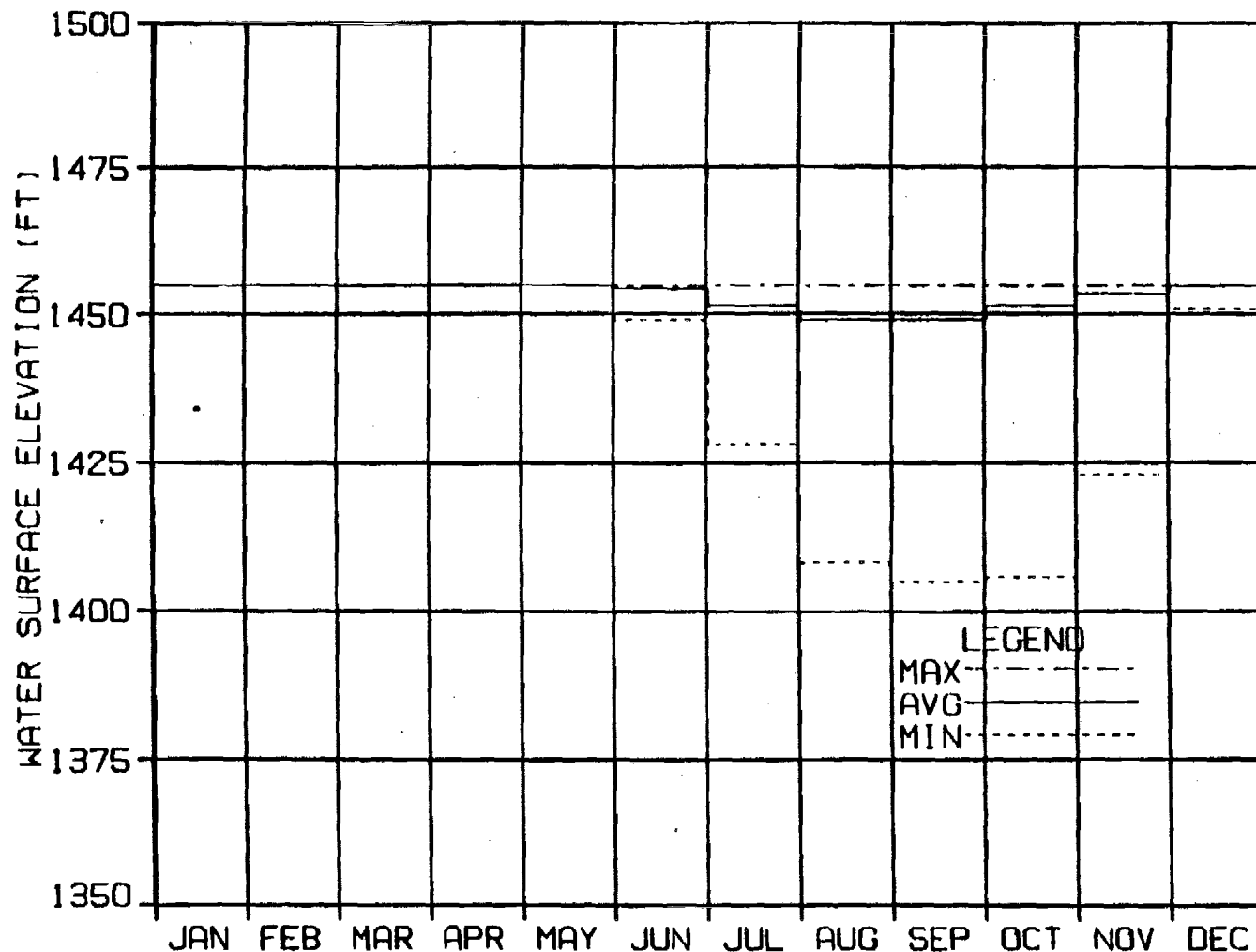


DEVIL CANYON WATER SURFACE ELEVATION

MONTHLY SUMMARY

STAGE III, LOAD YEAR 2020

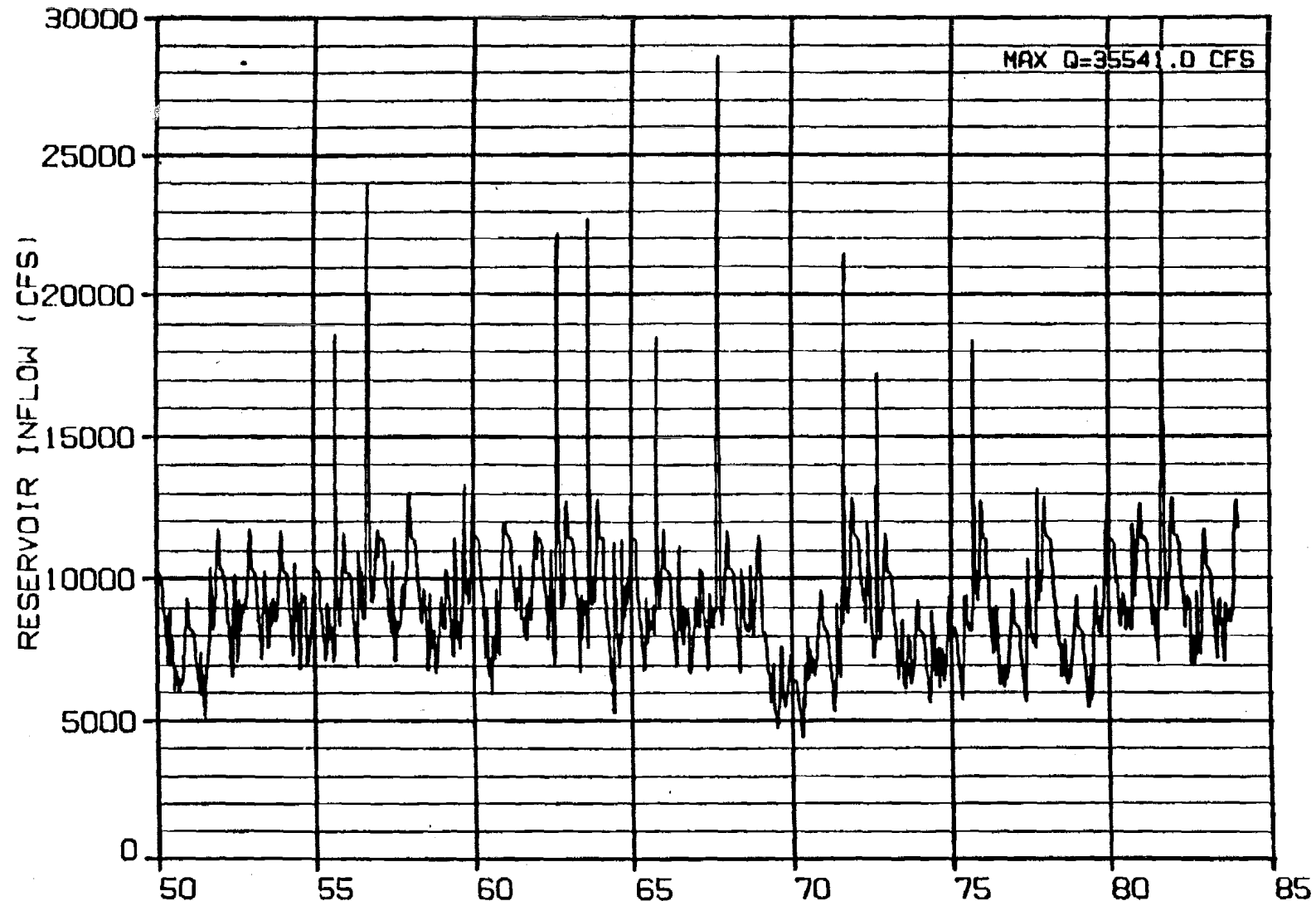
WATANA 2185 FT, DEVIL CANYON 1455 FT.



DEVIL CANYON RESERVOIR INFLOW

STAGE III. LOAD YEAR 2020

WATANA 2185 FT. DEVIL CANYON 1455 FT.



DEVIL CANYON RESERVOIR OUTFLOW
STAGE III, LOAD YEAR 2020
WATANA 2185 FT. DEVIL CANYON 1455 FT.

