

**SUSITNA
HYDROELECTRIC PROJECT**

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

**INSTREAM ICE SIMULATIONS:
SUPPLEMENTARY STUDIES FOR
MIDDLE SUSITNA RIVER**

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Susitna Joint Venture
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JULY 1985
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ALASKA POWER AUTHORITY

SUSITNA HYDROELECTRIC PROJECT

INSTREAM ICE SIMULATIONS:
SUPPLEMENTARY STUDIES FOR MIDDLE SUSITNA RIVER

Report by
Harza-Ebasco Susitna Joint Venture

Prepared for
Alaska Power Authority

Final Report
July 1985

NOTICE

**ANY QUESTIONS OR COMMENTS CONCERNING
THIS REPORT SHOULD BE DIRECTED TO
THE ALASKA POWER AUTHORITY
SUSITNA PROJECT OFFICE**

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A	Watana Only	2001	1981-82	Case C	Inflow-Matching	Present	Present
B	Watana Only	2001	1981-82	Case C	Warmest Water	Present	Present
C	Watana Only	2001	1981-82	Case C	Lowest Port	Present	Present
D	Watana Only	2001	1981-82	Case E-VI	Inflow-Matching	Present	Present
E	Watana Only	2001	1981-82	Case E-VI	Warmest Water	Present	Present
F	Watana Only	2001	1971-72	Case C	Warmest Water	Present	Present
G	Watana & Devil Canyon	2002	1981-82	Case C	Warmest Water	Present	Present
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L	Watana Only	2001	1971-72	Case C	Warmest Water	1880/1850	Present

LIST OF EXHIBITS (continued)

ICECAL SIMULATION RESULTS

<u>Exhibit</u>	<u>Project Status</u>	<u>Energy Demand</u>	<u>Weather Period</u>	<u>Flow Requirement</u>	<u>Intake Operating Policy</u>	<u>Watana Intake Design</u>	<u>Devil Canyon Cone Valve Intake</u>
M	Watana Only	2001	1971-72	Case C	Warmest Water	1800/1770	Present
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REPORT

SUMMARY

River ice simulation results are presented herein as a supplement to those included in the "Instream Ice Simulation Study" (Harza-Ebasco 1984b). The supplementary simulations are intended to evaluate the sensitivity of Susitna River ice processes to the following parameters:

- a) Case C vs. Case E-VI instream flow requirements
- b) Alternative operating policies for multi-level power intakes
- c) Alternative low levels for Watana power intake
- d) Alternative levels for Devil Canyon cone valves
- e) "Staged Project" vs. "License Application Project."

Results of the river ice simulations support the following conclusions:

1. Expected river ice conditions with the Case E-VI flow requirements are not significantly different from those with Case C.
2. Of the alternative intake operating policies considered, use of the "lowest port year-round" may be the most effective in reducing river ice development. However, this policy also results in the coldest summer releases.
3. Of the alternative Watana power intakes considered, an added low intake at elevation 1636 ft. is expected to be most effective in reducing river ice development. Low intakes at elevation 1880 or 1800 may not be effective in reducing the river ice development.

4. An alternative high cone valve (elevation 1425) at Devil Canyon has no significant effect on expected river ice conditions relative to the elevation 990 cone valve.

5. Stage I and Stage II of the "Staged Project" are expected to result in greater ice front extent and greater potential for slough overtoppings relative to the License Application Project. Stage III is expected to be similar to the completed License Application Project with regard to river ice.

1.0 INTRODUCTION

This report presents the results of river ice simulations for the middle reach of the Susitna River (i.e., downstream of the proposed Susitna Hydroelectric Project and upstream of the Chulitna River confluence - see Figure 1). These river ice simulations are provided as a supplement to the previously published "Instream Ice Simulation Study" (Harza-Ebasco 1984b) and are intended to evaluate the sensitivity of Susitna River ice processes to several parameters beyond the scope of the original report. In particular, the present report considers the effects on river ice of alternative instream flow requirements, alternative designs for the proposed multi-level power intake at Watana Dam, alternative operating policies for the power intakes at Watana and Devil Canyon Dams and alternative intake elevations for the Devil Canyon cone valve outlet works. The scope of these supplementary river ice simulations is summarized in Table 1 and details of these alternatives are discussed in Chapter 2. In addition, this report considers the river ice effects of "staged construction" of the Susitna Hydroelectric Project as an alternative to the "License Application Project." The "Staged Project," as detailed in Section 2.5, includes initial construction of a lower Watana Dam, followed by construction of the full Devil Canyon Dam and finally the raising of Watana to its full height.

The methodology for the supplementary river ice simulations herein is identical to that employed for the Instream Ice Simulation Study (Harza-Ebasco 1984b). The calibrated river ice model ICECAL (Harza-Ebasco 1984a) is used to generate the simulations. Each ICECAL simulation is based on the results of a corresponding reservoir temperature simulation via the DYRESM model (Alaska Power Authority 1984) and a stream temperature simulation via the SNTMP model (Arctic Environmental Information and Data Center 1984, Alaska Power Authority 1984). Results of the ICECAL model are presented in terms of representative ice thicknesses and water surface elevations as a function of time and location along the river. Results continue to be focused at the river mile locations of those slough and side channels believed to be most important in terms of salmon production.

For a more complete description of the background, methodology, capabilities and limitations of the river ice modeling process, it is recommended that the reader review the previously published reports (Harza-Ebasco 1984a, Harza-Ebasco 1984b) before proceeding with the present report.

2.0 SCOPE OF RIVER ICE SIMULATIONS

2.1 Alternative Operating Policies for Watana and Devil Canyon Multi-Level Power Intakes

Water temperatures within the proposed Watana and Devil Canyon reservoirs will vary with time and with depth. The multi-level power intake structures proposed for the Watana and Devil Canyon reservoirs are therefore intended to provide some degree of control over the reservoir release temperatures discharged to the river through the powerhouse. Alternative policies considered herein for operating the multi-level power intakes include "inflow-matching", "warmest water" and "lowest port". The "inflow-matching" policy, which was assumed for the "Instream Ice Simulation Study" (Harza-Ebasco 1984b), represents a year-round attempt to match the reservoir release temperatures with the natural temperature of the flow entering the reservoir. In effect, "inflow-matching" results in winter release of the coldest water available to the power intakes. The "warmest water" policy represents a year-round policy of releasing the warmest water available to the power intakes. For both "inflow-matching" and "warmest water" policies, the particular intake port selected for operation will vary with the changing reservoir levels and temperature profiles. The "lowest port" operating policy means that the lowest port of the multi-level power intake will be operated year-round regardless of water temperatures.

Comparisons of river ice simulations for these three alternative operating policies are based on Watana and Watana + Devil Canyon operating, Case C and Case E-VI alternative flow requirements (see Section 2.2) and the weather conditions of 1981-82 and 1971-72 (average and cold winters, respectively, in terms of mean air temperature).

2.2 Alternative Instream Flow Requirements

River ice simulations based on the "Case C" and "Case E-VI" alternative instream flow requirements are compared in this report. The "Case C" instream flow requirement (Figure 2) is proposed in the Susitna Hydroelectric Project License Application (Alaska Power Authority, 1983) and is assumed for the "Instream Ice Simulation Study" (Harza-Ebasco 1984b). The "Case E-VI" flow requirement (Figure 2) represents a recommended refinement of "Case C" as described in the report "Evaluation of Alternative Flow Requirements" (Harza-Ebasco 1984c). Comparisons of river ice simulations for "Case C" and "Case E-VI" are based on both "inflow-matching" and "warmest water" operating policies (Section 2.1), Watana and Watana + Devil Canyon project stages, and the 1981-82 weather conditions (an average winter in terms of mean air temperatures). Figure 3 shows a comparison of the simulated Case C and Case E-VI flow rates released from Watana reservoir for Watana operating alone with 2001 energy demand and the 1981-82 weather conditions. Figure 4 shows corresponding flows released from Devil Canyon reservoir with the 2002 energy demand.

2.3 Alternative Designs for Watana Multi-Level Power Intake

River ice simulations are provided for several alternative designs of the Watana multi-level power intake structure as detailed in Table 2. The "present design" shown in Figure 5 corresponds to that proposed in the Susitna Hydroelectric Project License Application (Alaska Power Authority, 1983) and includes intake ports at elevations 2151, 2114, 2077 and 2040 ft. MSL with an approach channel at elevation 2025 ft. MSL. This "present design" was assumed for the "Instream Ice Simulation Study" (Harza-Ebasco, 1984b). The alternative Watana power intake designs considered herein are similar to the "present design" but with one additional low level port at elevation 1880, 1800 or 1636 ft. MSL (Table 2). These alternative power intake designs are considered in order to determine if an additional low level port can effectively provide warmer winter reservoir releases and subsequently reduced river

ice cover development downstream relative to that with the "present design". Comparisons of river ice simulations for the alternative power intake designs are based on the "warmest water" operating policy (Section 2.1), "Case C" flow requirements (Section 2.2), Watana and Watana + Devil Canyon operating and the 1971-72 and 1981-82 weather conditions.

2.4 Alternative Designs for Devil Canyon Cone Valve Intakes

River ice simulations are included for two alternative designs for the intake to the Devil Canyon cone valves. The "present design" provides the cone valve intake at elevation 990 ft. MSL and was used for the "Instream Ice Simulation Study" (Harza-Ebasco, 1984b). An alternative "high level" cone valve intake at elevation 1425 ft. MSL was later considered for the purpose of improving summer release temperatures. River ice results for the "present design" and "high level" cone valves are compared herein on the basis of the "warmest water" power intake operating policy (Section 2.1), "Case C" flow requirements (Section 2.2), the "present" and Elev. 1800 Watana power intake designs (Section 2.3) and the average 1981-82 winter weather conditions.

2.5 Staged Construction of Susitna Hydroelectric Project

The Susitna Hydroelectric Project as presented in the License Application (Alaska Power Authority 1983) would be constructed in two phases. Watana Dam would be completed to its full height (normal maximum pool elevation 2185 feet MSL) for operation in 1996 and Devil Canyon Dam would be completed for operation in 2002. The river ice simulations discussed previously in this report are based on this "License Application Project." In addition, this report includes river ice simulations which consider the effects of an alternative "staged construction" of the Susitna Hydroelectric Project. With this "Staged Project", a lower Watana Dam (normal maximum pool elevation 2000 feet MSL) would initially be constructed for operation in 1996 (Stage I), followed by completion of the full Devil Canyon Dam for operation in

2002 (Stage II) and finally the raising of Watana to its full height (normal maximum pool elevation 2185 feet MSL) for operation in 2008 (Stage III). The "Staged Project", when completed, would therefore be equivalent to the "License Application Project" but would be completed at a later date.

River ice simulations for Stage I and Stage II of the "Staged Project" are included in this report for comparison with the "License Application Project." Comparisons are based on the 1981-82 weather conditions (average in terms of mean winter air temperatures), the inflow-matching power intake operating policy and the Case E-VI instream flow requirements. In accordance with the License Application, simulations of Devil Canyon included a maximum drawdown of 50 feet and a 2-level power intake (port elevations 1425 and 1375 feet MSL). In an effort to improve summer release temperatures from Devil Canyon during Stage II, an alternative 9 foot maximum drawdown and an alternative 3-level power intake (port elevations 1425, 1400 and 1375 feet MSL) were also considered. River ice simulations for these alternatives are therefore also included in this report.

3.0 RESULTS

3.1 General

The supplementary river ice simulation results are presented in Exhibits A through V. These exhibits are presented in the same format as those of the "Instream Ice Simulation Study" (Harza-Ebasco, 1984b) and include the following plotted information:

1. Profile of maximum river stages which occurred during the simulation period and the corresponding ice cover thickness which existed on the date of maximum stage.
2. Location of the ice front and 0°C water isotherm throughout the simulation.
3. Time history of water surface elevation, ice thickness and water temperature at selected slough and side channel locations.

Tables 3, 6 and 9 present a summary of the maximum simulated river stages and simulated ice front progression for the various alternatives considered in this study (see Chapter 2). With a similar format, Tables 4, 7 and 10 summarize the maximum simulated total ice thicknesses and Tables 5, 8 and 11 show the maximum solid ice thicknesses for the various alternatives.

For comparative purposes, Tables 3 through 11 include summary results of certain river ice simulations already presented in the Instream Ice Simulation Study (Harza-Ebasco 1984b).

3.2 Alternative Operating Policies for Watana and Devil Canyon Multi-Level Power Intakes

3.2.1 Watana Operating Alone with 2001 Energy Demand

River ice simulation results for the alternative power intake operating policies for Watana operating alone (License Application Project) are presented in Exhibits A through F. A summary of these results is shown in Tables 3, 4 and 5. (Note that these exhibits and tables also consider the effects of the alternative instream flow requirements - see Section 3.3.)

Review of Tables 3, 4 and 5 suggests that the relative effects on river ice of the alternative Watana power intake operating policies (i.e. "inflow-matching", "warmest water" and "lowest port" - see Section 2.1) do not follow a simple general trend. These river ice results, however, are consistent with the corresponding results of the reservoir temperature simulations (DYRESM model) and can best be discussed in conjunction with the DYRESM results. Figures 6, 7 and 8 show these corresponding reservoir temperature simulation results for the alternative power intake operating policies based on Watana operating alone with 2001 energy demand.

Figure 6 shows that, based on Case C flows and 1981-82 weather conditions, the "lowest port" operating policy provides significantly warmer releases (often by 1°C or more) during the winter months than either the "inflow-matching" or "warmest water" policies. This is reflected in the river ice results (Tables 3, 4 and 5) which show a significantly reduced ice front extent, reduced ice thickness and river stages and fewer slough overtoppings for the "lowest port" policy relative to "inflow-matching" or "warmest water." Figure 6 shows that the "lowest port" policy also provides summer releases which are often colder (by as much as 6°C) than those of "inflow-matching" or "warmest water". To some extent, these cold summer releases of the "lowest port" policy may allow the reservoir to store

a relatively large amount of thermal energy (compared to the alternative policies) which can subsequently be released in the form of warmer water the following winter. Based on Case C flows and the 1981-82 weather conditions, it therefore appears that the "lowest port" policy is more effective than the other policies in reducing the extent of river ice development. Environmental effects of the relatively cold summer releases with the "lowest port" policy are beyond the scope of this report.

Based on the Case C flows and 1981-82 weather conditions, Tables 3, 4 and 5 show that the "warmest water" operating policy is not effective in reducing river ice development relative to "inflow-matching". In fact, simulated results of the "warmest water" policy at some locations show greater ice thicknesses and river stages than the "inflow-matching" policy. These river ice results are consistent with the corresponding reservoir temperature simulation results (see Figure 6) which show that, for Case C flows and 1981-82 weather, the "warmest water" policy provides winter releases which are often cooler than those of the "inflow-matching" policy. Although this result may appear unusual, it should be emphasized that these alternative power intake operating policies are year-round policies. As shown in Figure 6, the summer releases of the "warmest water" policy are often significantly warmer than those with "inflow-matching". The "warmest water" policy may therefore cause faster depletion of thermal energy storage in the reservoir and subsequently colder water available for release the following winter.

A comparison of the "warmest water" and "inflow-matching" policies is also made for the Case E-VI flows with 2001 energy demand and 1981-82 weather conditions. The simulated river ice results for Case E-VI are again consistent with the corresponding reservoir temperature simulation results shown in Figure 7. As shown, temperature simulations with Case E-VI flows apparently result in a different trend from the Case C flows discussed above. With Case E-VI (see Figure 7), the "warmest water" policy again shows summer releases which are often

warmer than those of "inflow-matching", but also shows warmer winter releases. In this case, release of warmer water during the summer may have resulted in earlier formation of the reservoir ice cover which subsequently tended to insulate the reservoir from the further cooling effects of wind and air temperature. As shown in Tables 3, 4 and 5, simulated river ice results for Case E-VI with the "warmest water" policy show reduced ice thicknesses, river stages and ice front extent and fewer slough overtoppings relative to "inflow-matching".

Alternative operating policies for Watana operating alone with 2001 energy demand and Case C flows are also simulated for 1971-72 weather conditions. For these conditions, Figure 8 shows that reservoir releases with the "warmest water" policy are warmer during the winter months than those with the "inflow-matching" policy. These release temperatures are again reflected in the simulated river ice results. As shown in Tables 3, 4 and 5, the "warmest water" policy (with Case C flows, 2001 energy demand, 1971-72 weather) results in reduced ice thicknesses and river stages and fewer slough overtoppings in the reach upstream of River Mile 126 relative to the "inflow-matching" policy.

3.2.2 Watana and Devil Canyon Operating with 2002 Energy Demand

River ice simulation results for the "inflow-matching" and "warmest water" power intake operating policies for Watana and Devil Canyon operating (License Application Project) with 2002 energy demand are presented in Exhibits G, H and I. These results are based on Case C and Case E-VI flows and the 1981-82 weather conditions. As shown in Tables 3, 4 and 5, the river ice results for the "warmest water" policy are nearly identical to those with with "inflow-matching" policy. The corresponding reservoir temperature simulation results (Figures 9 and 10) show that the "warmest water" policy provides slightly warmer winter releases than "inflow-matching", but this difference is not great enough to significantly affect the river ice development.

3.3 Alternative Instream Flow Requirements

3.3.1 Watana Operating Alone with 2001 Energy Demand

River ice simulation results for Watana operating alone with the Case C and Case E-VI alternative flow requirements are presented in Exhibits A, B, D and E. These comparisons are based on the License Application Project, the 1981-82 weather conditions and 2001 energy demand and consider both "inflow-matching" and "warmest water" intake operating policies. Results are summarized in Tables 3, 4 and 5. As discussed in Section 3.2.1, trends in river ice simulation results reflect the corresponding trends in the reservoir temperature simulation results. Simulated Watana reservoir release temperatures for the alternative instream flow requirements are compared in Figures 11 and 12.

Based on the "inflow-matching" policy, simulated reservoir release temperatures during the winter for Case C and Case E-VI show significant time-variation (Figure 11) but the average winter release temperatures for the two flow cases appear quite similar. The corresponding river ice simulations for "inflow-matching" show that Case E-VI causes slightly greater ice thicknesses and river stages upstream of River Mile 126 and slightly reduced ice thicknesses and river stages downstream of River Mile 126 relative to Case C. The extent of the ice cover progression and the occurrences of slough overtoppings, however, remains nearly the same for Case C and Case E-VI.

Based on the "warmest water" policy, Figure 12 shows that Case E-VI results in warmer winter reservoir releases (often by 1°C) than those of Case C. This is reflected in reduced river ice extent, reduced river stages and fewer slough overtoppings for the Case E-VI river ice simulations relative to Case C (Tables 3, 4 and 5) based on the "warmest water" policy.

3.3.2 Watana and Devil Canyon Operating with 2002 Energy Demand

River ice simulation results for the alternative flow requirements with both dams operating are presented in Exhibits G, H and I. Comparisons of Case C and Case E-VI are based on the License Application Project, the 1981-82 weather conditions and 2002 energy demand and include "inflow-matching" and "warmest water" operating policies. Corresponding results of the Devil Canyon reservoir release temperature simulations are shown in Figures 13 and 14.

Figures 13 and 14 show that the simulated winter releases from Devil Canyon reservoir for Case E-VI are generally quite similar or only slightly colder than those of Case C. This trend is reflected in the river ice simulations which show generally similar river stages, ice thicknesses and slough overtoppings for Case C and Case E-VI flow requirements.

3.4 Alternative Designs for Watana Multi-Level Power Intake

3.4.1 Watana Operating Alone with 2001 Energy Demand

River ice simulation results for alternative Watana power intake designs (see Section 2.3) are presented in Exhibits B, F and J through O based on Watana operating alone (License Application Project), 2001 energy demand, Case C flows and the "warmest water" operating policy. These results are summarized for comparison in Tables 6, 7 and 8. Figures 15 and 16 show simulated reservoir release temperatures for several of these alternatives and are consistent with the trends in river ice simulation results.

Tables 6, 7 and 8 show that the addition of a lower level intake port may tend to reduce somewhat the extent of the simulated river ice cover and corresponding river stages near the upstream extent of the cover. Based on the 1971-72 weather condition, the largest reduction in ice extent, relative to the present intake design, is simulated for

the addition of an intake port at elevation 1636 ft. For this alternative, the ice cover extent is reduced by 9 miles and simulated overtopping at sloughs 9A, 11, 20 and 21 is prevented, relative to the present intake design.

Provision of a lower level intake port, however, does not necessarily result in significantly reduced river ice development. Based on the 1971-72 weather conditions, for example, an additional intake at elevation 1880 ft. provides no reduction in river ice extent or slough overtoppings relative to the present intake design. A lower level intake at elevation 1800 ft. shows only a very slight reduction in river ice extent and prevents at most only one additional slough (Slough 21-A6) from overtopping relative to the present design.

It therefore appears that the addition of lower level ports to the Watana power intake may not be a dependable method for reducing the extent of river ice development. Also, further consideration of the alternative low intakes, particularly at elevation 1636, will require evaluation of other environmental effects (e.g., high turbidity, low dissolved oxygen) associated with releases from such great depths.

3.4.2 Watana and Devil Canyon Operating with 2002 Energy Demand

River ice simulation results for alternative Watana intake designs are presented in Exhibits G, P, Q and R based on Watana and Devil Canyon operating (License Application Project), 2002 energy demand, 1981-82 weather conditions, Case C flows and the "warmest water" intake operating policy. These results are summarized for comparison in Tables 6, 7 and 8. Note that comparisons are based on both "present" and "high" alternative designs for the Devil Canyon cone valves (see Section 2.4). Figures 17 and 18 show the corresponding reservoir release temperature simulation results.

Tables 6, 7 and 8 show that an additional Watana intake port at elevation 1800 results in a very slight reduction in river ice development

relative to the existing Watana intake designs. For the most part, river stages and slough overtoppings with the lower (Elevation 1800) intake are the same as those with the present design. This trend occurs based on both the "present design" and the "high level" Devil Canyon cone valves. It therefore again appears that lower level power intakes for Watana may not be effective in reducing river ice development.

3.5 Alternative Designs for Devil Canyon Cone Valve Intake

River ice simulation results for the "present" and "high level" designs for the Devil Canyon cone valve intake (see Section 2.4) are presented in Exhibits G, P, Q and R. These alternatives are based on 1981-82 weather conditions, the License Application Project, 2002 energy demand, Case C flows and "warmest water" operating policy. The results are summarized for comparison in Tables 6, 7 and 8. Corresponding results of the reservoir release temperature simulations are shown in Figures 19 and 20.

As shown in Figures 6, 7 and 8, there is no significant difference in river ice results between the alternative Devil Canyon cone valve intake designs. This is true based on both the "present design" and the alternative "El. 1800" design for the Watana power intakes. The similarity of winter reservoir release temperatures for the alternative Devil Canyon cone valves is apparent from Figures 19 and 20.

3.6 Staged Construction of Susitna Hydroelectric Project

River ice simulation results for Staged Construction of the Susitna Hydroelectric Project (see Section 2.5) are presented in Exhibits S, T, U and V. These results include Stage I and Stage II and are based on the 1981-82 weather conditions, Case E-VI flow requirements and the "inflow-matching" operating policy. The Staged Project river ice results are summarized in Tables 9, 10 and 11 for comparison with the License Application Project. Results of the corresponding reservoir

temperature simulations are shown in Figures 21, 22, 23, and 24. Simulated flow rates released from the reservoirs for the Staged Project and License Application Project are shown in Figures 25 and 26.

As shown in Tables 9, 10 and 11, expected river ice thicknesses and ice cover progression with Stage I and Stage II are generally greater than those with the License Application Project. Stage I (low Watana) results show approximately 3 additional miles of ice front progression, higher river stages between RM 130 and RM 137, and an additional overtopping at Slough 11, relative to high Watana (License Application). Stage II (low Watana + Devil Canyon) results show 7 additional miles of ice front progression, greater maximum river stages downstream of RM 132 and additional overtopping events at Sloughs 8A and 9 relative to the final phase of the License Application Project. For Stage II, river ice results show no significant difference between the alternative 9 foot and 50 foot drawdown policies at Devil Canyon. Also, there is no apparent effect on river ice due to the 3-level Devil Canyon intake relative to the 2-level intake.

The general trends of these river ice results are consistent with the corresponding reservoir temperature simulations (Figures 21, 22, 23 and 24). These results show generally colder winter releases with the Staged Project (Stages I and II) relative to the License Application Project. For Stage II, simulated winter release temperatures are similar among the alternative Devil Canyon drawdown policies and intake designs.

Based on the above simulations, it is expected that the first two stages of the Staged Project would tend to result in somewhat greater river ice development and greater slough overtopping events relative to the License Application Project. Although simulations were not performed for Stage III, it is equivalent to the final phase of the License Application Project and is expected to be similar in terms of river ice.

4.0 CONCLUSIONS

The following conclusions are based on the supplementary river ice simulations presented in this study.

1. Alternative Operating Policies for Watana and Devil Canyon Multi-Level Power Intakes - License Application Project

With Watana operating alone, the "warmest water" and "lowest port" alternative operating policies may reduce river ice development somewhat relative to that of the "inflow-matching" policy. Based on 1981-82 weather conditions and Case E-VI flows, for example, the "warmest water" policy reduced the expected ice cover progression by 11 miles and prevented overtopping of sloughs 8A, 9 and 9A relative to the "inflow-matching" policy. This trend, however, does not hold for all cases and should not be counted on as a general rule. River ice development is very sensitive to winter reservoir release temperatures which, in turn, are influenced by the preceeding summer release temperatures and the timing of the reservoir ice cover formation, among other factors. The combination of these factors is complex and may not follow a regular pattern in terms of winter release temperatures.

Of the alternative operating policies considered, it appears that the "lowest port" policy may be most effective in reducing river ice development. This policy, however, also results in the coldest summer releases which must be evaluated in terms of effect on the summer in-stream environment.

With Watana and Devil Canyon operating, the alternative operating policies appear to have very little effect on river ice development.

2. Alternative Instream Flow Requirements - License Application Project

With Watana operating alone, based on the 1981-82 weather conditions, the expected river ice development with the Case E-VI flow requirements is

equivalent to or less than that with the Case C flows. With Watana and Devil Canyon operating and the 1981-82 weather conditions, the Case E-VI flows result in slightly greater expected ice front progression and ice thicknesses, but no significant difference in slough overtoppings relative to Case C. It therefore appears that the Case E-VI instream flow requirements are generally similar to Case C with regard to river ice.

3. Alternative Designs for Watana Multi-level Power Intake - License Application Project

Relative to the present design of the Watana power intake, the addition of lower level intake ports with Watana operating alone tends to reduce the expected ice front progression and the corresponding river stages near the upstream extent of the cover. Based on the 1971-72 weather conditions, the most significant reduction in river ice occurs for the lowest of the alternative intake ports (elev. 1636 ft.). With this alternative, the expected ice cover progression is reduced by 9 miles and overtopping of sloughs 9A, 11, 20 and 21 is prevented relative to the present power intake design. Based on the 1971-72 weather conditions, the alternative lower intake ports at elev. 1880 and 1800 are much less effective than the elev. 1636 alternative and may not significantly reduce slough overtoppings relative to the existing design. With Watana and Devil Canyon operating, based on the 1981-82 weather conditions, the alternative lower level port at elev. 1800 also is quite ineffective in reducing river ice development relative to the present design.

It therefore appears that, except for the very low intake at elev. 1636, the alternative lower intake designs will not be a dependable method for reducing river ice development. Also, further consideration of the elev. 1636 intake alternative will require evaluation of potential negative environmental effects (e.g. high turbidity, low dissolved oxygen) associated with releases from such great depths.

4. Alternative Designs for Devil Canyon Cone Valve Intake - License Application Project

Based on Watana and Devil Canyon operating with the 2002 energy demand and the 1981-82 weather conditions, the alternative high cone valve intake at elev. 1425 has no significant effect on river ice relative to the present cone valve design at elev. 990.

5. Staged Project vs. License Application Project

Relative to the "License Application Project", Stages I and II of the "Staged Project" are expected to result in somewhat greater ice front progression, greater river stages and increased slough overtopping events. Based on the 1981-82 winter (average air temperatures), the additional expected ice front progression is approximately 3 miles for Stage I and 7 miles for Stage II. Additional overtopping events for the 1981-82 winter include Slough 11 for Stage I and Sloughs 8A and 9 for Stage II, relative to the License Application Project. Stage III is expected to result in river ice conditions similar to those of the completed License Application Project.

With the "Staged Project", addition of Devil Canyon Dam (Stage II) tends to reduce the expected ice cover extent, river stages and slough overtoppings relative to Watana alone (Stage I). This trend is similar to that of the "License Application Project."

5.0 REFERENCES

Alaska Power Authority, 1983, "Susitna Hydroelectric Project," Application for FERC License.

Alaska Power Authority, 1984, "Susitna Hydroelectric Project, Alaska Power Authority Comments on the Federal Energy Regulatory Commission Draft Environmental Impact Statement of May 1984," Appendices IV and V.

Arctic Environmental Information and Data Center, 1984, "Assessment of the Effects of the Proposed Susitna Hydroelectric Project on Instream Temperature and Fishery Resources in the Watana to Talkeetna Reach" Draft Report for Harza-Ebasco for Alaska Power Authority.

Harza-Ebasco, 1984a, "Instream Ice, Calibration of Computer Model" Document No. 1122, for Alaska Power Authority.

Harza-Ebasco, 1984b, "Instream Ice Simulation Study" Final Report, Document No. 1986, for Alaska Power Authority.

Harza-Ebasco, 1984c, "Evaluation of Alternative Flow Requirements."

TABLES

SUSITNA HYDROELECTRIC PROJECT SCOPE OF SUPPLEMENTARY RIVER ICE SIMULATIONS LICENSE APPLICATION PROJECT

		WATANA ONLY 2001 DEMAND						WATANA + DEVIL CANYON 2002 DEMAND				PROJECT STATUS WEATHER CONDITIONS FLOW REQUIREMENTS OPERATING POLICIES		
		1981-82			1971-72			1981-82						
		CASE C			CASE E-VI			CASE C		CASE C			CASE E-VI	
		I	W	L	I	W		I	W	I	W		I	W
DEVIL CANYON CONE VALVE INTAKE	WATANA POWER INTAKE DESIGN													
PRESENT DESIGN El. 990	PRESENT	A	B	C	D	E	△	F	△	G	H	I		
	1880/1850		J					L						
	1800/1770		K					M		P				
	1800/1500							N						
	1636/1470							O						
HIGH LEVEL El. 1425	PRESENT									Q				
	1800/1770									R				

LEGEND: **A, B, C** ICECAL EXHIBIT PRESENTED HEREIN
 ICECAL SIMULATION PRESENTED PREVIOUSLY (HARZA-EBASCO 1984b)

POWER INTAKE
 OPERATING POLICIES:
I INFLOW-MATCHING
W WARMEST WATER
L LOWEST PORT

TABLE 1

TABLE 2

SUSITNA HYDROELECTRIC PROJECT
ALTERNATIVE WATANA POWER INTAKE DESIGNS
PORT ELEVATIONS IN FEET M.S.L.

	<u>Present</u> <u>Design</u>	<u>Alt.</u> <u>1880/1850</u>	<u>Alt.</u> <u>1800/1770</u>	<u>Alt.</u> <u>1800/1500</u>	<u>Alt.</u> <u>1636/1470</u>	<u>Stage I</u>
Level 1	2151	2151	2151	2151	2151	1964.5
Level 2	2114	2114	2114	2114	2114	1926.5
Level 3	2077	2077	2077	2077	2077	1888.5
Level 4	2040	2040	2040	2040	2040	1850.5
Level 5	--	1880	1880	1800	1636	1812.5
Approach Channel	2025	1850	1770	1500	1470	1800

**SUSITNA HYDROELECTRIC PROJECT
MAXIMUM SIMULATED WINTER RIVER STAGES**

TABLE 3

ALTERNATIVE POWER INTAKE OPERATING POLICIES AND INSTREAM FLOW REQUIREMENTS

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY: 2001 ENERGY DEMAND								WATANA + DEVIL CANYON: 2002 DEMAND			
			WINTER 1981-82						WINTER 1971-72		WINTER 1981-82			
			CASE C FLOWS			CASE E-VI		CASE C		CASE C		CASE E-VI		
			I	W	L	I	W	I	W	I	W	I	W	
Whiskers	101.5	367	371	371	370	371	370	372	372	369	369	369	369	
Gash Creek	112.0	Unknown	461	458	458	458	457	459	459	456	455	456	455	
6A	112.3	(Upland)	464	461	460	460	460	461	461	458	458	459	458	
8	114.1	476	477	476	475	475	475	476	477	475	475	476	476	
MSII	115.5	482	489	487	487	488	487	489	489	485	485	485	485	
MS II	115.9	487	491	490	490	490	489	491	492	488	488	488	487	
Curry	120.0	Unknown	525	525	522	524	522	525	527	520	520	520	520	
Moose	123.5	Unknown	553	556	552	552	546	555	556	548	548	548	548	
8A West	126.1	573	574	574	573	575	569	575	575	568	568	571	571	
8A East	127.1	582	584	585	582	585	582	586	585	580	581	581	581	
9	129.3	604	606	606	602	607	603	610	607	601	601	601	601	
9 u/s	130.6	Unknown	620	620	617	621	617	625	622	616	616	616	616	
4th July	131.8	Unknown	632	633	628	633	628	636	633	627	627	627	627	
9A	133.7	651	652	654	650	654	650	659	655	650	649	649	649	
10 u/s	134.3	657	658	660	656	660	656	665	663	655	655	655	655	
11 d/s	135.3	Unknown	667	670	668	668	668	676	674	667	667	667	667	
11	136.5	687	683	684	684	684	684	690	687	682	682	682	682	
17	139.3	Unknown	715	715	715	715	715	727	718	714	714	714	714	
20	140.5	730	729	729	729	729	729	741	735	728	728	728	728	
21 (A6)	141.8	747	747	747	747	747	747	751	749	745	746	746	746	
21	142.2	755	753	753	753	754	754	755	754	752	752	752	752	
22	144.8	788	787	787	787	787	787	787	787	785	785	785	785	
UPSTREAM EXTENT OF ICE COVER PROGRESSION														
SIMULATED ICE FRONT PROGRESSION														
Ice Front Start at River Mile 98.6			12:30	12:28	1:2	12:28	1:3	11:28	12:1	12:30	1:1	12:30	12:31	
Maximum Ice Front Extent (River Mile)			134	136	126	134	123	142	142	124	124	126	126	
Melt Out Date			4:3	3:29	3:19	3:23	3:9	5:15	5:3	3:12	3:13	3:19	3:18	

NOTES:

- LOCATIONS WHERE MAXIMUM RIVER STAGE OVERTOPS A KNOWN SLOUGH THRESHOLD ELEVATION.
- OPERATING POLICIES FOR WATANA AND DEVIL CANYON POWER INTAKES:
 I INFLOW-MATCHING
 W WARMEST WATER
 L LOWEST PORT
- ALL RIVER STAGES IN FEET MSL.
- "PRESENT DESIGN" FOR WATANA POWER INTAKE IS ASSUMED THROUGHOUT.
- WINTER AIR TEMPERATURES:
1981-82 AVERAGE
1971-72 COLD
- LICENSE APPLICATION PROJECT.

TABLE 3

TABLE 4

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED TOTAL ICE THICKNESSES
 ALTERNATIVE POWER INTAKE OPERATING POLICIES AND INSTREAM FLOW REQUIREMENTS**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY: 2001 ENERGY DEMAND						WATANA+DEVIL CANYON:2002 DEMAND				
			WINTER 1981-82			WINTER 1971-72			WINTER 1981-82				
			CASE C FLOWS			CASE E-VI		CASE C		CASE C		CASE - E-VI	
			I	W	L	I	W	I	W	I	W	I	W
Whiskers	101.5	367	3	3	2	3	2	5	5	2	2	3	2
Gash Creek	112.0	Unknown	7	3	3	2	2	5	5	2	2	3	2
6A	112.3	(Upland	7	4	3	2	2	5	5	3	2	4	3
8	114.1	476	4	3	3	2	1	5	5	3	3	4	3
MS II	115.5	482	5	4	4	3	1	5	5	3	2	3	1
MS II	115.9	487	6	6	6	3	1	5	6	4	3	4	3
Curry	120.0	Unknown	6	7	3	4	2	5	7	1	1	1	1
Moose	123.5	Unknown	5	9	5	4		6	8	1	1	3	3
8A West	126.1	573	2	3	2	2		5	4			1	1
8A East	127.1	582	2	2		2		4	3				
9	129.3	604	1	2		2		6	2				
9 w/s	130.6	Unknown	1	2		2		6	3				
4th July	131.8	Unknown	2	3		3		7	3				
9A	133.7	651	1	3		2		8	5				
10 w/s	134.3	657	1	3		2		9	7				
11 d/s	135.3	Unknown		2				8	5				
11	136.5	687						5	3				
17	139.3	Unknown						13	3				
20	140.5	730						12	5				
21 (A6)	141.8	747						3	1				
21	142.2	755						1					
22	144.8	788											

NOTES:

1. OPERATING POLICIES FOR WATANA AND DEVIL CANYON POWER INTAKES:
 I INFLOW-MATCHING
 W WARMEST WATER
 L LOWEST PORT
2. ALL ICE THICKNESSES IN FEET
3. "PRESENT DESIGN" FOR WATANA POWER INTAKE IS ASSUMED THROUGHOUT
4. WINTER AIR TEMPERATURE:
 1981-82 AVERAGE
 1971-72 COLD
5. LICENSE APPLICATION PROJECT.

TABLE 4

TABLE 5

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED SOLID ICE THICKNESSES
 ALTERNATIVE POWER INTAKE OPERATING POLICIES AND INSTREAM FLOW REQUIREMENTS**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY: 2001 ENERGY DEMAND						WATANA+DEVIL CANYON:2002 DEMAND				
			WINTER 1981-82			WINTER 1971-72			WINTER 1981-82				
			CASE C FLOWS			CASE E-VI		CASE C		CASE C		CASE E-VI	
			I	W	L	I	W	I	W	I	W	I	W
Whiskers	101.5	367	3	3	2	3	2	5	5	2	2	3	2
Gash Creek	112.0	Unknown	3	3	2	2	1	5	5	2	2	2	2
6A	112.3	(Upland)	3	3	2	2	1	5	5	2	2	2	2
8	114.1	476	2	3	2	2	1	5	5	2	2	2	2
MS II	115.5	482	2	2	1	2	1	5	4	1	1	1	1
MS II	115.9	487	2	2	1	2	1	5	5	1	1	1	1
Curry	120.0	Unknown	1	2	1	2	0	5	4	1	1	1	1
Moose	123.5	Unknown	1	1	1	1		4	3	0	0	1	1
8A West	126.1	573	1	1	0	1		4	3			1	0
8A East	127.1	582	1	1		1		4	3				
9	129.3	604	1	1		1		4	2				
9 u/s	130.6	Unknown	1	1		0		4	2				
4th July	131.8	Unknown	0	1		0		4	2				
9A	133.7	651	0	0		0		4	2				
10 u/s	134.3	657	0	0		0		3	2				
11 d/s	135.3	Unknown		0				3	2				
14	136.5	687						3	1				
17	139.3	Unknown						2	1				
20	140.5	730						2	1				
21 (A6)	141.8	747						1	0				
21	142.2	755						0					
22	144.8	788											

NOTES:

1. OPERATING POLICIES FOR WATANA AND DEVIL CANYON POWER INTAKES.
 I INFLOW-MATCHING
 W WARMEST WATER
 L LOWEST PORT
2. ALL ICE THICKNESSES IN FEET.
3. "PRESENT DESIGN" FOR WATANA POWER INTAKE IS ASSUMED THROUGHOUT.
4. WINTER AIR TEMPERATURE. 1981-82 AVERAGE 1971-72 COLD
5. LICENSE APPLICATION PROJECT.

TABLE 5

TABLE 6

**SUSITNA HYDROELECTRIC PROJECT
MAXIMUM SIMULATED WINTER RIVER STAGES
ALTERNATIVE DESIGNS FOR WATANA POWER INTAKE AND DEVIL CANYON CONE VALVE INTAKE**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY : 2001 ENERGY DEMAND					WATANA+DEVIL CANYON:2002 DEMAND							
			WINTER 1981-82			WINTER 1971-72					WINTER 1981-82				
			PRESENT	1880/1850	1800/1770	PRESENT	1880/1850	1800/1770	1800/1500	1636/1470	PRESENT	1800/1770	PRESENT	1800/1770	
								PRESENT (EL. 990)		HIGH (EL. 1425)					
Whiskers	101.5	367	371	370	370	372	372	372	372	372	369	369	369	369	
Gash Creek	112.0	Unknown	458	458	458	459	461	459	461	460	455	455	455	455	
6A	112.3	(Upland)	461	461	460	461	464	461	464	462	458	458	458	458	
8	114.1	476	476	476	477	480	477	478	478	478	475	474	475	474	
MS I	115.5	482	487	488	489	490	491	490	489	489	485	485	485	485	
MS II	115.9	487	490	489	491	492	493	494	493	492	488	487	488	486	
Curry	120.0	Unknown	525	522	524	527	526	528	527	525	520	520	520	520	
Moose	123.5	Unknown	556	551	552	556	555	557	556	555	548	545	548	544	
8A West	126.1	573	574	572	574	575	574	574	575	574	568	568	568	568	
8A East	127.1	582	585	582	584	585	585	585	585	584	581	581	581	581	
9	129.3	604	606	602	604	607	608	607	608	605	601	601	601	601	
9 u/s	130.6	Unknown	620	617	617	622	624	621	621	620	616	616	616	616	
4th July	131.8	Unknown	633	628	628	633	635	633	633	631	627	627	627	627	
9A	133.7	651	654	650	650	655	654	656	656	650	649	649	649	649	
10 u/s	134.3	657	660	656	656	663	660	663	662	657	655	655	655	655	
11 d/s	135.3	Unknown	670	668	667	674	672	673	673	668	667	667	667	667	
11	136.5	687	684	683	683	687	687	688	687	683	682	682	682	682	
17	139.3	Unknown	715	715	715	718	719	717	716	715	714	714	714	714	
20	141.5	730	729	729	729	735	735	730	730	729	728	728	728	728	
21 (A6)	141.8	747	747	747	747	749	749	747	747	747	746	746	746	746	
21	142.2	755	753	753	753	754	754	753	753	753	752	752	752	752	
22	144.8	788	787	787	787	787	787	787	787	787	785	785	785	785	
SIMULATED ICE FRONT PROGRESSION:															
Ice Front Start at River Mile 98.6			12.28	12	11	12.1	12.2	12.2	12.3	12.6	1.1	1.1	1.1	1.1	
Maximum Ice Front Extent (River Mile)			136	126	129	142	142	140	139	133	124	122	124	122	
Melt out Date			3.29	3.15	3.20	5.3	4.30	4.26	4.25	4.5	3.13	3.9	3.14	3.10	

WATANA POWER
INTAKE DESIGN
DEVIL CANYON
CONE VALVE

UPSTREAM EXTENT
OF ICE COVER
PROGRESSION

NOTES:

1. LOCATIONS WHERE MAXIMUM RIVER STAGE OVERTOPS A KNOWN SLOUGH THRESHOLD ELEVATION
2. ALL RIVER STAGES IN FEET MSL.
3. CASE C INSTREAM FLOW REQUIREMENTS AND "WARMEST WATER" POWER INTAKE OPERATING POLICY IS ASSUMED THROUGHOUT.
4. WINTER AIR TEMPERATURE. 1981-82 AVERAGE, 1971-72 COLD
5. LICENSE APPLICATION PROJECT

TABLE 6

TABLE 7

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED TOTAL ICE THICKNESSES
 ALTERNATIVE DESIGNS FOR WATANA POWER INTAKE AND DEVIL CANYON CONE VALVE INTAKE**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY: 2001 ENERGY DEMAND								WATANA+DEVIL CANYON: 2002 DEMAND			
			WINTER 1981-82			WINTER 1971-72					WINTER 1981-82			
			PRESENT	1880/1850	1800/1770	PRESENT	1880/1850	1800/1770	1800/1500	1636/1470	PRESENT	1800/1770	PRESENT	1800/1770
			PRESENT (EL.990)		HIGH (EL.1425)		PRESENT (EL.990)		HIGH (EL.1425)					
Whiskers	101.5	367	3	2	2	5	5	5	4	3	2	2	2	2
Gash Creek	112.0	Unknown	3	4	4	5	7	4	7	5	2	1	2	1
6A	112.3	(Upland)	4	5	3	5	7	4	7	5	2	2	3	1
8	114.1	476	3	3	3	5	6	4	5	4	3	2	3	2
MS II	115.5	482	4	3	5	5	6	7	7	5	2	1	2	1
MS II	115.9	487	6	5	6	6	7	11	8	6	3	2	3	1
Curry	120.0	Unknown	7	2	5	7	7	9	7	5	1	1	1	1
Moose	123.5	Unknown	9	4	5	8	8	9	8	8	1		1	
8A West	126.1	573	3	1	3	4	2	3	3	3				
8A East	127.1	582	2		2	3	2	2	2	2				
9	129.3	604	2			2	3	3	3	1				
9 u/s	130.6	Unknown	2			3	5	2	3	1				
4th July	131.8	Unknown	5			3	4	3	3	1				
9A	133.7	651	3			5	3	5	5					
10 u/s	134.3	657	3			7	4	6	6					
11 d/s	135.3	Unknown	2			5	3	4	4					
11	136.5	687				3	3	3	3					
17	139.3	Unknown				3	4	2						
20	140.5	730				5	5							
21 (A6)	141.8	747				1	1							
21	142.2	755												
22	144.8	788												

WATANA POWER INTAKE DESIGN

DEVIL CANYON CONE VALVE

NOTES:

1. ALL RIVER STAGES IN FEET MSL.
2. CASE C INSTREAM FLOW REQUIREMENTS AND "WARMEST WATER" POWER INTAKE OPERATING POLICY IS ASSUMED THROUGH.
3. WINTER AIR TEMPERATURE 1981-82 AVERAGE 1971-72 COLD
4. LICENSE APPLICATION PROJECT

TABLE 7

TABLE 8

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED SOLID ICE THICKNESSES
 ALTERNATIVE DESIGNS FOR WATANA POWER INTAKE AND DEVIL CANYON CONE VALVE INTAKE**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY: 2001 ENERGY DEMAND					WATANA+DEVIL CANYON: 2002 DEMAND						
			WINTER 1981-82			WINTER 1971-72		WINTER 1981-82						
			PRESENT	1800/1850	1800/1770	PRESENT	1830/1850	1800/1770	1800/1500	1636/1470	PRESENT	1800/1770	PRESENT	1800/1770
					PRESENT (EL. 080)		HIGH (EL. 1425)							
Whiskers	101.5	367	3	2	2	5	5	5	4	3	2	2	2	2
Gash	112.0	Unknown	3	2	2	5	4	4	4	3	2	1	2	1
6A	112.3	(Upland)	3	2	1	5	4	4	4	3	2	1	2	1
8	114.1	476	3	2	1	5	4	4	3	3	2	1	2	1
MS II	115.5	482	2	1	1	4	4	4	3	3	1	1	1	1
MS II	115.9	487	2	1	1	5	3	4	3	3	1	1	1	1
Curry	120.0	Unknown	2	1	1	4	3	3	3	3	1	0	1	0
Moose	123.5	Unknown	1	1	1	3	3	3	2	2	0		0	
8A West	126.1	573	1	0	1	3	2	2	2	1				
8A East	127.1	582	1		0	3	2	2	2	1				
9	129.3	604	1			2	2	2	2	0				
9 u/s	130.6	Unknown	1			2	2	2	2	0				
4th July	131.8	Unknown	1			2	2	2	2	0				
9A	133.7	651	0			2	2	1	1					
10 u/s	134.3	657				2	2	1	1					
11 d/s	135.3	Unknown	0			2	1	1	1					
11	136.5	687				1	1	1	1					
17	139.3	Unknown				1	1	0						
2'	140.5	730				1	1							
21 (A6)	141.8	747				0	0							
21	142.2	755												
22	144.8	788												

WATANA POWER
INTAKE DESIGN

DEVIL CANYON
CONE VALVE

NOTES:

- 1 ALL RIVER STAGES IN FEET MSL
- 2 CASE C INSTREAM FLOW REQUIREMENTS AND "WARMEST WATER" POWER INTAKE OPERATING POLICY IS ASSUMED THROUGH
3. WINTER AIR TEMPERATURE
1981-82 AVERAGE
1971-72 COLD
4. LICENSE APPLICATION PROJECT

TABLE 8

TABLE 9

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED WINTER RIVER STAGES
 STAGED CONSTRUCTION vs LICENSE APPLICATION PROJECT**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY 2001 ENERGY DEMAND		WATANA + DEVIL CANYON 2002 ENERGY DEMAND			
			LICENSE APPLICATION PROJECT	STAGE I	LICENSE APPLICATION PROJECT	STAGE II		
						50 Ft. 2-LEVEL	50 Ft. 3-LEVEL	9 Ft. 2-LEVEL
Whiskers	101.5	387	371	371	369	370	370	370
Gash Creek	112.0	UnKnown	458	458	456	460	459	460
6A	112.3	(Upland)	460	460	459	462	461	462
8	114.1	476	475	475	476	476	476	476
MS II	115.5	482	488	490	485	487	487	487
MS II	115.9	487	490	494	488	490	490	490
Curry	120.0	Unknown	524	528	520	521	522	520
Moose	123.5	Unknown	552	555	548	552	553	551
8A West	126.1	573	575	574	571	573	573	574
8A East	127.1	582	585	584	581	584	584	584
9	129.3	604	607	607	601	605	606	605
9 a.s	130.6	Unknown	521	622	616	619	619	619
4th July	131.8	Unknown	633	634	627	630	630	630
12	133.7	651	654	658	648	649	649	649
10 a.s	134.3	657	660	665	655	655	655	655
11 a.s	135.0	UnKnown	668	675	667	667	667	667
17	136.5	687	684	688	682	682	682	682
17	139.3	Unknown	715	715	714	714	714	714
20	140.5	730	729	729	728	728	728	728
21 (A5)	141.8	747	747	747	746	746	746	746
21	142.2	755	754	753	752	752	752	752
22	144.8	788	787	787	785	785	785	785
SIMULATED ICE FRONT PROGRESSION								
Ice Front Start at River Mile 98.6			12.28	12.12	12.30	12.29	12.29	12.29
Maximum Ice Front Extent (River Mile)			131	137	126	133	133	132
Melt out Date			3.23	4.12	3.19	4.4	4.1	3.23

DEVIL CANYON:
 MAX. DRAWDOWN
 POWER INTAKE

1. LOCATIONS WHERE MAXIMUM RIVER STAGE OVERTOPS A KNOWN SLOUGH THRESHOLD ELEVATION.
2. ALL RIVER STAGES IN FEET MSL.
3. ASSUMED CONDITIONS THROUGHOUT: 1981-82 WINTER (AVERAGE) CASE LEVEL FLOW REQUIREMENTS; INFLOW MATCHING OPERATING POLICY.

UPSTREAM EXTENT
 OF ICE COVER
 PROGRESSION

TABLE 9

TABLE 10

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED TOTAL ICE THICKNESSES
 STAGED CONSTRUCTION vs LICENSE APPLICATION APPLICATION PROJECT**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY 2001 ENERGY DEMAND		WATANA + DEVIL CANYON 2002 ENERGY DEMAND			
			LICENSE APPLICATION PROJECT	STAGE I	LICENSE APPLICATION PROJECT	STAGE II		
						50 Ft.	50 Ft.	9 Ft.
						2-LEVEL	3-LEVEL	2-LEVEL
Whiskers	101.5	367	3	3	3	3	3	3
Gash Creek	112.0	Unknown	2	3	3	6	5	6
6A	112.3	(Upland)	2	3	4	6	5	6
8	114.1	476	2	3	4	4	3	4
MS II	115.5	482	3	5	3	4	4	4
MS II	115.9	477	3	9	4	6	6	6
Curry	120.0	Unknown	4	9	1	2	3	1
Moose	123.5	Unknown	4	7	3	6	7	5
8A West	126.1	573	2	3	1	3	3	3
8A East	127.1	582	2	2		2	2	2
9	129.3	604	2	3		2	3	2
9 u/s	130.6	Unknown	2	4		2	2	2
4th July	131.8	Unknown	3	4		2	2	1
9A	133.7	651	2	8				
10 u/s	134.3	657	2	9				
11 d/s	135.3	Unknown		7				
11	136.5	687		3				
17	139.3	Unknown						
20	140.5	730						
21 (A6)	141.8	747						
21	142.2	755						
22	144.8	788						

DEVIL CANYON:
 MAX. DRAWDOWN
 POWER INTAKE

NOTES:

1. ALL RIVER STAGES IN FEET MSL.
2. ASSUMED CONDITIONS THROUGHOUT:
 1981-82 WINTER (AVERAGE); CASE E-VI
 FLOW REQUIREMENTS; INFLOW-
 MATCHING OPERATING POLICY.

TABLE 10

TABLE 11

**SUSITNA HYDROELECTRIC PROJECT
 MAXIMUM SIMULATED SOLID ICE THICKNESSES
 STAGED CONSTRUCTION vs LICENSE APPLICATION PROJECT**

SLOUGH OR SIDE CHANNEL	RIVER MILE	THRESHOLD ELEVATION	WATANA ONLY 2001 ENERGY DEMAND		WATANA + DEVIL CANYON 2002 ENERGY DEMAND			
			LICENSE APPLICATION PROJECT	STAGE I	LICENSE APPLICATION PROJECT	STAGE II		
						50 Ft. 2-LEVEL	50 Ft. 3-LEVEL	9 Ft. 2-LEVEL
Whiskers	101.5	367	3	3	3	3	3	
Gash Creek	112.0	UnKnown	2	3	2	3	3	
6A	112.3	(Upland)	2	3	2	3	3	
9	114.1	476	2	3	2	3	2	
MS II	115.5	482	2	3	1	2	2	
MS II	115.9	487	2	3	1	2	2	
Curry	120.0	Unknown	2	3	1	1	1	
Moose	123.5	Unknown	1	3	1	1	1	
8A West	126.1	573	1	3	1	1	1	
8A East	127.1	582	1	2	1	1	1	
9	129.3	604	1	2	1	1	1	
9 u/s	130.6	Unknown	0	2	0	0	0	
4th July	131.8	Unknown	0	1	0	0	0	
9A	133.7	651	0	1				
10 u/s	134.3	657	0	1				
11 d/s	135.3	Unknown		1				
11	136.5	687		0				
17	139.3	Unknown						
20	140.5	730						
21 (A6)	141.8	747						
21	142.2	755						
22	144.8	788						

DEVIL CANYON:
 MAX. DRAWDOWN
 POWER INTAKE

- NOTES:
1. ALL RIVER STAGES IN FEET MSL.
 2. ASSUMED CONDITIONS THROUGHOUT:
 1981-82 WINTER (AVERAGE); CASE E-VI
 FLOW REQUIREMENTS; INFLOW-
 MATCHING OPERATING POLICY.

TABLE 11

FIGURES

ALASKA

FIGURE 1

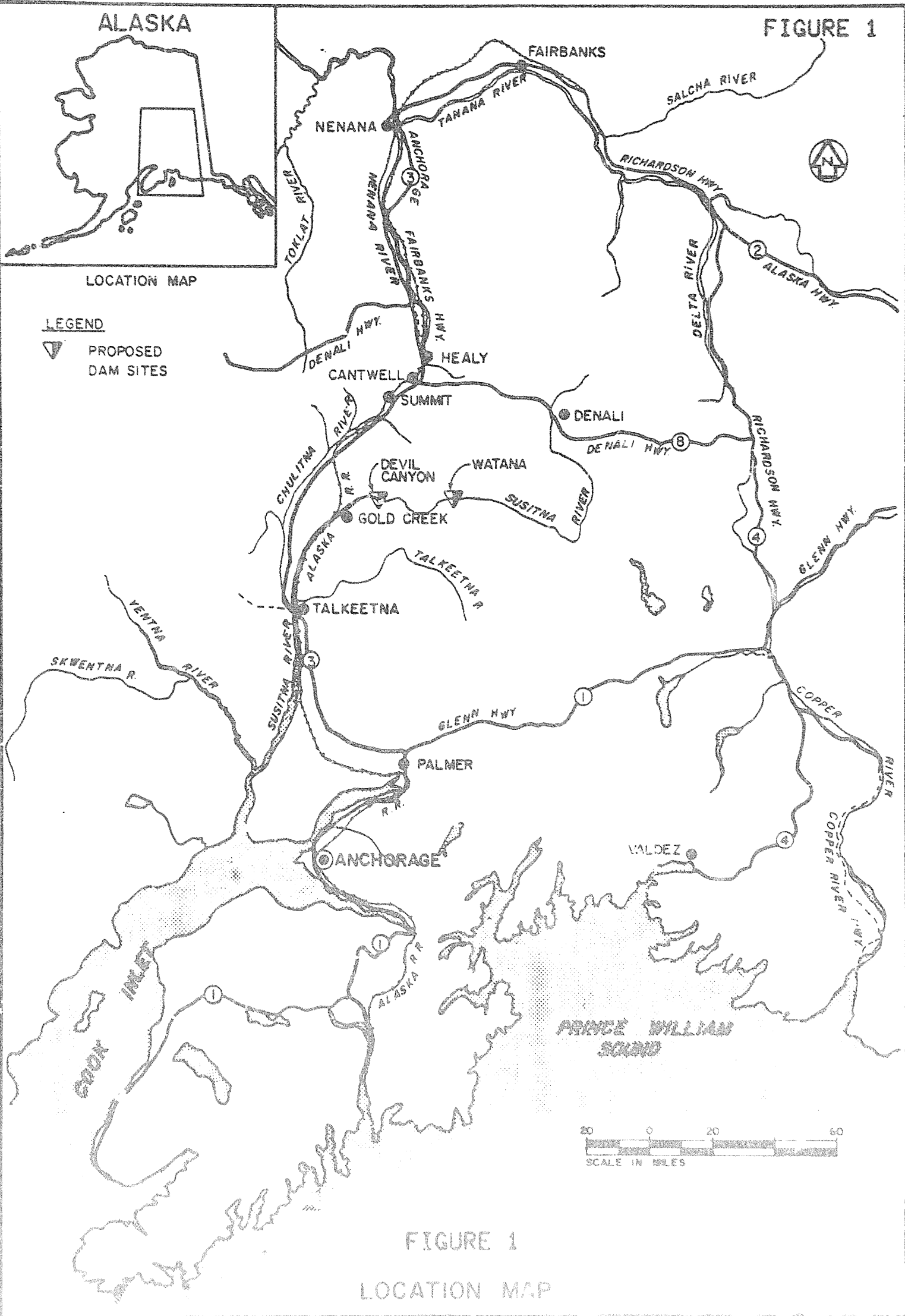


FIGURE 1

LOCATION MAP

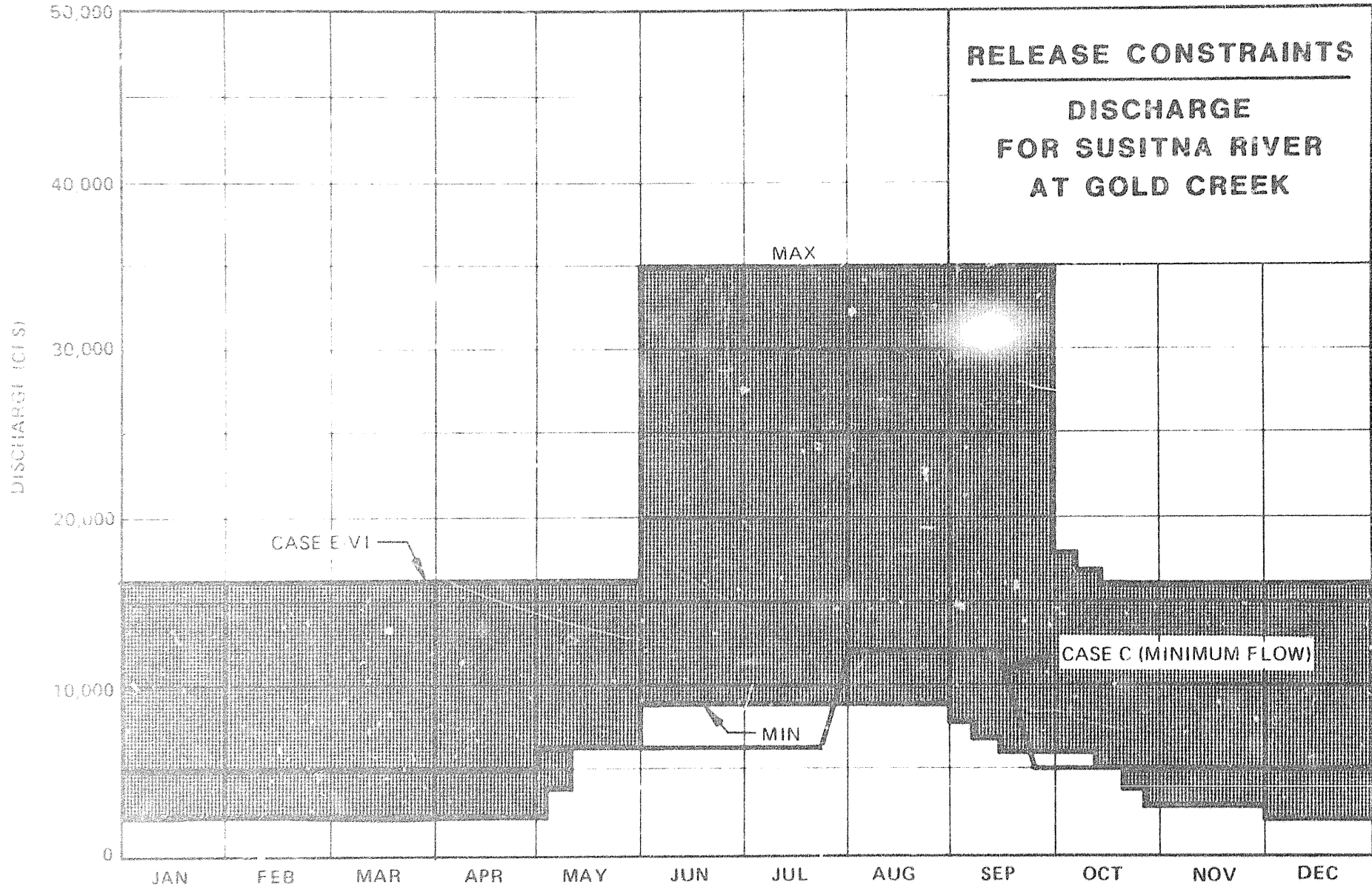


FIGURE 2

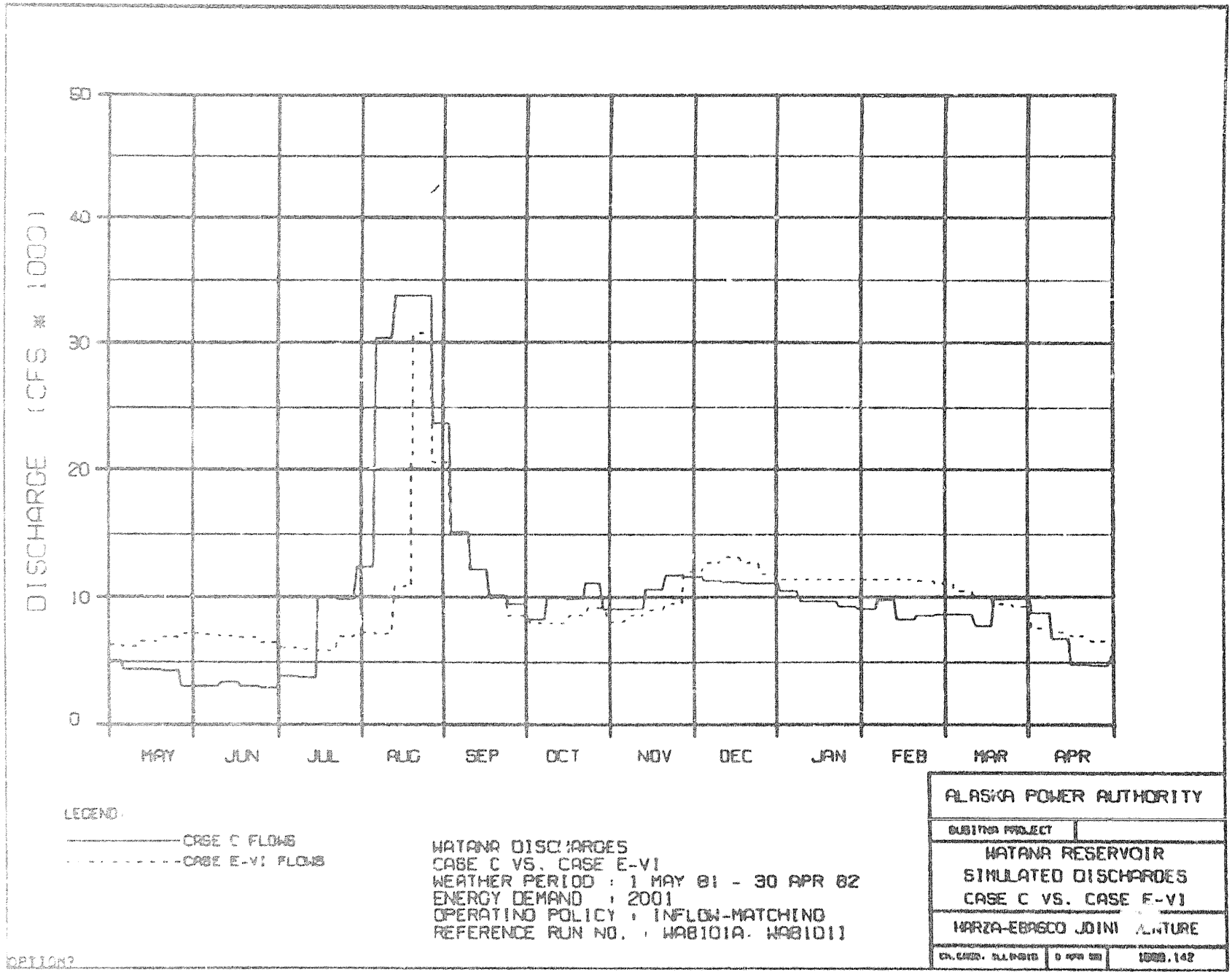
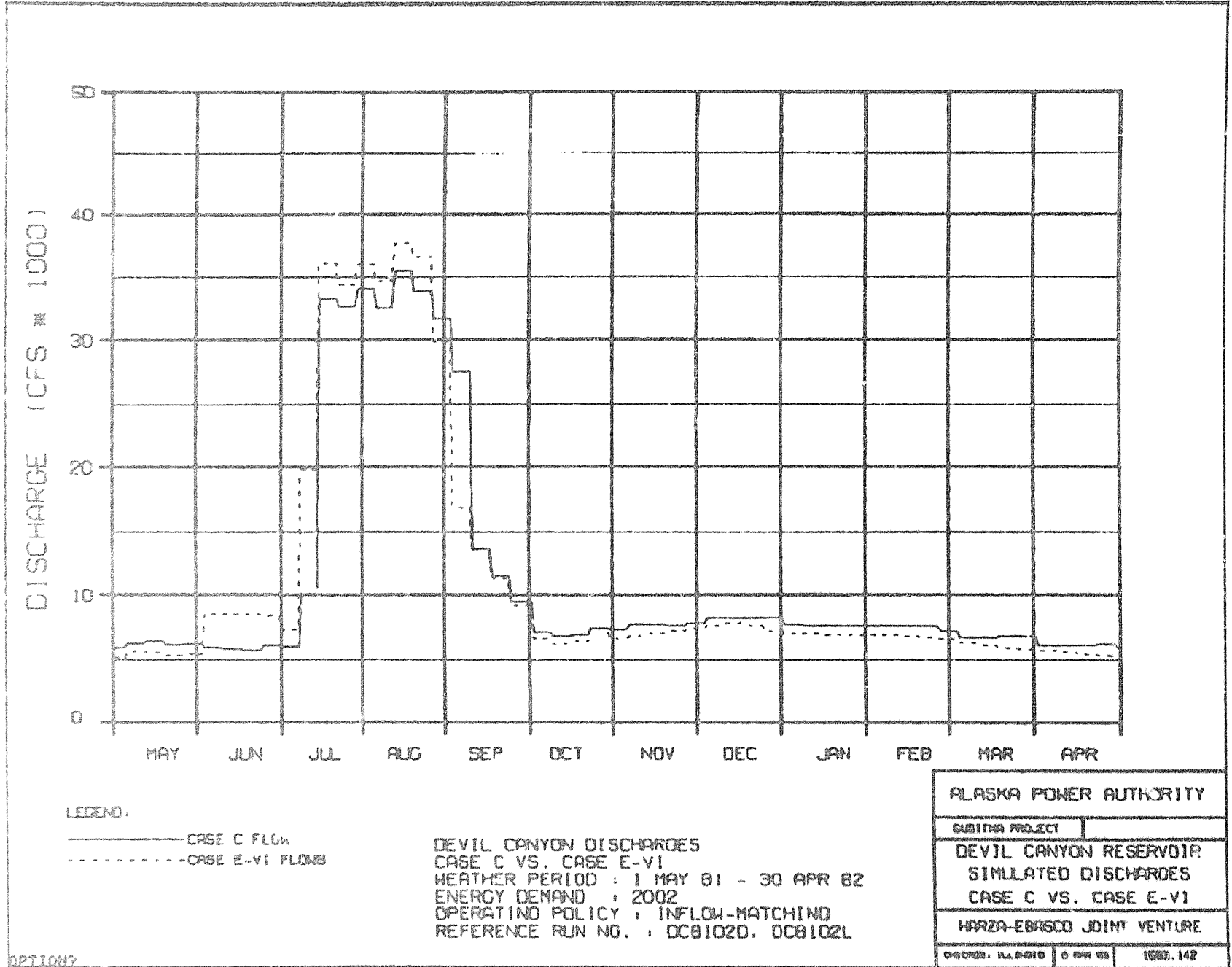


FIGURE 3



OPTION?

FIGURE 4

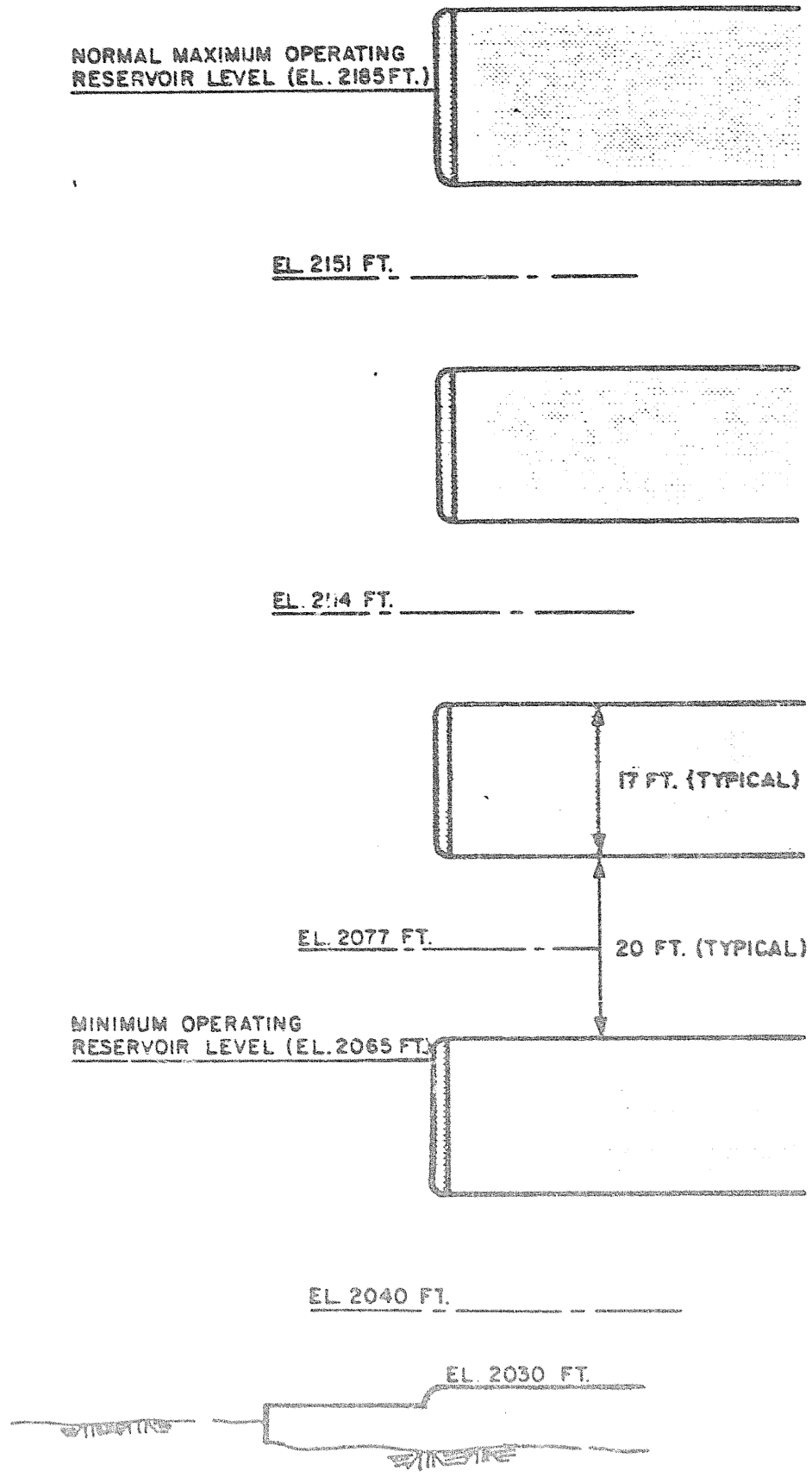


FIGURE 5

WATANA MULTILEVEL INTAKE
LICENSE APPLICATION DESIGN

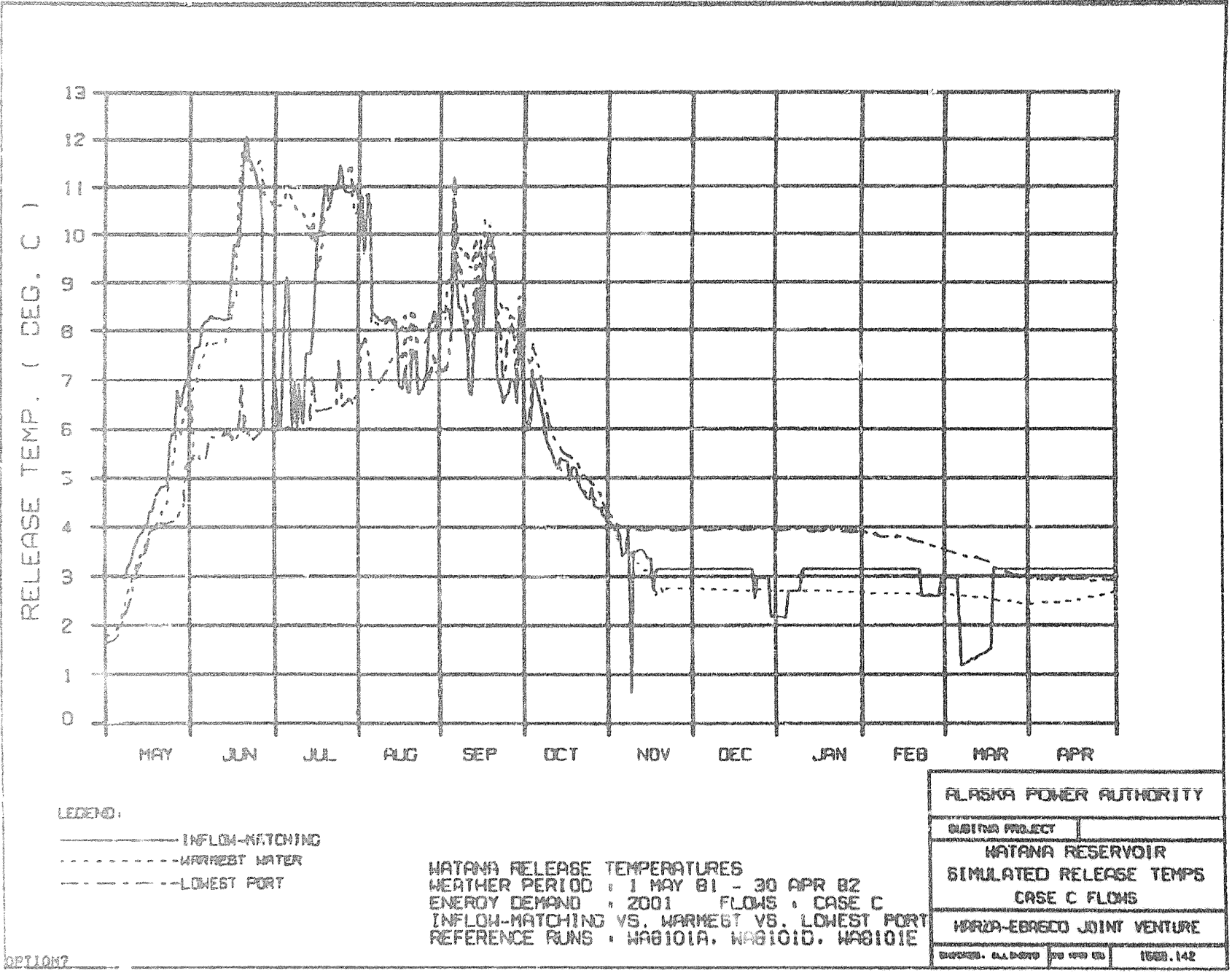


FIGURE 6

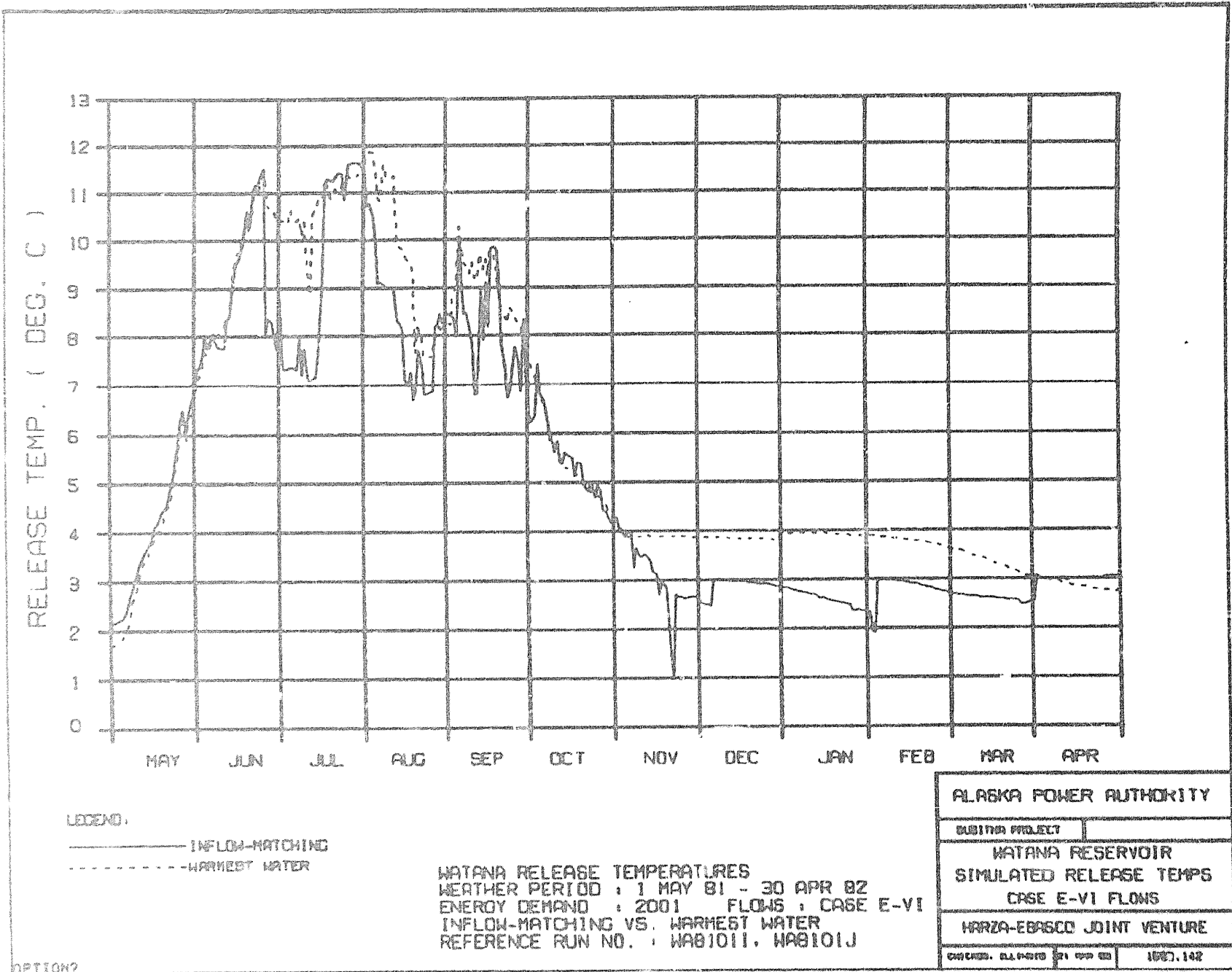


FIGURE 7

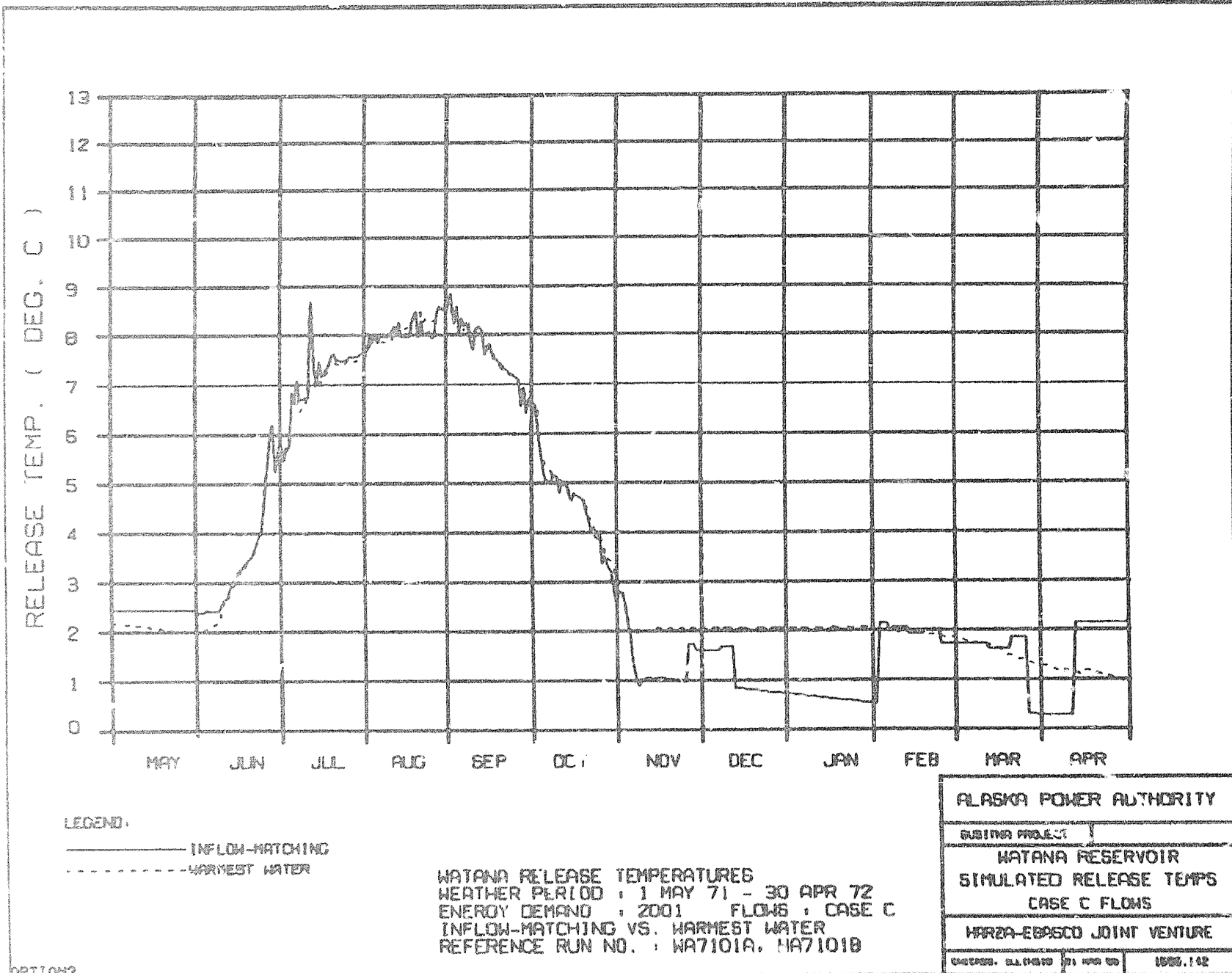


FIGURE 8

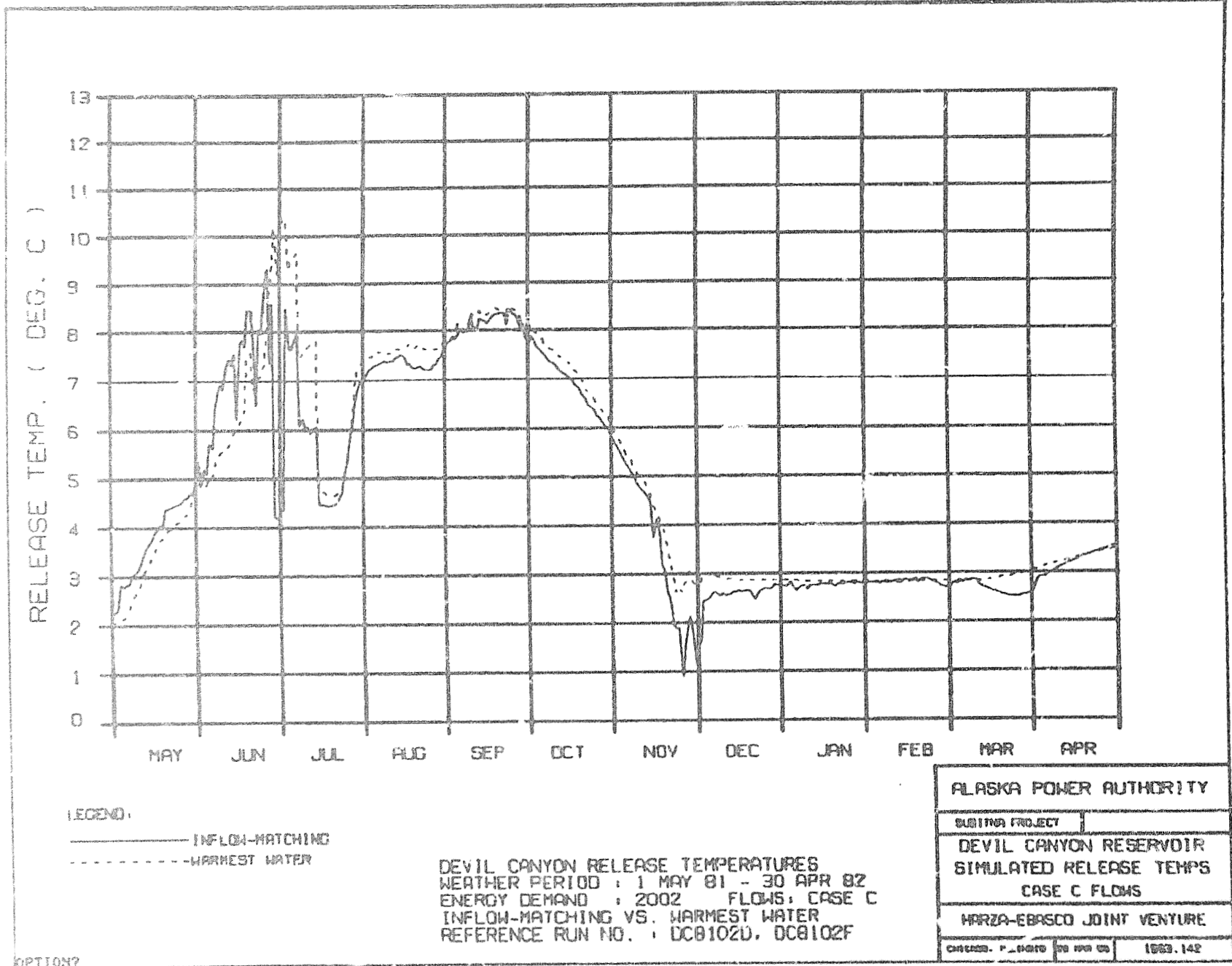
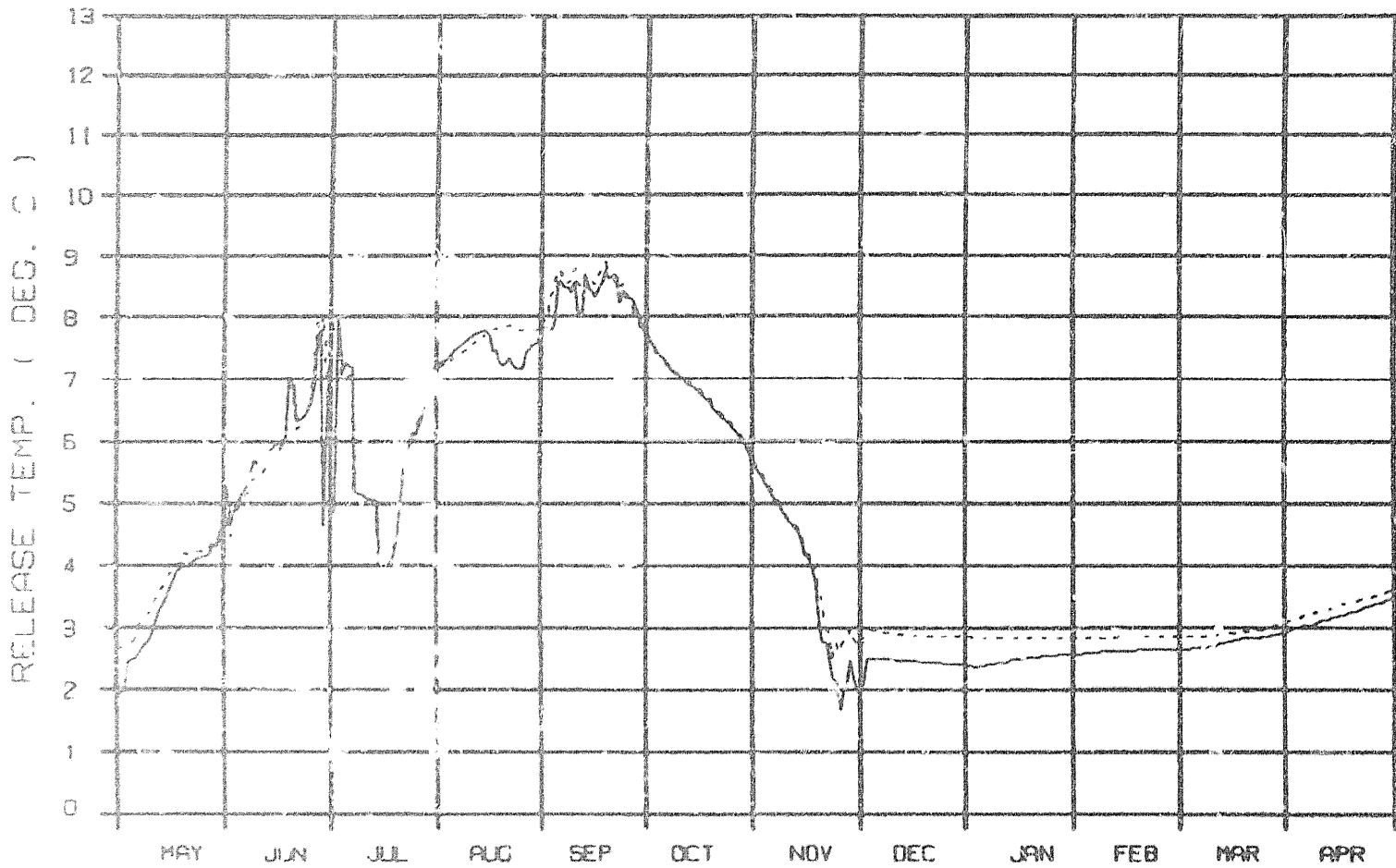


FIGURE 9



LEGEND

- INFLOW-MATCHING
- WARMEST WATER

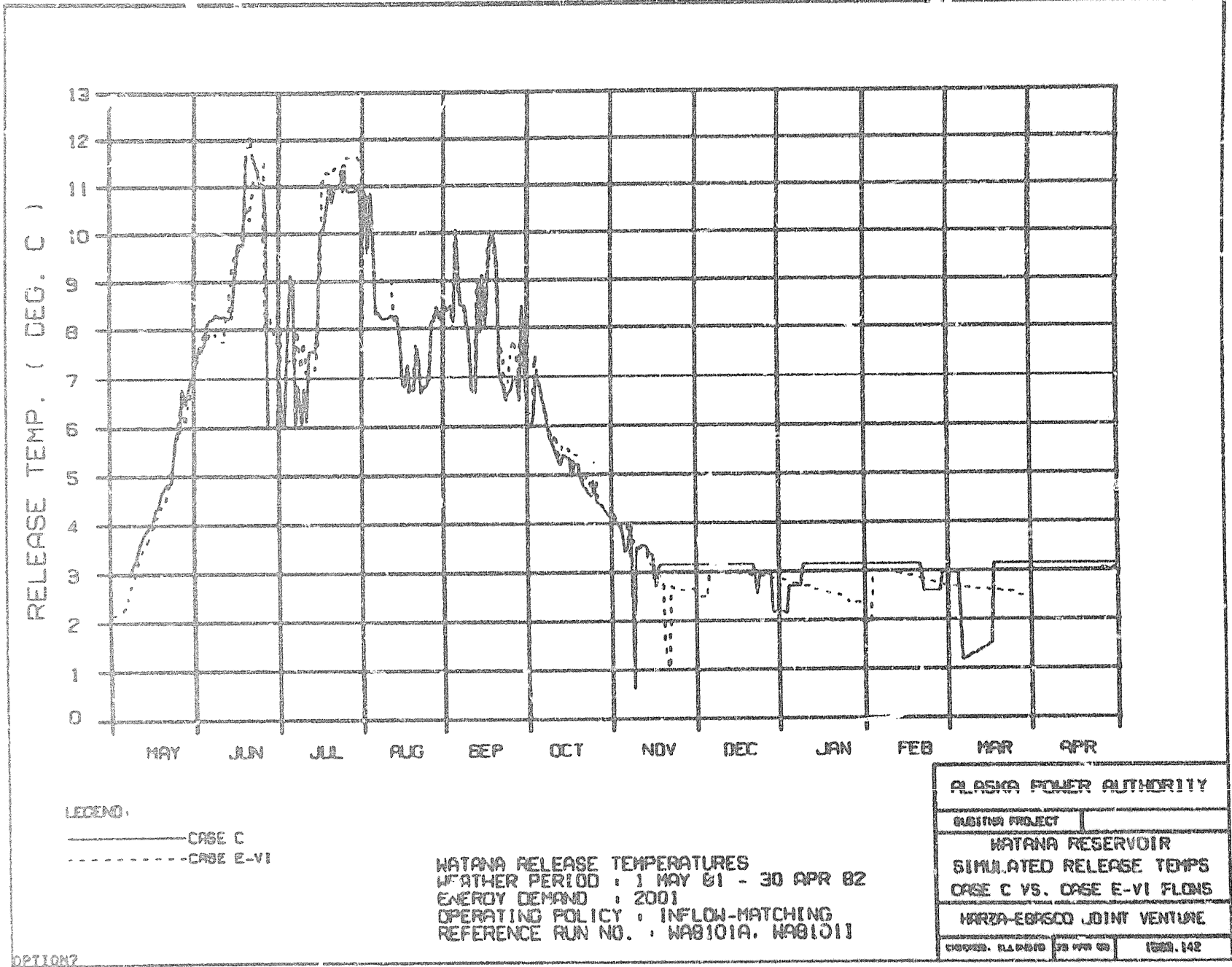
DEVIL CANYON RELEASE TEMPERATURES
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOWS, CASE E-VI
 INFLOW-MATCHING VS. WARMEST WATER
 REFERENCE RUN NO. : DC8102L, DC8102M

FLASKA POWER AUTHORITY	
SUBITRA PROJECT	
DEVIL CANYON RESERVOIR SIMULATED RELEASE TEMPS CASE E-VI FLOWS	
WARZA-EBASCO JOINT VENTURE	
CHIEF ENGINEER	1000.142

08/11/82

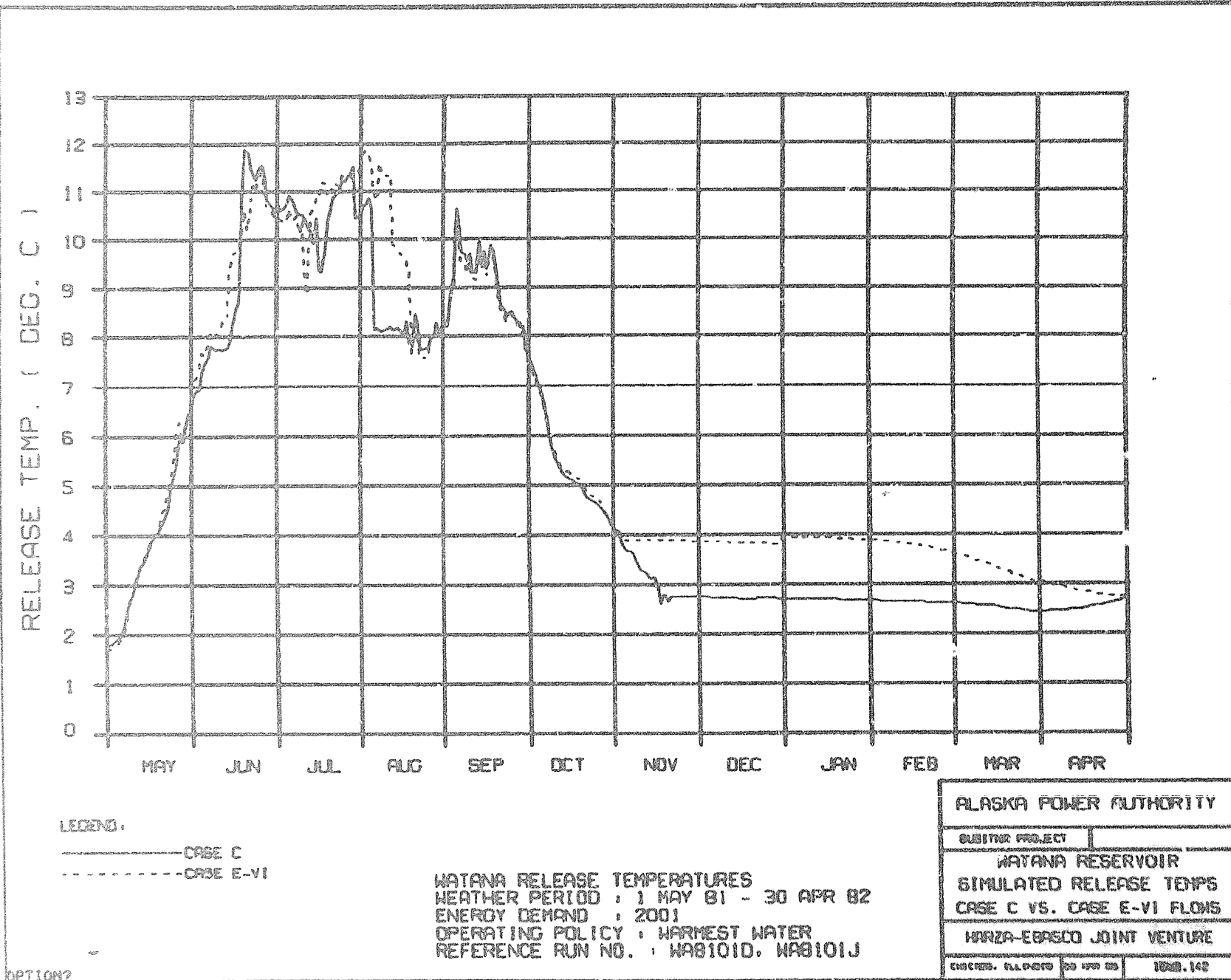
FIGURE 10

C



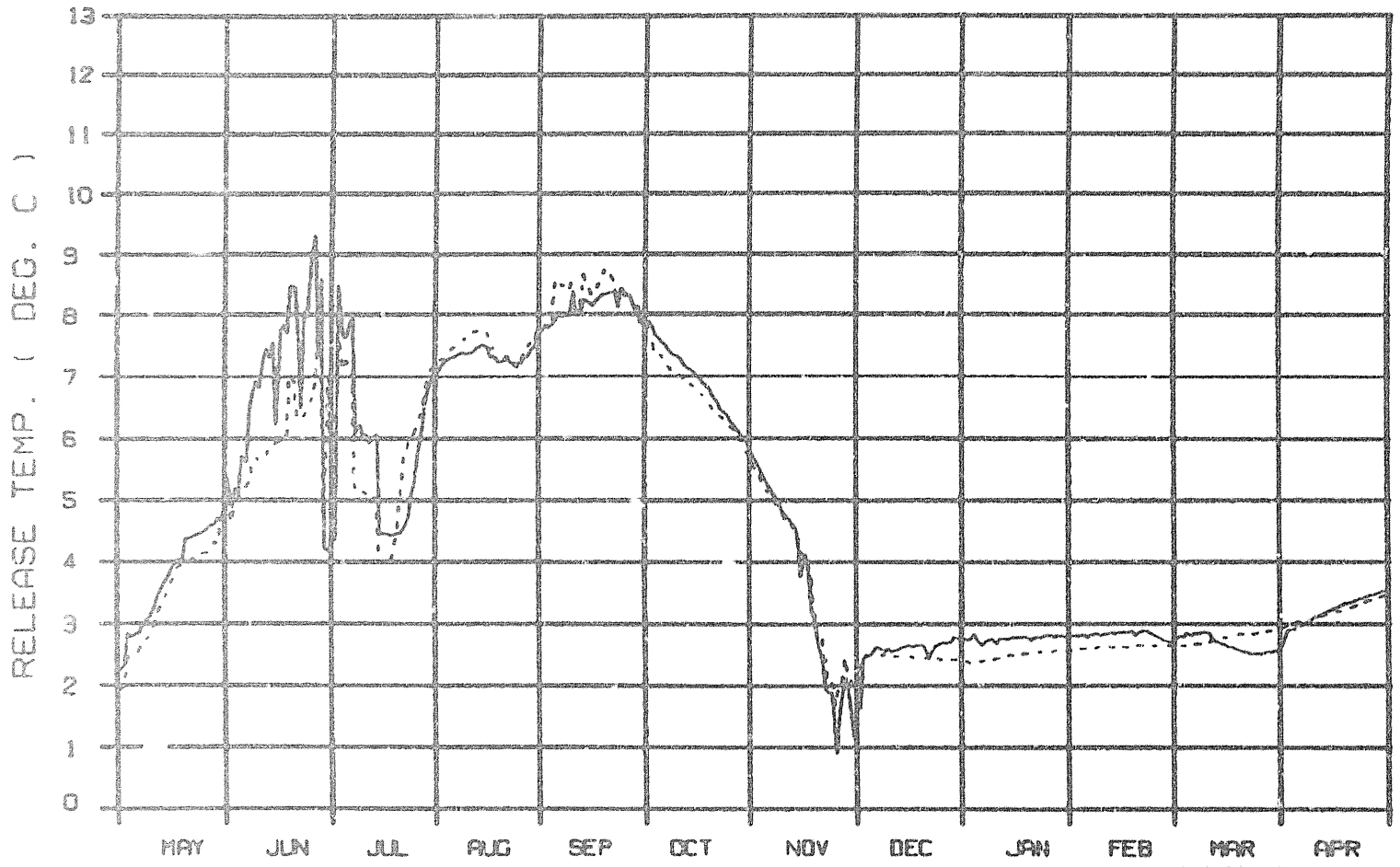
OPTION2

FIGURE 11



OPTION?

FIGURE 12



RELEASE TEMP. (DEG. C)

LEGEND:
 ——— CASE C
 - - - CASE E-VI

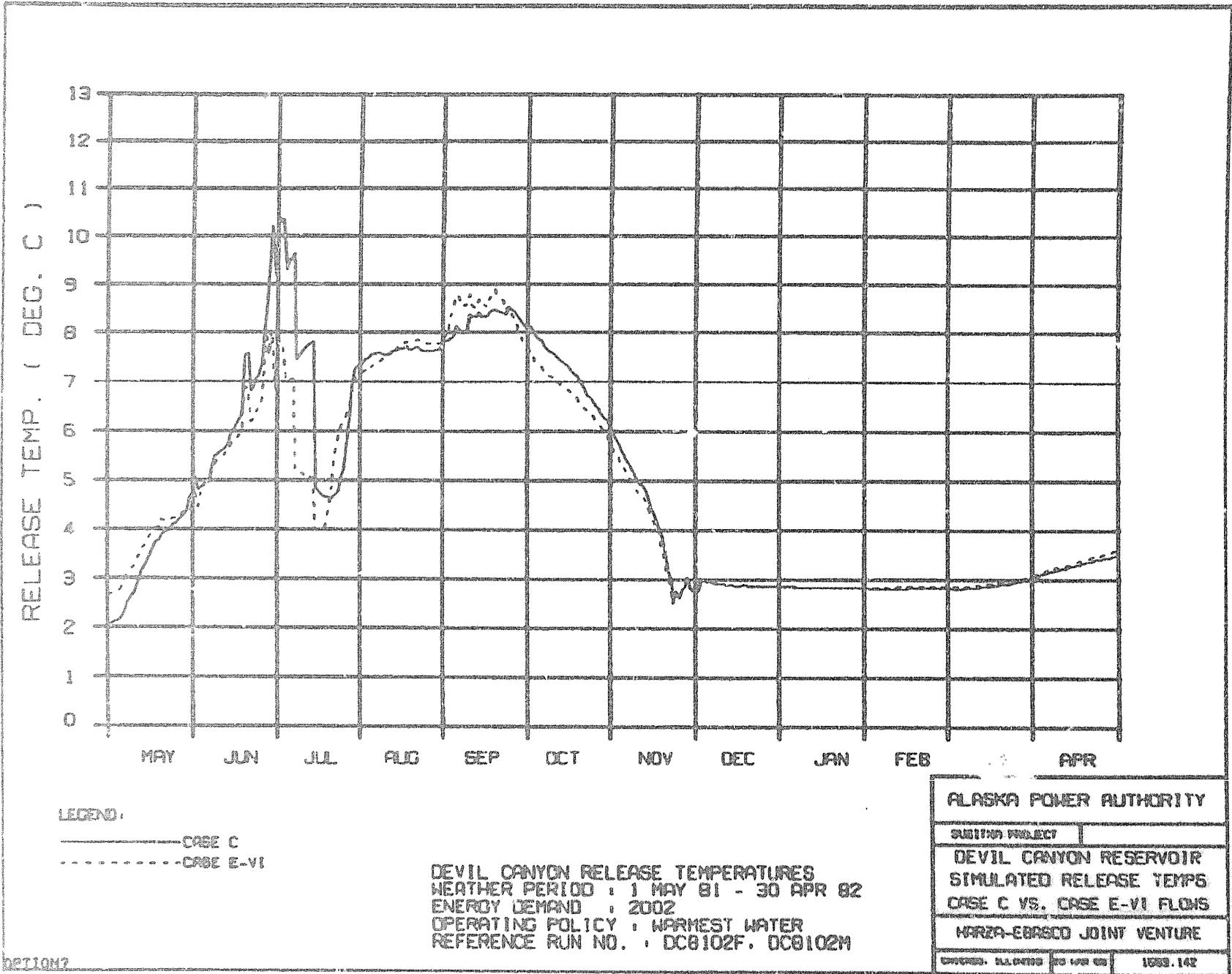
DEVIL CANYON RELEASE TEMPERATURES
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002
 OPERATING POLICY : INFLOW-MATCHING
 REFERENCE RUN NO. : DC0102D, DC0102L

ALASKA POWER AUTHORITY	
QUESTNA PROJECT	
DEVIL CANYON RESERVOIR	
SIMULATED RELEASE TEMPS	
CASE C VS. CASE E-VI FLOWS	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60606	70 PPF US
1059.142	

OPTION?

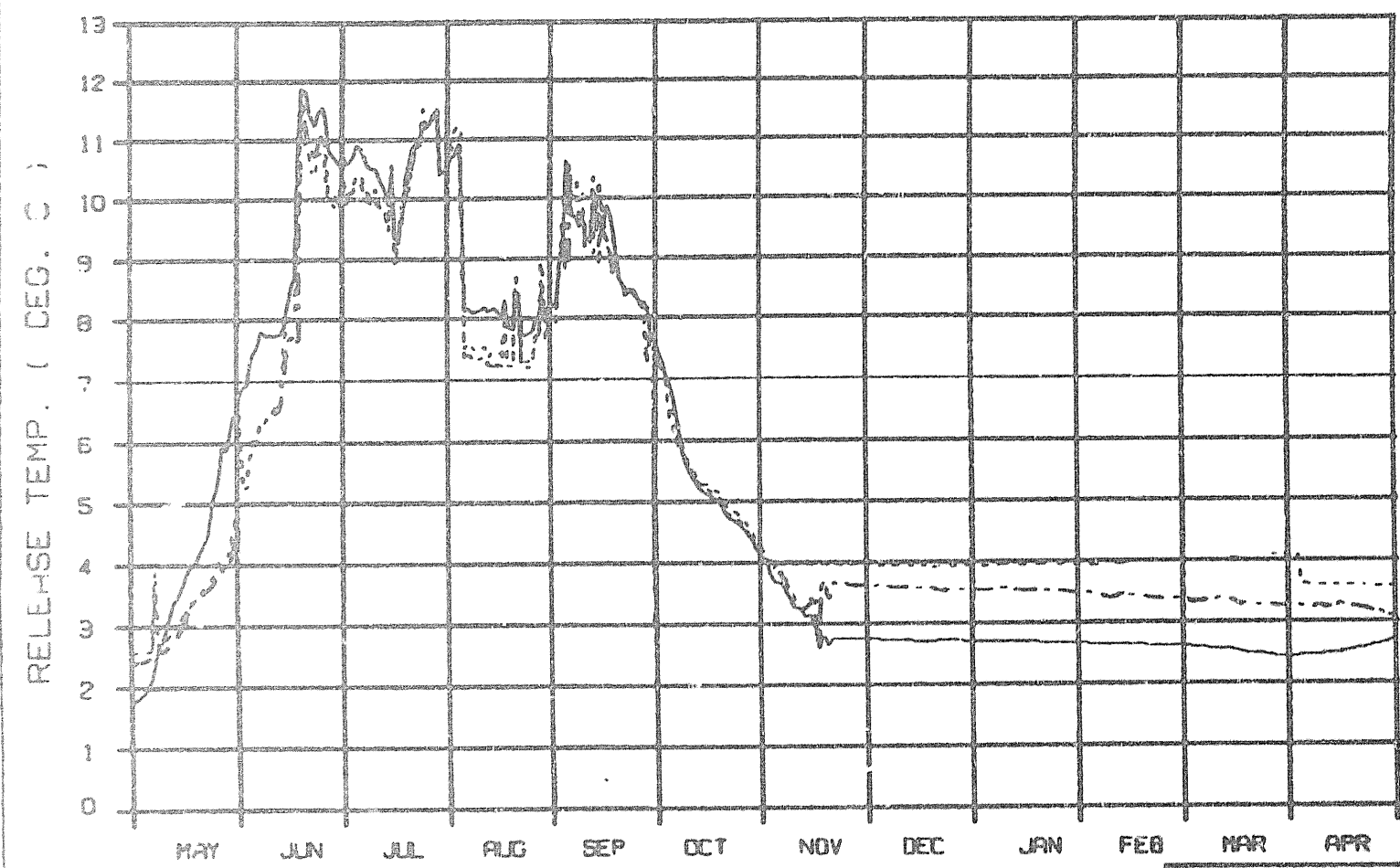
FIGURE 13.

C



0210M?

FIGURE 14



LEGEND.
 ———— EXISTING INTAKE
 - - - - - ALT. 1650/1650
 - · - · - ALT. 1600/1770

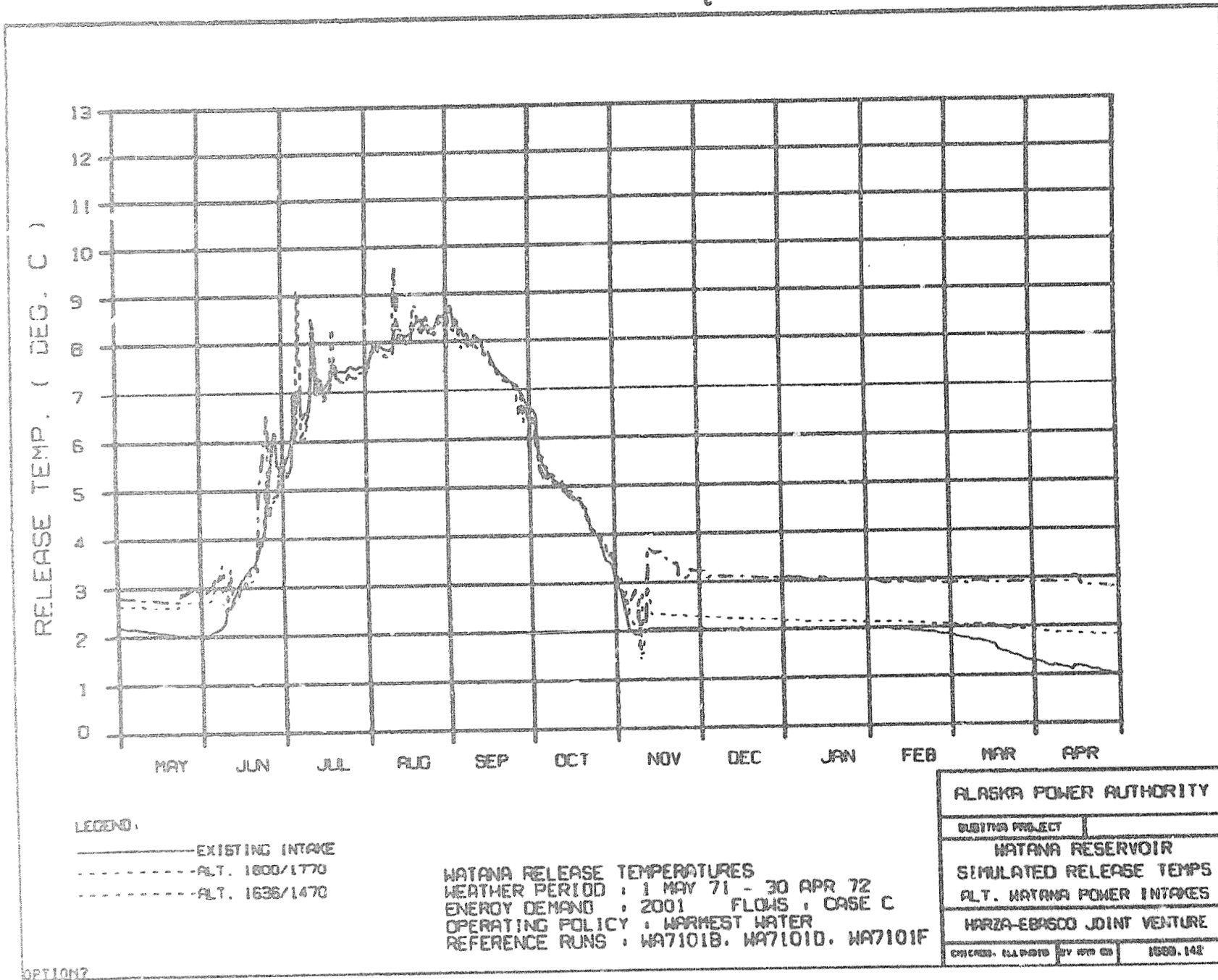
WATANA RELEASE TEMPERATURES
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2001 FLOWS : CASE C
 OPERATING POLICY : WARMEST WATER
 REFERENCE RUNS : WA8101D, WA8101F, WA8101G

ALASKA POWER AUTHORITY	
SUBINA PROJECT	
WATANA RESERVOIR	
SIMULATED RELEASE TEMPS	
ALT. WATANA POWER INTAKES	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILLINOIS 60601	1983.142

OPTION?

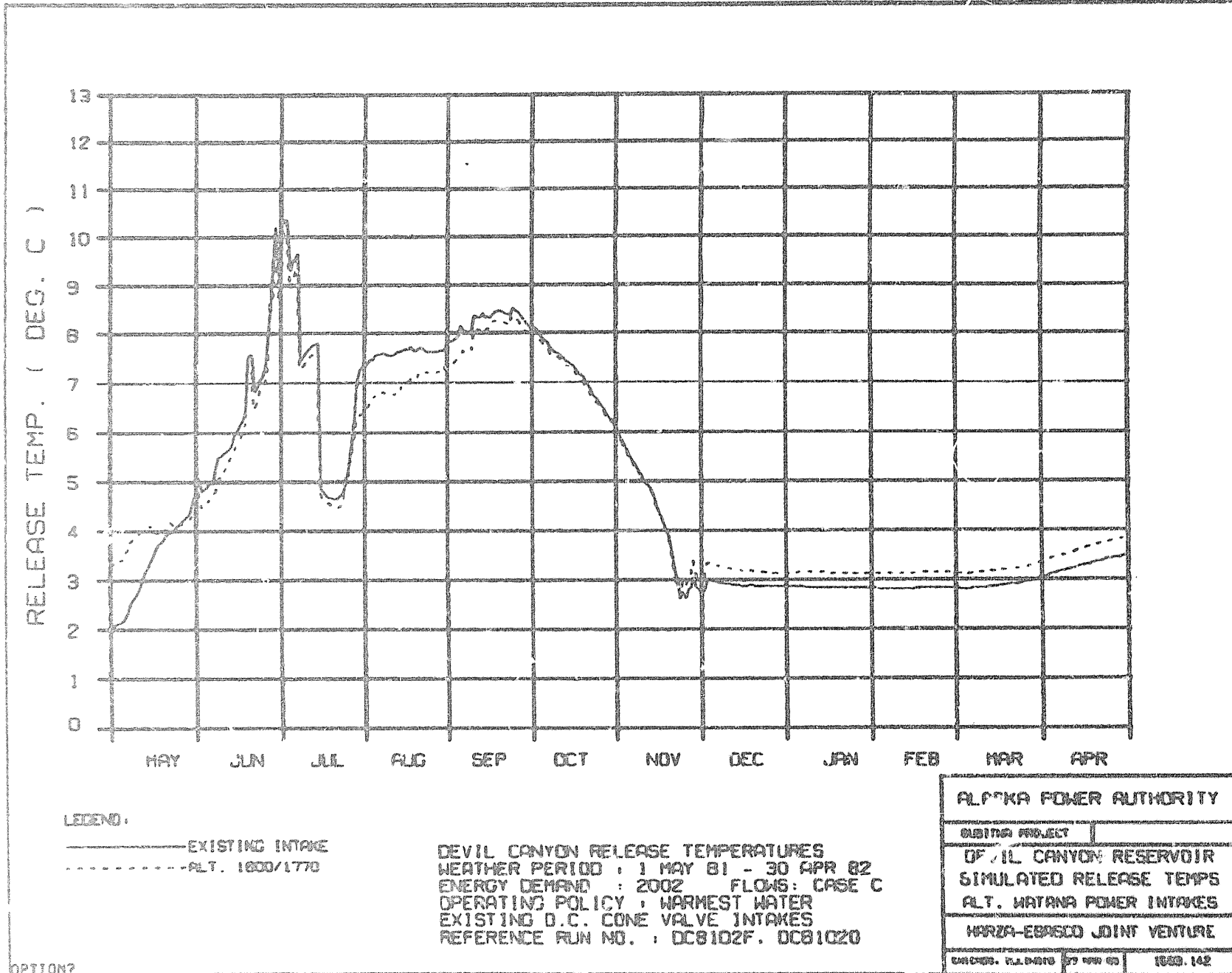
FIGURE 15

C



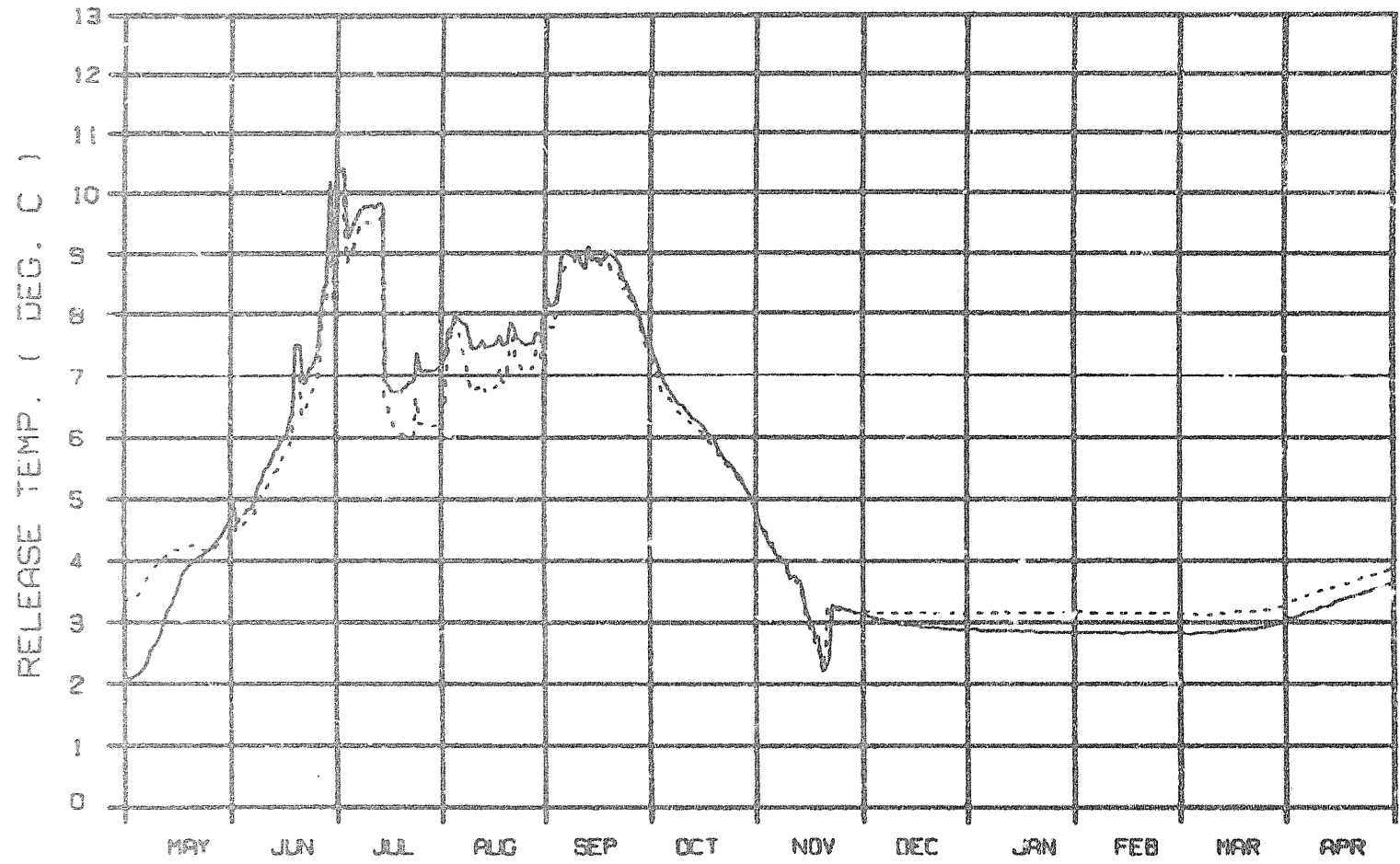
OPYLON?

FIGURE 16



OPTION?

FIGURE 17



LEGEND:
 ———— EXISTING INTAKE
 - - - - - ALT. 1600/1770

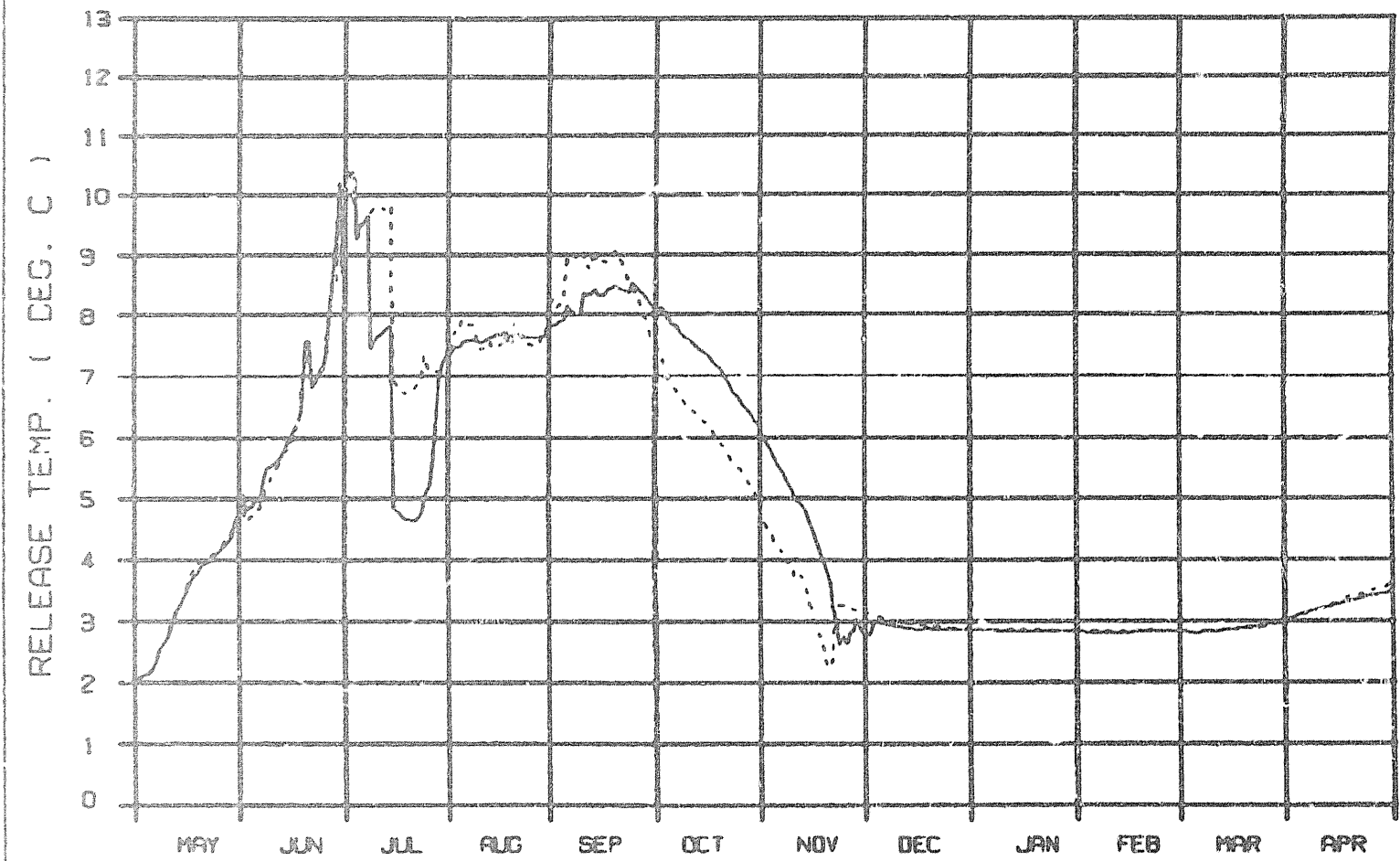
DEVIL CANYON RELEASE TEMPERATURES
 WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOWS: CASE C
 OPERATING POLICY : WARMEST WATER
 HIGH (EL. 1425) D.C. CONE VALVE INTAKES
 REFERENCE ALW NO. : DC81021, DC8102H

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
DEVIL CANYON RESERVOIR	
SIMULATED RELEASE TEMPS	
ALT. MATANA POWER INTAKES	
MARZA-EBASCO JOINT VENTURE	
DATE: 03.10.82	BY: [signature]
1000.141	

OPTION?

FIGURE 18

c



LEGEND:

- EXISTING D.C. CONE VALVE
- - - - - HIGH LEVEL (EL. 1426)

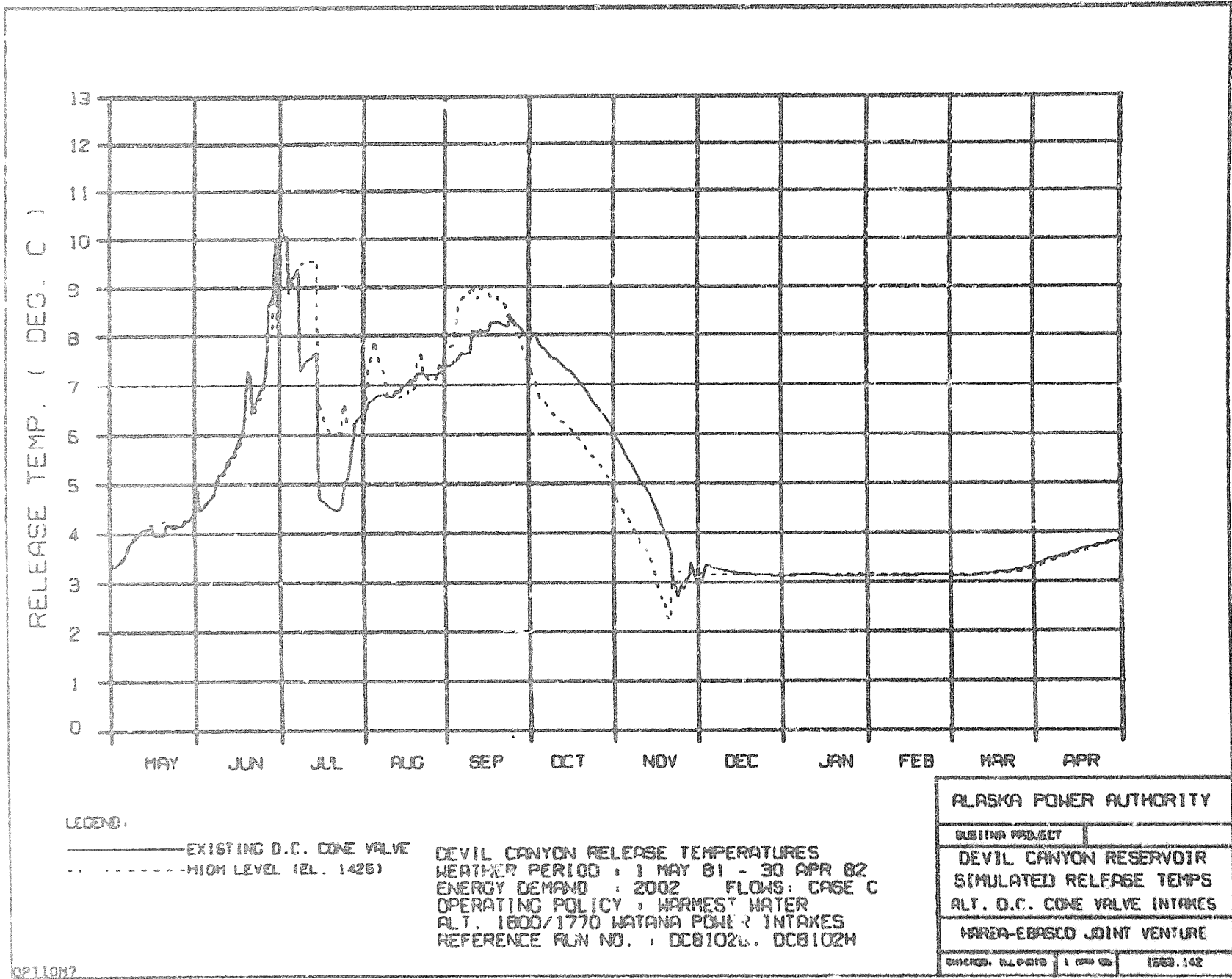
DEVIL CANYON RELEASE TEMPERATURES
 WEATHER PERIOD : ; MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOWS: CASE C
 OPERATING POLICY : WARMEST WATER
 EXISTING WATANA POWER INTAKES
 REFERENCE RUN NO. : DC8102F. DC8102I

OPTION?

ALASKA POWER AUTHORITY		
SUBSTANTIAL PROJECT		
DEVIL CANYON RESERVOIR		
SIMULATED RELEASE TEMPS		
ALT. D.C. CONE VALVE INTAKES		
WARZA-EBRACO JOINT VENTURE		
PROJECT: EL. 1426	1 APR 82	1553.142

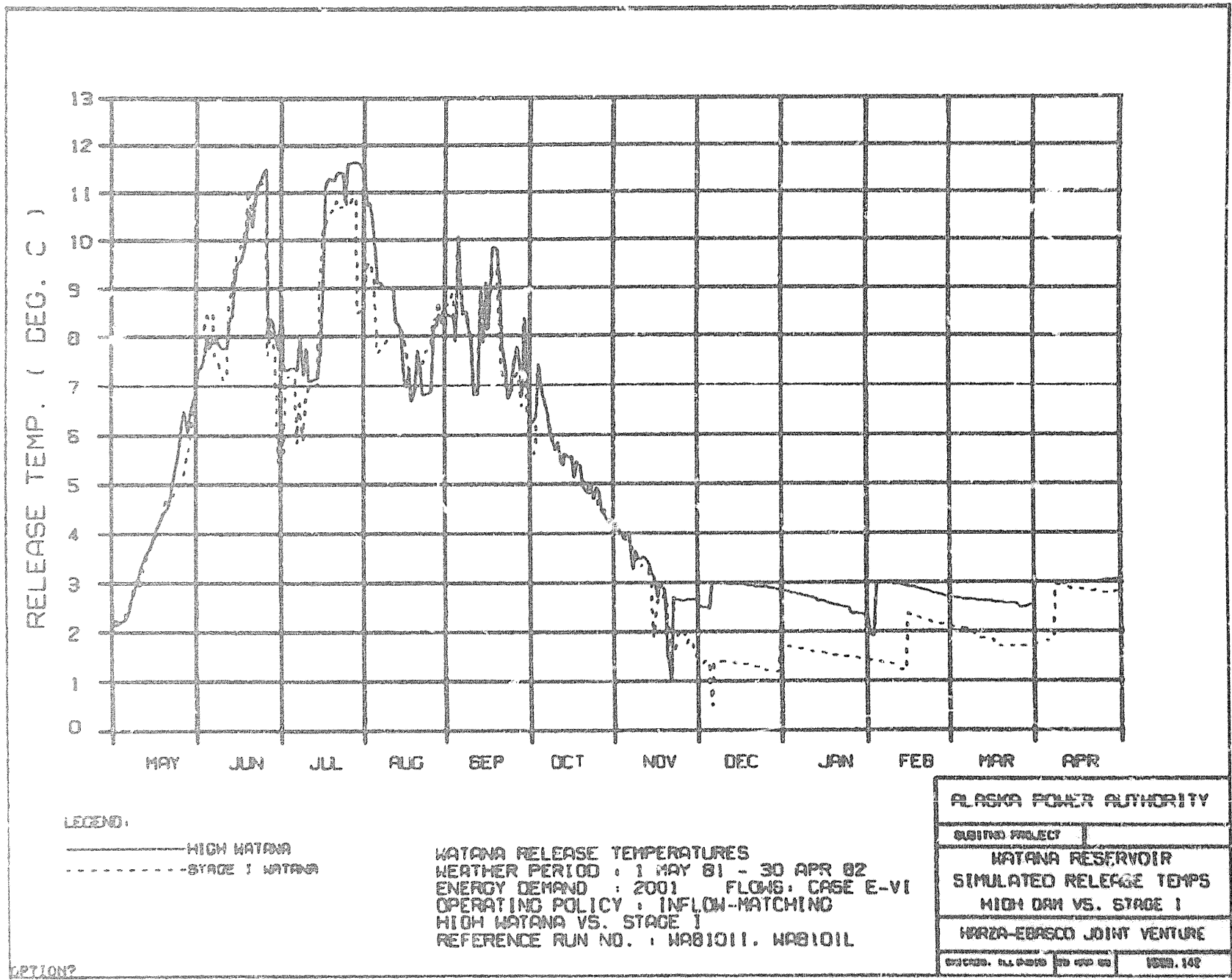
FIGURE 19

C



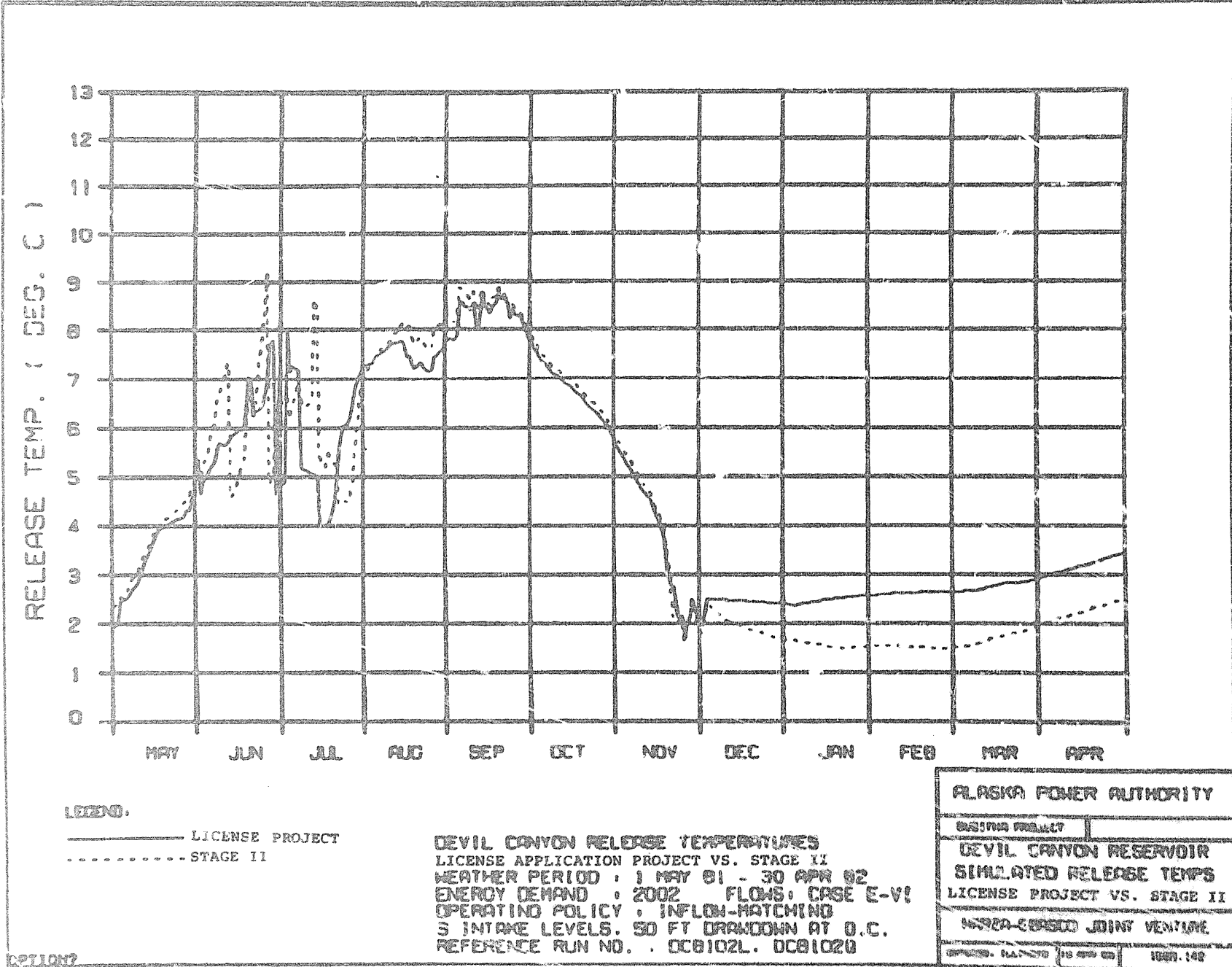
OPTION?

FIGURE 20



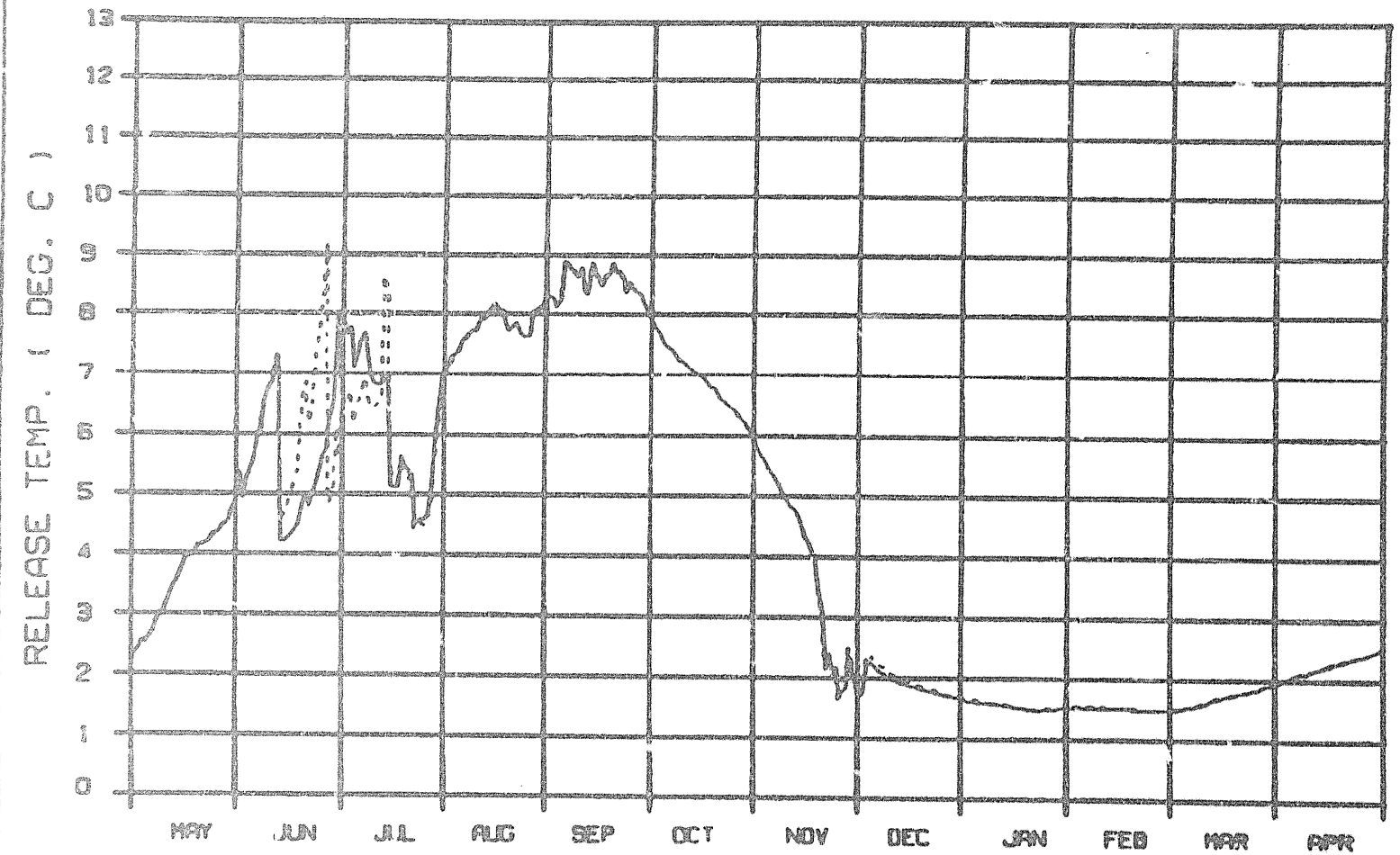
CAPTION?

FIGURE 21



OPTION?

FIGURE 22



LEGEND:

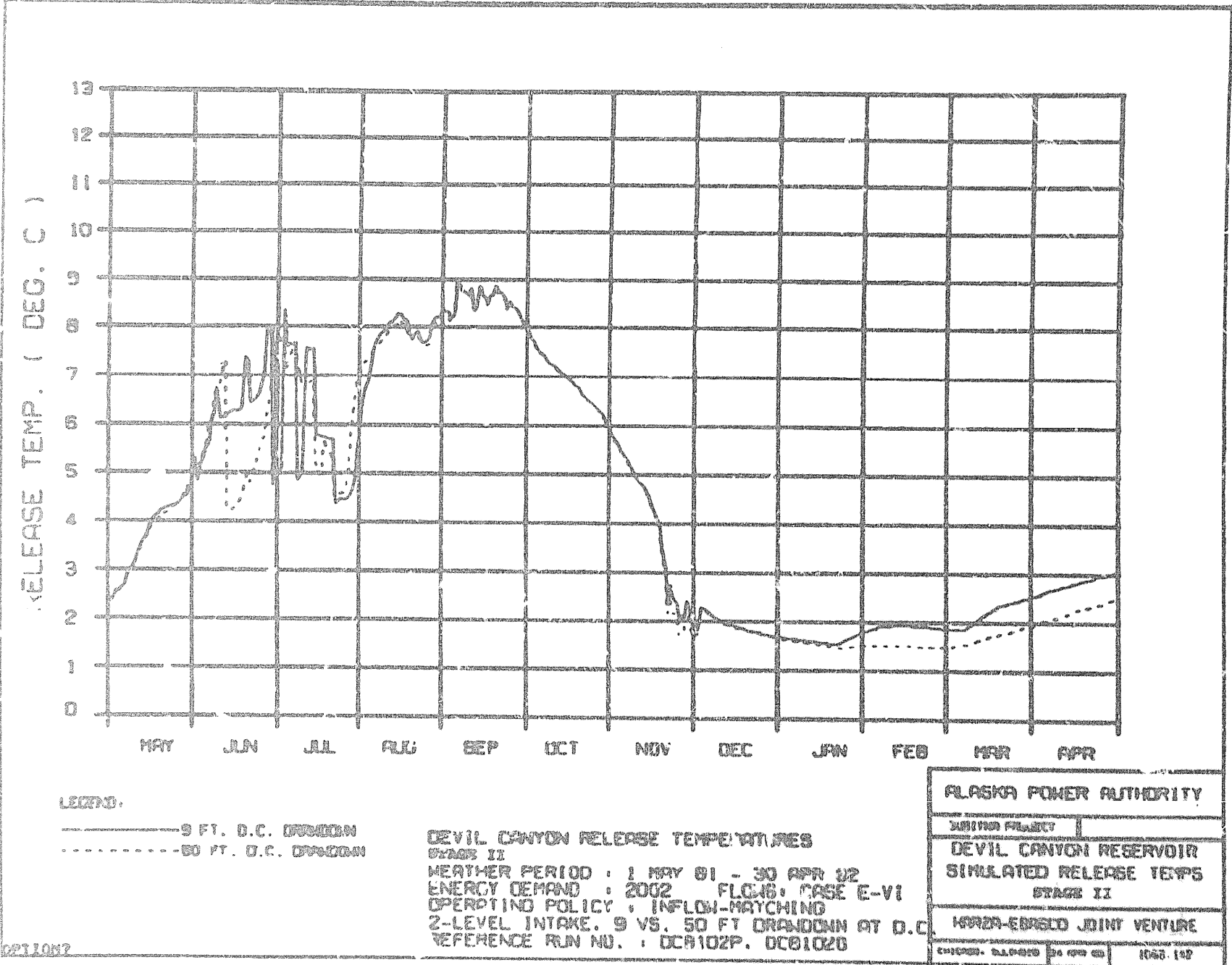
- 2 D.C. INTAKE LEVELS
- 3 D.C. INTAKE LEVELS

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

0P71087

ALASKA POWER AUTHORITY	
SIBTVA PROJECT	
DEVIL CANYON RESERVOIR	
SIMULATED RELEASE TEMPS	
STAGE II	
HARR-EDASCO JOINT VENTURE	
CHIEFED. D.L. DAVIS	1583.142

FIGURE 23



LEGEND:

- 9 FT. D.C. DRAIN
- 50 FT. D.C. DRAIN

DEVIL CANYON RELEASE TEMPERATURES
STAGE II

WEATHER PERIOD : 1 MAY 81 - 30 APR 82
 ENERGY DEMAND : 2002 FLOW: CASE E-VI
 OPERATING POLICY : INFLOW-MATCHING
 2-LEVEL INTAKE, 9 VS. 50 FT DRAINAGE AT D.C.
 REFERENCE RUN NO. : DC8102P, DC8102B

ALASKA POWER AUTHORITY	
SUBJECT	
DEVIL CANYON RESERVOIR SIMULATED RELEASE TEMPS STAGE II	
KARZA-EDGED JOINT VENTURE	
CHIEF: ALP/ED	DATE: 08/01/82
1060-100	

0211017

FIGURE 24

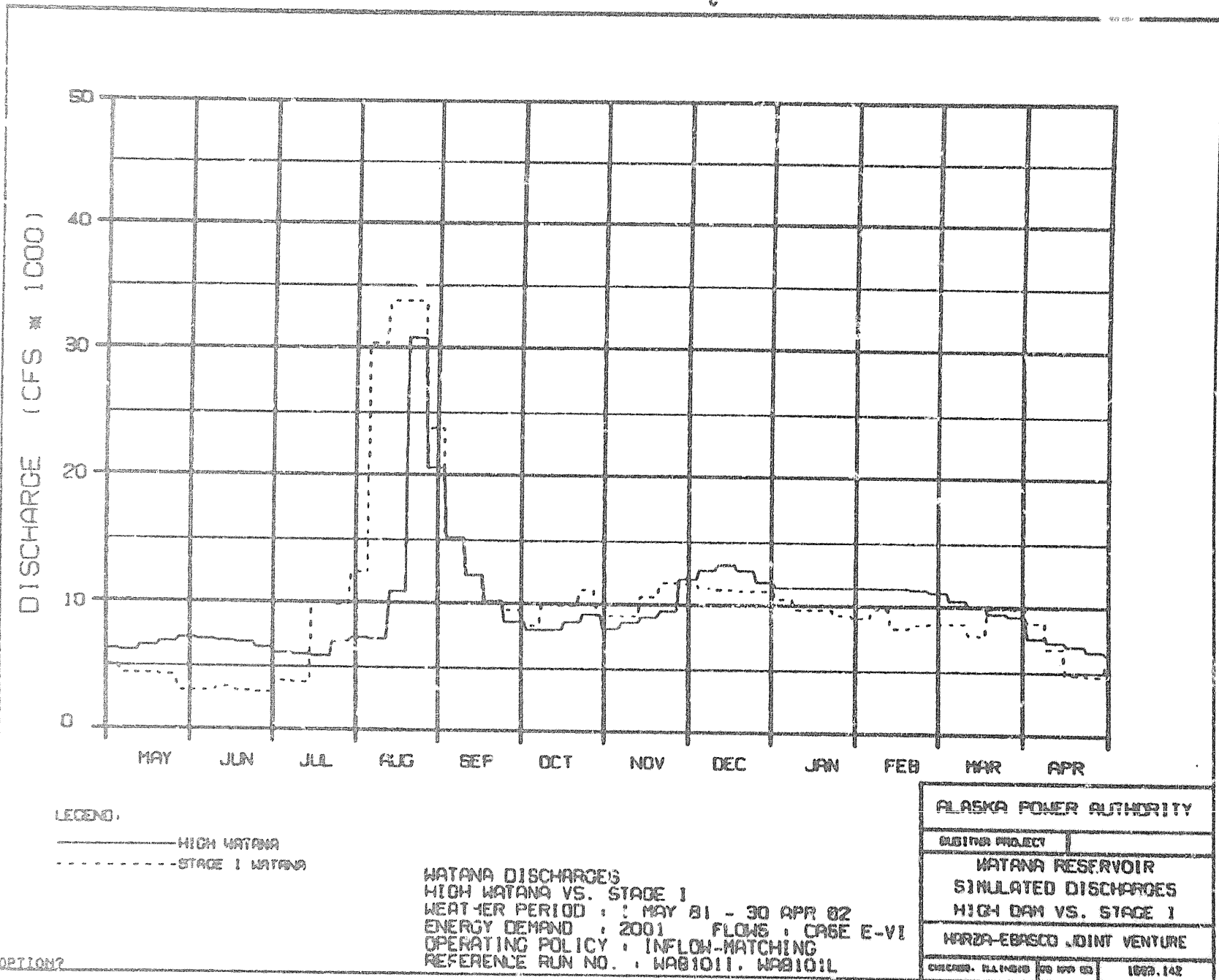
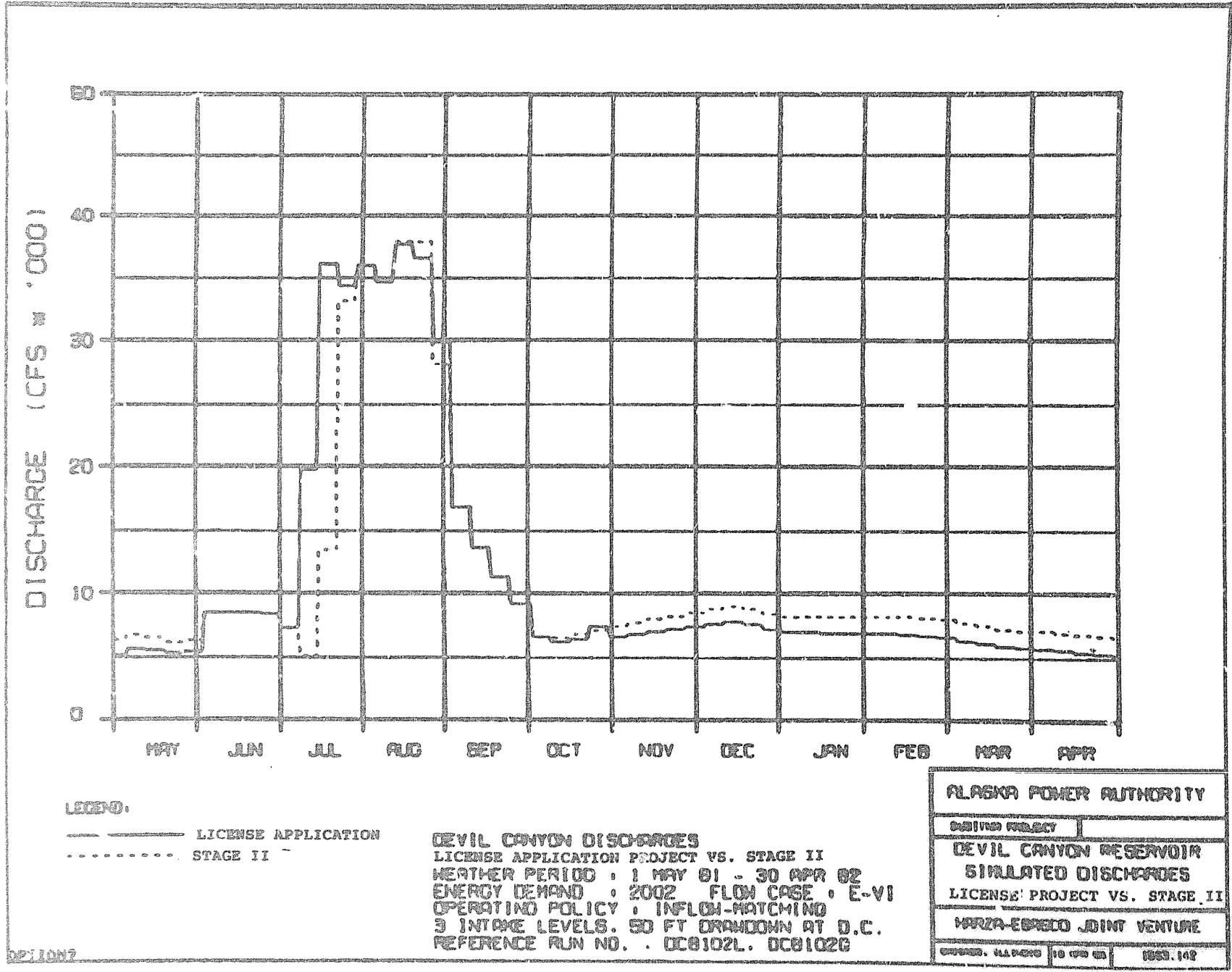


FIGURE 25



LEGEND:
 — LICENSE APPLICATION
 STAGE II

DEVIL CANYON DISCHARGES
 LICENSE APPLICATION PROJECT VS. STAGE II
 WEATHER PERIOD : 1 MAY 01 - 30 APR 02
 ENERGY DEMAND : 2002 FLOW CASE : E-VI
 OPERATING POLICY : INFLOW-MATCHING
 3 INTAKE LEVELS, 50 FT DRAWDOWN AT D.C.
 REFERENCE RUN NO. : DC8102L, DC8102R

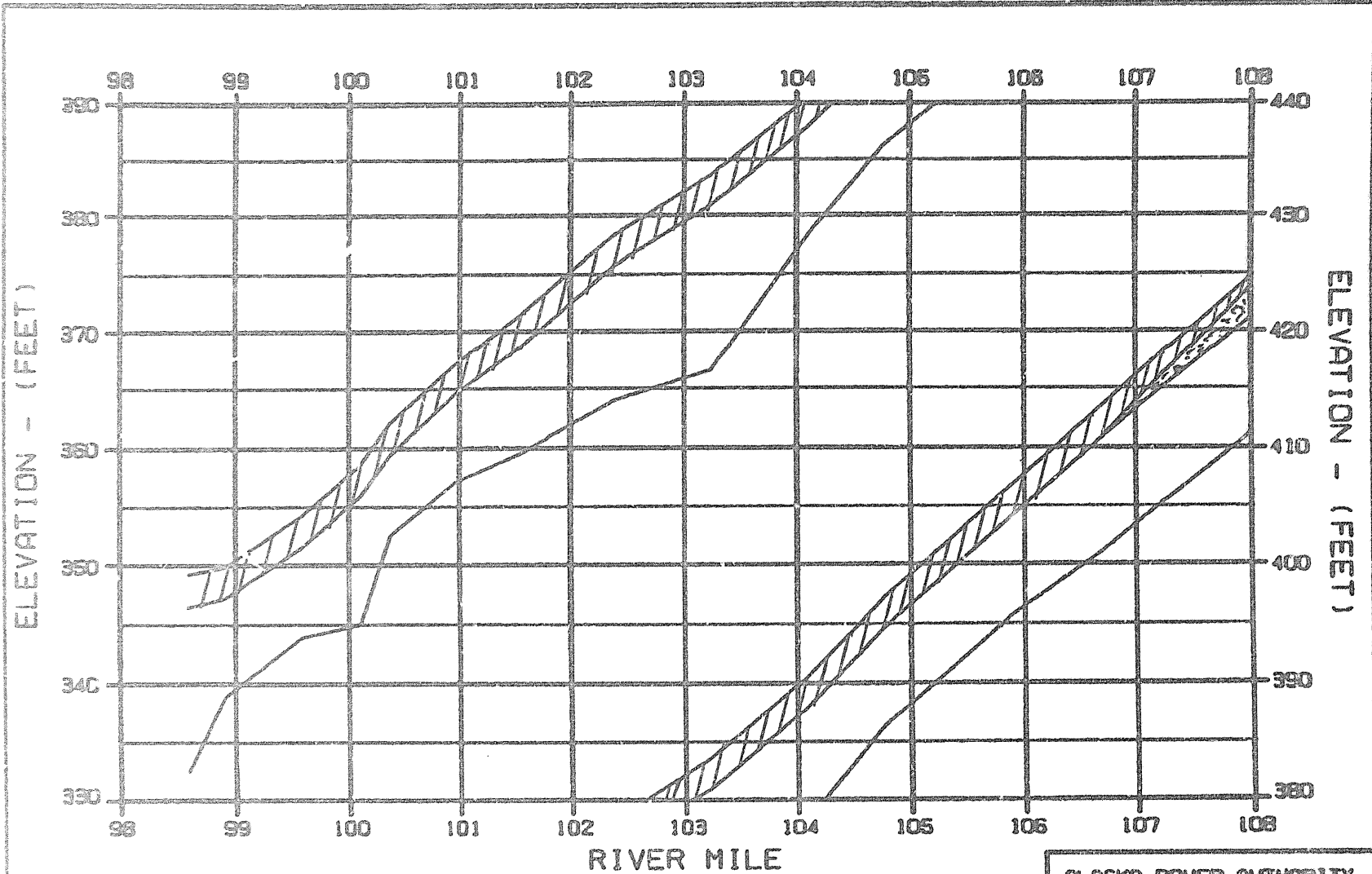
ALASKA POWER AUTHORITY		
DESIGNED PROJECT		
DEVIL CANYON RESERVOIR		
SIMULATED DISCHARGES		
LICENSE PROJECT VS. STAGE II		
MARZA-EBRACO JOINT VENTURE		
DESIGNED	DATE	ISSUE NO.
11/14/01	10/03/02	0050, 149

OPTION?

FIGURE 26

EXHIBITS

EXHIBIT A







ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

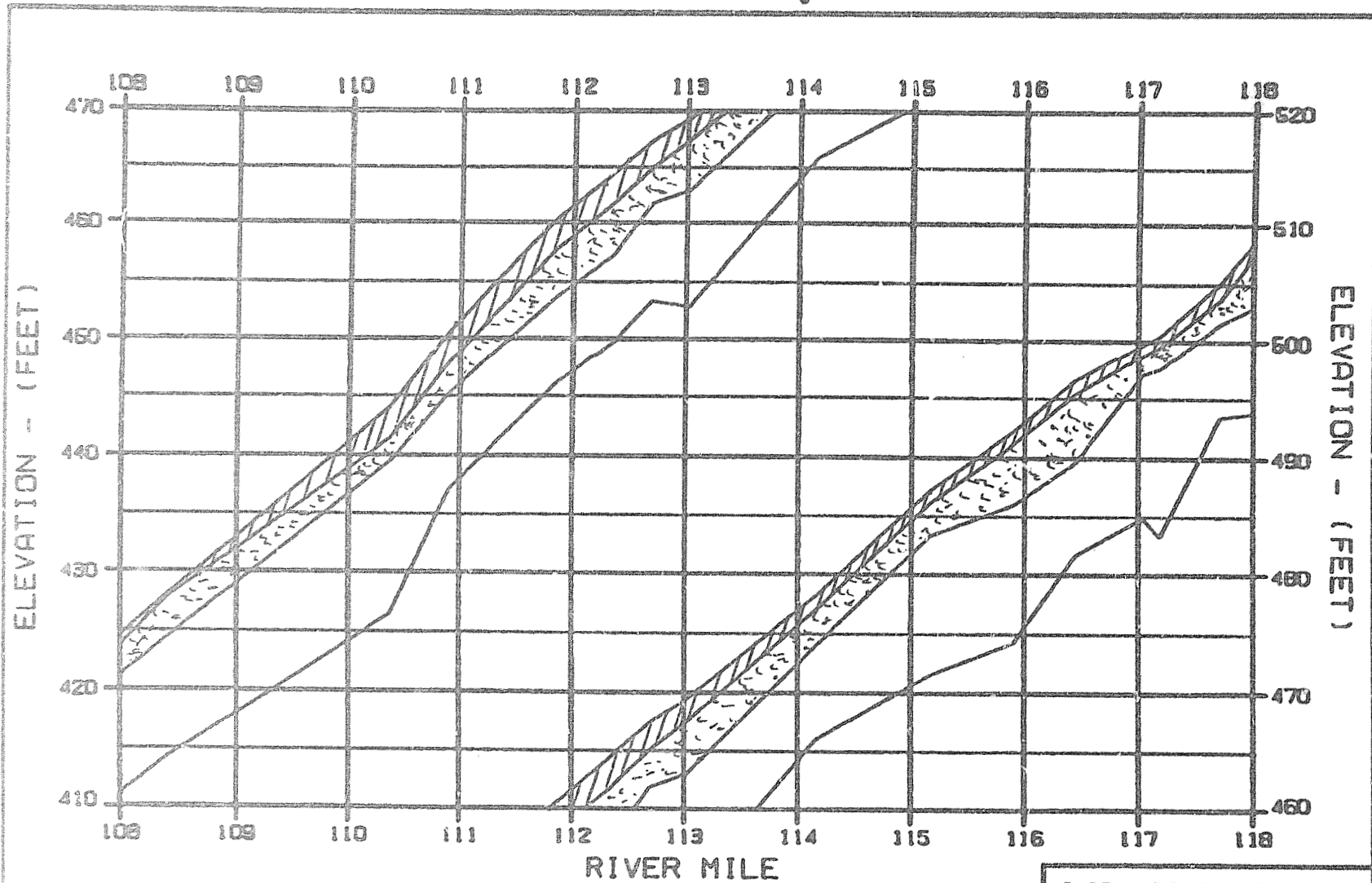
LEGEND:

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


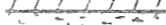


WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : HAYAMA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 0101CN

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HORZA-EBRACO JOINT VENTURE	
DATE: 04/05/02	BY: JLM
SCALE: 1:2	

OPTION 2

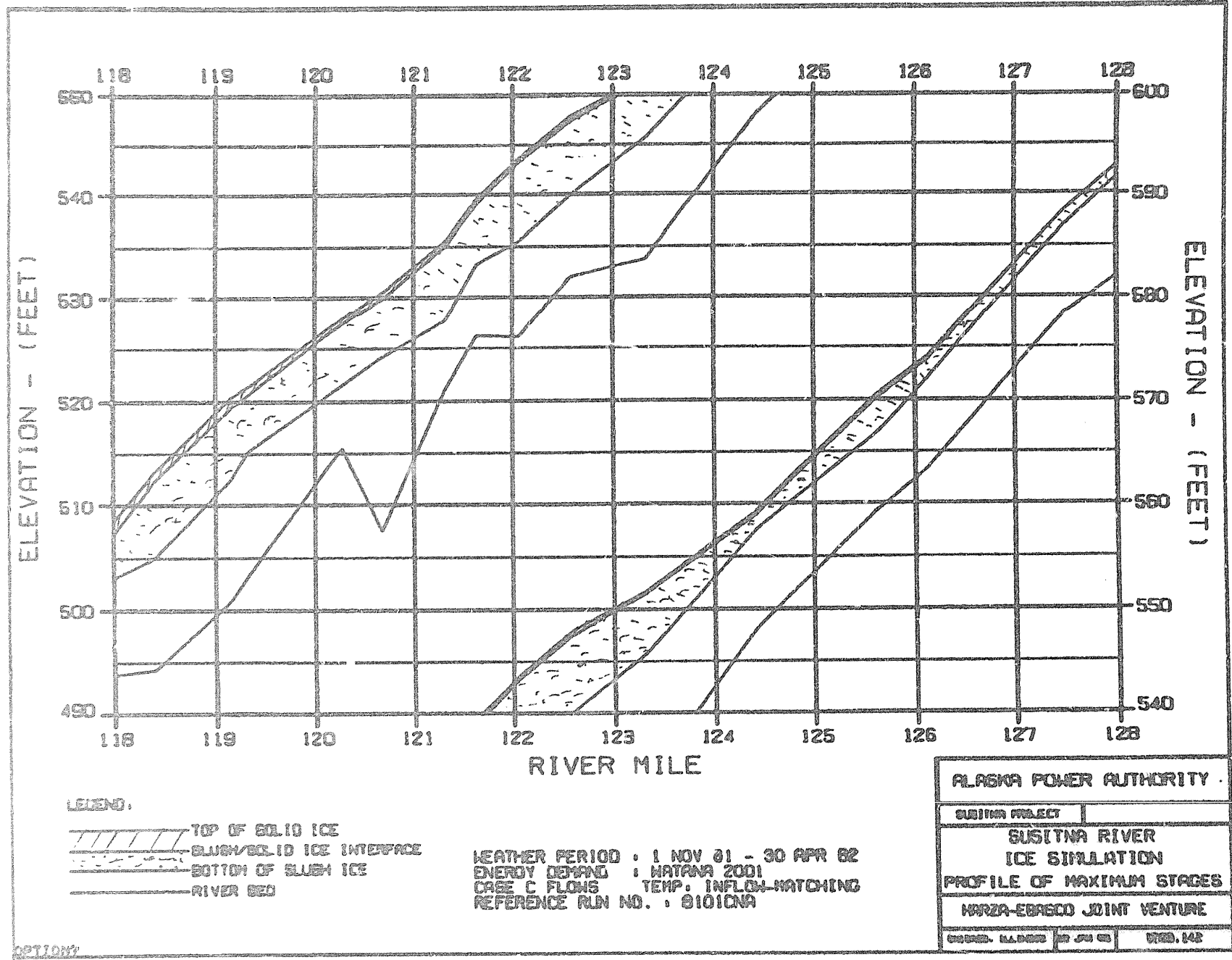


LEGEND.

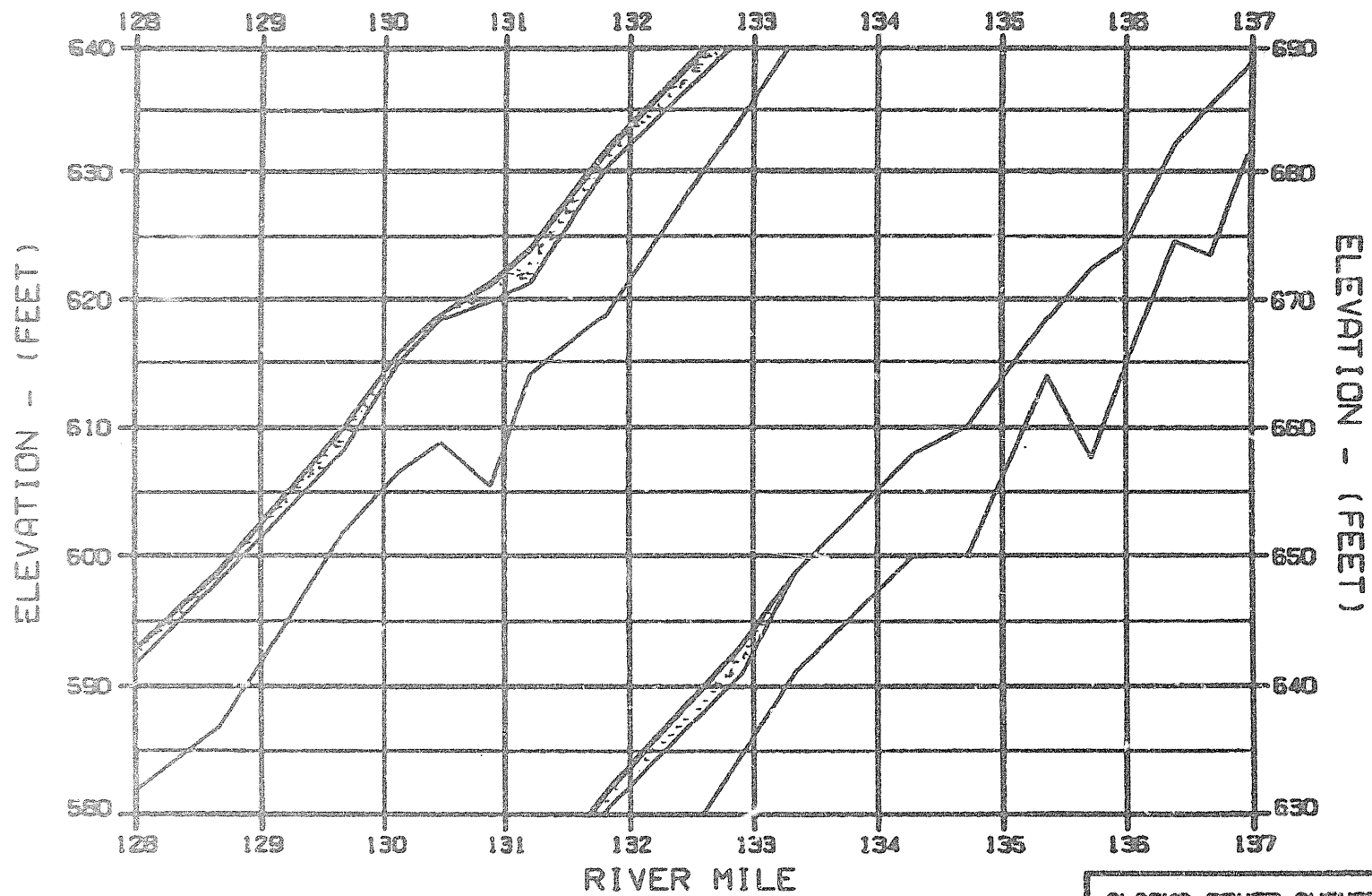
-  TOP OF SOLID ICE
-  BLUSH/SOLID ICE INTERFACE
-  BOTTOM OF BLUSH ICE
-  RIVER BED

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



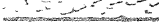

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARZ-EBASCO JOINT VENTURE	
DATE: 01/01/82	2000.148



08770M7

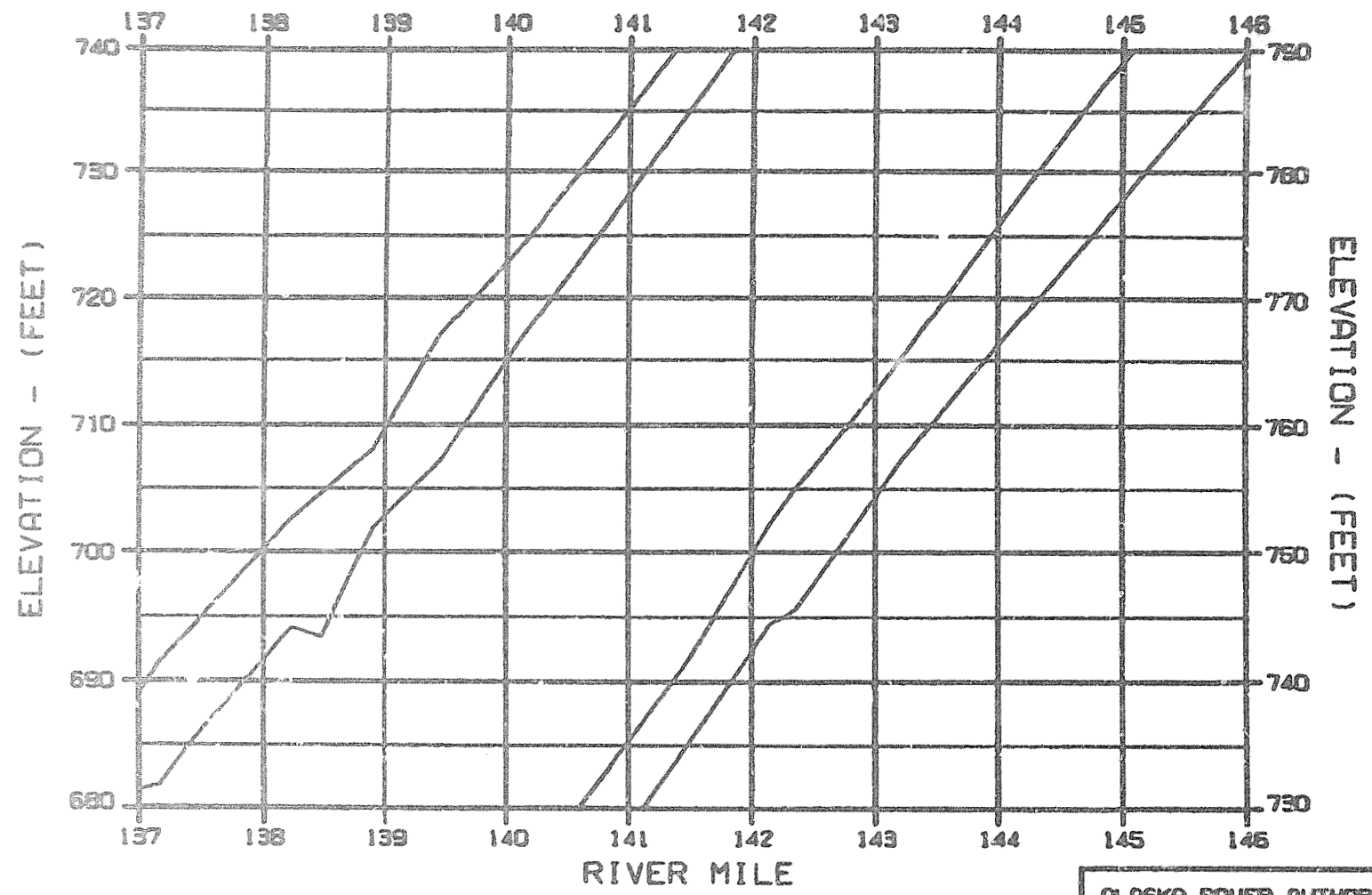


LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP. INFLOW-MATCHING
 REFERENCE RUN NO. : 0101CNA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARDA-ERASCO JOINT VENTURE	
DESIGNED: ALLISON	27 JUN 02
	1999.142



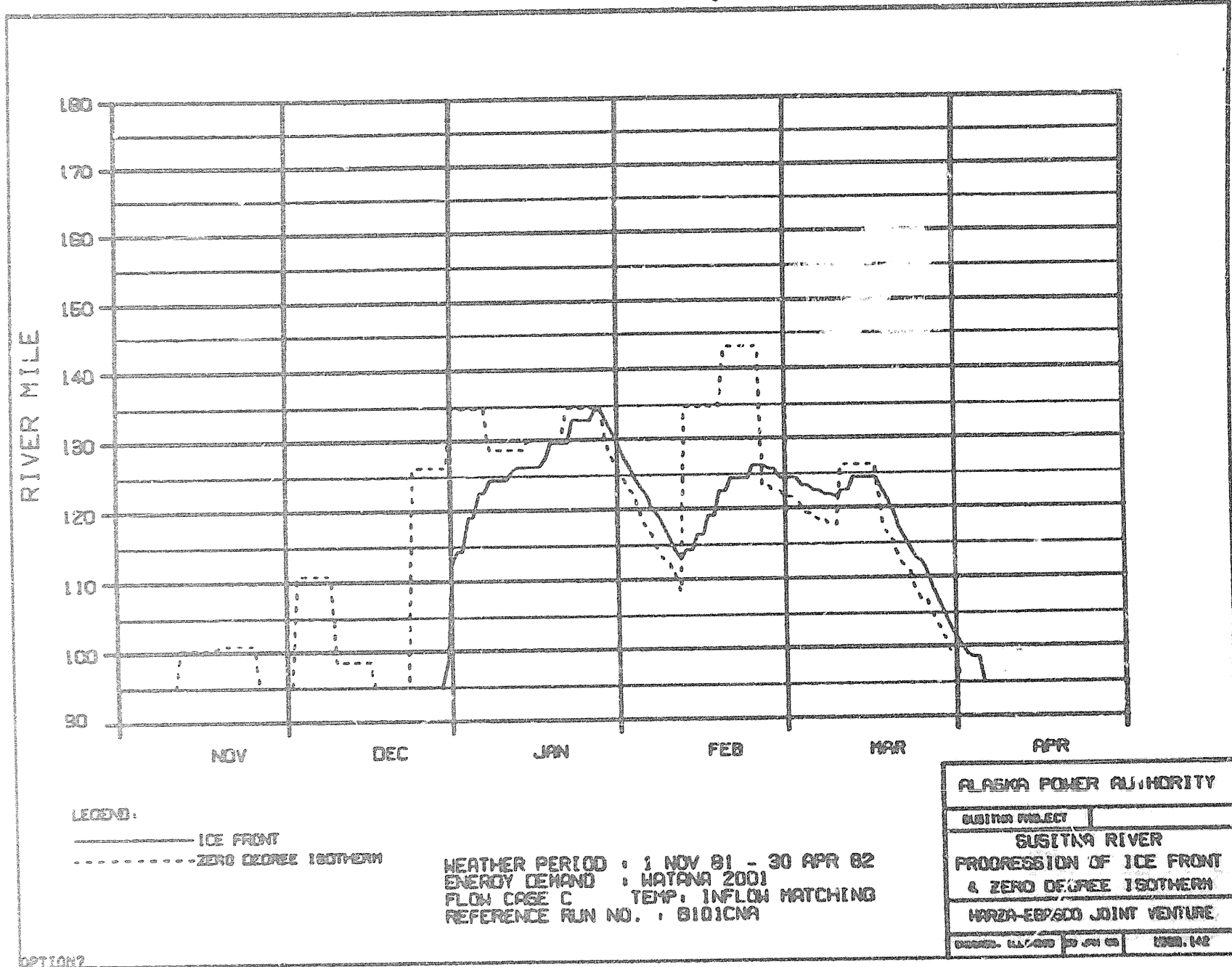
LEGEND:

- TOP OF SOLID ICE
- ▨▨▨▨▨ BLUISH/SOLID ICE INTERFACE
- - - - - BOTTOM OF BLUISH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS TEMP. INFLOW-MATCHING
 REFERENCE RUN NO. : 0101CNA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
UNIVERSITY OF ALASKA	1999.142

OPTION?

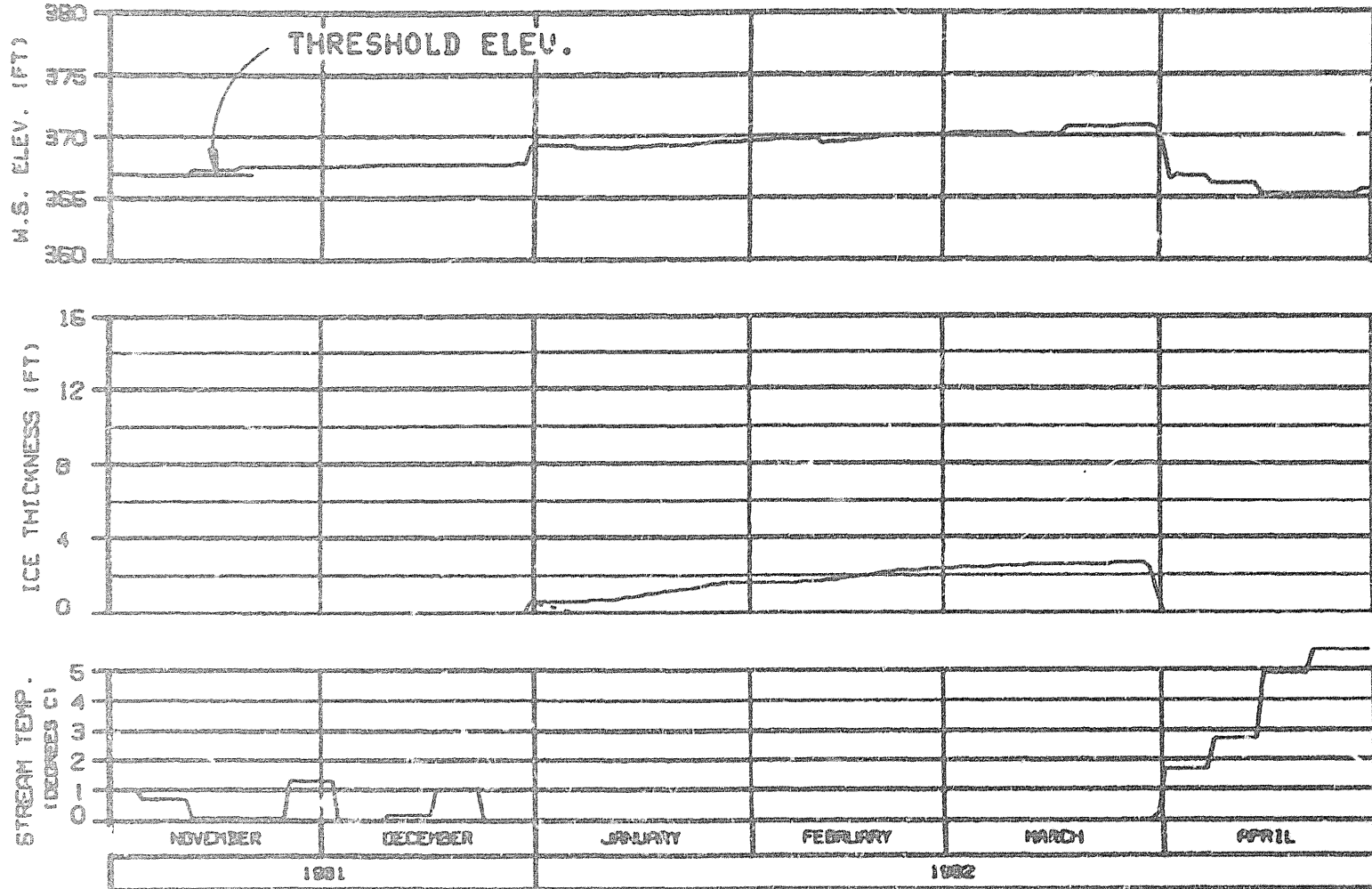


LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 FLOW CASE C TEMP: INFLOW MATCHING
 REFERENCE RUN NO. : BIDICNA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
PROGRESSION OF ICE FRONT	
& ZERO DEGREE ISOTHERM	
WARZA-EBERD JOINT VENTURE	
DESIGNED: G.L. GARDNER	DATE: JAN 82
DRAWN: G.L. GARDNER	DATE: MAR 82

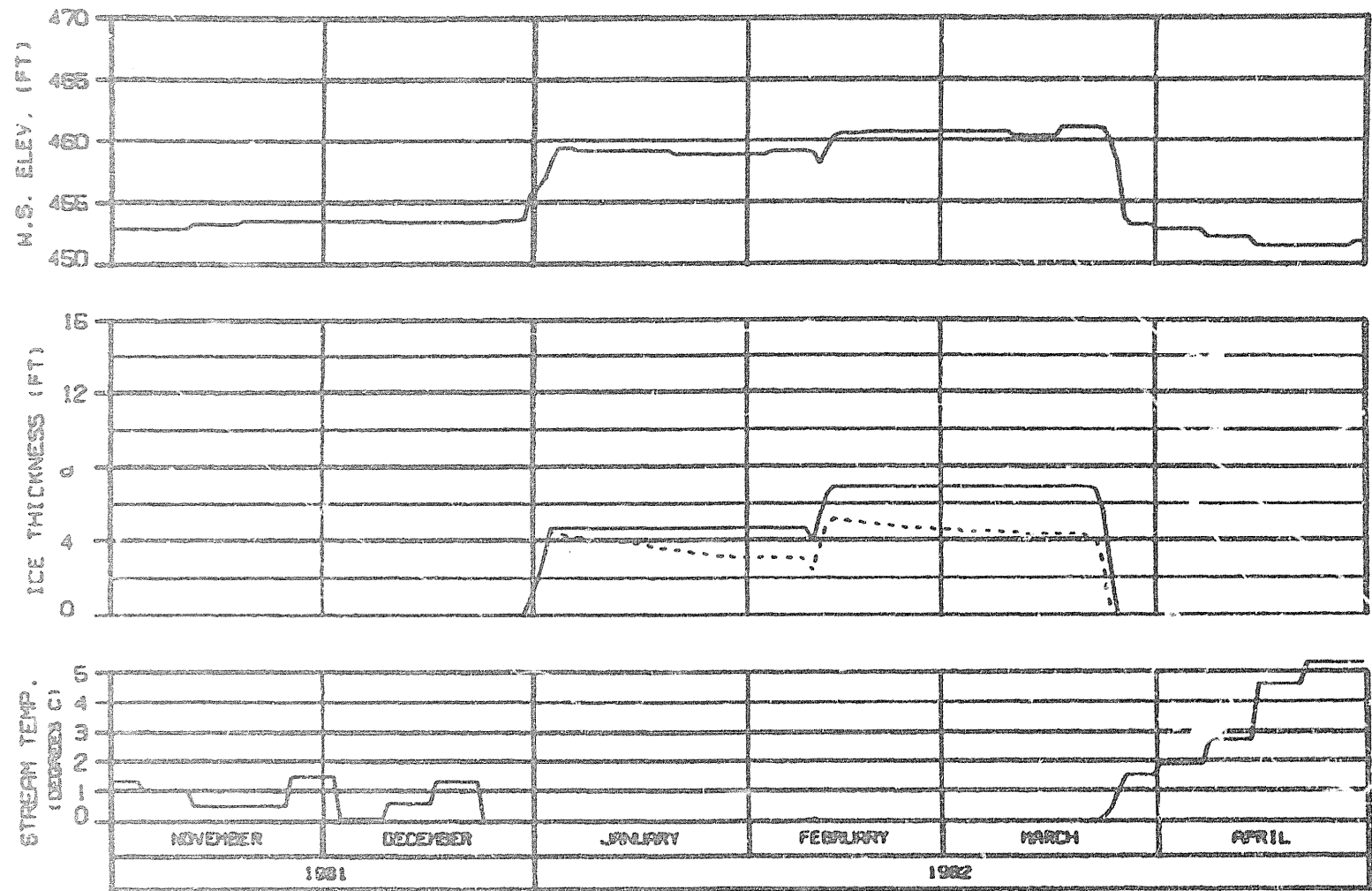


HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-ERASCO JOINT VENTURE		
GRAPH. ALP/STW	20 JUN 82	ISS. 142

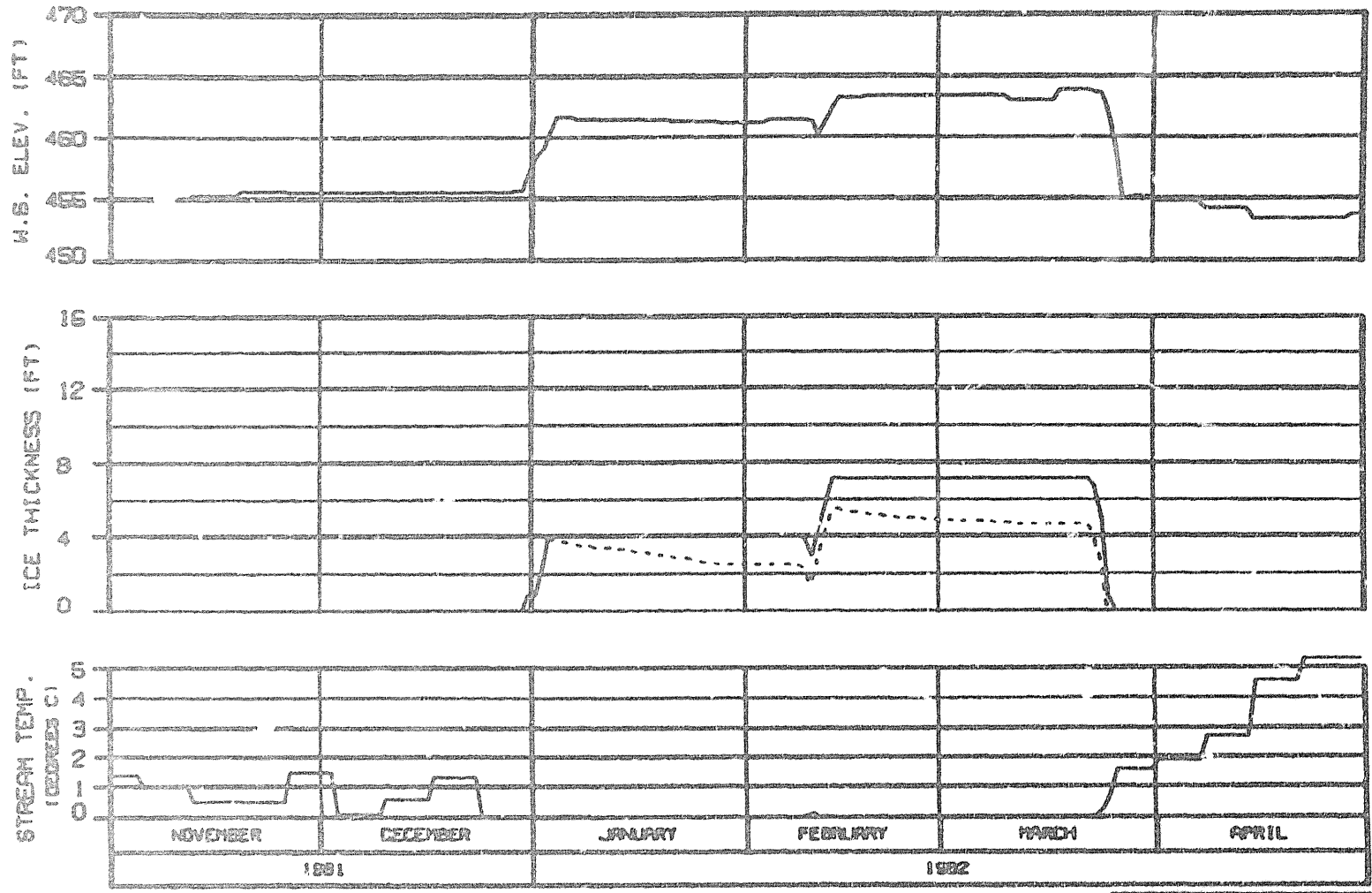


SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

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

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED BY	DATE	ISS. NO.
GEORGE S. GARDNER	27 JUN 82	1005.142

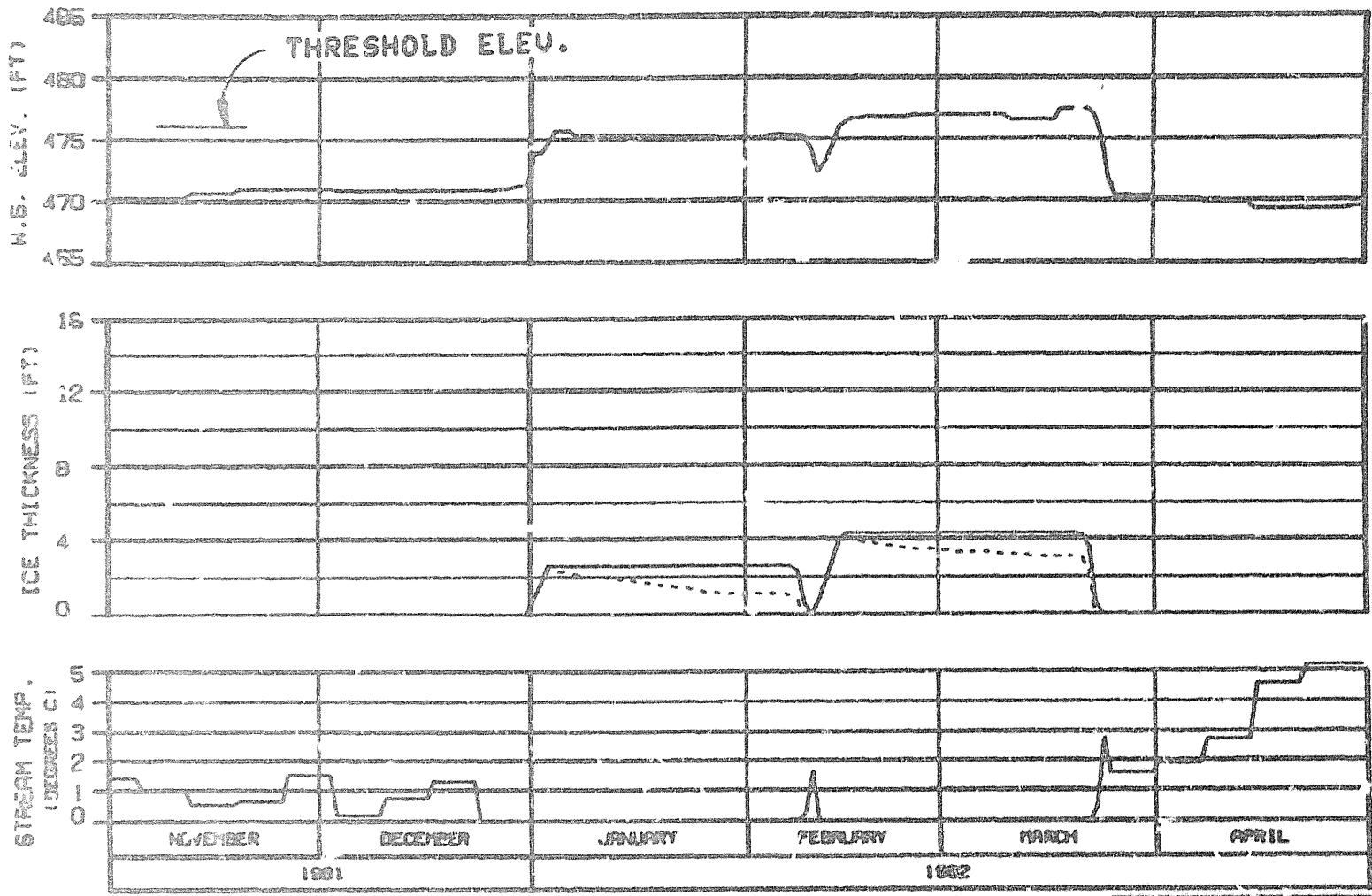


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 81010N4

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HWZA-EBAGCO JOINT VENTURE	
DESIGNED BY: G. L. GARDNER	DATE: JUN 82
DRAWN BY: J. L. GARDNER	

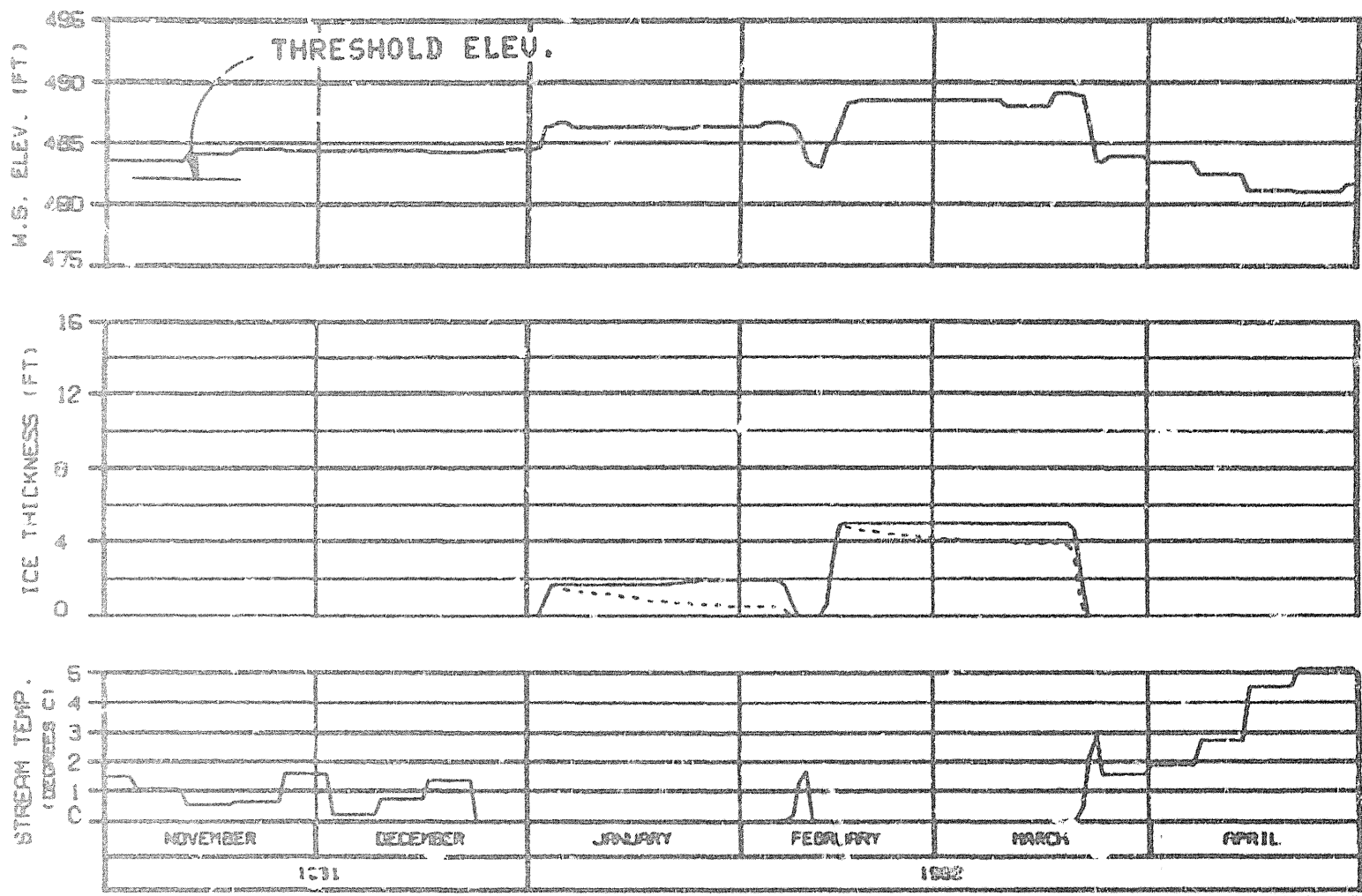


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : WATANA 2011
 CASE C FLOWS TEMP: INFLUW-MATCHING
 REFERENCE RUN NO. : 8101NA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HIST.	
WARZA-EBRODD JOINT VENTURE	
DESIGN: RALPH W. JOHNSON	NOV 1991

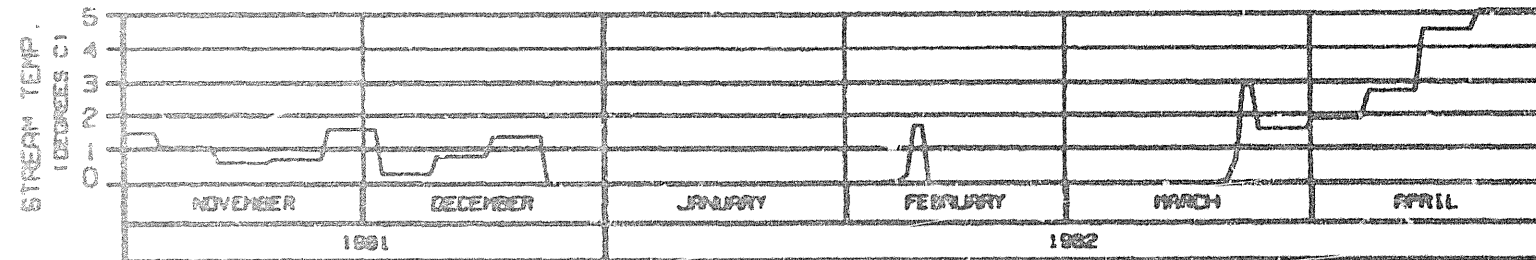
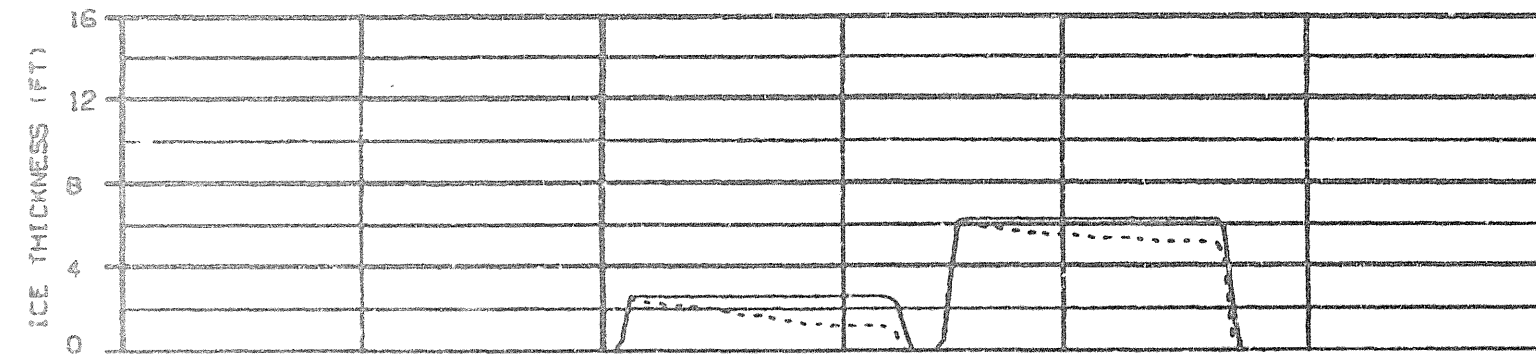
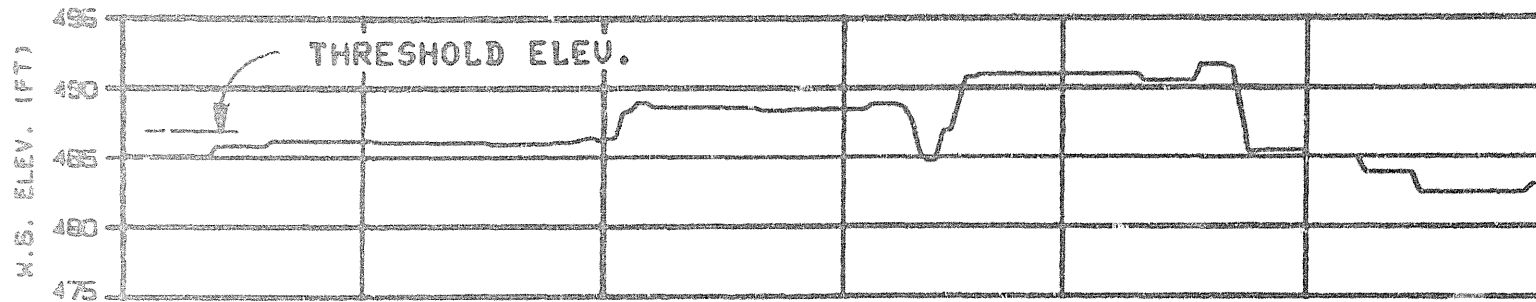


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 01 APR 82	NO. 142

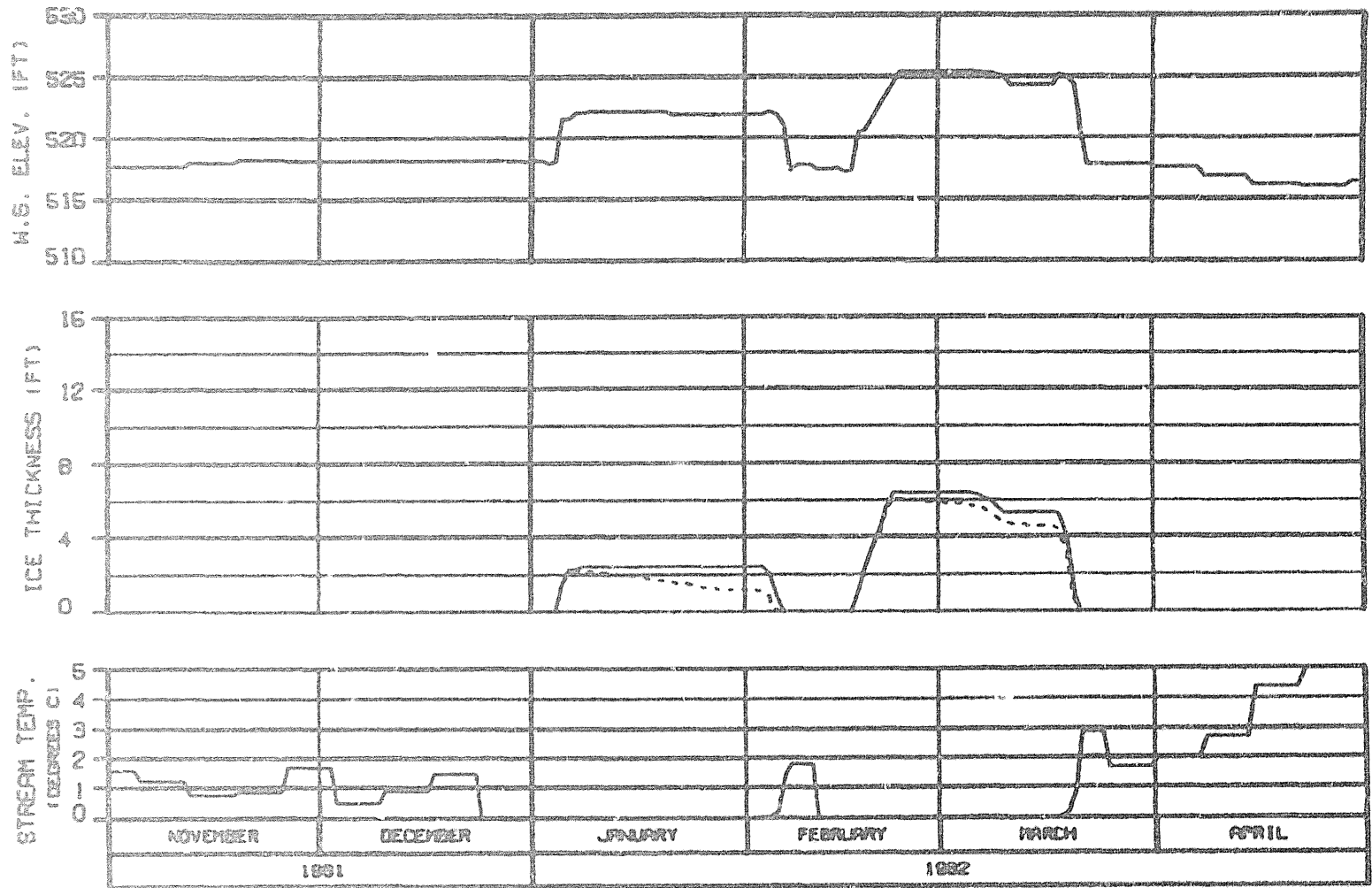


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 81010A

ALASKA POWER AUTHORITY	
SUBMITTA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
ISSUED: AUGUST 28 1981	1000.142

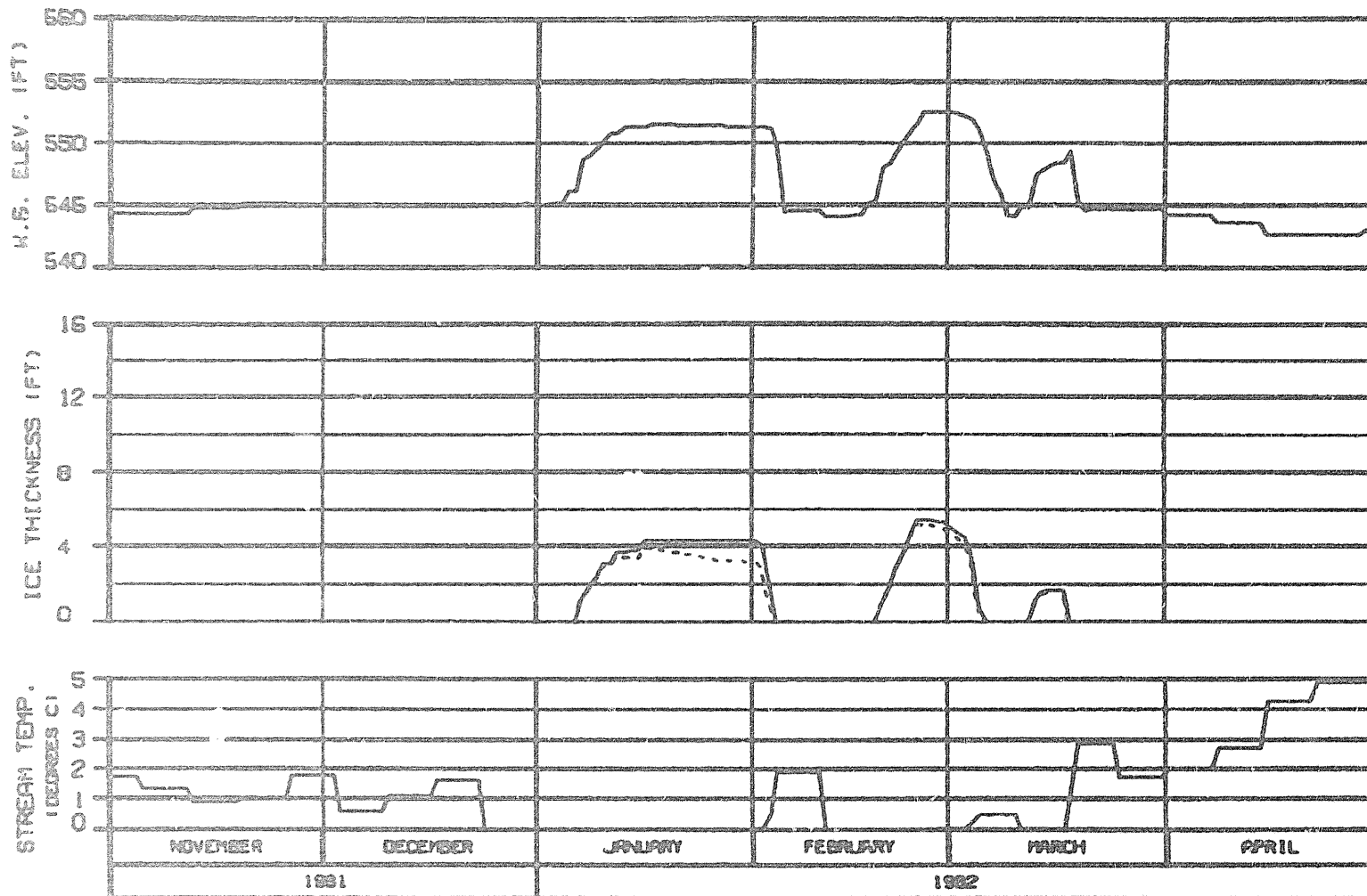


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HEARZ-EBASCO JOINT VENTURE		
GRAPH. 010000	22 JAN 82	1000.142

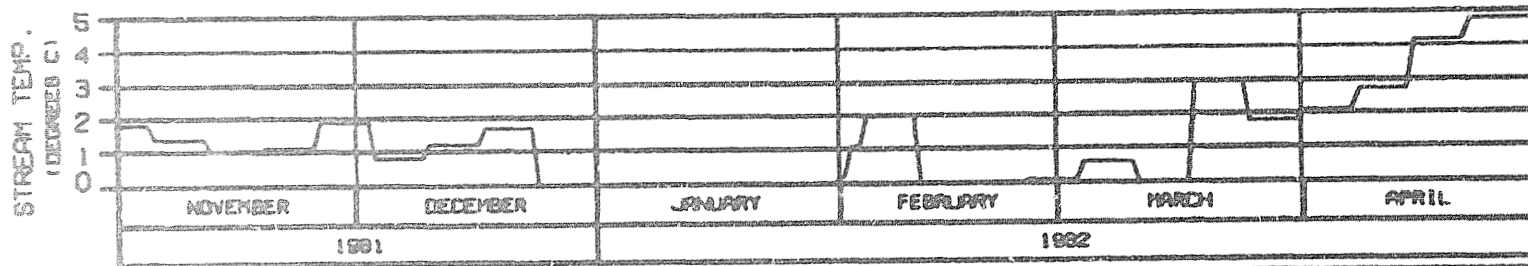
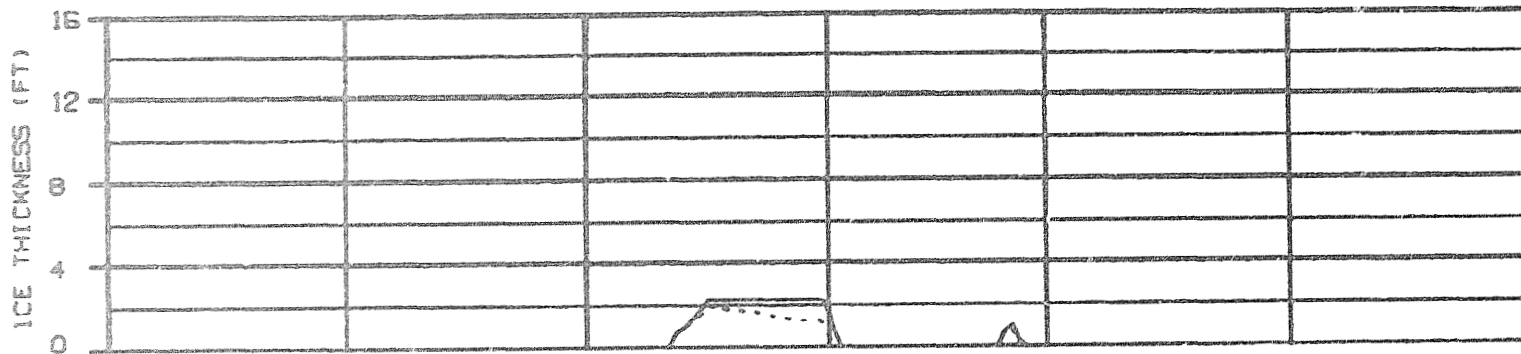
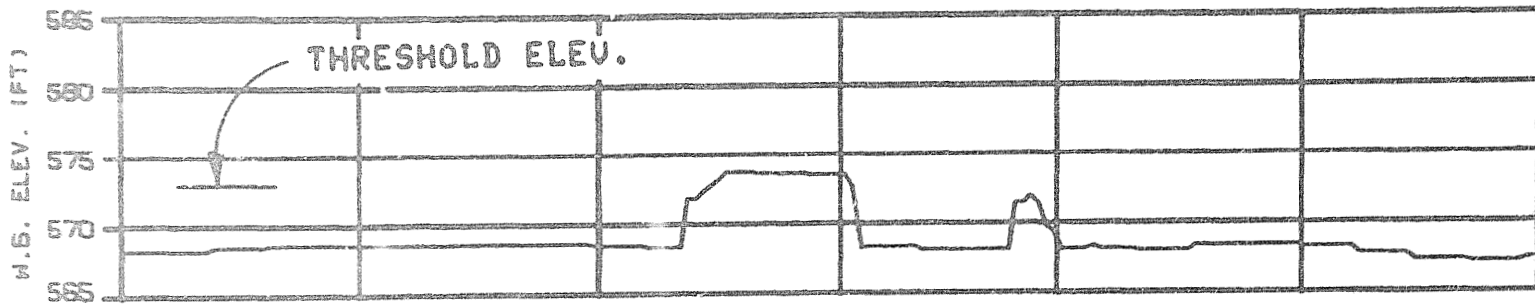


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

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

ALASKA POWER AUTHORITY	
SLISTNA PROJECT	
SLISTNA RIVER ICE SIMULATION TIME HISTORY	
NORZA-ERASCO JOINT VENTURE	
DATE: 04/08/82	BY: J. G. G.
8888.142	



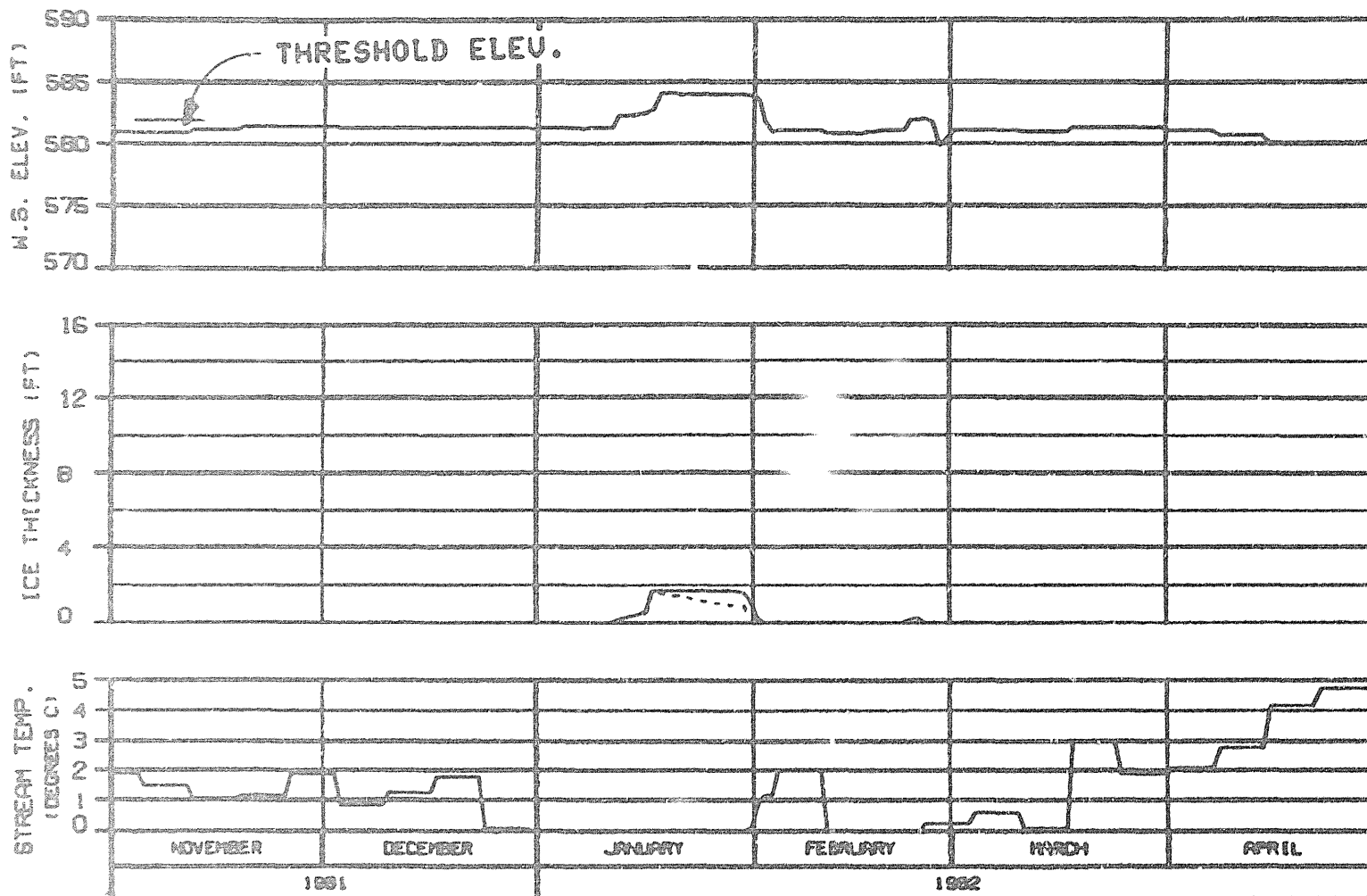
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-ERBACO JOINT VENTURE		
PAPER: 84828	16 JAN 83	1089.142



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 : NATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 0101CNA

ALASKA POWER AUTHORITY

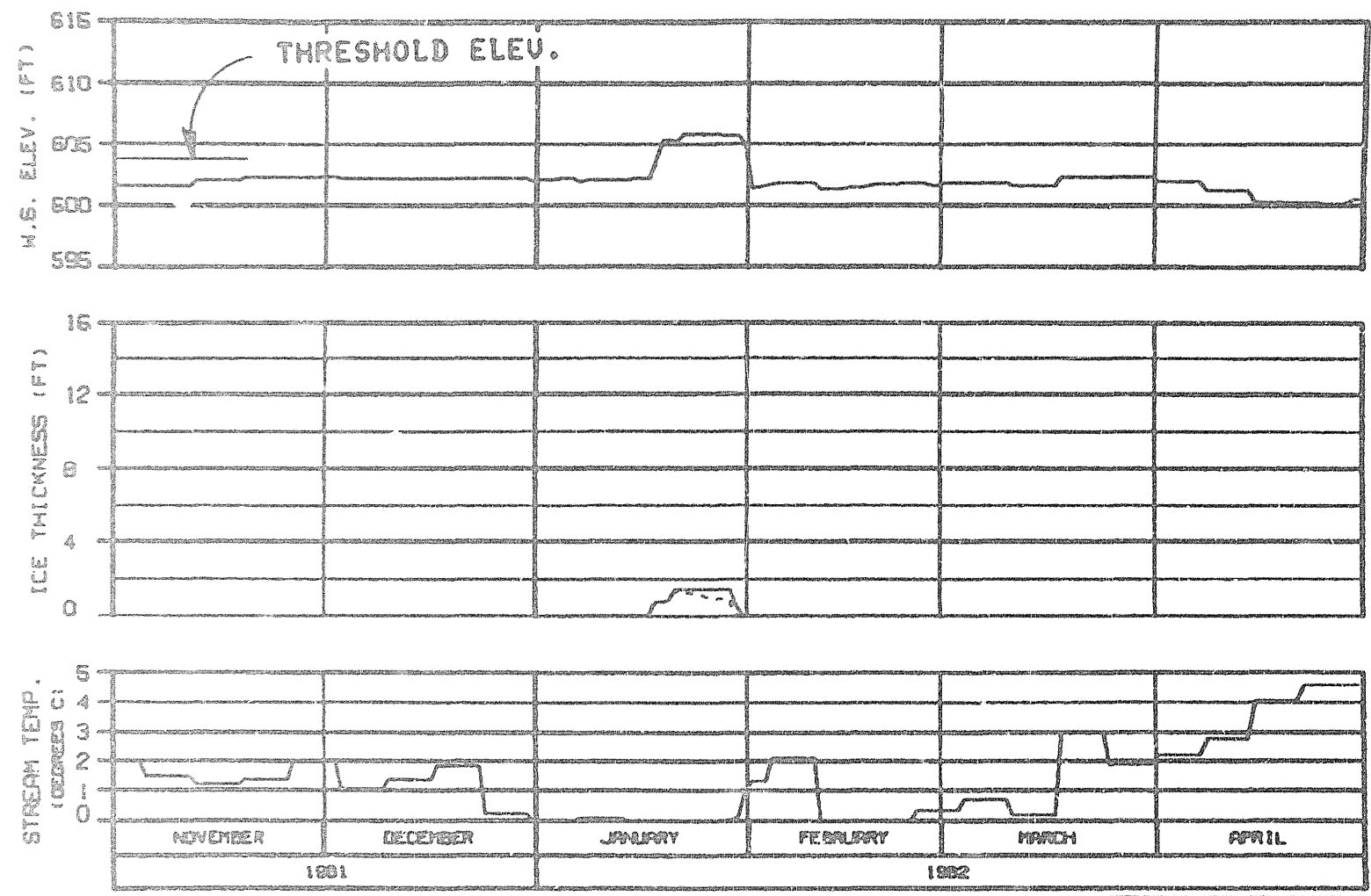
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBRSCO JOINT VENTURE

CHUCKER, B.L.DONN 87 JUN 82 1522.142

STOP C



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

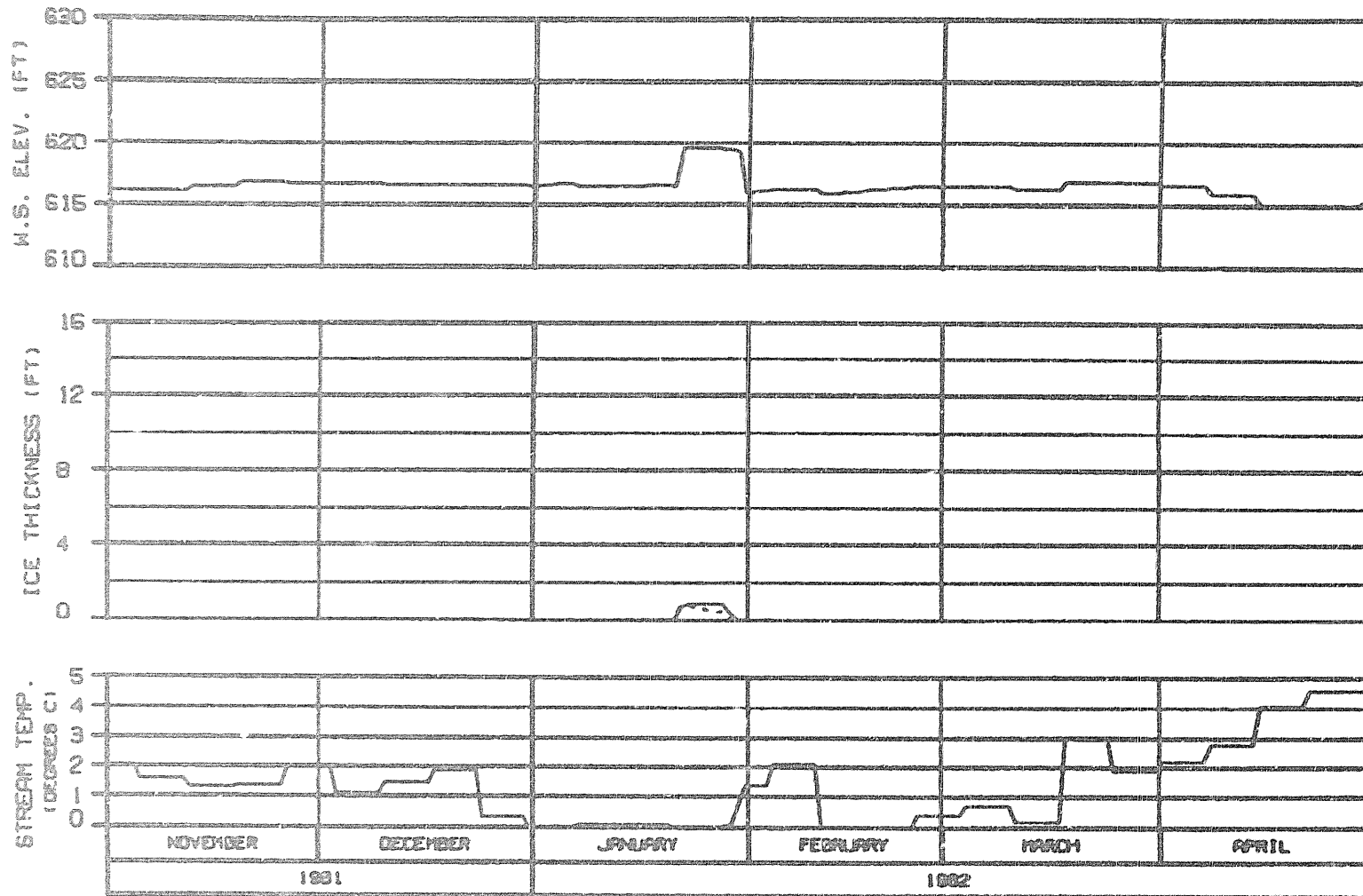
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : B101CNA

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGN. D.L. BROWN	BY JES CH	1000.142

OPT17087

OPTIONARY



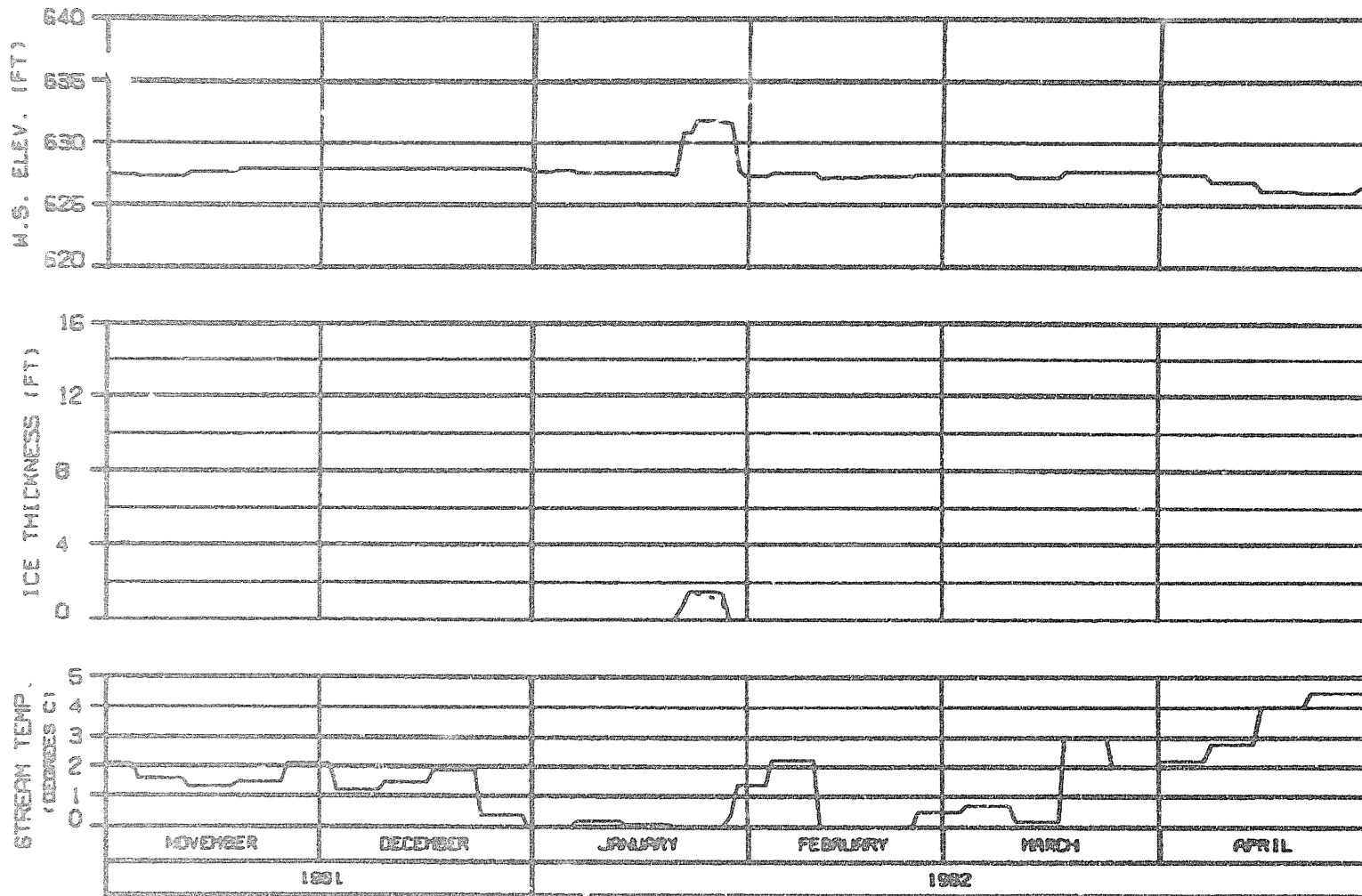
SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : 81010A

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRSCO JOINT VENTURE		
DESIGNED: G.L. GARDNER	BY: J.W. GIBSON	DATE: 1/82

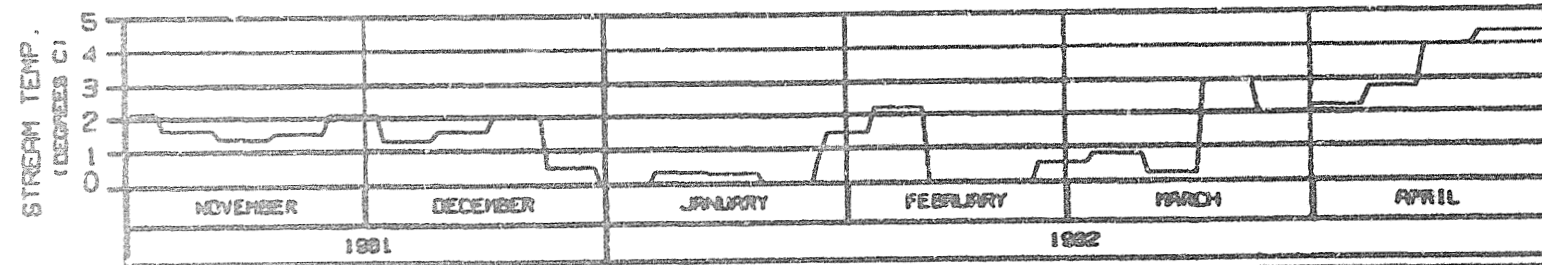
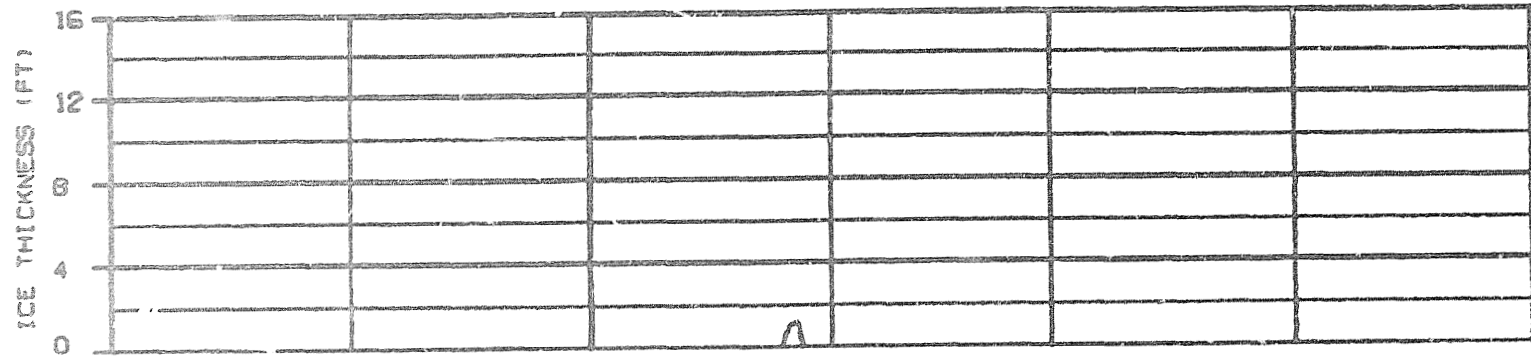
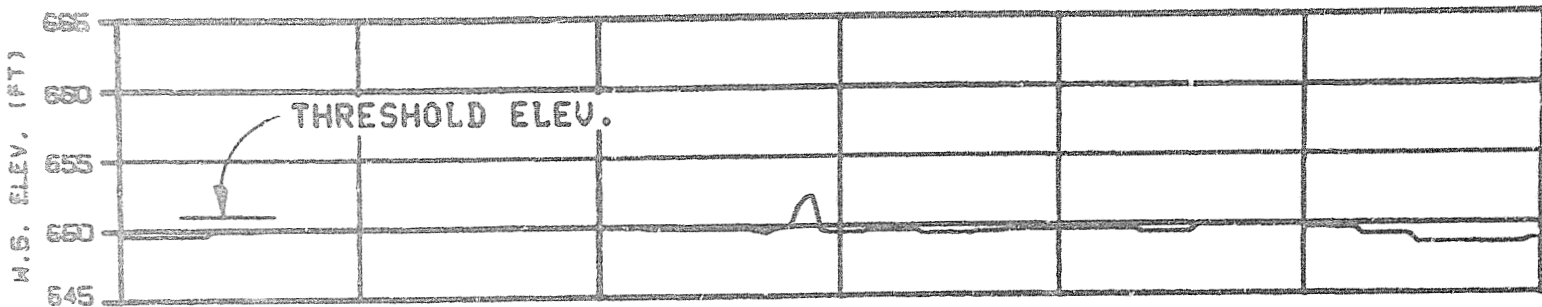


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - D.L. HARRIS	25 JAN 82
8888.142	

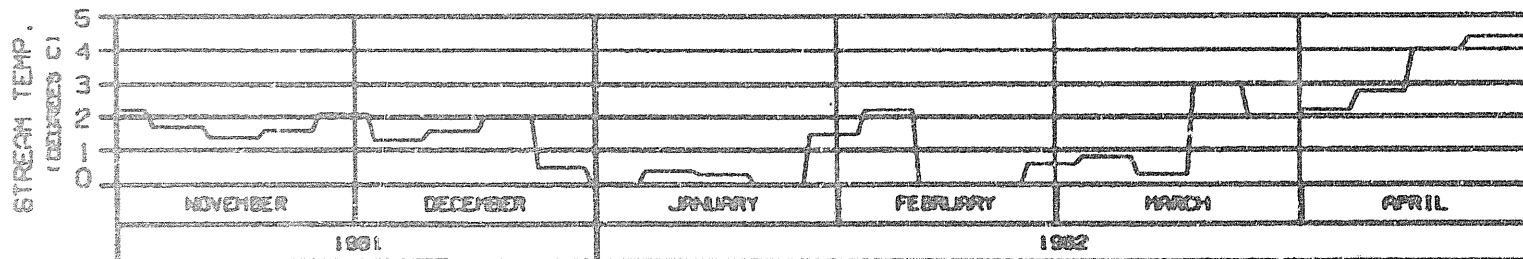
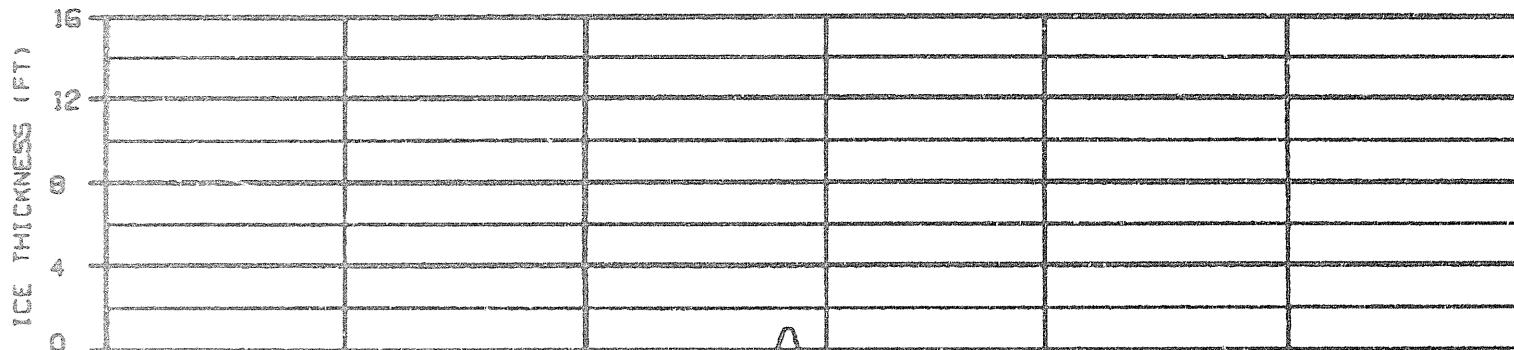
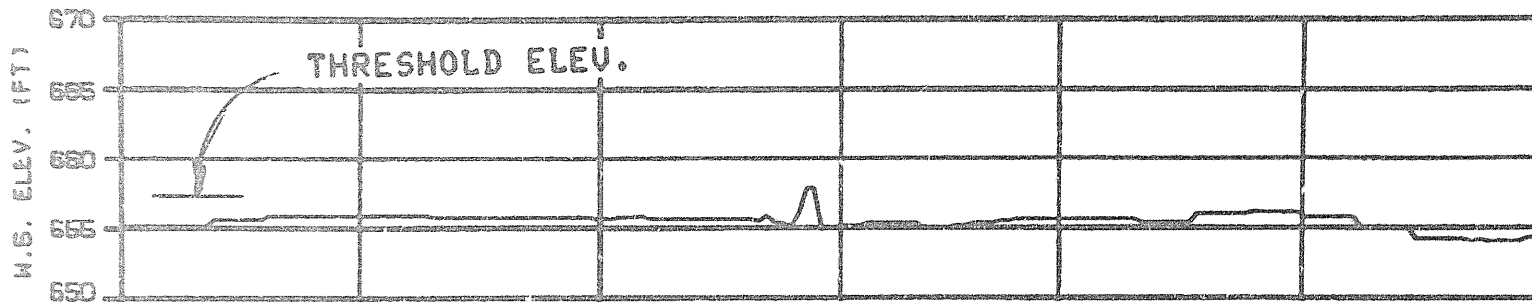


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 810109A

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBRACO JOINT VENTURE		
CHUCK BLAND	JOHN GIBSON	8202.142



SIDE CHANNEL U/S OF SLOUGH 10

RIVER MILE : 134.30

ICE THICKNESS LEGEND:

- TOTAL THICKNESS
- SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

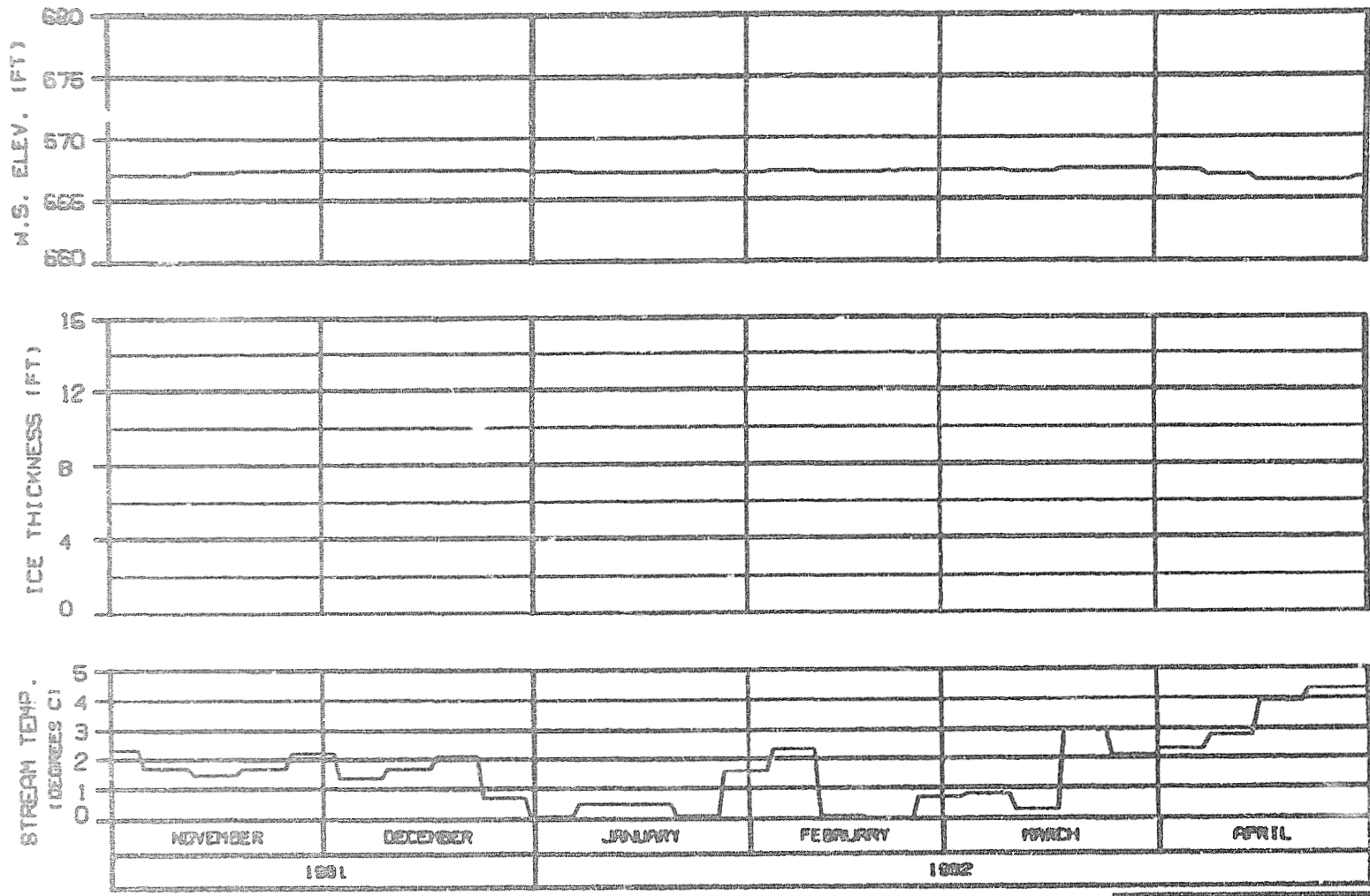
ALASKA POWER AUTHORITY

SUSTINA PROJECT

SUSTINA RIVER
 ICE SIMULATION
 TIME HISTORY

HV2A-EBASCO JOINT VENTURE

ORDER: 04000 27 JAN 03 1000.142

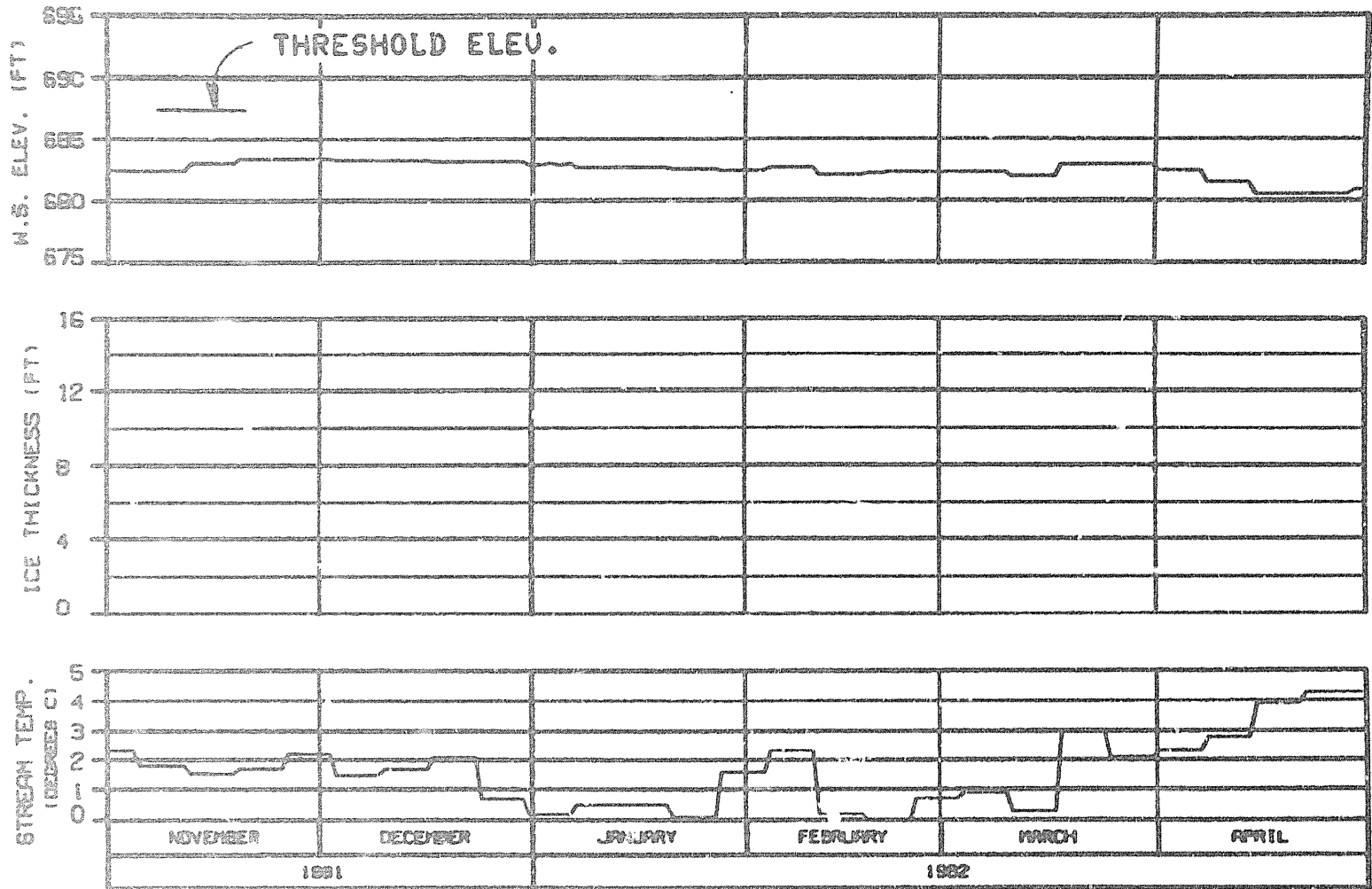


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

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

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBECO JOINT VENTURE	
DESIGNED BY: B.L.P. 8/82	DATE: 10/1/82

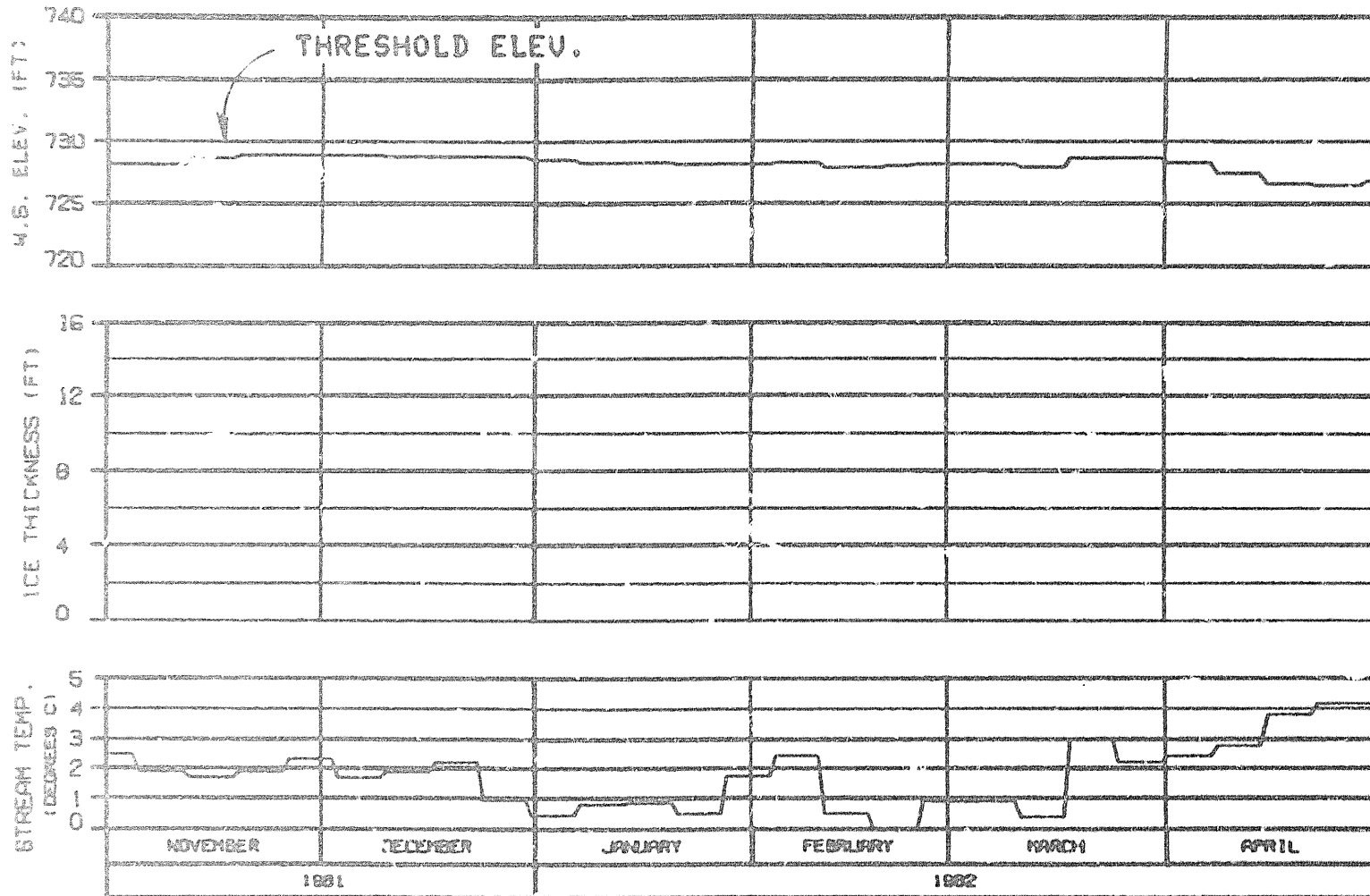


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRSCO JOINT VENTURE		
DESIGNED: 8/10/92	BY: JFM/ED	1000.142

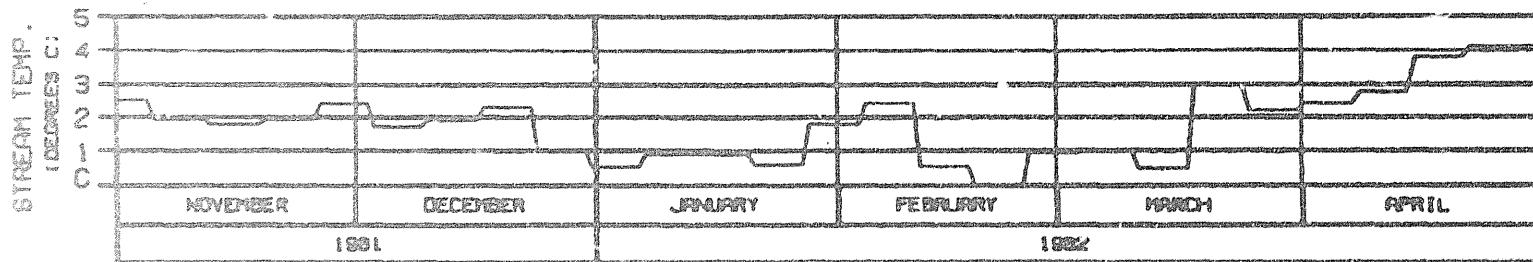
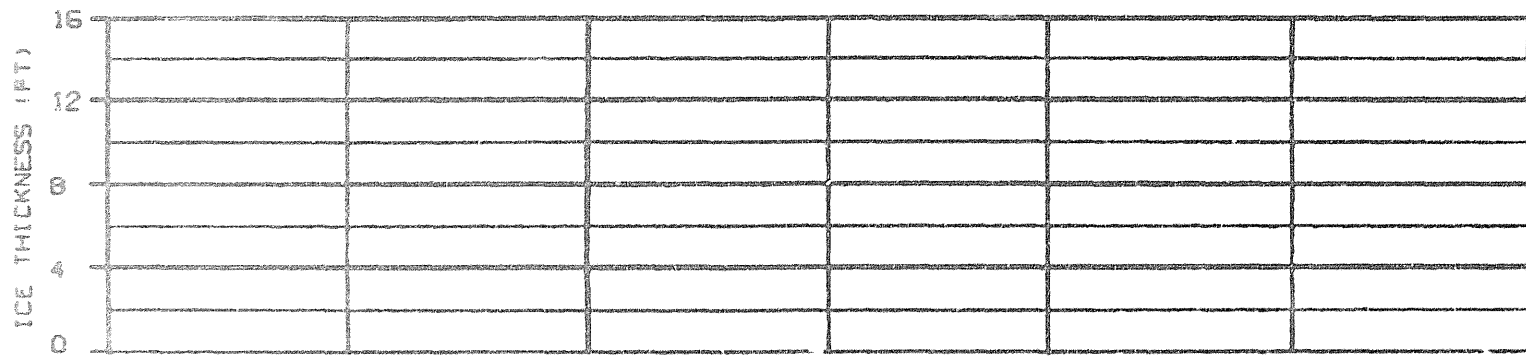
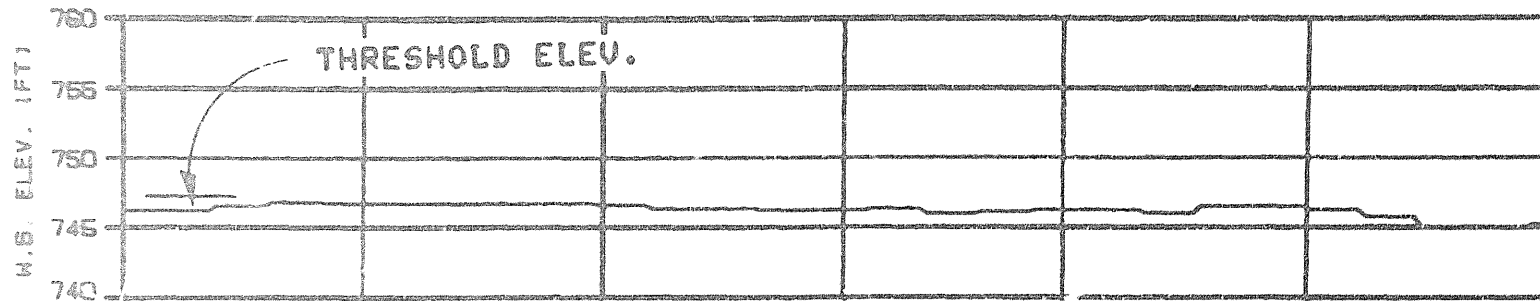


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

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

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CHANGES -	DATE	BY
	04-19-82	JD
1982.142		



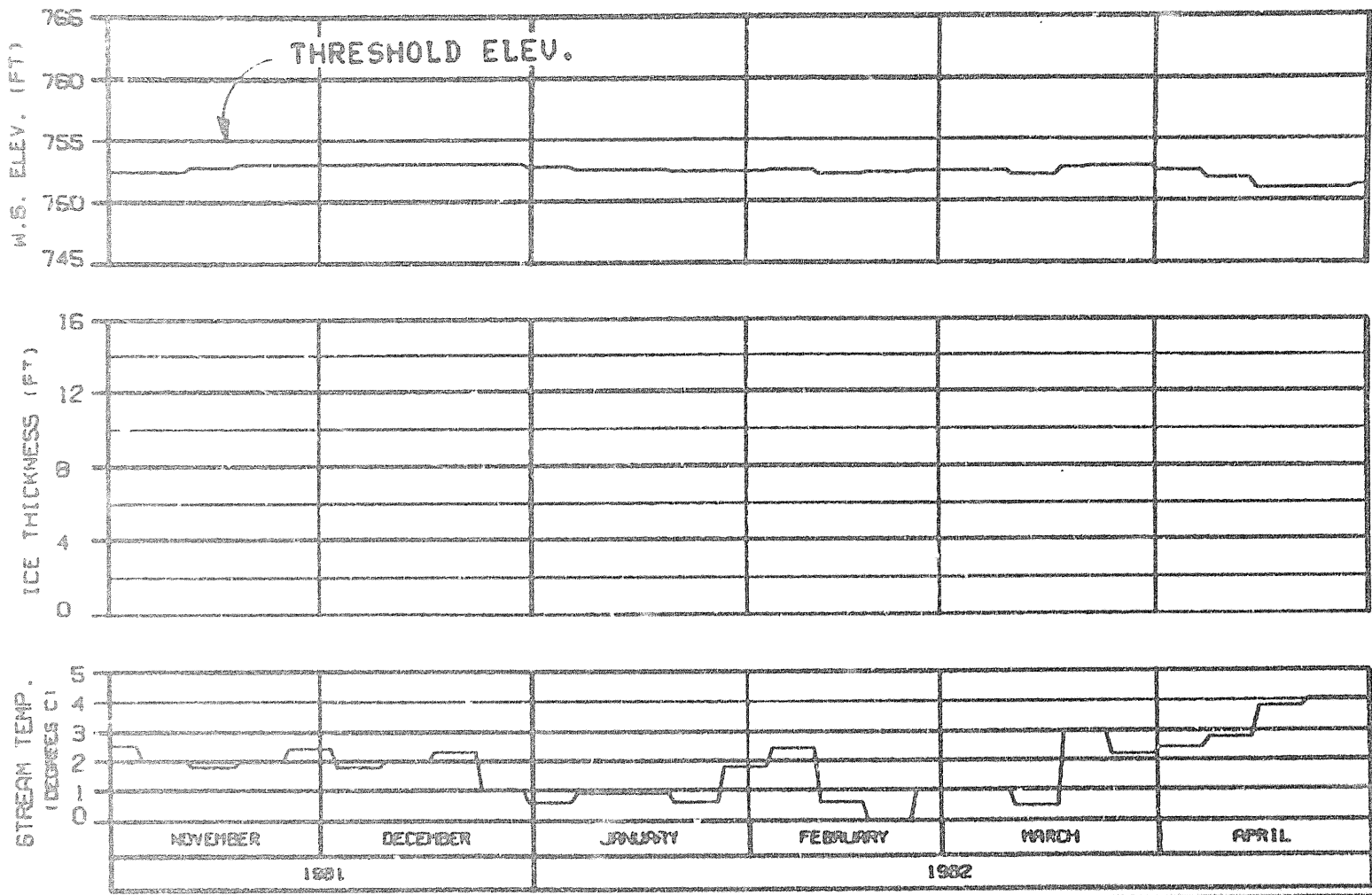
SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : 81010NA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DATE: 04/08/82	BY: JFM/82
PAGE: 142	



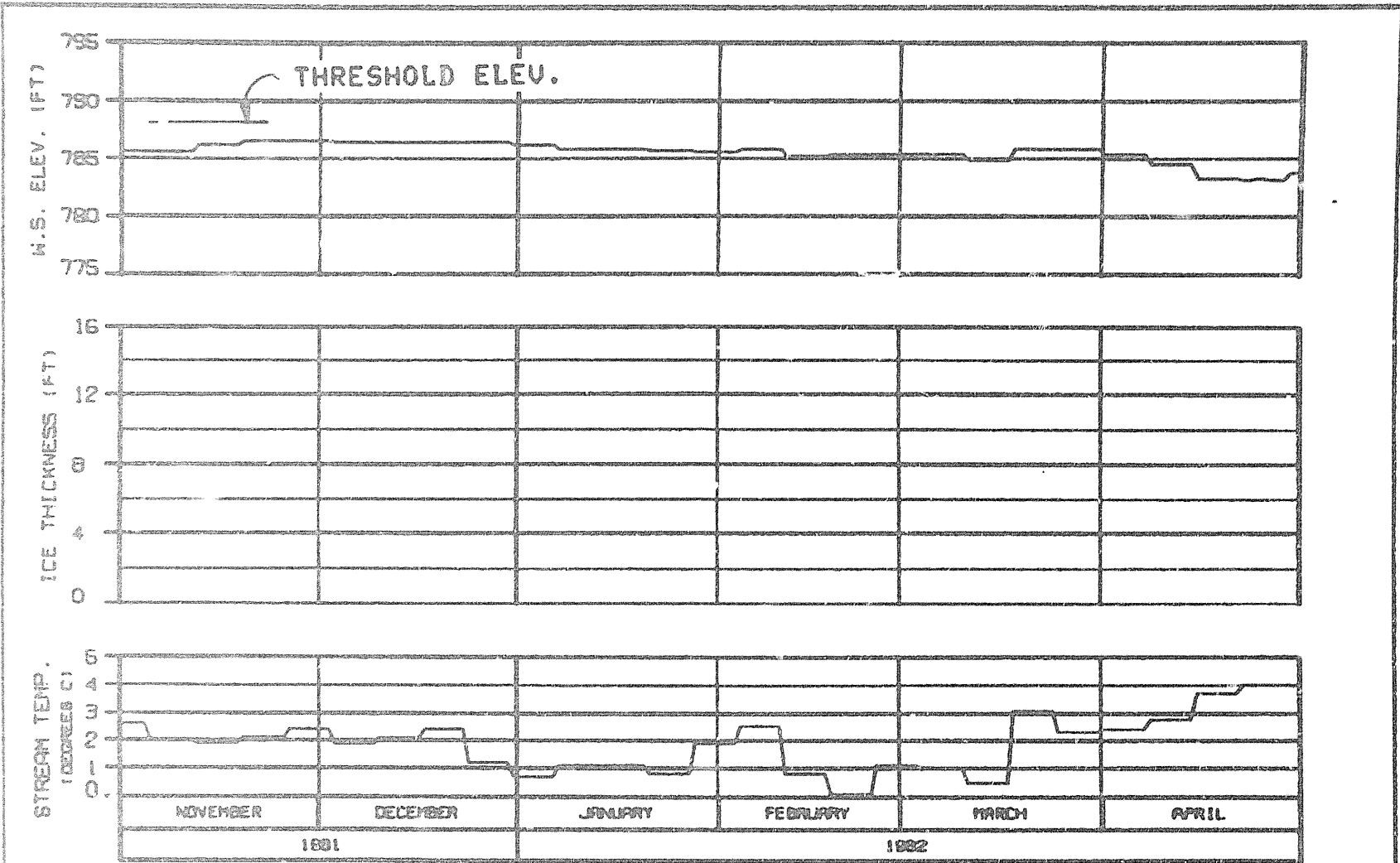
HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERBECCO JOINT VENTURE	
DESIGNED - DALLAS	DATE JAN 83
1983.142	

c



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

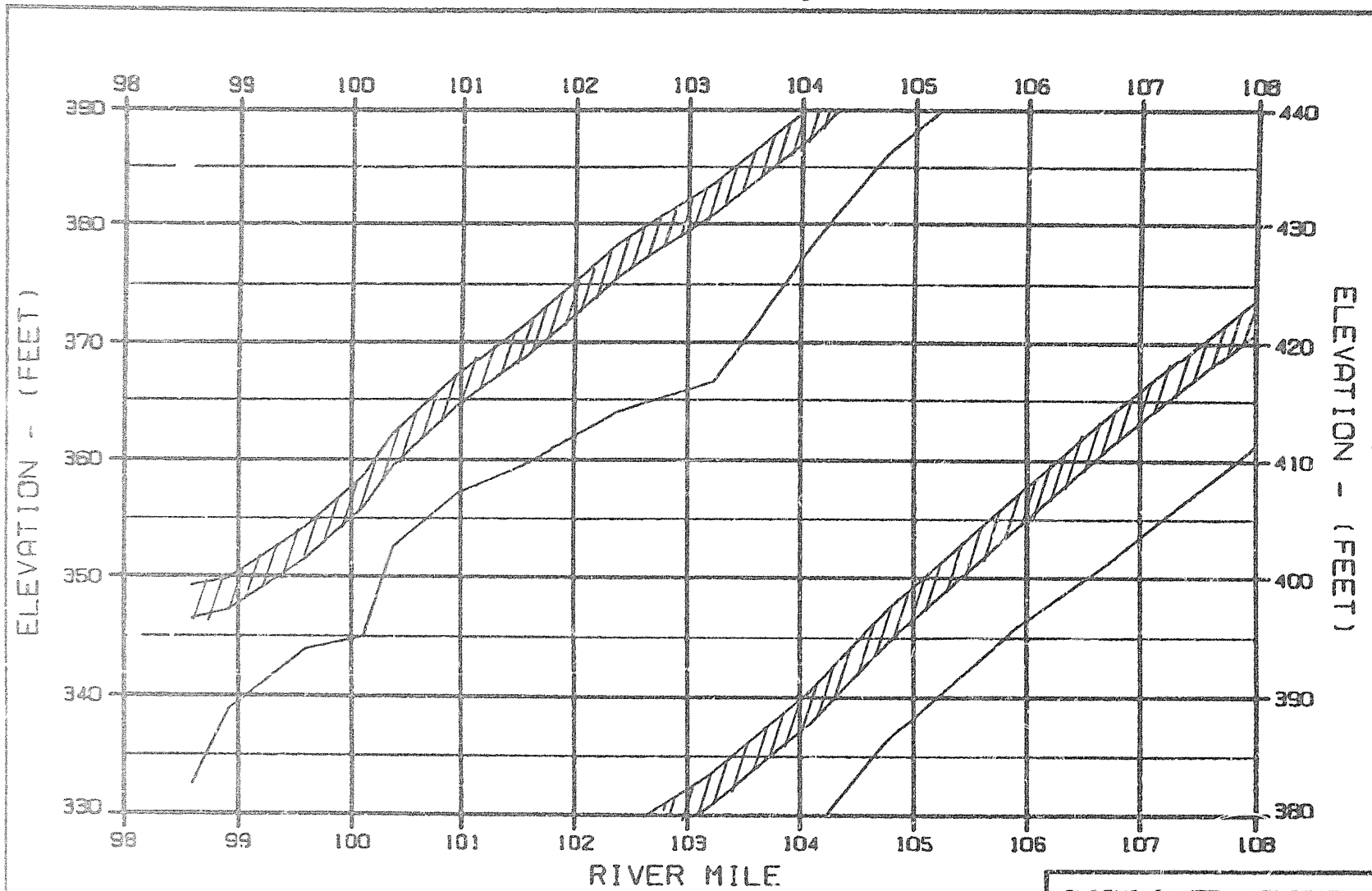
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101CNA

ALASKA POWER AUTHORITY		
SUBJECT PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
PROJECT: 8101CNA	DATE: 07 JUN 82	5588.142

OPTION?

EXHIBIT B

C


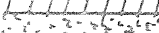

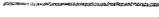


ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

LEGEND:

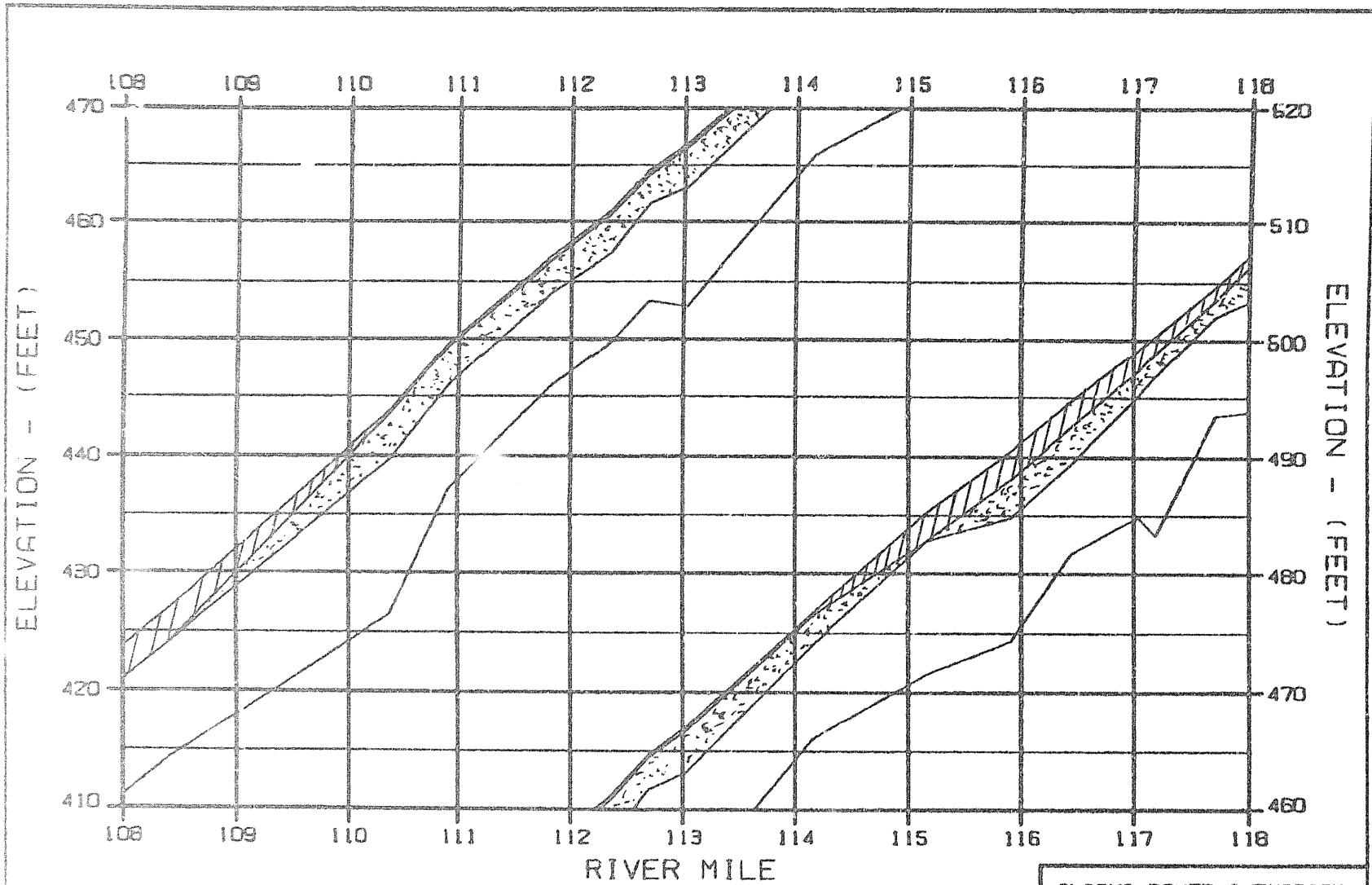
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB





ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
ENGINEER: G.L. BOGGS	BY: H.W. CH	1053.142

OPTION 2

c



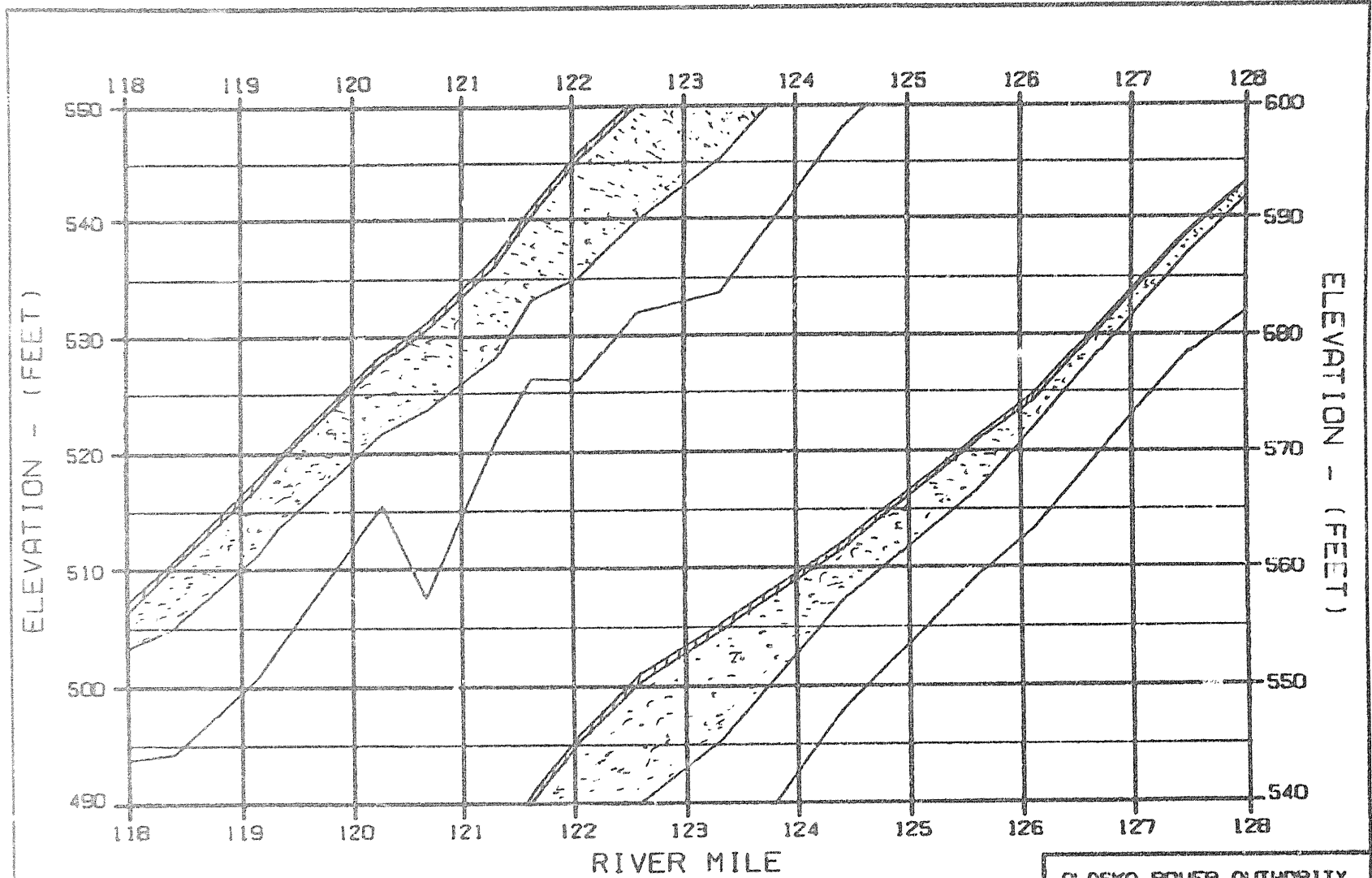
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CHB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
CREATED, ILLUSTRATED BY HWY 60	1698.142

OPTION?



LEGEND:

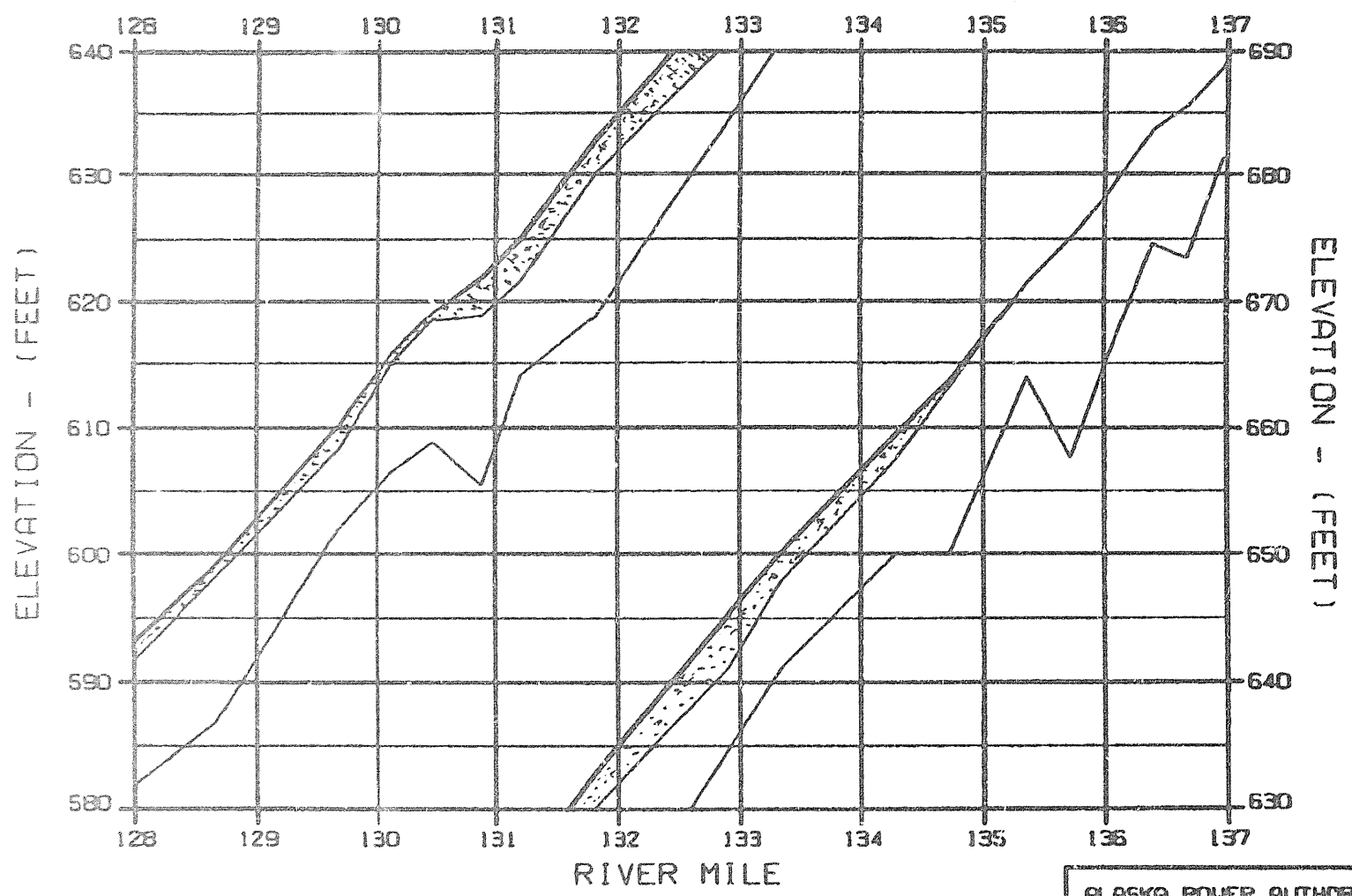
- TOP OF SOLID ICE
- SLUSH/SOLID ICE INTERFACE
- BOTTOM OF SLUSH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CMB


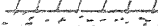


ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILLINOIS 77 NOV 84	1688.142

OPTION?

c



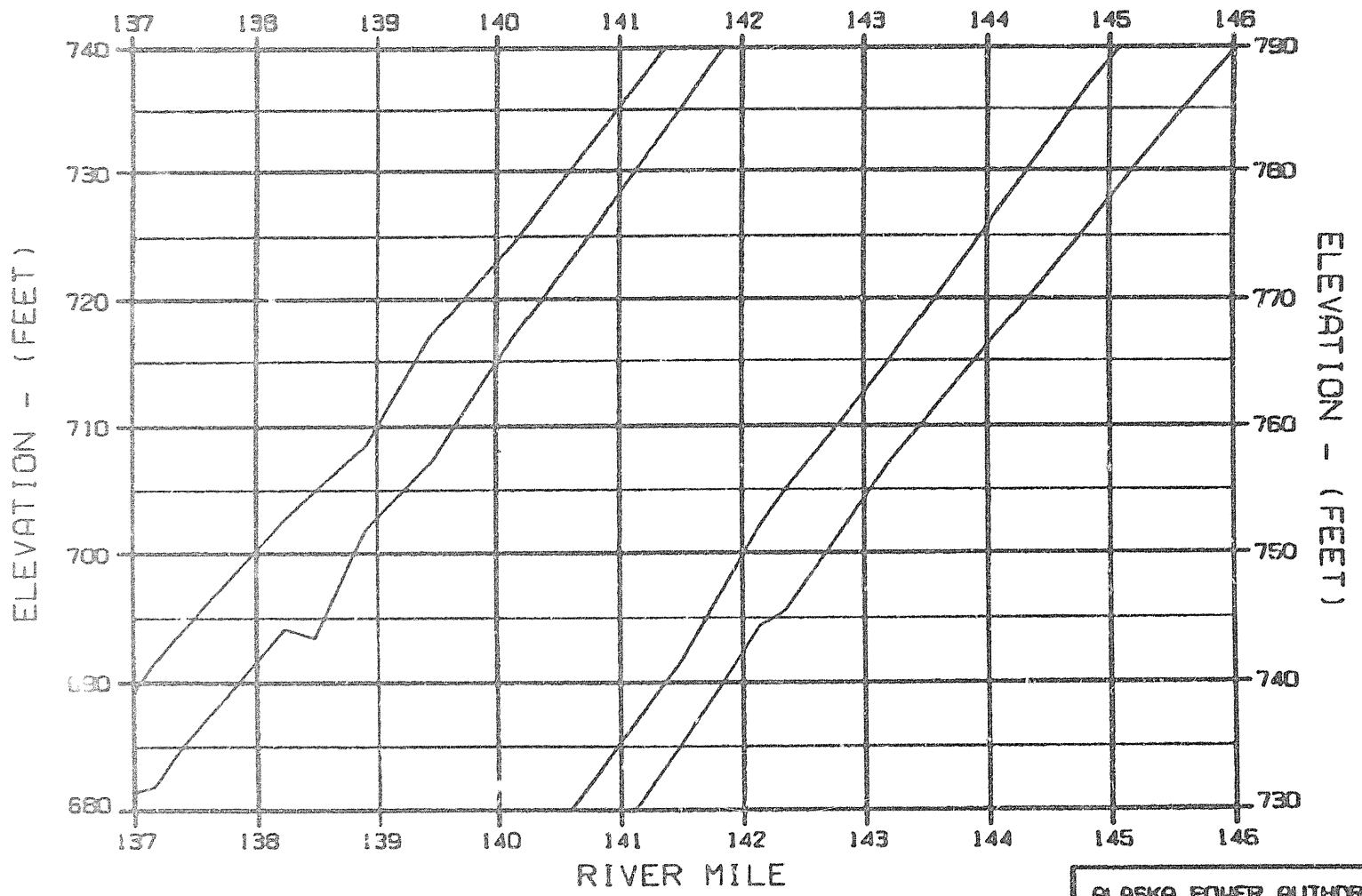
LEGEND:

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


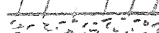
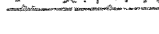
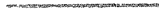
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CMB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-EBASCO JOINT VENTURE		
DESIGNED -	DRAWN -	DATE -
		77 NOV 84
		1988.142

OPTION?



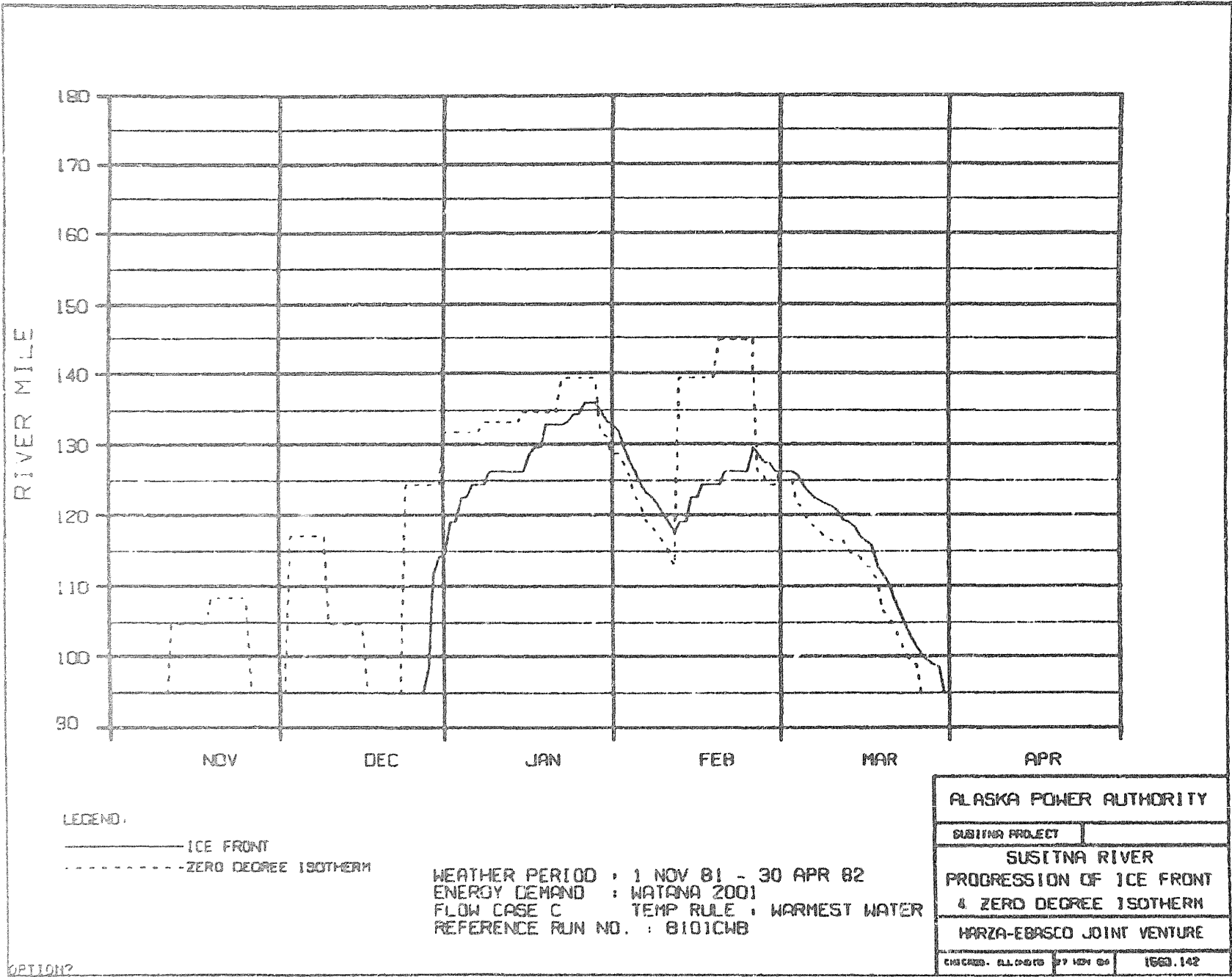
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 TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101C8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
ENGINEER: ALLISON	70 NOV 81	8803.142

OPTION?

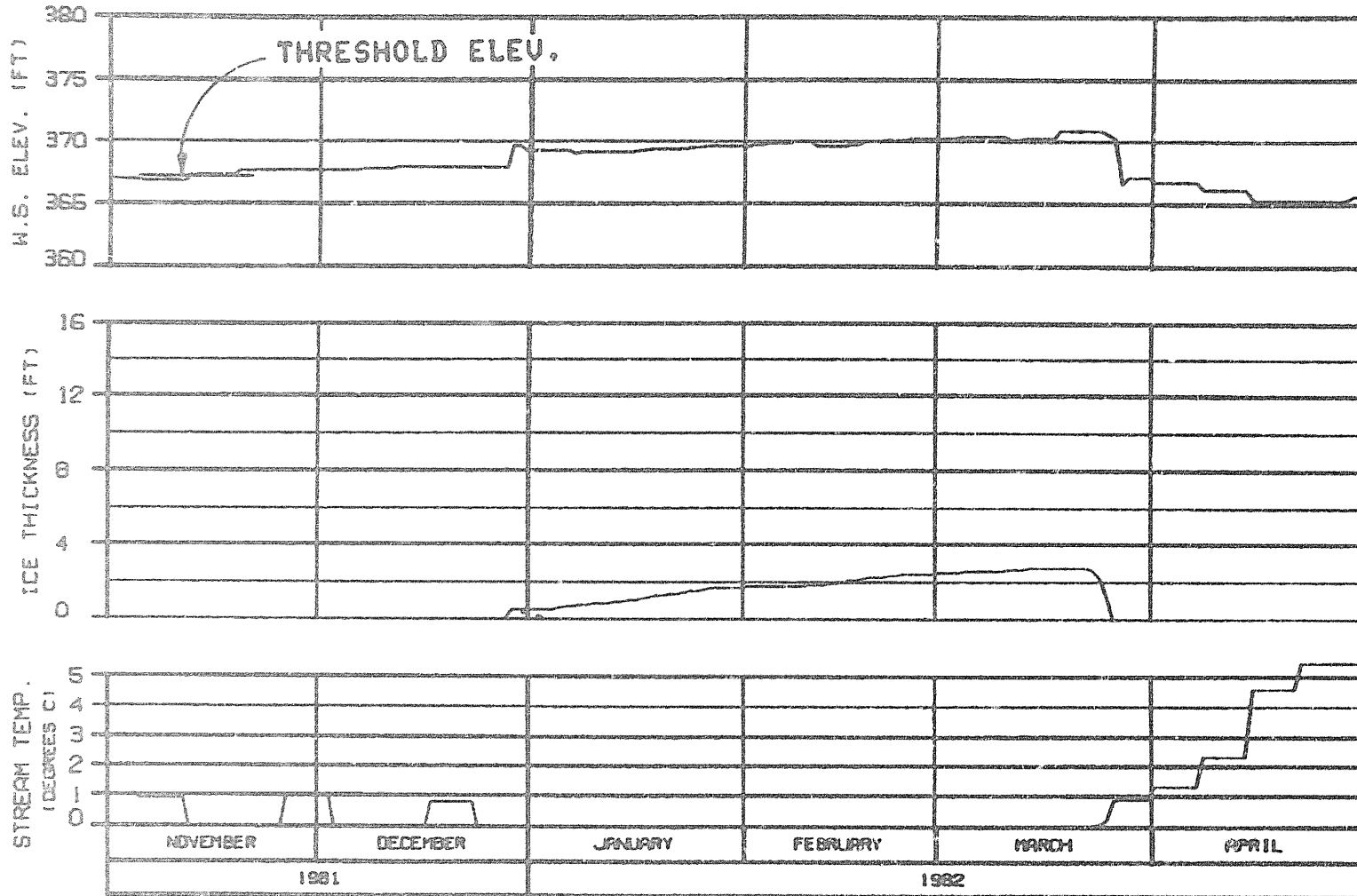


LEGEND:
 — ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE C TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
HARZA-EBASCO JOINT VENTURE		
CHICAGO, ILL. 60610	BY 1224 04	1563.142

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 C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

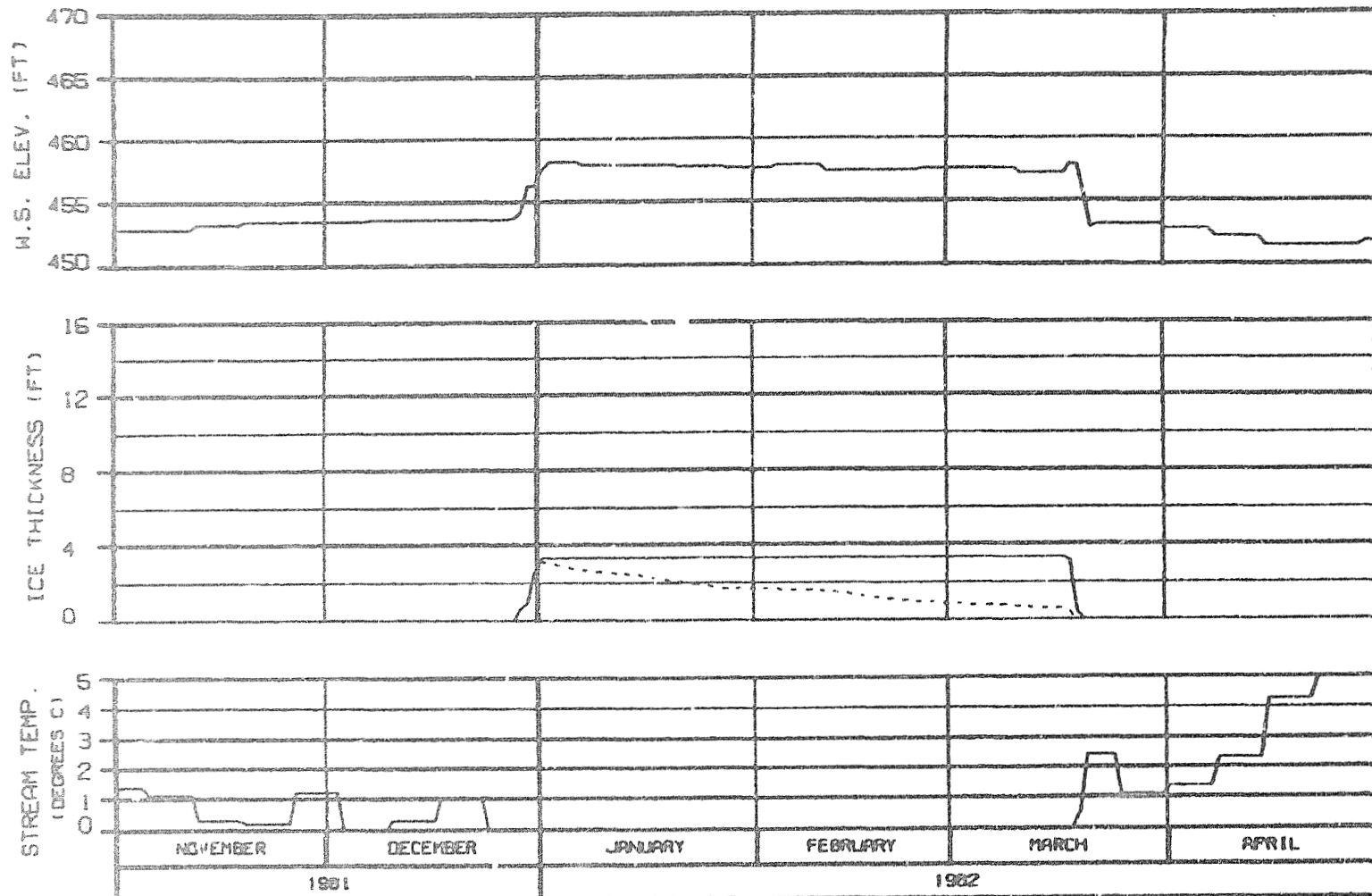
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CONTRACT - 81A-01-0420 07 FEB 82 1583.142

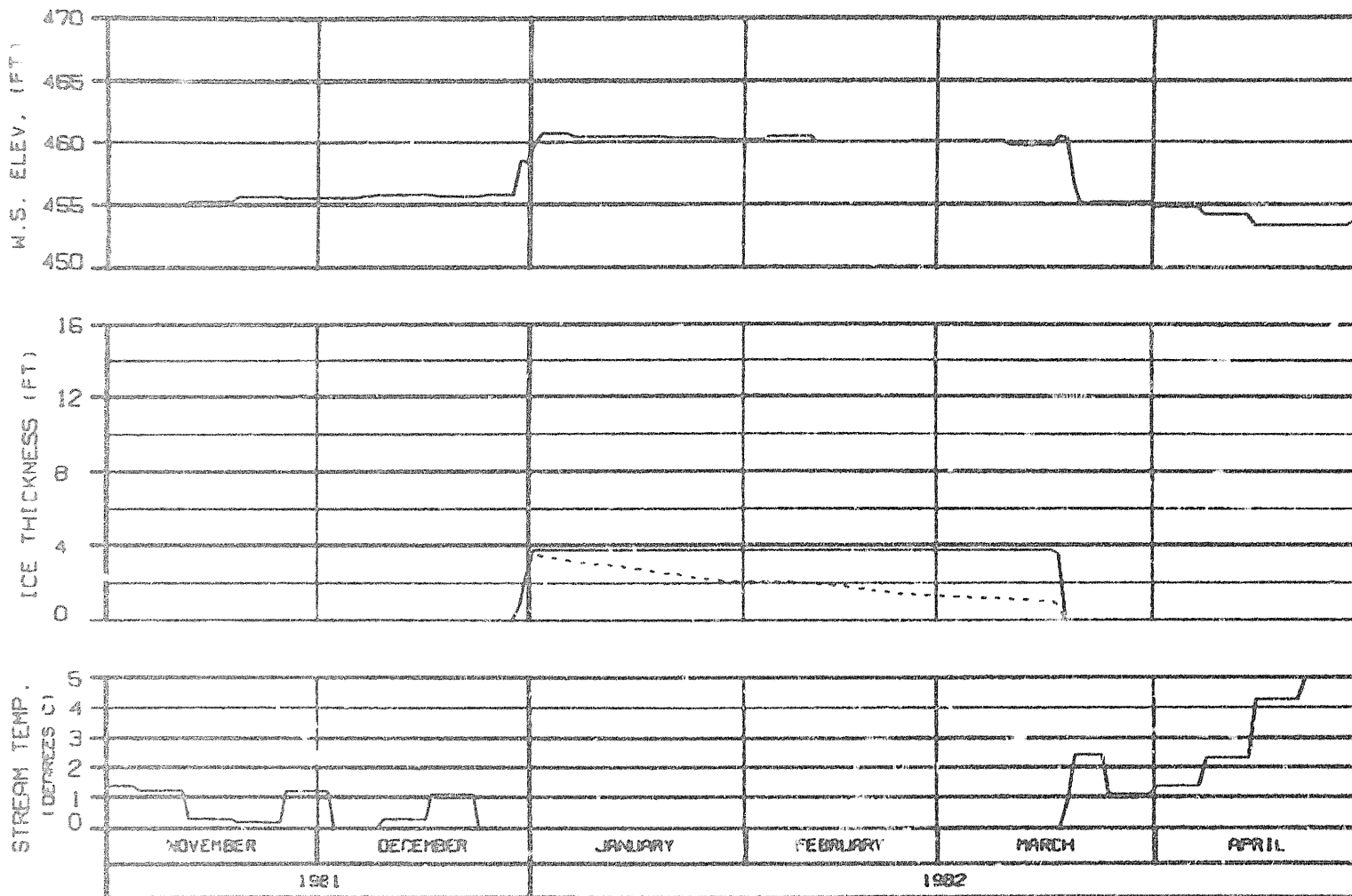


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUISH COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CH8

ALASKA POWER AUTHORITY		
SUSTITNA PROJECT		
SUSTITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CHECKED: ELLENRU	BY: 107/04	1583.142

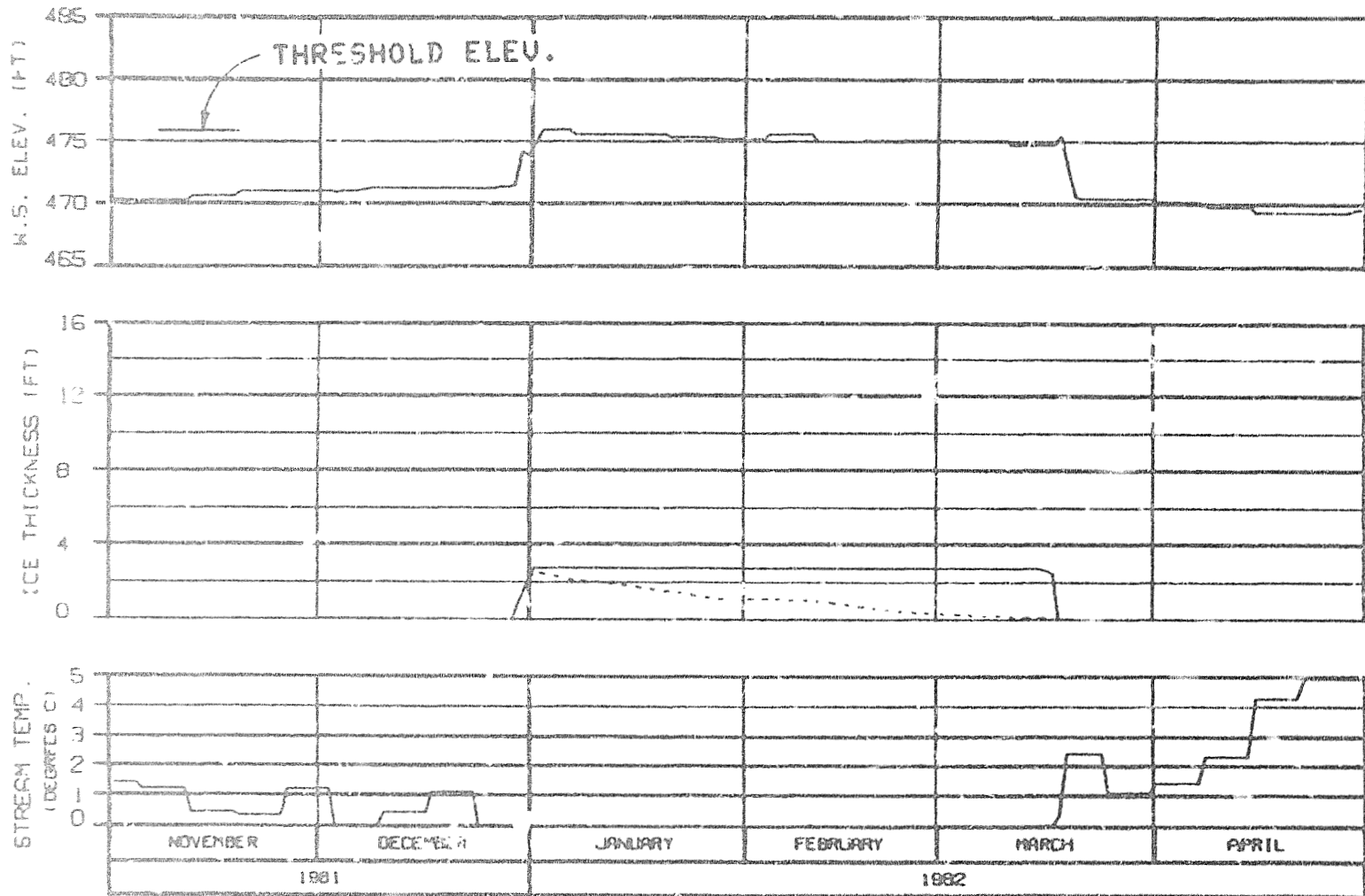


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

FORKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
ISSUED: 8/1/82	BY: JCB/BA
1503.142	



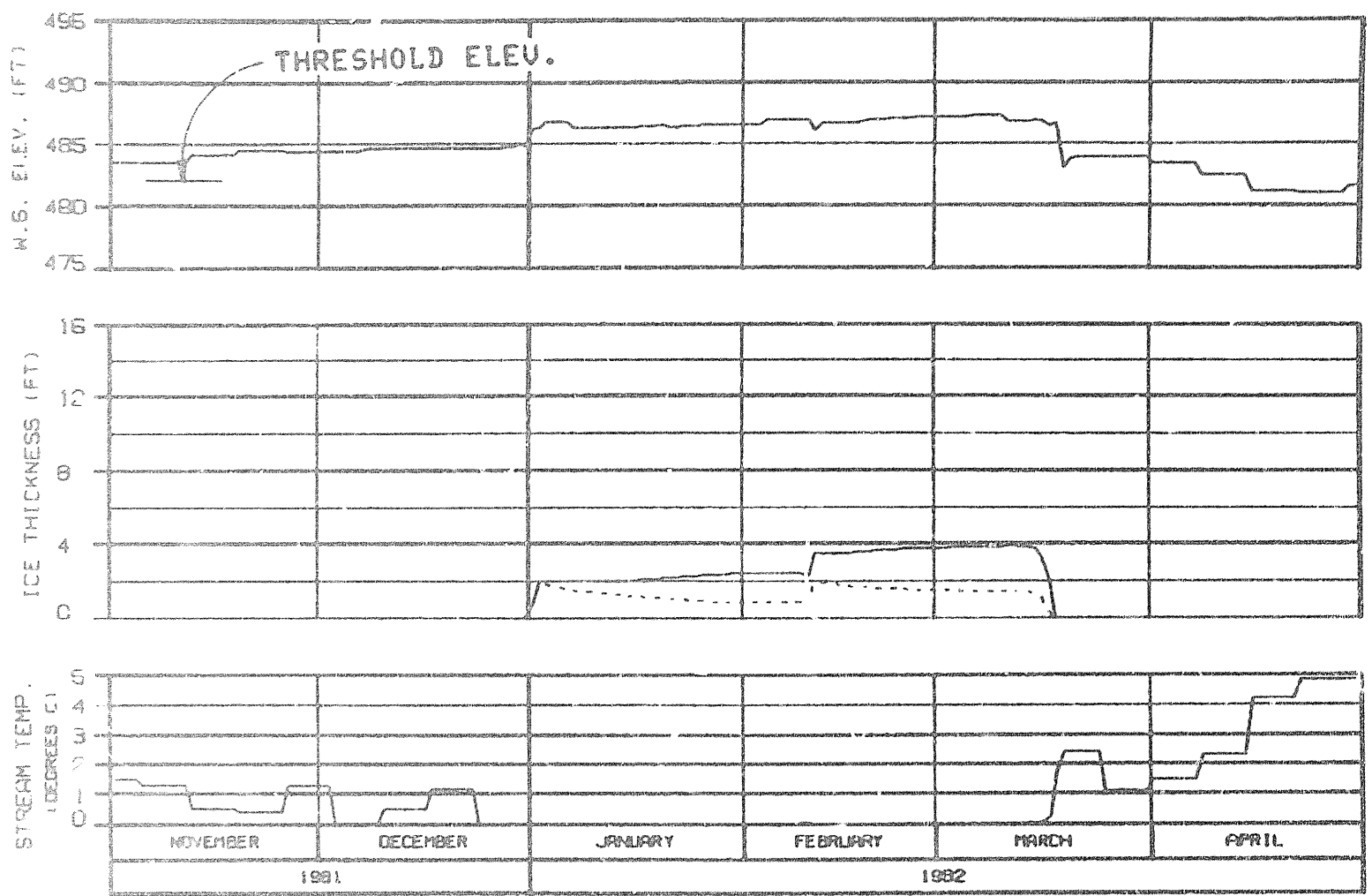
ICE THICKNESS LEGEND:

—— TOTAL THICKNESS
 - - - - - LUSH COMPONENT

HEAD OF SLOUGH 8
 RIVER MILE : 114.10

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : B101CWB

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHECKED: G.L. HARRIS	BY: M.V. GIL	1509.142

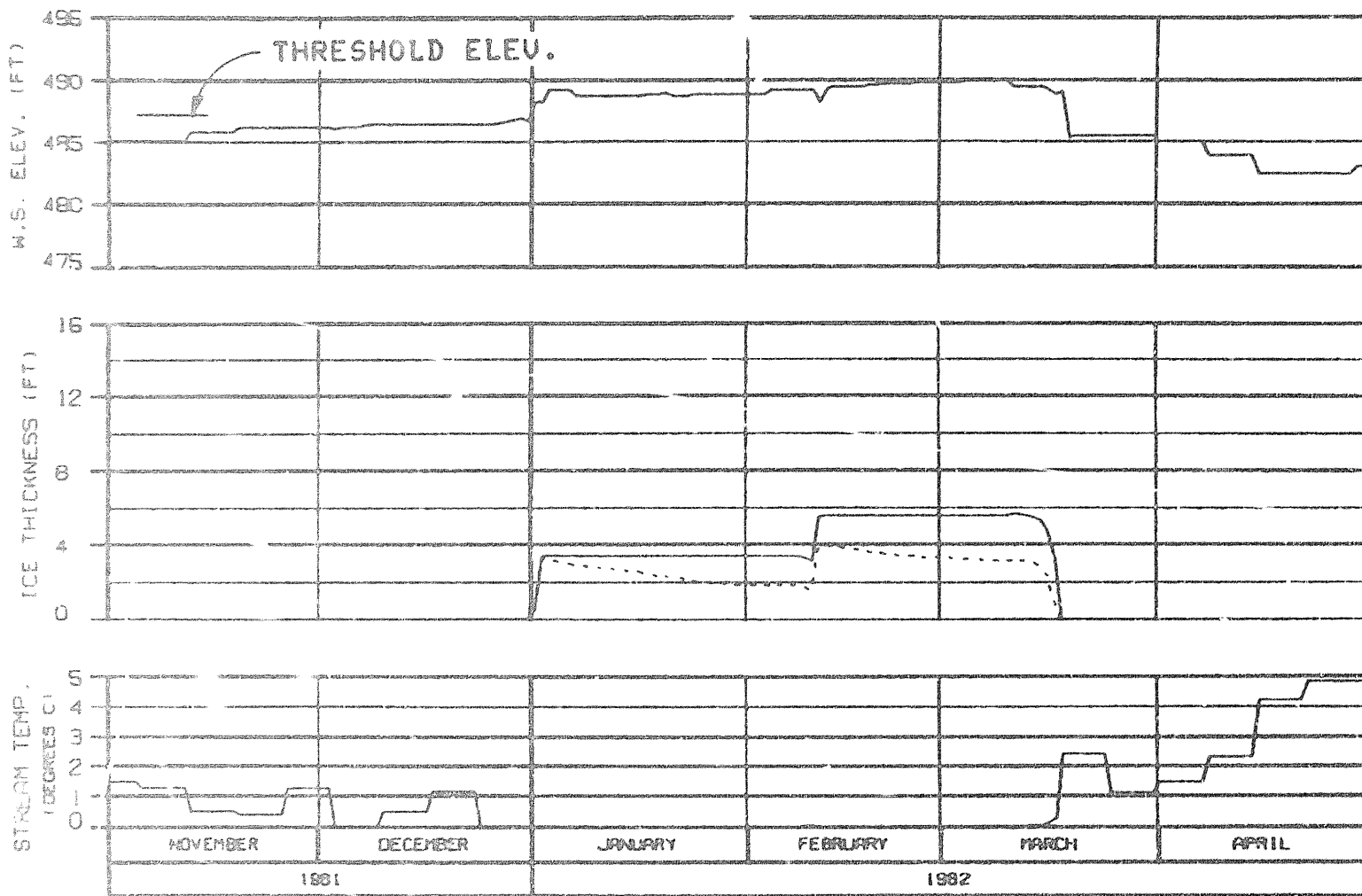


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBAGOO JOINT VENTURE	
CHGNO. 81-0-0103	1583.142

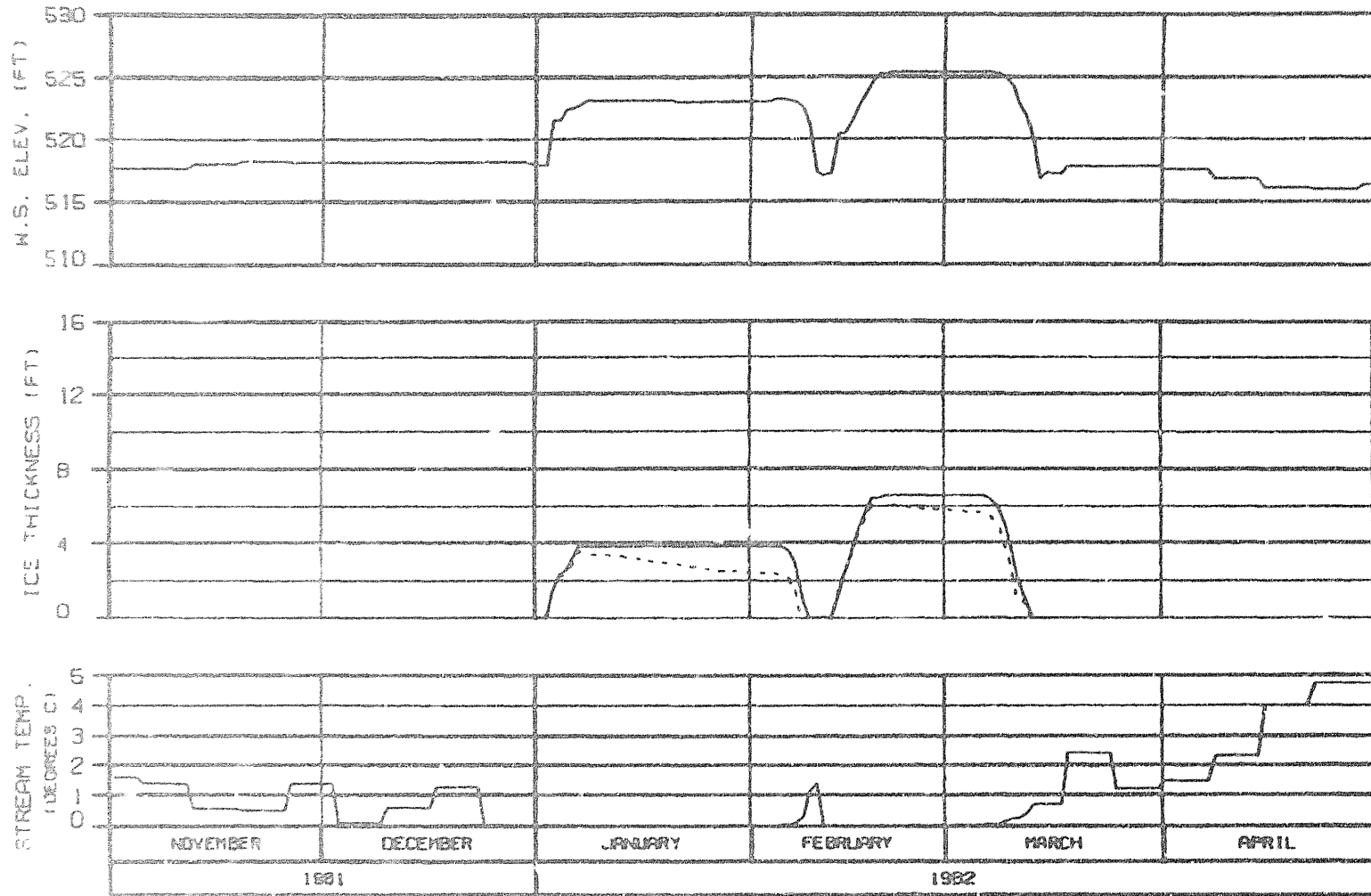


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
CHICAGO, ILLINOIS 77 001 00	ISSN 142

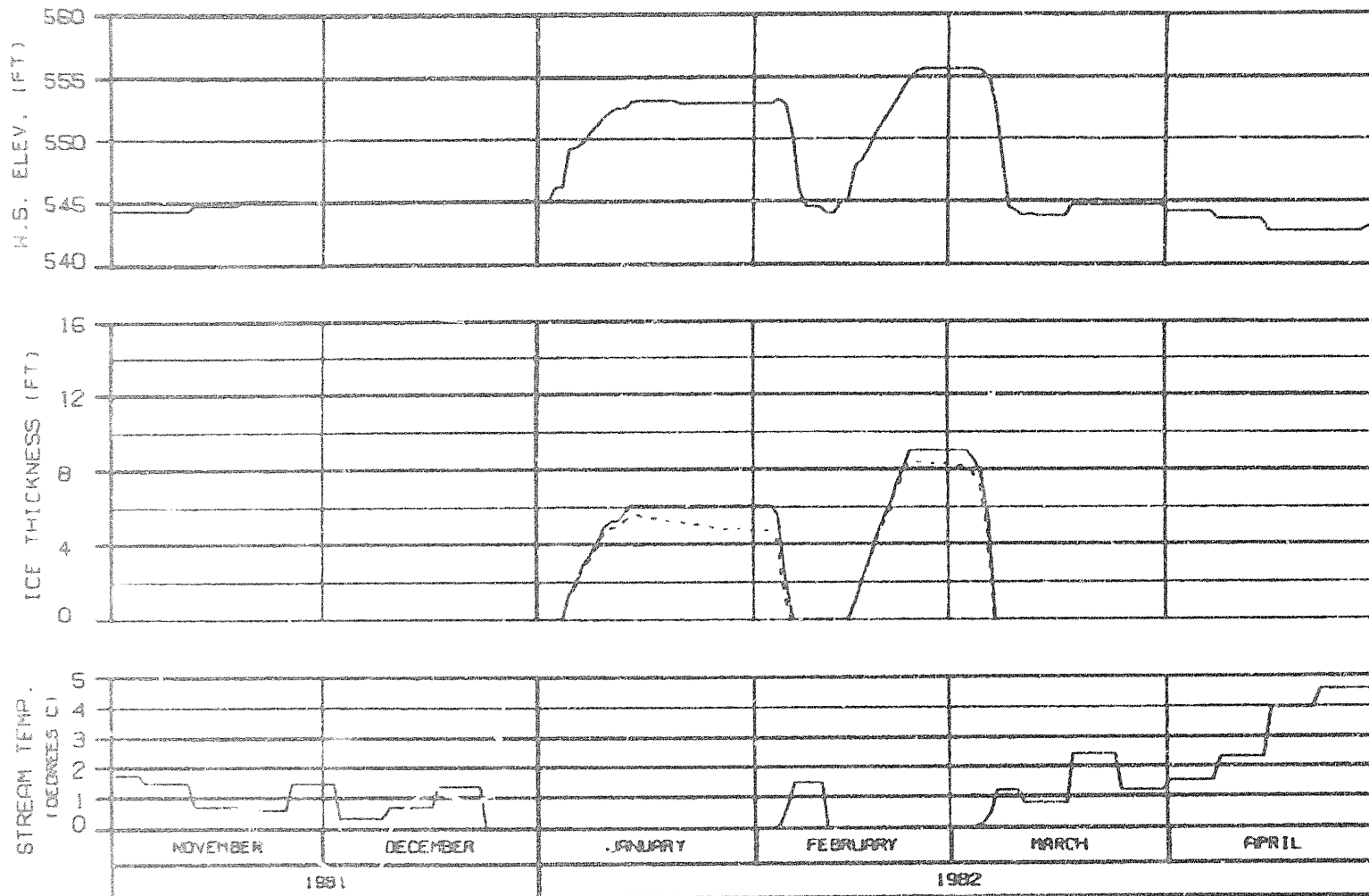


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
ENR028. 011-010	87 MAY 84	1000. 142

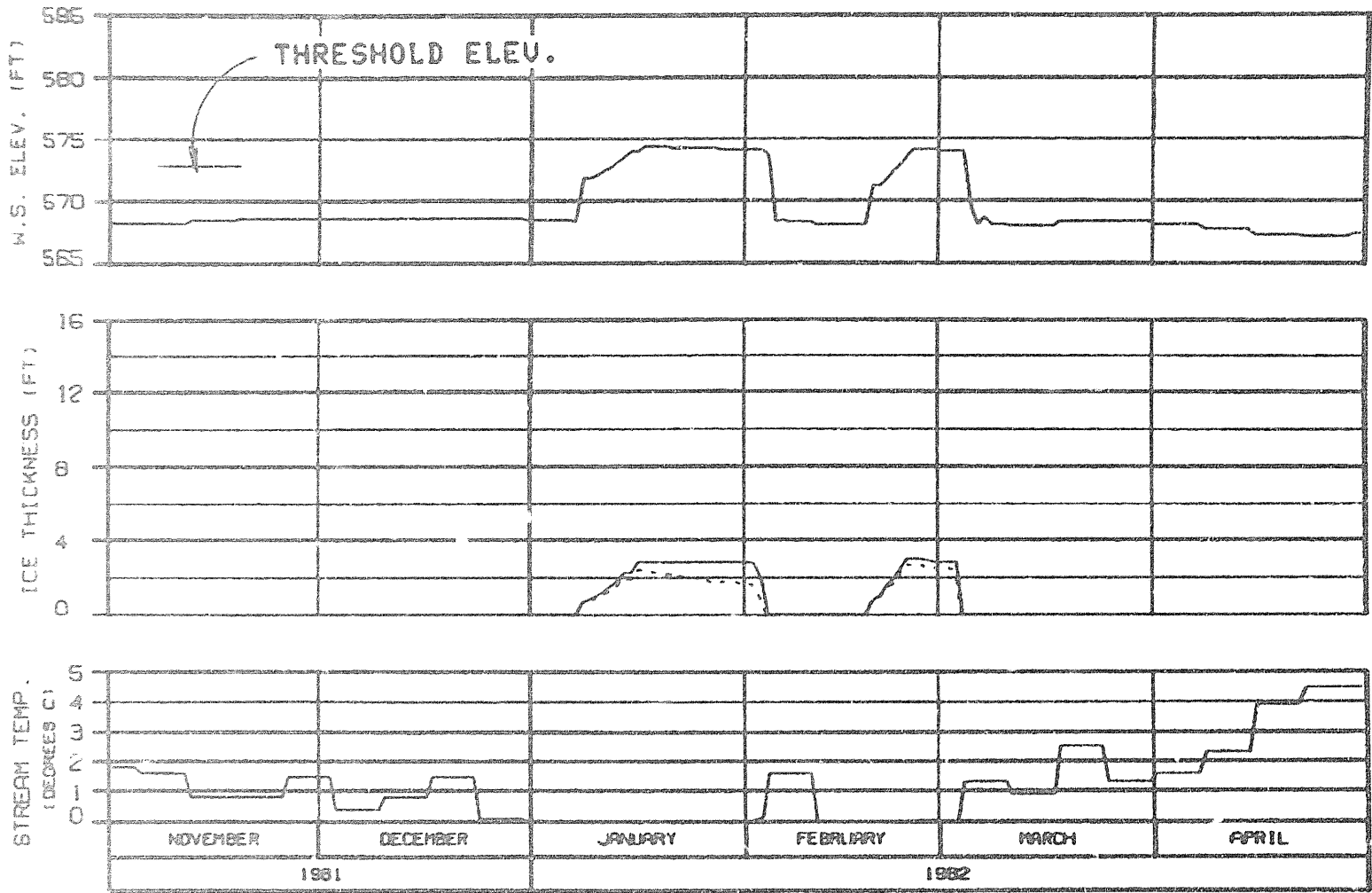


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 81010WB

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBAGCO JOINT VENTURE		
040000	ALP-078	77 123 04
		1538.142

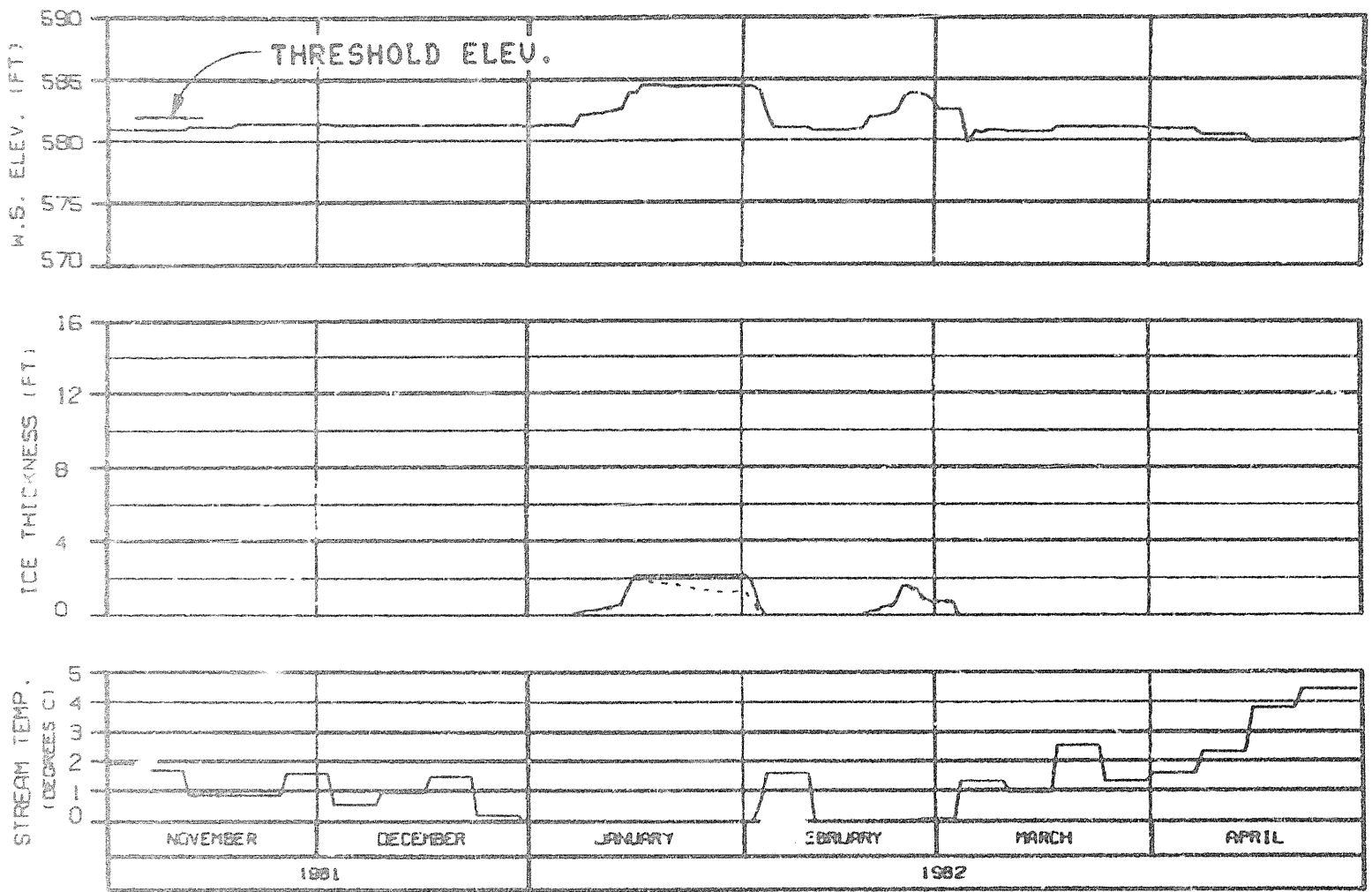


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CHB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WORZA-EBASCO JOINT VENTURE		
DESIGNED -	DRAWN -	CHECKED -
DATE	DATE	DATE



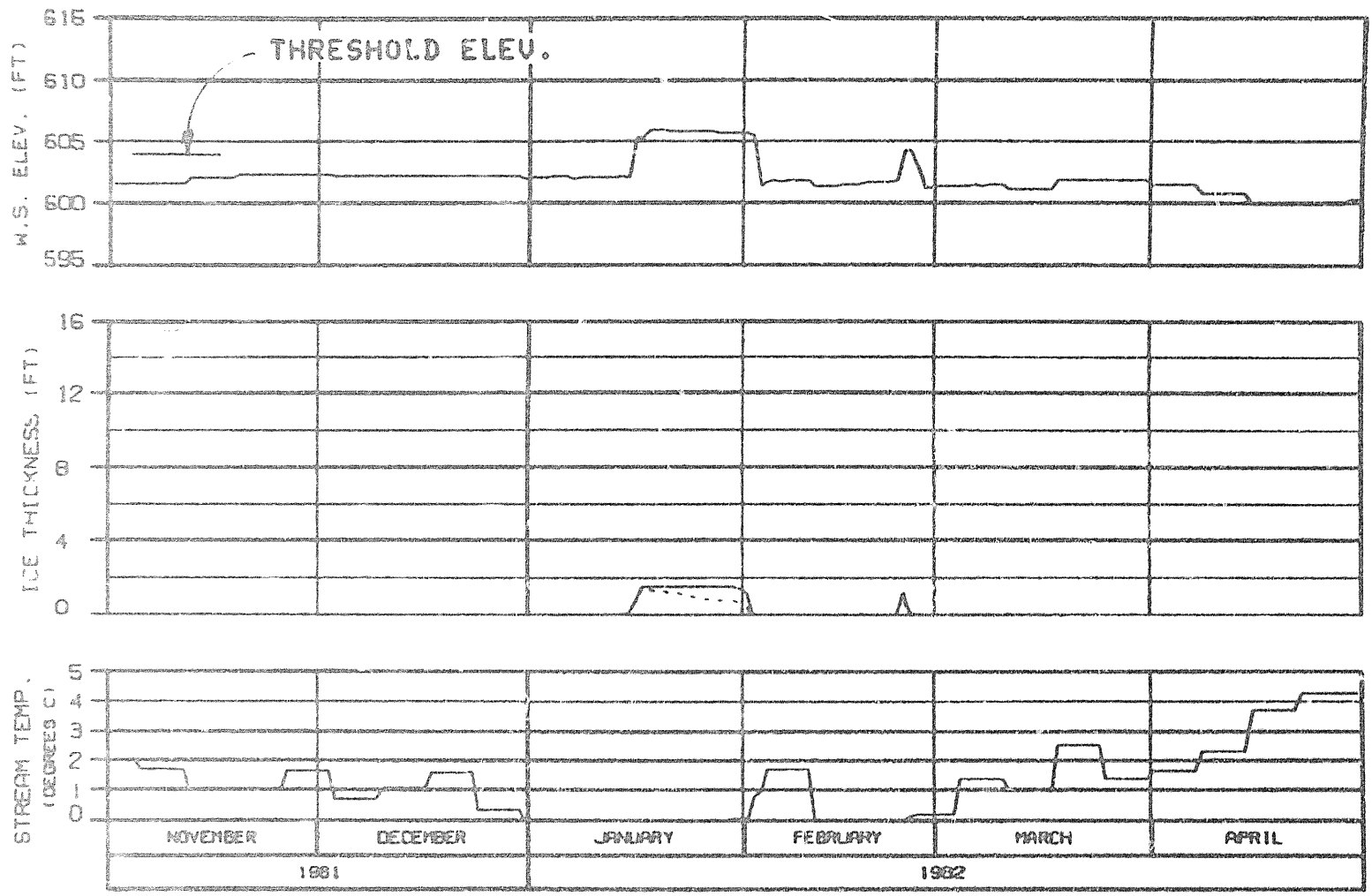
HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
DATE: 08/11/82	BY: KJG/BA	1000.142

C



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

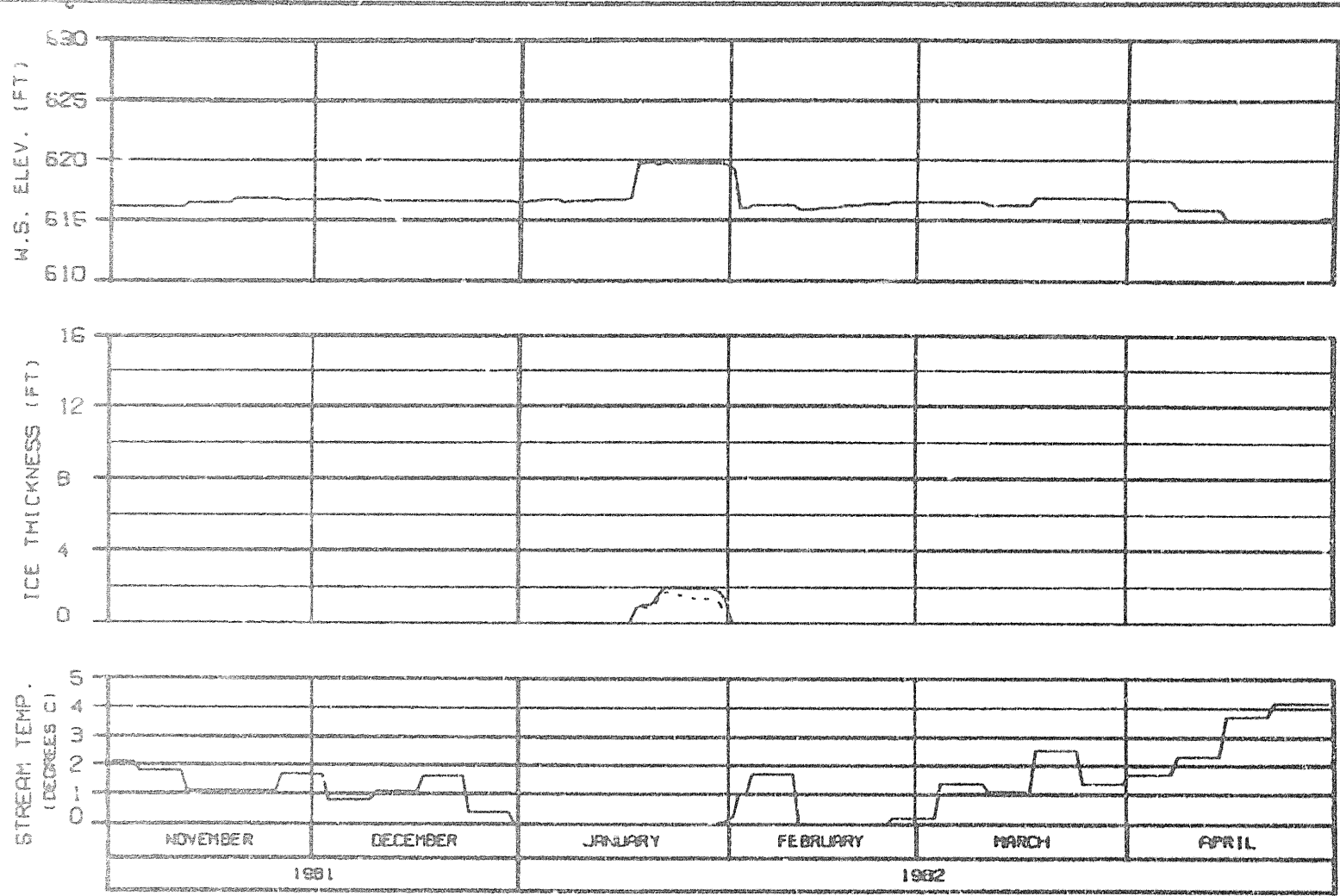
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CW8

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRSCO JOINT VENTURE	
CHECKED: BLANDIN	27 APR 82
1008.142	

OPTION?

OPTION?

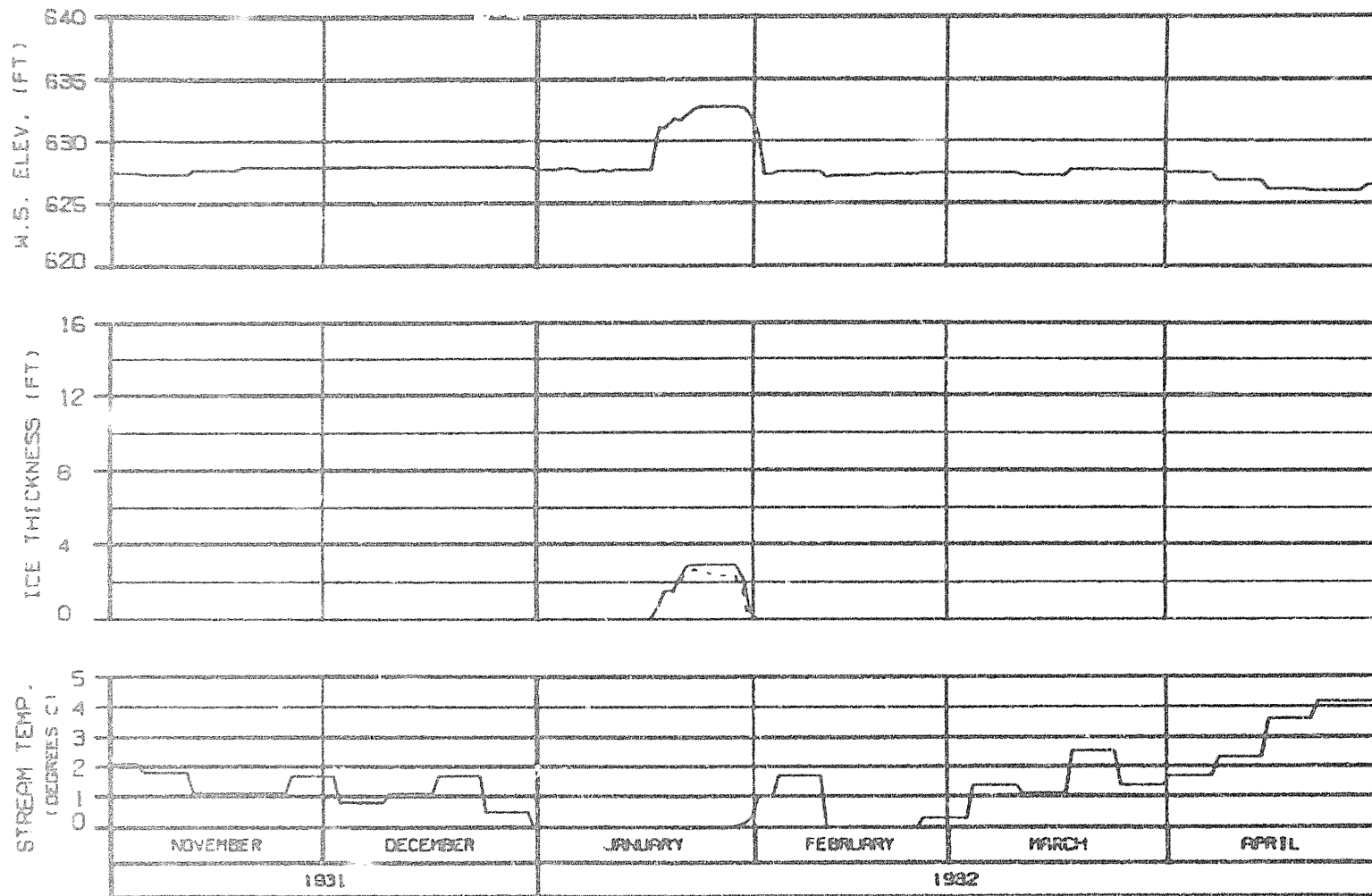


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RLE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
OWNER: BLM/USFS	BY: KEN GUN
	DATE: 11/82

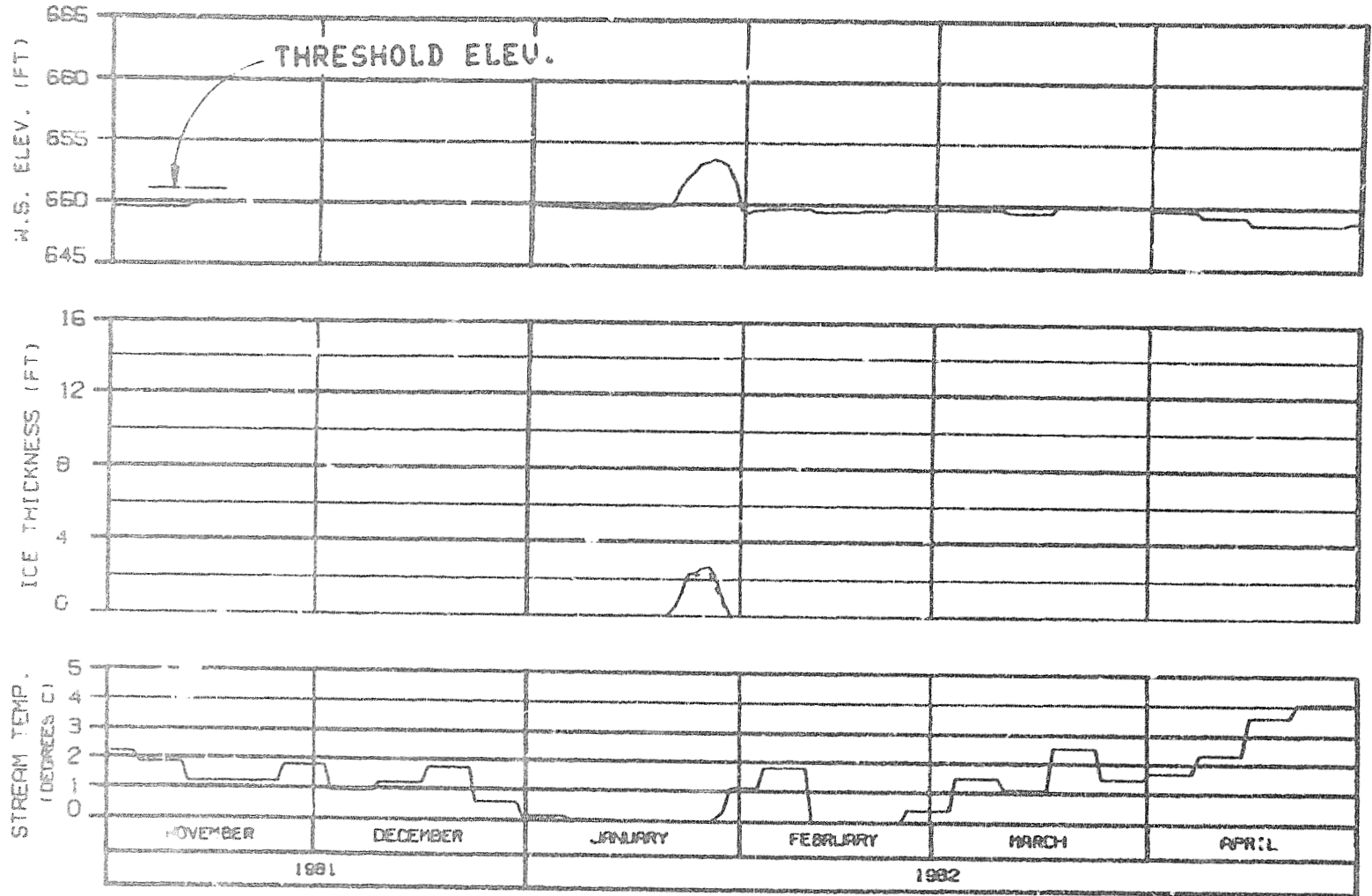


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY	
GLBITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHIEF: ALLENDA	BY: WJG 82
PAGE: 142	

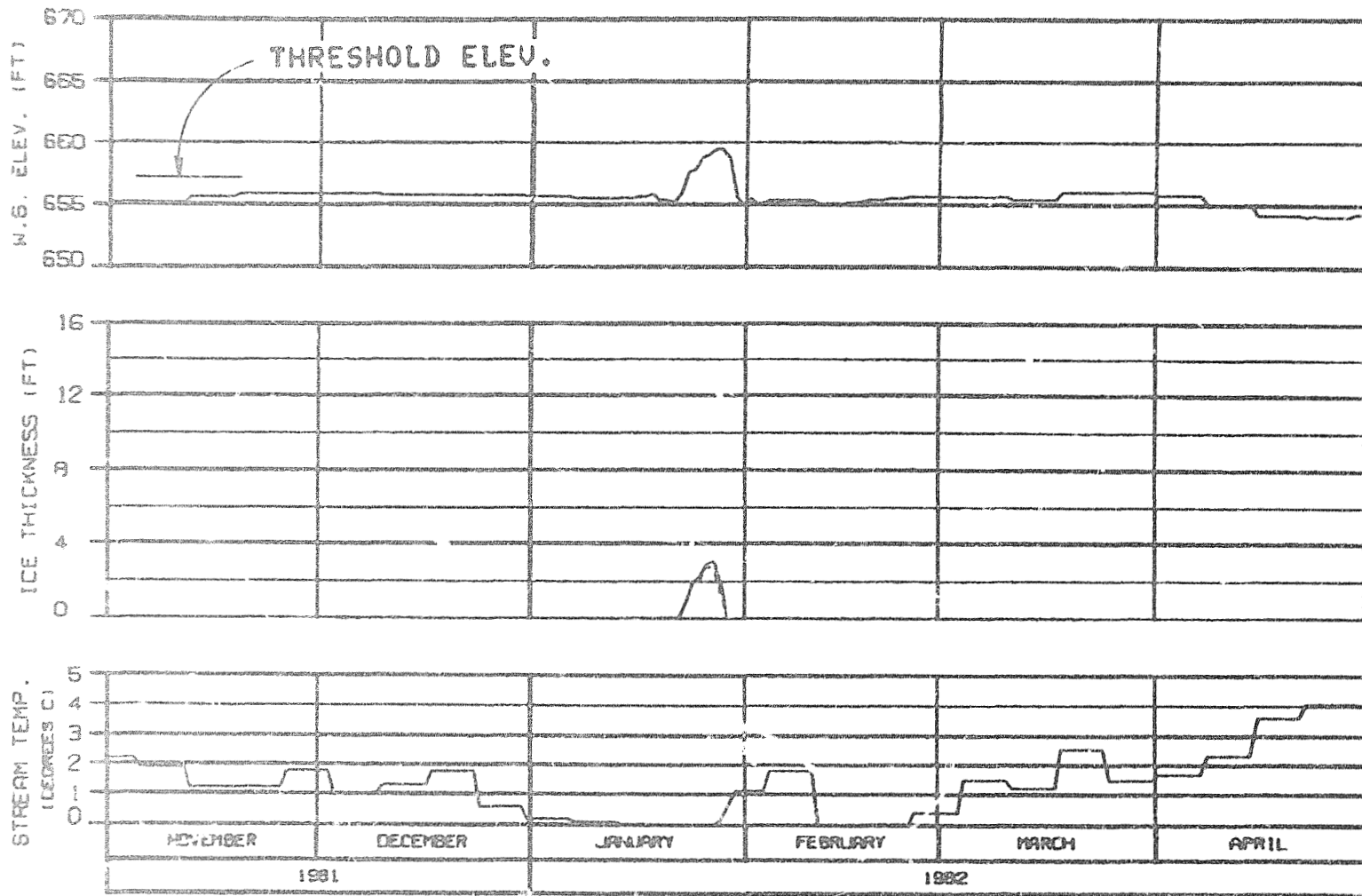


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WAF MEST WATER
 REFERENCE RUN NO. : 8101CMB

ALASKA POWER AUTHORITY		
SUBSTITUTION PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EMASCO JOINT VENTURE		
CHART NO. 8101CMB	BY KSB/CS	NOV. 1982



SIDE CHANNEL U/S OF SLOUGH 10

RIVER MILE : 134.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RJN NO. : 8101CMB

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

ALASKA POWER AUTHORITY

GLACIER PROJECT

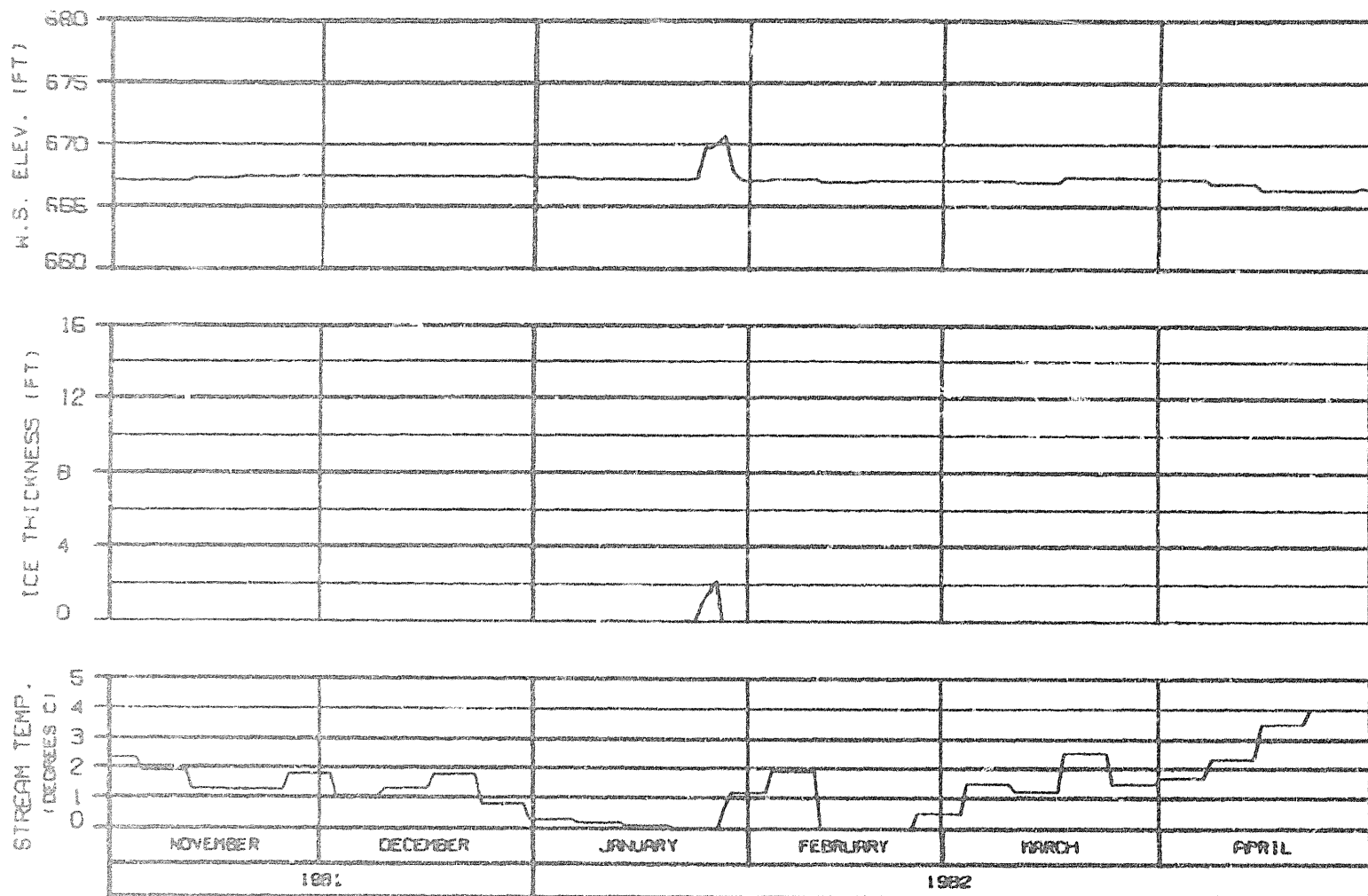
SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHUCKS, GARDNER

77 1055 000

1982.142

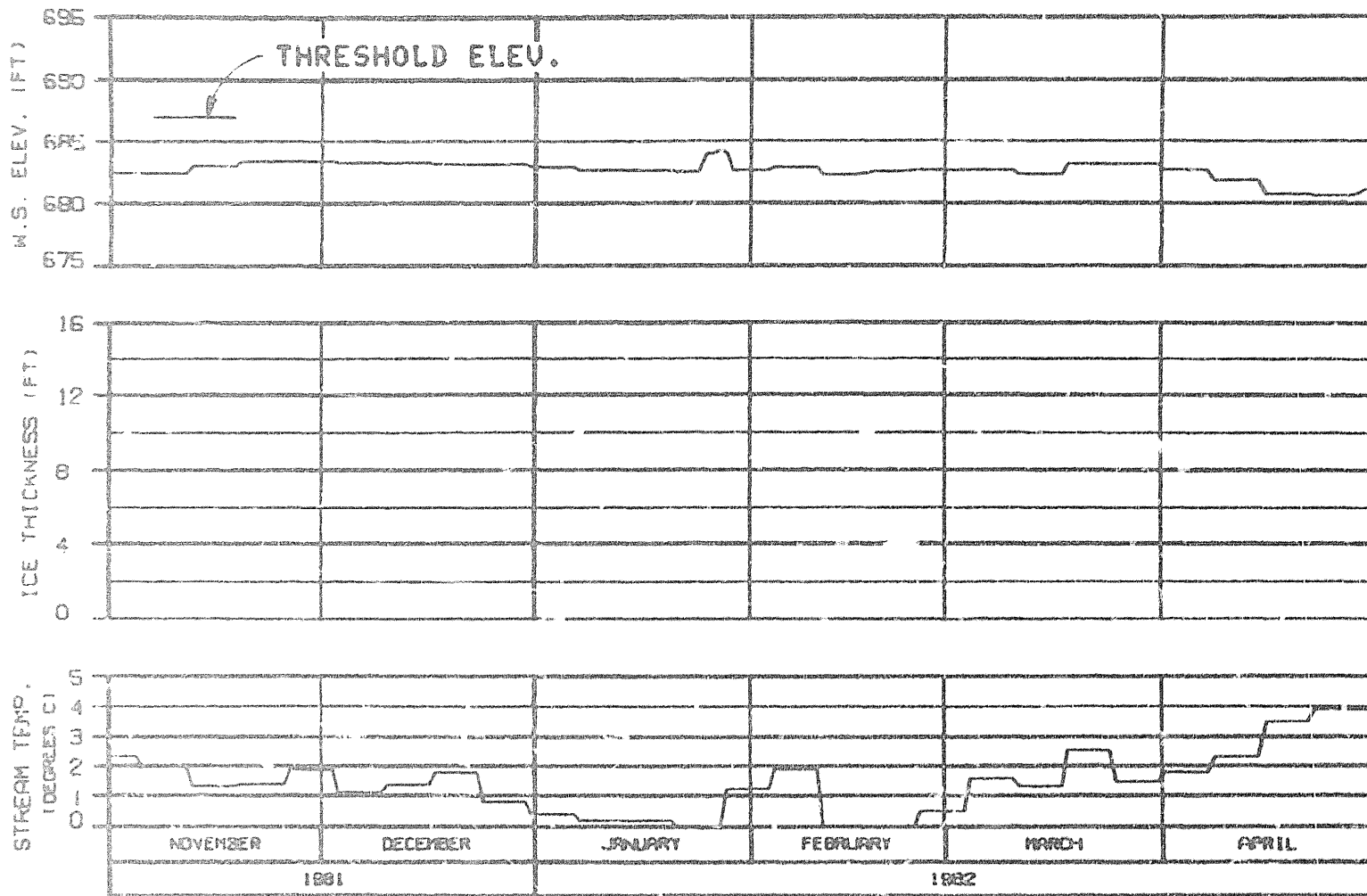


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUS-1 COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CW8

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED, ILLUSTRATED BY	1982, 1AR

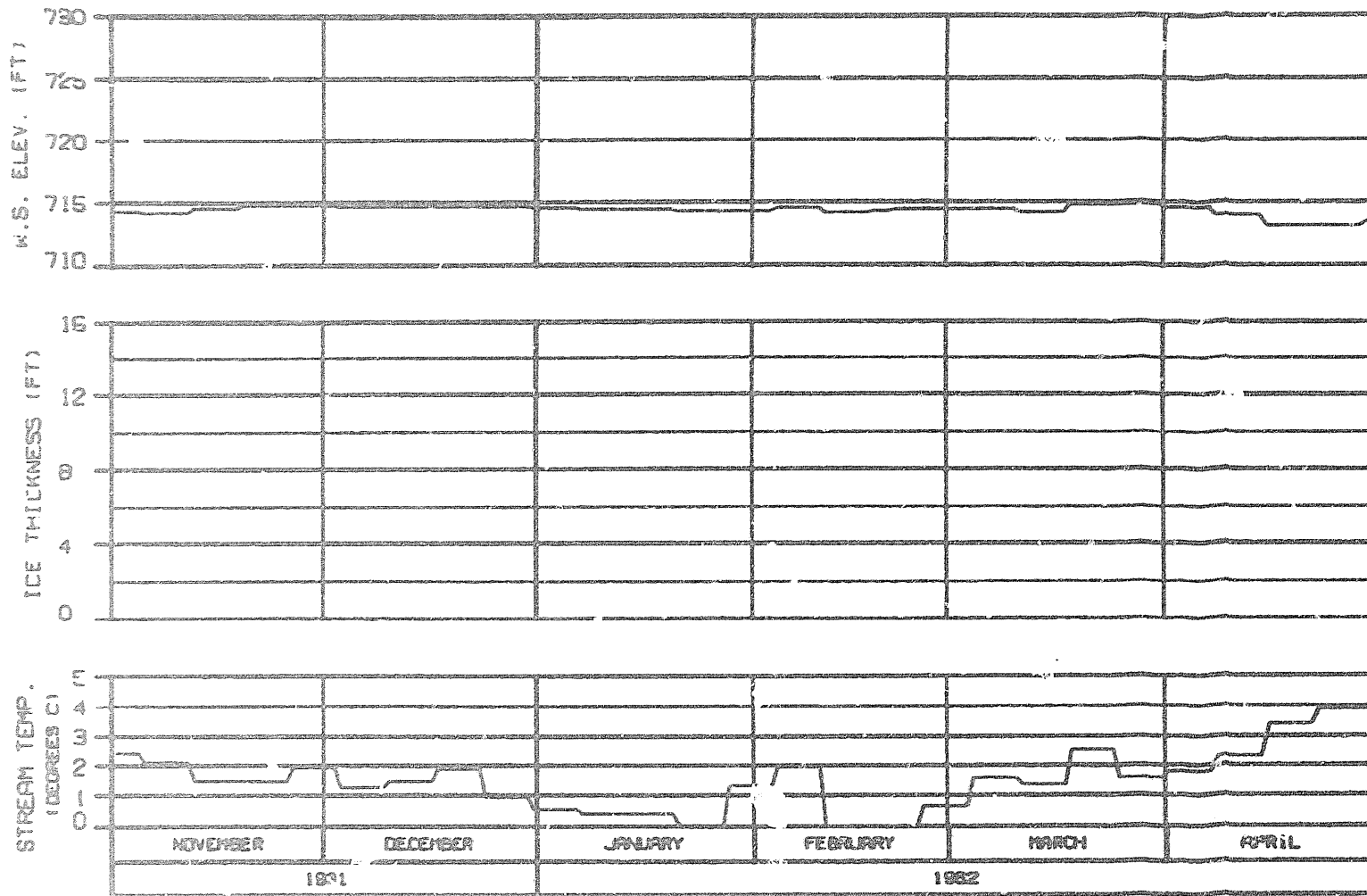


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - FLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARGE: ELASISW	BY: NEM: GM
	NOV. 1982

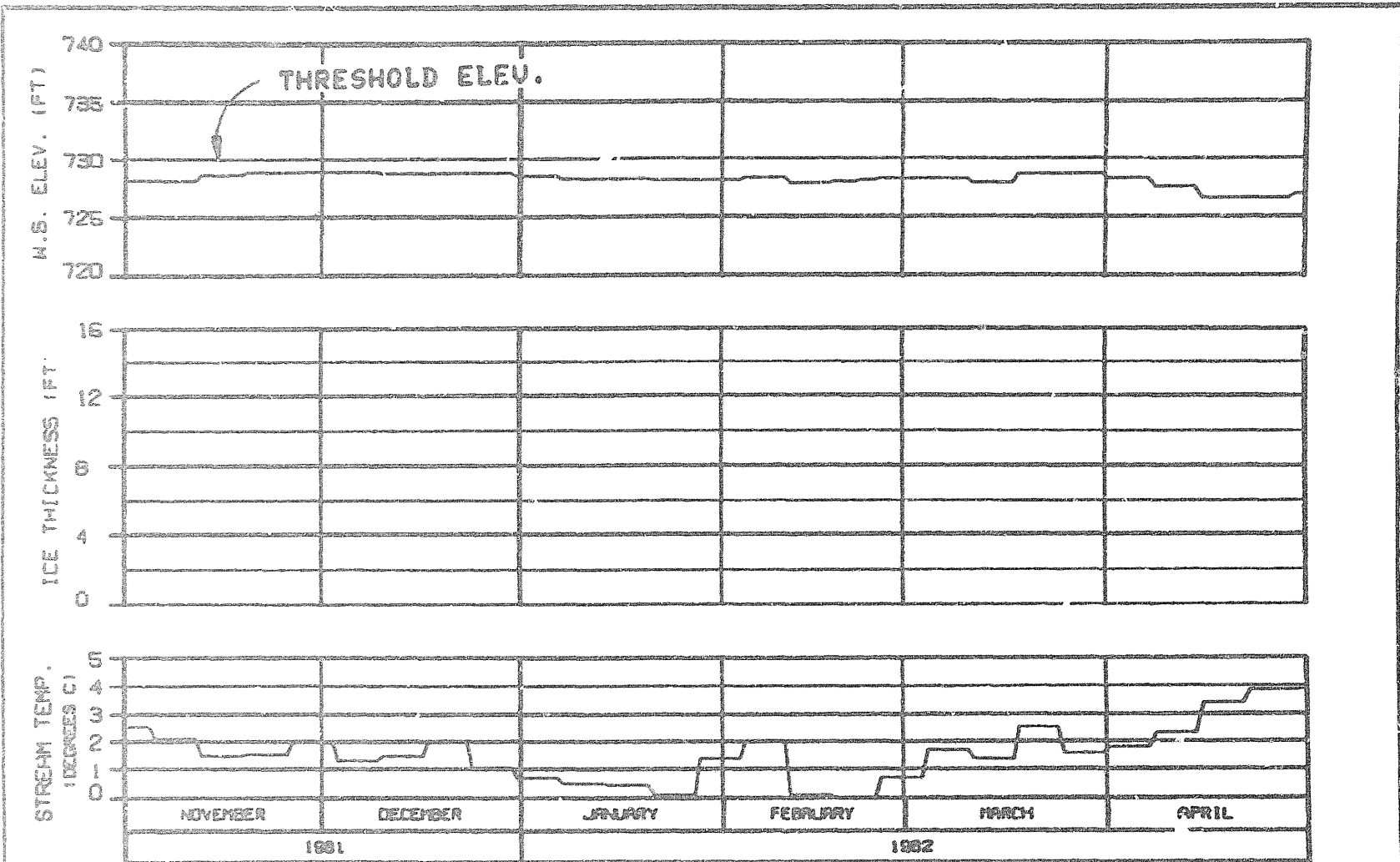


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

HEAD OF SLOUGH 17
 RIVER MILE : 139.30

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED BY	DATE	NO. 102

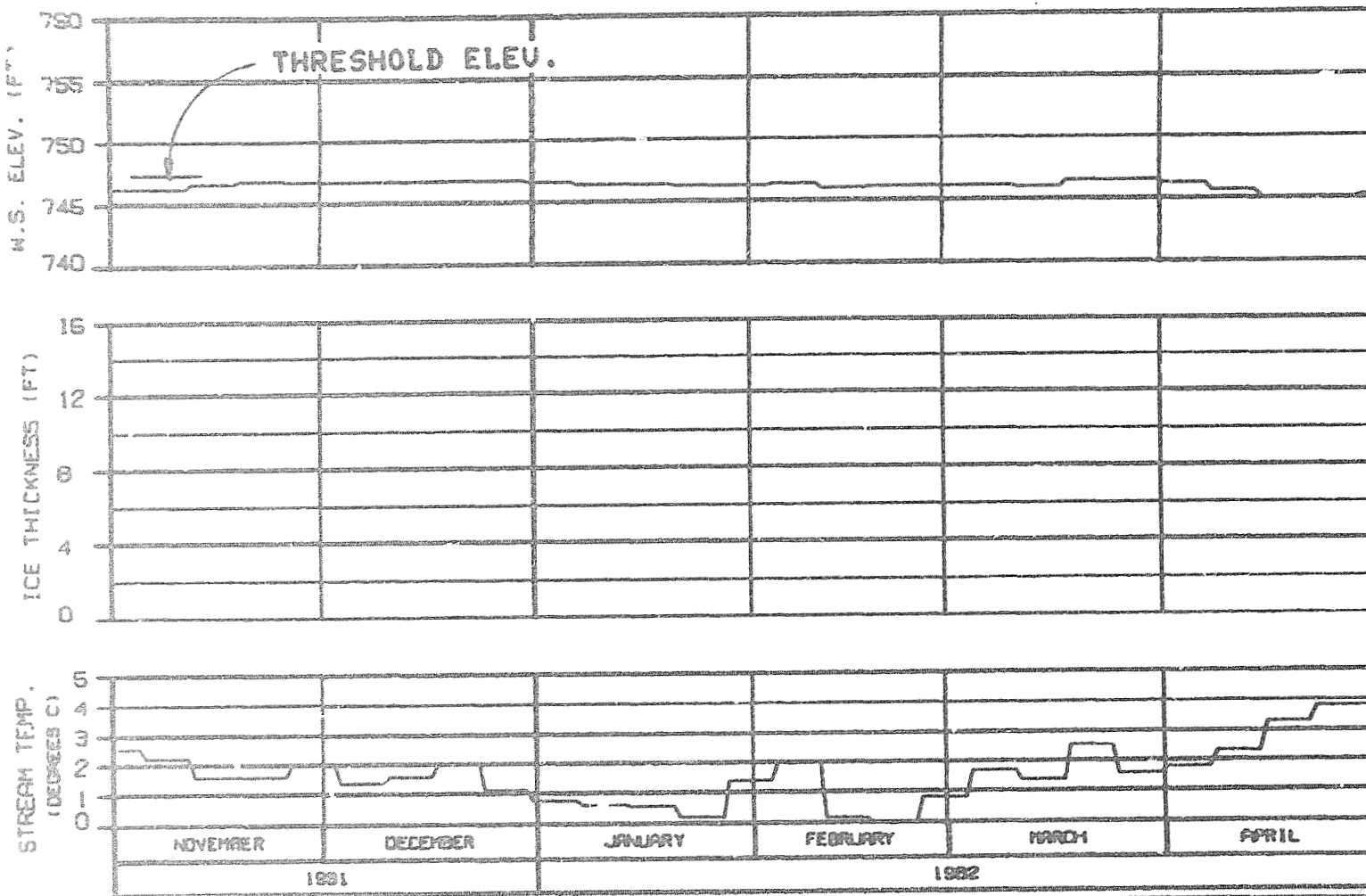


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: JAMES R. ...	DATE: 1982.142



SLOUGH 21 (ENTRANCE A6)

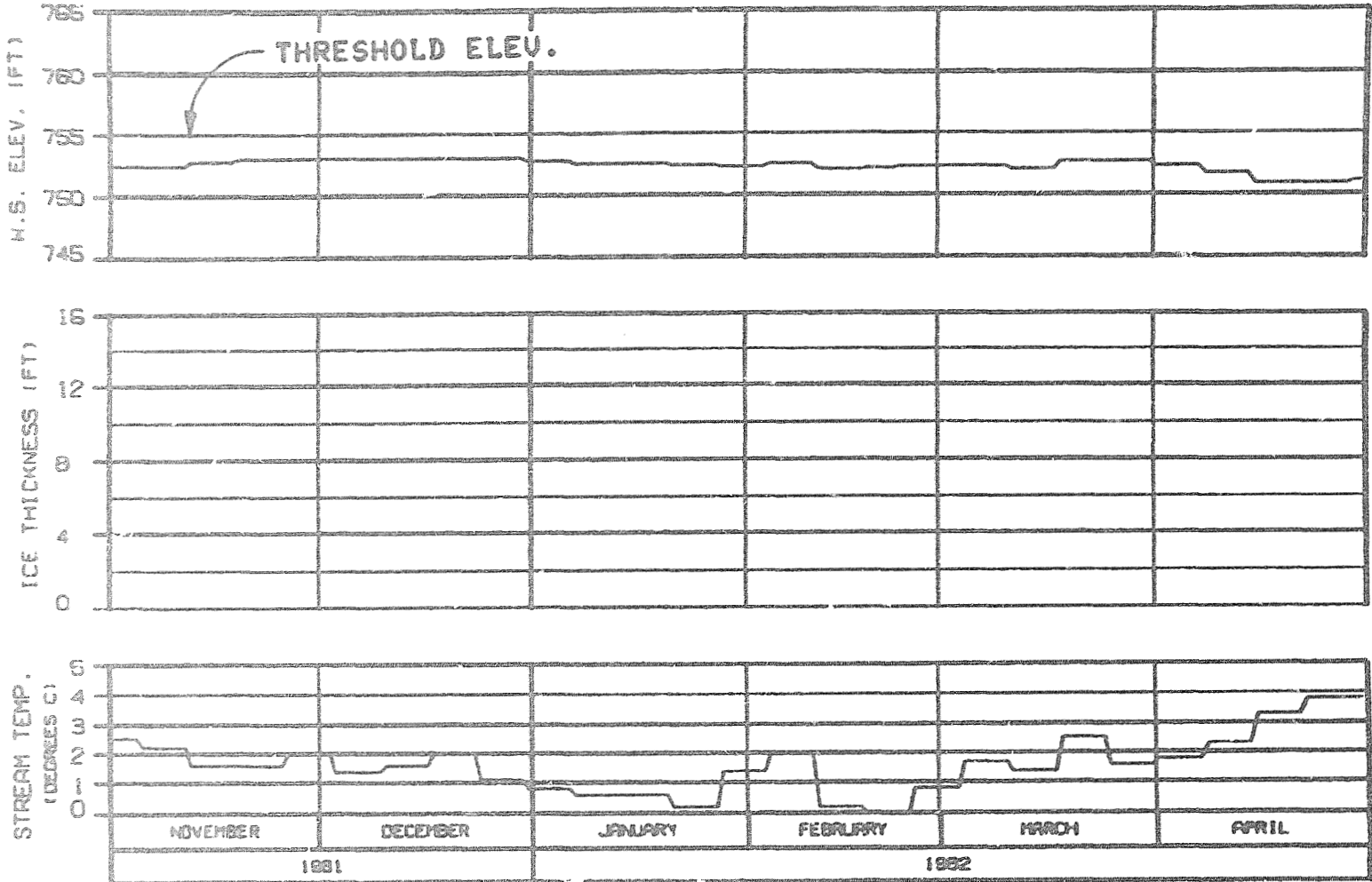
RIVER MILE : 141.80

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CMB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGINEER: D.L. GOSPEL	NOV 82
DESIGNER: D.L. GOSPEL	NOV 82



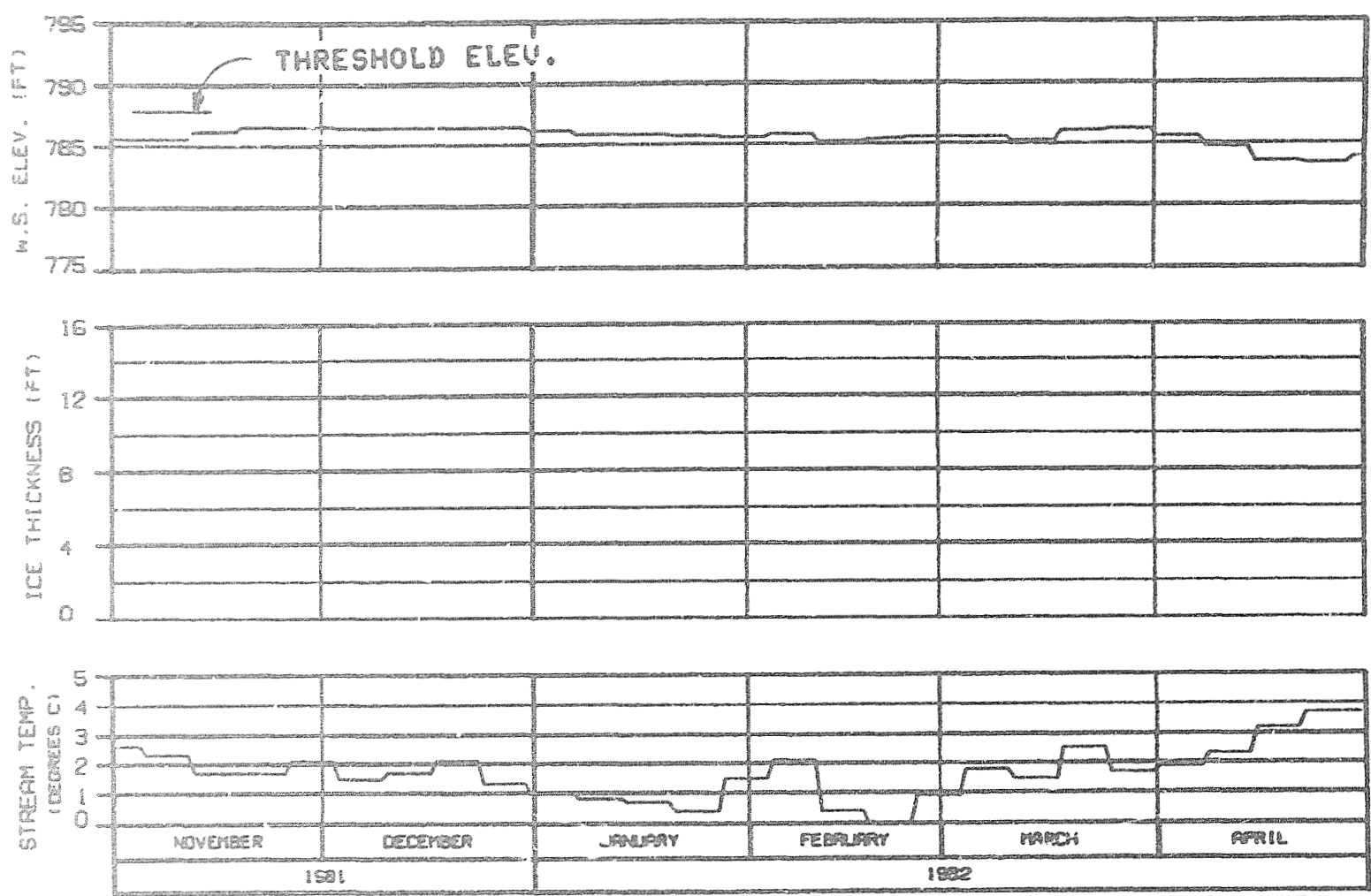
HEAD OF SLOUGH 21
RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : MATANA 2001
CASE C FLOWS TEMP RULE : WARMEST WATER
REFERENCE RUN NO. : 81010WB

ALASKA POWER AUTHORITY	
GUSTINA PROJECT	
GUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CONCEPT. DATED 07 APR 84	ISSUE 142

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HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

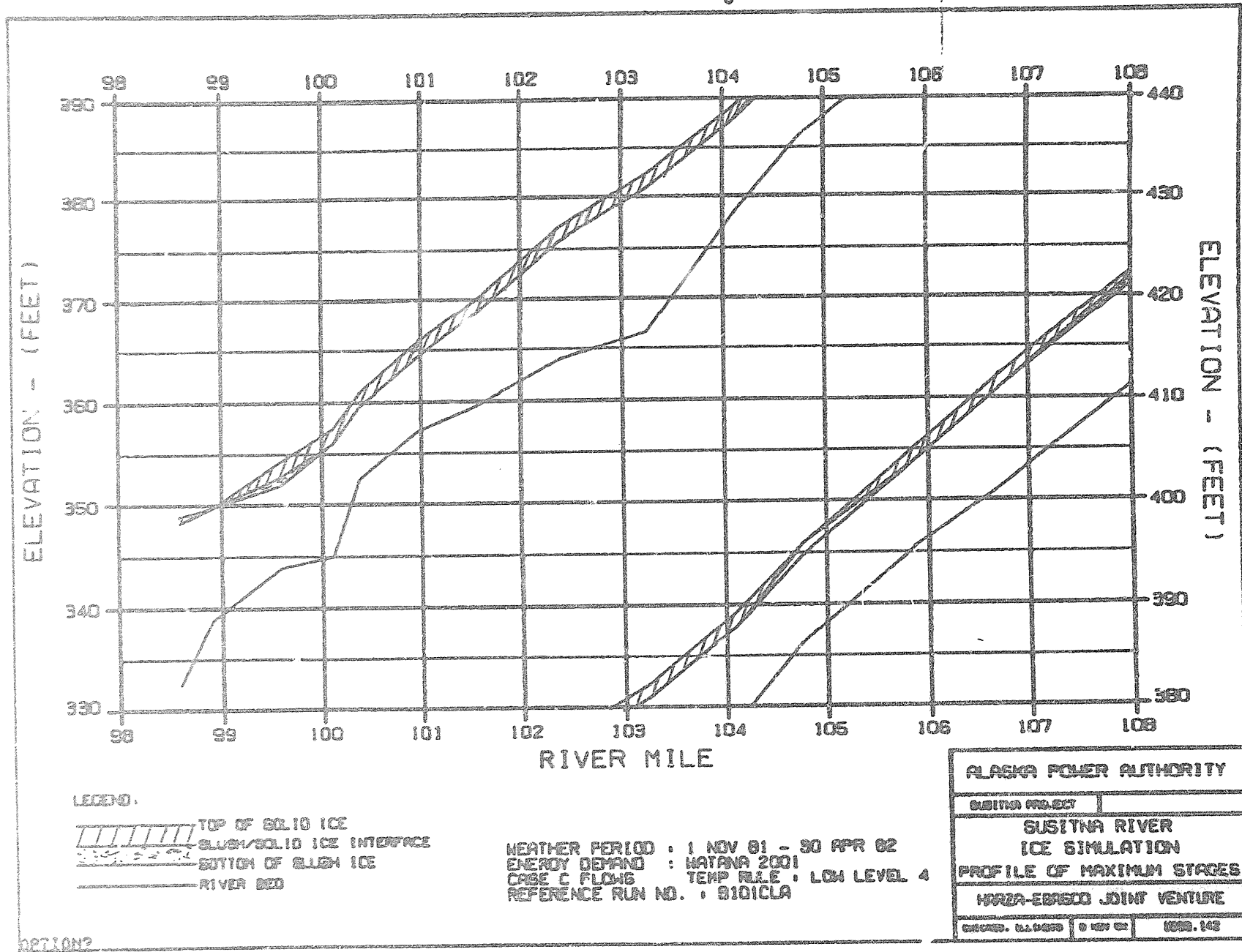
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8101CWB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HRZA-EBASCO JOINT VENTURE	
ORDER: 8101CWB	DATE: 07 OCT 82
PAGE: 142	

OPTION?

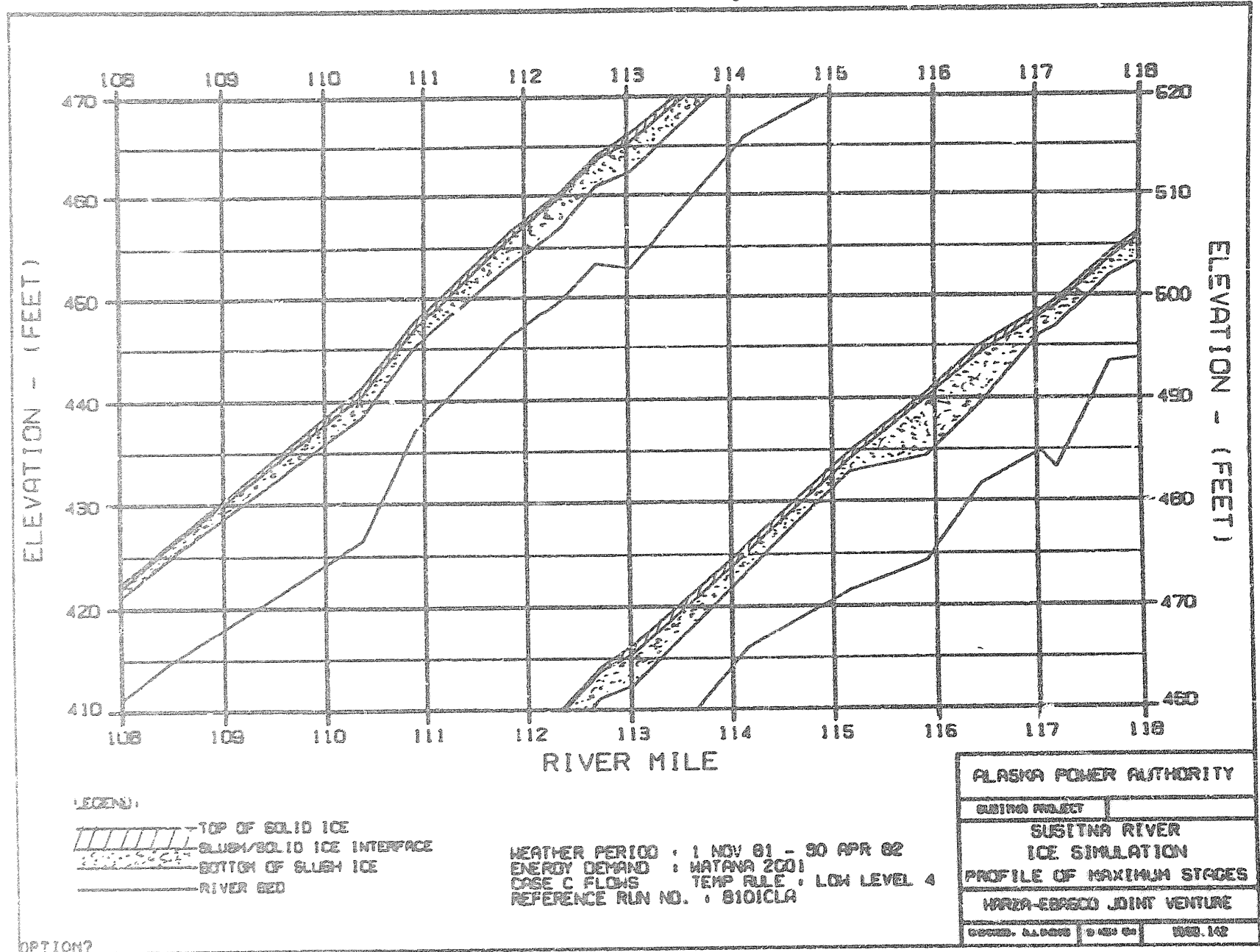
EXHIBIT C

C



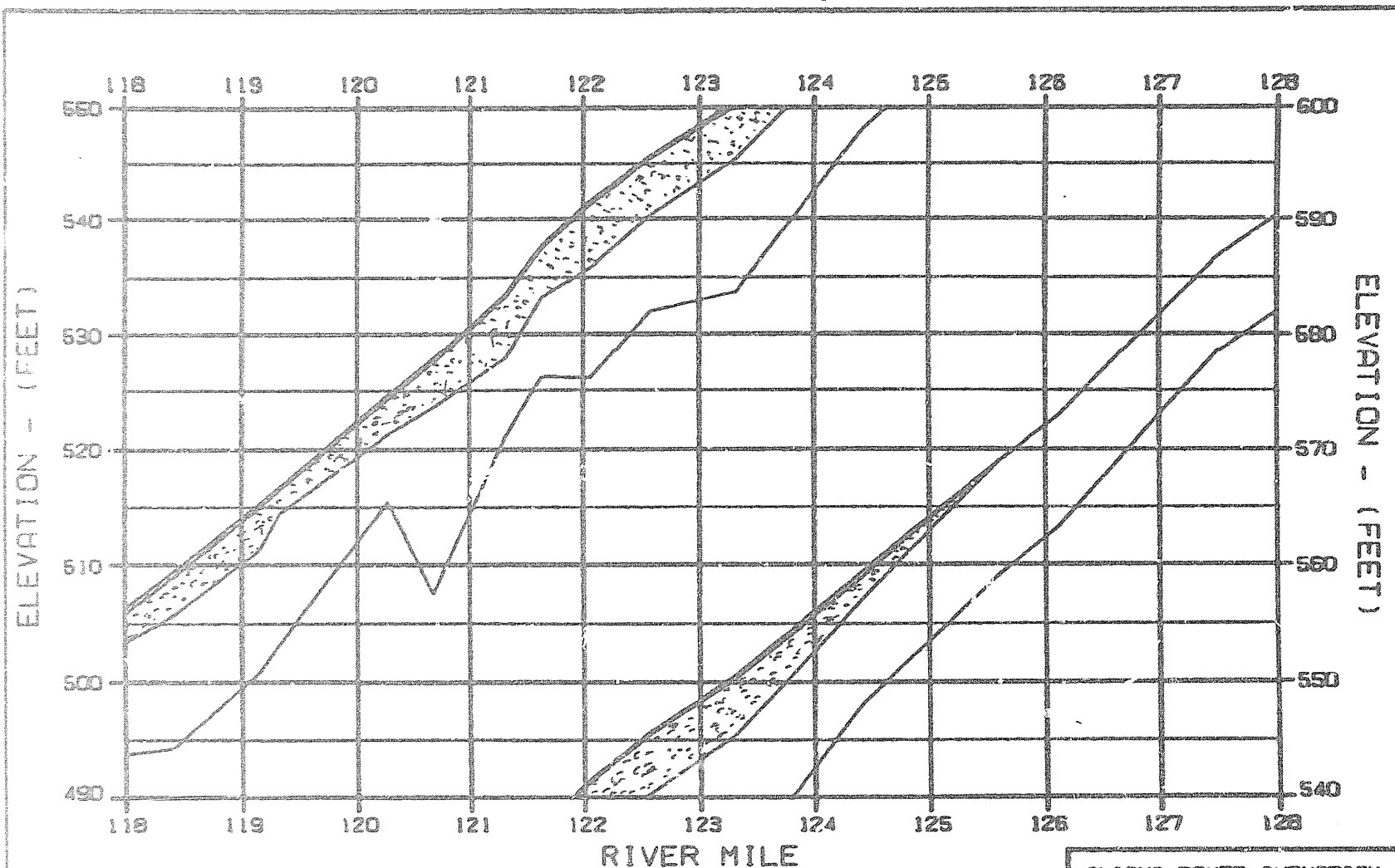
OPTION?

C



OPTION 2


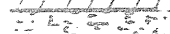


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ELEVATION - (FEET)

ELEVATION - (FEET)

LEGEND:

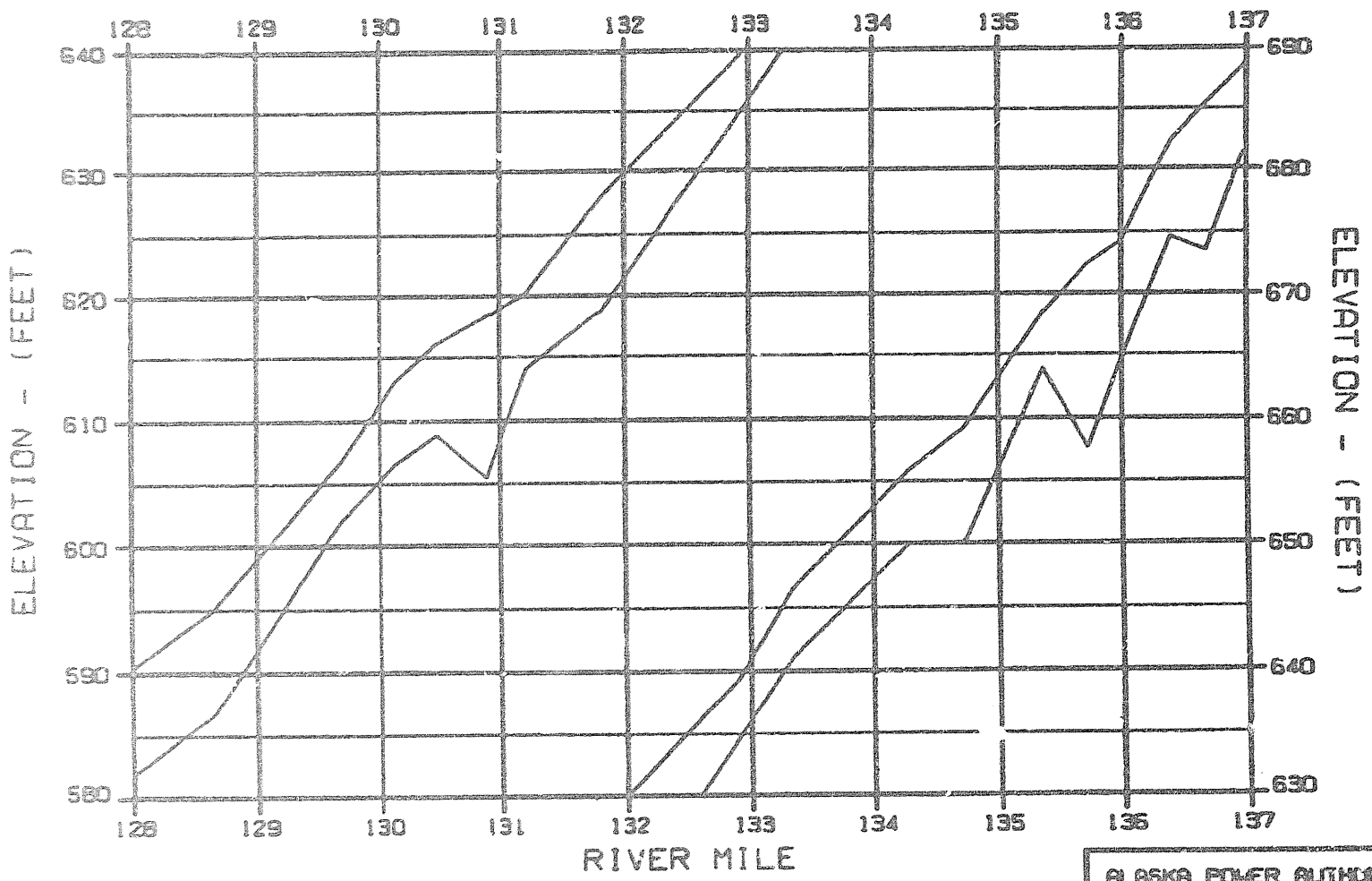
 TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

HEATING PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 81D1CLA





ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBREDD JOINT VENTURE	
DATE: 11/27/82	BY: J. G.
11/27/82	

OPTION 2

C



LEGEND:

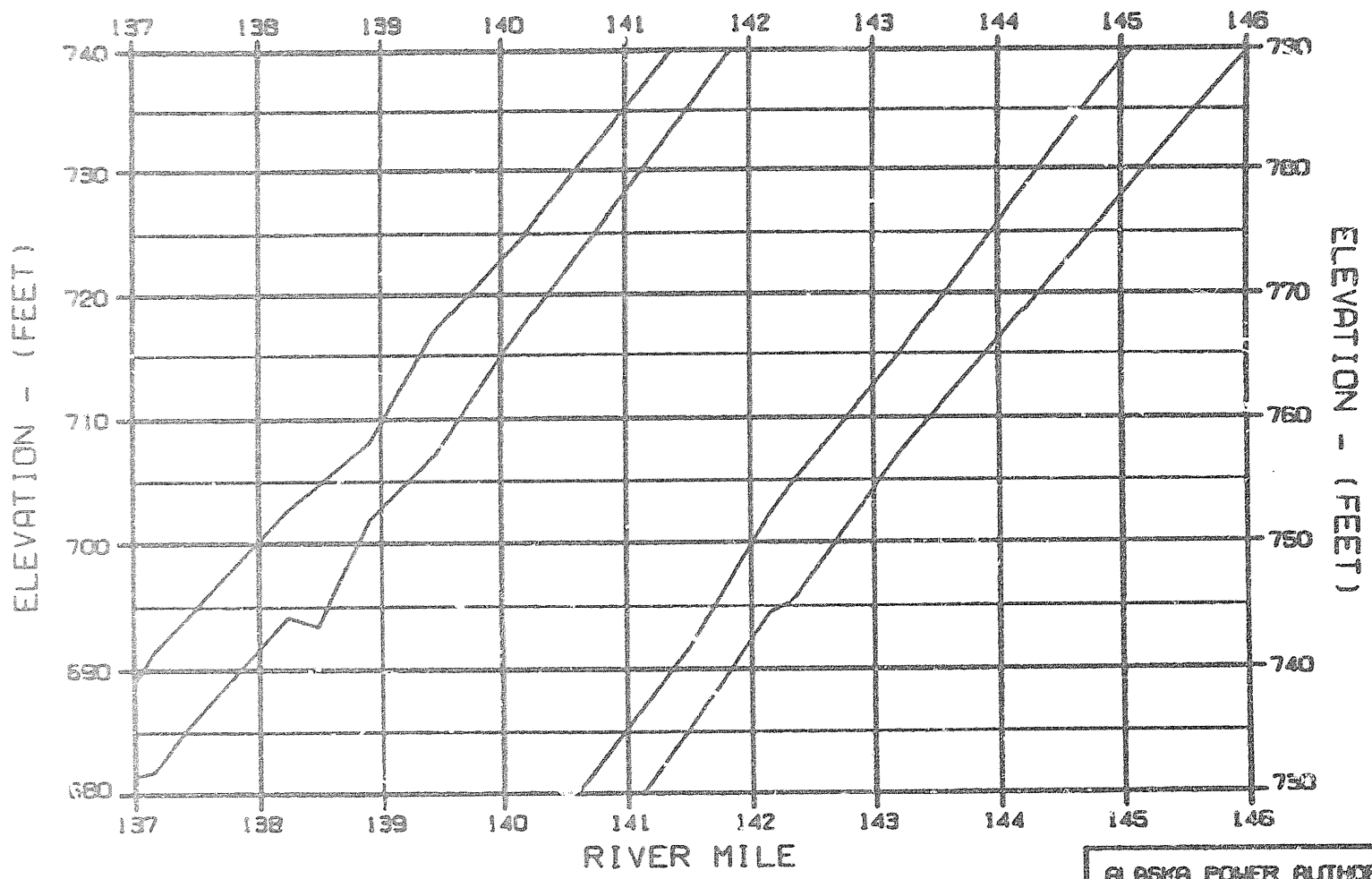
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 81D1CLA


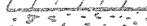


ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-ERBECO JOINT VENTURE	
DATE: 01/11/82	BY: JCH
SCALE: 1/8" = 100'	FIG. 142

OPTION 2

C



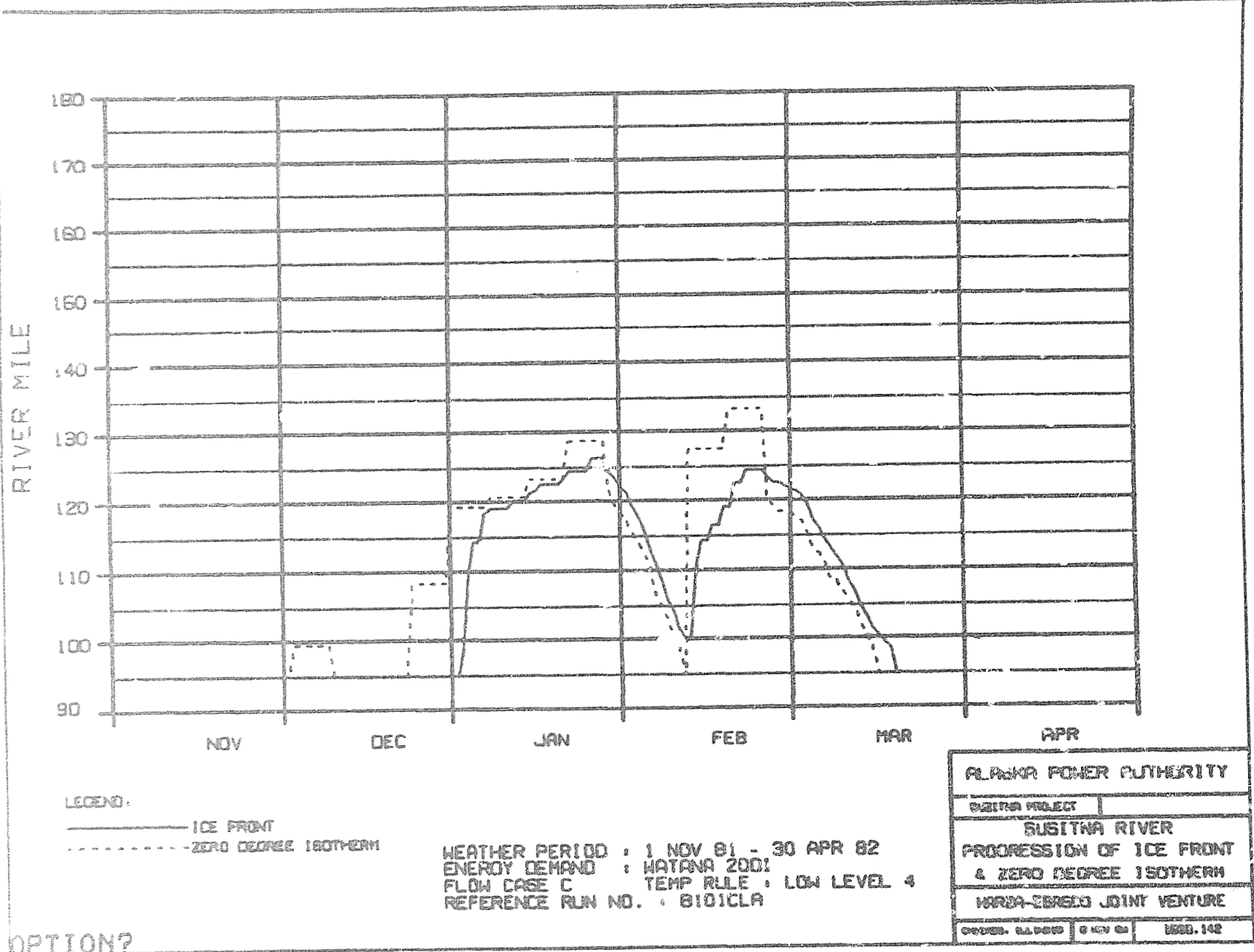
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
HARZA-ESBSCO JOINT VENTURE		
UNSCR. 8101CLA	9 APR 82	ISS. 142

OPTION?

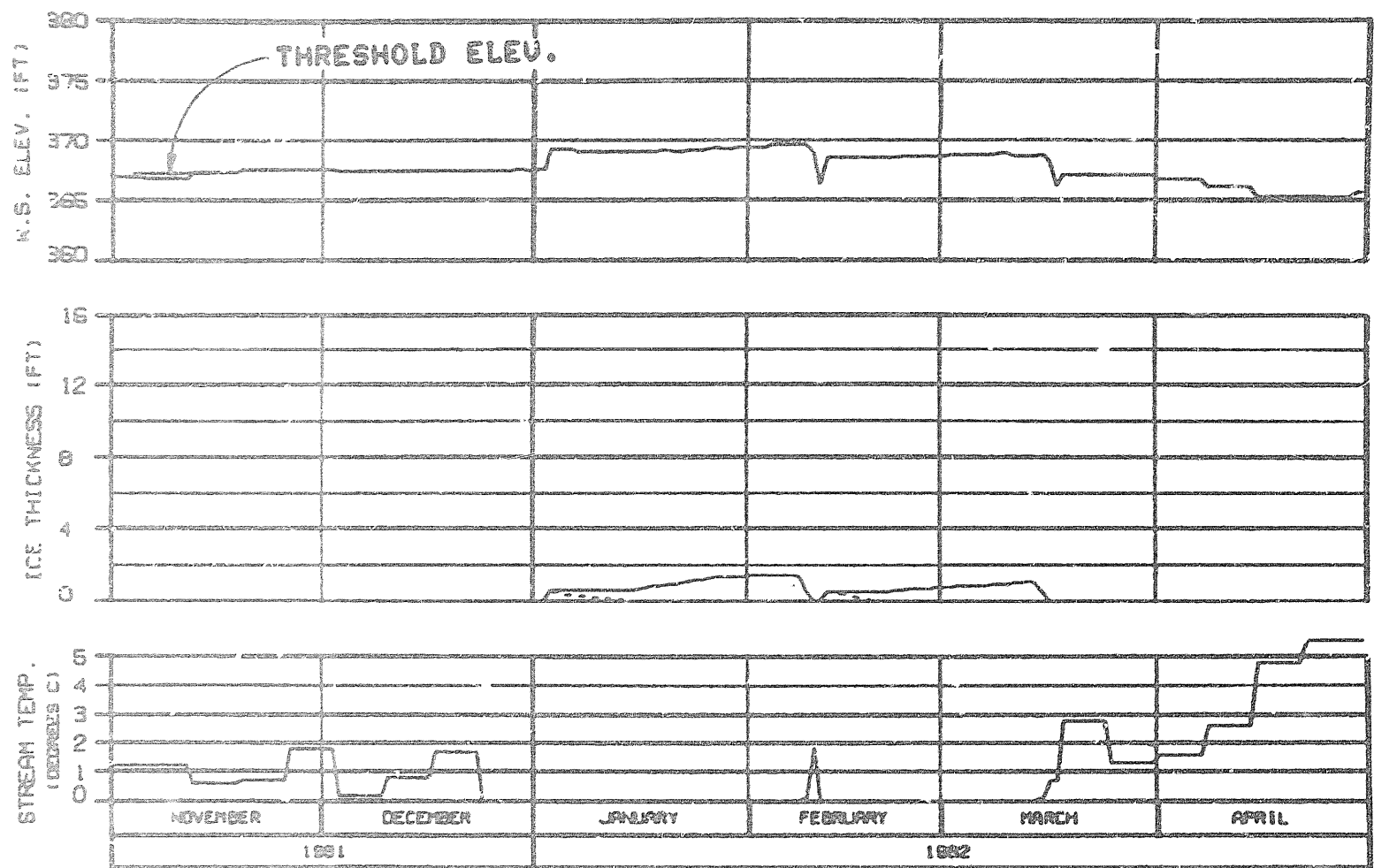


LEGEND:
 — ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 FLOW CASE C TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : B101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
& ZERO DEGREE ISOTHERM		
WARDA-ERSSO JOINT VENTURE		
DATE: 04/08/82	BY: MJK	ISS: 142

OPTION?

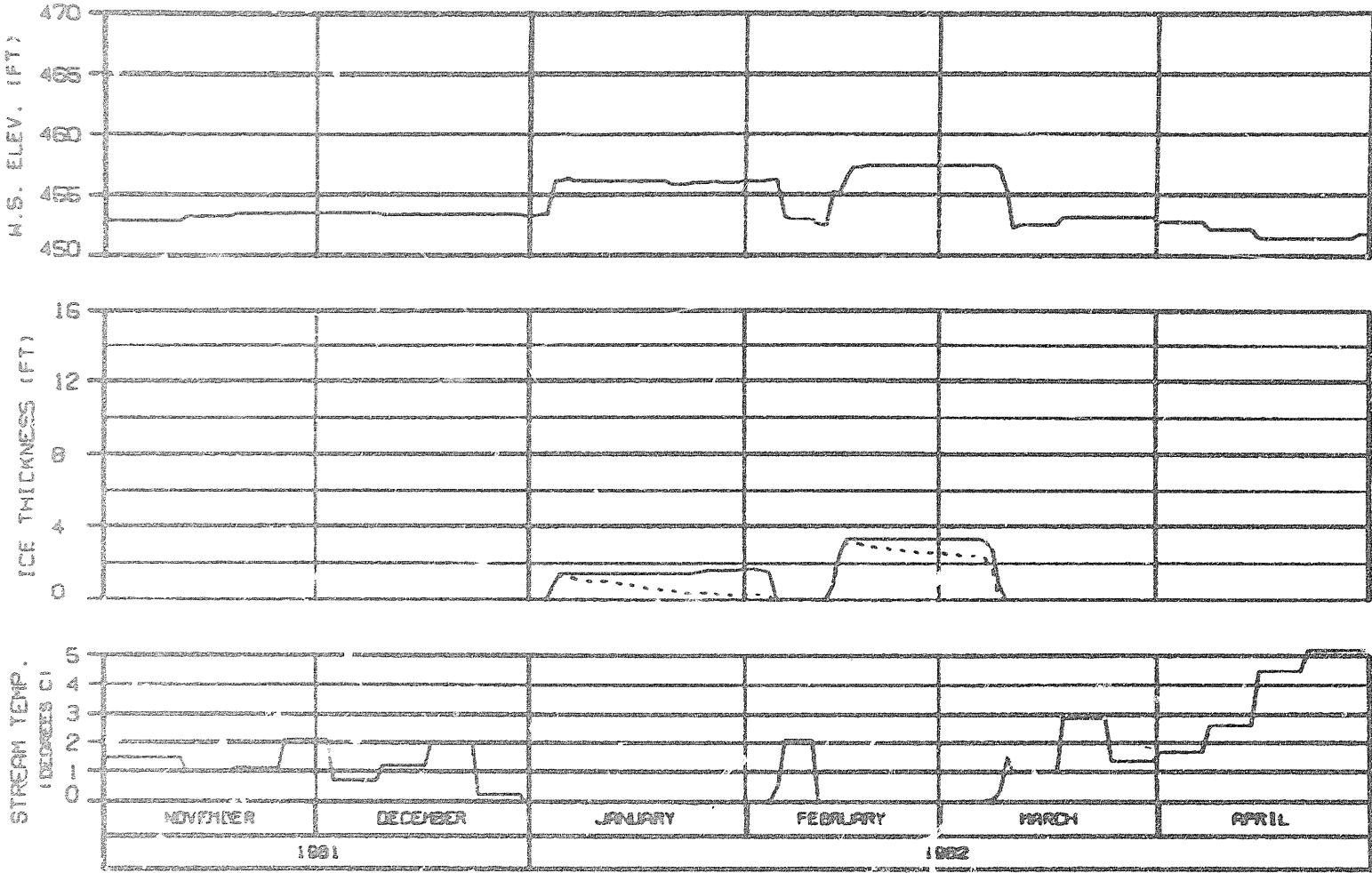


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : B101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MYRZA-EBASCO JOINT VENTURE		
POWER PLANT	DATE	2000-142

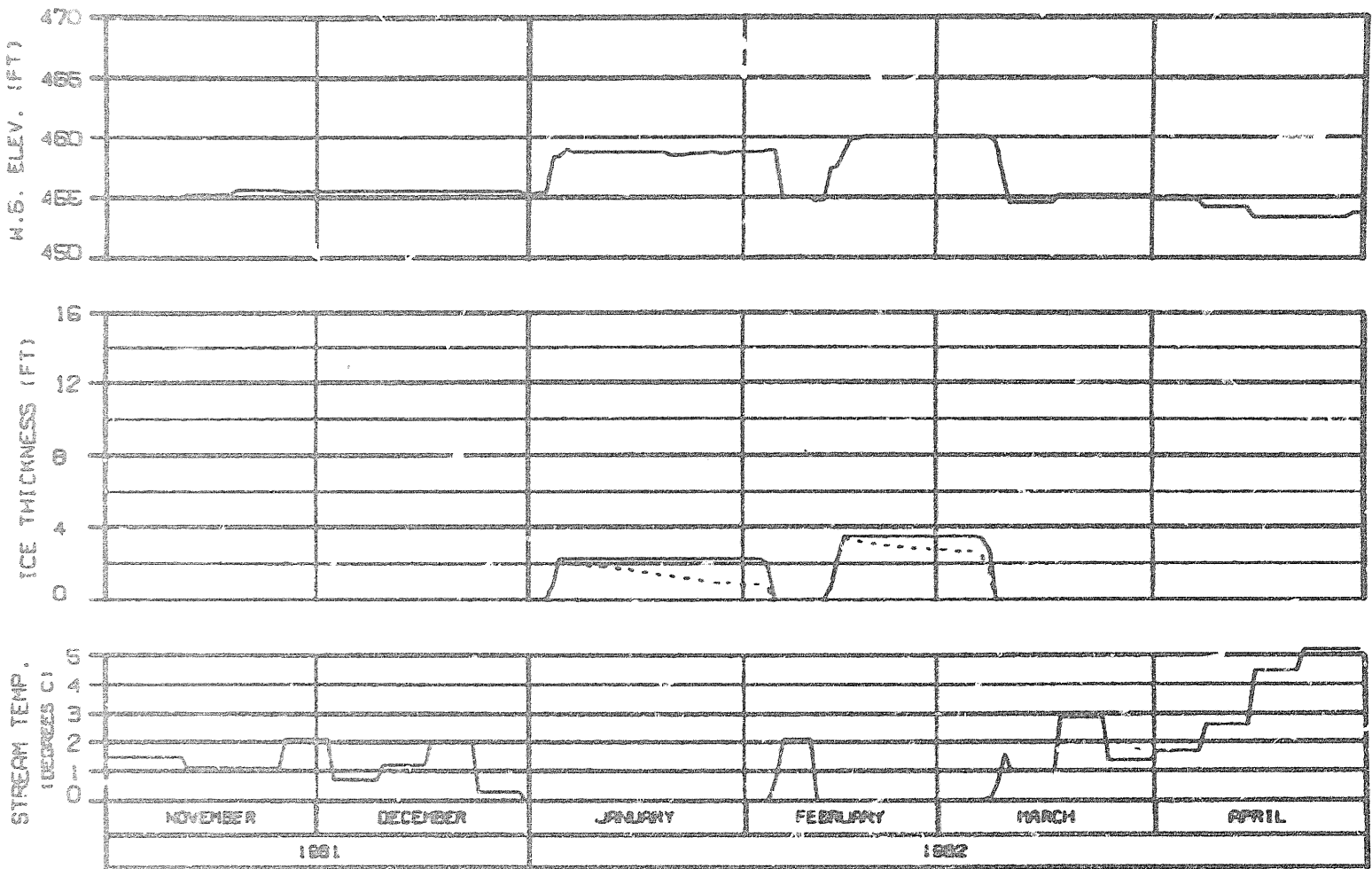


SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RILE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: ALBERT	DRAWN BY: [blank]
	NOV. 1982

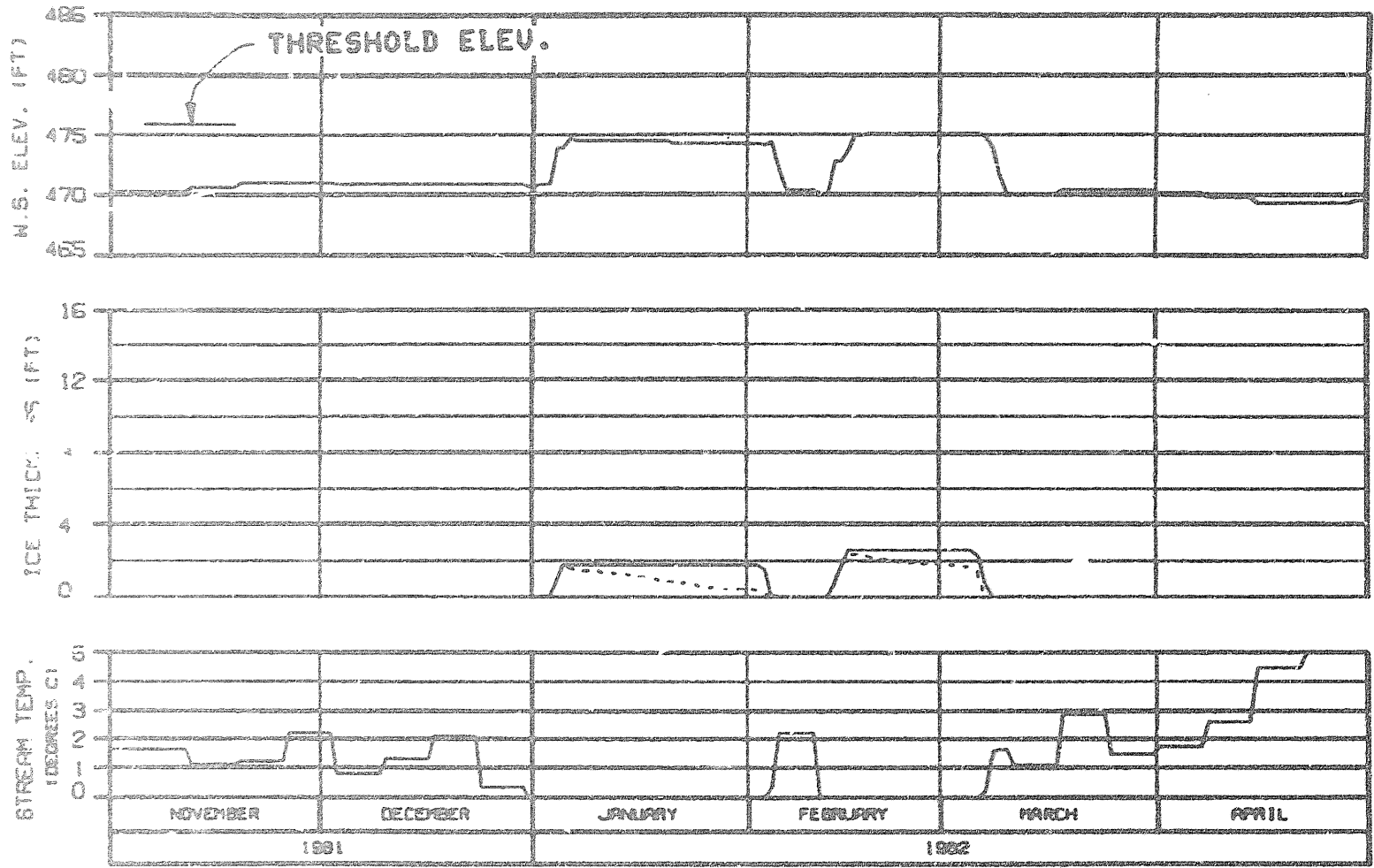


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : BIDICLA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGINEER: ALLIANCE	DATE: 1982.142

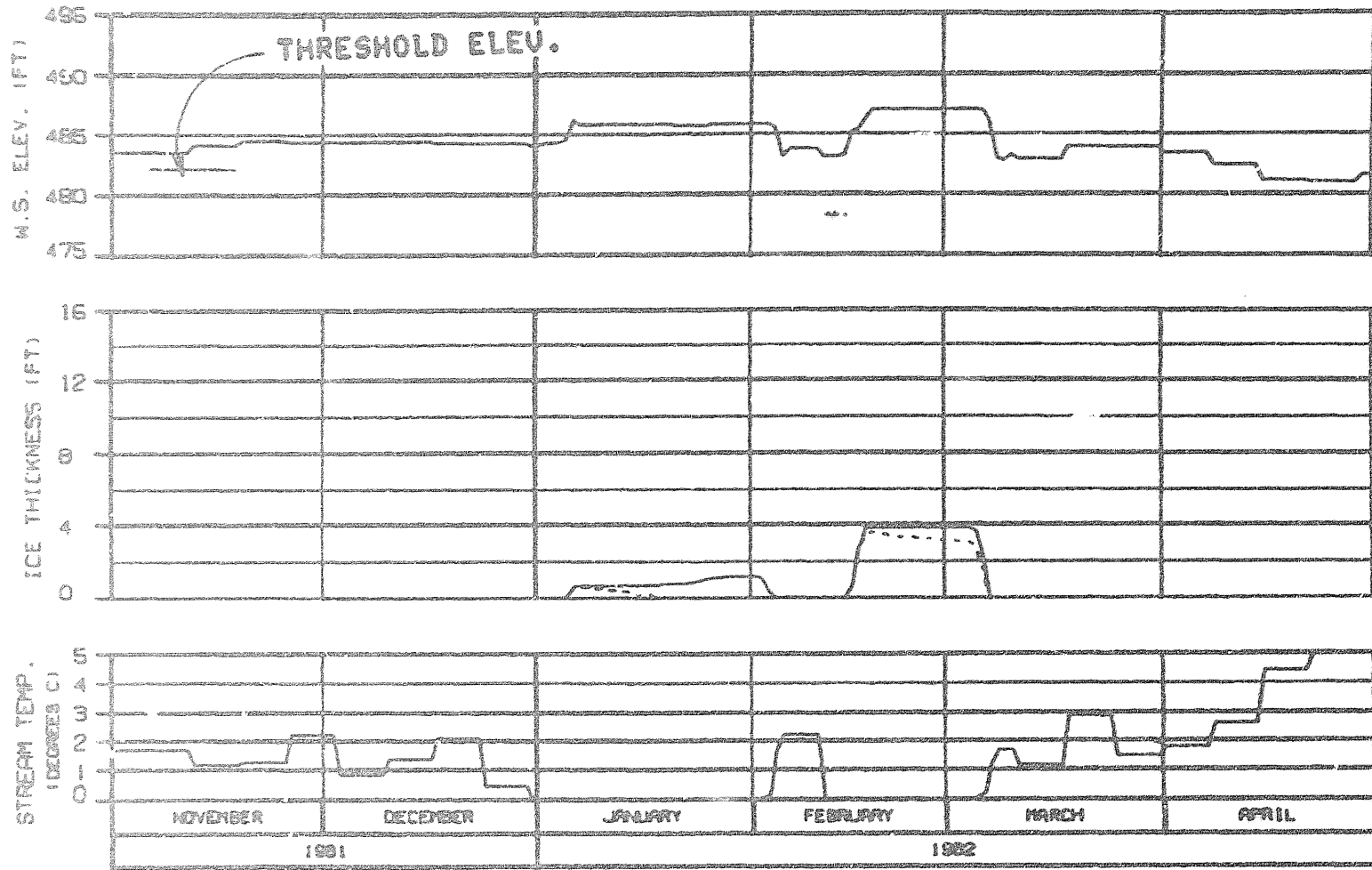


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDUCO JOINT VENTURE	
GRAPH. FILE NO. : 0 101 01	1008.142

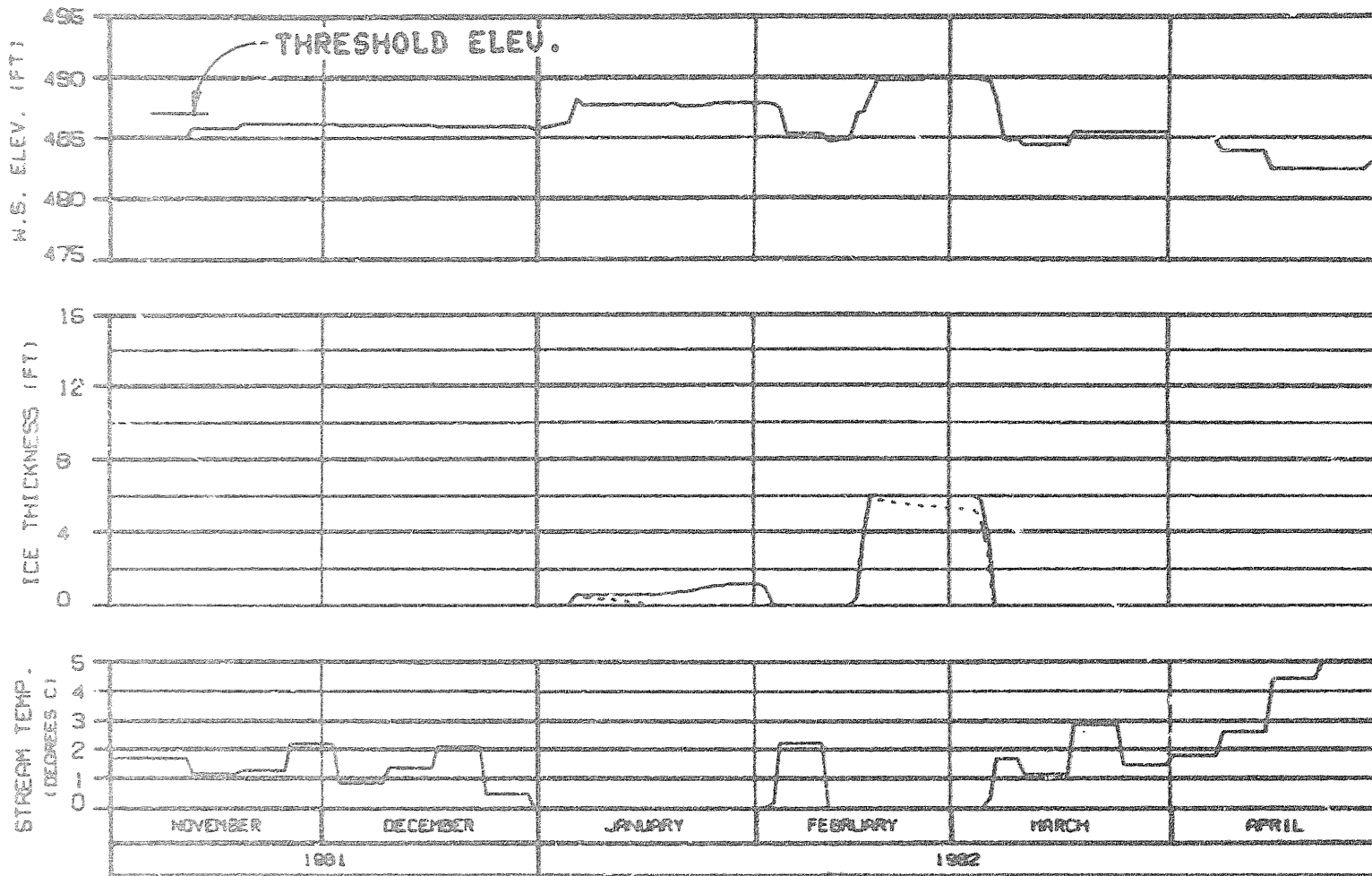


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 0101CLA

ALASKA POWER AUTHORITY	
SUBINA PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ESPACO JOINT VENTURE	
DESIGN - 01/01/82	REV. 142

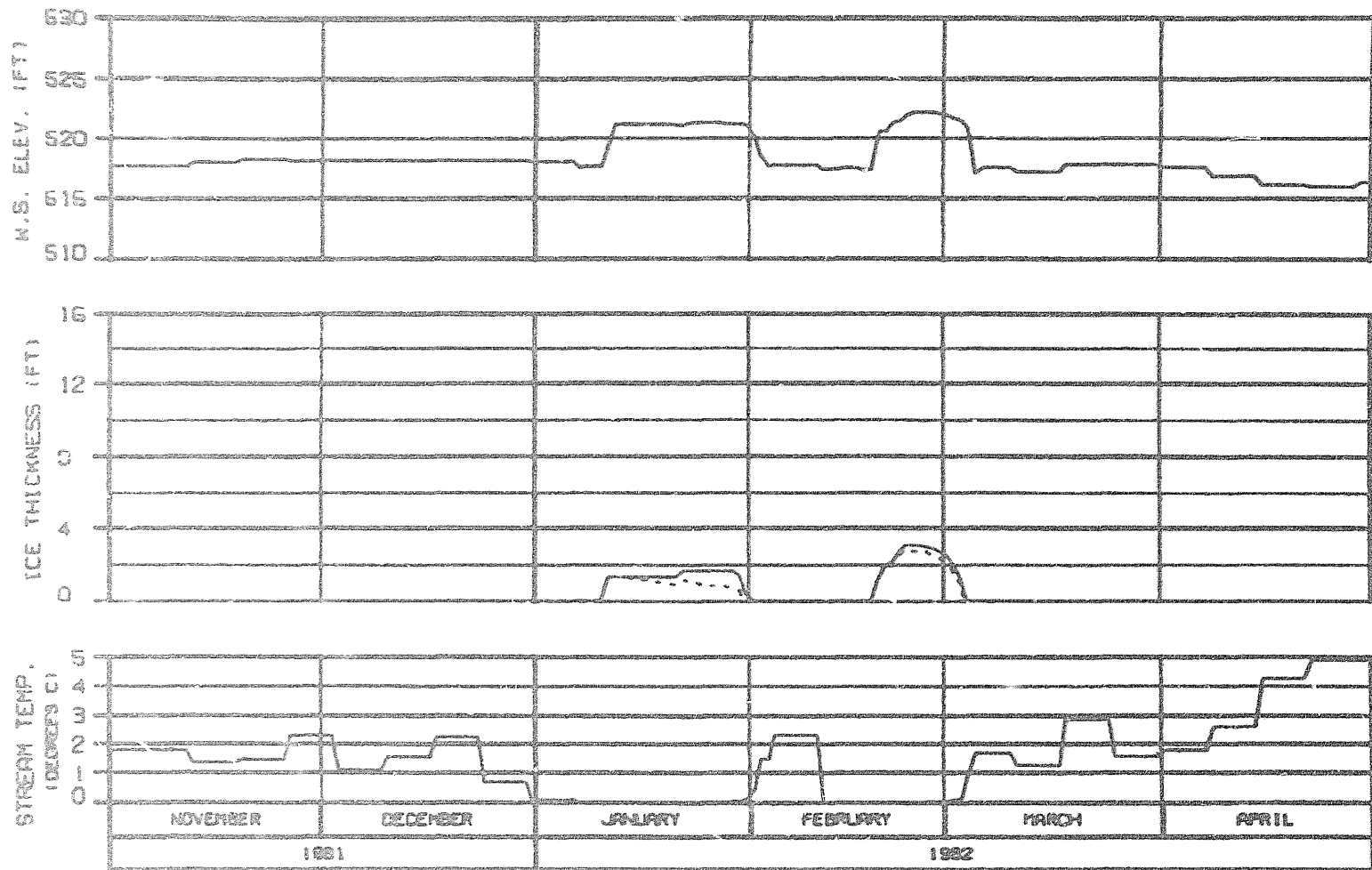


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARSA-EDRSCO JOINT VENTURE		
DESIGNED: B.L.P.000	DRAWN BY: B.L.P.001	REVISION: 142

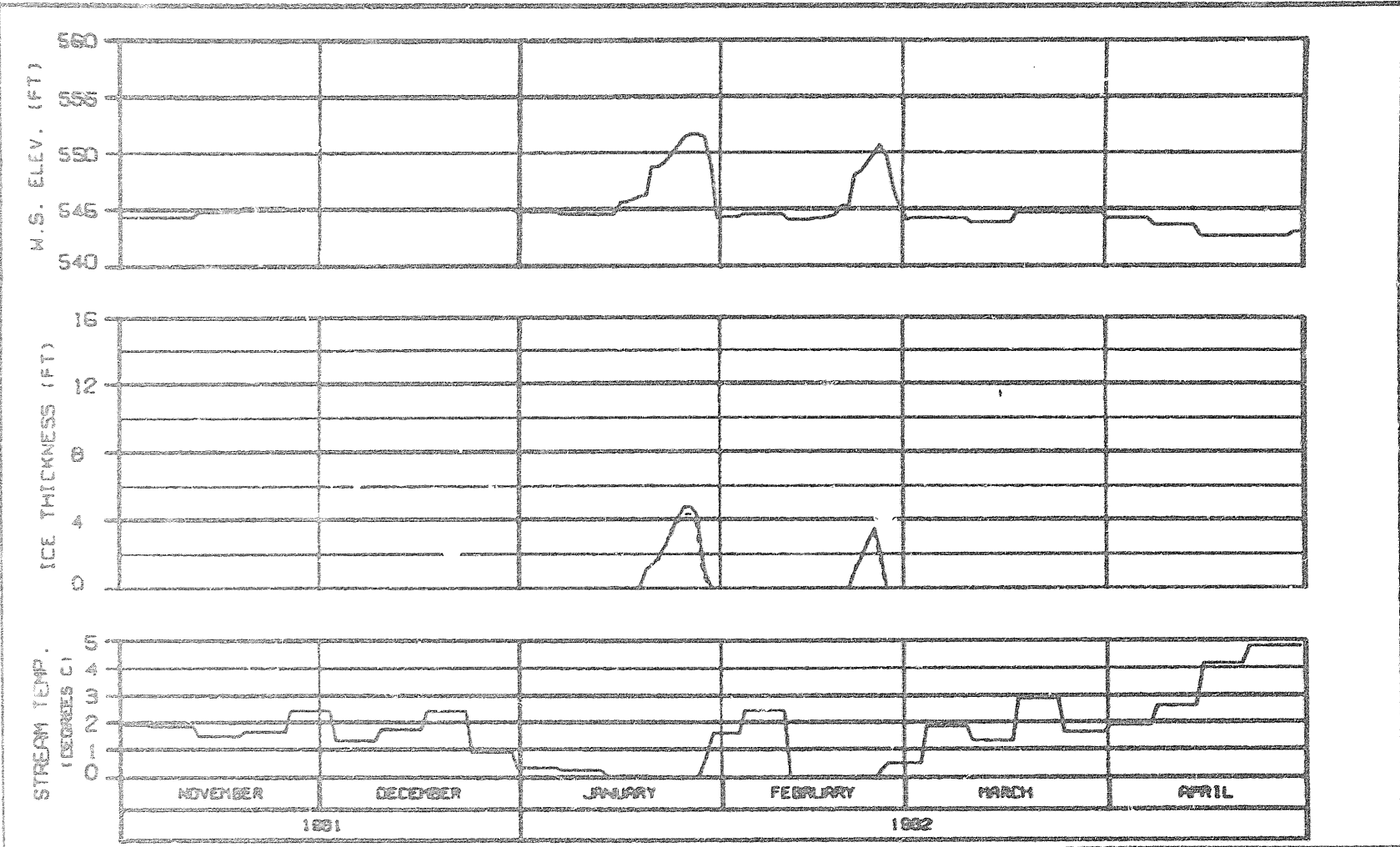


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: B.L. ANDERSON	DATE: 01 MAR 82
PAGE: 142	

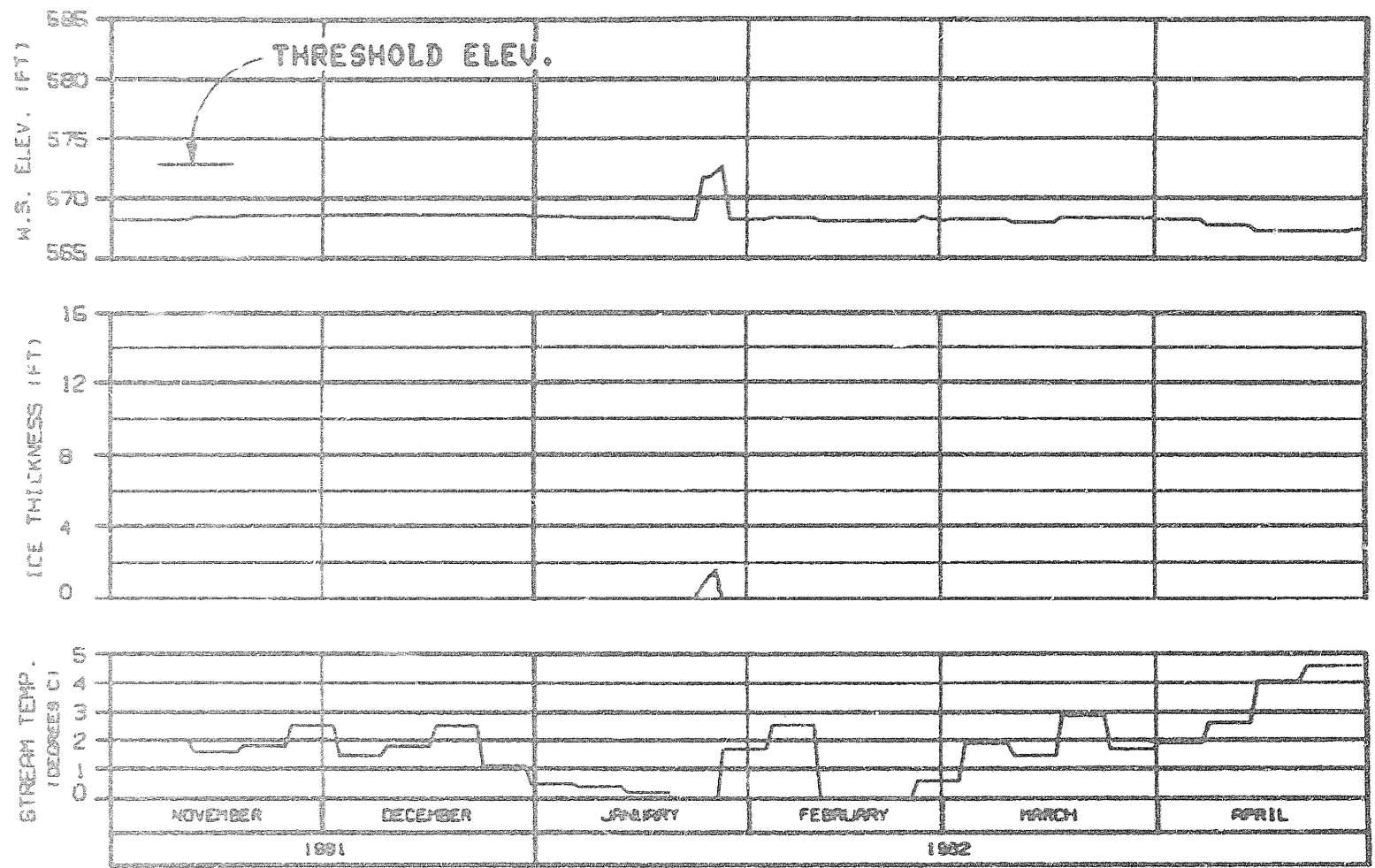


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUBJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DESIGNED BY: J. B. BROWN	DATE: 8-1-82
DRAWN BY: J. B. BROWN	



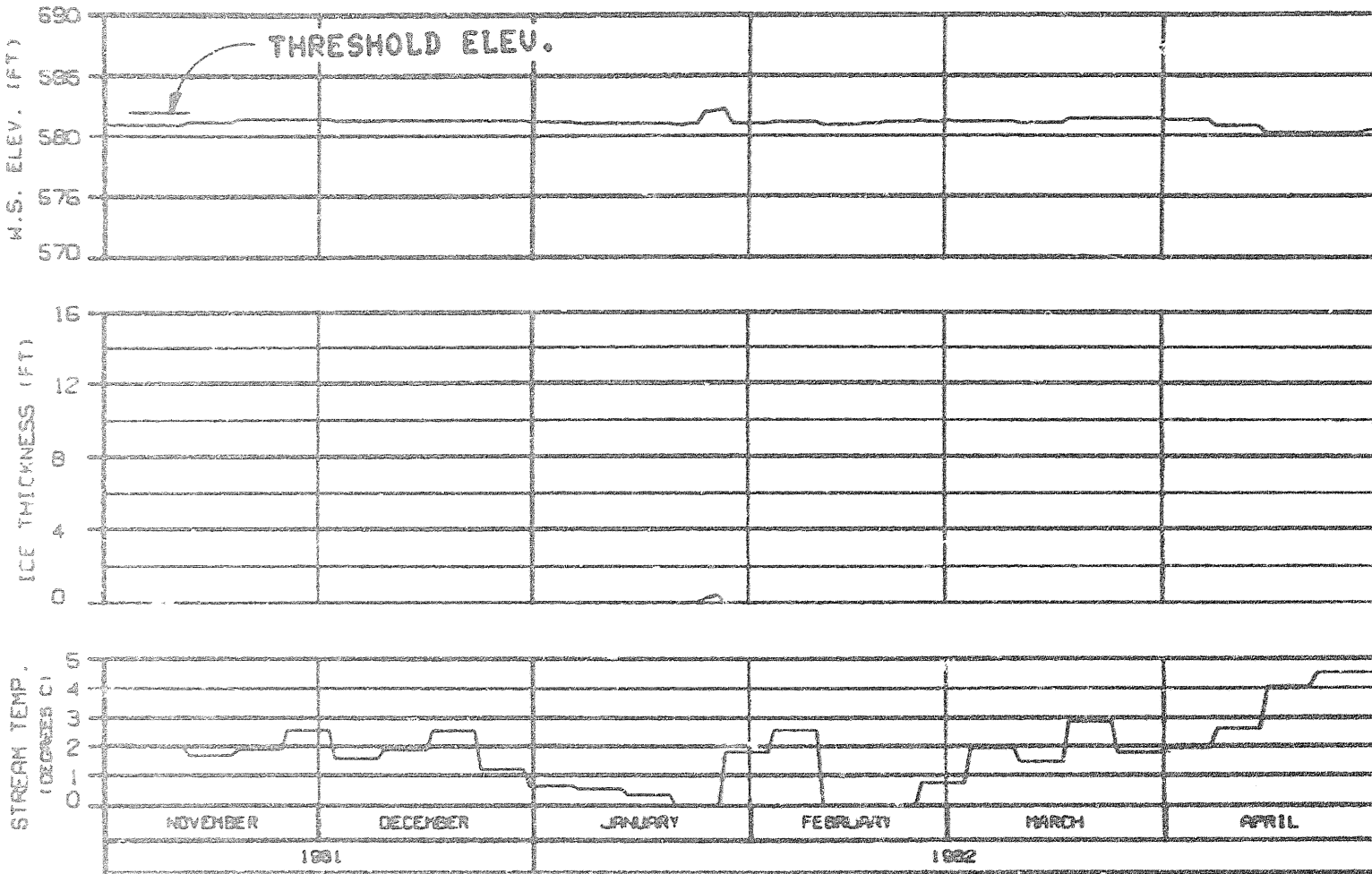
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : KATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EBRACO JOINT VENTURE	
DRAWN - ELDER	0 127 04
1993.142	



HEAD OF SLOUGH 8A (EAST)

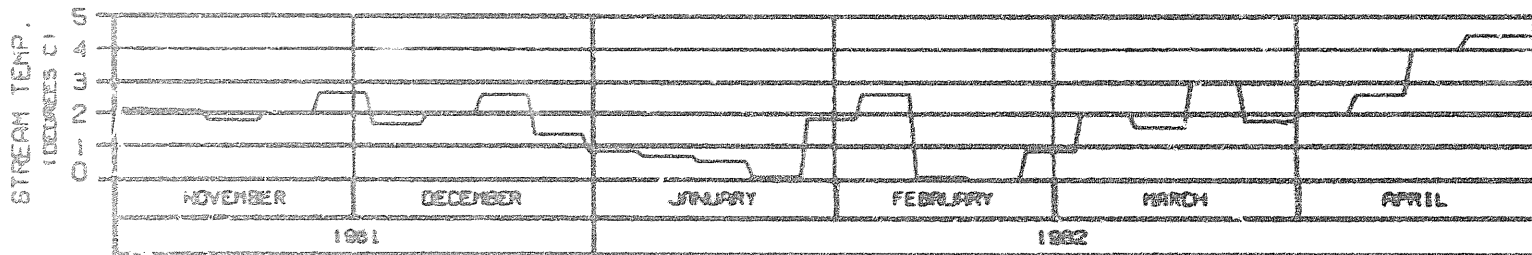
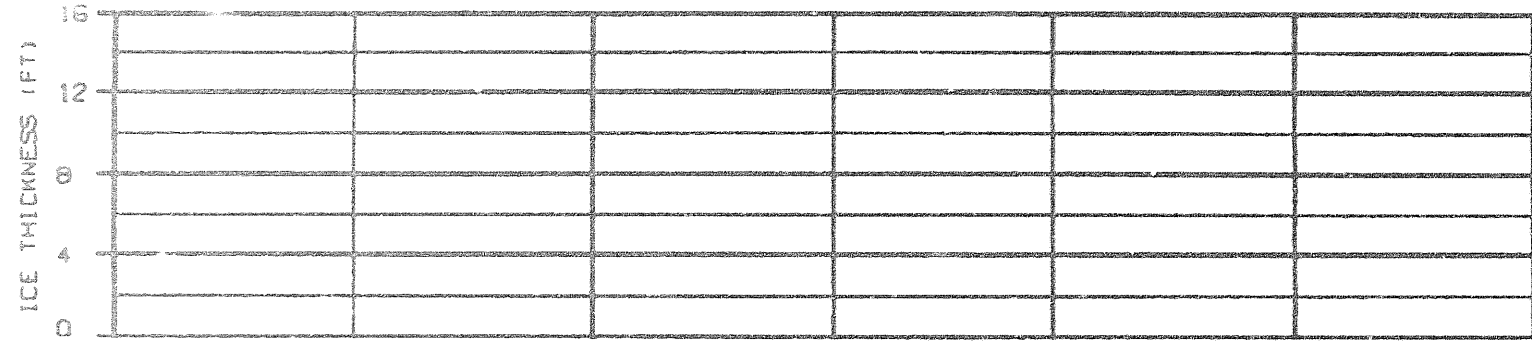
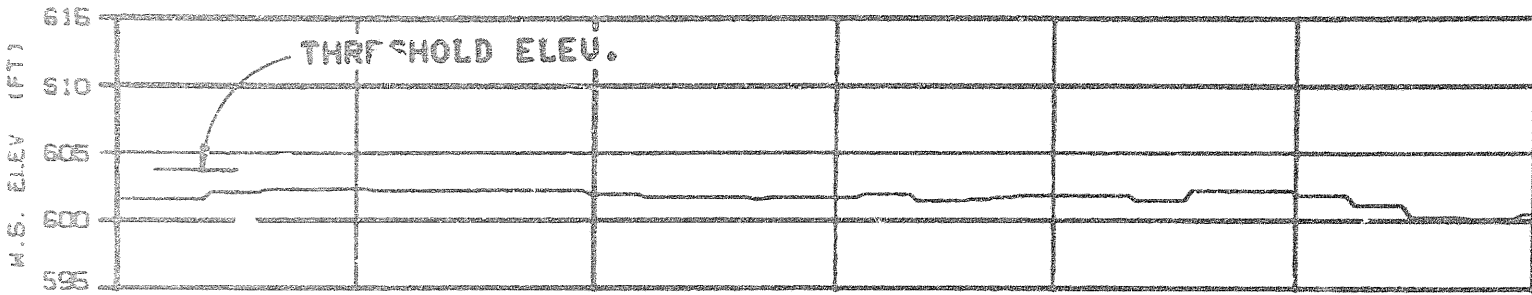
RIVER MILE : 127.10

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 2 NOV 81 - 30 APR 82
 ENERGY DEMAND : MAYANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUBINA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CREATED: 11/19/81	BY: WJG	DATE: 1/22/82



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

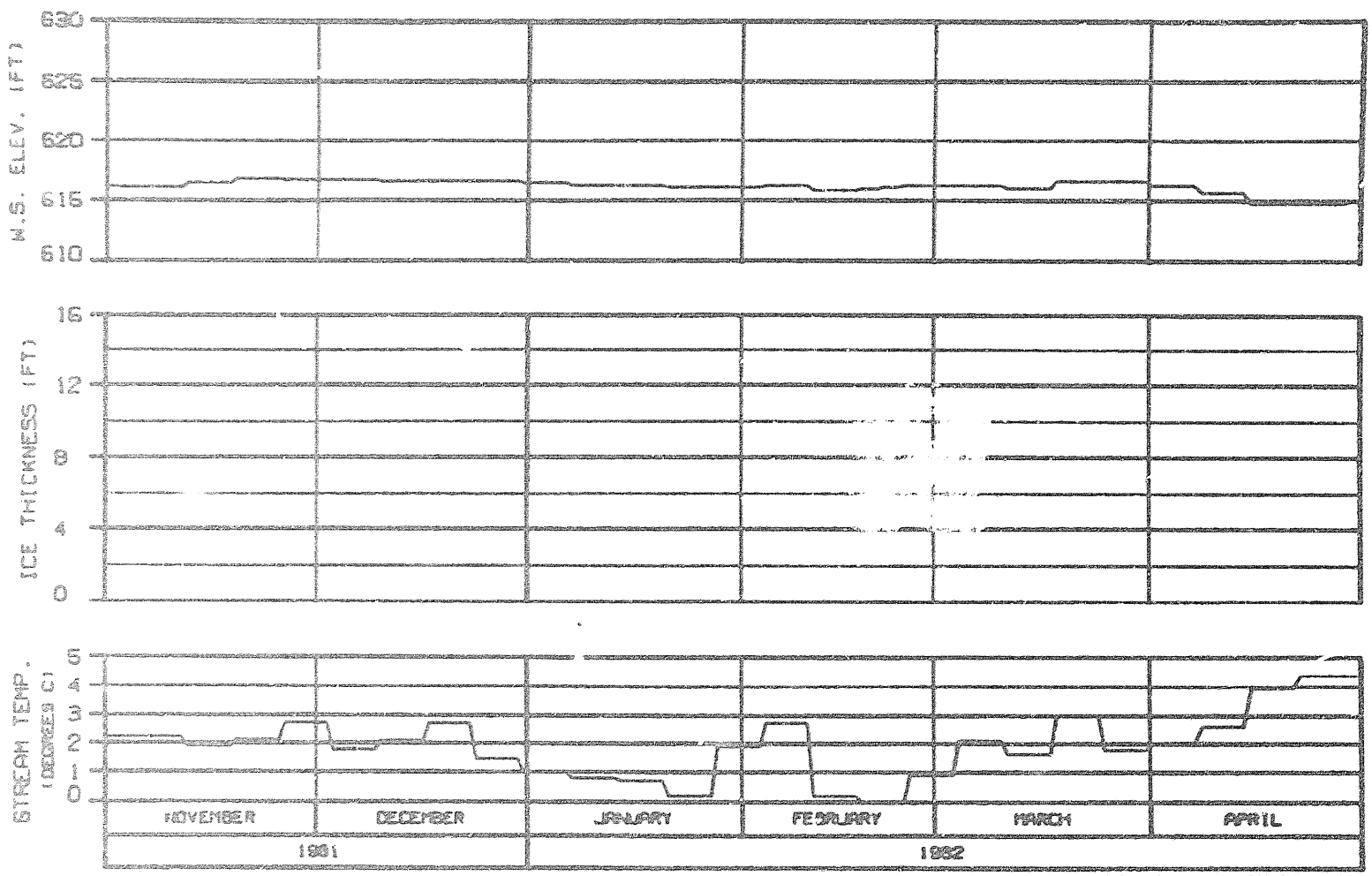
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
ORDER: 81-0-000	0 REV 00	ISS. 142

PTION?

OPTION?

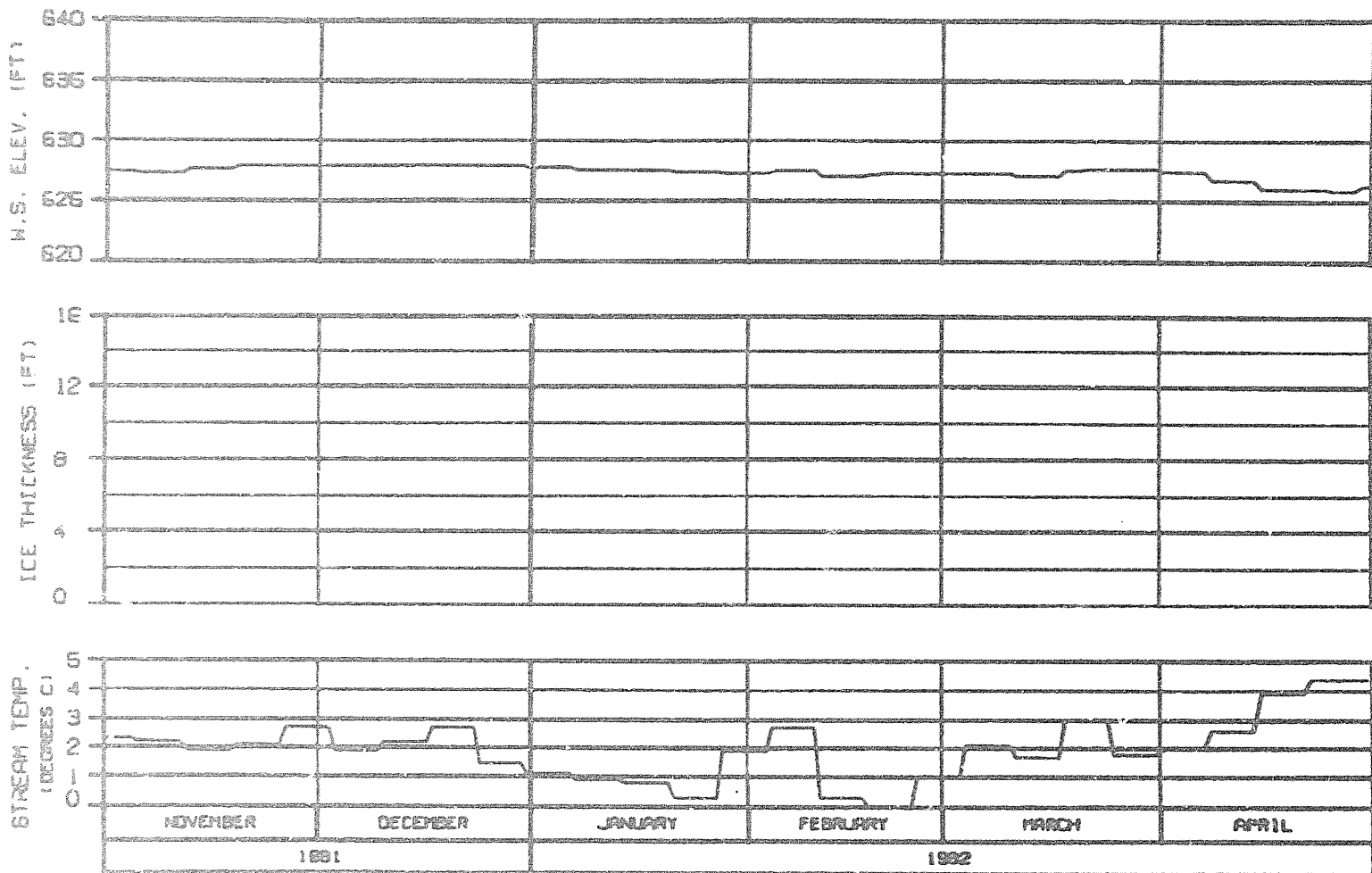


SIDE CHANNEL U/S OF SLOUGH 9
 RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 81D1CLA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EPRI/DO JOINT VENTURE	
DESIGNED - J. L. ...	0 0000 00
1982.142	

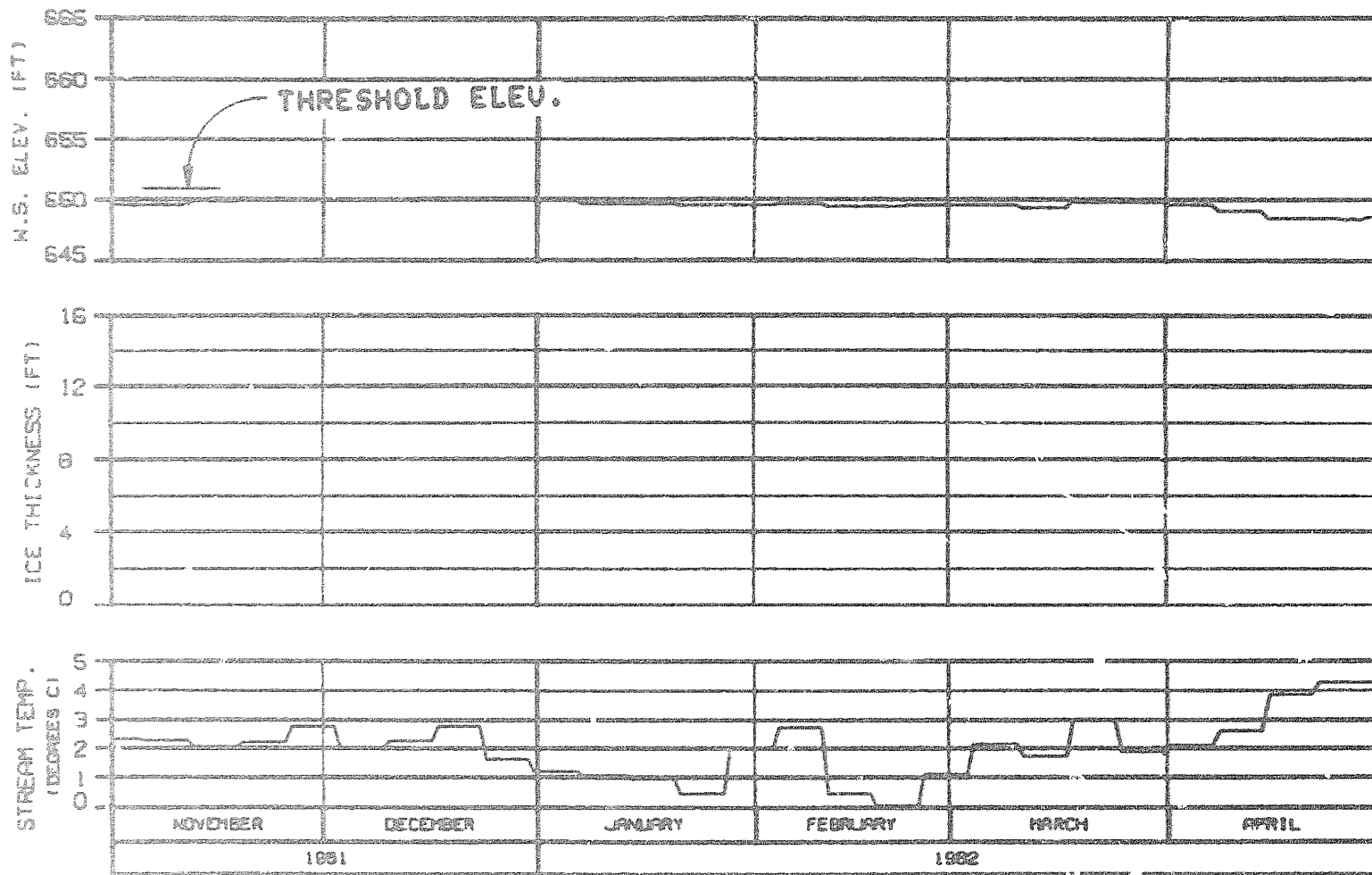


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : B101CLA

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DATE: 04-2-82	131.80



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 : MATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY

SUSITNA RIVER

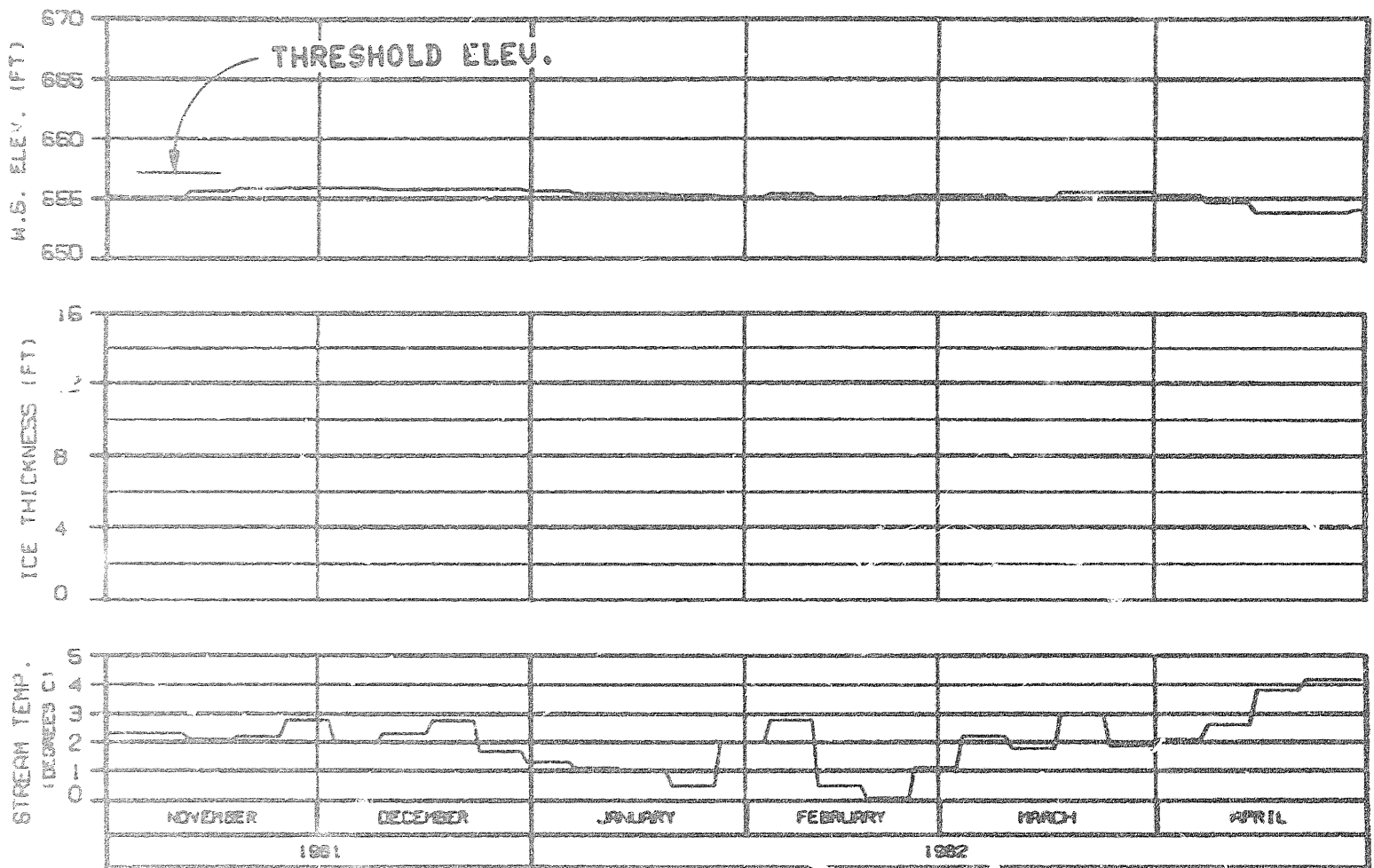
SUSITNA RIVER
 ICE SIMULATION!
 TIME HISTORY

WARZA-EGASCO JOINT VENTURE

GRAPHED BY: D. D. DAVIS

8 NOV 82

1528, 142

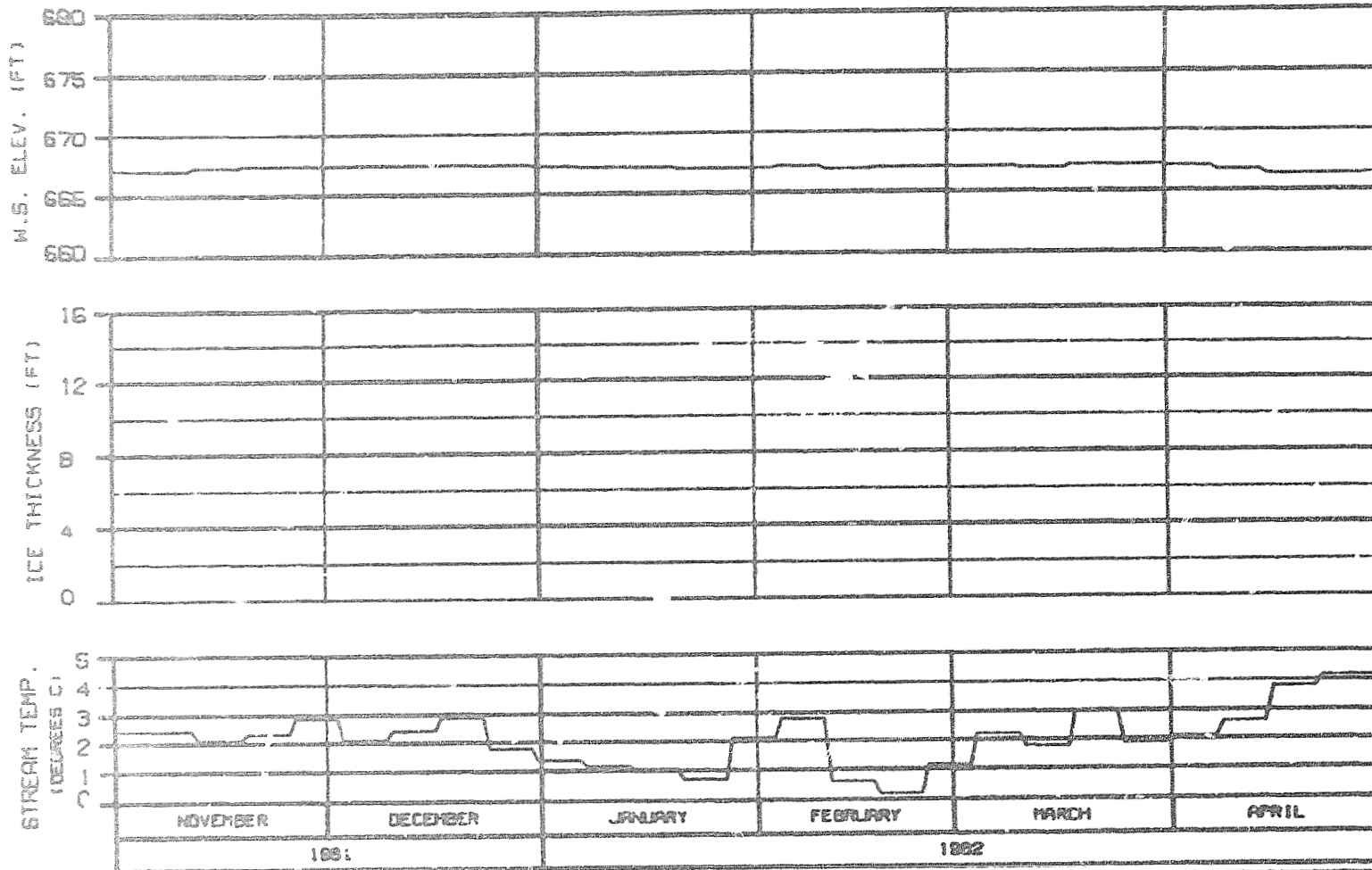


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
QUESTIONS PROJECT		
SLUICING RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACCO JOINT VENTURE		
DESIGNED -	DRAWN -	NO. 142

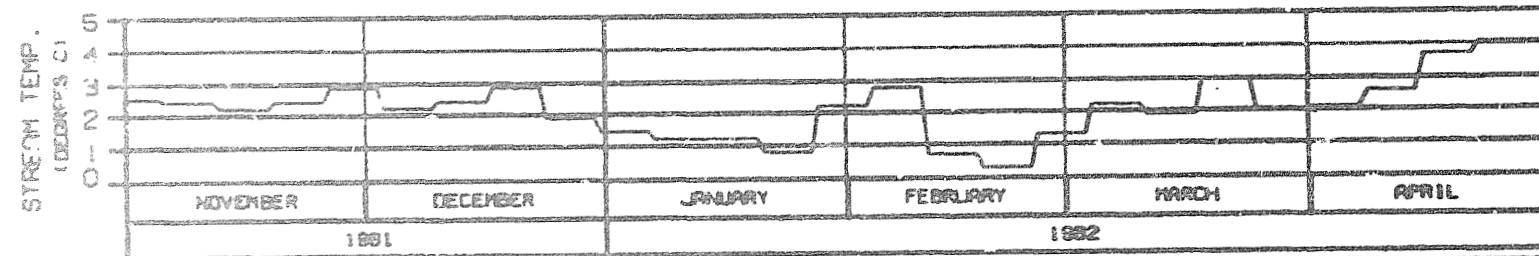
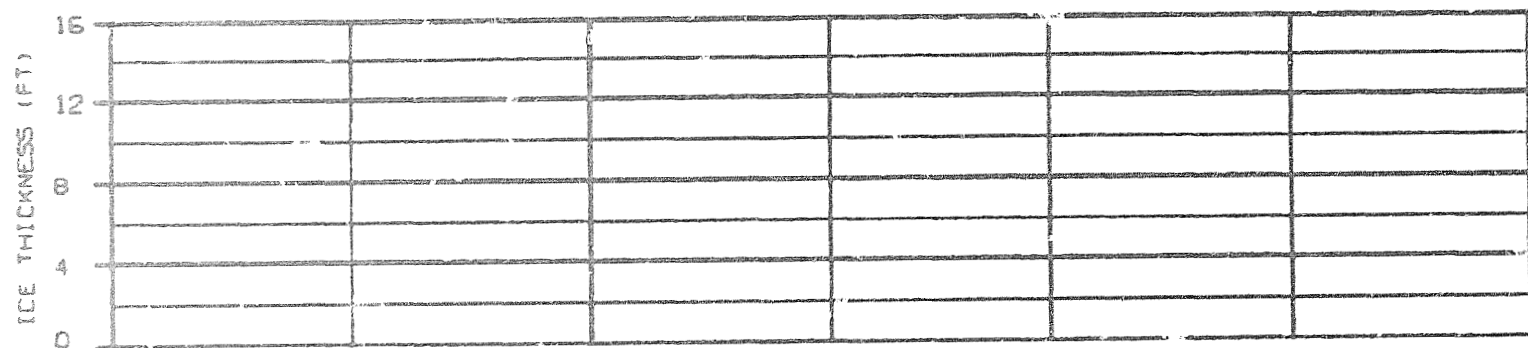
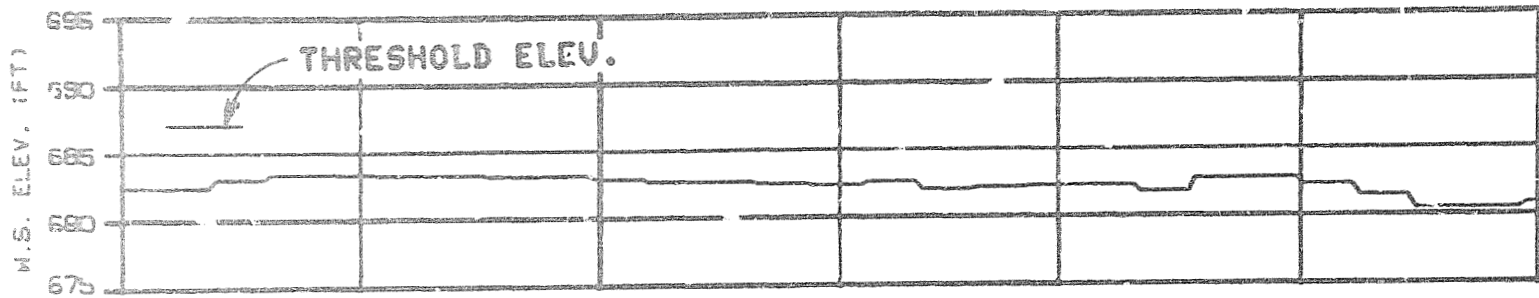


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : B101CLA

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUBITNA RIVER ICE SIMULATION TIME HISTORY	
WATZA-EBASCO JOINT VENTURE	
CHS 003 - 01.0210	0 NOV 84
FORM 142	

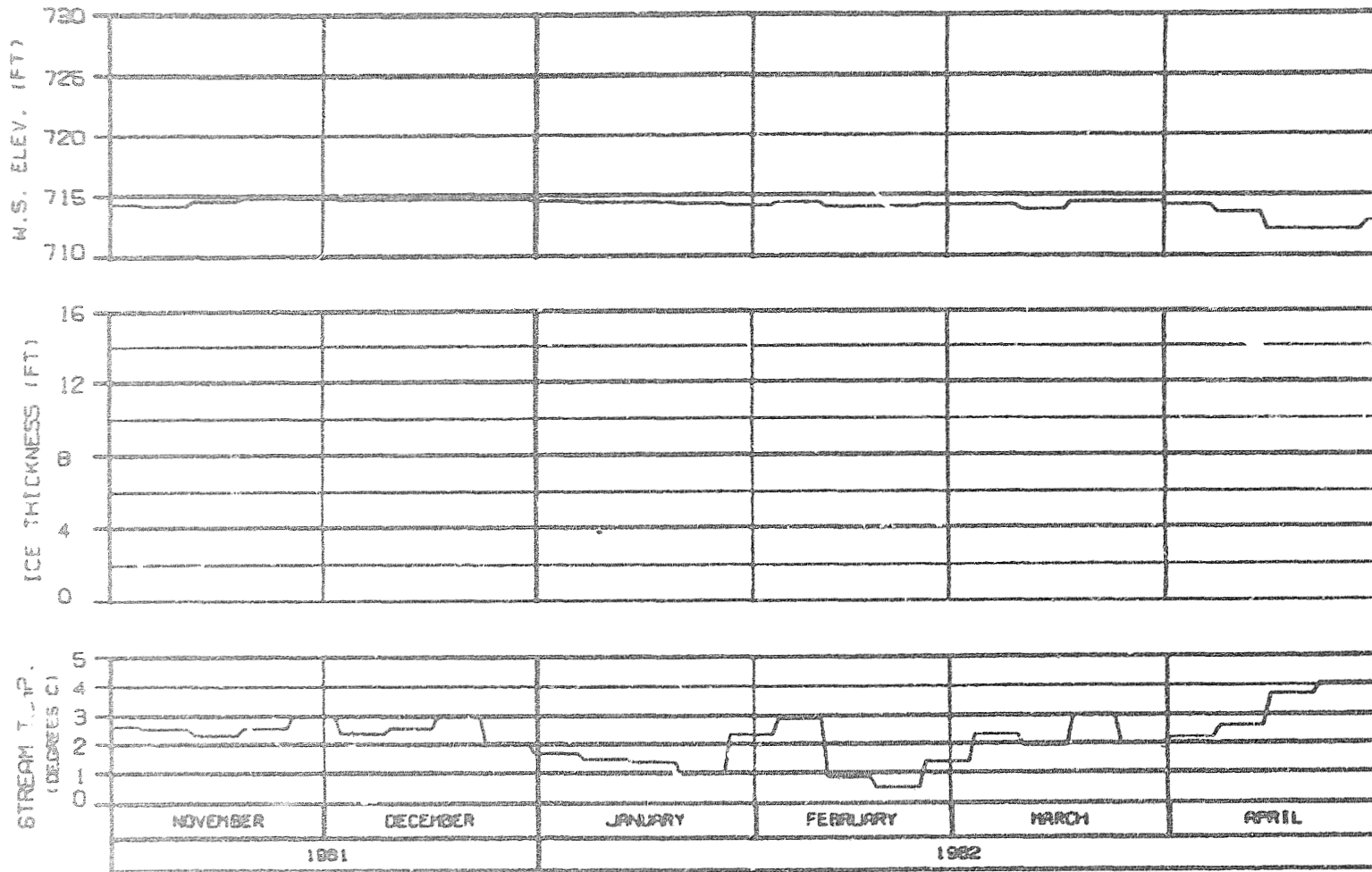


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : B101CLA

ALASKA POWER AUTHORITY		
SUBSTRA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRACD JOINT VENTURE		
ORDER: 01.0010	1981 04	1982.142

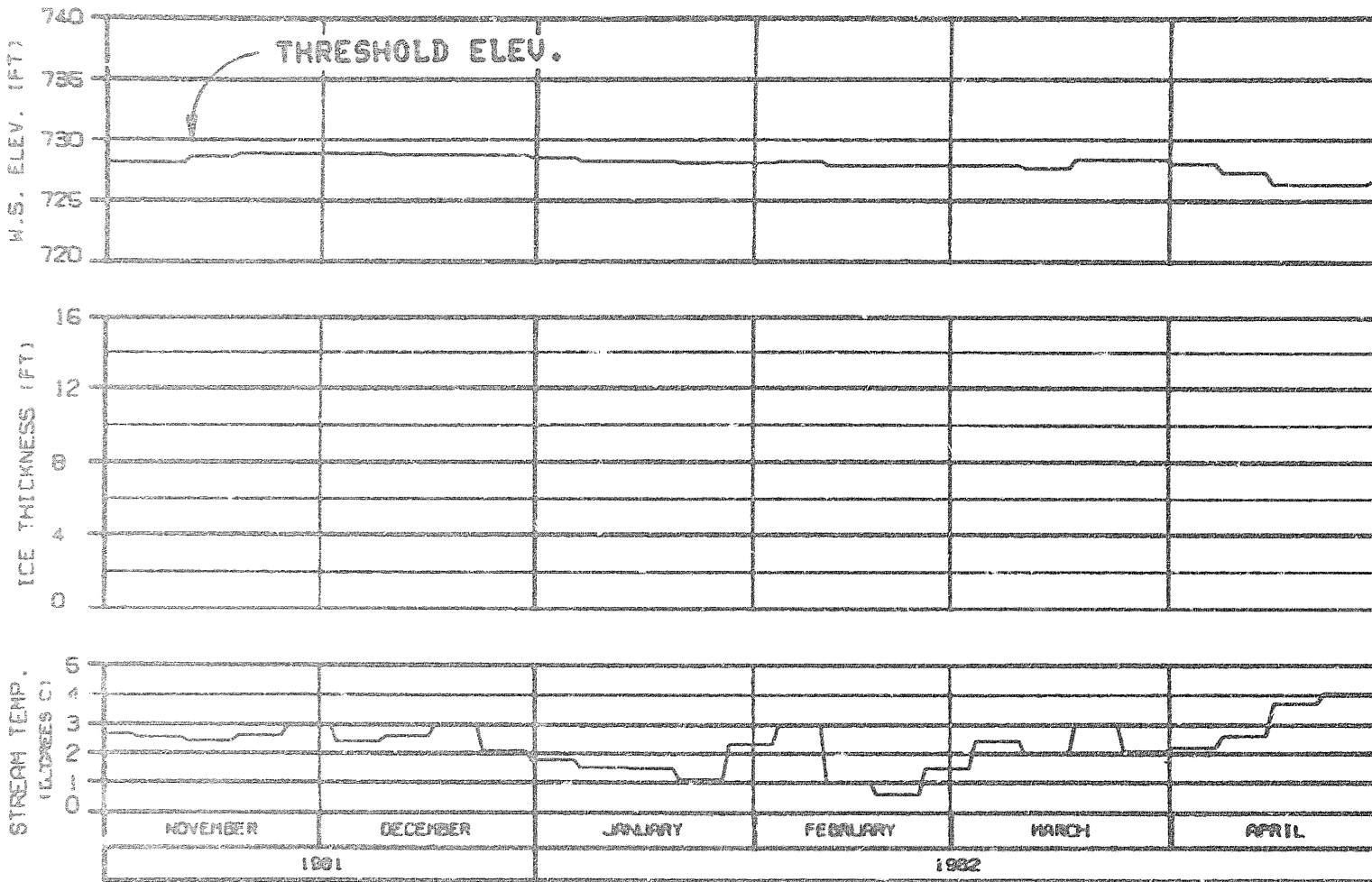


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
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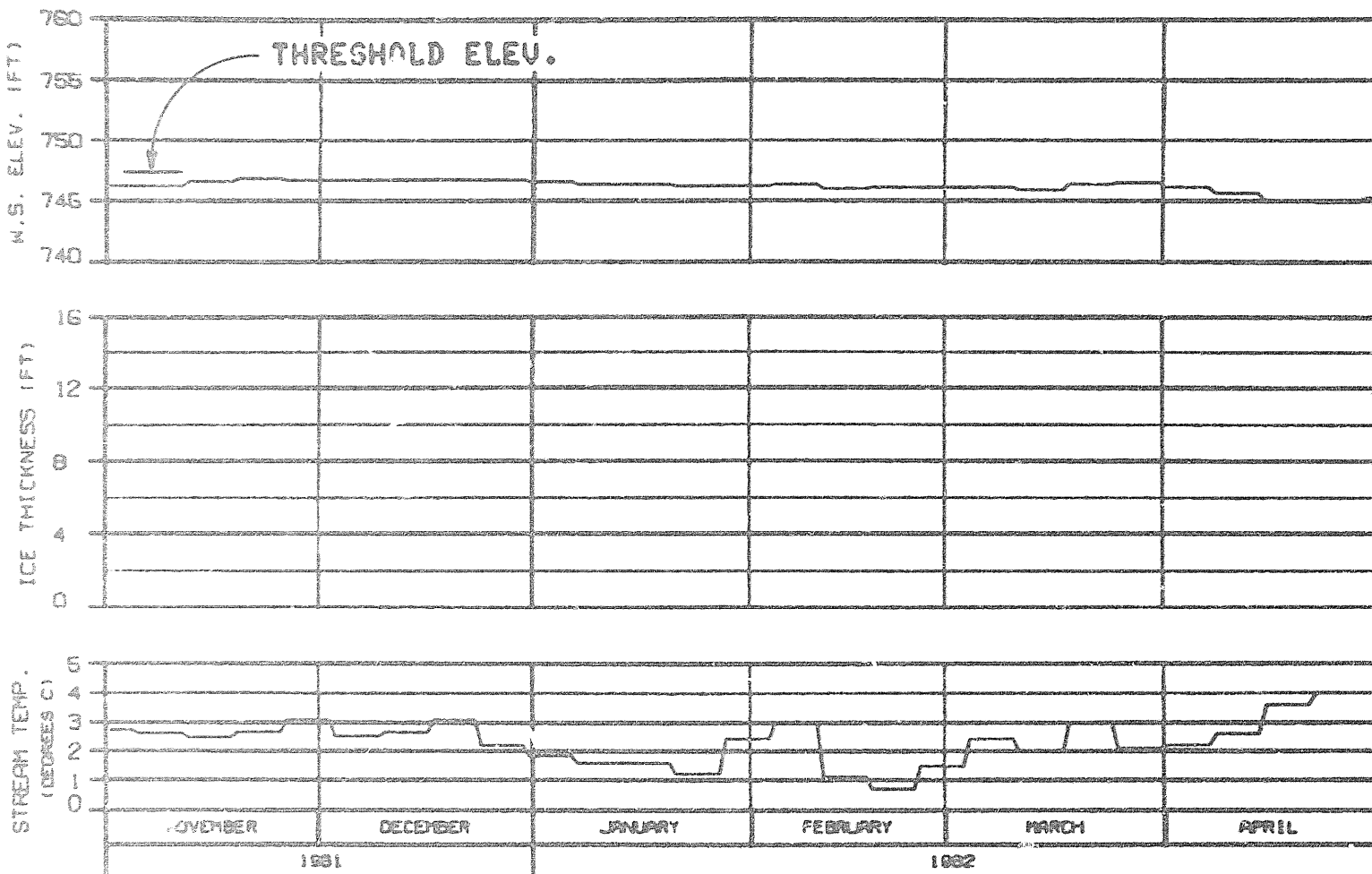


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUBITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGRECO JOINT VENTURE	
DESIGNED - G. L. DAVIS	DRAWN BY - J. W. SMITH
NOV 82 142	

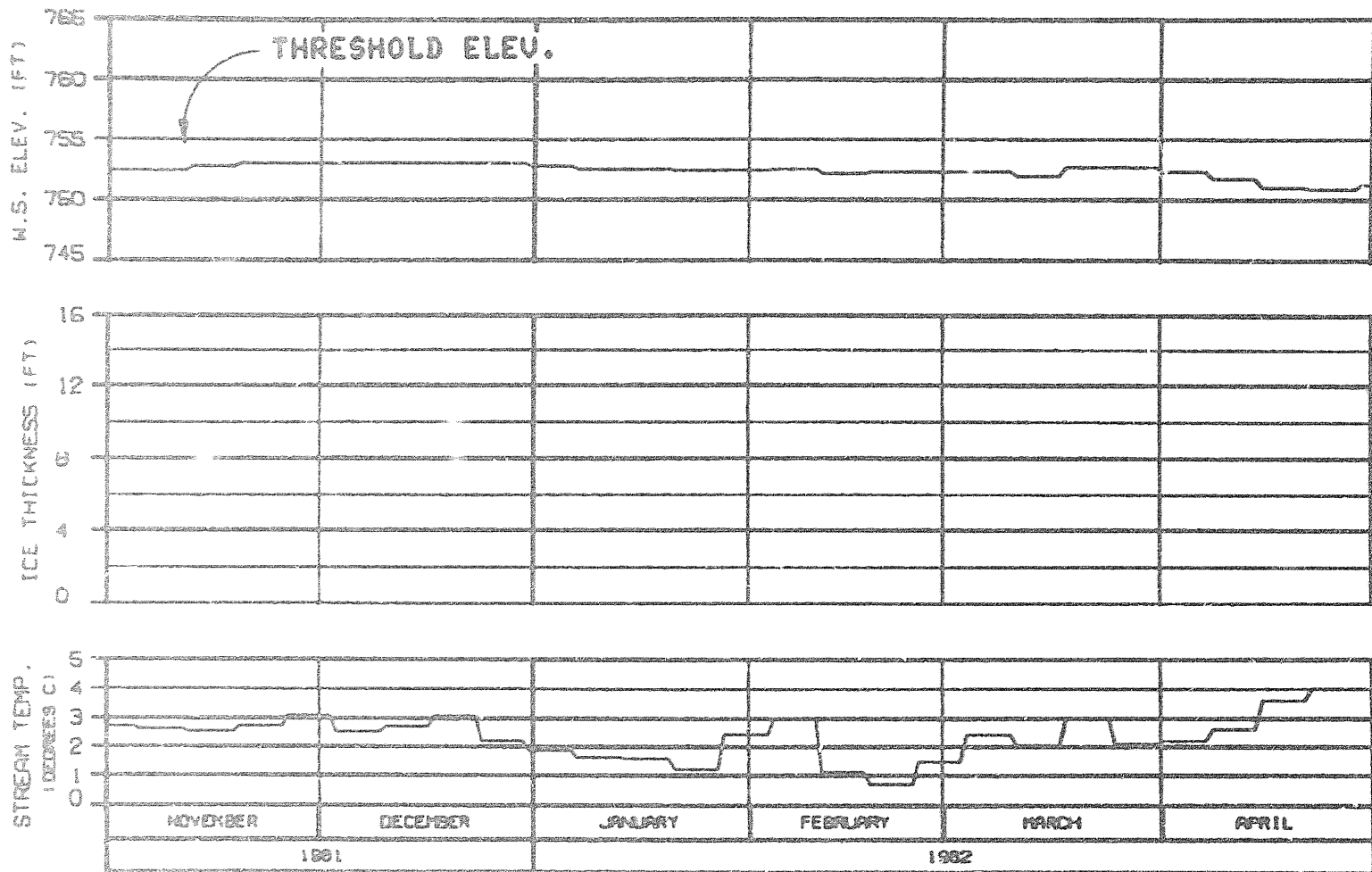


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS : TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
PROJECT: 8101CLA	DATE: 8/82	1000.148



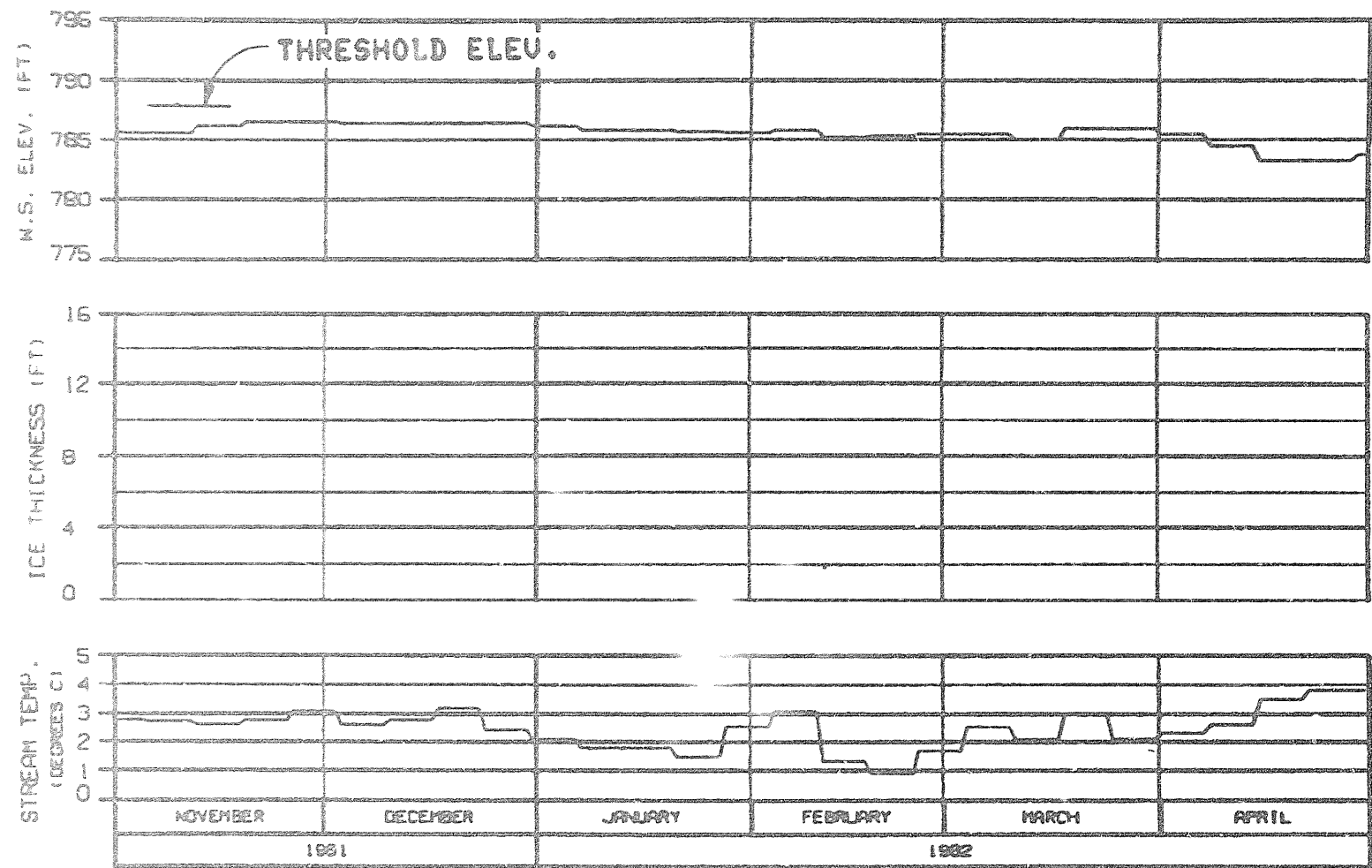
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BULKY COMPONENT

HEAD OF SLOUGH 21
 RIVER MILE : 142.20

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED BY: D.L. BROWN	DATE: 0 MAY 84	PROJECT NO.: 8888.142

C



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

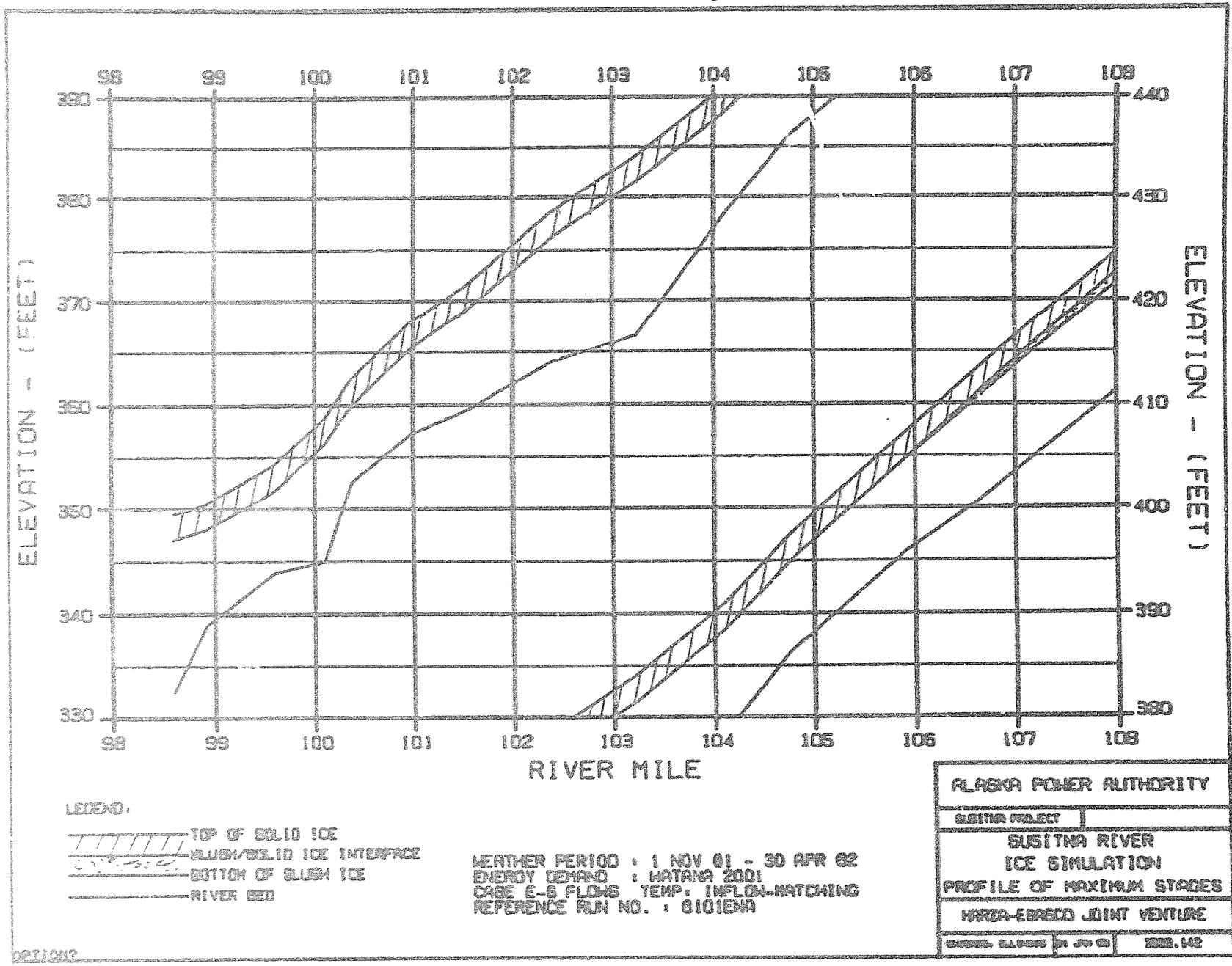
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : LOW LEVEL 4
 REFERENCE RUN NO. : 8101CLA

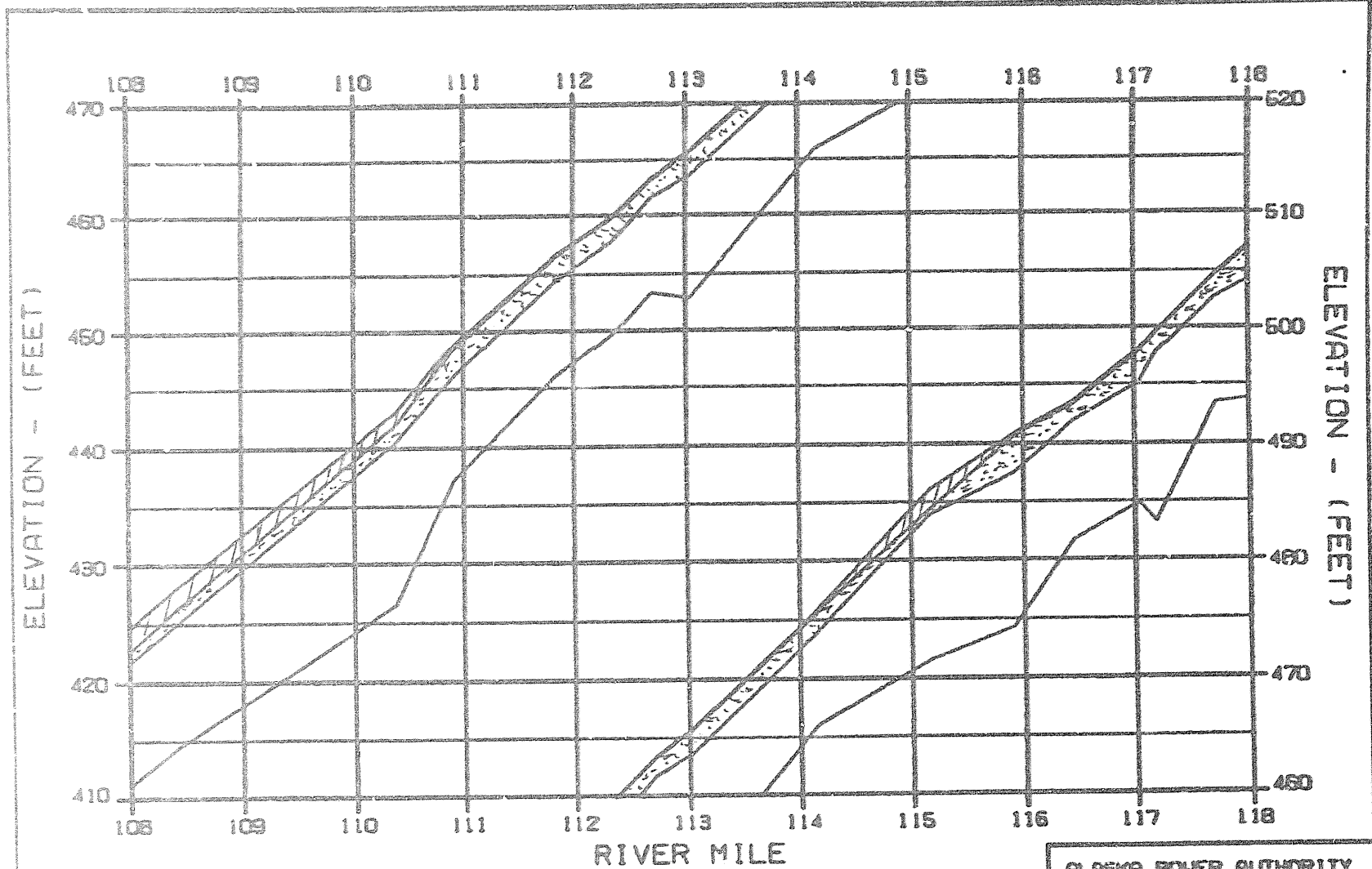
ALASKA POWER AUTHORITY	
SUBTNA PROJECT	
SUSTNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
PROJECT: 81-01-001	0 REV 01
1000.148	

OPTION?

EXHIBIT D



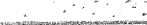



0211012



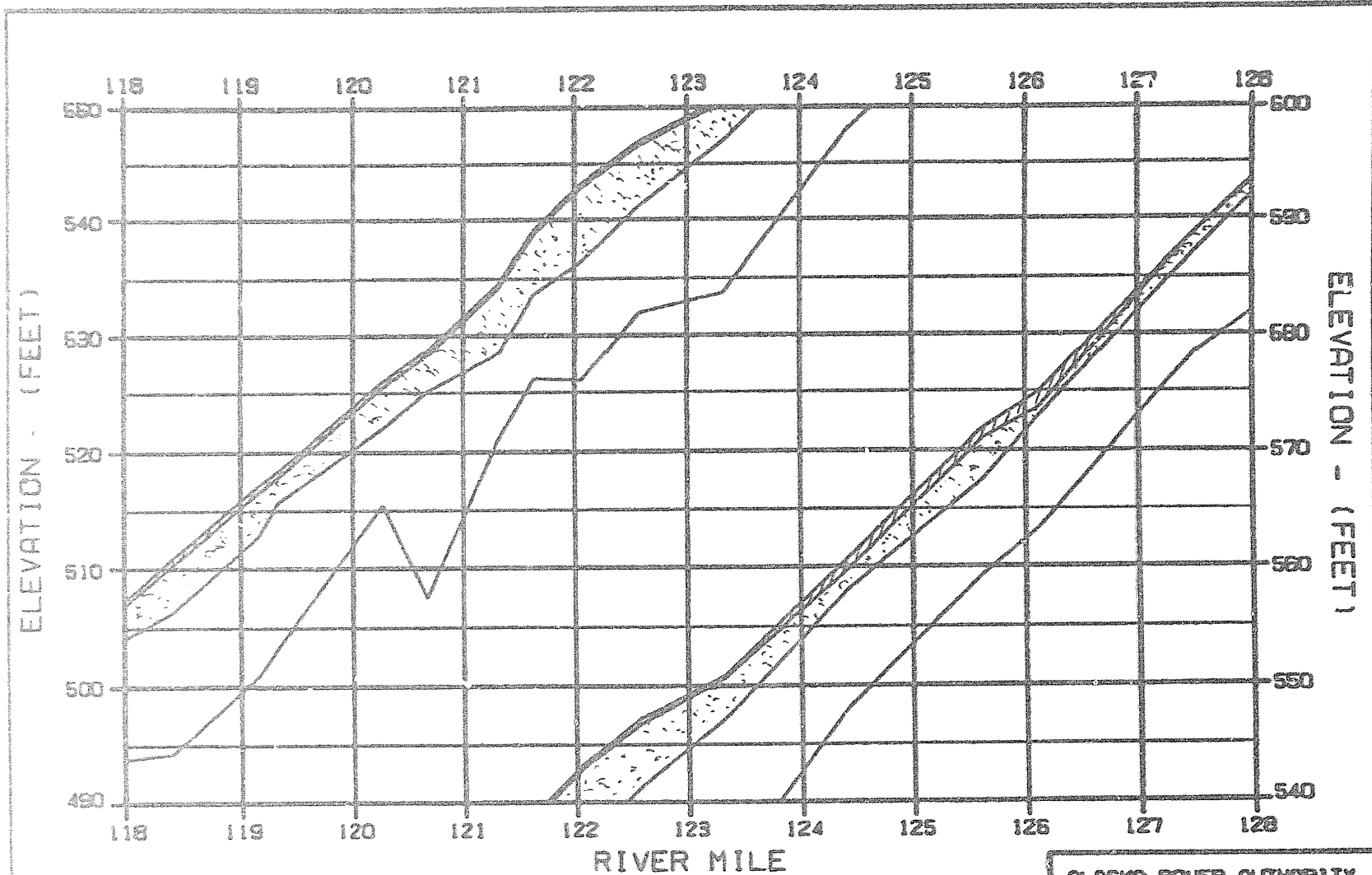
ELEVATION - (FEET)

ELEVATION - (FEET)

- 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 : NATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARDA-EBASCO JOINT VENTURE	
DATE: AUG 82	BY: JWS
NO. 142	

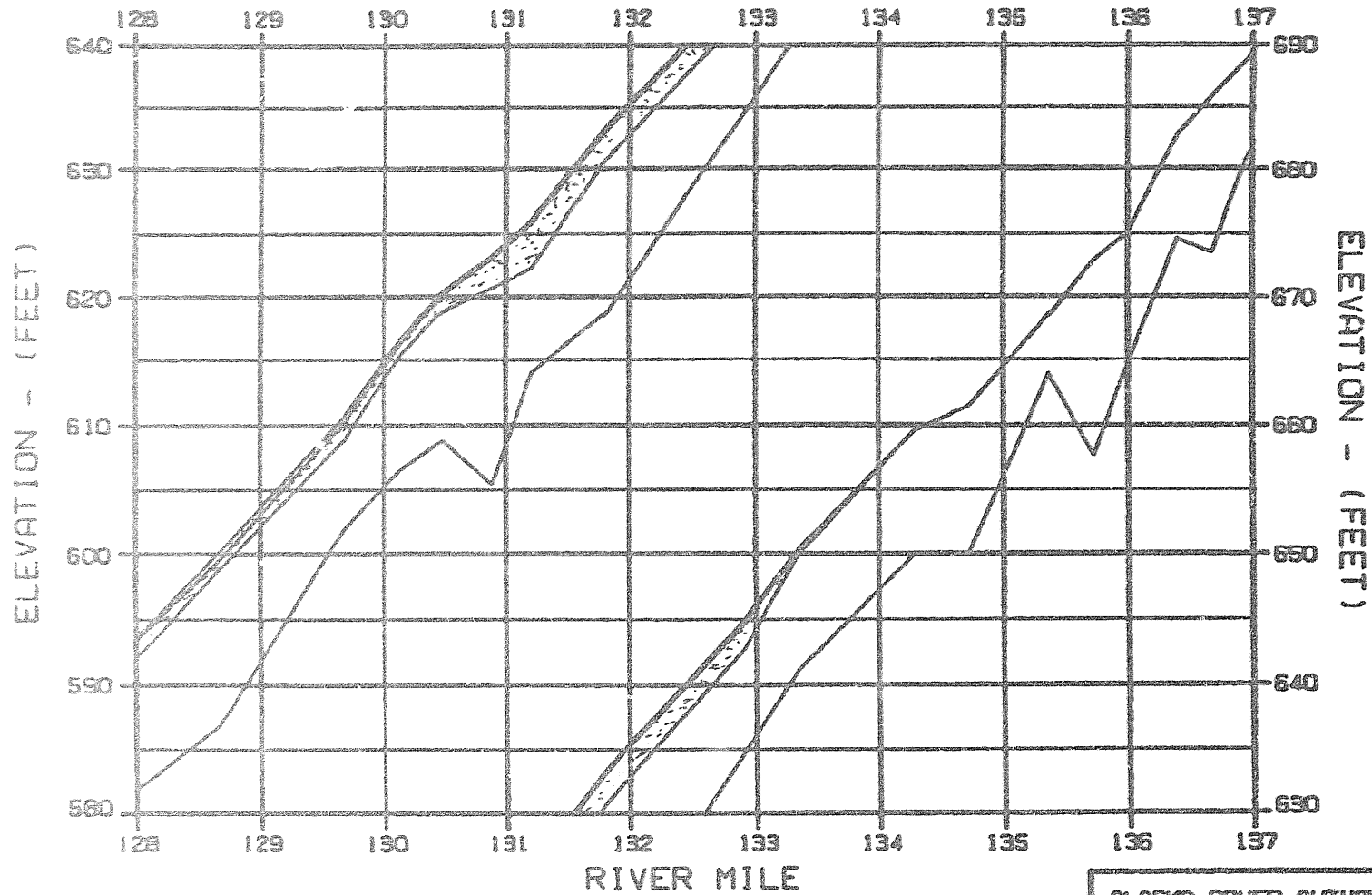


LEADER:
 [Symbol] TOP OF SOLID ICE
 [Symbol] SLUSH/SOLID ICE INTERFACE
 [Symbol] BOTTOM OF SLUSH ICE
 [Symbol] RIVER BED

LEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWG TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 81018NA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HARZA-EDASCO JOINT VENTURE	
DESIGNED: [Symbol]	DATE: 01 JAN 82
DRAWN: [Symbol]	

OPTION 2

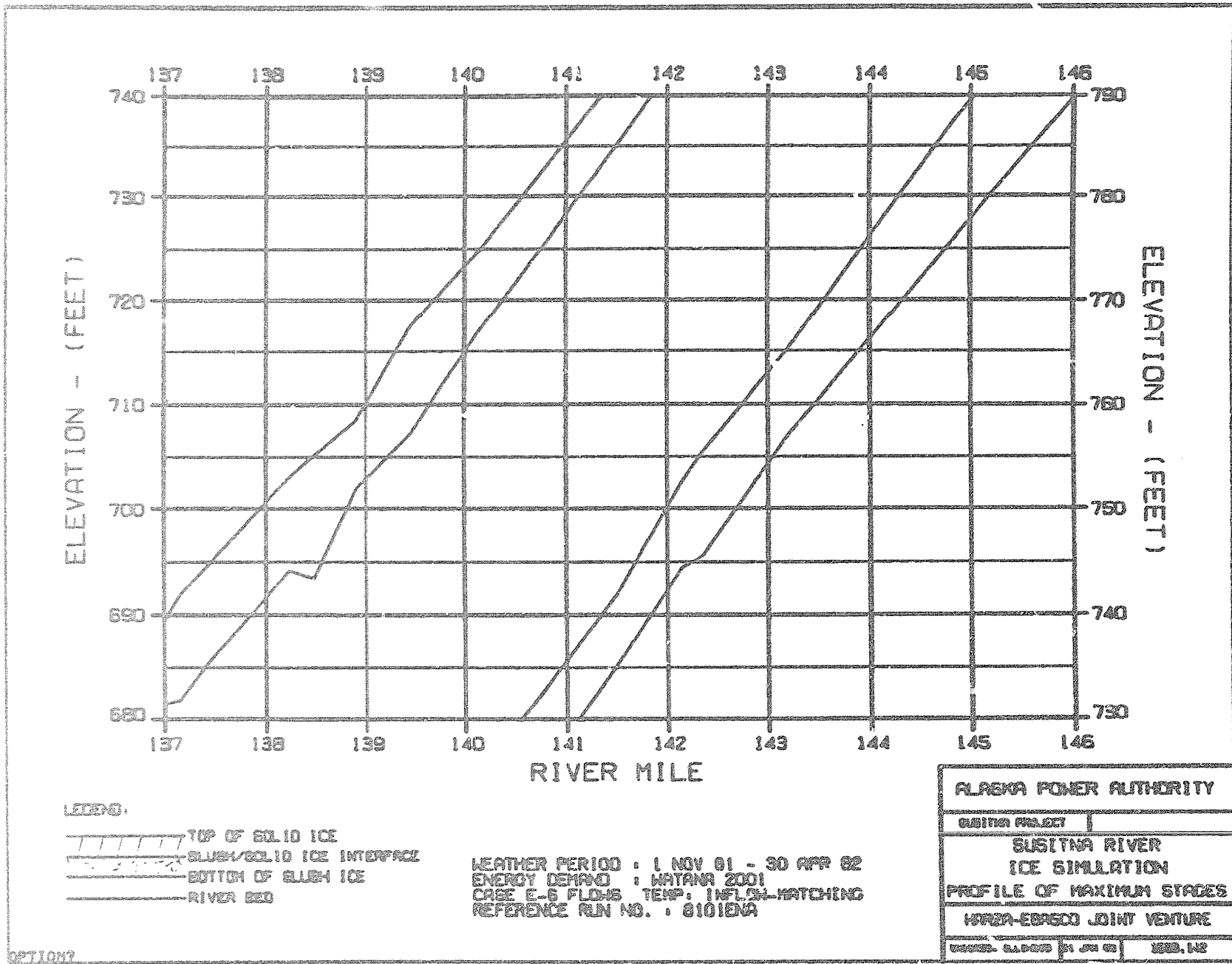


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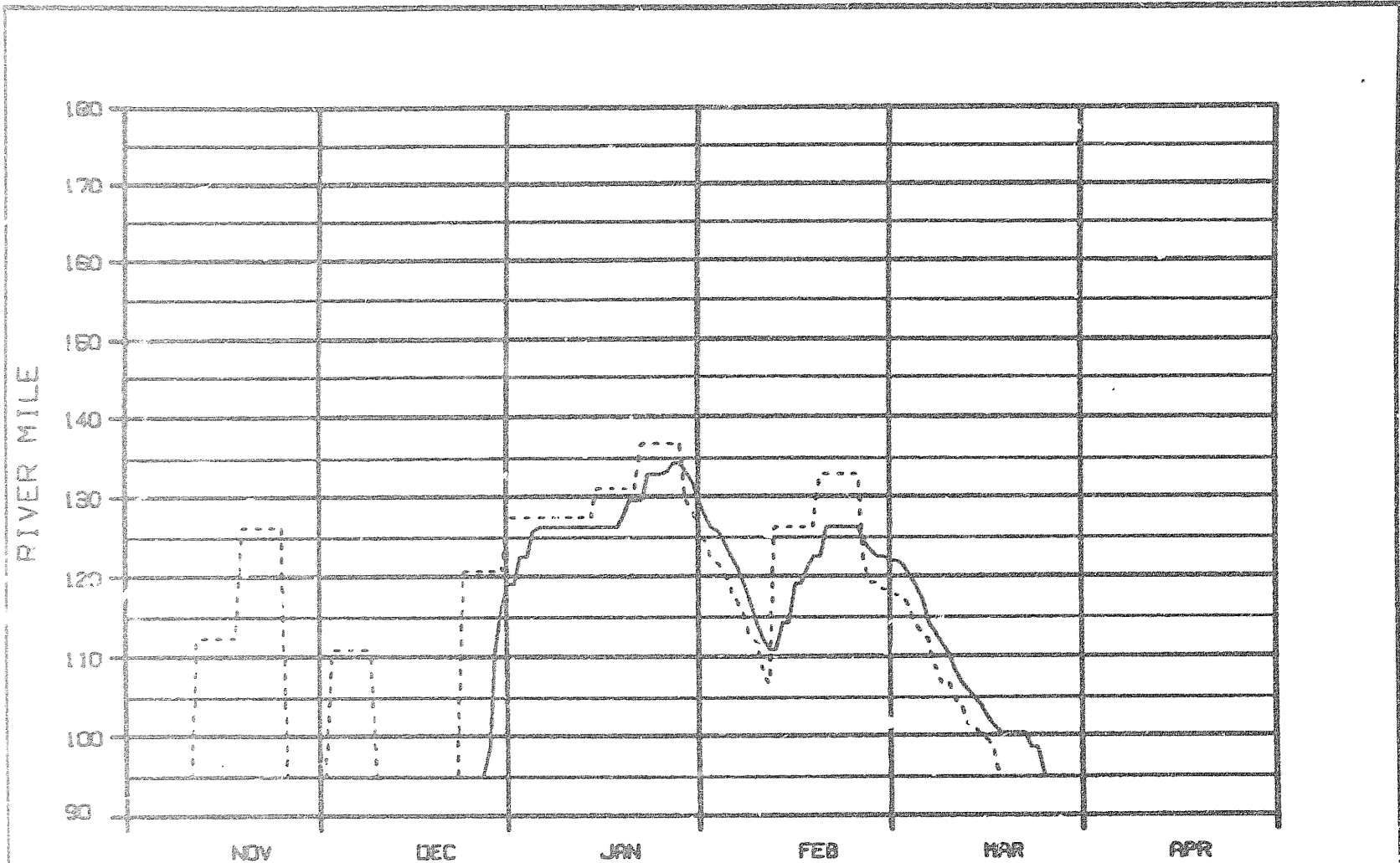
- TOP OF SOLID ICE
- SLUSH/SOLID ICE INTERFACE
- BOTTOM OF SLUSH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARSA-EDRACO JOINT VENTURE	
DESIGN CLASS	21 JUN 82
1000.142	



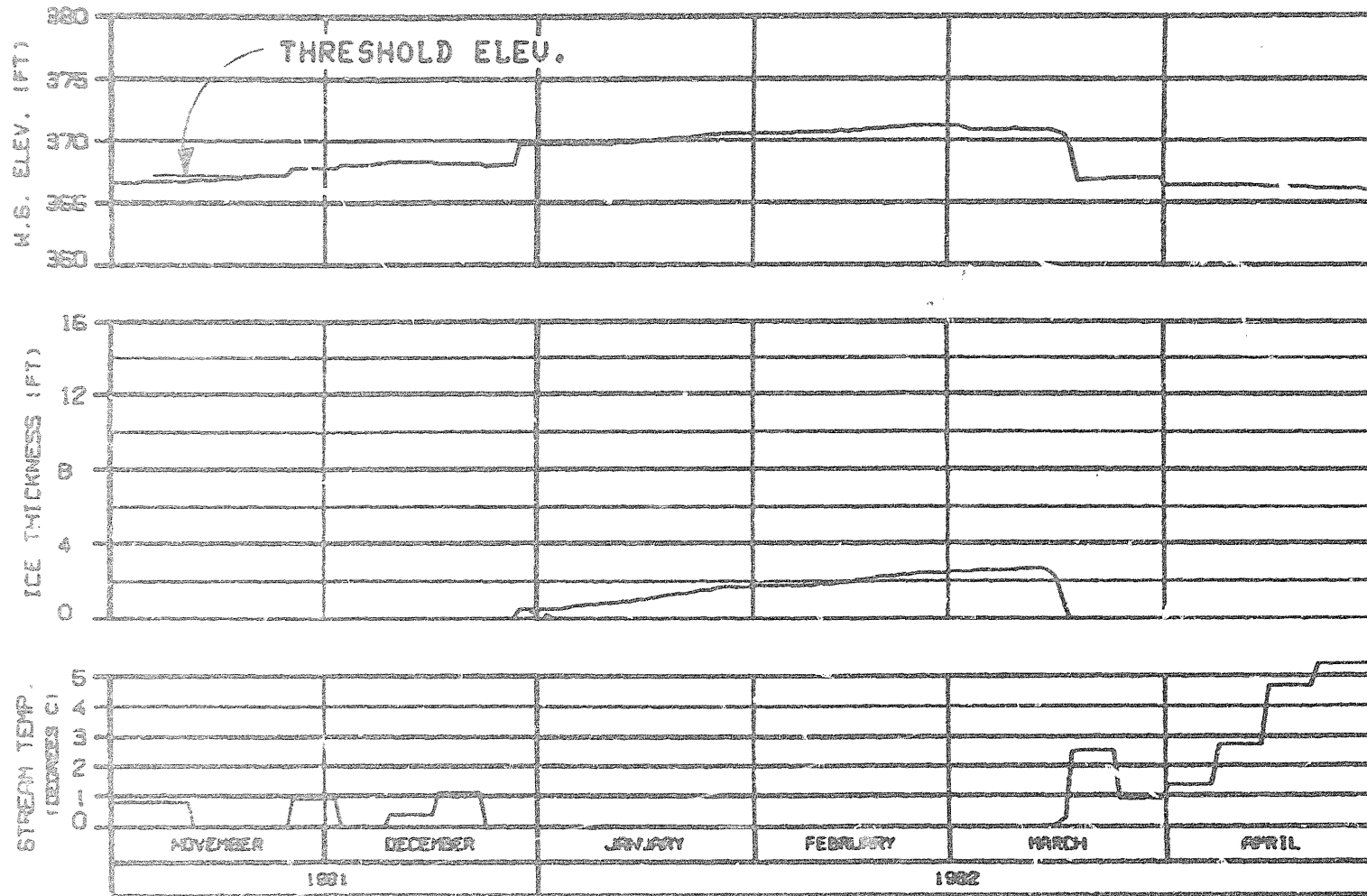
OPTION?



LEGEND:
 — ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 200J
 FLOW CASE E-5 TEMP: INFLOW MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
& ZERO DEGREE ISOTHERM		
WARZA-ERESCO JOINT VENTURE		
DESIGNED: ALBERTS	21 JAN 82	1000.148



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-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

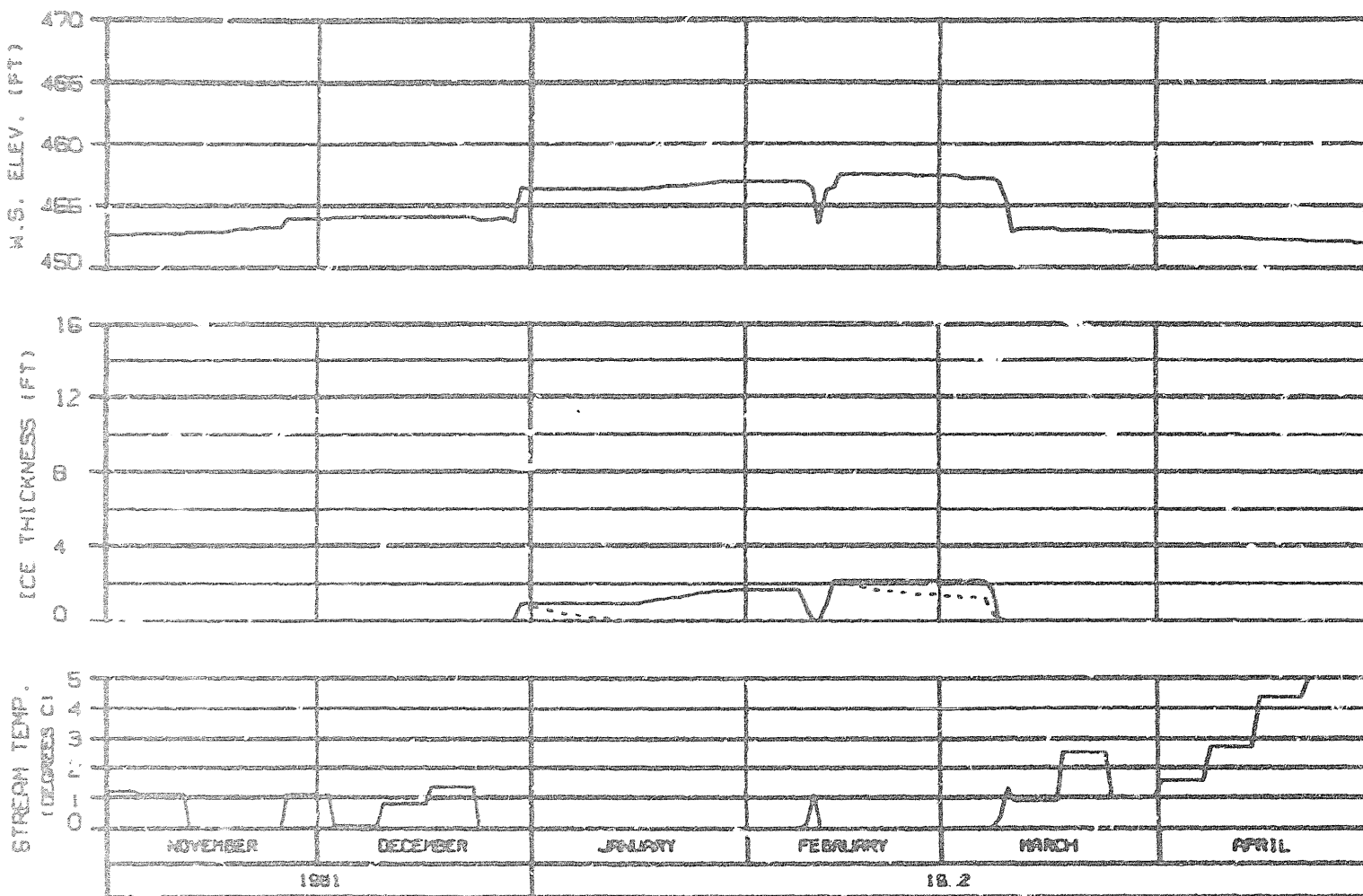
ALASKA POWER AUTHORITY

SUSTINA PROJECT

SUSTINA RIVER
 ICE SIMULATION
 TIME HISTORY

WATANA-FORECO JOINT VENTURE

DATE: 01 JUN 82 09:14Z

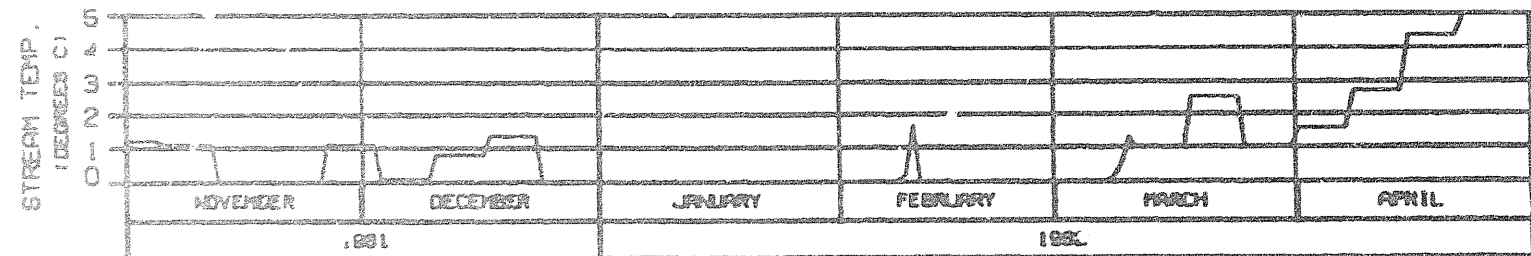
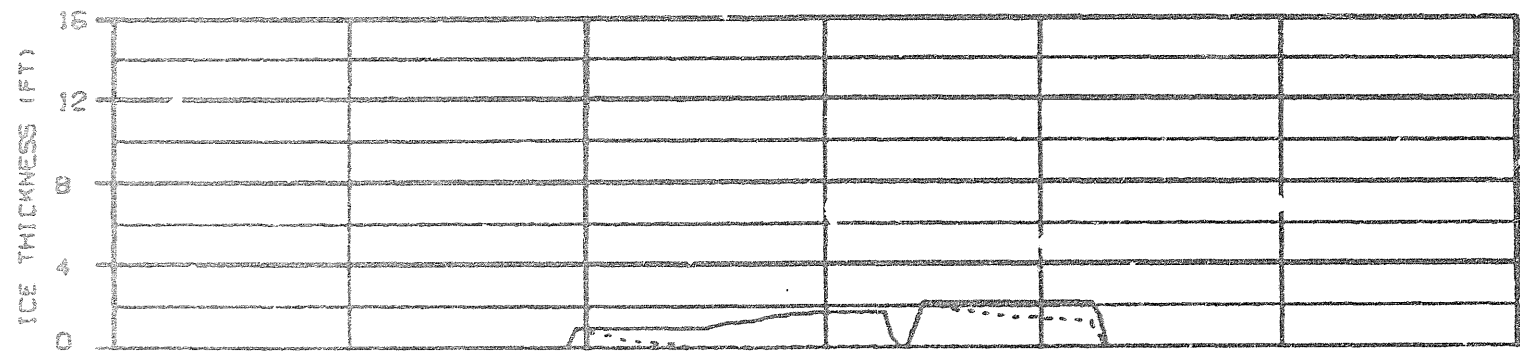
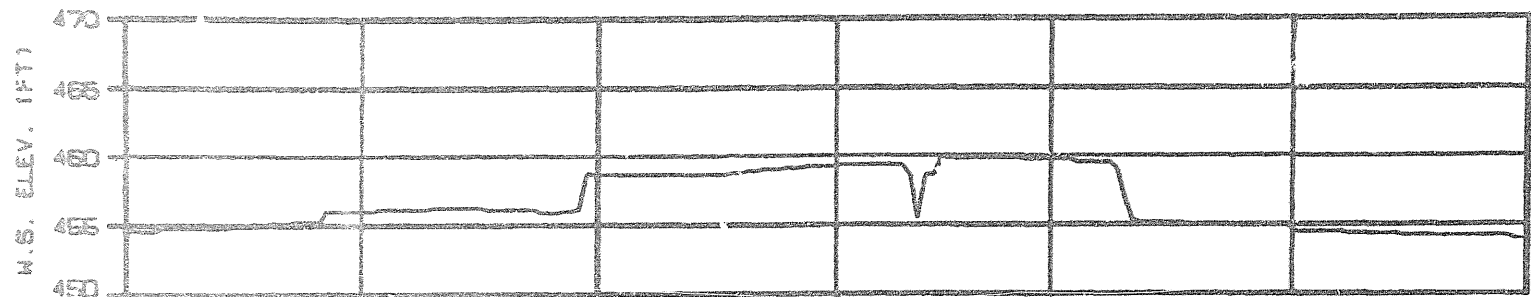


SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 12.00

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP. INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBERD JOINT VENTURE	
CHART: ALP-82-11-03	ISS: 142

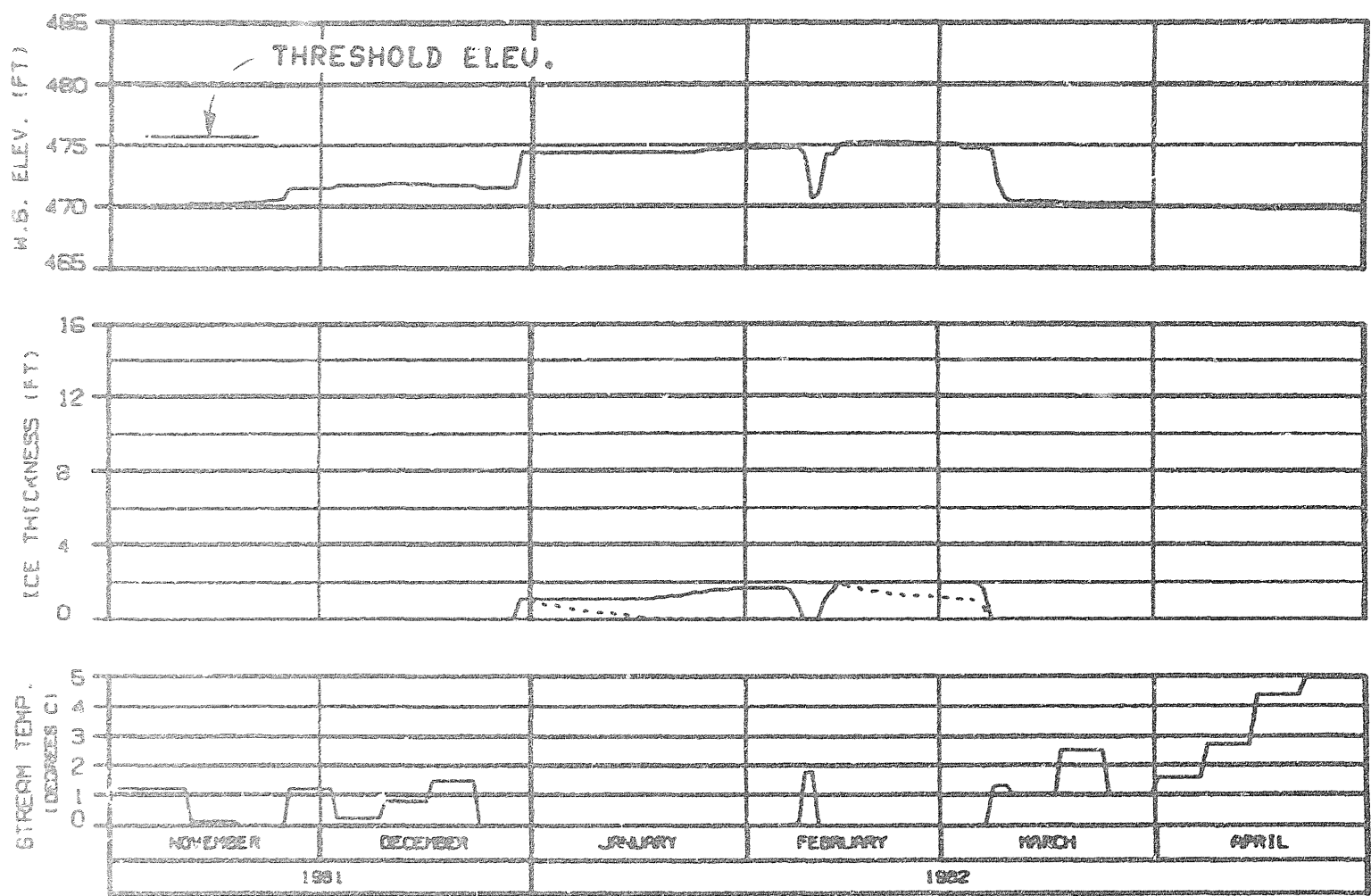


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEA. PER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP. INFLOW-MATCHING
 REFERENCE RUN NO. : 6101EN4

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARSA-EDASCO JOINT VENTURE	
DESIGN. DRAWING: 111 JAN 82	2222.142

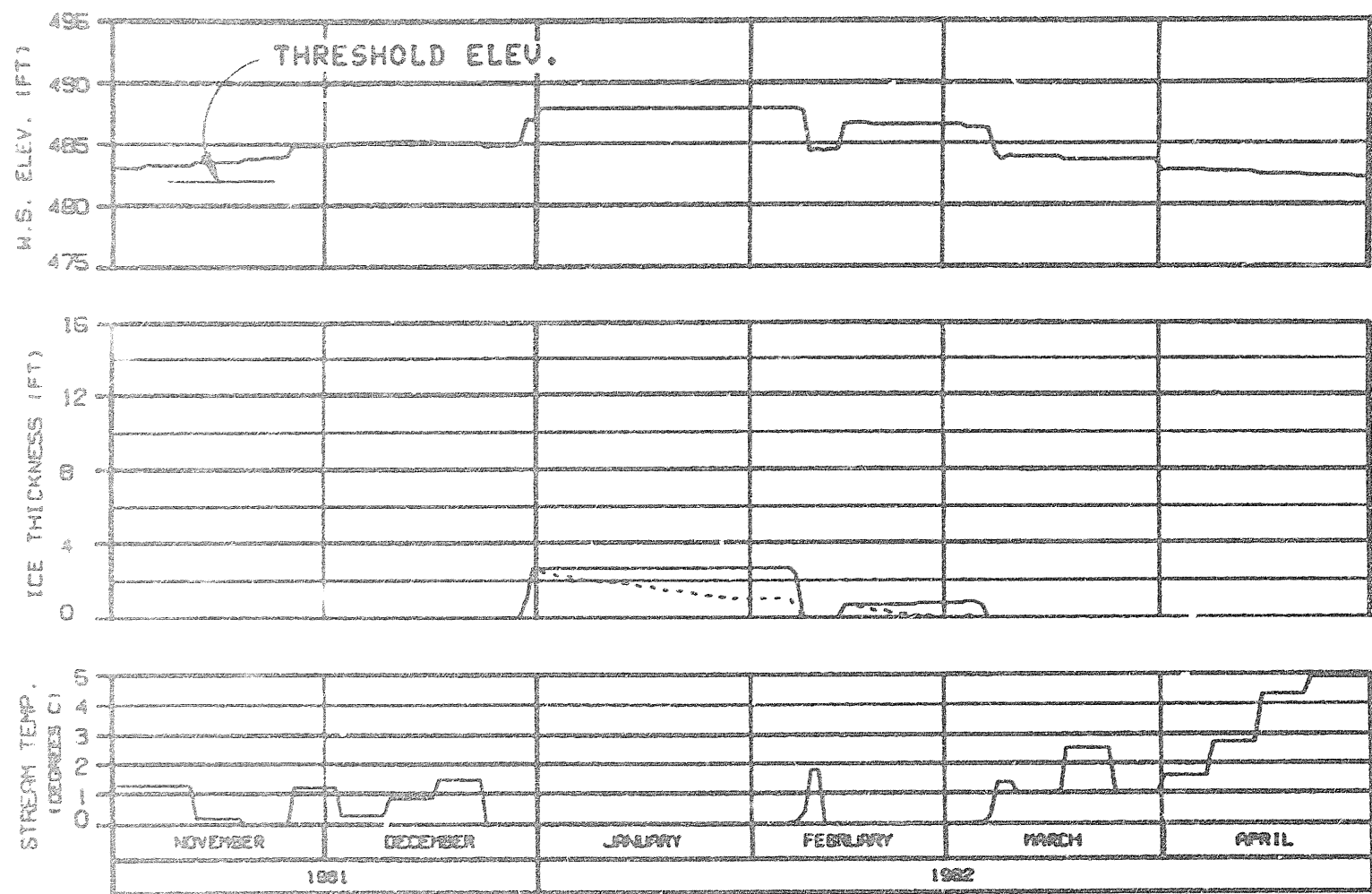


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : BIOLINA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
ISSUED: ALASKA	21 JAN 82	ISSN: 142

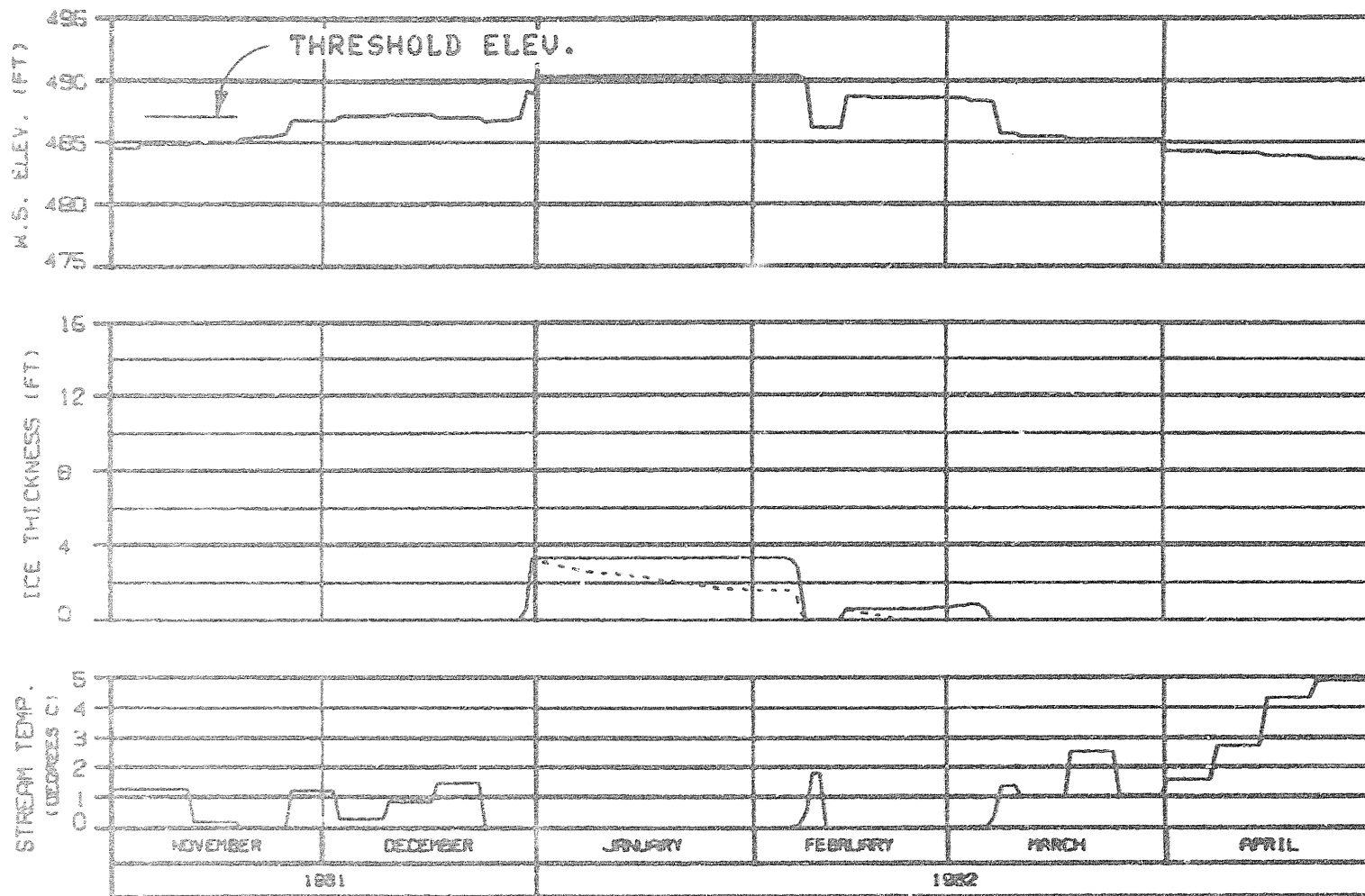


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : SIDENA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HYDRA-EBASCO JOINT VENTURE		
DESIGNER: ALP/MS	BY: JAW	NOV. 1982

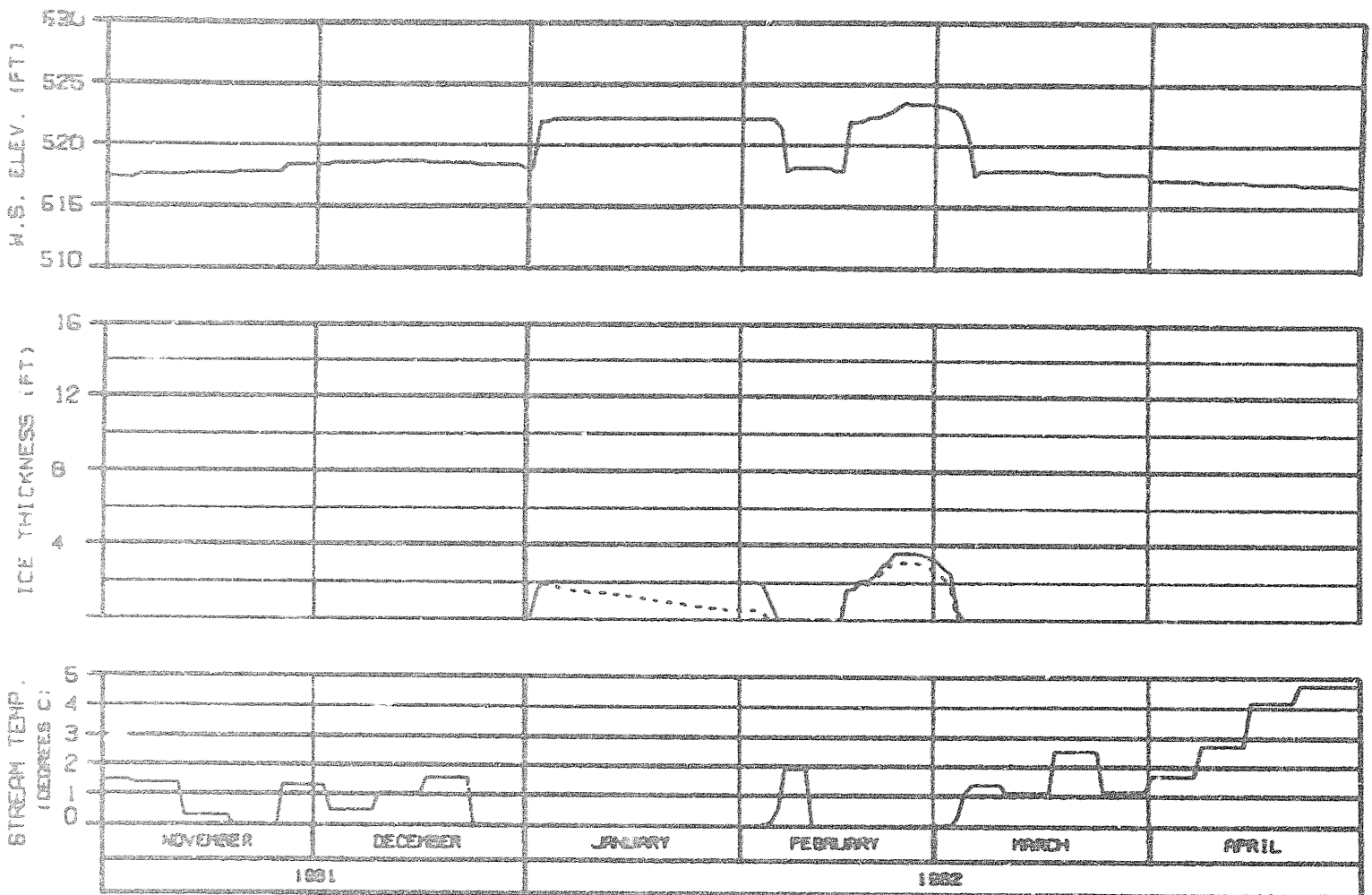


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : BIDIENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
NSR2A-EBR600 JOINT VENTURE	
STARTED: 01/08/82	BY: JPM/SL
	0002.142

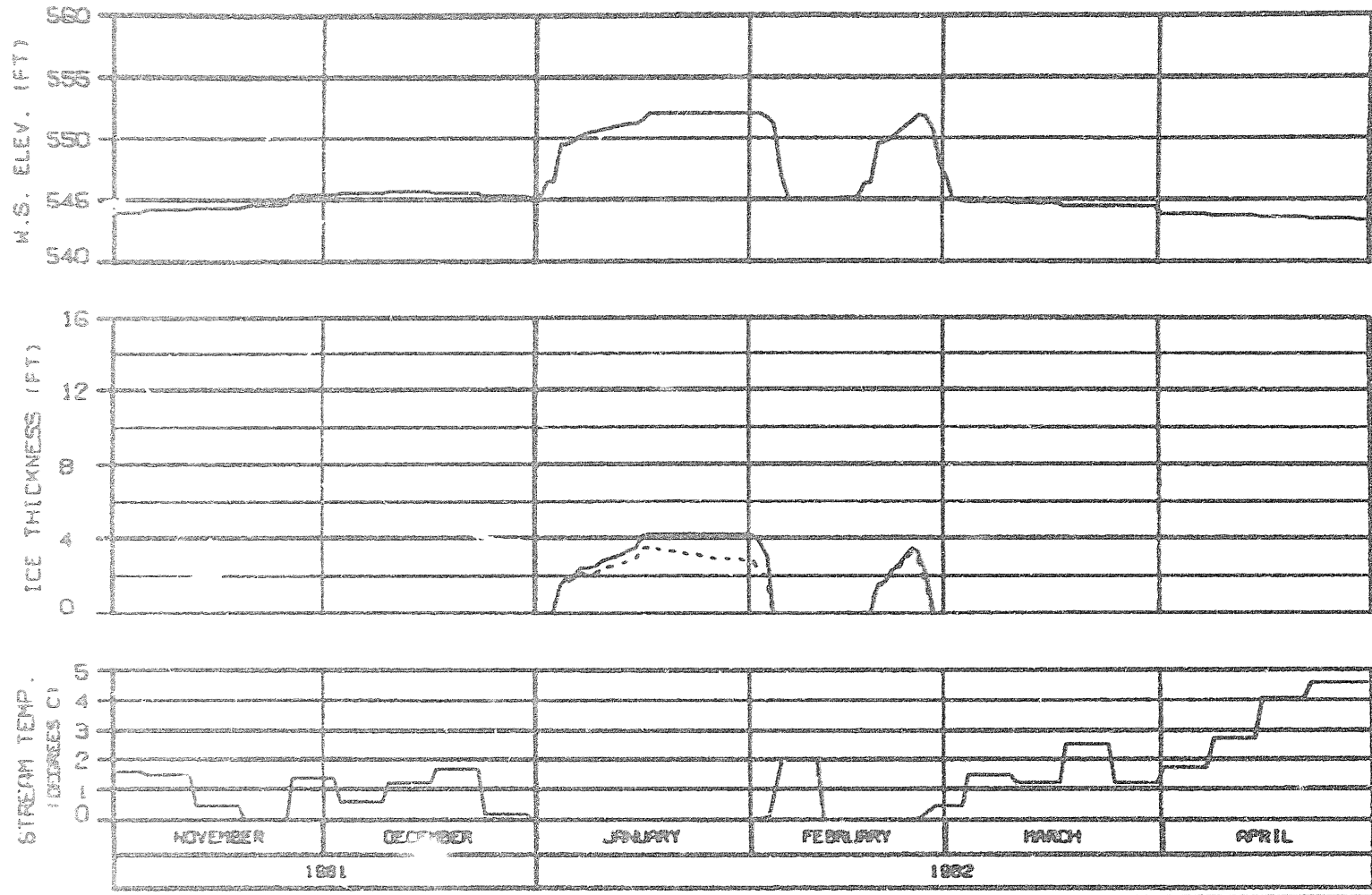


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-S FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : B101ENA

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
APRZA-EBRACO JOINT VENTURE		
CREATED: 03/08/92	BY: JCH/ES	DSW/142

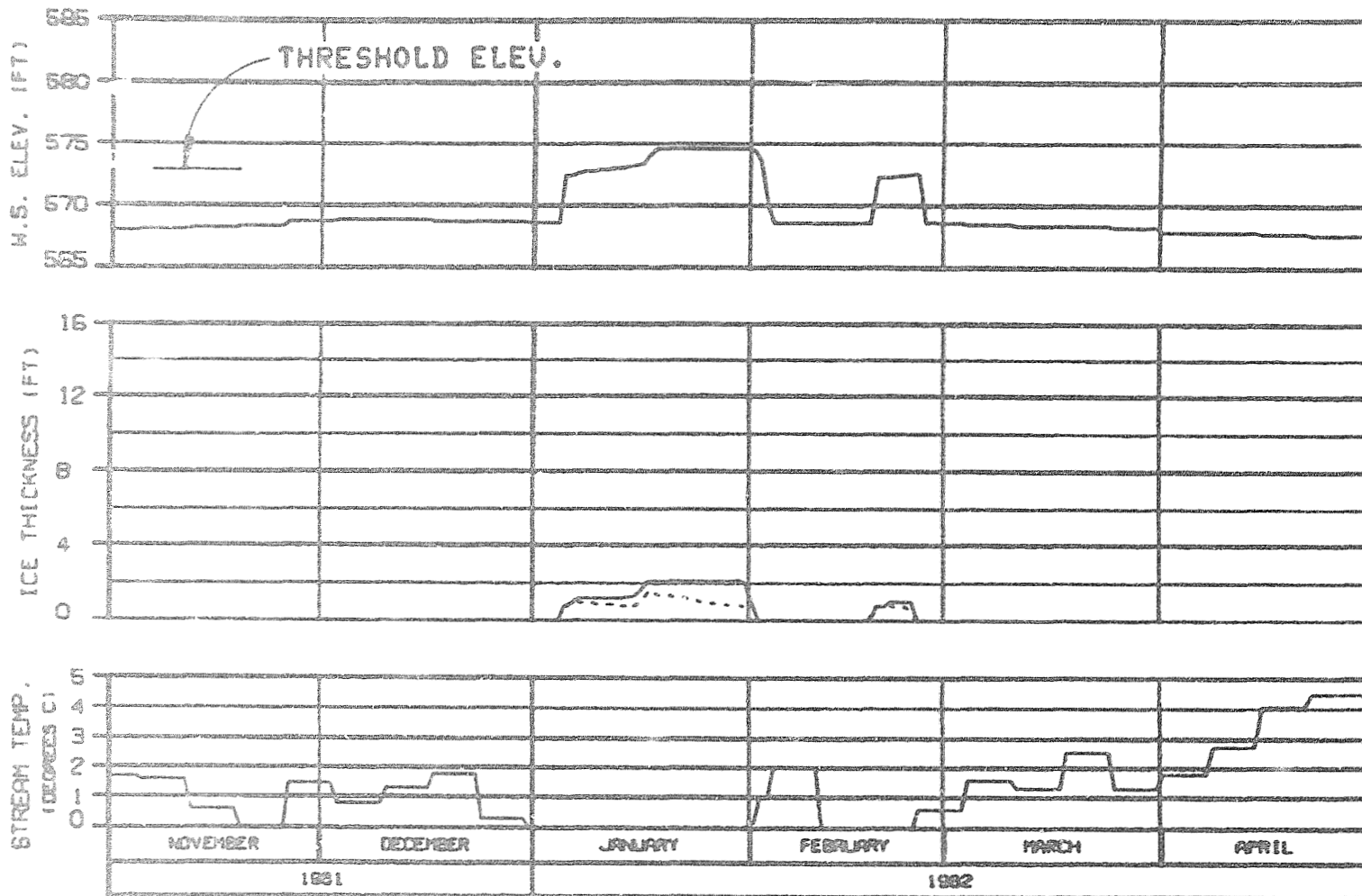


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : HATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : BIOLENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ISSUED: 02.06.92	BY: JH/CS
PAGE: 142	

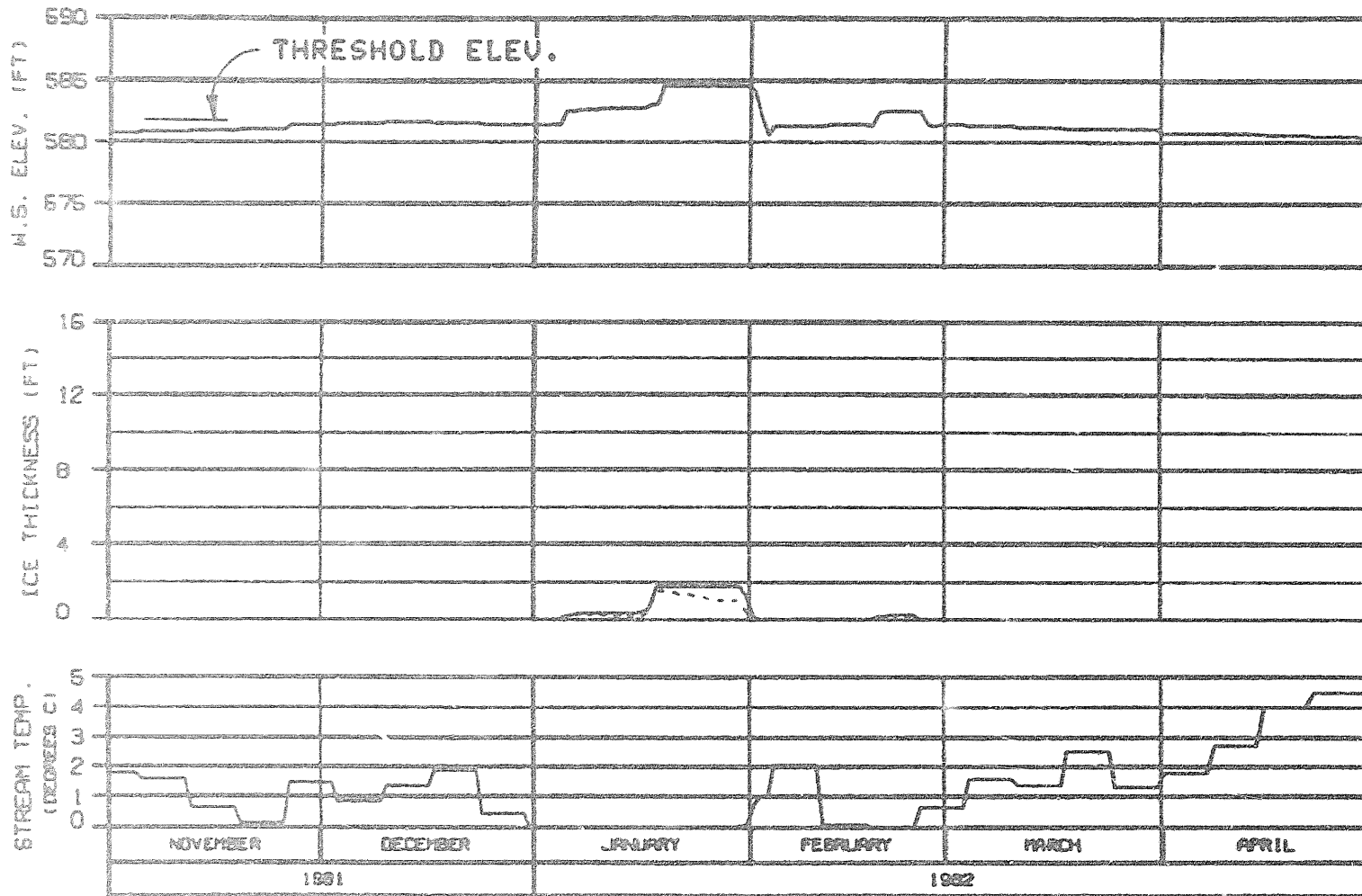


HEAD OF SLOUGH 8A (WEST)
RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARD-EBASCO JOINT VENTURE		
COVER: ALP018	PI JAN 82	1000.142

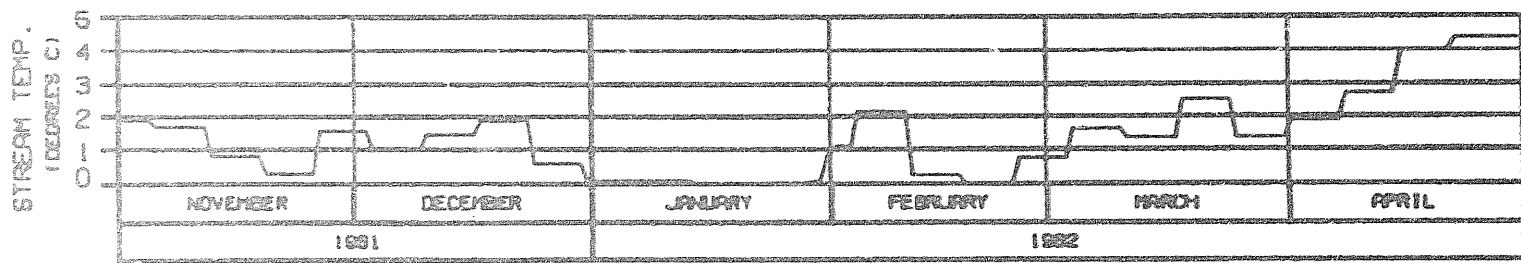
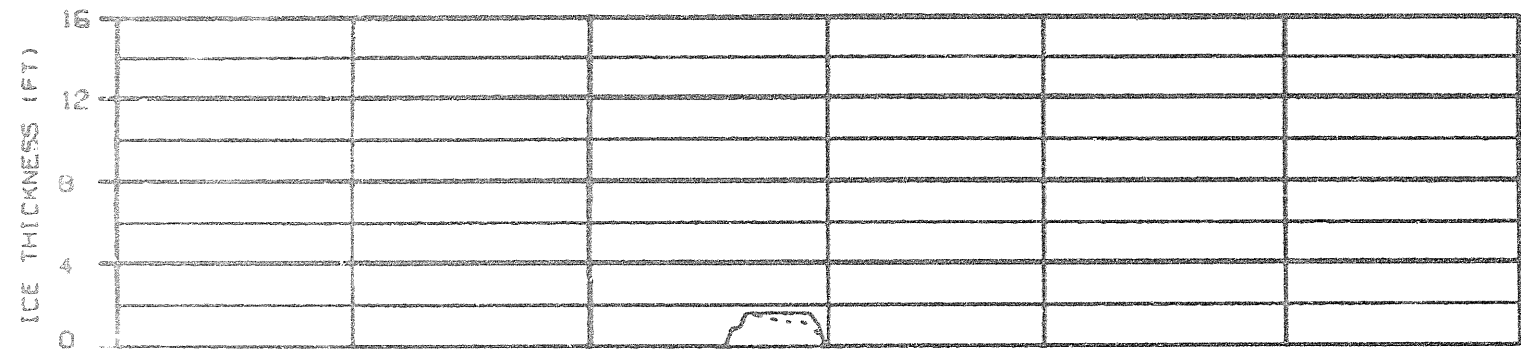
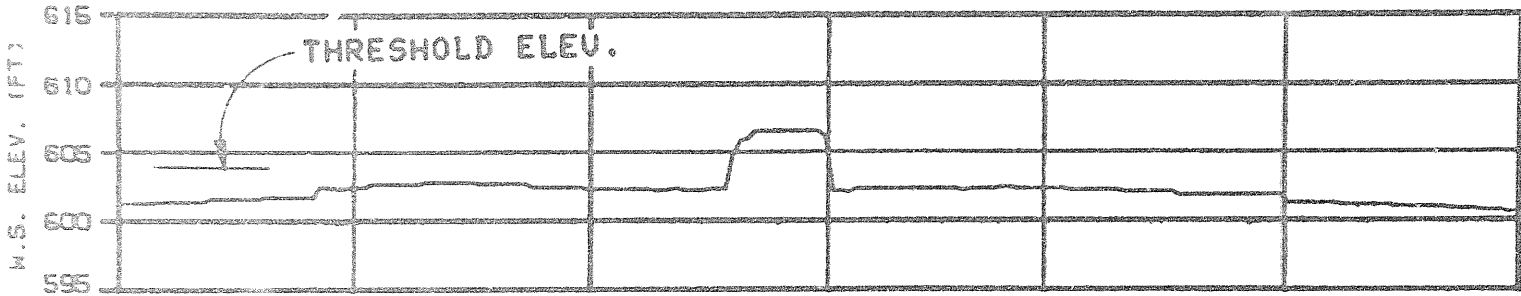


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENR

ALASKA POWER AUTHORITY	
SLISTNA PROJECT	
SLISTNA RIVER ICE SIMULATION TIME HISTORY	
HORZA-EBASCO JOINT VENTURE	
DATE: 01/21/82	0001.142



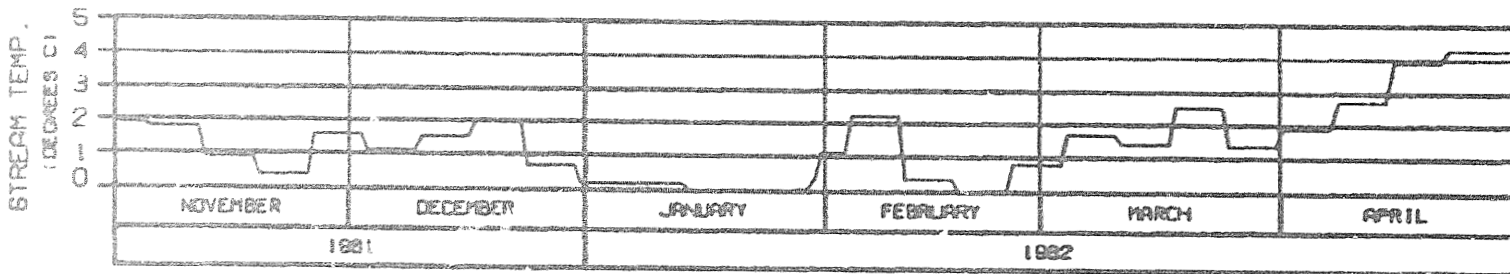
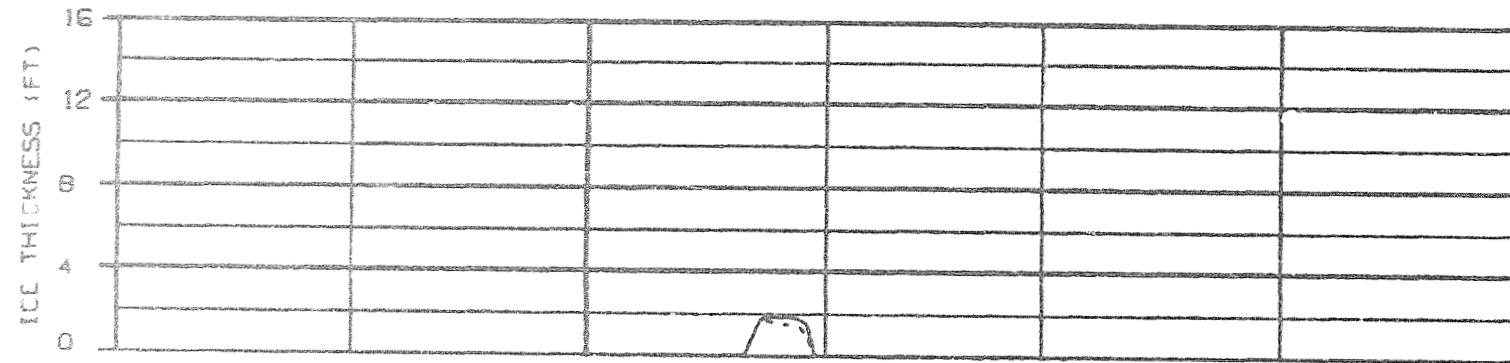
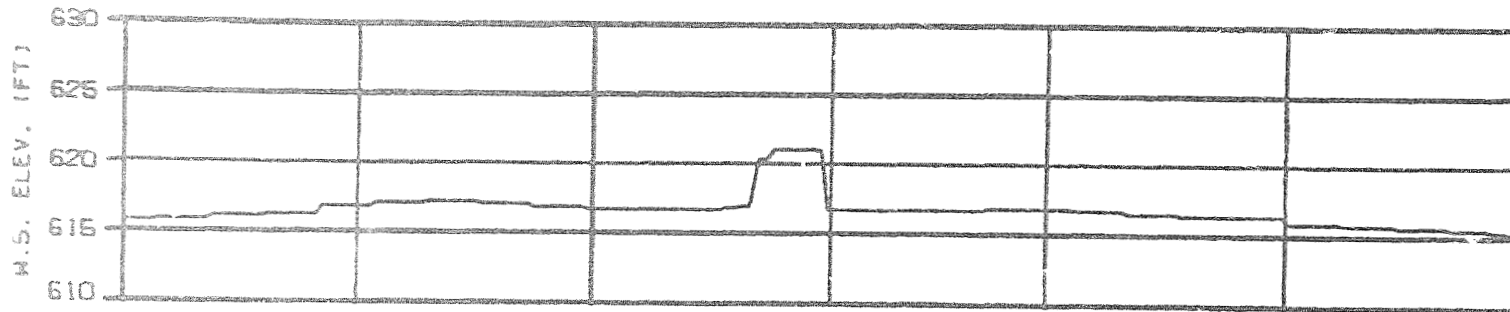
HEAD OF SLOUGH 9
 RIVER MILE : 129.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGNED - ILLUMIN	BY JON 82
1982, 142	

OPTION 7



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-6 FLOWS TEMP; INFLOW-MATCHING
 REFERENCE RUN NO. : BIDIENA

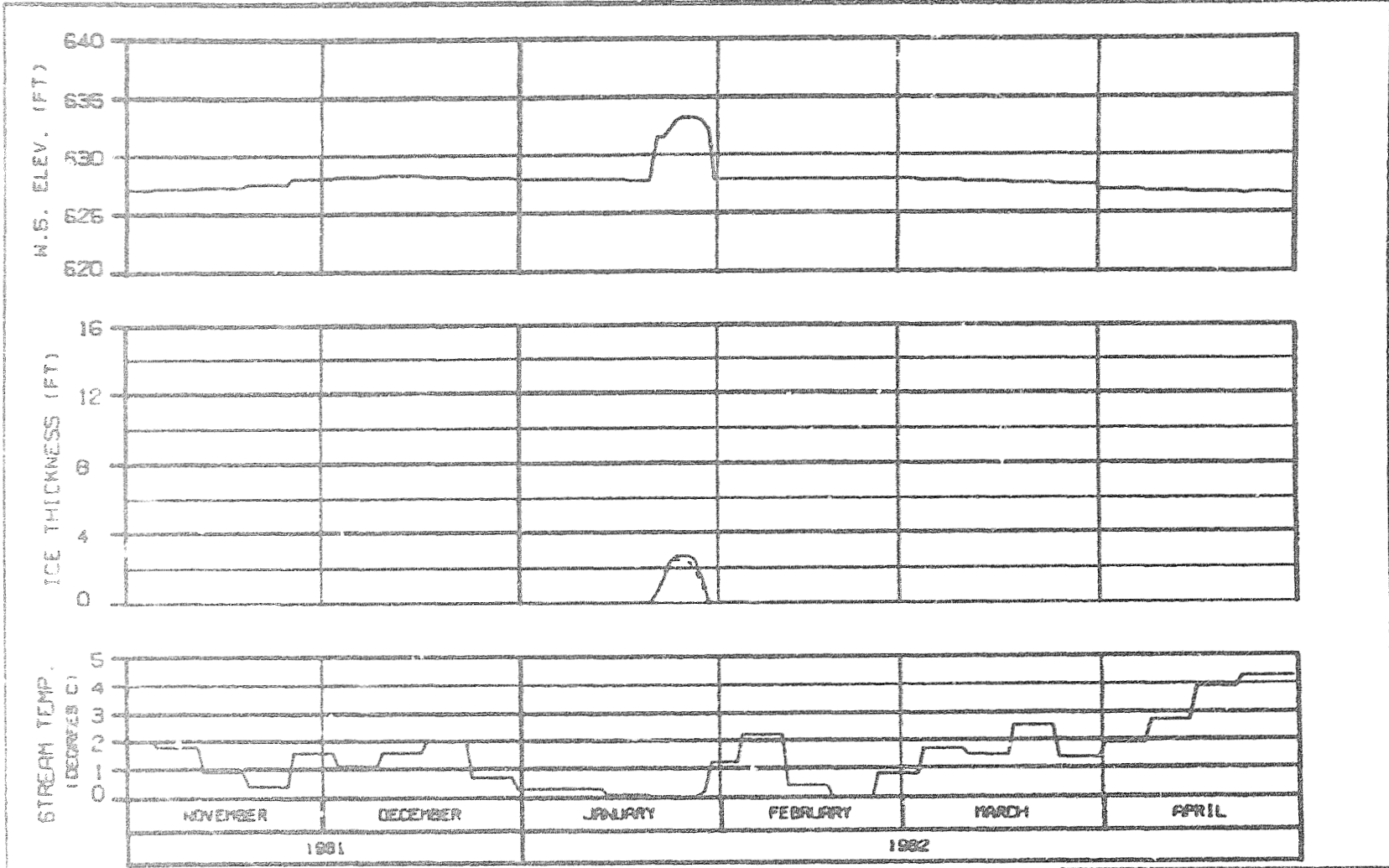
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HARZA-EBASCO JOINT VENTURE

CHANGES: 00 JAN 82 1000.142

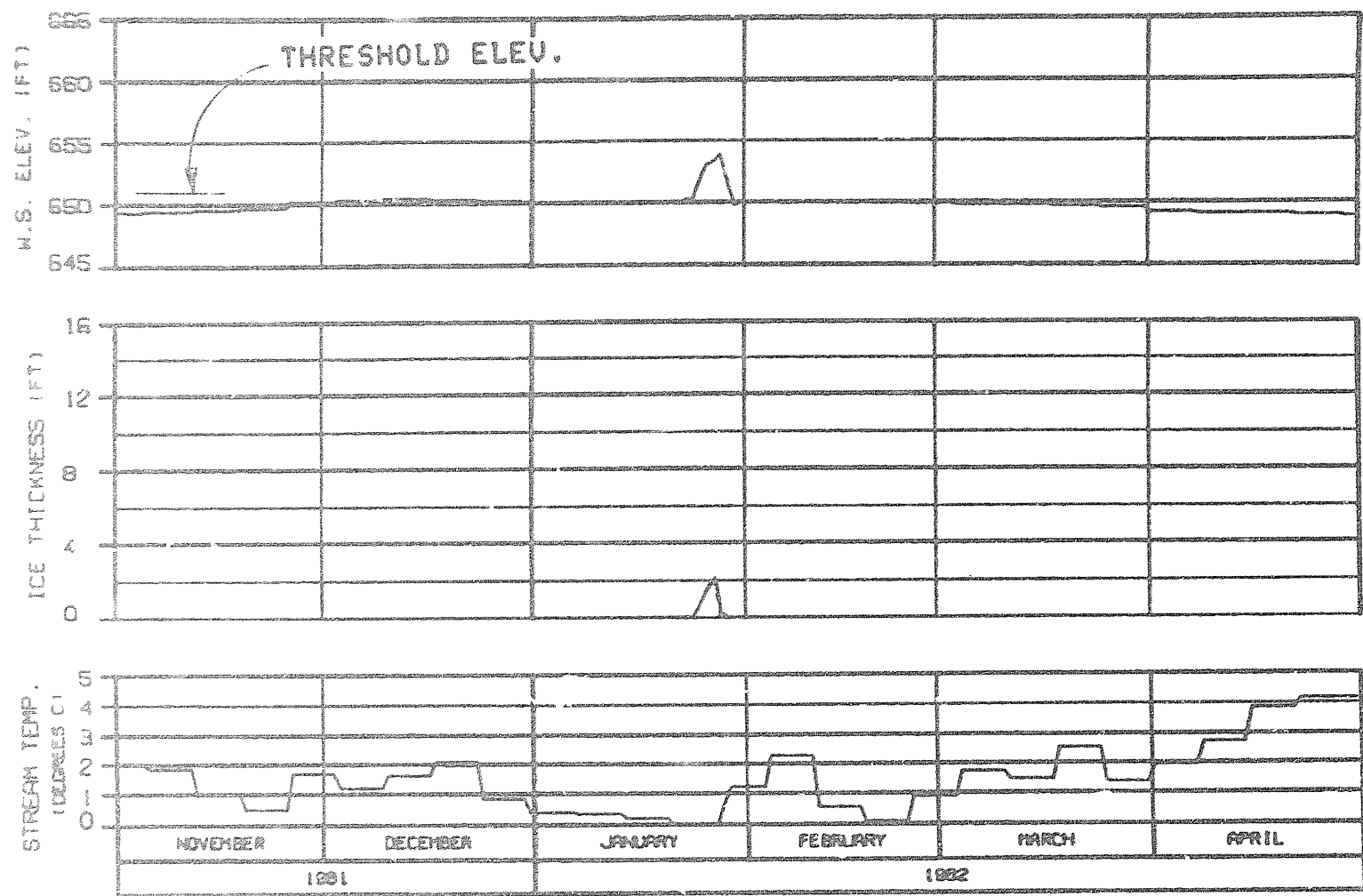


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CREATED: 04/04/82	BY: JON GIB
NOB. 142	

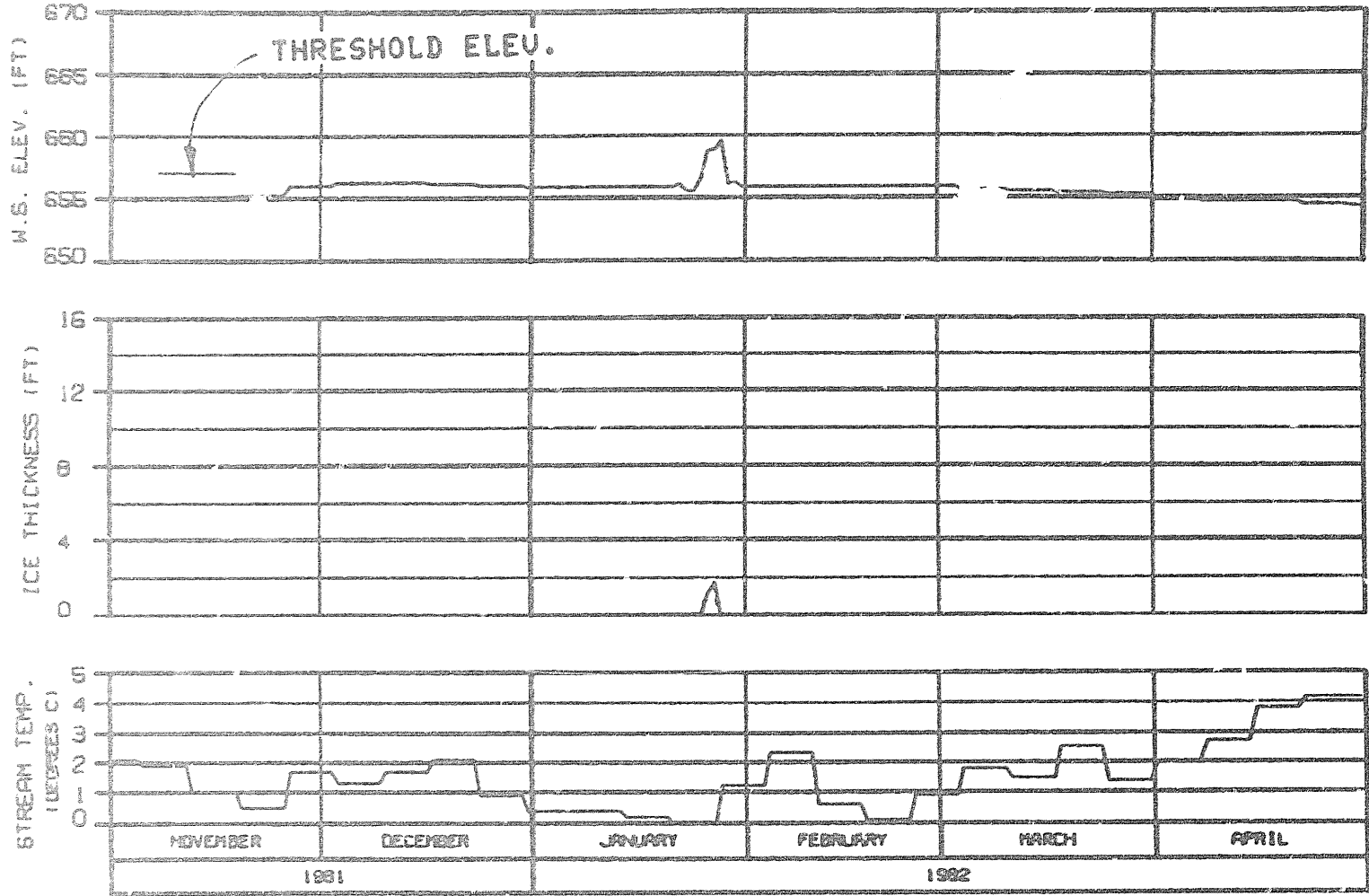


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 01-04-82	BY: JFM 82
E008.142	

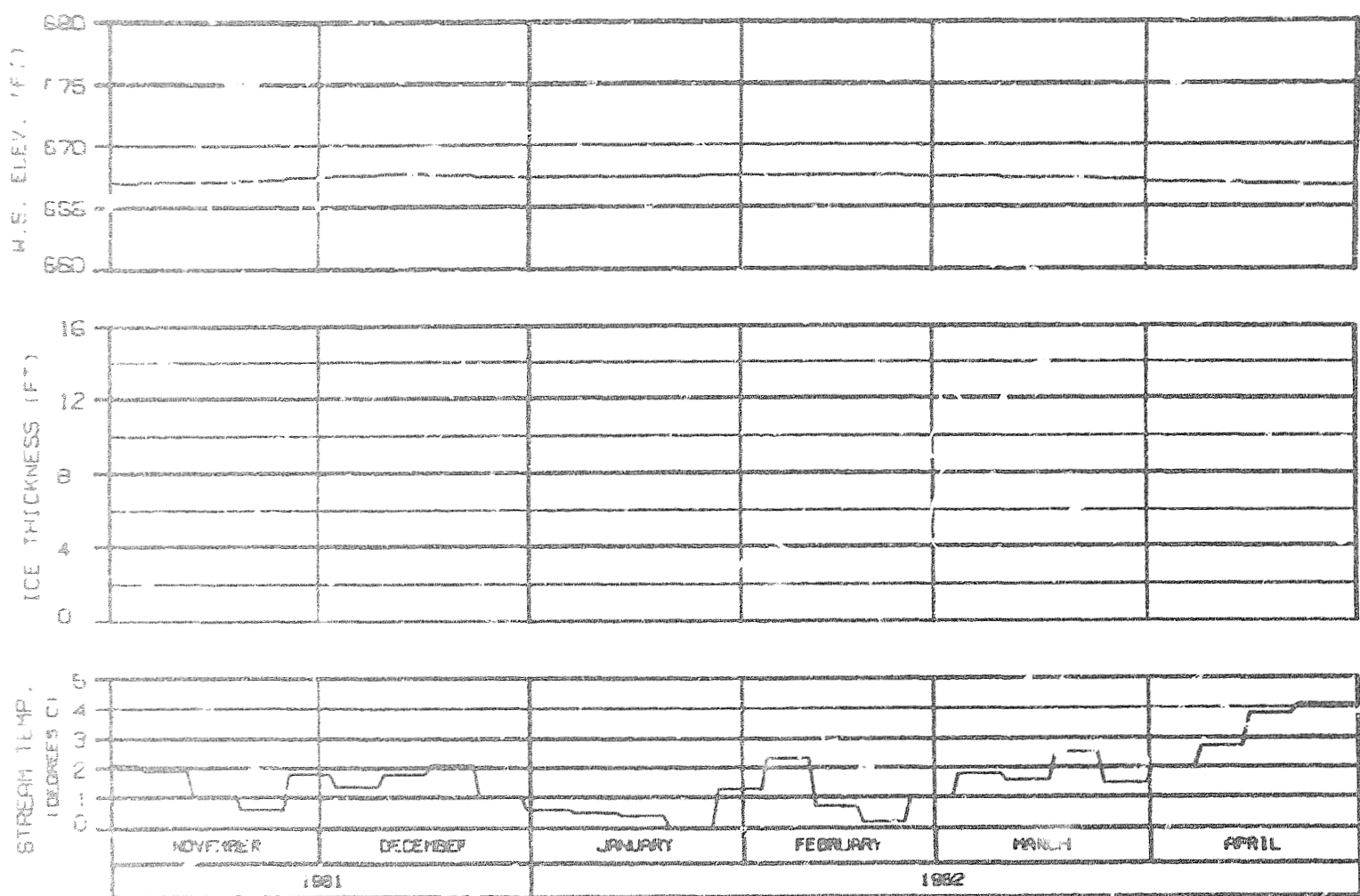


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENR

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGINEER: H. L. GARDNER	DATE: JUN 82
1588.142	

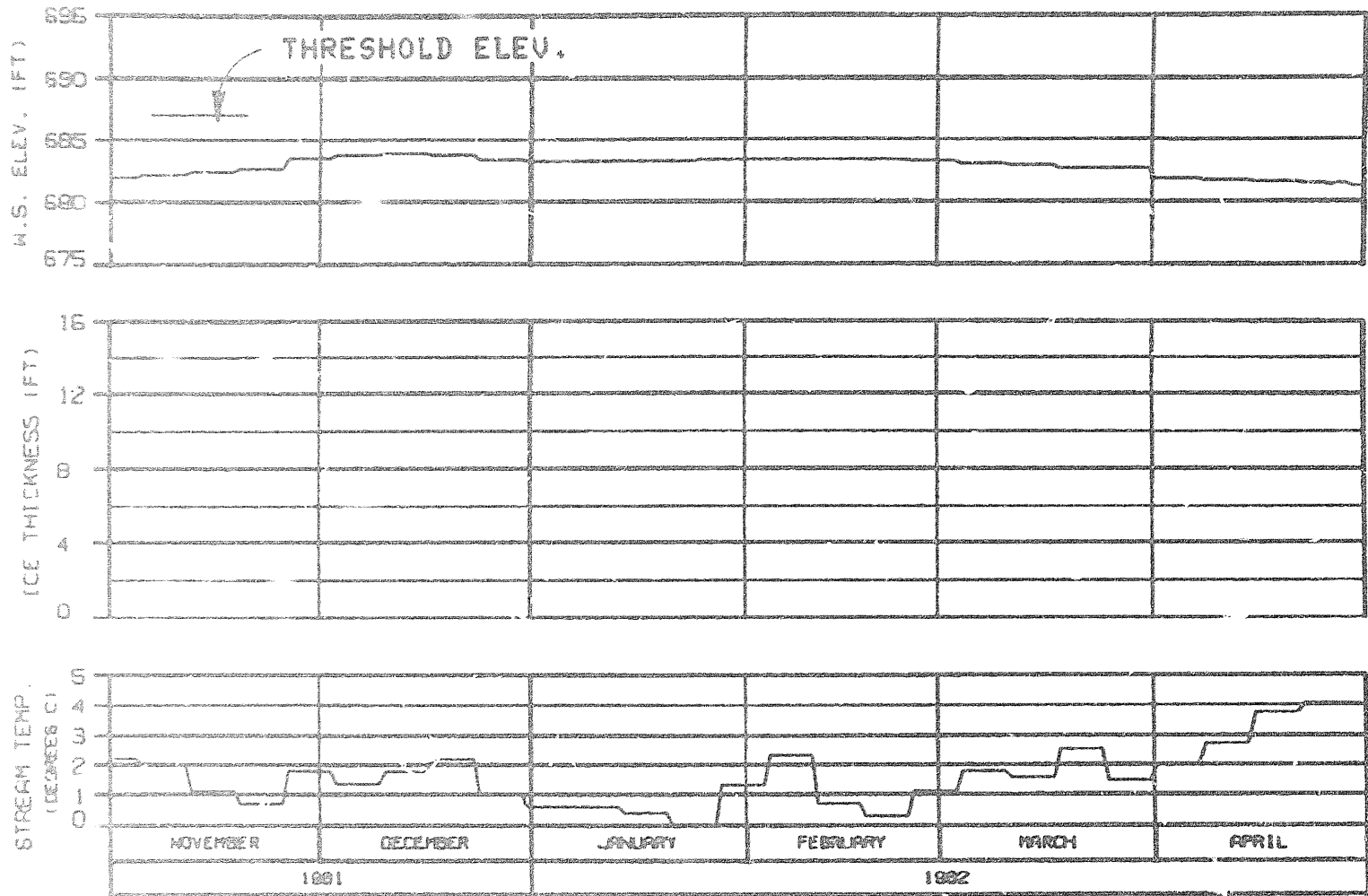


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 200,
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101NA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHANGES: 01A 0200	02 JAN 82
	1982.142



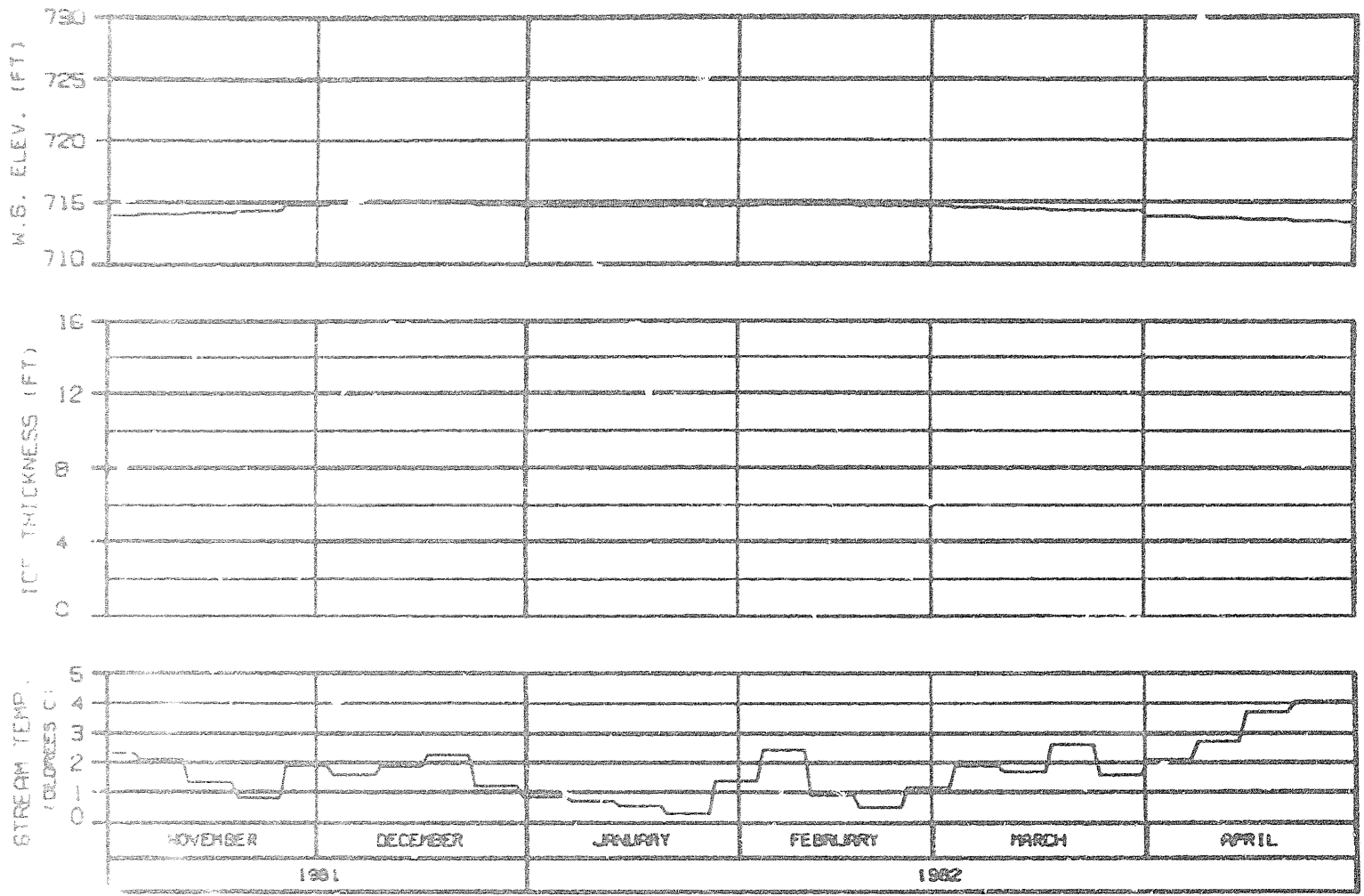
ICE THICKNESS LEGEND:

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

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : B101EN4

ALASKA POWER AUTHORITY	
SUBMITTING PROJECT	
SLUITINI RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 11/19/82	1000.142

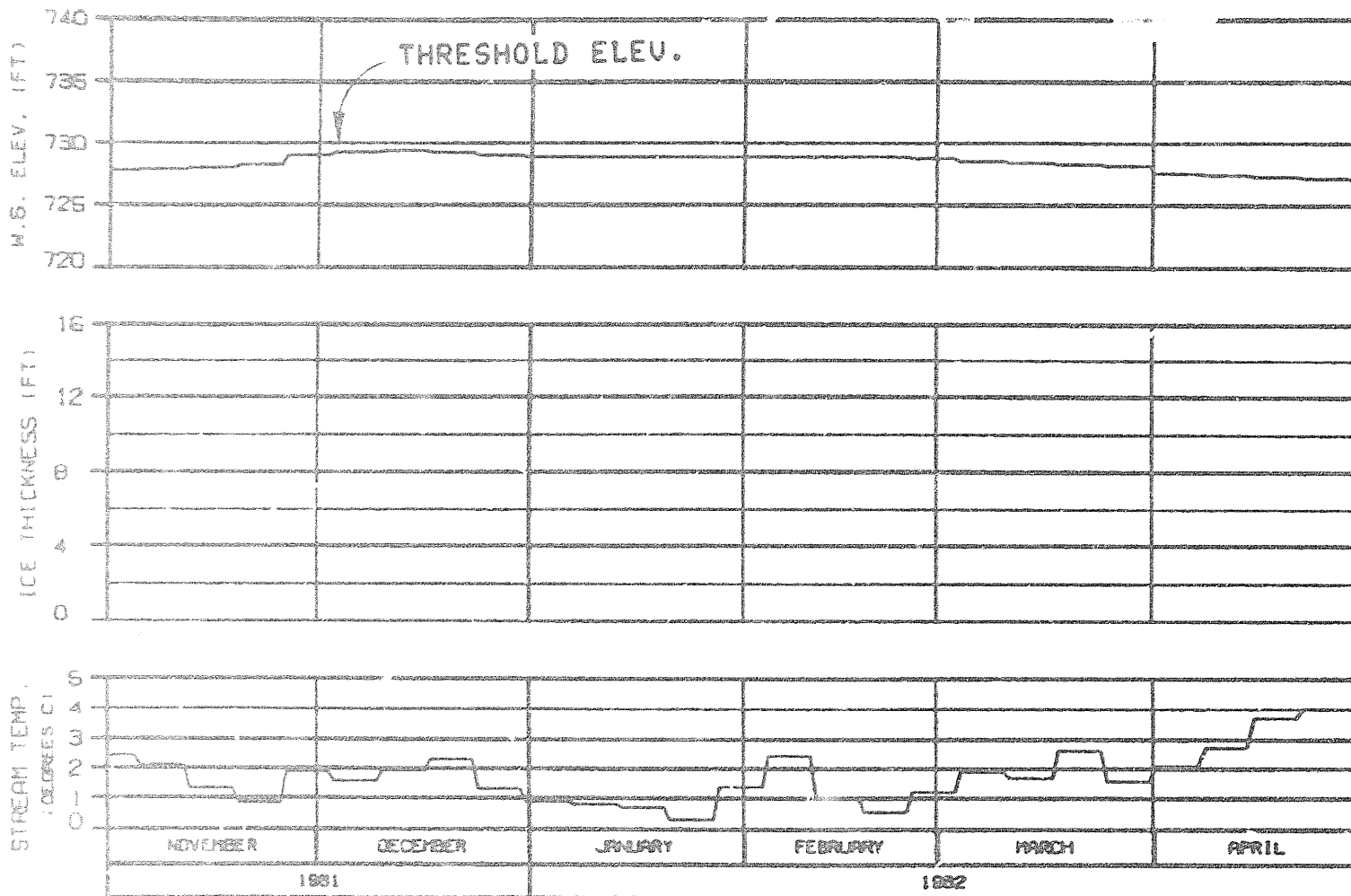


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENR-205 01-0-200	REV. 142

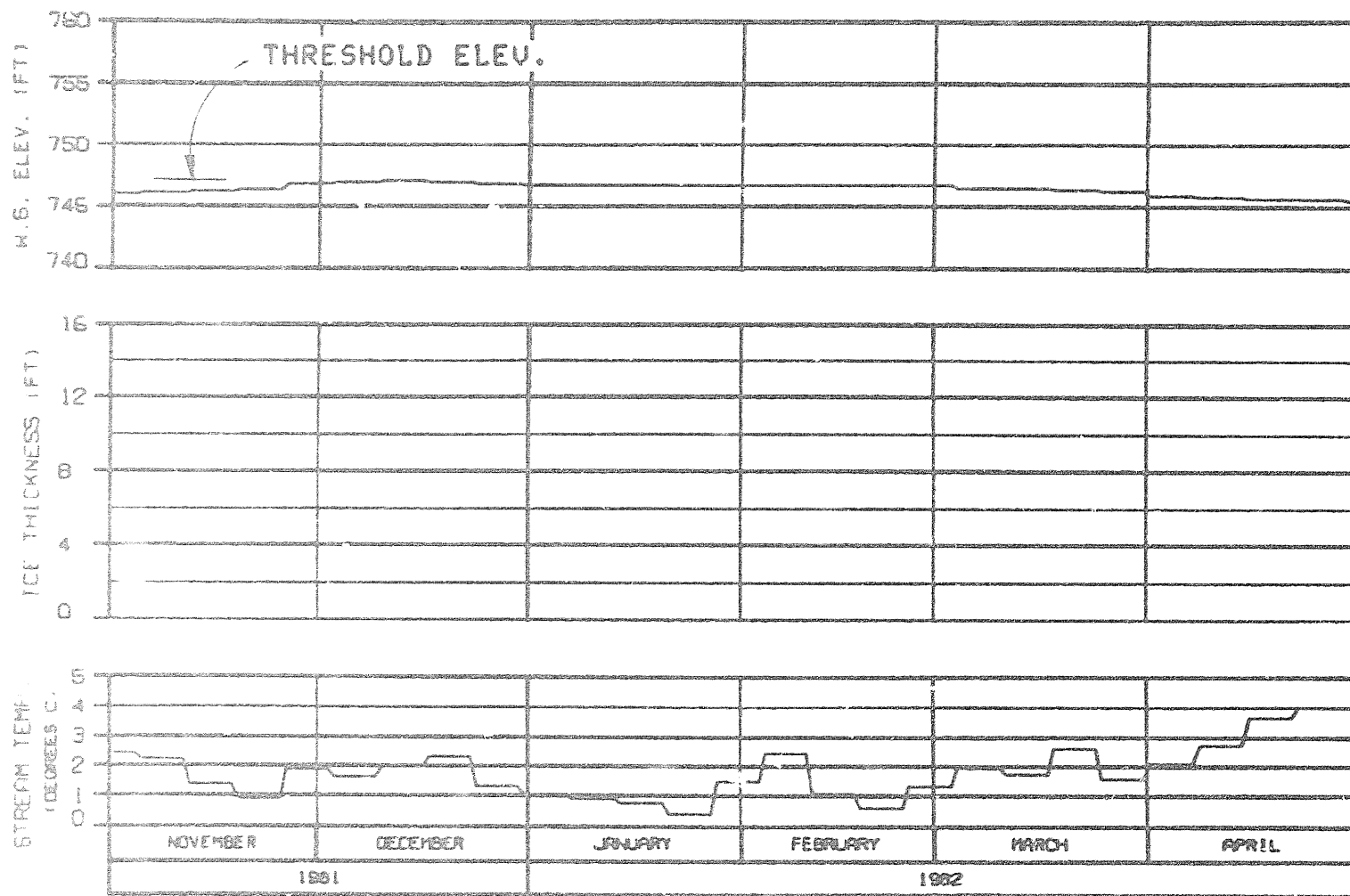


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP, INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
STATION PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HAZRA-EBASCO JOINT VENTURE	
DRAWN: ALLIANCE	BY: JPA 82
	ISS: 148



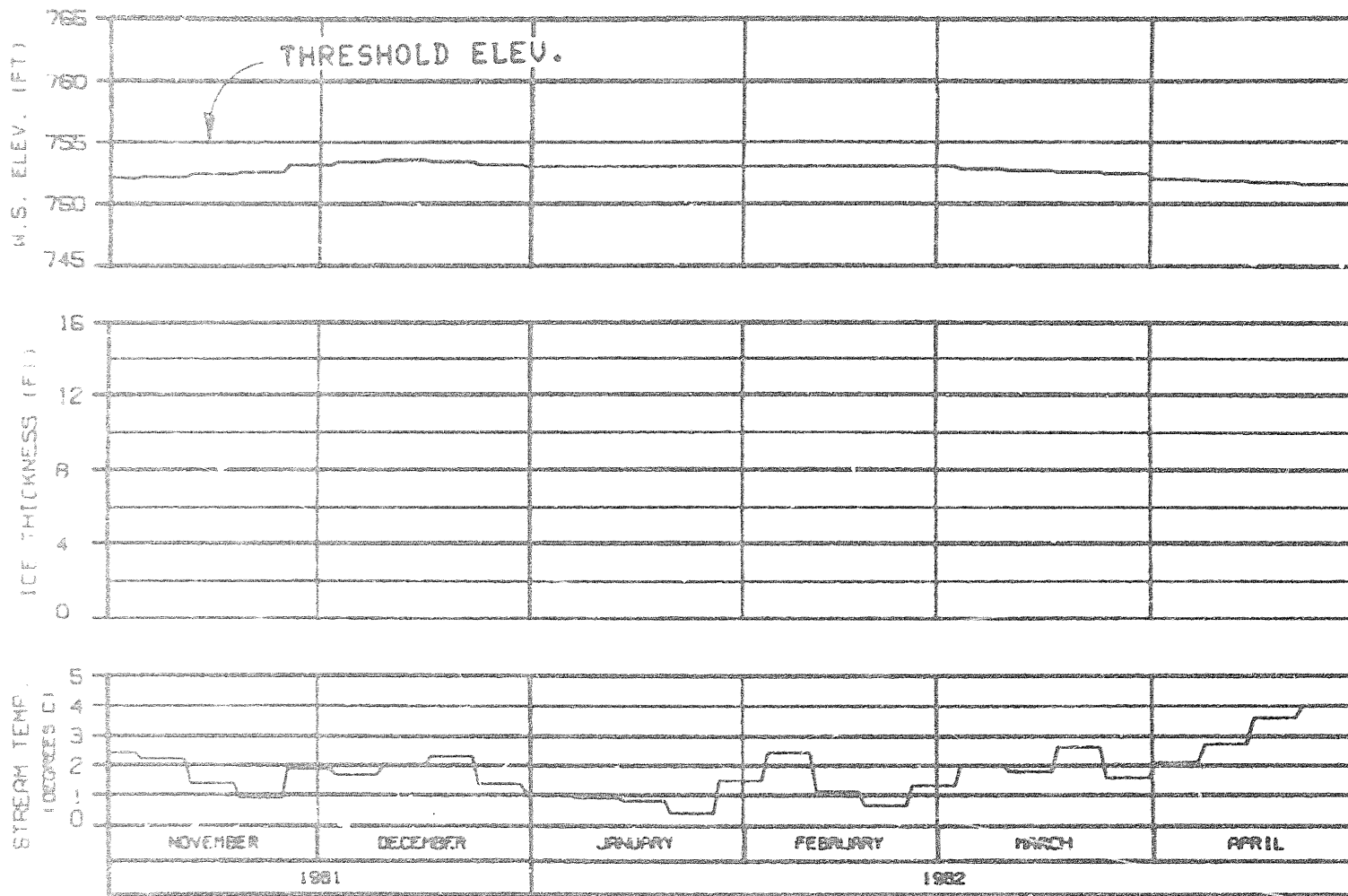
SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EDASCO JOINT VENTURE	
DATE: 11-01-92 10:50 AM	1992.142

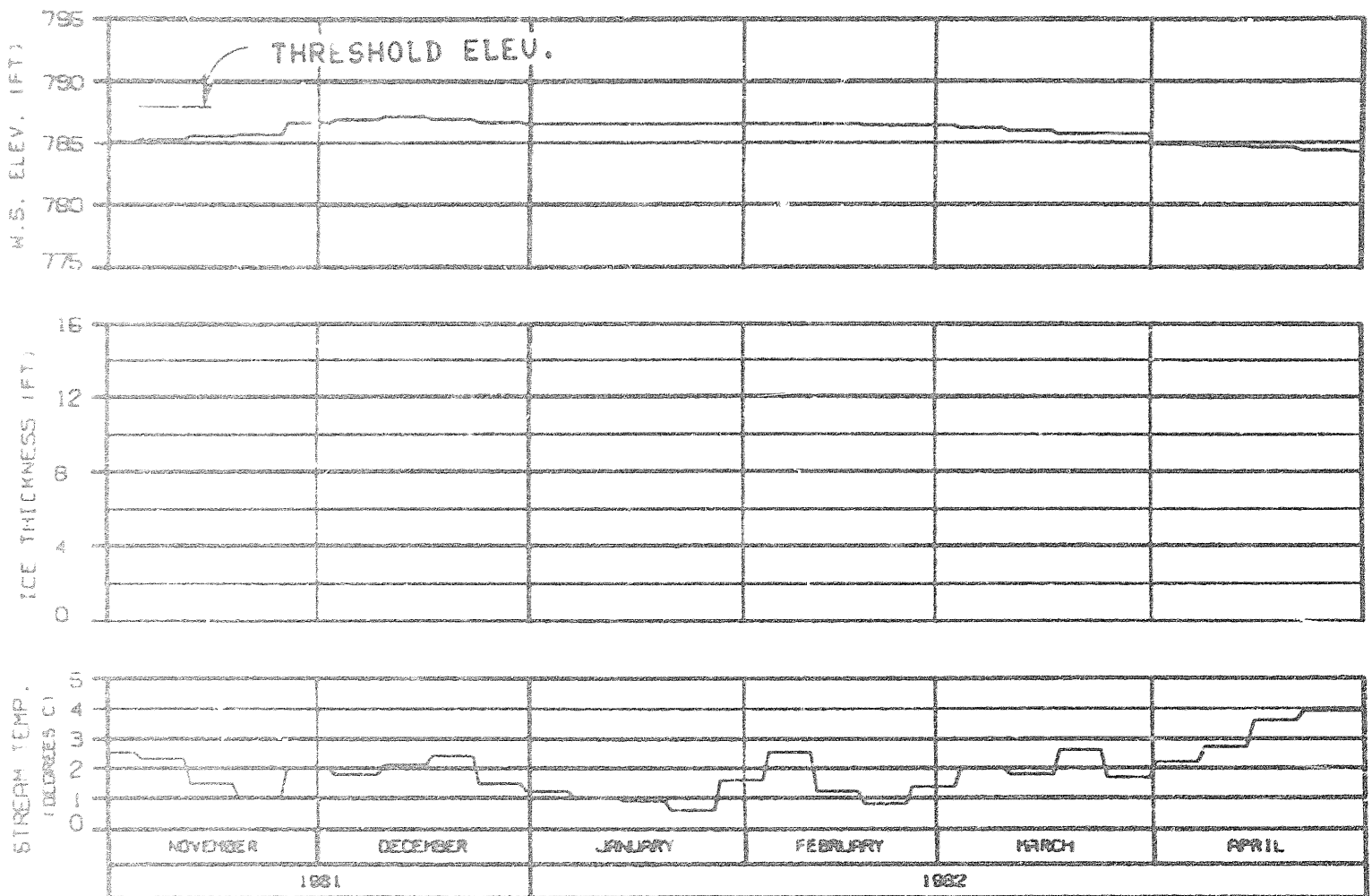


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : B101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
030025-1117-002	1000.142



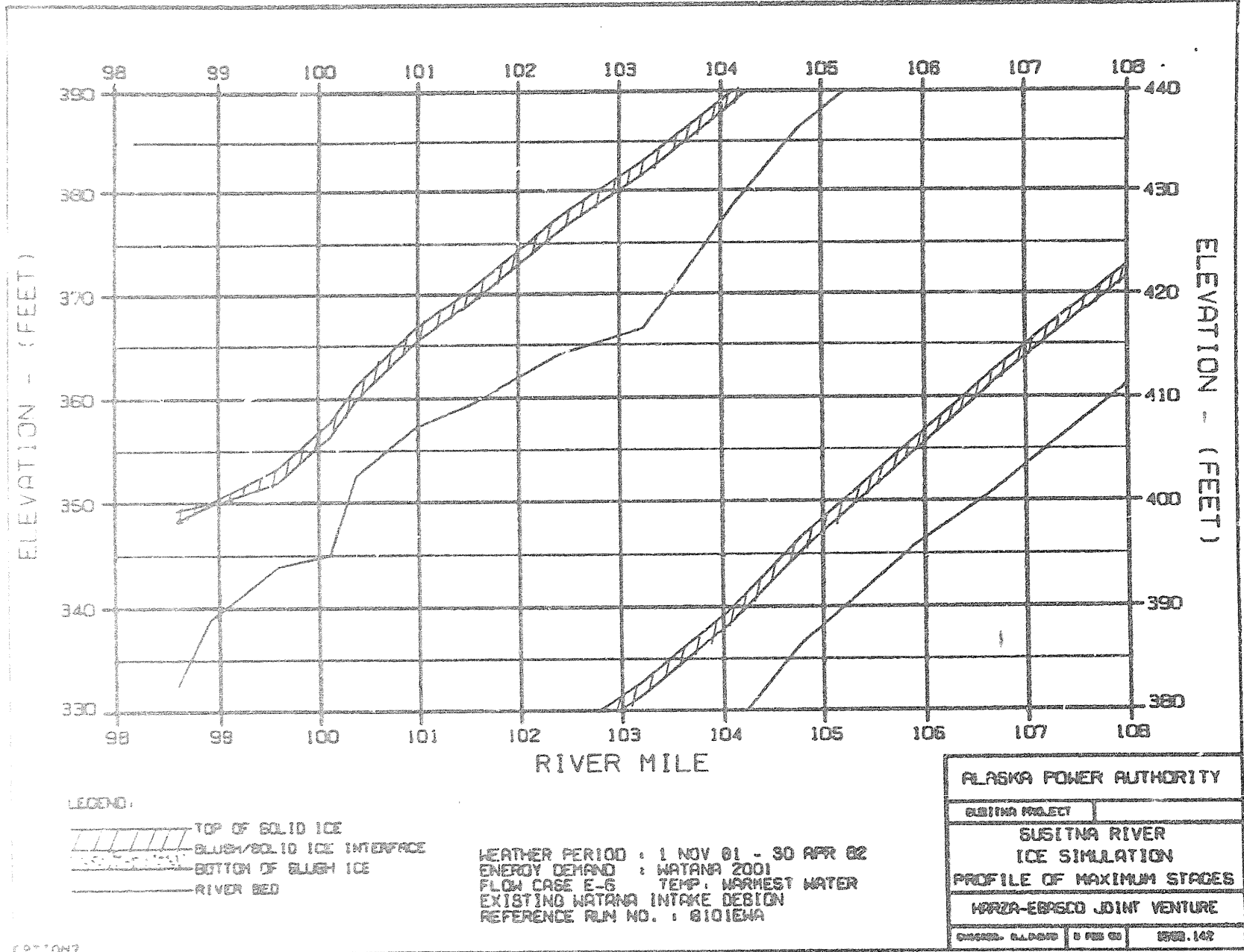
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

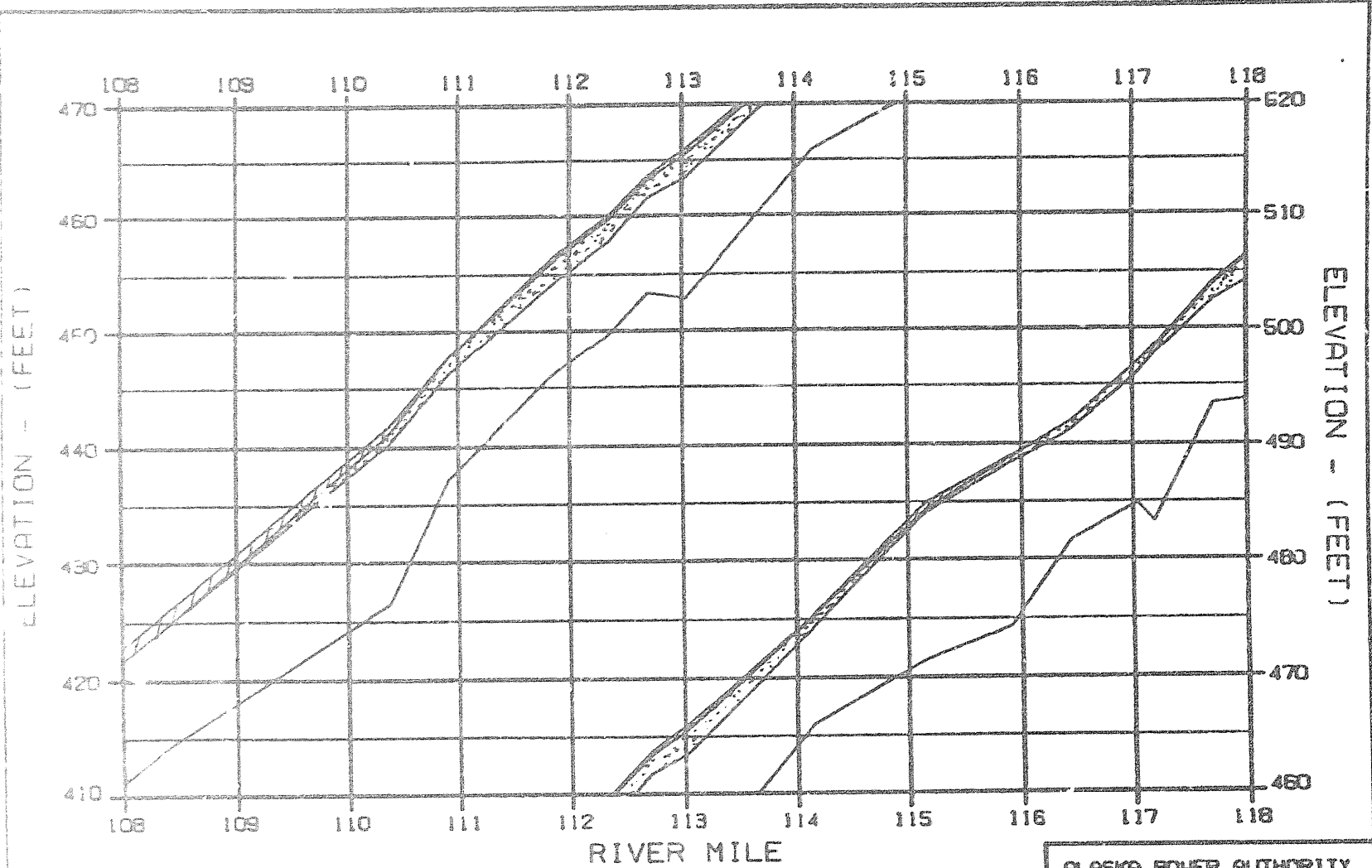
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP: INFLOW-MATCHING
 REFERENCE RUN NO. : 8101ENA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
CHECKED: D.L. HARRIS	DATE: JAN 82
1982.142	





EXHIBIT E



CAPTION?



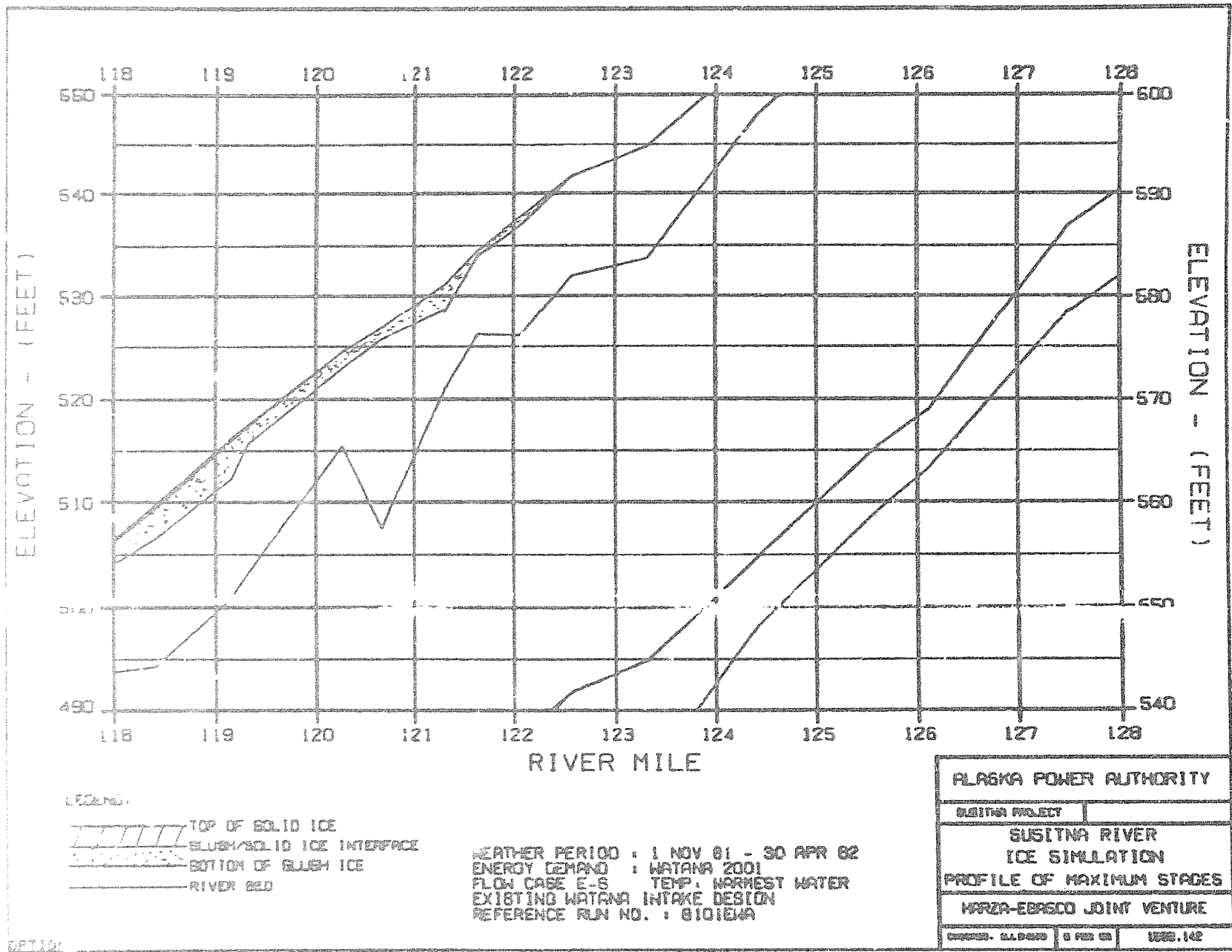
LEGEND:

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

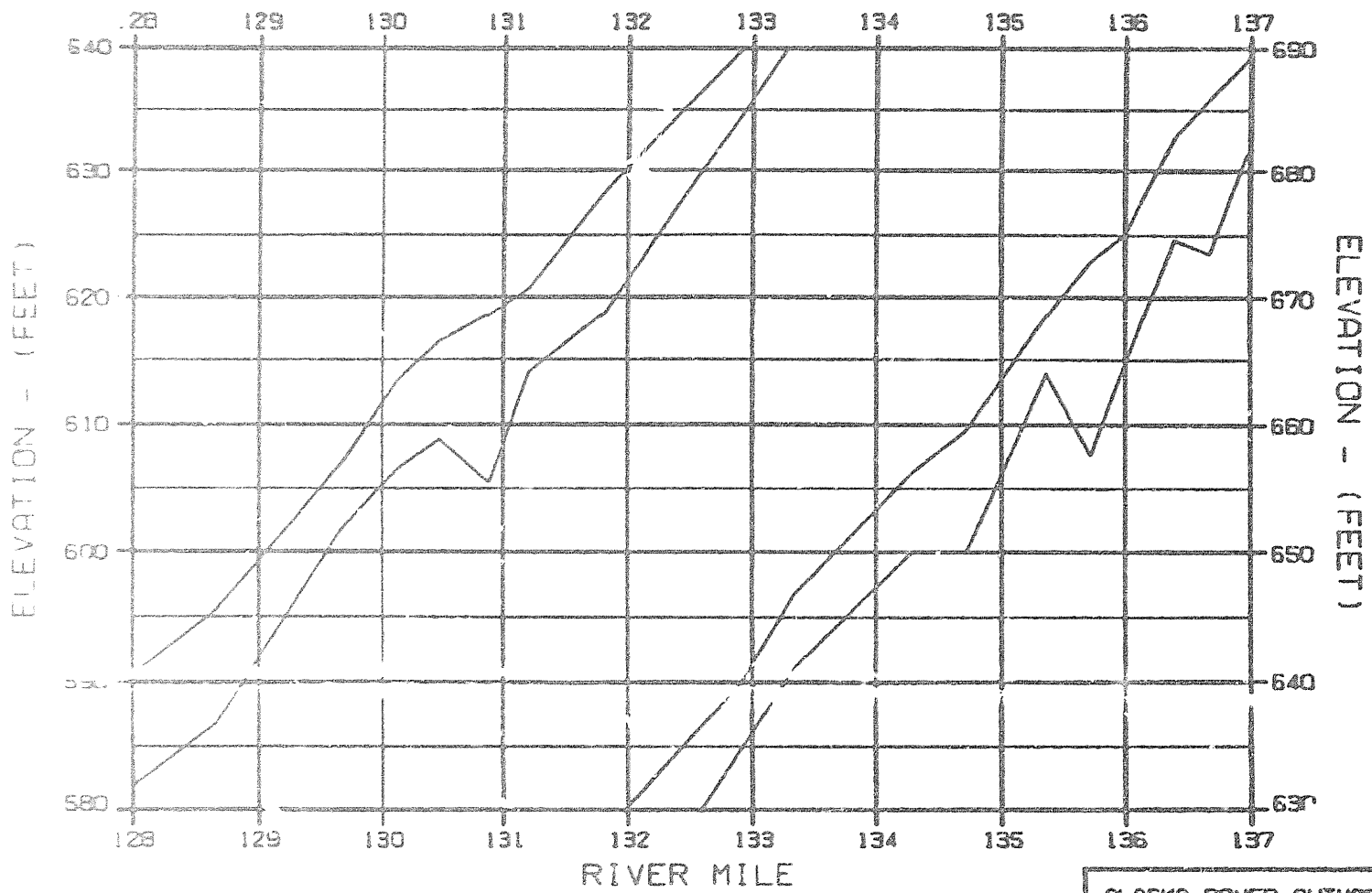
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE E-G TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-ERASCO JOINT VENTURE		
ENGINEER: ALLAN BIRD	DATE: FEB 82	WORK SHEET NO. 142

c



SP3101



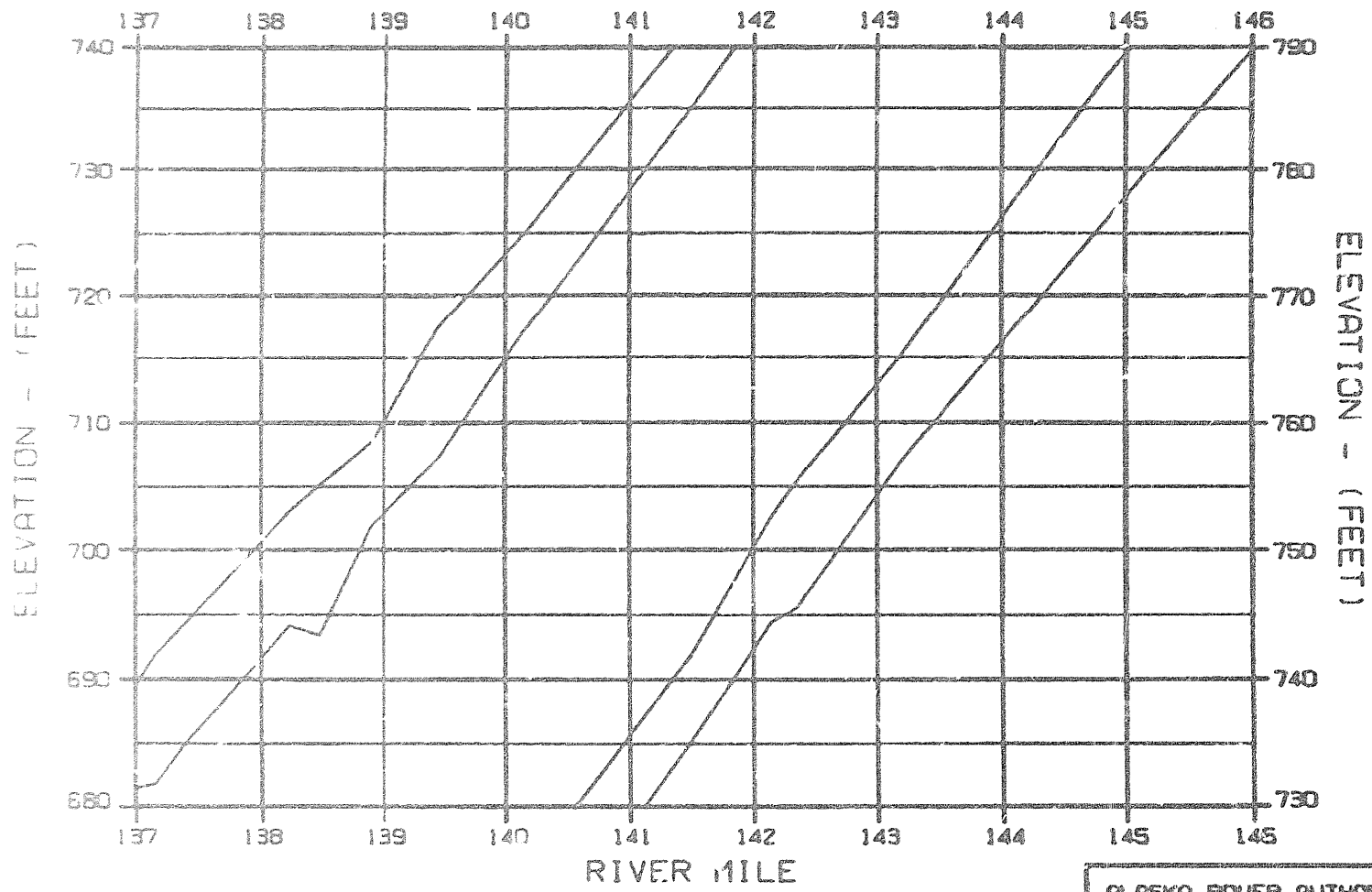
LEGEND

- 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-6 TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 0101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EBASCO JOINT VENTURE	
DATE: 11/19/82	BY: JEB
10001.142	

021102

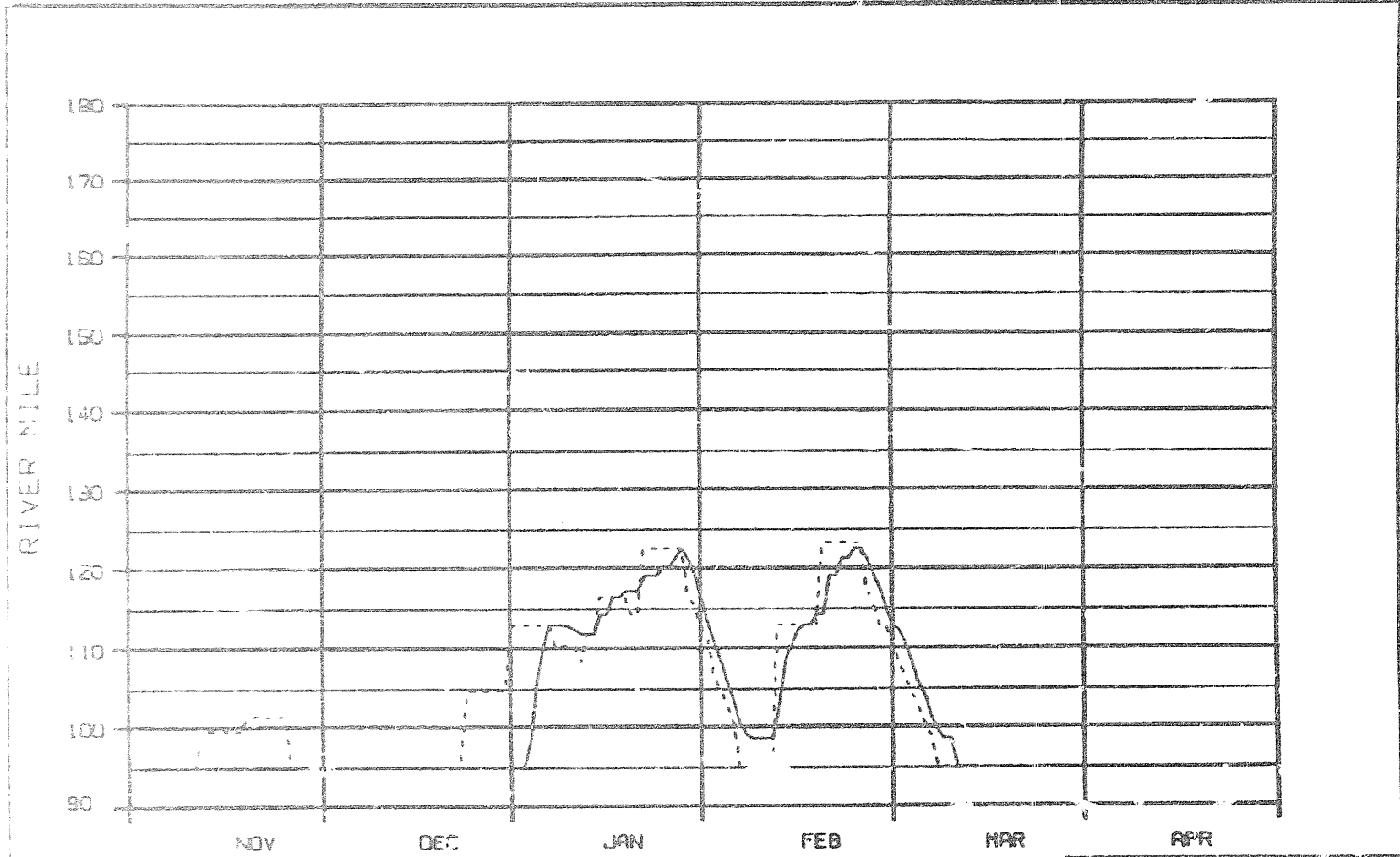


LEGEND:

-  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-6 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 81015NA

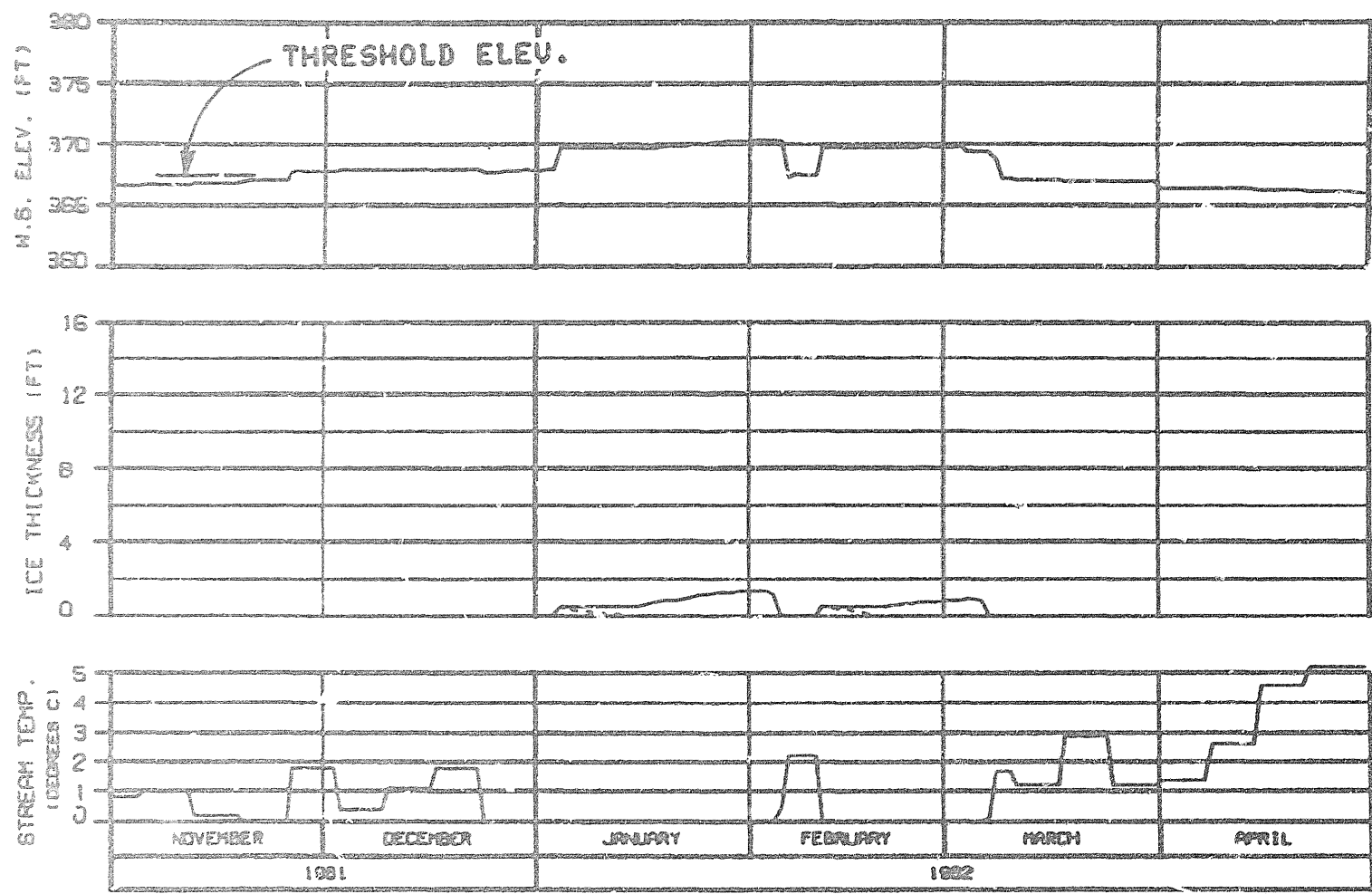
ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
HARZA-EGASCO JOINT VENTURE		
DESIGNED - RALPH W	8 FEB 82	1022.142



LEGEND:
 — ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE E-6 TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
& ZERO DEGREE ISOTHERM		
WARZA-EBRACO JOINT VENTURE		
DATE: 04/11/82	BY: PJA/GR	15000.142

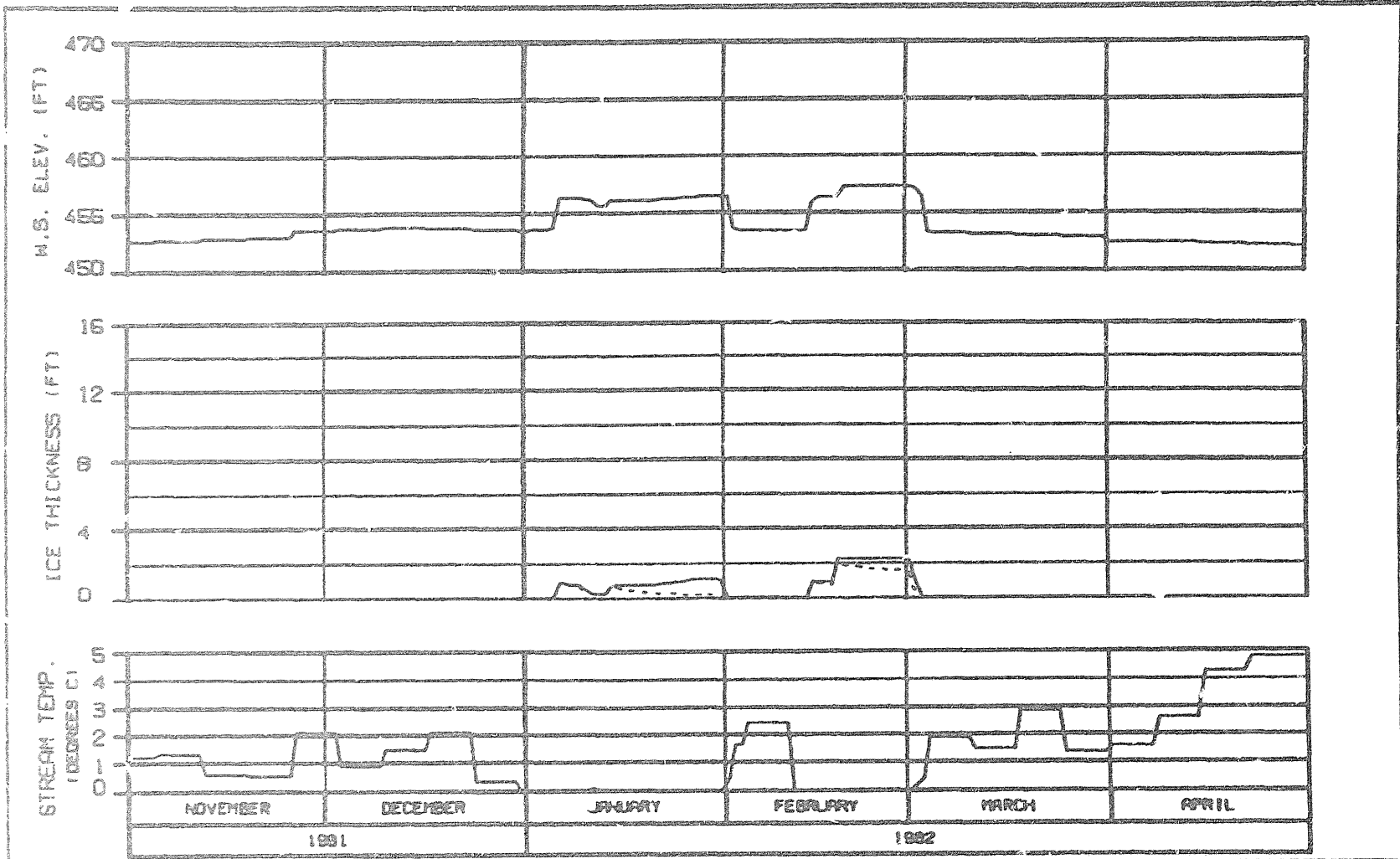


HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL 60606	FILE NO 1000.102

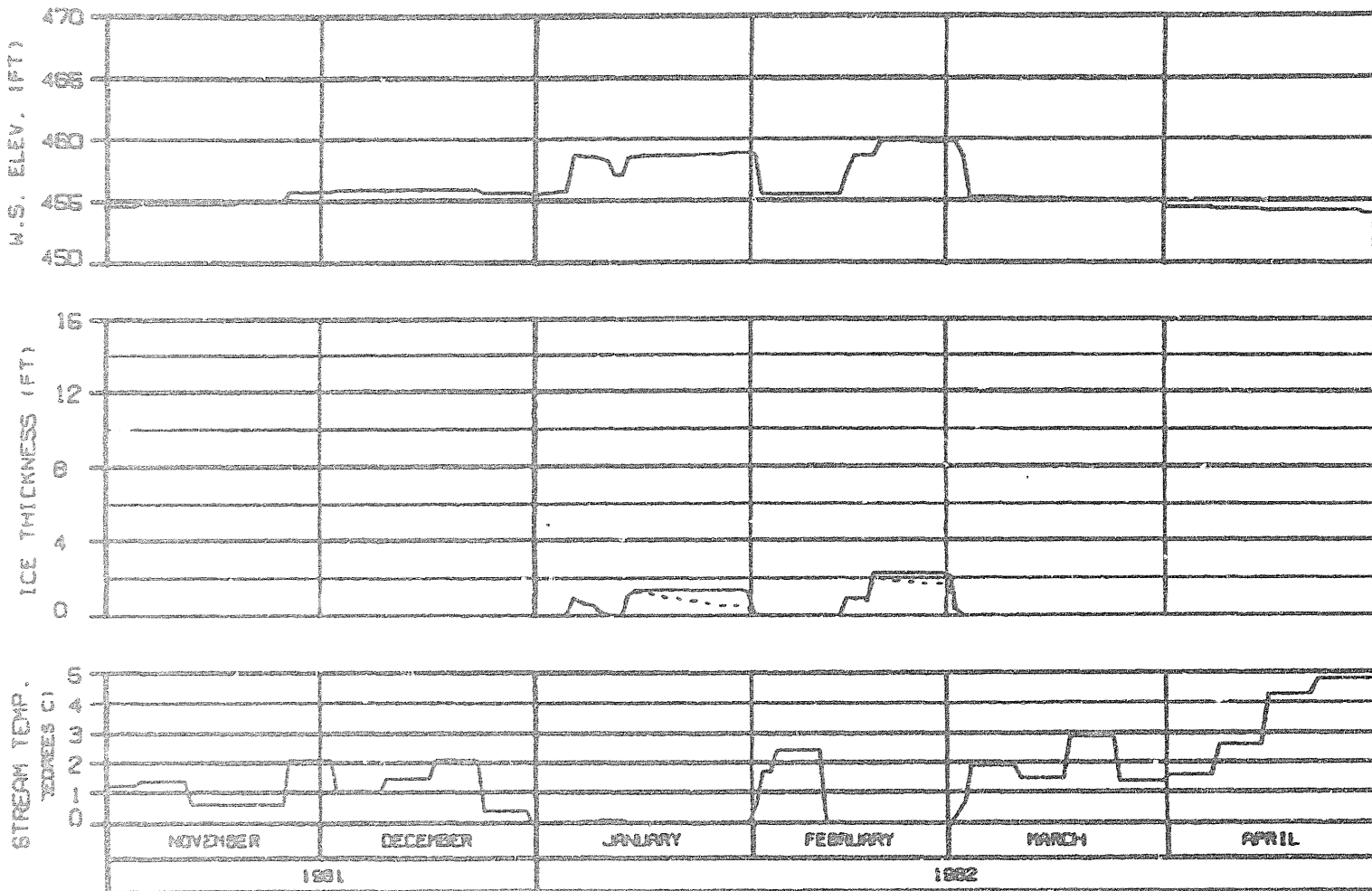


**SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00**

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 61016A

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTER: 04-09-93	5 FEB 94
ISSUE: 142	

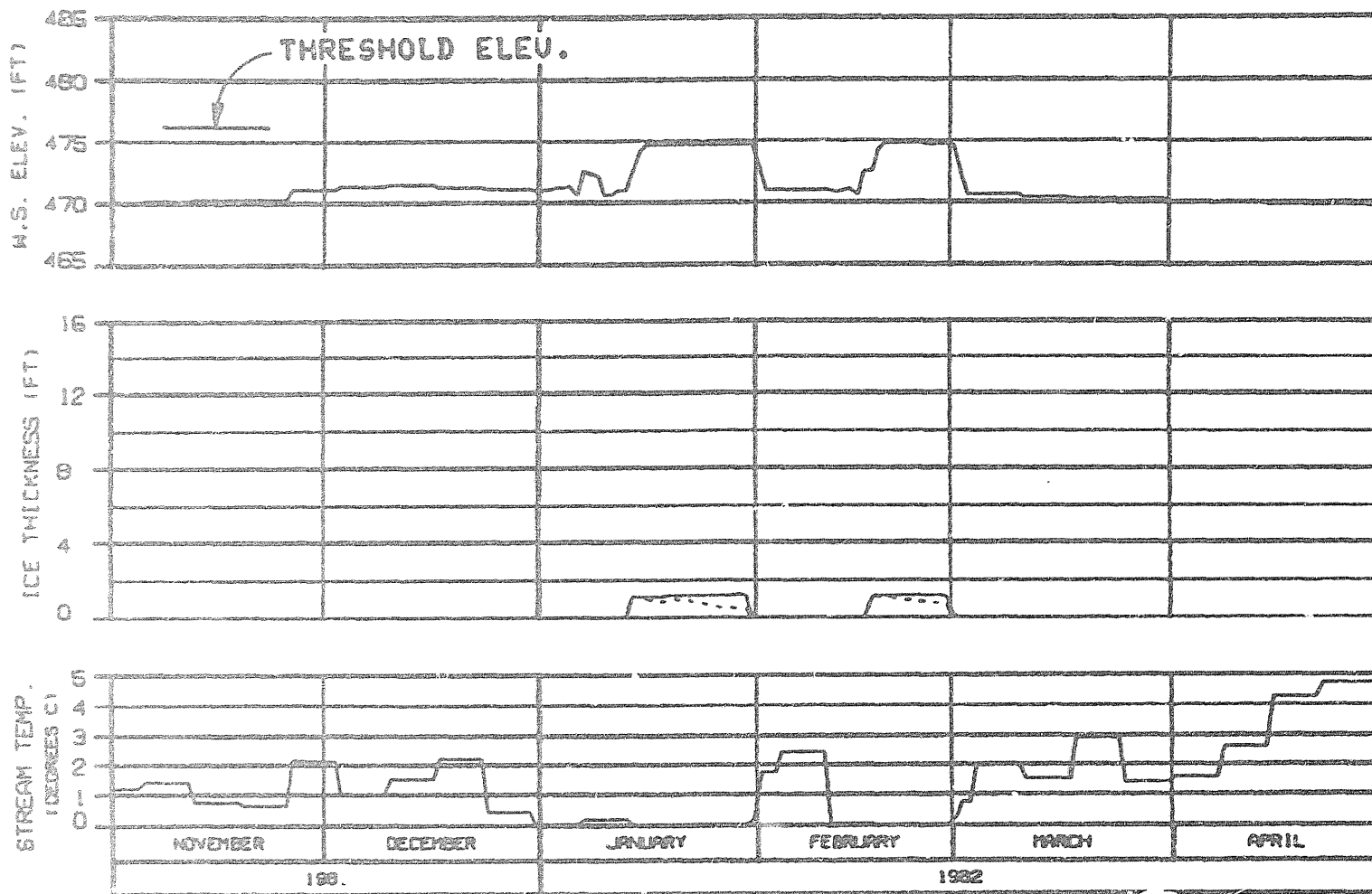


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDASCO JOINT VENTURE		
DESIGN: 6/1/82	0 FEB 82	ISSN: 142

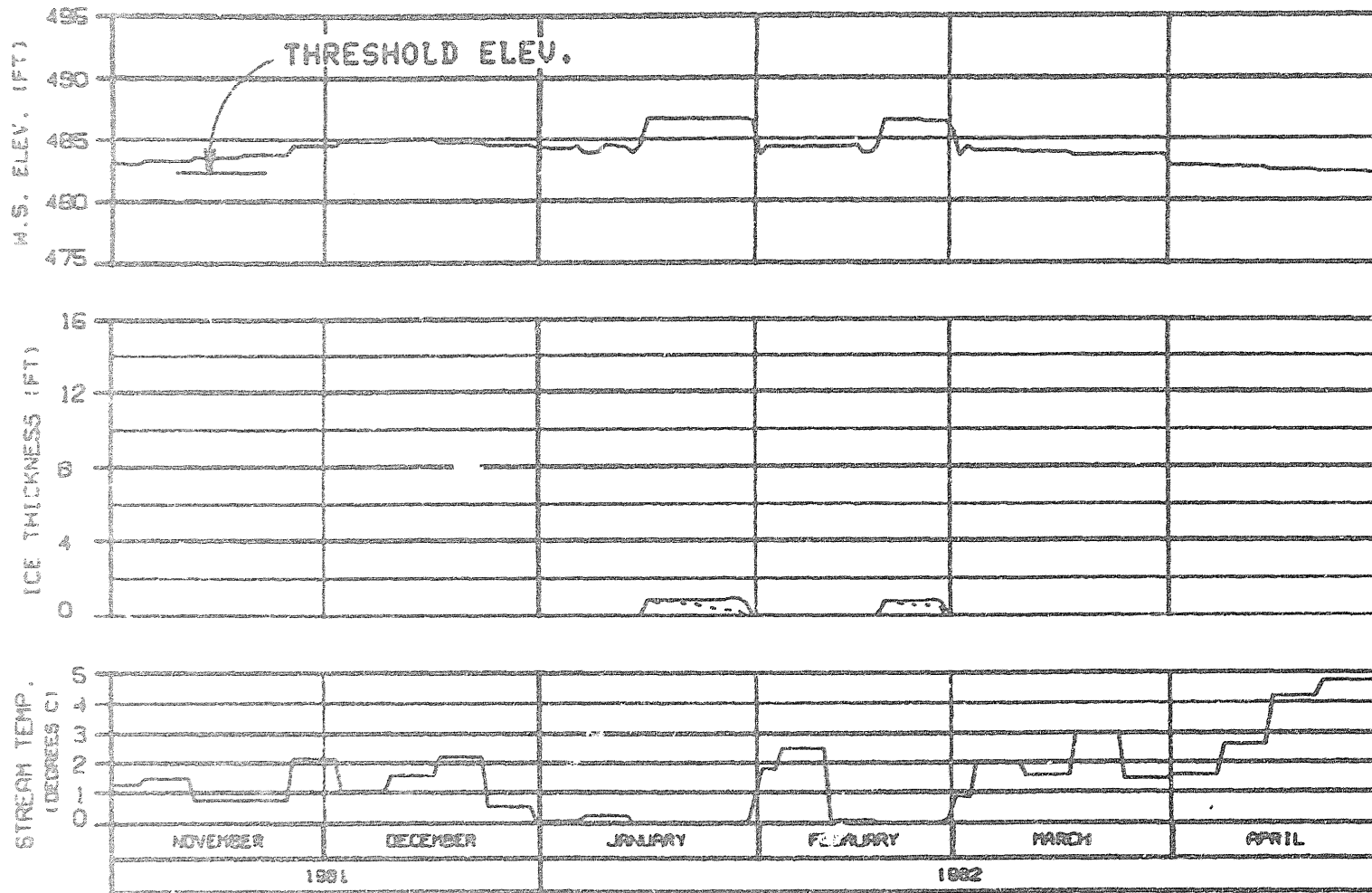


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERASCO JOINT VENTURE	
DESIGNED BY: BLD/SSB	DATE: 6 FEB 82
DRAWING NO.: 1000.142	

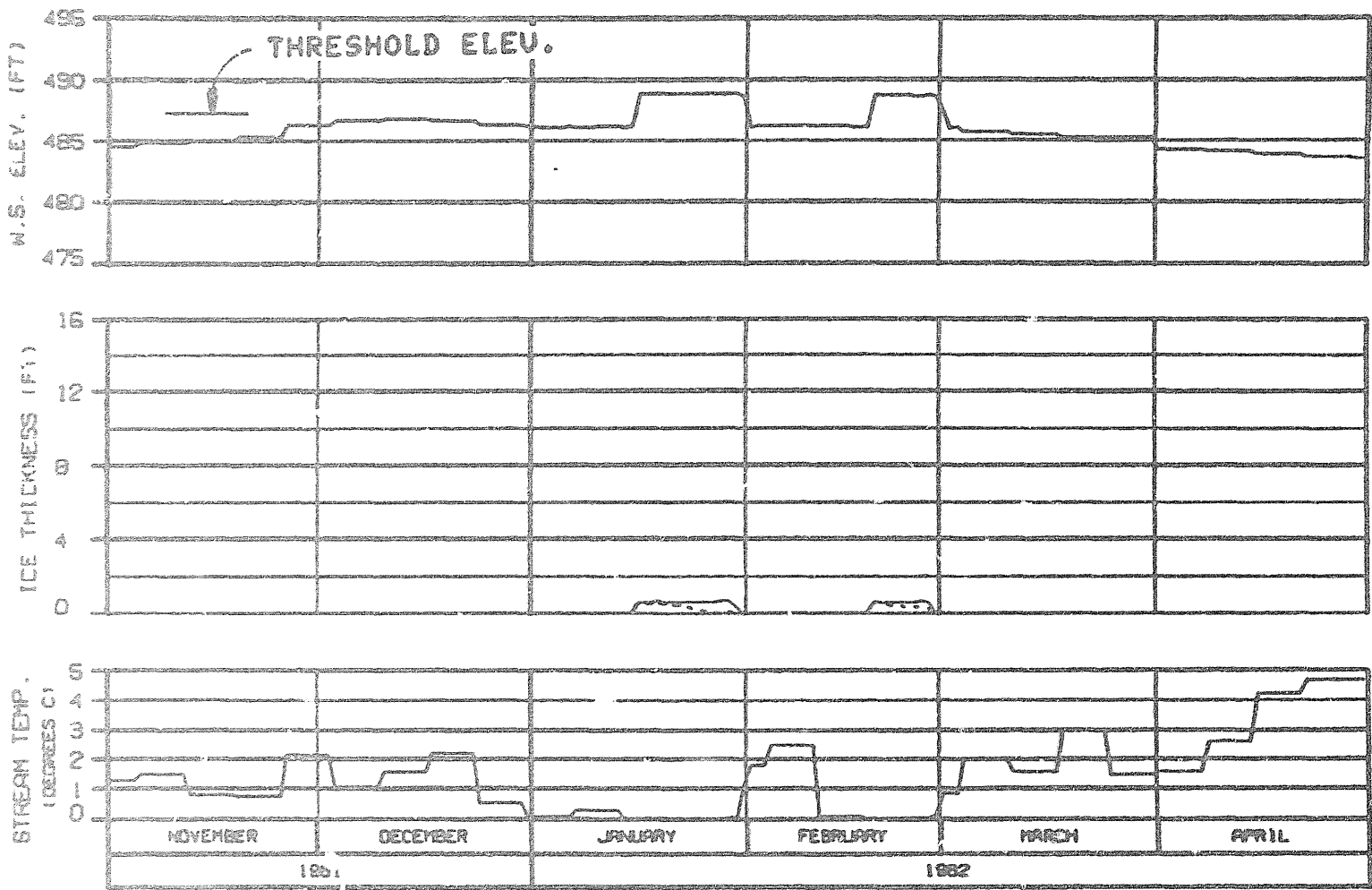


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - GLUSH COMPONENT

SIDE CHANNEL MSII
 RIVER MILE : 115.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRACD JOINT VENTURE	
CREATED: 01.10.82	0 FEB 82
ISSN: 142	

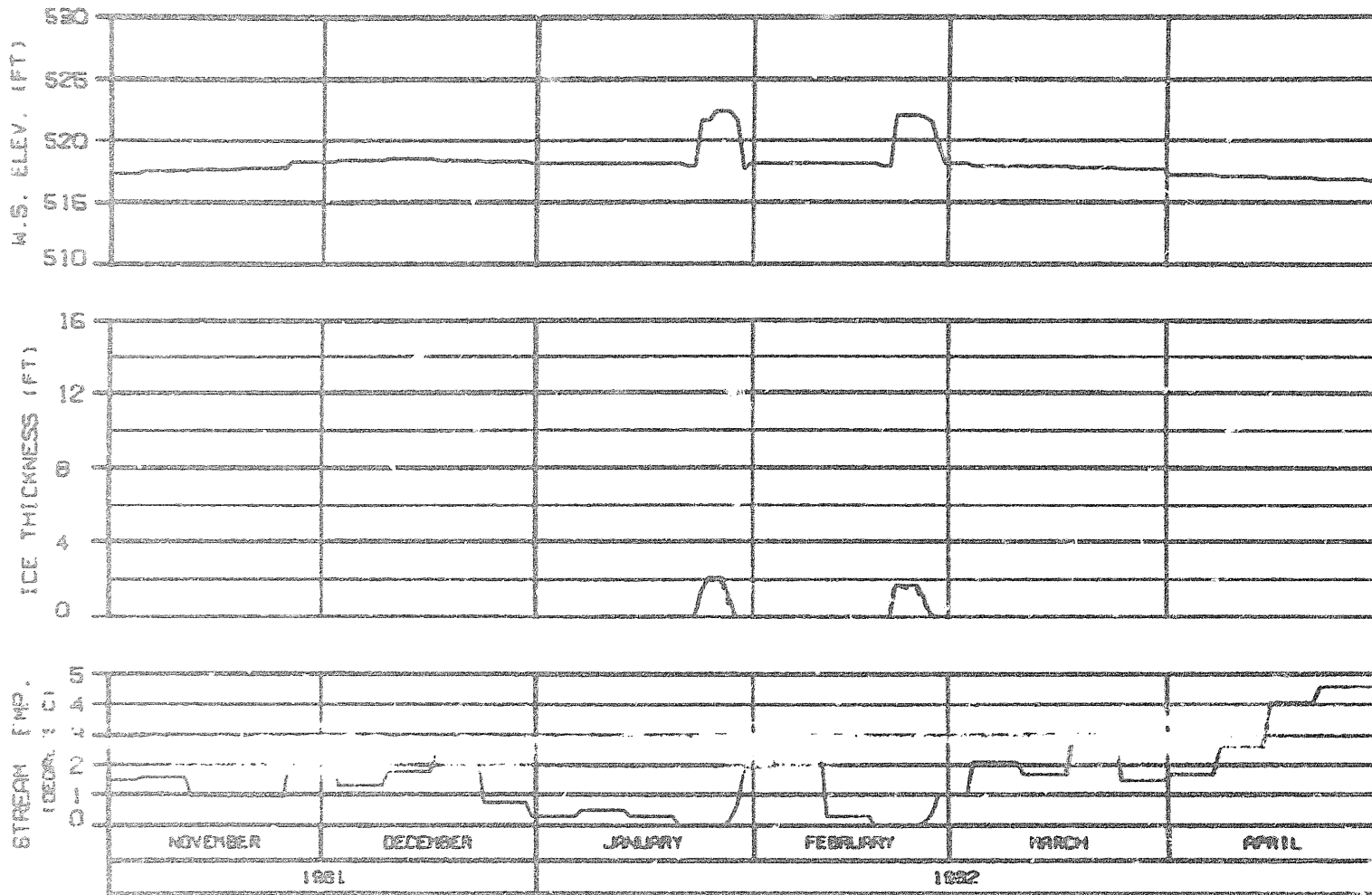


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING MATANA INTAKE DESIGN
 REFERENCE RUN NO. : BIOIEMA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGRECO JOINT VENTURE	
PROJECT: ILLP010	0 FEB 82
1588.142	

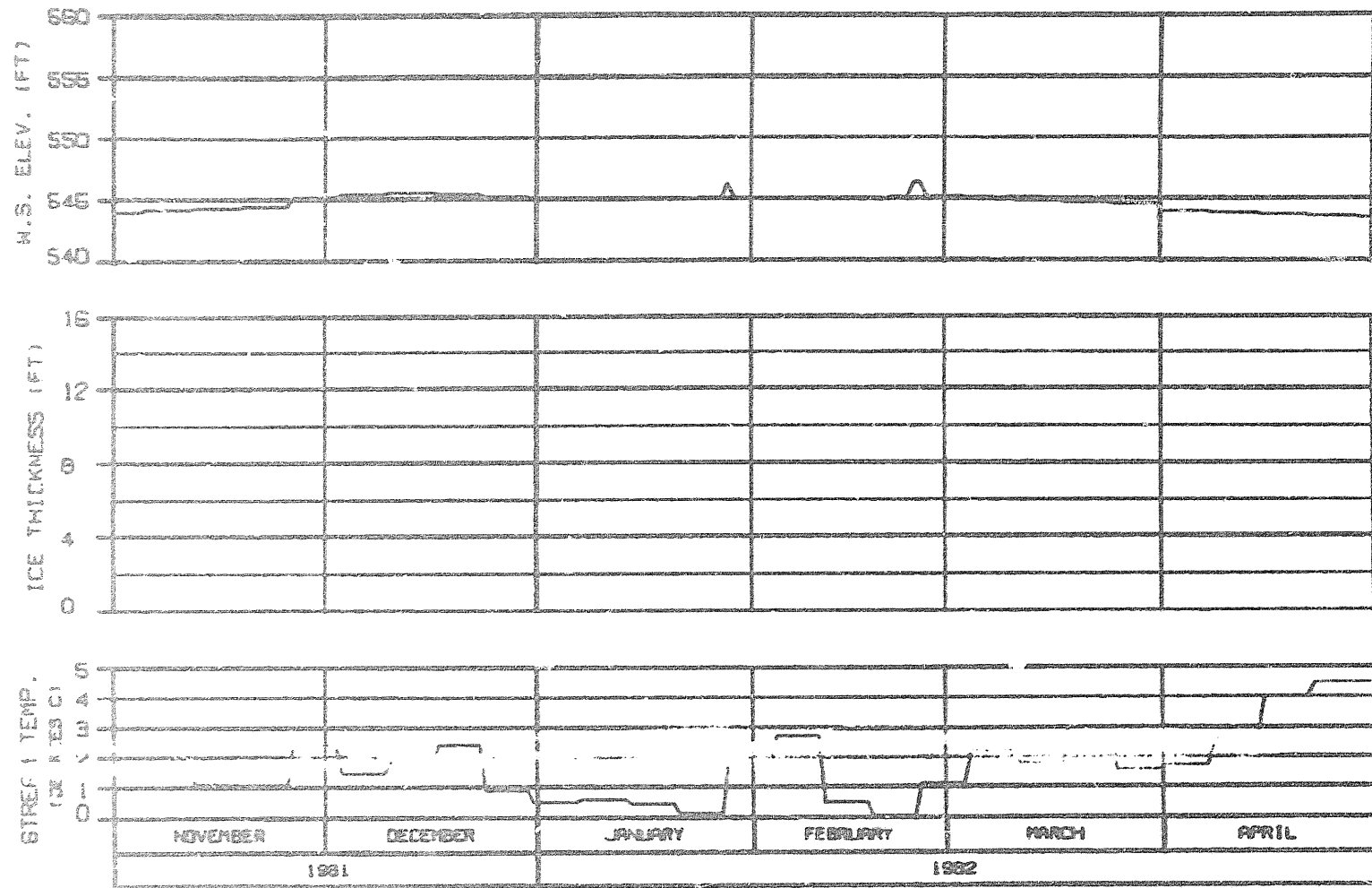


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING MATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101ENH

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRACO JOINT VENTURE	
082808 - 04:00:00	5 FEB 82
1000.142	

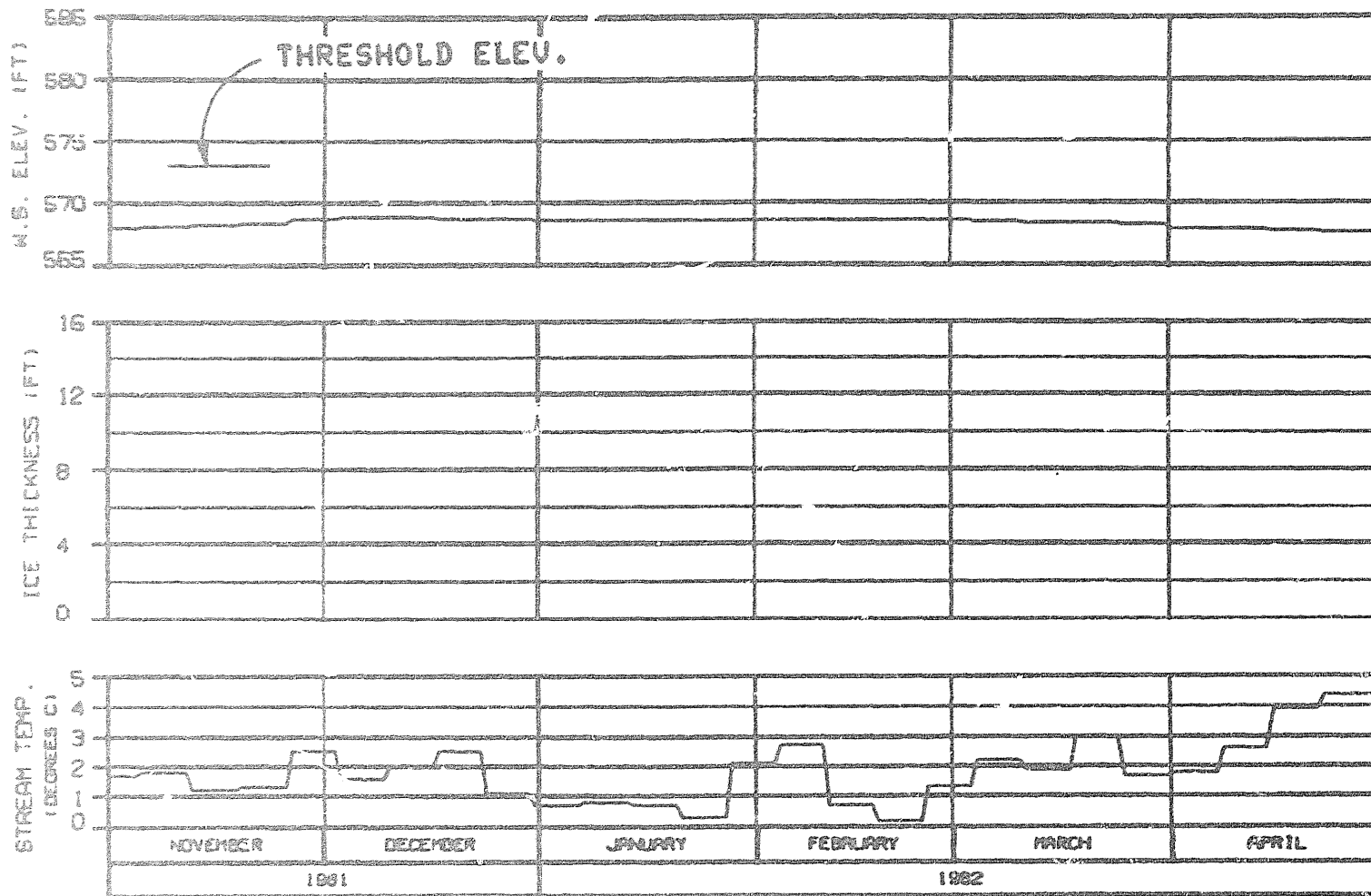


ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING NATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRSCO JOINT VENTURE		
DESIGNED BY: D. J. ...	8 FEB 82	1000.142



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 20L1
 CASE E-6 FLOWS : TEMP: WARMEST WATER
 EXISTING WATANA : INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

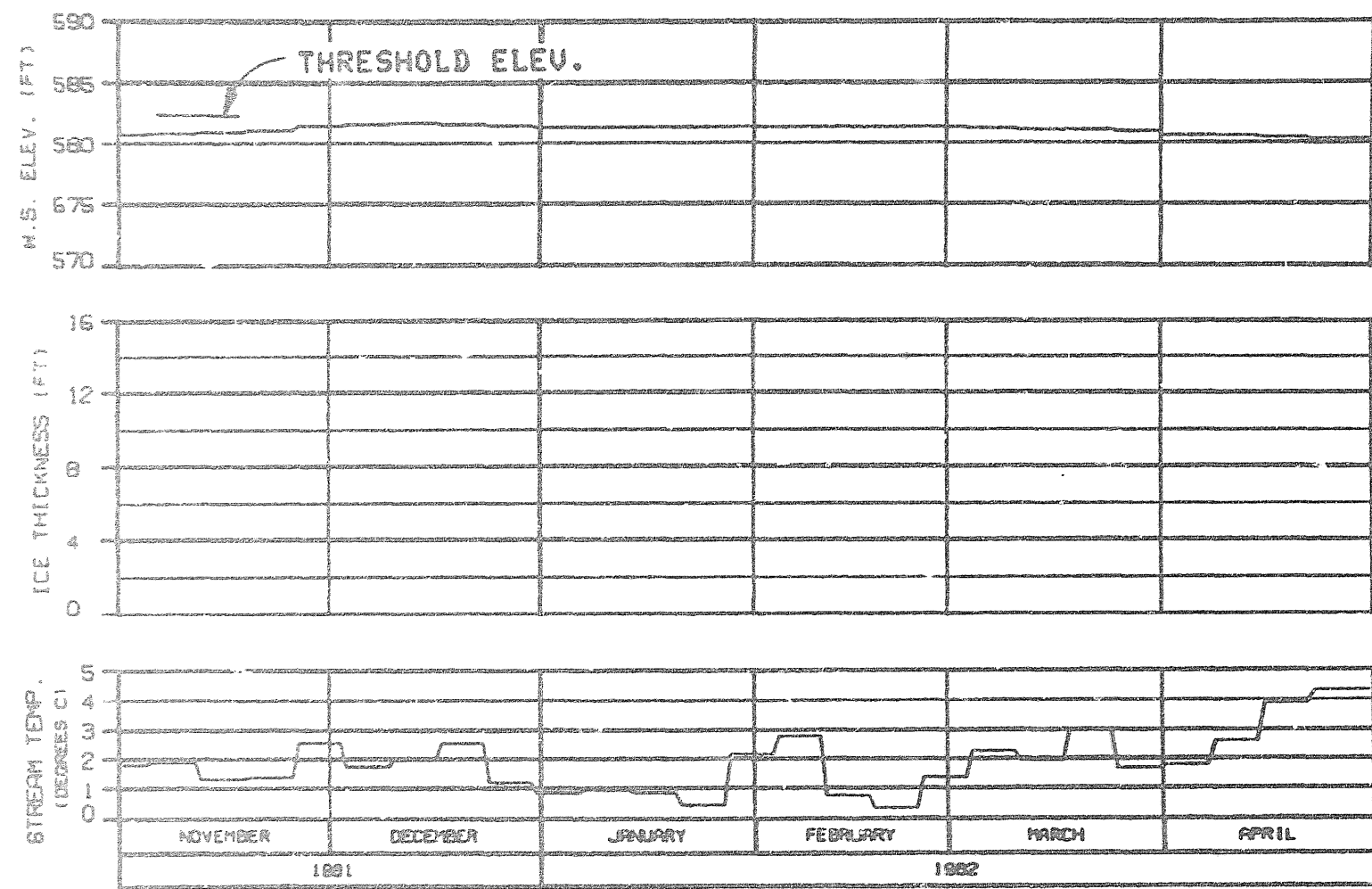
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EGREDD JOINT VENTURE

CHANGES: 01A 04/27/82 0 000 02 10000.142

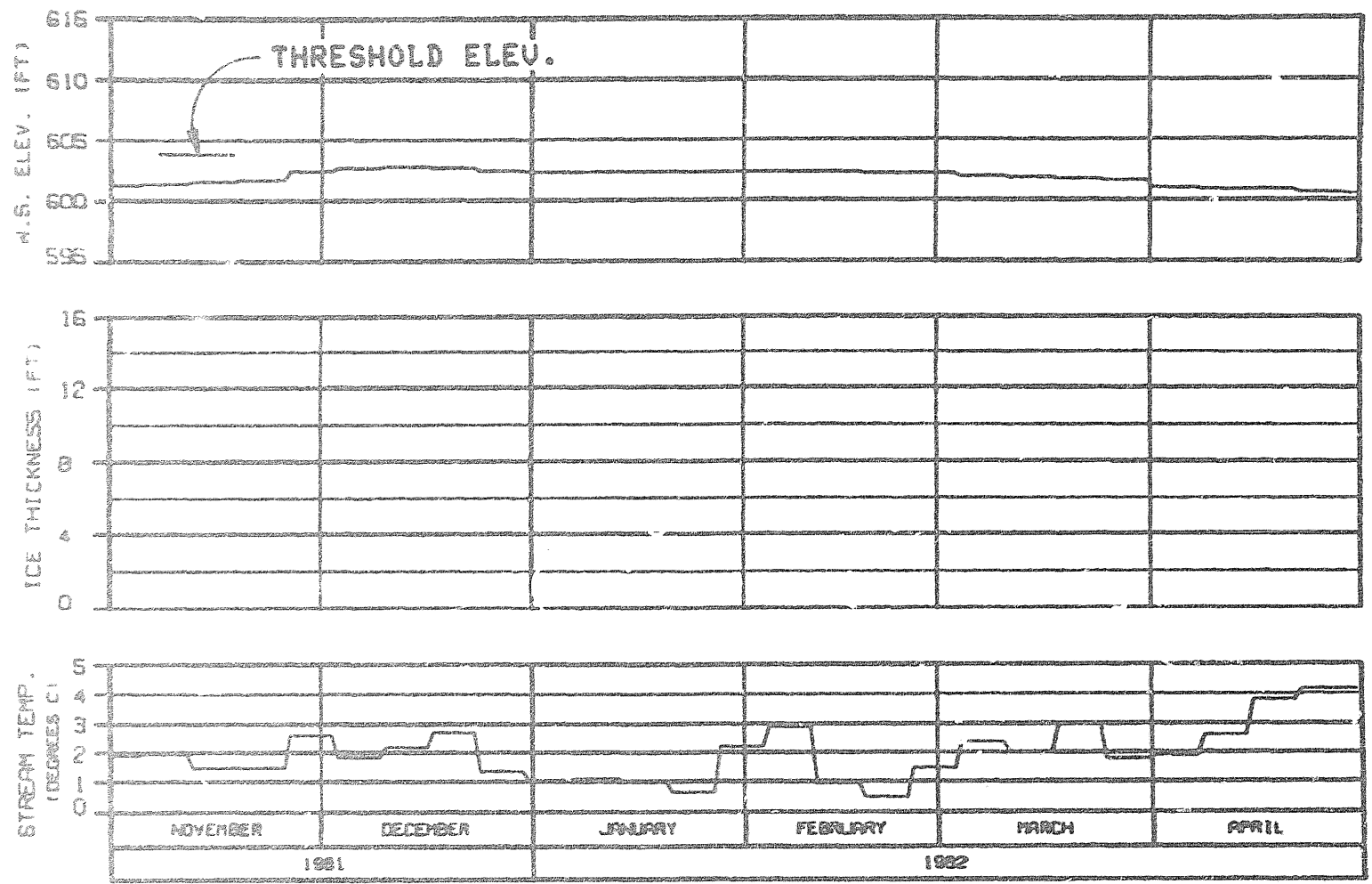


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ORDER NO. 81-104-02	0 725 03
1982.142	



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

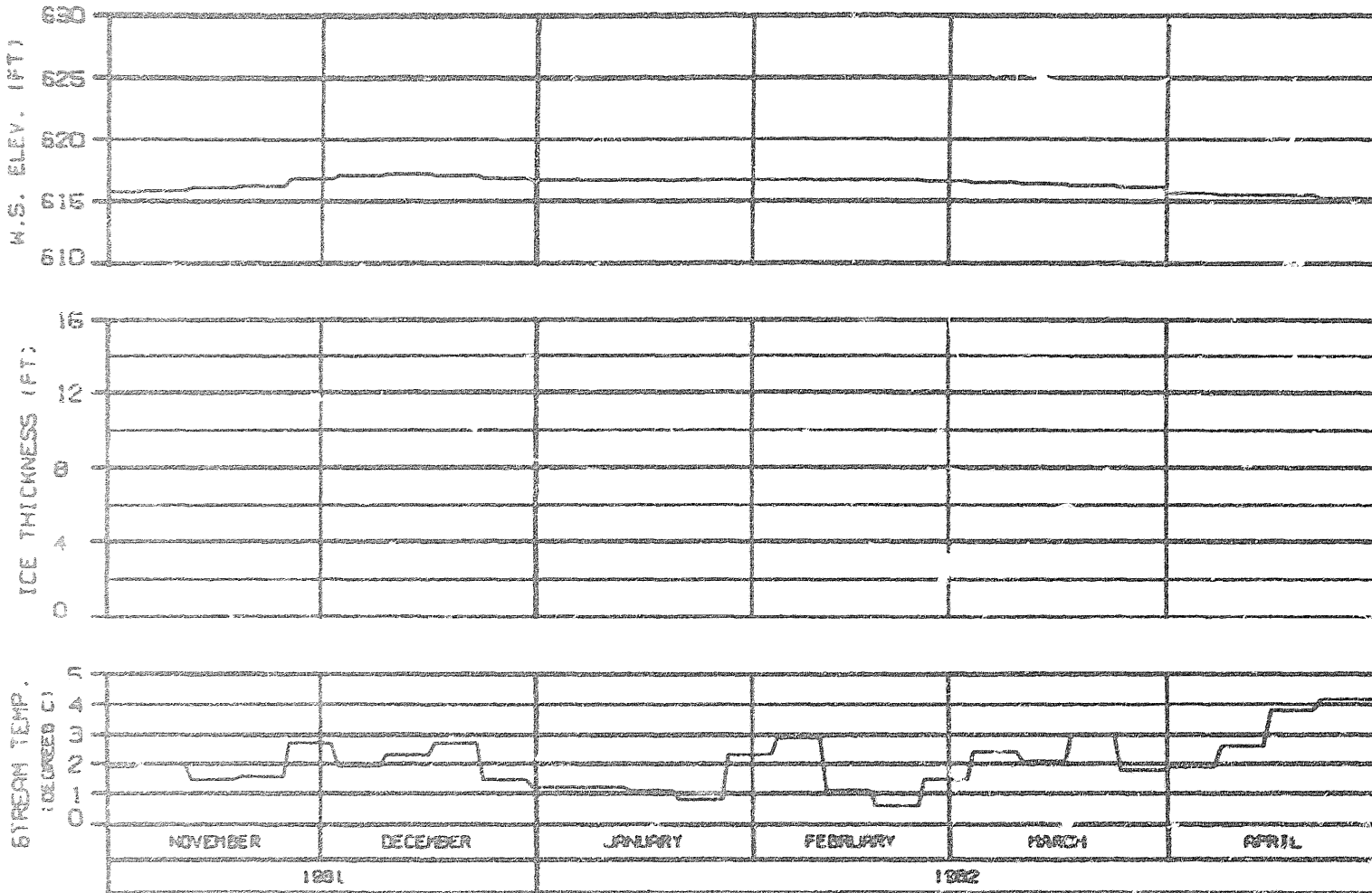
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-S FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : B101EWA

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DATE: 11/19/82	ISSUE NO: 103

OPTION?

OPTION 9

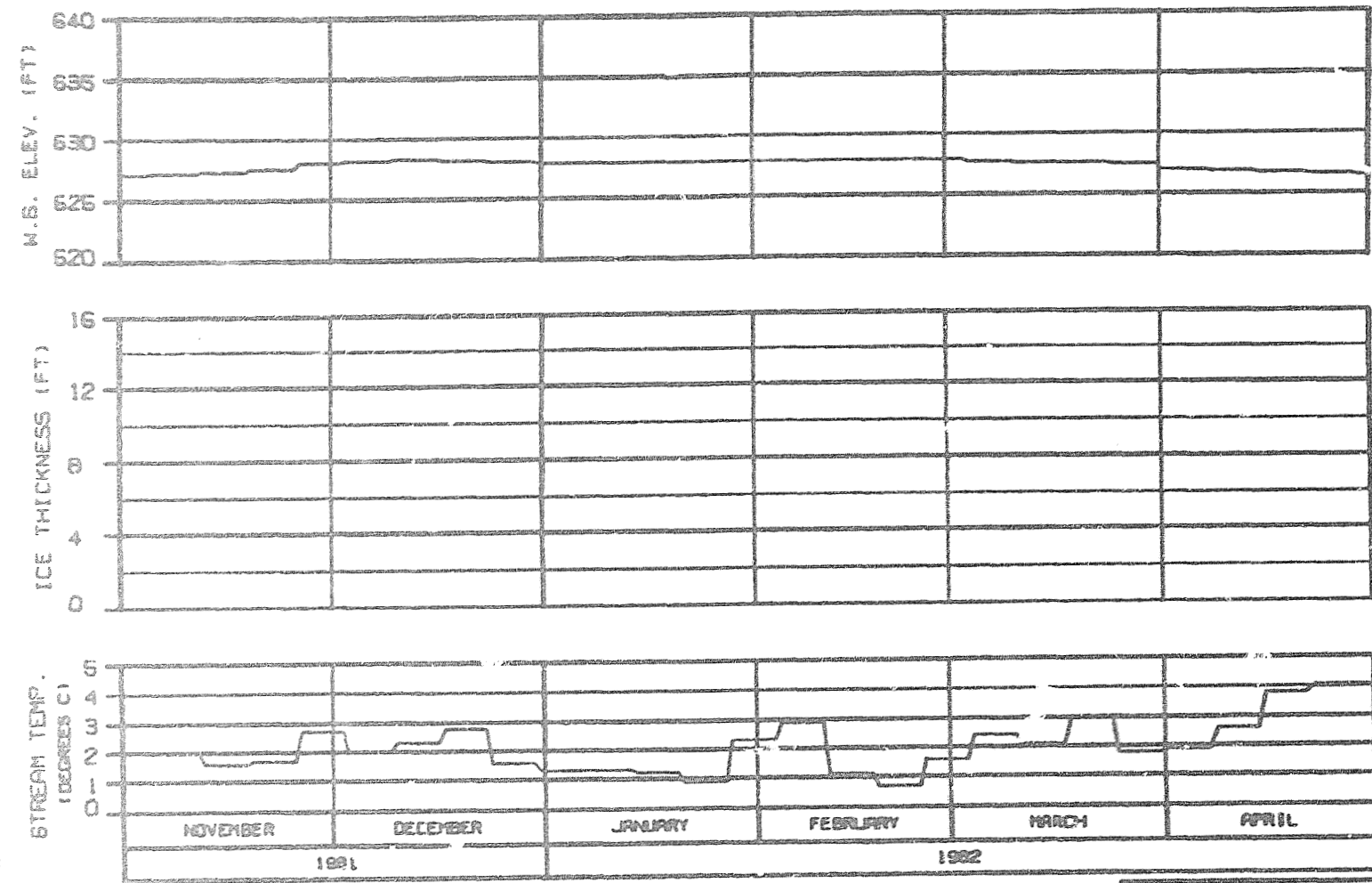


SIDE CHANNEL U/S OF SLOUGH 9
 RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERAPCO JOINT VENTURE	
DESIGNED: H.L. GARDNER	DRAWN: G. F. B. B. B.
1982.142	

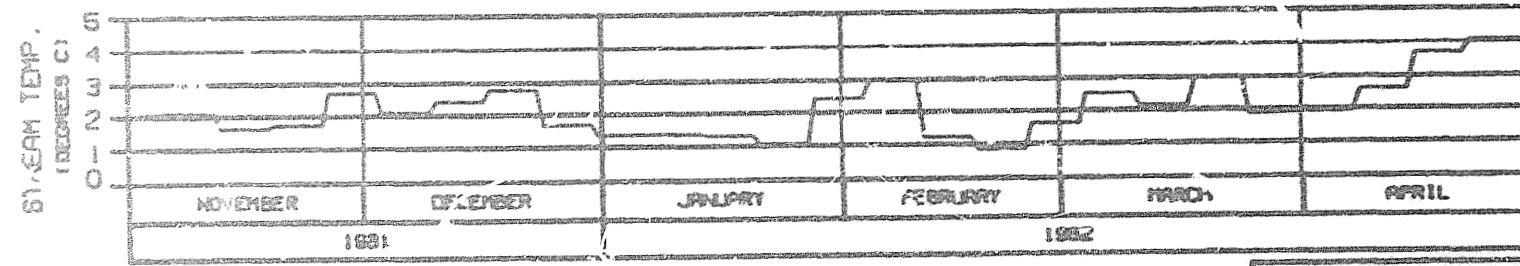
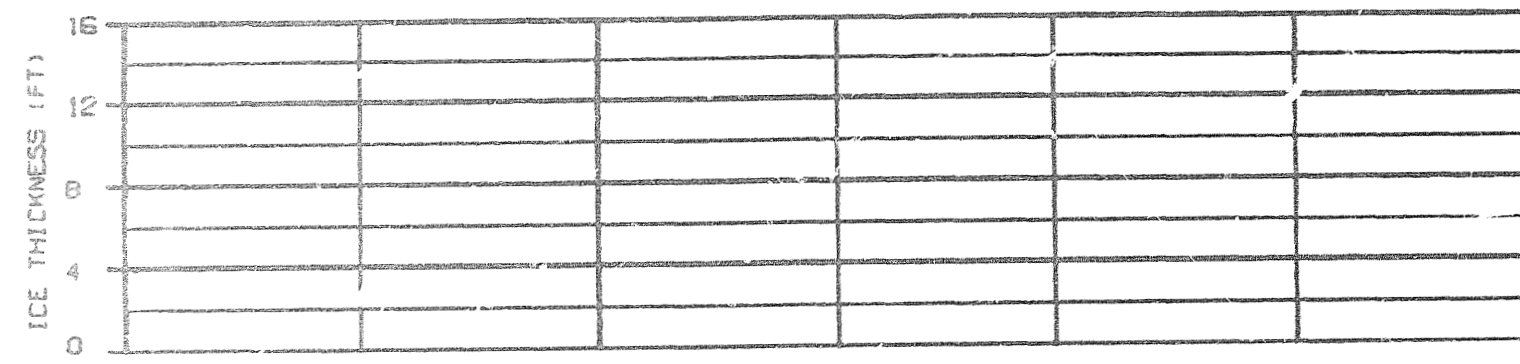
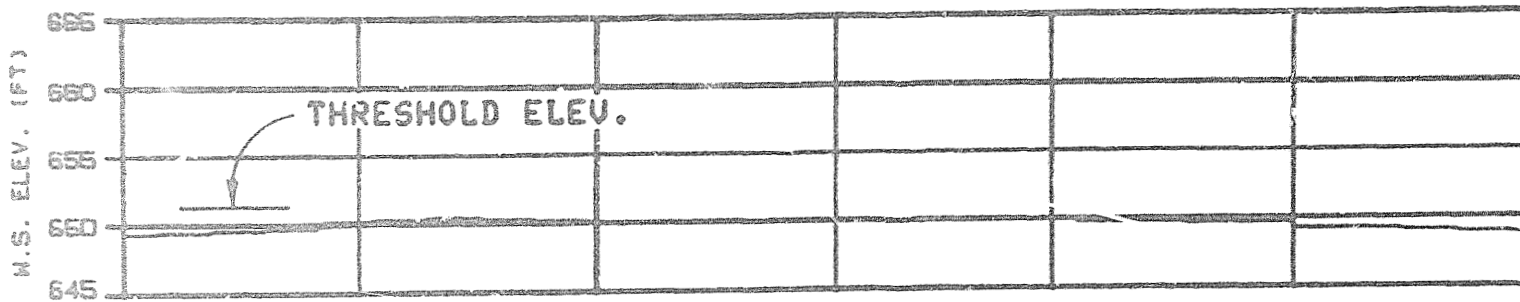


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 200,
 CASE E-6 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDASCO JOINT VENTURE	
REVISED: 11/1/82	ISSUED: 11/1/82
BY: JES	1000-142

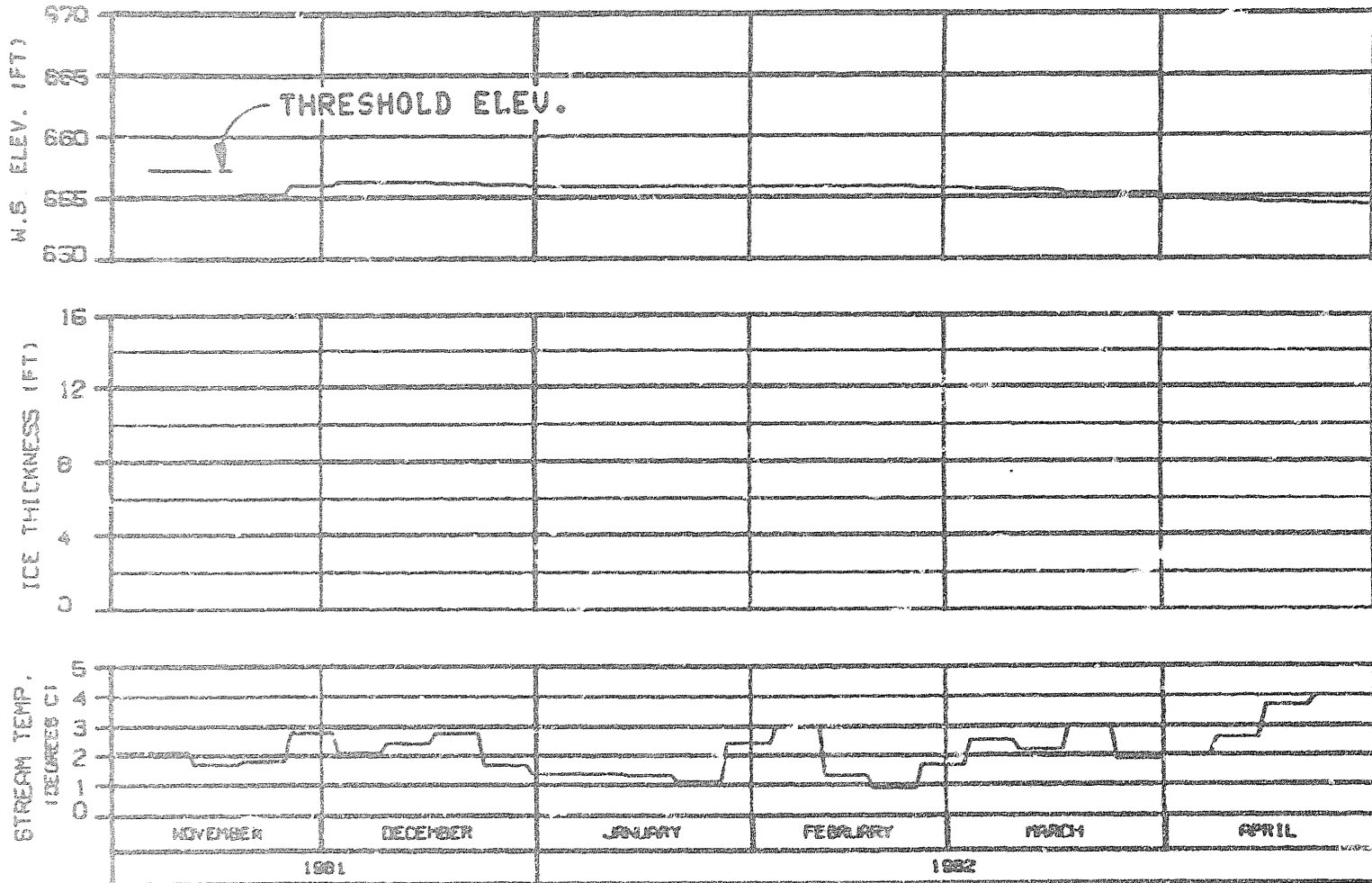


ICE THICKNESS LEGEND:
 --- TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

WEATHER PERIOD : NOV 01 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 81016WA

ALASKA POWER AUTHORITY	
BRITISH PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAZA-EBRSCO JOINT VENTURE	
CHARGE: 81016WA	0 FEB 82
1000.142	

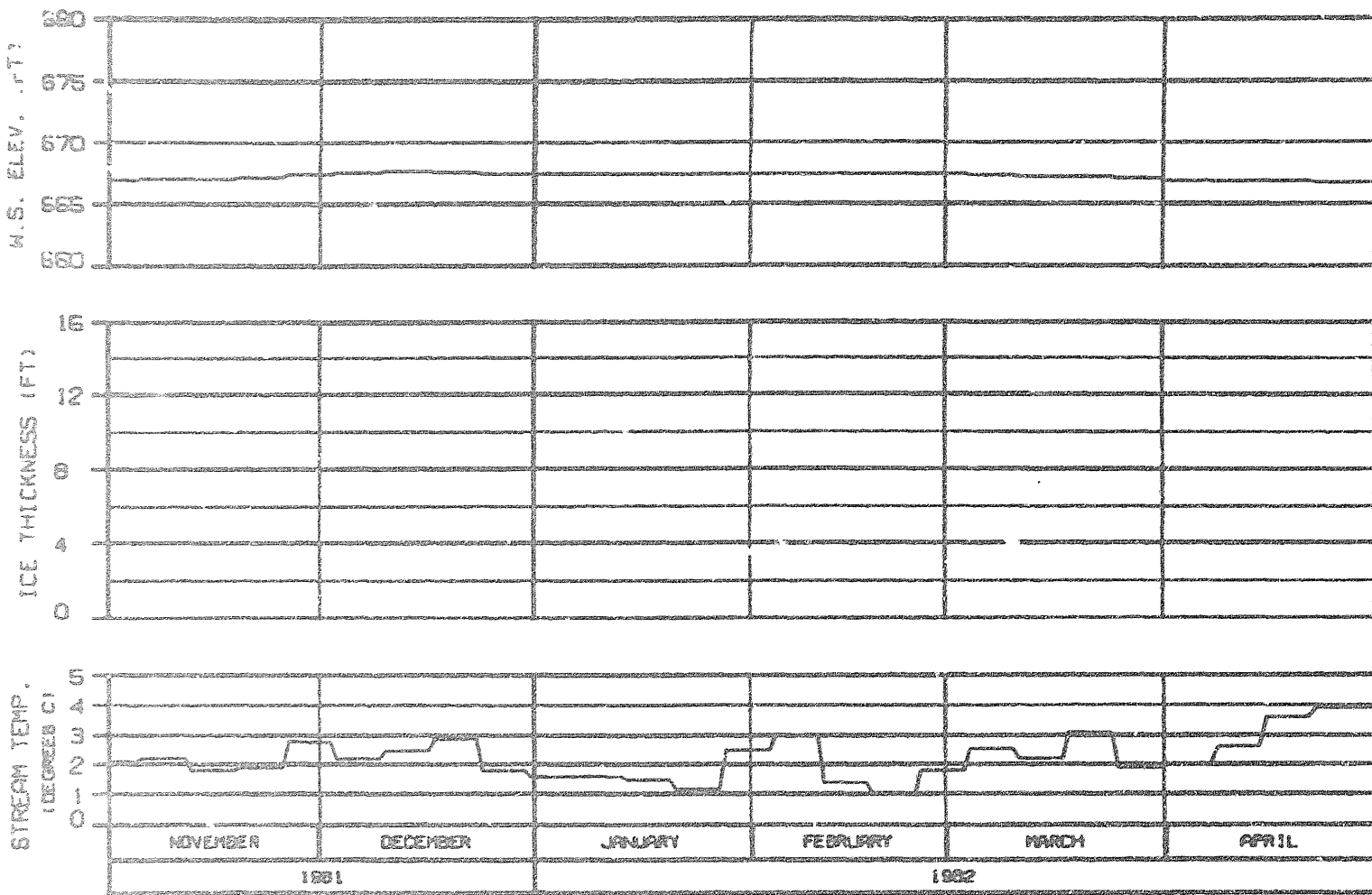


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS : TEMP, WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RLIN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAPDA-EBRACO JOINT VENTURE	
PROJECT: 81-0023	0 FEB 82
1000.142	

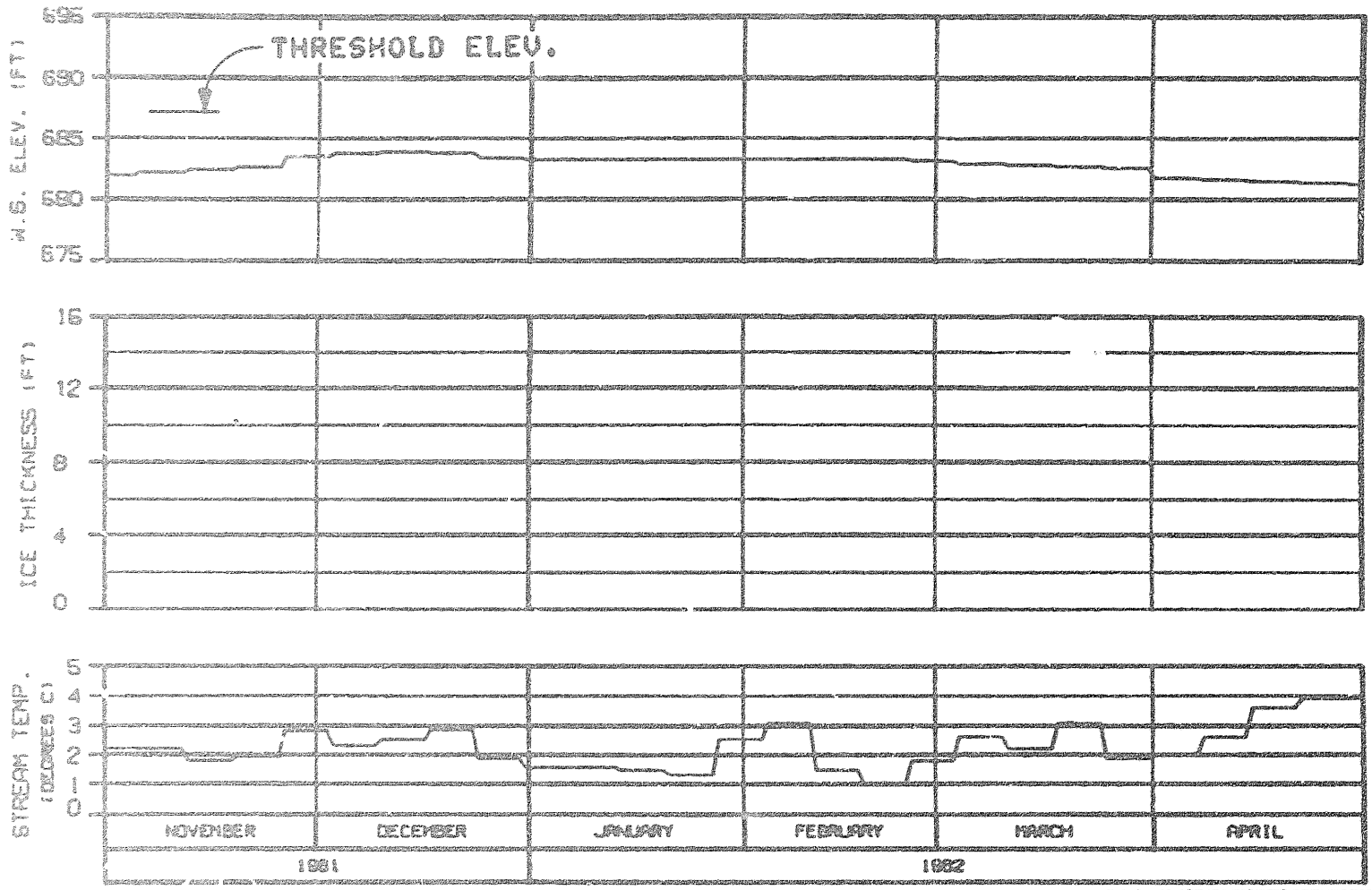


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 3101EWA

ALASKA POWER AUTHORITY.		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: SLD/STW	DRAWN: SLD/STW	1588.142

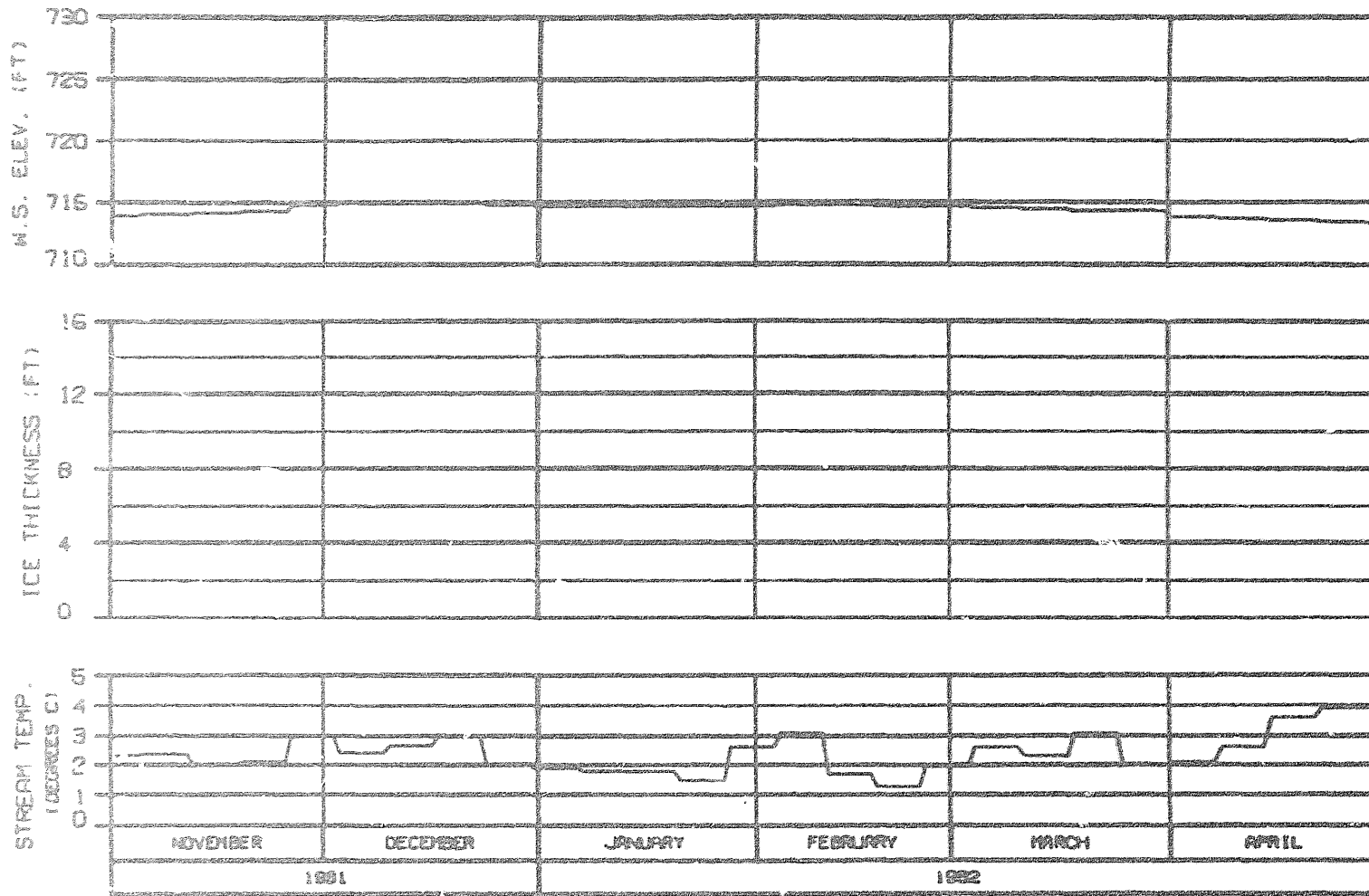


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-5 FLOWS TEMP, WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : BIOLENA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARA-ESPACO JOINT VENTURE		
DATE: 01.15.82	BY: JES/MS	FIG. NO. 148

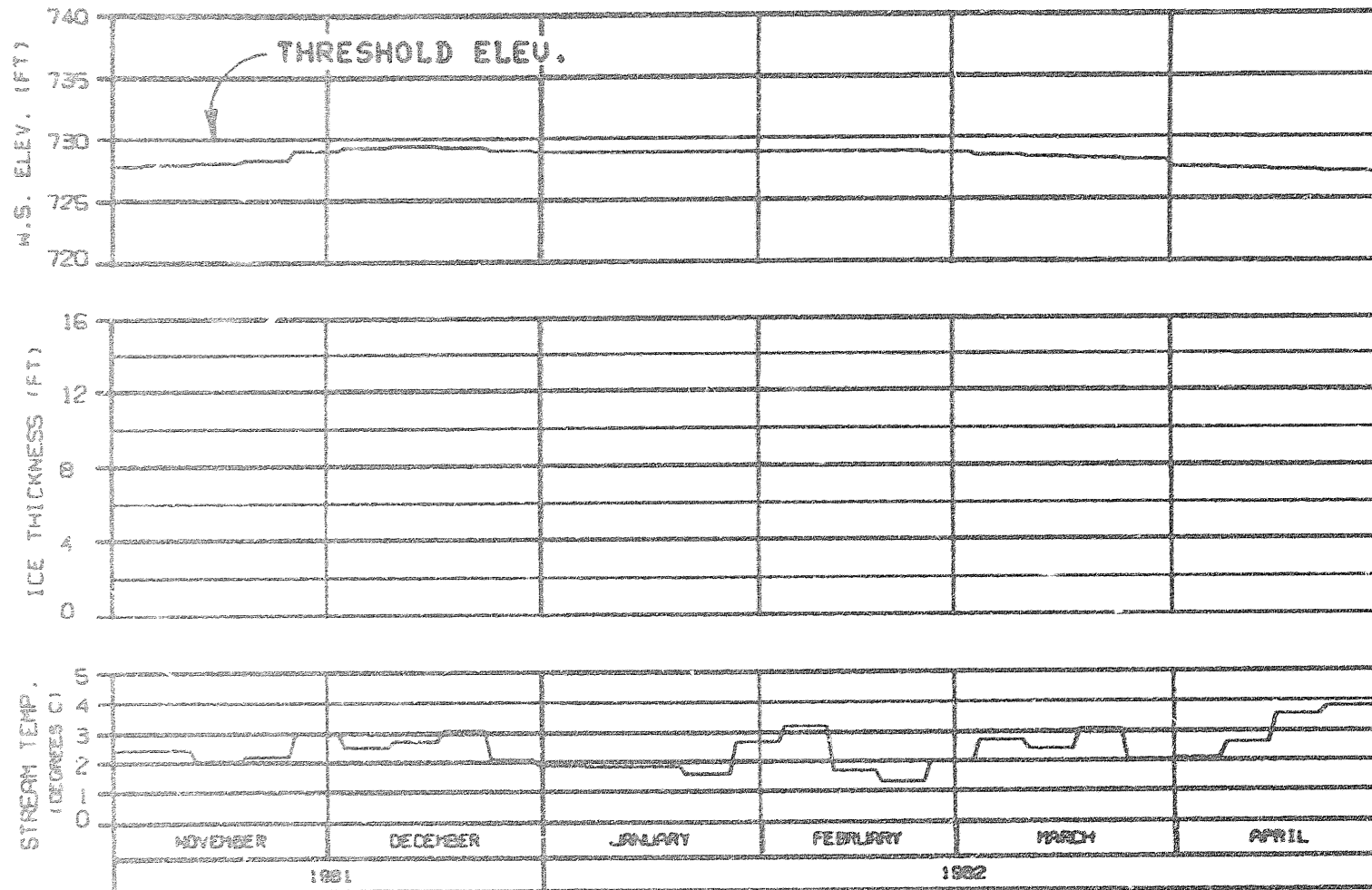


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : B101EWA

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: ALL PAGES	REV: 025 42
PAGE: 142	

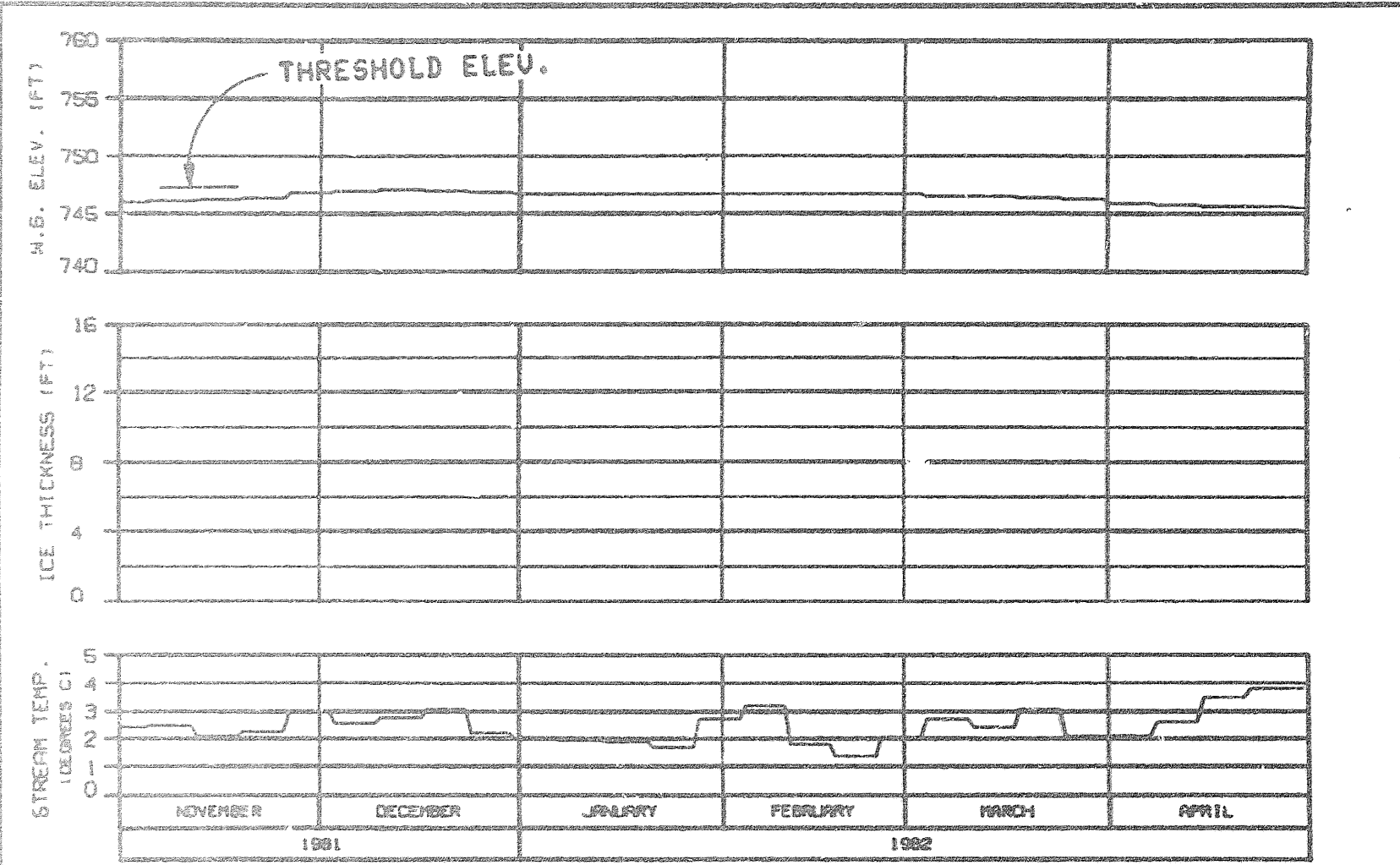


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

HEAD OF SLOUGH 20
 RIVER MILE : 140.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE E-6 FLOWS : TEMP: WARMEST WATER
 EXISTING MATANA INTAKE DESIGN
 REFERENCE RUN NO. : 6101EWA

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SLUITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBAGOD JOINT VENTURE		
000000-0104070	0 FEB 82	0002.142

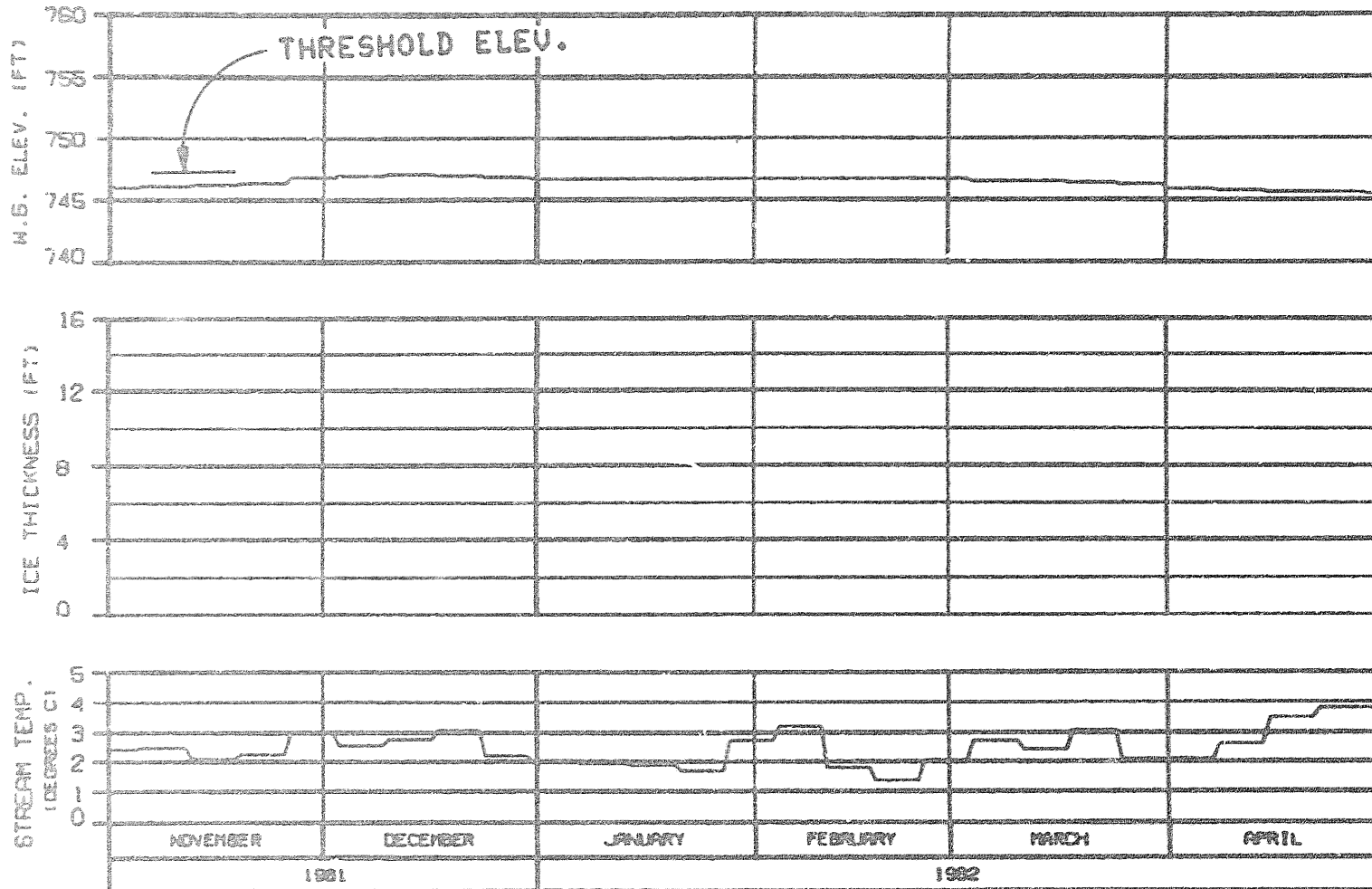


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING NATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8101EWA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-ENBECO JOINT VENTURE	
DESIGN: H.A. DAVIS	DATE: FEB 82
FIG. 14B	

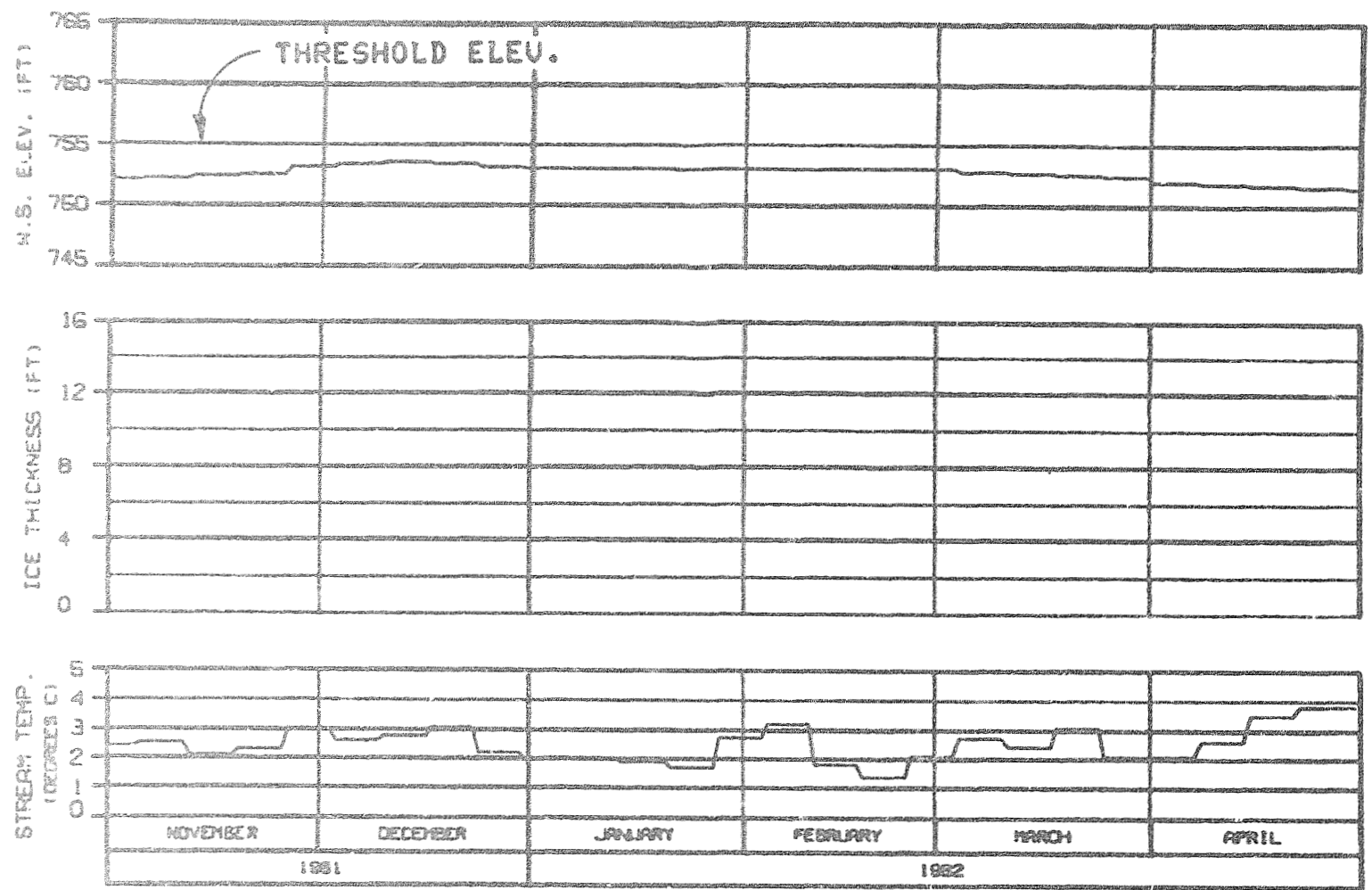


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 810LEWA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EGASCO JOINT VENTURE	
DESIGNED BY: DILLON	8 FEB 92
1500.142	

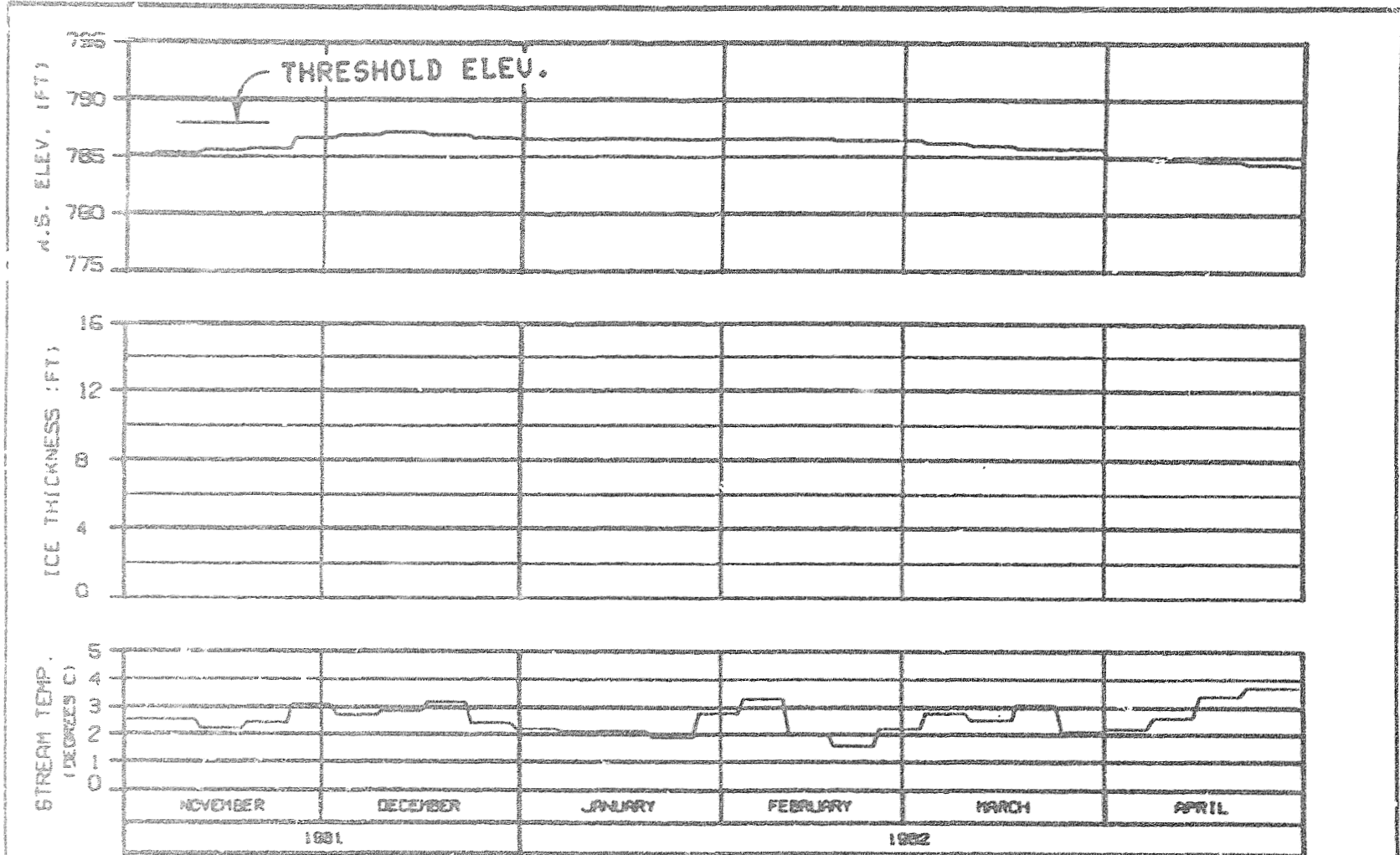


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUE-I COMPONENT

HEAD OF SLOUGH 21
 RIVER MILE : 142.20

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-6 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 6101EWA

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WATANA-EBASCO JOINT VENTURE	
DESIGNED BY: D.L. DEBO	DATE: 6 FEB 82
1000-142	



HEAD OF SLOUGH 22
RIVER MILE : 144.80

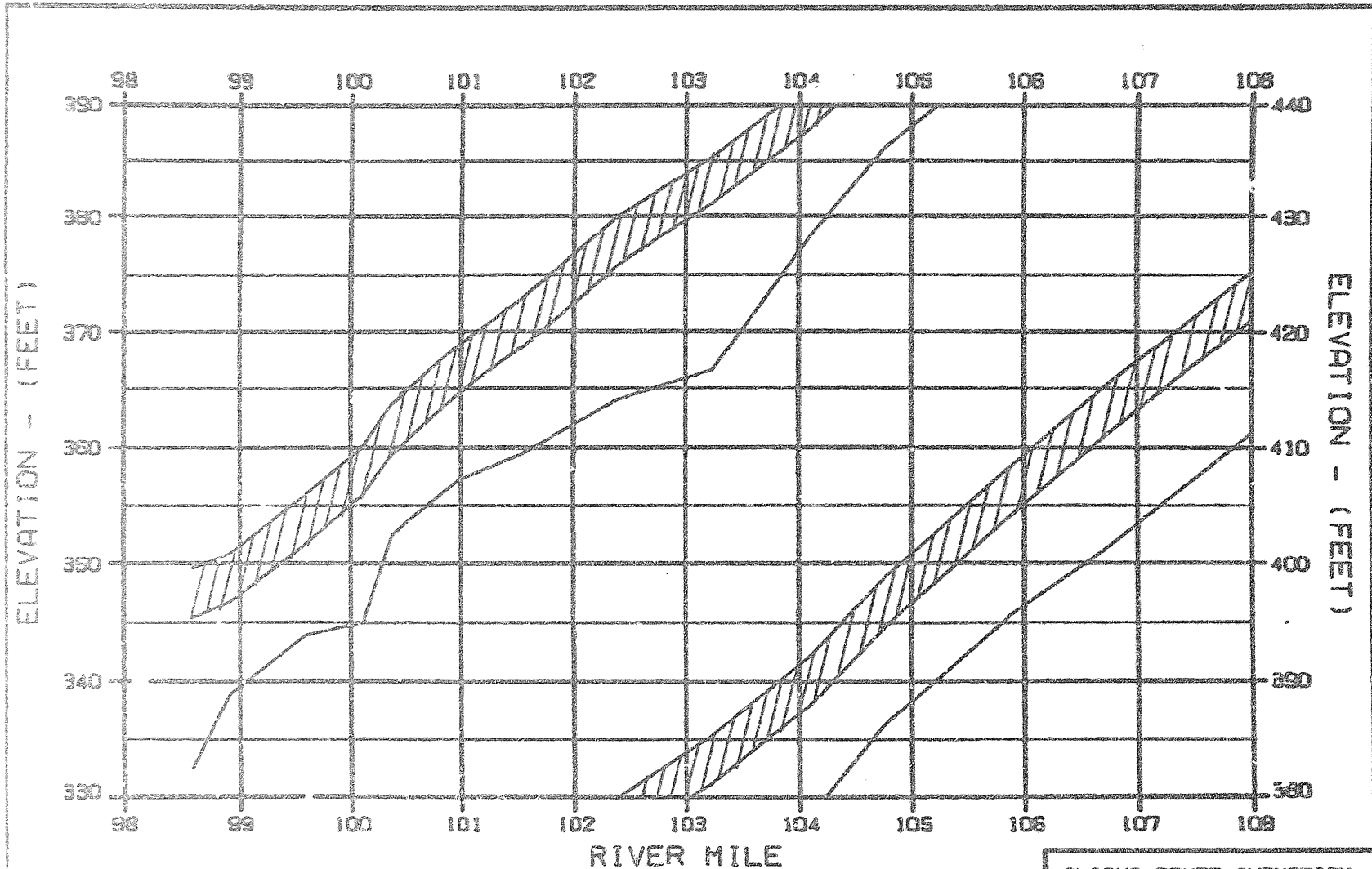
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-5 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : B101EN4


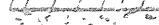


ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 04.08.82	1000.102

OPTION?

EXHIBIT F



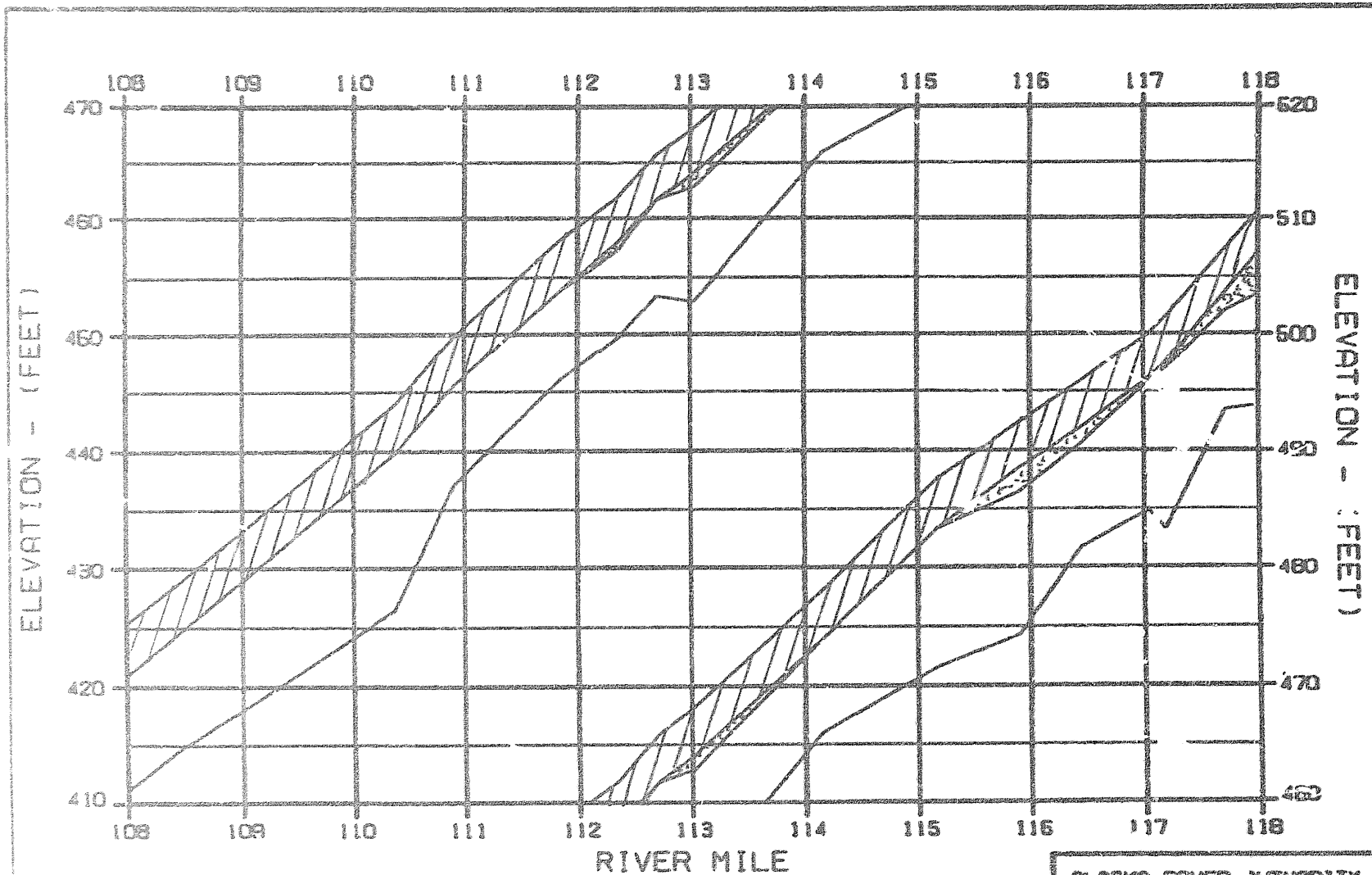
LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RLE : WARMEST WATER
 REFERENCE RUN NO. : 7101CMB

ALASKA POWER AUTHORITY
SUSITNA PROJECT
SUSITNA RIVER
ICE SIMULATION
PROFILE OF MAXIMUM STAGES
HARZA-EBRARD JOINT VENTURE
DATE: 11/20/72
BY: J. L. H.
SCALE: 1/4" = 100'

OPTION 2



ELEVATION - (FEET)

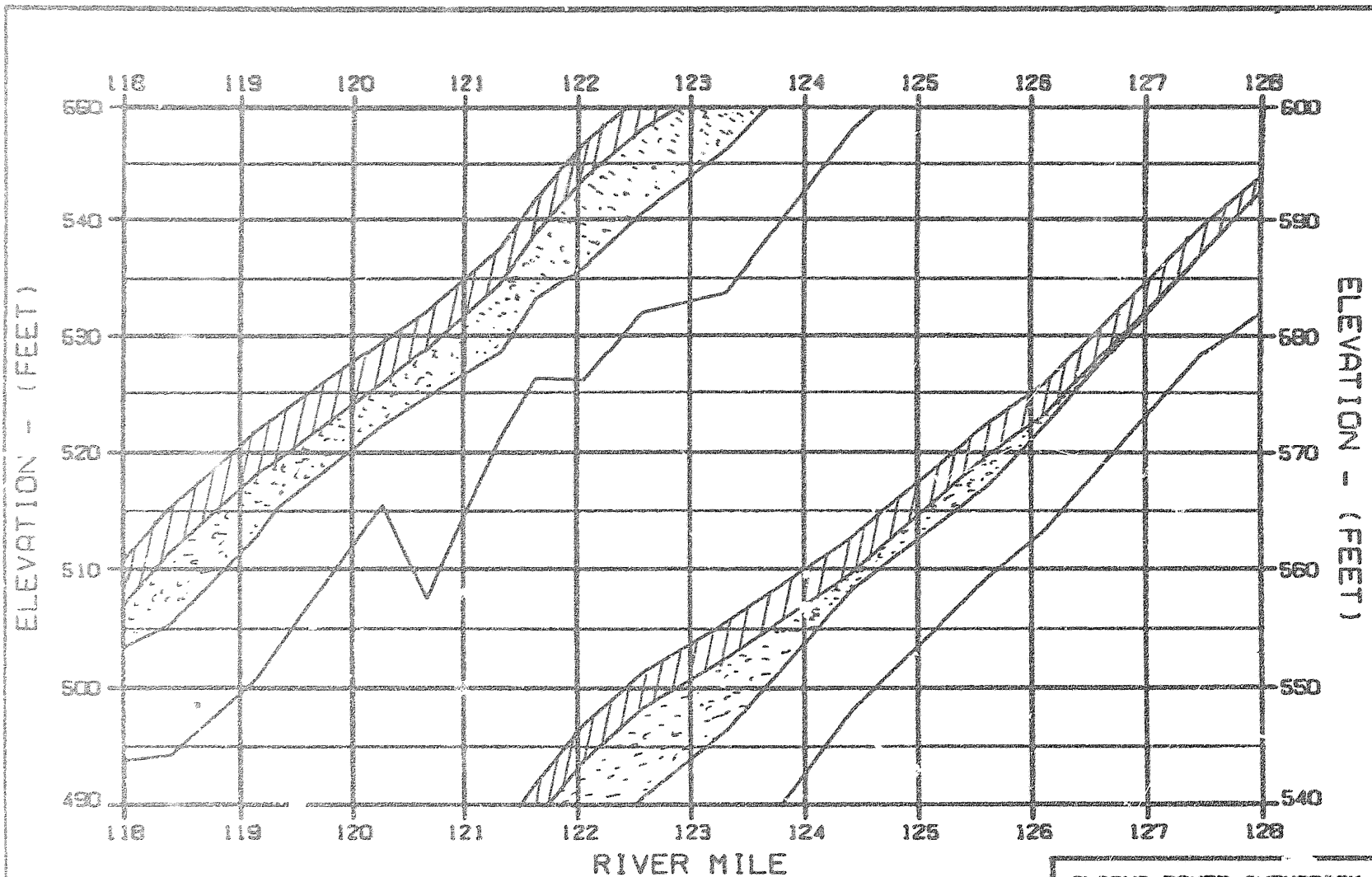
ELEVATION - (FEET)

LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWS


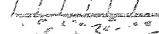
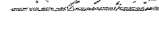
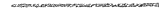
ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MORZA-EDRSCO JOINT VENTURE	
CHARTED - 11/11/72	BY 107 GP
1000.142	



ELEVATION - (FEET)

ELEVATION - (FEET)

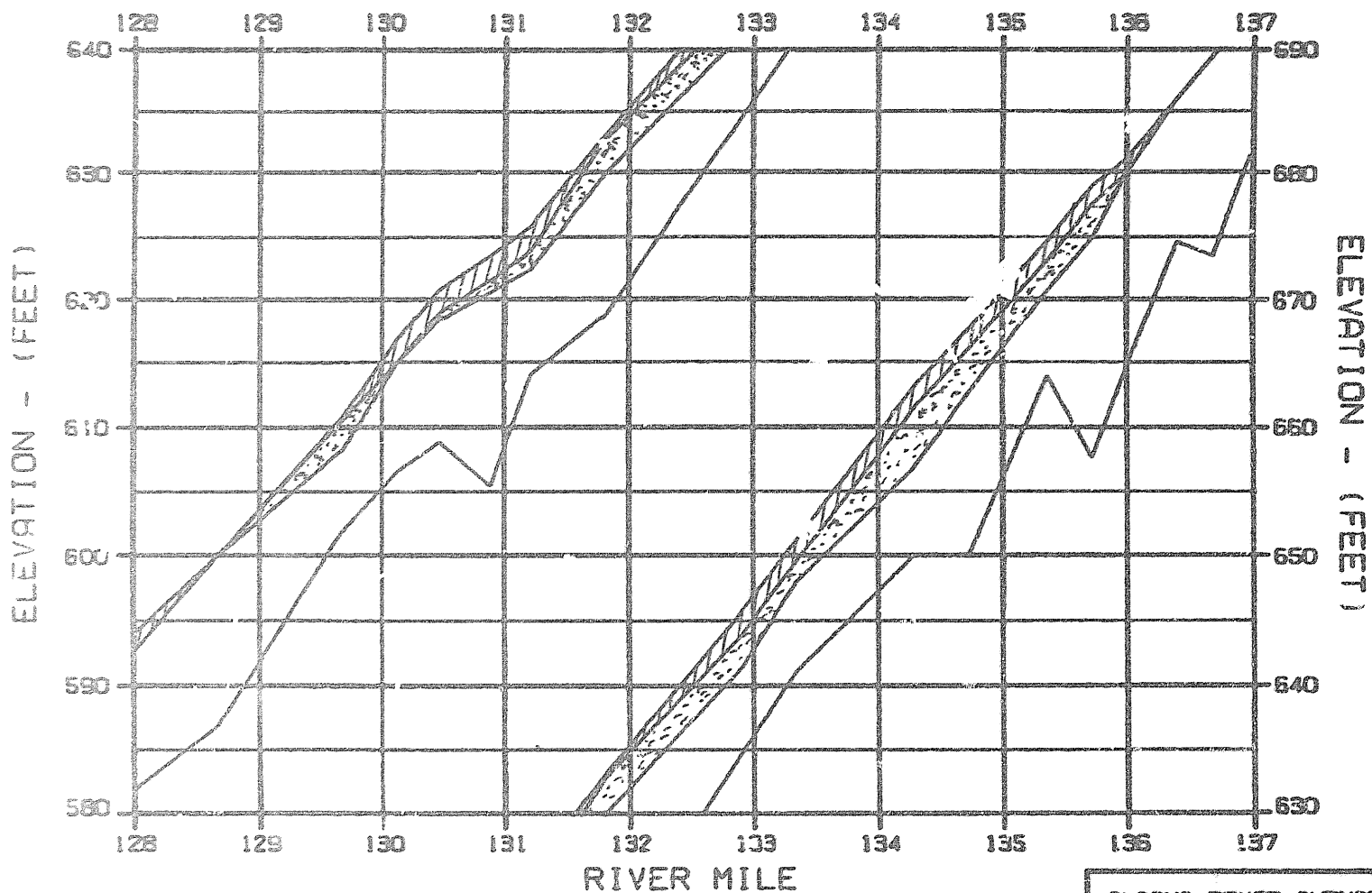
LEGEND:

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




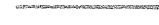
WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST WATER
 REFERENCE RUN NO. : 7101CMB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBRSCO JOINT VENTURE		
SCALE: HORIZONTAL	70 METERS	1:5000

OPTION 2

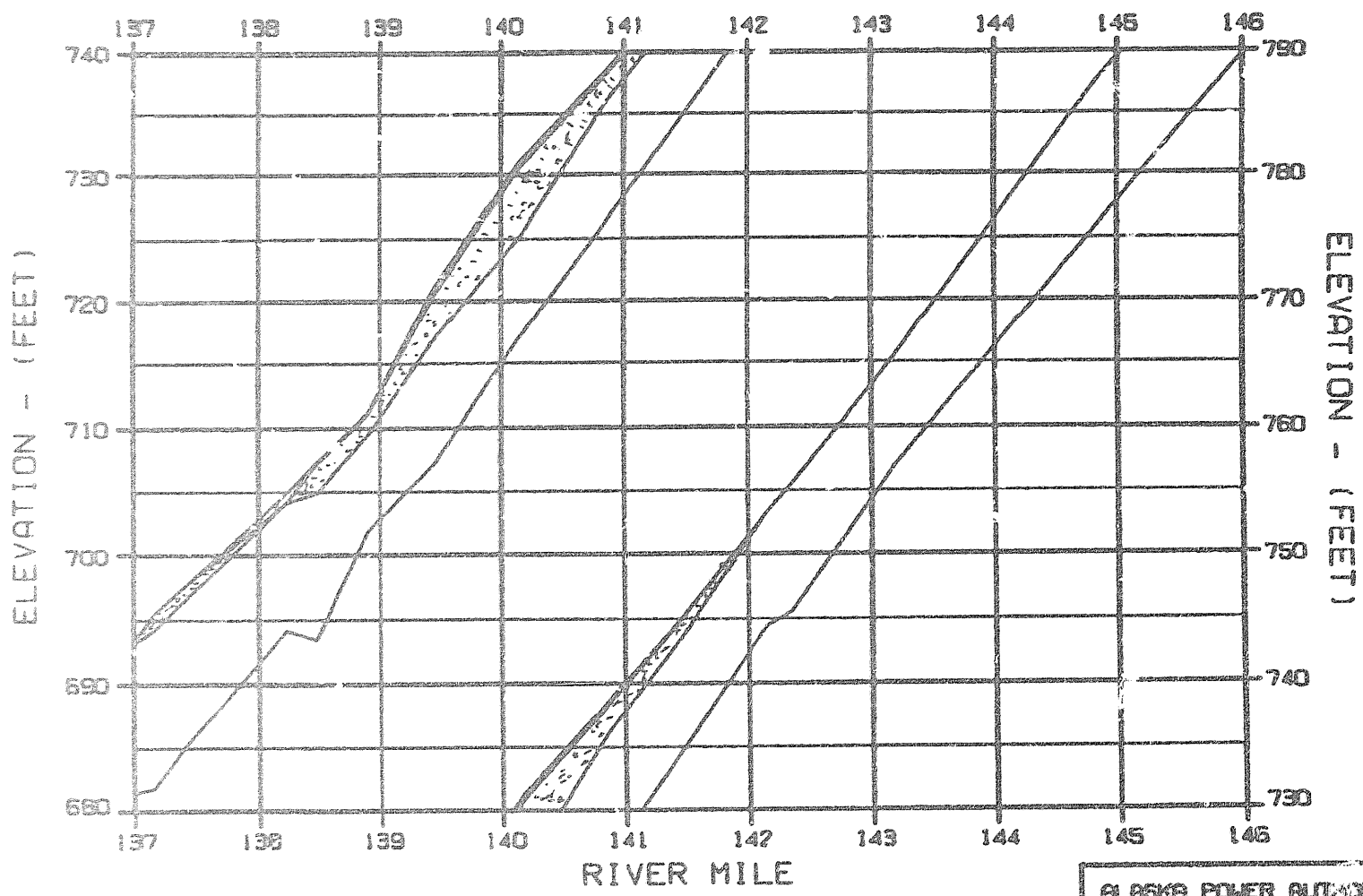


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CHB

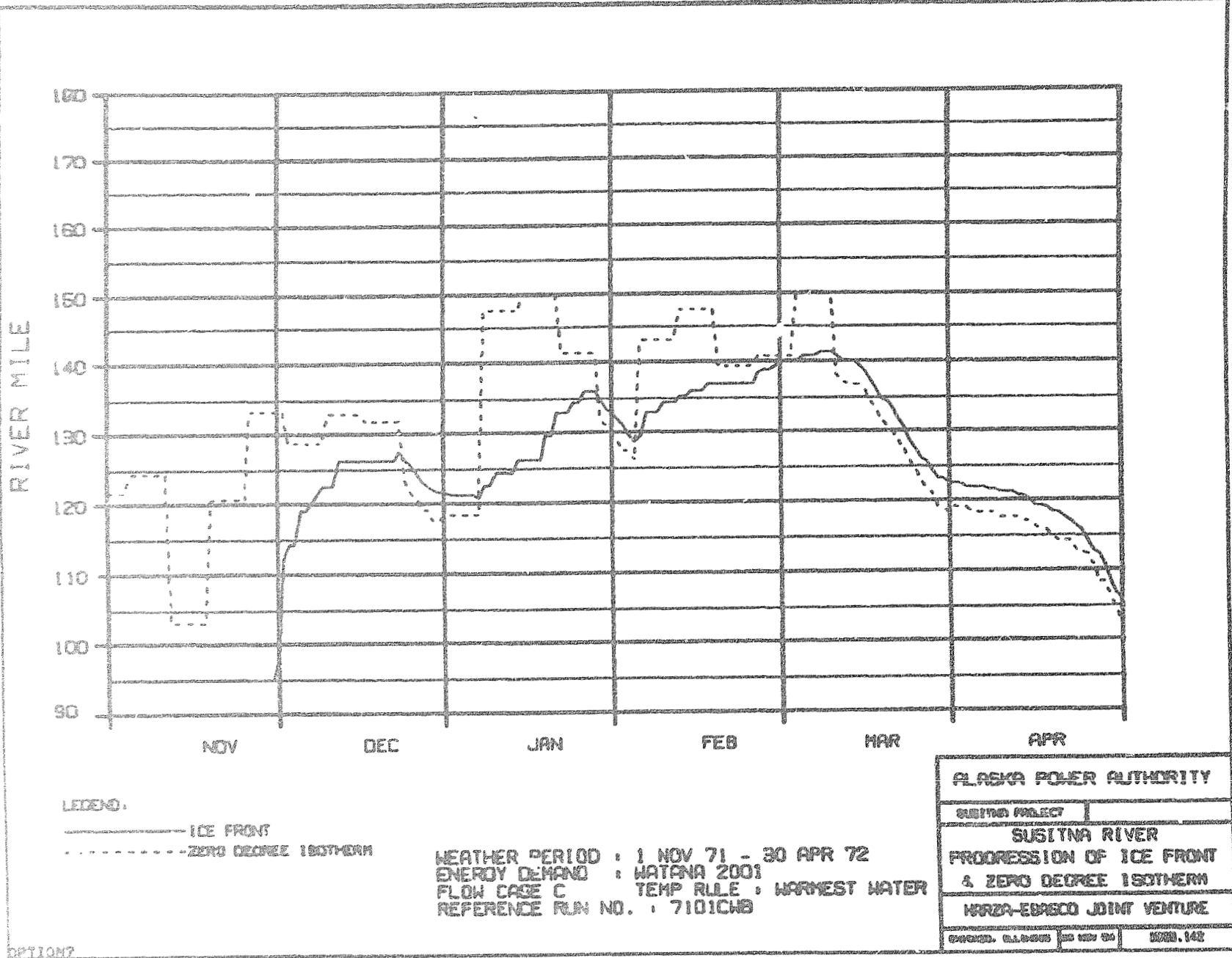
ALASKA POWER AUTHORITY	
SUSTINNA PROJECT	
SUSTINNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARA-EGASCO JOINT VENTURE	
DESIGNED BY	1048.142



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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLYING TEMP FILE : WARMEST WATER
 REFERENCE RUN NO. : 7101CMB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HOKA-EBASCO JOINT VENTURE	
DATE: 11/20/72	BY: JWS
SHEET 148	

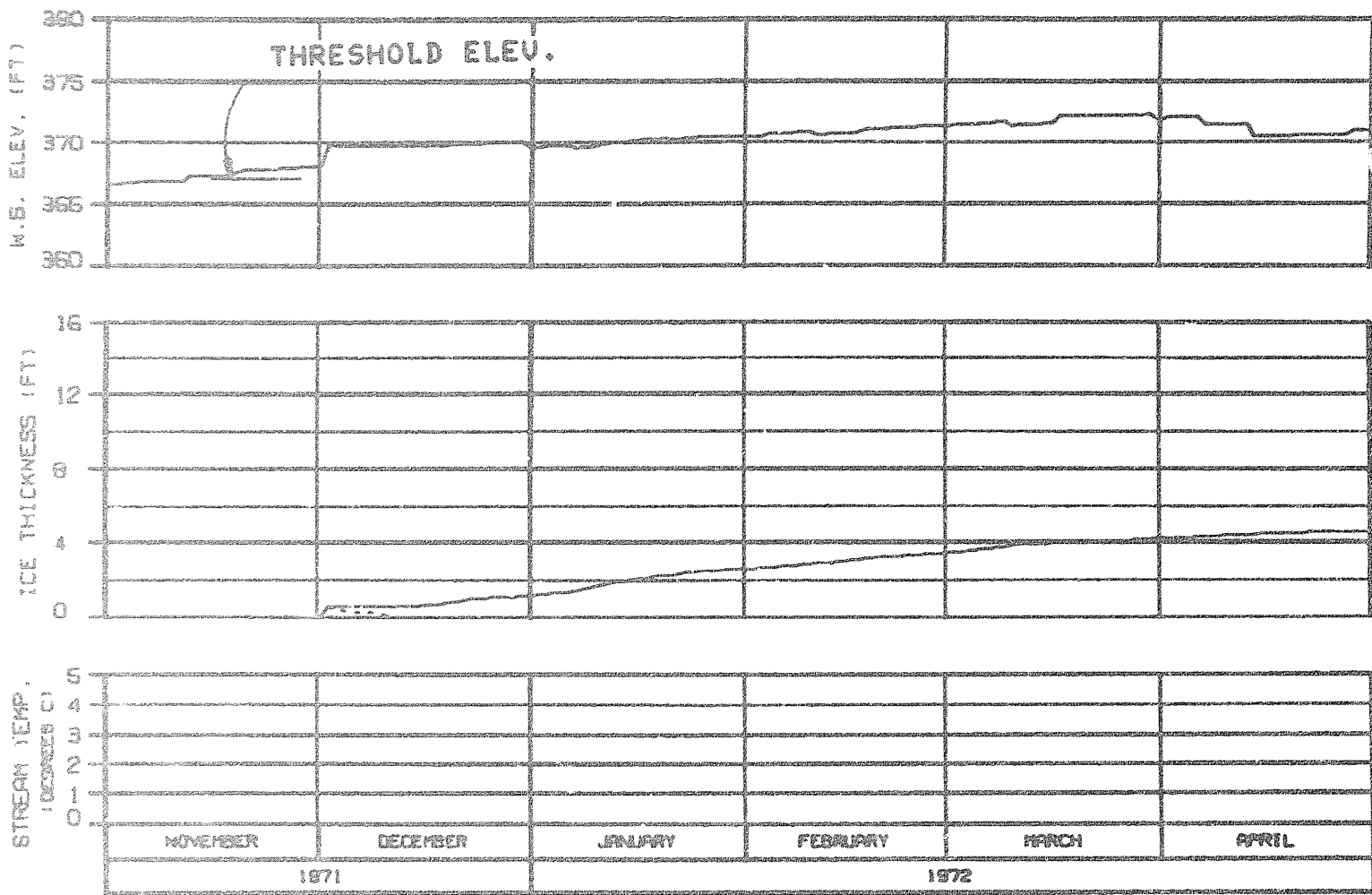


LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 FLOW CASE C TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CHB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
WARZA-EDASCO JOINT VENTURE		
DATE: 11-20-71	BY: JWB	5220.142

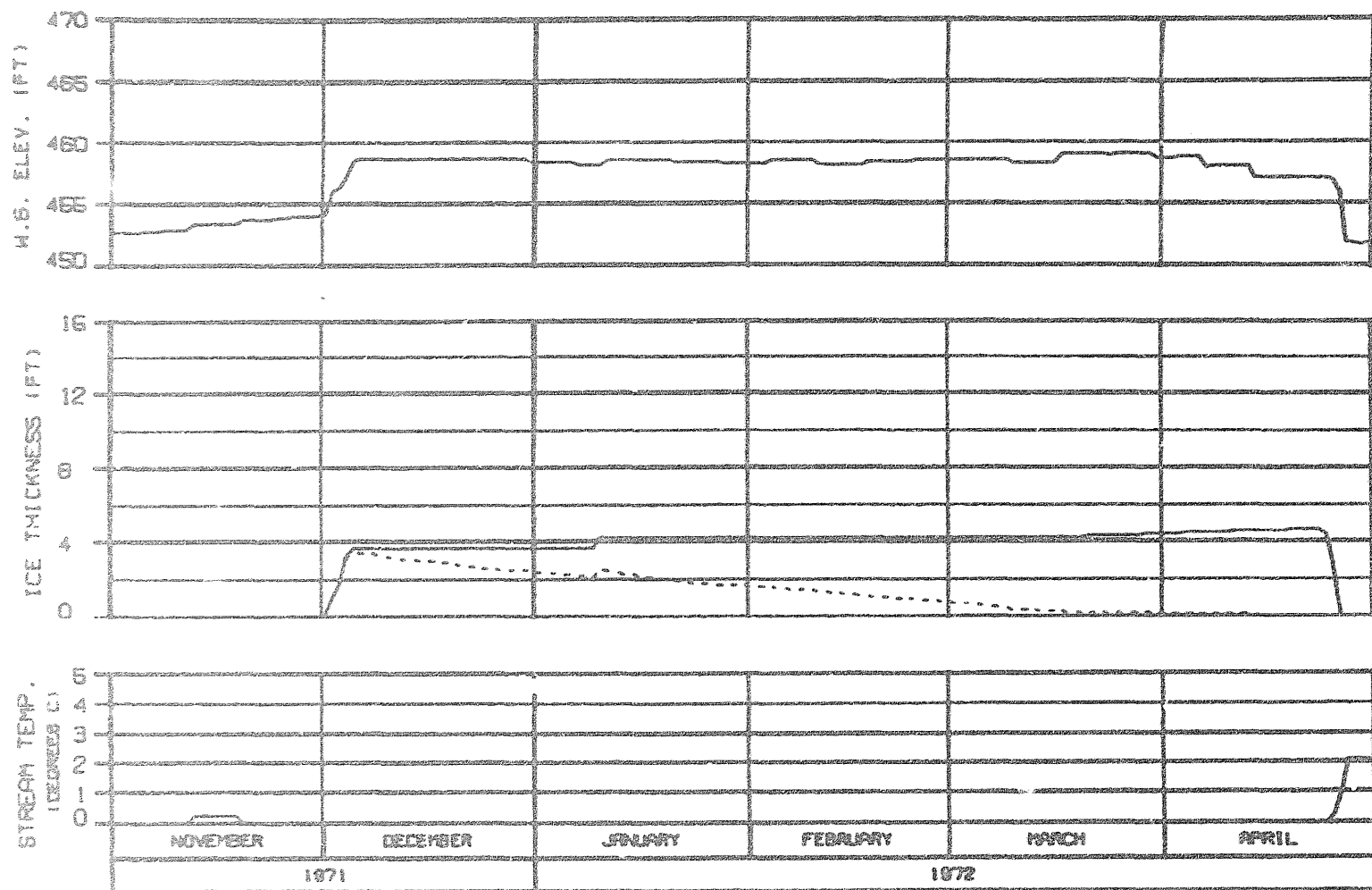


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EDRACO JOINT VENTURE	
CHARGE: AL-1475	ISS: NOV 71
PAGE: 143	

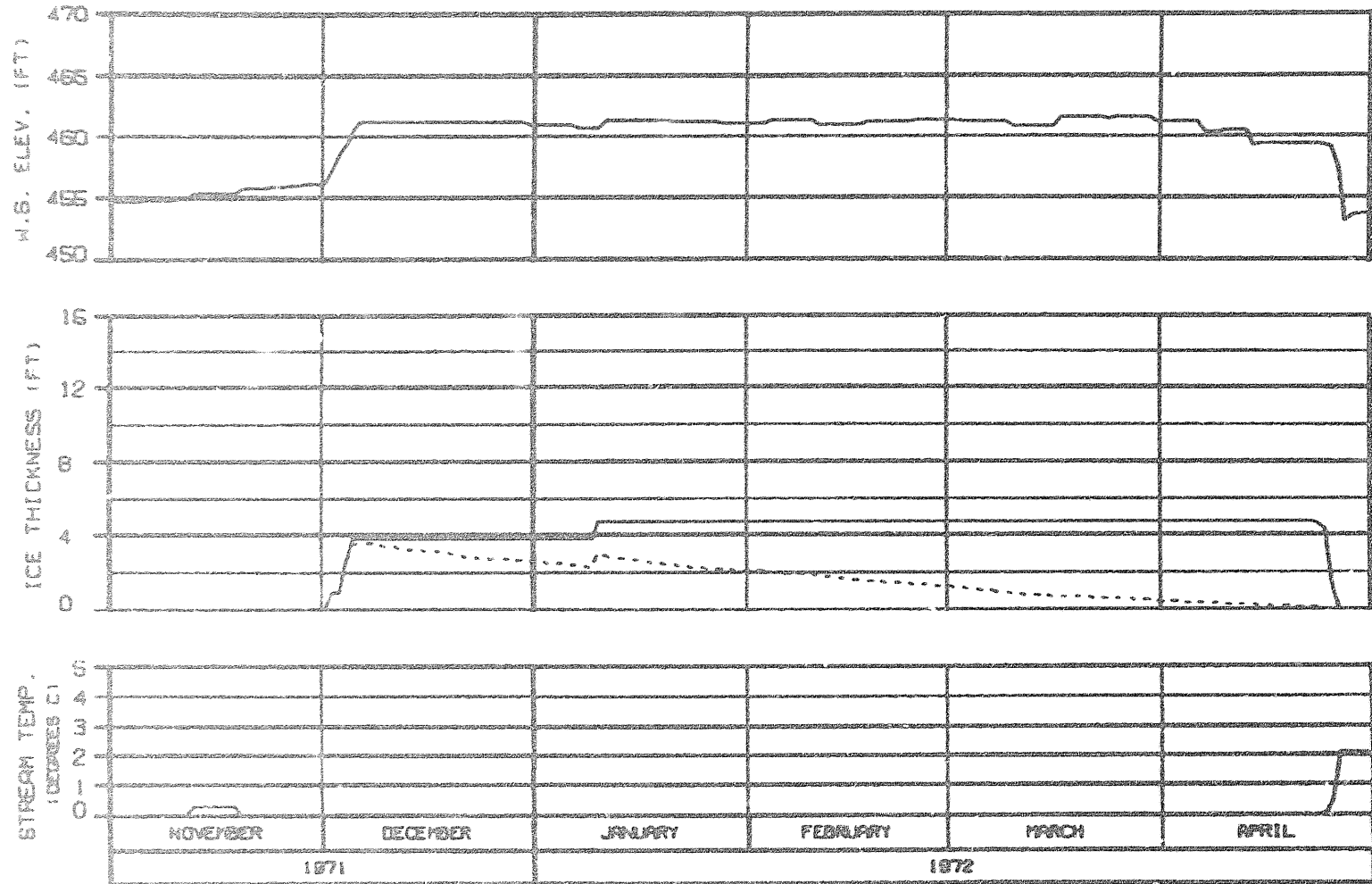


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARSA-EBASCO JOINT VENTURE		
DESIGN - 11-19-71	BY 620 62	1982.142

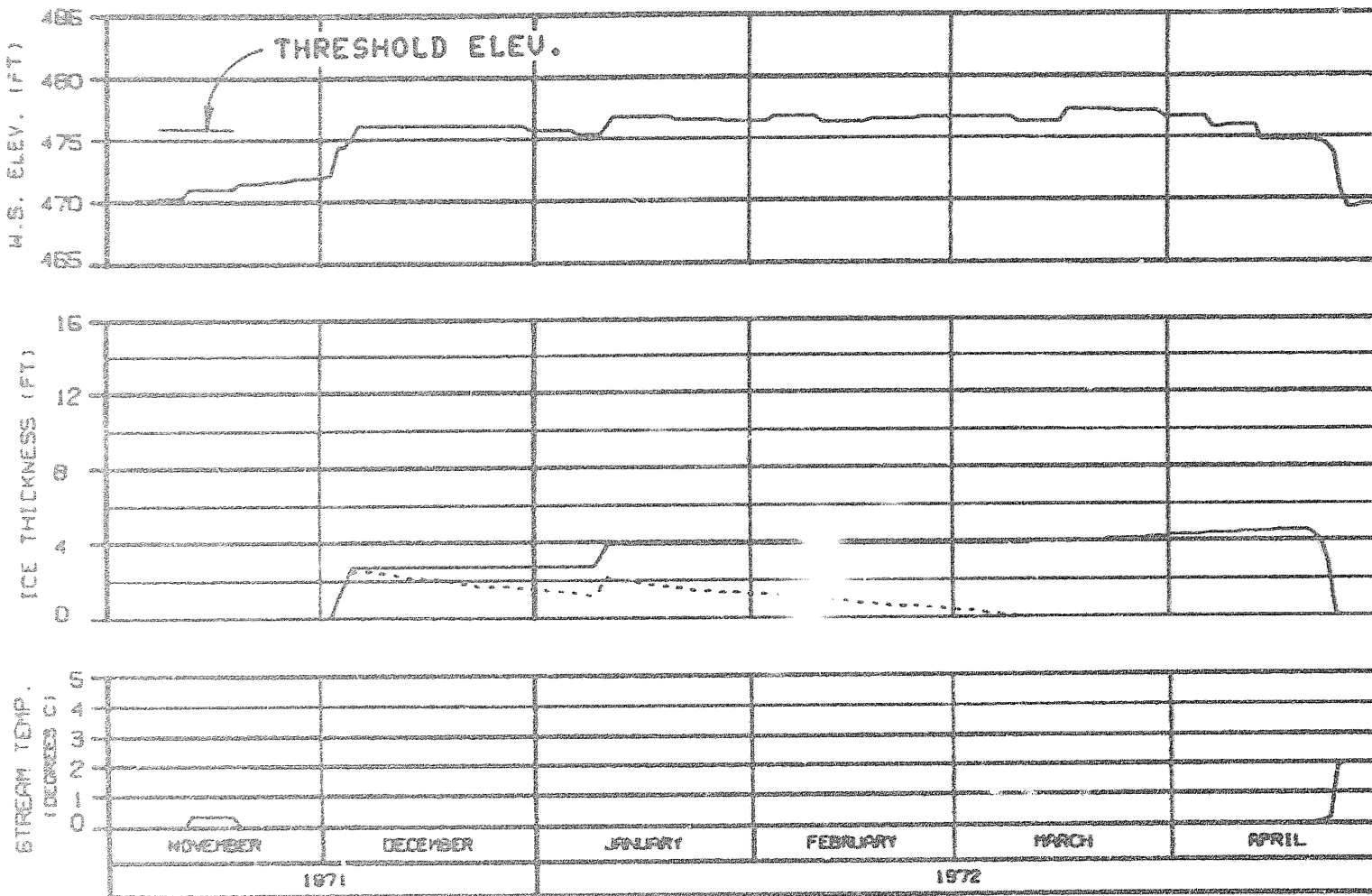


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101C-2

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDASCO JOINT VENTURE		
DESIGNED BY	DATE	REVISION
ILLIUM	03 APR 72	0000.102

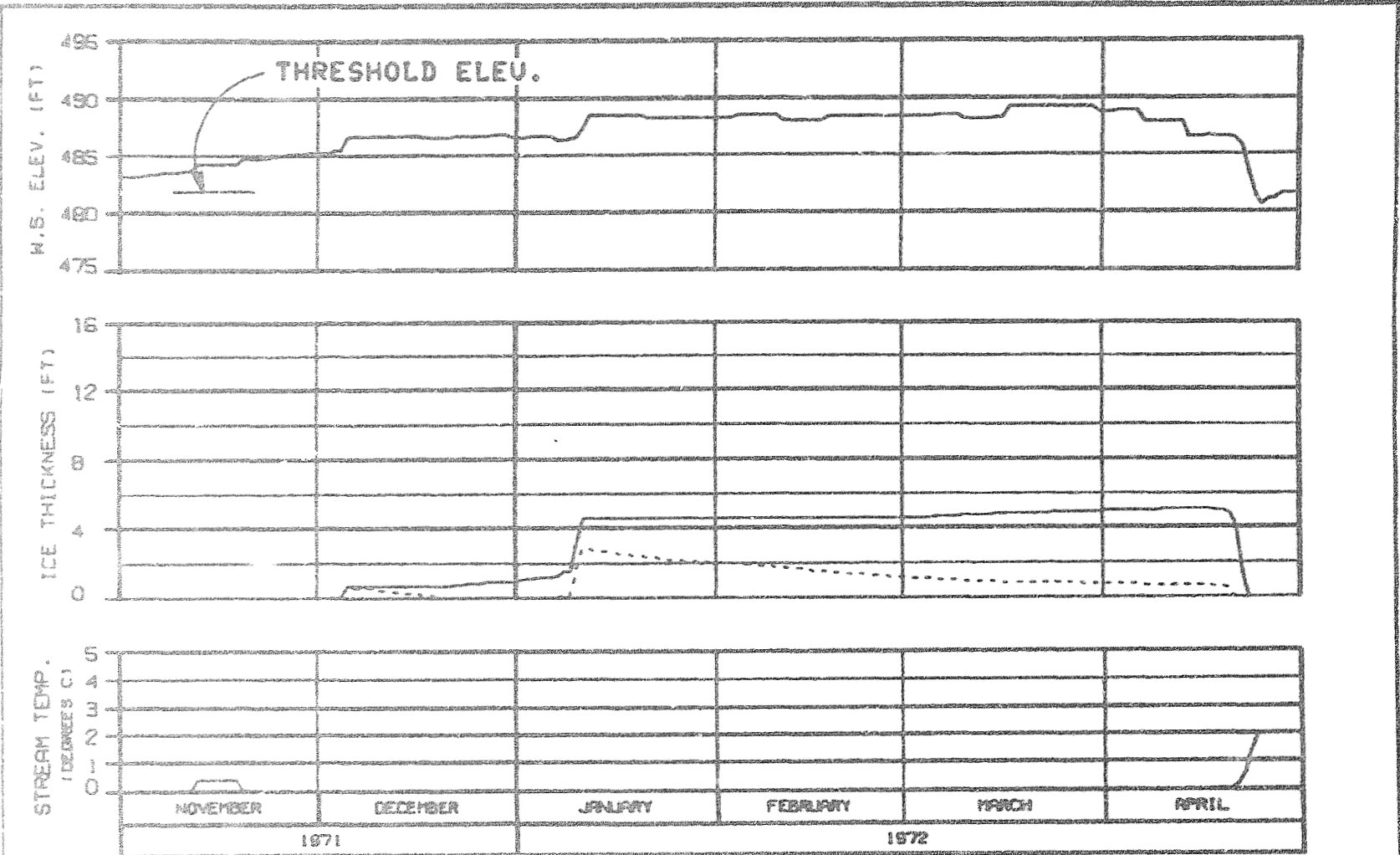


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CMB

ALASKA POWER AUTHORITY	
SIUSITNA PROJECT	
SIUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGNED BY: H.L. O'NEILL	DATE: 1972.142

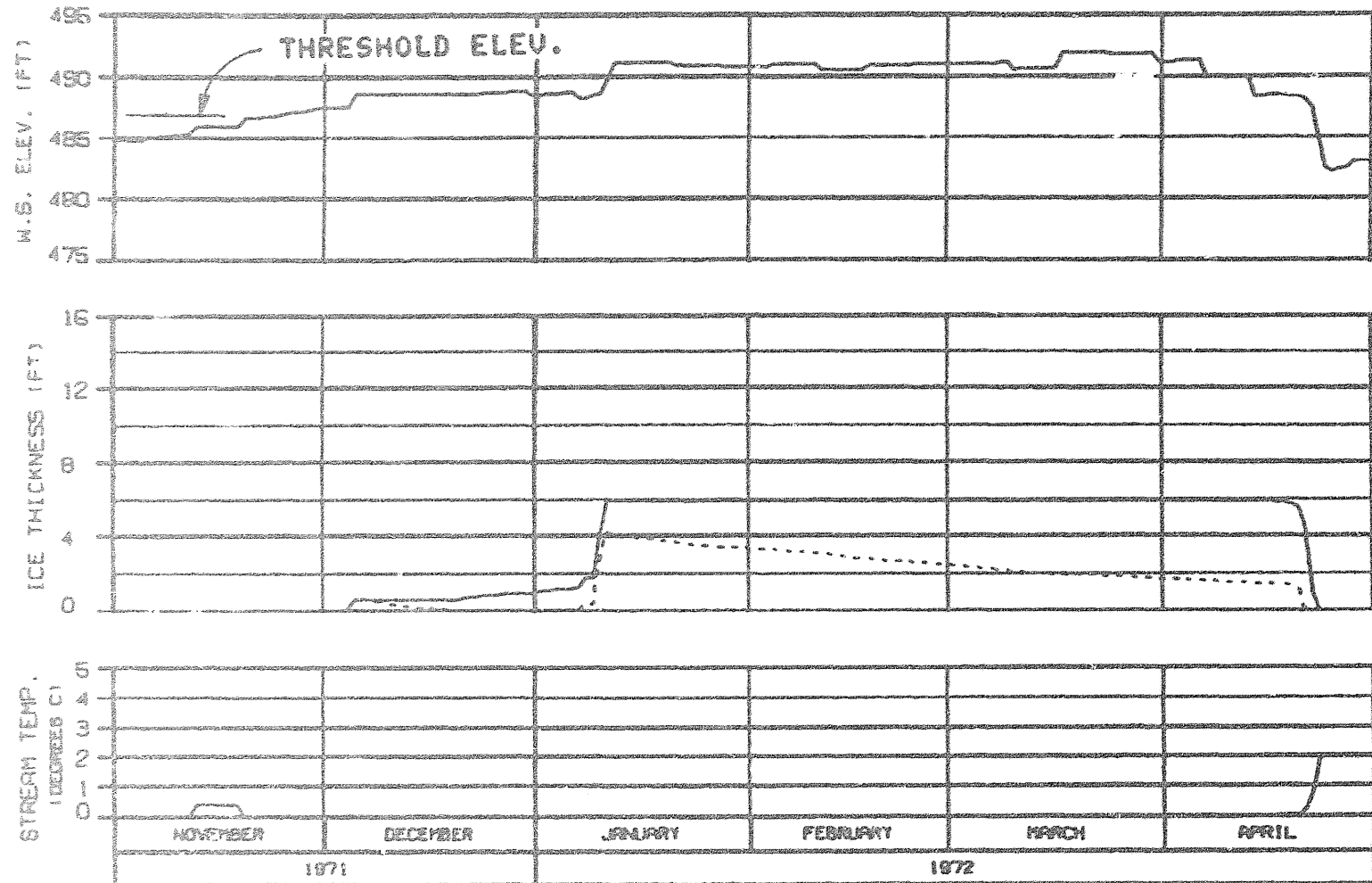


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 71010WS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED - ALASKA	BY - KIM SM	NOV. 1972

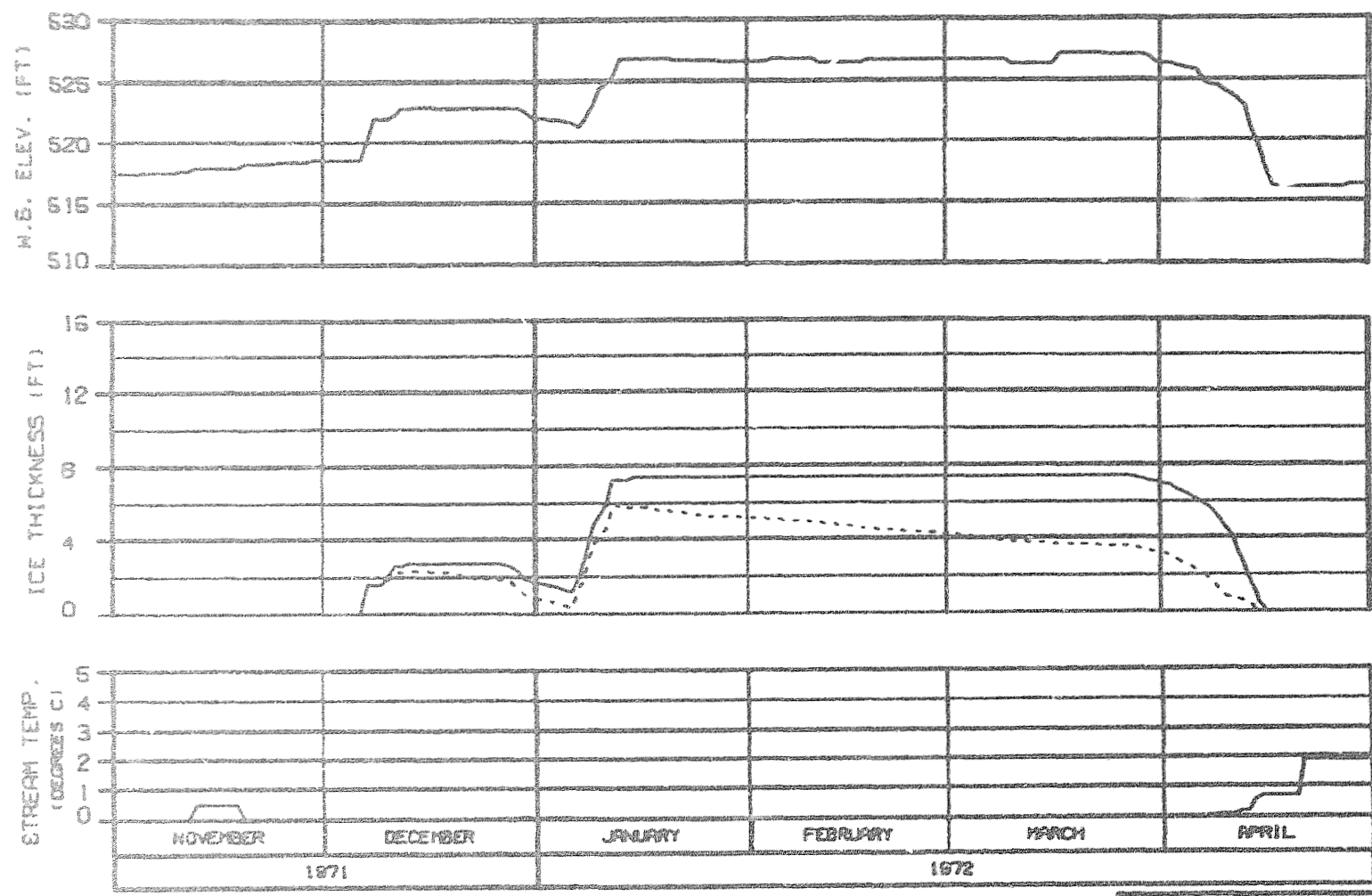


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EGASCO JOINT VENTURE	
DESIGNED: G.L. GIBBS	BY: J.M. GIBBS
NOV 1971	1015.142

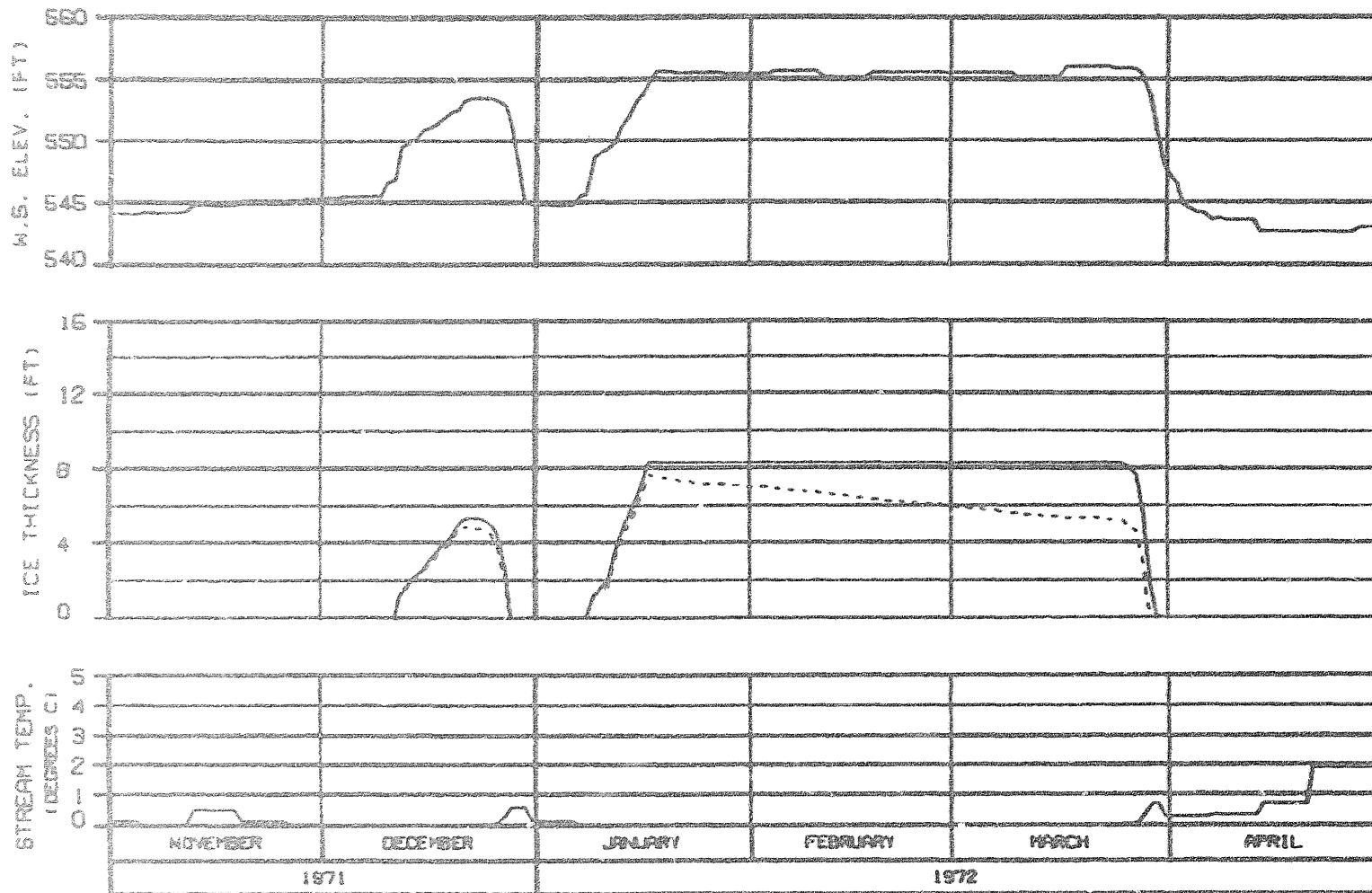


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDRSCO JOINT VENTURE	
ORDER: 81-0318	83 127 04
1978.142	

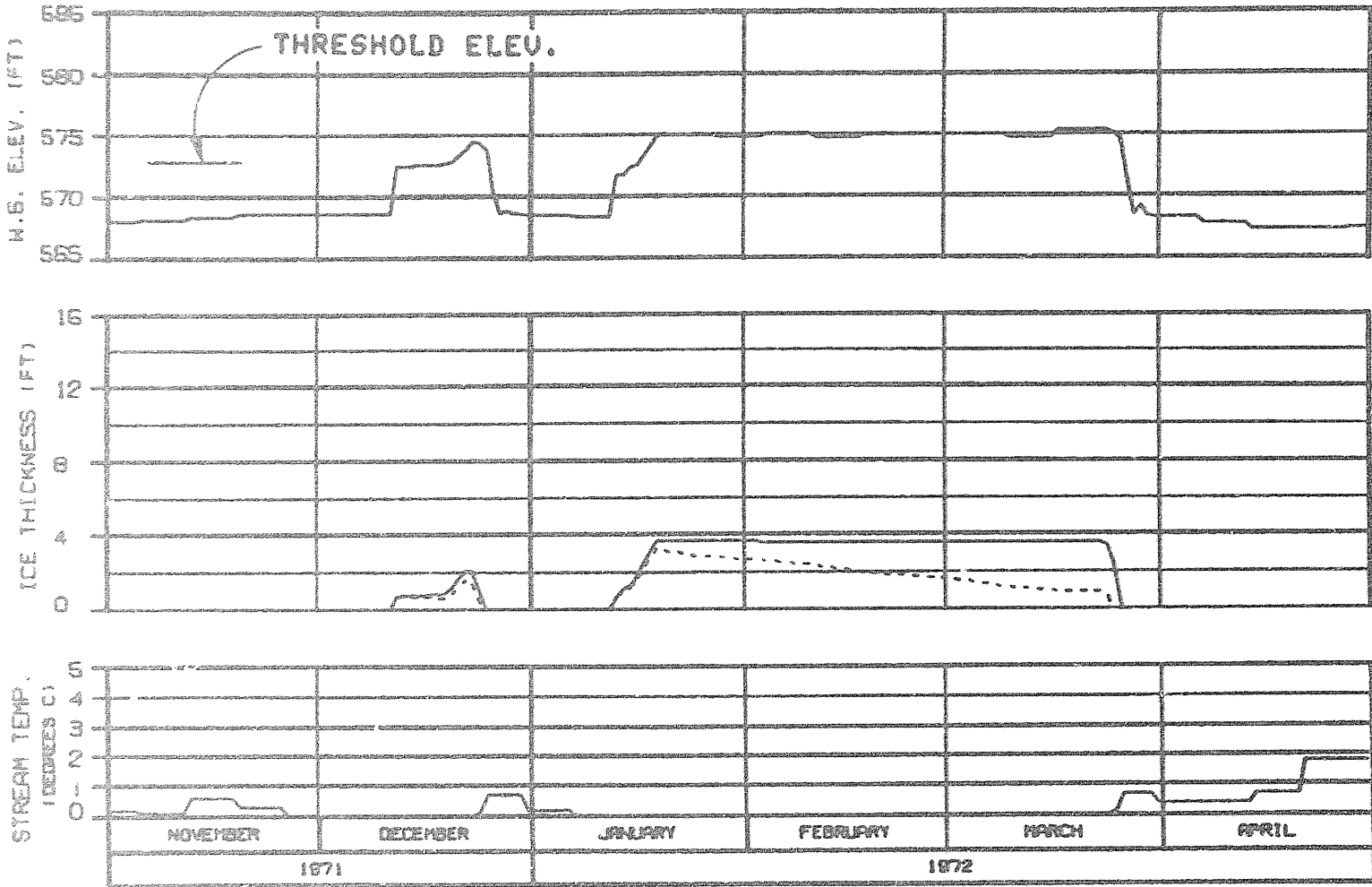


HEAD OF MOOSE SLOUGH
RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUBITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRSCO JOINT VENTURE	
DESIGN DRAWING NO	23 NOV 74
	2008.142



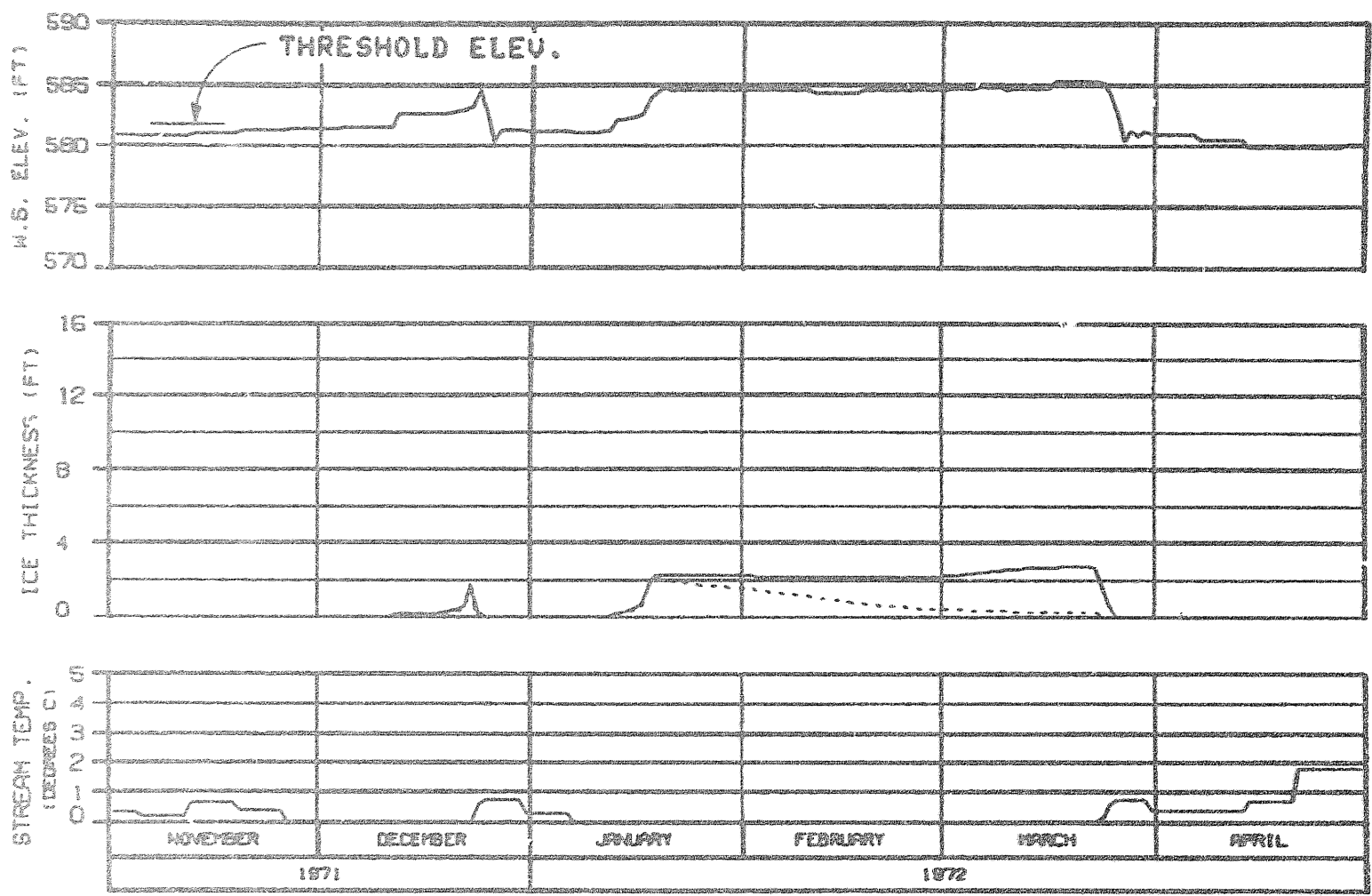
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 71D1CW8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
PROJECT - 8110000	AS REV 030	1008.102

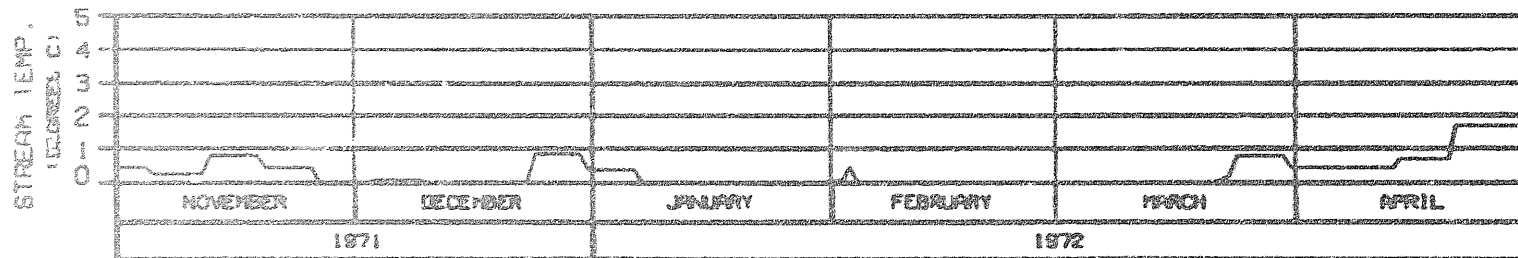
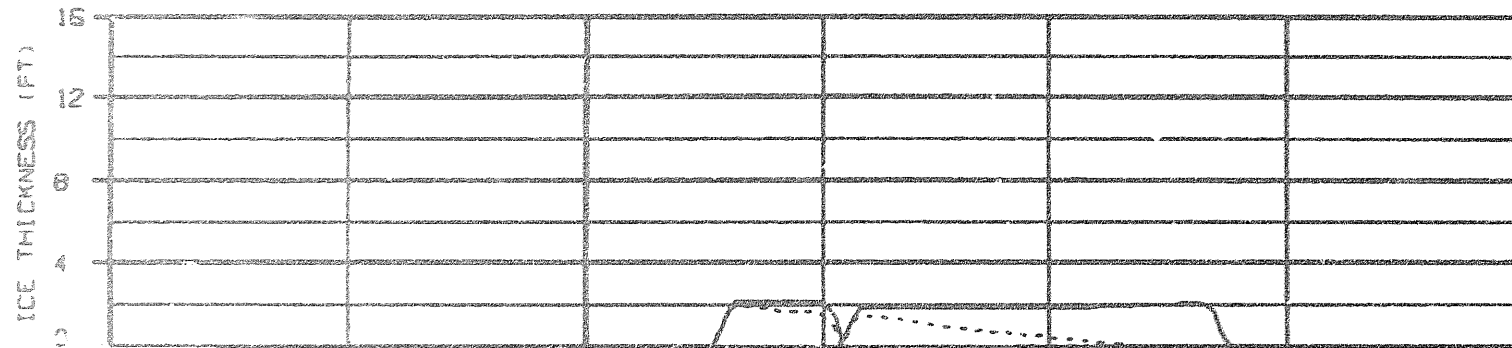
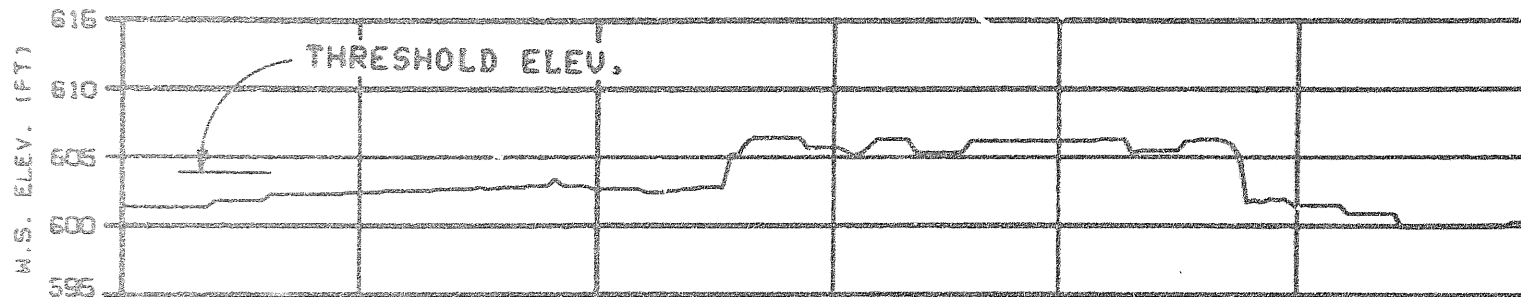


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARSA-EGANCO JOINT VENTURE	
DESIGNED BY: [illegible]	1988.142



HEAD OF SLOUGH 9
RIVER MILE : 129.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 710104B

ALASKA POWER AUTHORITY

SUBMITTING PROJECT

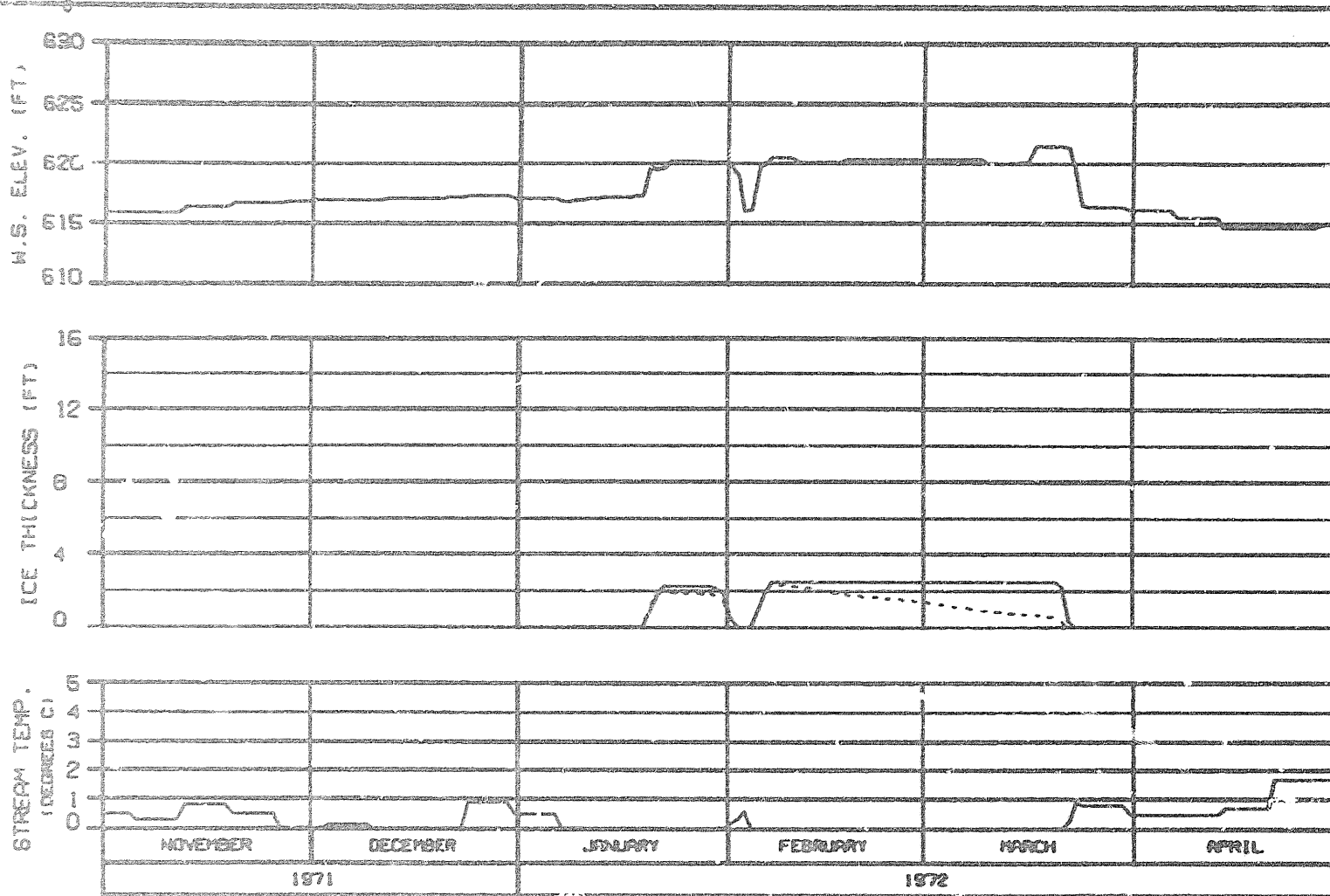
SUSITNA RIVER
ICE SIMULATION
TIME HISTORY

WARZA-EBASCO JOINT VENTURE

ORDER. ALLDRES 00 NOV 80 102B.102

OPTION?

OPTION#



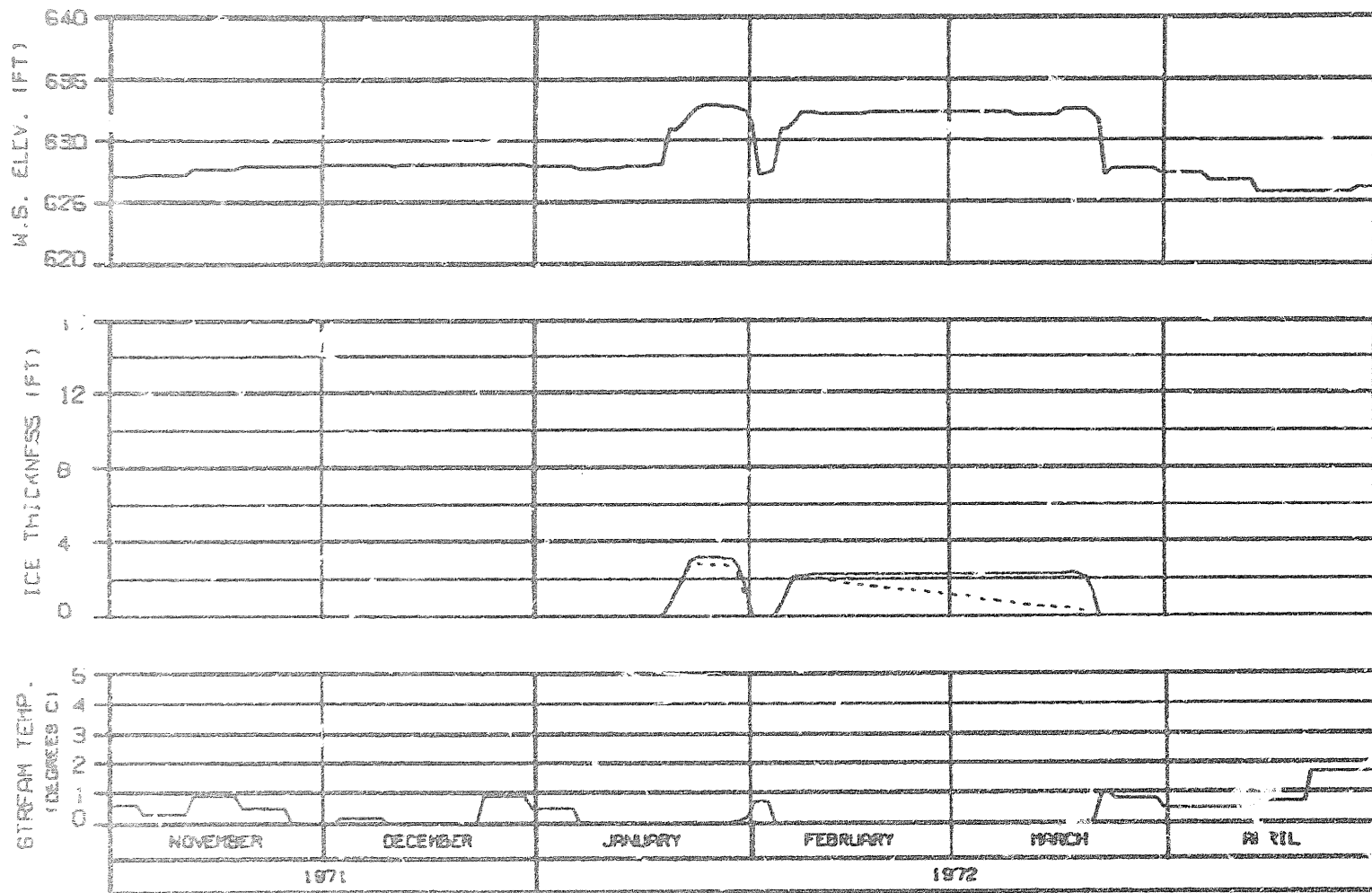
SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-ERACCO JOINT VENTURE	
CONTRACT NUMBER: 66-100-00	ISSUE: 148

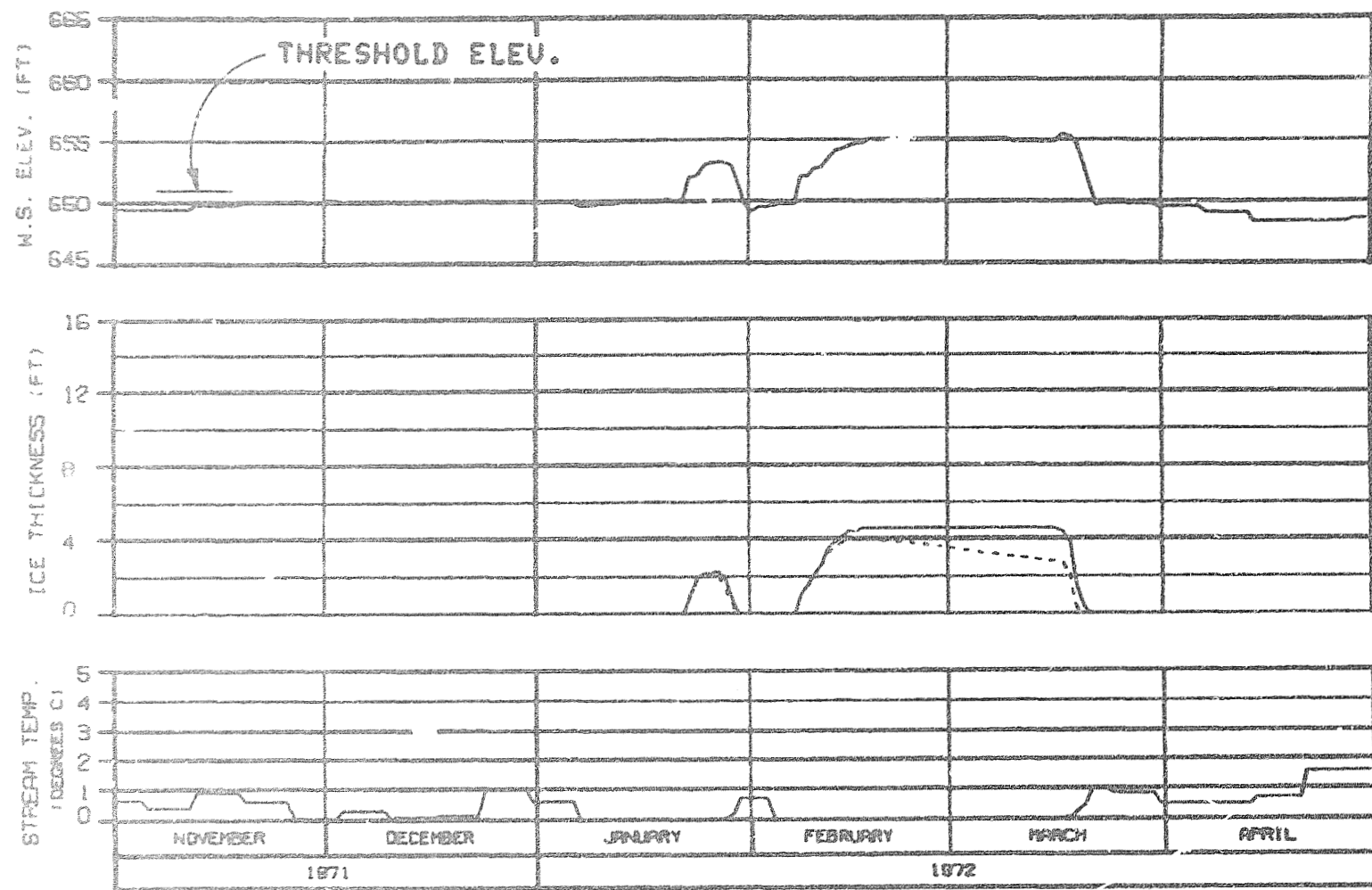


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WRZA-E/ABCO JOINT VENTURE		
DESIGN. D.L.DAVIS	BY: HOF GW	REVISION 142

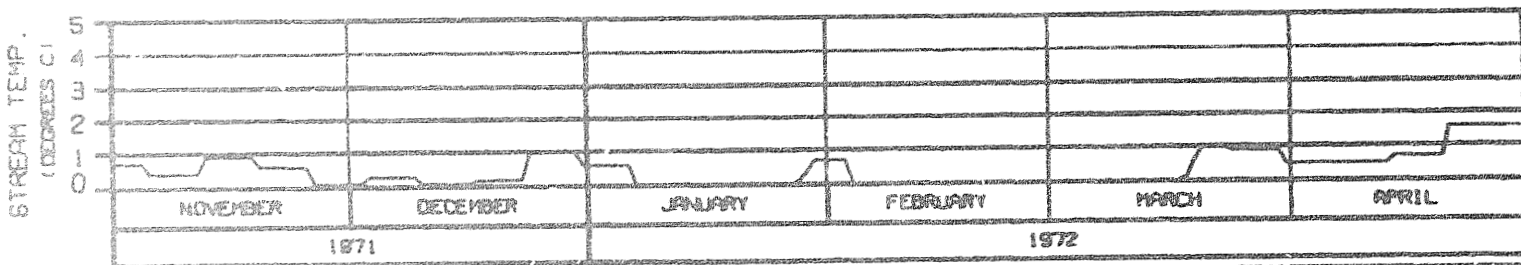
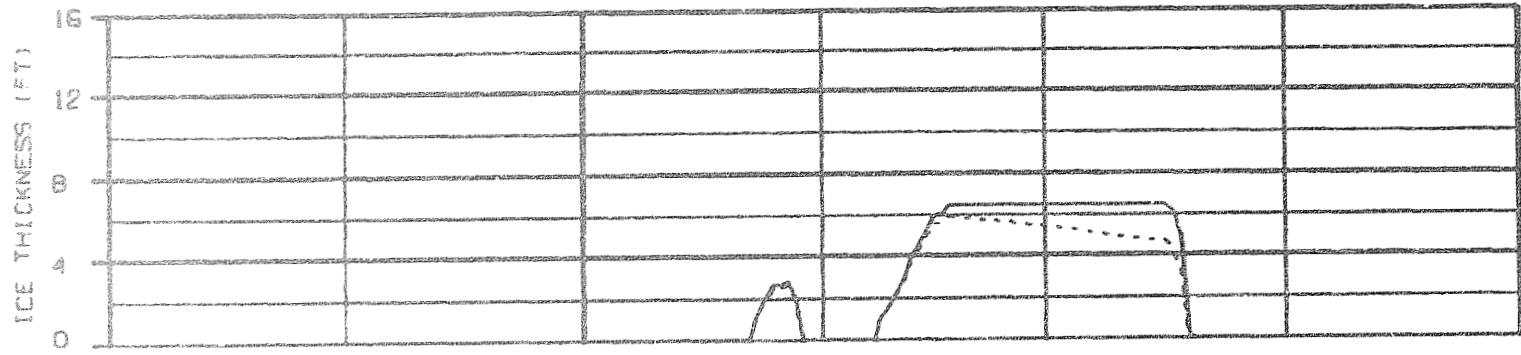
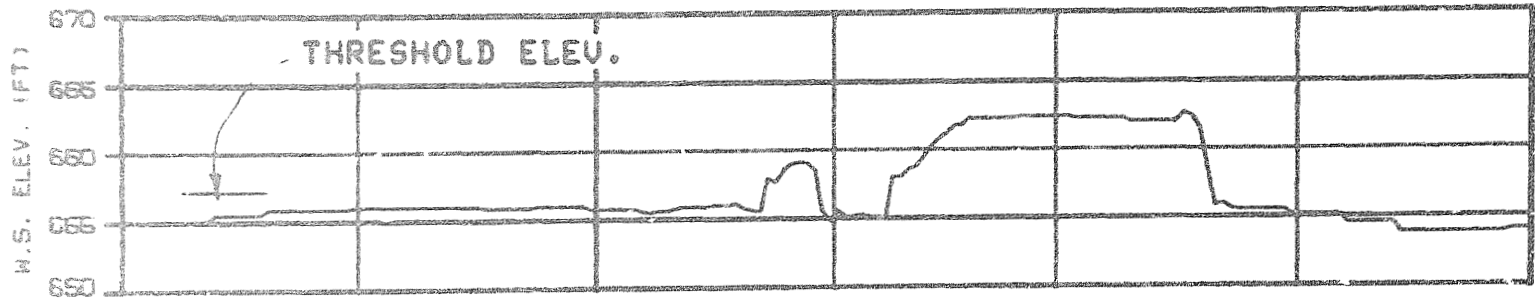


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: B.L. GARDNER	DATE: 01/01/72
DRAWN BY: L.S.B.	

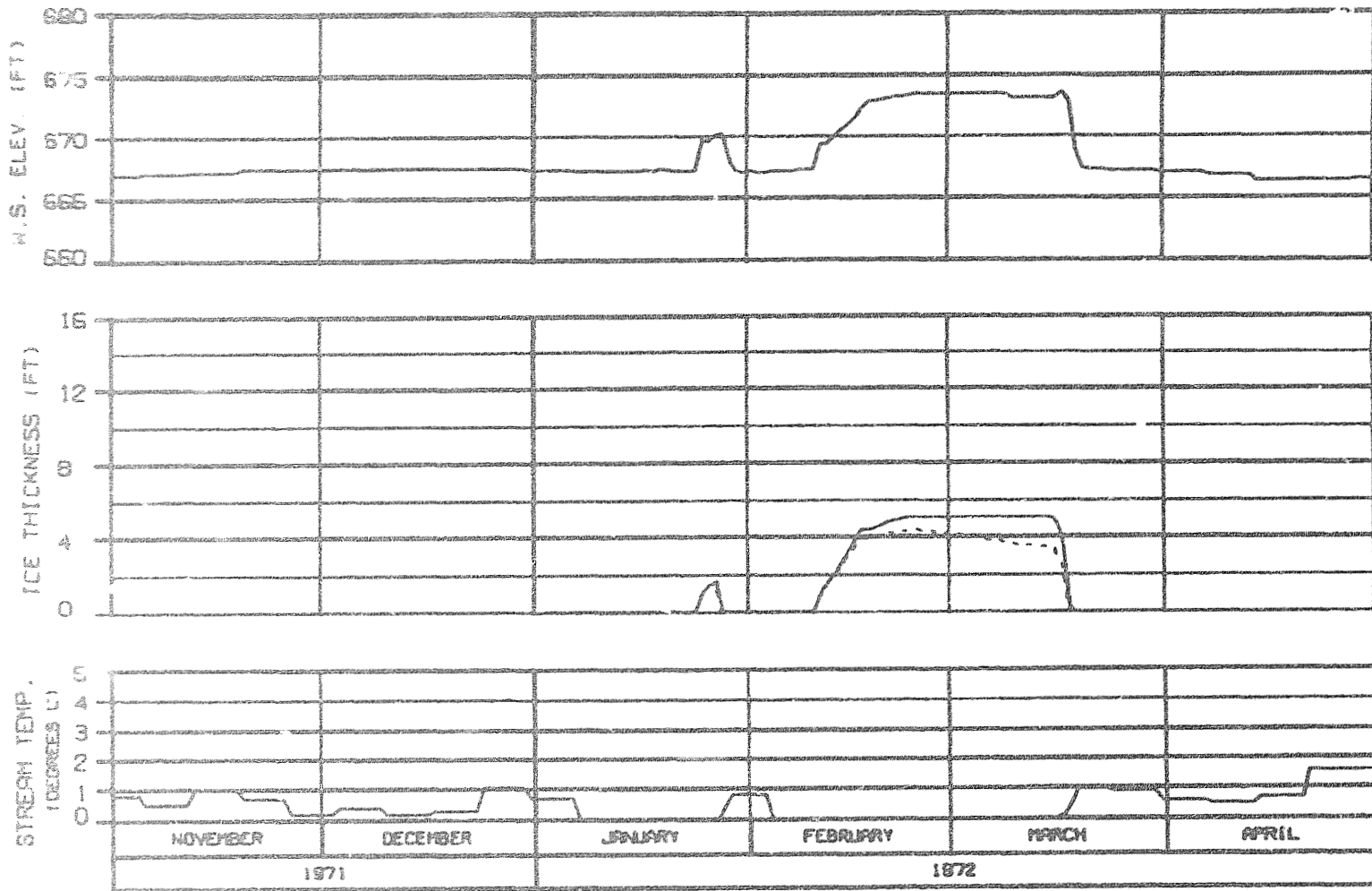


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE PLAN NO. : 7101CMB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGNED - S.L. DAVIS	NOV 71
REVISED - 142	



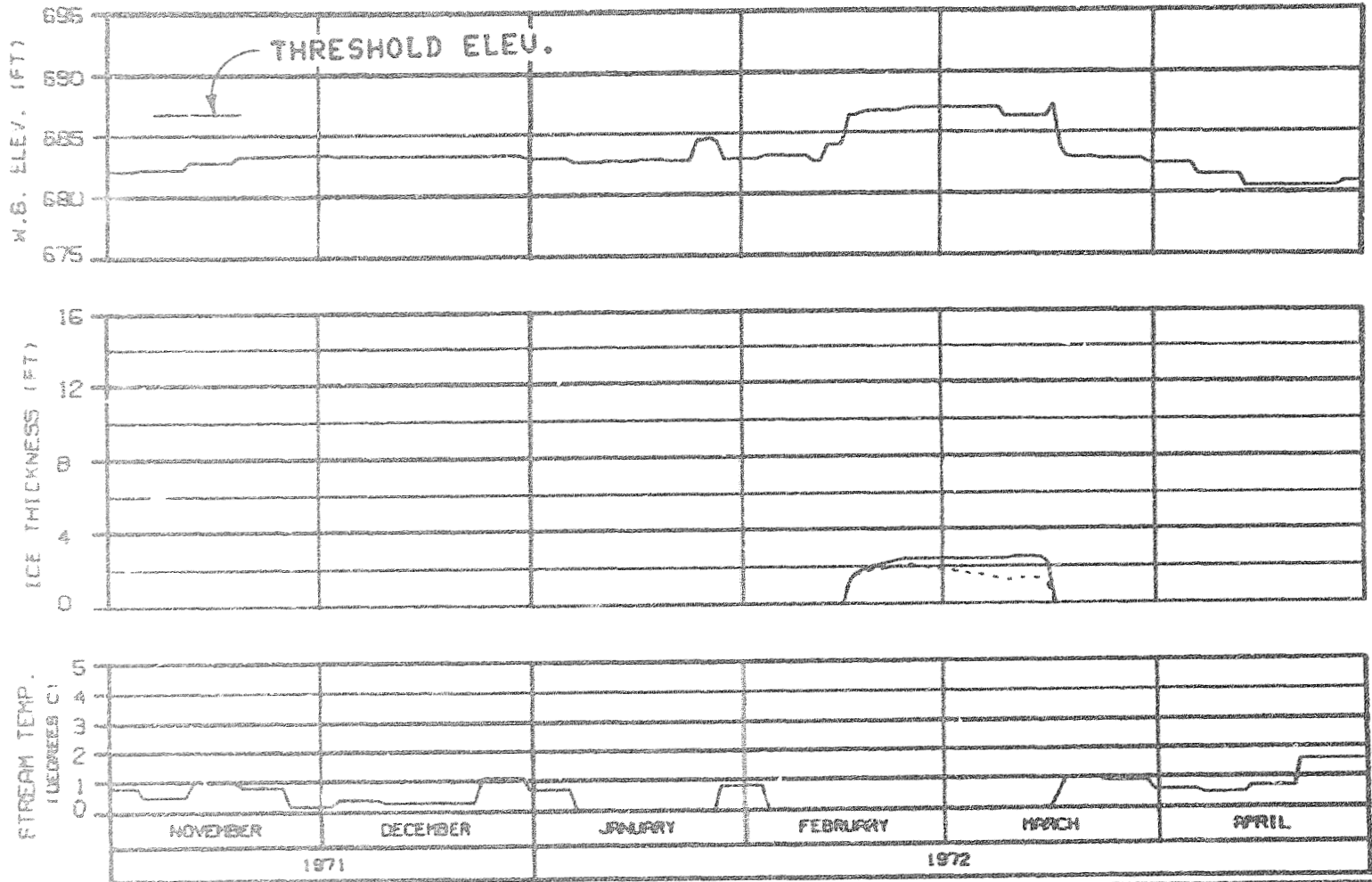
SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CMB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HANZA-EBAGCO JOINT VENTURE	
DATE: 01.09.82	BY: JBY/01
PAGE 142	

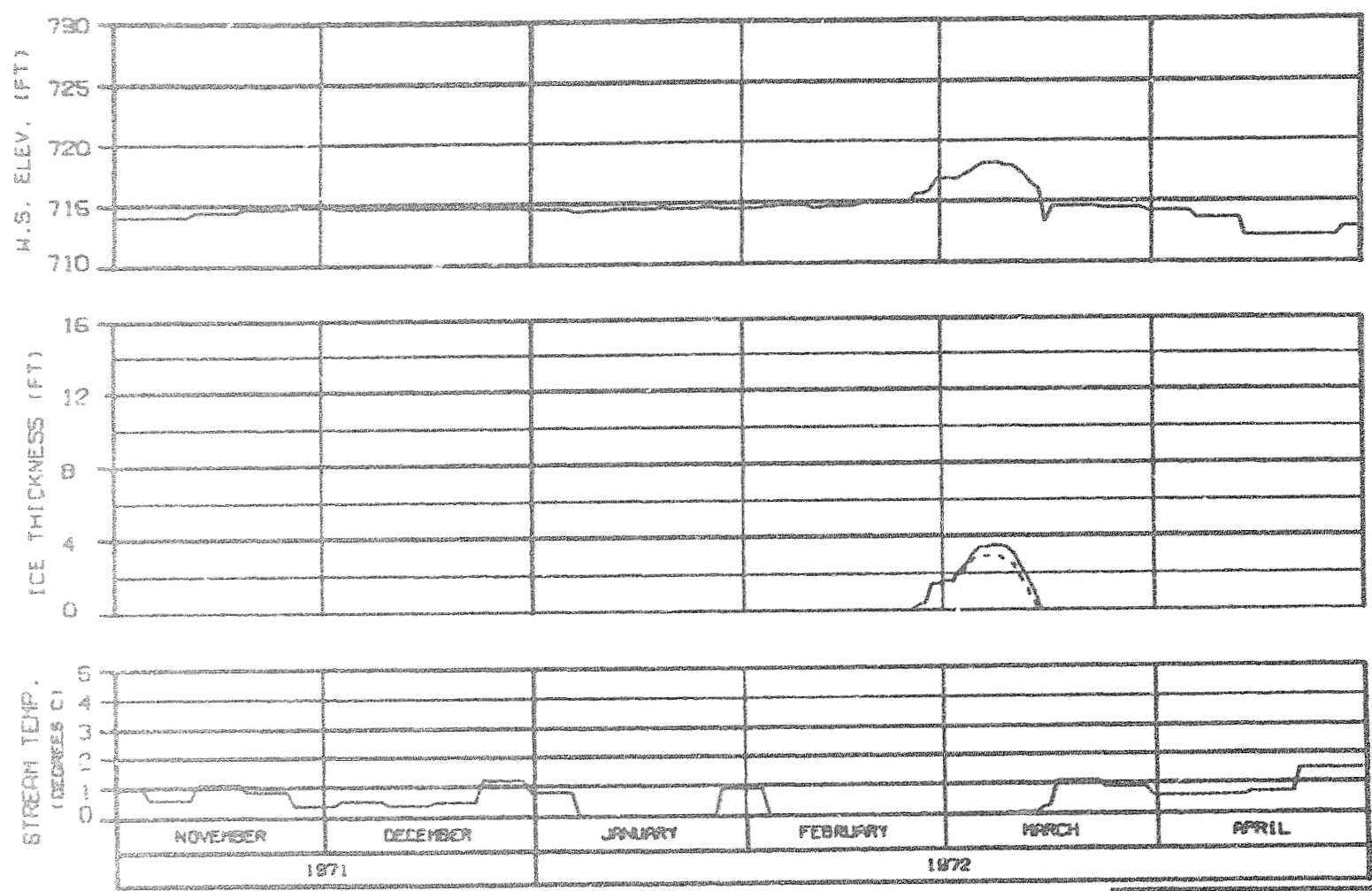


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY		
SLISTNA PROJECT		
SLISTNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: S.L.B.-028	20 NOV 71	1585.142

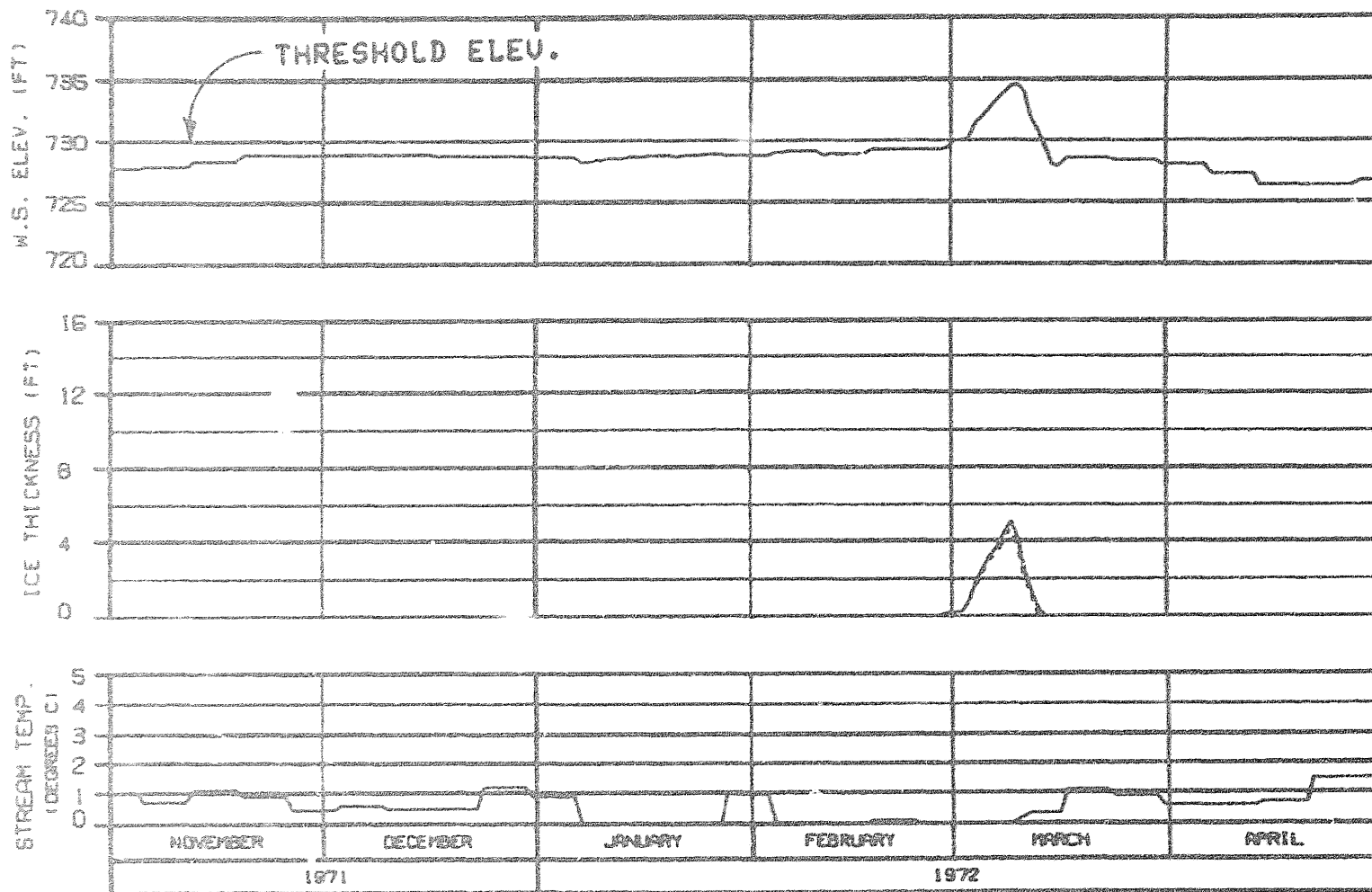


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CW8

ALASKA POWER AUTHORITY	
SUBSTRA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EGASCO JOINT VENTURE	
DATE: 2.1.1978	BY: GUY SM
DRAW: 142	



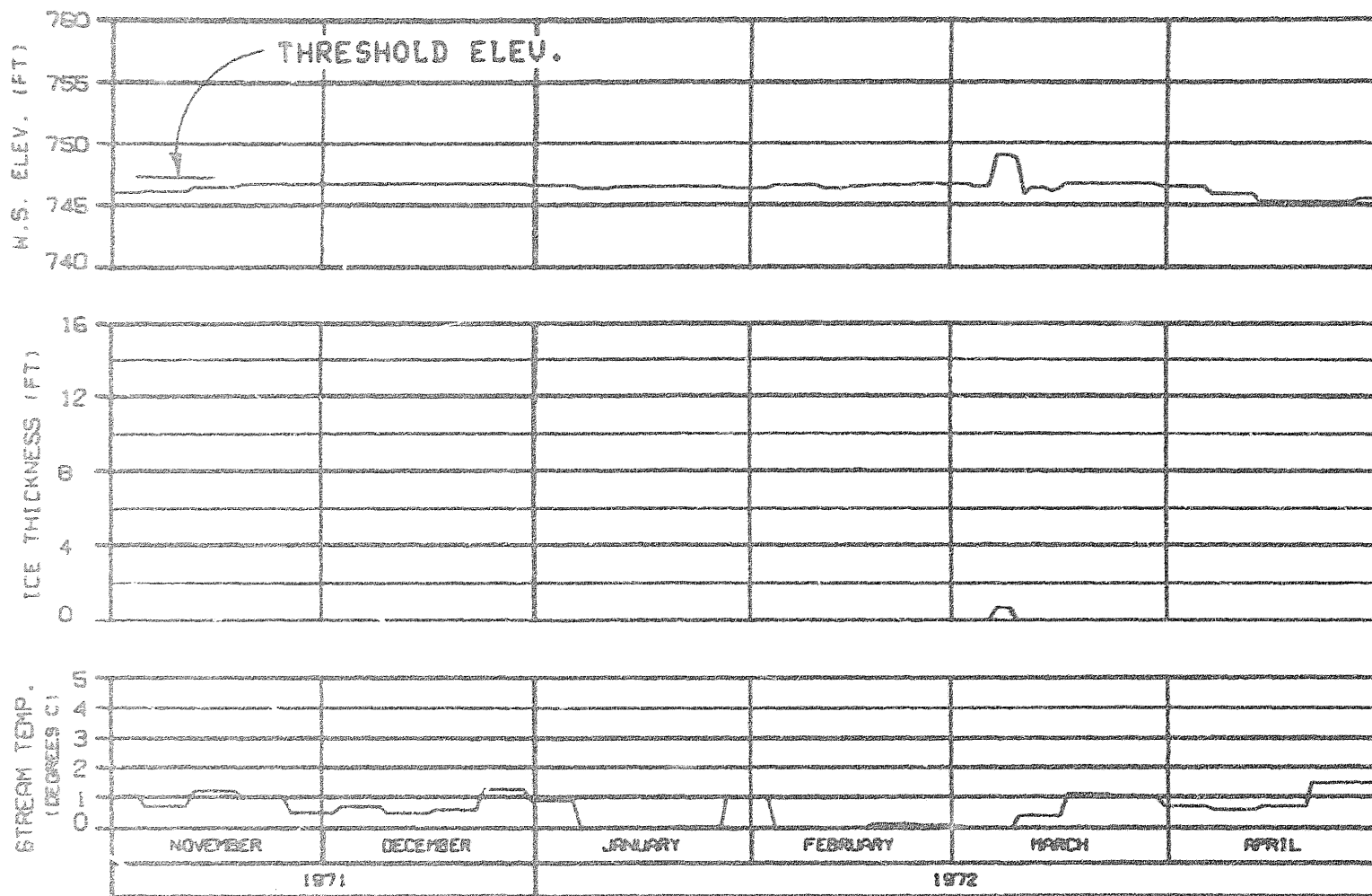
ICE THICKNESS LEGEND:

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

HEAD OF SLOUGH 20
 RIVER MILE : 140.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101C4B

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARDA-EBROCO JOINT VENTURE		
DESIGNED: ELLIOTT	75 APR 72	1088.142



SLOUGH 21 (ENTRANCE A6)

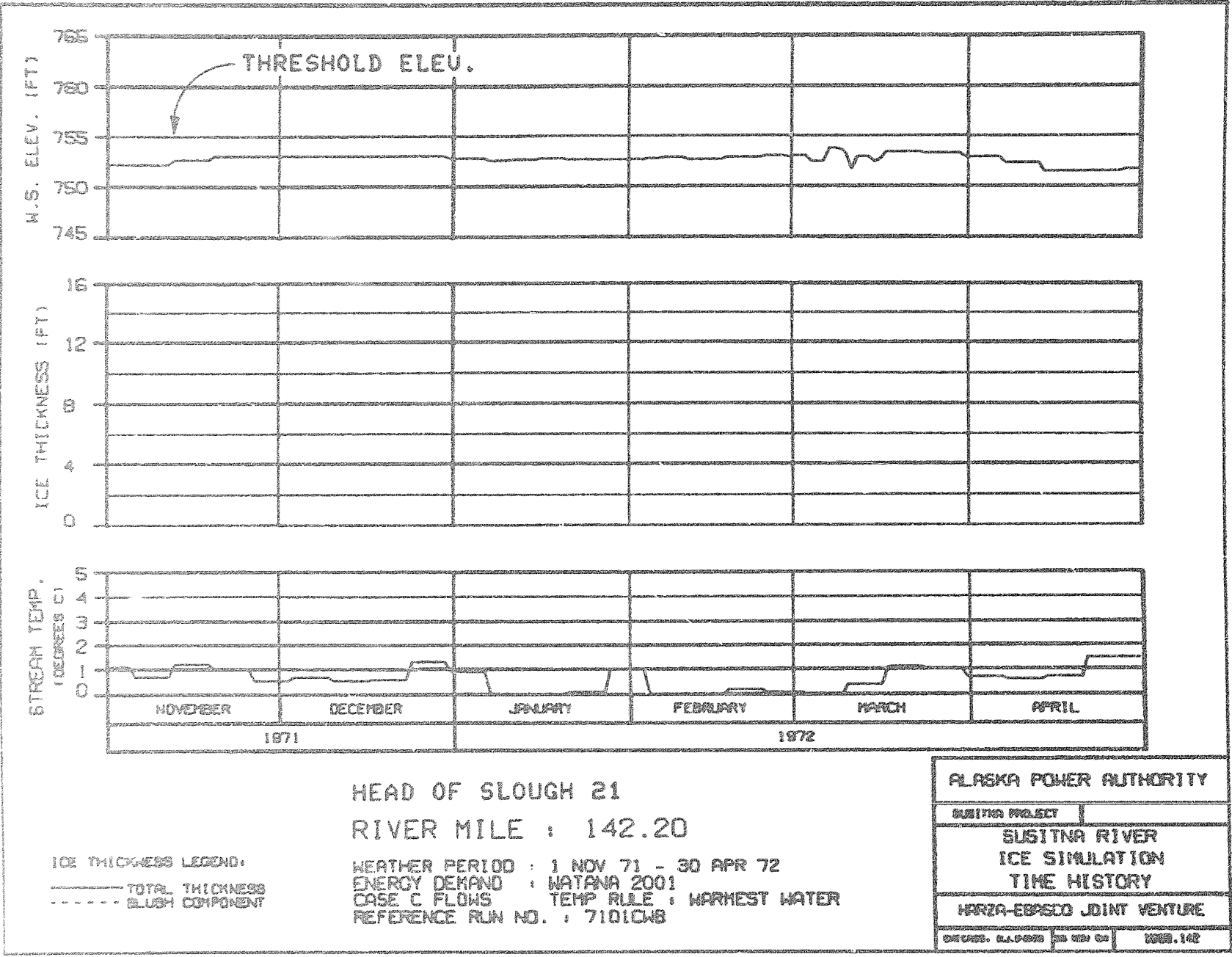
RIVER MILE : 141.80

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101C48

ALASKA POWER AUTHORITY	
SLUSHING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARREN-EBERD JOINT VENTURE	
PROJECT: SLUSHING	DATE: 04/72
FIG NO: 142	

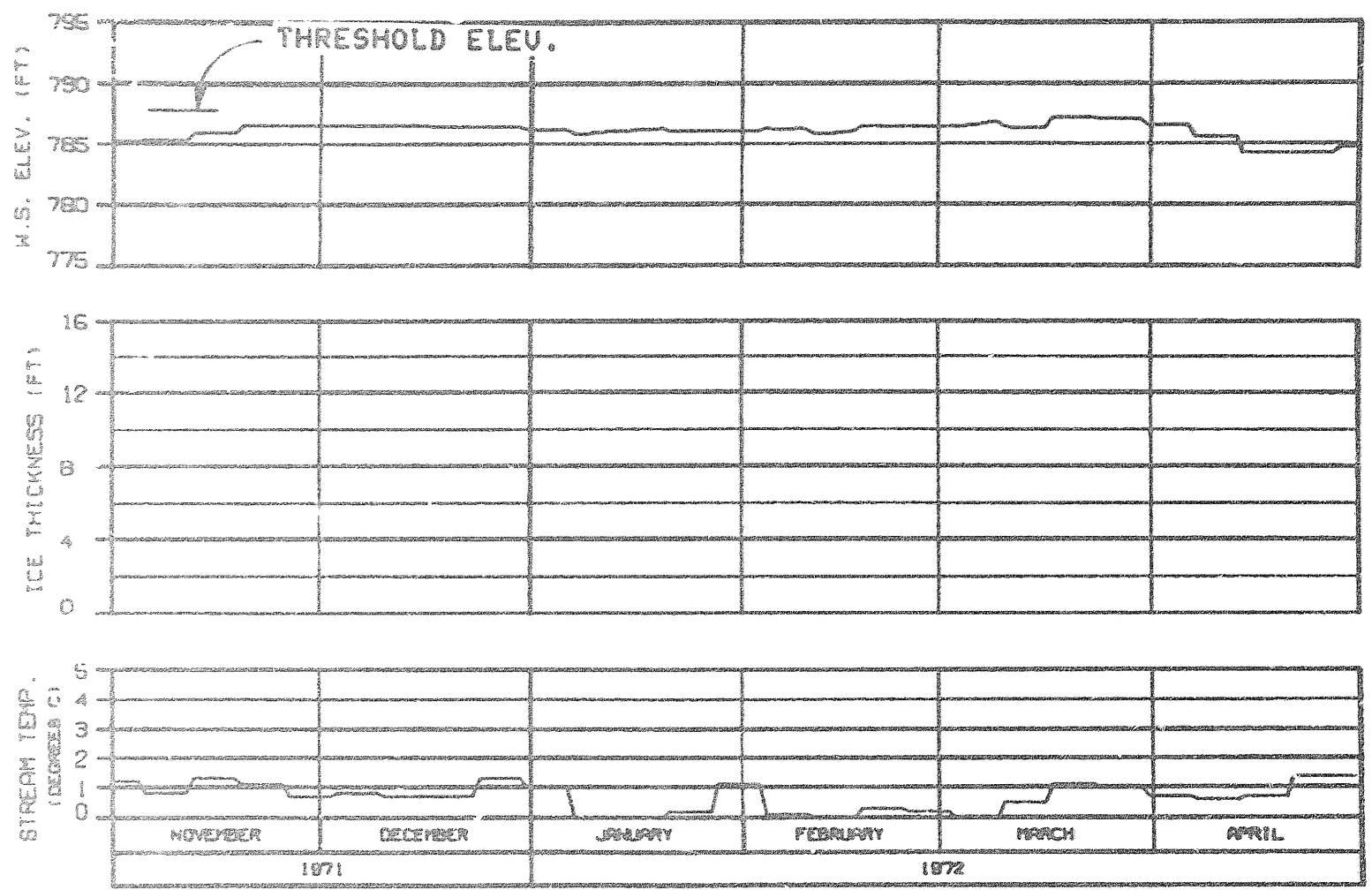


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 71D1CW8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBRSCO JOINT VENTURE		
DESIGN: G.L.PONS	BY: W.S. CH	NOV. 1972



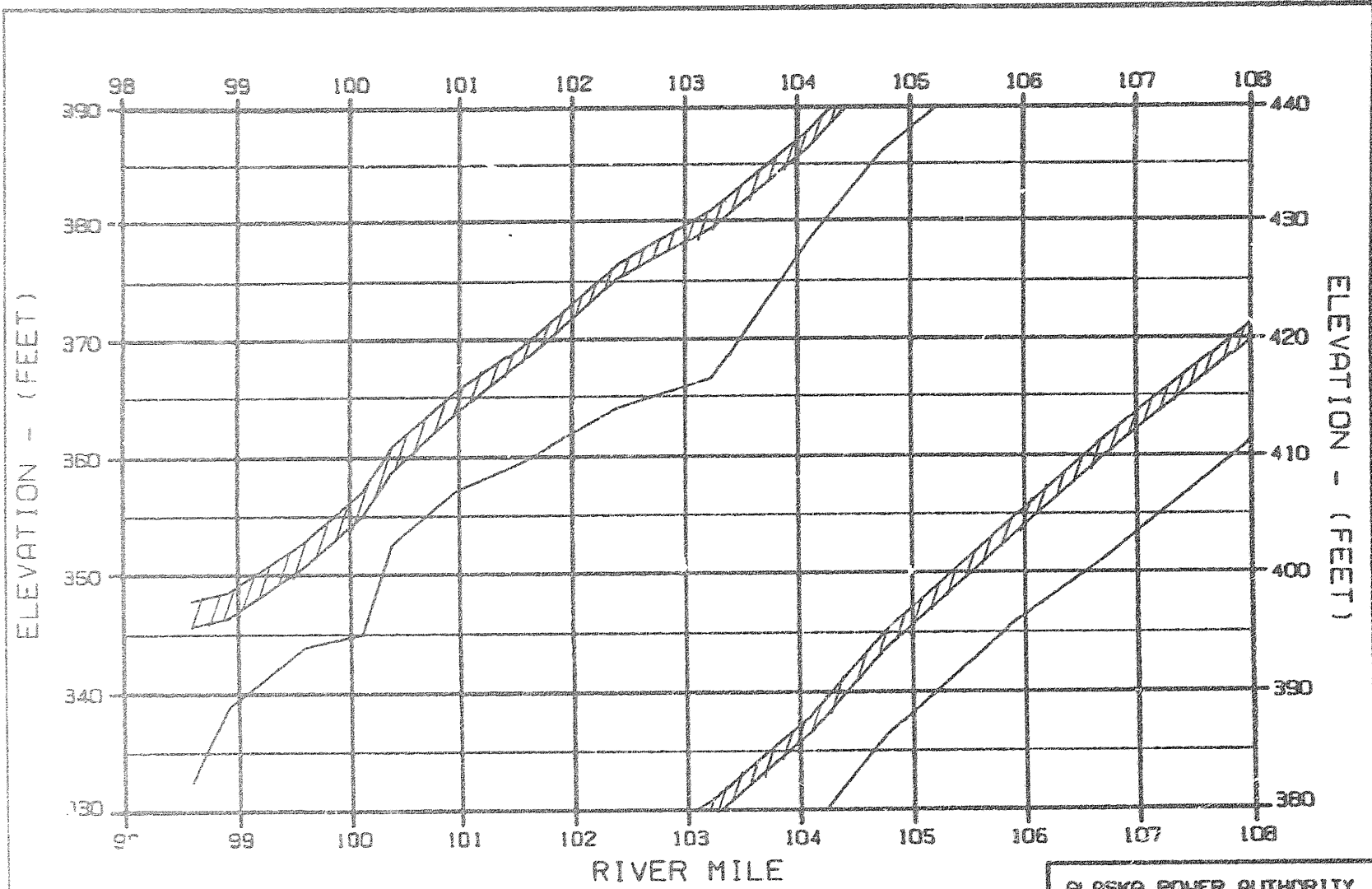
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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


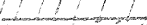
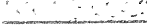

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 7101CWB

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBERCO JOINT VENTURE		
DATE: 11/20/72	BY: [unclear]	NO. 102

EXHIBIT G



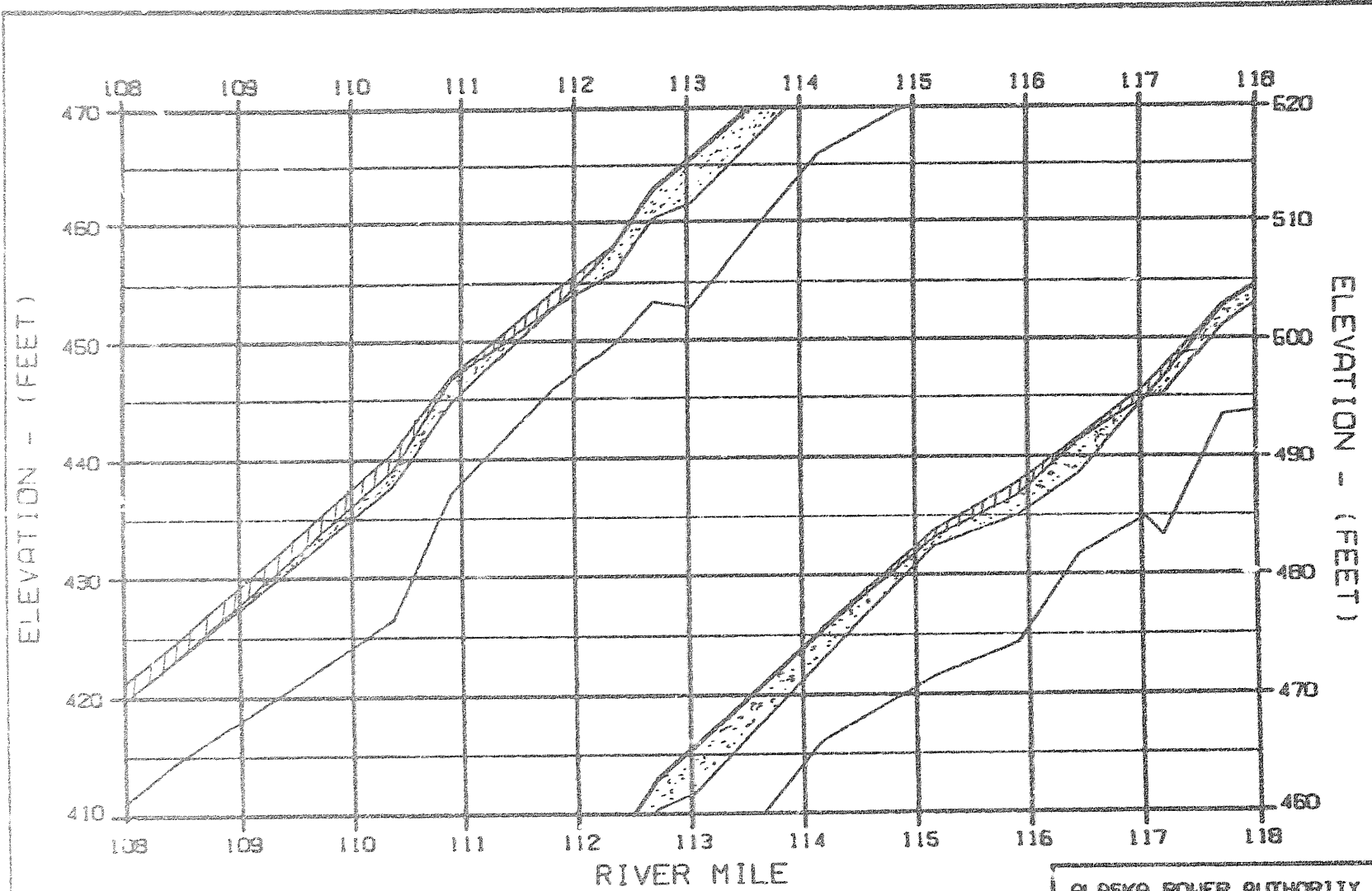
LEGEND:

-  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
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CMB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WRZA-EBASCO JOINT VENTURE		
CHIEF: G.L. BROWN	DESIGNER: G.H.	DATE: 1982.142

C



LEGEND:

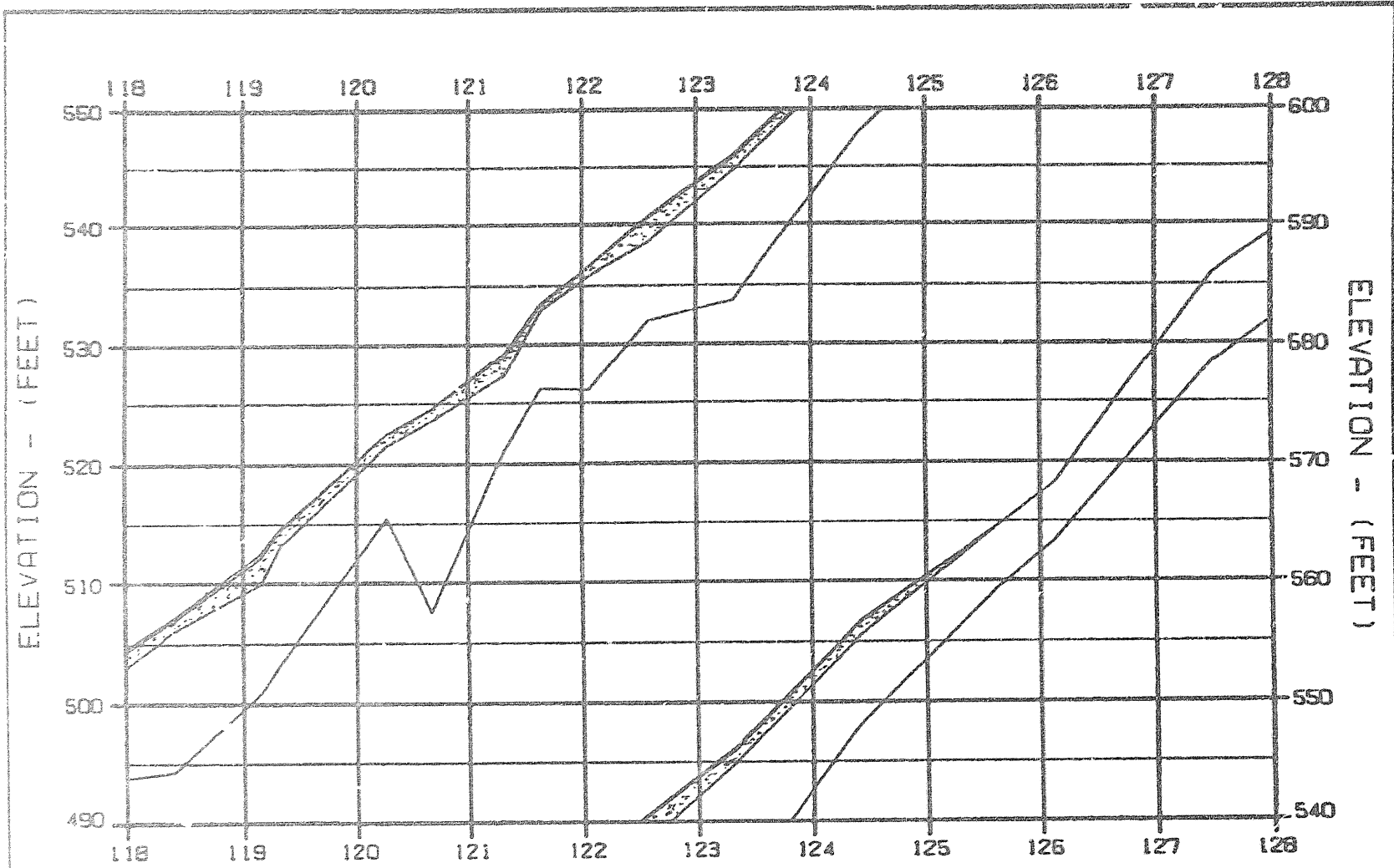
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RLVN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARDA-EBASCO JOINT VENTURE		
CHGRES - ALL 0000	20 NOV 82	1000.MR

OPTION 7

c



LEGEND:

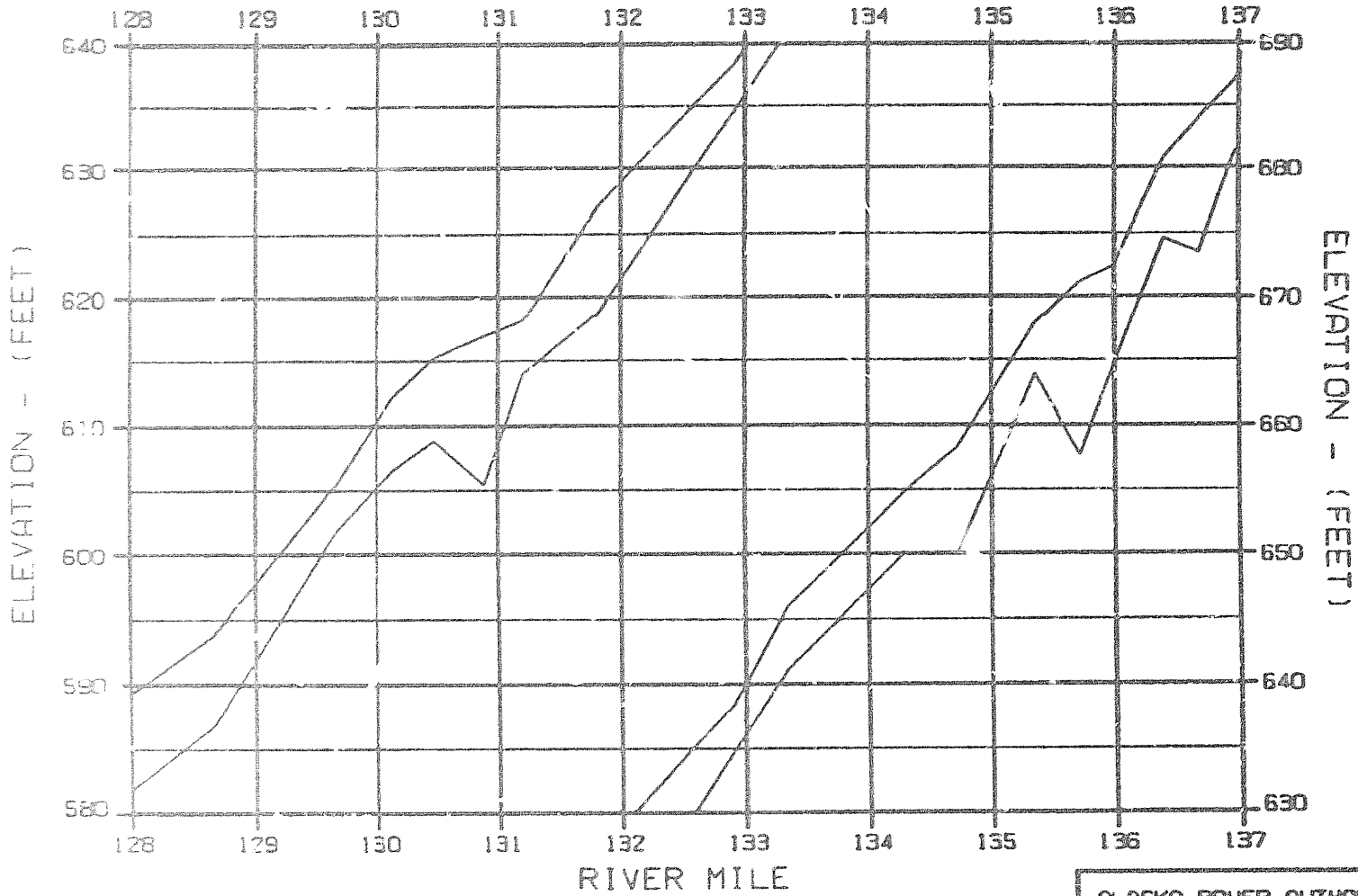
- TOP OF SOLID ICE
- SLUSH/SOLID ICE INTERFACE
- BOTTOM OF SLUSH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
ENERGY DEMAND : DEVIL CANYON 2002
CASE C FLOWS **TEMP RULE :** WARMEST WATER
REFERENCE RUN NO. : 8102CWB



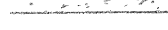

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-EBASCO JOINT VENTURE		
DRAWN: ILLDPER	FD 100 84	1600.142

OPTION?

c

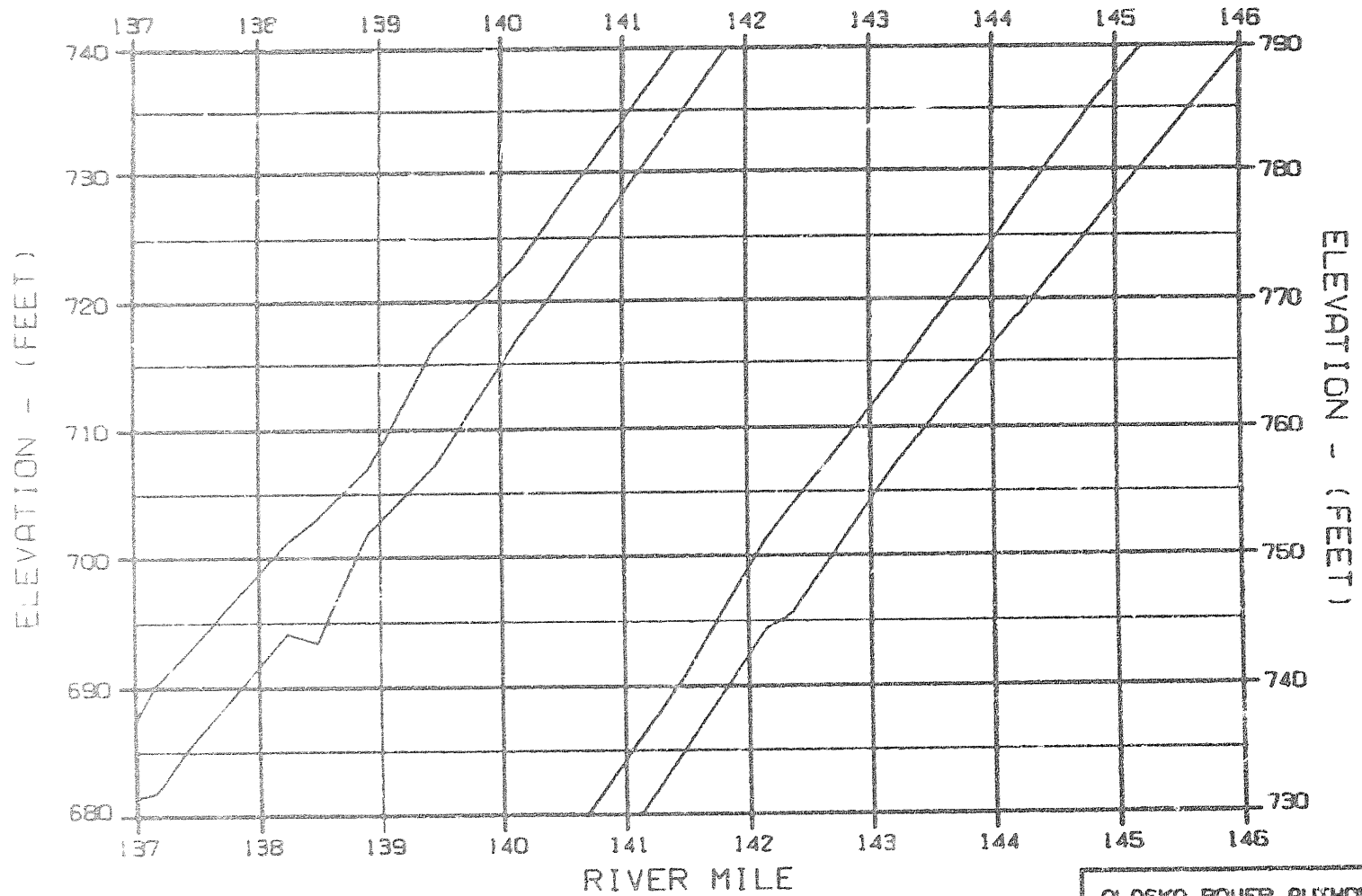


LEGEND

-  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
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HANZA-EBASCO JOINT VENTURE	
CHIEF: D.L. BAKER	DESIGN: G.M. USBR 142



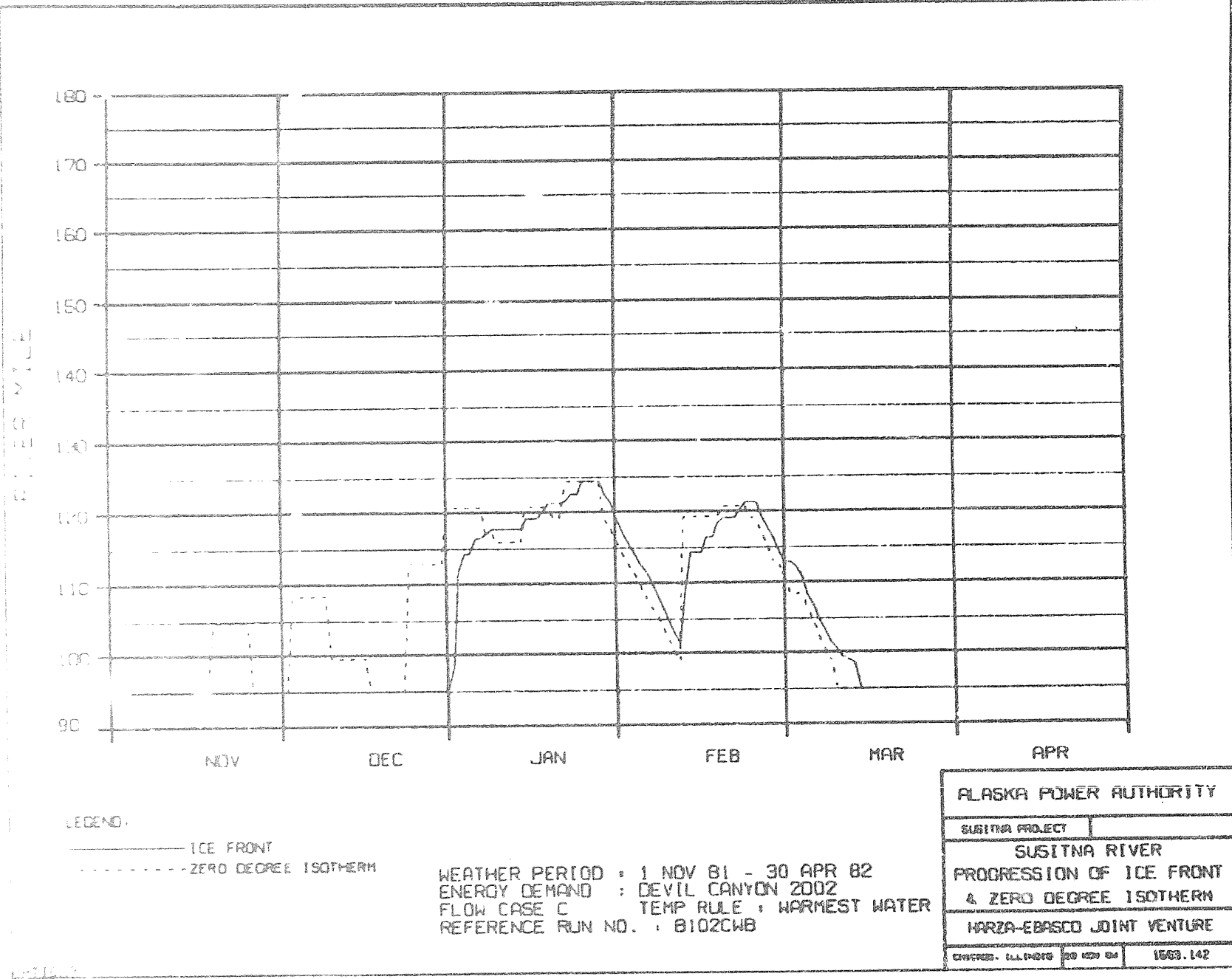
LEGEND:

- 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
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
HARZA-EBASCO JOINT VENTURE		
CHIEF: D.L. ROY	BY: J.W. CH	1982.142

OPTION?

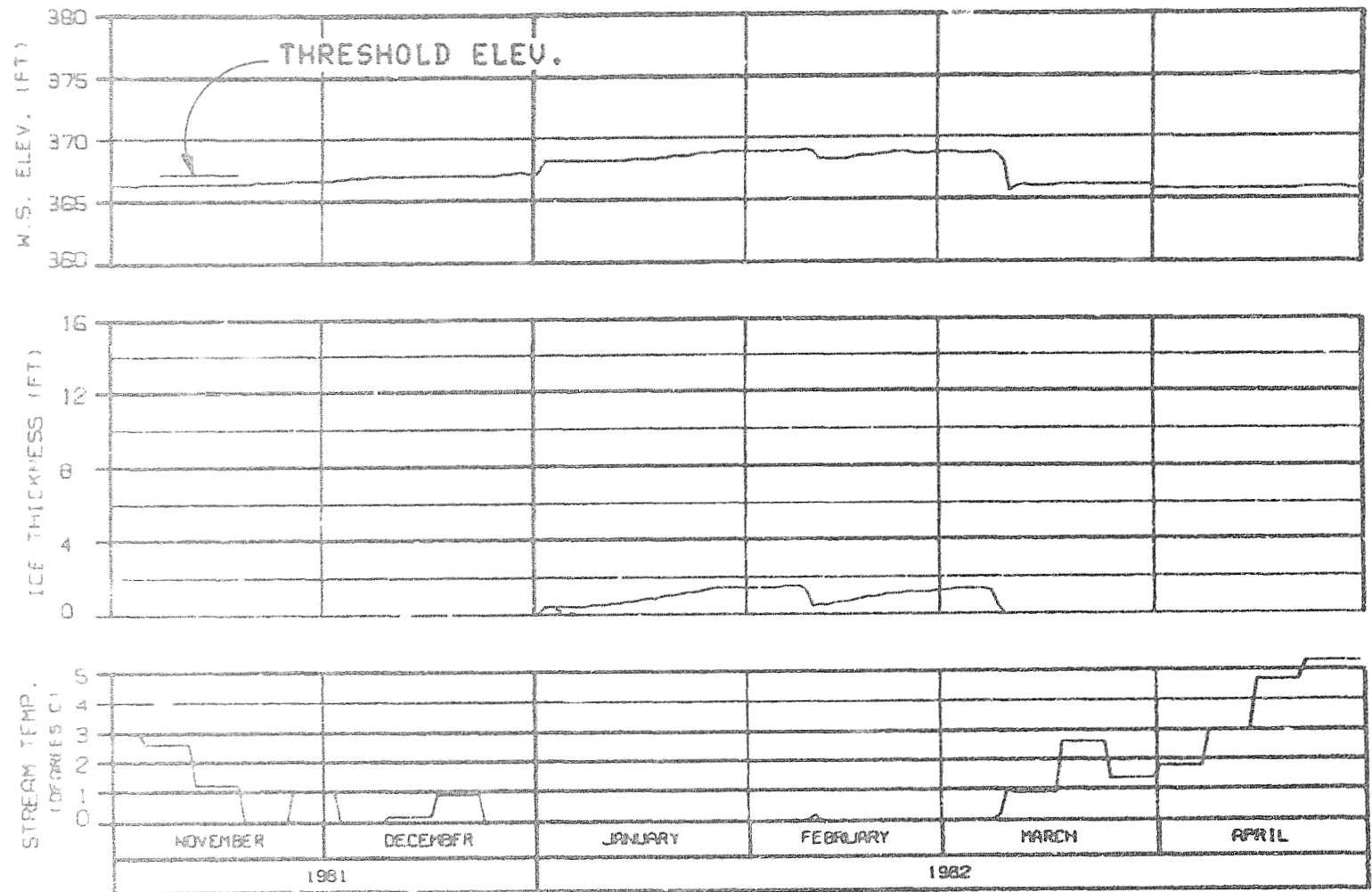


LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE C TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
MARZA-EBASCO JOINT VENTURE		
CWCRS - 1111078	20 1029 04	1063.142

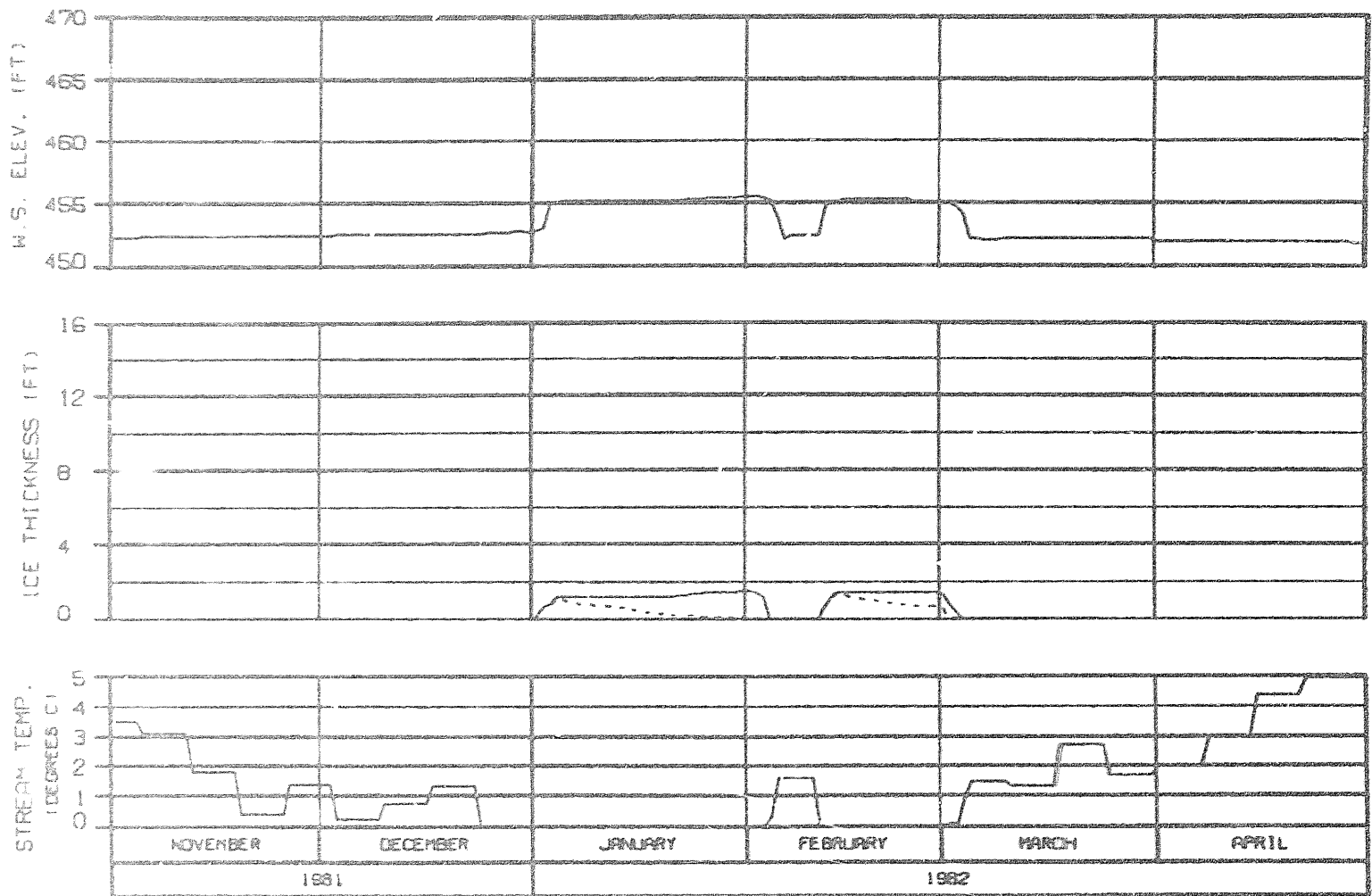


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS : TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60610	USGS, 142

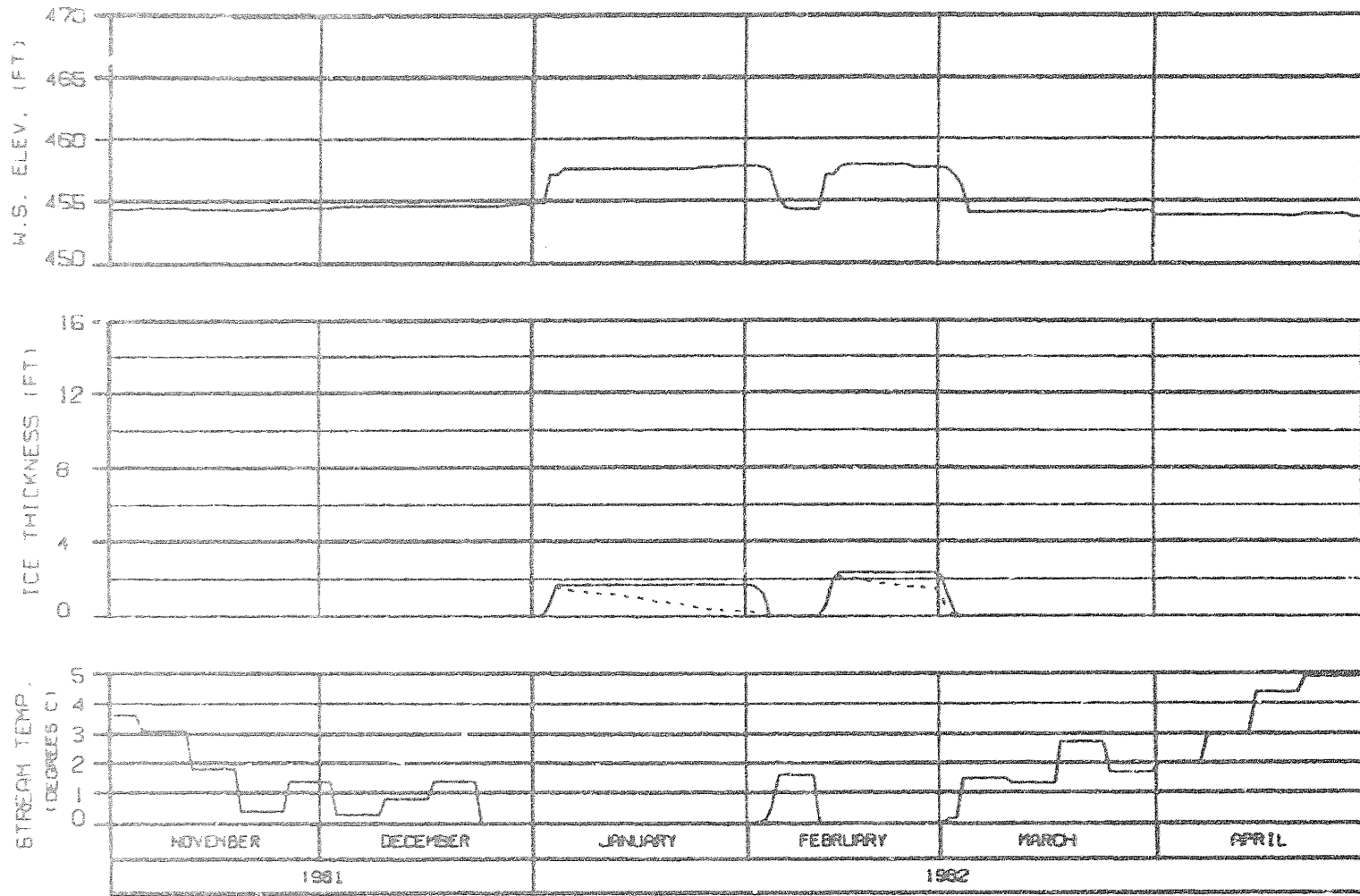


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EGASCO JOINT VENTURE		
DESIGNED BY	DATE	1983.142

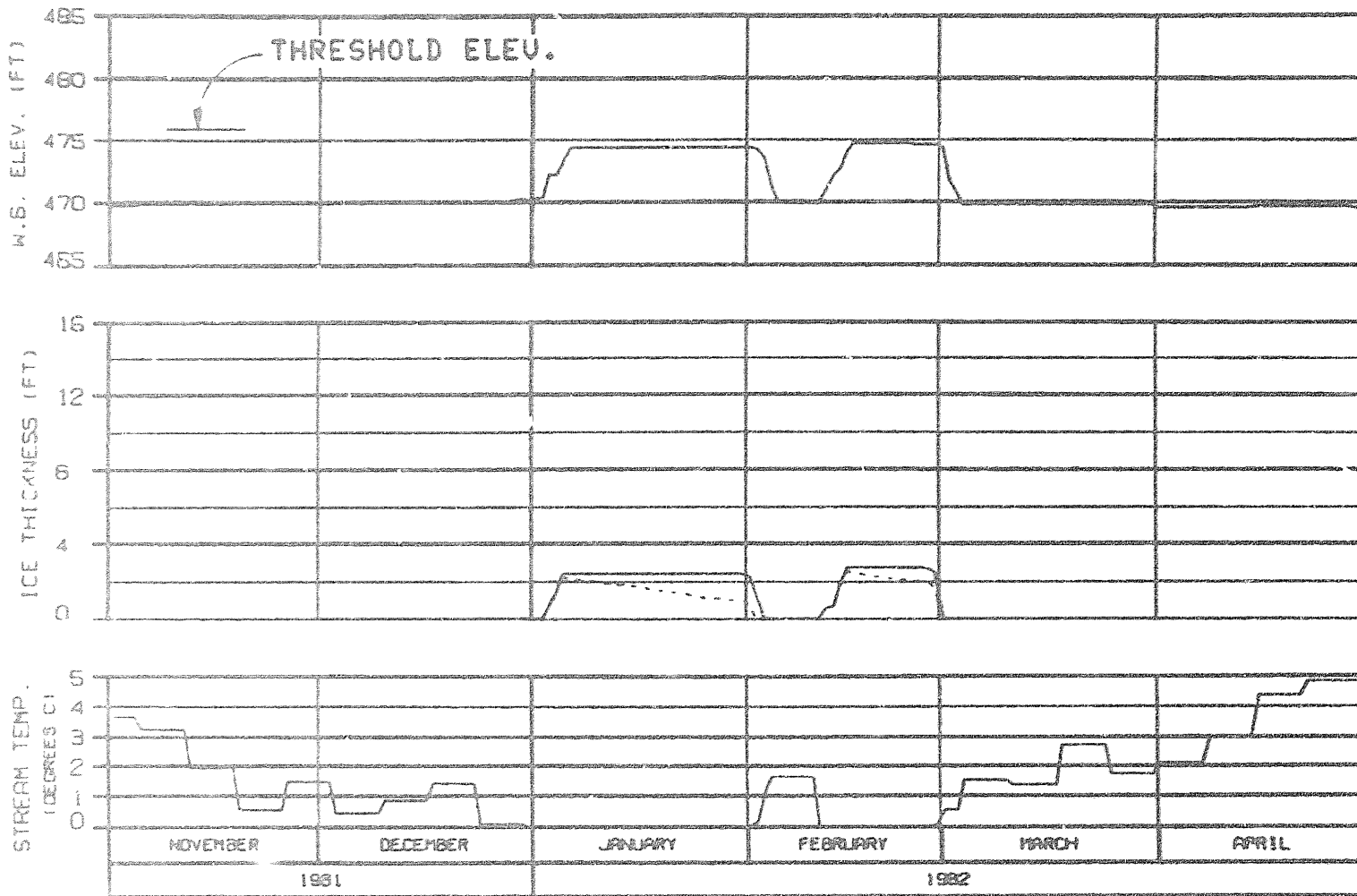


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : B102CWB

ALASKA POWER AUTHORITY	
INITIAL PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRACO JOINT VENTURE	
CHARGE - ALL RIGHTS RESERVED	1983.142

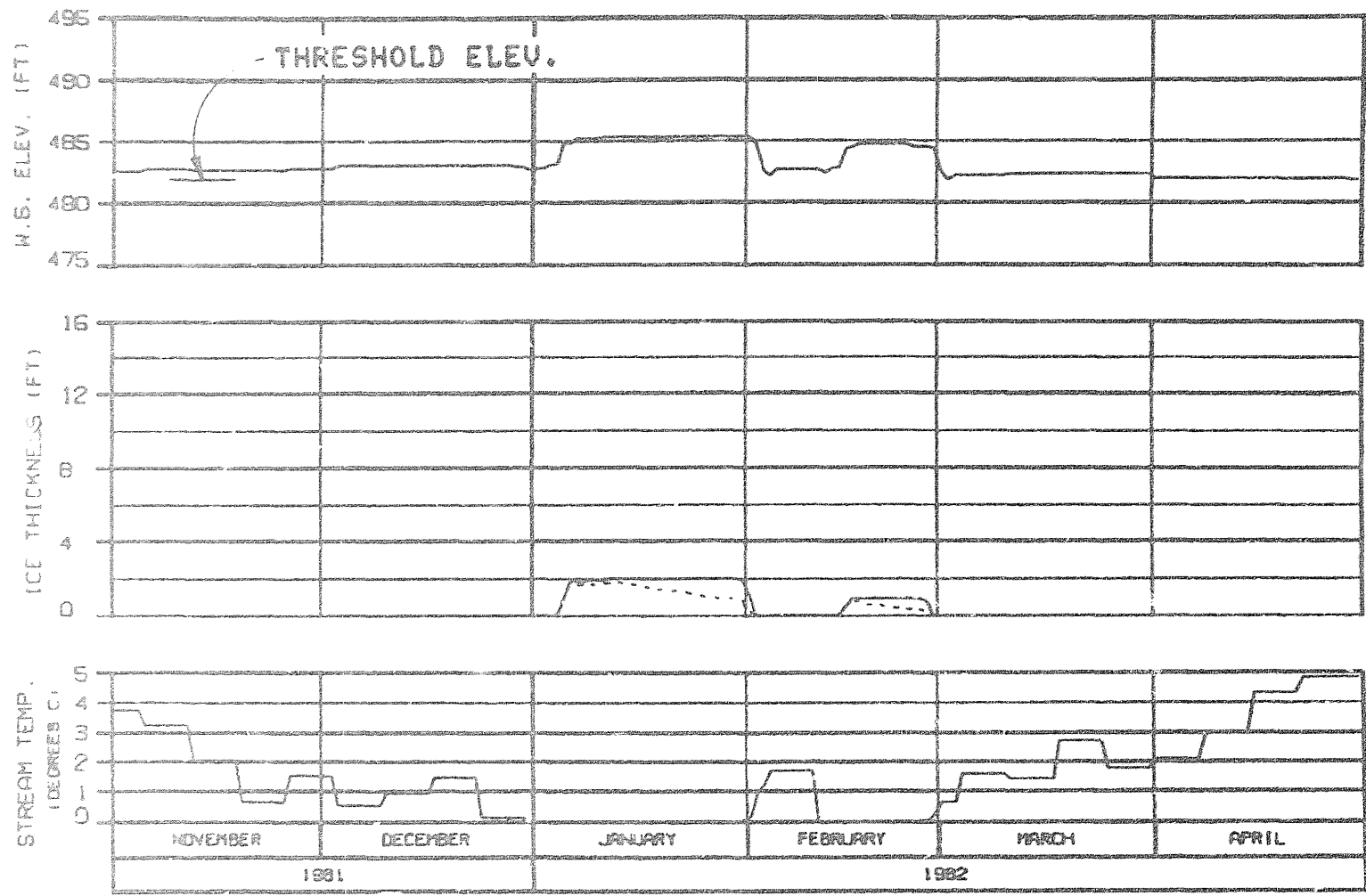


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP / : : WARMEST WATER
 REFERENCE RUN NO. : 810204B

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: H.L. DAVIS	30 NOV 82	1000.142

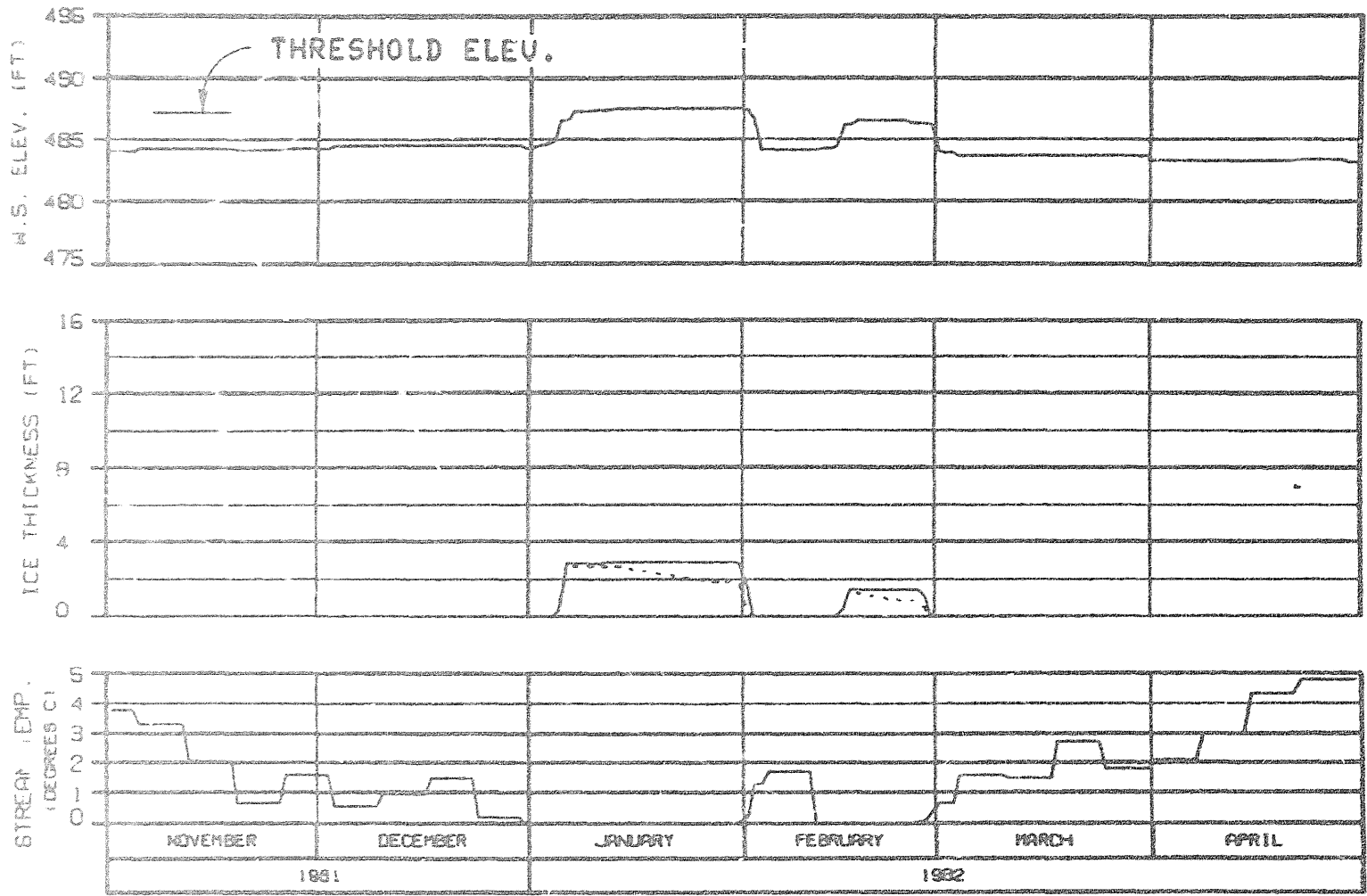


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL MSII
 RIVER MILE : 115.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60676	ISS. NOV 82
LOGS. 142	

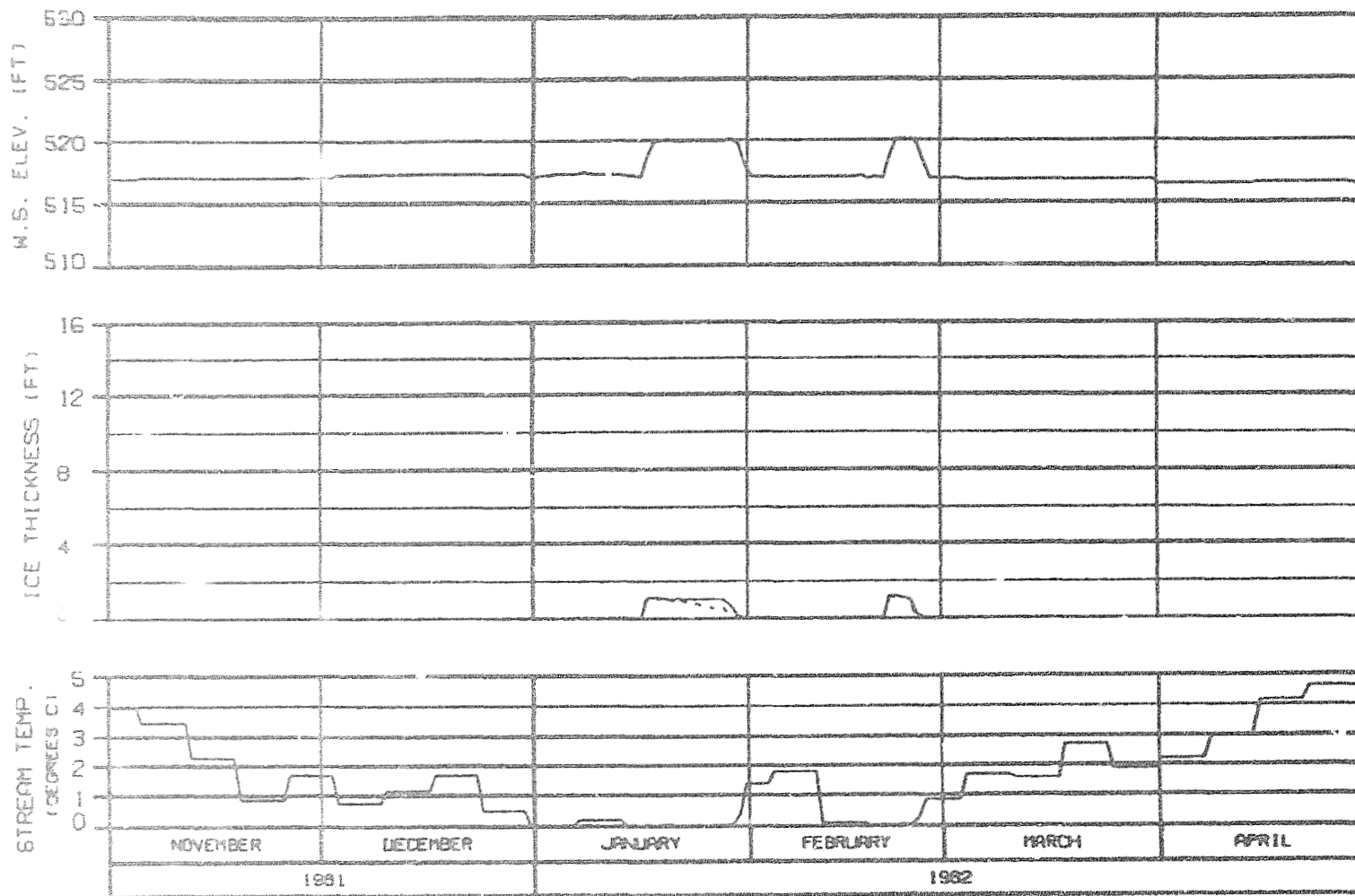


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102048

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HAZA-EBASCO JOINT VENTURE	
DATE: 11/01/82	BY: LHM/82
1055.142	

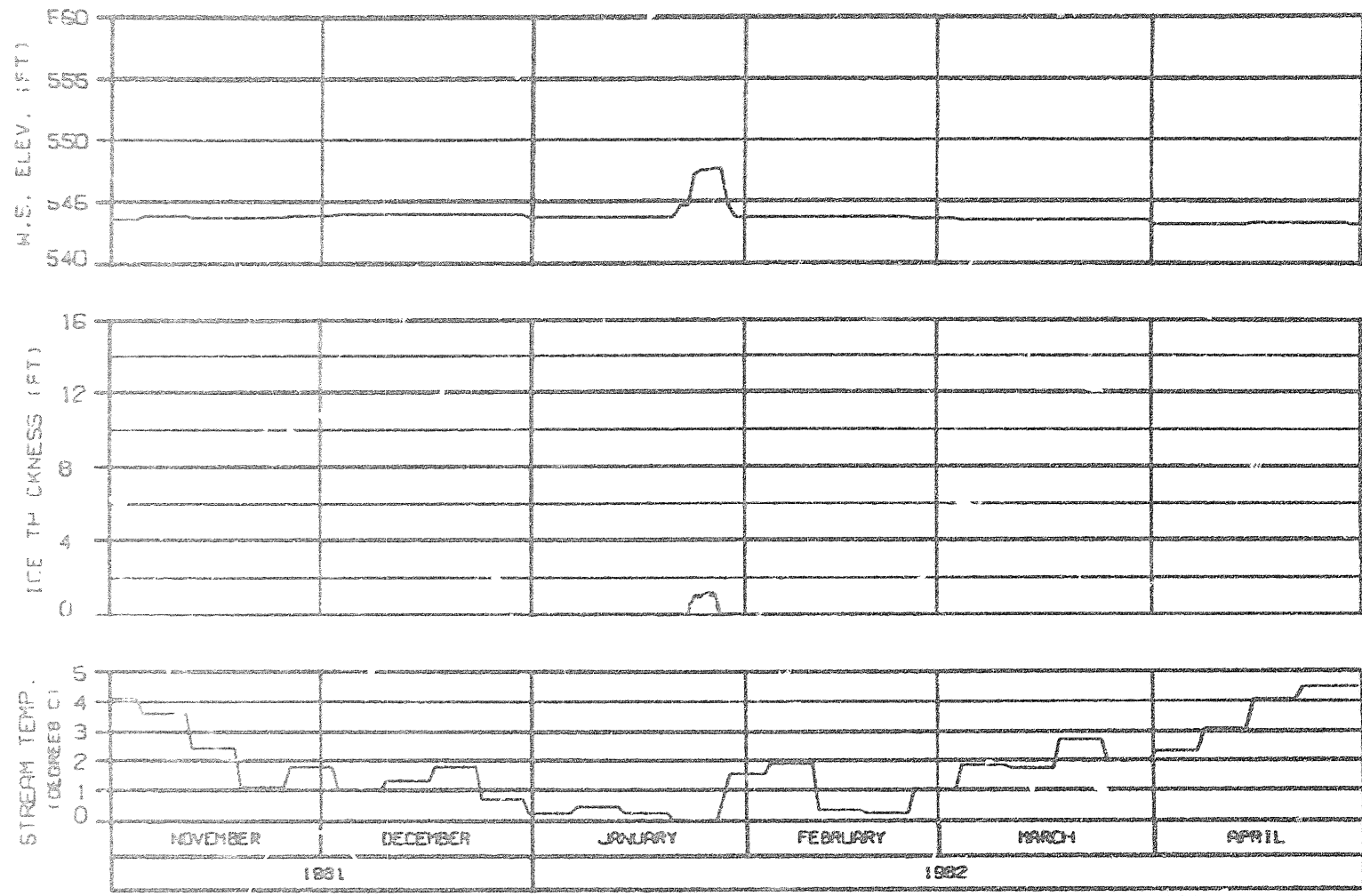


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DATEPLOT - 04/28/82	1503.142

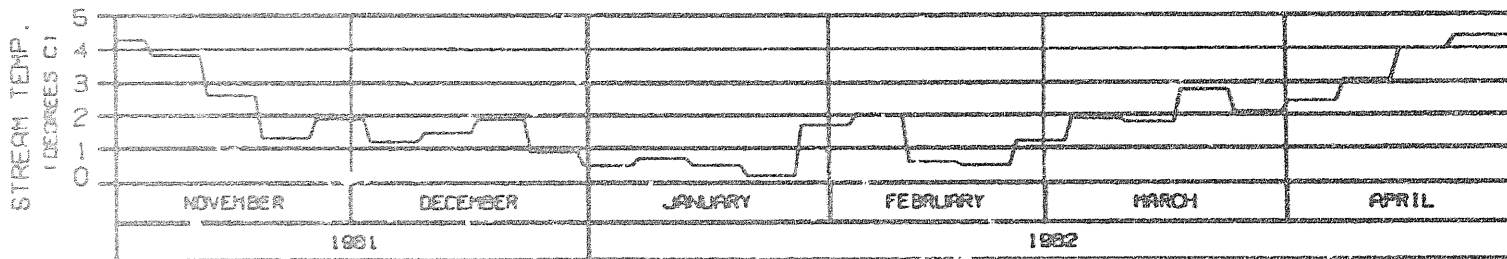
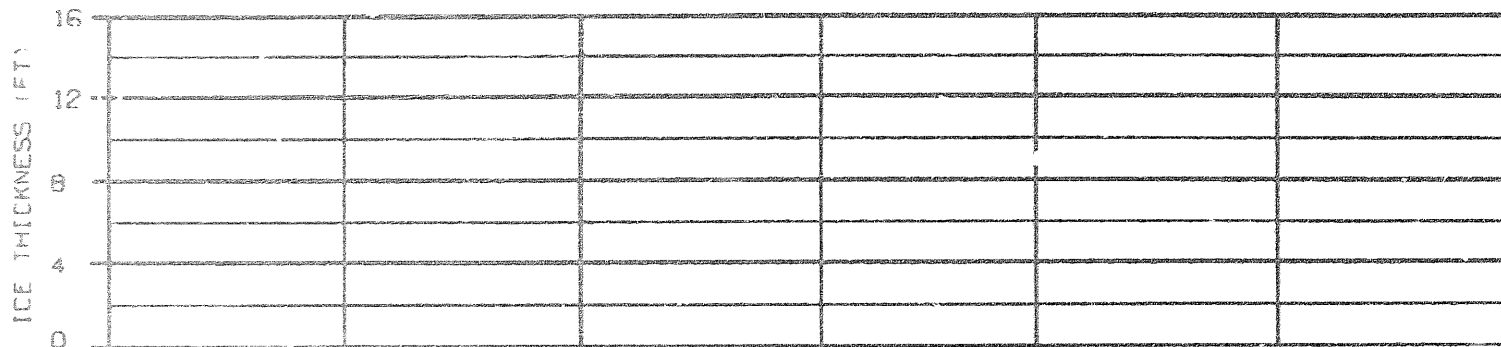
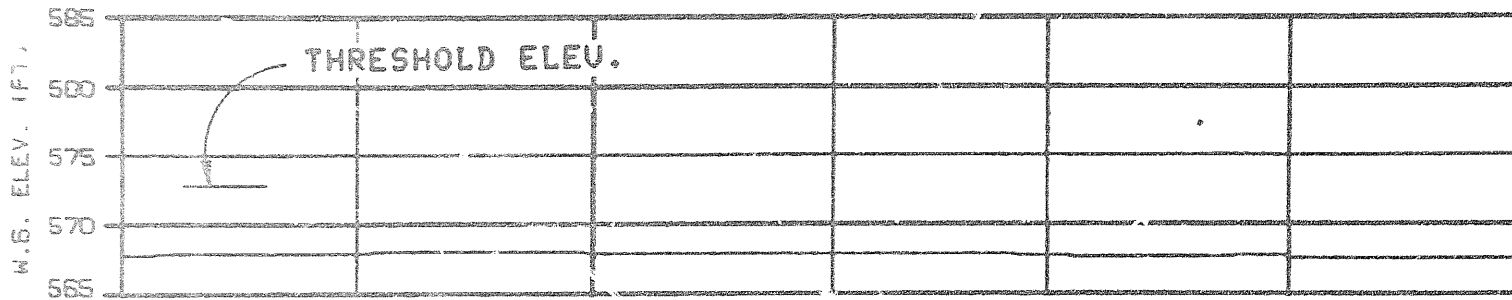


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DESIGNED - ILLINOIS	1278.142



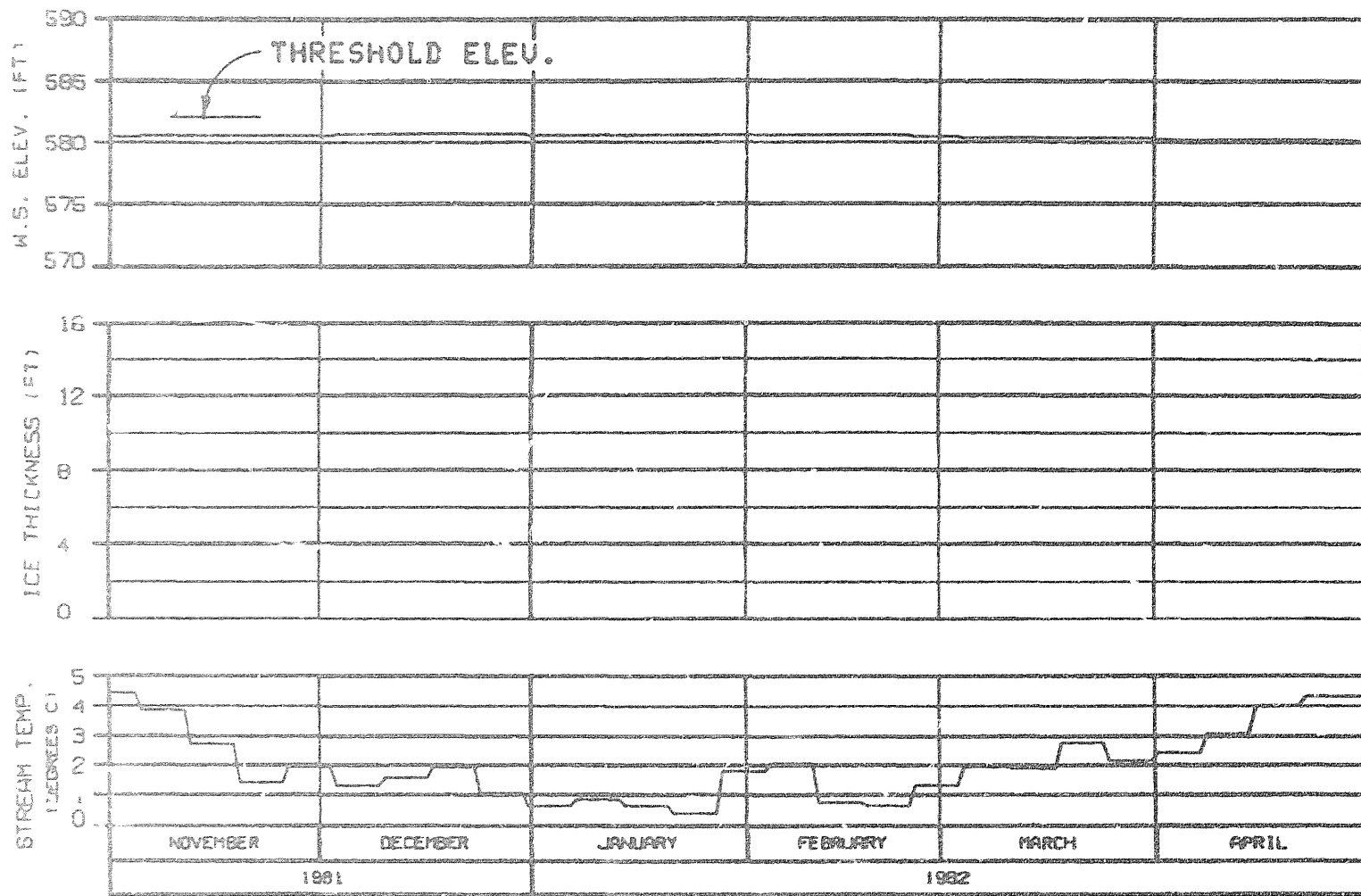
HEAD OF SLOUGH 8A (WEST)

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 C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 04/15/82	BY: JKH
PAGE: 142	



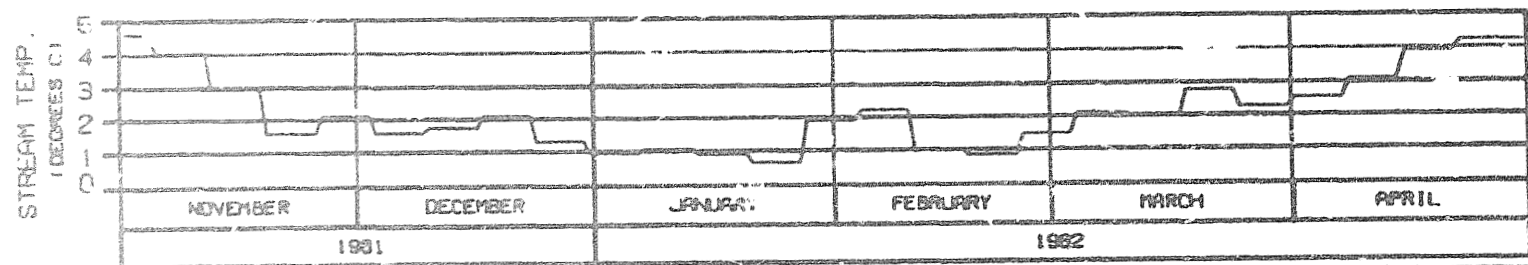
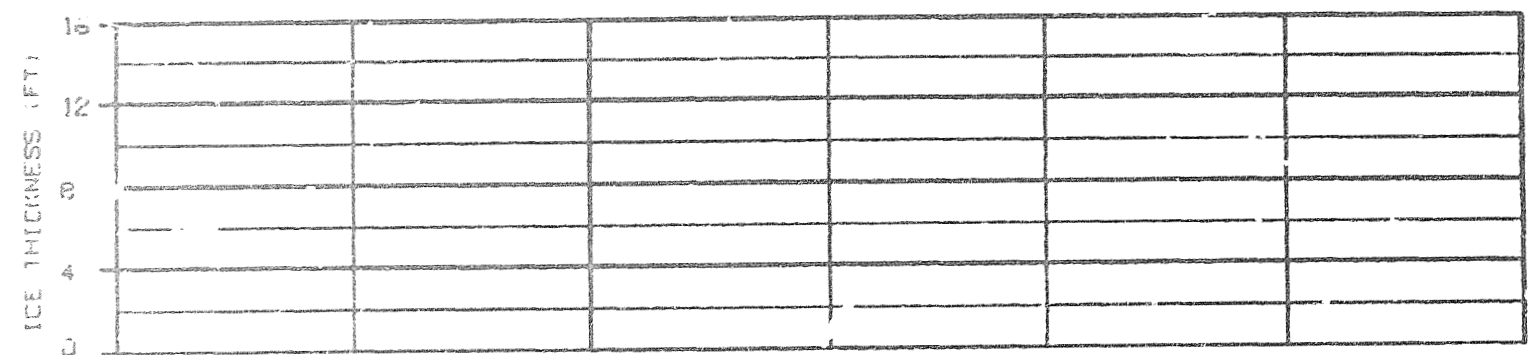
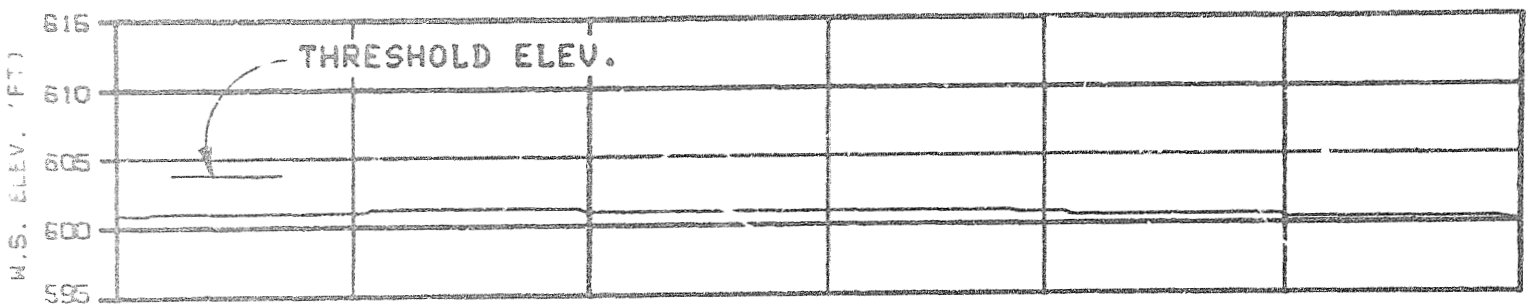
HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : B10ZCMB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBAGOD JOINT VENTURE	
DESIGNED: ALL 04	NOV 81
1158.142	

STOP C



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

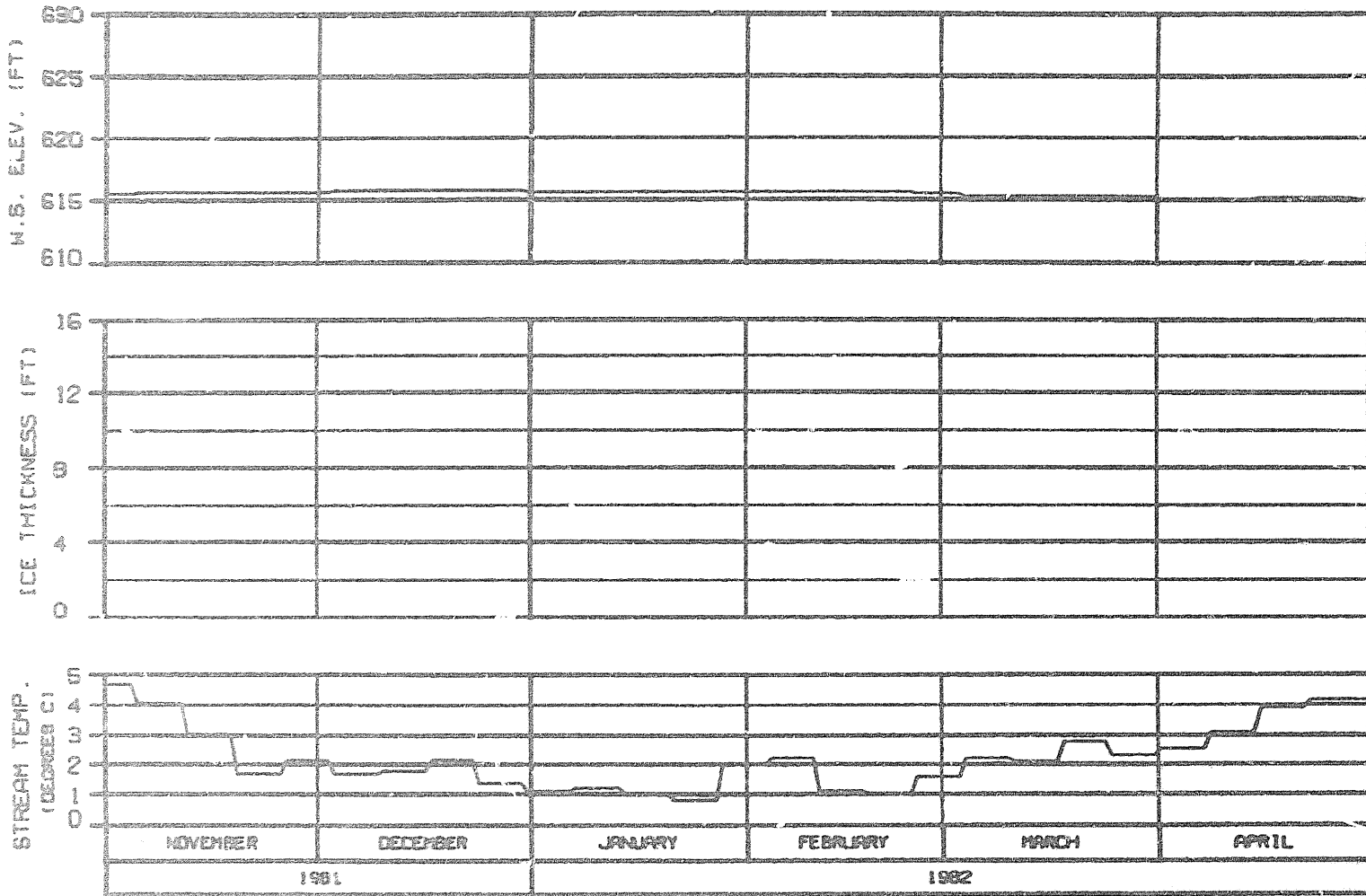
HEAD OF SLOUGH 9
 RIVER MILE : 129.30

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 810204B

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGINEER: P.L. DAVIS	NO. 457 04
	1000.142

OPTION?

OPTION 7

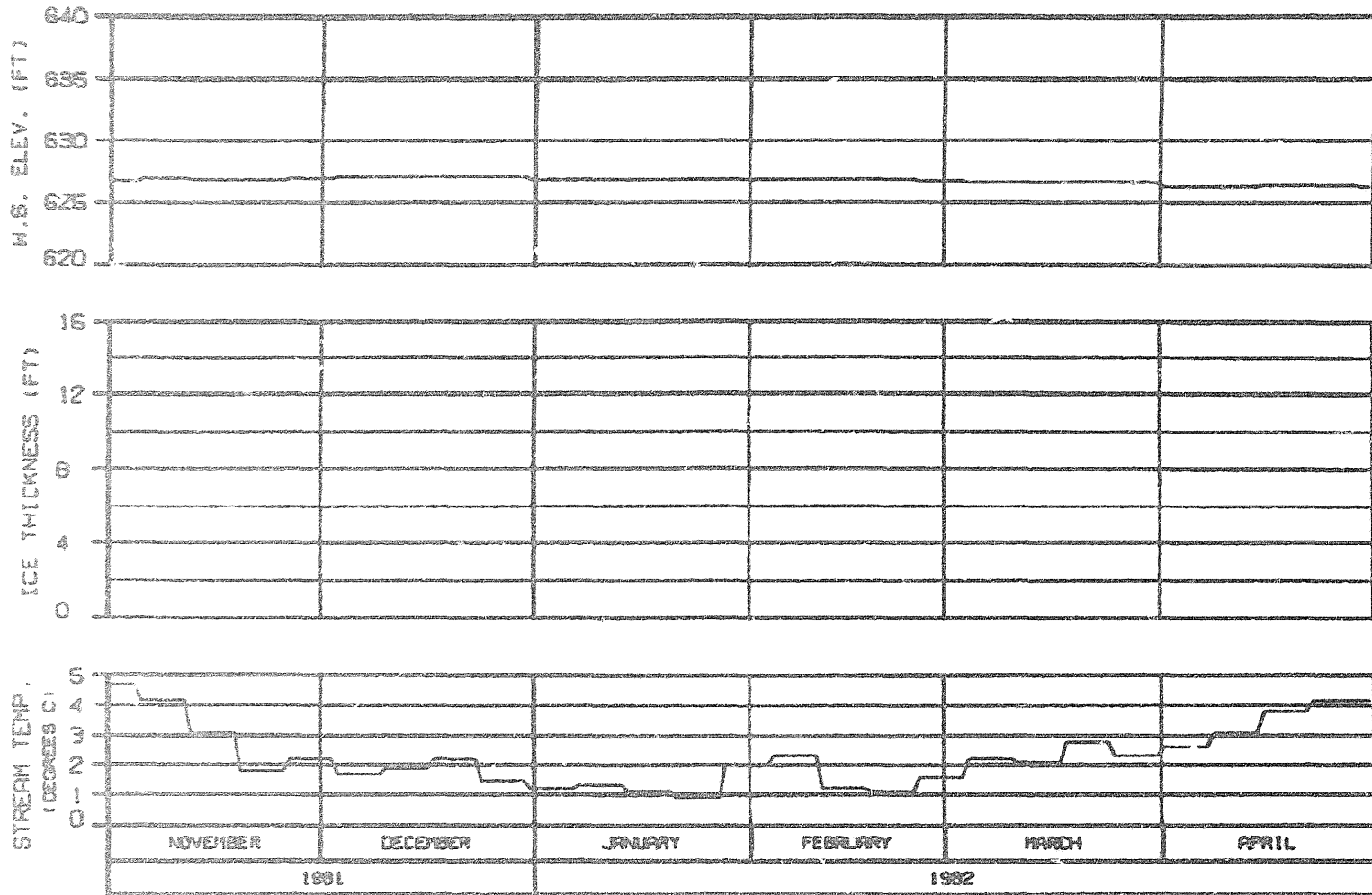


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEM ID : DEVIL CANYON 2002
 CASE C FLOWS TEMP RLE : WARMEST WATER
 REFERENCE RUN NO. : 8102048

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 11/20/81	NO. 142

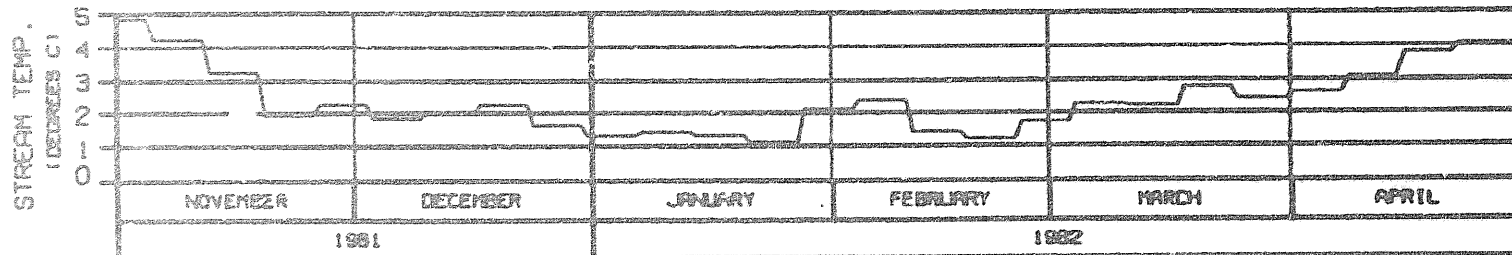
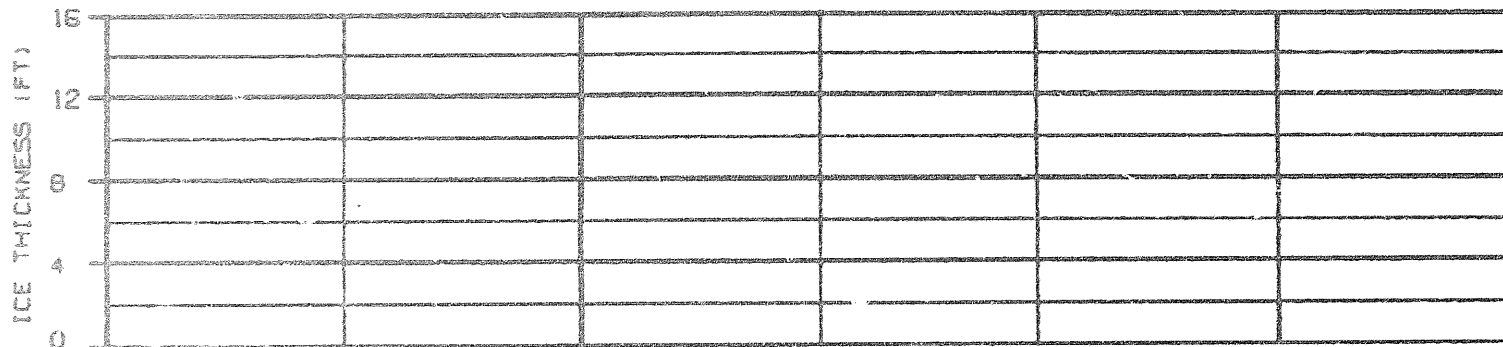
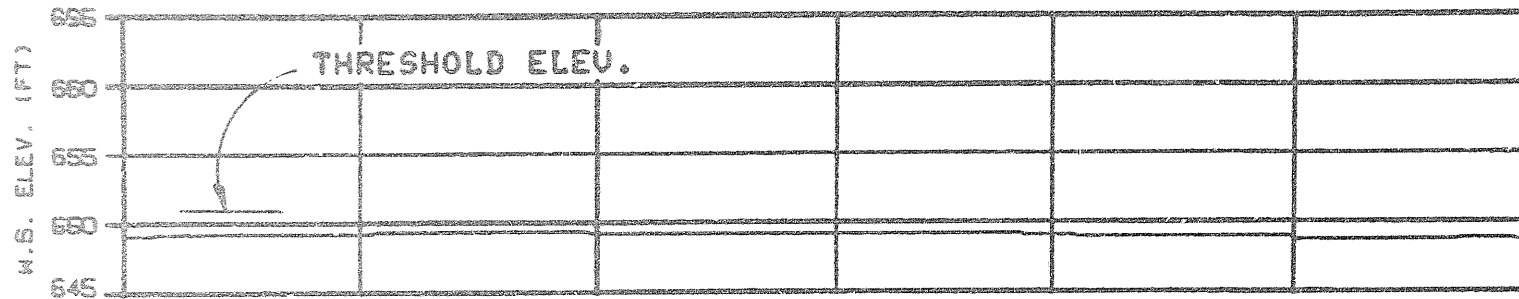


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102C48

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERASCO JOINT VENTURE	
CHG CRES. ALL RIGHTS RESERVED	1000.142



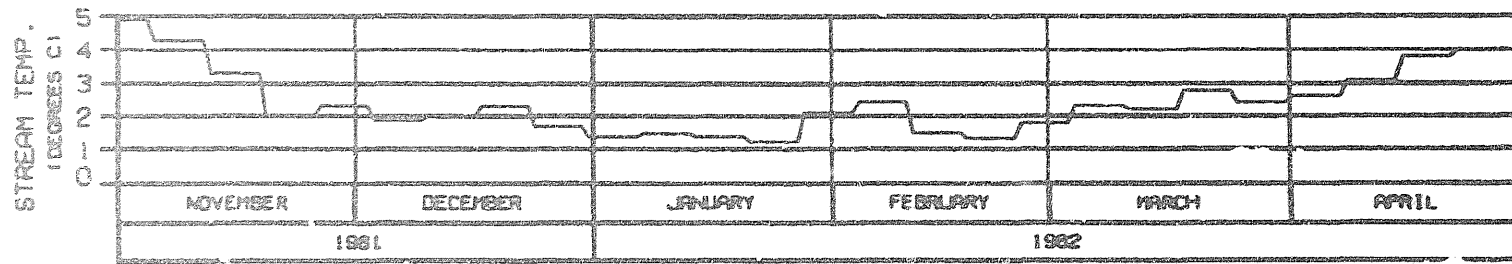
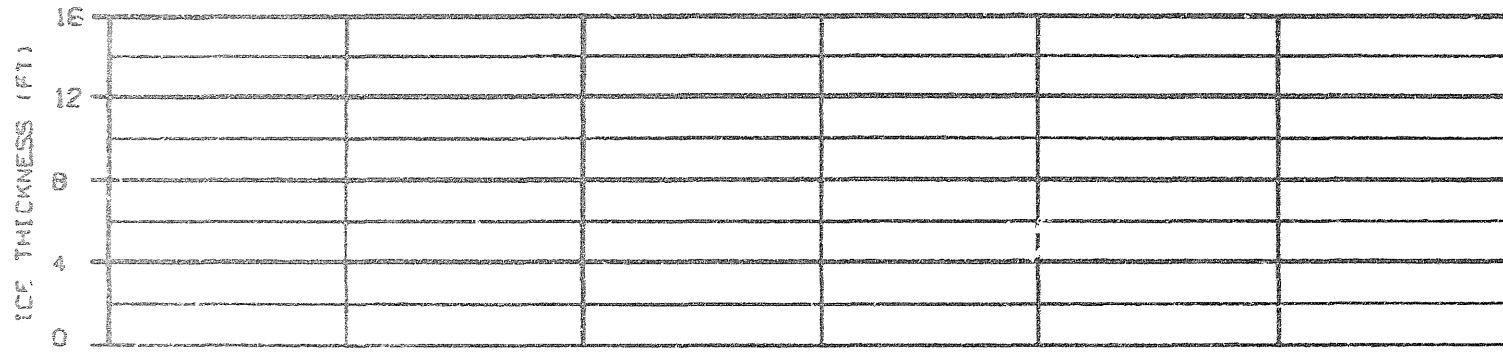
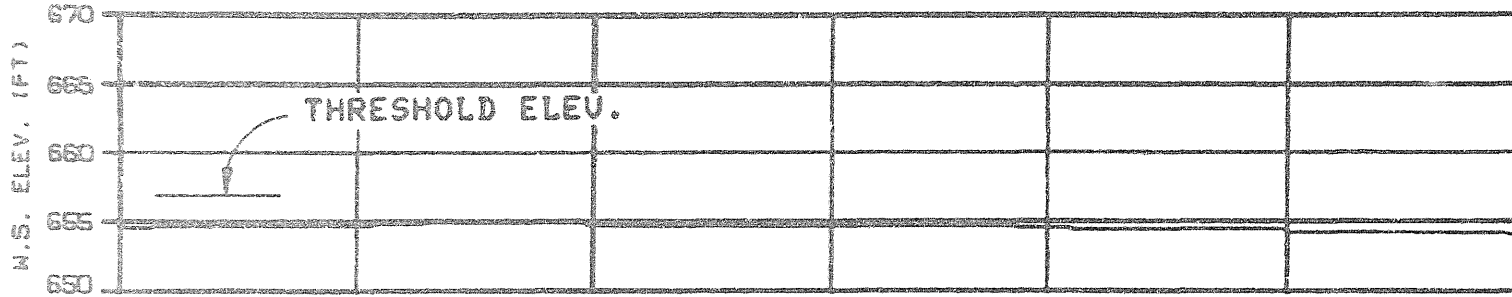
HEAD OF SLOUGH 9A

RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RLE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGN: EL0010	DATE: 10/9/82
	1080.143



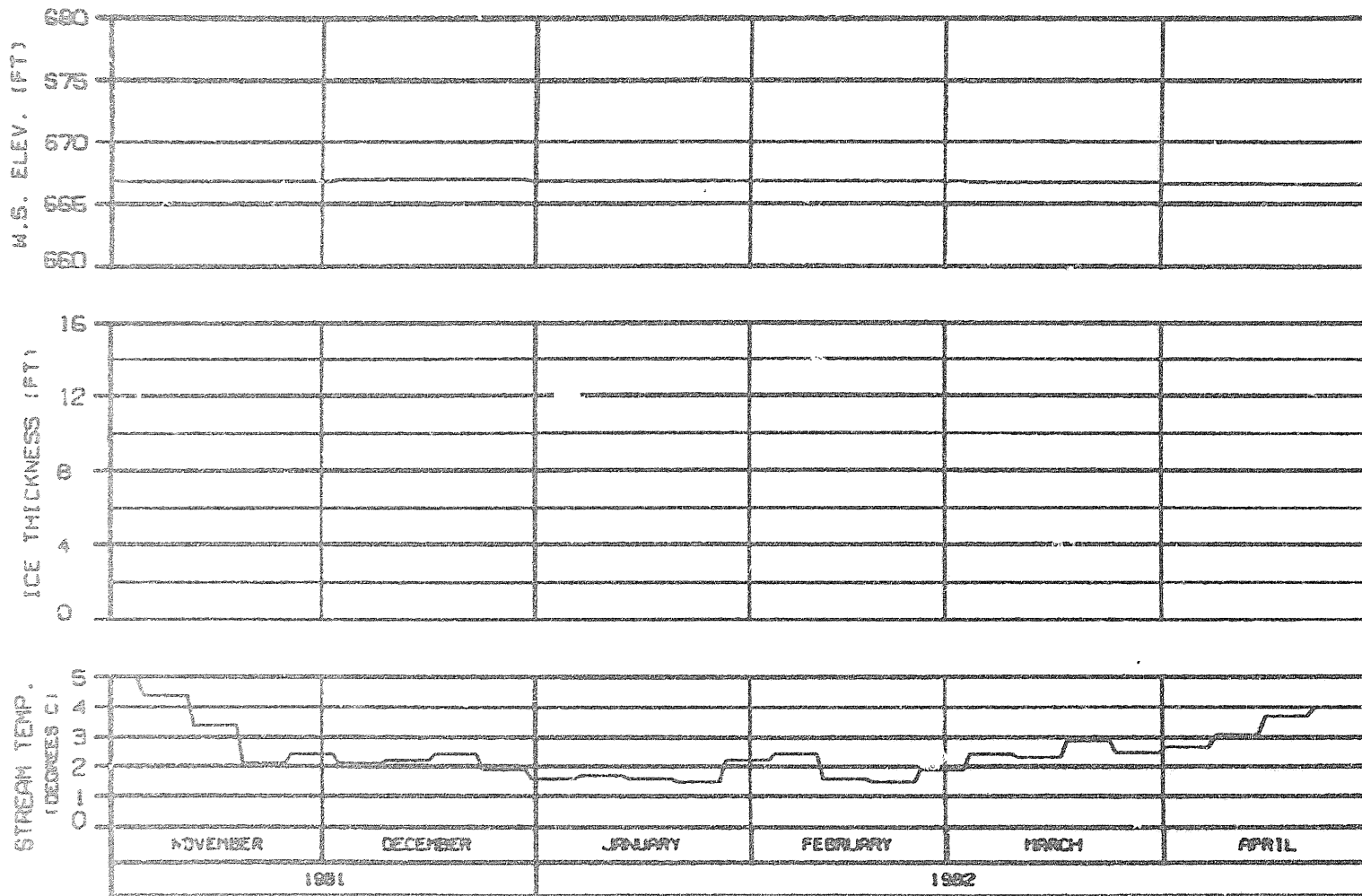
SIDE CHANNEL U/S OF SLOUGH 10

RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
PROJECT: 8110210	REV: 01	ISS: 142



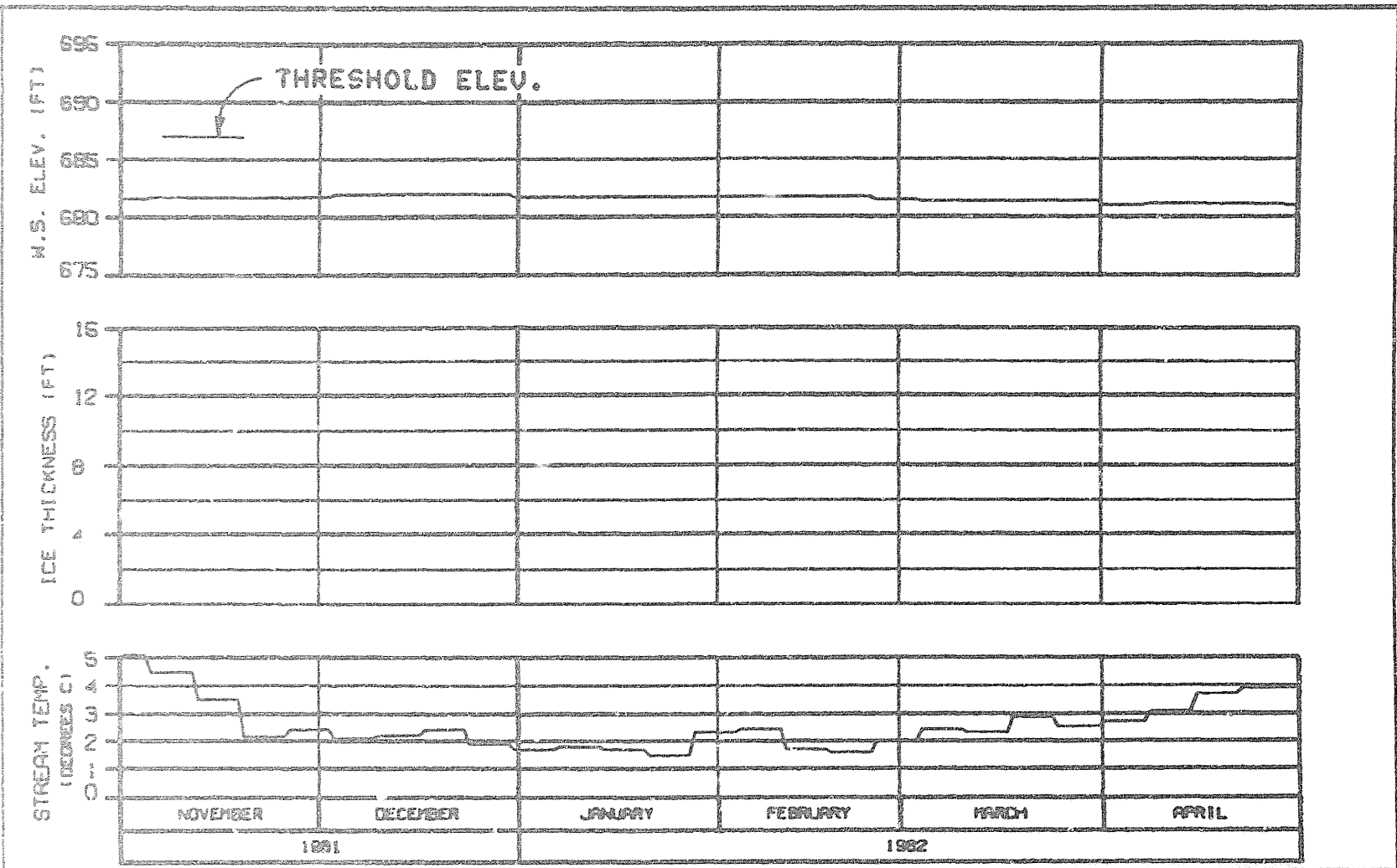
SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

ICE THICKNESS LEGEND:

———— TOTAL THICKNESS
 - - - - - SLOUGH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDASCO JOINT VENTURE	
CHANGES: 11.10.82	30 NOV 82
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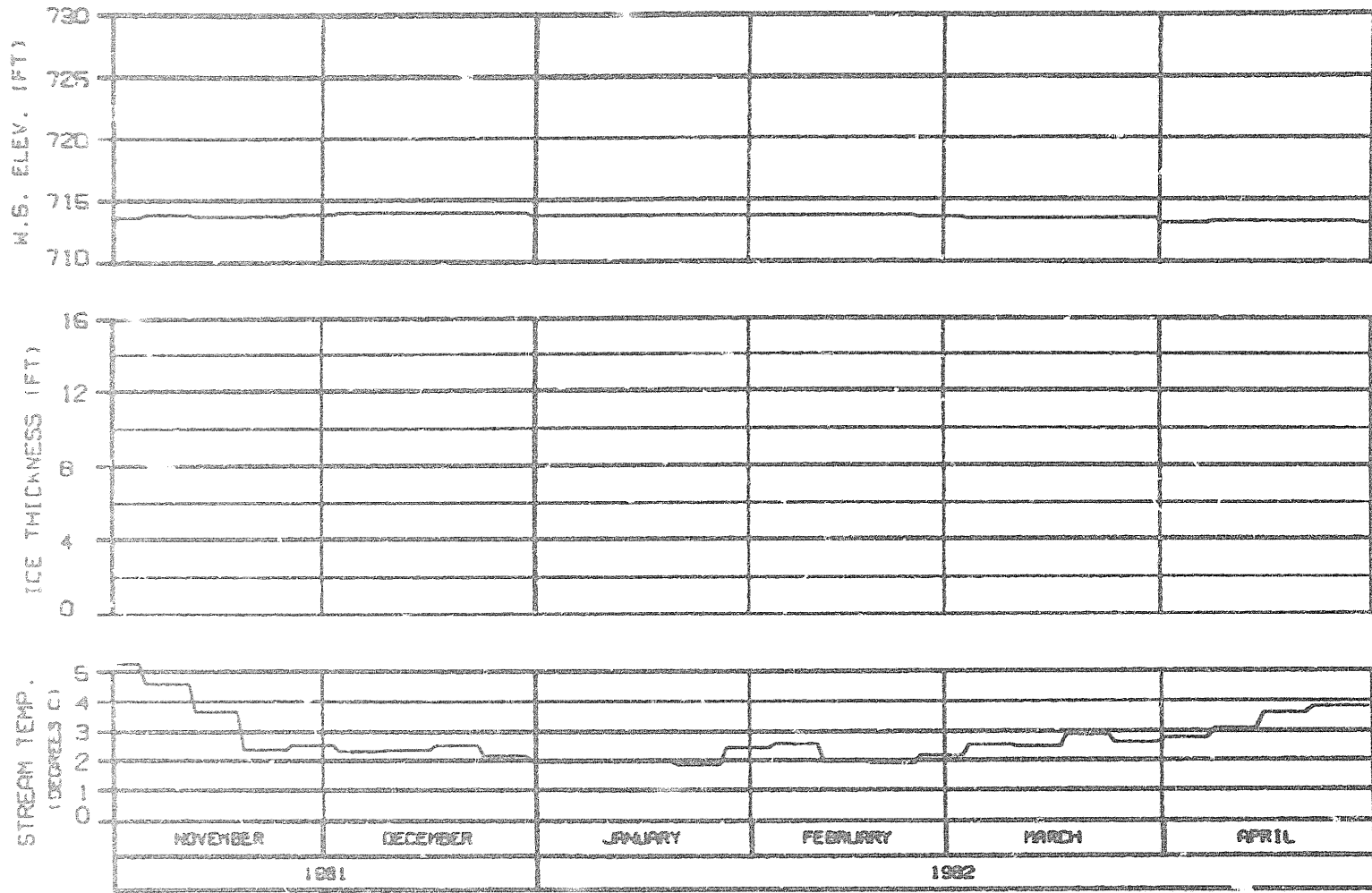


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERSSCO JOINT VENTURE	
DATE: 11/1/82	BY: JEP/101
PAGE: 142	

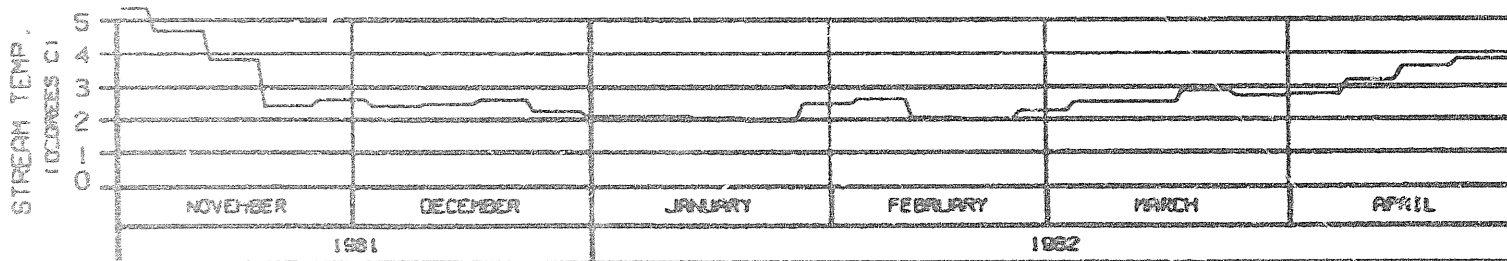
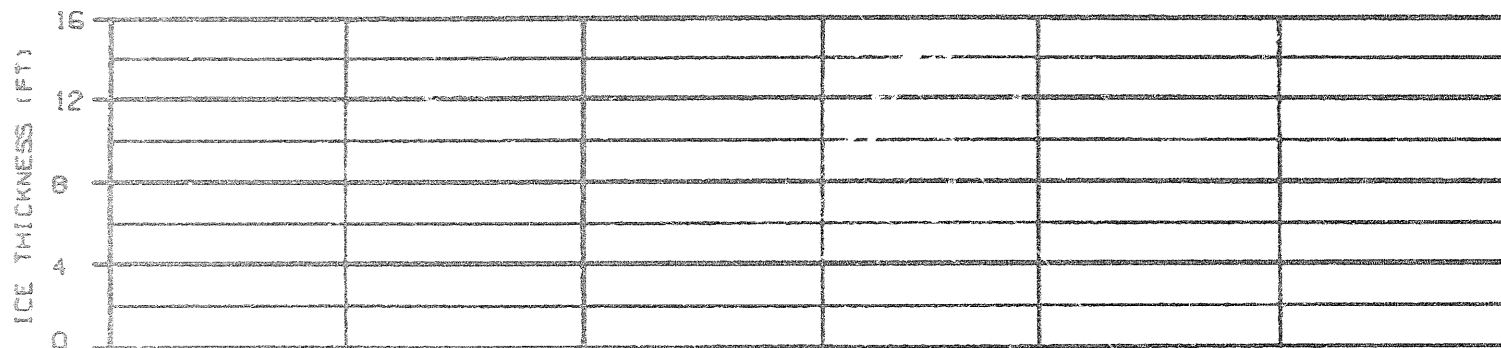
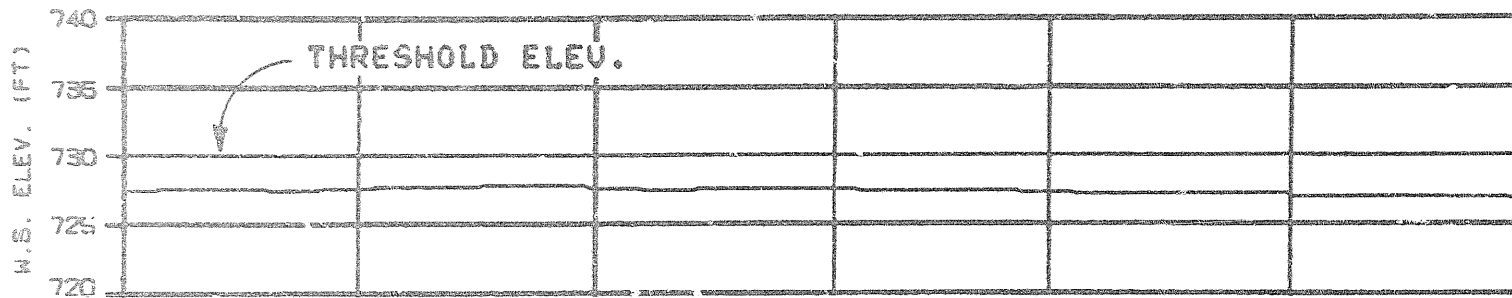


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
ARPA-EG&CO JOINT VENTURE		
CHUCK BLANCH	SP 100 04	1982.142

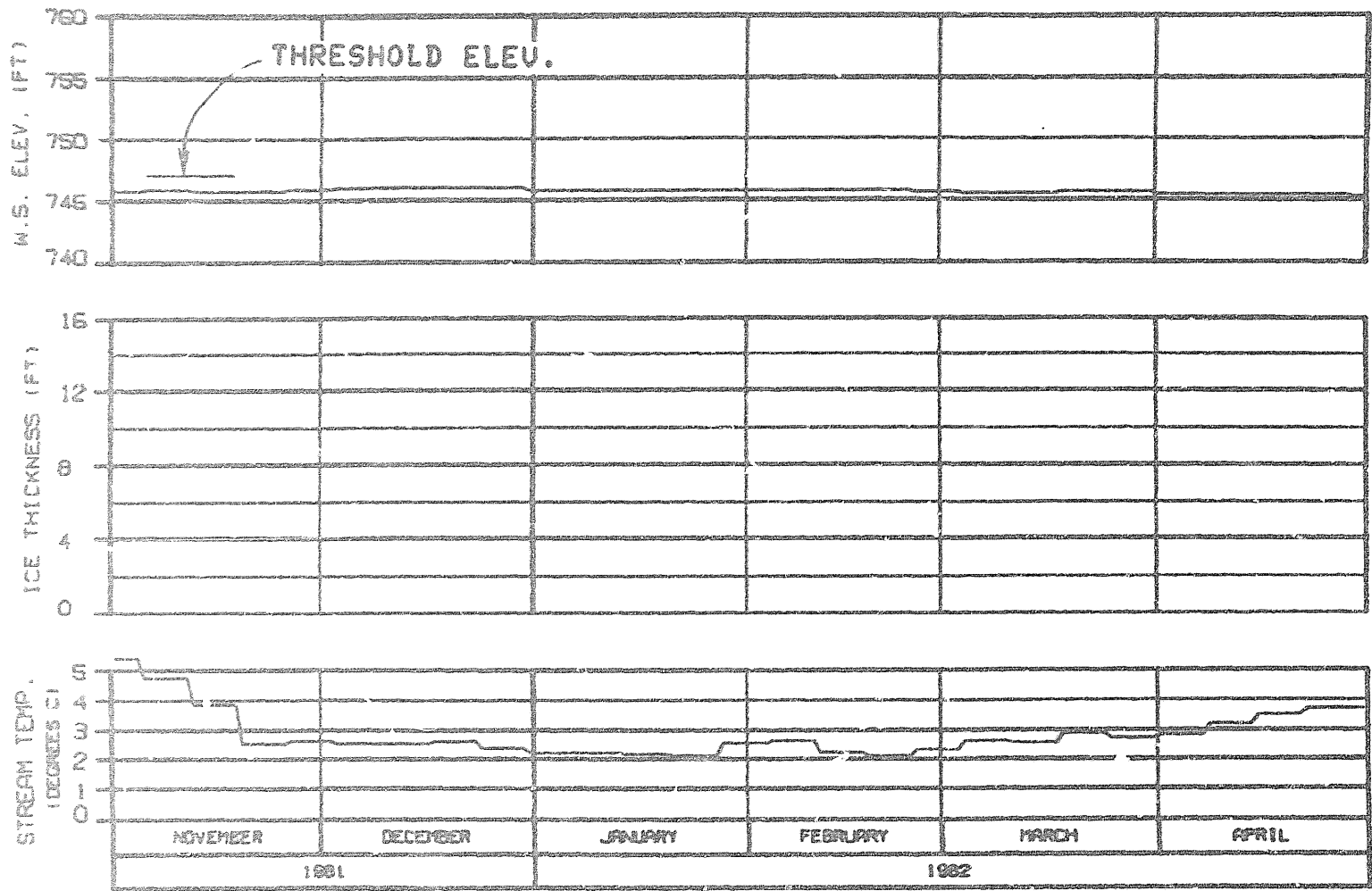


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 31 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRECO JOINT VENTURE	
ORDER NO. 82-0008	10 NOV 82
1000.142	

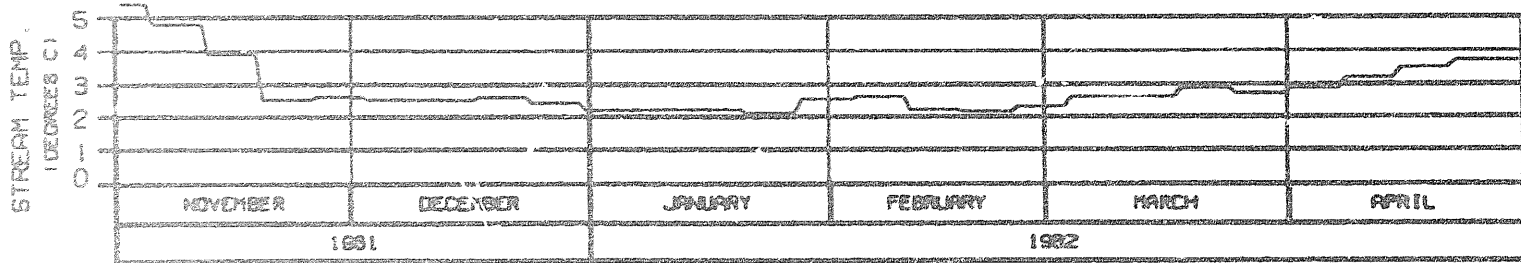
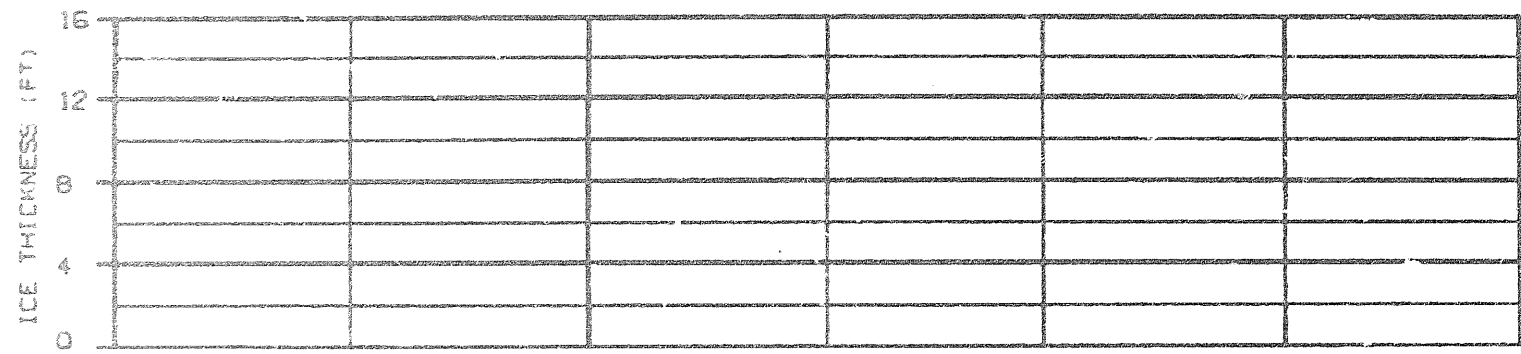
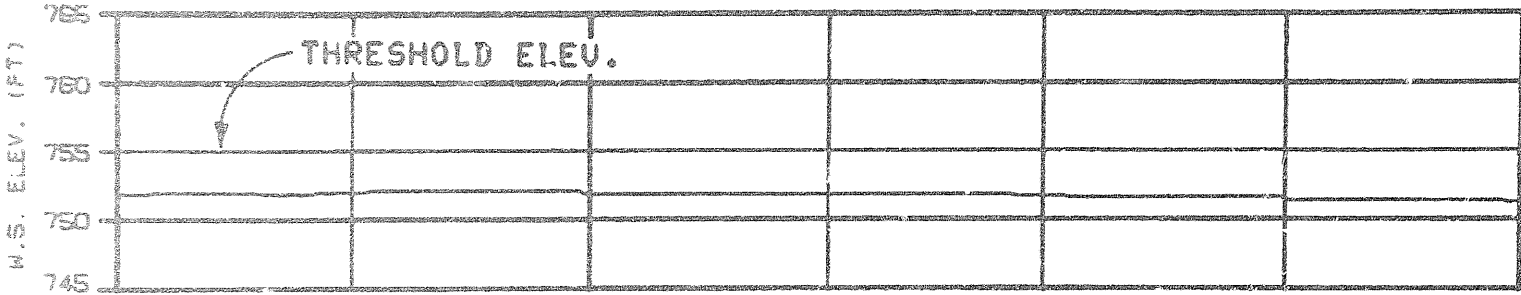


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY	
SLUSH PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
HAZRA-EBASCO JOINT VENTURE	
FIGURE - 01.0010	REV 10/81
	1003.142

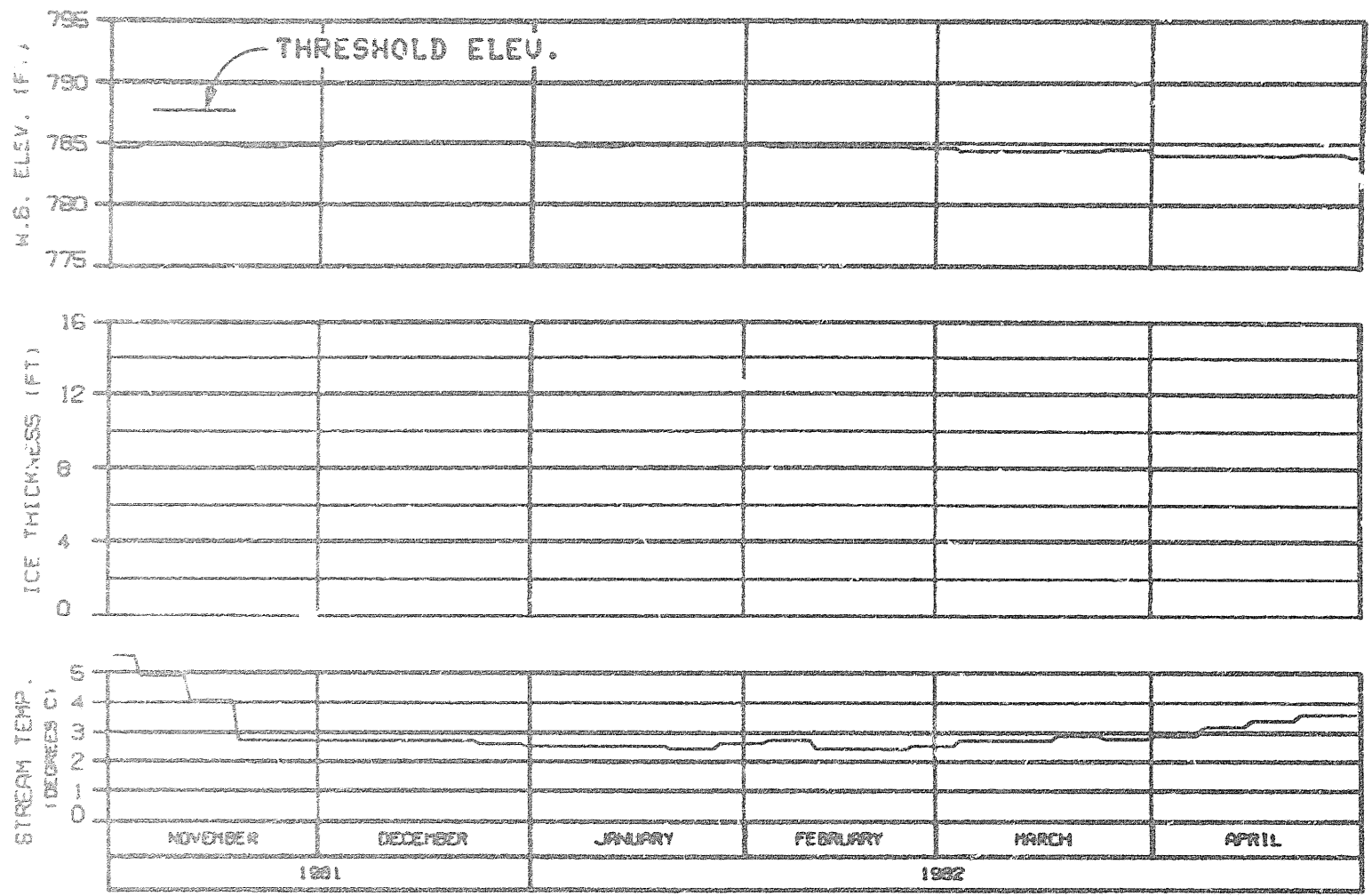


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102048

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NORZA-EBAGCO JOINT VENTURE		
SCHEM. ELEV. 81	NOV 81	1000.142



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

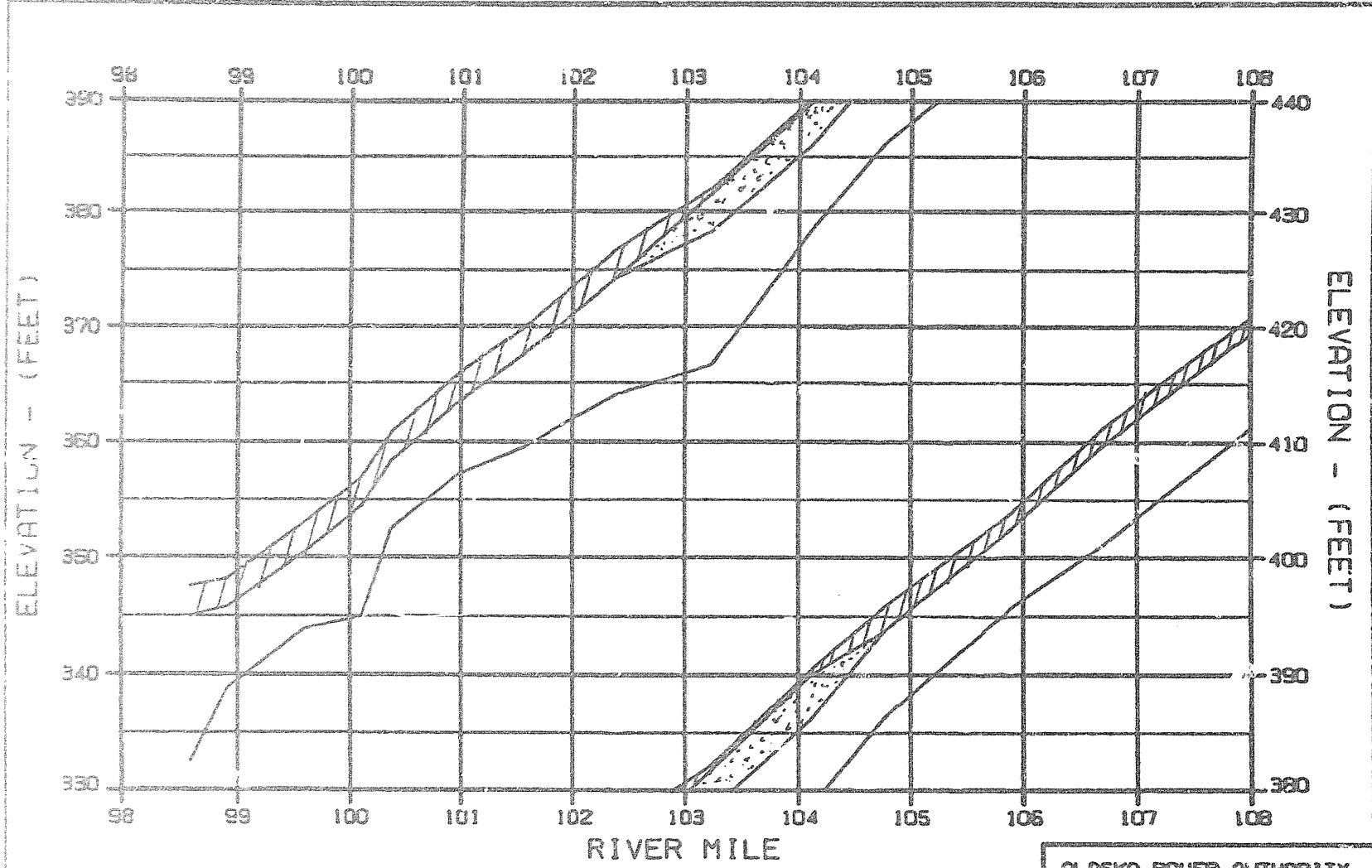
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP RULE : WARMEST WATER
 REFERENCE RUN NO. : 8102CWB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZ-EBASCO JOINT VENTURE		
DESIGN - 11/1981	30 NOV 82	1000.142

EXHIBIT H

C


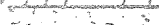




ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

LEGEND:

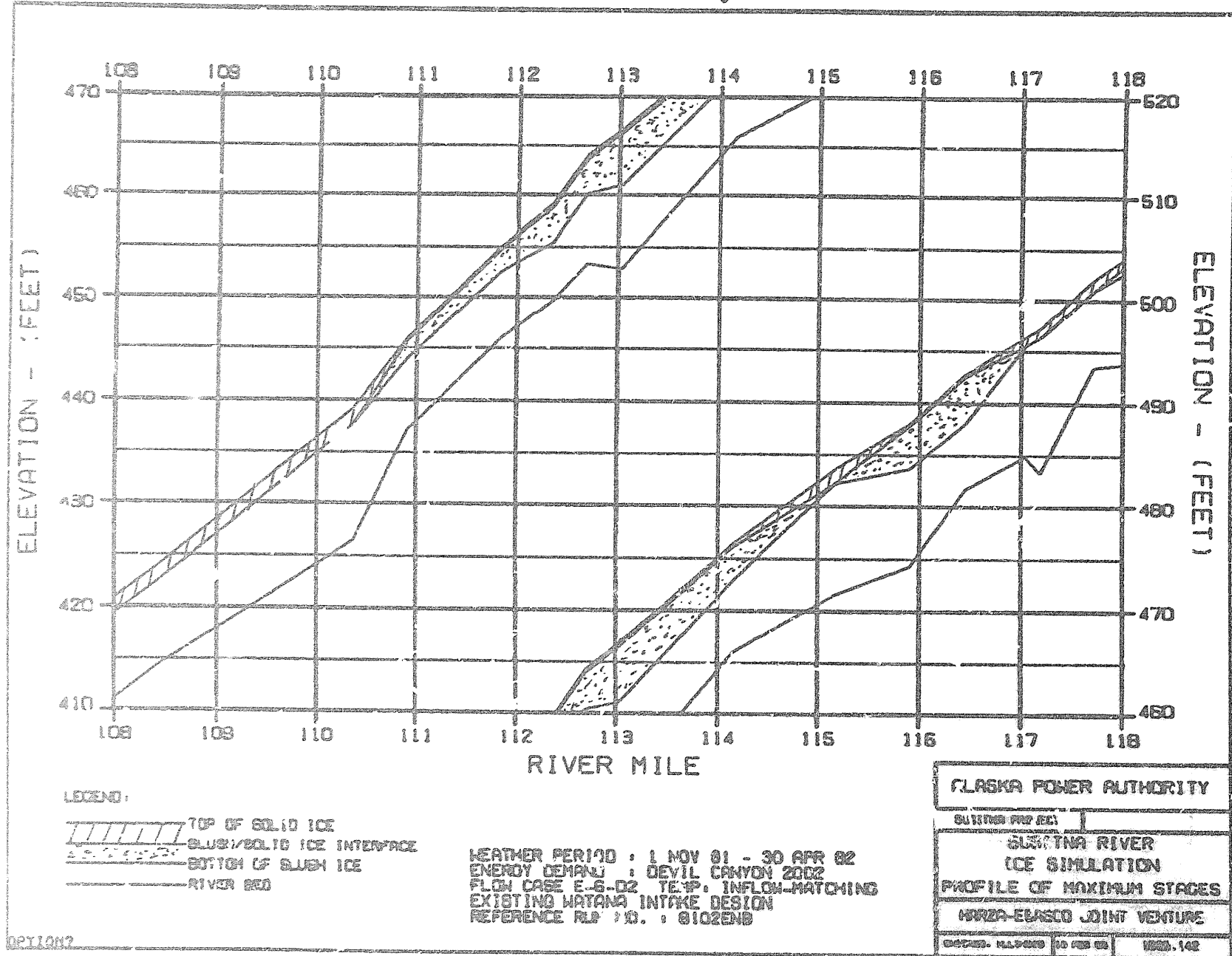
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-G-02 TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 010205

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARDA-EBASCO JOINT VENTURE	
DATE: 11/01/02	ISSUE: 142

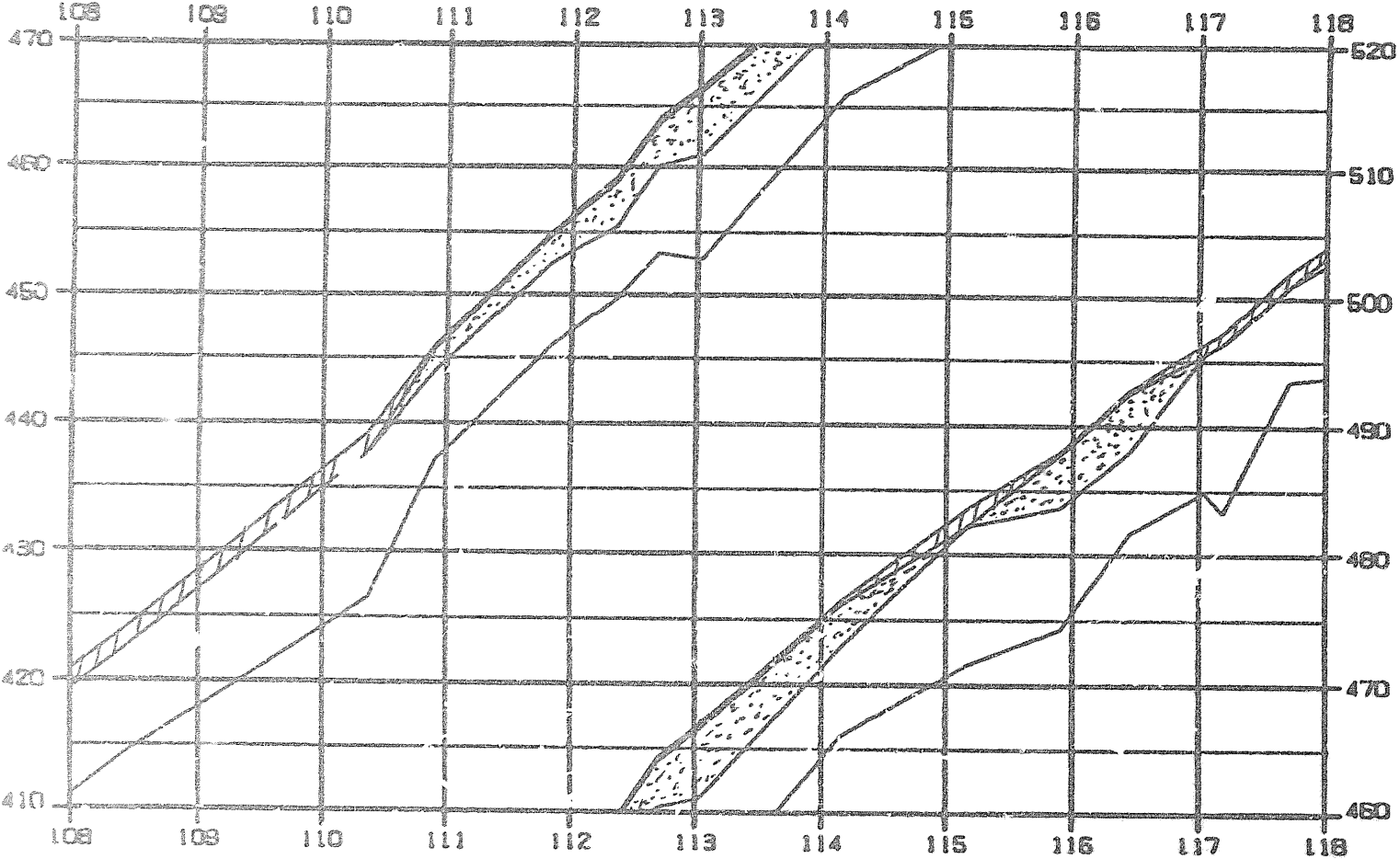
SECTION?

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ELEVATION - (FEET)

ELEVATION - (FEET)



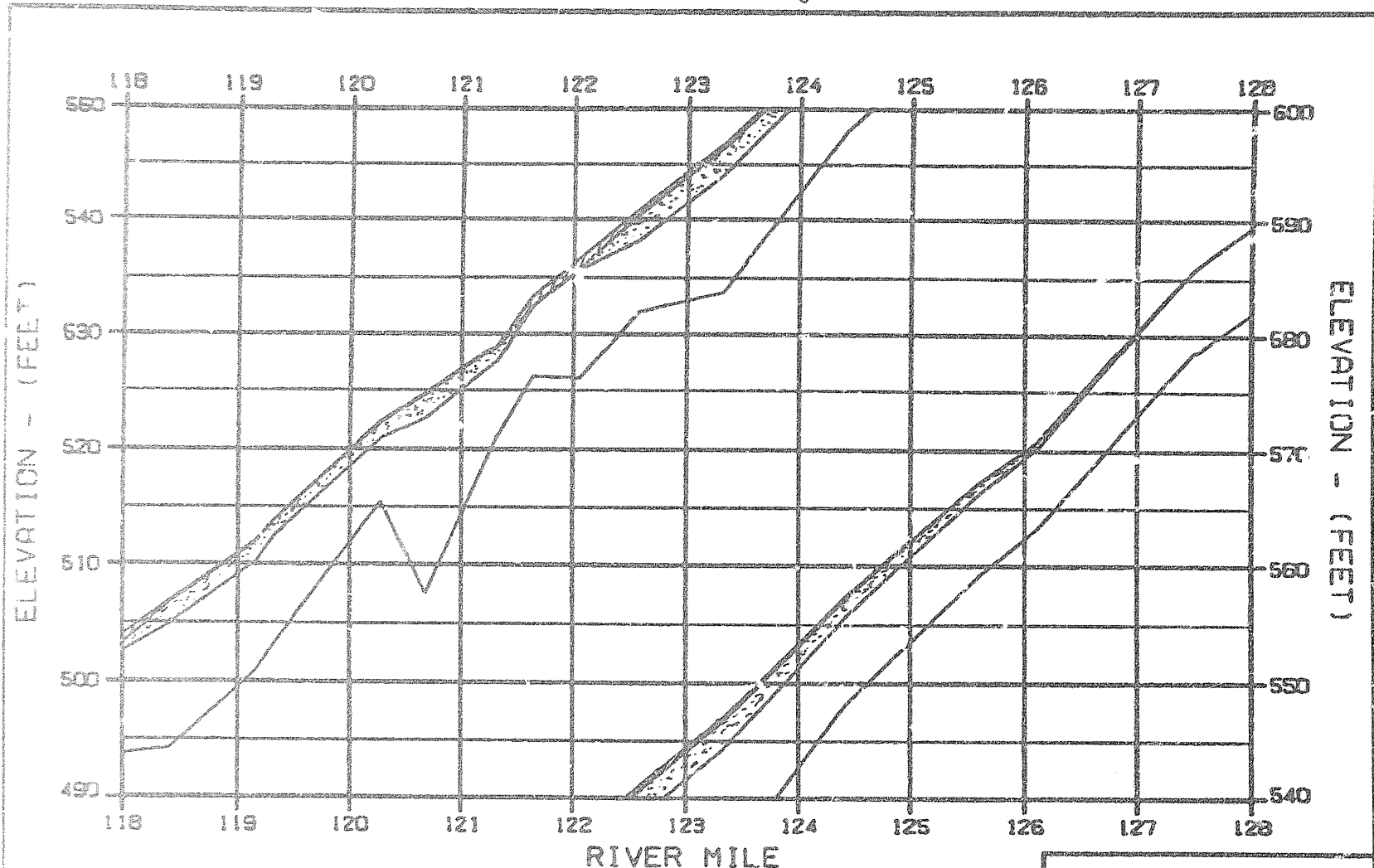
LEGEND:

- 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-6-02 TE-1P: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE R/LP NO. : 0102END

FLASKA POWER AUTHORITY	
SLEETNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-ELASCO JOINT VENTURE	
DESIGN: KLLP/02	NOV 82
NO. 142	

OPTION?

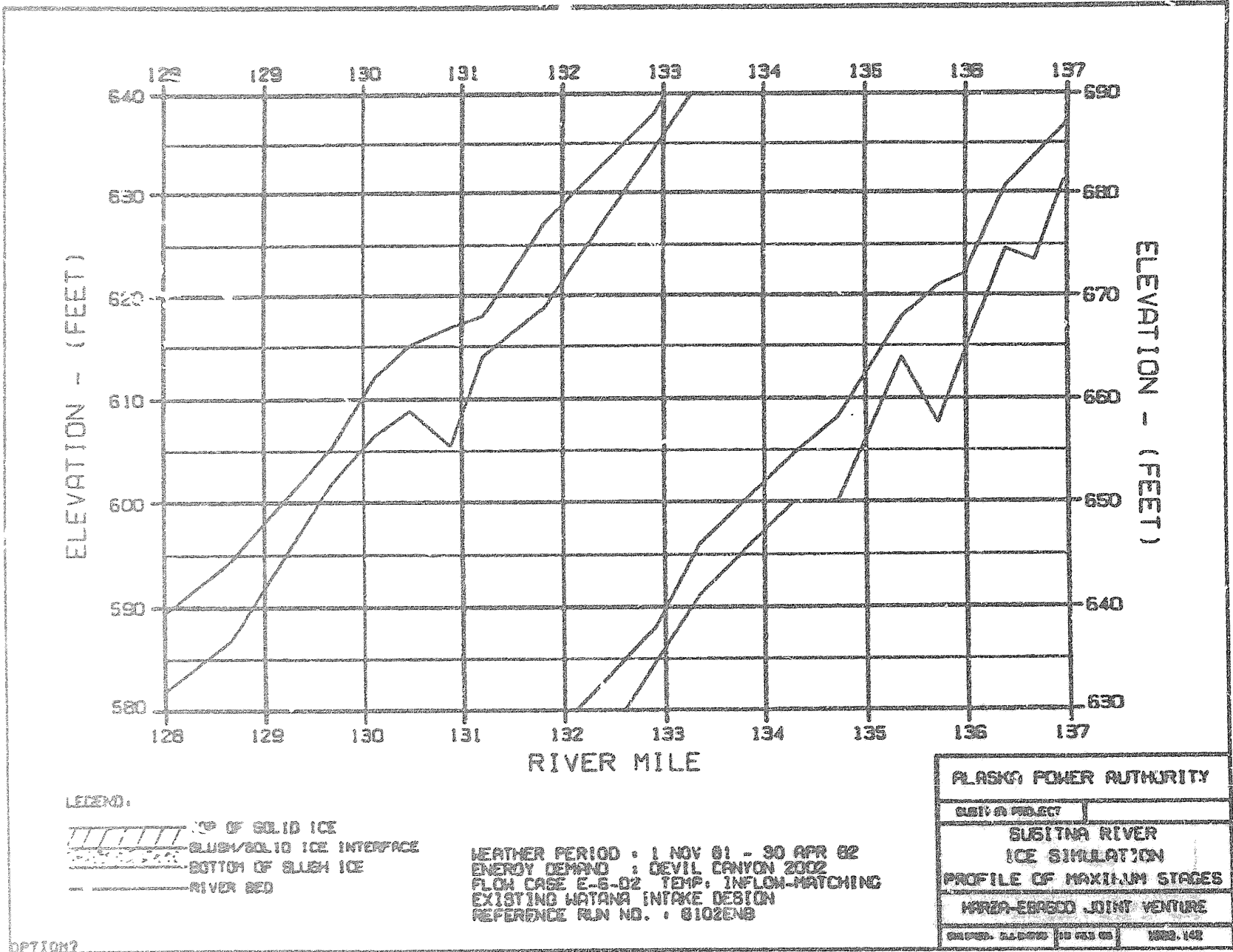


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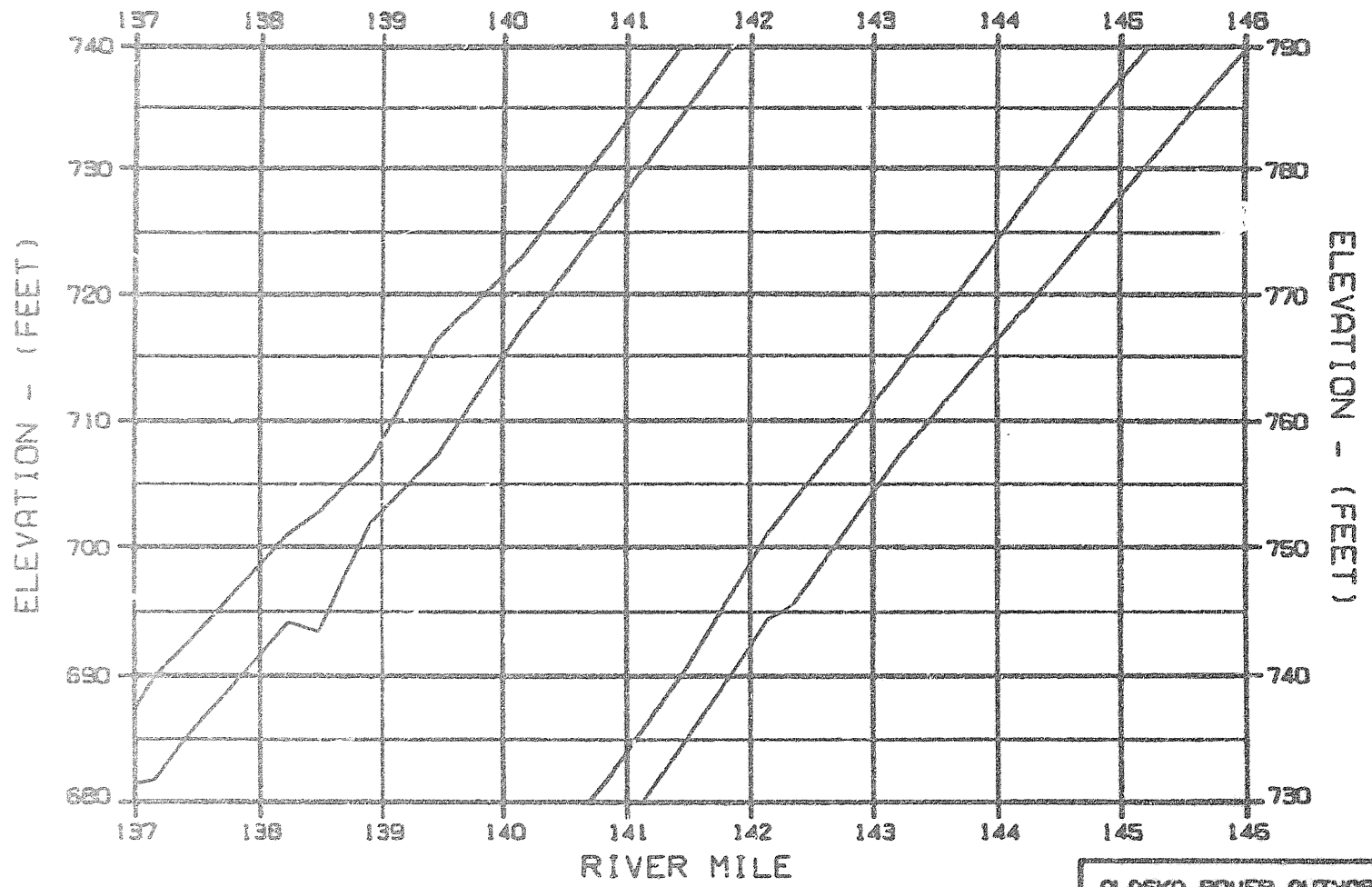
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-5-02 TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WRAZ-EBASCO JOINT VENTURE	
DATE: 11-10-02	BY: PDS/CS
PAGE: 142	



OPTION?



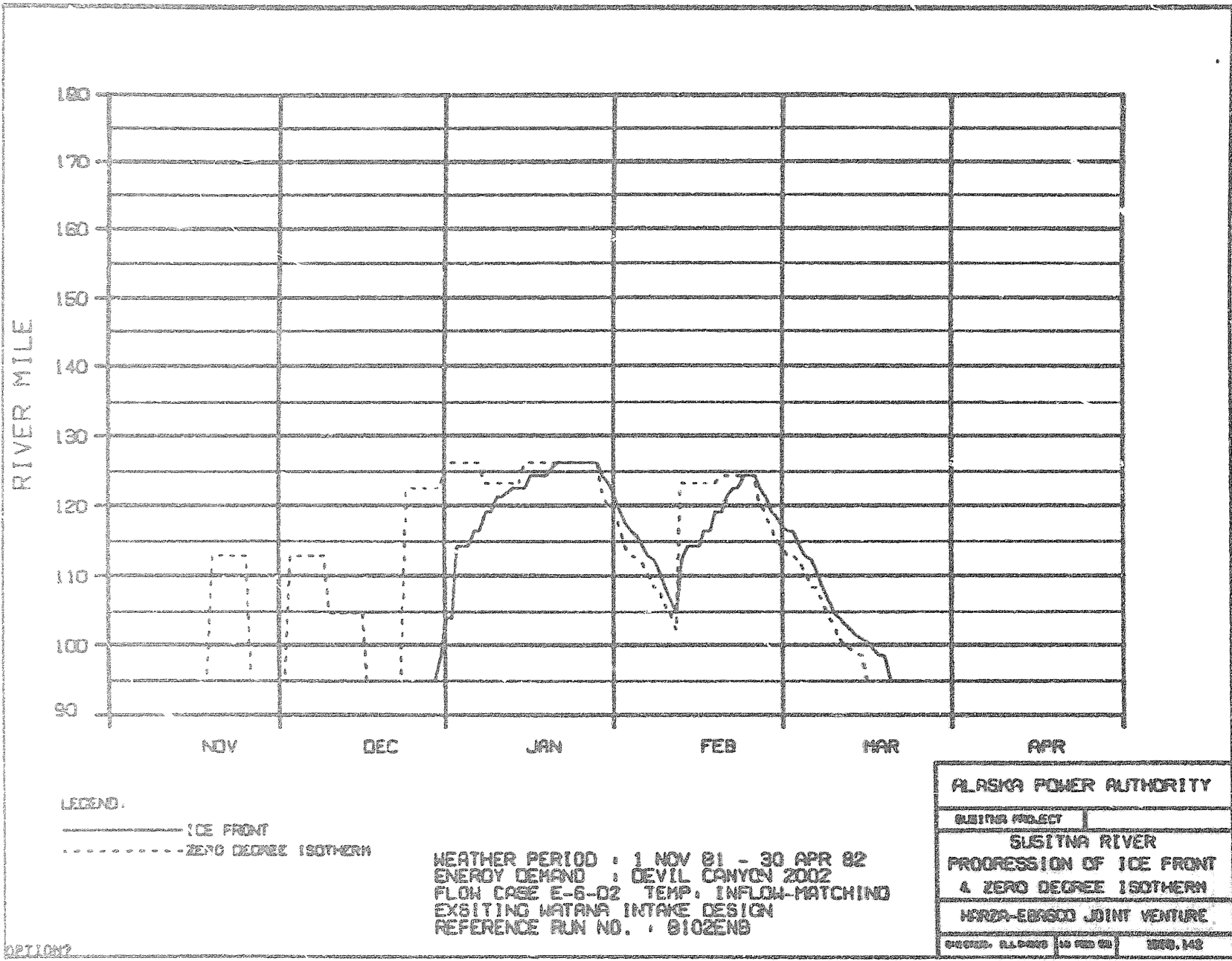
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-6-02 TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102END

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
DESIGN. 11/19/81	1982.ICE

OPTION 2

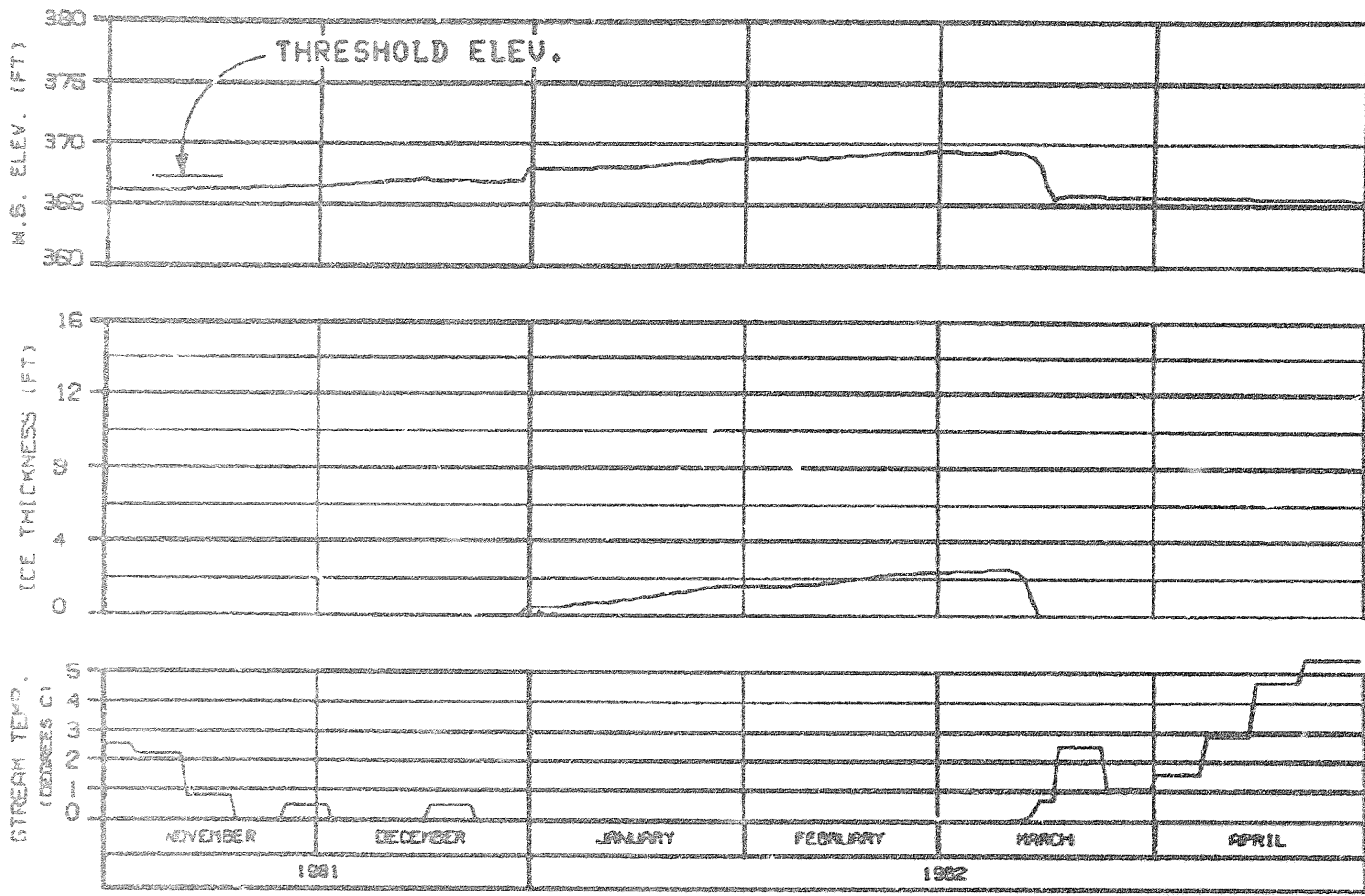


LEGEND:
 ——— ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-6-02 TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 81028NB

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
HARZA-ENERSCO JOINT VENTURE		
DATE: 11-6-82	BY: PEB/SL	1000.142

OPTION?



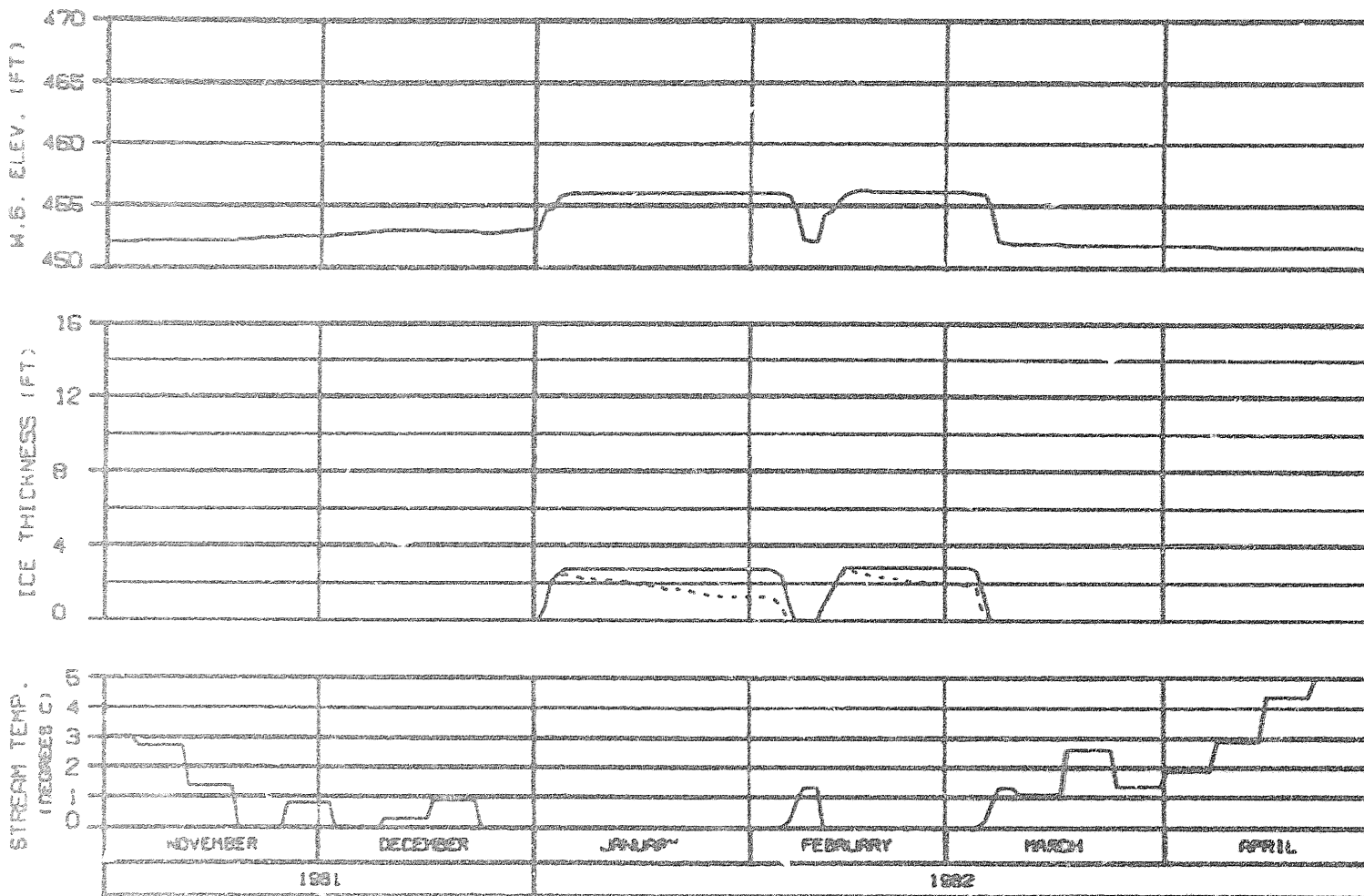
HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-5-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EBRSCO JOINT VENTURE		
DESIGNED: G.L.P. 010	10 FEB 82	10289.142

OPTION 7

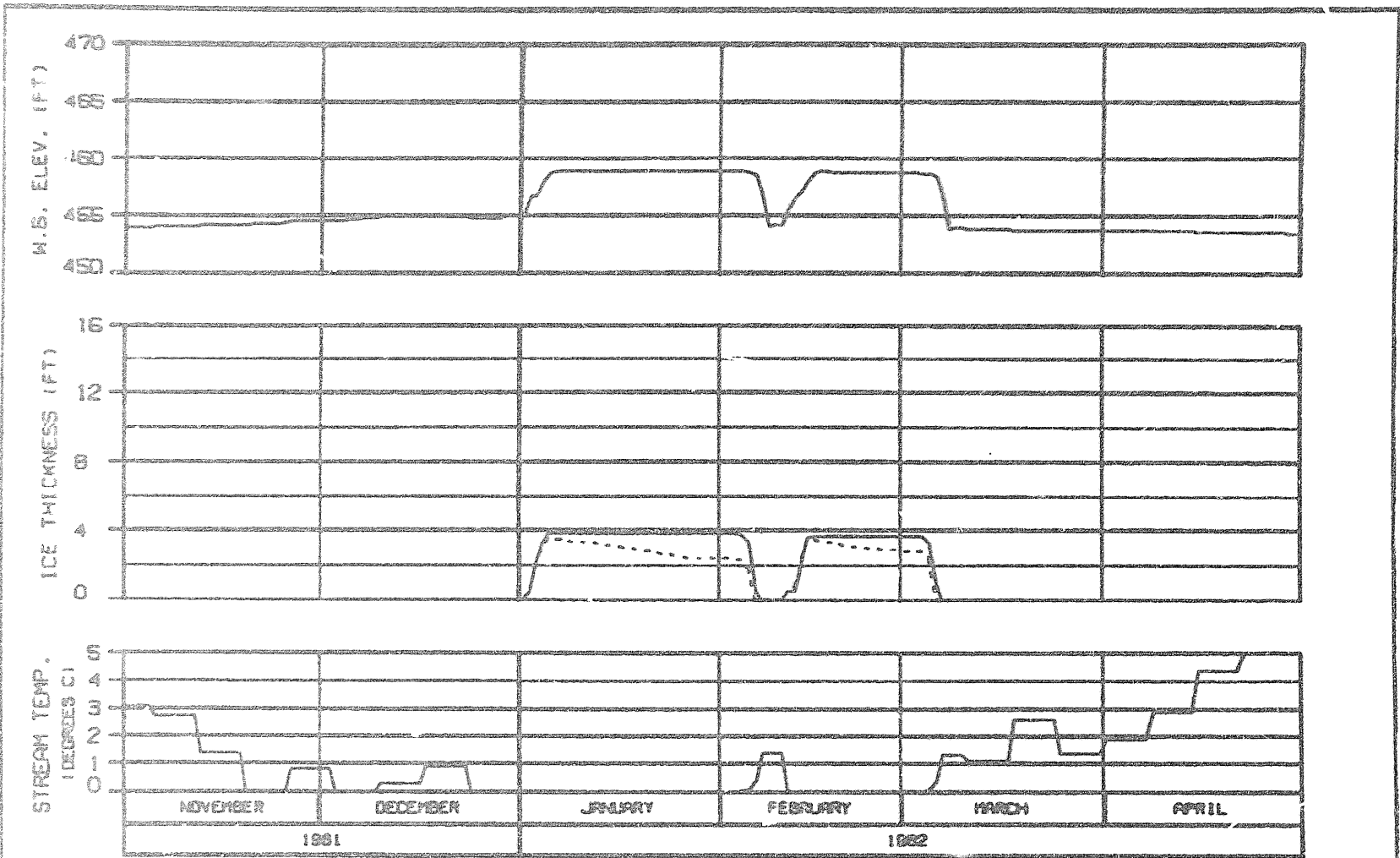


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 BULKY COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-8-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING NATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRSCO JOINT VENTURE	
DATE: 01-04-82	BY: FEB 82
PAGE: 142	

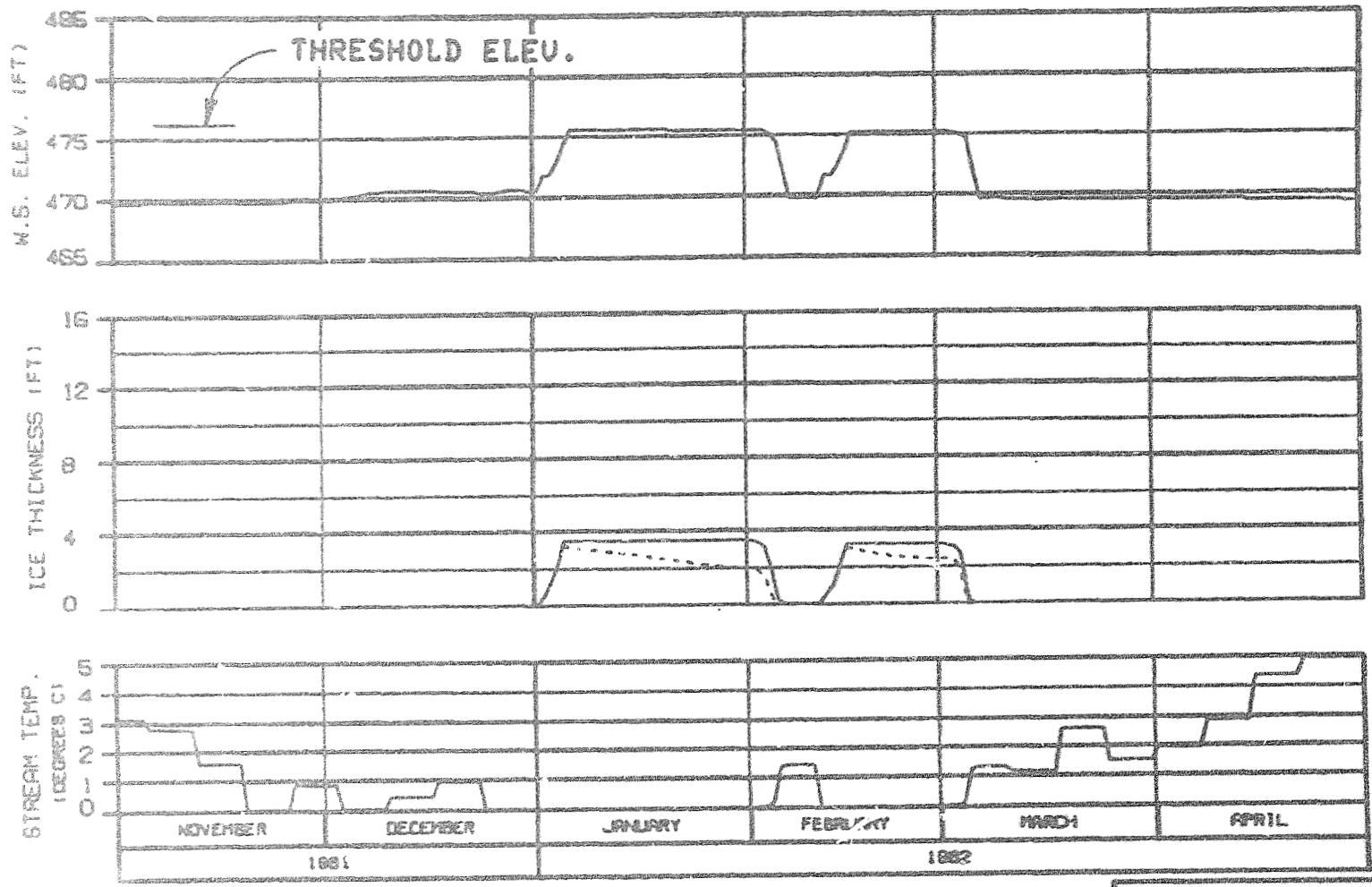


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 01.04.82	10 FEB 82
1000.142	

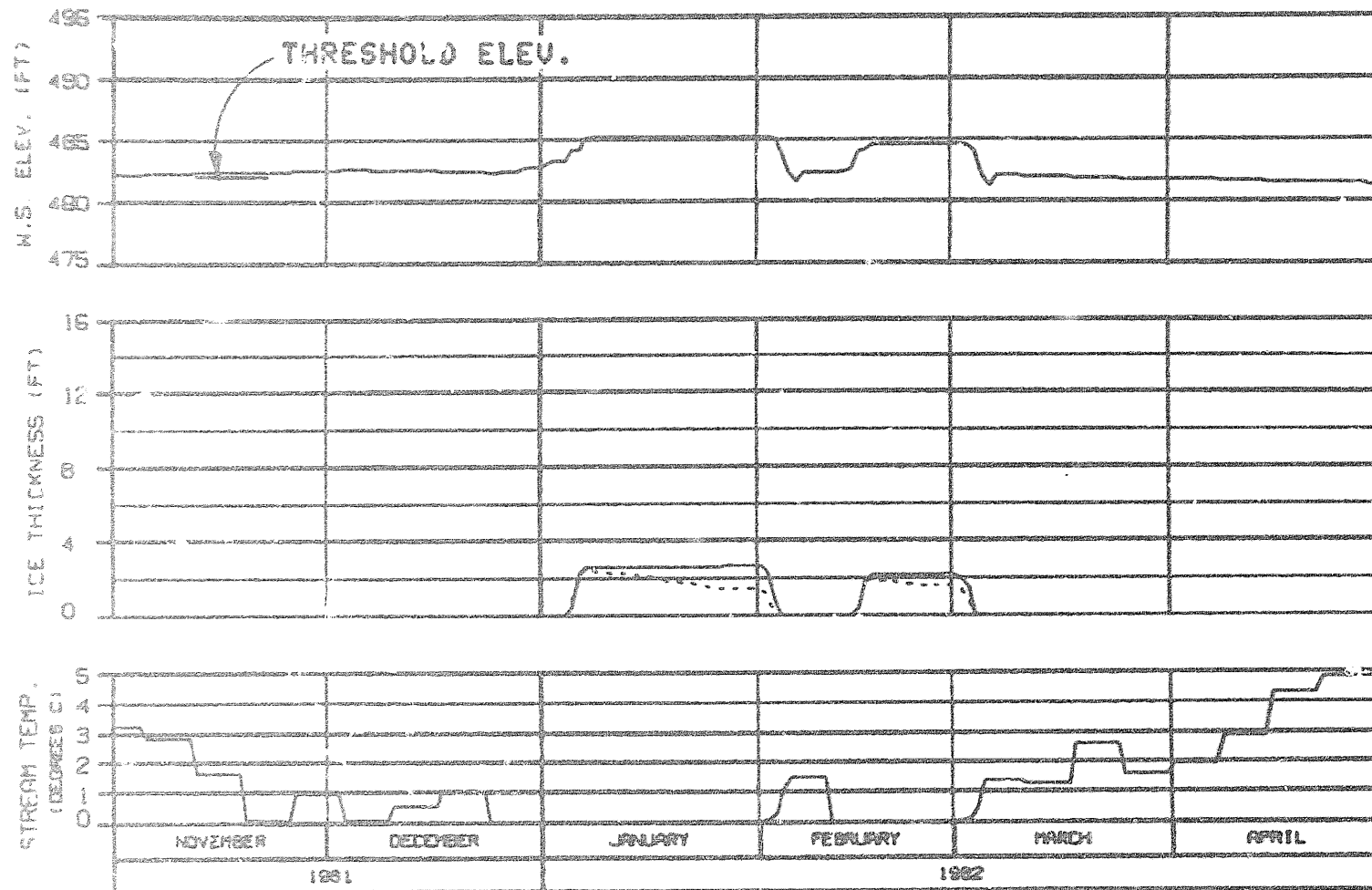


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP, INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EDSCO JOINT VENTURE	
DESIGNED BY: []	DATE: []
DRAWN BY: []	SCALE: 1/4" = 1'



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-8-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING KATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

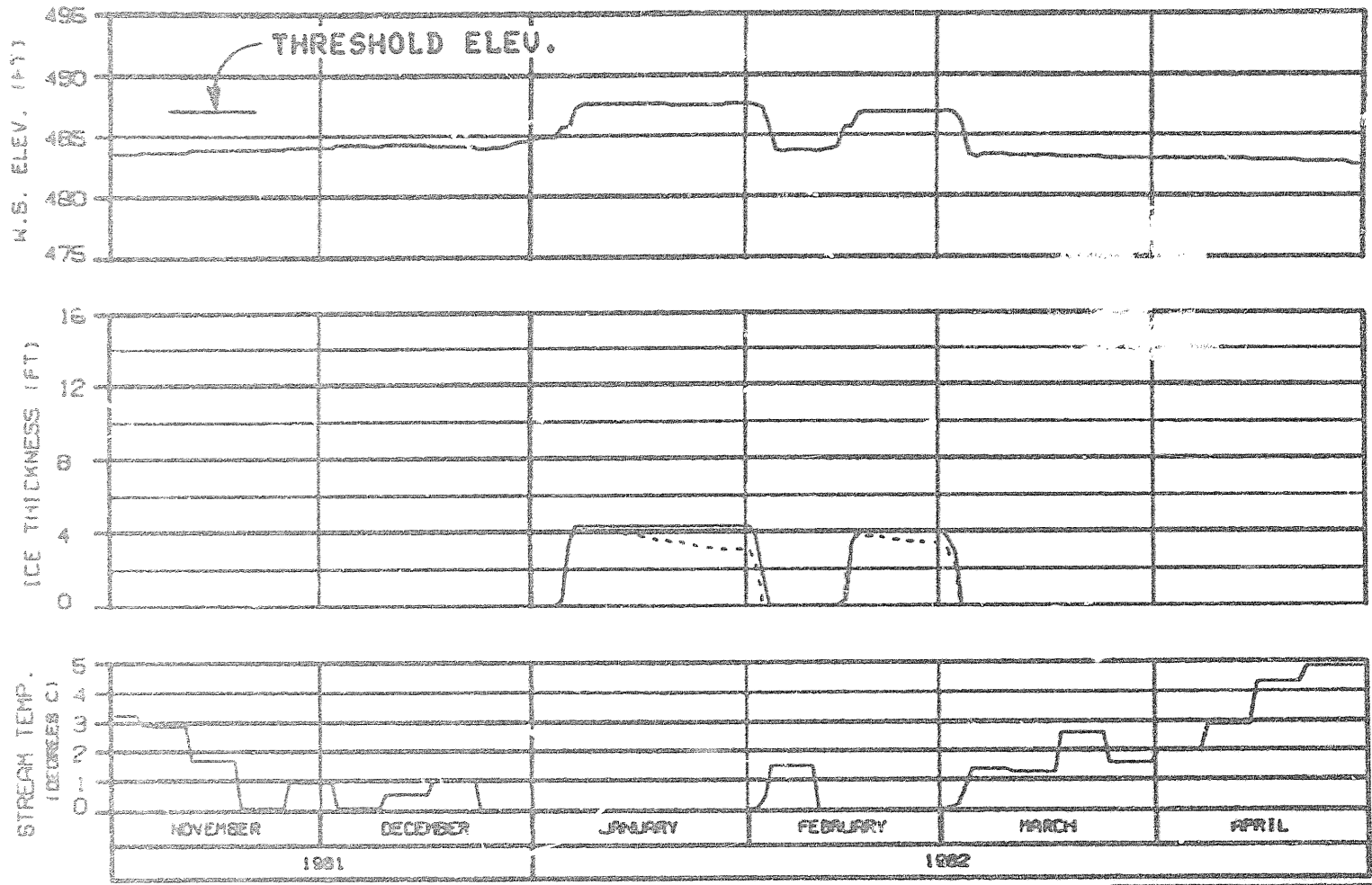
ALASKA POWER AUTHORITY

KATANA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EGASCO JOINT VENTURE

DESIGNED BY: J. J. PERRY 10 FEB 82 SHEET 142



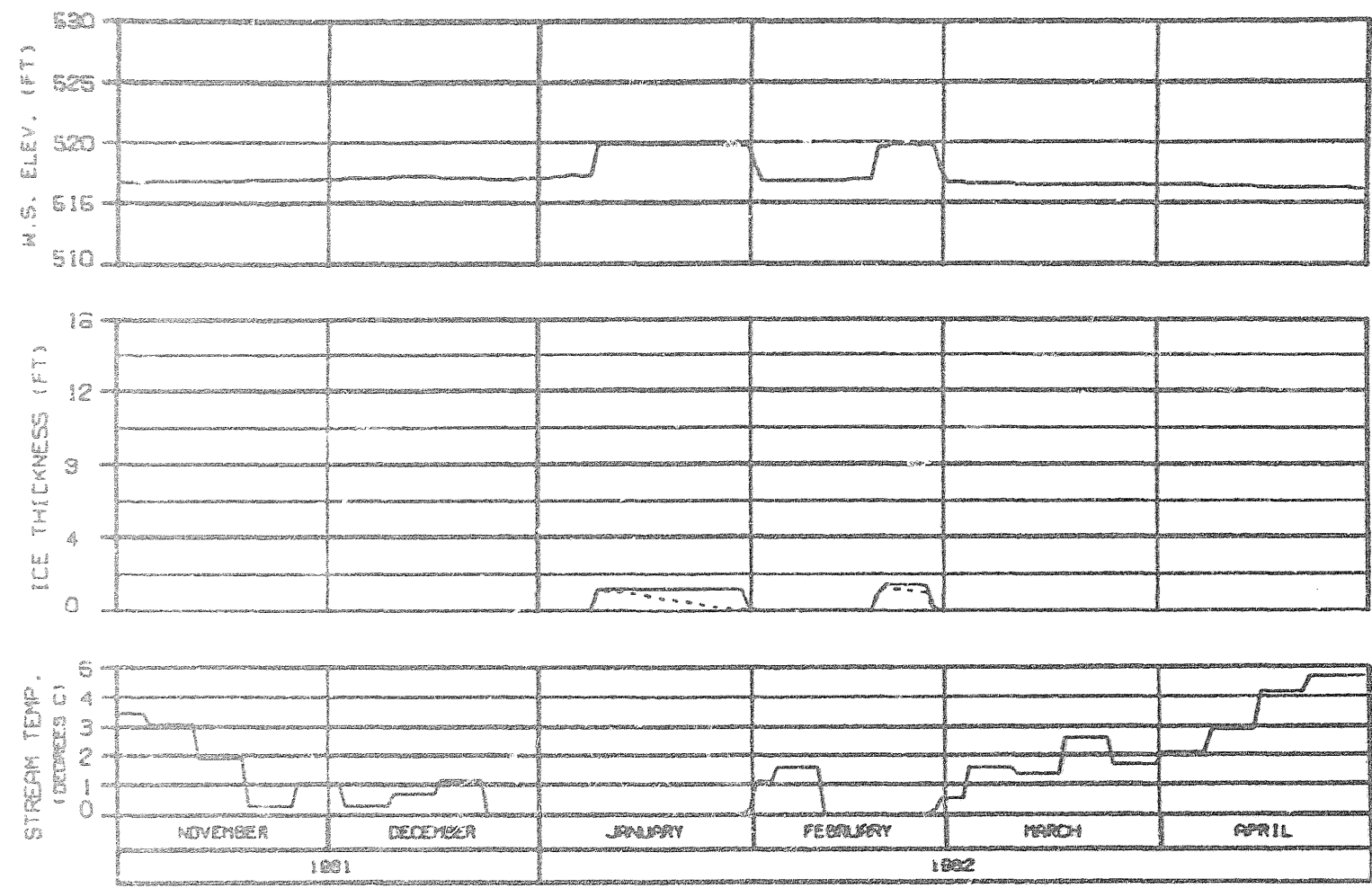
HEAD OF SIDE CHANNEL MSII

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-6-D2 FLOWS TEMP, INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : B10ZENS

ALASKA POWER AUTHORITY	
CUSTOMER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: B.L. GARDNER	10 FEB 82
1008.142	

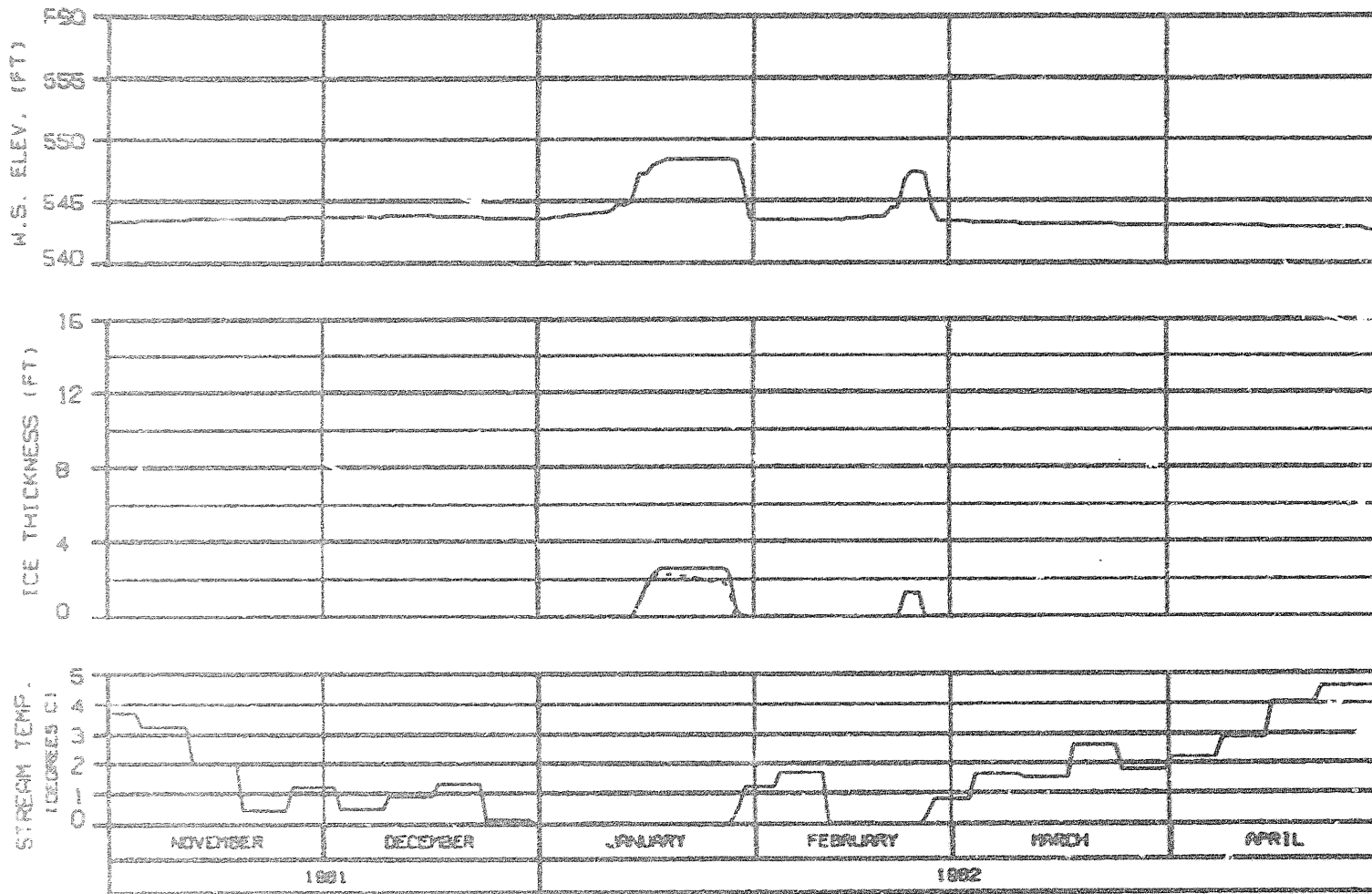


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE F-6-02 FLOWS TEMP, INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EN8

ALASKA POWER AUTHORITY	
SUBJECT	SUSITNA RIVER ICE SIMULATION TIME HISTORY
HARZA-EBRACO JOINT VENTURE	
DATE: 11 FEB 82	1888.148



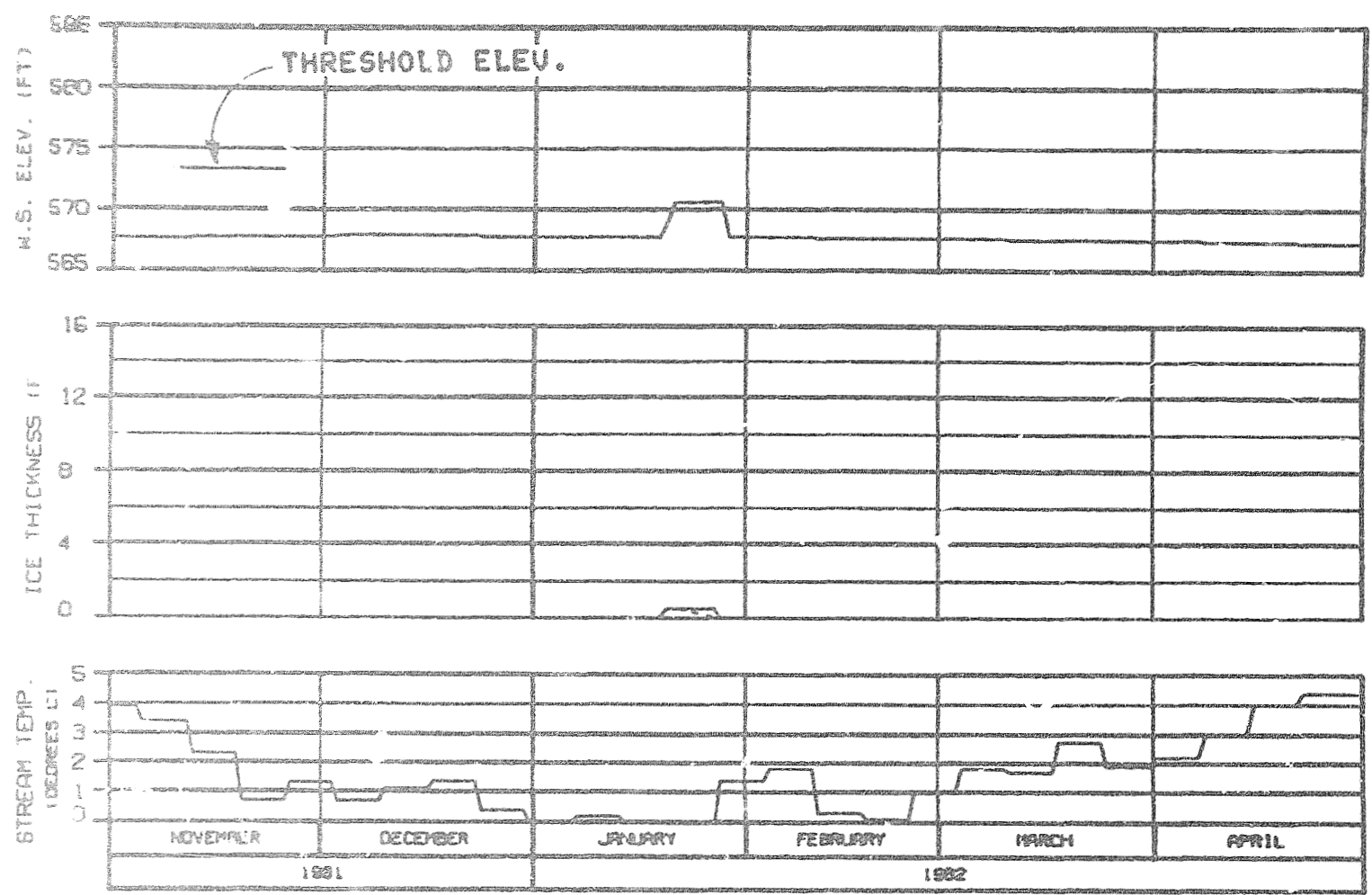
HEAD OF MOOSE SLOUGH

RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARDA-EBASCO JOINT VENTURE	
DATE: 11/10/81	1008.142

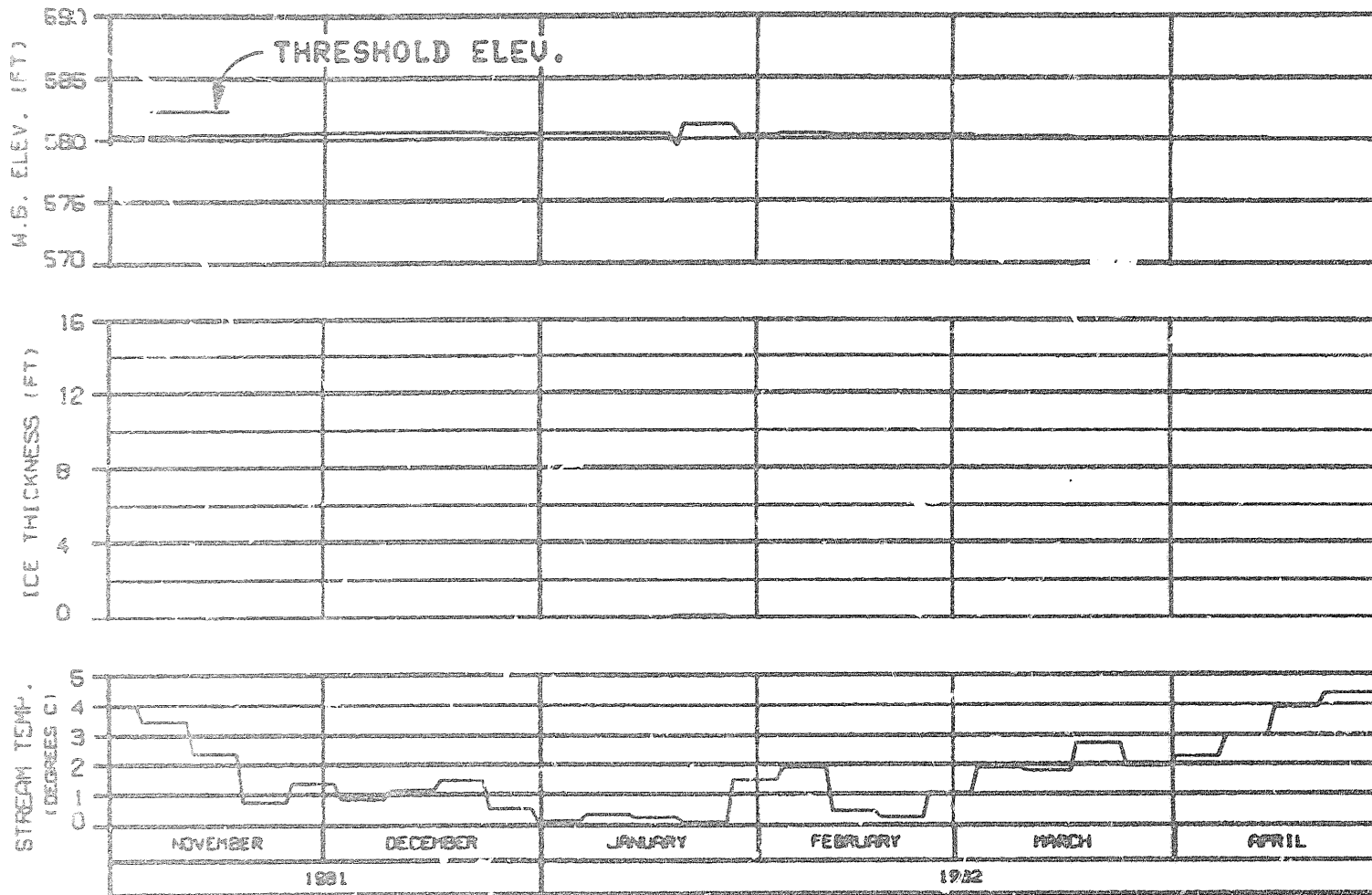


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP, INFLOW-MATCHING
 EXIST? NO NATANA INTAKE DESIGN
 REFERENCE RUN NO. : 810ZENS

ALASKA POWER AUTHORITY	
DISTRICT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EPSCO JOINT VENTURE	
CHARTER. 04-19-82	10 FEB 82
1988.142	



HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SL JCH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

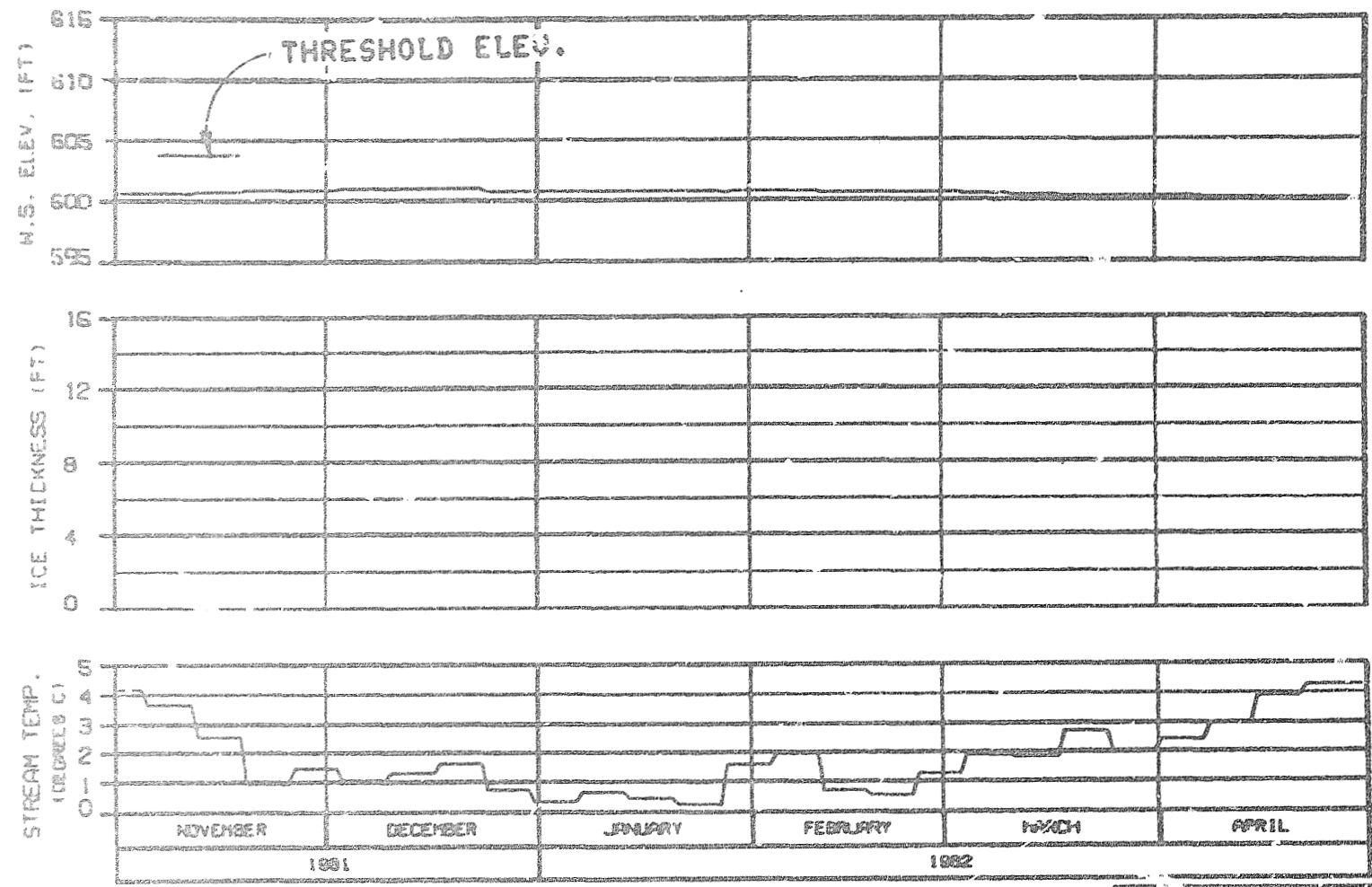
ALASKA POWER AUTHORITY

SUSITNA PRO. DIST.

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

REVISED: 04/20/82 10 FEB 82 1088.142



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

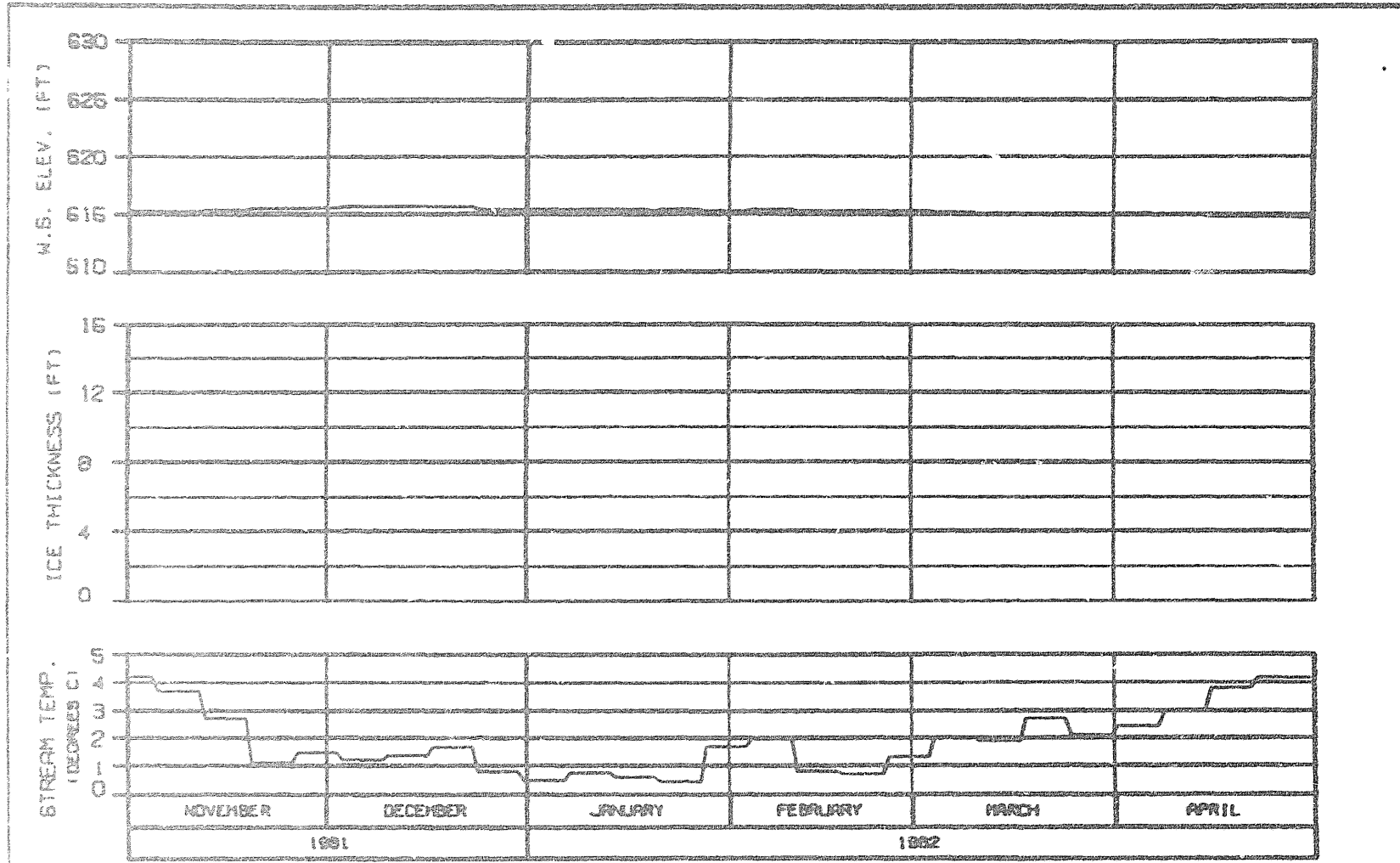
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-5-D2 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EN6

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: G.L. DAVIS	18 FEB 82
	NOSS-142

OPTION 7

OPTION?

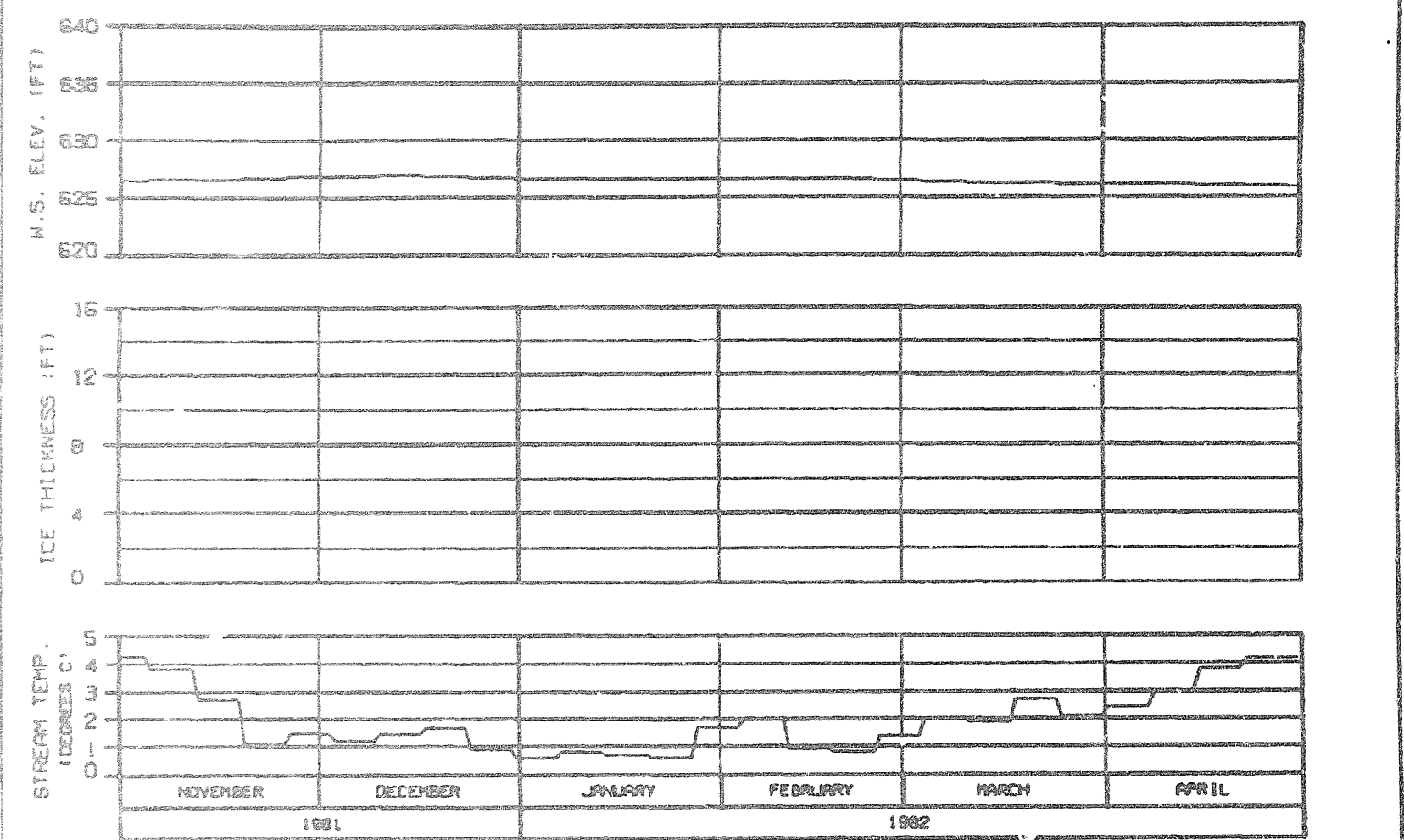


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EDASCO JOINT VENTURE		
CHARTER: ULLMANN	10 FEB 83	1023.143

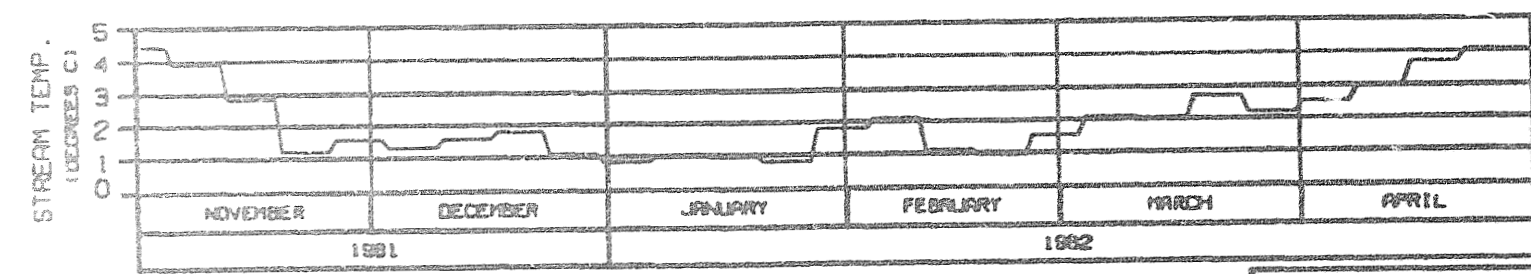
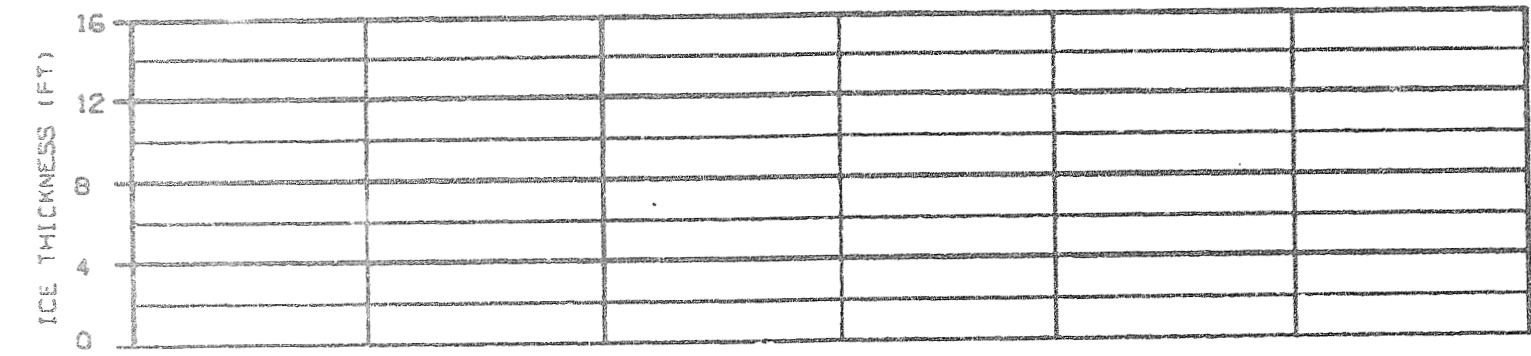
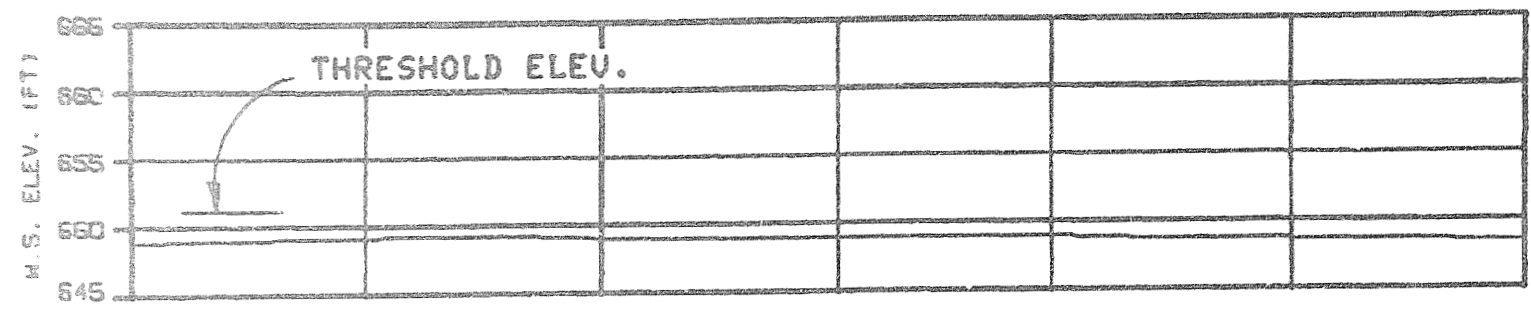


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 810208

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
APRA-ERASCO JOINT VENTURE	
DESIGNED: 10 FEB 82	2002.142

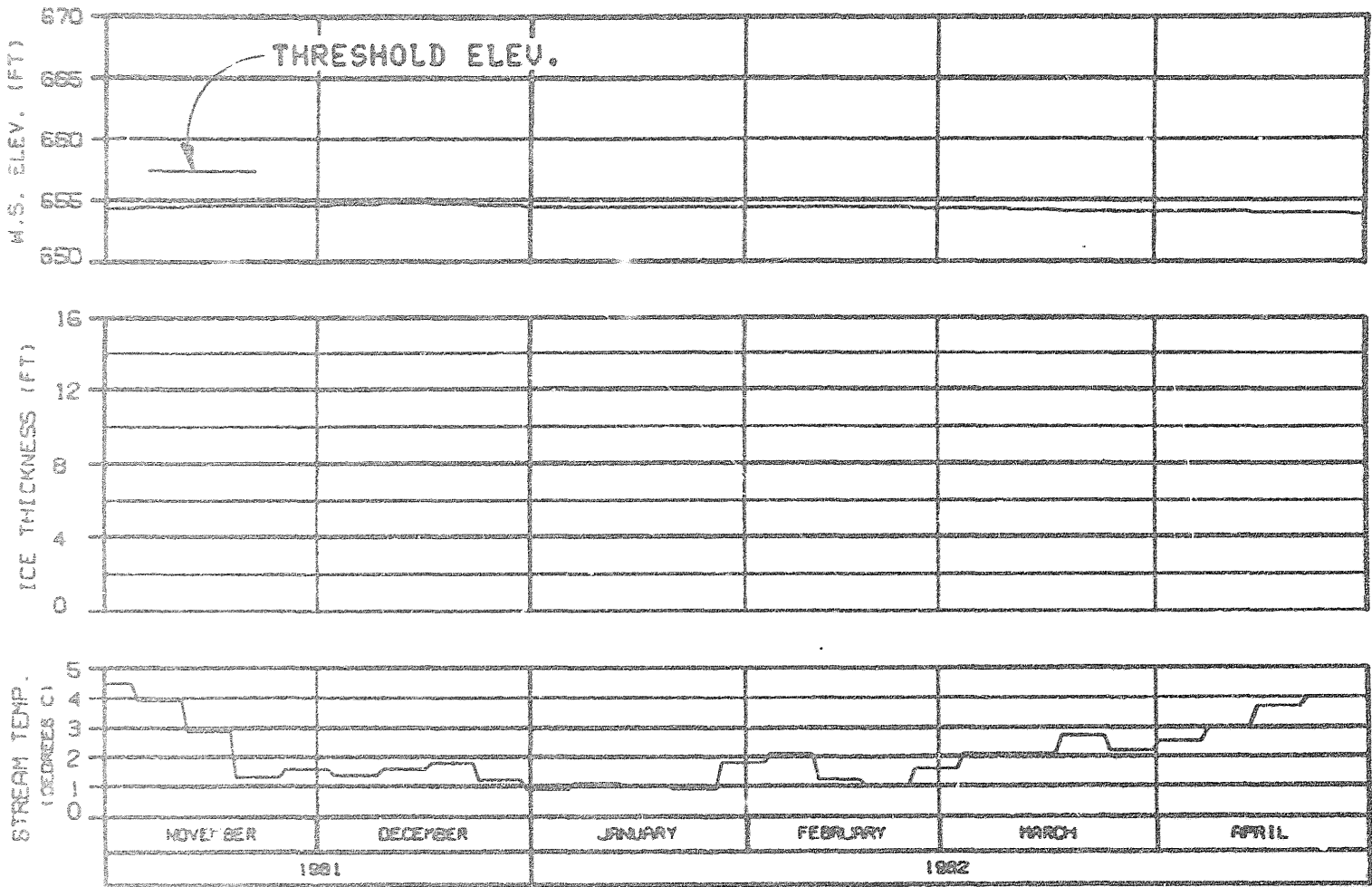


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MPS&A-BASED JOINT VENTURE	
DATE: 11-04-82	16 FEB 83 1000.142

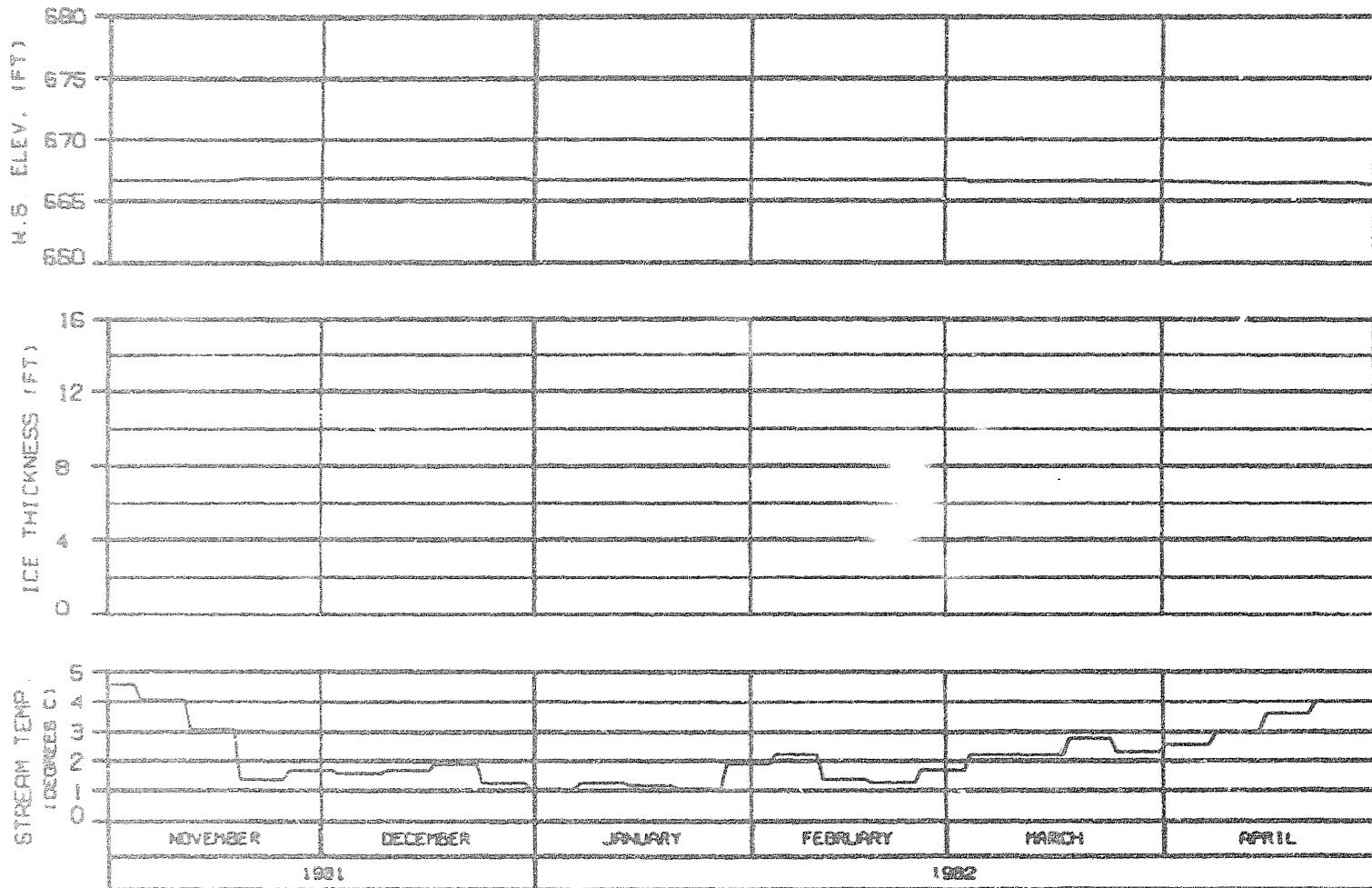


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFEREN. : RUN NO. : 810208

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
ENGINEER - D.A. HANSEN	10 FEB 82
SHEET 142	

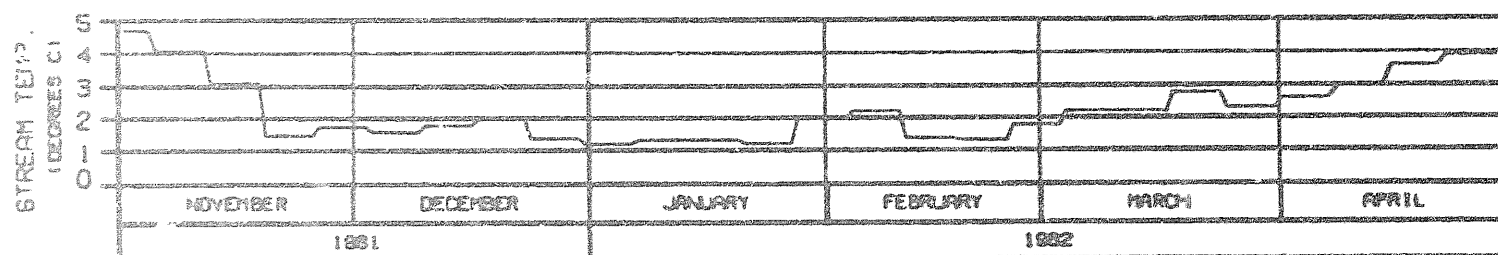
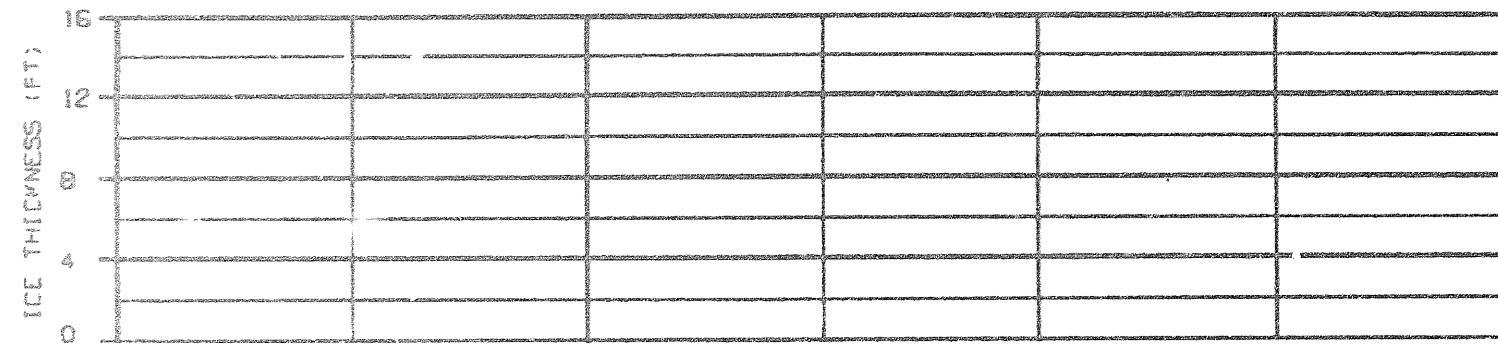
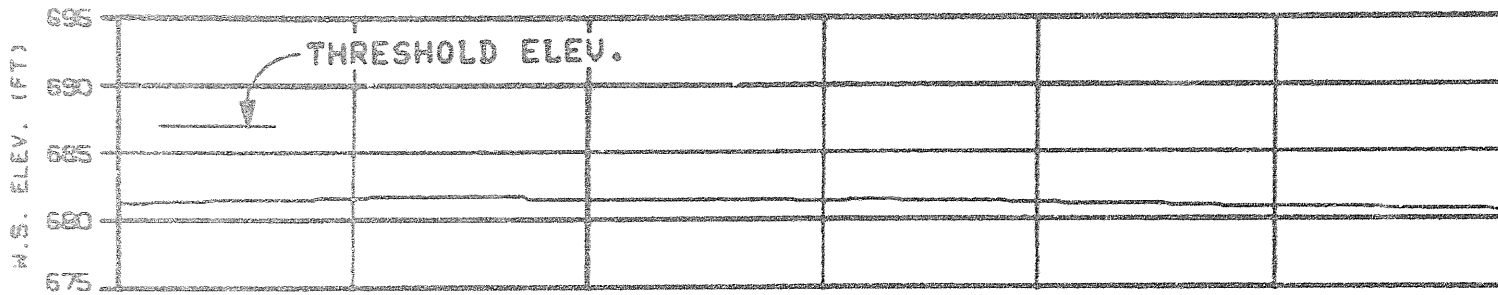


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

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-6-02 FLOWS TEMP. INFLW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EN8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACO JOINT VENTURE		
ENRCH22	DL 8-22-82	10 FEB 83
10228.142		

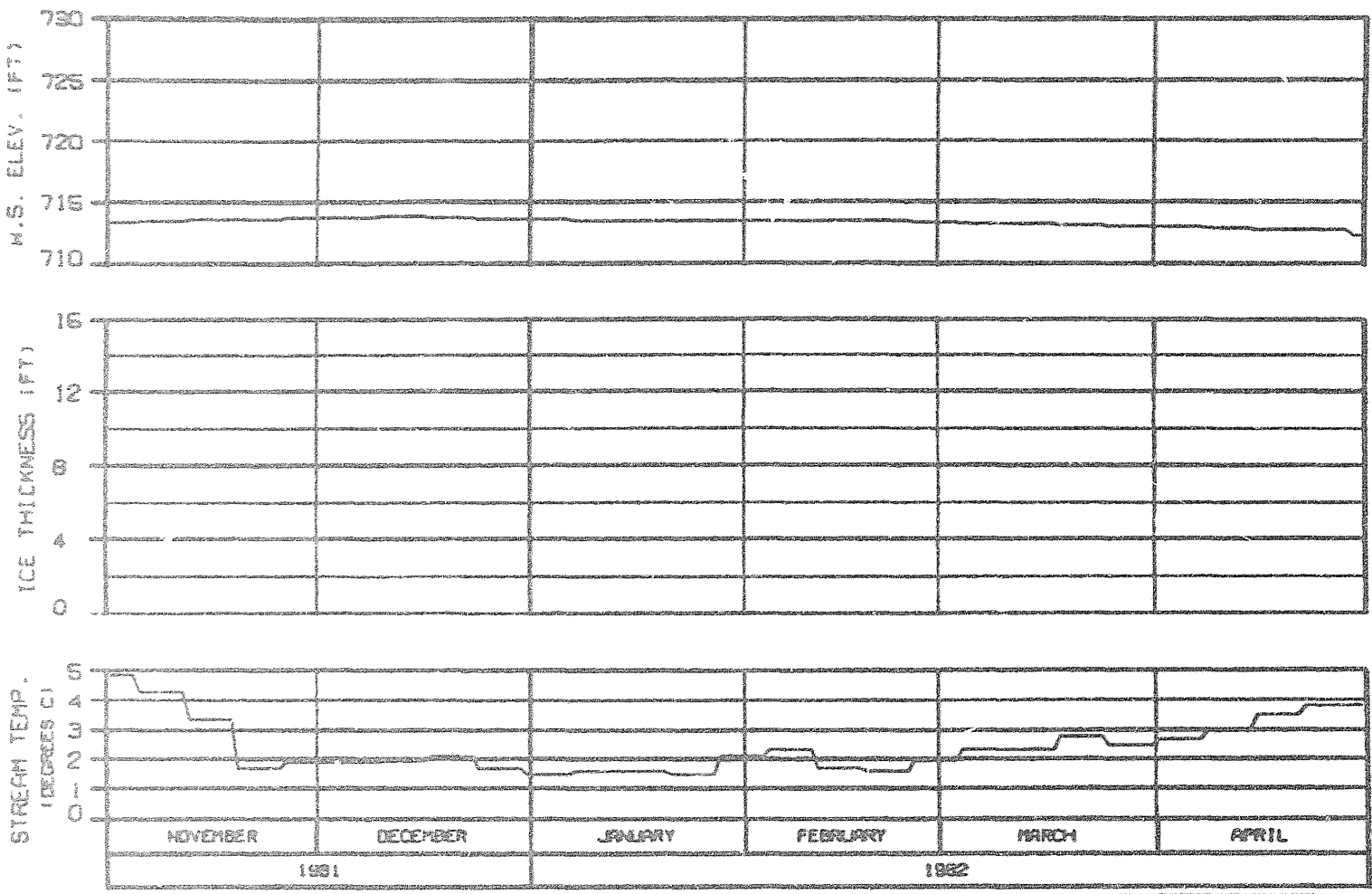


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CHGSR. 04.1982	10 FEB 82	1000.142

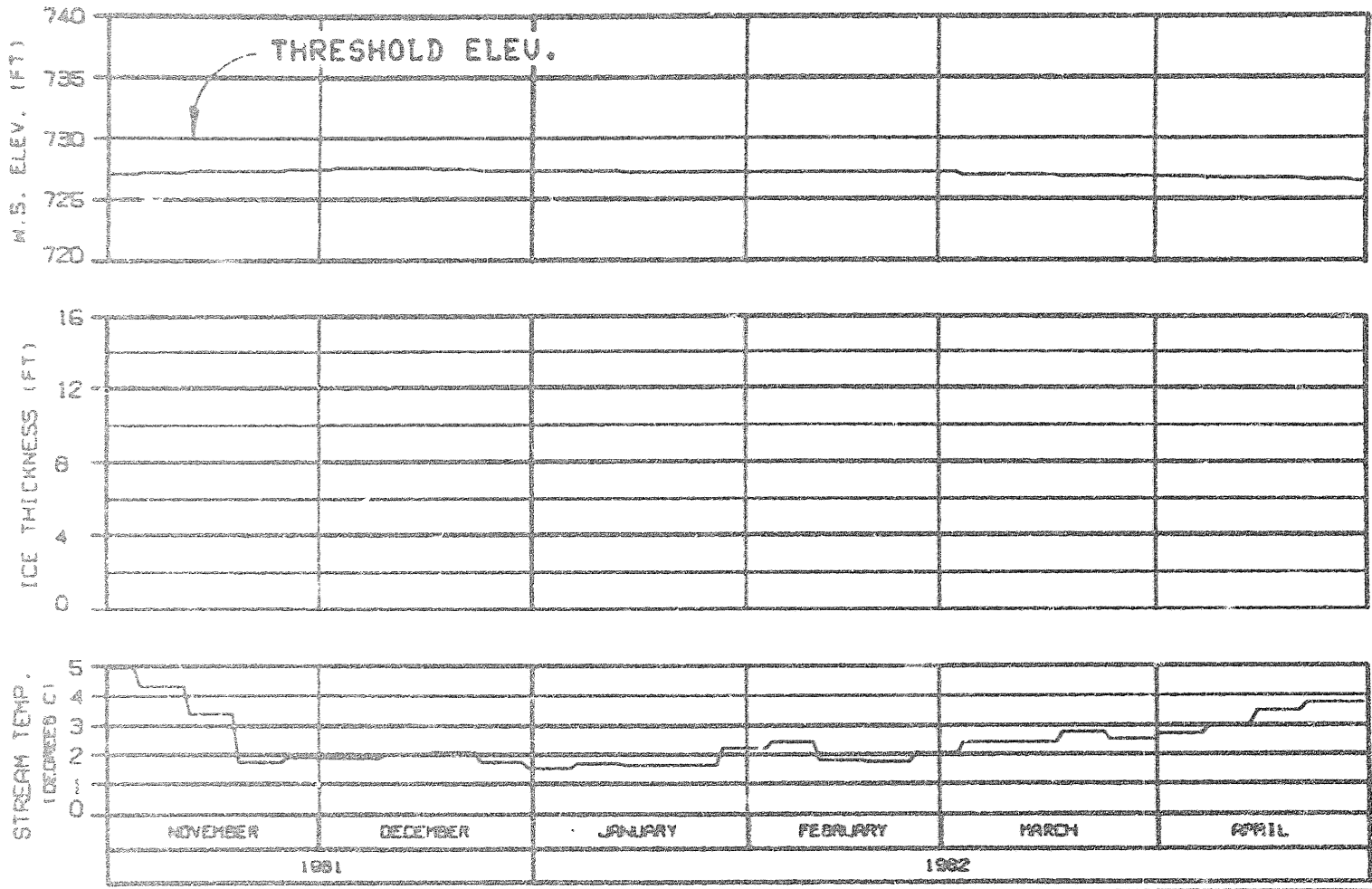


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: G.L. BROWN	10 FEB 82
PAGE 142	

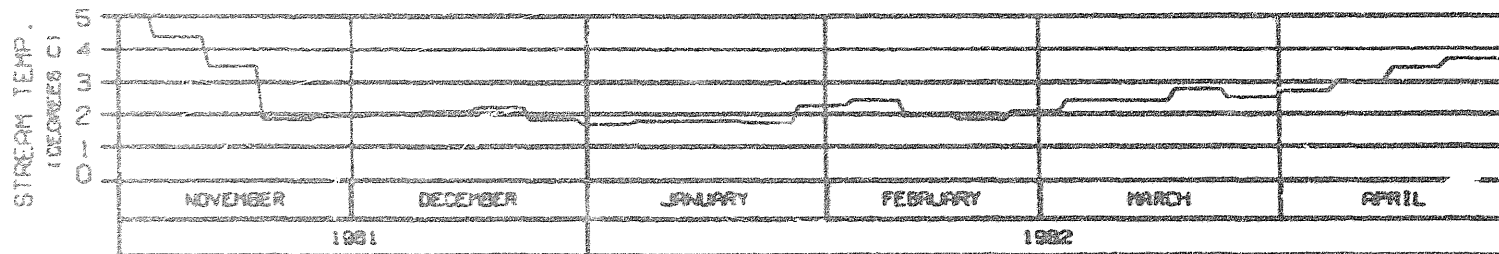
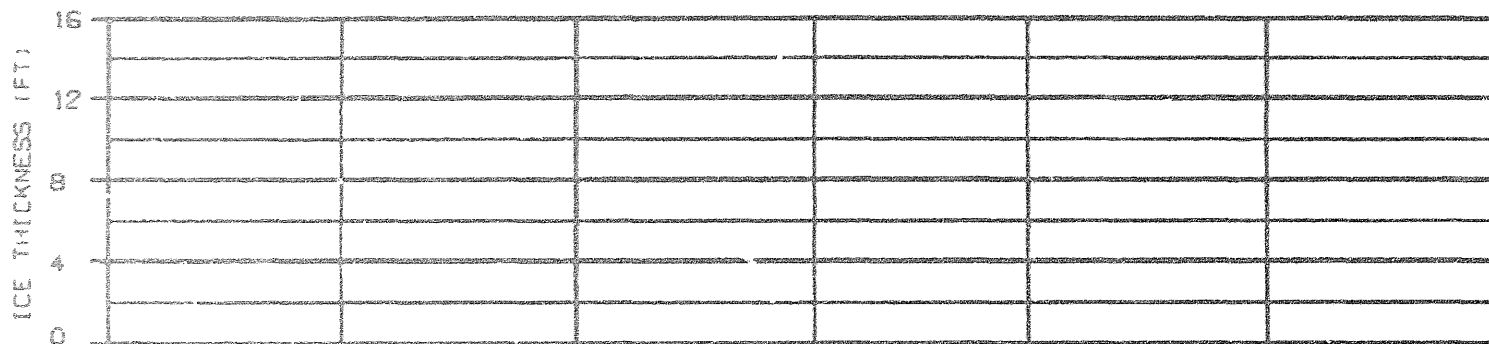
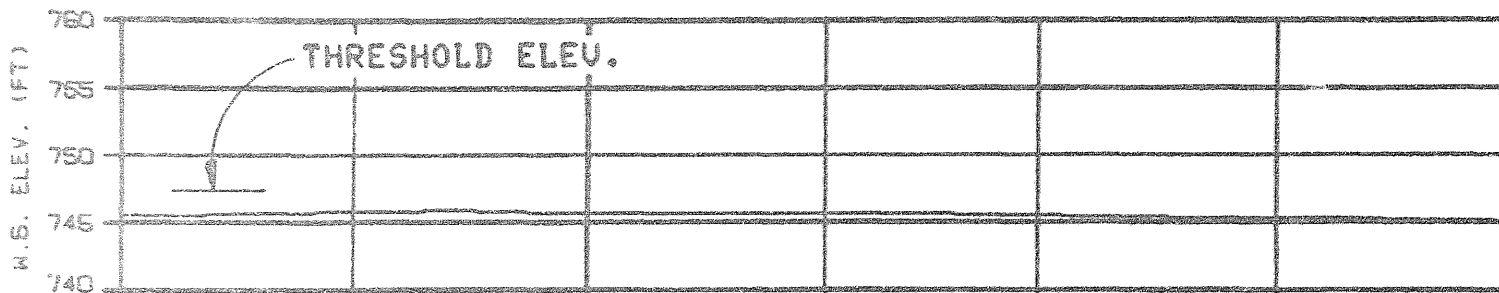


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP: INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - S.L.DENB	24 FEB 82
1988.142	

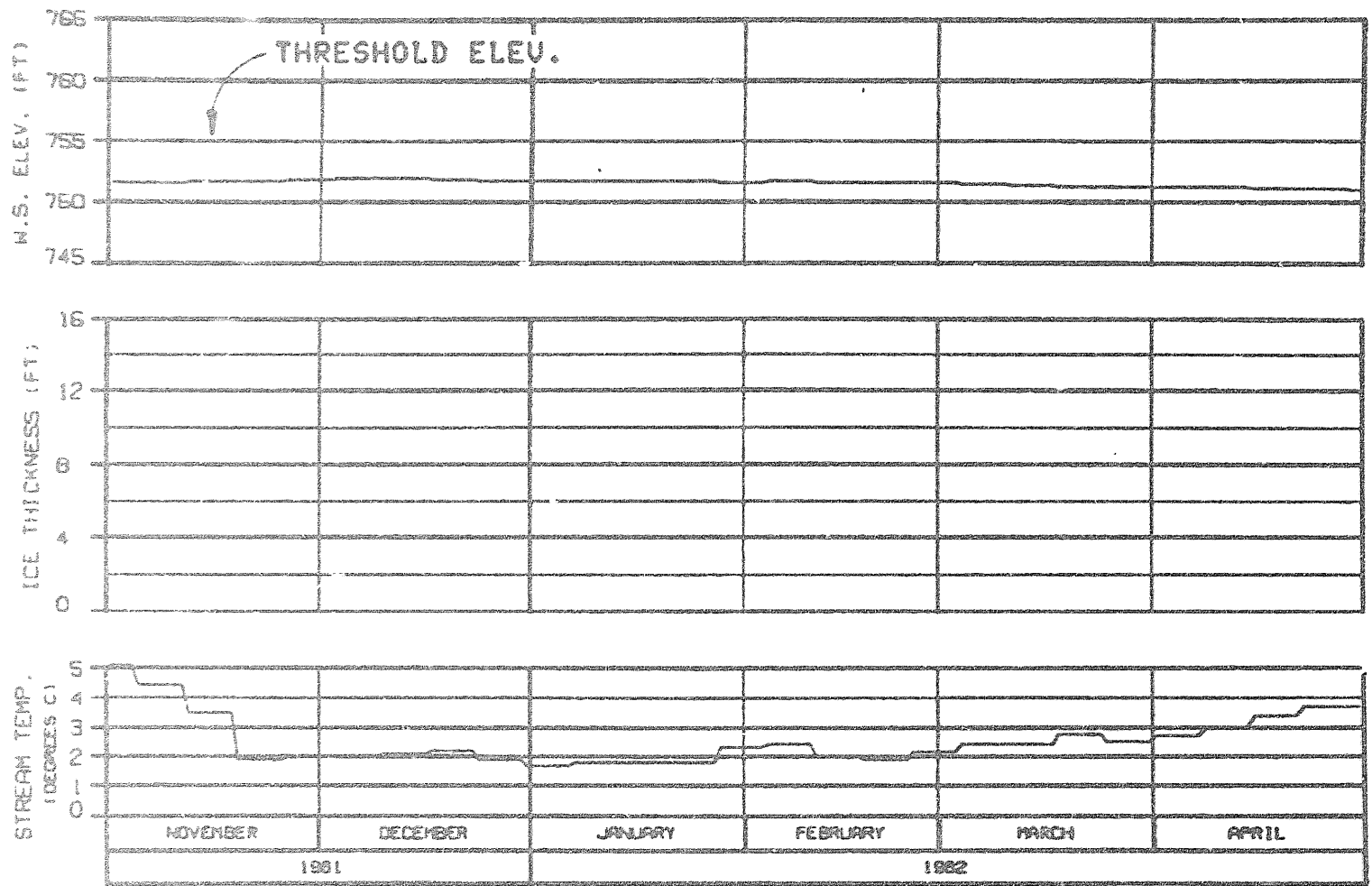


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP. INFLOW-MATCHING
 EXISTING NATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EBASCO JOINT VENTURE	
CHART: ALP018 (00 FEB 82)	1982.ICE

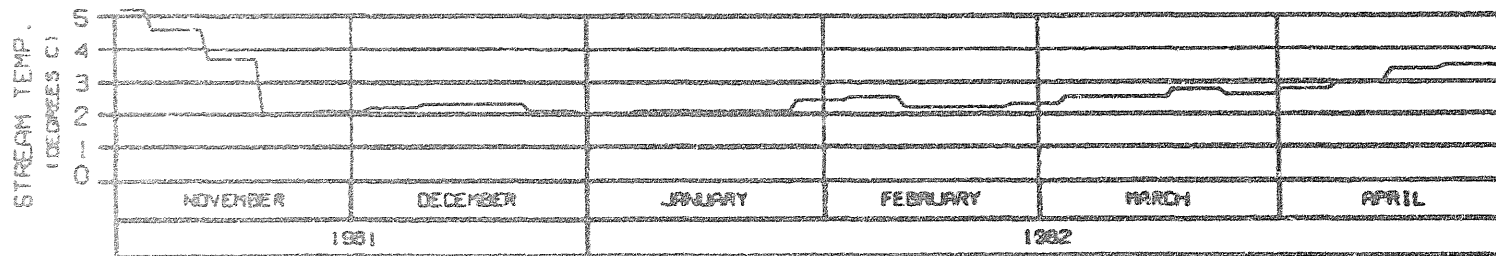
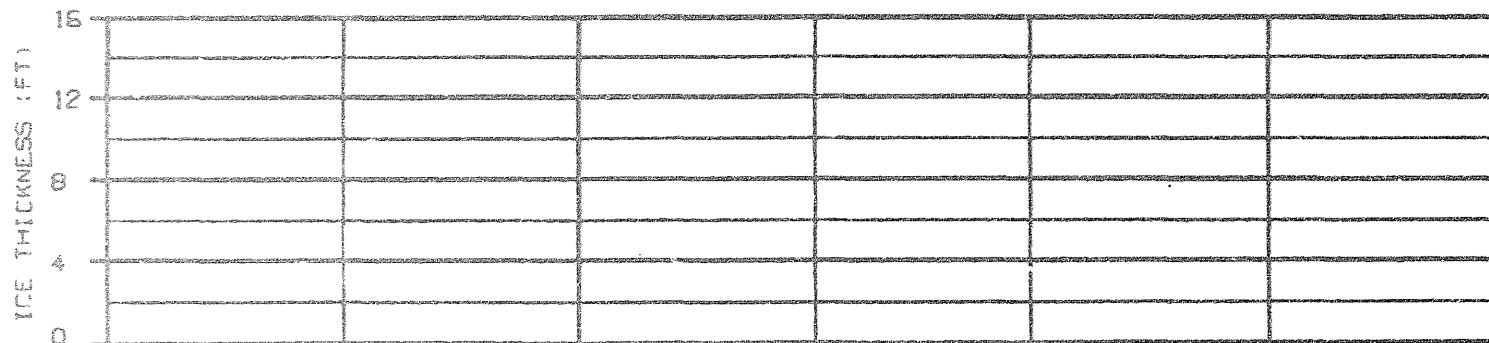
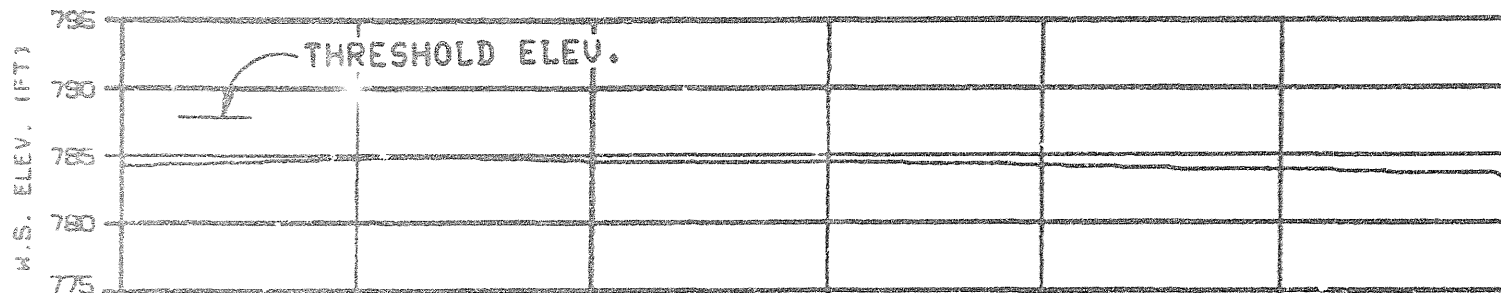


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DATE: 10 FEB 92	1002.142



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 : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. INFLOW-MATCHING
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY

SUSTINA PROJECT

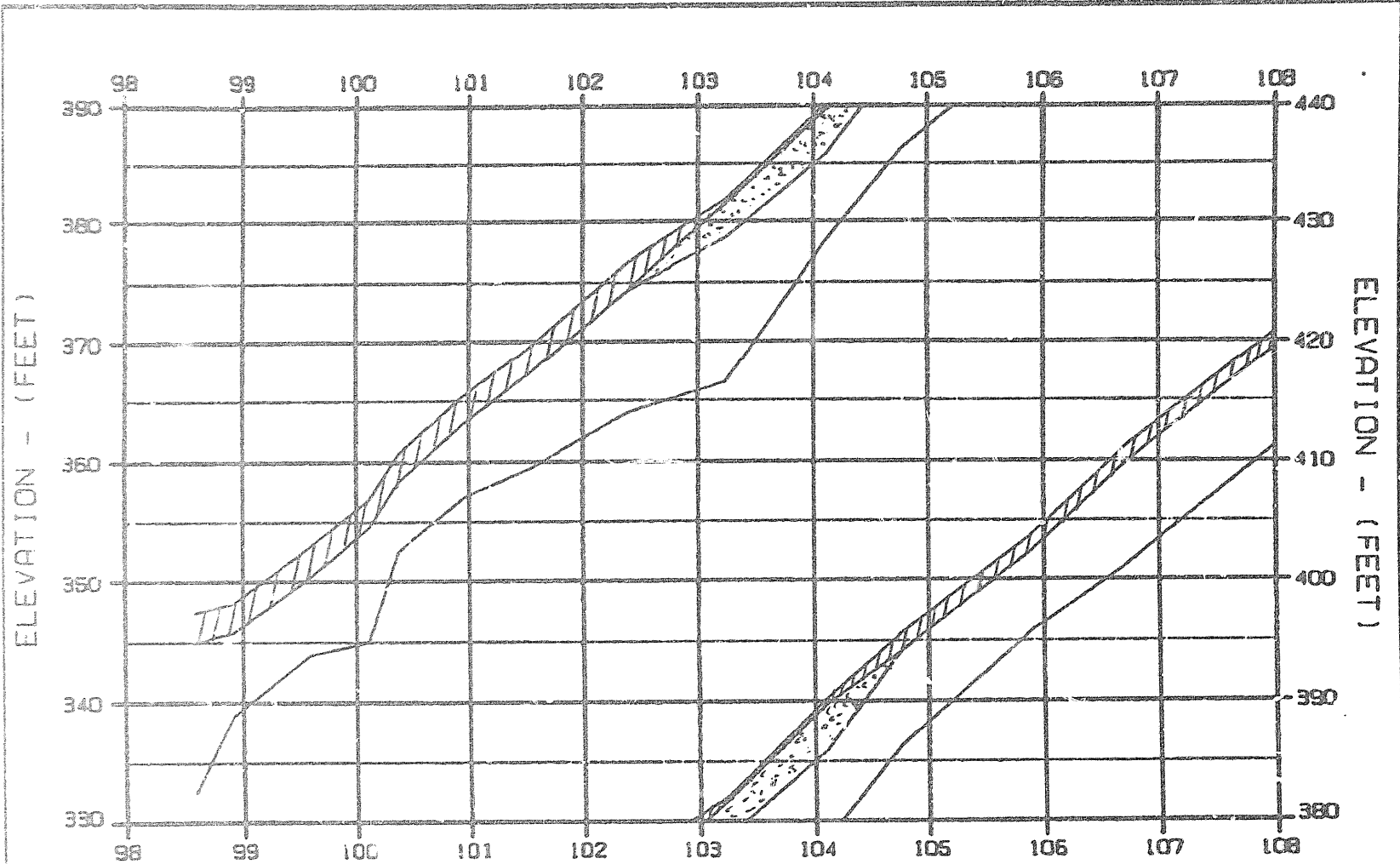
SUSTINA RIVER
ICE SIMULATION
TIME HISTORY

WARZA-EDASCO JOINT VENTURE

CHARTER. 01.00.010 10 FEB 82 1028.142

OPTION?

EXHIBIT I


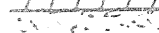
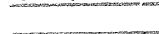



ELEVATION - (FEET)

ELEVATION - (FEET)

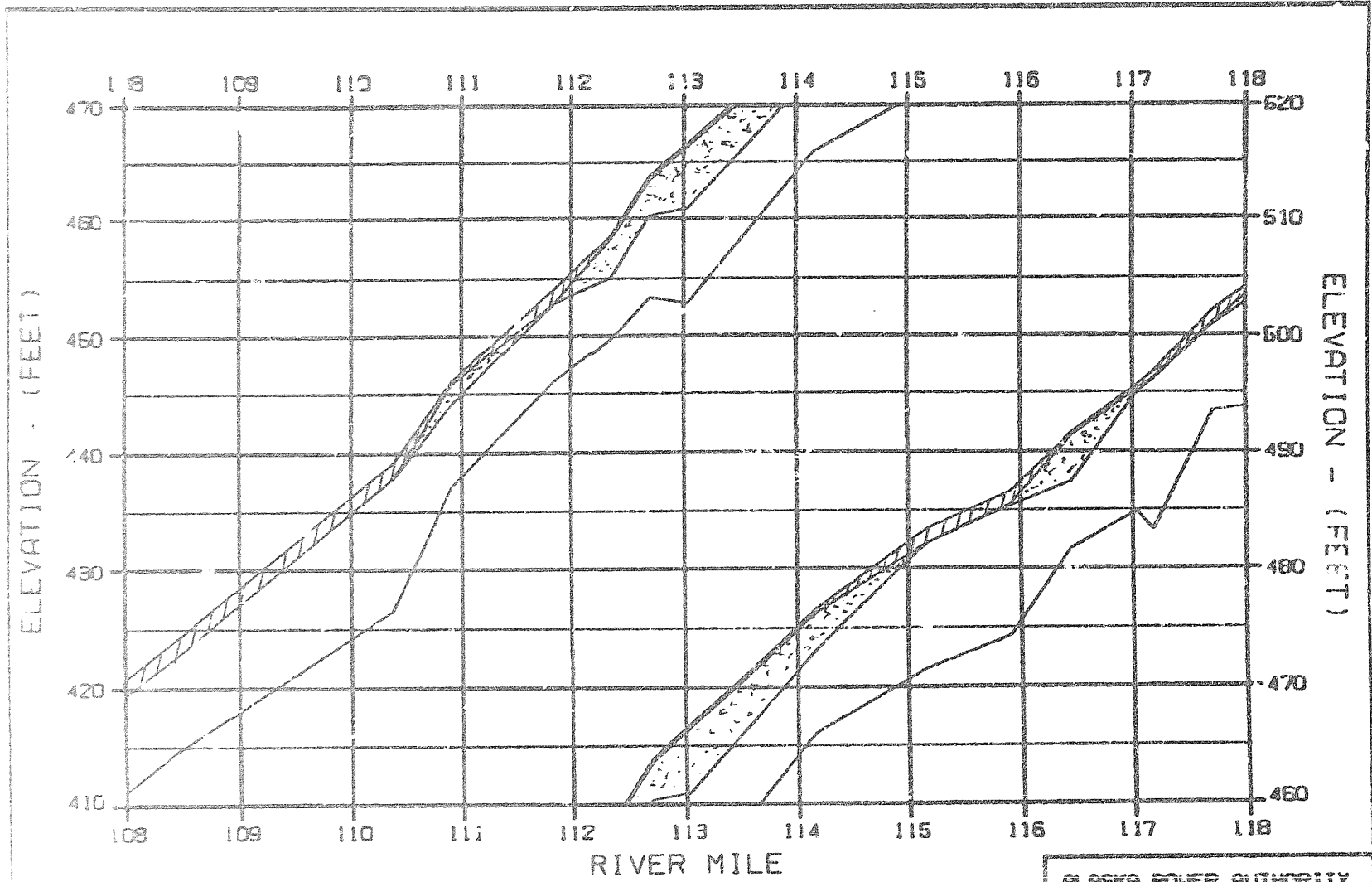
RIVER MILE

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-6-02 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EMB

ALASKA POWER AUTHORITY	
SUBSTING PROJECT	
GUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-ESAGED JOINT VENTURE	
CHECKED: ALLIGNED	15 FEB 82
	1878.142



ELEVATION - (FEET)

ELEVATION - (FEET)

108 109 110 111 112 113 114 115 116 117 118

470
460
450
440
430
420
410

460
470
480
490
500
510
520

RIVER MILE

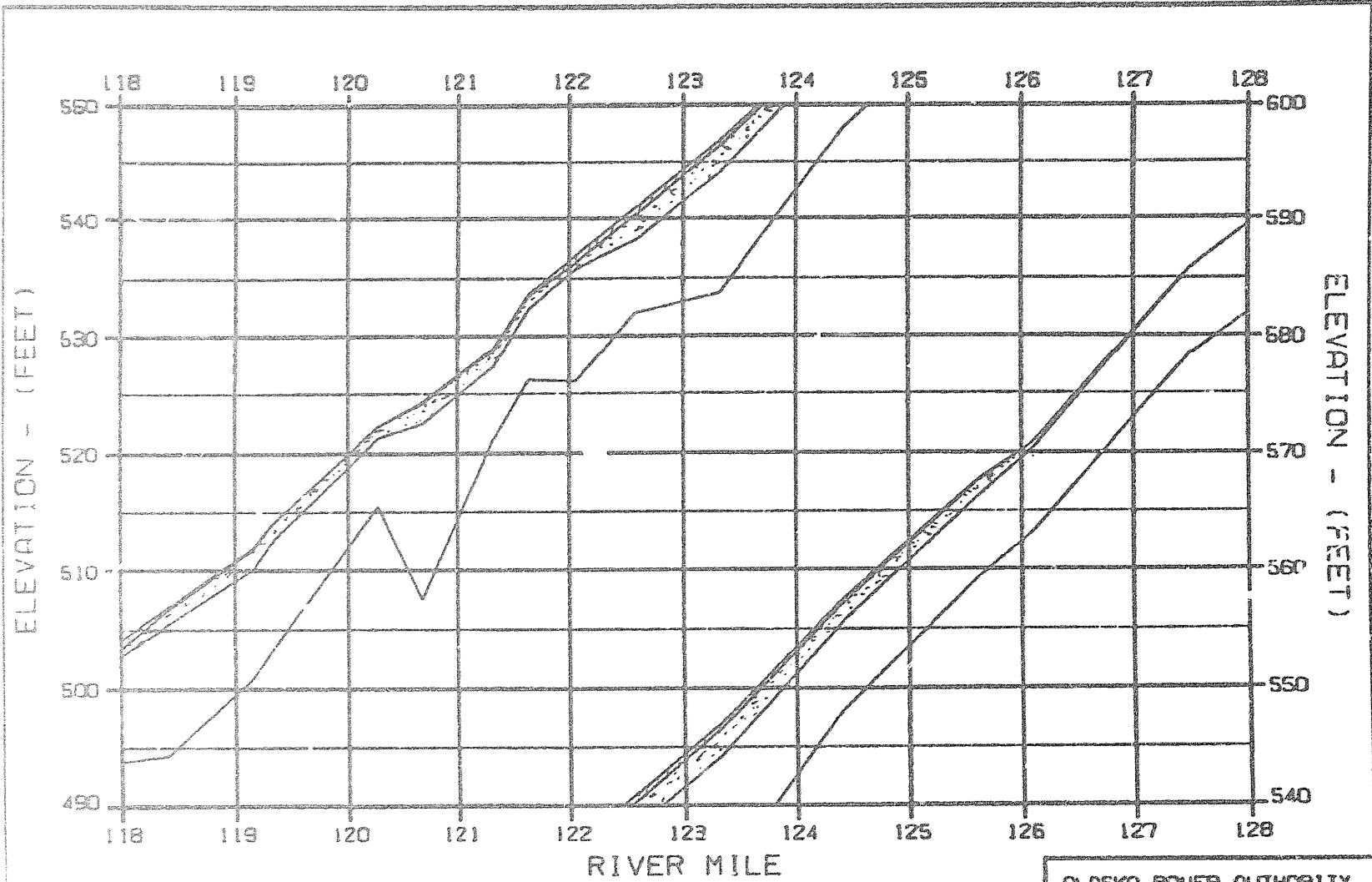
LEGEND:

- 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-6-02 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 3102ENB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EBASCO JOINT VENTURE	
FIGURE - ALLIANCE	14 FEB 83
	1503.142

c


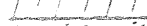
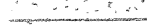



ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

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-6-D2 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY

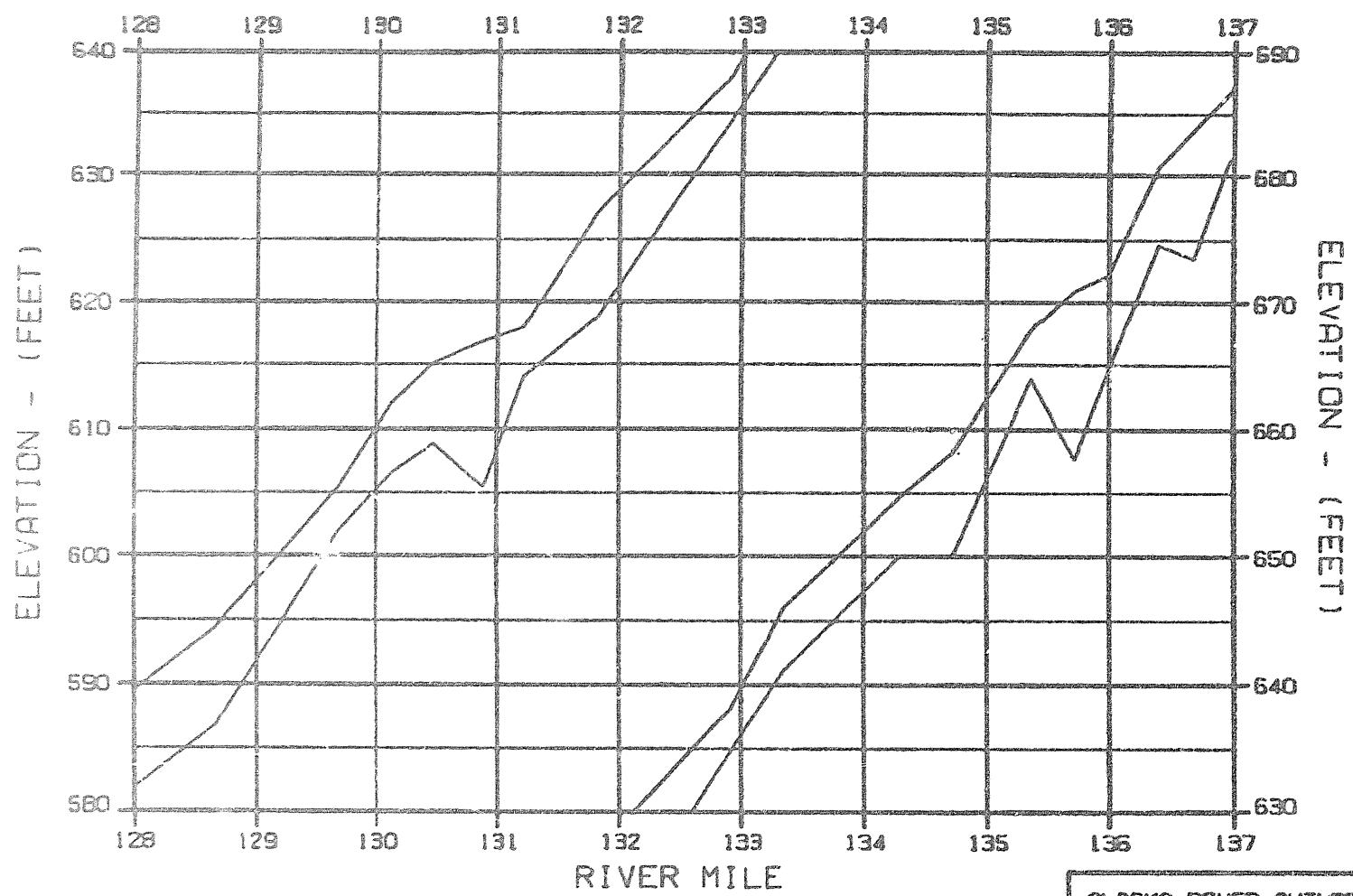
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 PROFILE OF MAXIMUM STAGES





WARZA-EBASCO JOINT VENTURE

DATE: 11/19/82 11:42 AM 1088.147

OPTION 2



LEGEND:

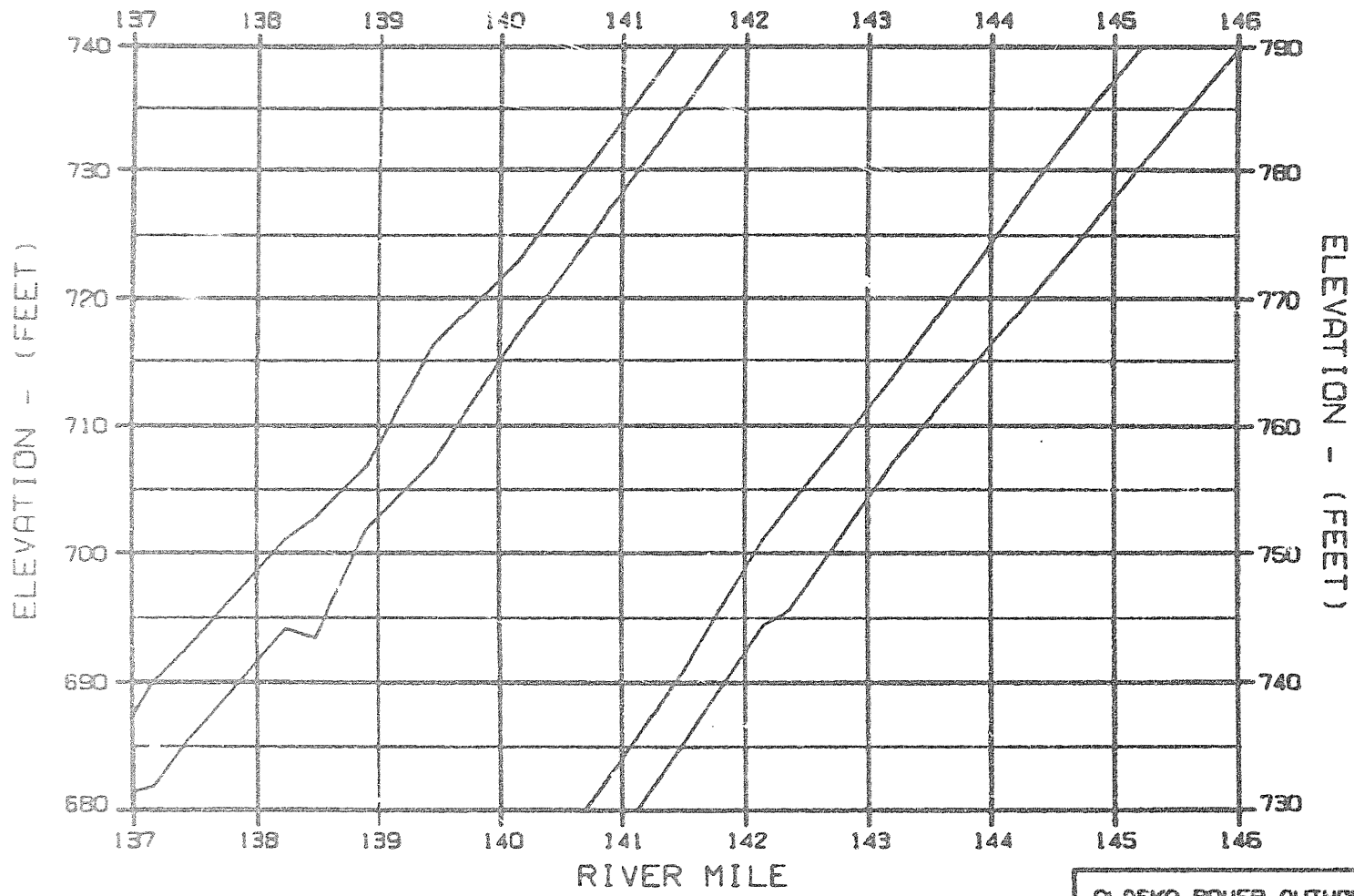
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-6-D2 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 810288

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
ORDER NO. 81184008	15000.142

OPTION?

c



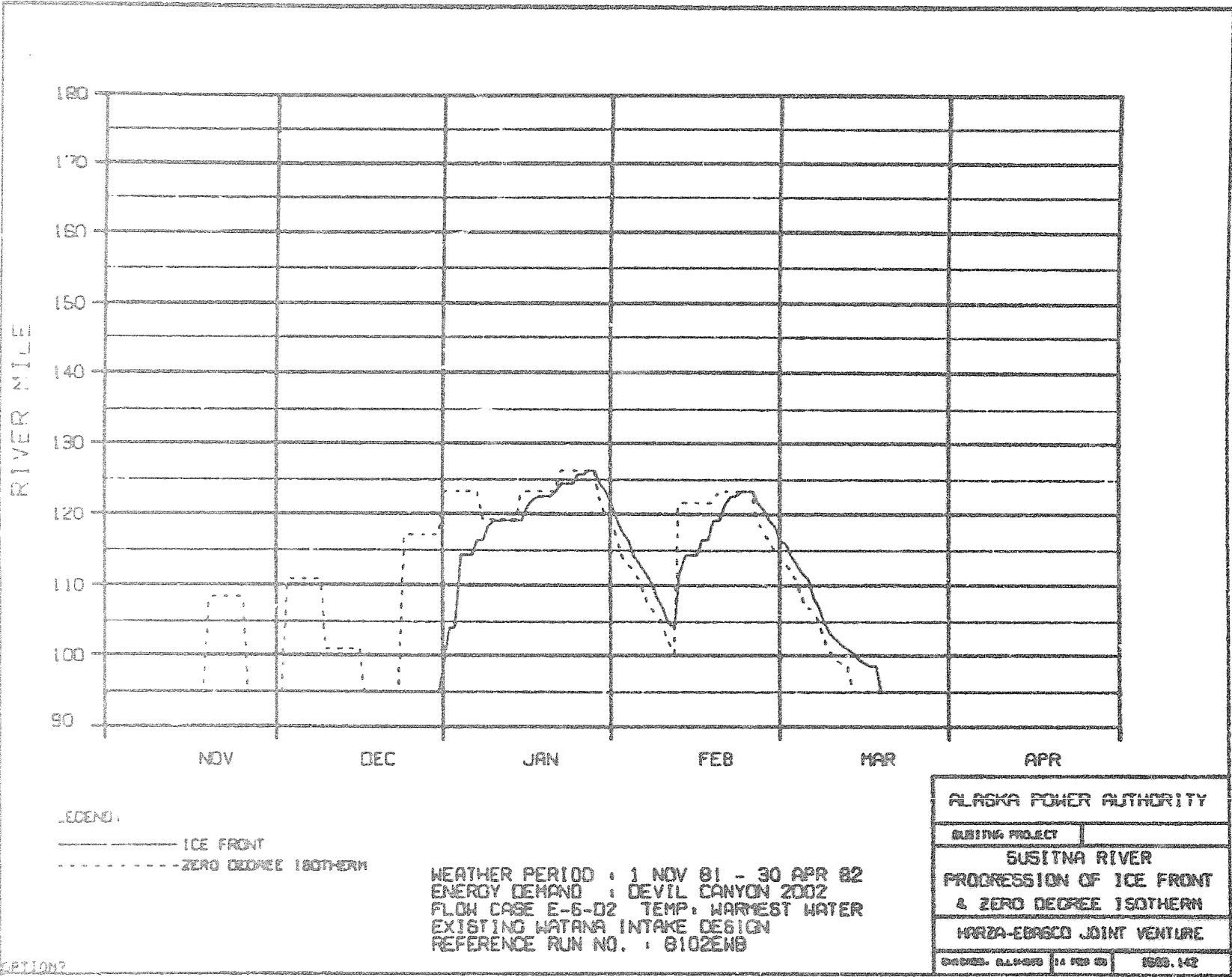
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-6-02 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 0102EWS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - GALLAGHER	14 FEB 82
	1000.142

OPTION 2



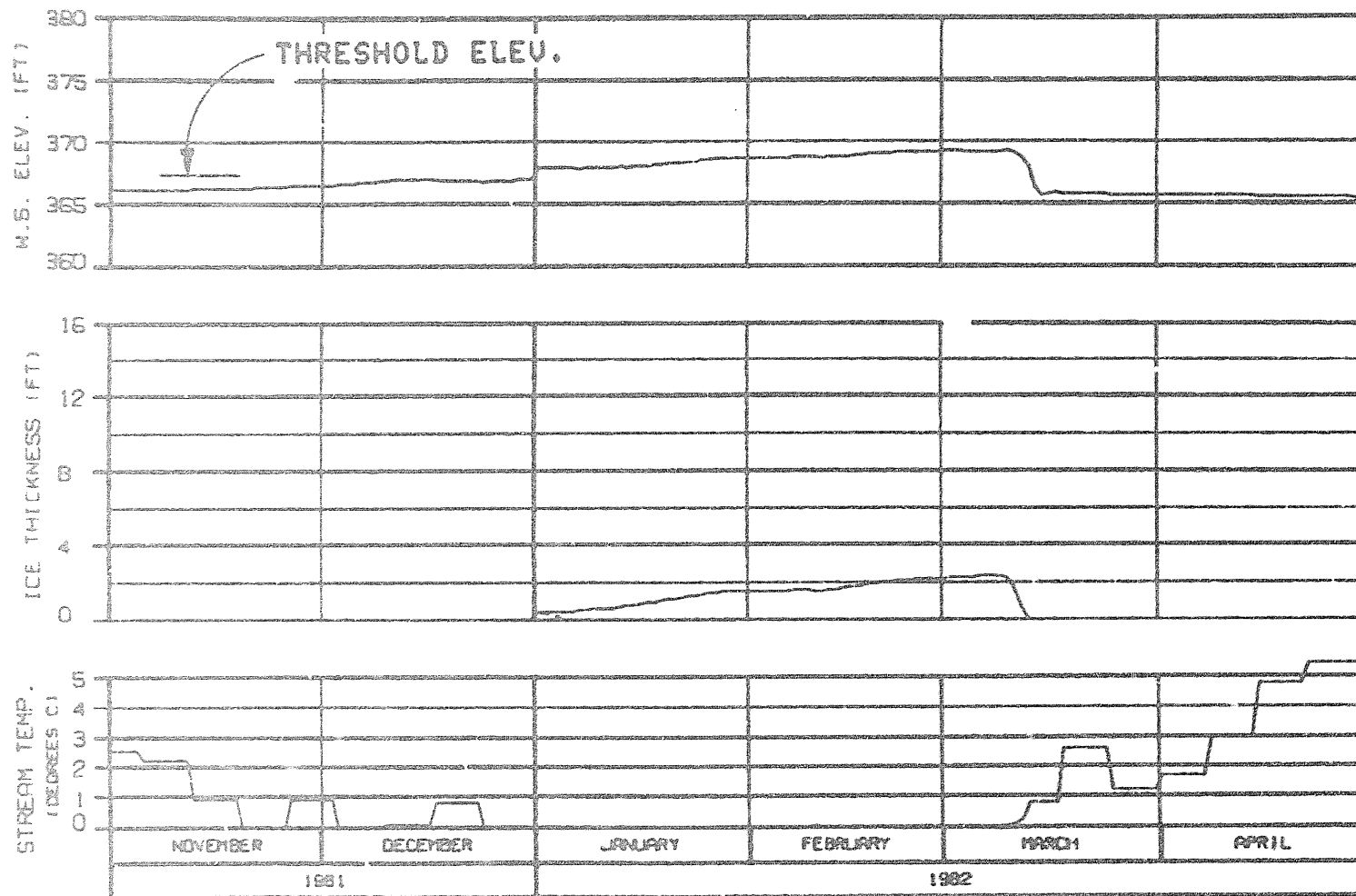
LEGEND:

- ICE FRONT
- - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-6-02 TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102ENB

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
WARZA-EBRSCO JOINT VENTURE		
DESIGN: G.L.M.S.B.	14 FEB 82	1503.142

SECTION 2



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-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EHB

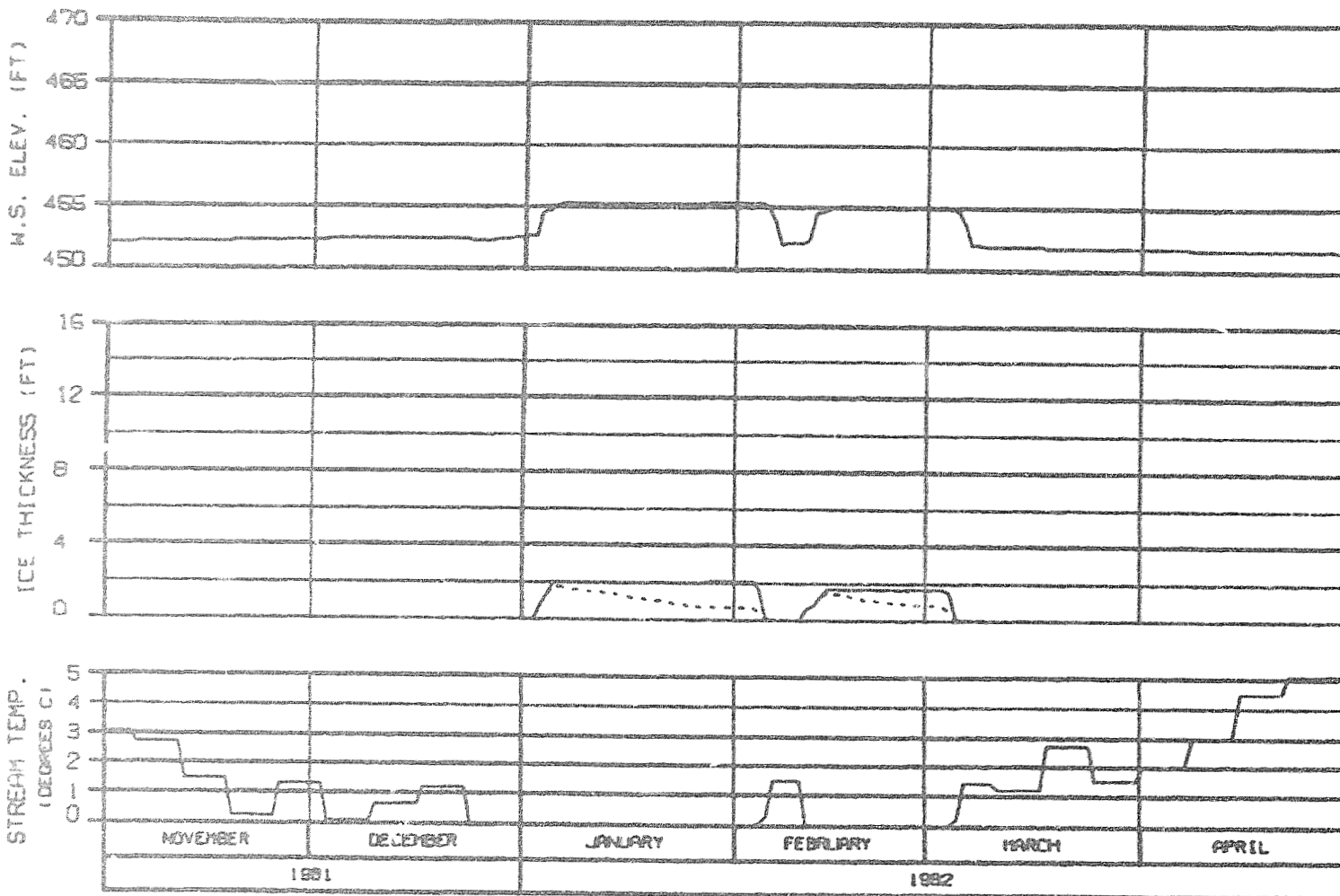
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBERCO JOINT VENTURE

CHARTED. ELEMENT 10 FEB 82 1000.142

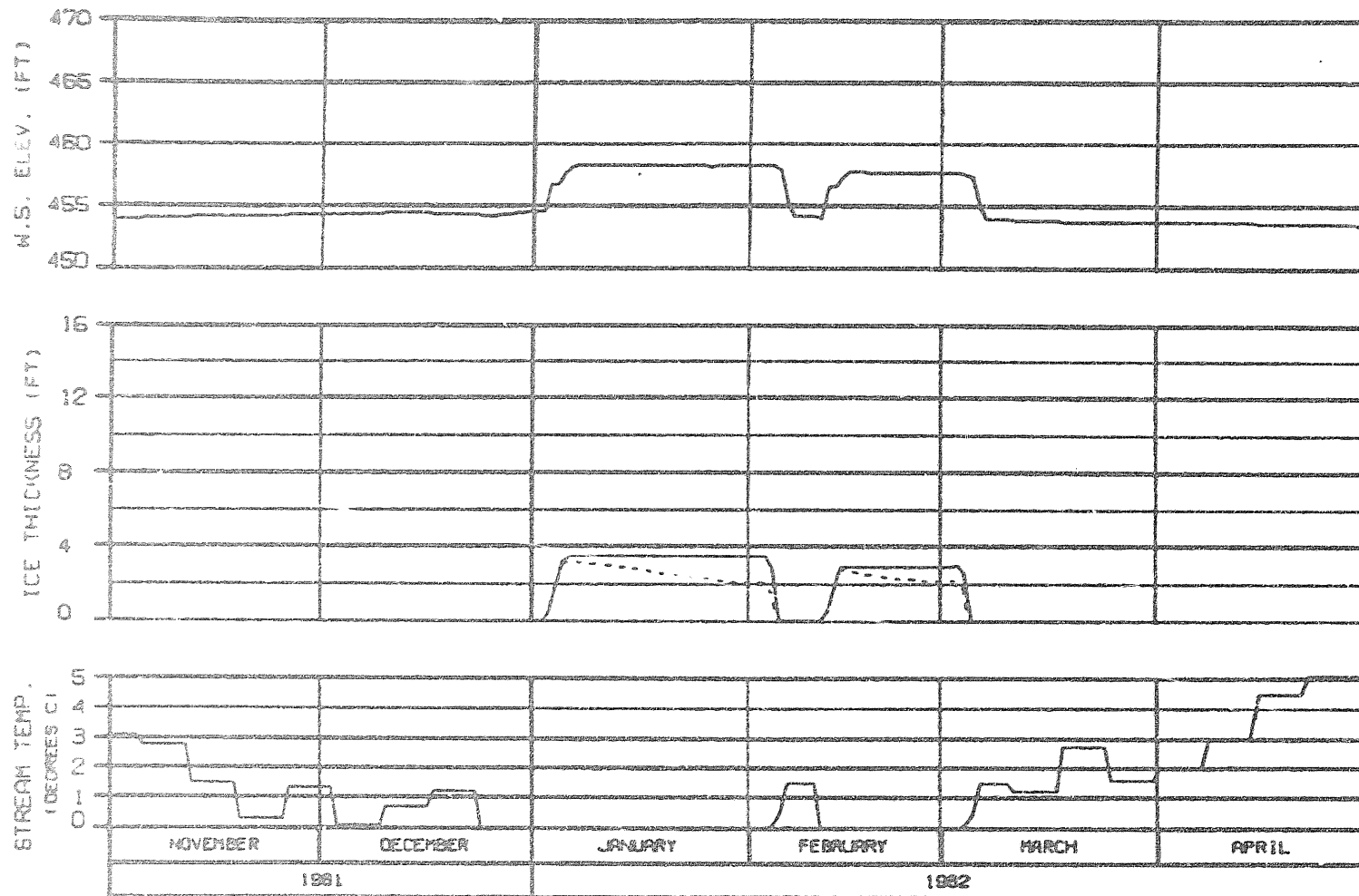


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAR2A-EBASCO JOINT VENTURE	
DATE: 04/08/82	1588-142

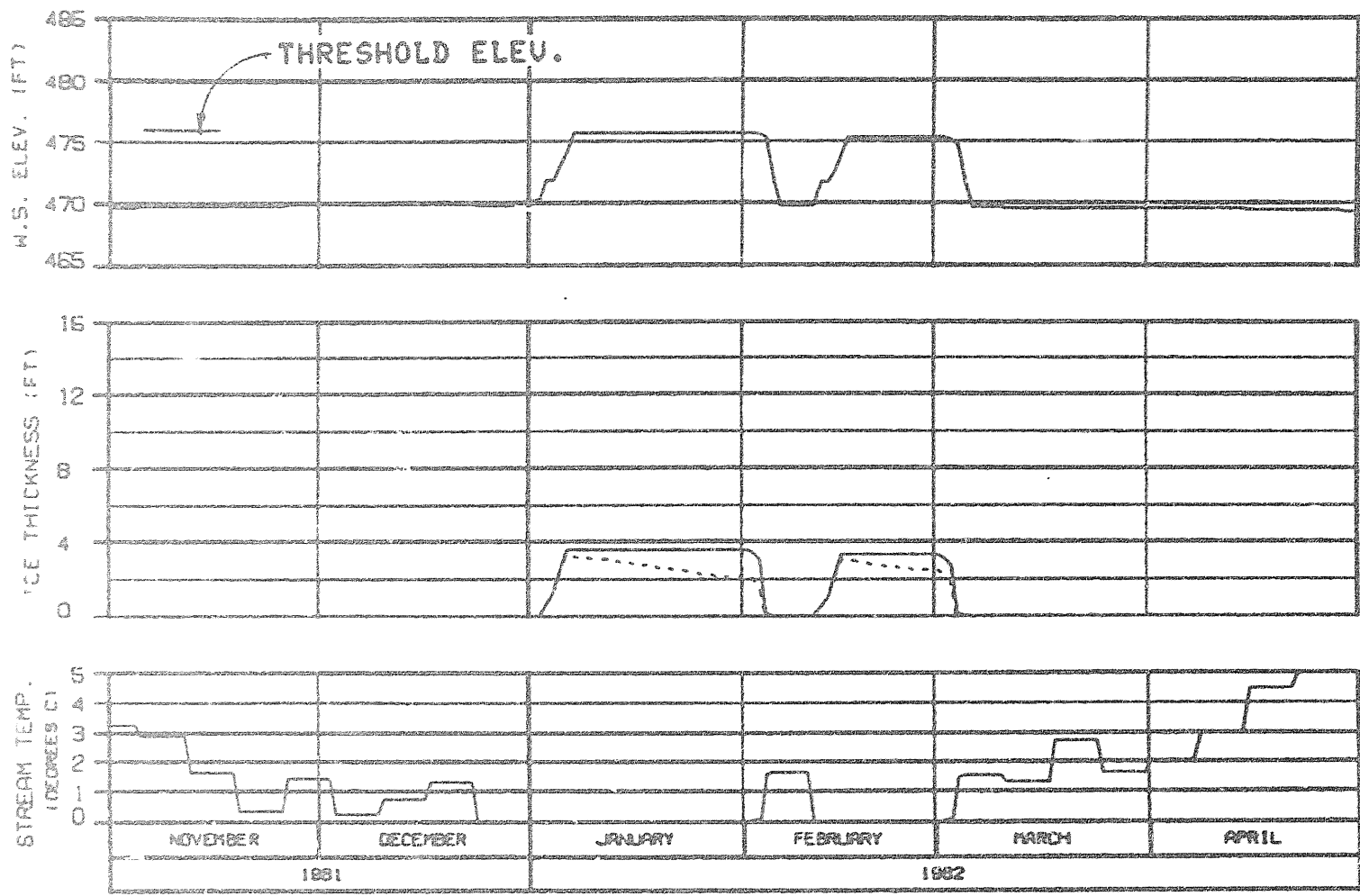


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CREATED: 04/09/82	14 FEB 82	1028.142

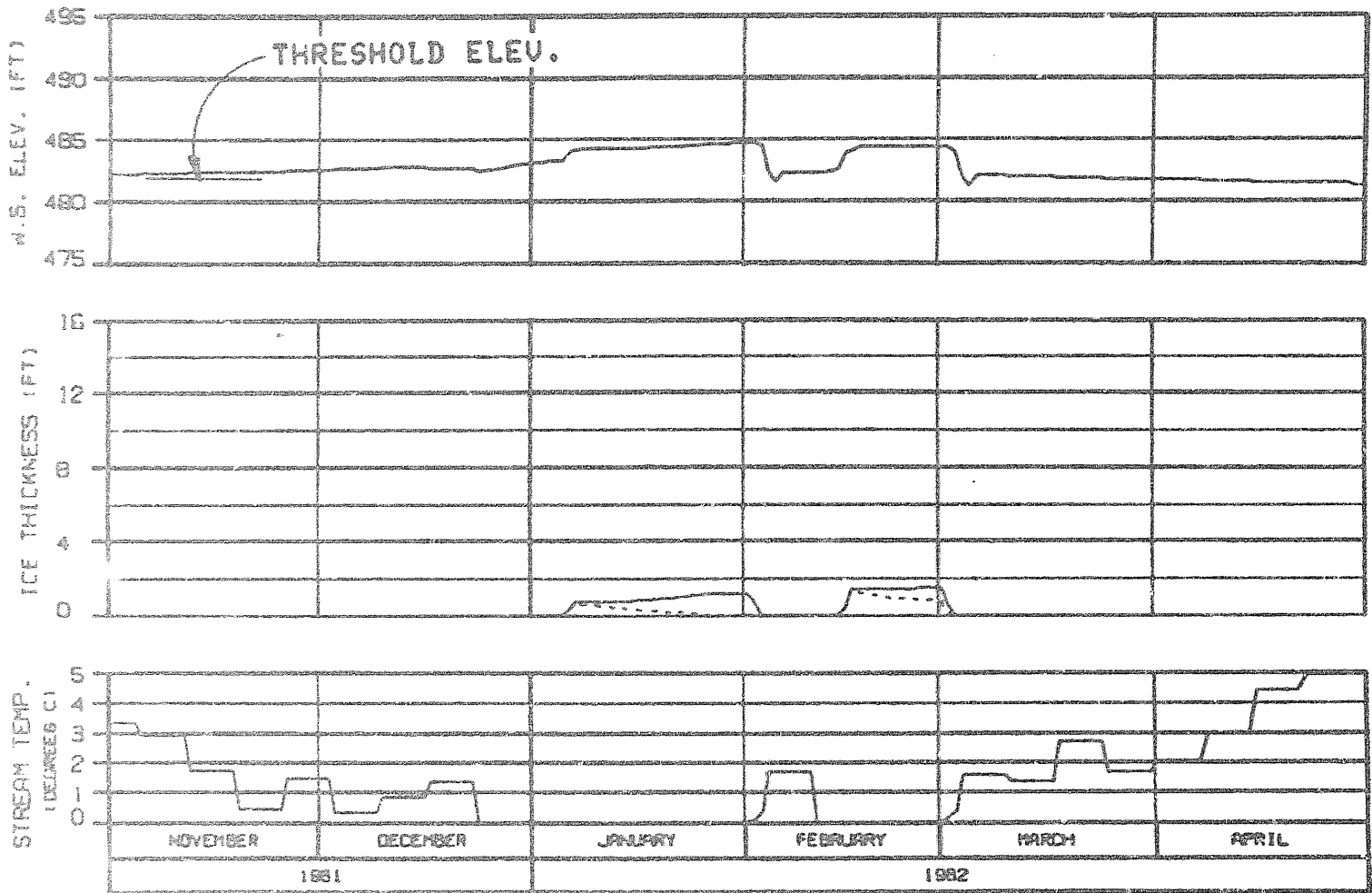


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DESIGNED BY: D. L. DAVIS	14 FEB 82
1805.142	

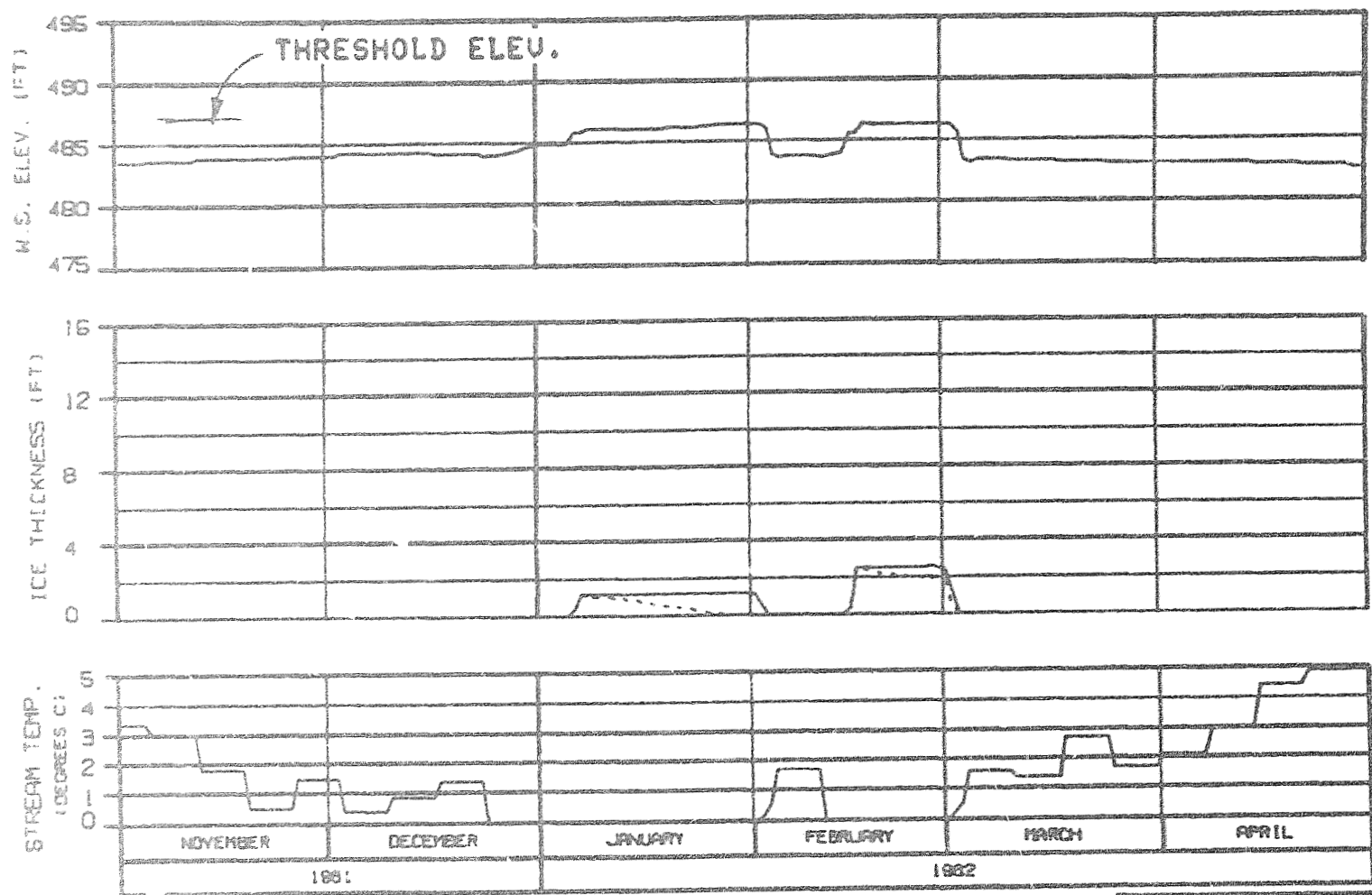


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL MSII
 RIVER MILE : 115.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
QUALITY PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBROO JOINT VENTURE	
DESIGN: CL-0410	REV: 142

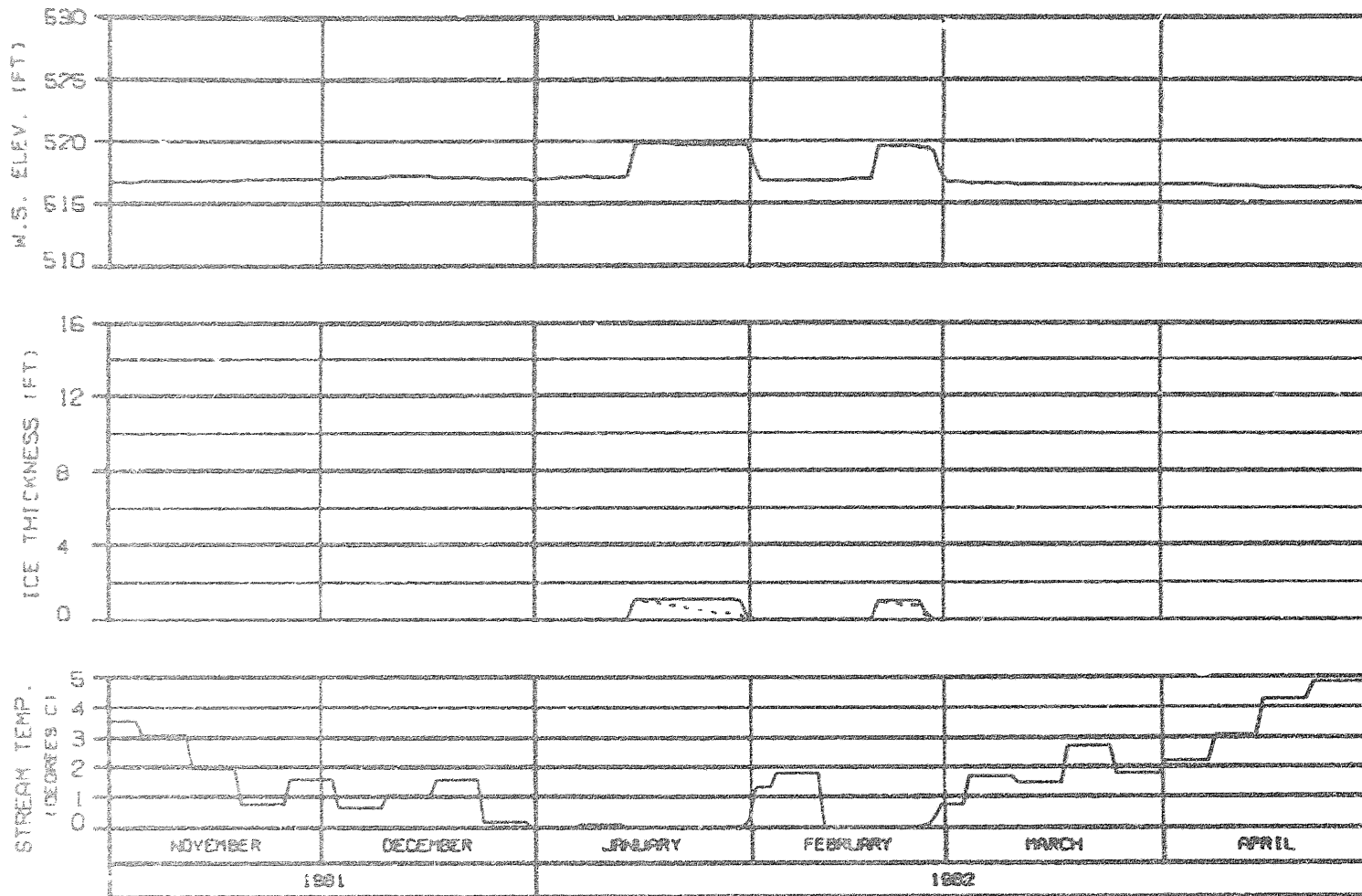


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWB

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACO JOINT VENTURE		
DESIGNED BY	DATE	1982.142



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

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWS

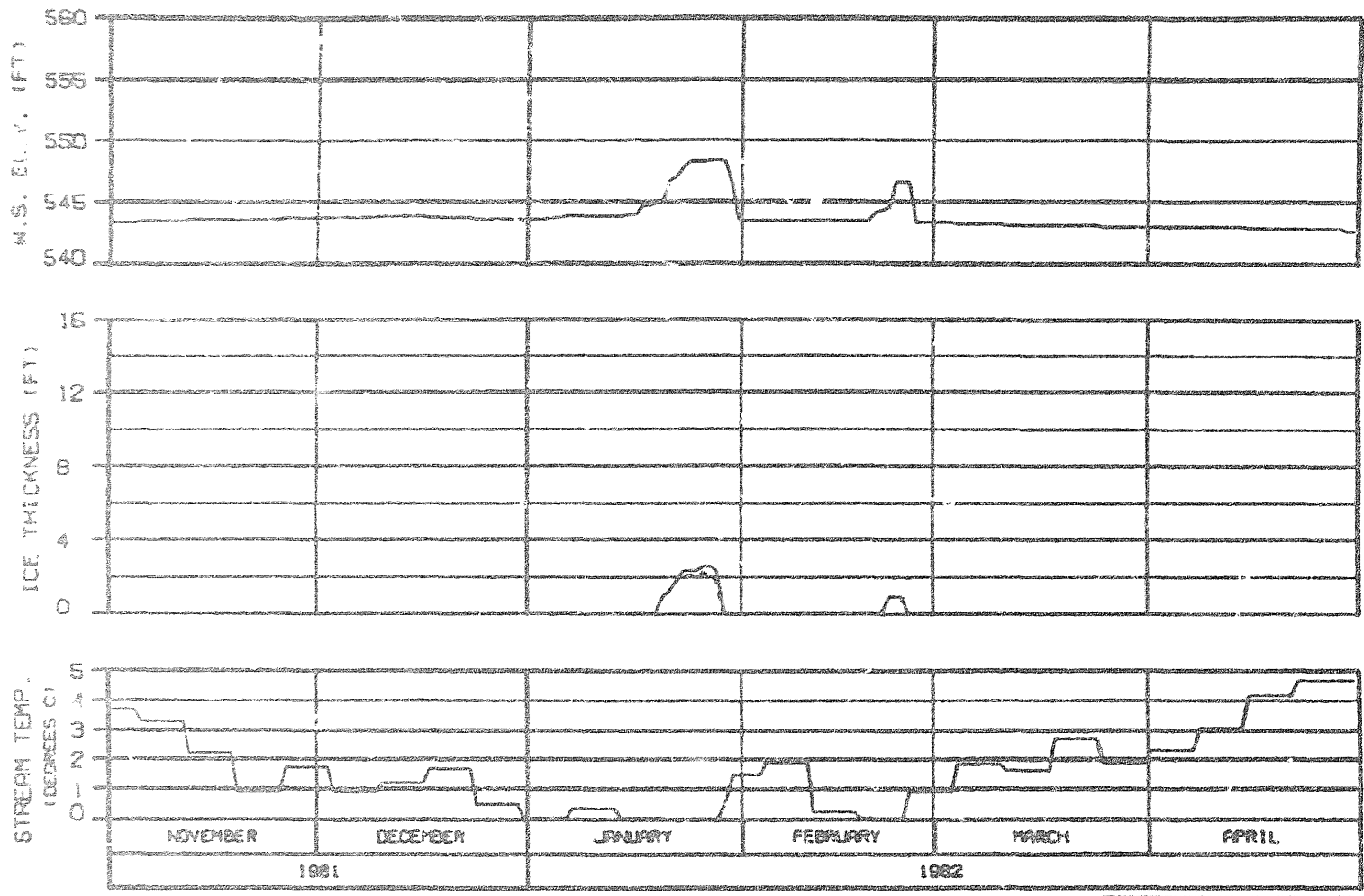
ALASKA POWER AUTHORITY

SUBJECT PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBSCO JOINT VENTURE

ENCLOSURE 11-2-82 14 FEB 82 1022.142

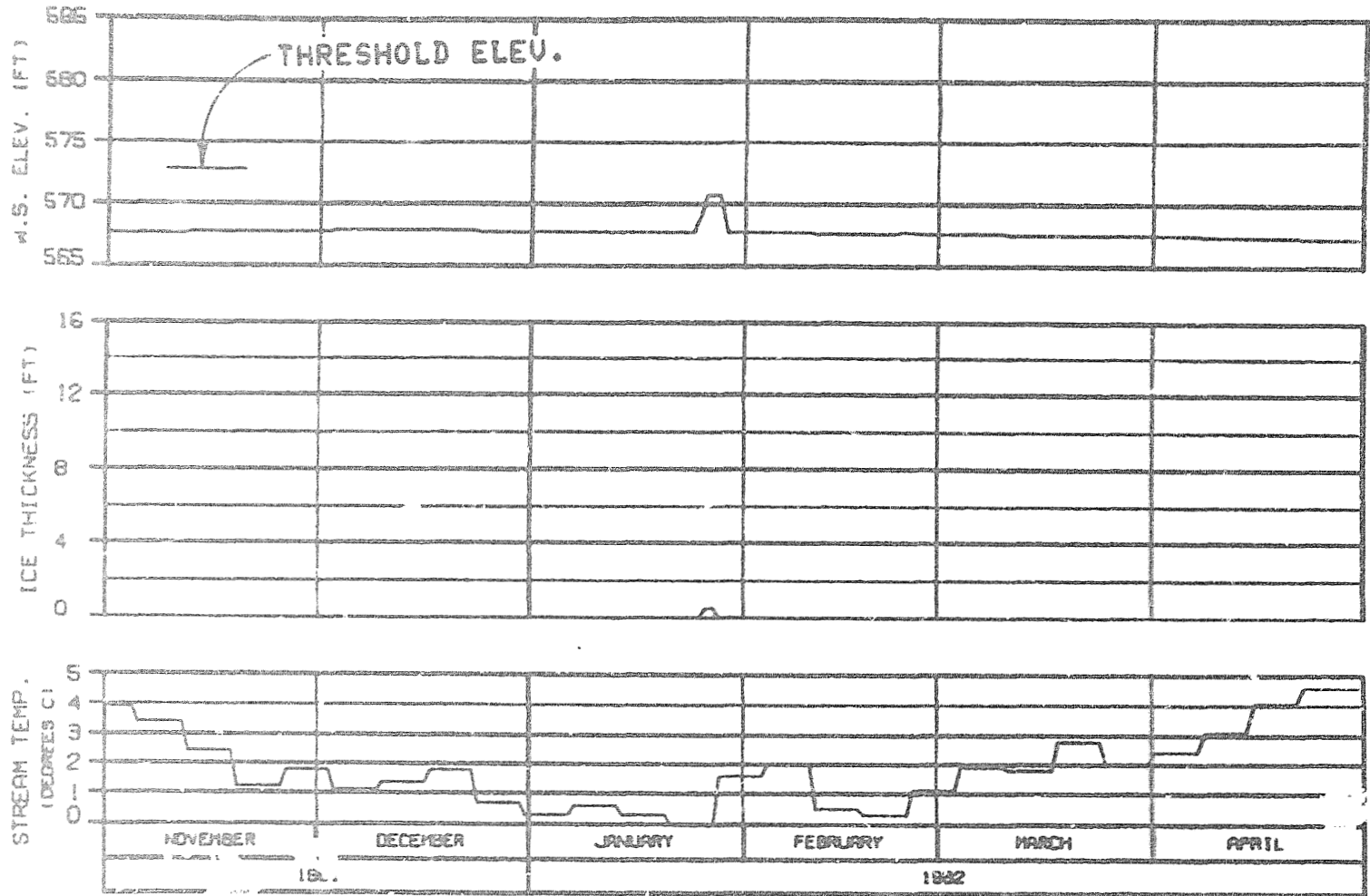


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
WORKING - ALL SHEETS	14 FEB 82
	1800.142



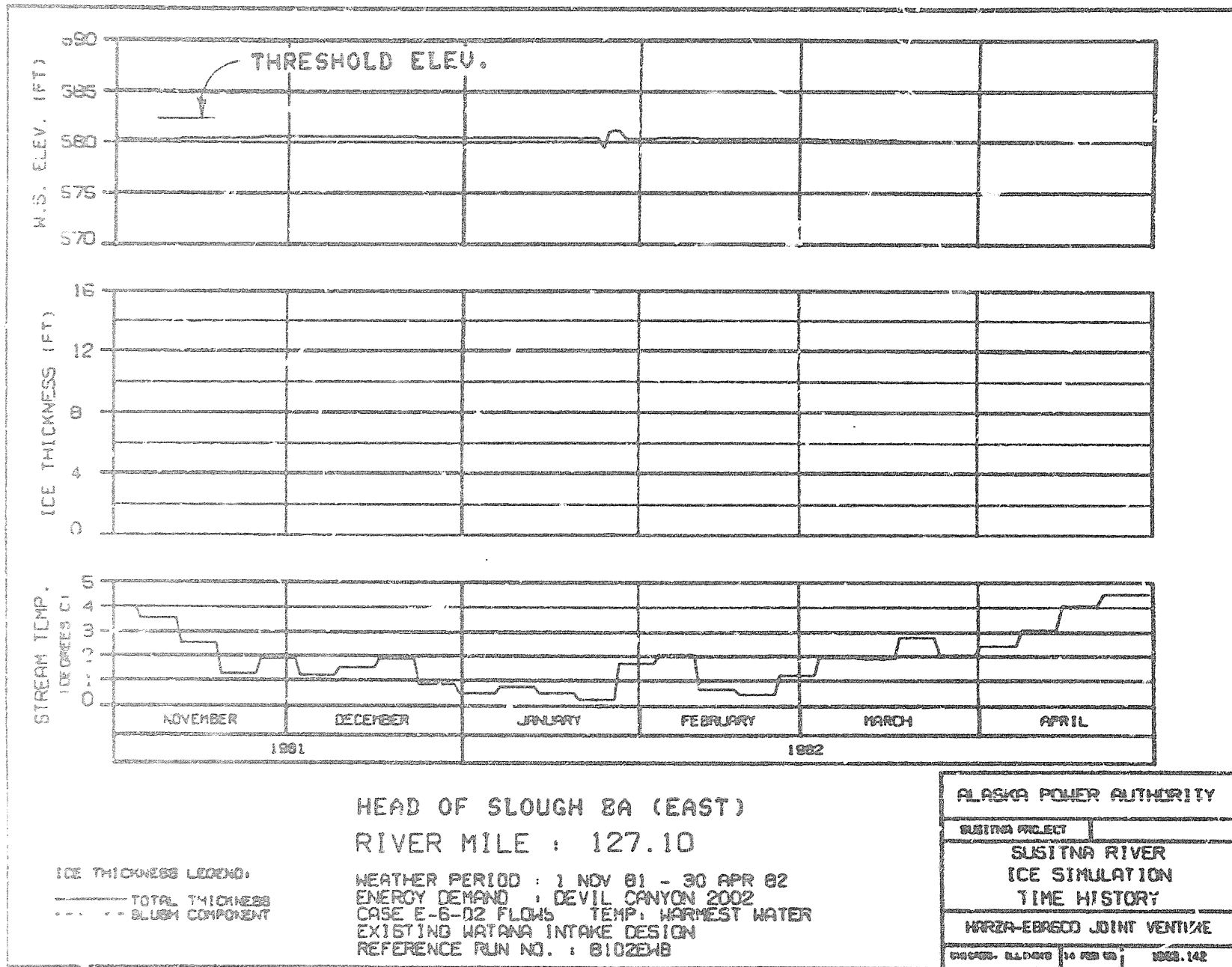
HEAD OF SLOUGH 8A (WEST)

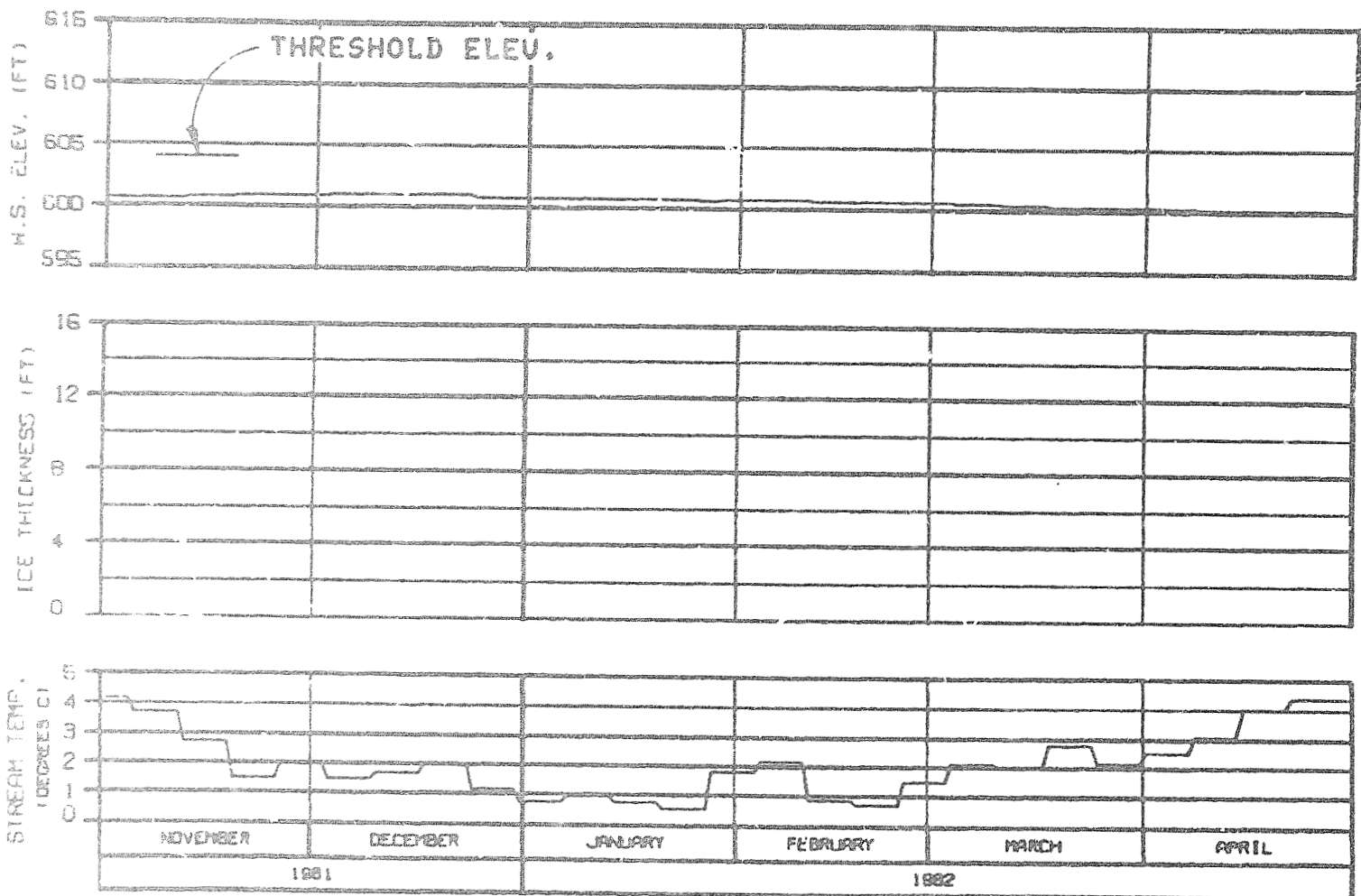
RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP. WARMEST WATER
 EXISTING NATANA INTAKE DESIGN
 REFERENCE RUN NO. : S102EWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGN. ALL PAGES	16 FEB 82
1000.142	





HEAD OF SLOUGH 9
 RIVER MILE : 129.30

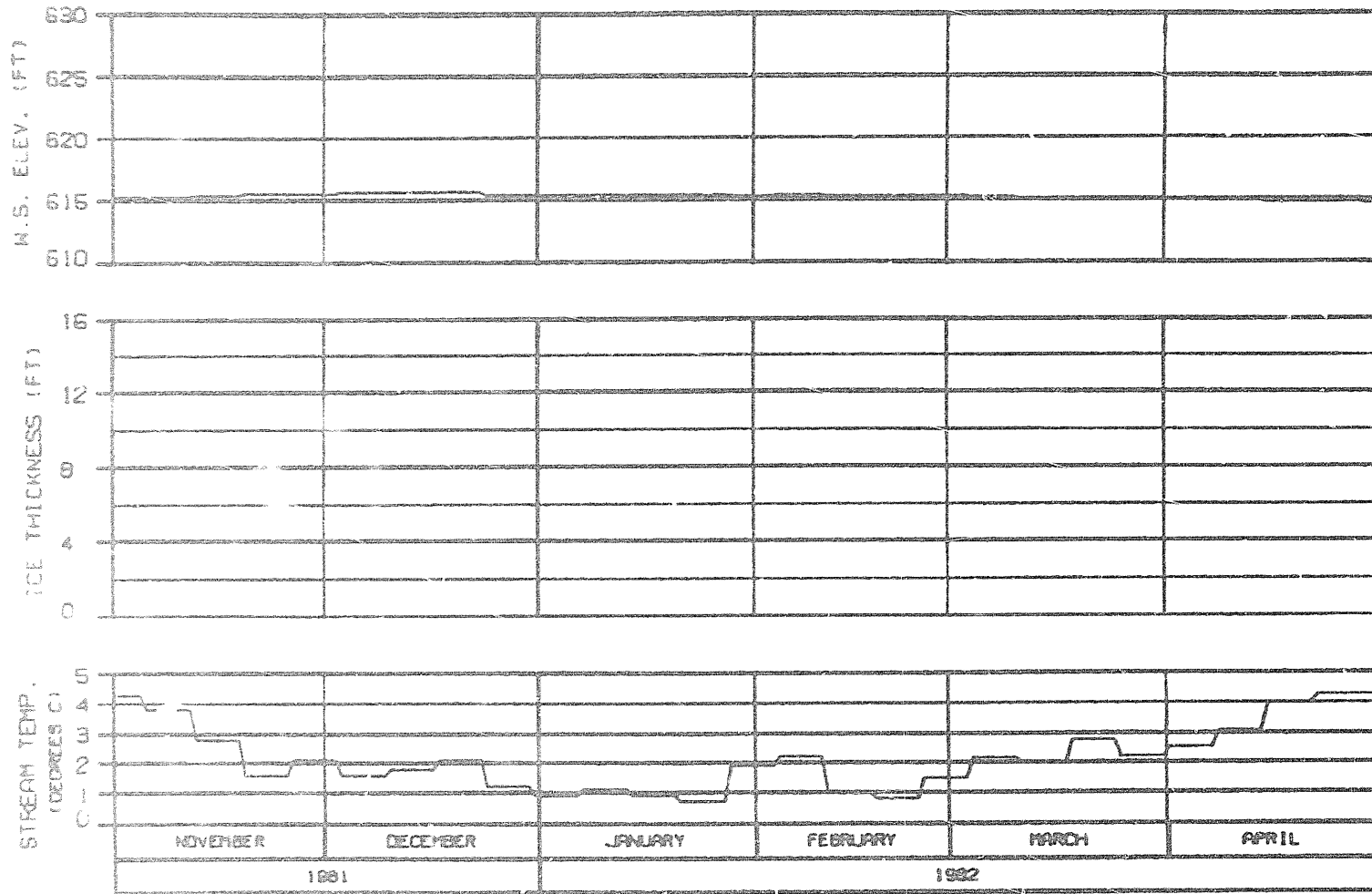
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLISK COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY SCENARIO : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHARTER. 11.1.82	10 FEB 82	2888.142

OPTION?

OPTION 7

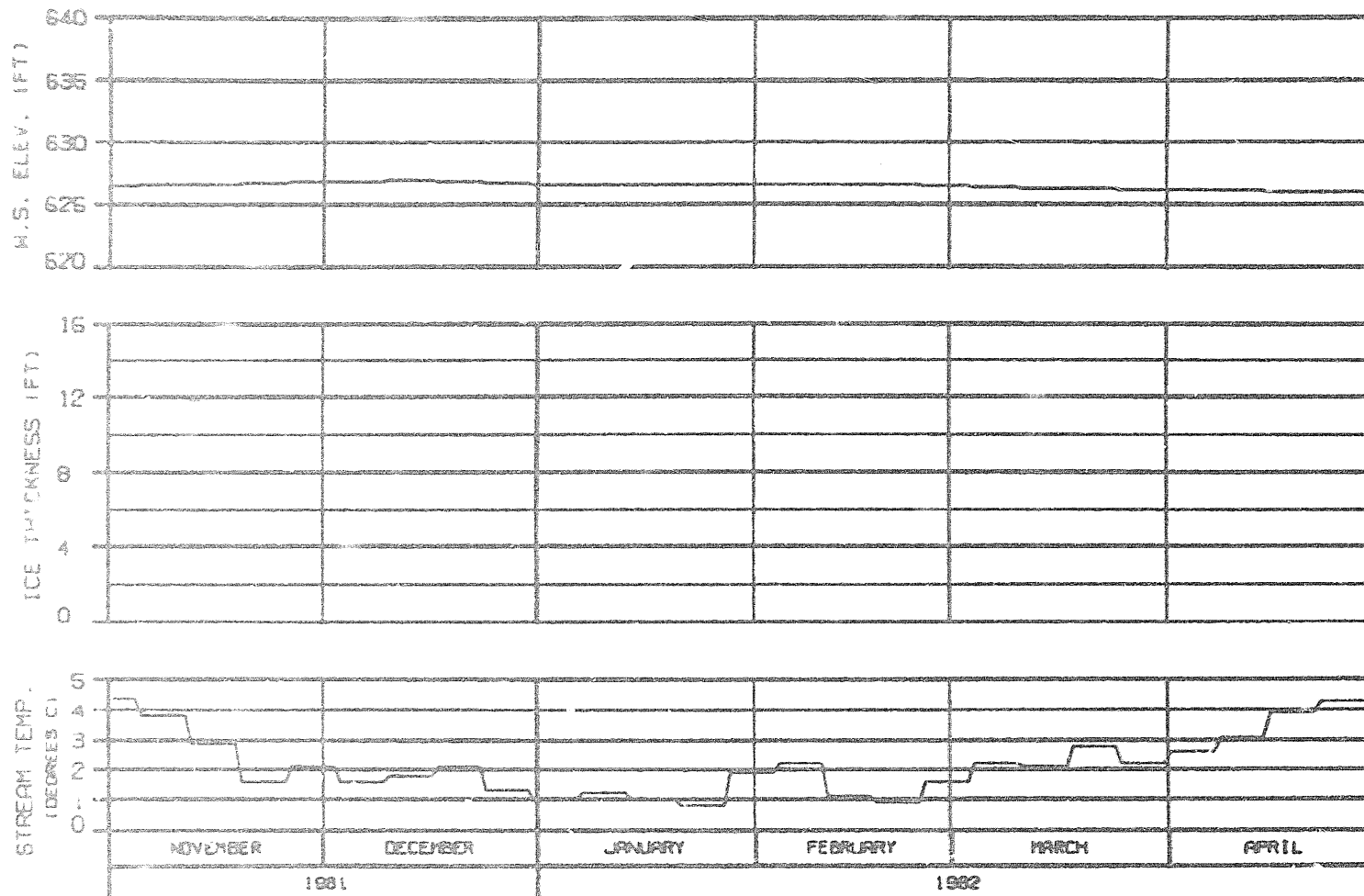


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLSHM COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : B102EWB

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHACRE, S.L.P.A.S	16 FEB 82	1000.149

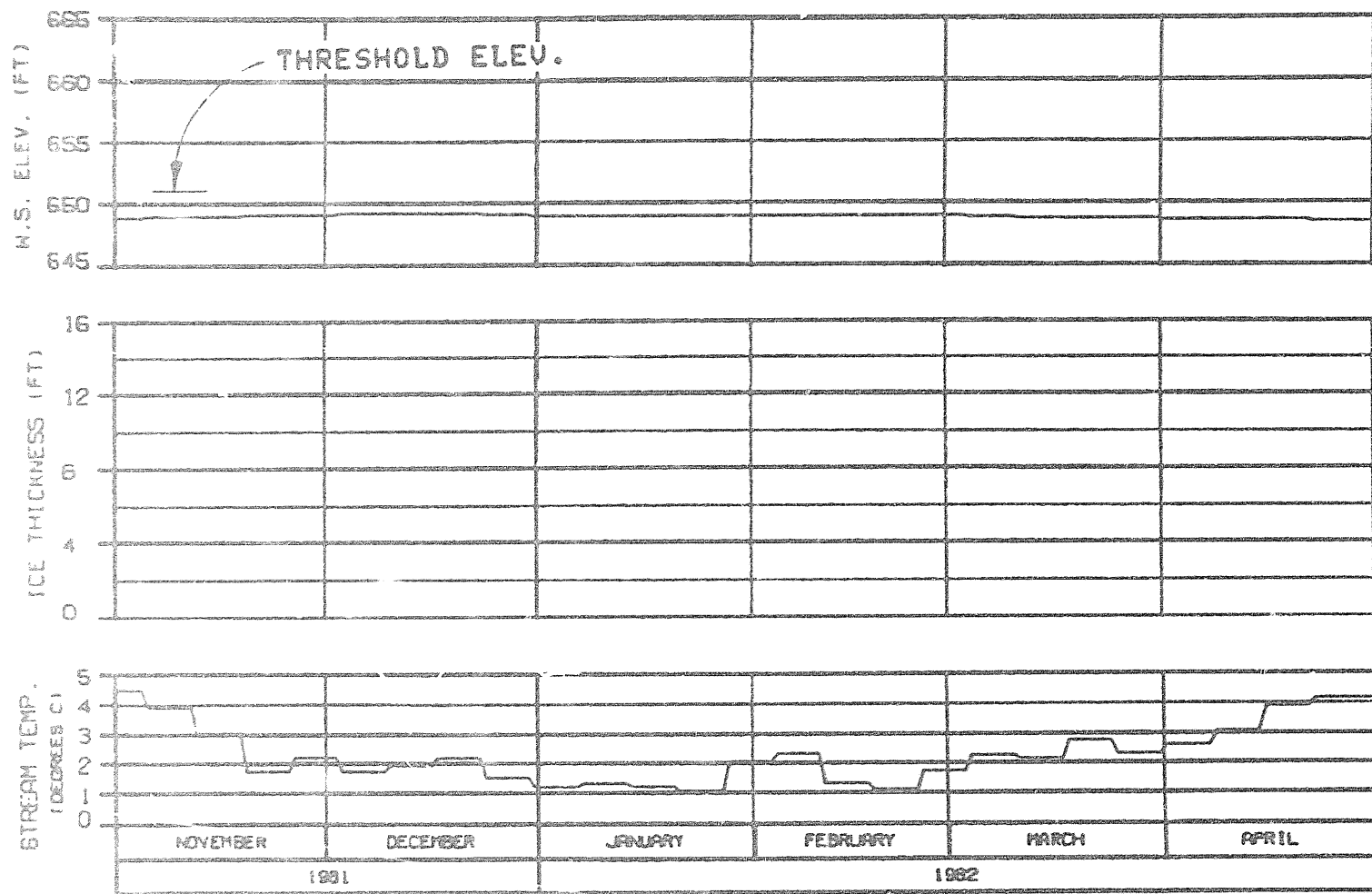


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102WB8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGN. DRAWING	10 FEB 82	W888.142

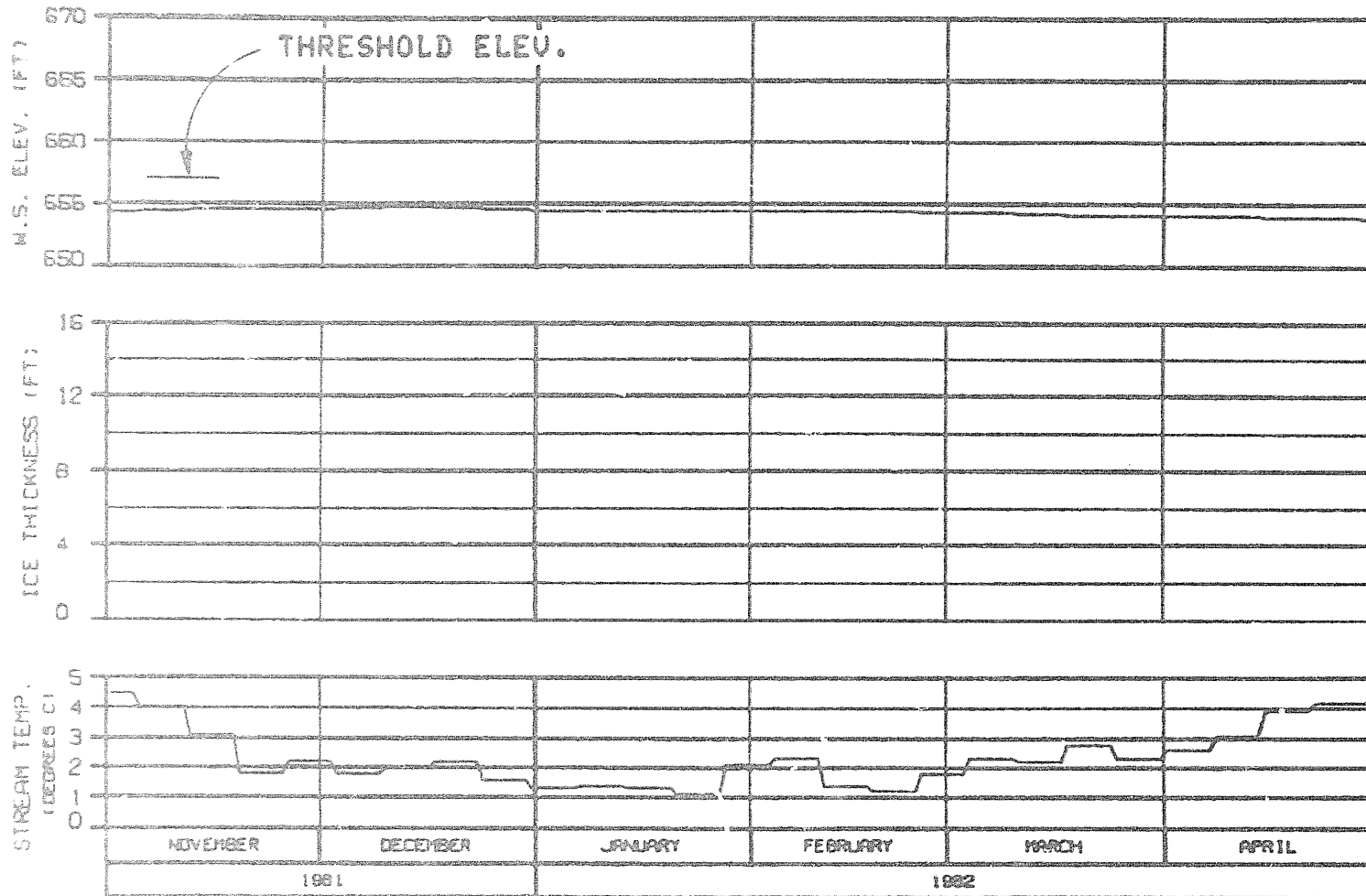


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EAB

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EGRECO JOINT VENTURE	
DATE: 01.04.02	14 FEB 02
PAGE 142	

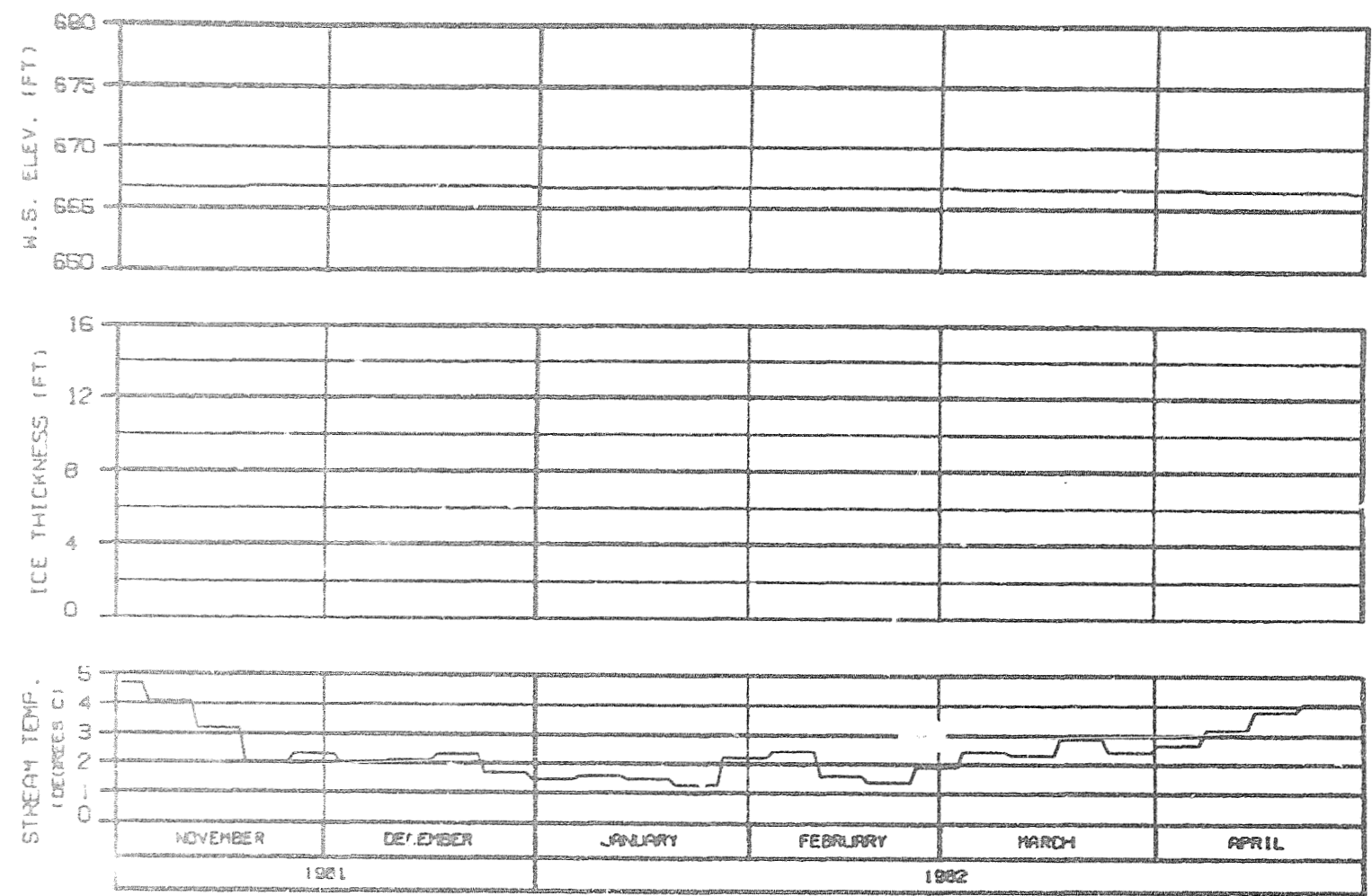


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 GLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-S-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGN. ALLIANCE	14 FEB 82	1000.142

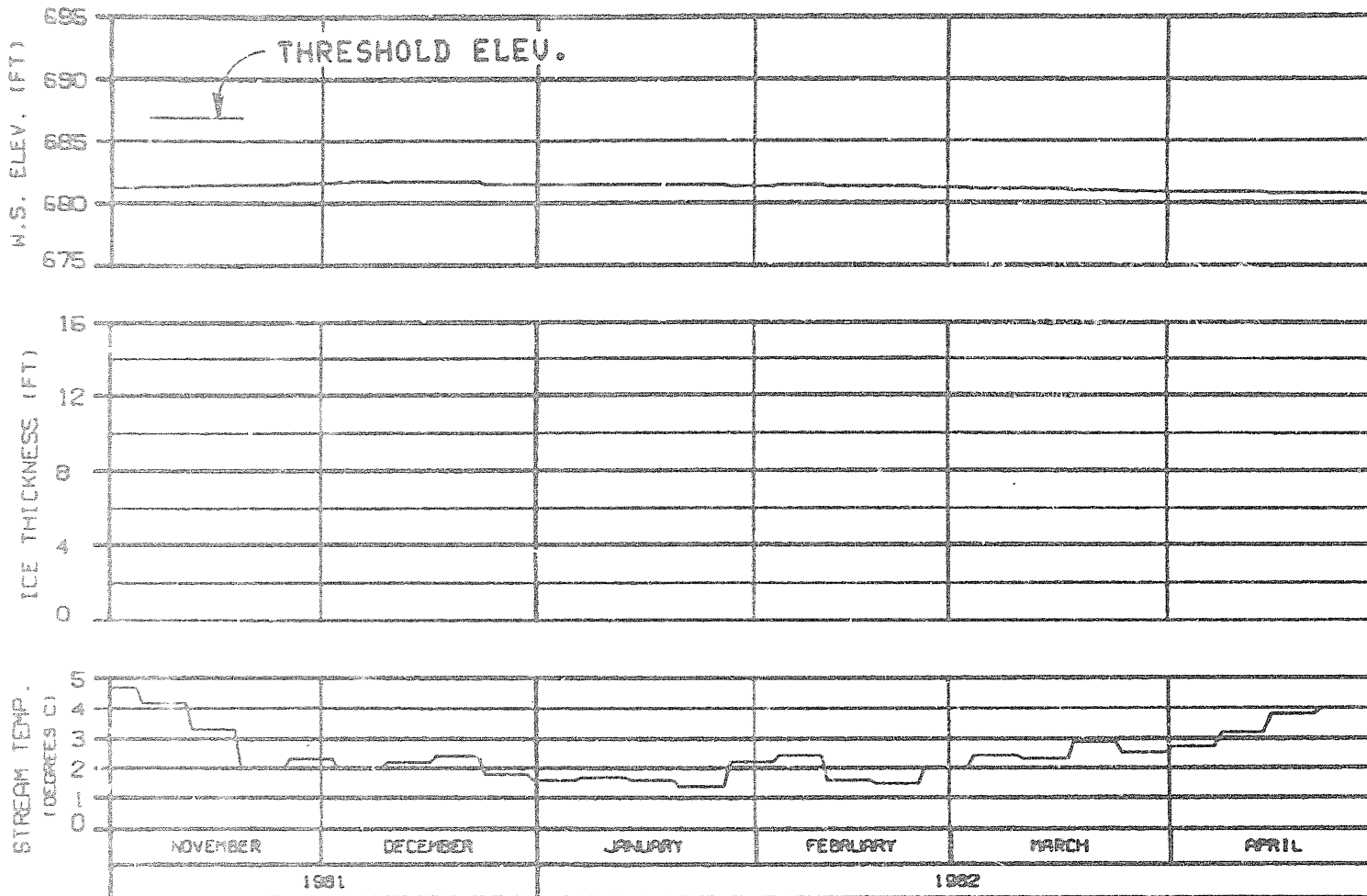


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-D2 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHGNO. 11.03.82	10 FEB 82
	1978.142

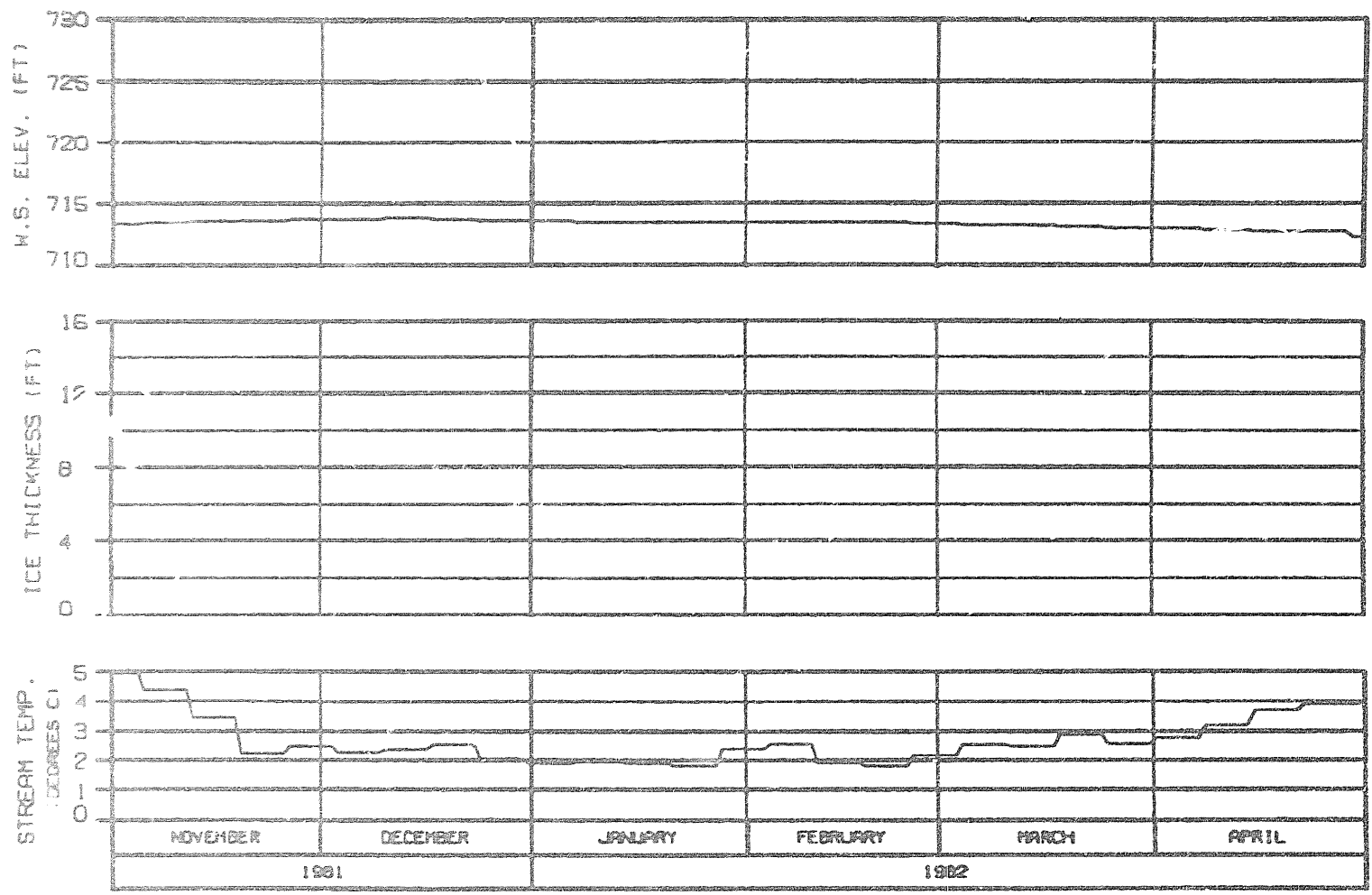


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWB

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTERED. DALLAS TEXAS	14 FEB 82 1000.142

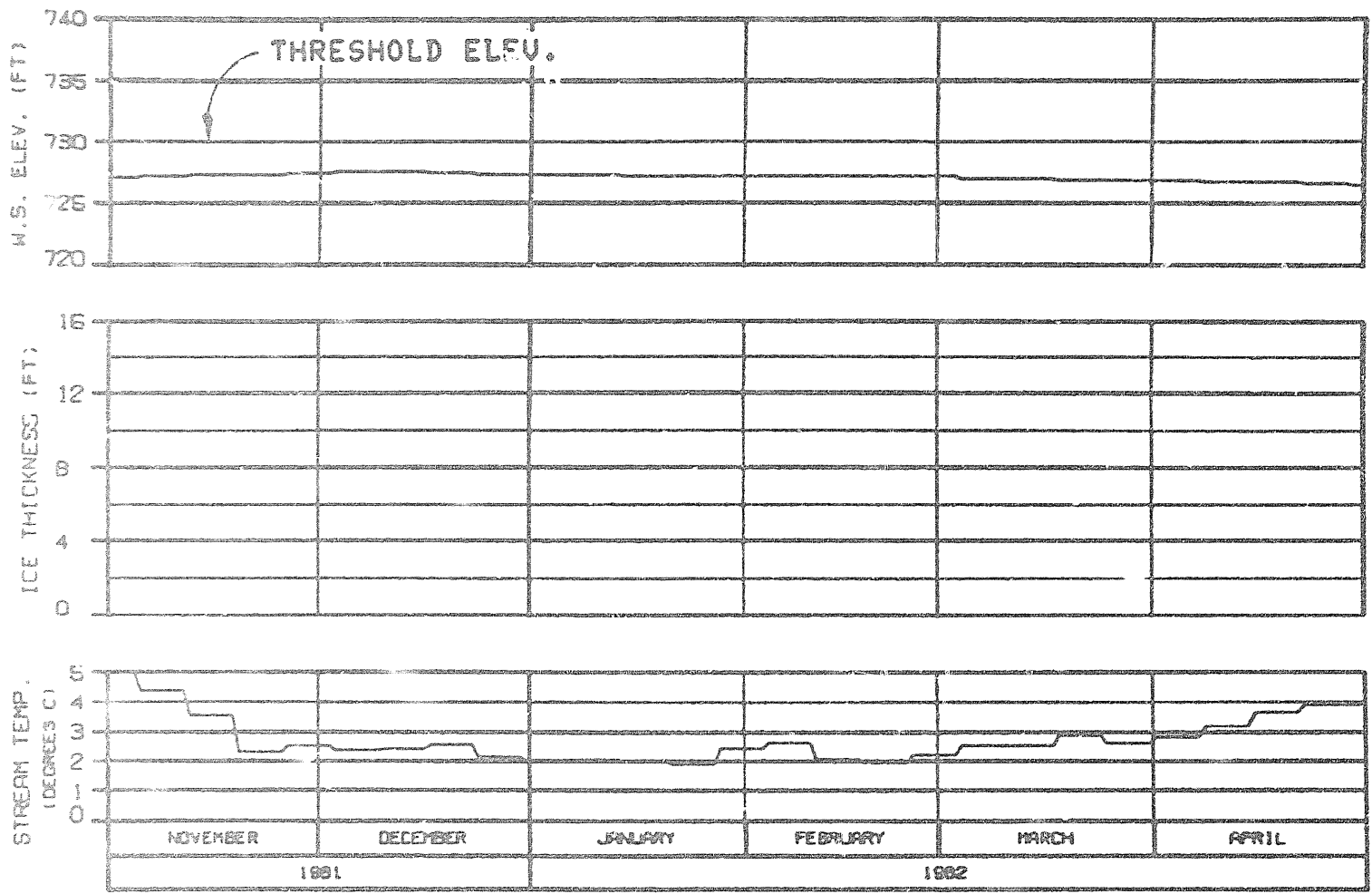


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNER: E.L. BROWN	DATE: FEB 82
PROJECT NO: 8102EW8	SCALE: 1:100

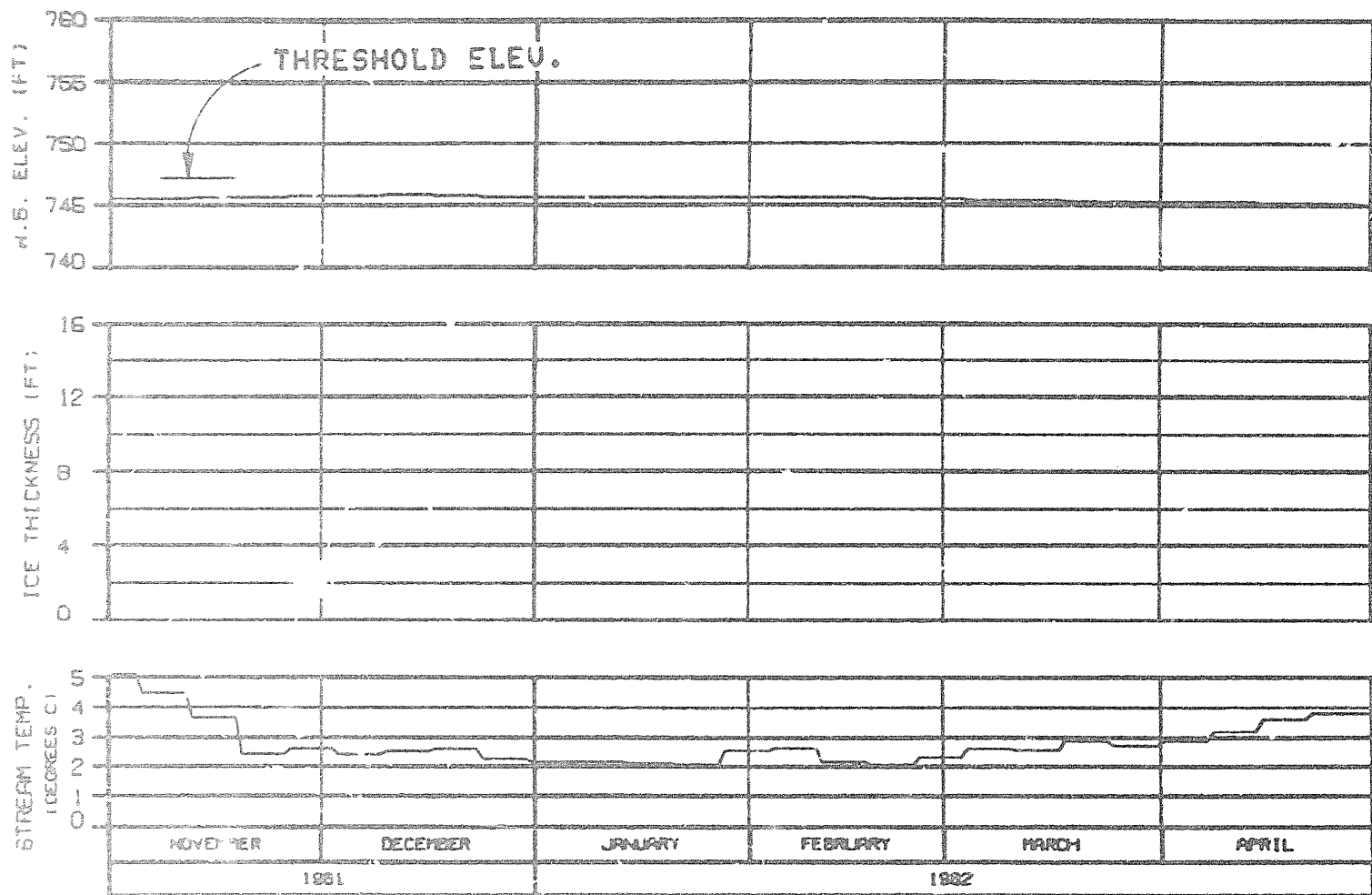


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOW TEMP: WARMEST WATER
 EXISTING WATER: INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EBASCO JOINT VENTURE	
DESIGN - 11-0-82	LEAD - 142

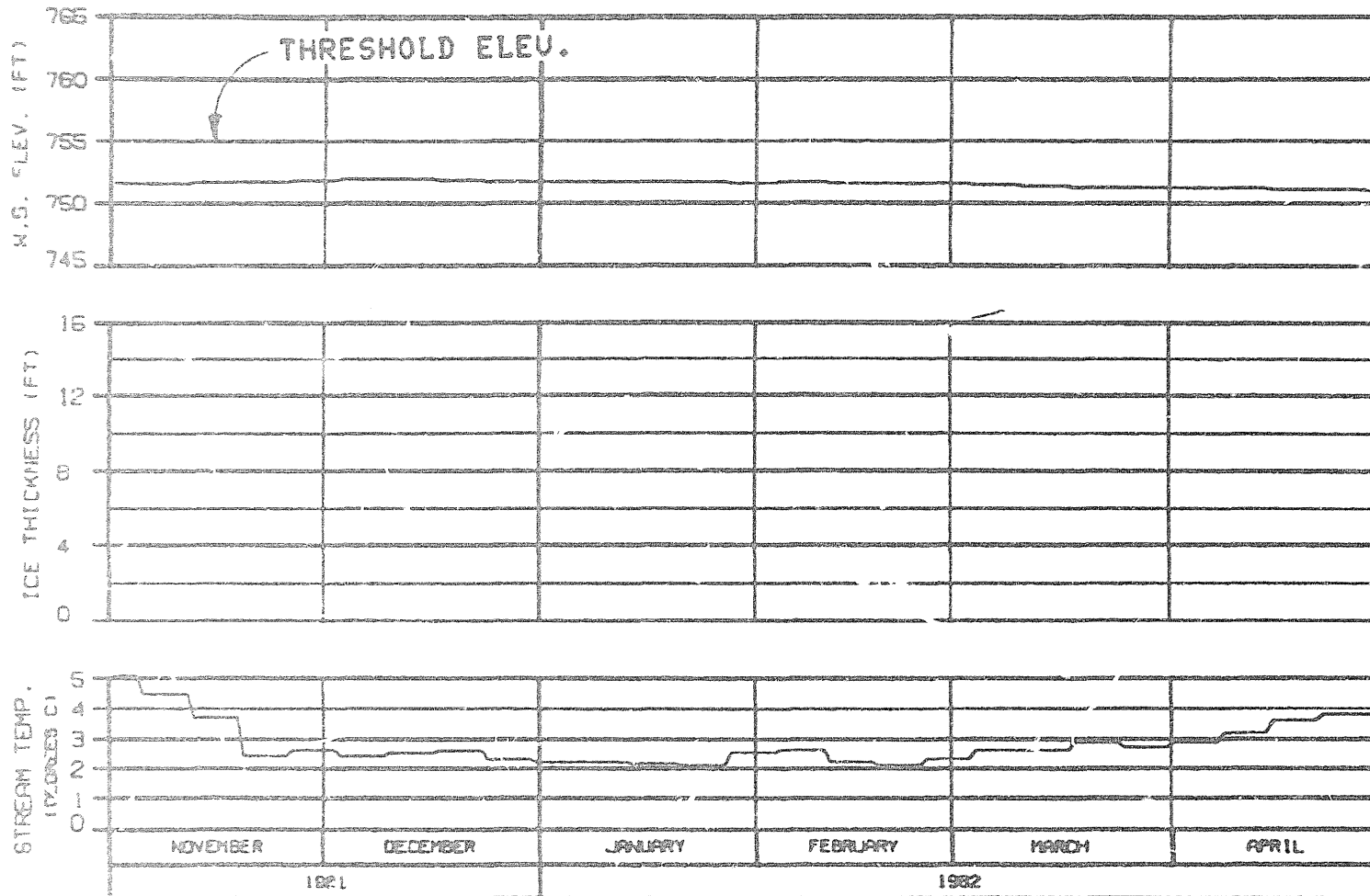


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102END

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
PROJECT: 81-02-020	14 FEB 82	1588.142



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-6-82 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EW8

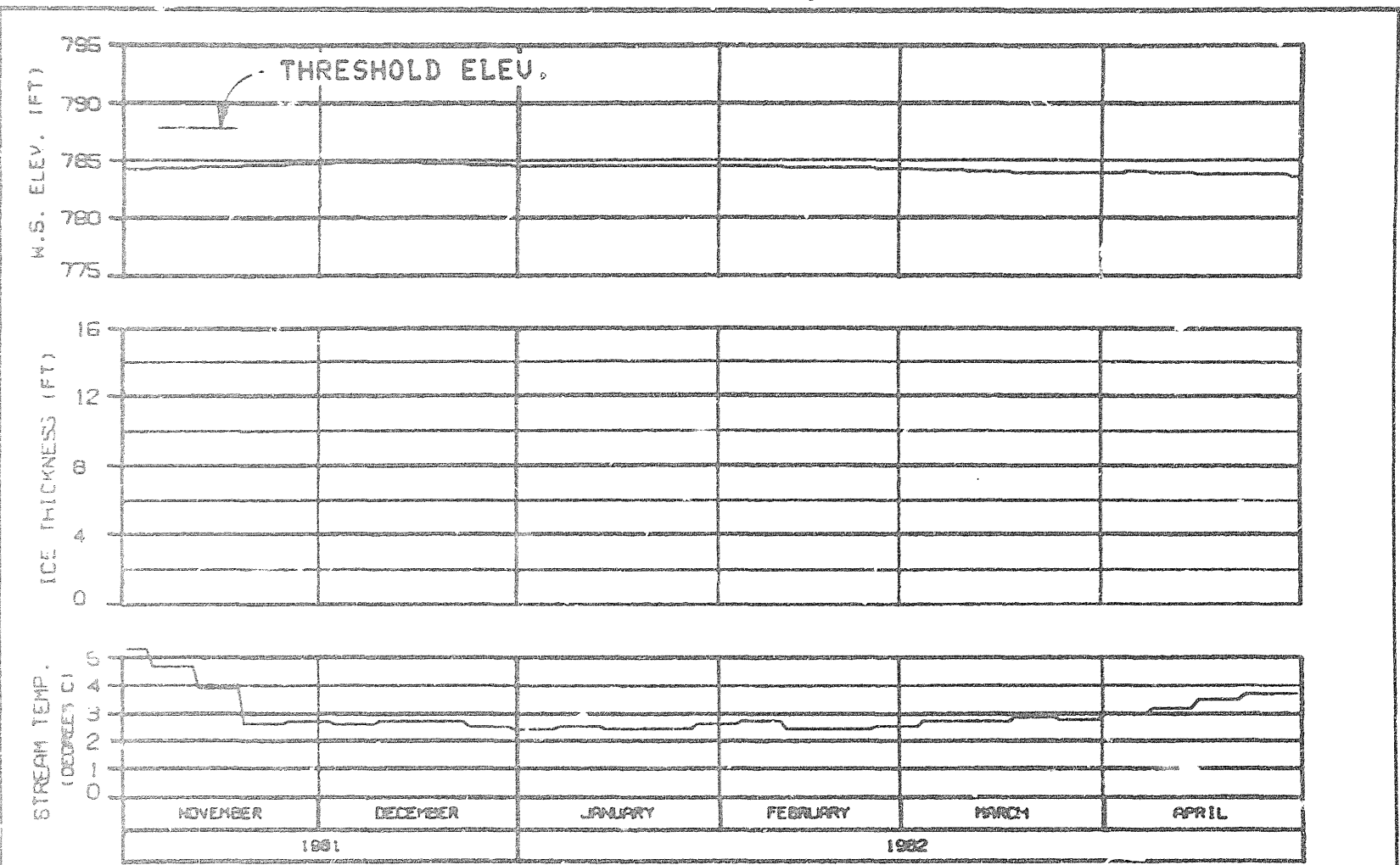
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

PROCESS: ILLUMINATED 14 FEB 82 1500.142



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

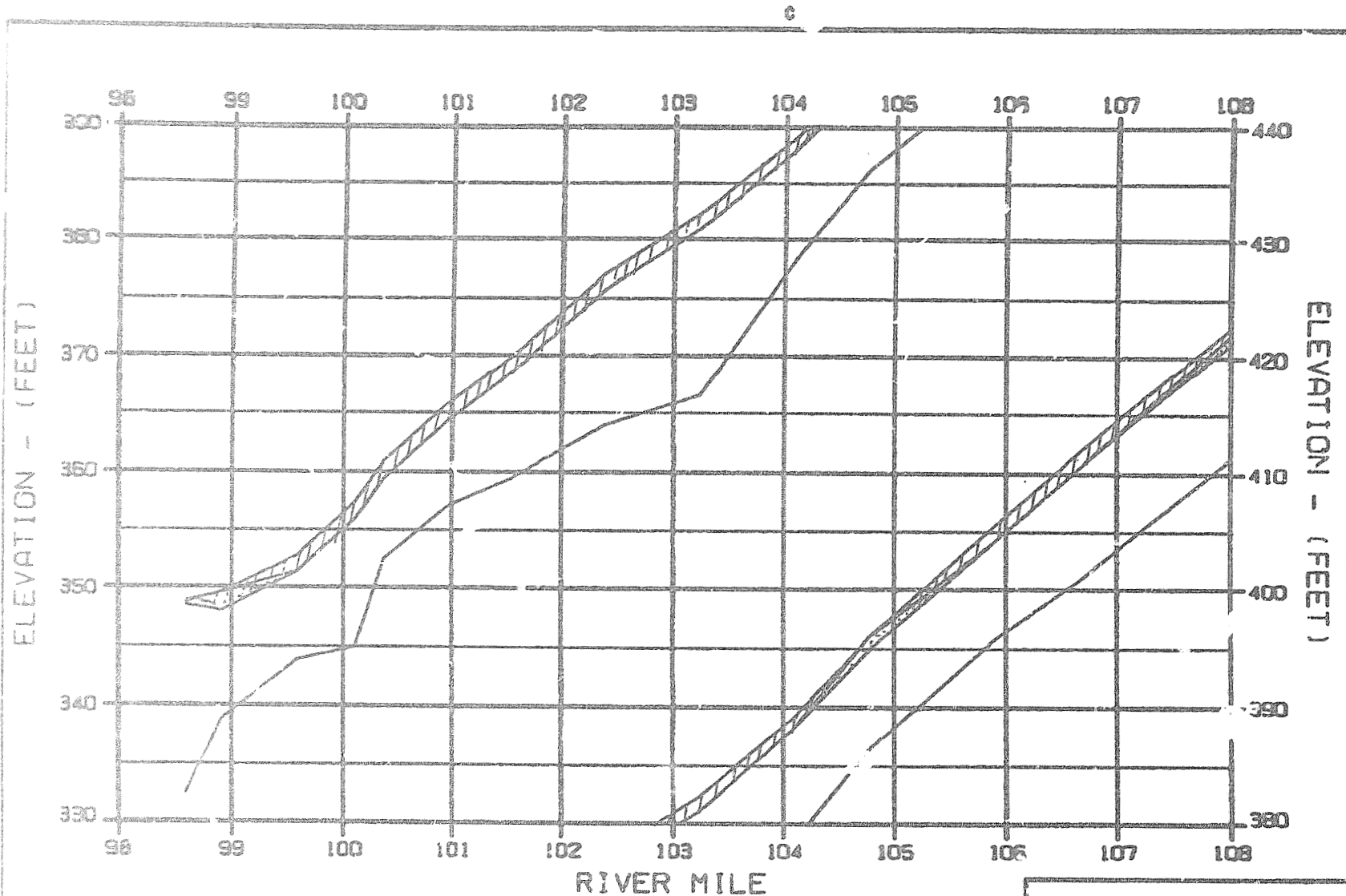
ICE THICKNESS LEGEND:
 ----- TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-6-02 FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE DESIGN
 REFERENCE RUN NO. : 8102EWS





ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBAGCO JOINT VENTURE		
DESIGN: B.L. BROWN	14 APR 82	8028.148

OPTION 7

EXHIBIT J



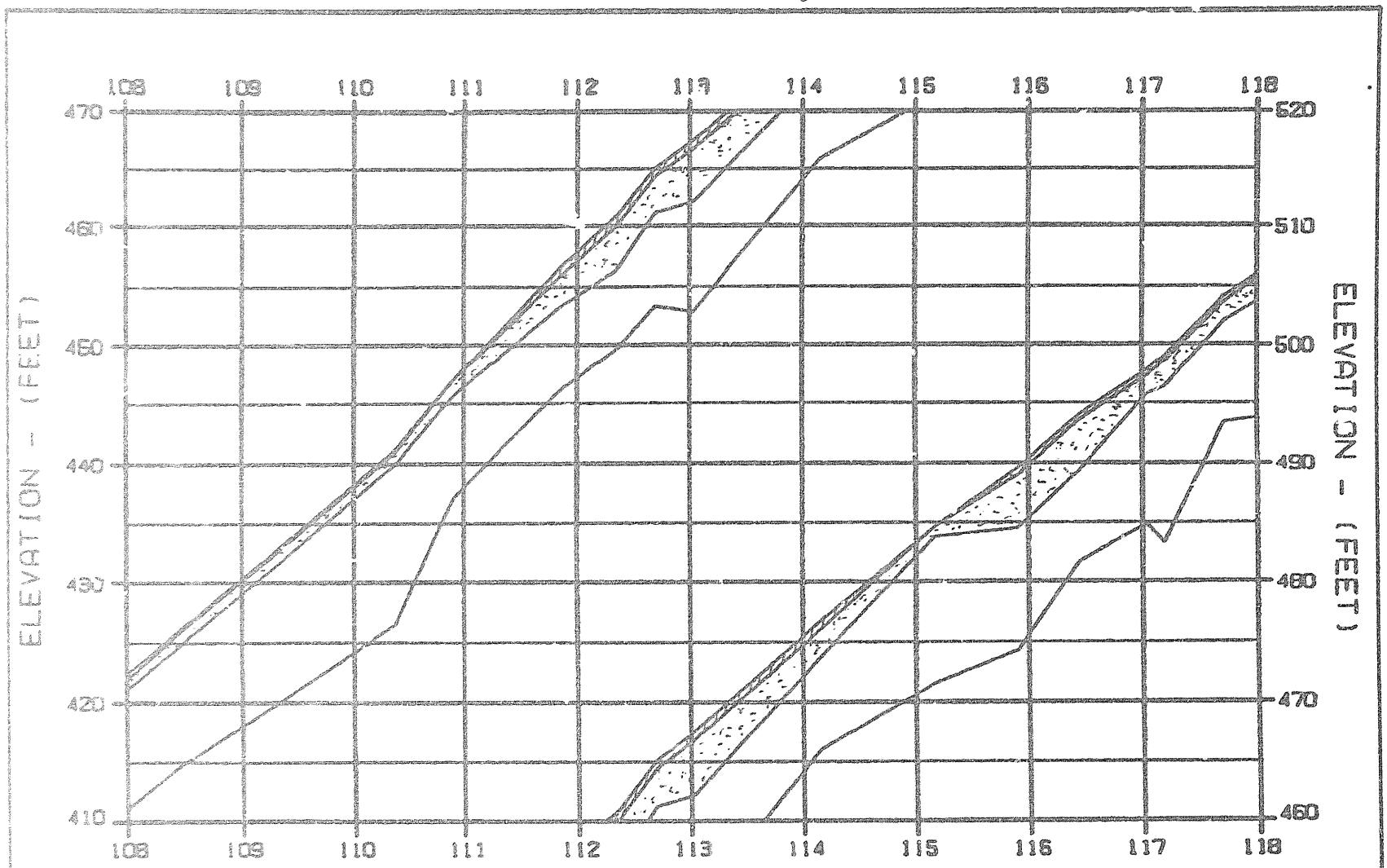
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: ALM/STO	17 JUN 82	1008-142

SECTION?



ELEVATION - (FEET)

ELEVATION - (FEET)

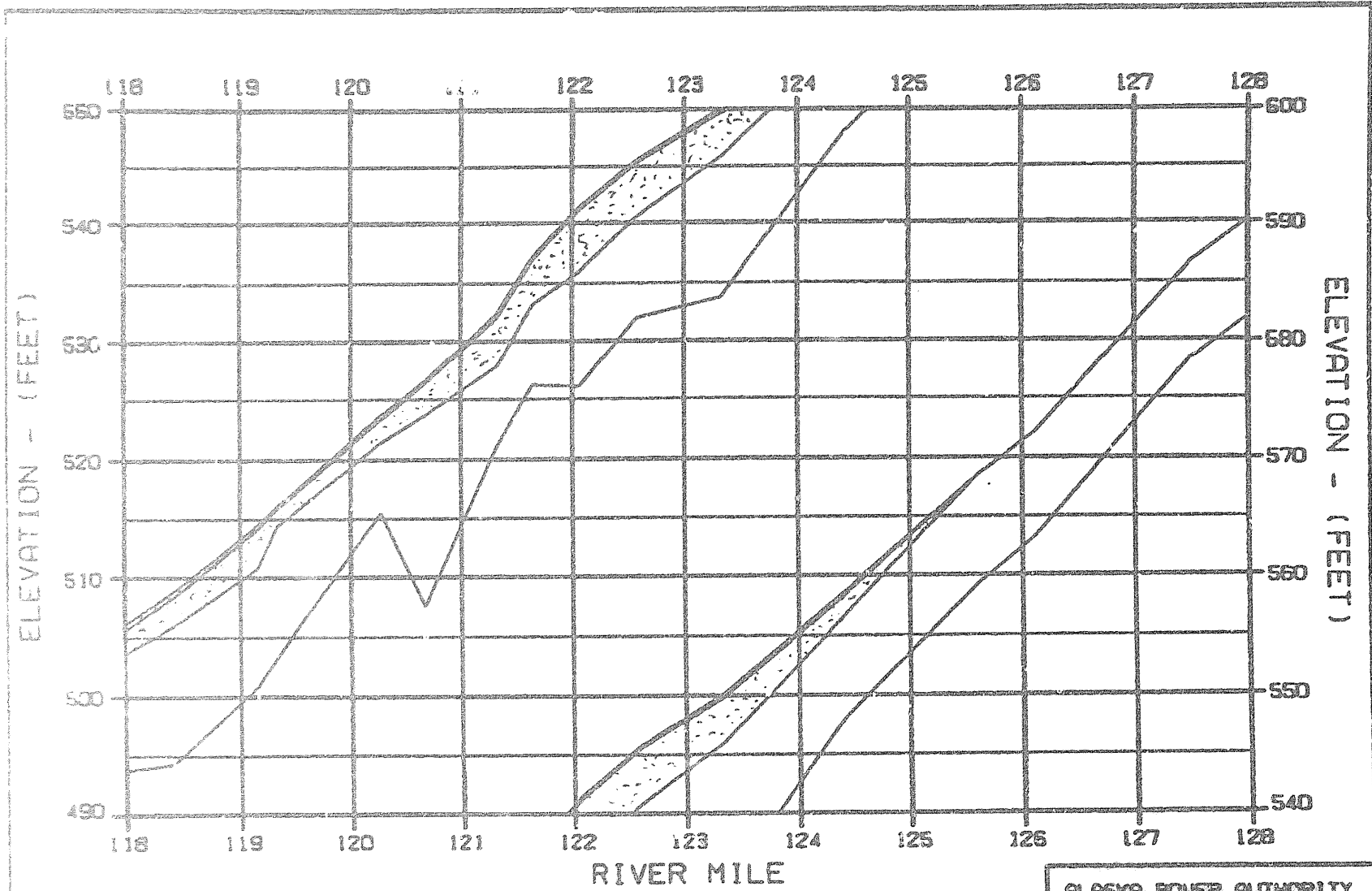
LEGEND:

- 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
 CASE C FLOWS INTAKE 1880. APPROACH 1860.
 REFERENCE RUN NO. : 8101C4D

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
CHGNO. 04000	17 JUN 82
1000.142	

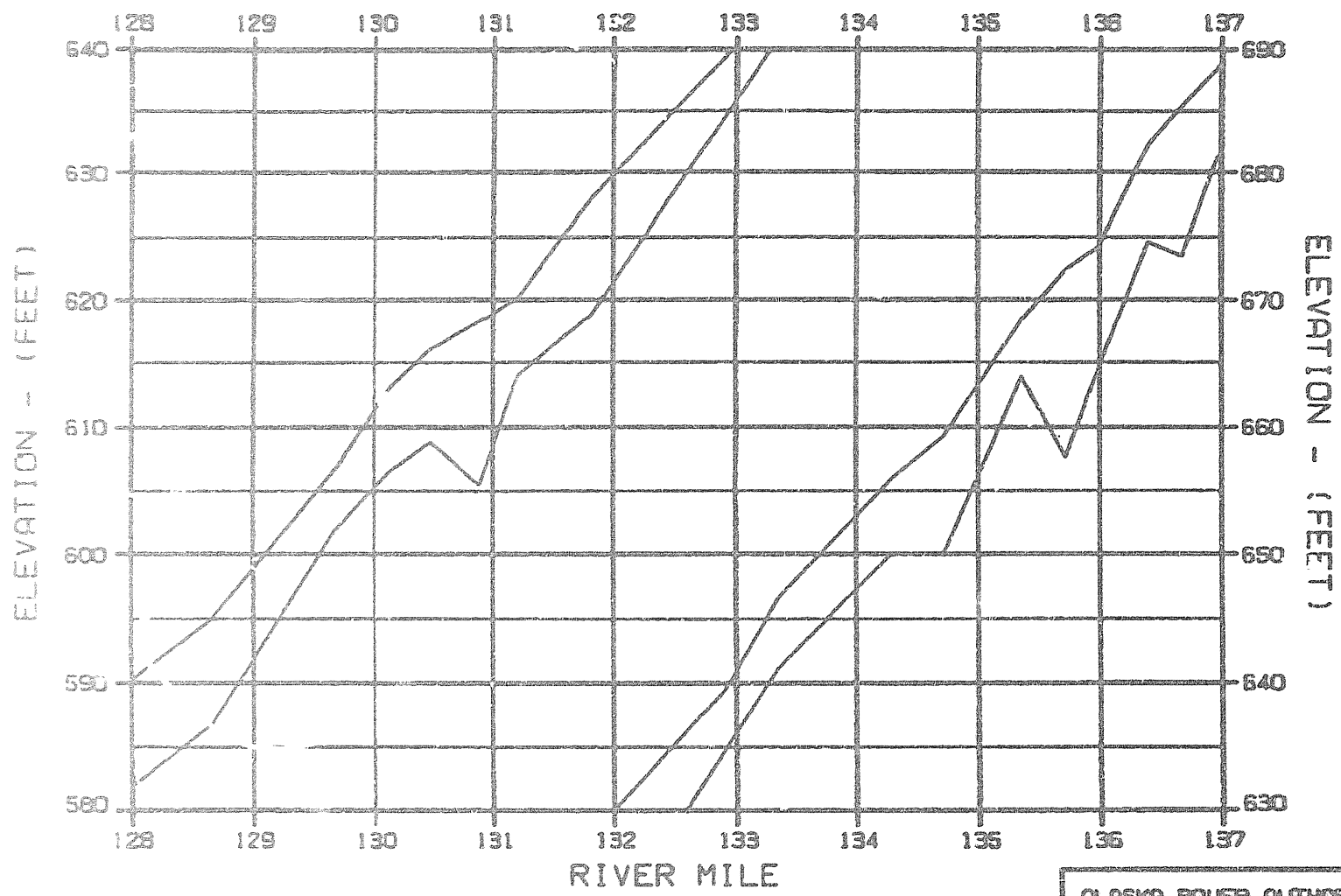
OPTION?



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 : MATANA 2001
 CASE C FLOWS INTAKE 1980, APPROACH 1990.
 REFERENCE RUN NO. : 8101C00

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HARZA-EDASCO JOINT VENTURE	
CHIEF ENGINEER	17 JAN 83
DESIGNER	1000142

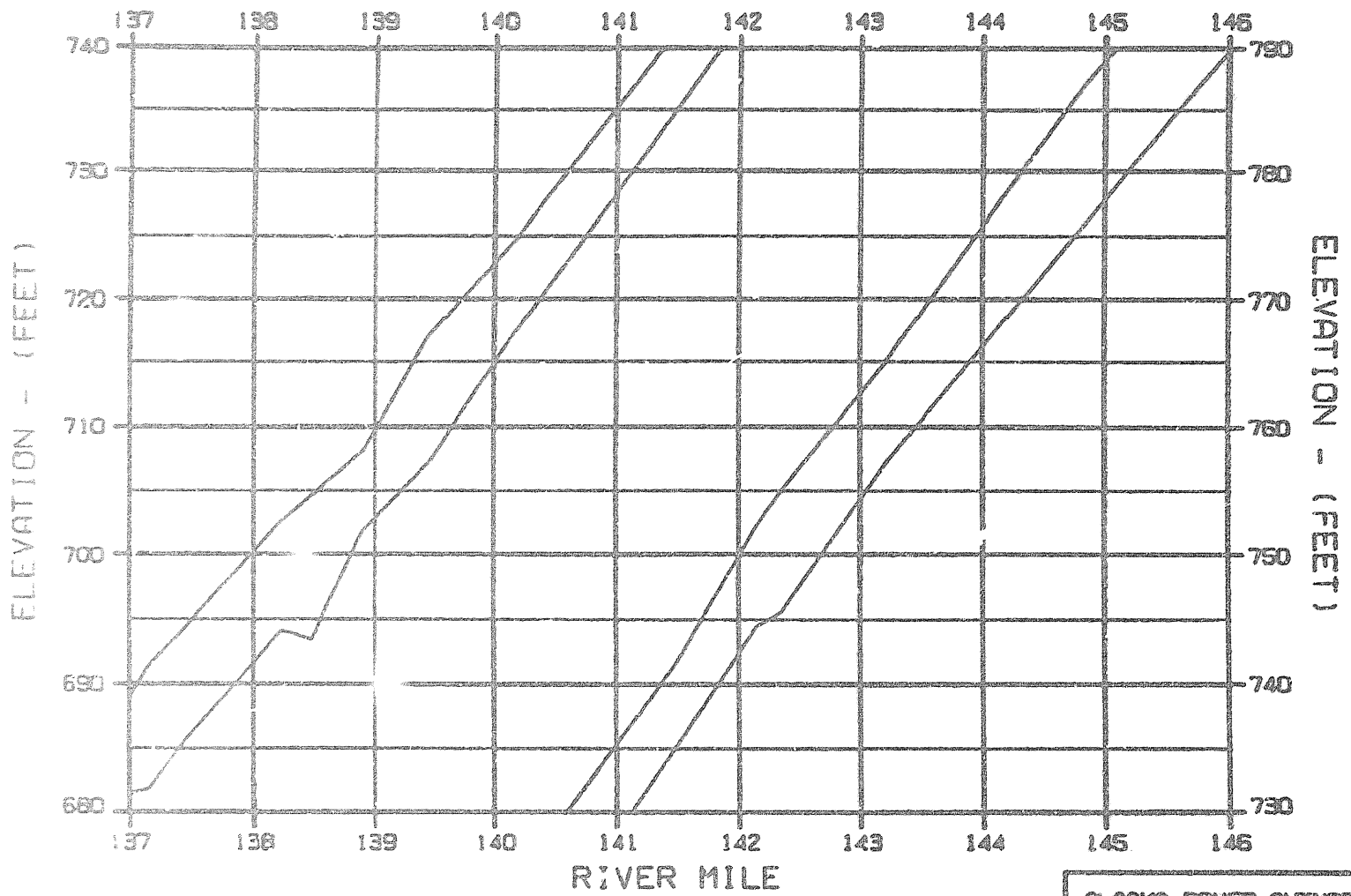


LEGEND:

- 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
 CASE C FLOWS INTAKE 1880. APPROACH 1860.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EDASCO JOINT VENTURE		
DATE: 01-10-82	BY: JWC	1000.142



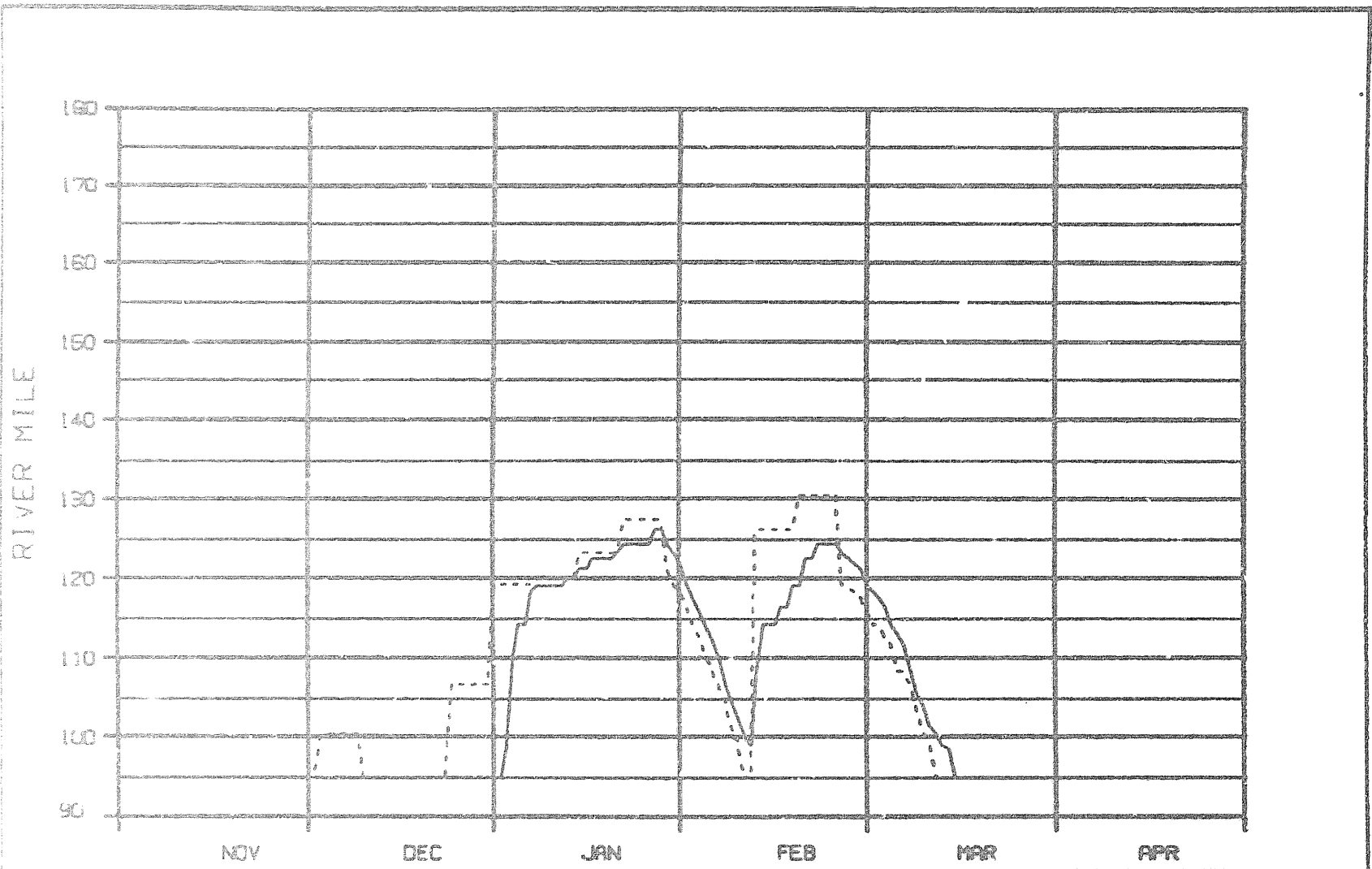
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1880.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBRACO JOINT VENTURE	
DATE: ALASKA 17 JUN 82	1880.148

SECTION?

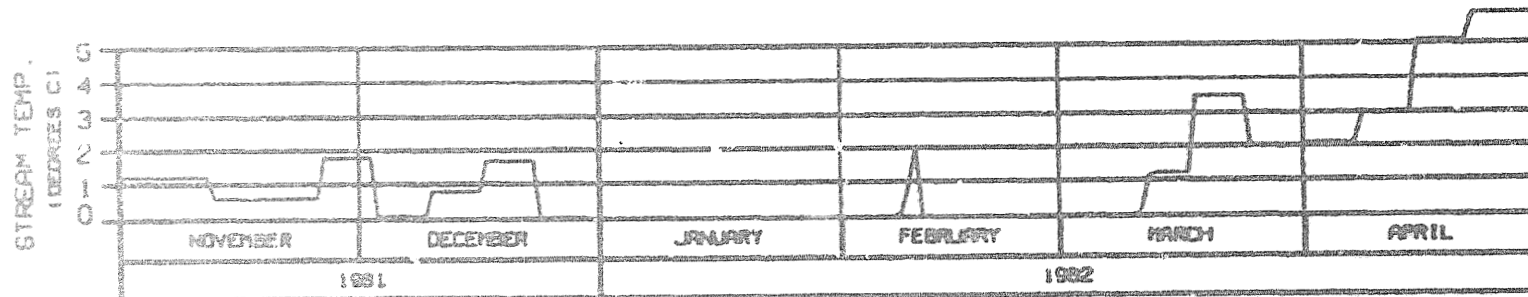
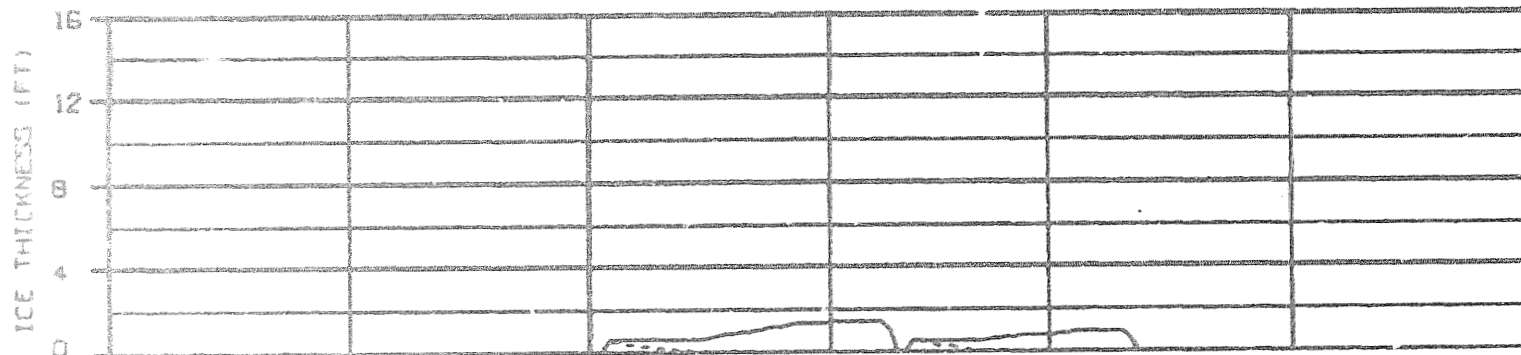
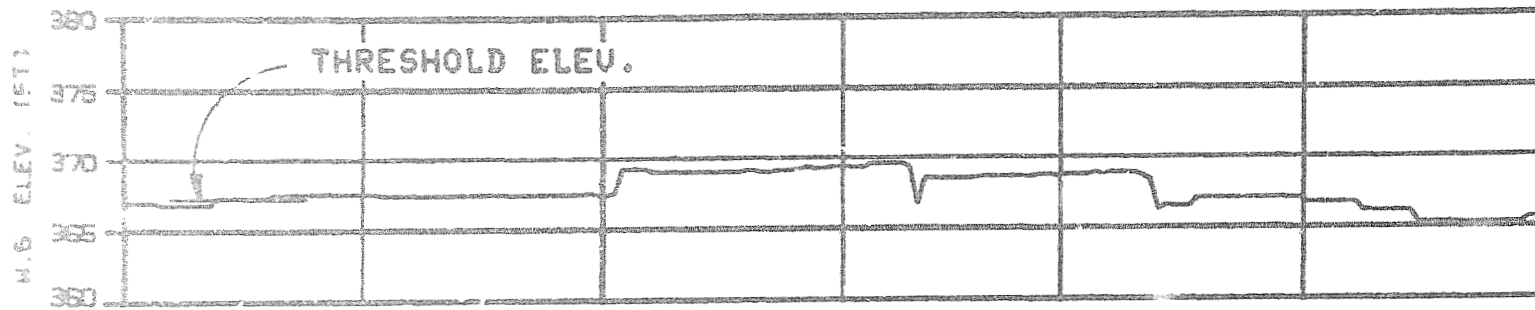


LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE C INTAKE 1880 APPROACH 1850.
 REFERENCE RLW NO. : 8101CXU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
PROGRESSION OF ICE FRONT	
& ZERO DEGREE ISOTHERM	
NARZA-EBASCO JOINT VENTURE	
CREATED - REVISED	BY JAN 82 1880.142



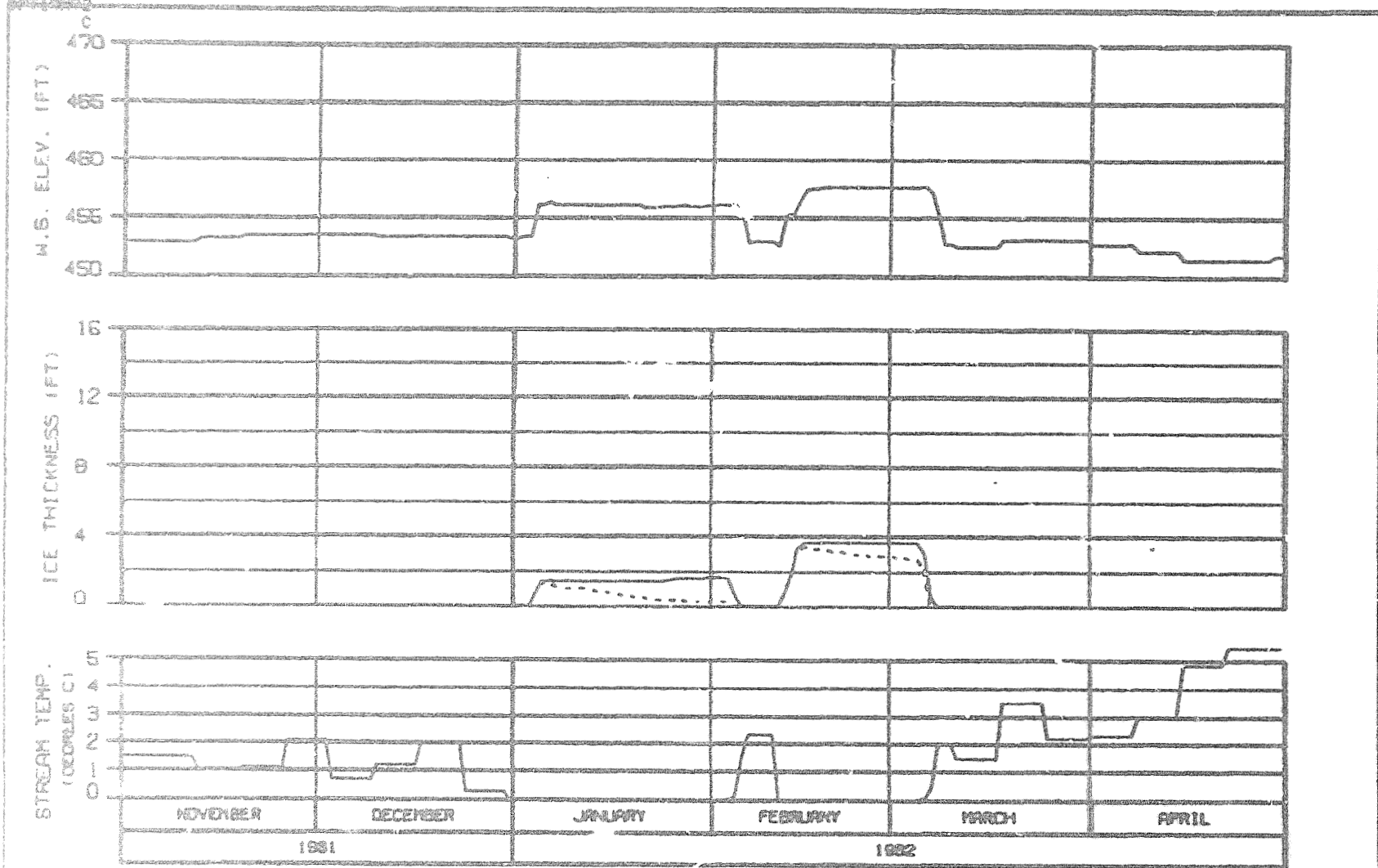
HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
CHGNO. 01000	17 JAN 92
	1800-142

OPTION 1

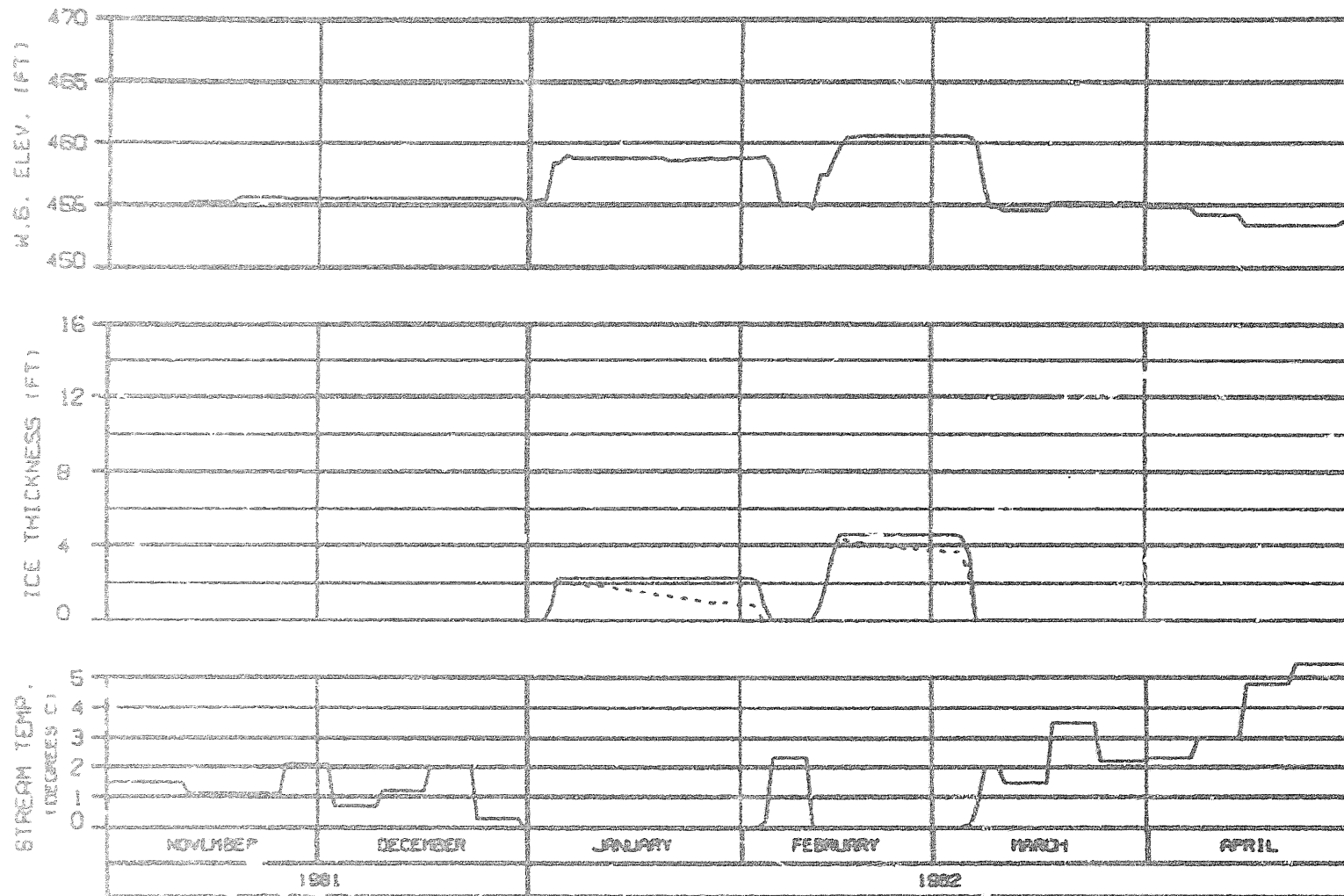


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850, APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBERSON JOINT VENTURE	
DOC NO. 8101CX0	REV. 01
1982.142	

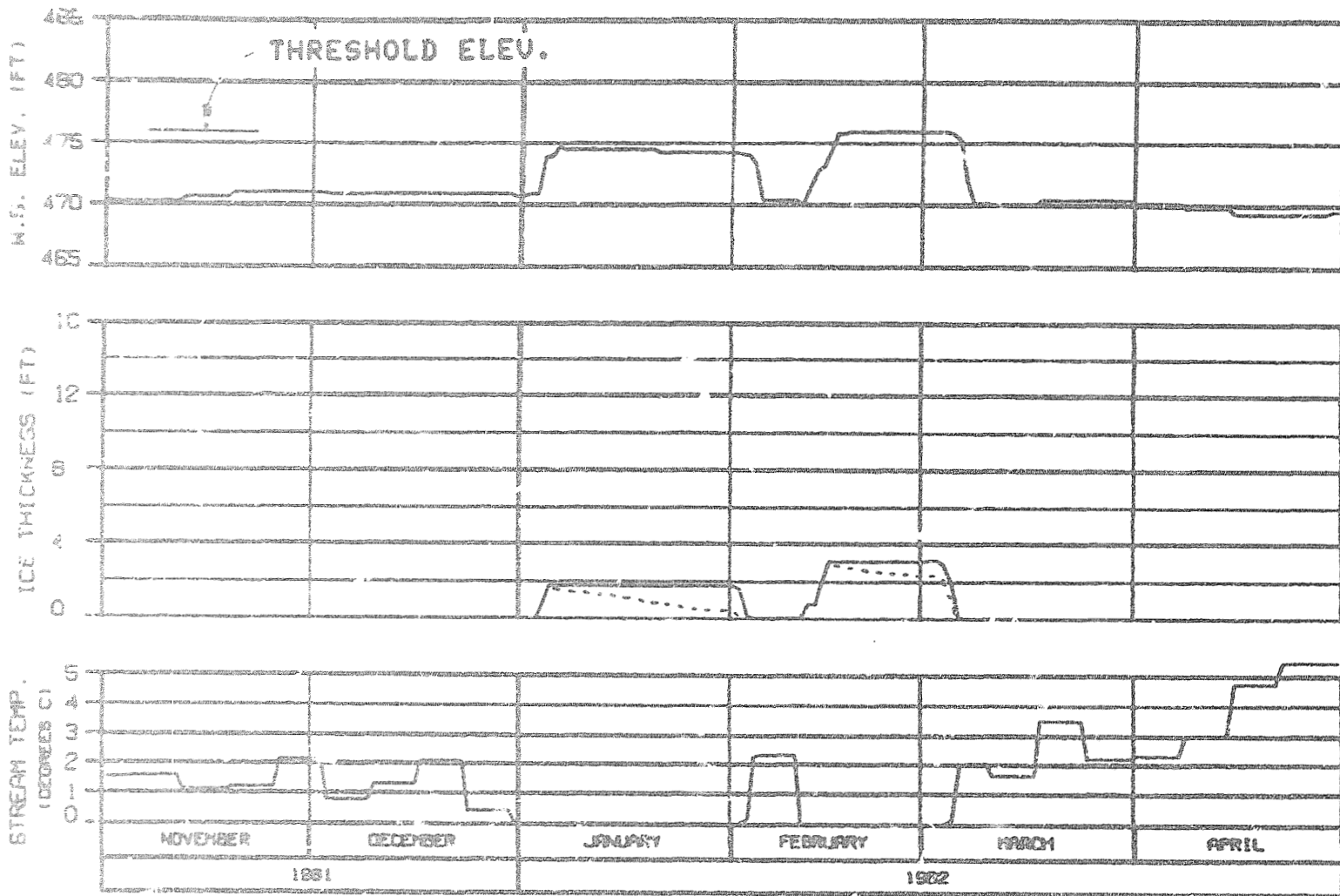


MOUTH OF SLOUGH 6A
 P. 112.34

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

PERIOD : 1 NOV 81 - APR 82
 AND : WATANK
 AS INTAKE
 REFERENCE RUN NO. 1 8101

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARSA-ERASSO JOINT VENTURE	
ORDER: 84-000	BY: JWC
SHEET 142	

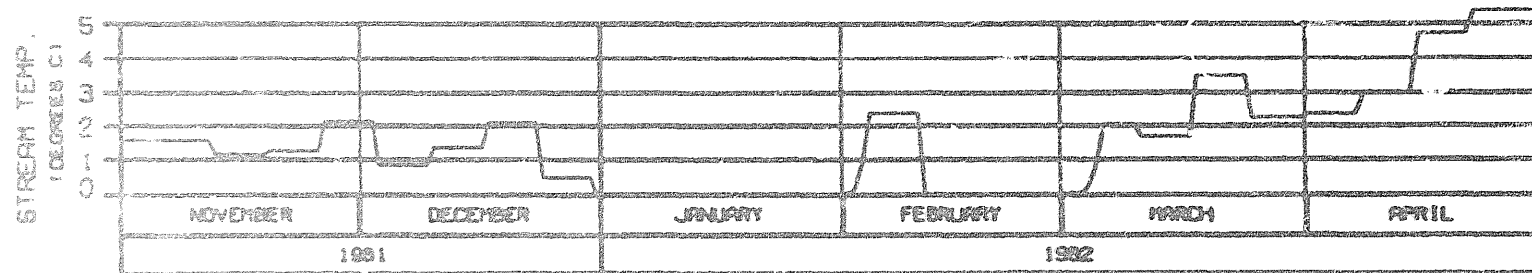
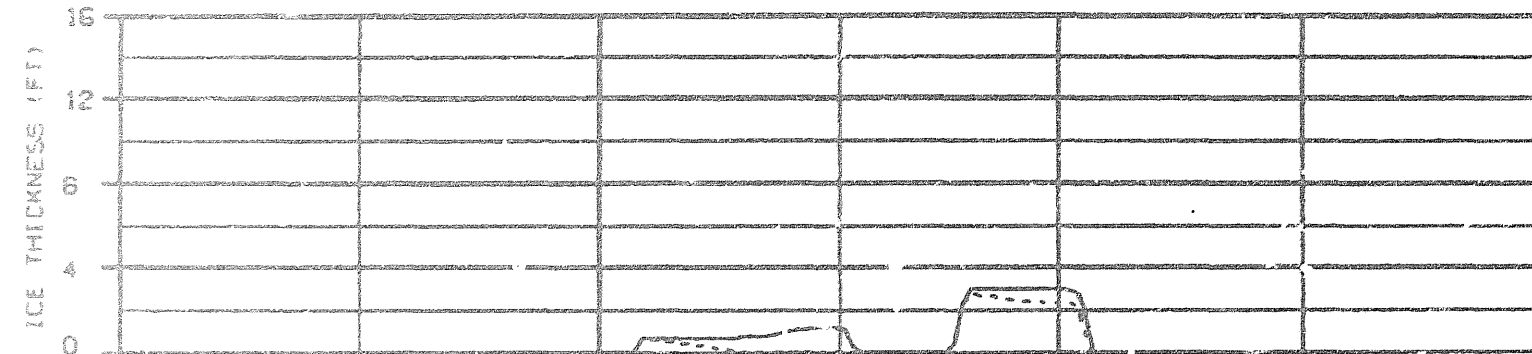
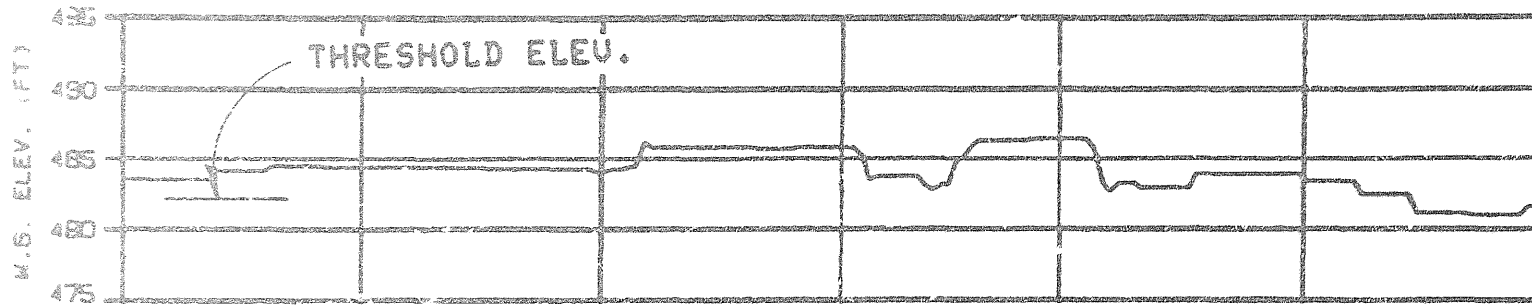


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HANZA-EBRACCO JOINT VENTURE	
DESIGNED BY: J. J. ...	DATE: 1982.148

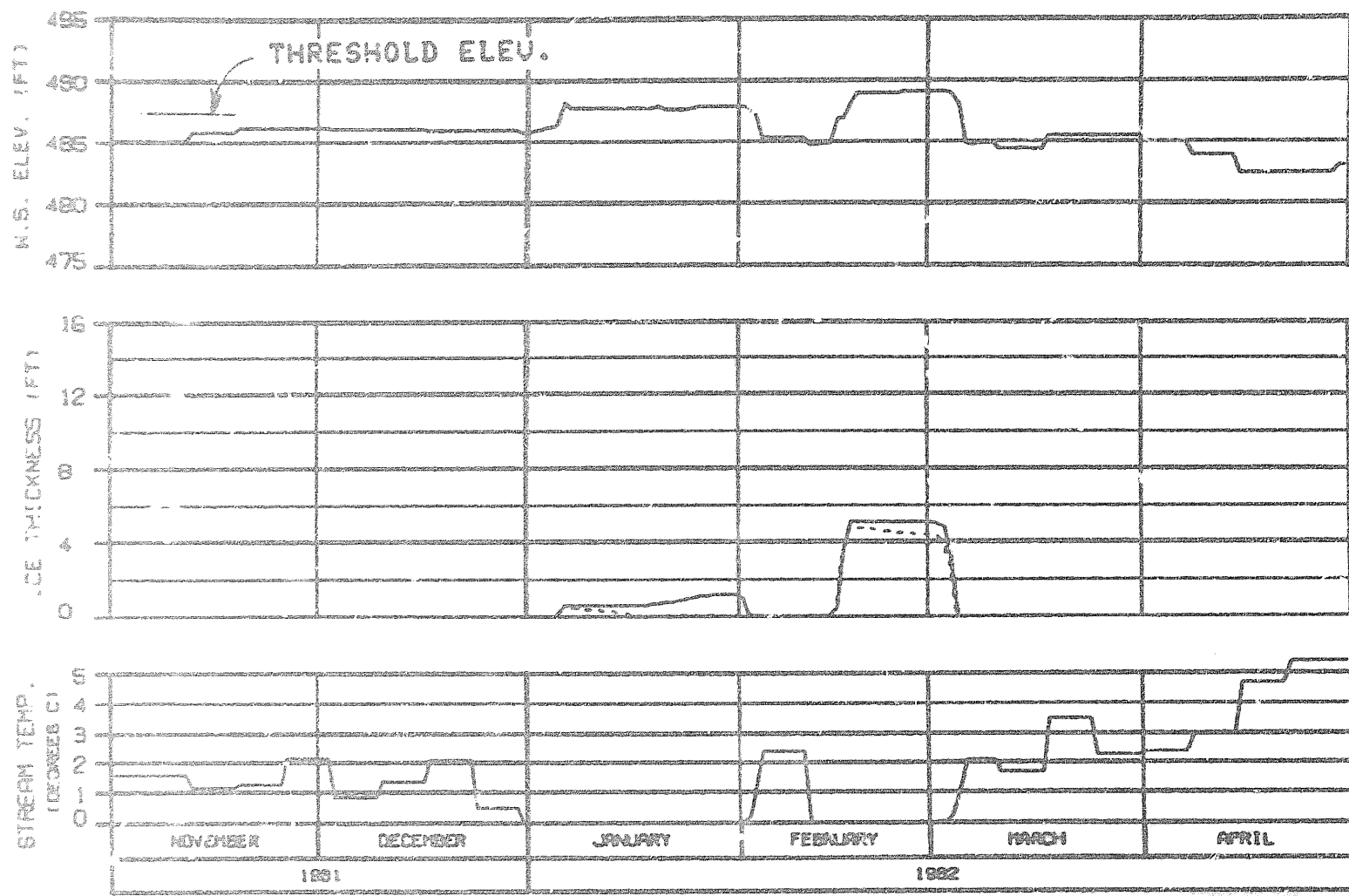


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : NATANA 200!
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 3101CXD

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRARD JOINT VENTURE	
DATE: 11/20/91	FILE: 1850.ICE

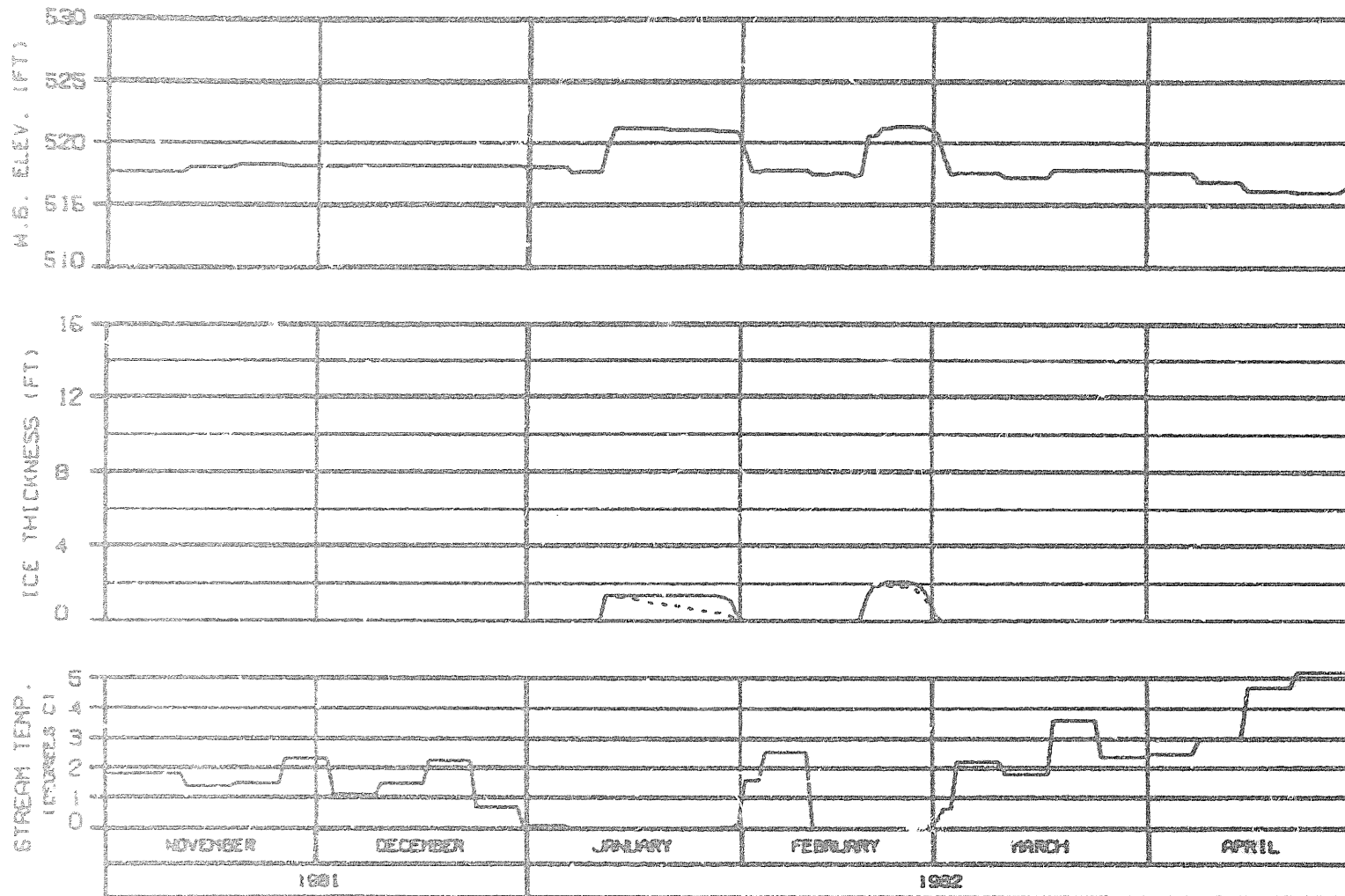


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - BULGE COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 01/28/82	BY: JWS/82
1982:148	

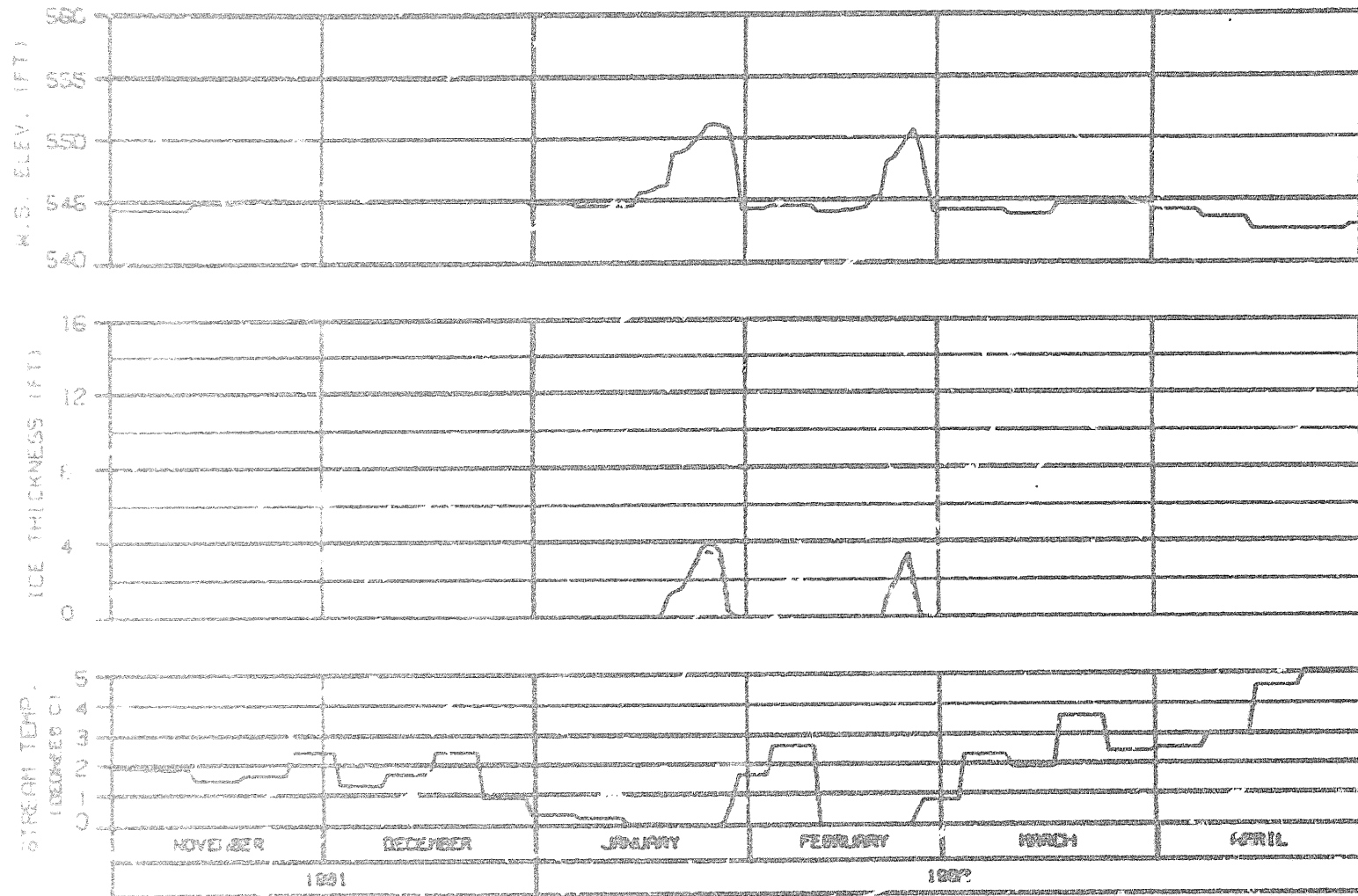


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HYDRA-EBASCO JOINT VENTURE	
WORKSHEET NO. 11	1008.142

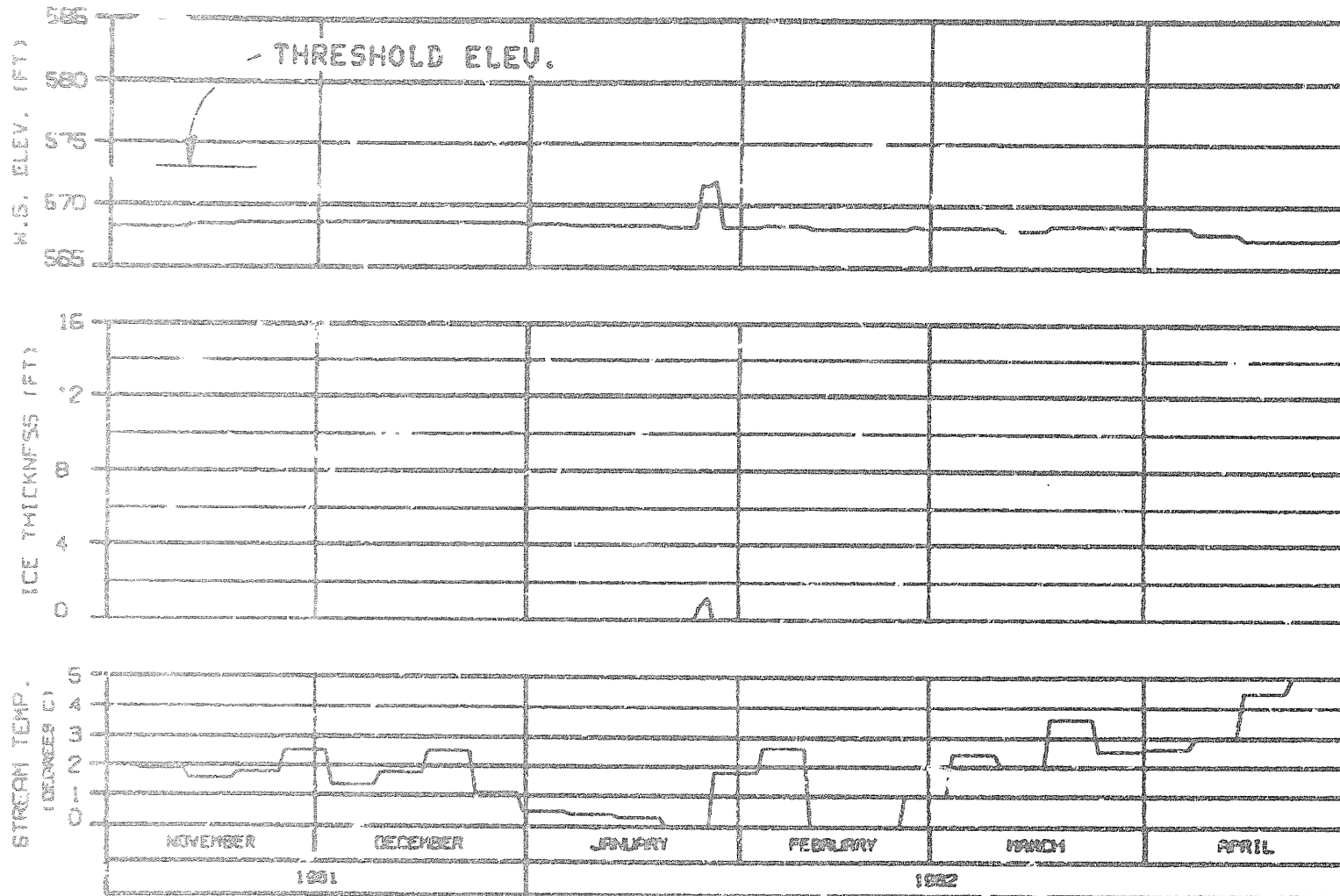


ICE THICKNESS (FT):
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF MOUSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS : INTAKE 1850, APPROACH 1850.
 REFERENCE FILM NO. : B101CX0

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRACO JOINT VENTURE	
DATE: 04.08.82 17.00.82	080.142



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 C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

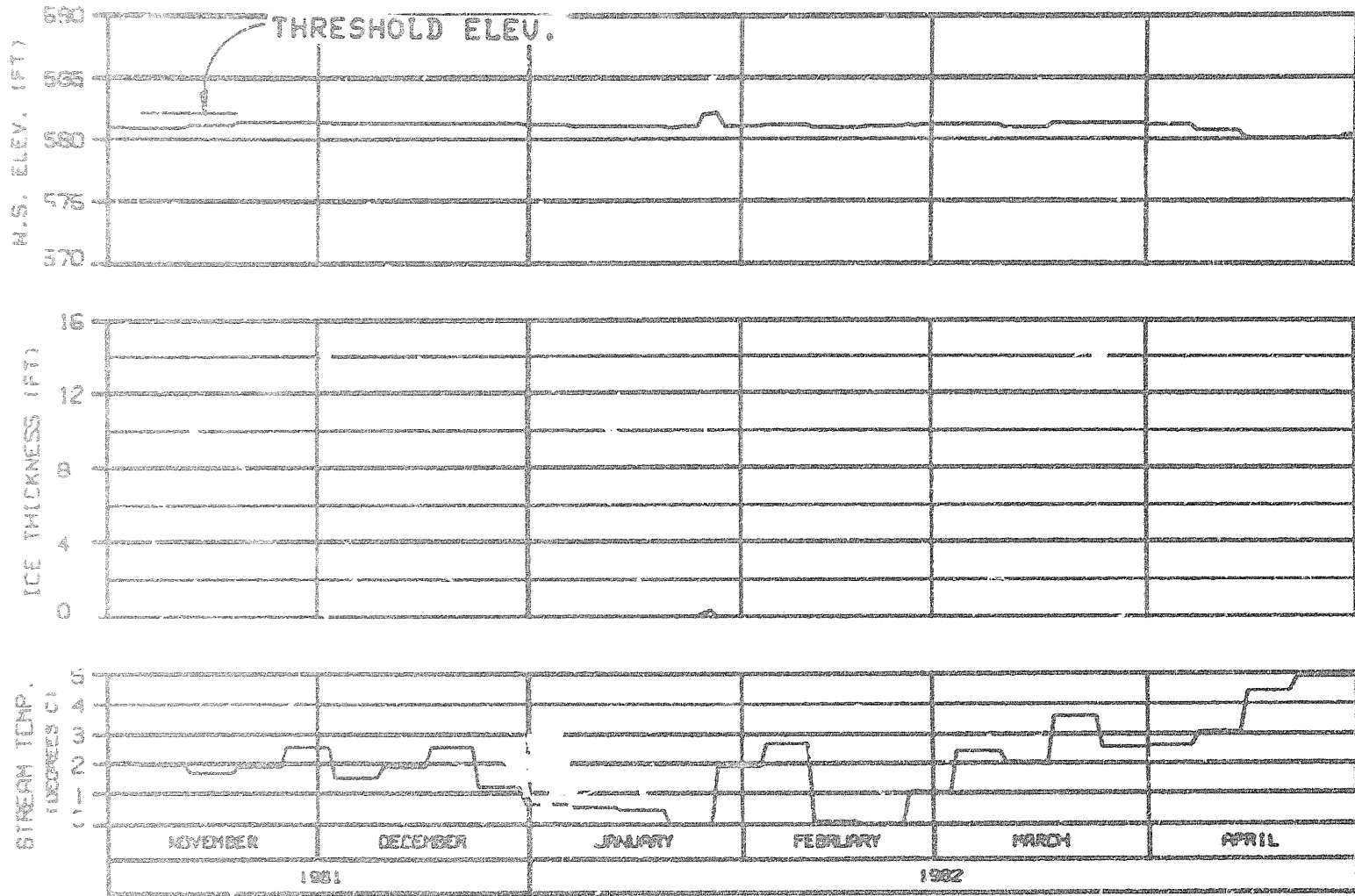
ALASKA POWER AUTHORITY

SUSTINA PROJECT

SUSTINA RIVER
 ICE SIMULATION
 TIME HISTORY

WATANA-EBASCO JOINT VENTURE

CHARGE: 8101CX0 07 APR 82 1850. XG

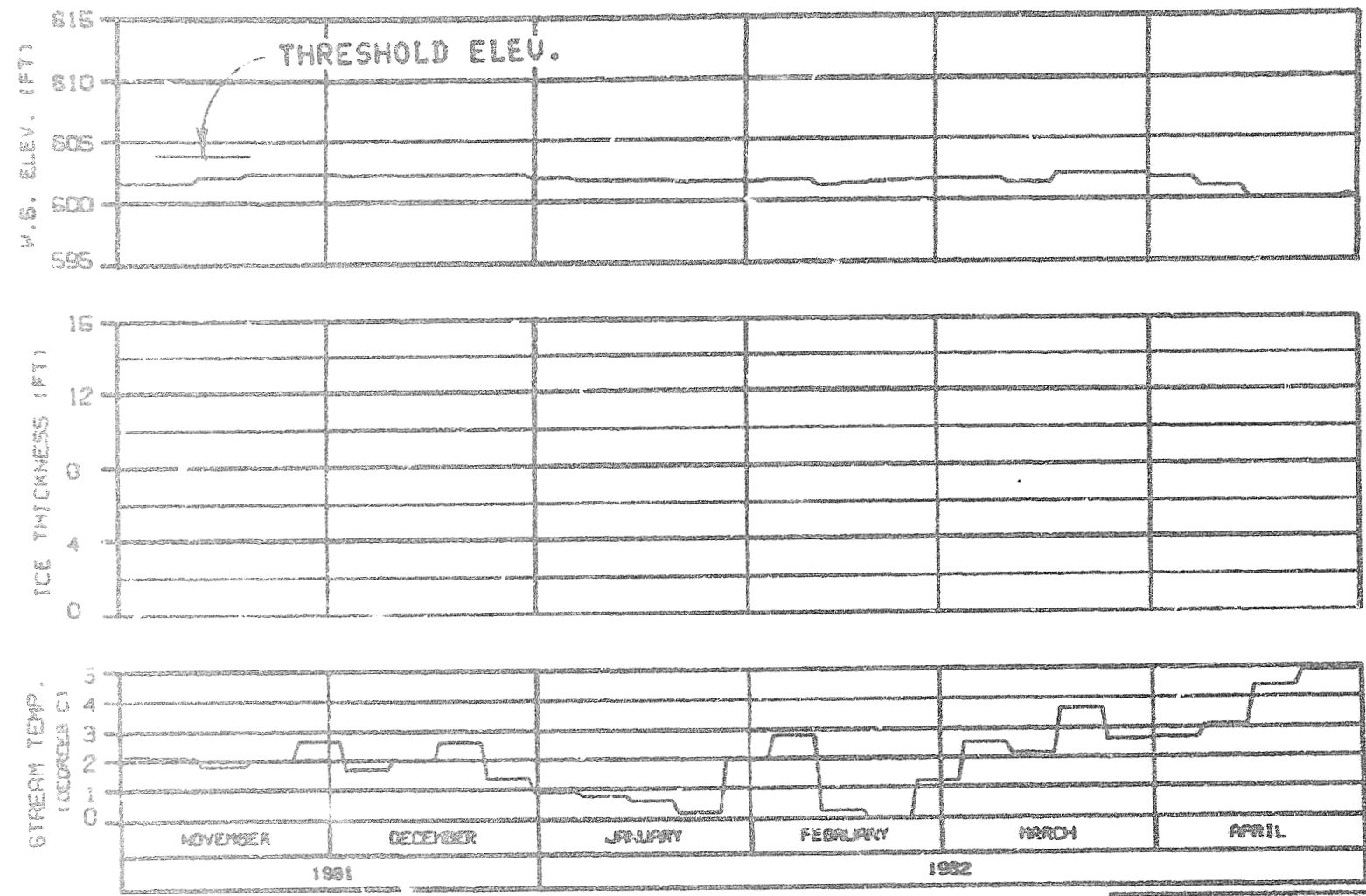


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 81D1CX0

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
REVISED - 04/20/82	BY: JPM/ED
1982.142	



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

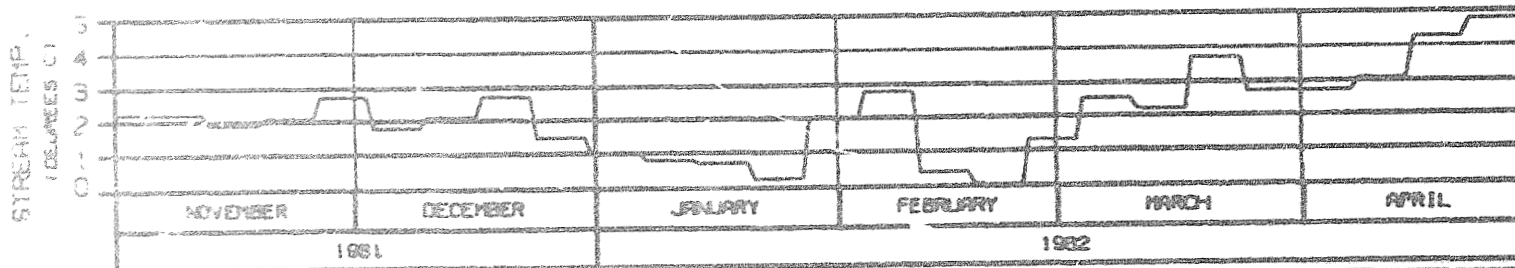
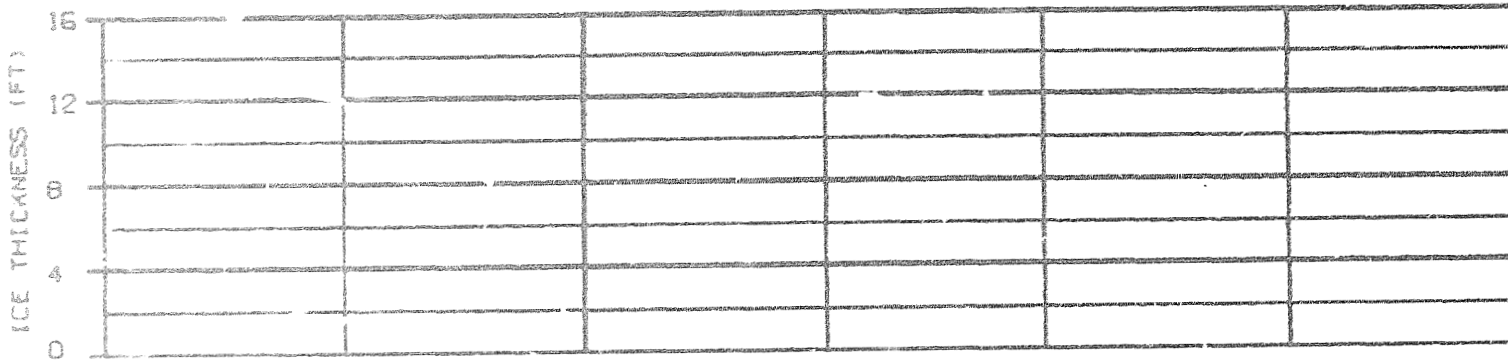
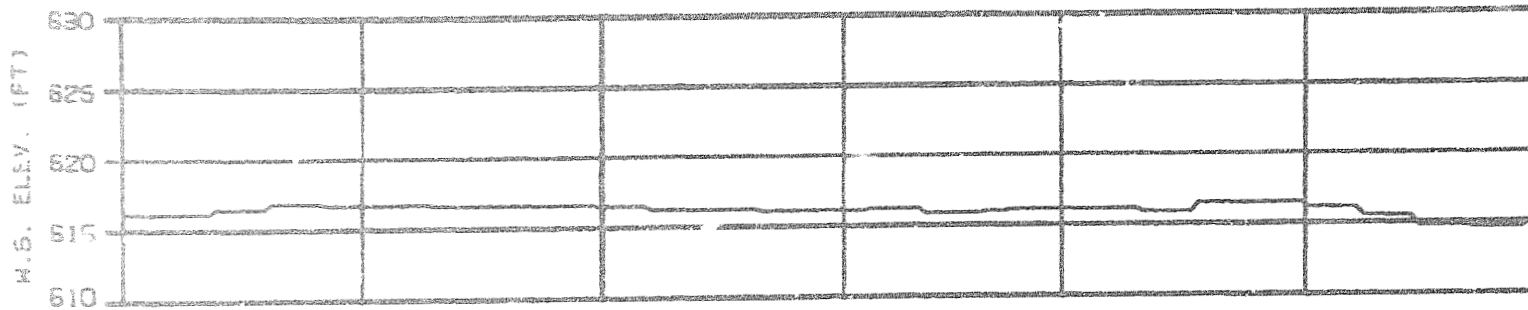
ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1890. APPROACH 1850.
 REFERENCE RUN NO. : 810100

ALASKA POWER AUTHORITY	
SUBMITTA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBAGOO JOINT VENTURE	
ISSUED: 04/01/92 BY: JPC/CR	1850.142

OPTION?

OPTIOM?

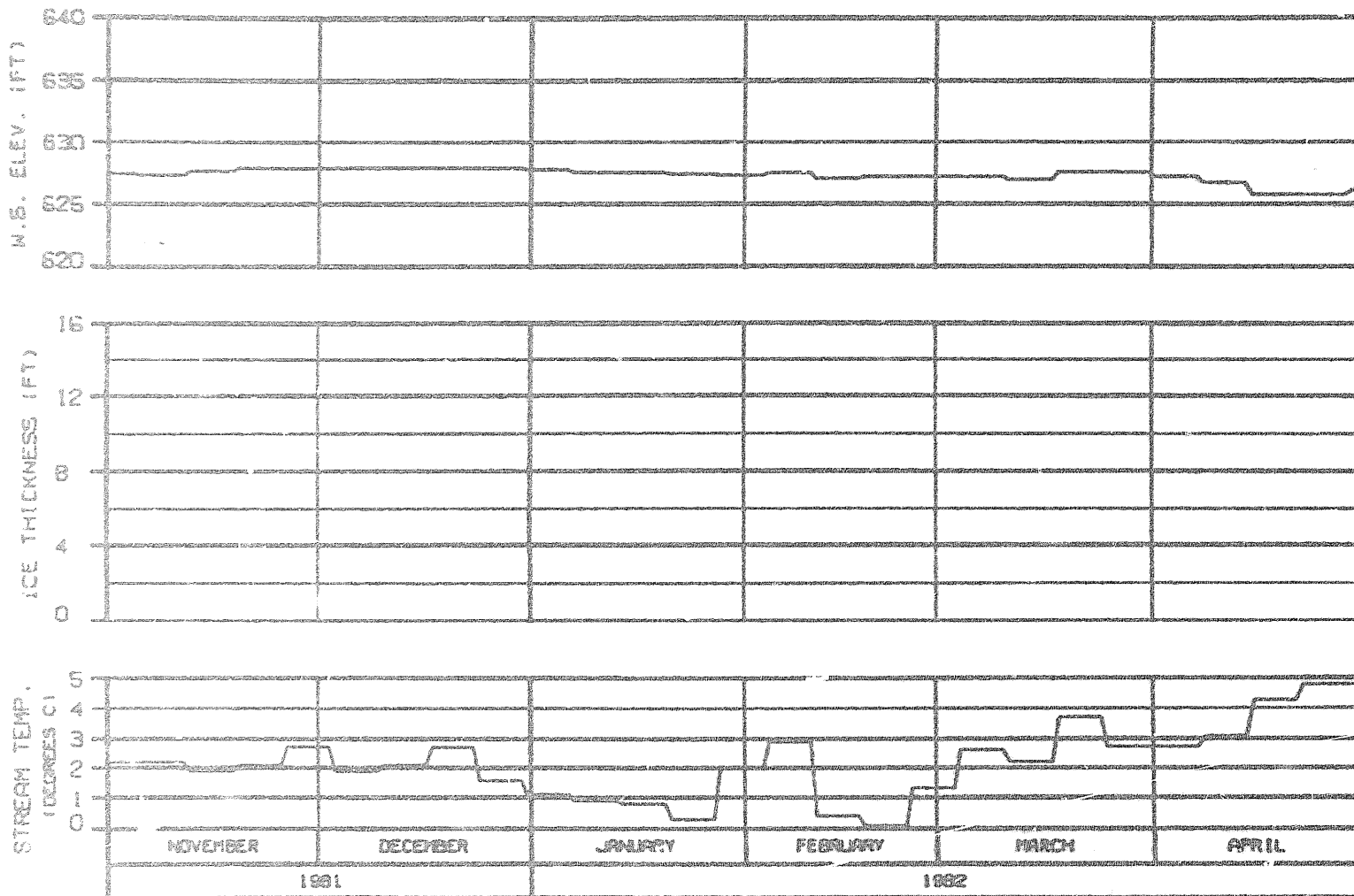


SIDE CHANNEL U/S OF SLOUGH 9
 RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8:01CXD

ALASKA POWER AUTHORITY	
GLINA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 17 JUN 82	1088-142

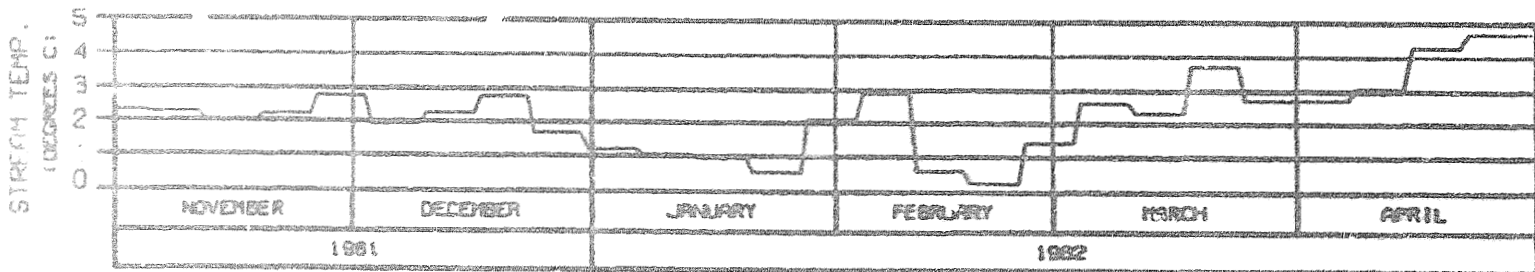
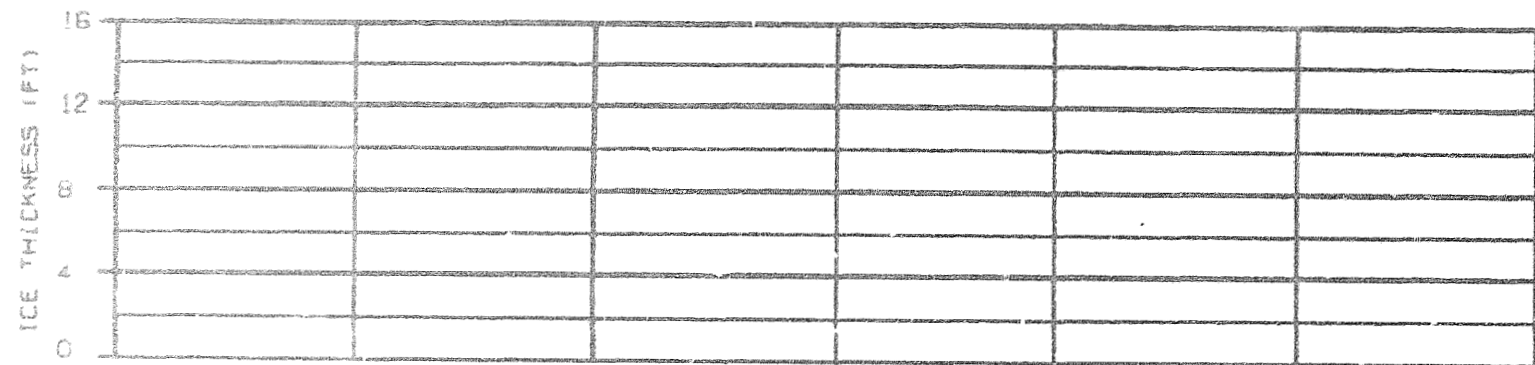
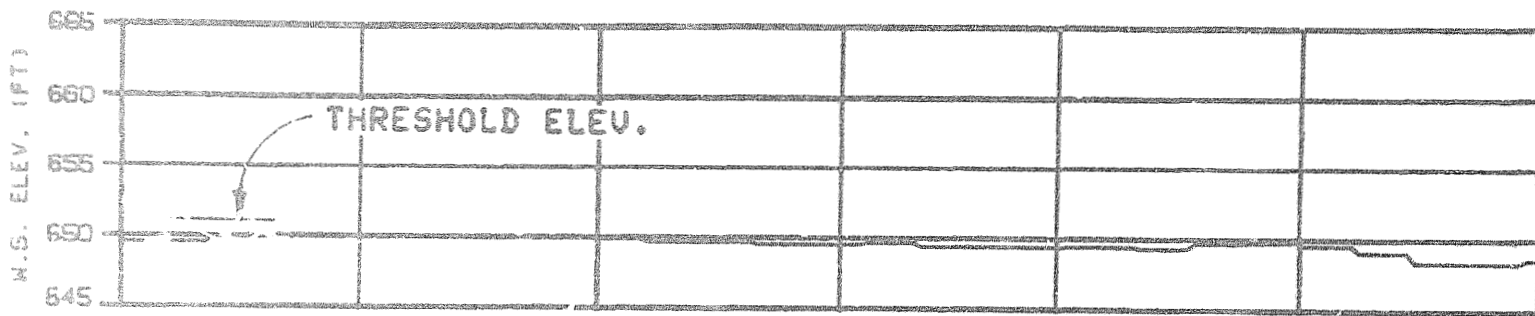


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1850, APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HWRA-EBASCO JOINT VENTURE	
DATE: 04/08/82 07:00 AM	1850-182

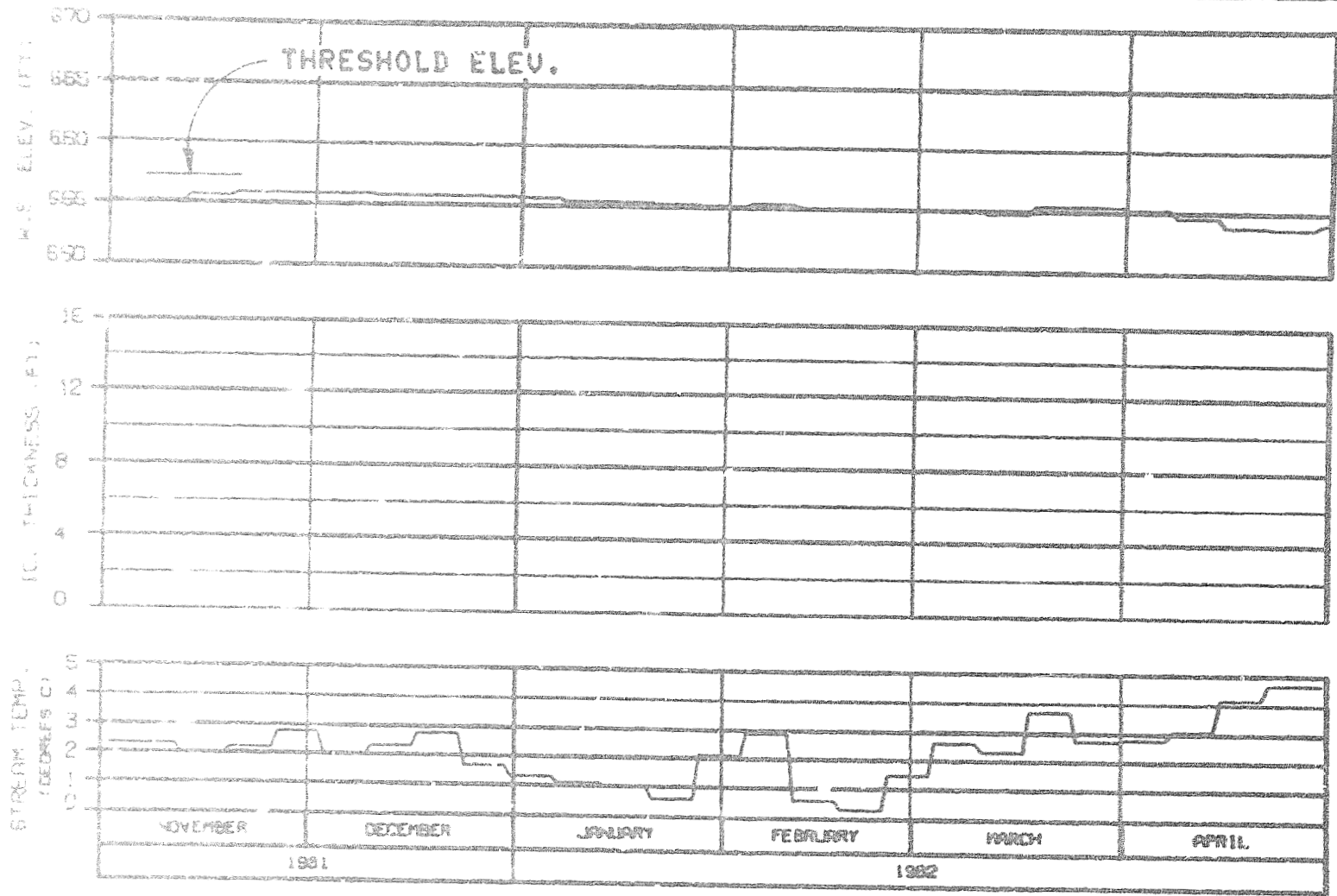


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1880, APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBRECO JOINT VENTURE	
ENGINEER: R.L. HARRIS	17 APR 82
	1880.142

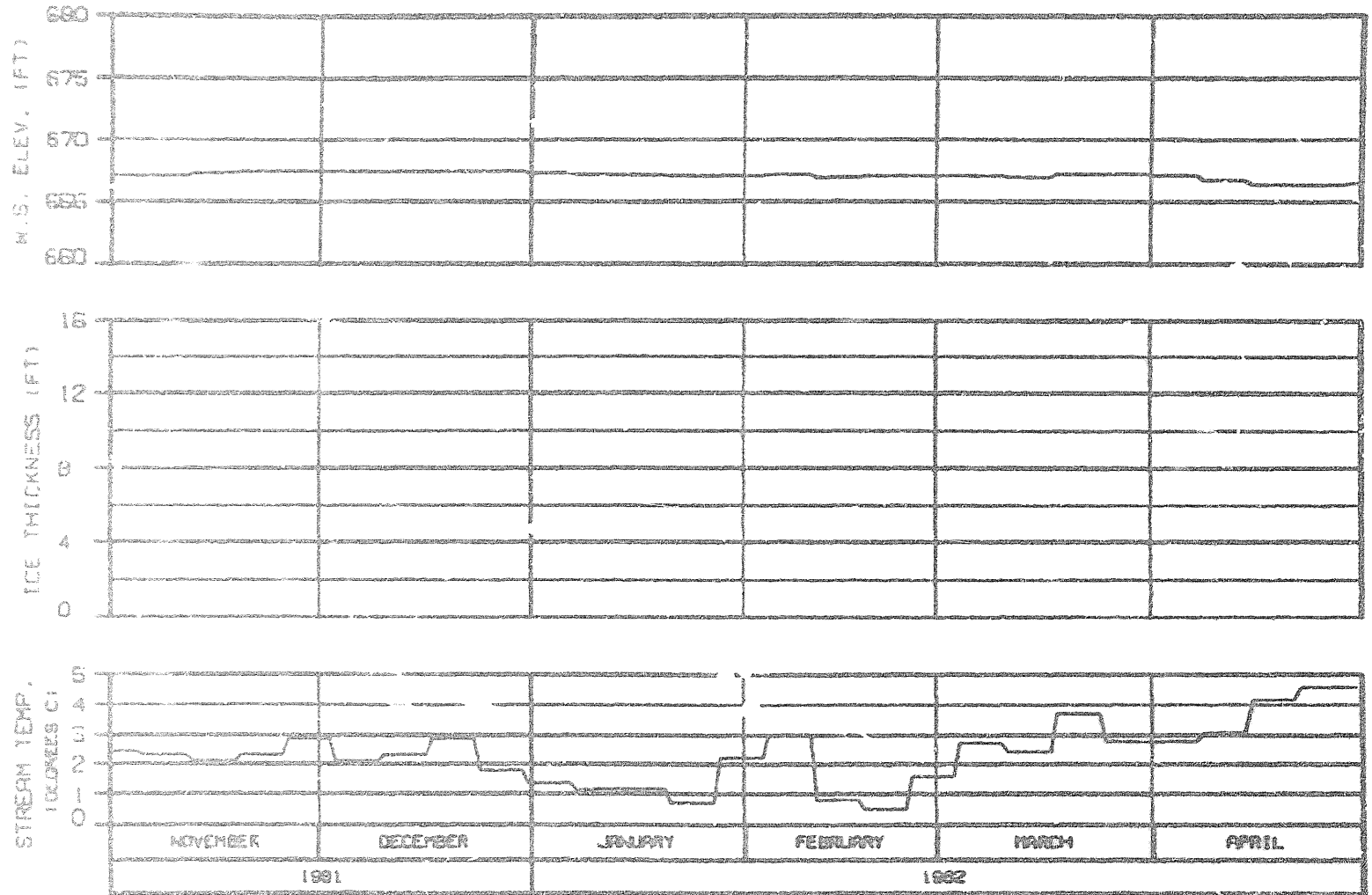


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - BULWARK COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1890. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGN: GARDNER	17 JAN 82
SUS. 142	

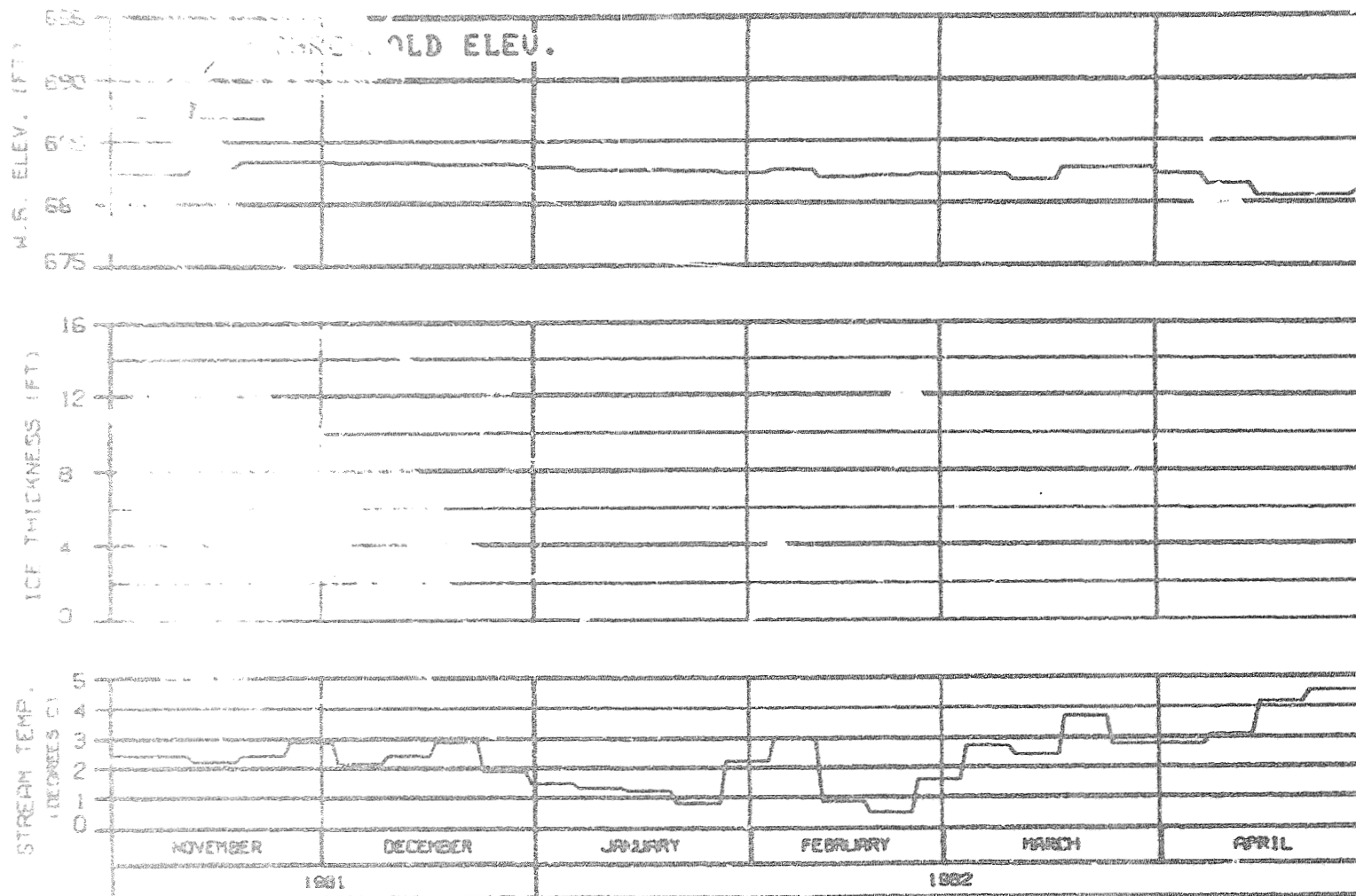


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880, APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHGNO - 81.08.83	77 JAN 82
100.142	

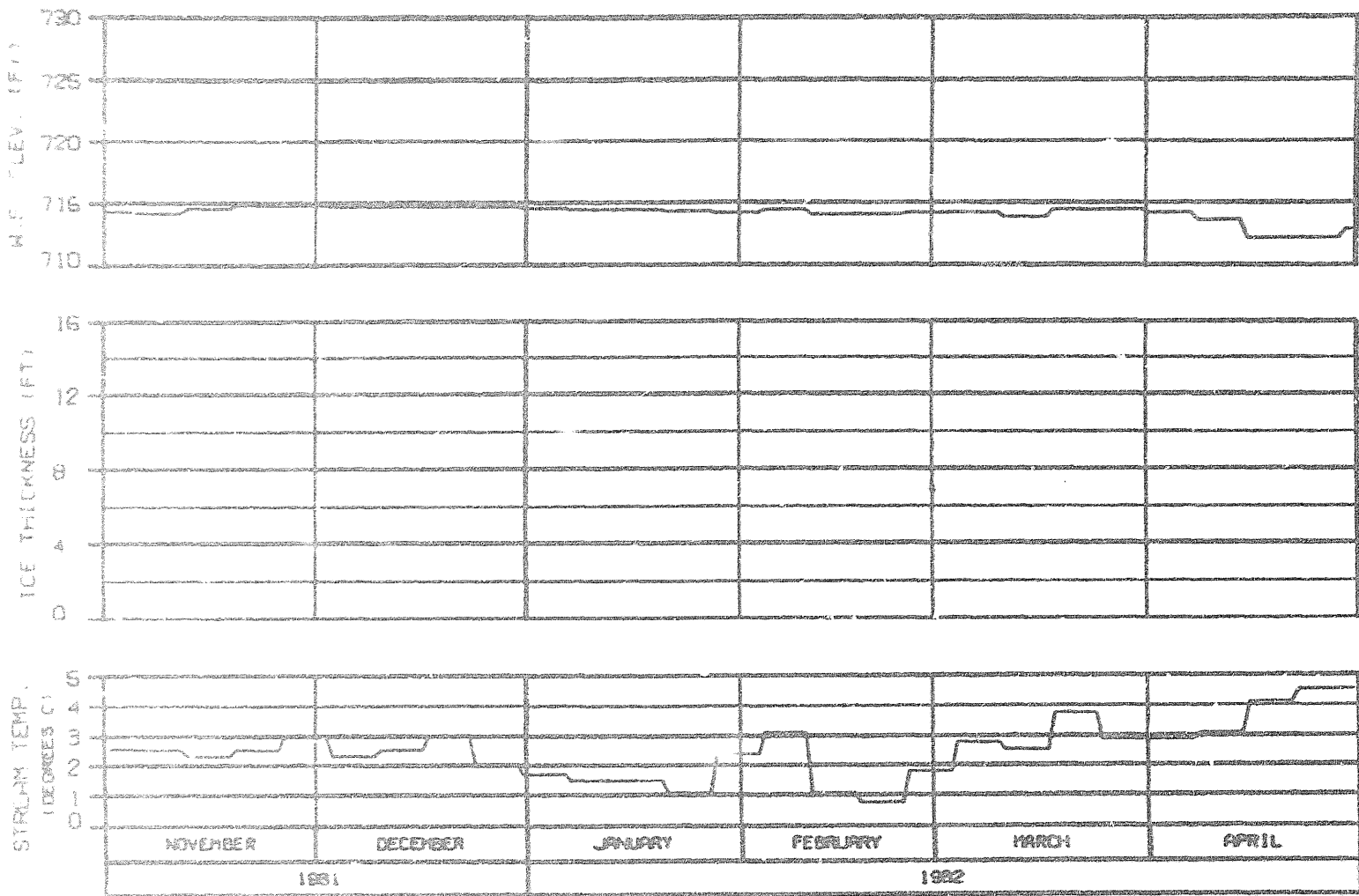


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAPAC-EBASCO JOINT VENTURE	
DESIGN: 8101CX0 27 JAN 82	ISSUE: 042

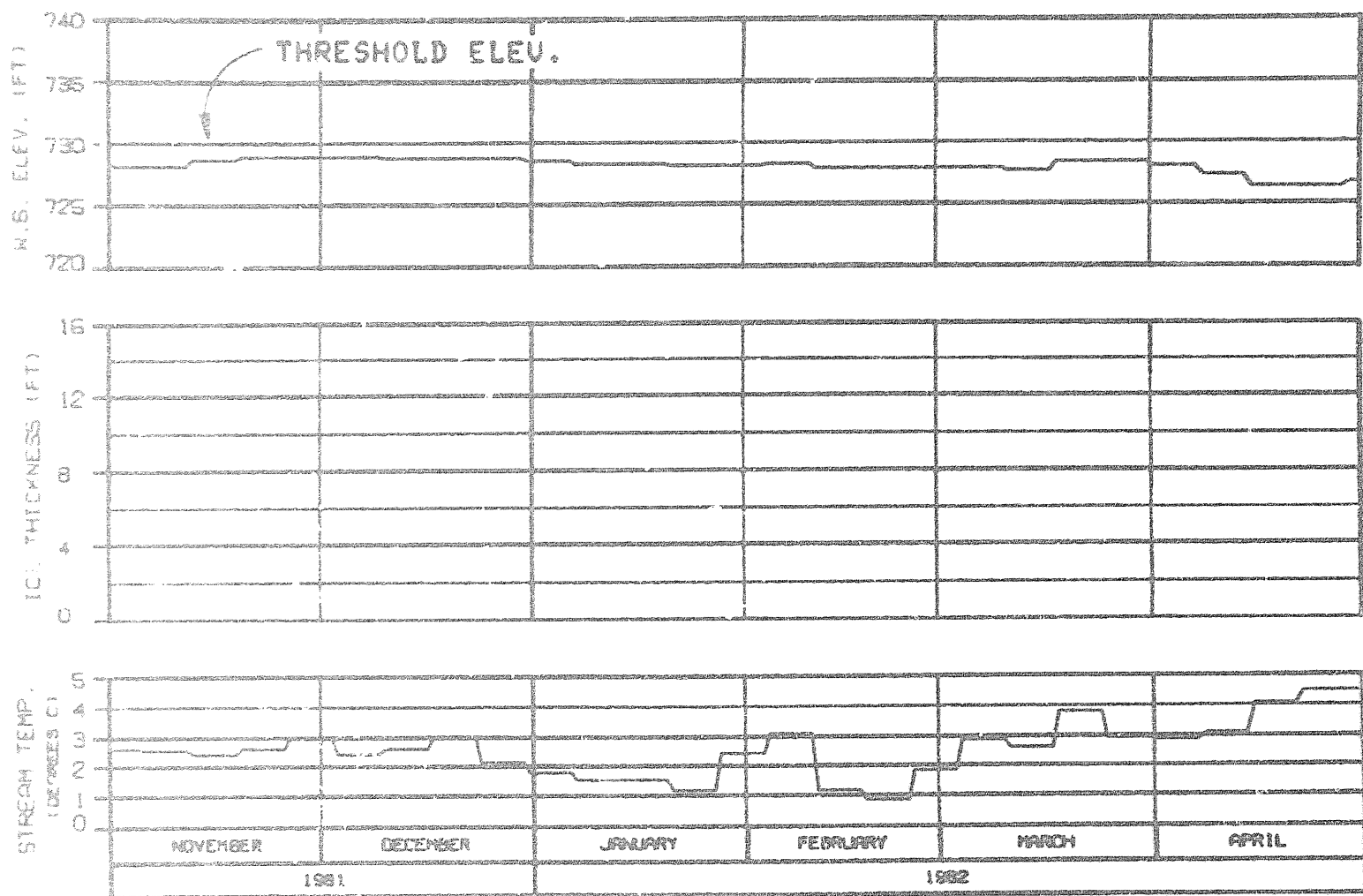


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ENRICO JOINT VENTURE	
ORDER - 111,000	17 JAN 82
PAGE 142	

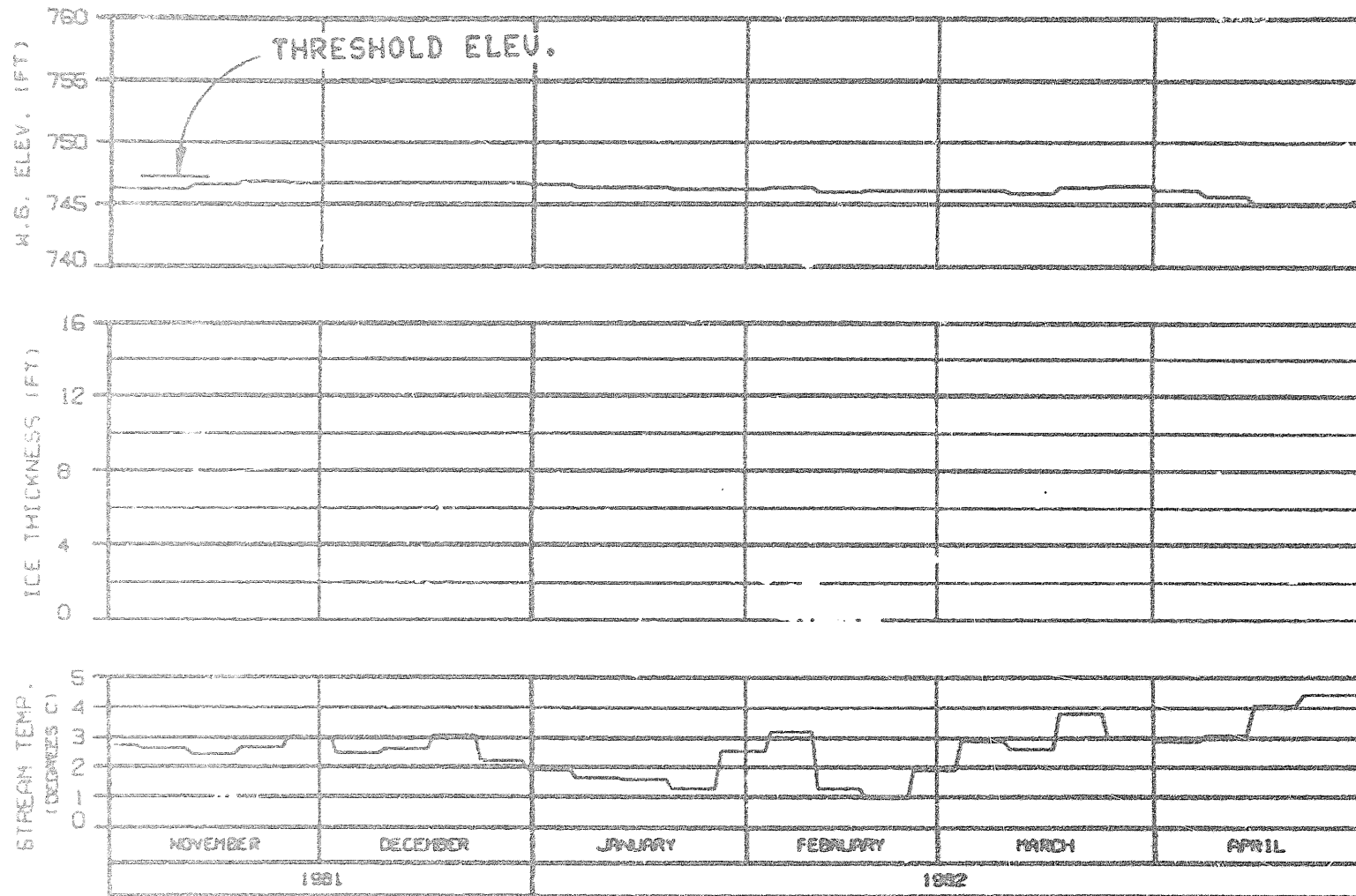


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1950, APPROACH 1950.
 REFERENCE RUN NO. : 8101CX0

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: [signature]	1993.143



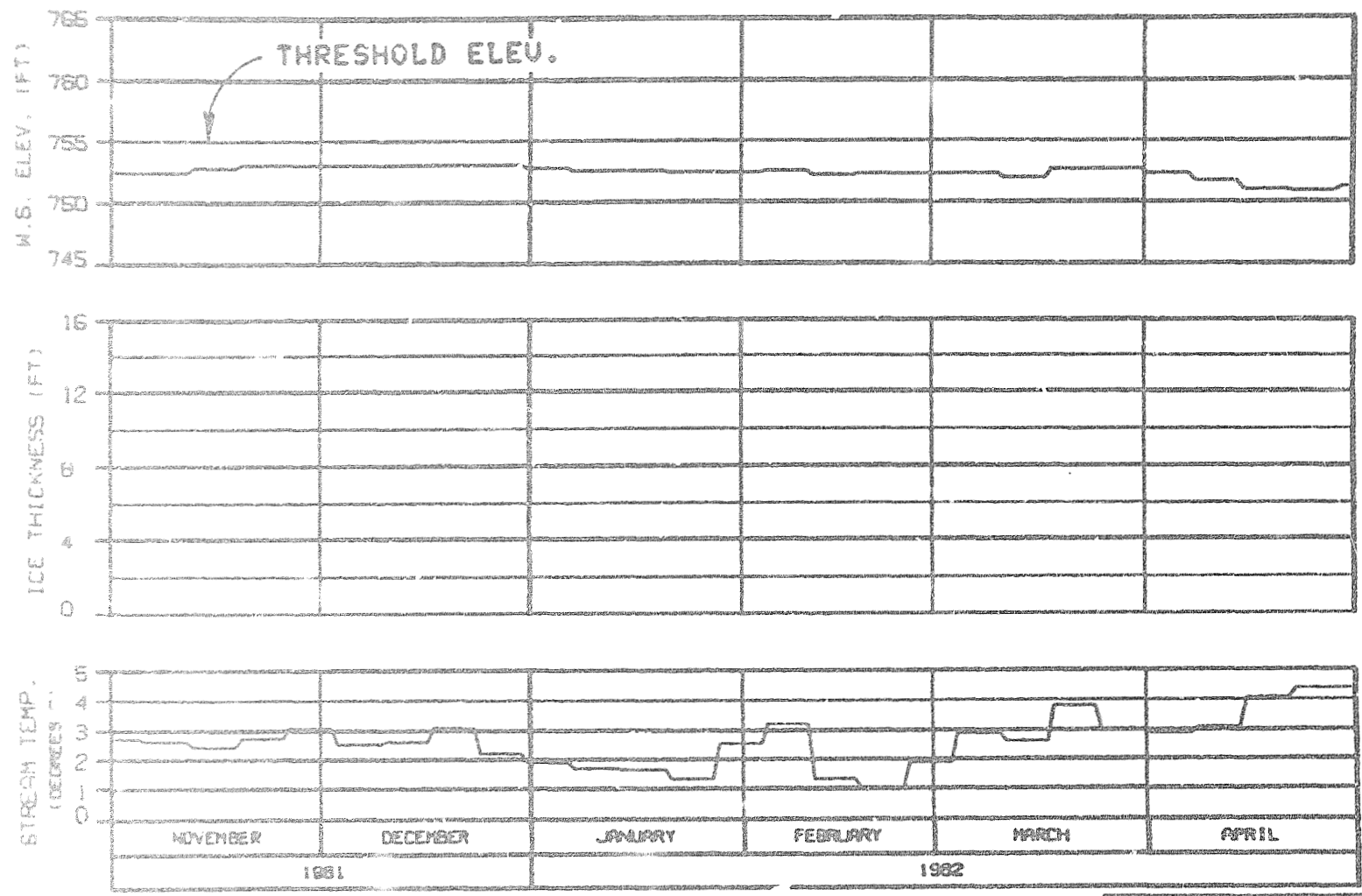
SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

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

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARPA-EBASCO JOINT VENTURE	
DATE: 01/28/82	12:00:00
1850.142	

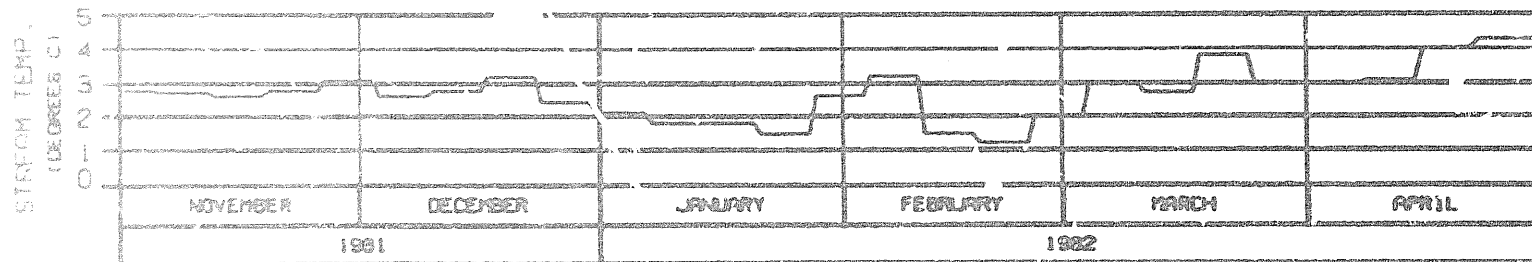
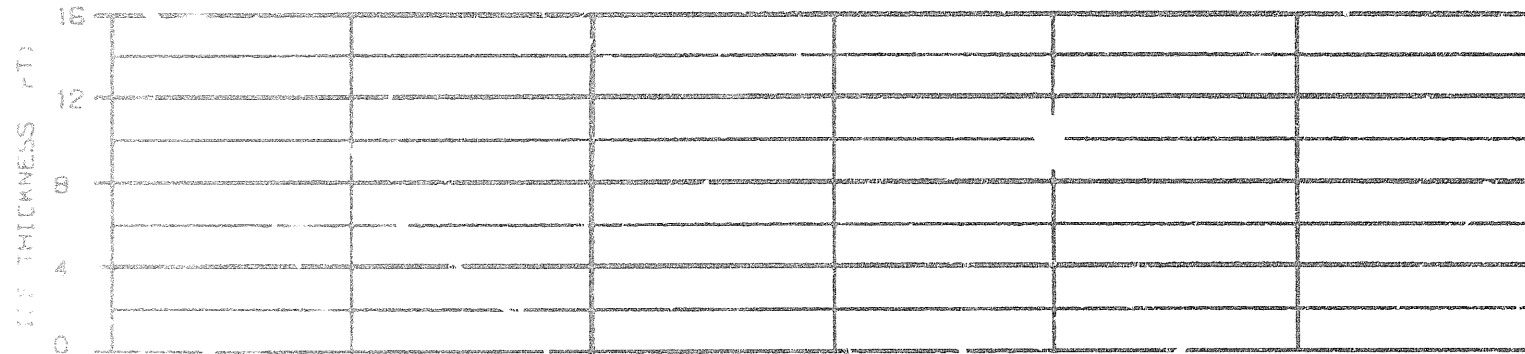
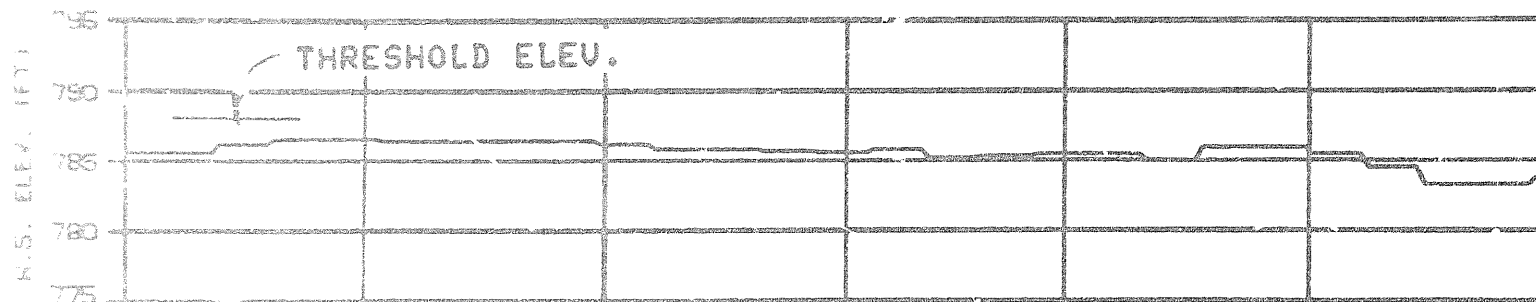


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : B101CX0

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDSOGD JOINT VENTURE	
UNIVERS. BLOCKS	17 APR 82
1982.142	



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

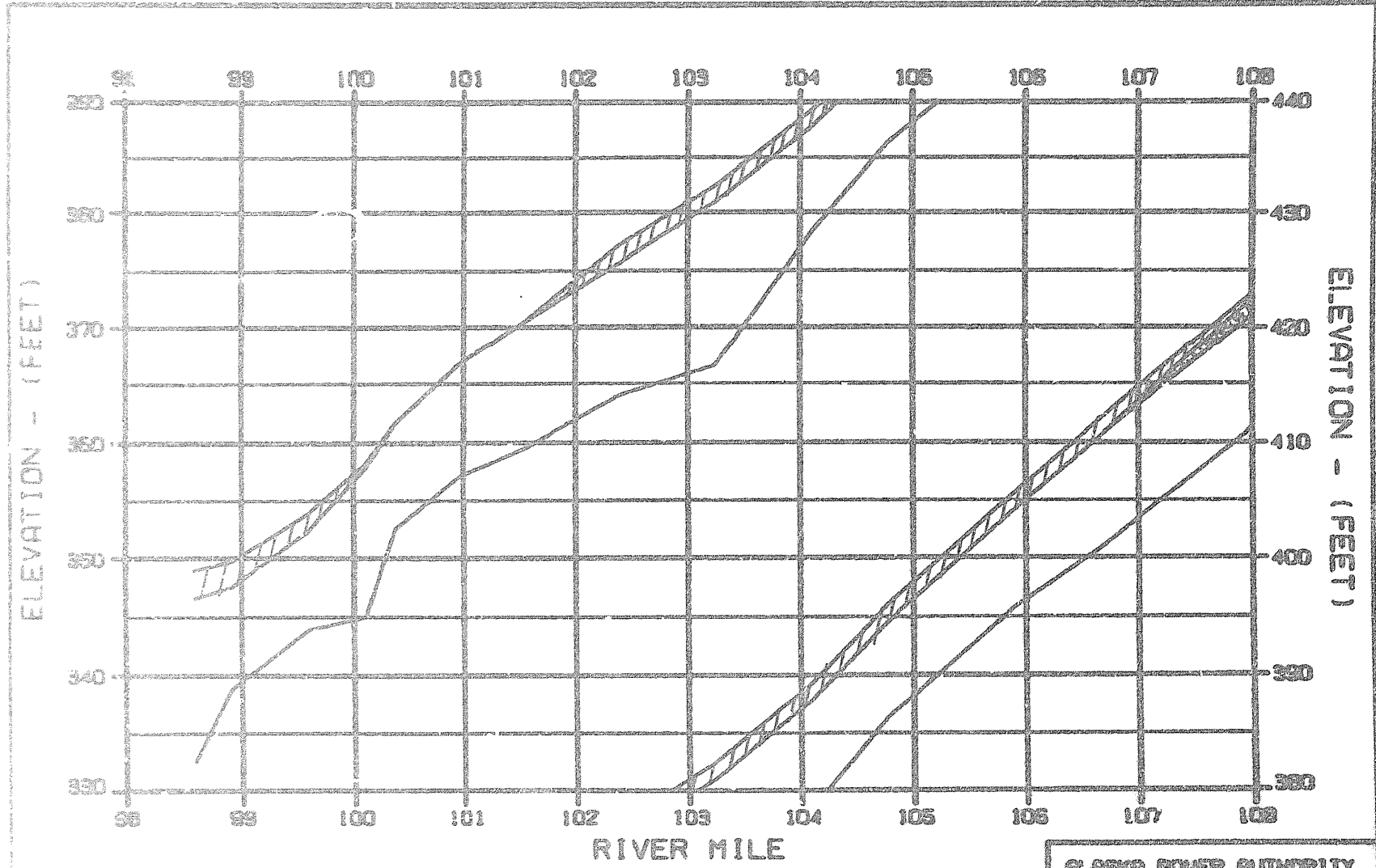
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 8101CXD

ALASKA POWER AUTHORITY	
SUBJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 1982	17 JUN 82 1850.142

SECTION 2

EXHIBIT K

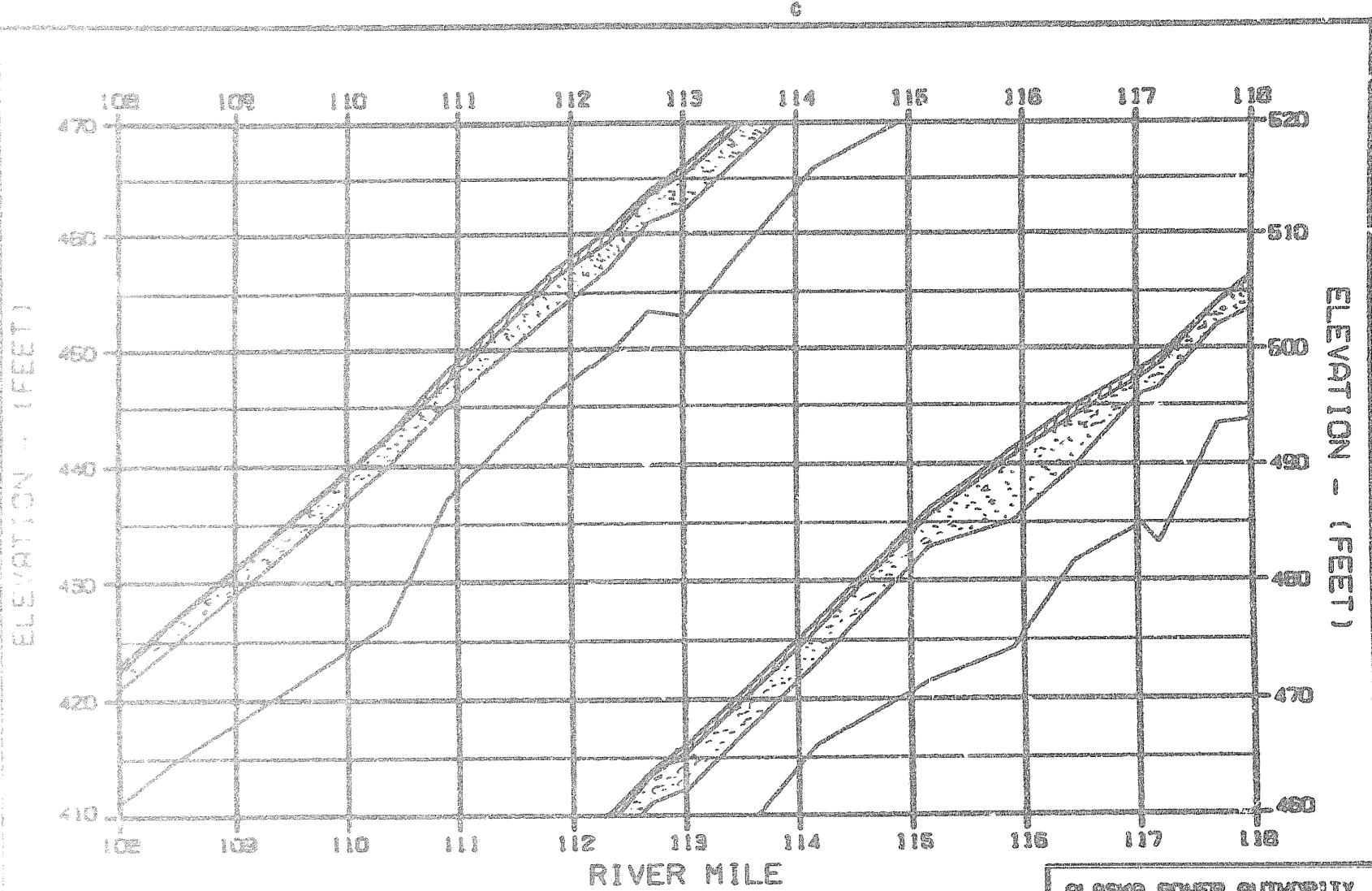


LEEDS:

 TOP OF SOLID ICE
 SUBMERGED ICE INTERFACE
 BOTTOM OF SOLID ICE
 RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RUL: WARMST. EL 1000.
 REFERENCE RUN NO. : 0101XA

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARDA-ERBARD JOINT VENTURE	
DESIGN: ALASKA	REV: 143



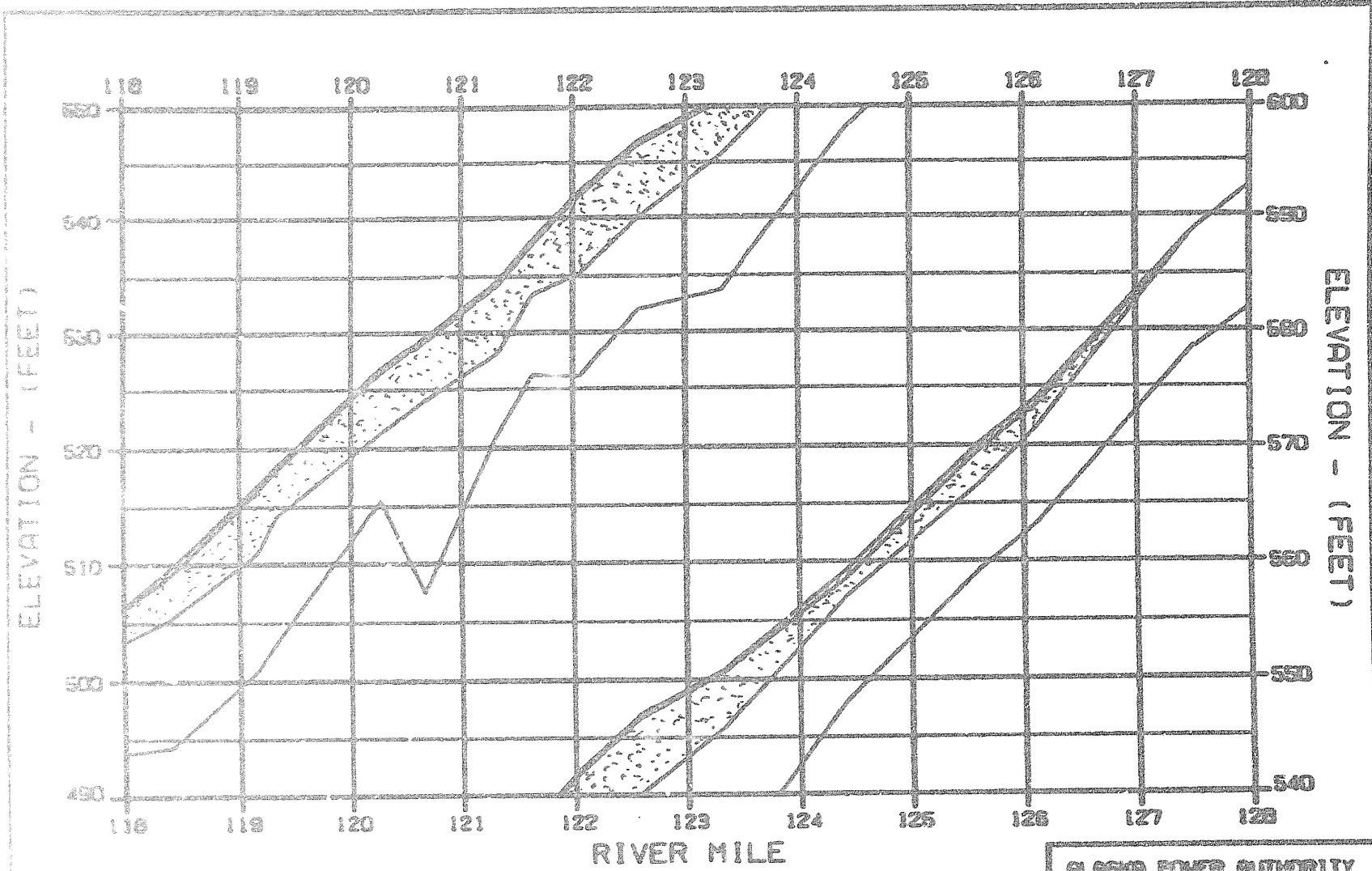
LEGEND:

- TOP OF SOLID ICE
- BLUISH-WHITE ICE INTERFACE
- BOTTOM OF BLUISH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RILE, WARMEST. EL 1800.
 REFERENCE RLN NO. : 8101C/A

ALASKA POWER AUTHORITY		
SUBITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WONDA-EDGED JOINT VENTURE		
DESIGNED BY	DATE	SCALE

C



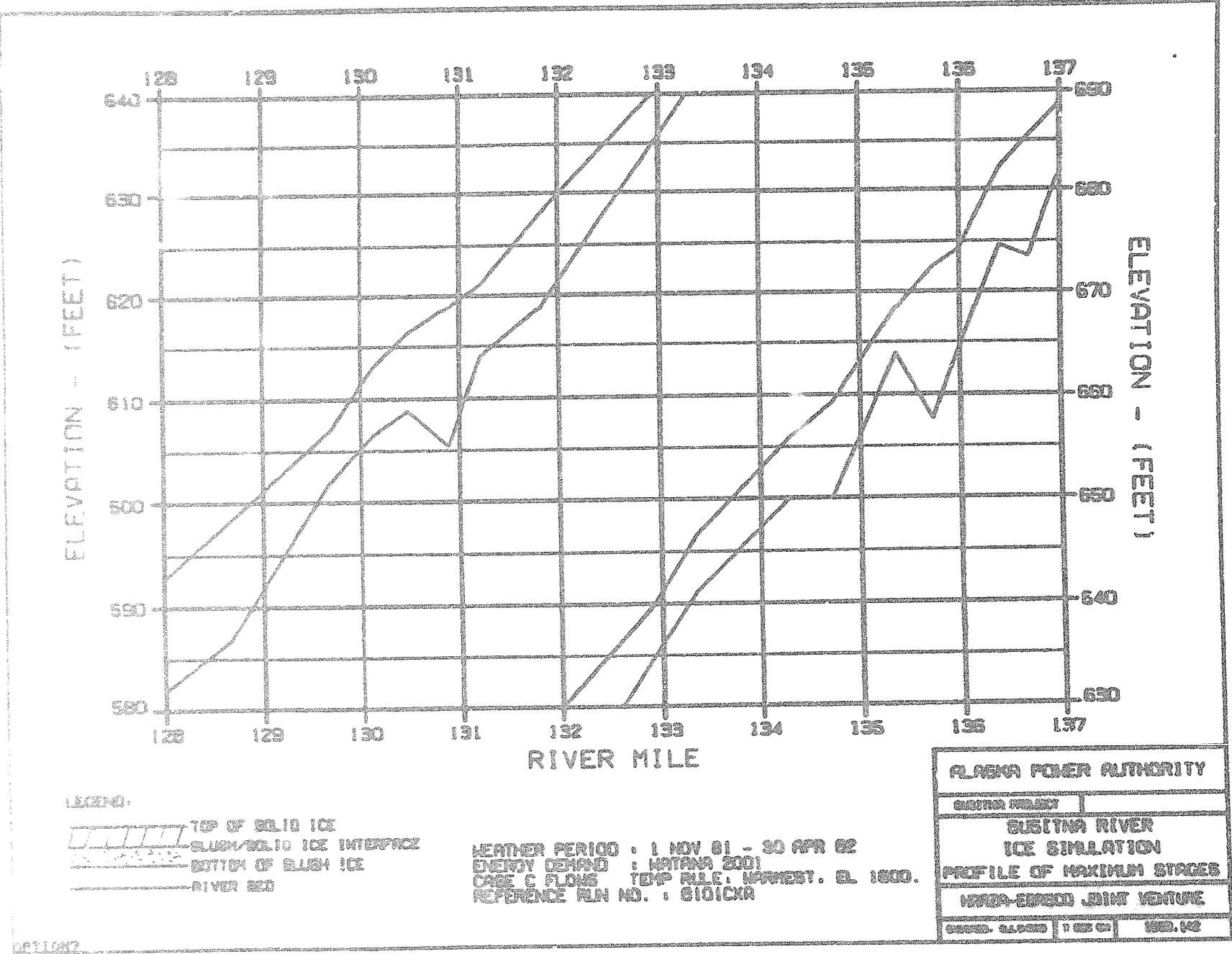
LEGEND

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



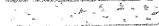

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE: WARMEST. EL 1000.
 REFERENCE PLAN NO. : 0101C1A

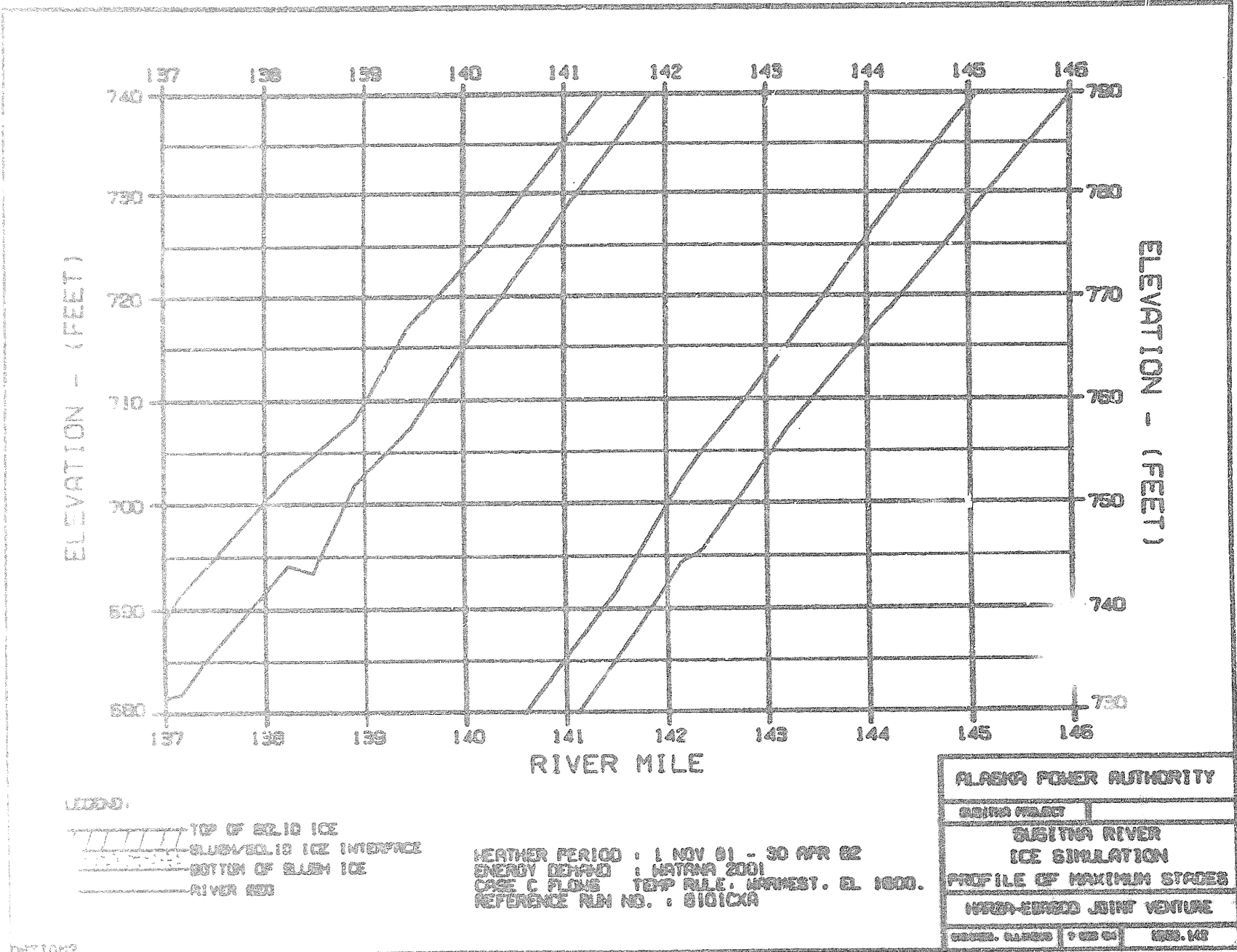
ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WATER-ENVELOPE JOINT VENTURE		
DESIGN: D. JAMES	DATE: 01/01/02	SCALE: 1:1000

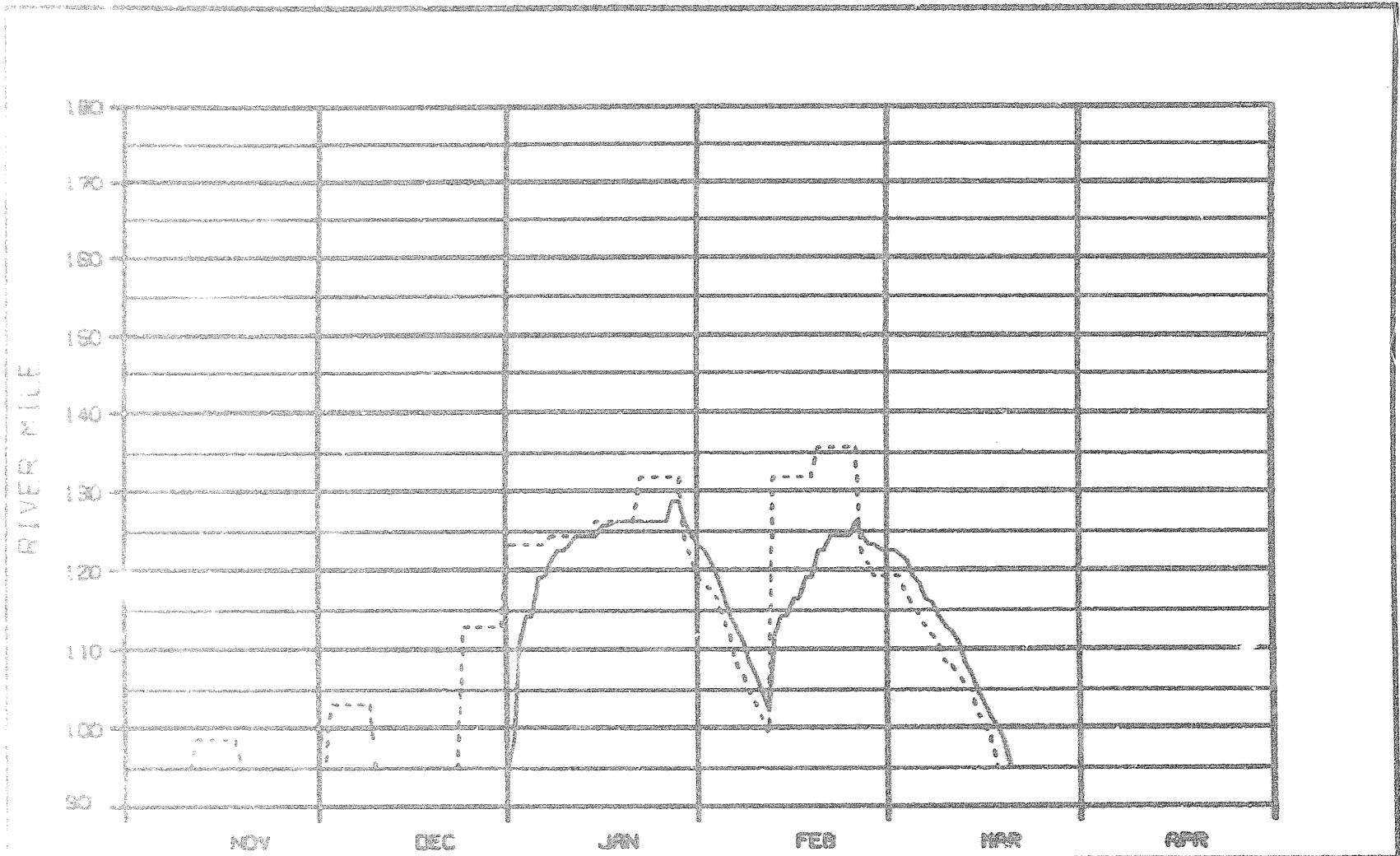
1/21/02



LEGEND:

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



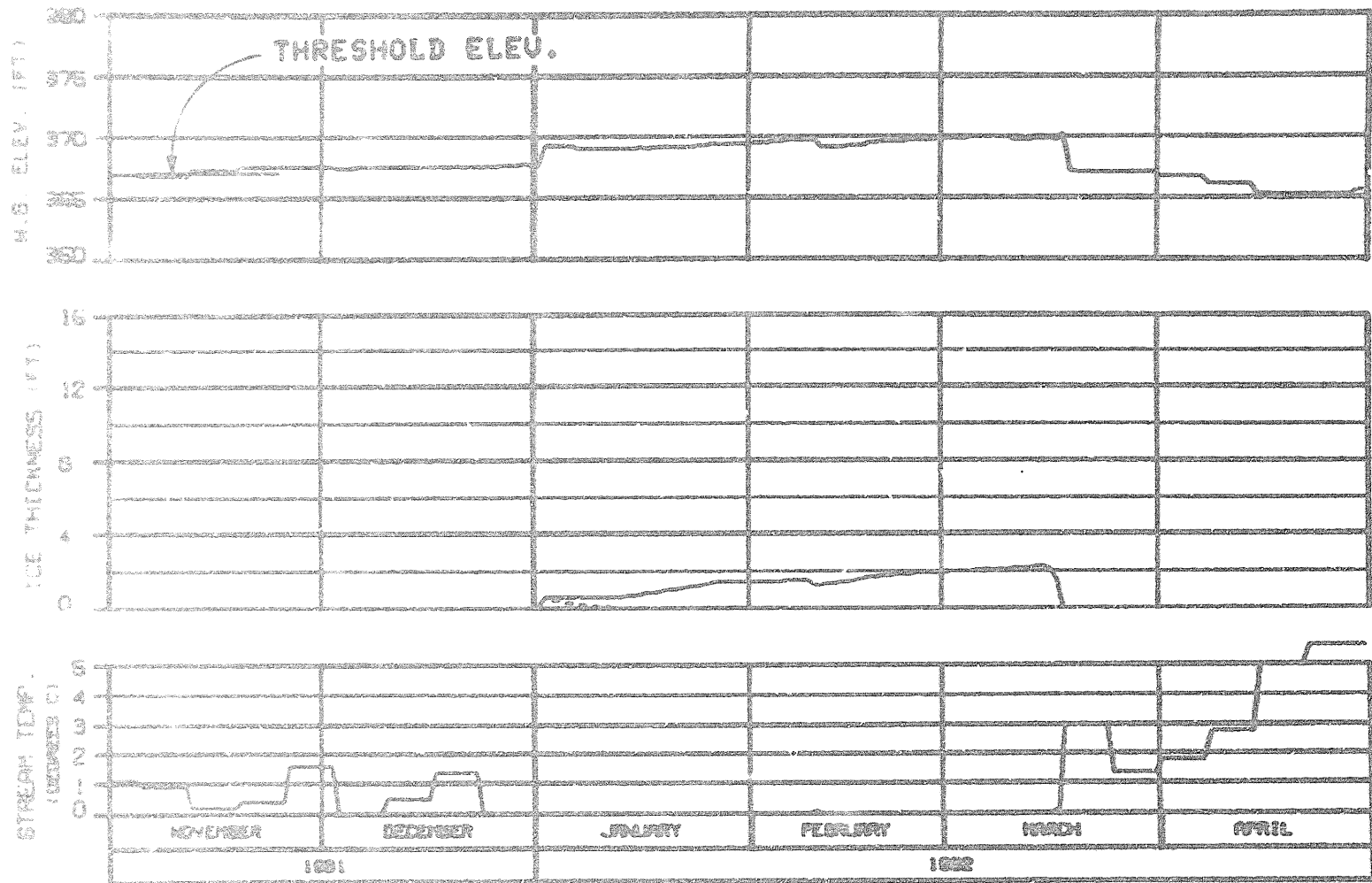


LEGEND:

———— ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 FLOW CASE C TEMP RLE : WAREST. EL 1800
 REFERENCE RUN NO. : 8101CXA

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
WASPA-EDR200 JOINT VENTURE		
DATE: 04/08/82	Y 08 00	088.182



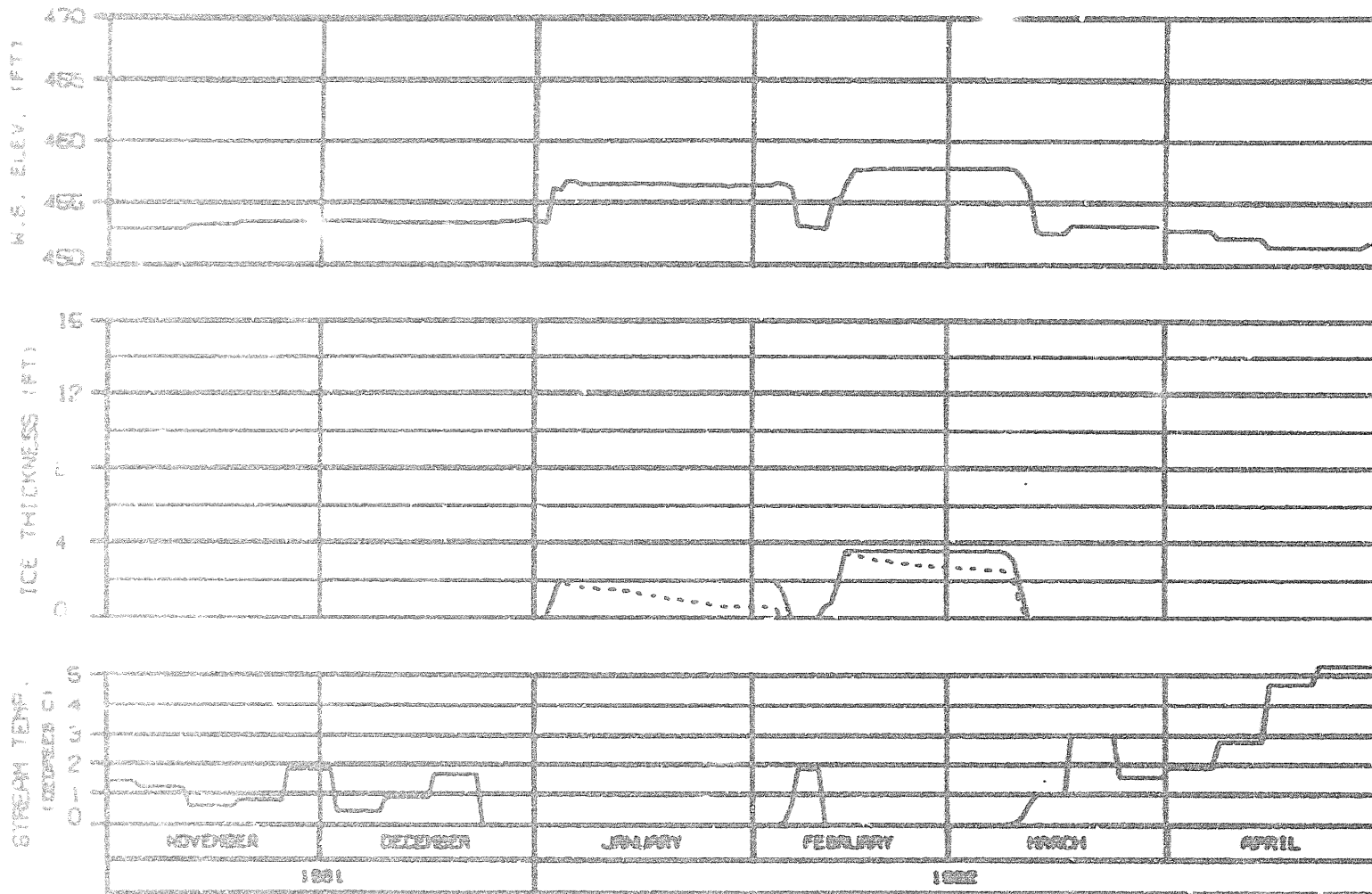
HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1800.
 REFERENCE RUN NO. : B101CA

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
NORZA-EDFECO JOINT VENTURE		
DATE: 04/20/92	7:00 AM	200.142

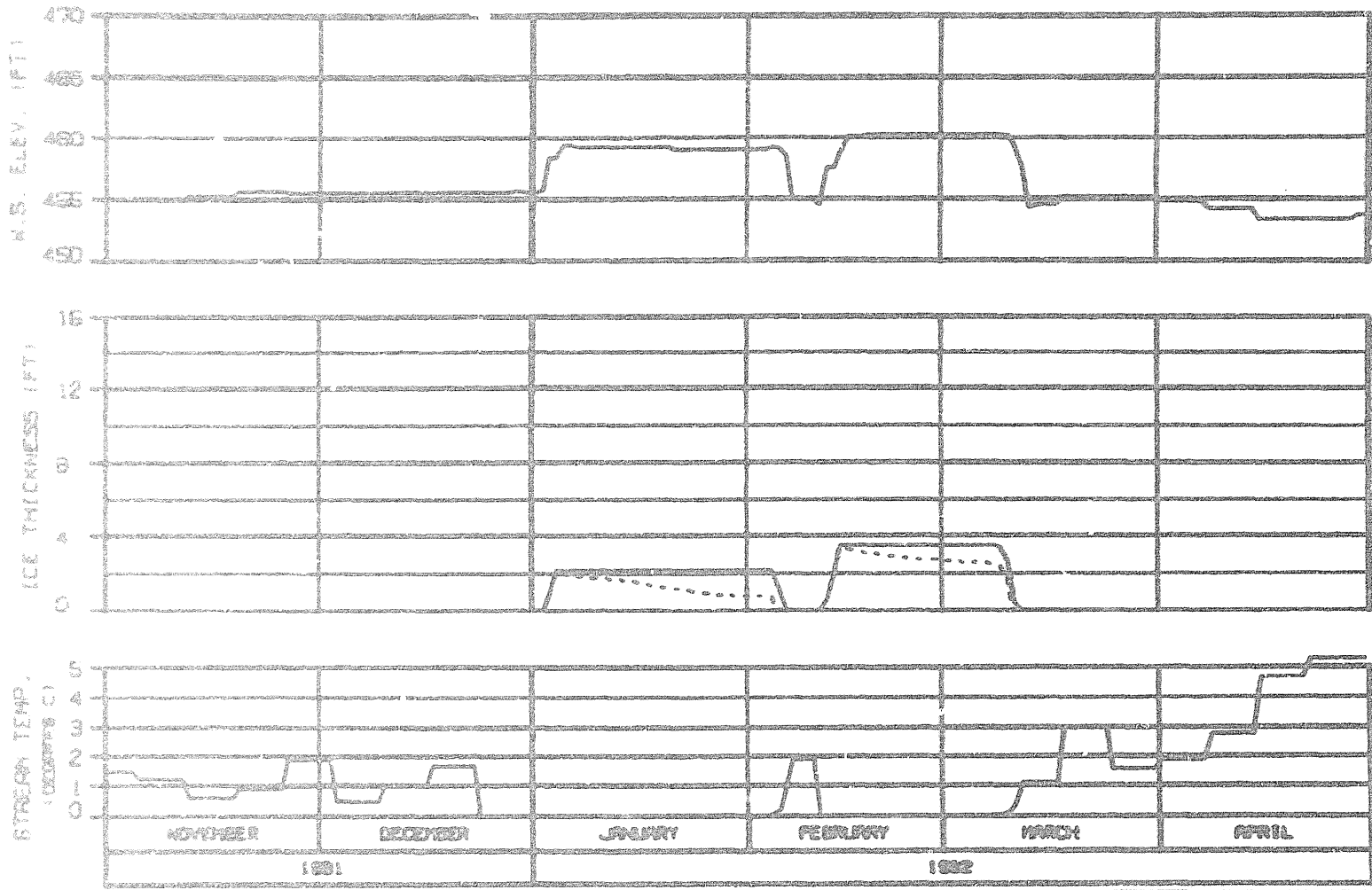


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUEM COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : 81010A

ALASKA POWER AUTHORITY	
OWNER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
NARDA-EDGED JOINT VENTURE	
DESIGNED - 04/08/82	7 000 00
1982.048	

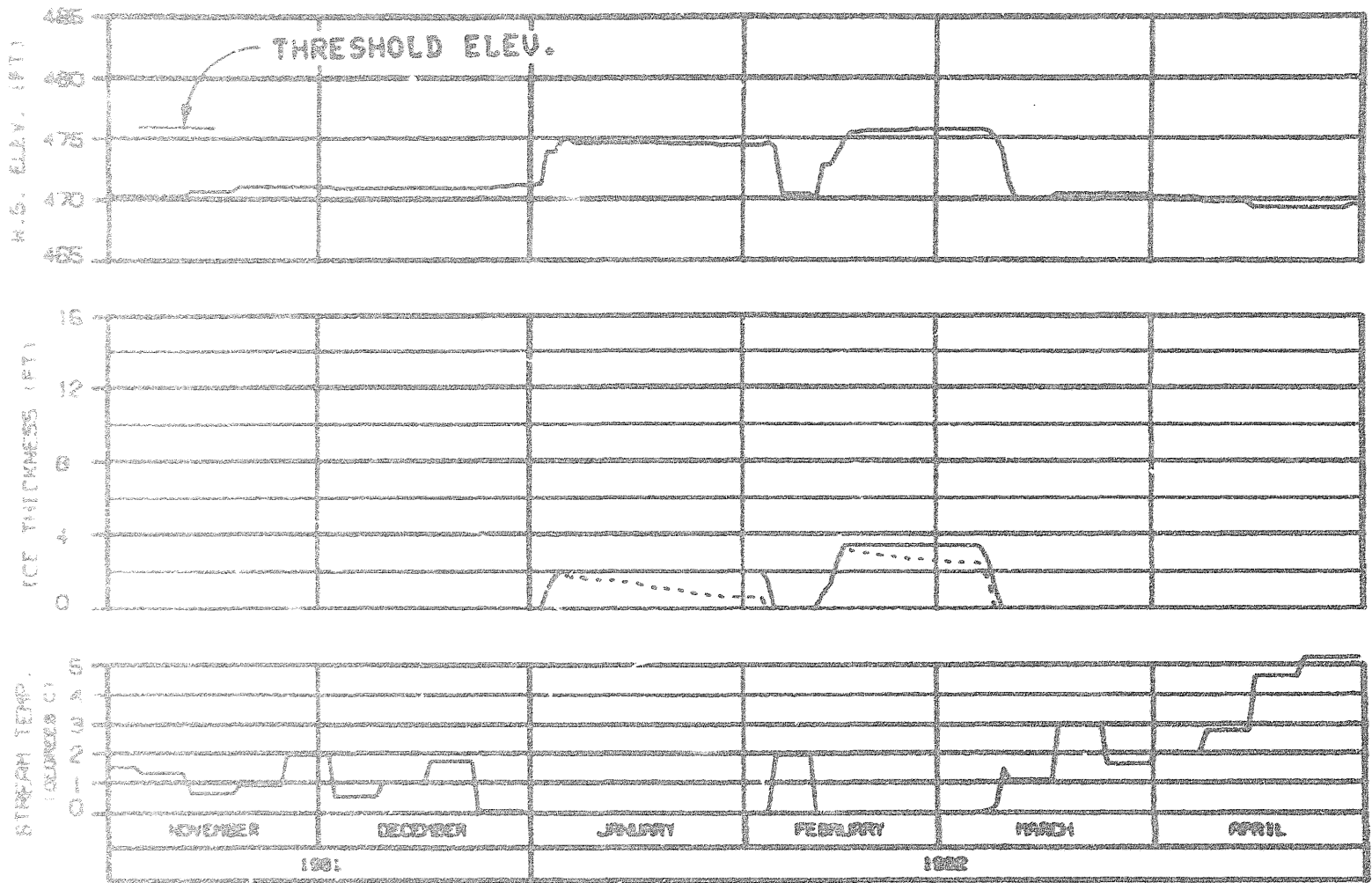


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

MOUTh OF SLOUGH 6A
 RIVER MILE : 112.34

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1000.
 REFERENCE RUN NO. : 010101A

ALASKA POWER AUTHORITY	
03/17/92	01/27/92
SUBITNA RIVER ICE SIMULATION TIME HISTORY	
HARBA-EDROD JOINT VENTURE	
03/17/92	01/27/92

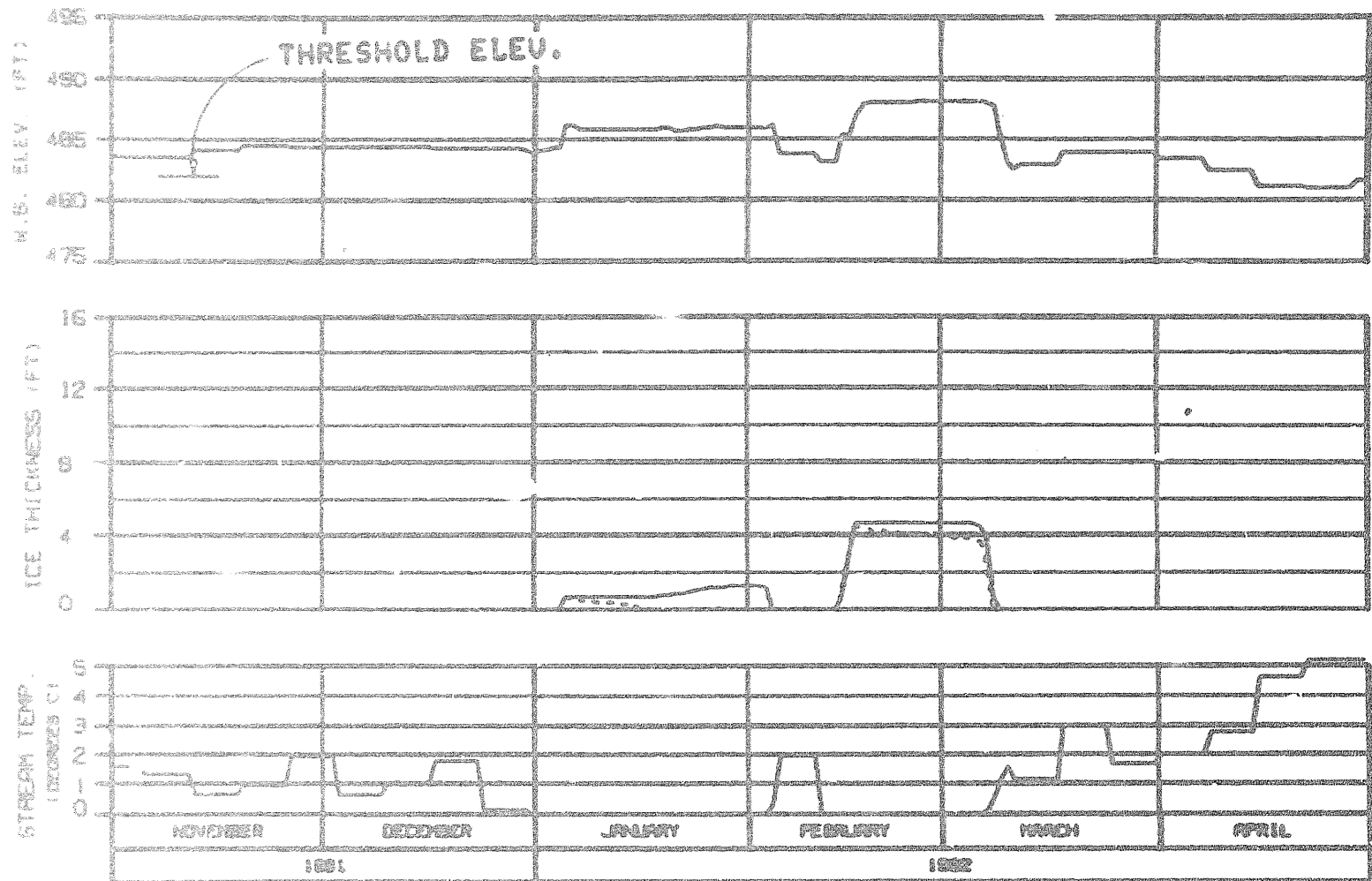


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1800.
 REFERENCE FILM NO. : 8101XA

ALASKA POWER AUTHORITY	
SUSTINA RIVER	
ICE SIMULATION	
TIME HISTORY	
HARDA-ERARD JOINT VENTURE	
DESIGN - ALASKA	7 821 01
SER. 148	

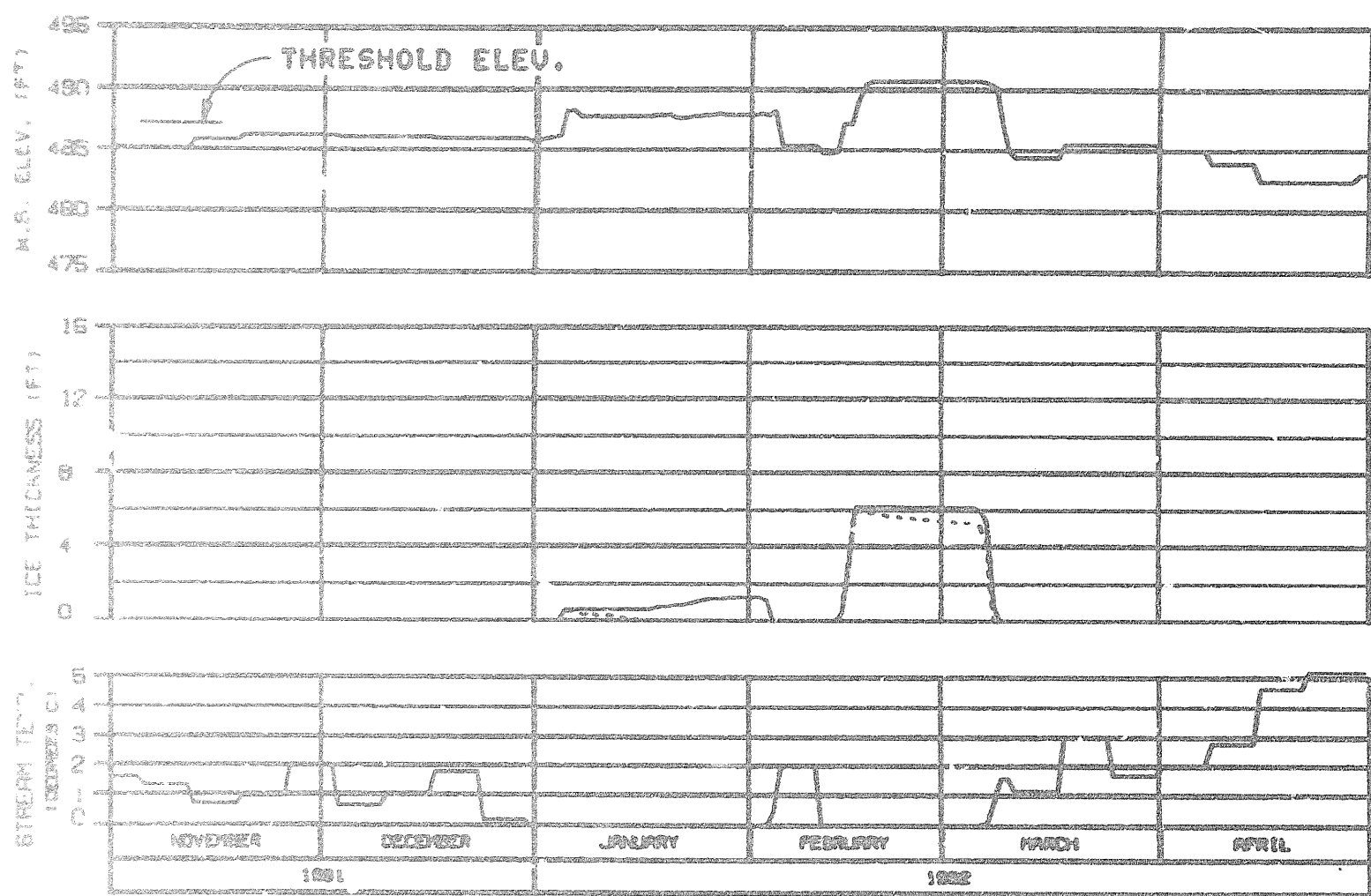


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE FLN NO. : BIDICXA

ALASKA POWER AUTHORITY	
ASPPA PROJECT	
ELSTINA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARD-EBERD JOINT VENTURE	
DATE: 01.02.82	BY: 0122 01
1982.142	

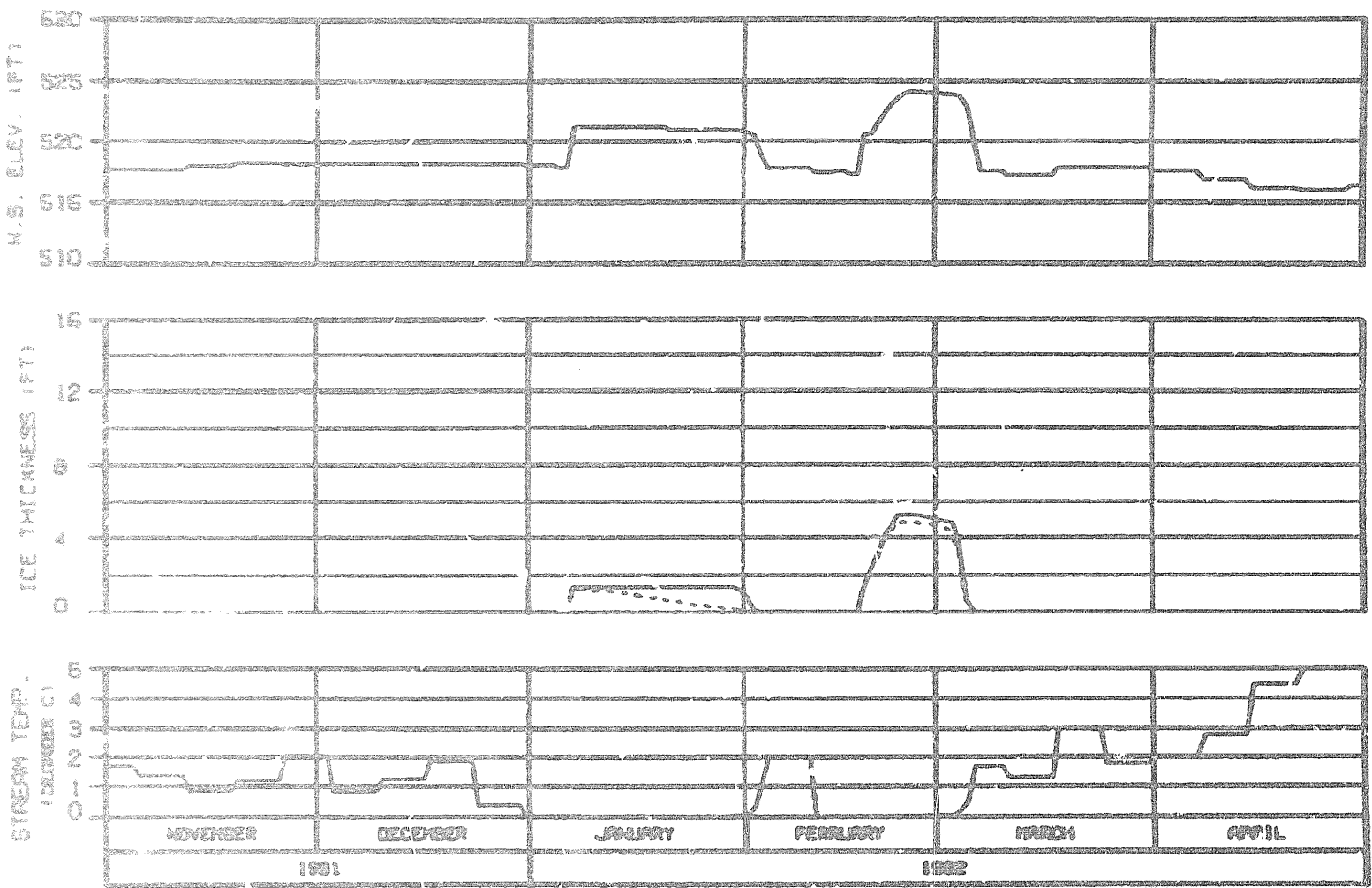


HEAD OF SIDE CHANNEL NSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1800.
 REFERENCE RUN NO. : 0101CXA

ALASKA POWER AUTHORITY	
SLUSH PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WADSWORTH-JOINT VENTURE	
CHARTER: 010000	7 000 00
	1982.108

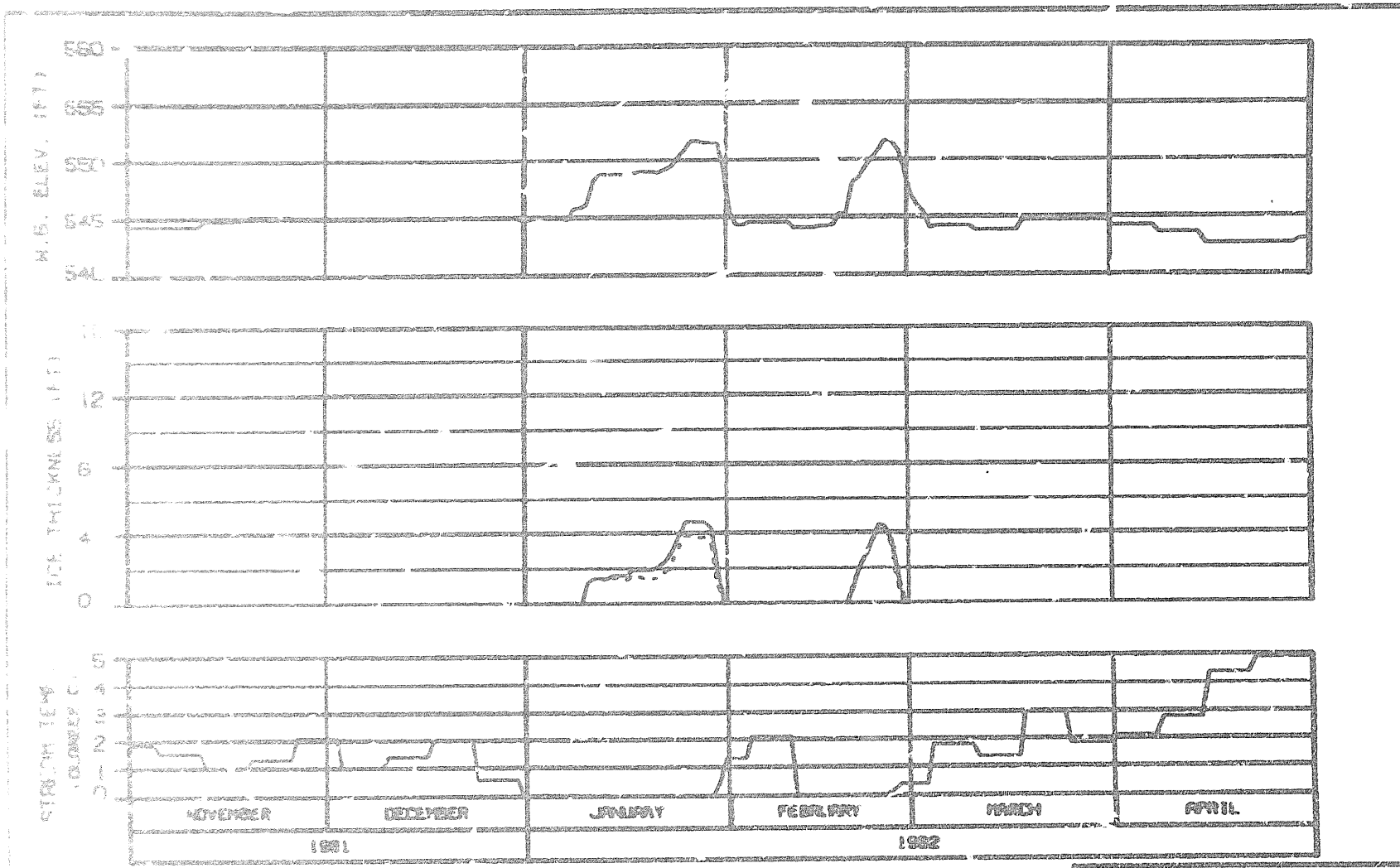


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1600.
 REFERENCE RUN NO. : 6101CA

ALASKA POWER AUTHORITY		
GRID NO. 005		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NARA-ESBSCO JOINT VENTURE		
DATE: 04/02	TIME: 04	000.140

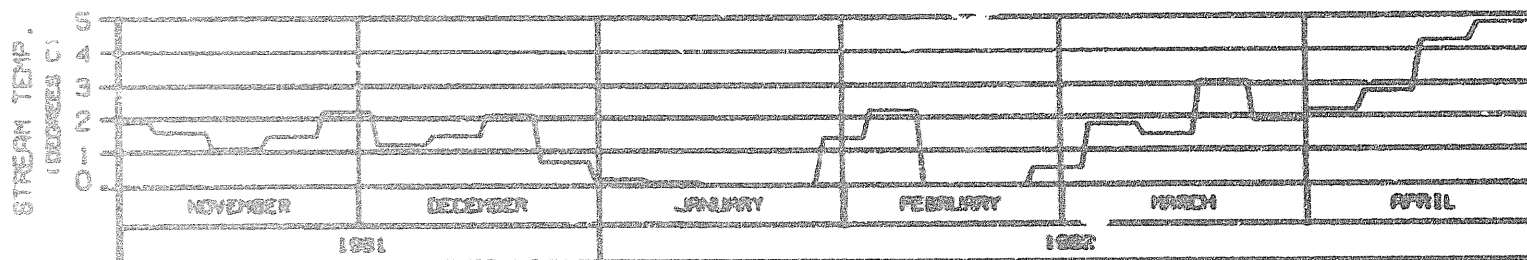
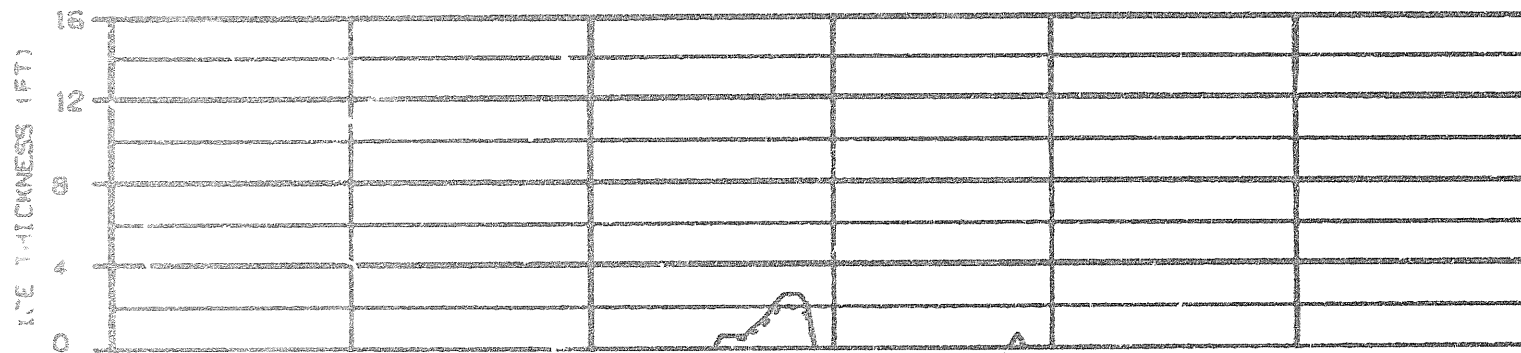
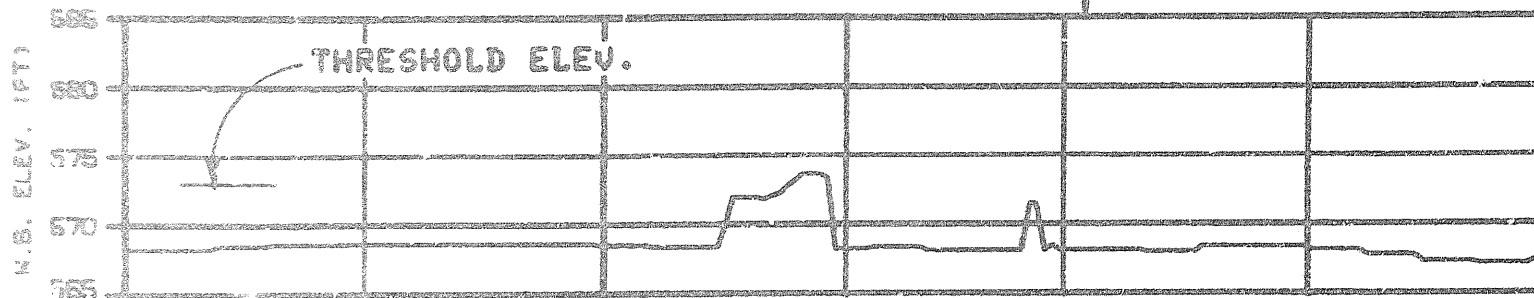


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - BUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : 8101CXA

ALASKA POWER AUTHORITY		
SUBJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARD-EDGED JOINT VENTURE		
OWNER - ALASKA	USER -	WED. 182

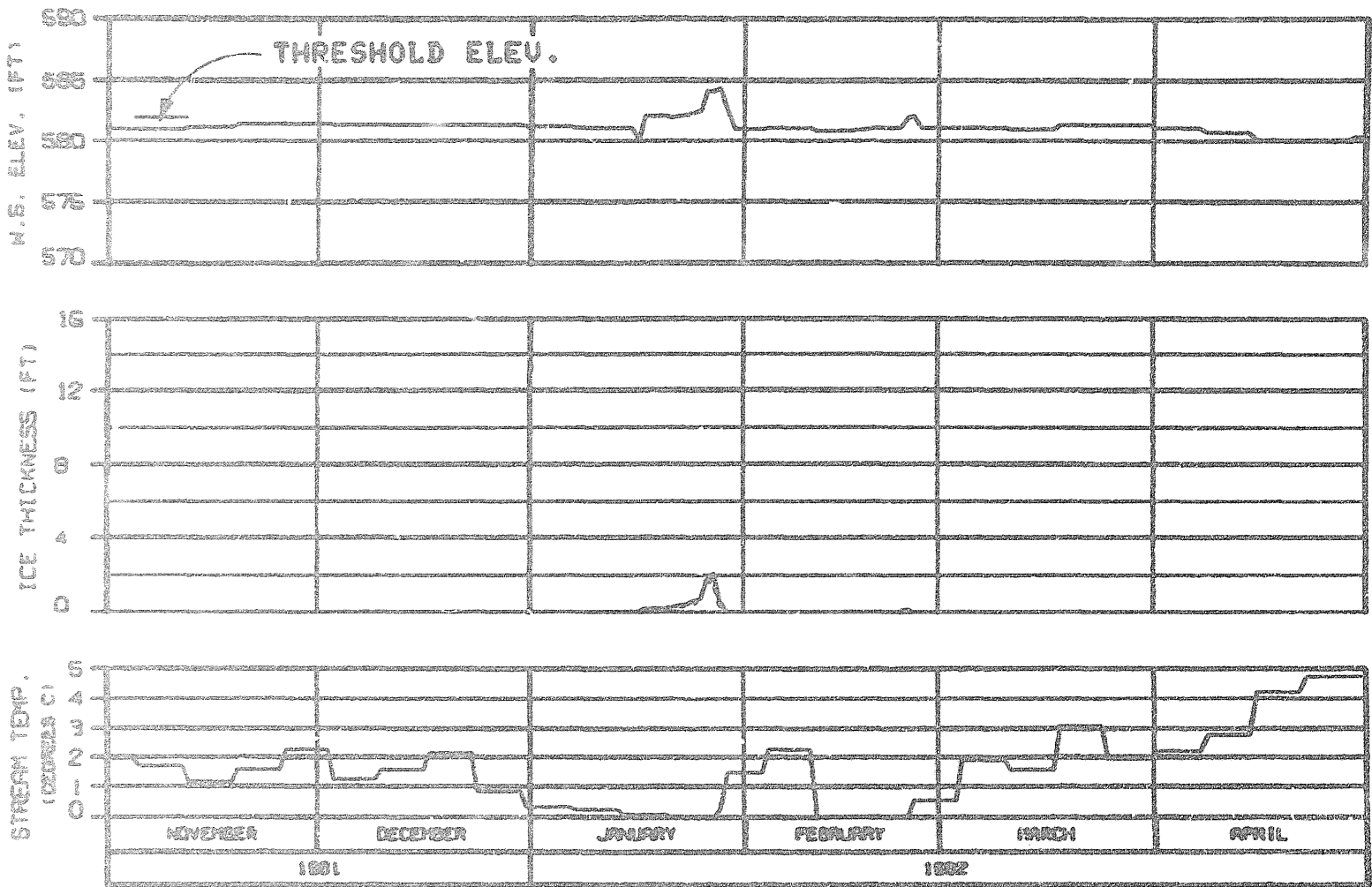


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : BIDICKA

ALASKA POWER AUTHORITY	
SYSTEM PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
NARDA-ESBECO JOINT VENTURE	
ORDER: 840808	7 FEB 84
888.542	



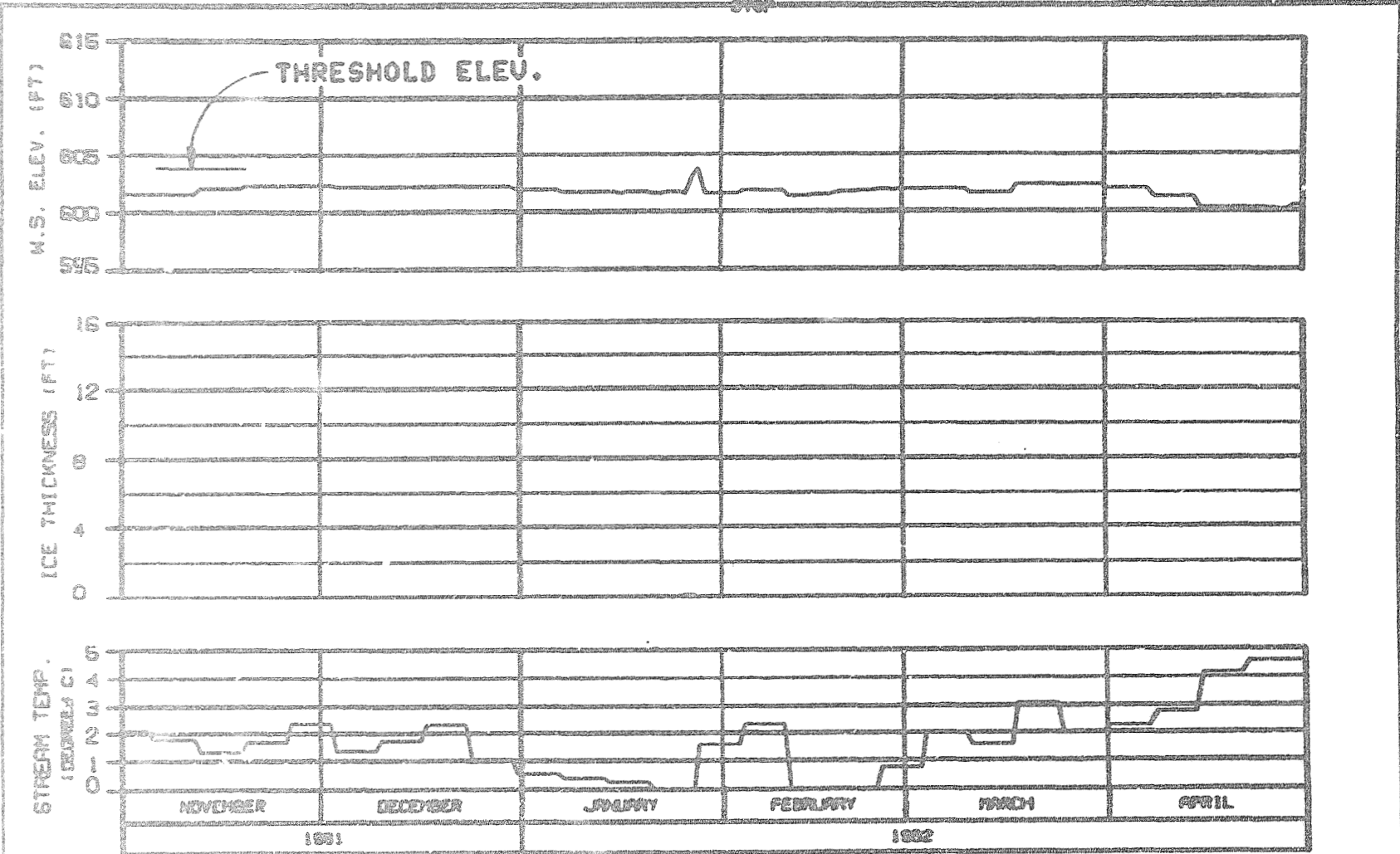
HEAD OF SLOUGH 8A (EAST)
RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL. 1800.
 REFERENCE RUN NO. : 810101A

FLORIDA POWER AUTHORITY	
SUBJECT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
INTEC-EDGECO JOINT VENTURE	
DESIGN. GROUP	DES. NO.
1025 81	828.142

C



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

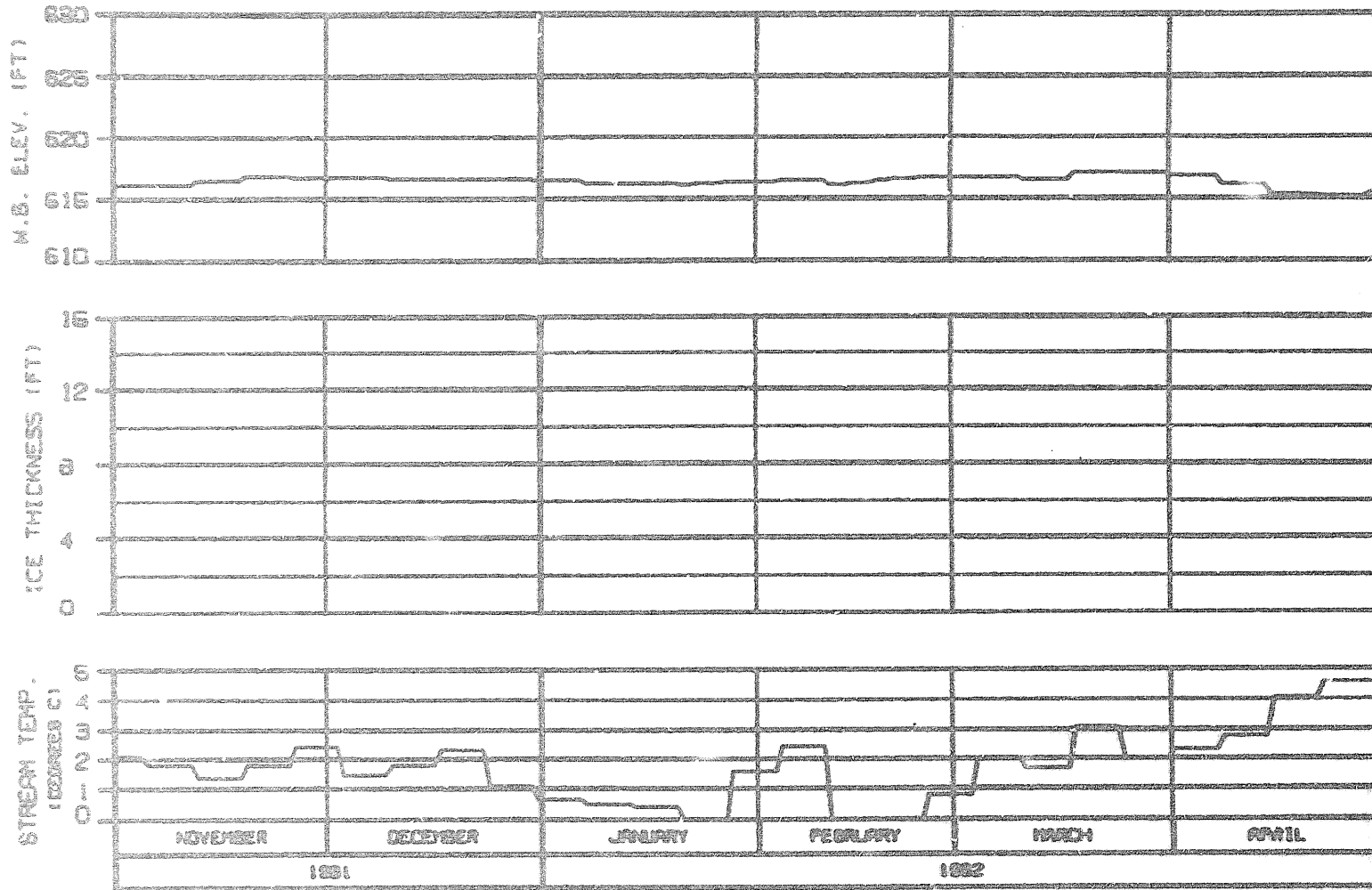
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : 81010XA

ALASKA POWER AUTHORITY	
ESTIM NO. 527	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAFRA-EBRACD JOINT VENTURE	
DRGNO. ALP001	FIG. NO. 102

OPTION 2

OPTION

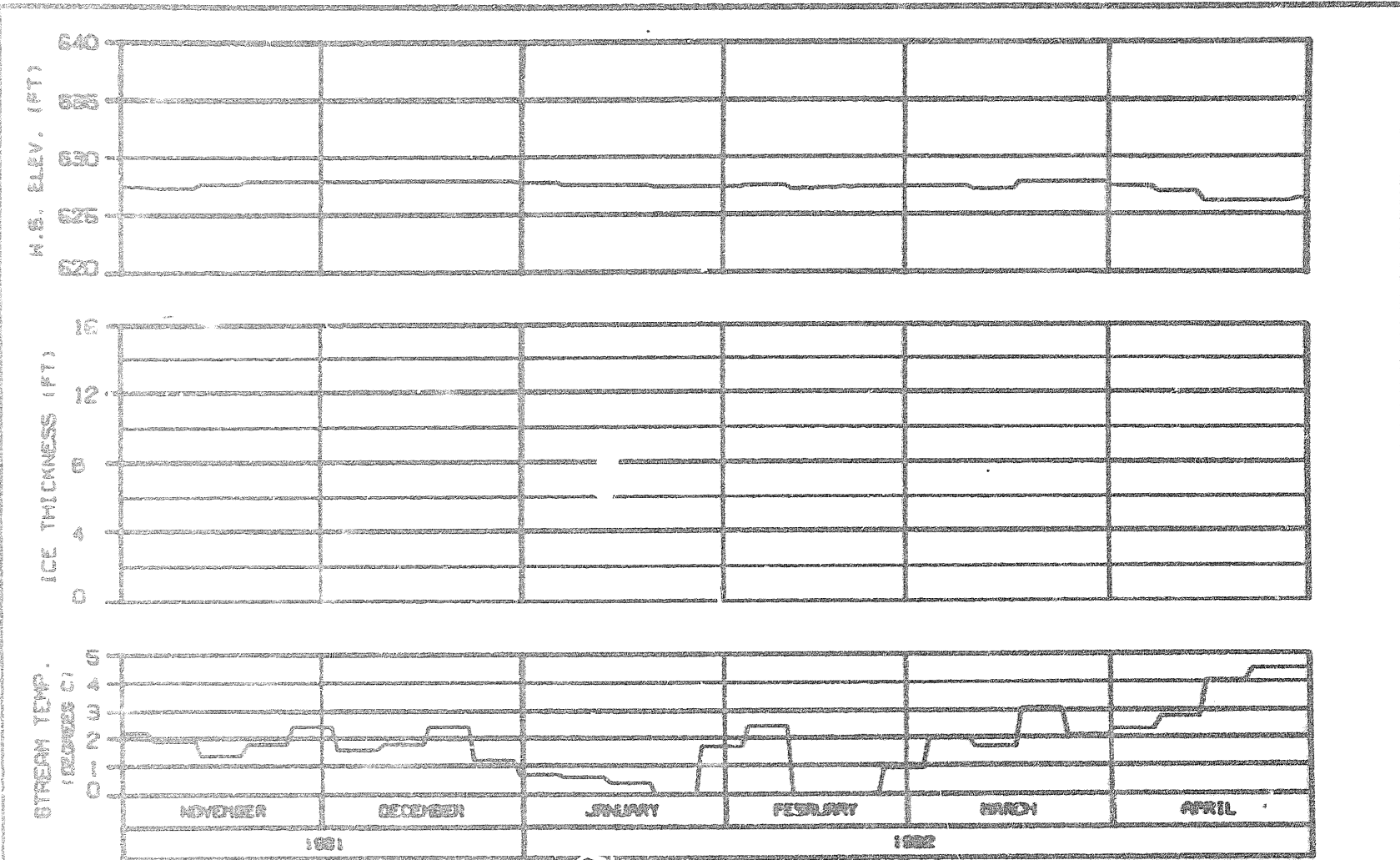


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST, EL 1600.
 REFERENCE RUN NO. : 8101XA

ALASKA POWER AUTHORITY	
STUDY SUBJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARSA-EBREDO JOINT VENTURE	
DESIGNED BY: D. J. DAVIS	DATE: FEB. 1982

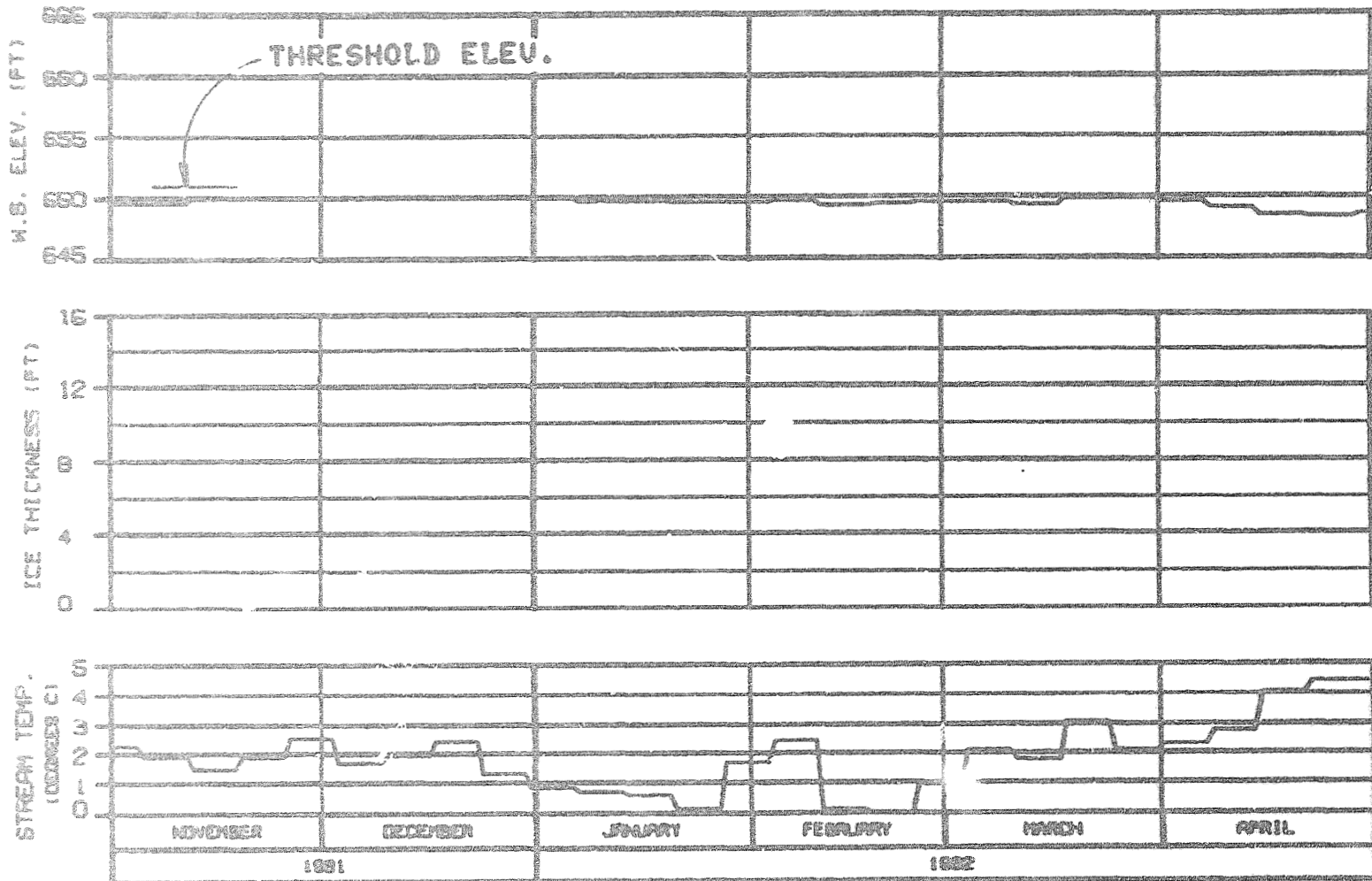


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1800.
 REFERENCE RUN NO. : 810101A

ALASKA POWER AUTHORITY		
GUSTINA PROJECT		
GUSTINA RIVER ICE SIMULATION TIME HISTORY		
HYDRA-ENGINEERED JOINT VENTURE		
DESIGNED BY	DATE	REV.

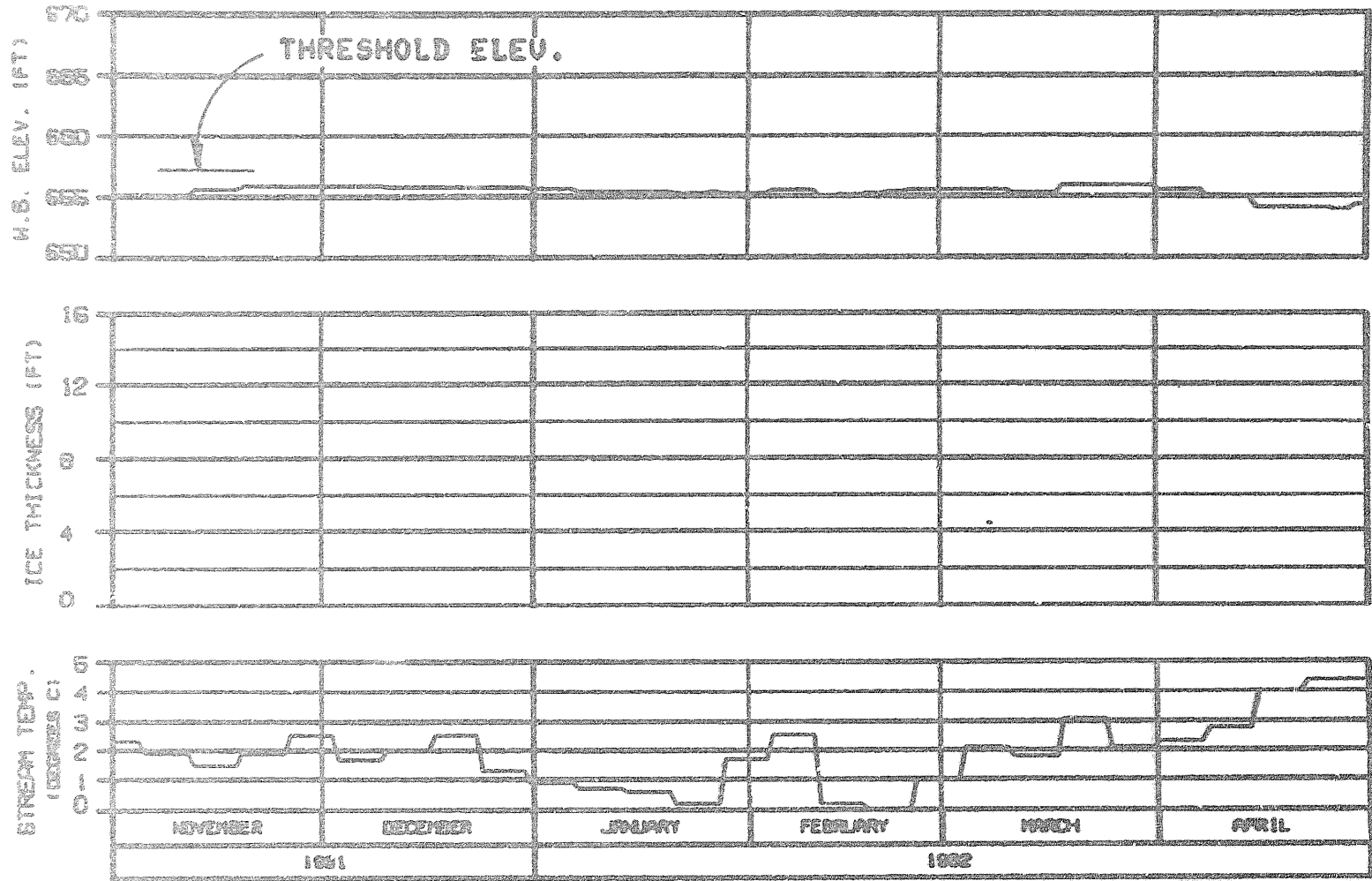


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : HARNEST, EL 1600.
 REFERENCE RUN NO. : 8101XA

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
HARBA-EDISON JOINT VENTURE		
ENGINEER	DATE	FIG. NO.
		102.102

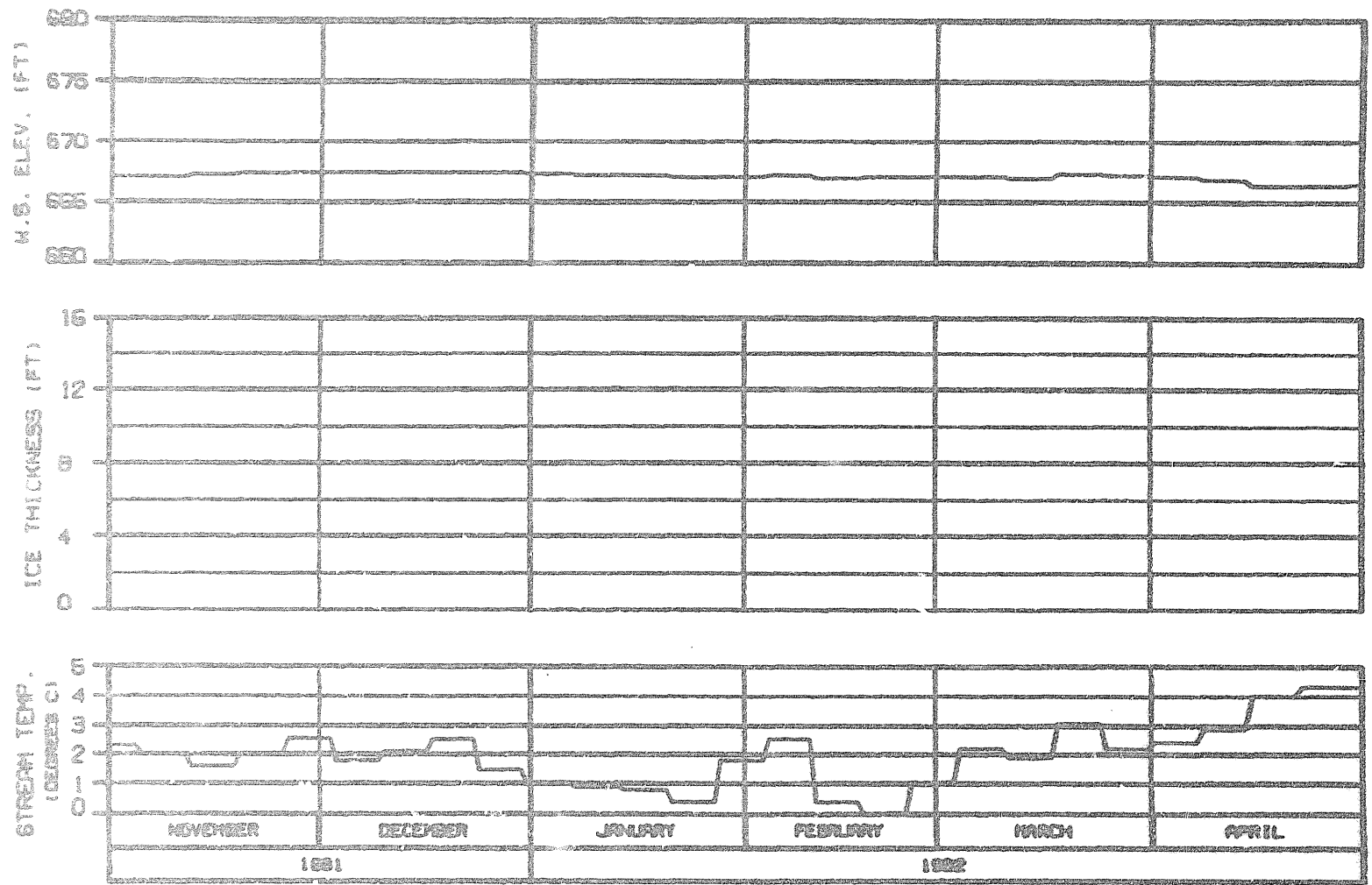


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : HARNEST. EL 1800.
 REFERENCE RUN NO. : 810101A

ALASKA POWER AUTHORITY	
SEIWA PROJECT	
SUBITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDGED JOINT VENTURE	
FORMS: 61-0010	7 002 01
	1000-140

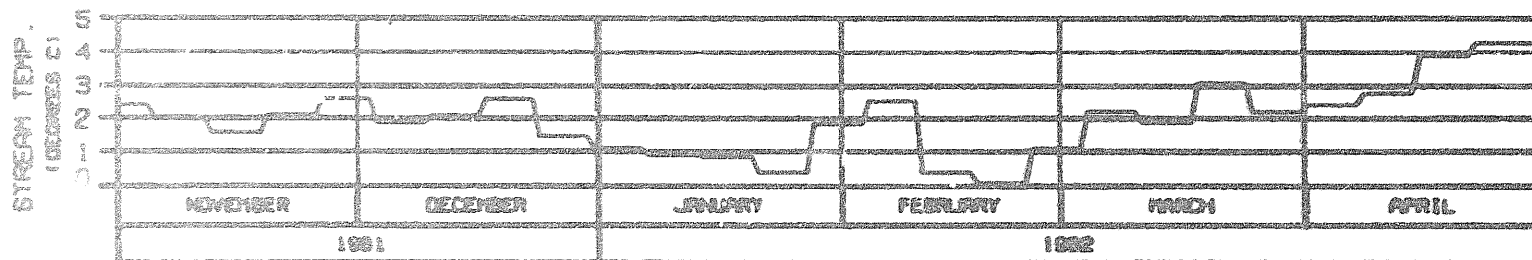
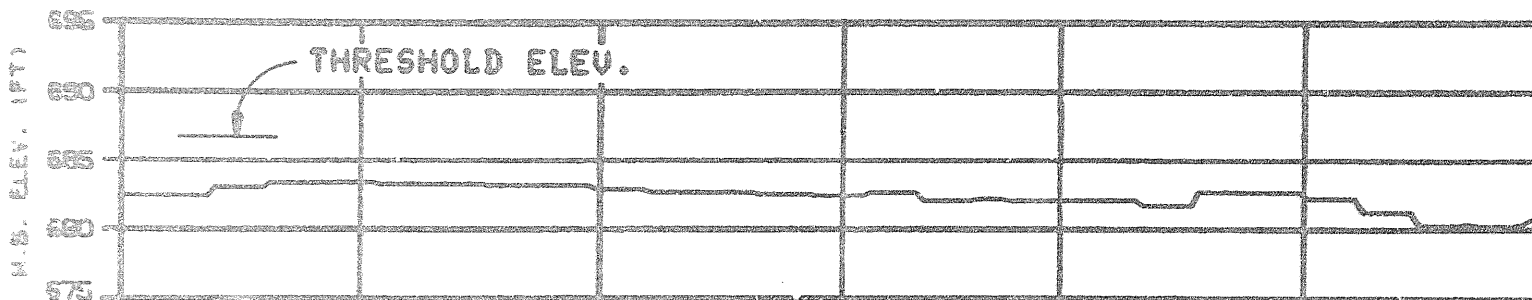


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : 61010XA

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WATANA-BASCO JOINT VENTURE		
DATE: 11/02/82	7 OF 81	1005.142

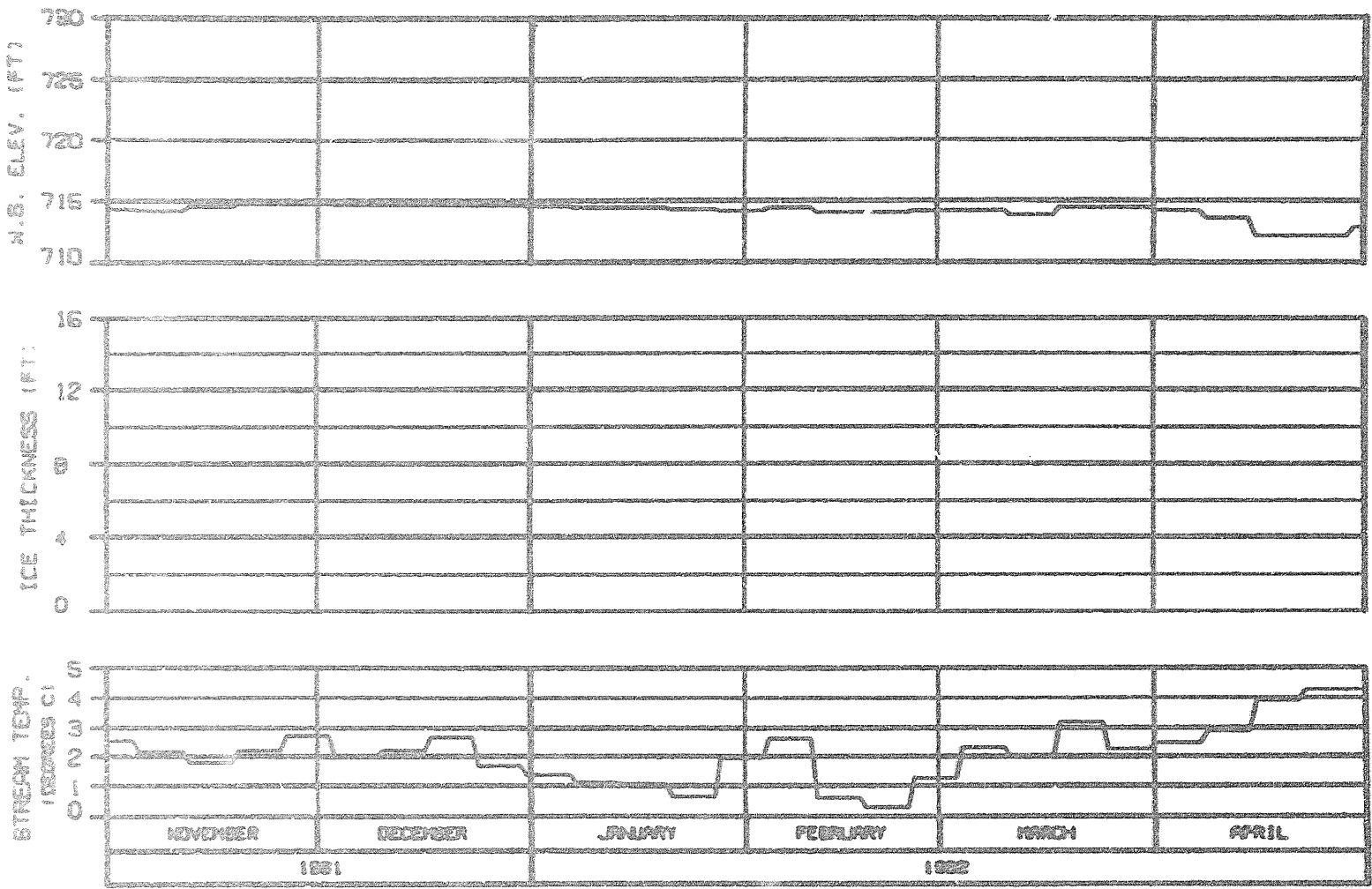


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : SIDICXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARA-SARCO JOINT VENTURE		
DESIGN. ENGINEER	DATE	USER

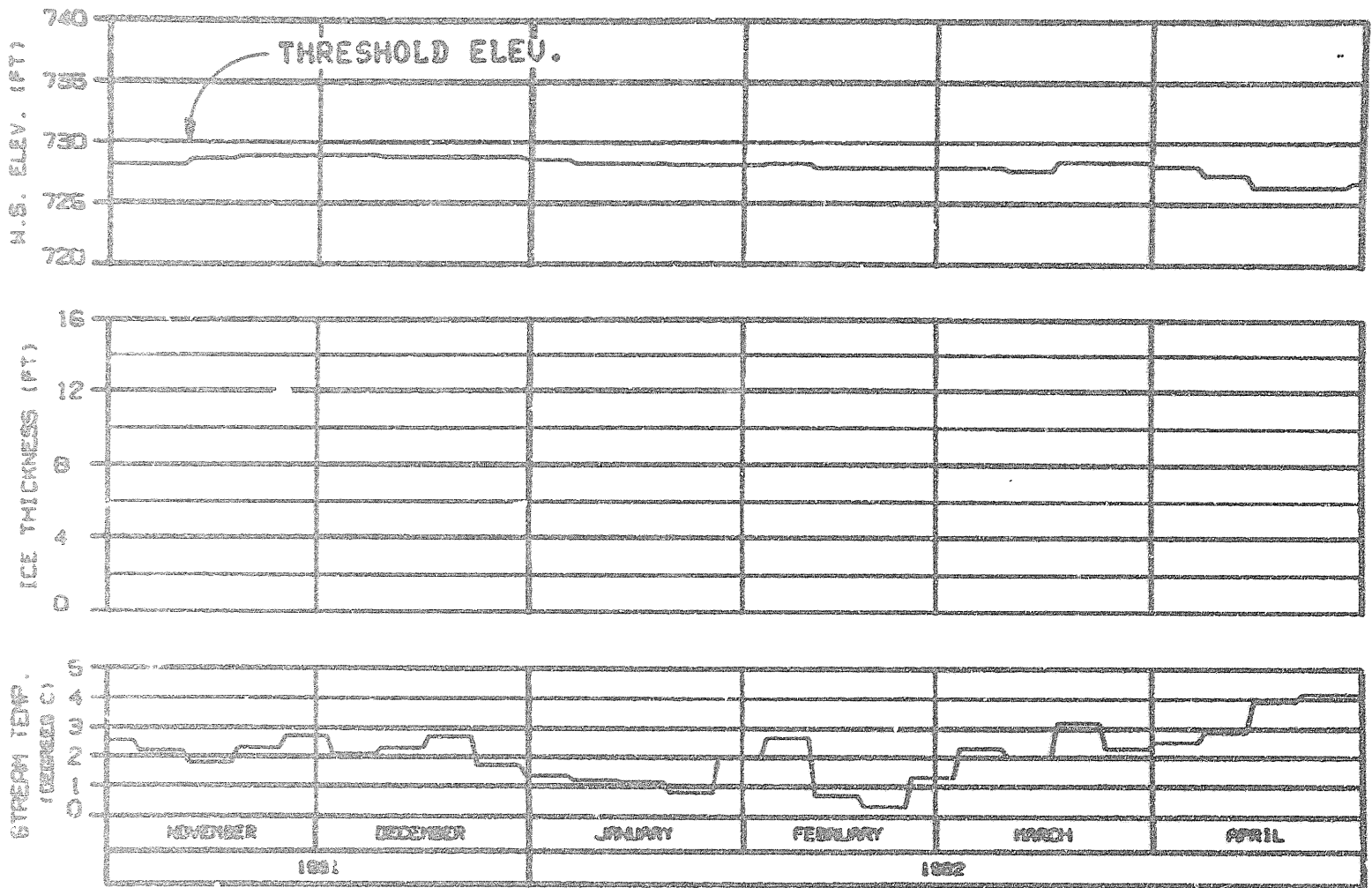


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST, EL 1800.
 REFERENCE RUN NO. : 8101XA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
NORAD-ENERCO JOINT VENTURE		
DATE: 04/08/82	TIME: 7:05 AM	PAGE: 1/2

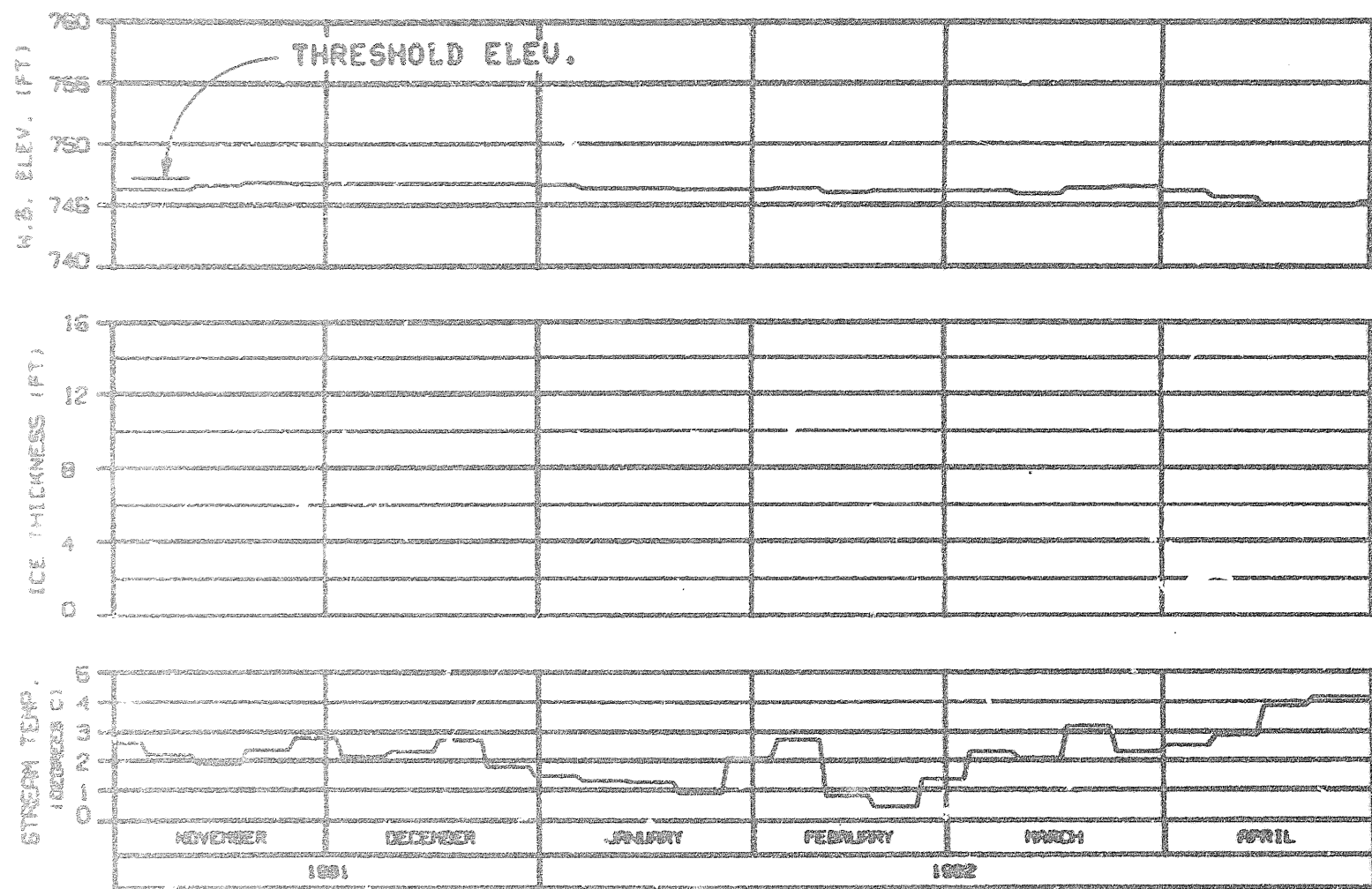


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST, EL 1800.
 REFERENCE RUN NO. : 8101CX

ALASKA POWER AUTHORITY		
SLEITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
MARA-EDISED JOINT VENTURE		
STARTED: 8/18/81	7 02Z 81	105.102

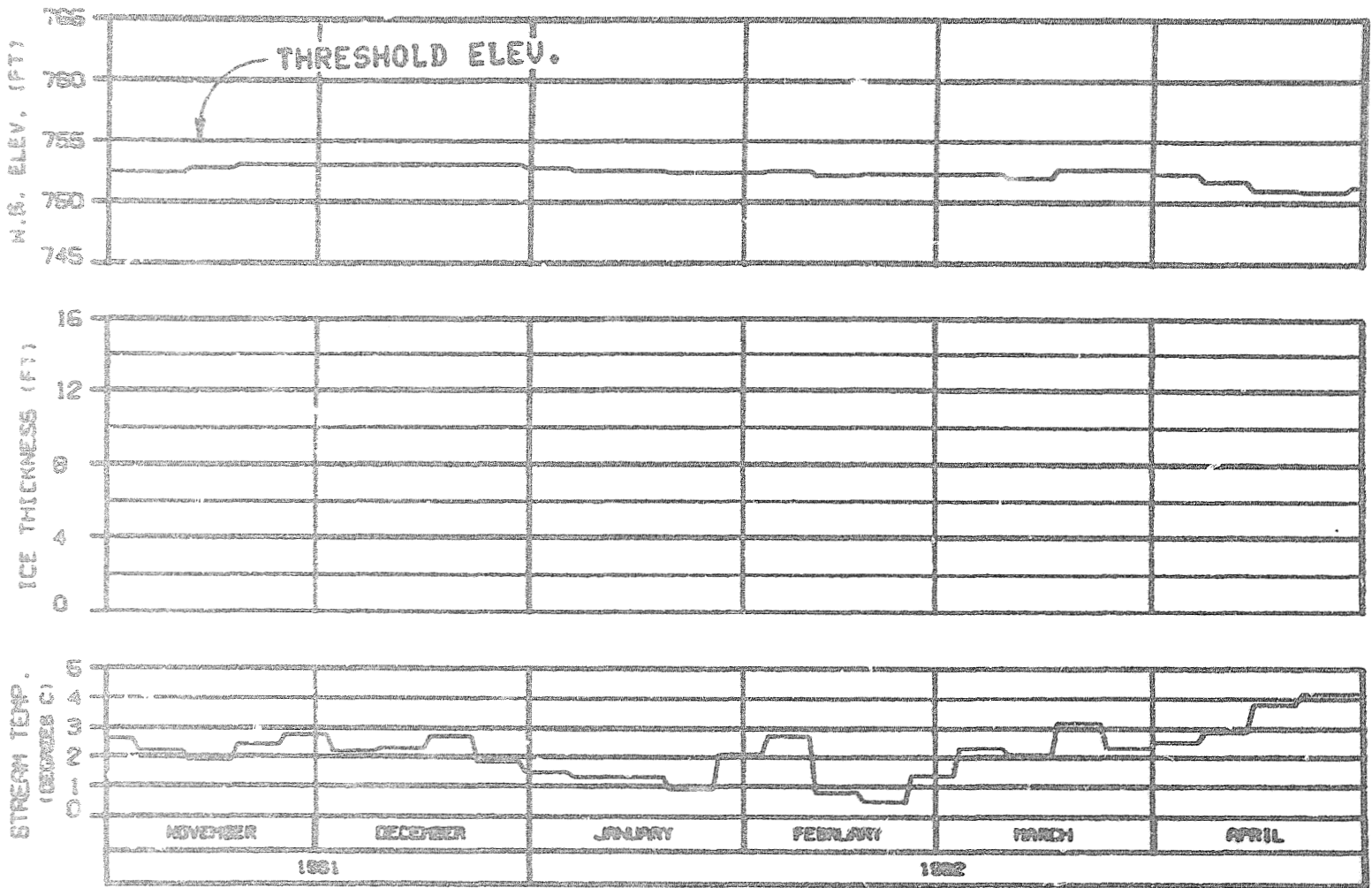


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1800.
 REFERENCE RUN NO. : BIDICXA

ALASKA POWER AUTHORITY	
GUSTINA PROJECT	
GUSTINA RIVER ICE SIMULATION TIME HISTORY	
NARA-SINCO JOINT VENTURE	
DESIGN. ELEVATION	1800.0
DATE	1982.04

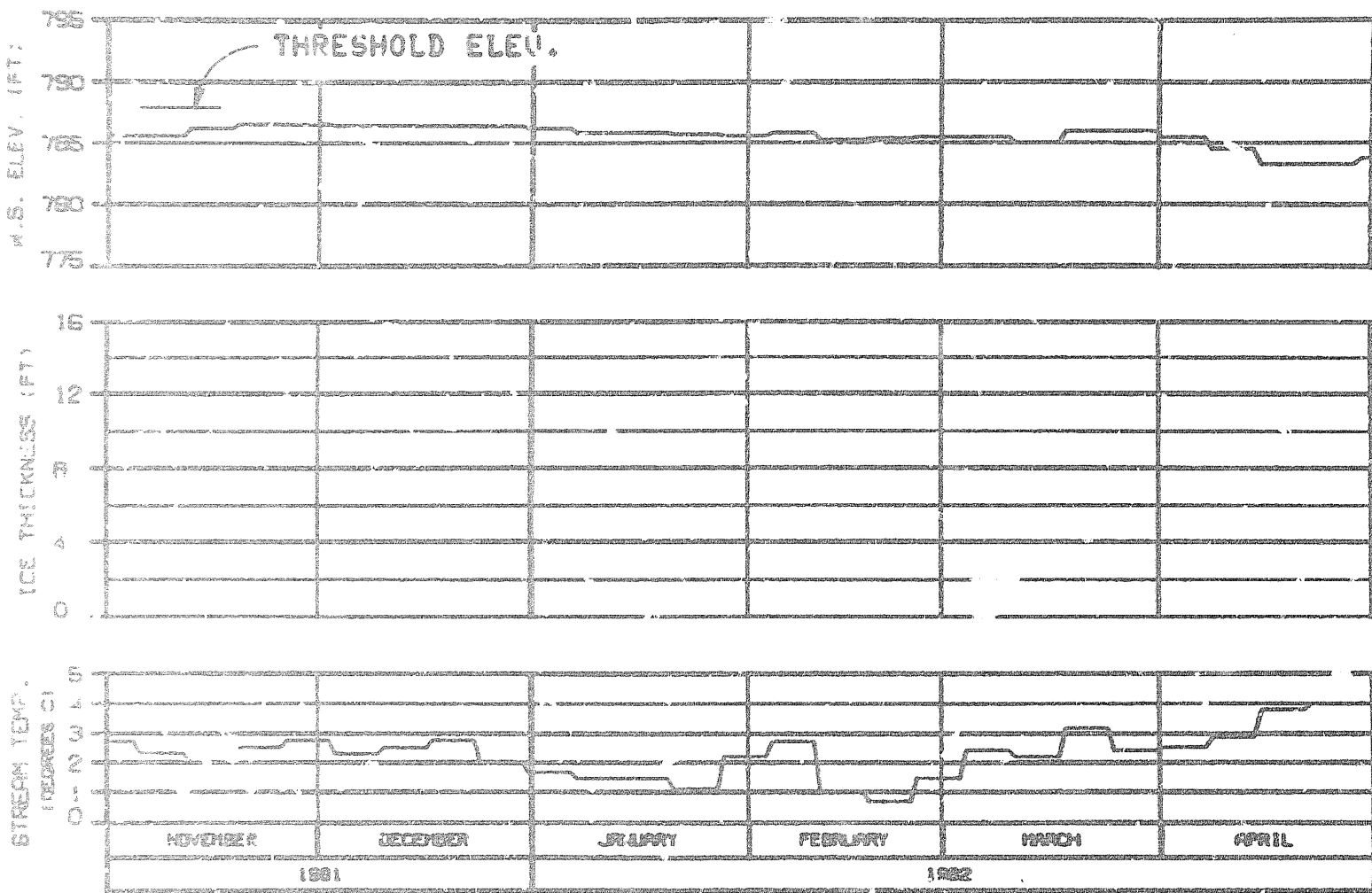


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1800.
 REFERENCE RLIN NO. : 8101CXA

ALASKA POWER AUTHORITY	
QUESTOR PROJECT	
GUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-ERASCO JOINT VENTURE	
DATE: 04/08	FILE NO: 1000.148



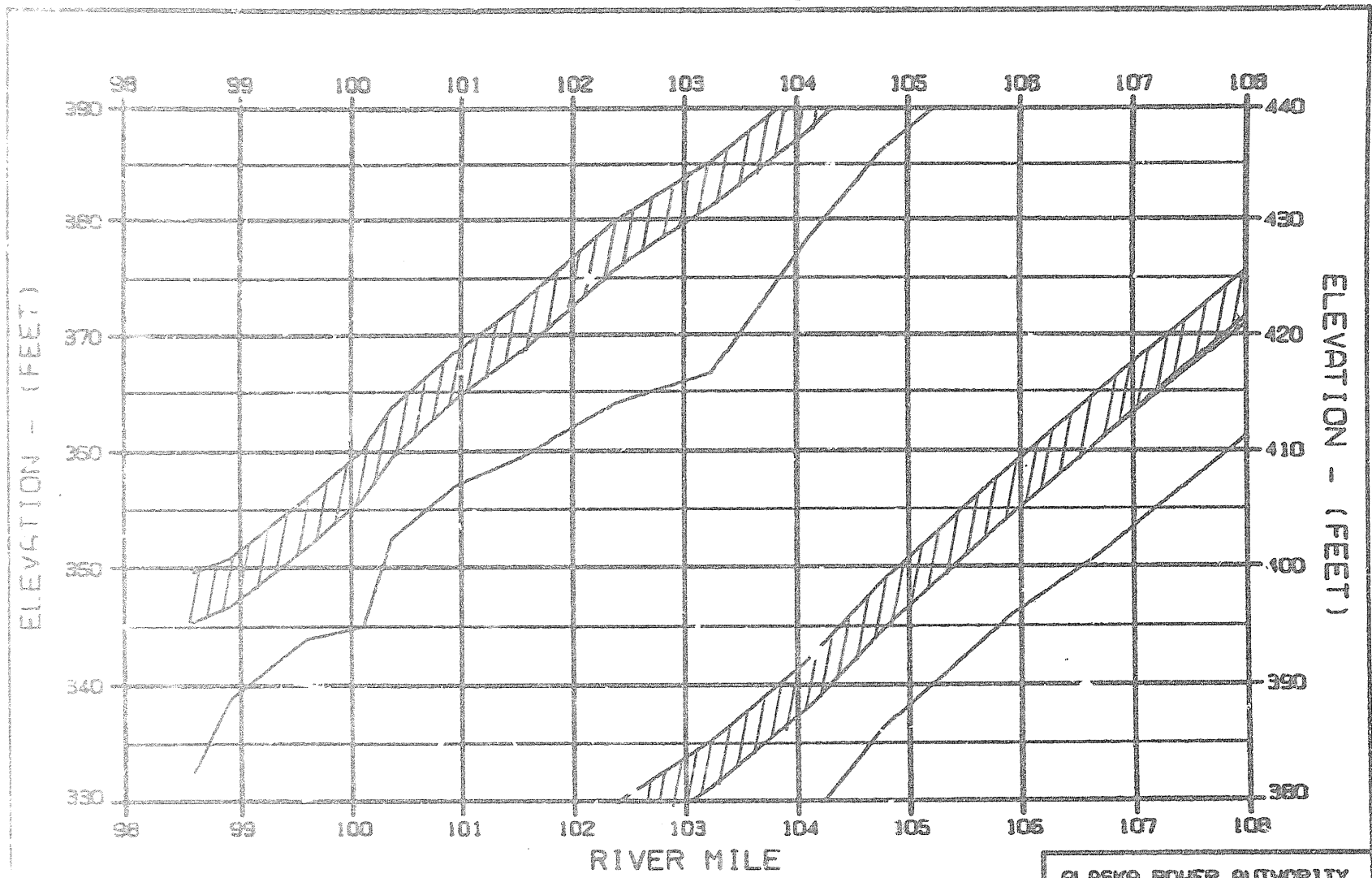
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 BULKY COMPONENT



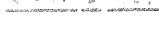
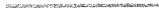
WEATHER PERIOD : ; NOV 81 - 30 APR 82
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. CL 1800.
 REFERENCE RUN NO. : 8101CXA

ALASKA POWER AUTHORITY	
PROJECT NO.	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
NARDA-ERASCO JOINT VENTURE	
OWNER: ALASKA	7 FEB 82
	1981.148

EXHIBIT L



LEGEND:

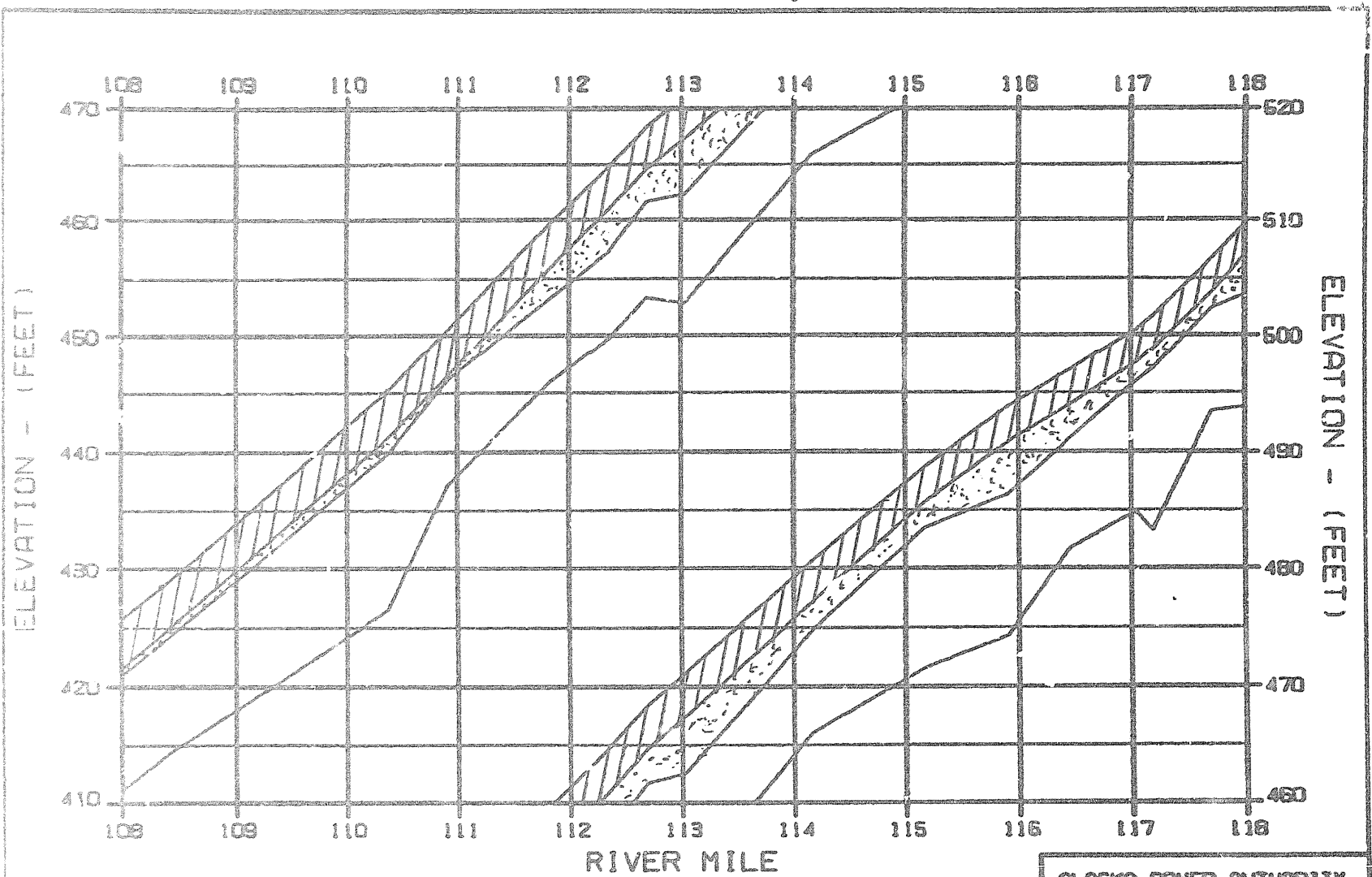
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

HEAT PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1980. APPROACH 1980.
 REFERENCE RUN NO. : 7101CXD





ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
NARVA-EBASCO JOINT VENTURE		
DESIGNED BY	DATE	NO.
ALP/CS	18 JAN 72	142

OPTION?

C



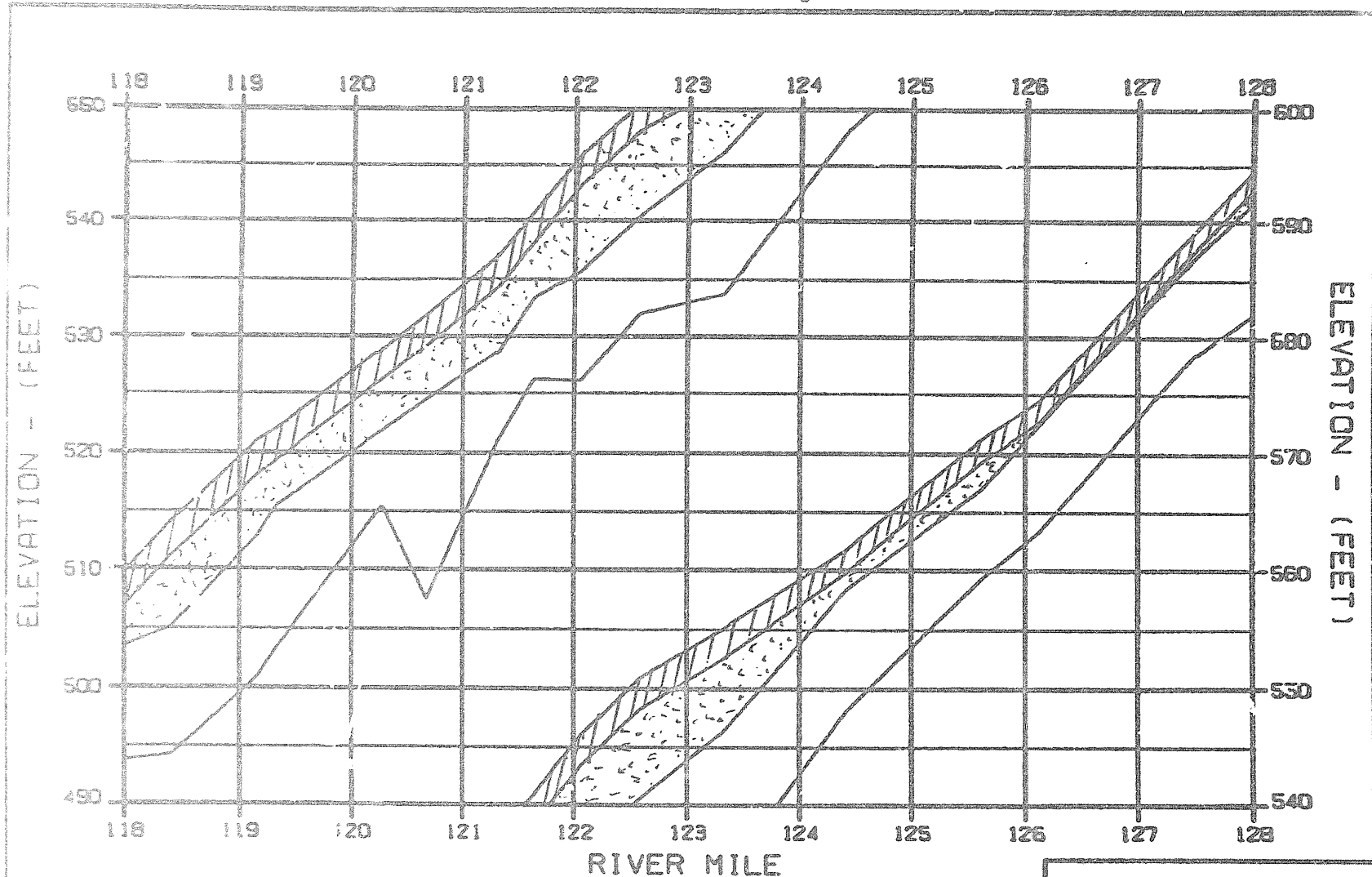
LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1980. APPROACH 1980.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
SUBINA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WAZA-EBASCO JOINT VENTURE	
DATE: 11/18/80	1000.142

DRILLON?

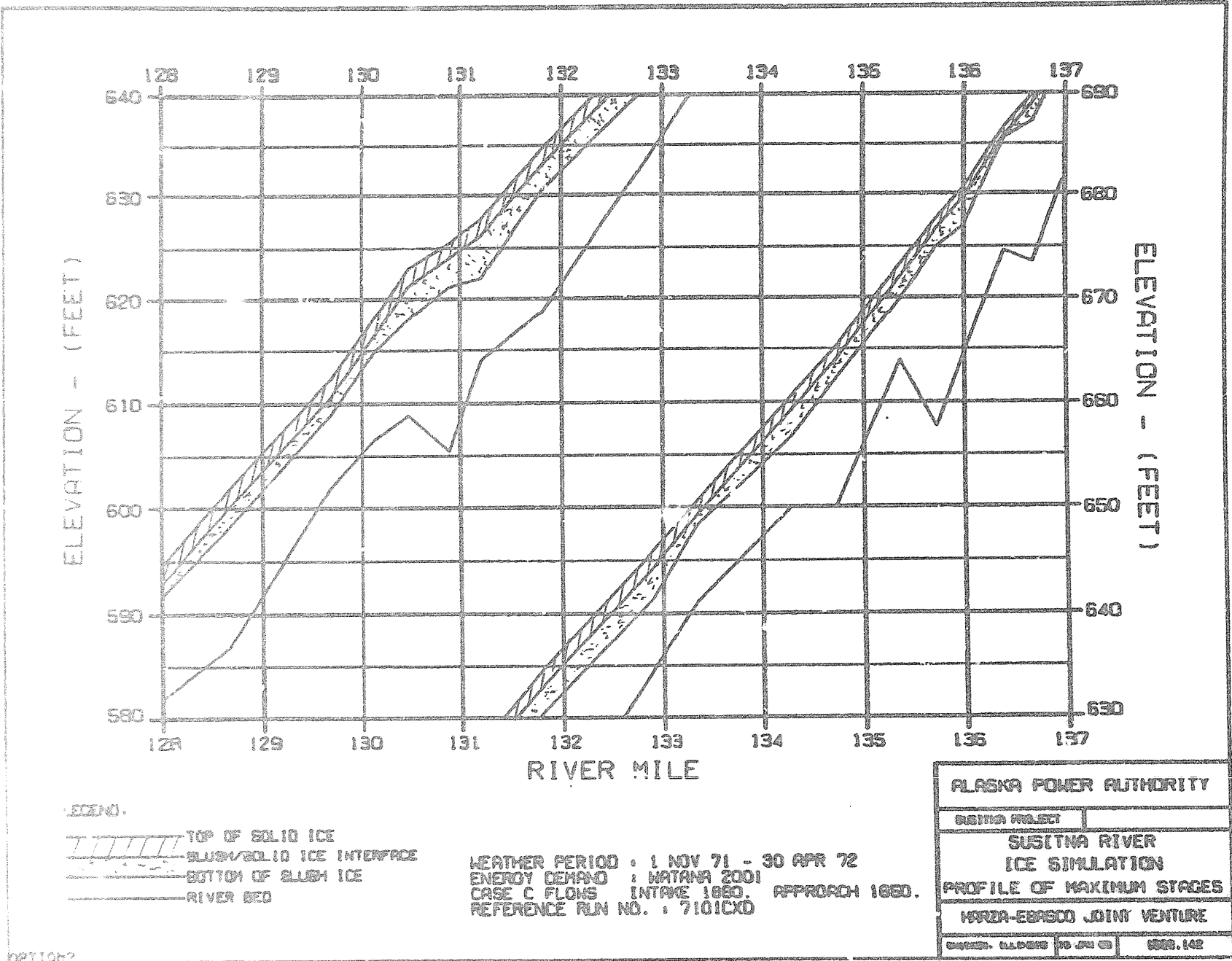


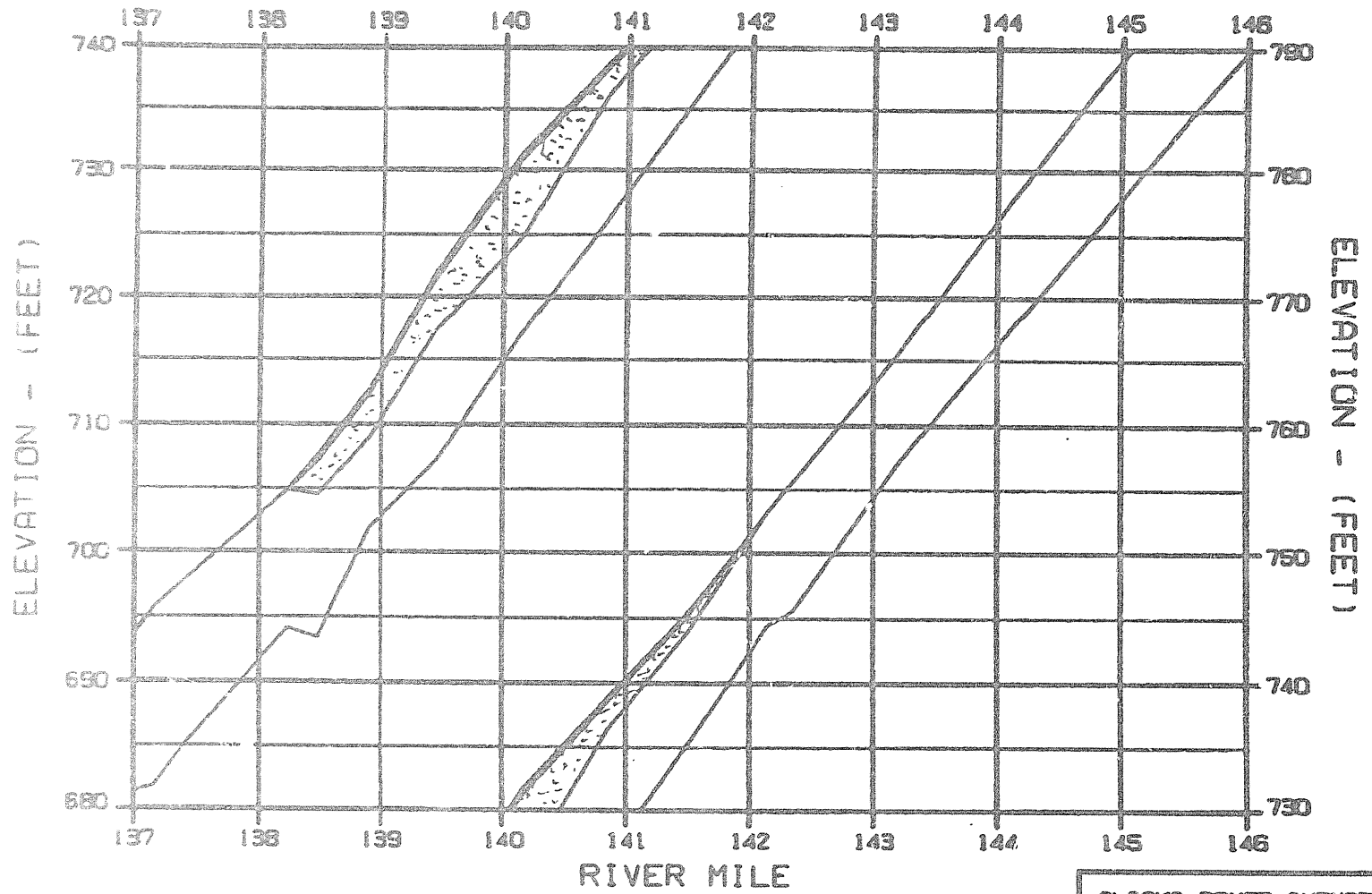
LEGEND:
 [Hatched] TOP OF SOLID ICE
 [Dotted] SLUSH/SOLID ICE INTERFACE
 [Stippled] BOTTOM OF SLUSH ICE
 [Solid] RIVER BED

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1950, APPROACH 1950.
 REFERENCE RUN NO. : 7101FY3



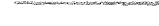

ALASKA POWER AUTHORITY	
GUSTINA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EDRACO JOINT VENTURE	
DATE: 04/08/72	BY: JFM/72
NO. 142	

COPYING



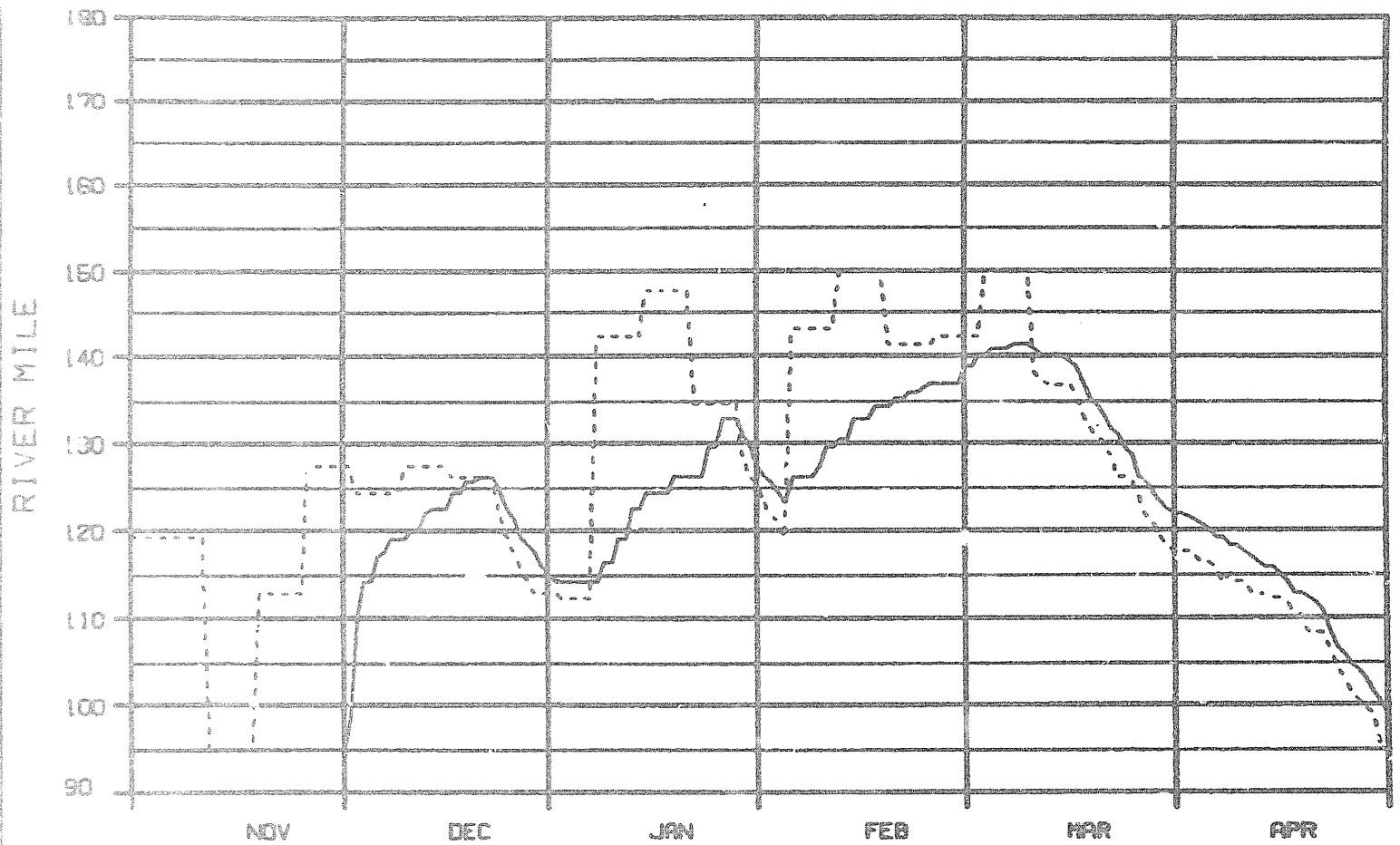


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1980. APPROACH 1950.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
ALBINA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY	DATE
REVISION	NO.

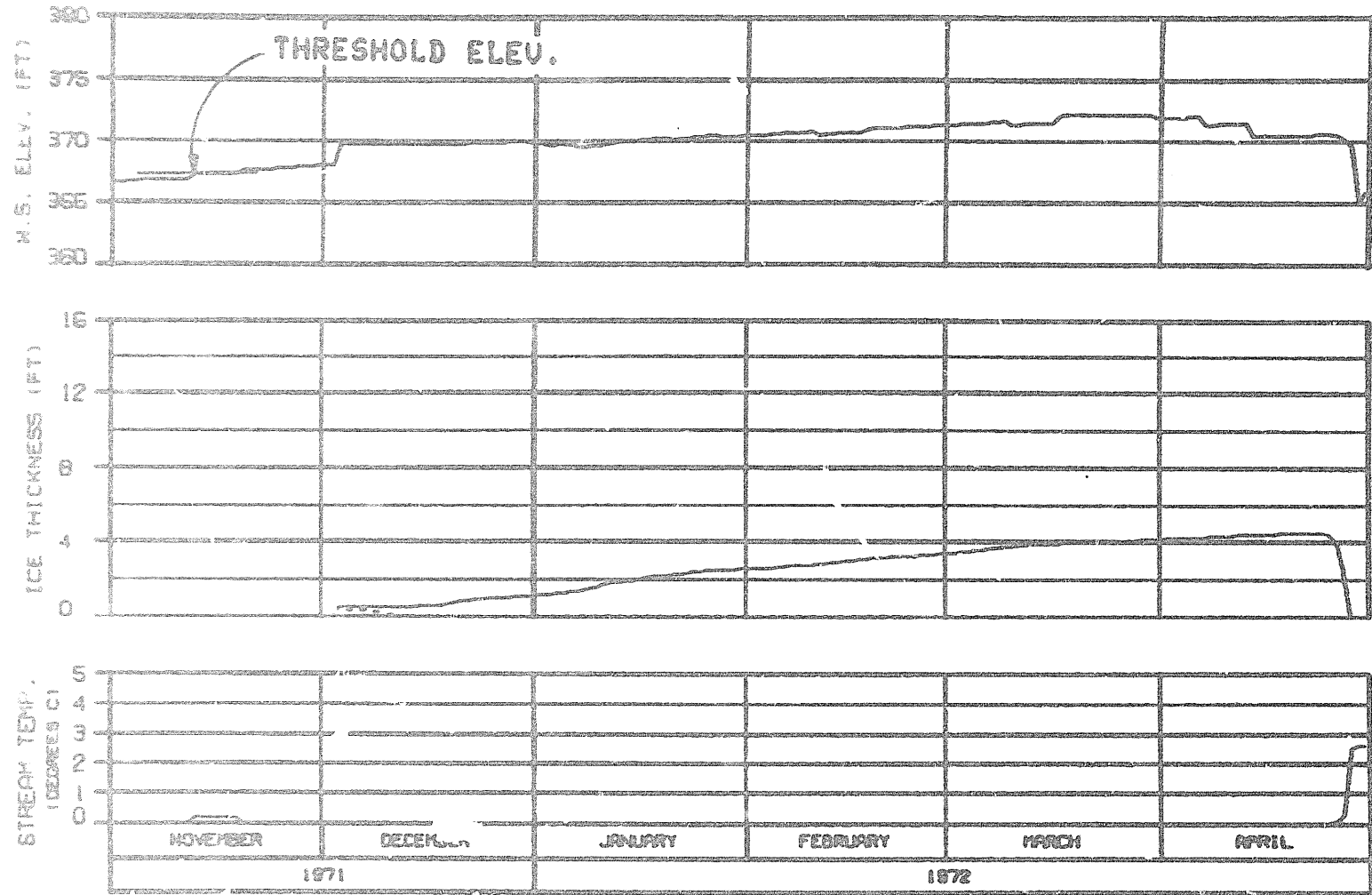


LEGEND:

- ICE FRONT
- - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 FLOW CASE C INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
MURZA-ERASLO JOINT VENTURE		
ORDER - 044000	20 JAN 50	FIG. 142

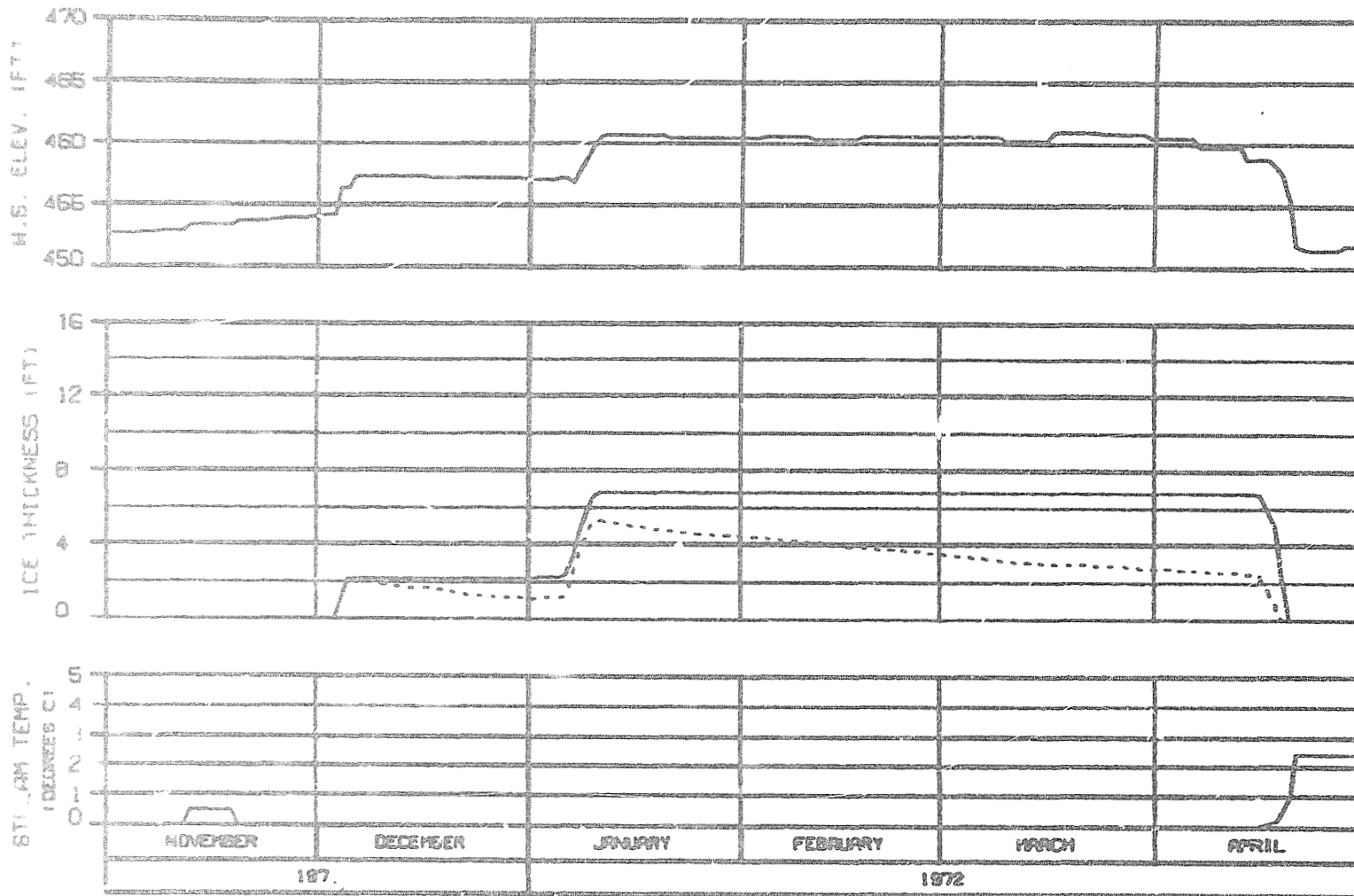


HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

ICE THICKNESS LEGEND:
 ----- TOTAL THIN. 0.33
 - - - - - SLOUGH COMPON. 7

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DATE: 01.04.72	10 00 00
1023.142	

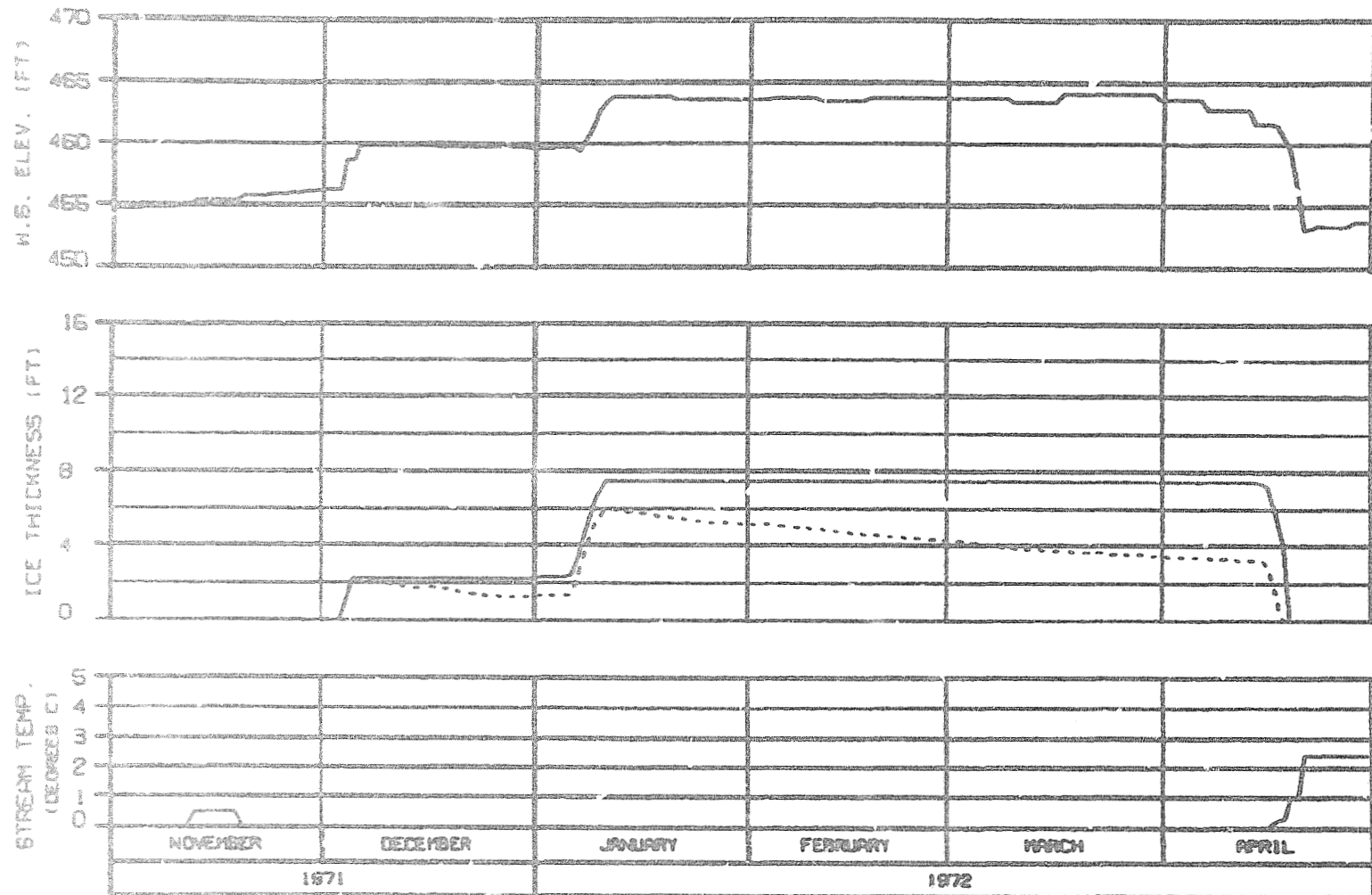


SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CX0

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
CHANDR. BLANCHARD	1000.142

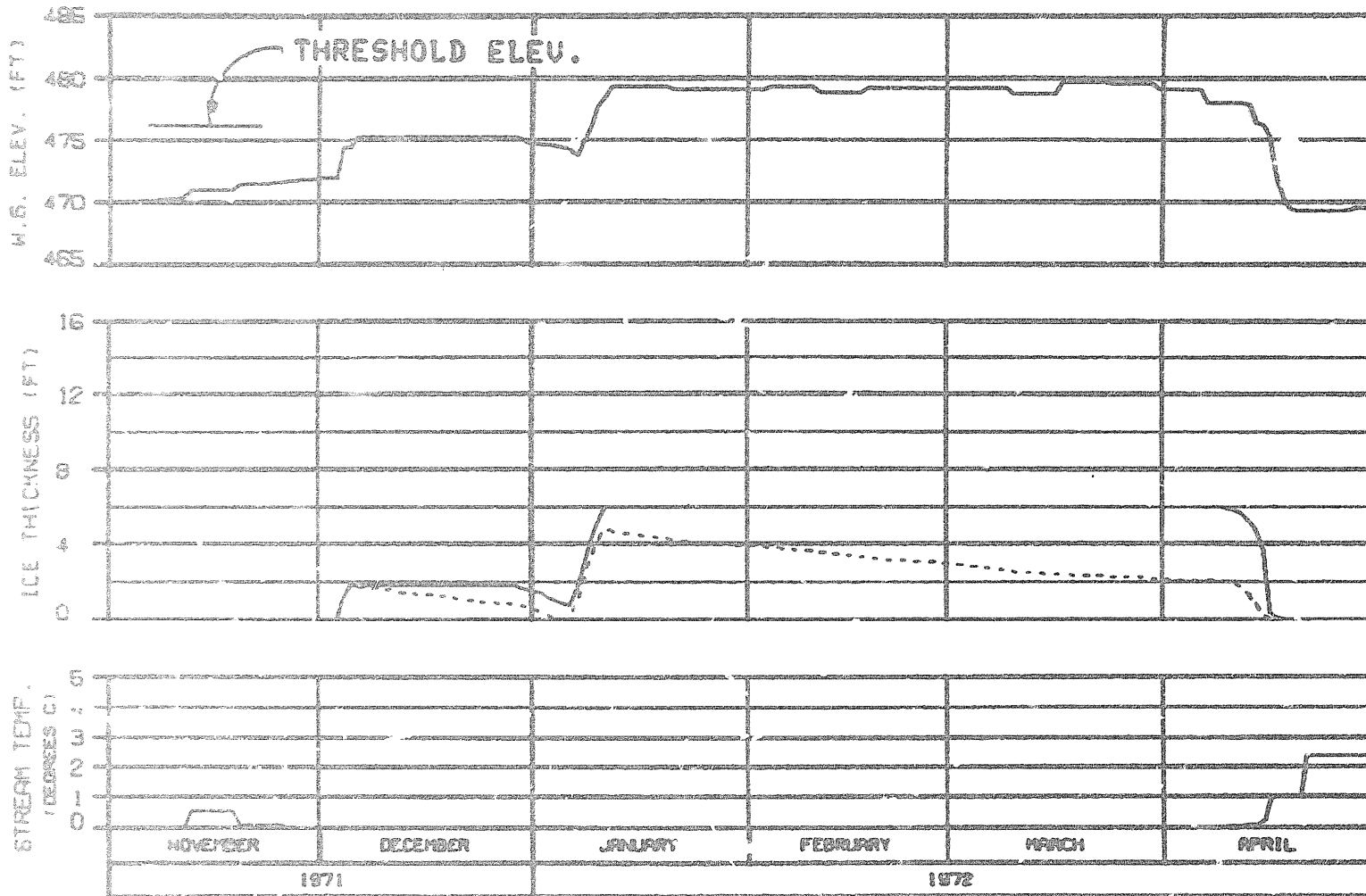


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBSCO JOINT VENTURE		
ORDER - 02-00012	20 APR 72	1850.142

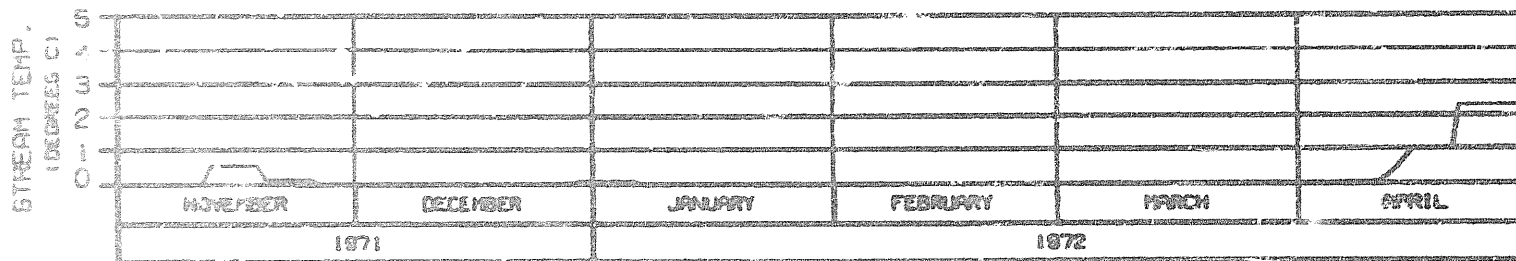
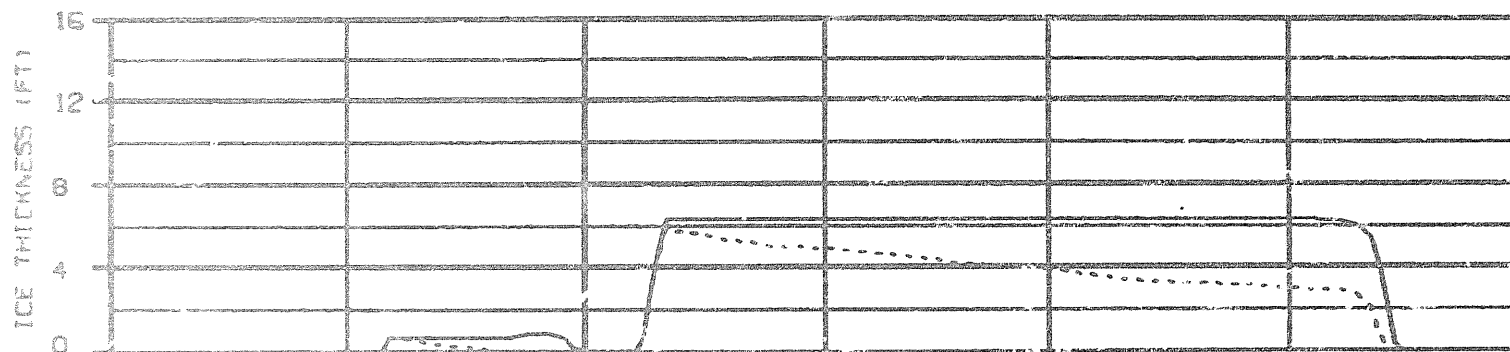
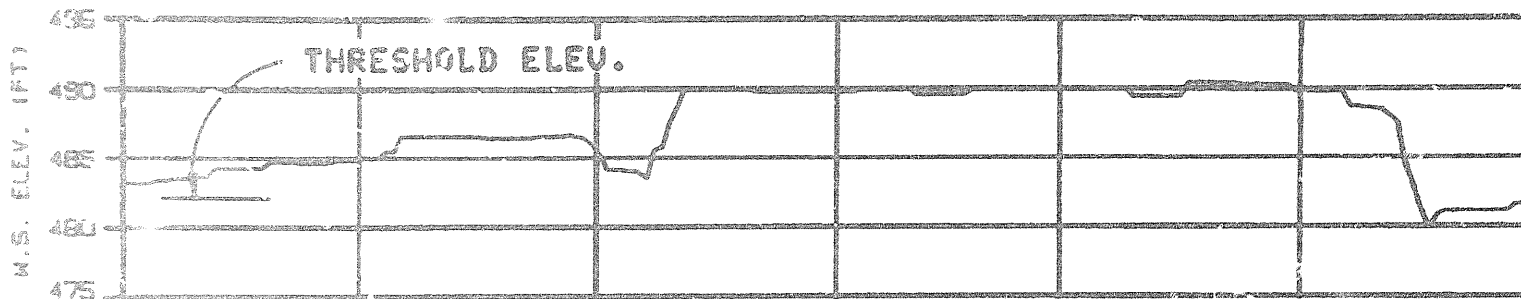


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CX0

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICF SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 04/02/72	BY: JH/CS	222.142

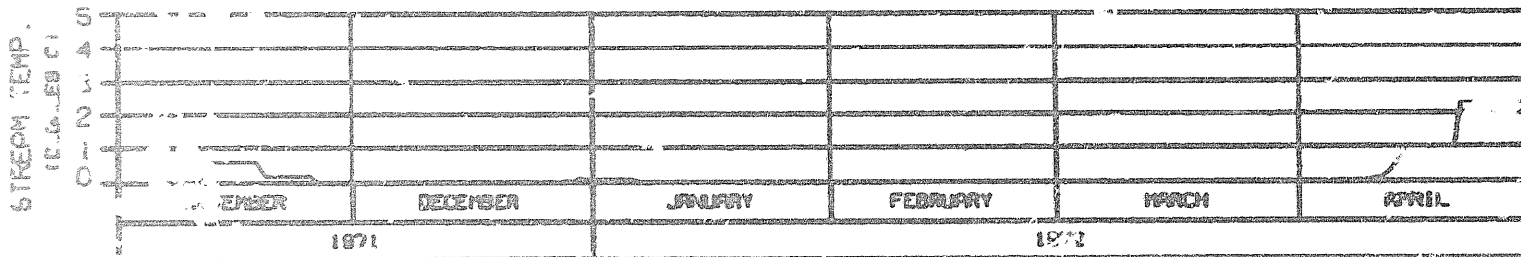
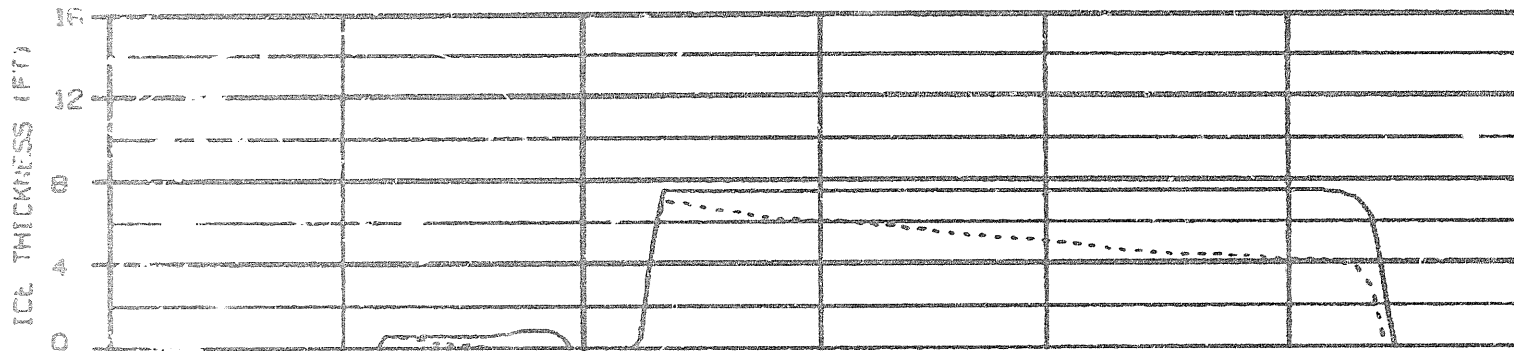
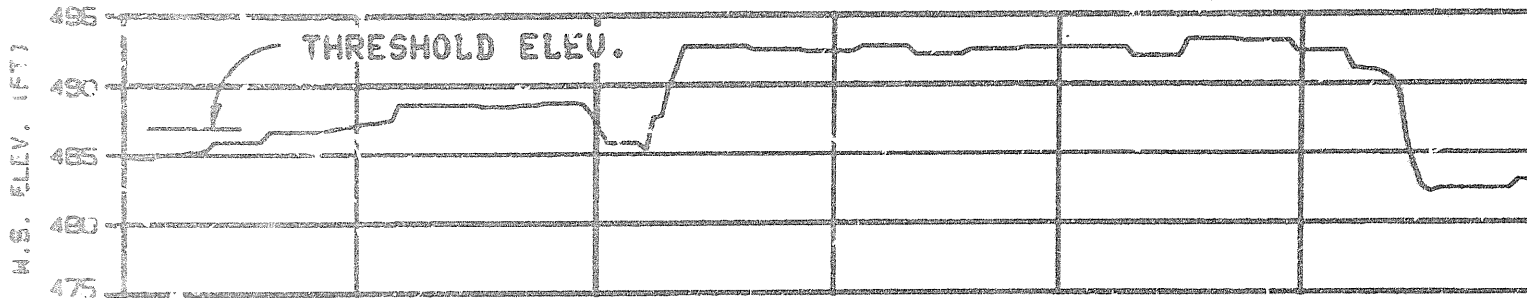


SIDE CHANNEL MSII
RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 710:FXD

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DRAWN: D.L.P. 8/23	30 JAN 72
8550.142	



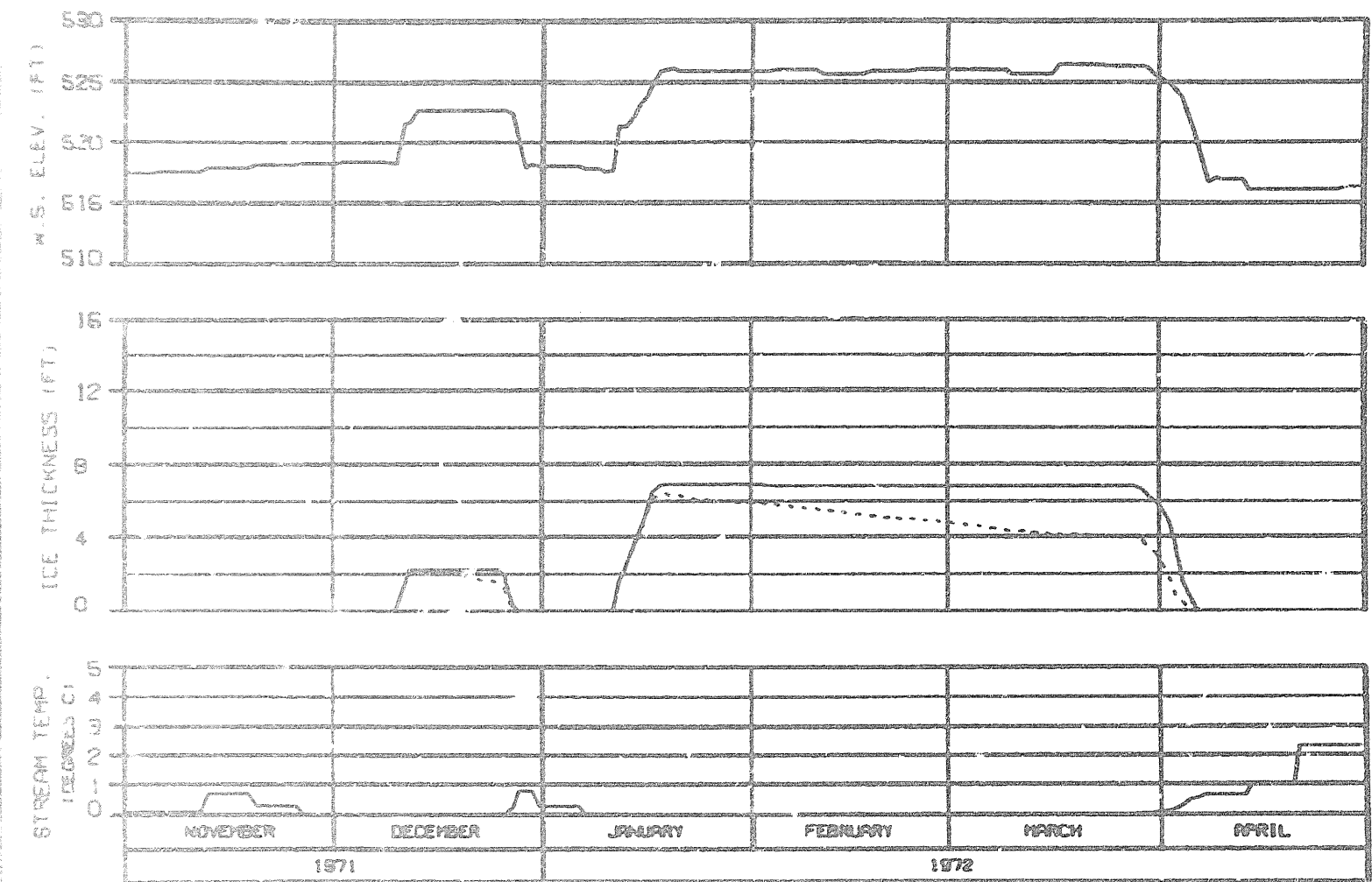
HEAD OF SIDE CHANNEL MSII

RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CX0

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

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
GROUP - ALASKA (NO. 01 03)	1000.142

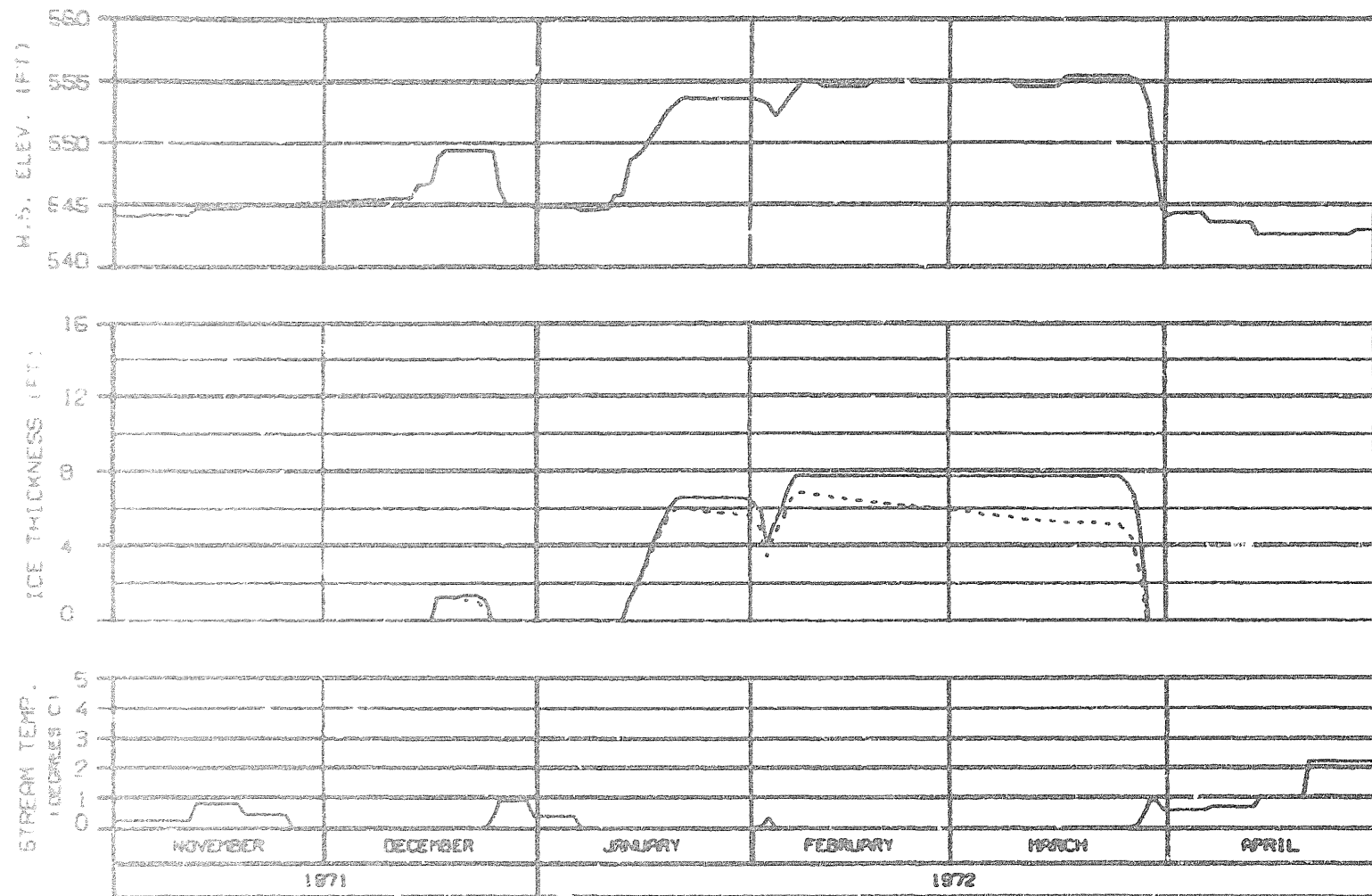


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - GLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
DESIGN. 01.10.00	10 JAN 72	1003.142

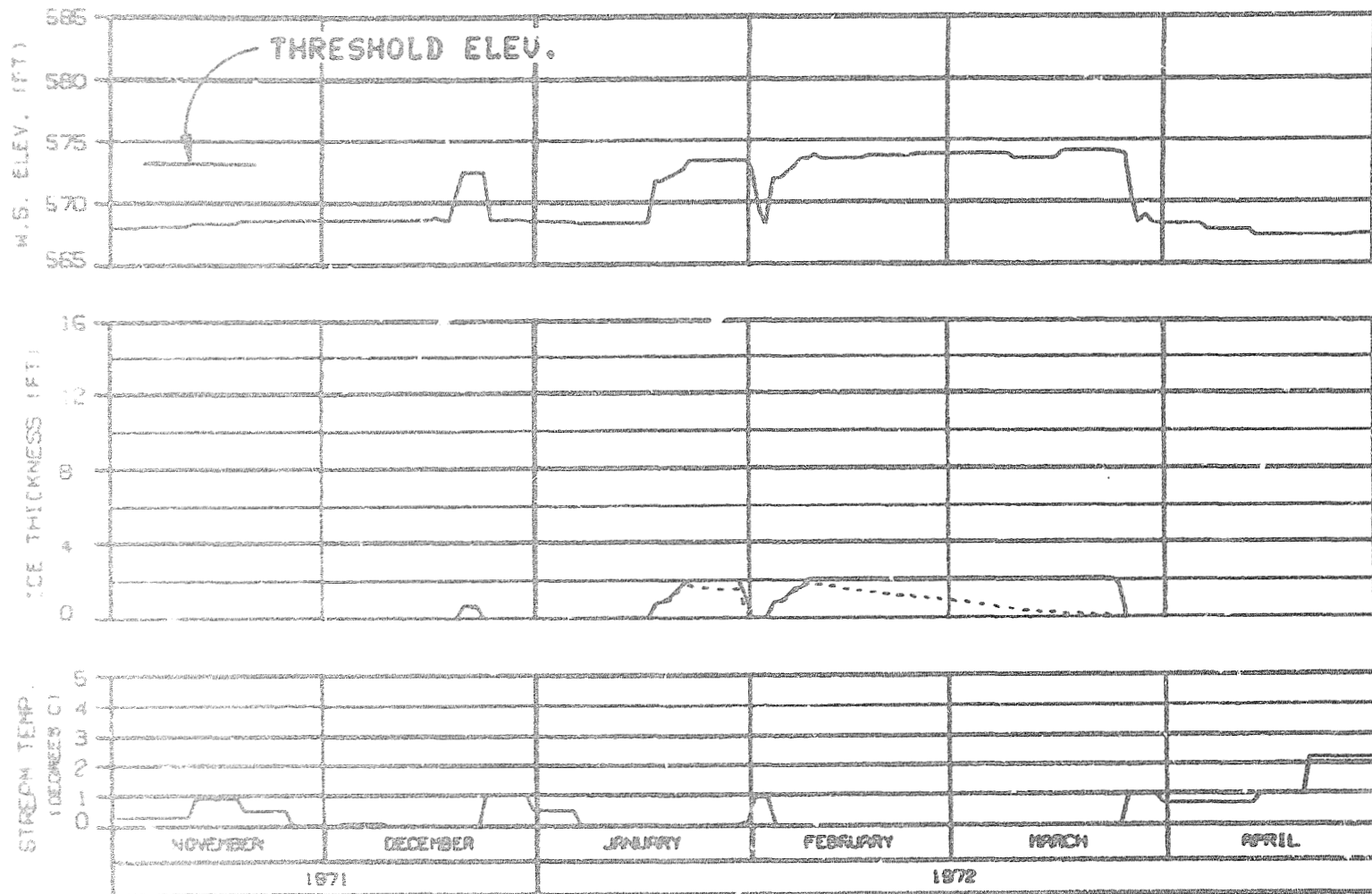


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBERD JOINT VENTURE	
DATE: 11/15/72	1023.142



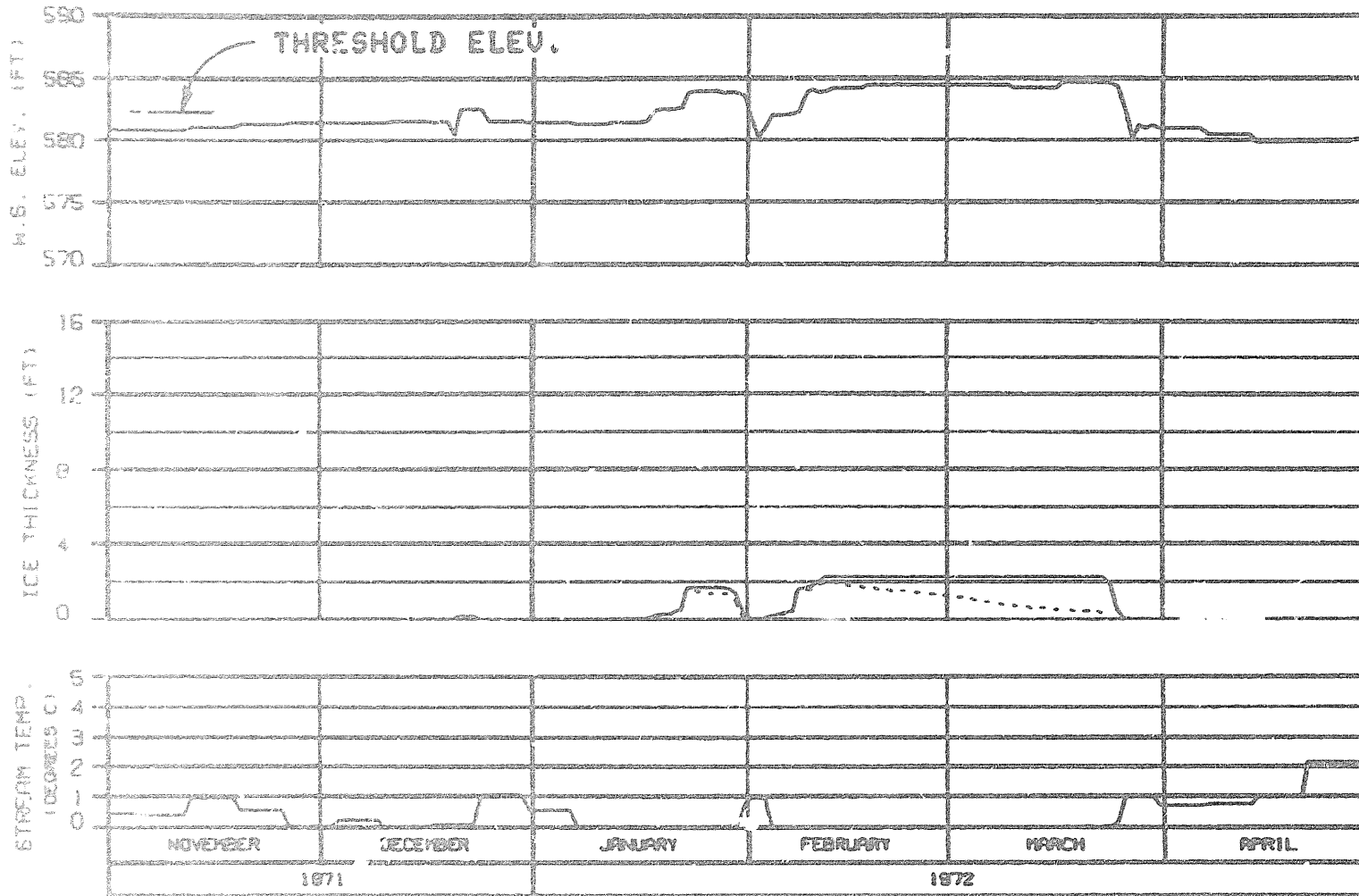
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBERD JOINT VENTURE		
DESIGN: W. P. B. S.	10 JAN 72	1558.142



HEAD OF SLOUGH 8A (EAST)

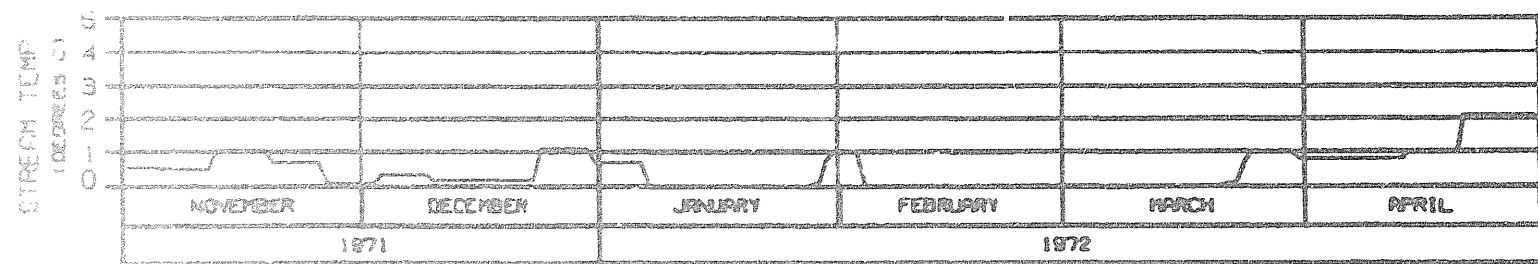
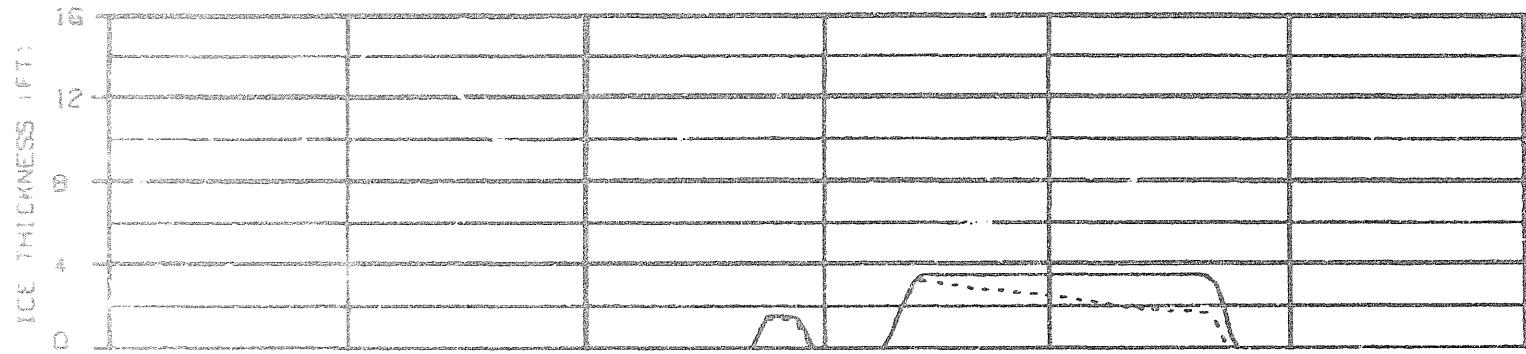
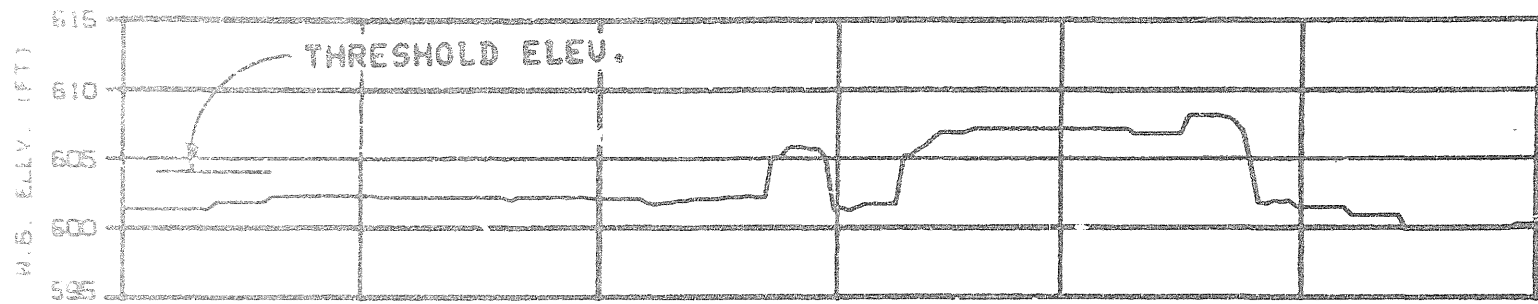
RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 11/28/72	BY: JAC	1000-142

6



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

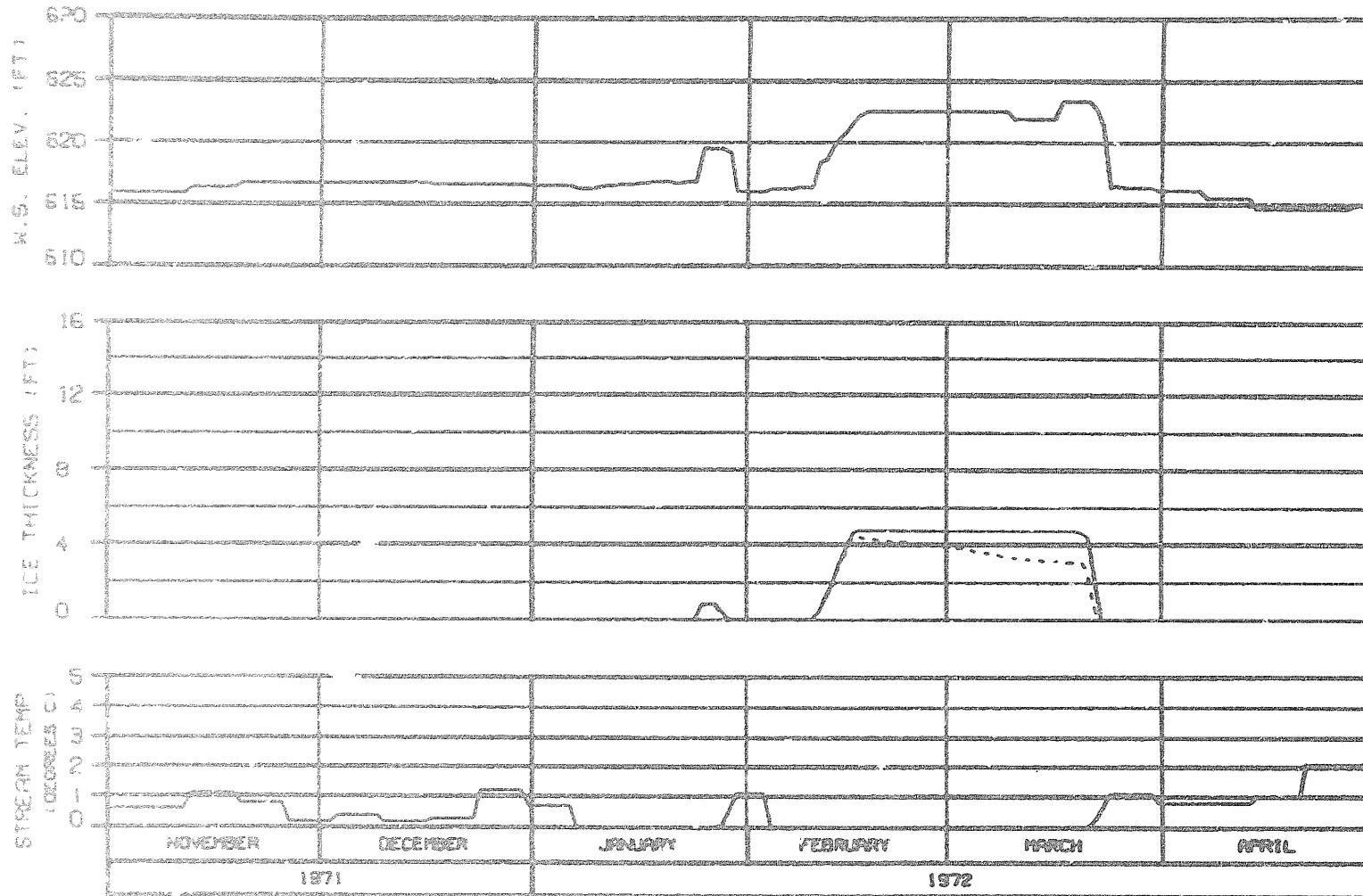
HEAD OF SLOUGH 9
 RIVER MILE : 129.30

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1980, APPROACH 1950.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-ERASCO JOINT VENTURE		
DESIGNED BY	DATE	NO. 142

7101CXD

OPTION 7

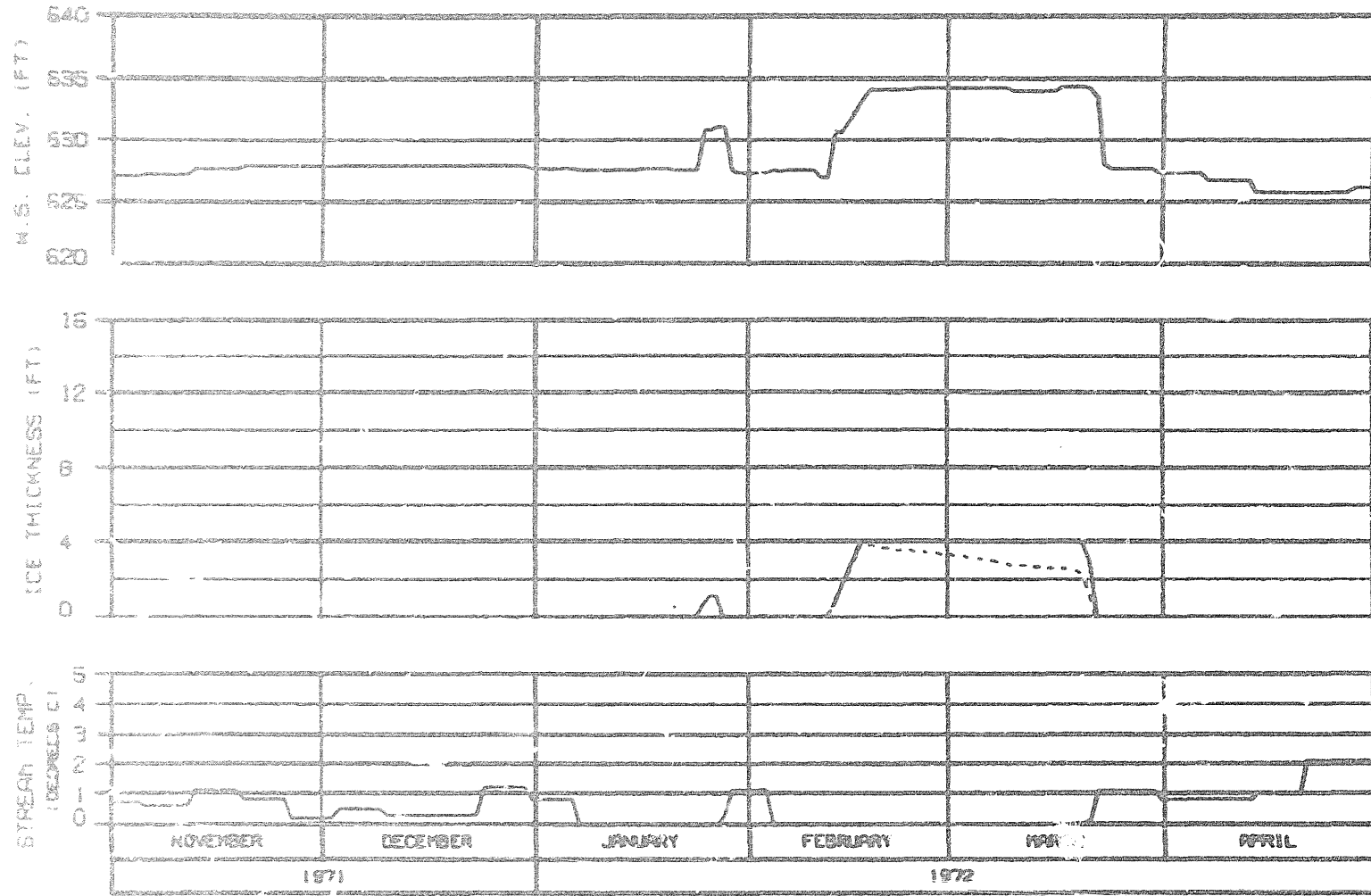


SIDE CHANNEL U/S OF SLOUGH 9
 RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY LEHANO : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
GLACIER PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
DESIGNED BY: D.L. DAVIS	10 APR 72
SHEET 142	

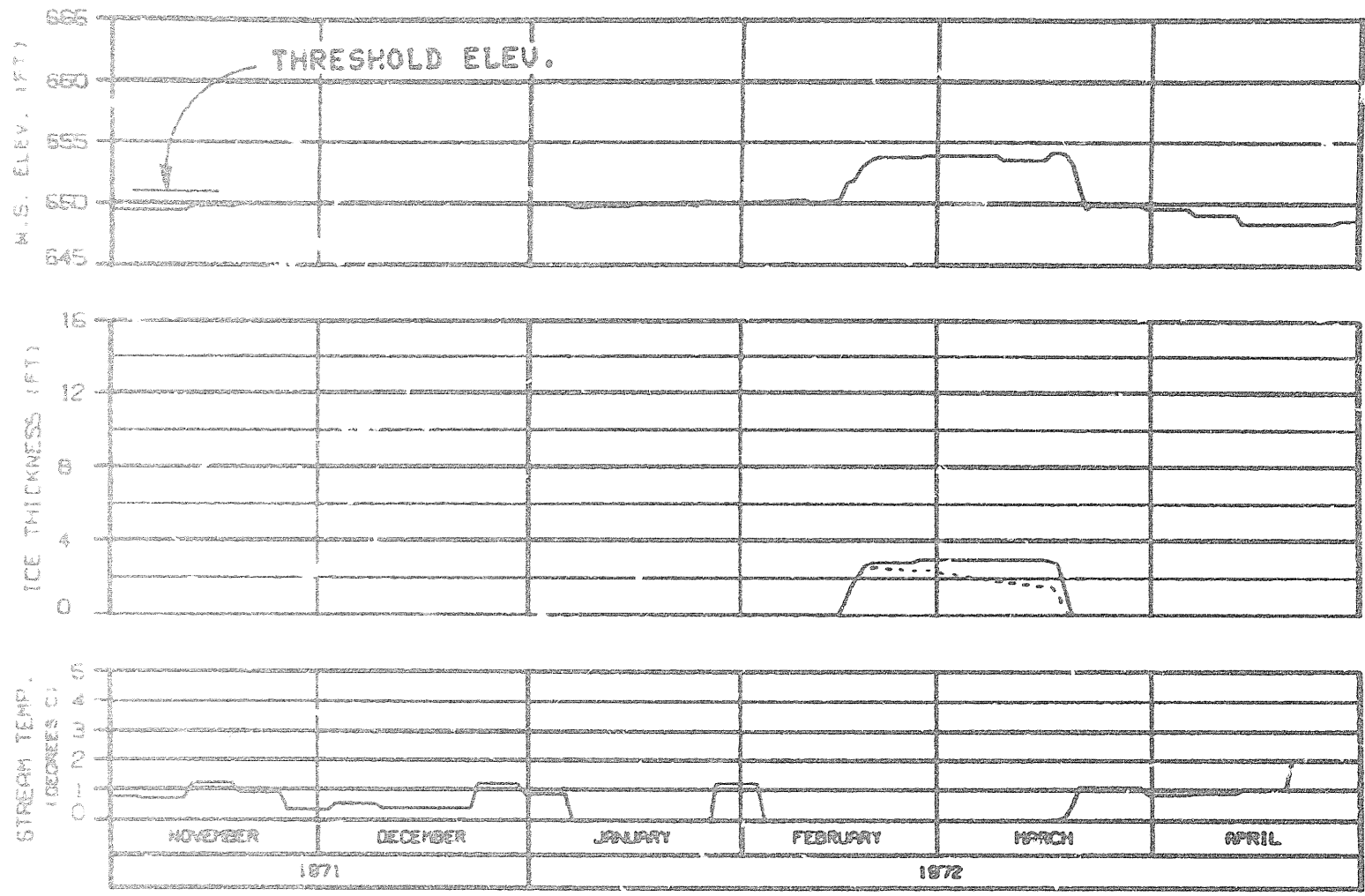


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
ENGINEER: ALP/MSD	10 JUL 82
1982. 112	

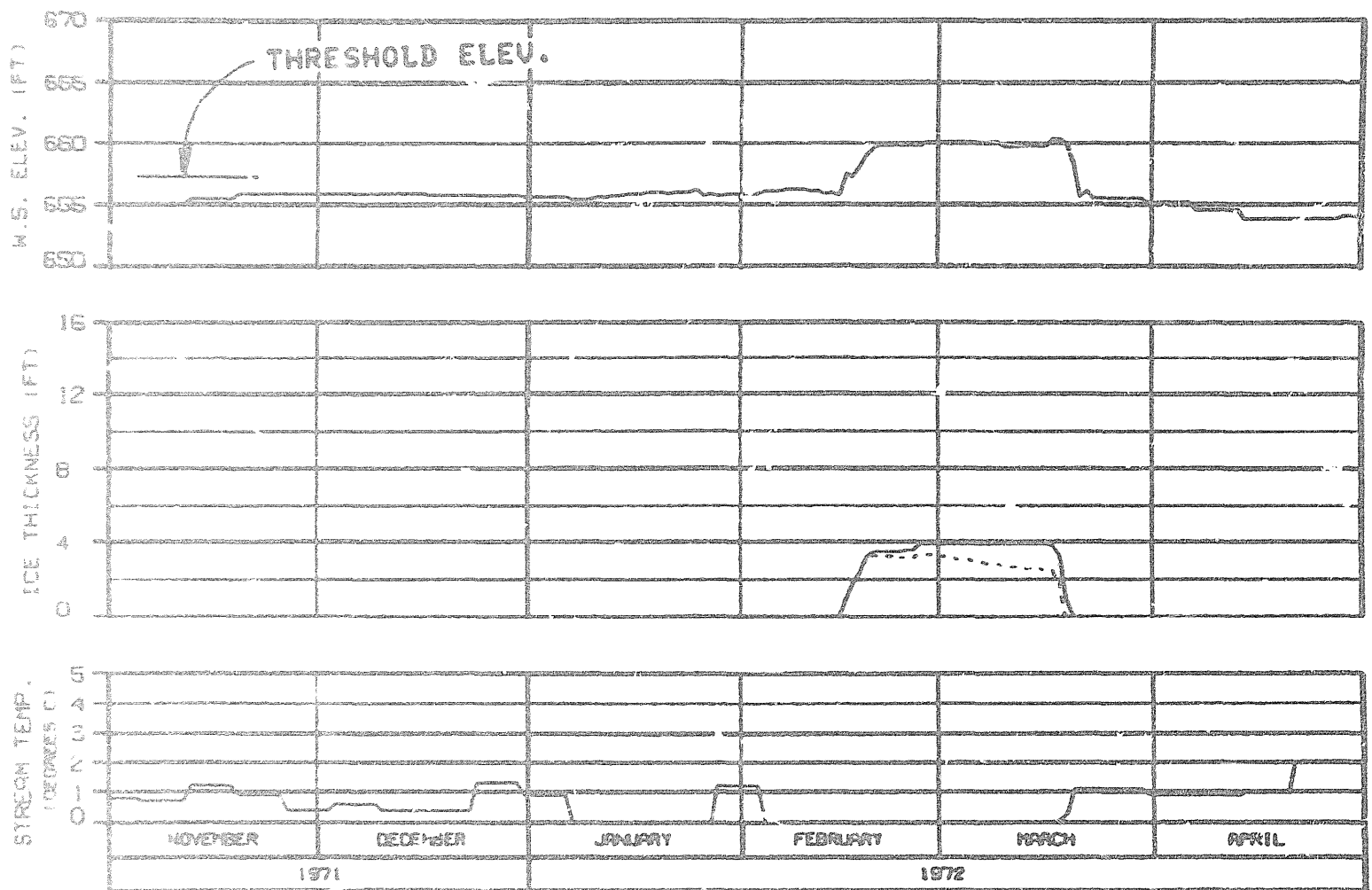


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: ALP/STW	10 JAN 72	ISSN: 142

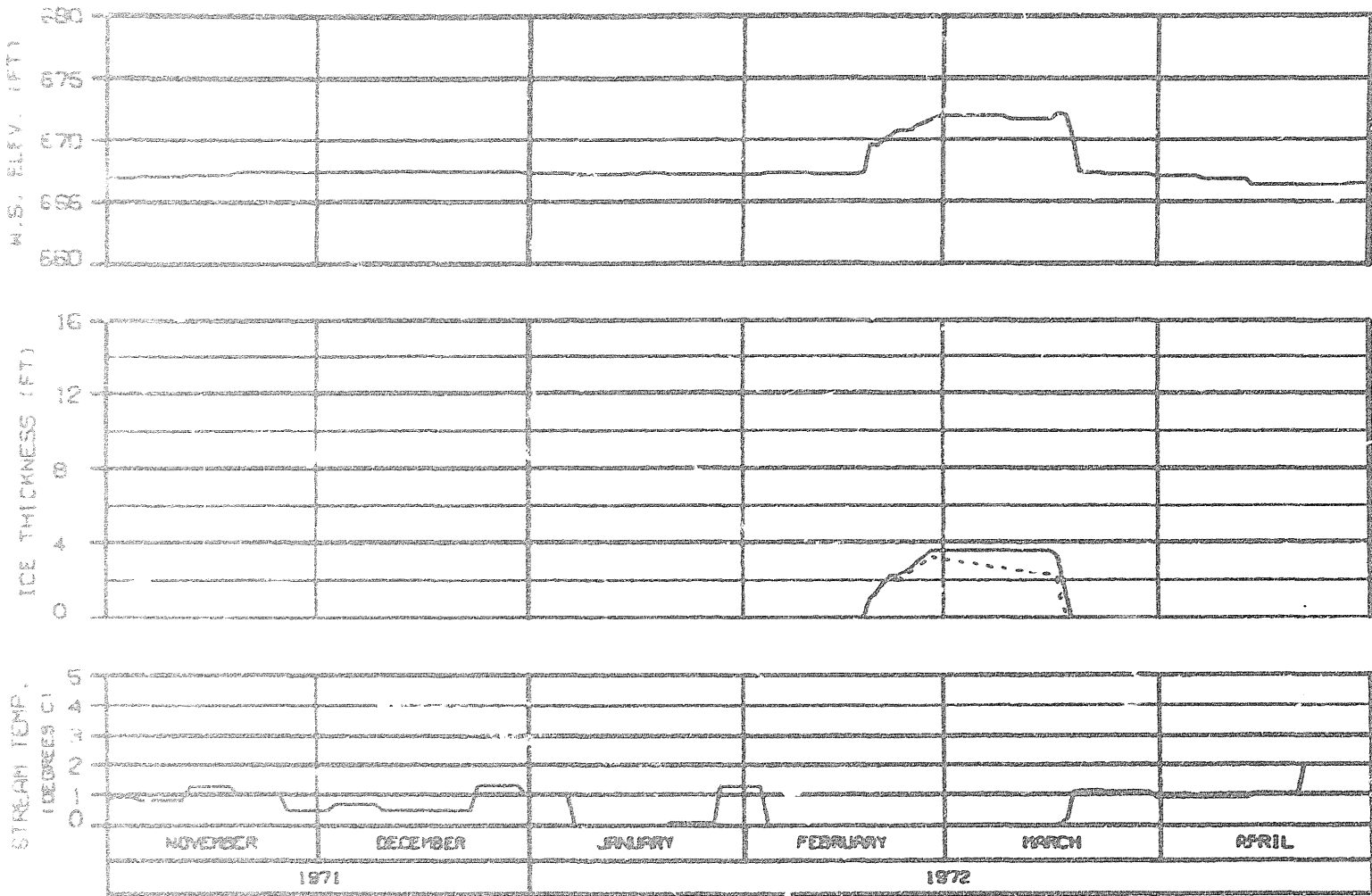


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
DATA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
GRAPH. PLANS	15 JAN 72
1000.142	

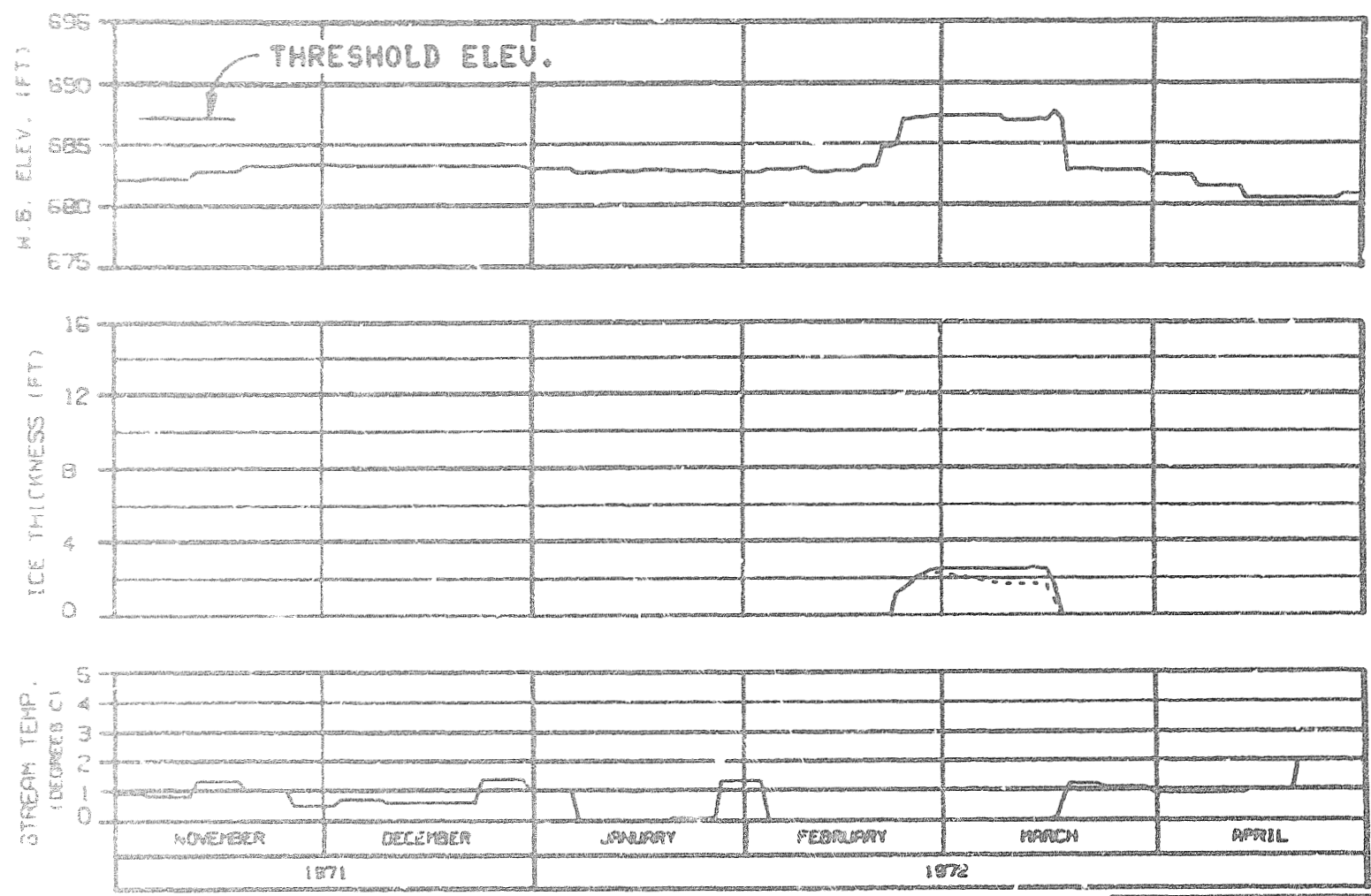


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACO JOINT VENTURE		
ORDER: 110210	10 JUN 72	1008.142

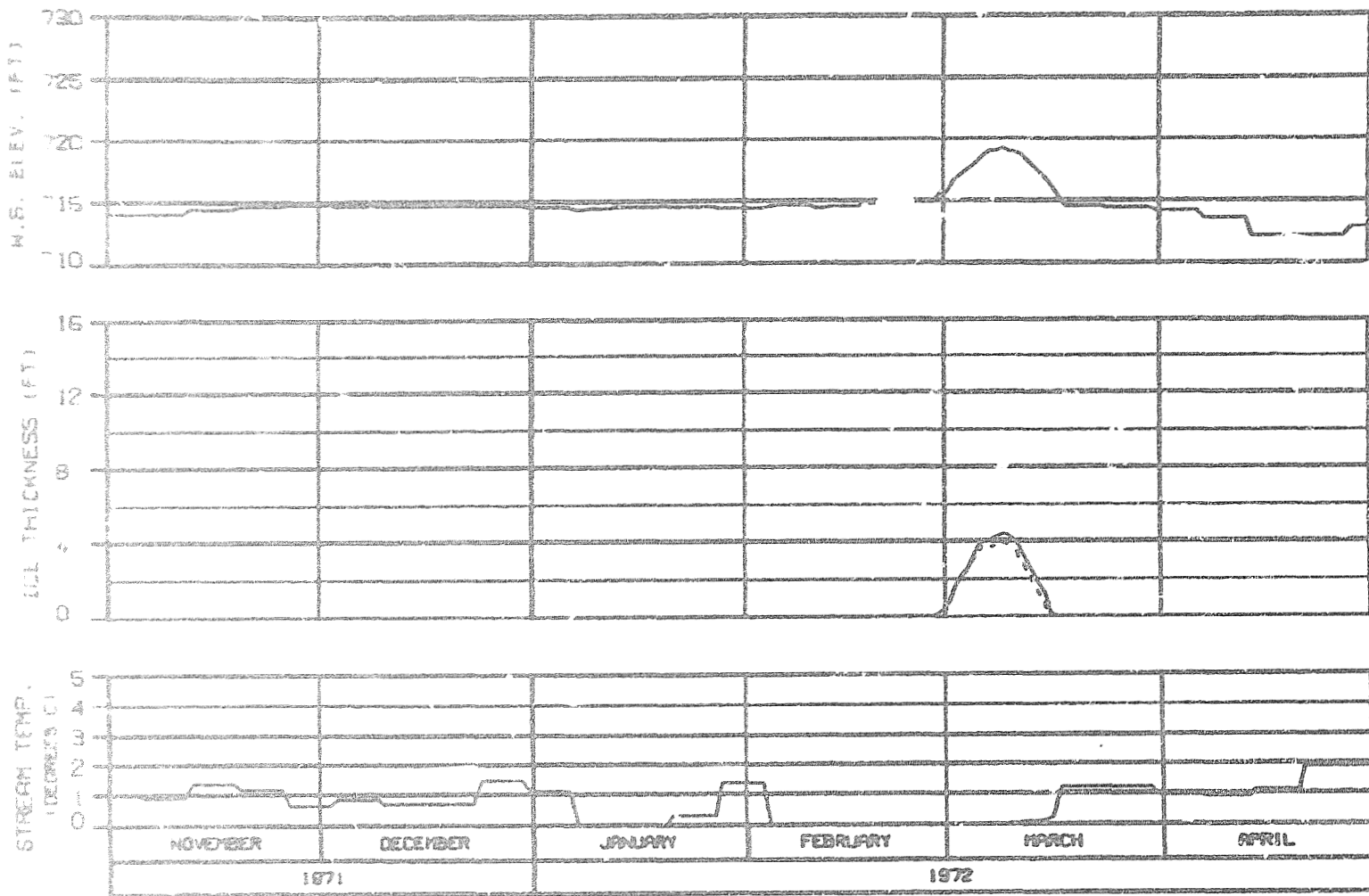


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CX0

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBERSCO JOINT VENTURE		
DATE: 02.08.72	BY: JWC	FIG. 142

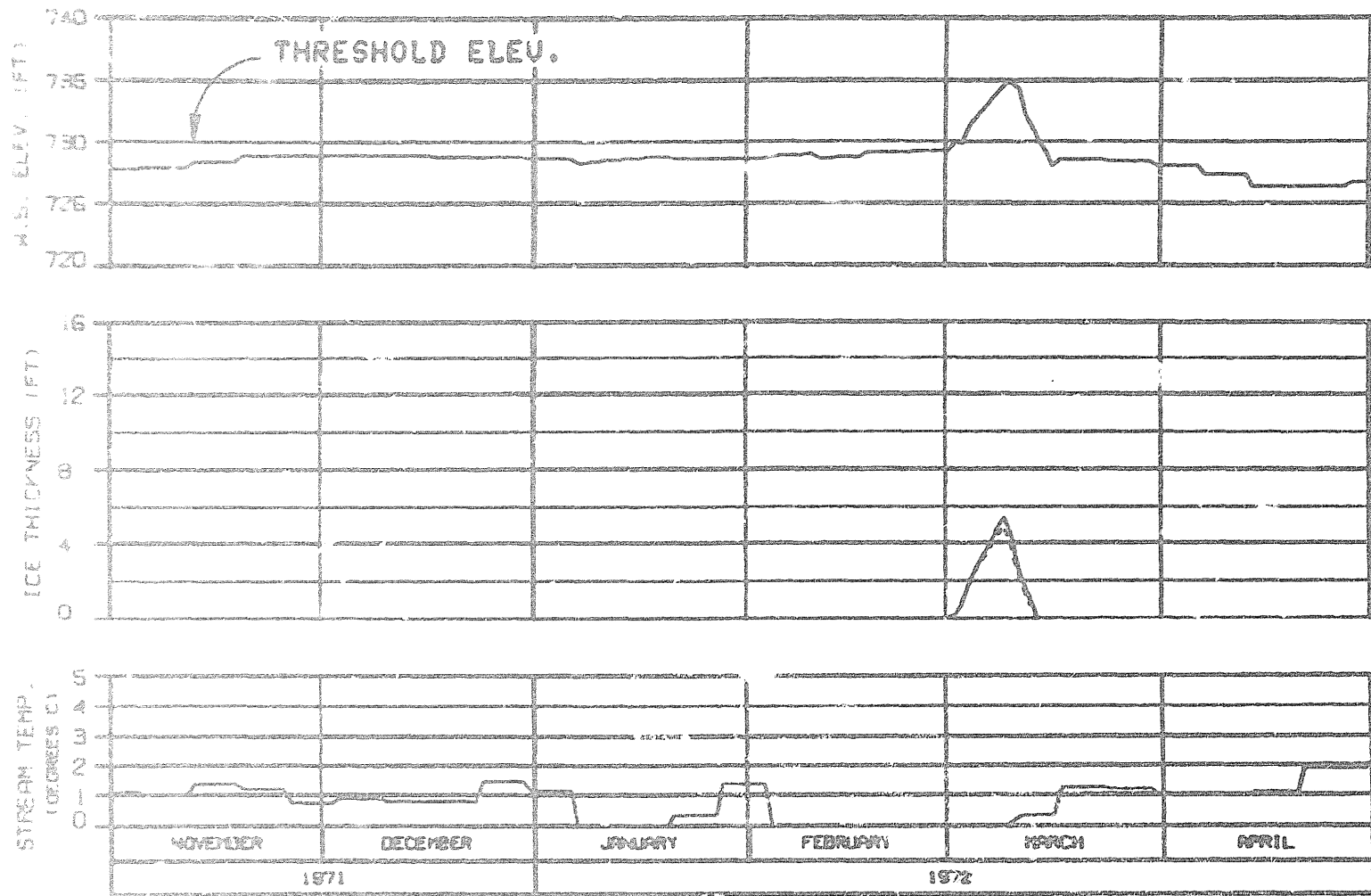


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7101CX0

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBR-JCO JOINT VENTURE	
PROJECT: 445073	ISS. 142

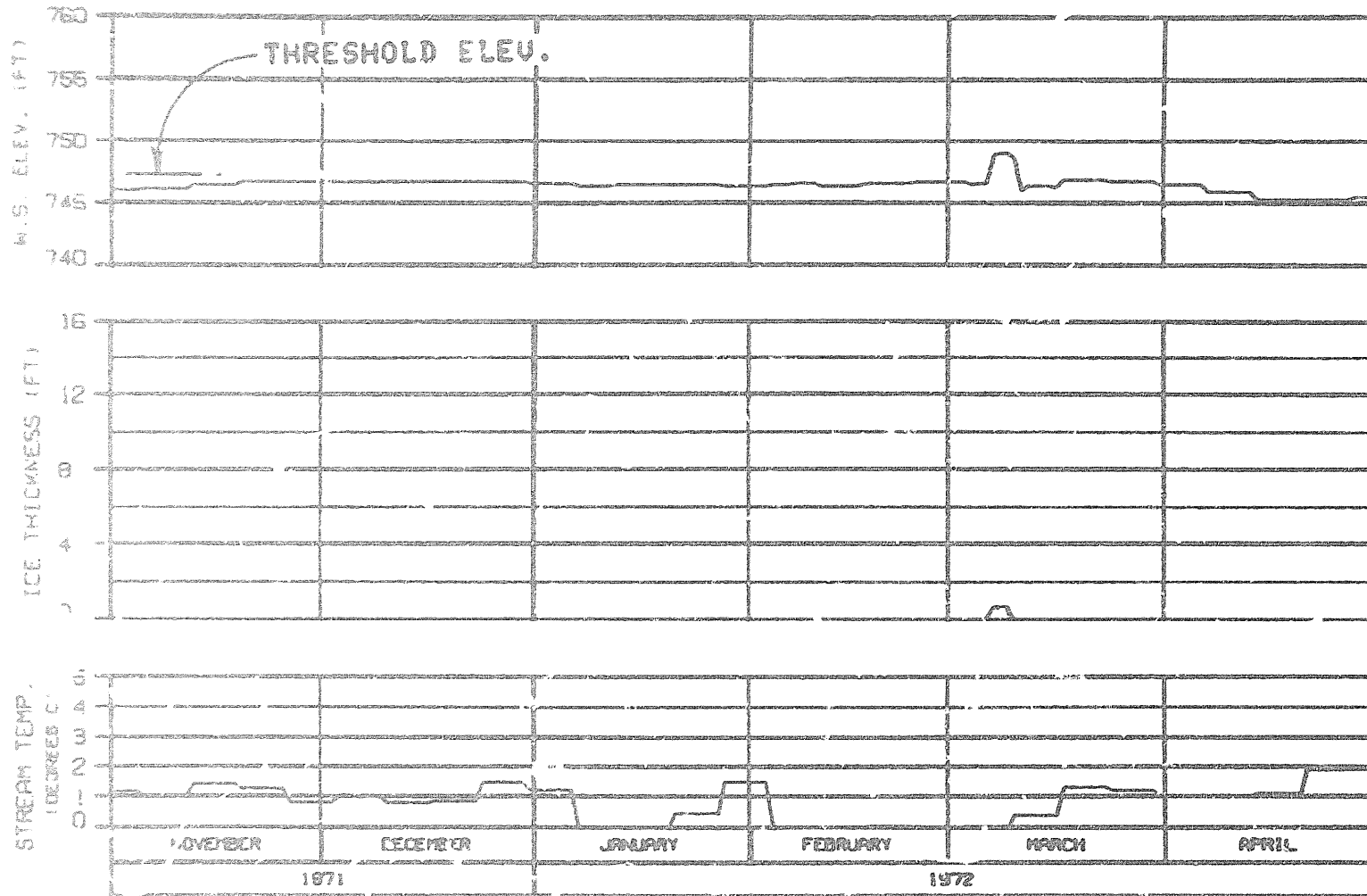


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1850. APRIL 1972
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
ALASKA-EBASCO JOINT VENTURE		
DATE	BY	NO.
11/1/71	JM	1820.142



SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

ICE THICKNESS LEGEND:

----- TOTAL THICKNESS
 - - - - - SLOUGH COMPARTMENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1850. APPROACH 1850.
 REFERENCE RUN NO. : 7:01CXD

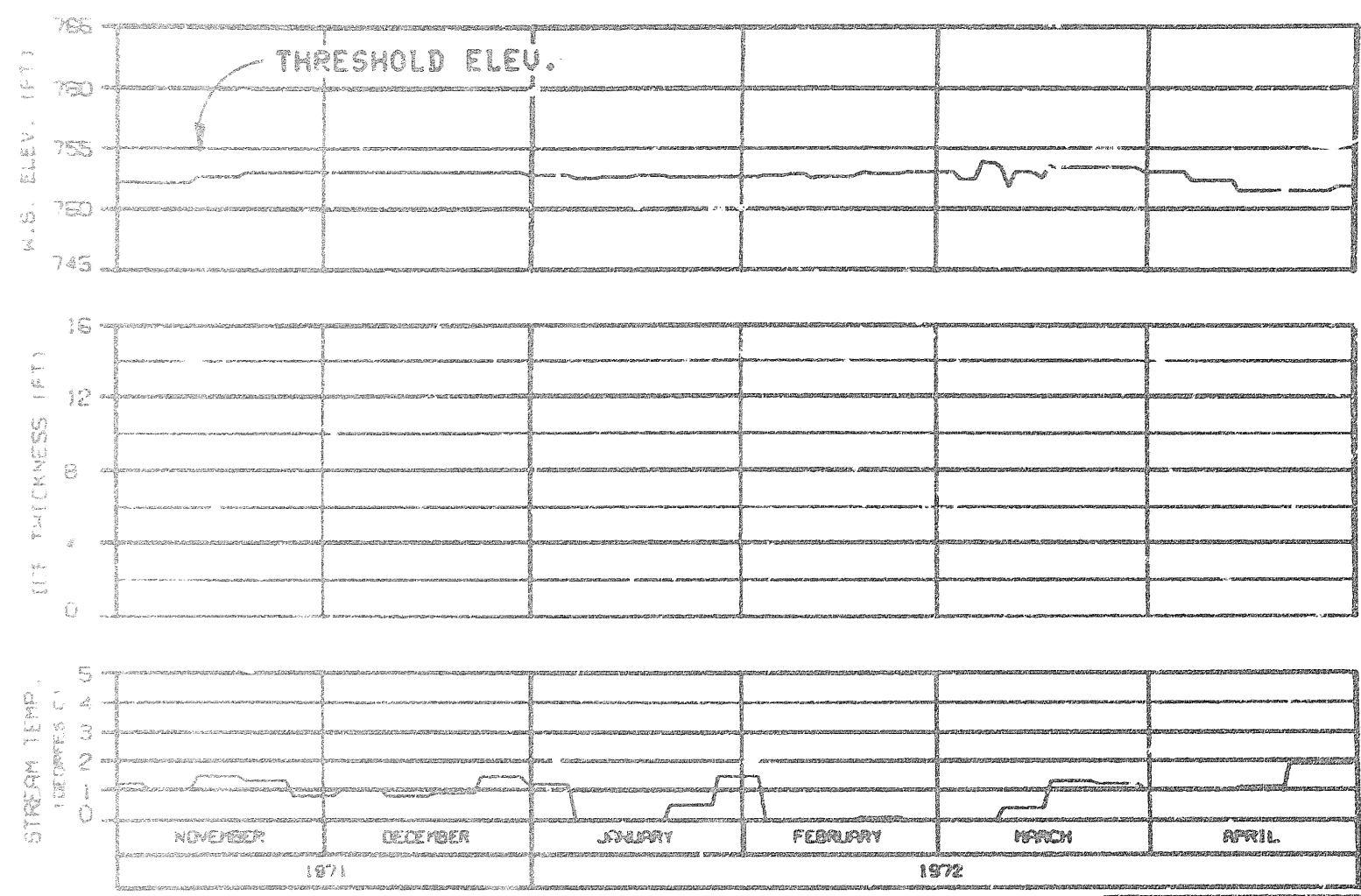
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHECKED: 01/01/72 BY: JAC/GR 1000.142

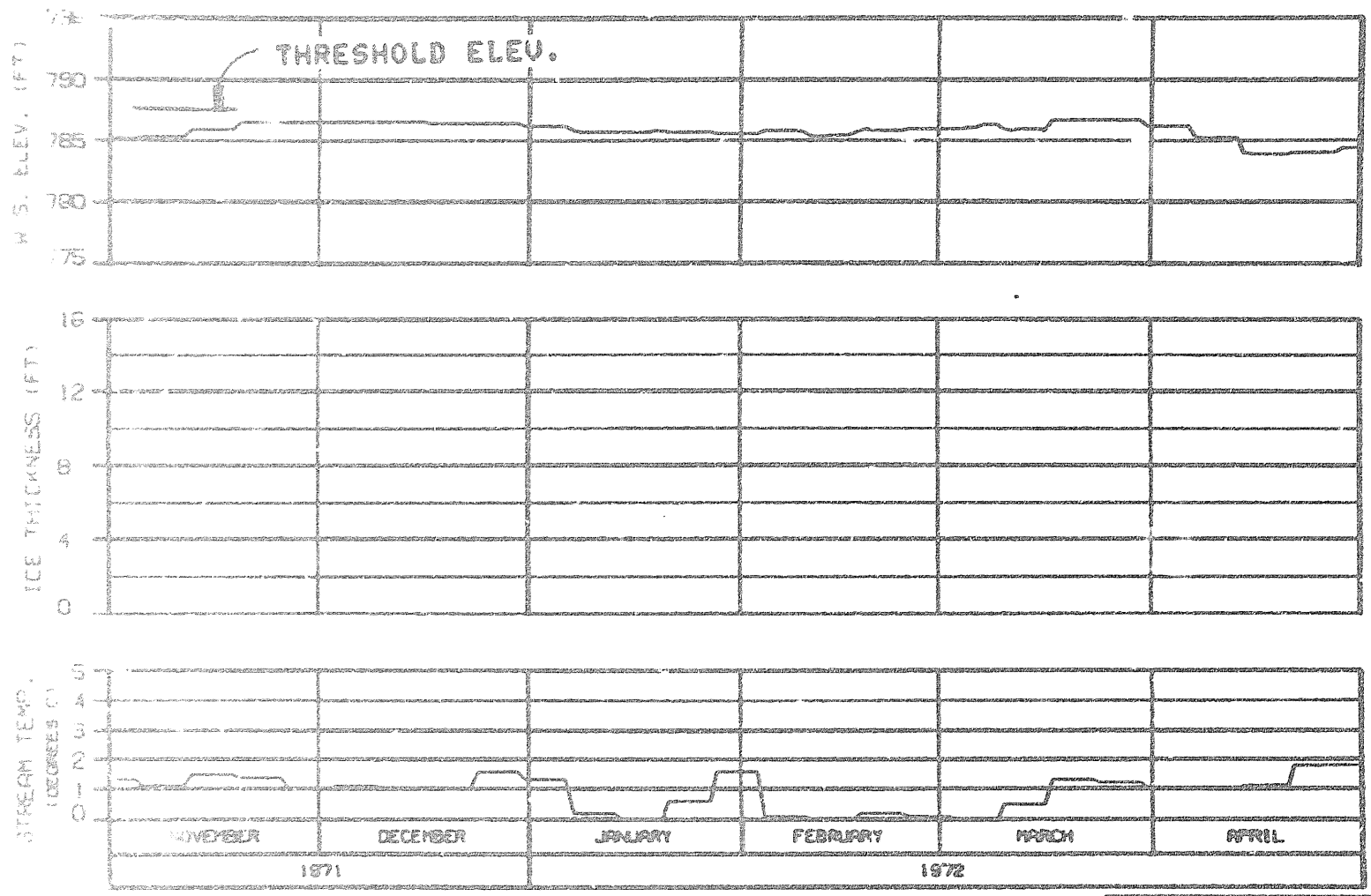


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : HAYANA 2001
 CASE C FLOWS INTAKE 1880. APPROACH 1850.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASOD JOINT VENTURE	
PROJECT: AL-5020	10 JAN 72
1000.142	



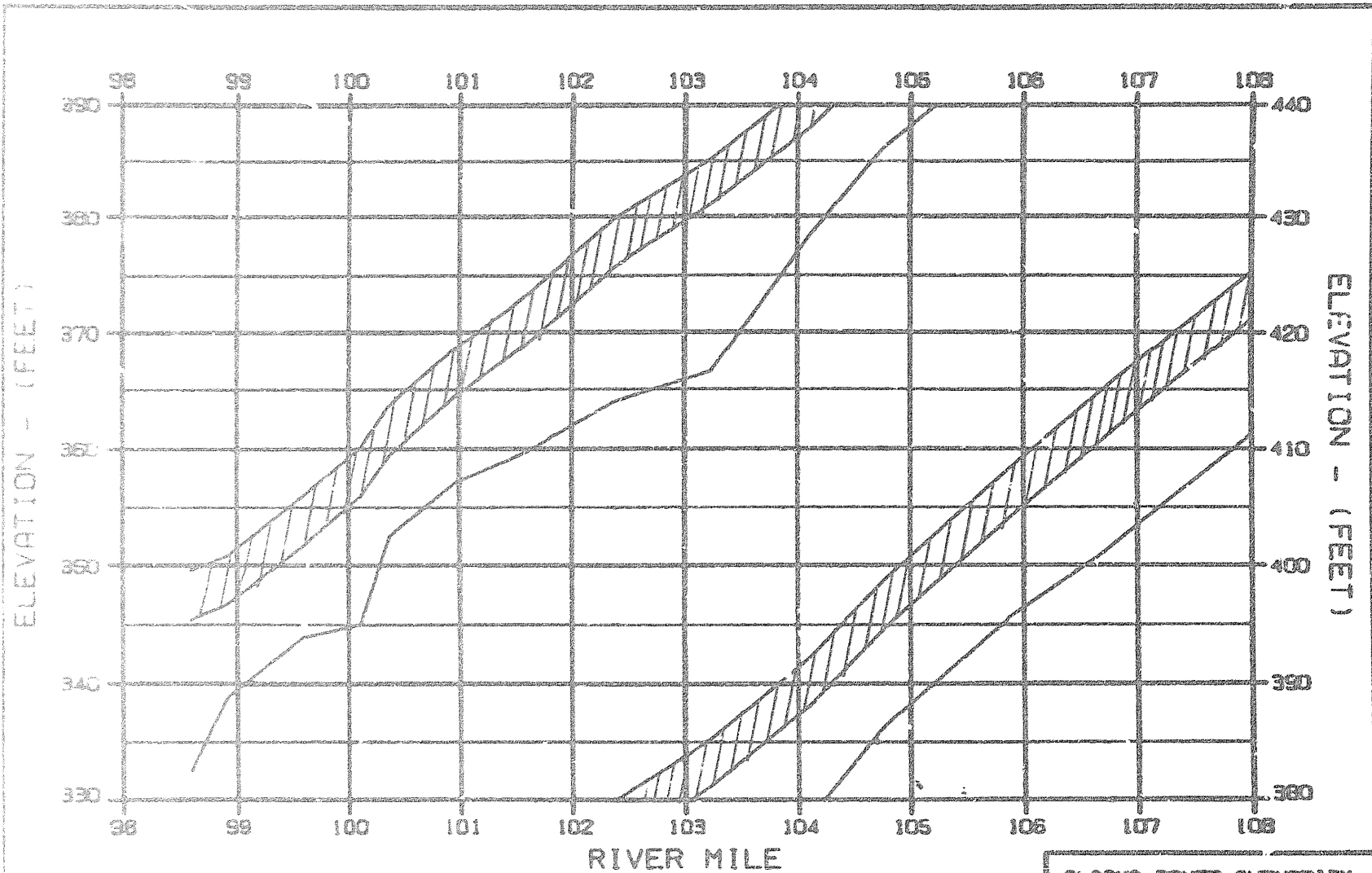
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANAI 2001
 CASE C FLOWS INTAKE 1980. APPROACH 1950.
 REFERENCE RUN NO. : 7101CXD

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHARGE. ALP-002	10 JUN 82	1002.148

EXHIBIT M



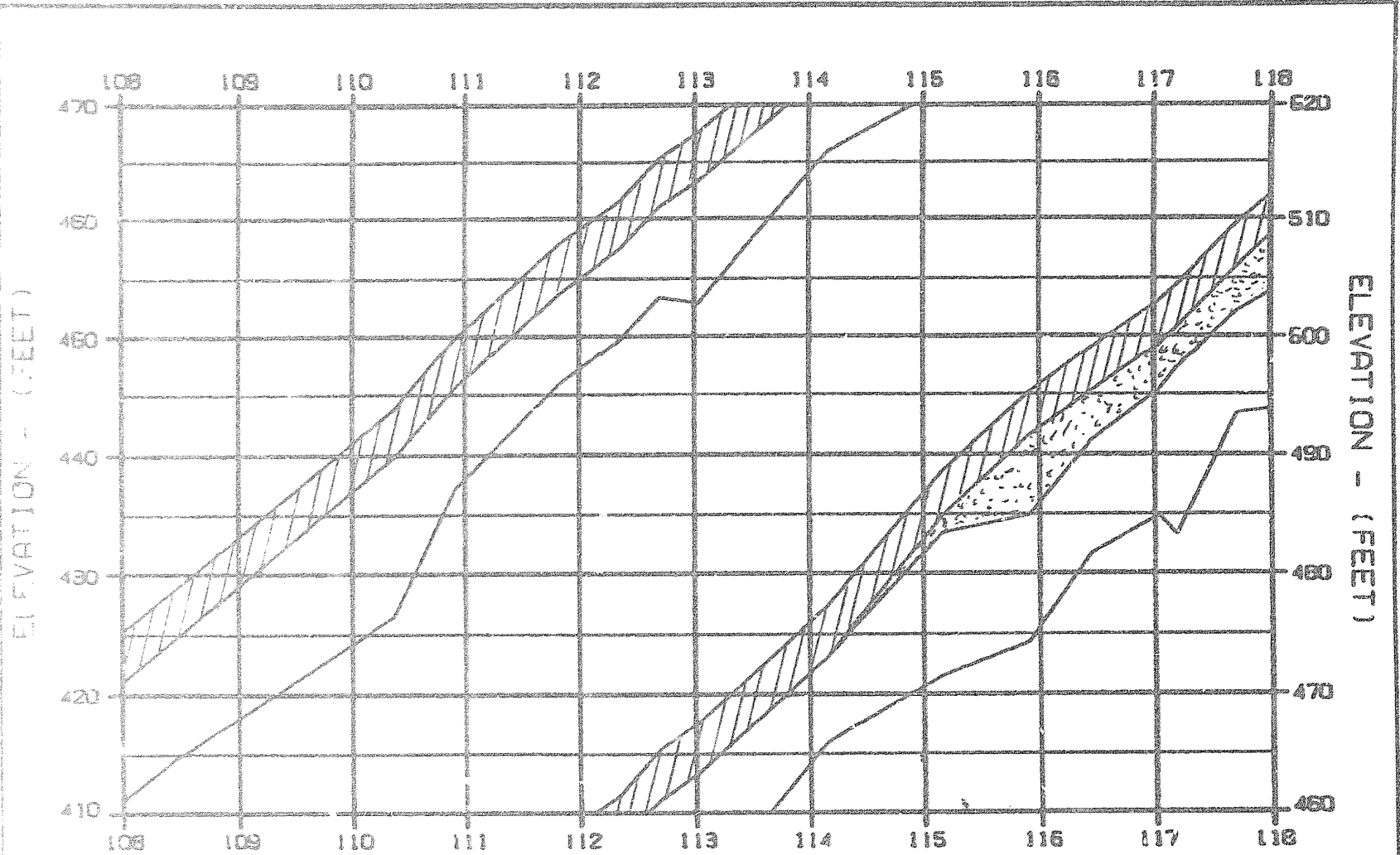
LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARSA-COASCO JOINT VENTURE	
DESIGNED BY: [blank]	DATE: [blank]
DRAWN BY: [blank]	SCALE: [blank]

C



LEGEND:

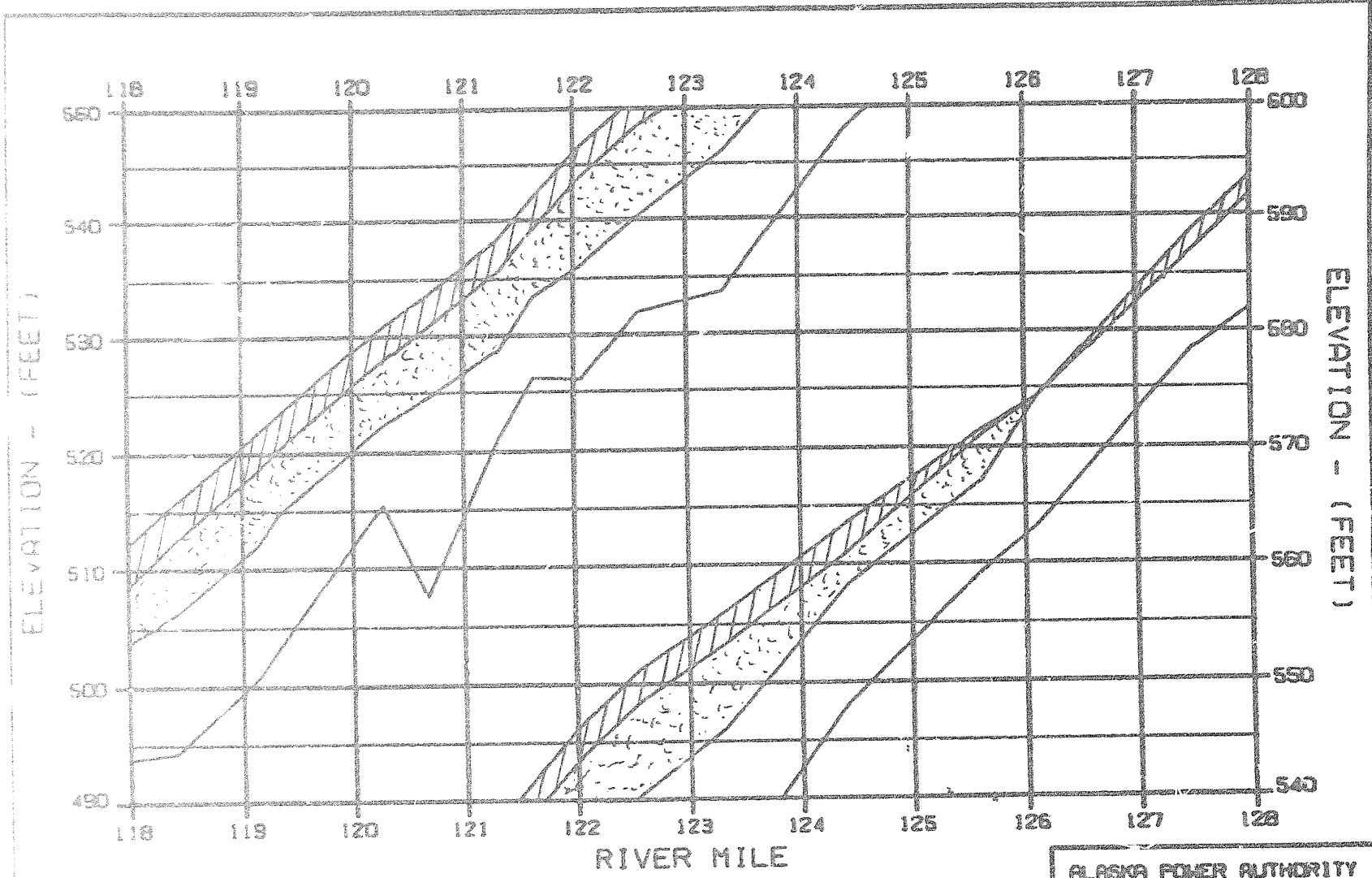
- TOP OF SOLID ICE
- BLUISH/SOLID ICE INTERFACE
- BOTTOM OF BLUISH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX





ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - GARDNER	NOV 72
SHEET 142	

OPTION 2

C



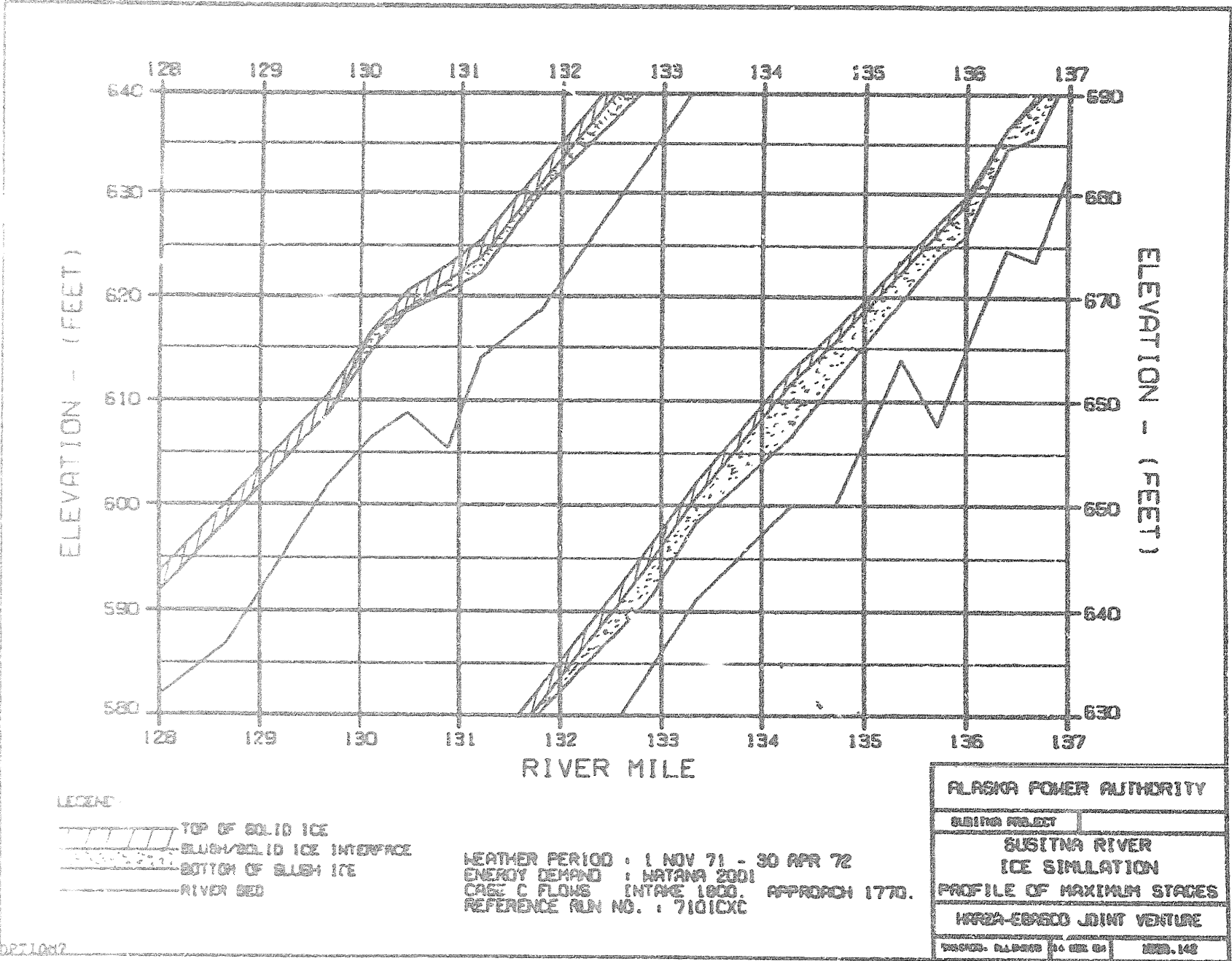
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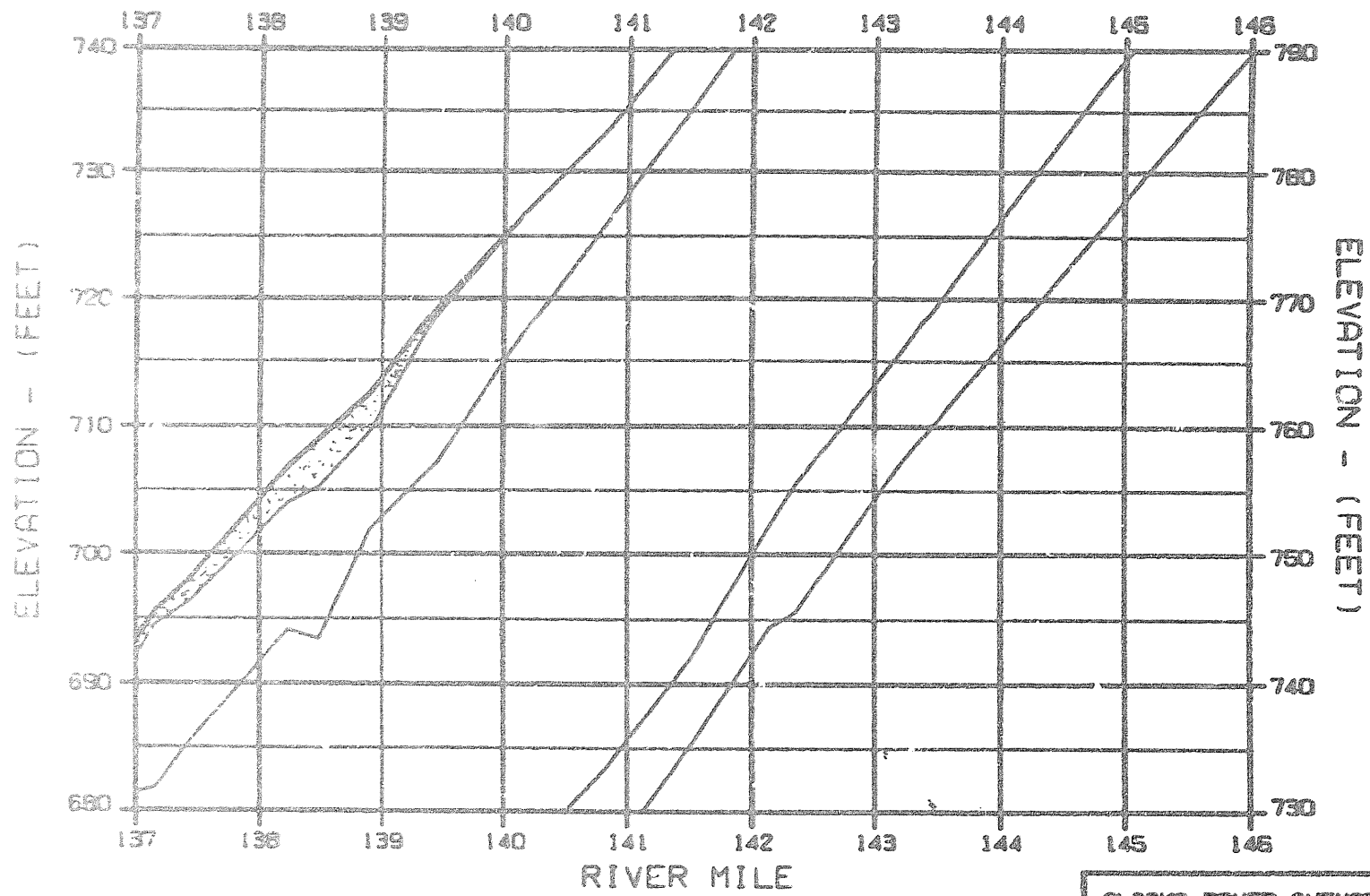
-  TOP OF SOLID ICE
-  BLUISH/SOLID ICE INTERFACE
-  BOTTOM OF BLUISH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX


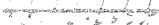
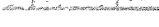
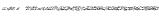
ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WATANA-EBASCO JOINT VENTURE	
DESIGN. NUMBER	2582.142

SECTION?



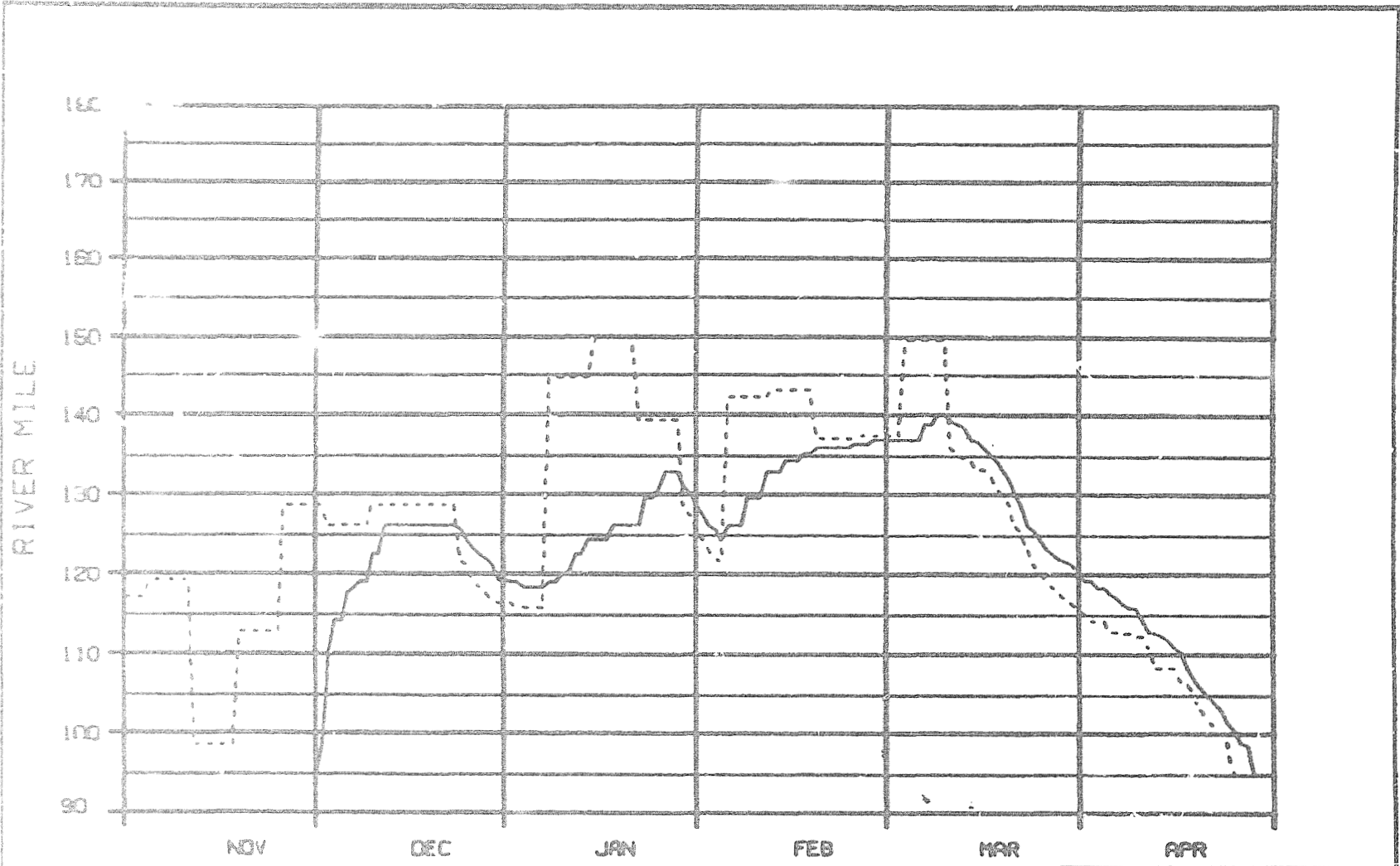


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATAKA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EGASCO JOINT VENTURE		
DESIGNED BY: G. L. BROWN	DATE: 02/72	REV: 142

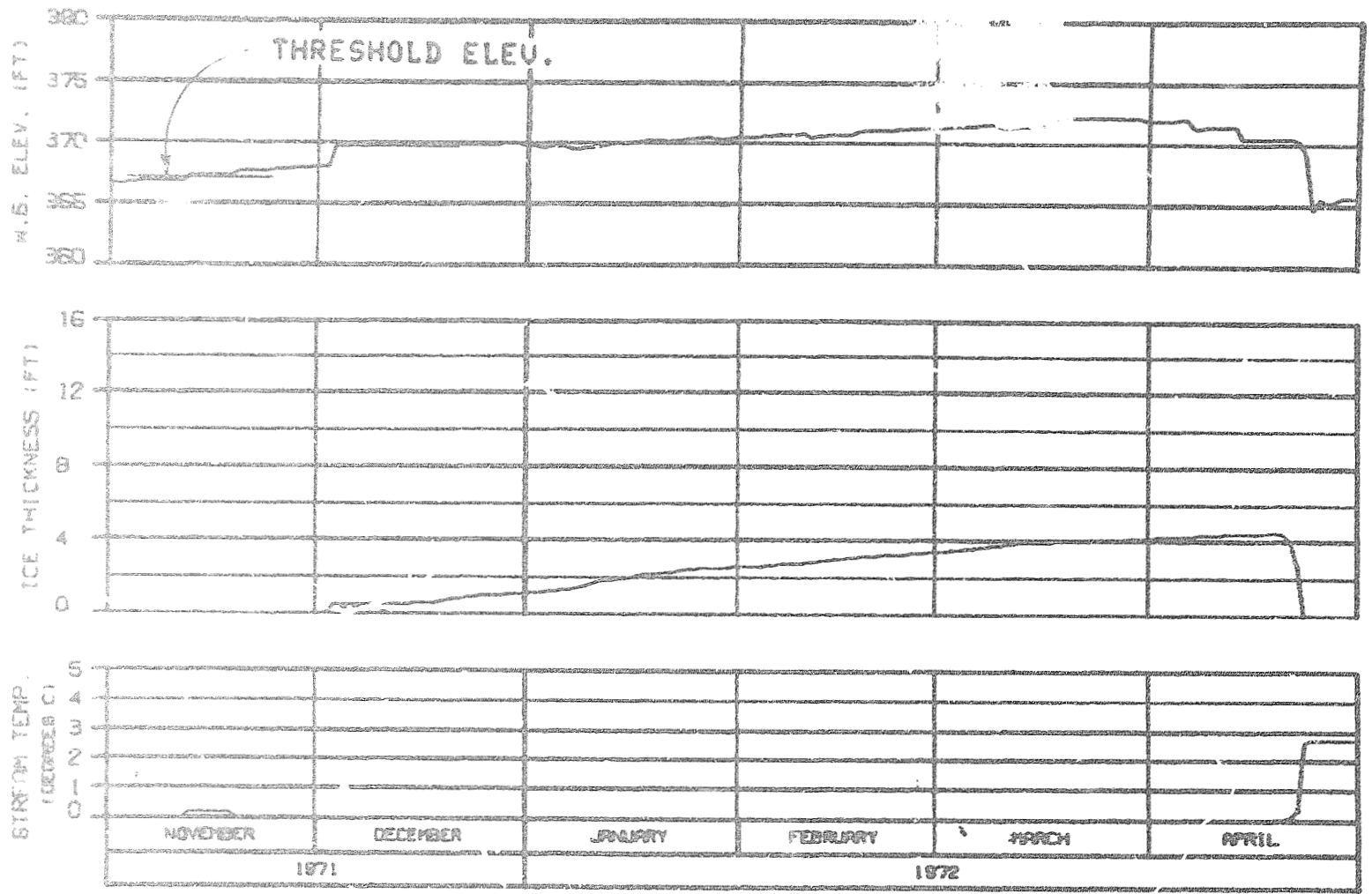


LEGEND:

- ICE FRONT
- - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 FLOW CASE C INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
4 ZERO DEGREE ISOTHERM		
WARA-EBASCO JOINT VENTURE		
DESIGNED: J.L.P. 10/71	14 DEC 71	1000.148



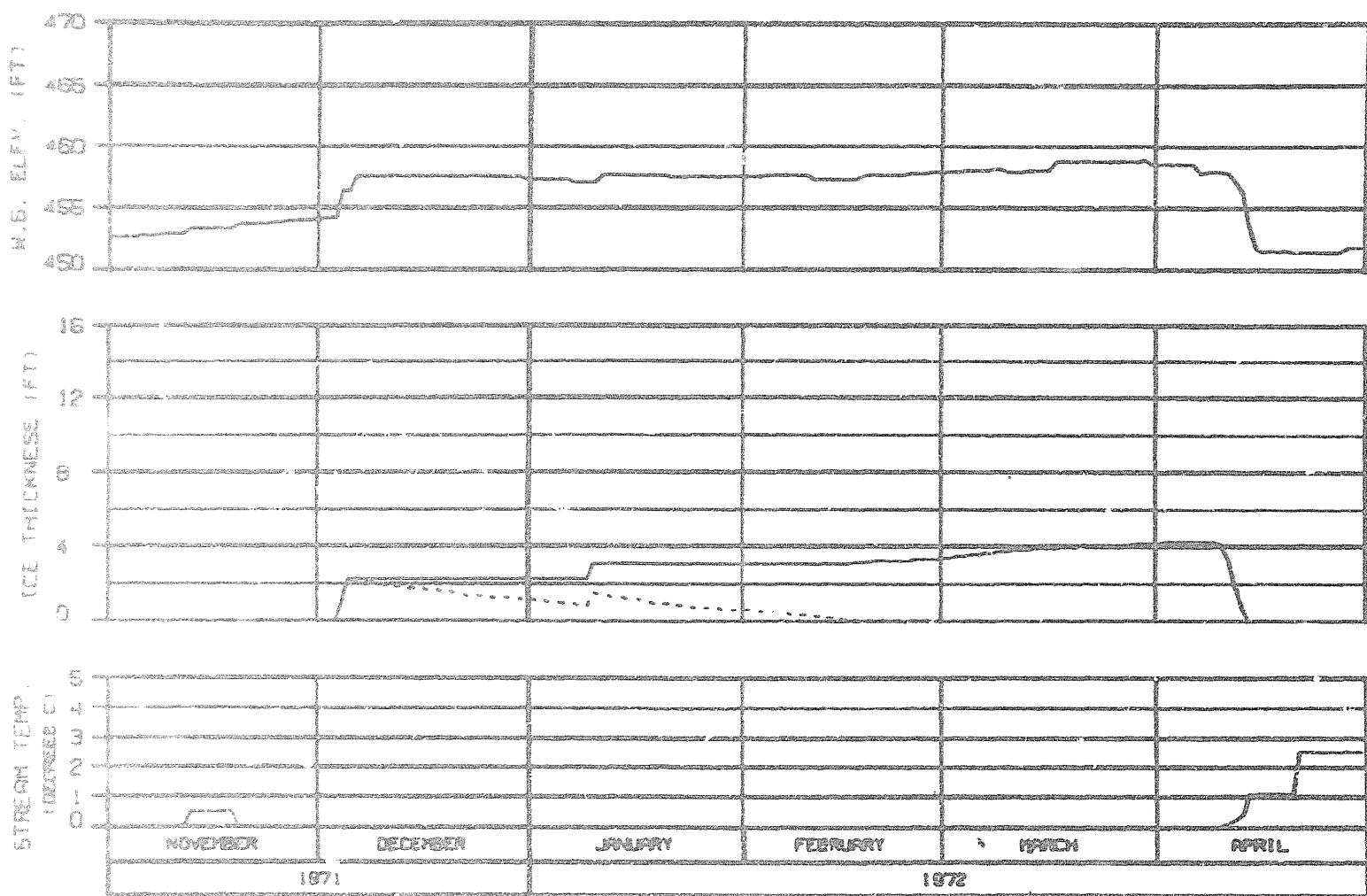
HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RJN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 11-10-72	BY: [Signature]	1000.142

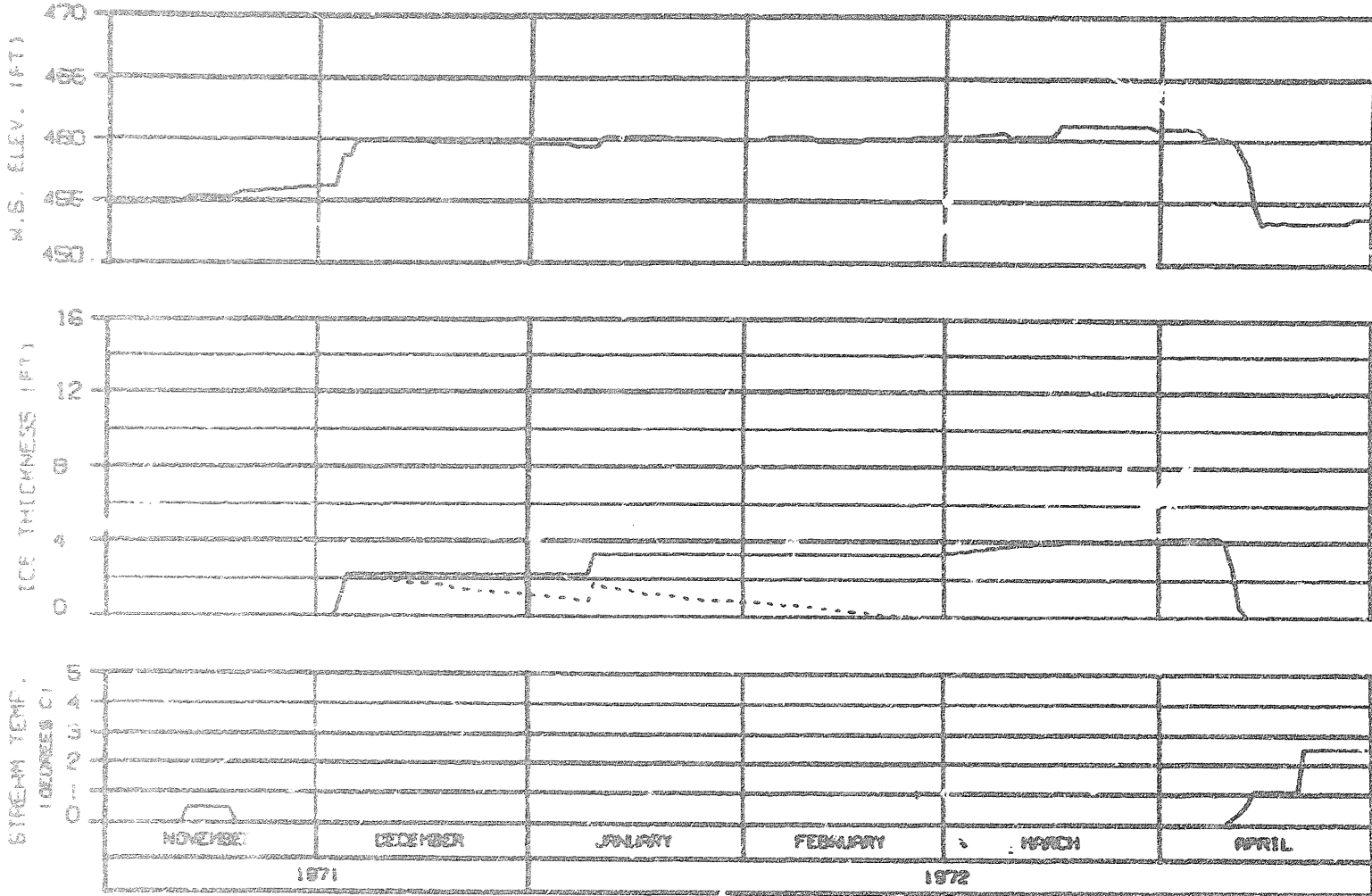


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1/70.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSTINA RIVER	
ICE SIMULATION	
TIME HISTORY	
HARZA-EDBECO JOINT VENTURE	
DESIGNED BY: D.L. GARDNER	DATE: 02/25/72
SHEET NO. 102	

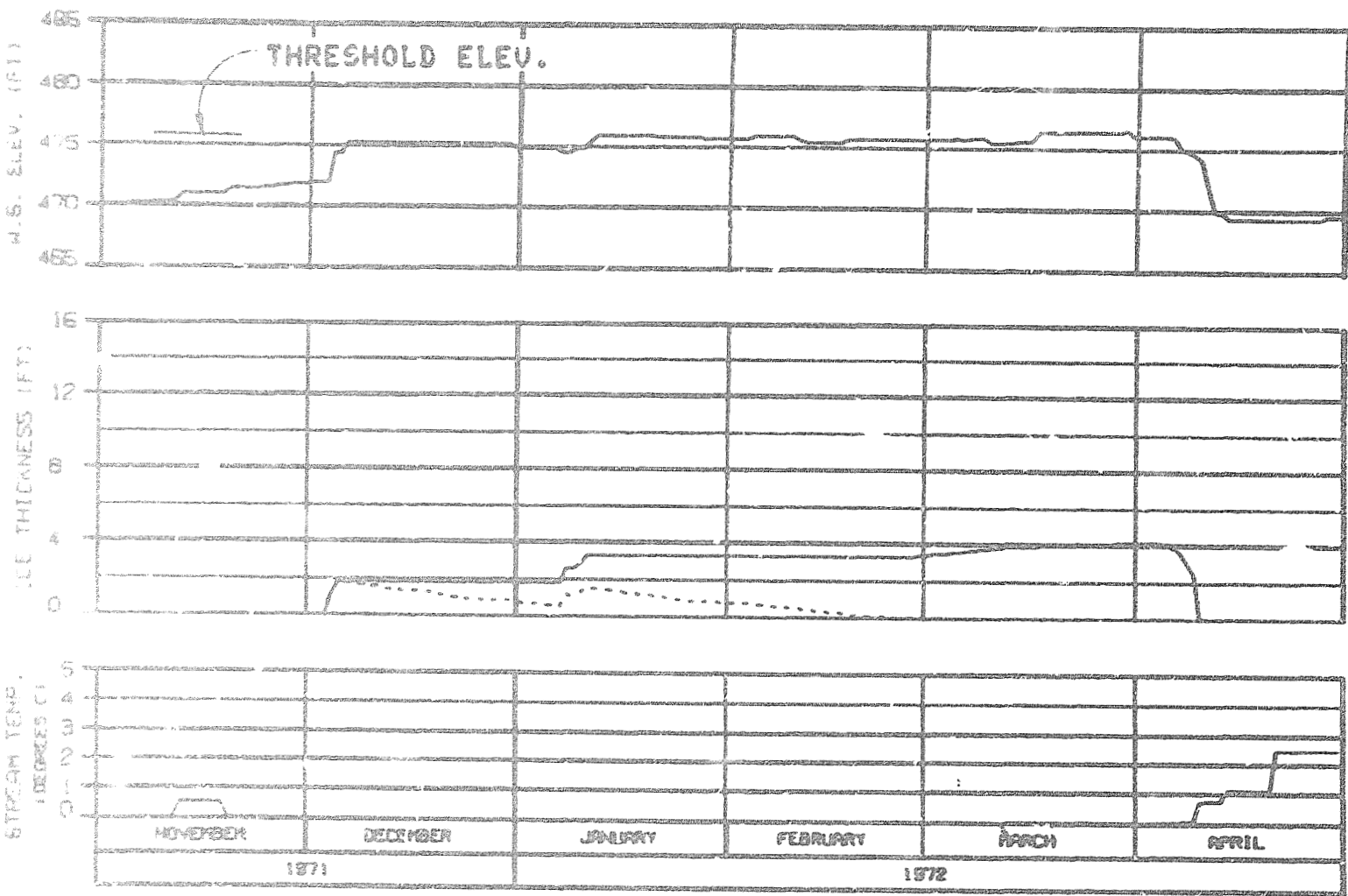


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 18CJ. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
GRAND PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDISON JOINT VENTURE	
DATE: 11/1/72	BY: J. G. G.

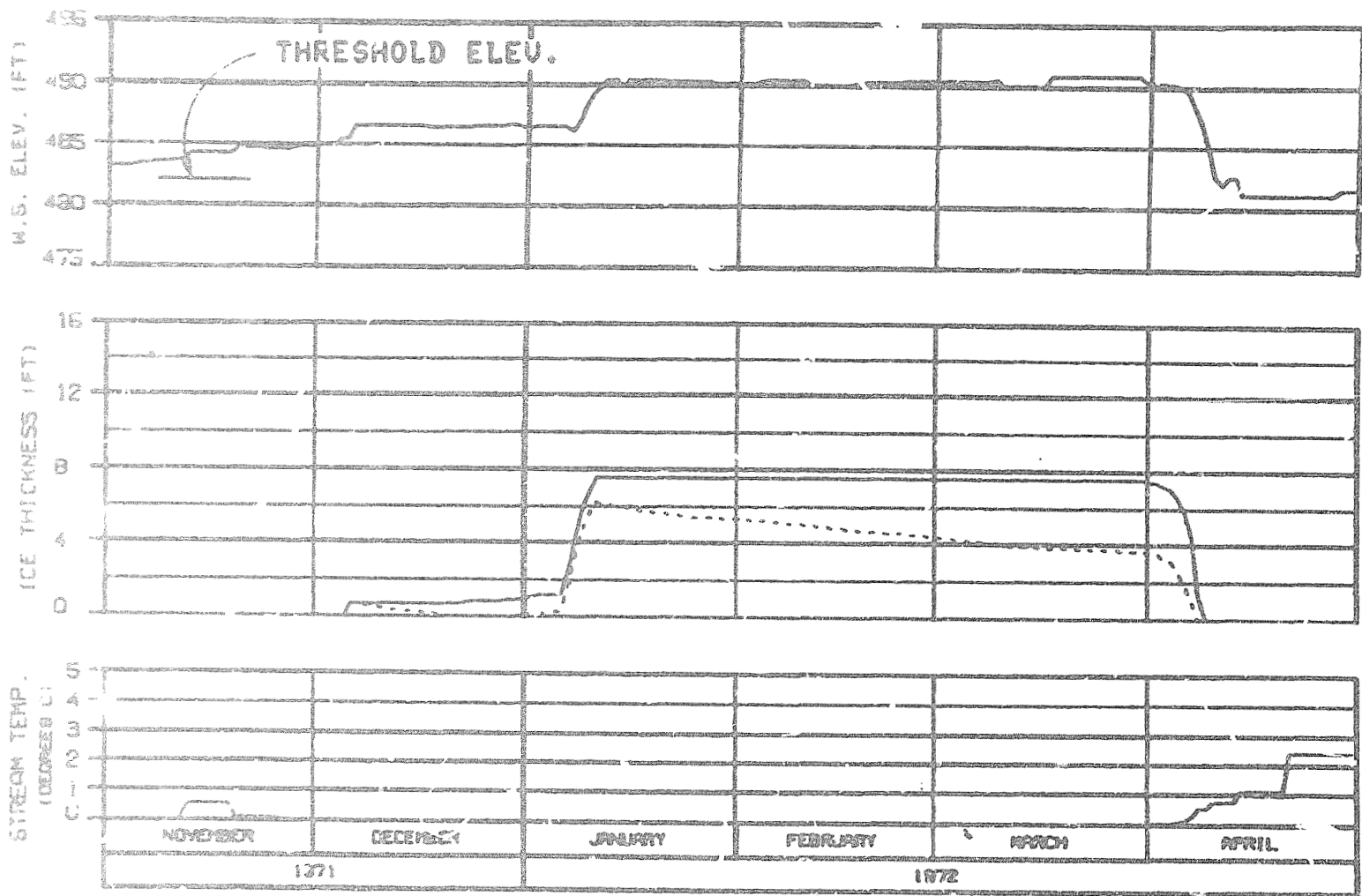


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARSA-EDISON JOINT VENTURE	
REPORT NUMBER : 71-22-01	FIG. 142

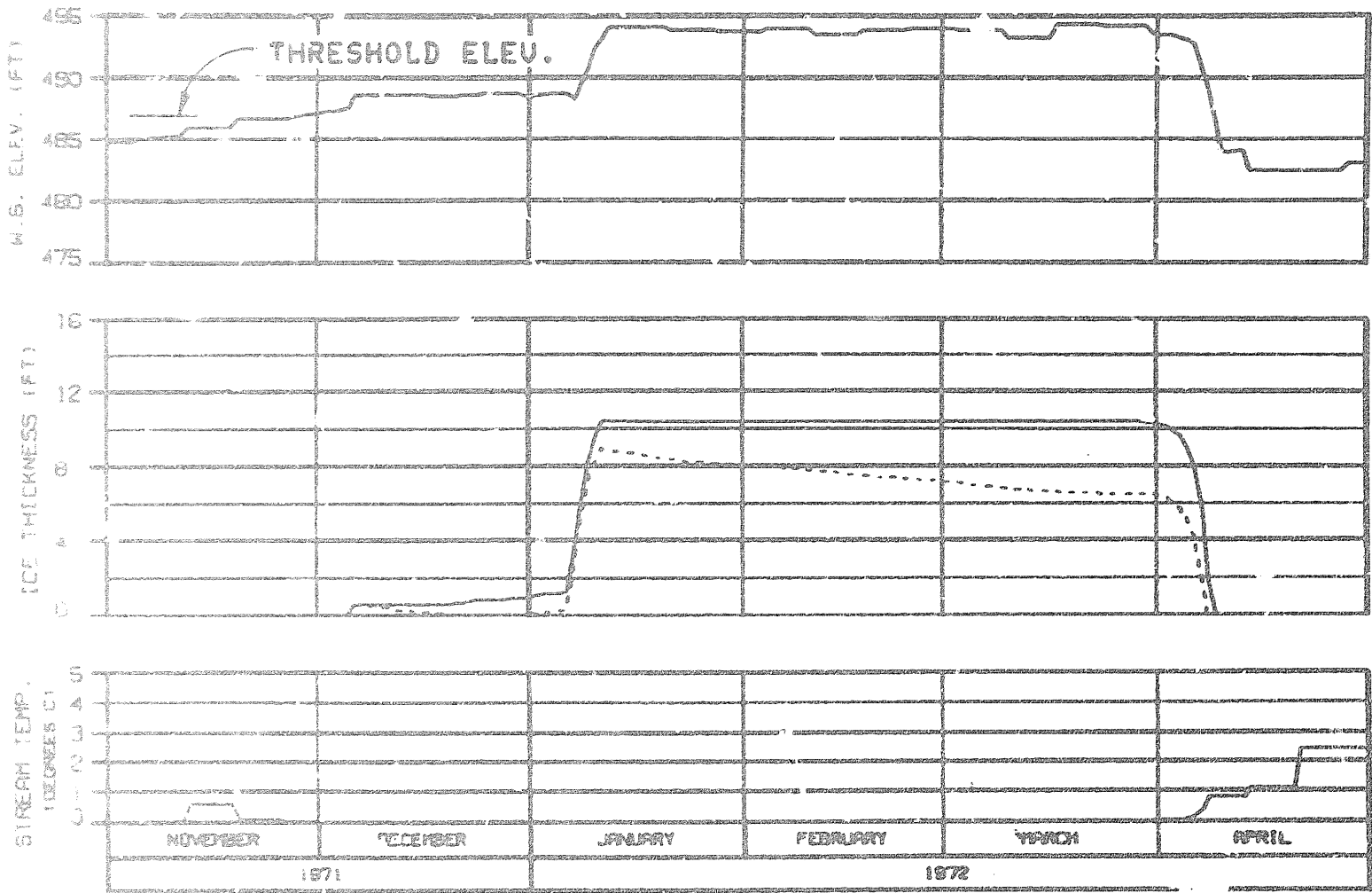


SIDE CHANNEL MSII
 RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 16LO. APPROACH 1770.
 REFERENCE RUN NO. : 710ICXC

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
AFRA-EBASCO JOINT VENTURE		
ORDER NO. 14-00000	DATE 03/08/72	ISSUE 1.02

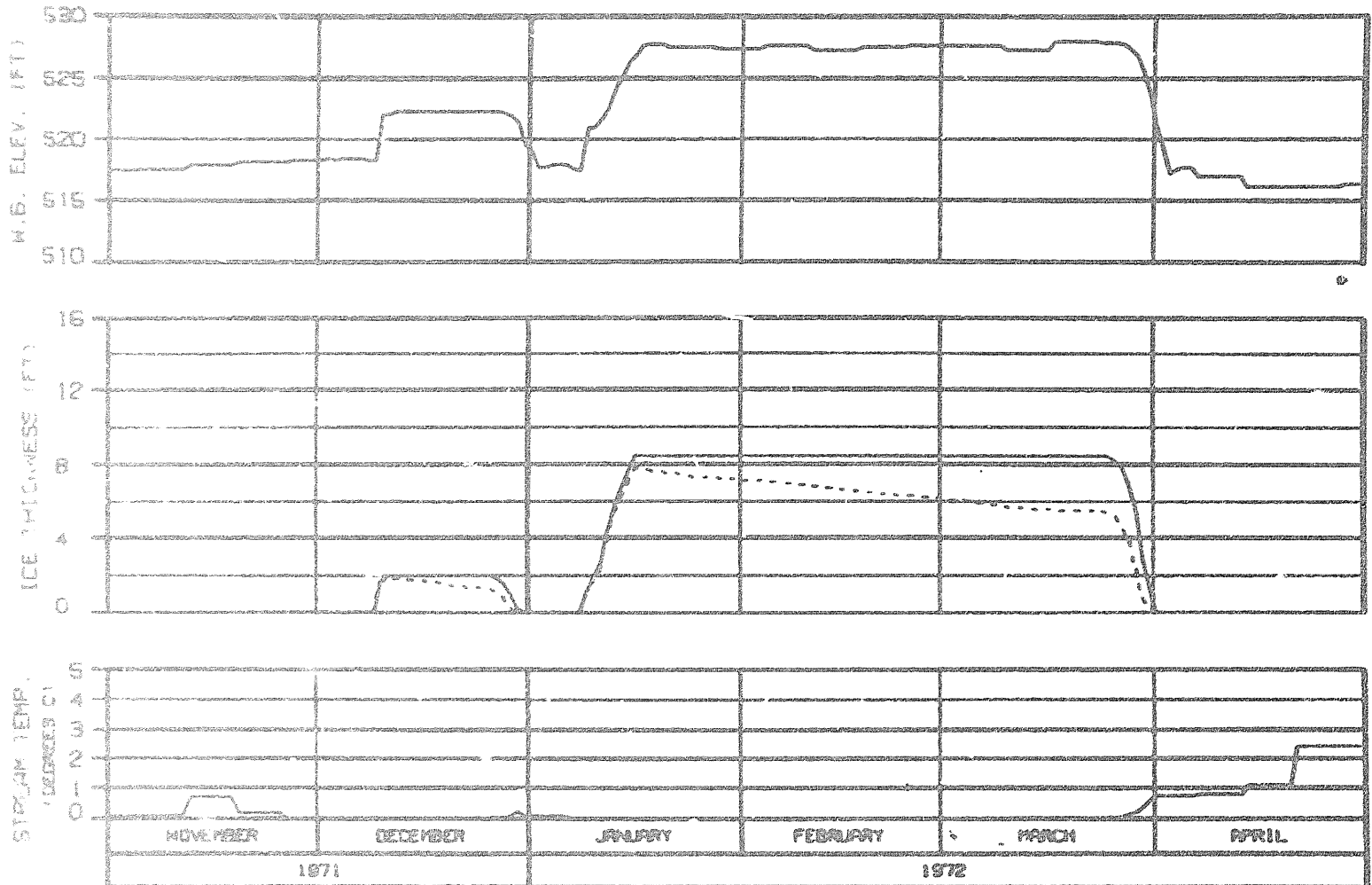


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANAI 2001
 CASE C FLOWS : INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-ERANCO JOINT VENTURE	
DESIGNED - 11/20/71	NO. 142



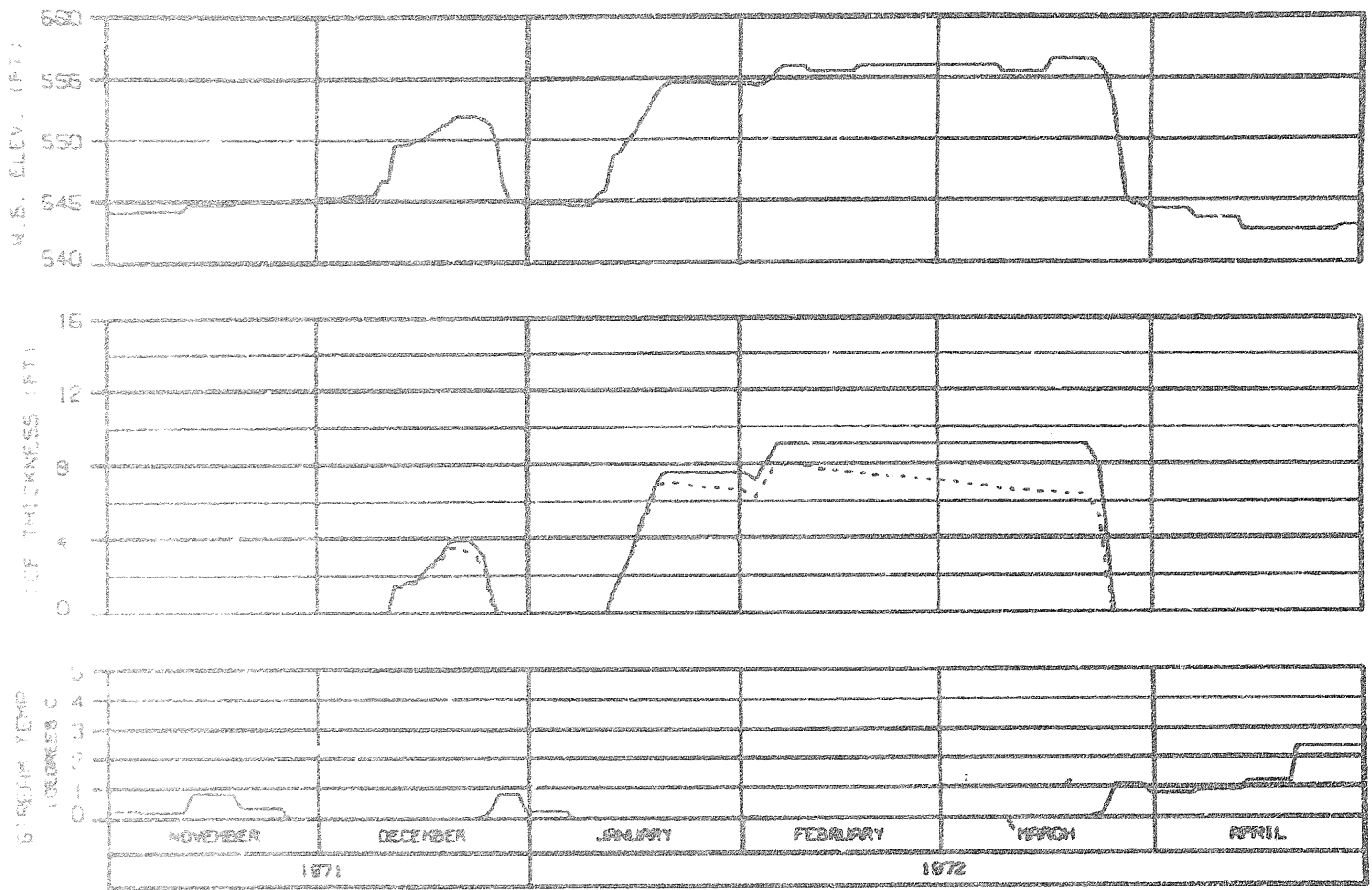
ICE THICKNESS LEGEND:

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

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WAZA-BASED JOINT VENTURE		
PROJECT: 910010	DATE: 03	0000.149

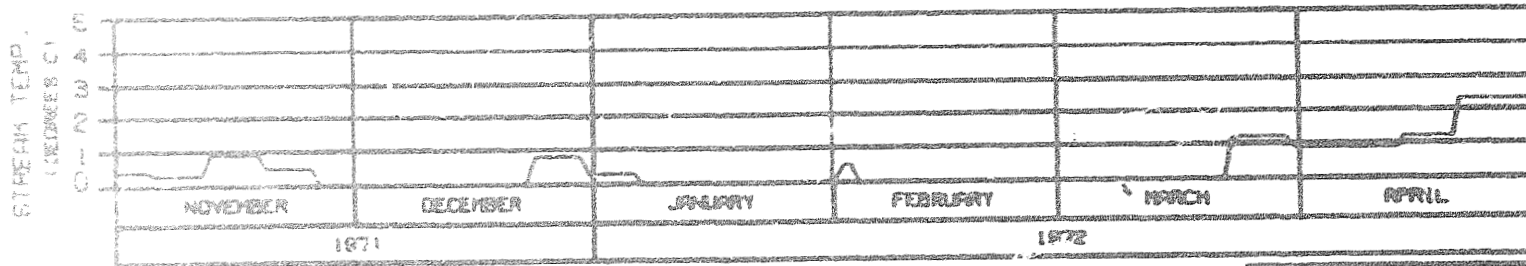
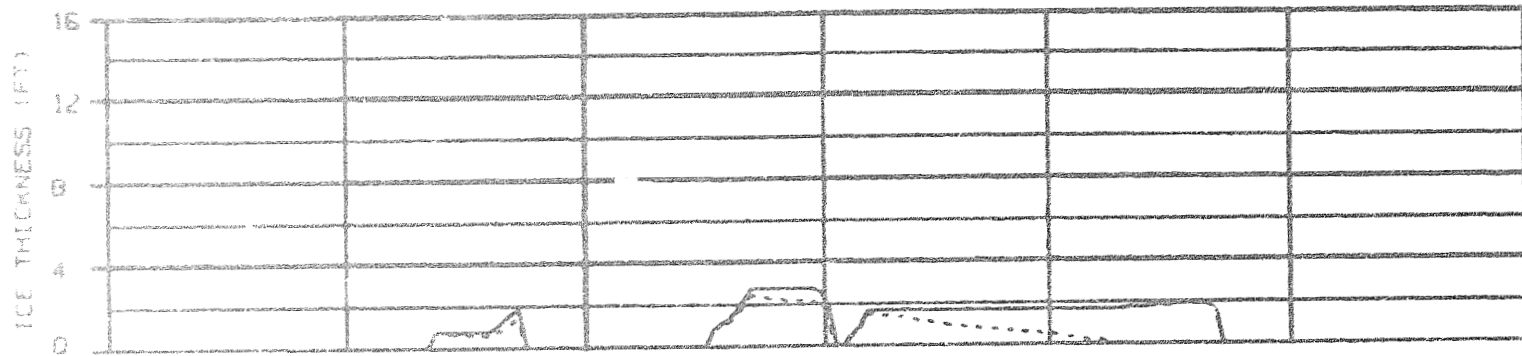
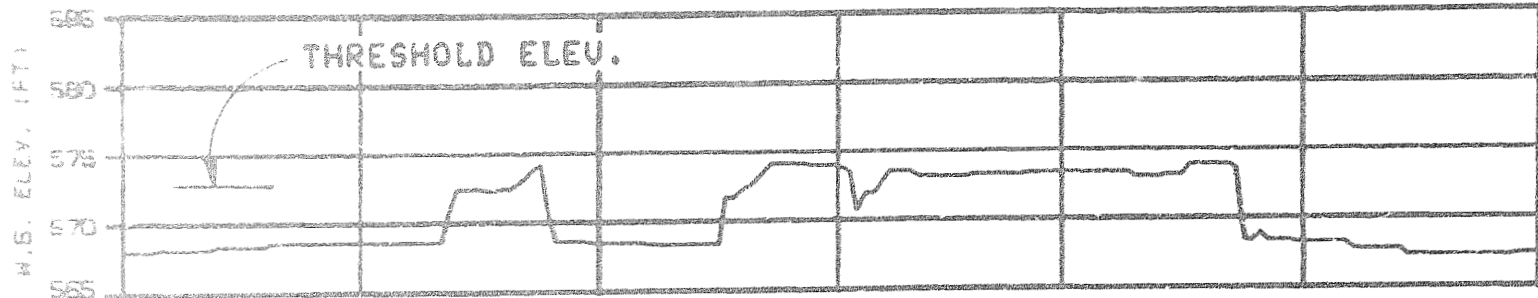


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EDGECO JOINT VENTURE	
PROJECT: 11-14-71	REV. 142

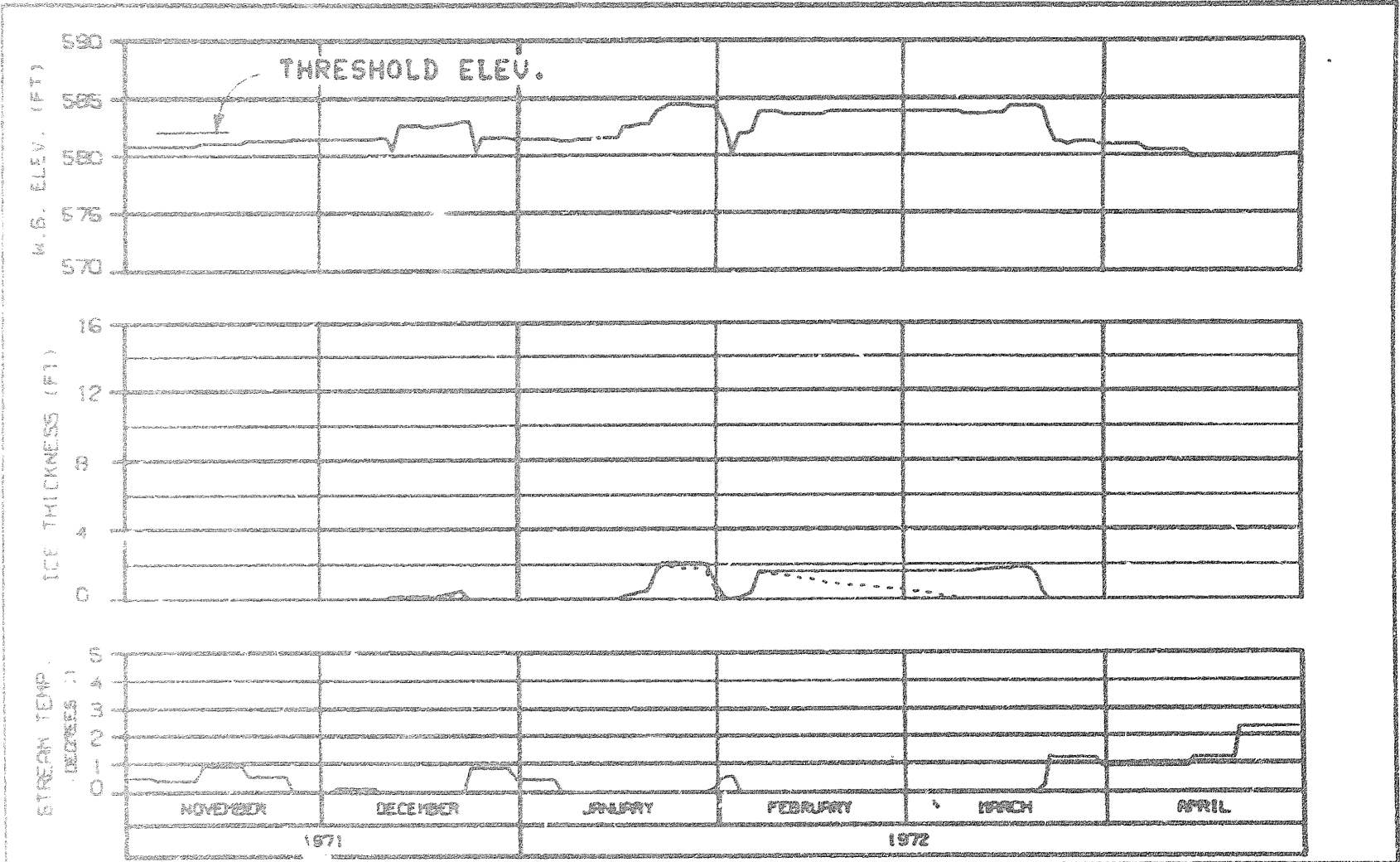


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - BLUE-ICE COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : HAYANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
UNITED PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
DESIGNED - G.L. DAVIS	BY - G.E. OR
	FIG. 142



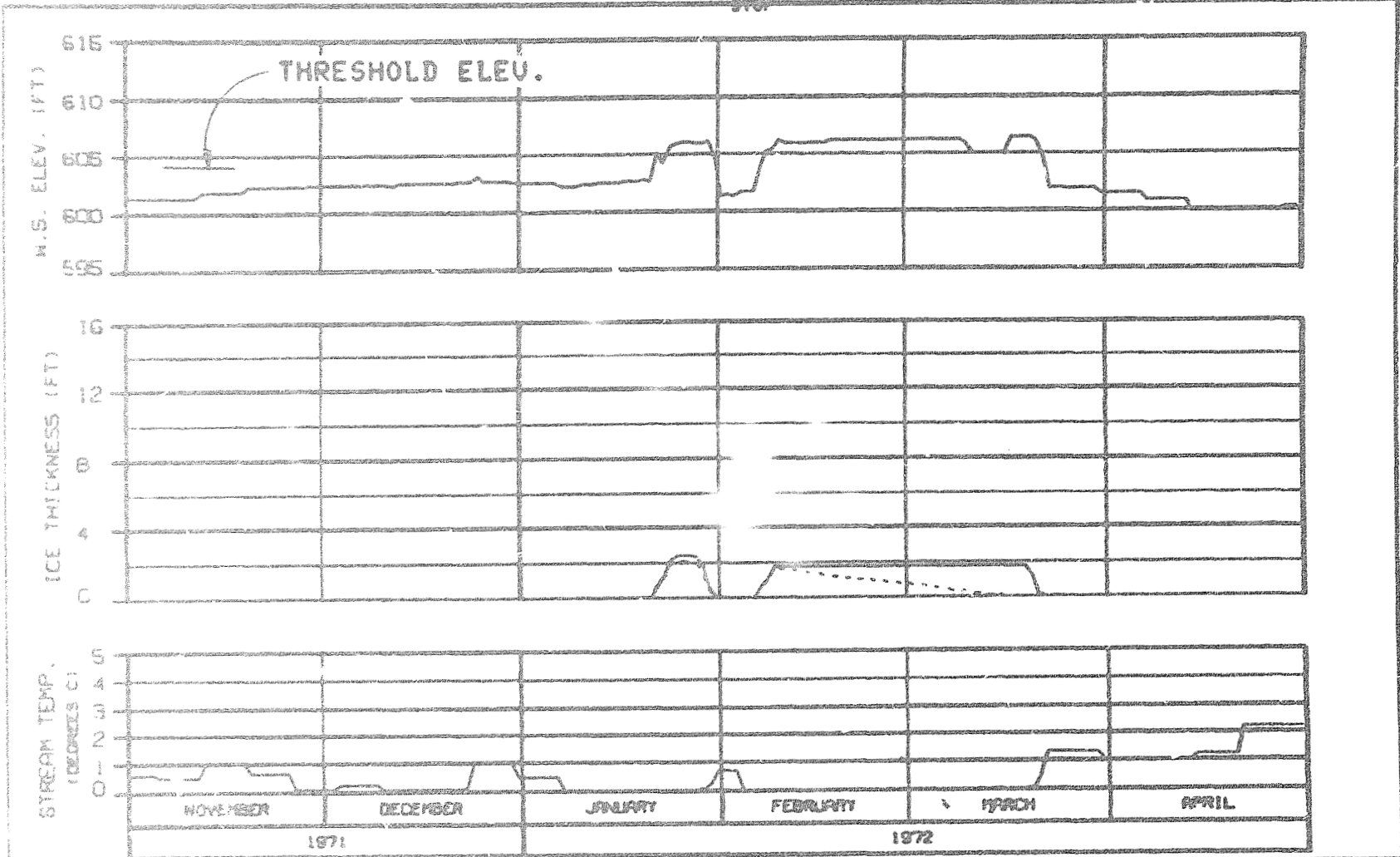
HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUBJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARD-EGGCO JOINT VENTURE		
DESIGNED - G.L. HARRIS	14 DEC 71	1000.142

C



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

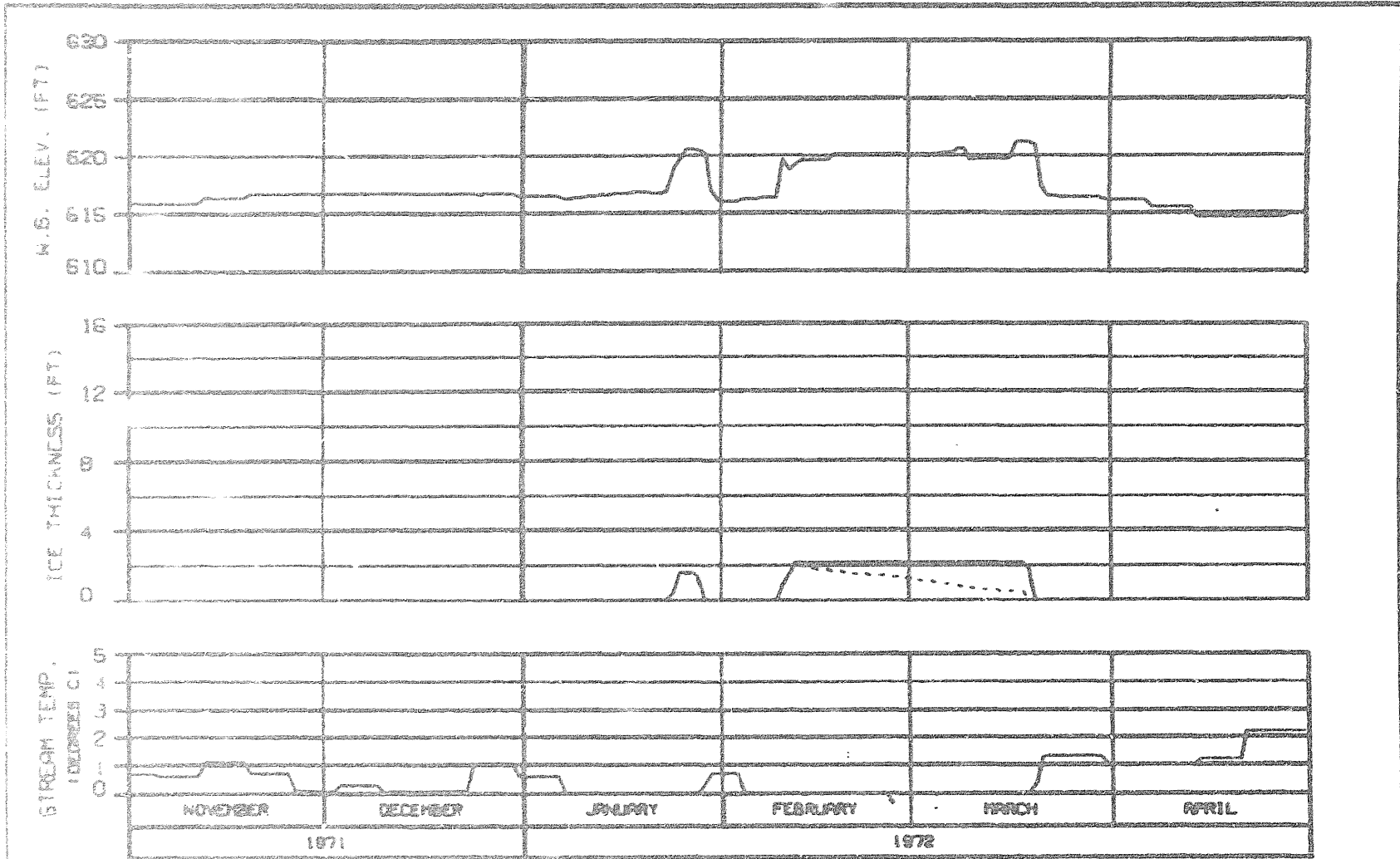
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATE : 2001
 CASE C FLOWS INTAKE 1800. APPROXCH 1770.
 REFERENCE RUN NO. : 7101XC

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBROO JOINT VENTURE	
ORDER - 84280	ISSUE NO - 122.142

0211087

OPTION?



SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

ICE THICKNESS LEGEND:

----- TOTAL THICKNESS
 - - - - - BLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

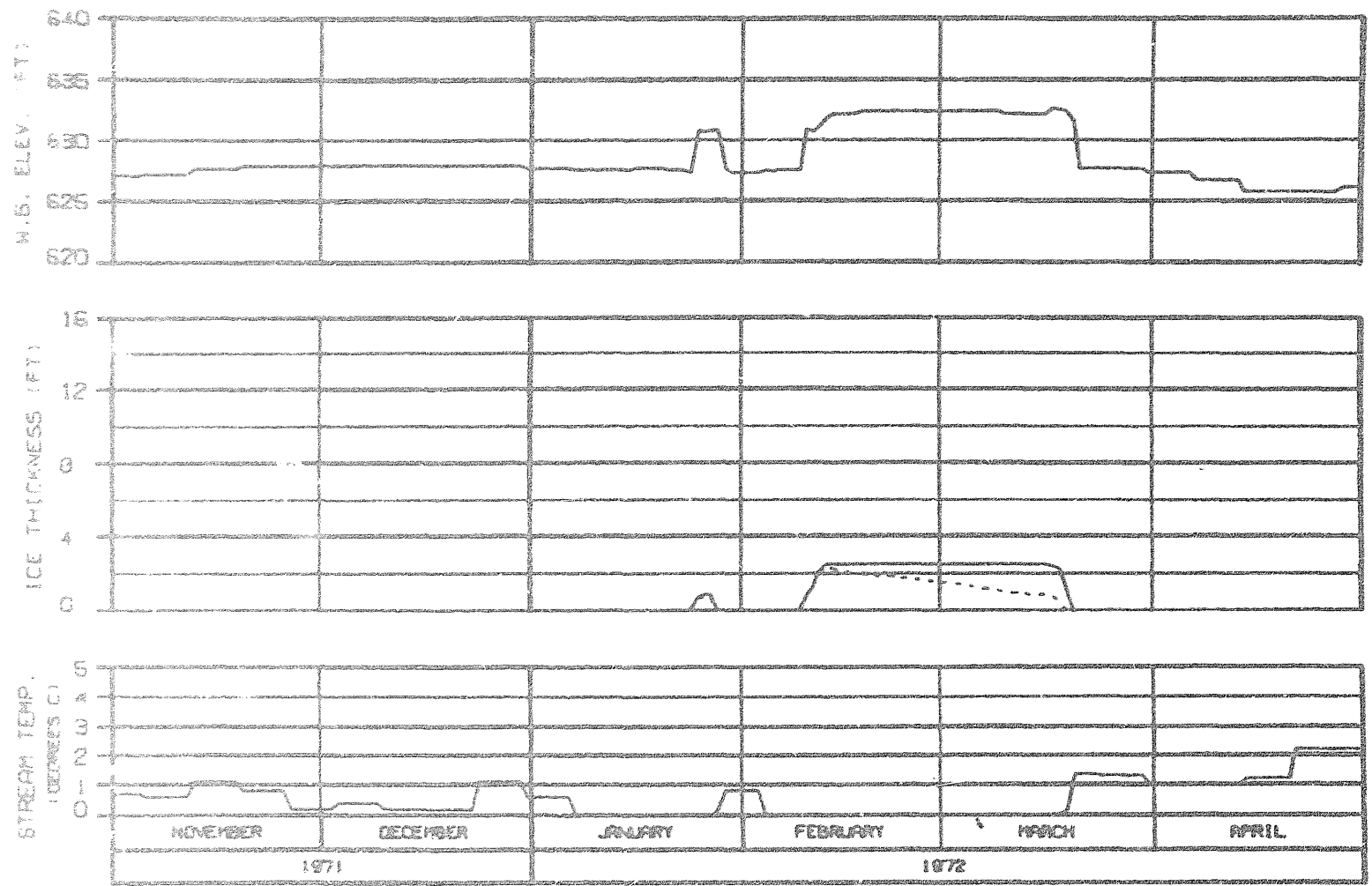
ALASKA POWER AUTHORITY

SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

GRAPH. PLOTTED BY: [] 10 02 84 1000.142

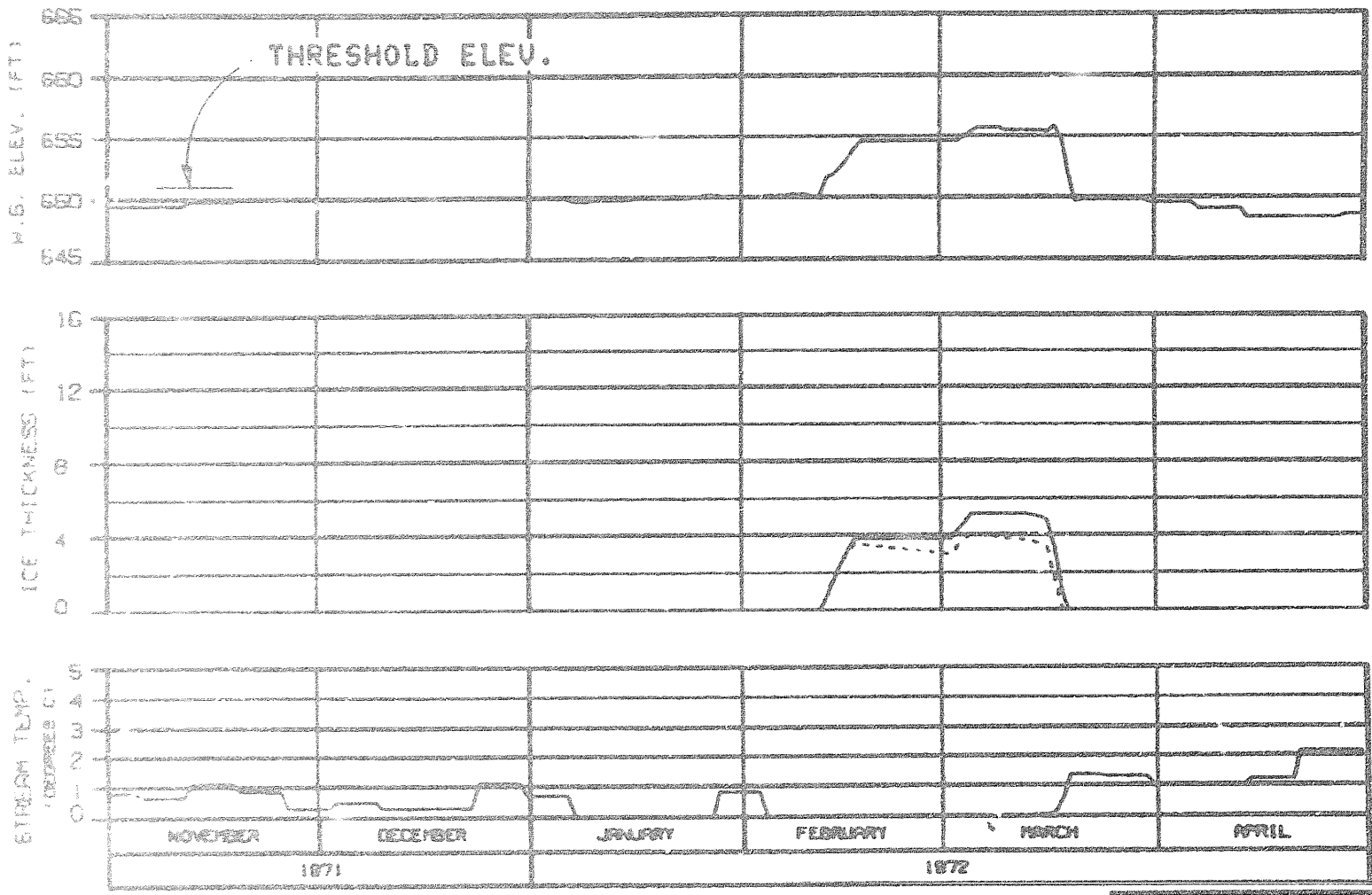


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROXCH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
GUSTINA PROJECT	
GUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: D.L. HARRIS	DATE: DEC 71
PAGE: 142	

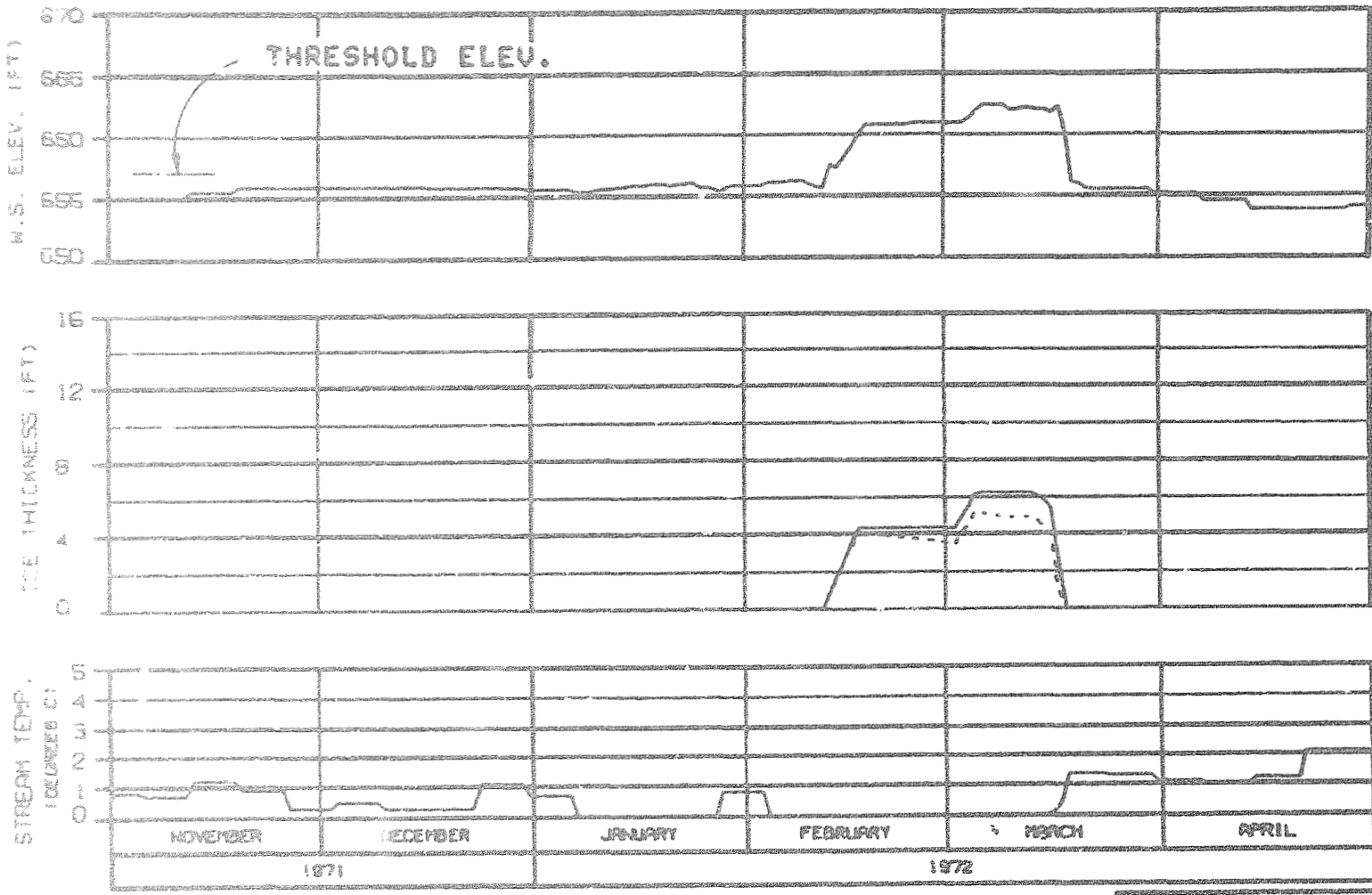


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARSA-EDGED JOINT VENTURE		
DESIGNED BY: JLD/RSB	NO. OF SHEETS: 10	SHEET NO.: 1000.102

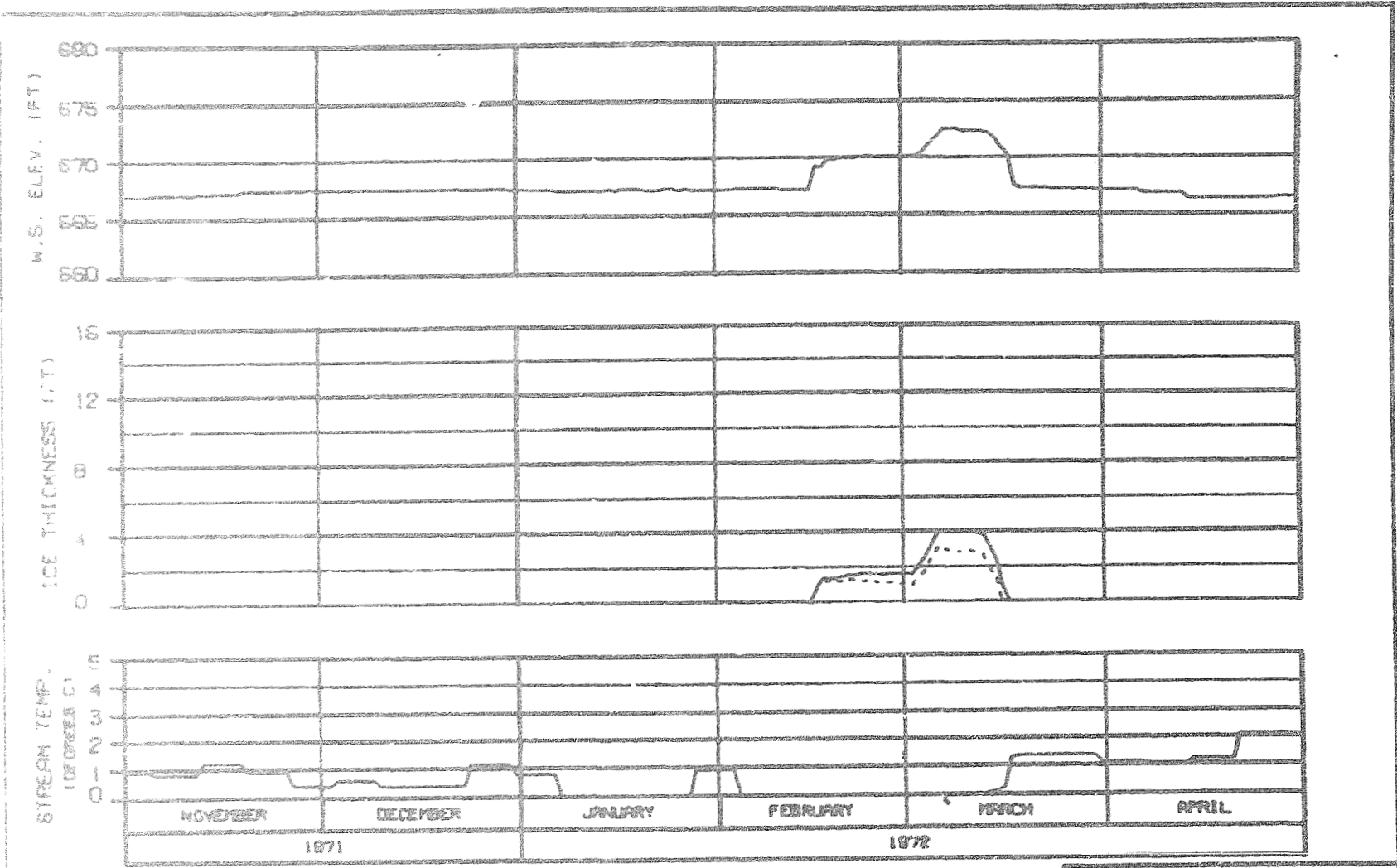


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-ESPACO JOINT VENTURE		
DATE: 01-08-72	BY: GSK/MS	WSB: MS

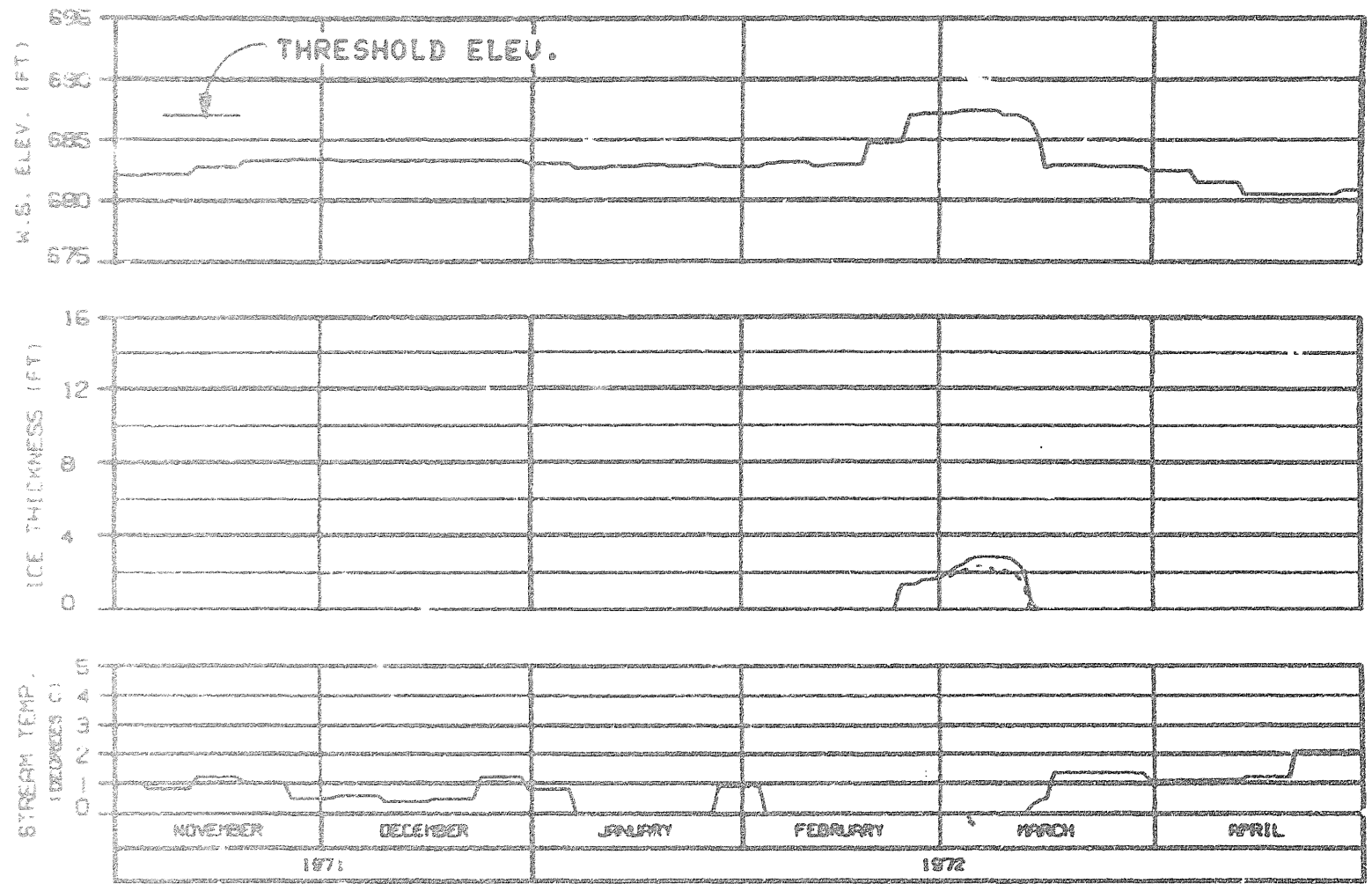


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800, APPROACH 1770.
 REFERENCE RUN NO. : 7101XC

ALASKA POWER AUTHORITY		
SISTINA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBERCO JOINT VENTURE		
GROUP - 01000	DATE - 04	ISS. 142

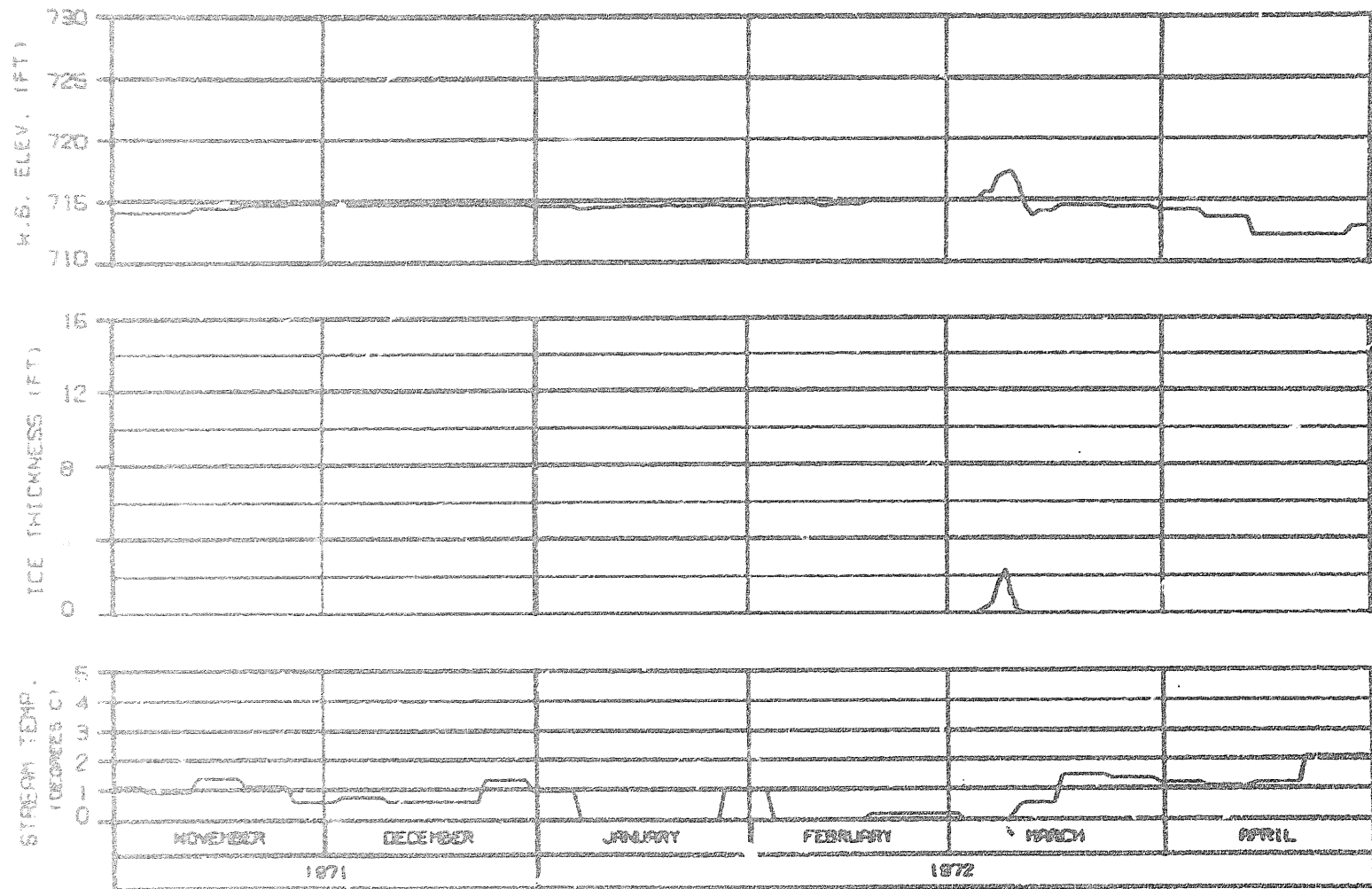


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARDA-EDBROO JOINT VENTURE		
DESIGN: ALBROO	NO. 003 04	1982.148

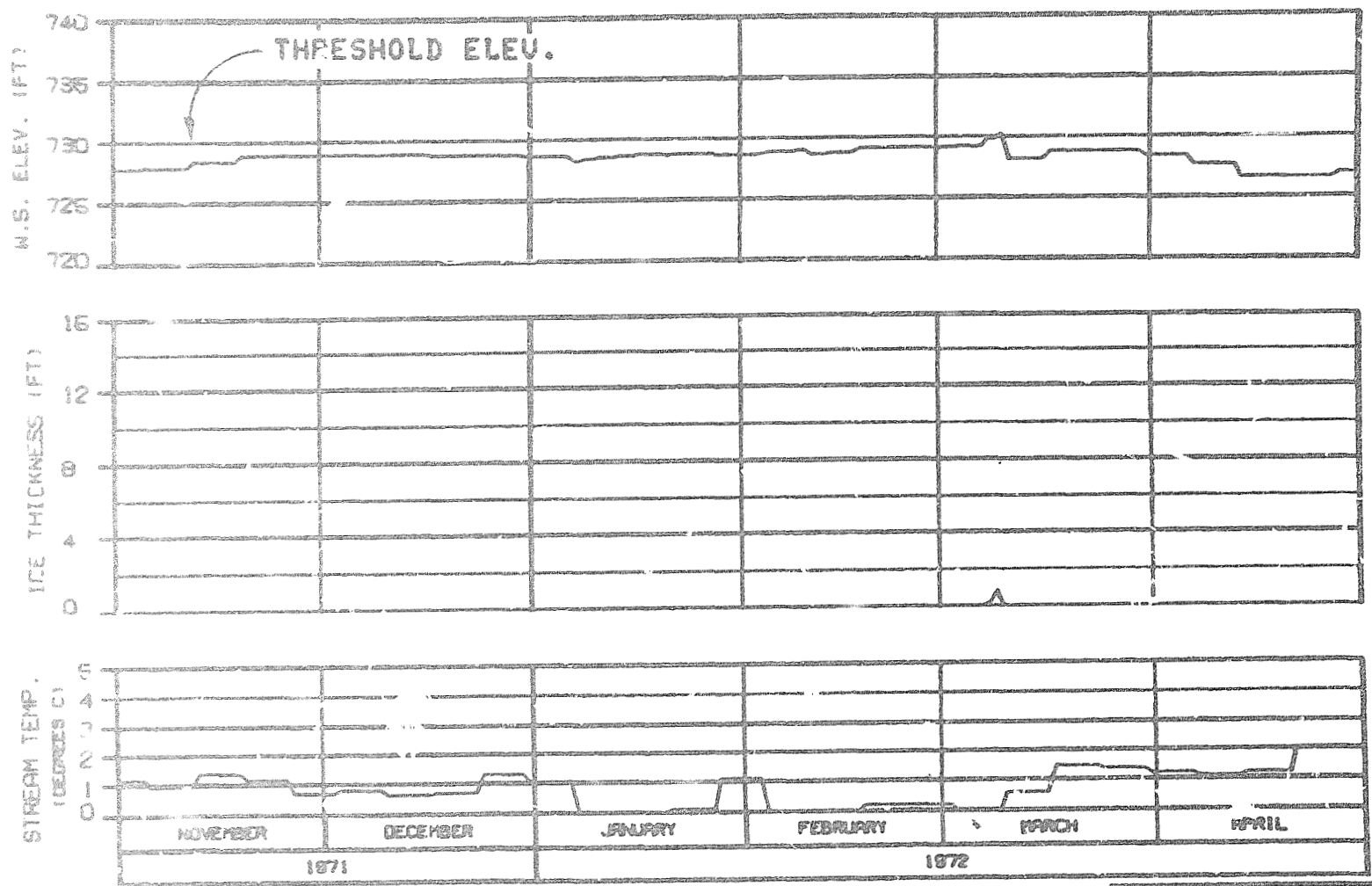


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CXC

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARD-EGGOLD JOINT VENTURE	
DESIGNED BY: []	DATE: []
DRAWN BY: []	DATE: []

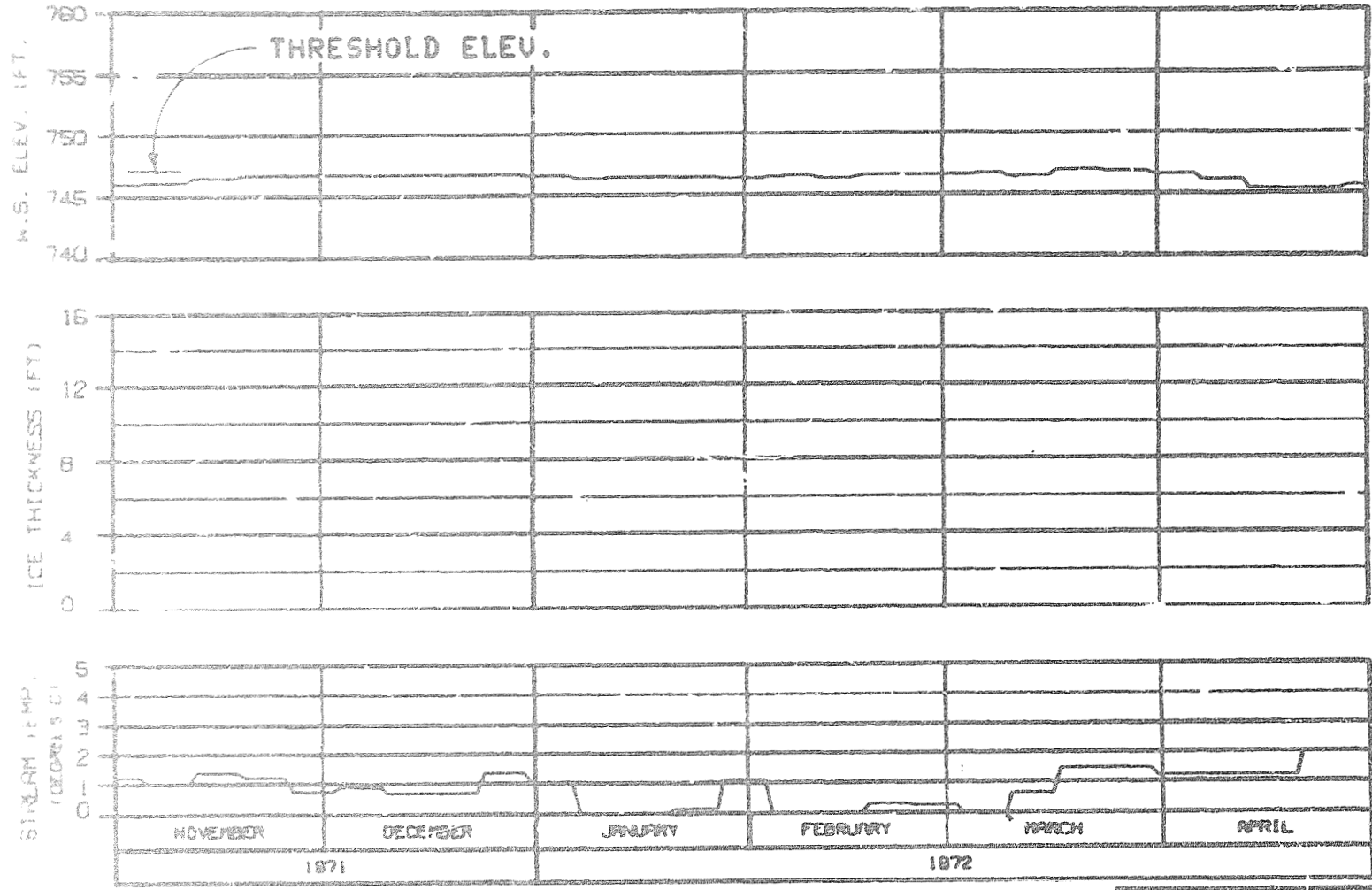


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUBJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHG'D. -	DATE
1003.142	



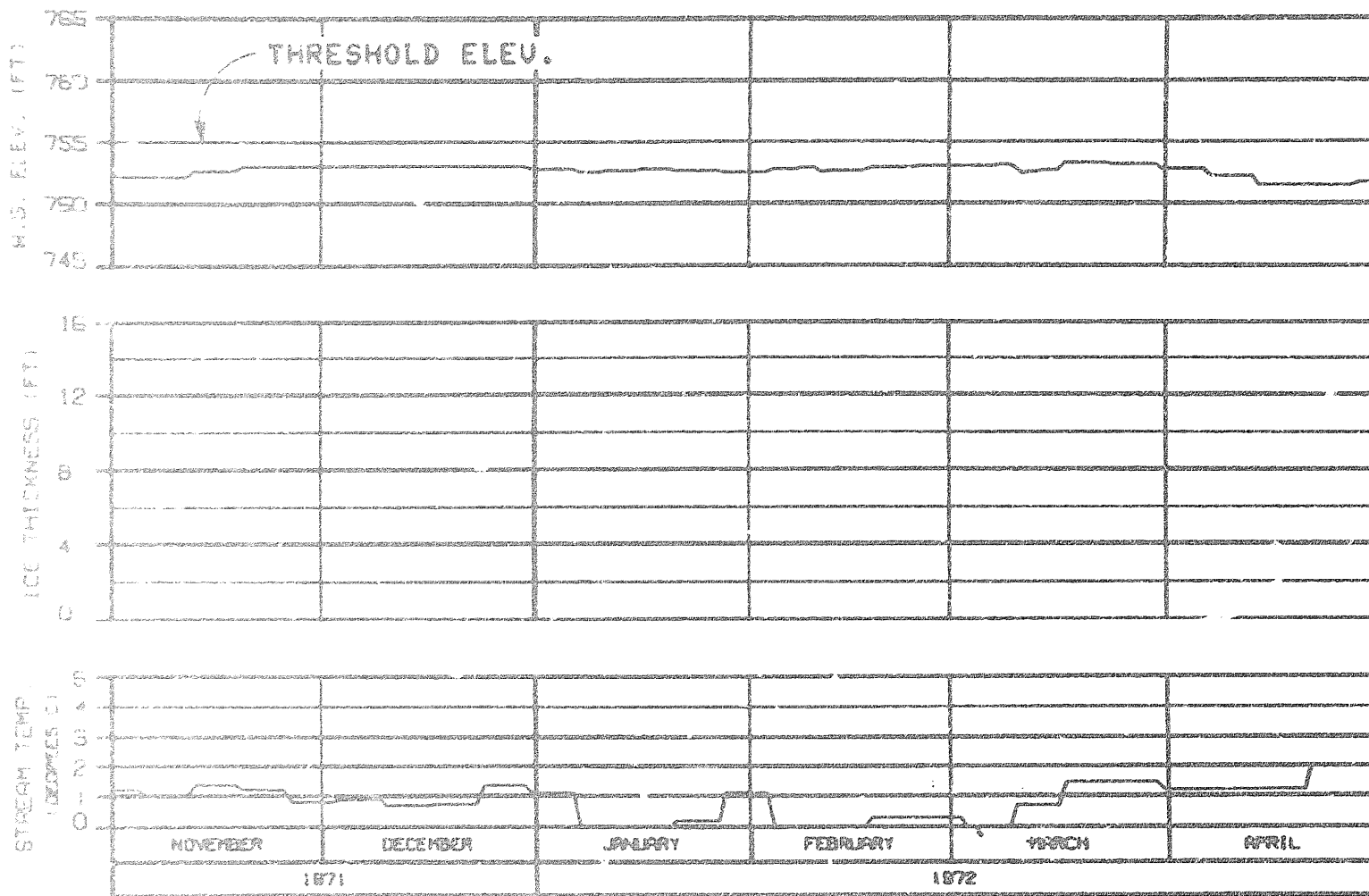
SLOUGH 21 (ENTRANCE A6)

RIVER MILE : 141.80

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

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

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUBITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRACO JOINT VENTURE		
DATE: 01-08-82	BY: ERS/BA	ISS: 142



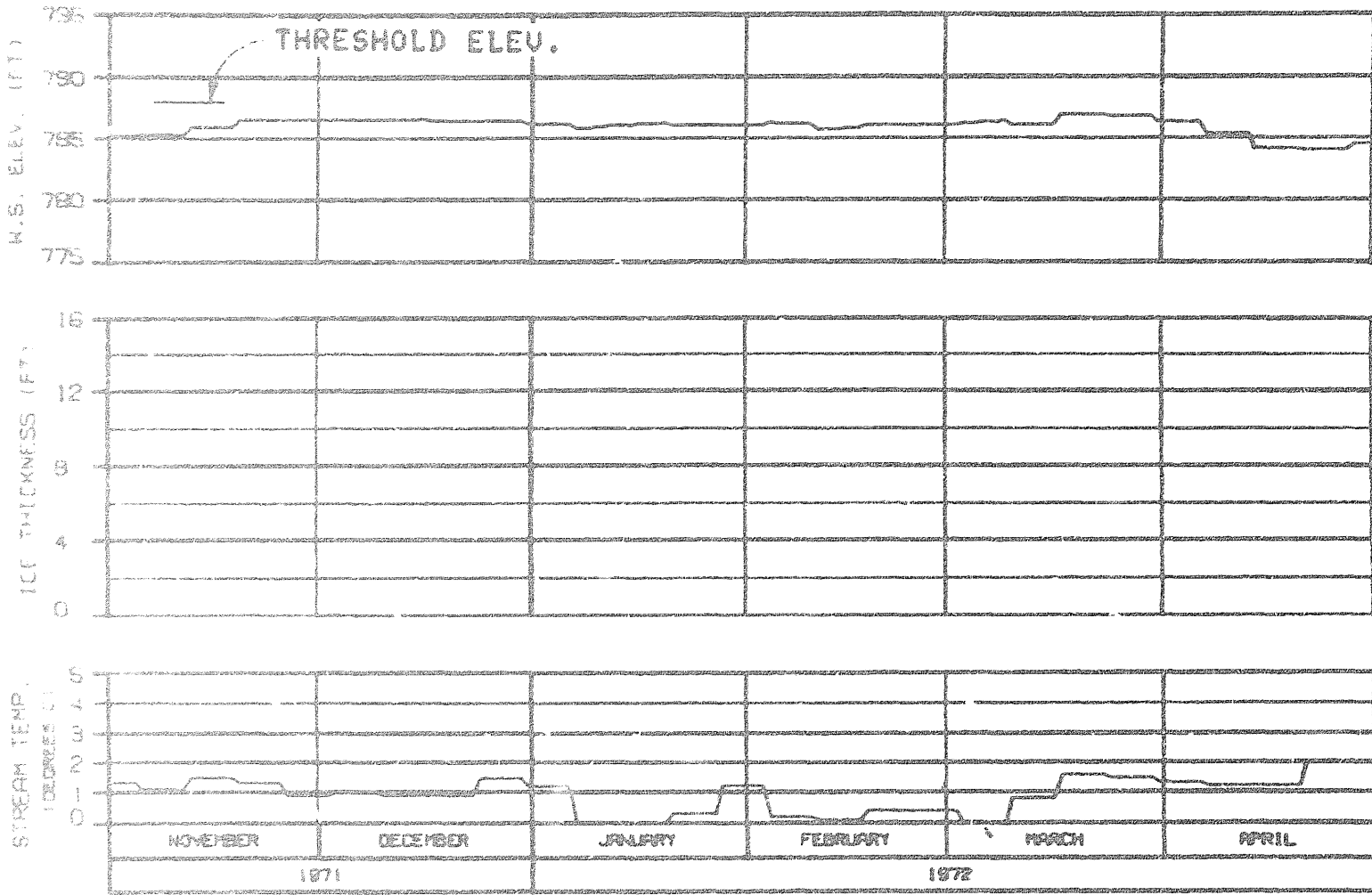
HEAD OF SLOUGH 21

RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
HARZA-EGROD JOINT VENTURE		
ORDER: 01-0001	DATE: 04 04 82	ISS: 142



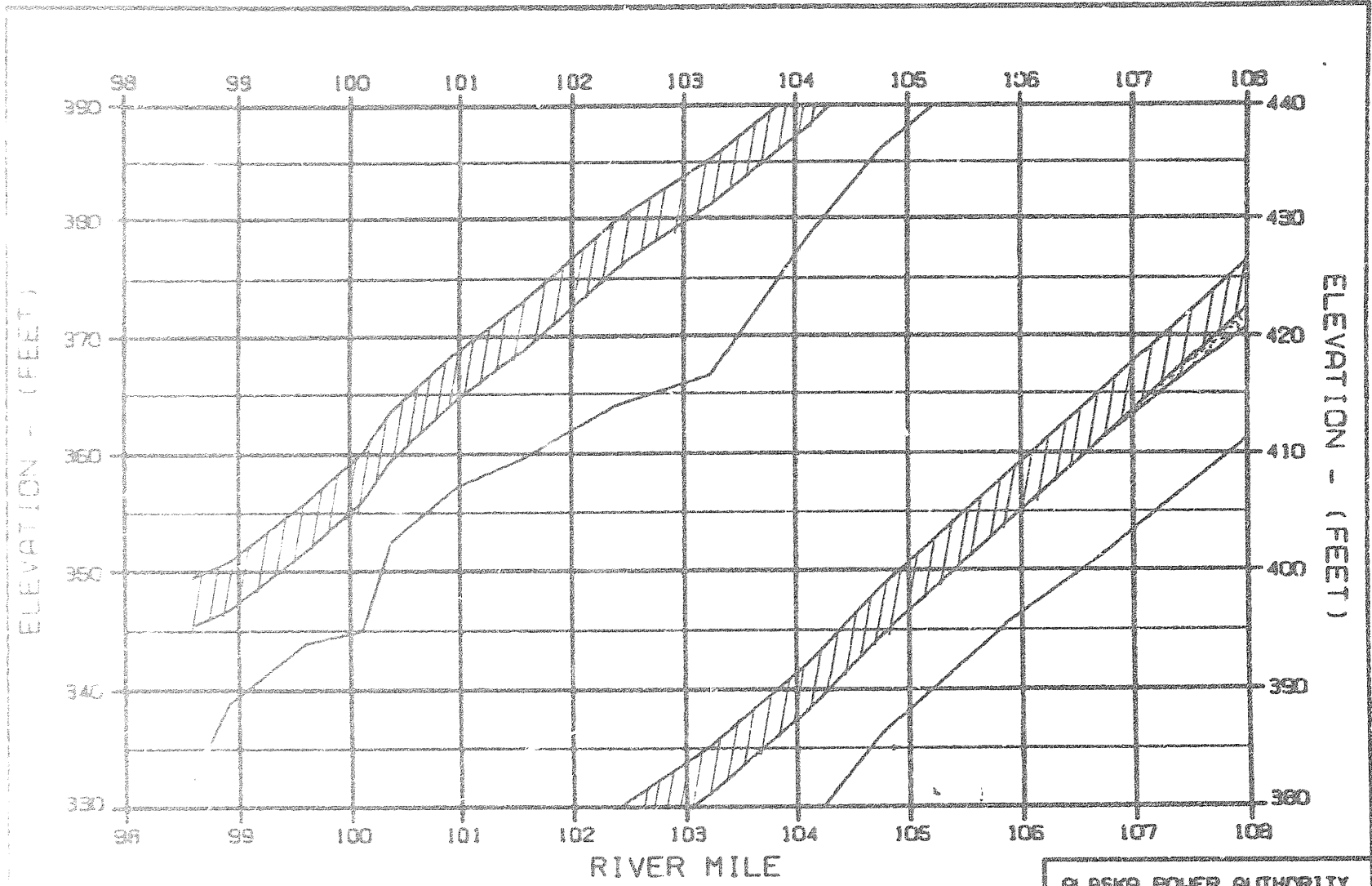
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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





WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WRAZA-BASSED JOINT VENTURE		
CHART NO. 84-0008	14 FEB 82	ISS. 142

EXHIBIT N



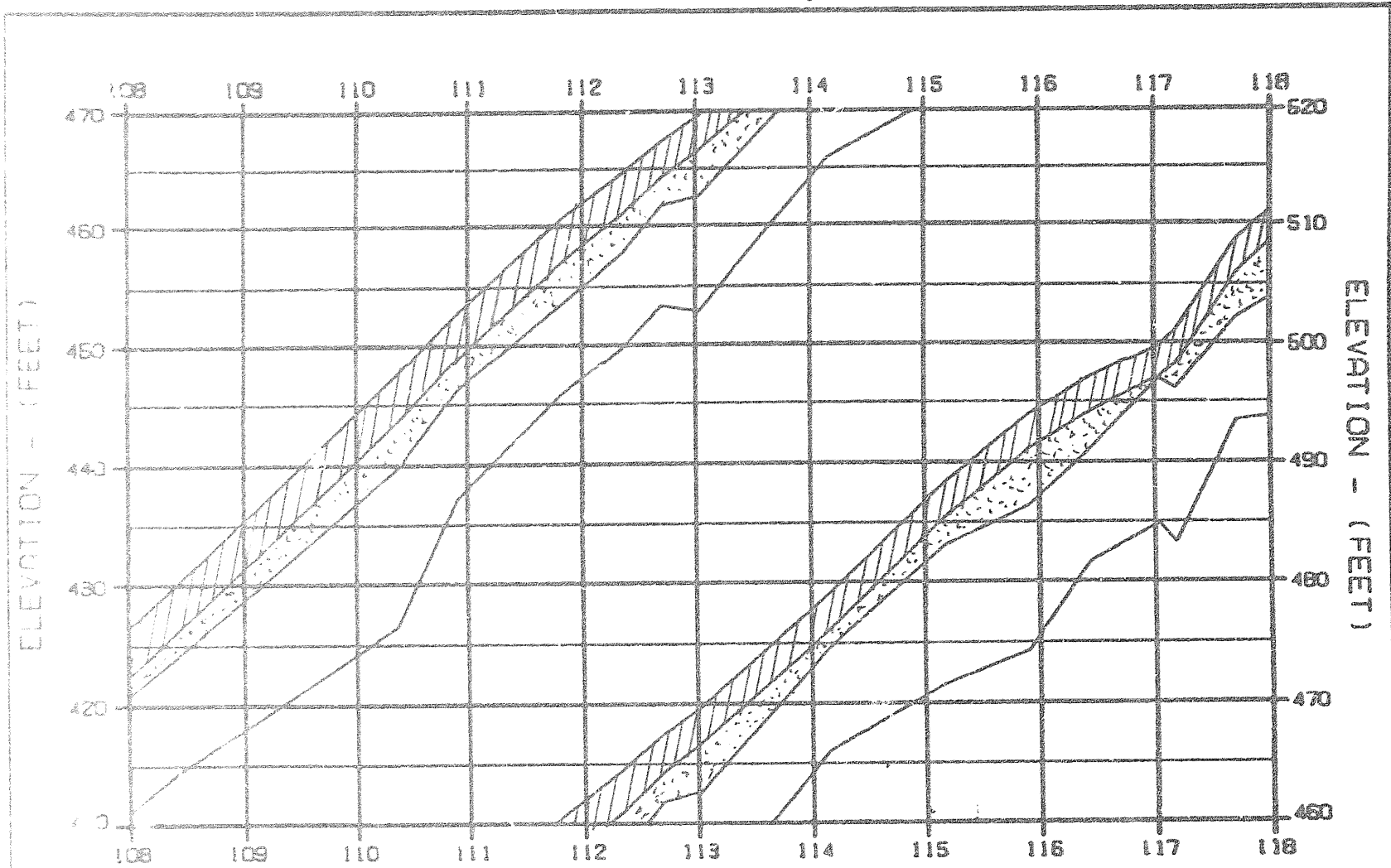
LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CKA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
WARZA, ALBUQUERQUE, N.M.	EBASCO, WASH. DC
NOV. 1972	

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ELEVATION - (FEET)

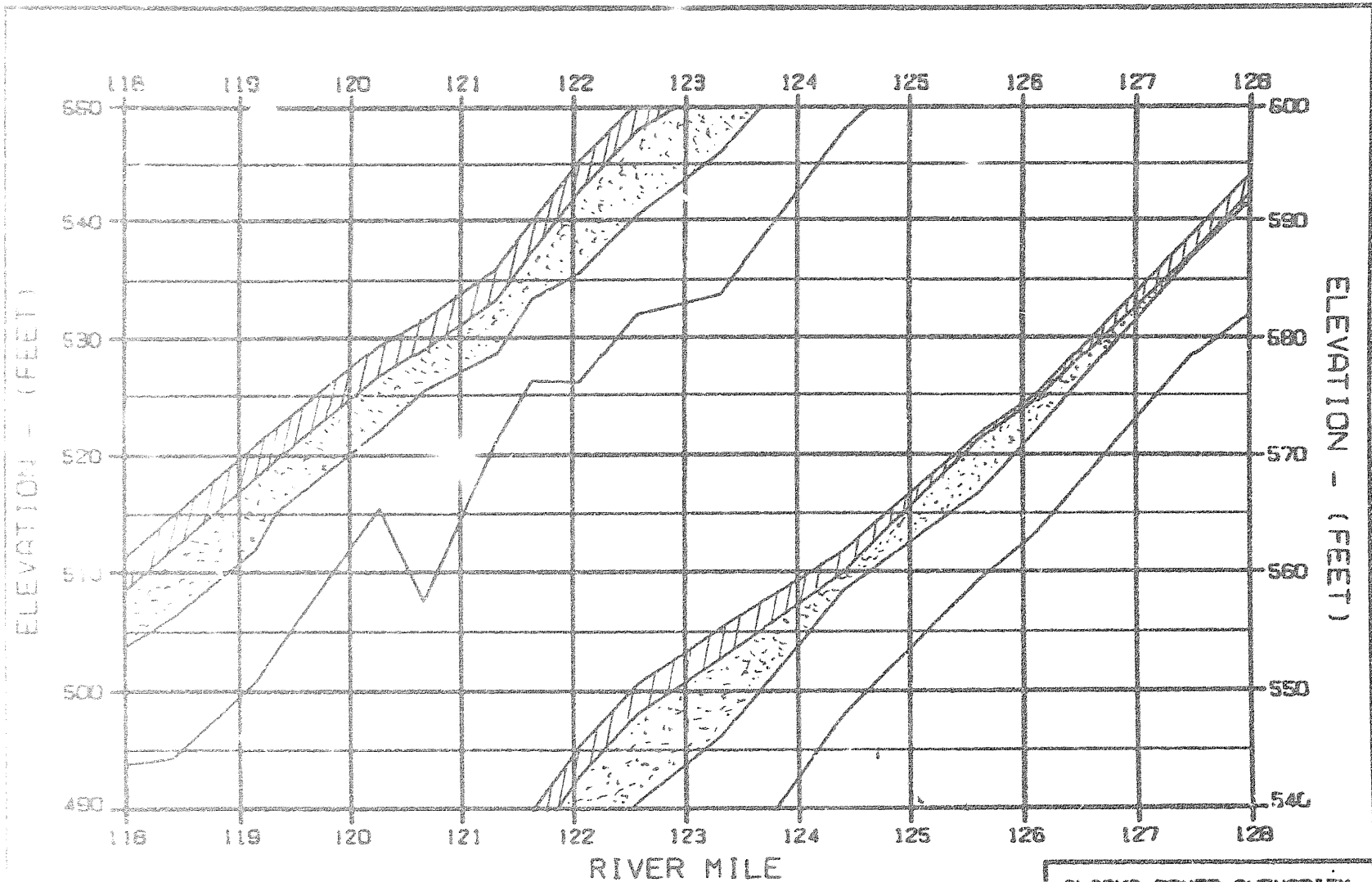
LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1600.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
DESIGNED: ALLPORT	14 DEC 72	1000.142

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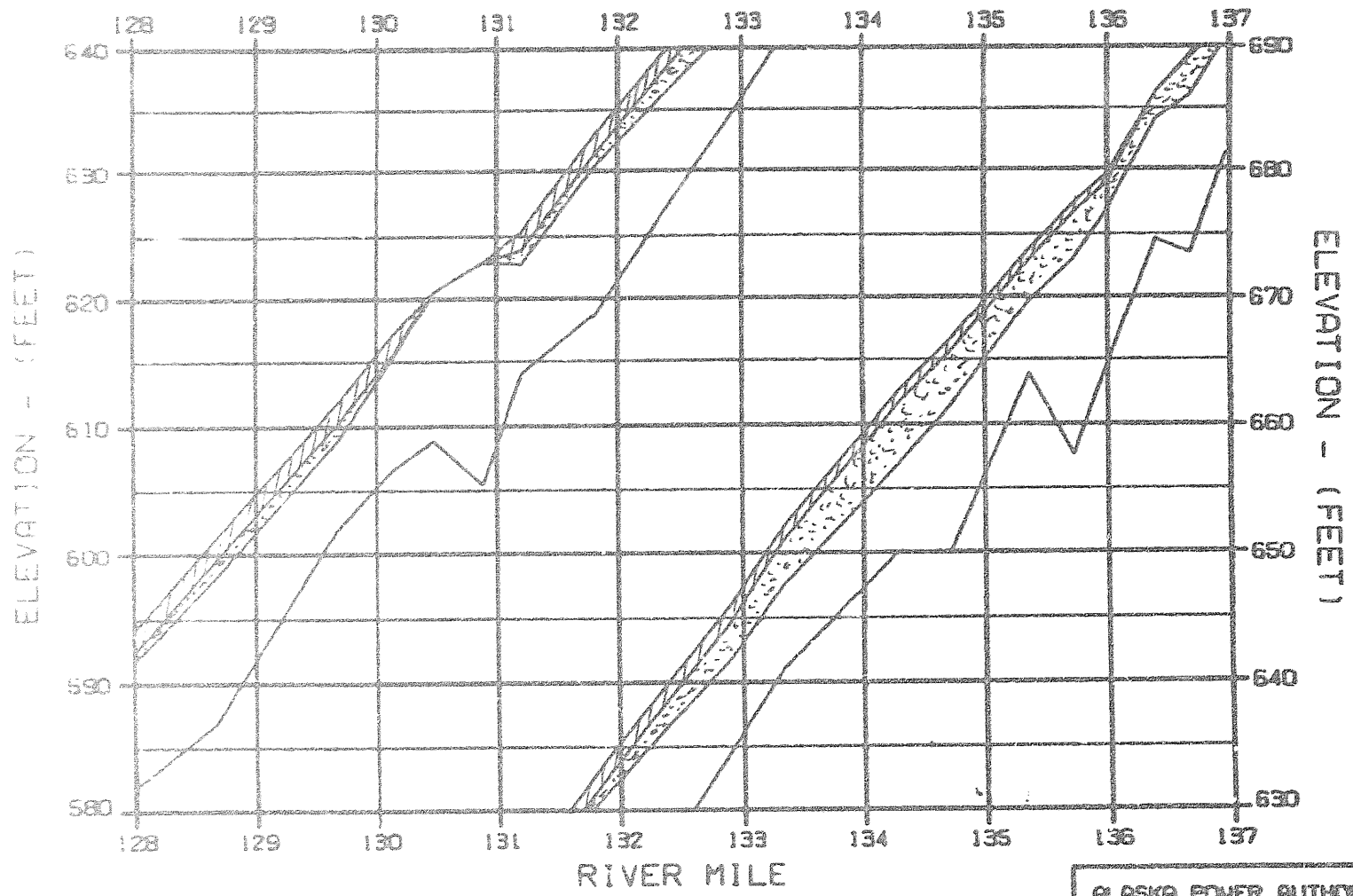


LEGEND:

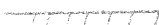
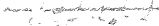


-  TOP OF SOLID ICE
-  BLUSH/SOLID ICE INTERFACE
-  BOTTOM OF BLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800, APPROACH 1500.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUBMITTAL PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
FIGURE 14.2	OF 142

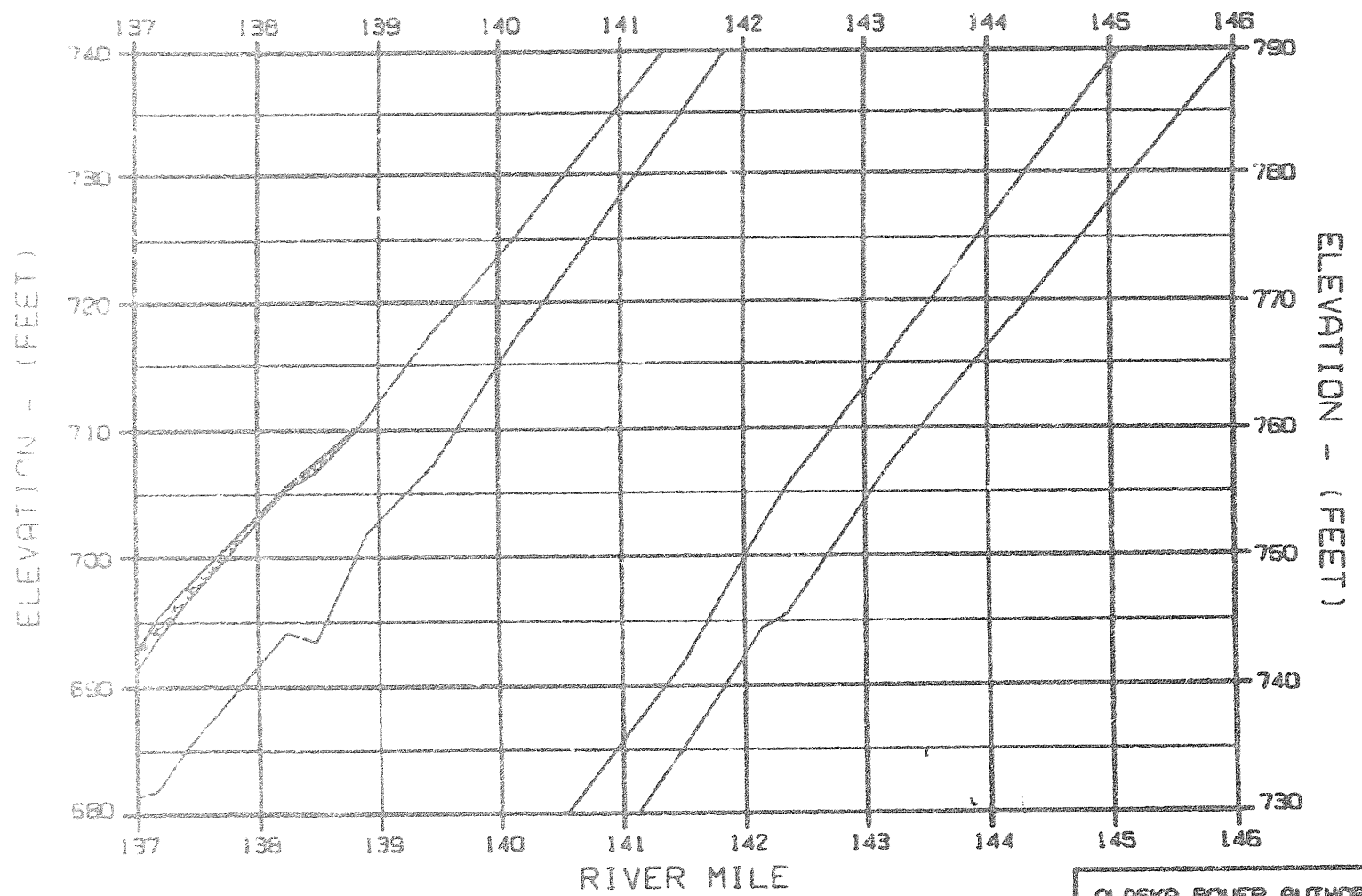


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
EKLITNA PROJECT		
EKLITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
HARZA-EDASCO JOINT VENTURE		
ENGINEER: D.L. GIBBS	14 DEC 80	FIG. 142



LEGEND:

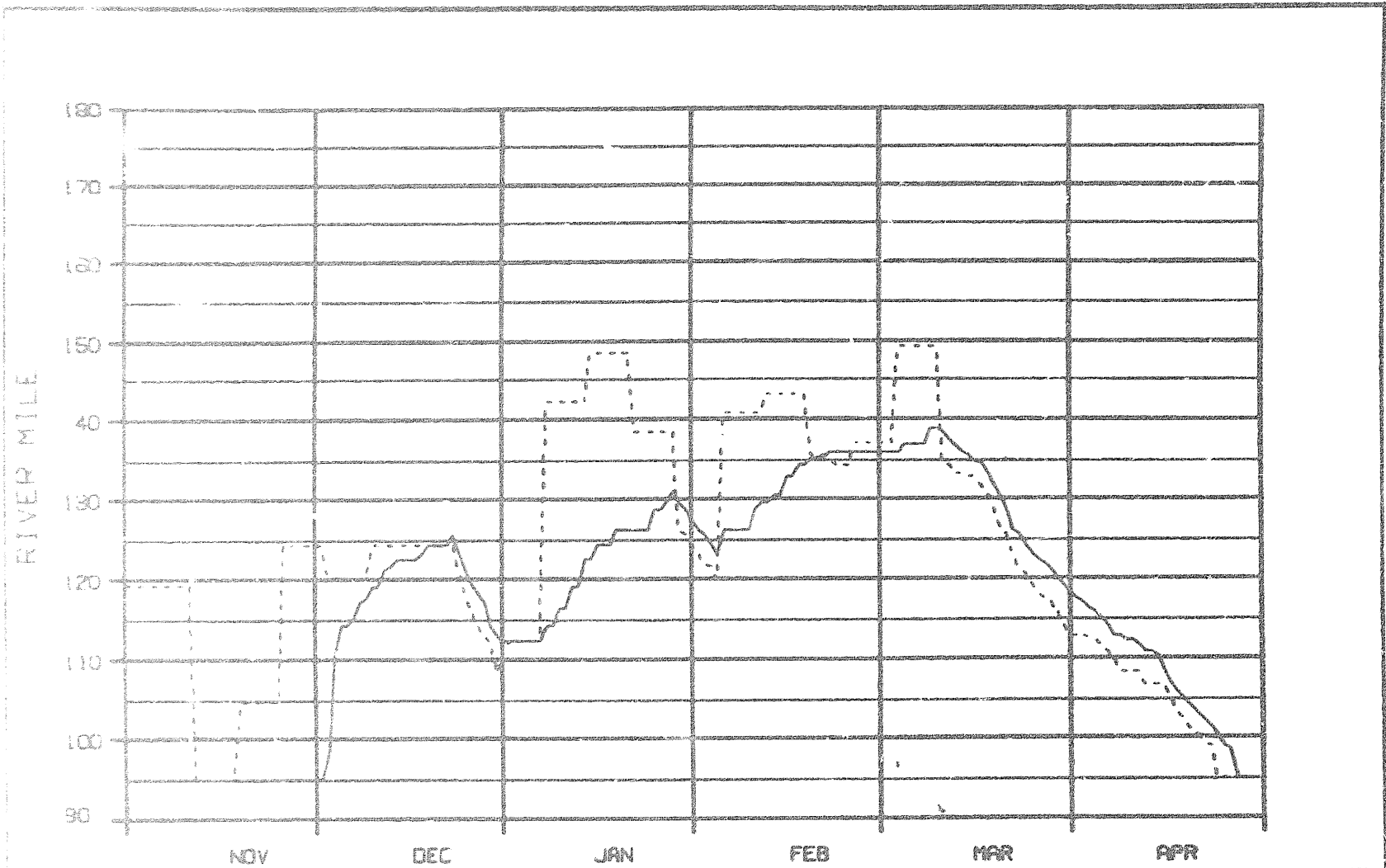
- TOP OF SOLID ICE
- SLUSH/SOLID ICE INTERFACE
- BOTTOM OF SLUSH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1600. APPROACH 1600.
 REFERENCE RUN NO. : 7101CX9

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARD-EDASCO JOINT VENTURE		
DESIGN - BLANDIN	14 DEC 74	1000.148

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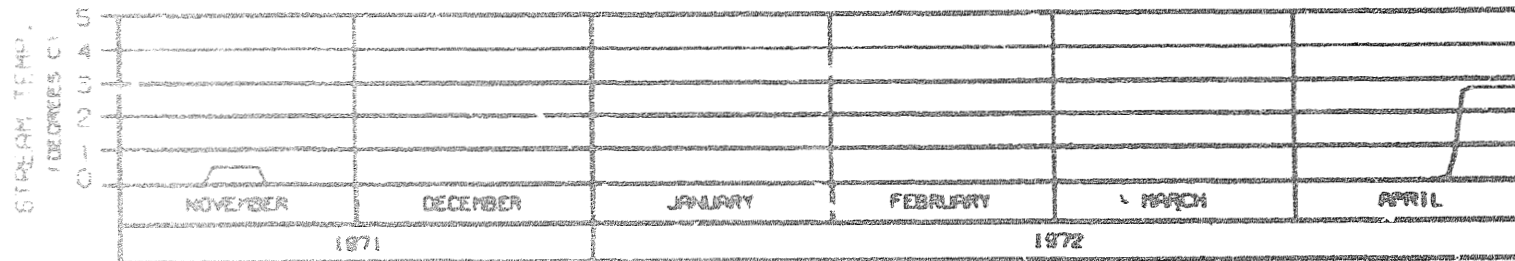
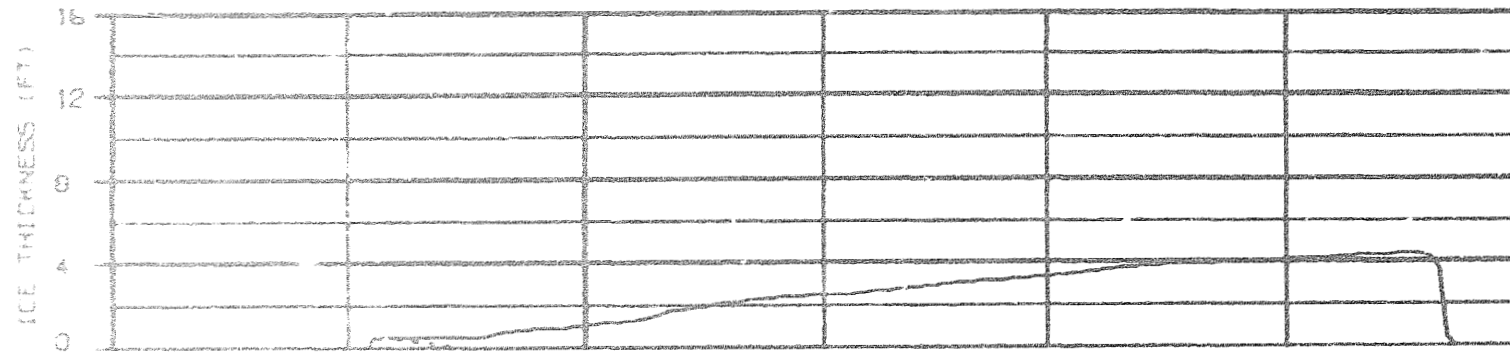
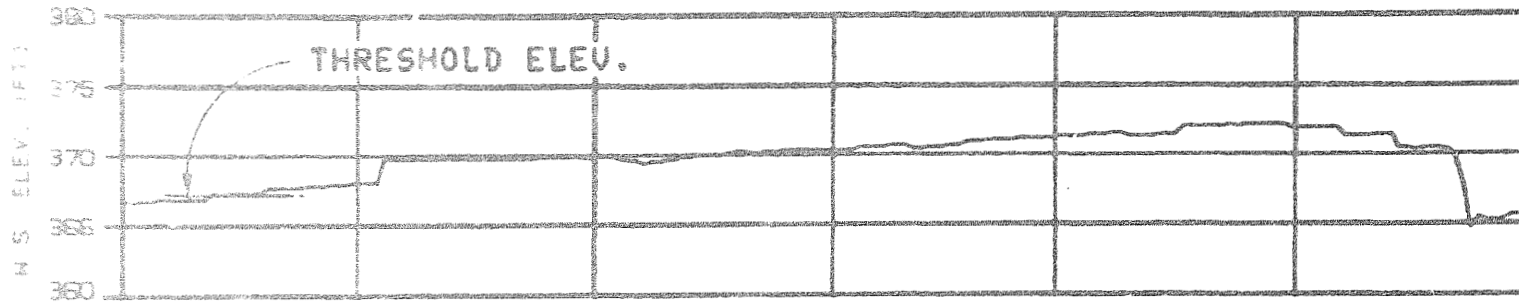


LEGEND:
 — ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 FLOW CASE C INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
PROGRESSION OF ICE FRONT	
& ZERO DEGREE ISOTHERM	
NARDA-EBASCO JOINT VENTURE	
CHGCRS. 04.04.72	ISS. 142

SECTION 2



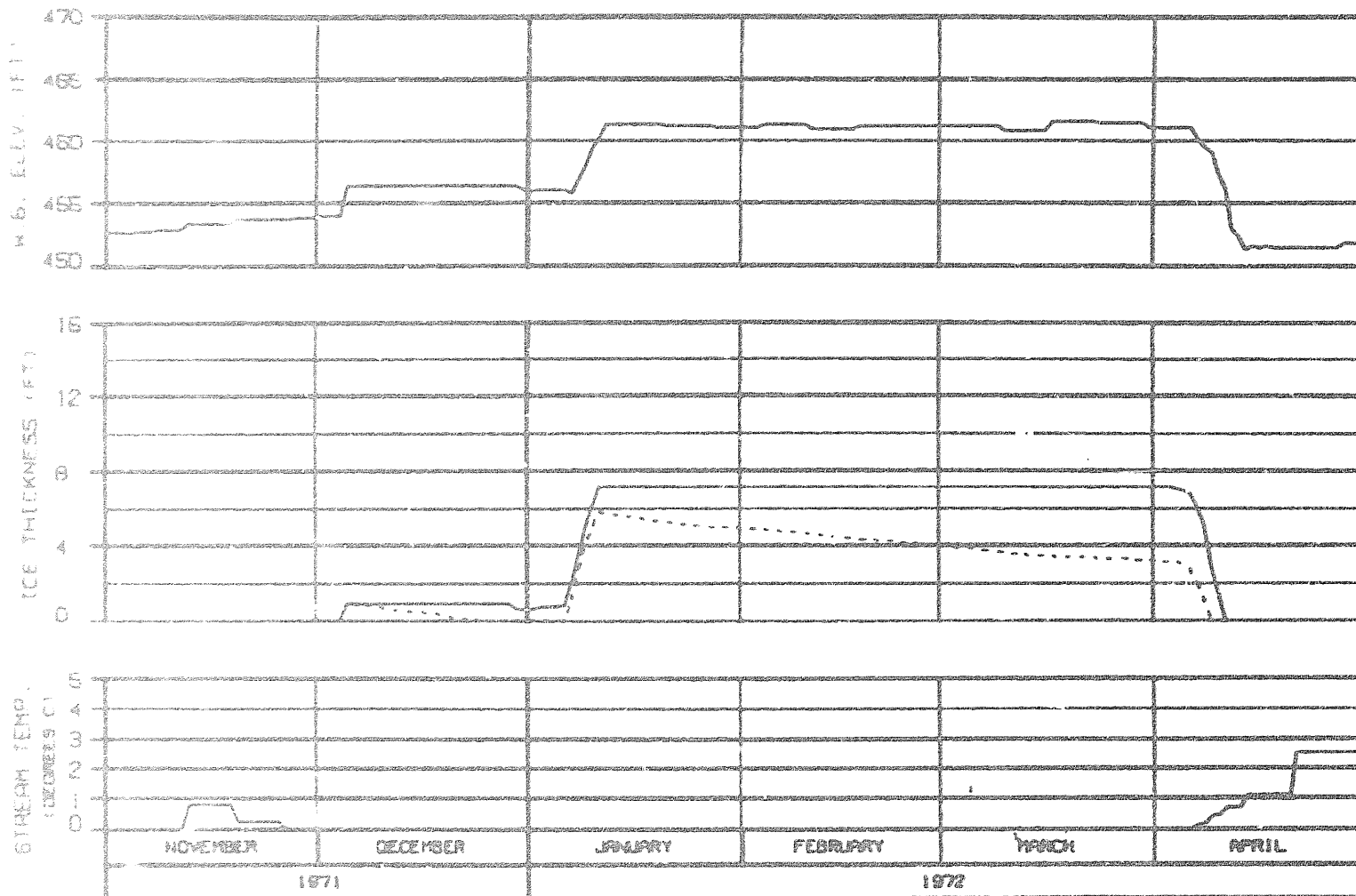
HEAD OF WHISKERS SLOUGH

RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 150.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBERD JOINT VENTURE	
DATE: 11/1/72	BY: J. W. W.
PAGE 148	

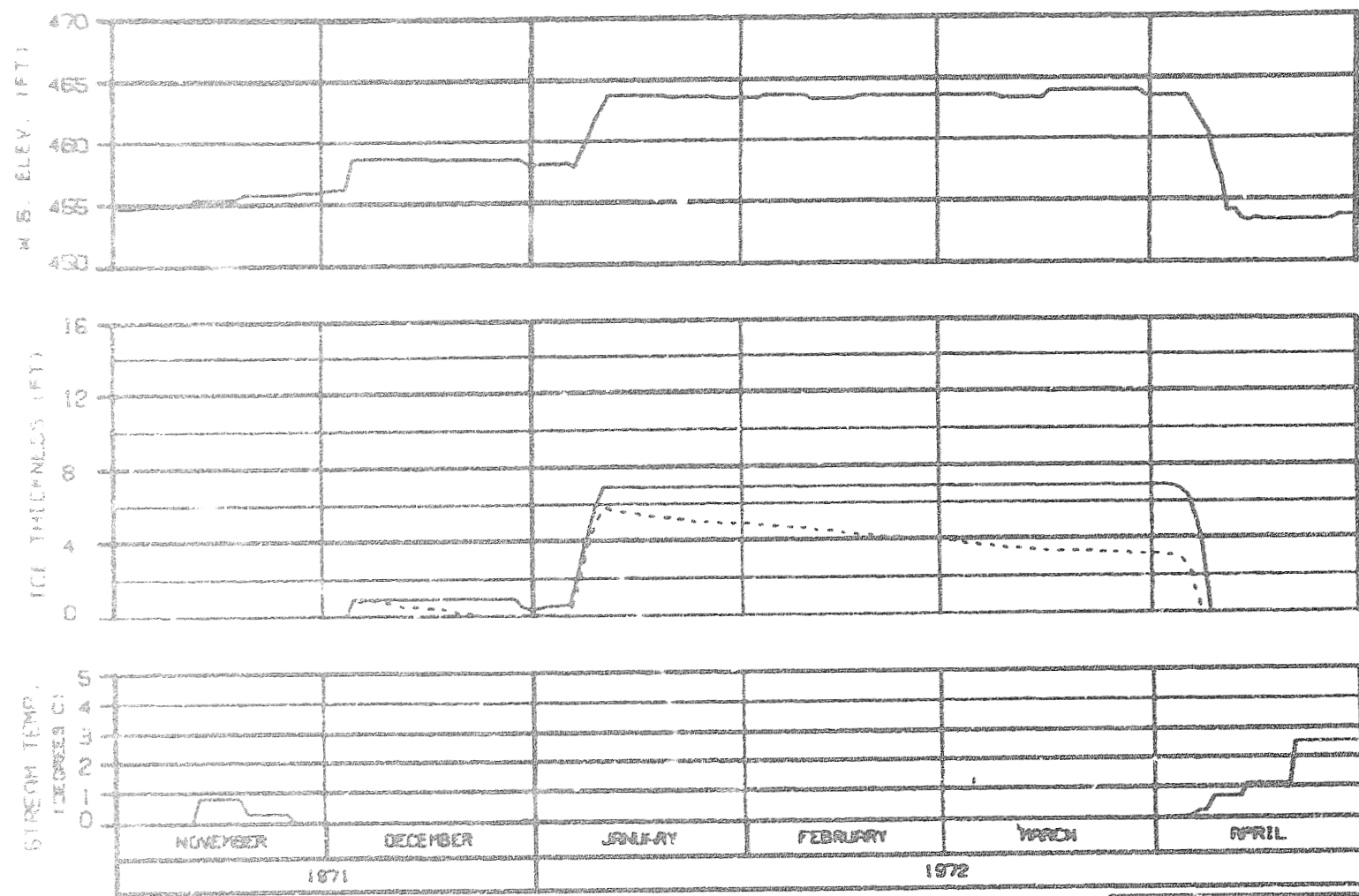


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
CHITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBREDD JOINT VENTURE	
DESIGNED: D.J. PETERSON	DATE: MAR 72
	REVISION: 142

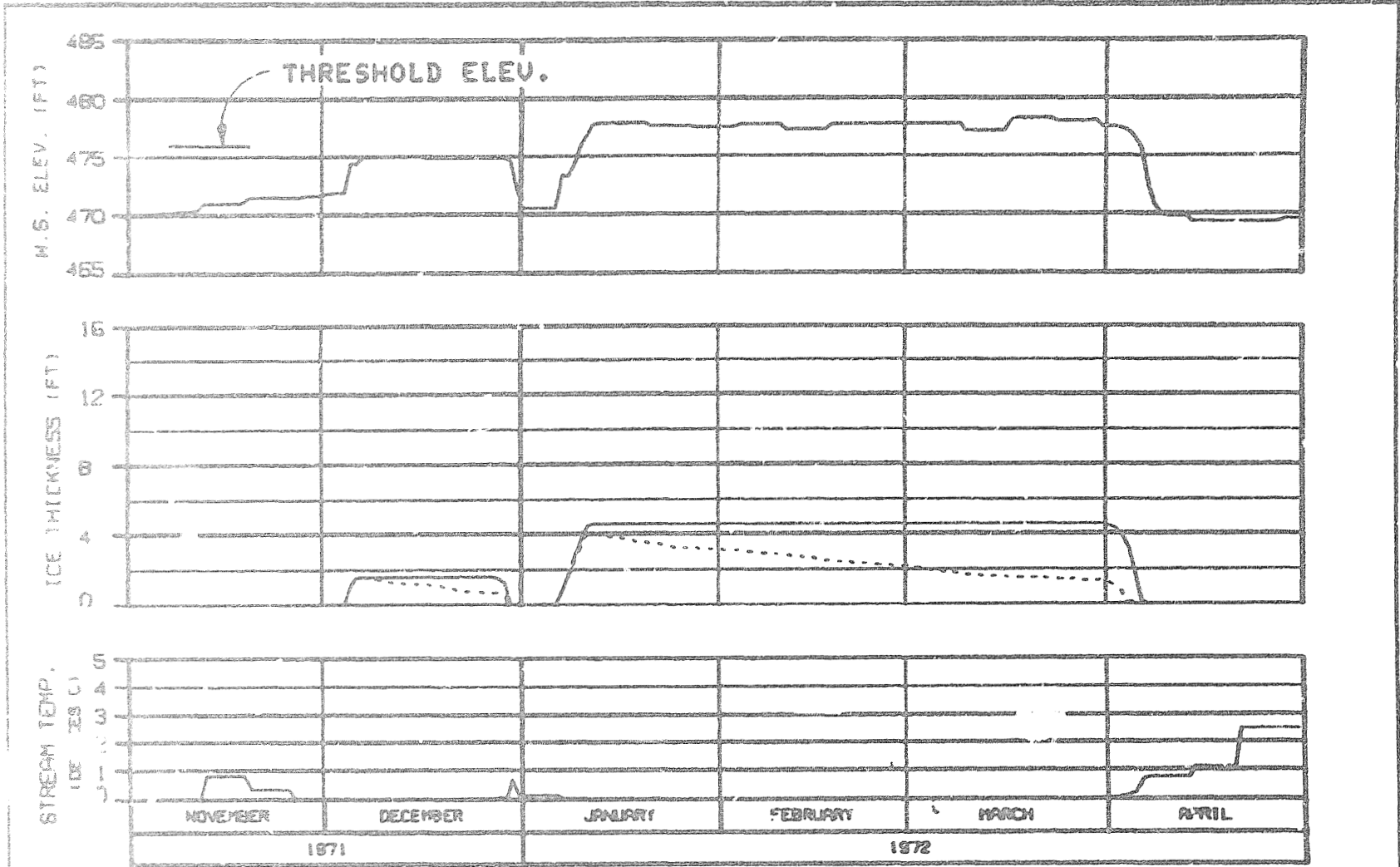


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WAPZA-EDBECO JOINT VENTURE		
ENGINEER: W.L. DUNN	14 DEC 72	ISSUE: 142

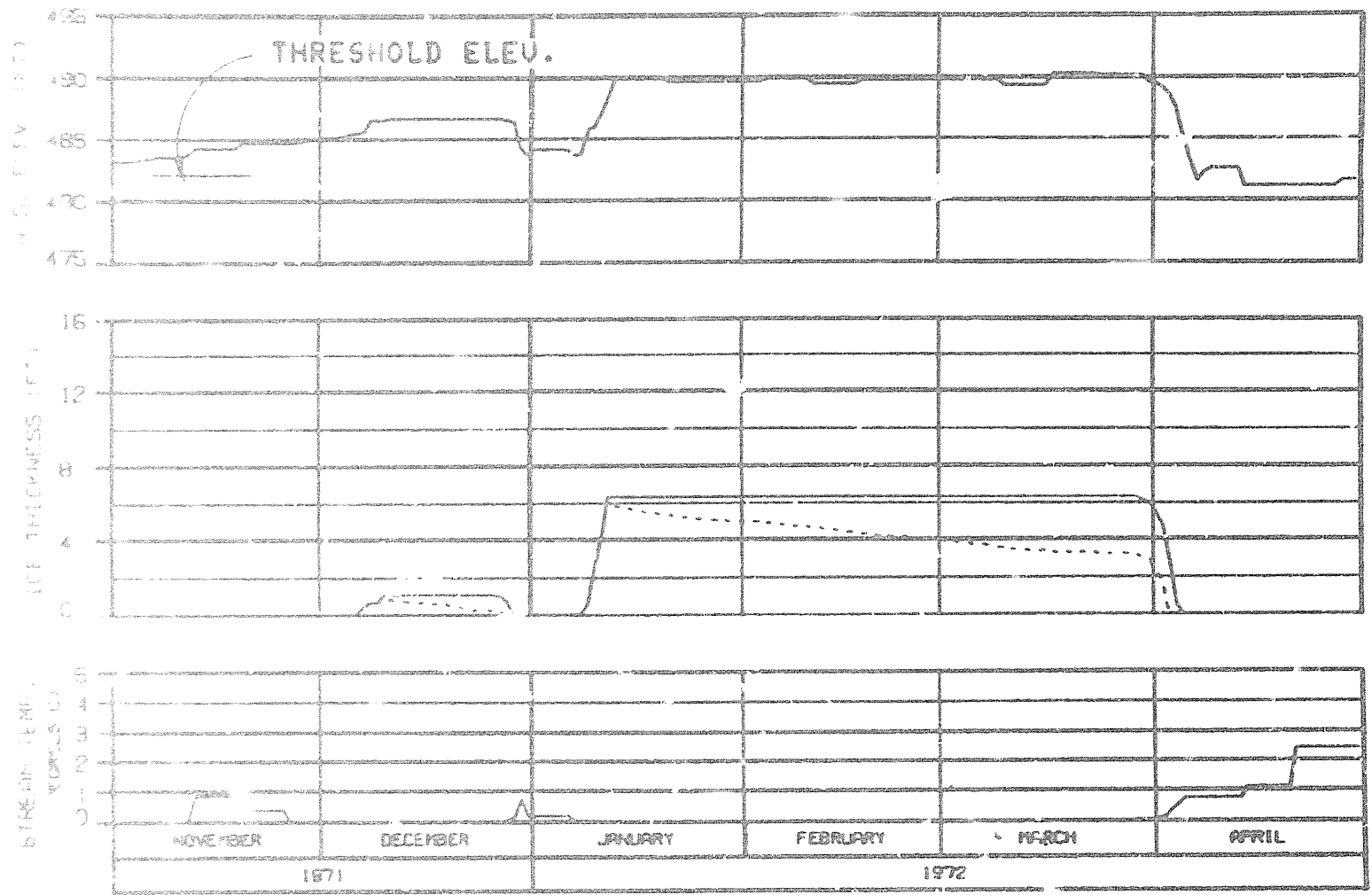


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CH. RES. REPORT	14 FEB 72	1025.142

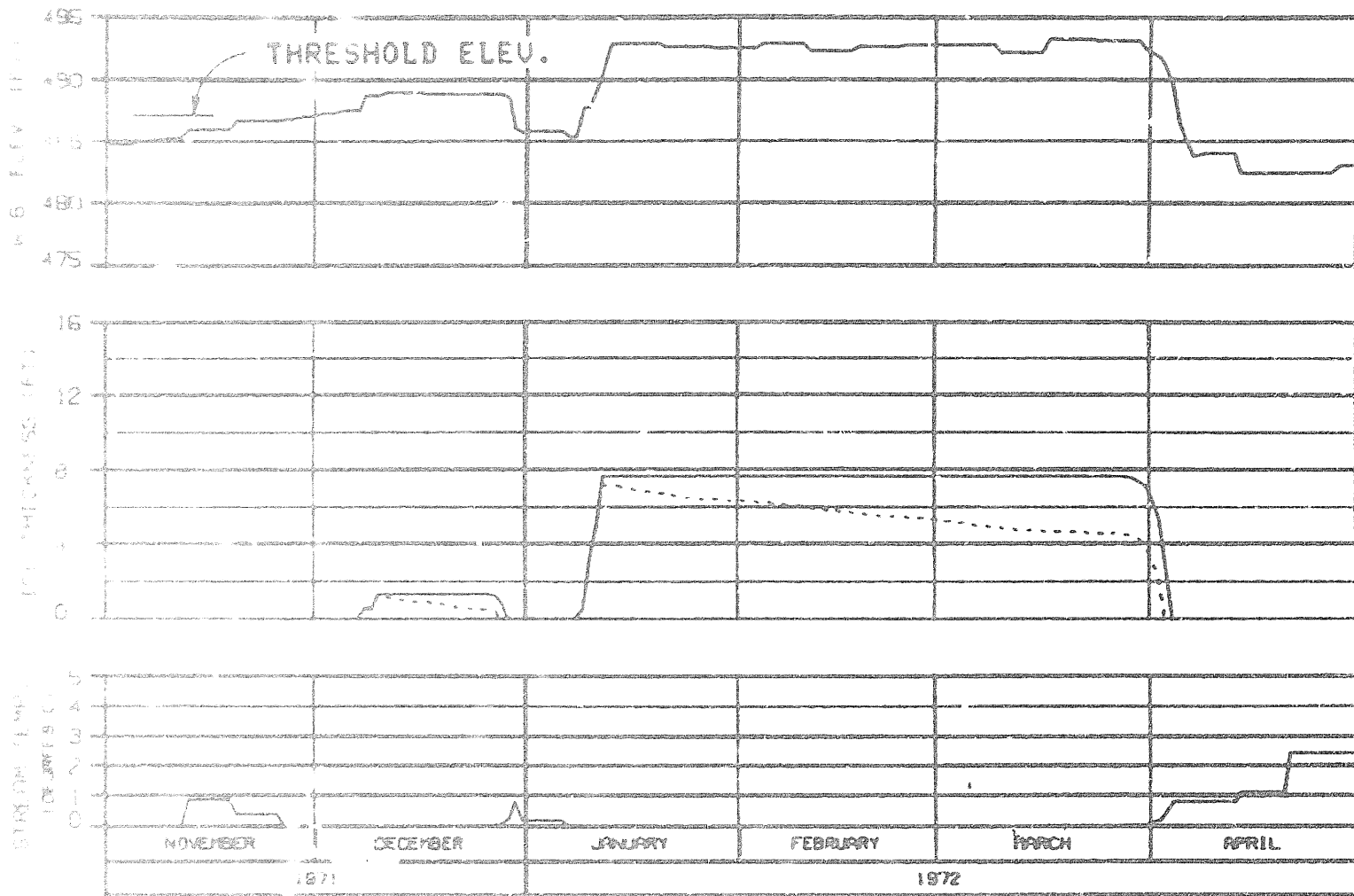


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

SIDE CHANNEL MSII
 RIVER MILE : 115.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTS, 2.1.0000	14 OF 24
1008.142	

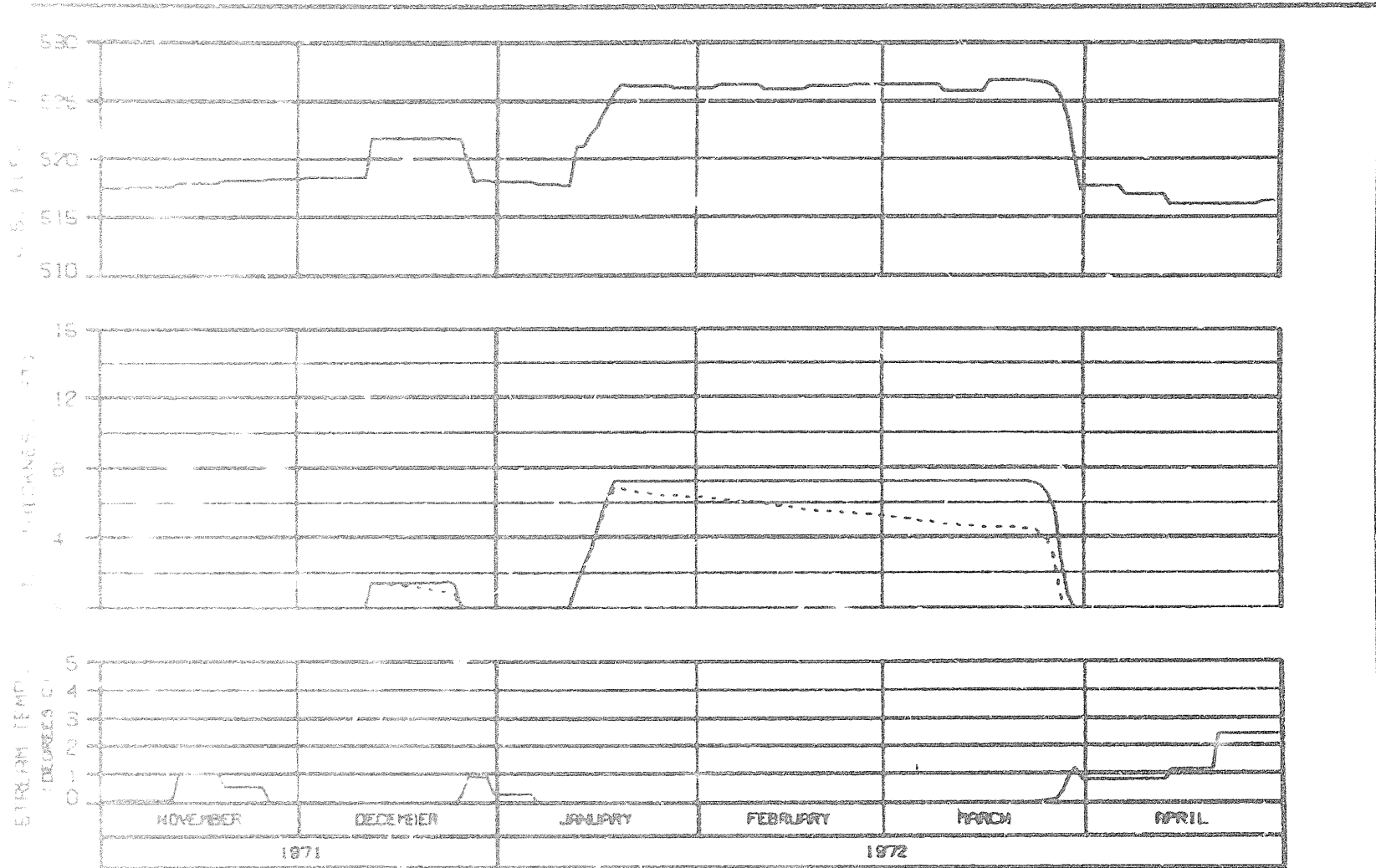


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ICE THICKNESS (L20210)
 ----- TOTAL THICKNESS
 - - - - - BLUISH COMPONENT

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTER. 01.0010	10 APR 72
1005.142	

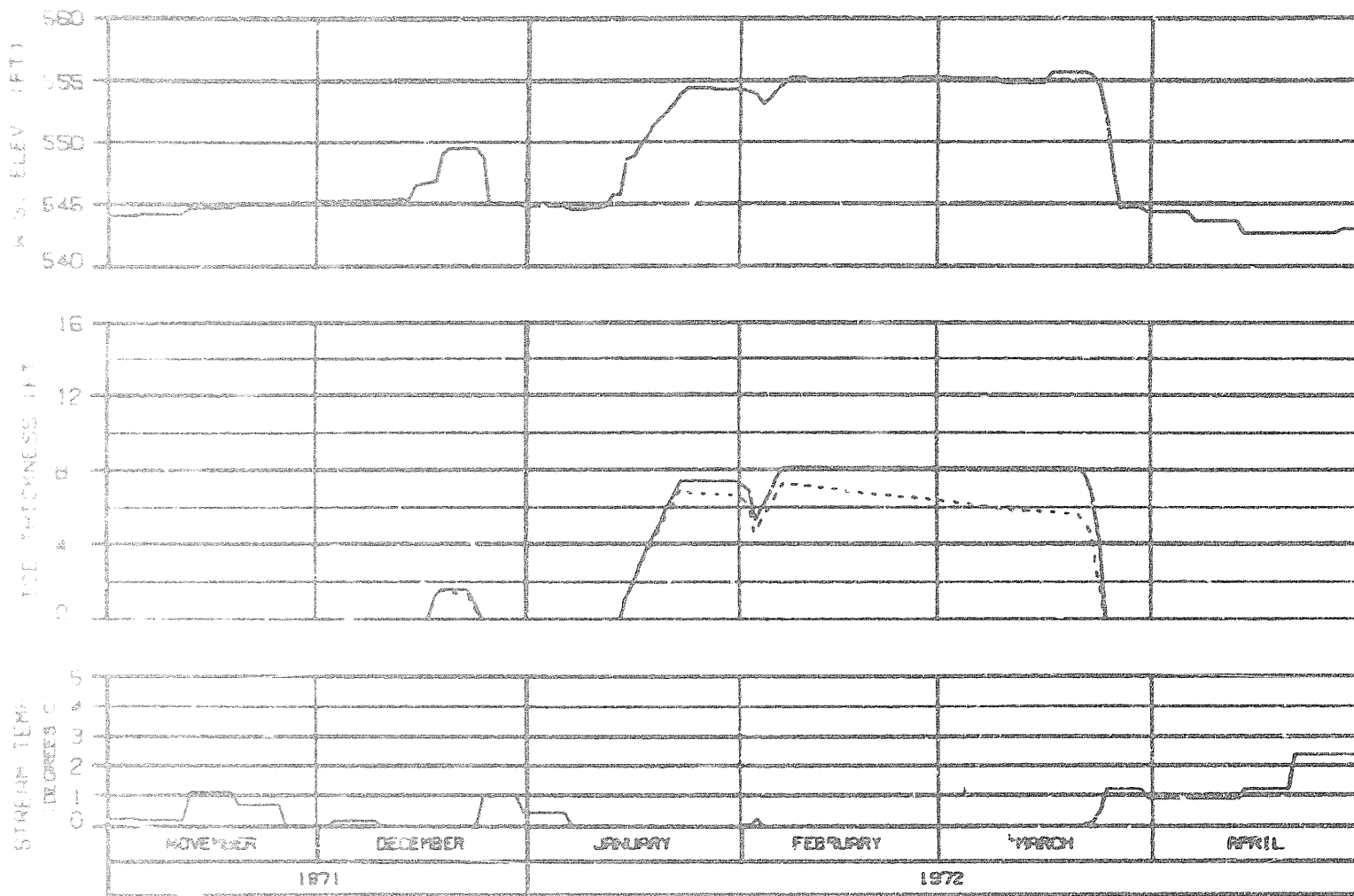


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DESIGNED: R.L. HAYES	14 FEB 72
1988.142	

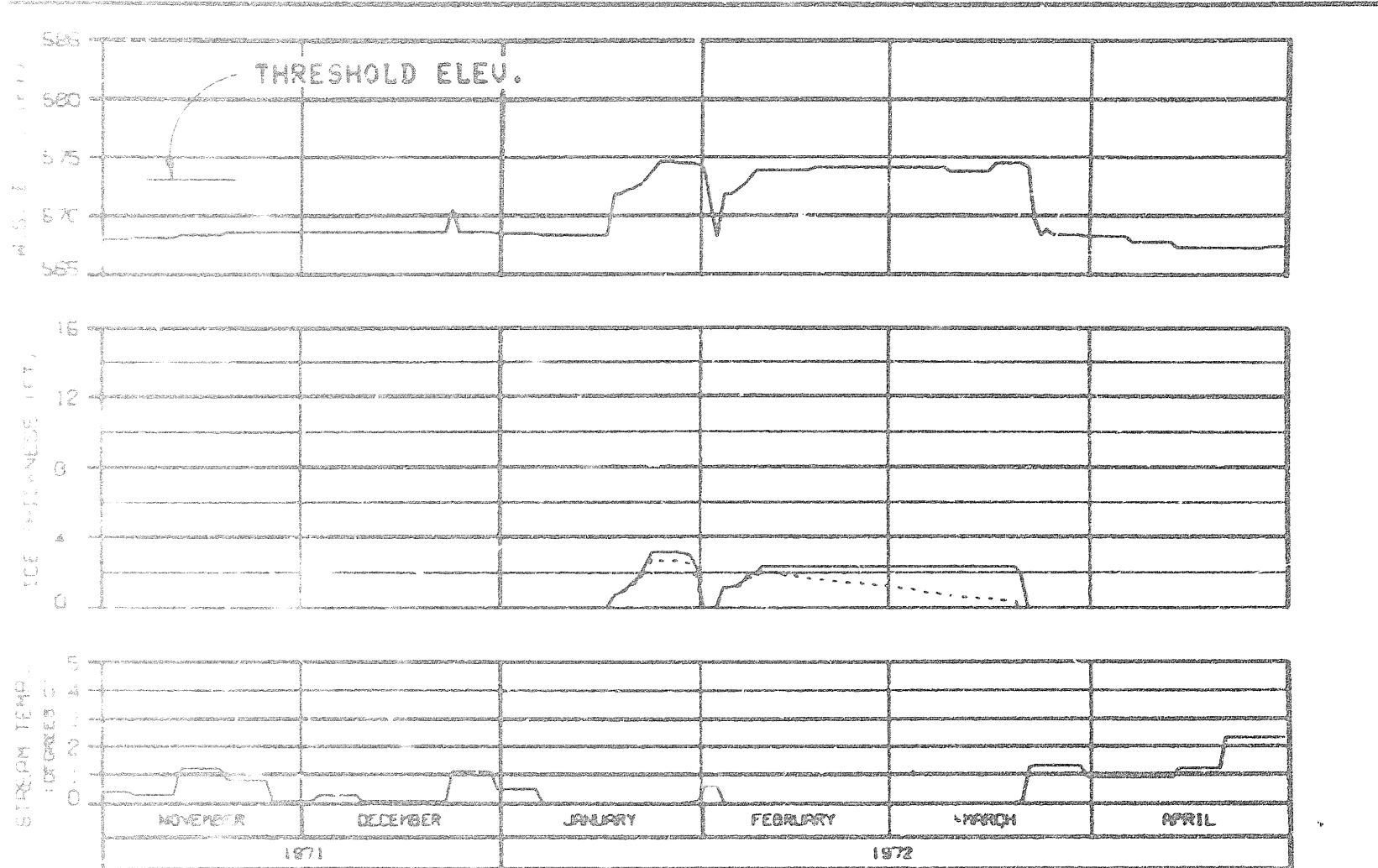


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WAYANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
PROJECT - 11A-0-010	1A REV. 04	1972.142



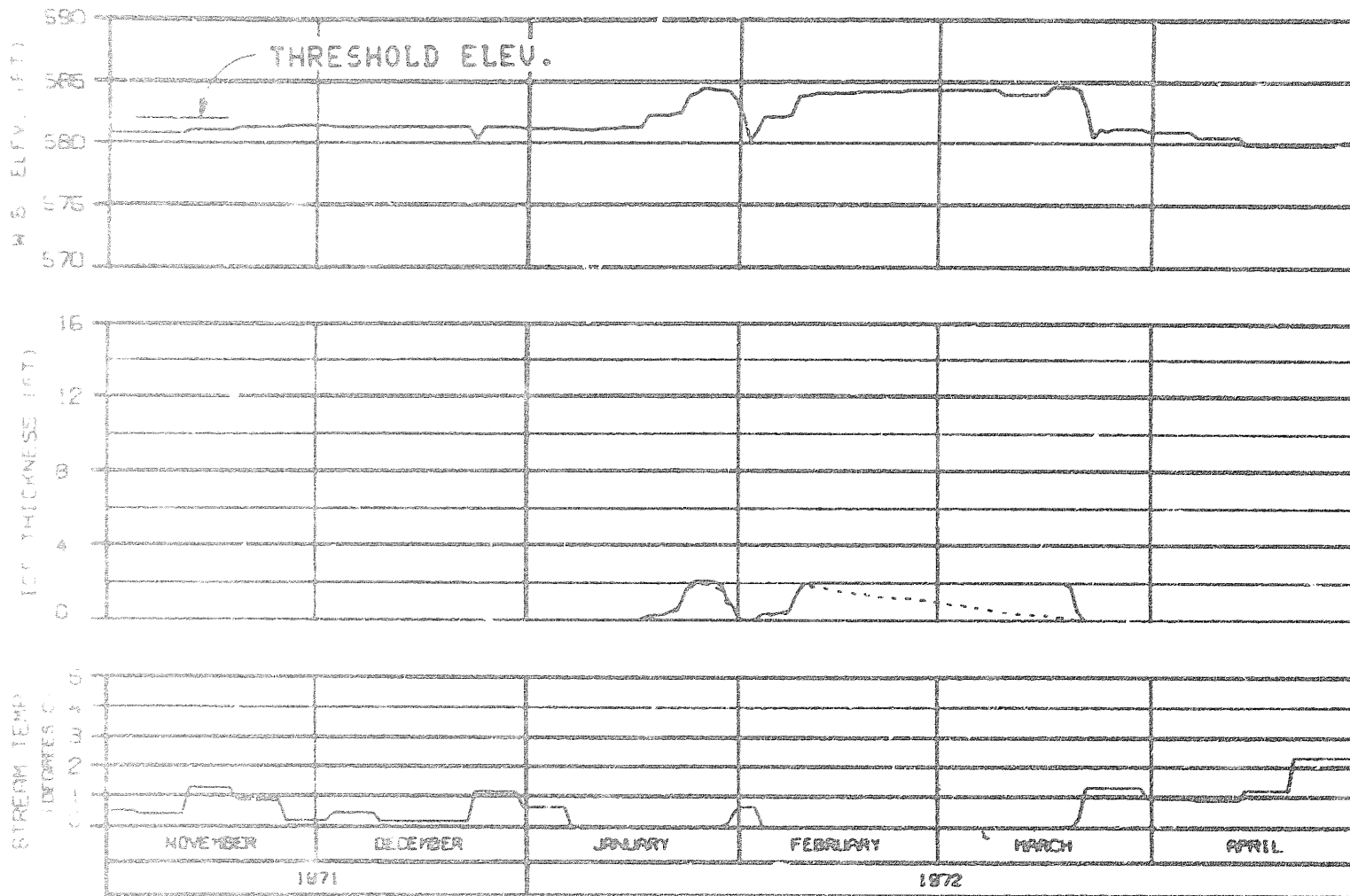
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - G.L. DAVIS	DRAWN - G.M.
NOV 71	NOV 71



HEAD OF SLOUGH 8A (EAST)

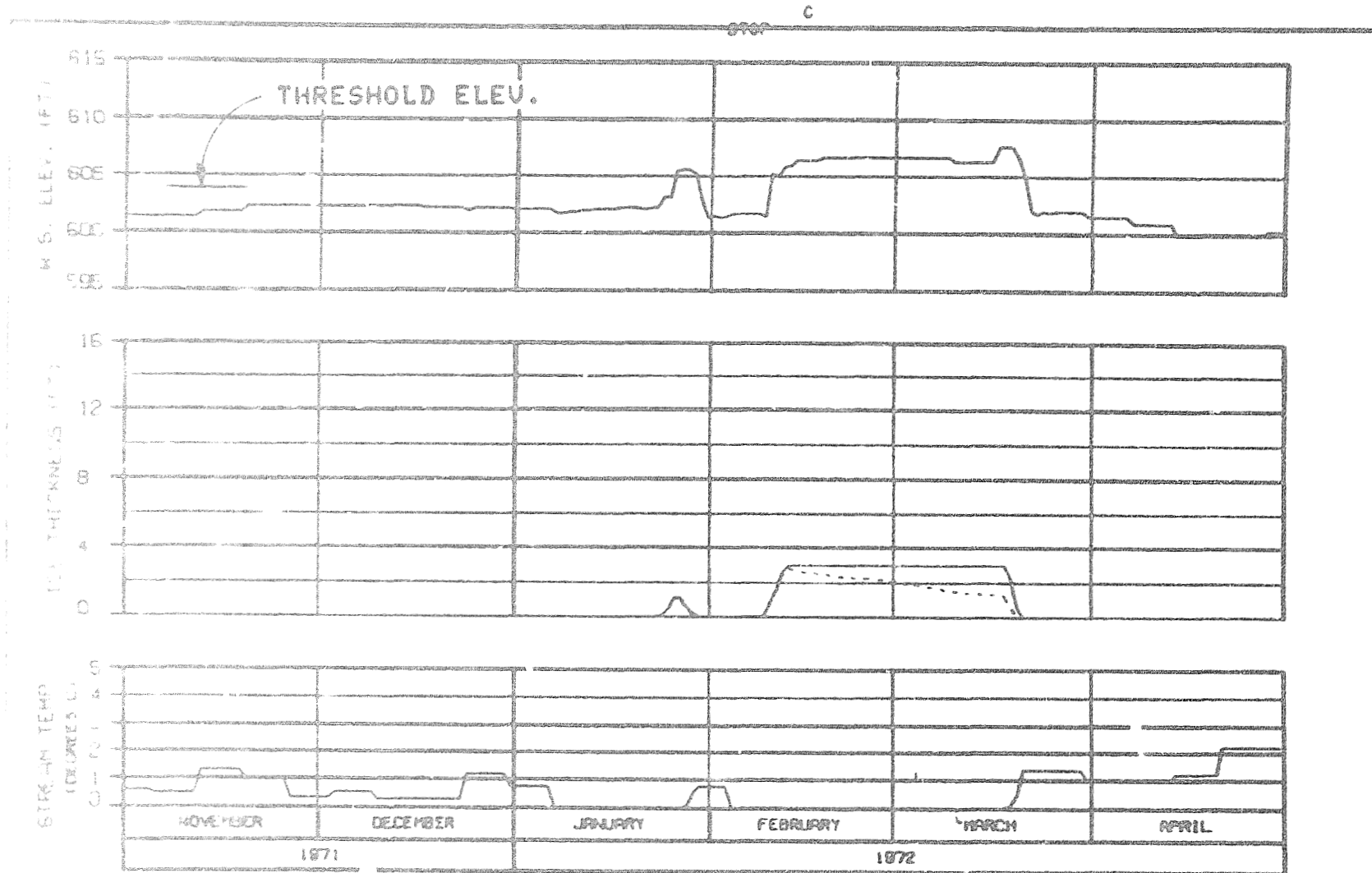
RIVER MILE : 127.10

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
ENGINEER - DA. SHEDD	14 DEC 80
	18207.148



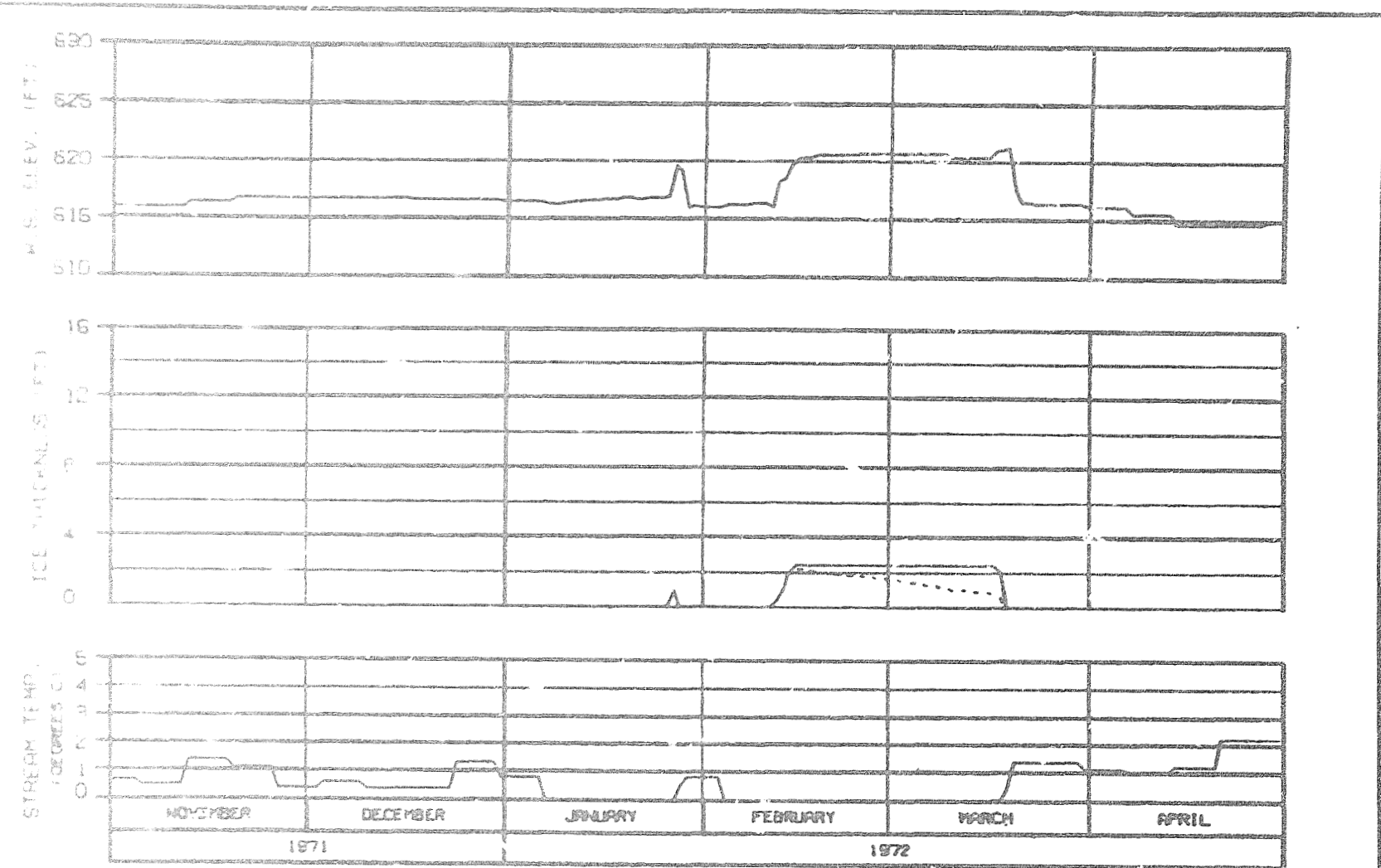
HEAD OF SLOUGH 9
 RIVER MILE : 129.30

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

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

ALASKA POWER AUTHORITY	
SLISTNA PROJECT	
SLISTNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
DATE: 11/20/72	BY: JES/DA
	UNB.142

SECTION 9

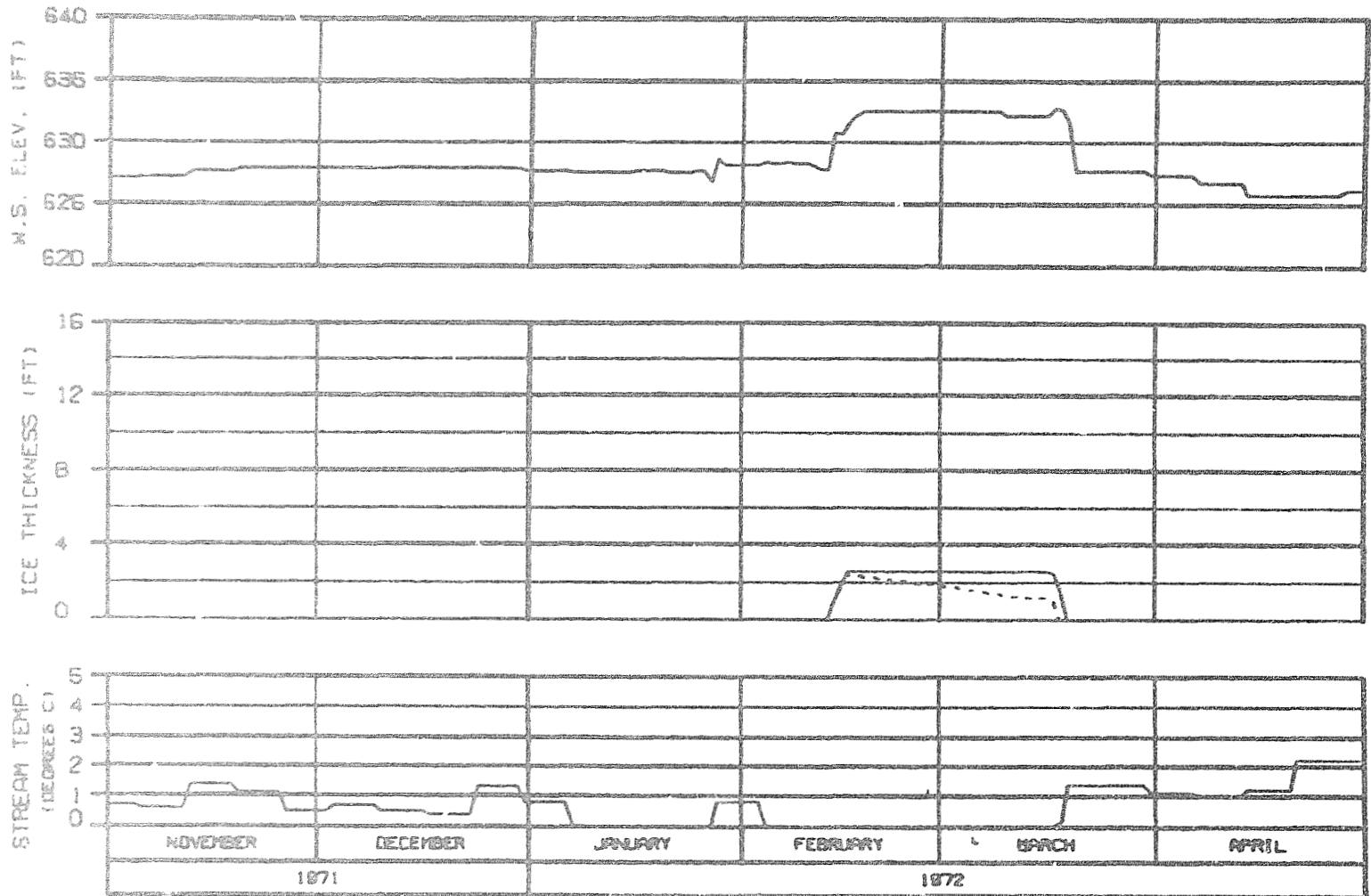


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: ALBERTO	ISSUED BY: 8588.142

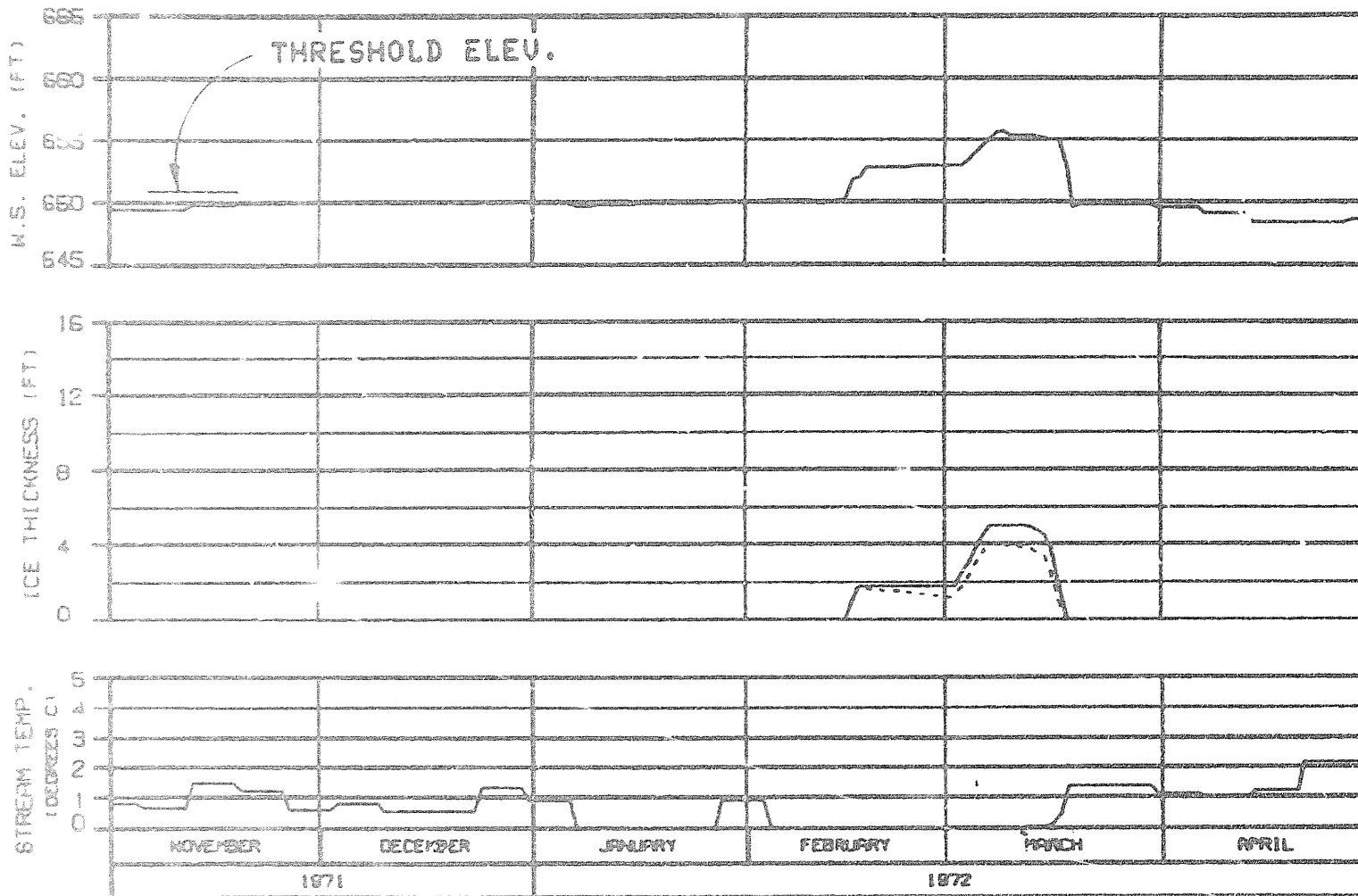


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUE-I COMPONENT

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENCLOSURE - DRAWINGS	1 OF 222 PAGES
	W003.142

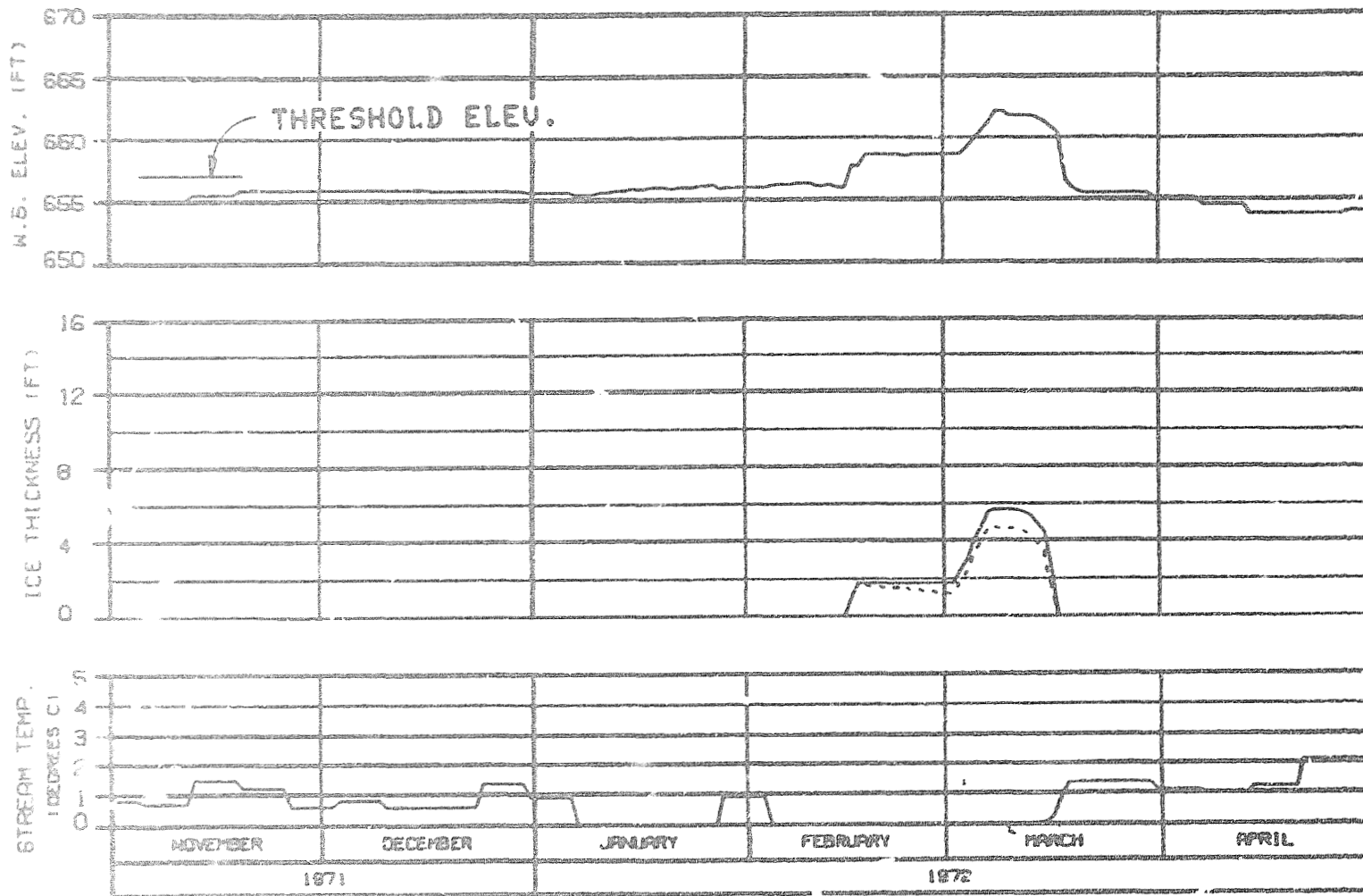


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBAGCO JOINT VENTURE	
CHANGES - ILLUSTRATED	ISSUED - 142

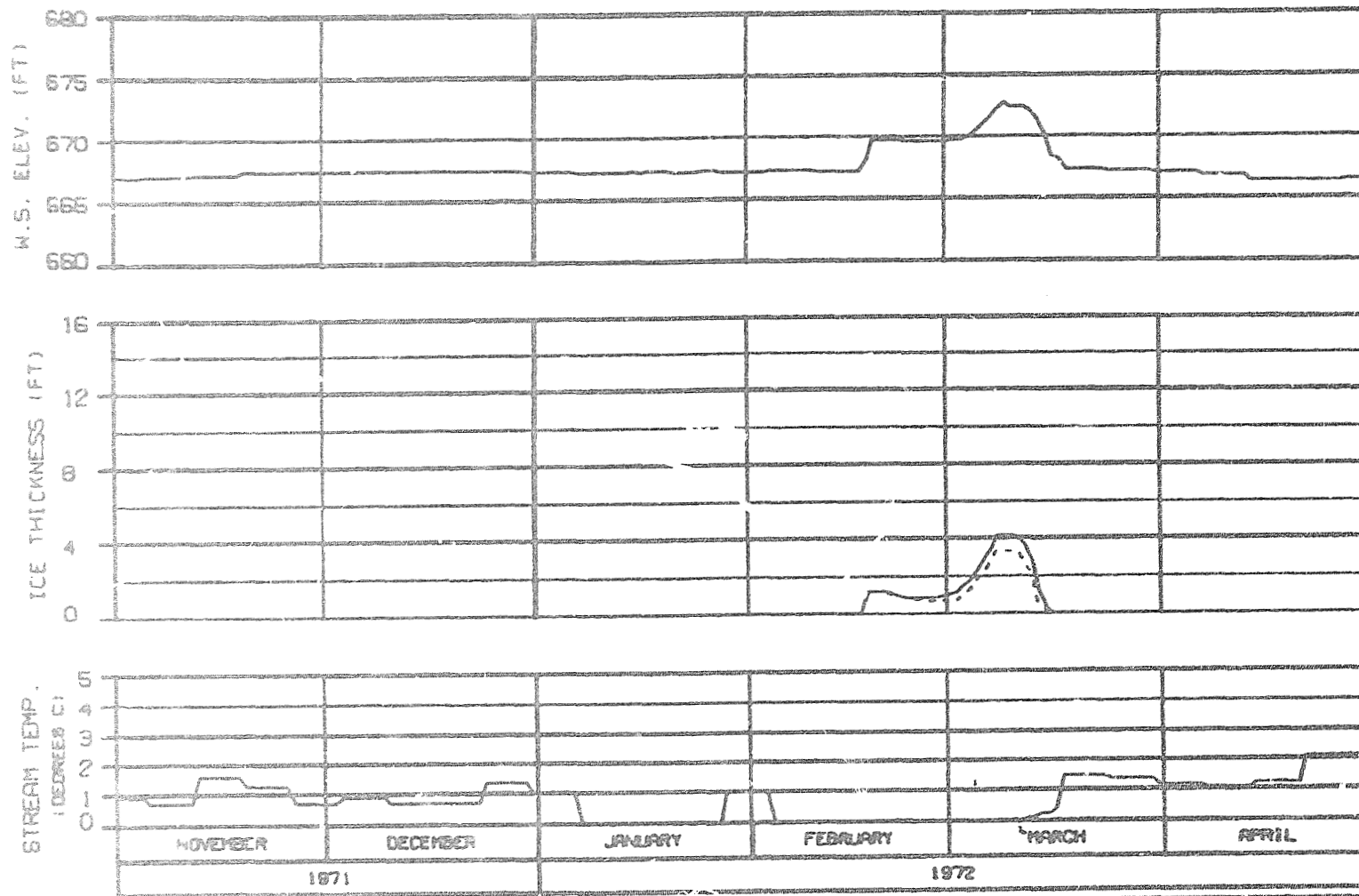


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EGASCO JOINT VENTURE		
DESIGNER: H. L. BROWN	DATE: 03	NO. 142



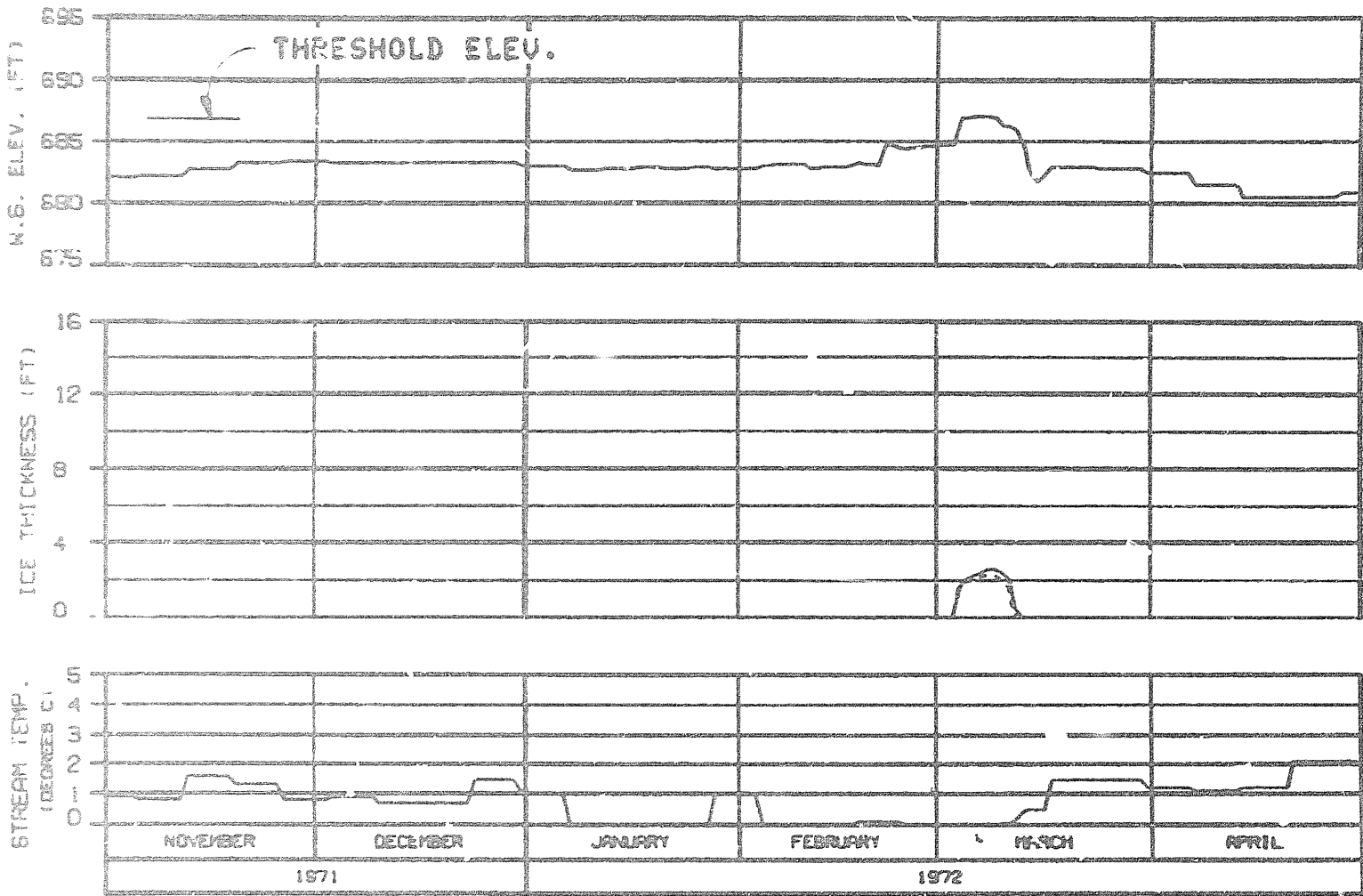
SIDE CHANNEL D/S OF SLOUGH 11

RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROX. 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EPASCO JOINT VENTURE	
DATE: 11/22/72	ISSN: 142

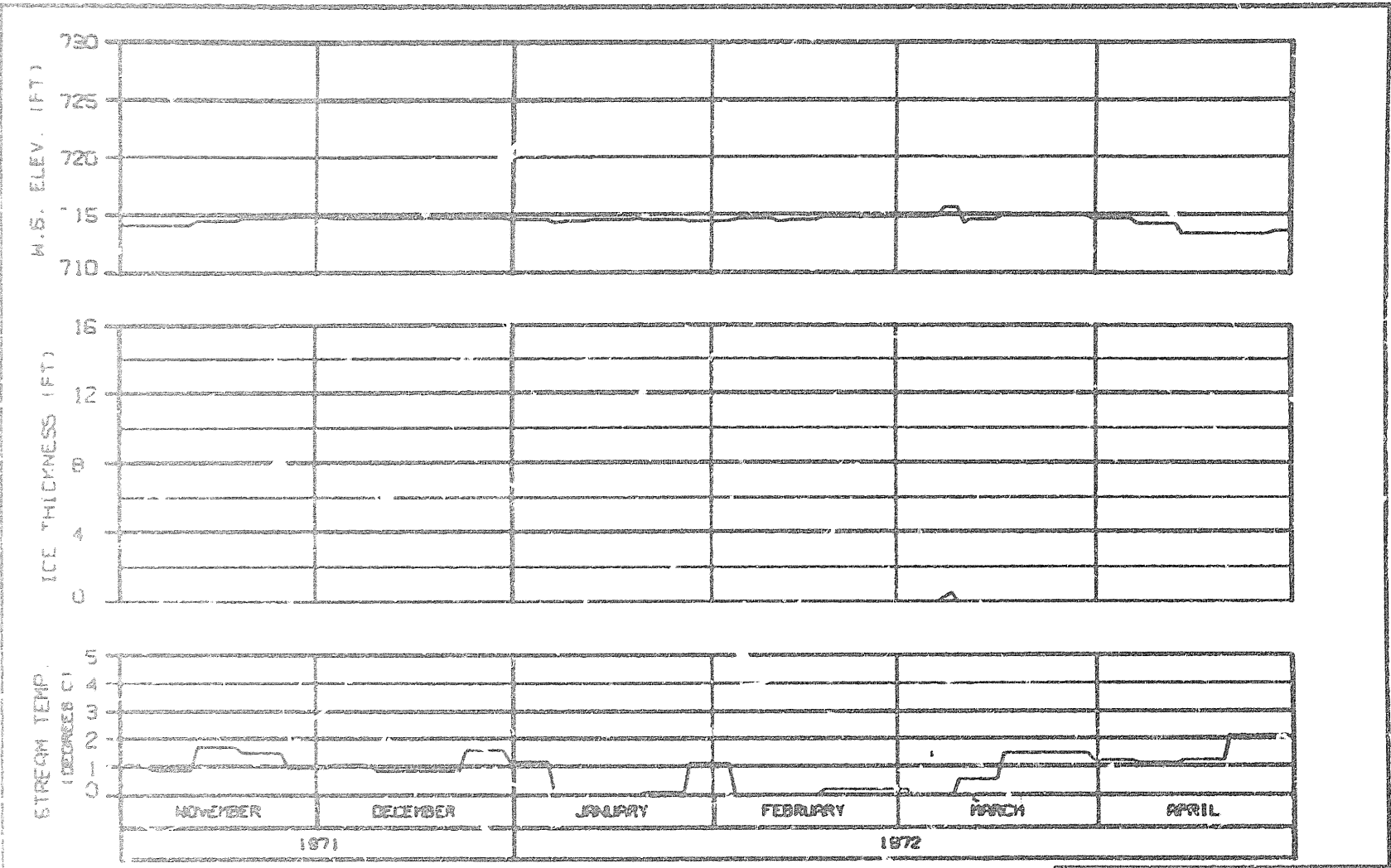


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BUSHY COMPONENT

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HYDRA-EBASCO JOINT VENTURE	
DESIGNED - ELLENOR	14 FEB 74
1520.142	

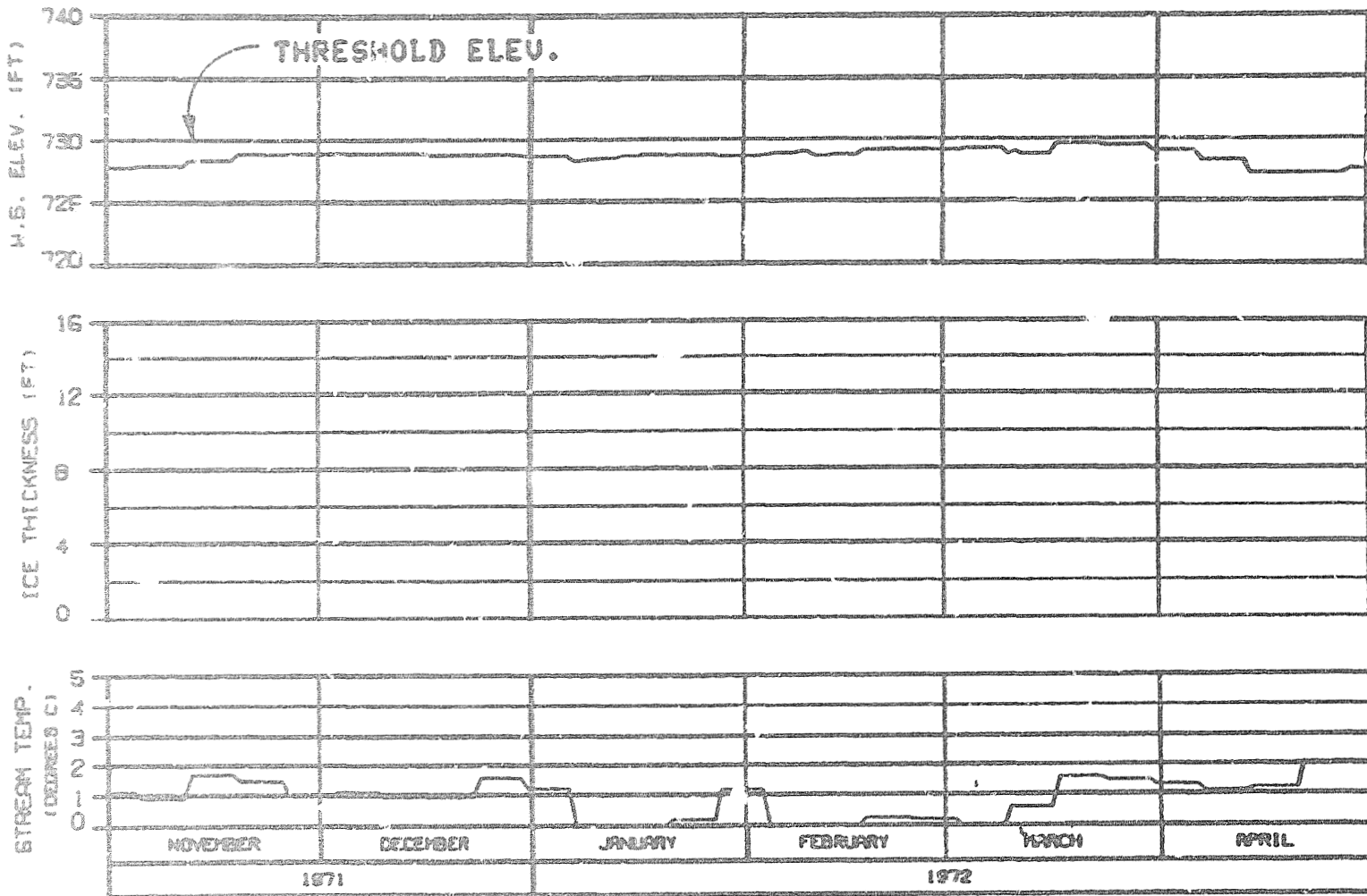


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CHARGE: 01/28/72	BY: 02/03/72	DATE: 102

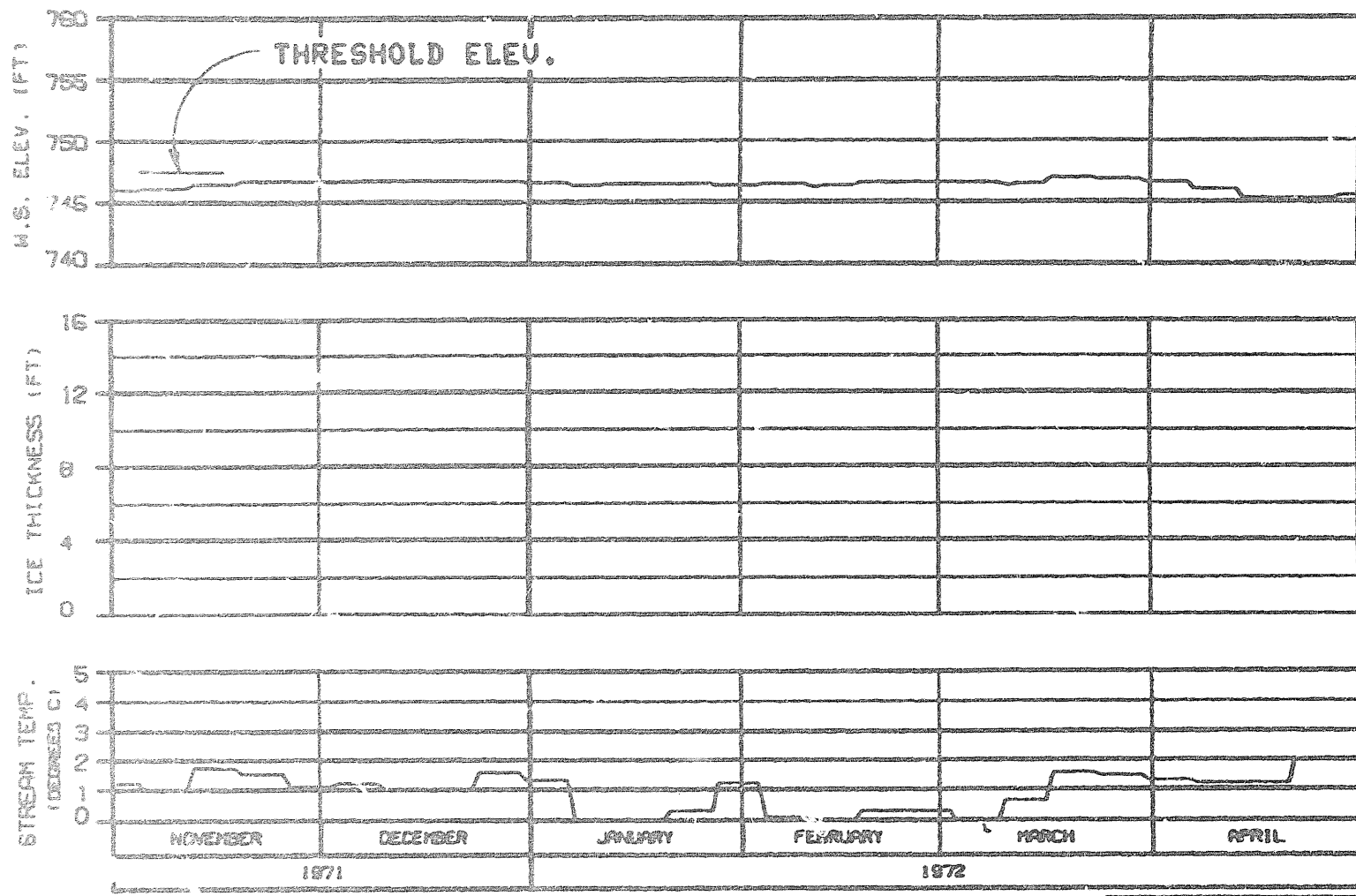


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800, APPROACH 1500.
 REFERENCE RUN NO. : 7101CX

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-ERSSOD JOINT VENTURE		
DESIGNED: ALP/MS	14 DEC 82	ISSUED: 142

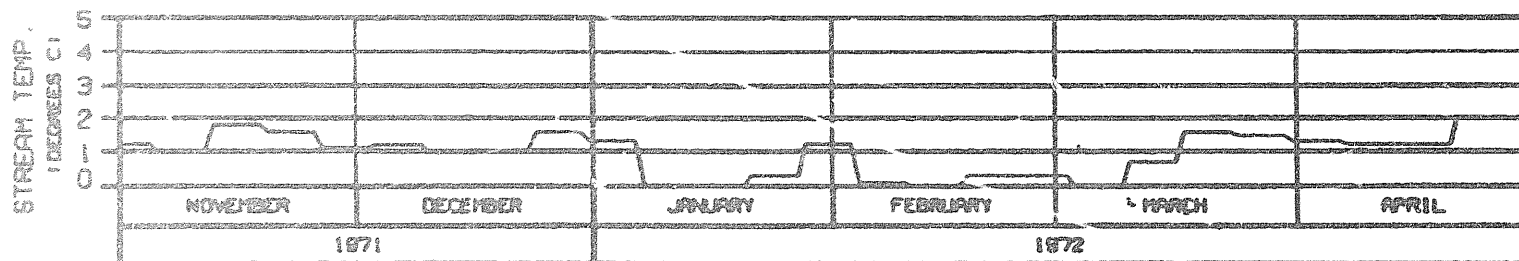
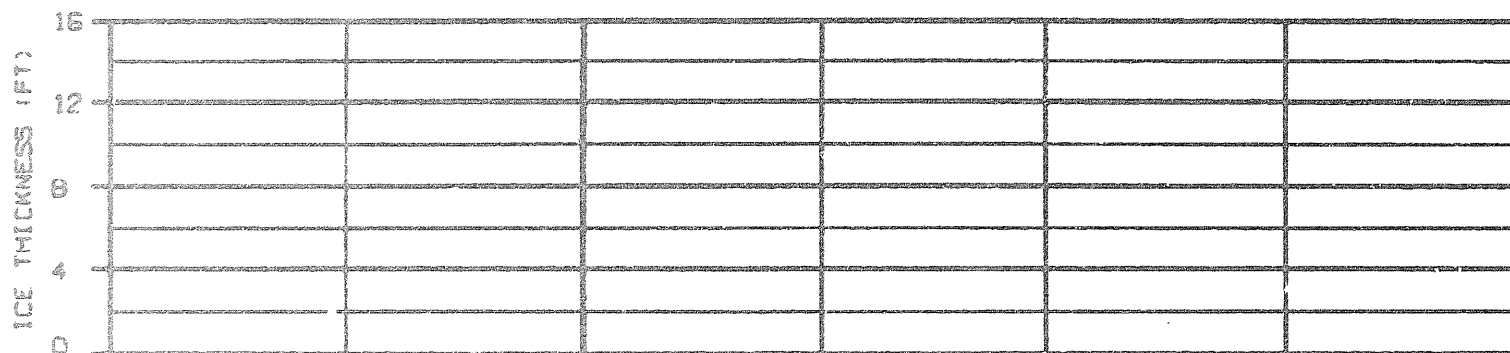
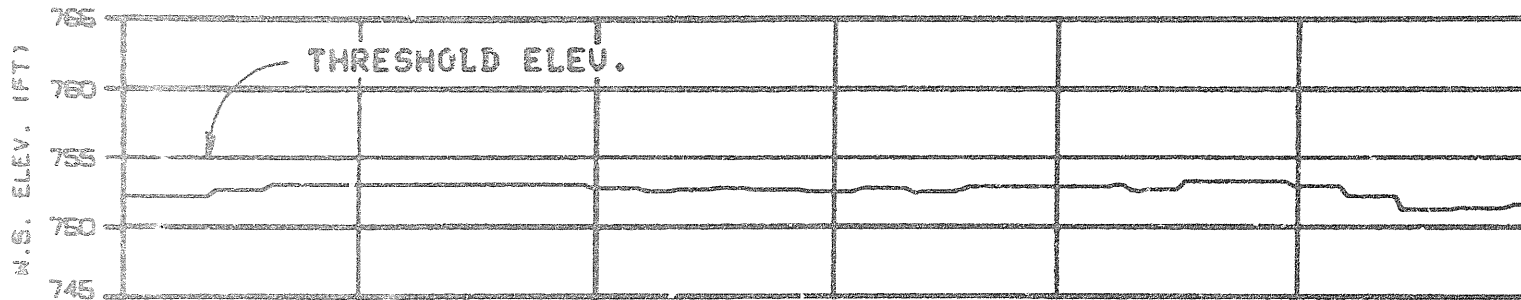


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARDA-EBASCO JOINT VENTURE		
ENGINEER - CLAYTON	DATE - 04	1972, 142

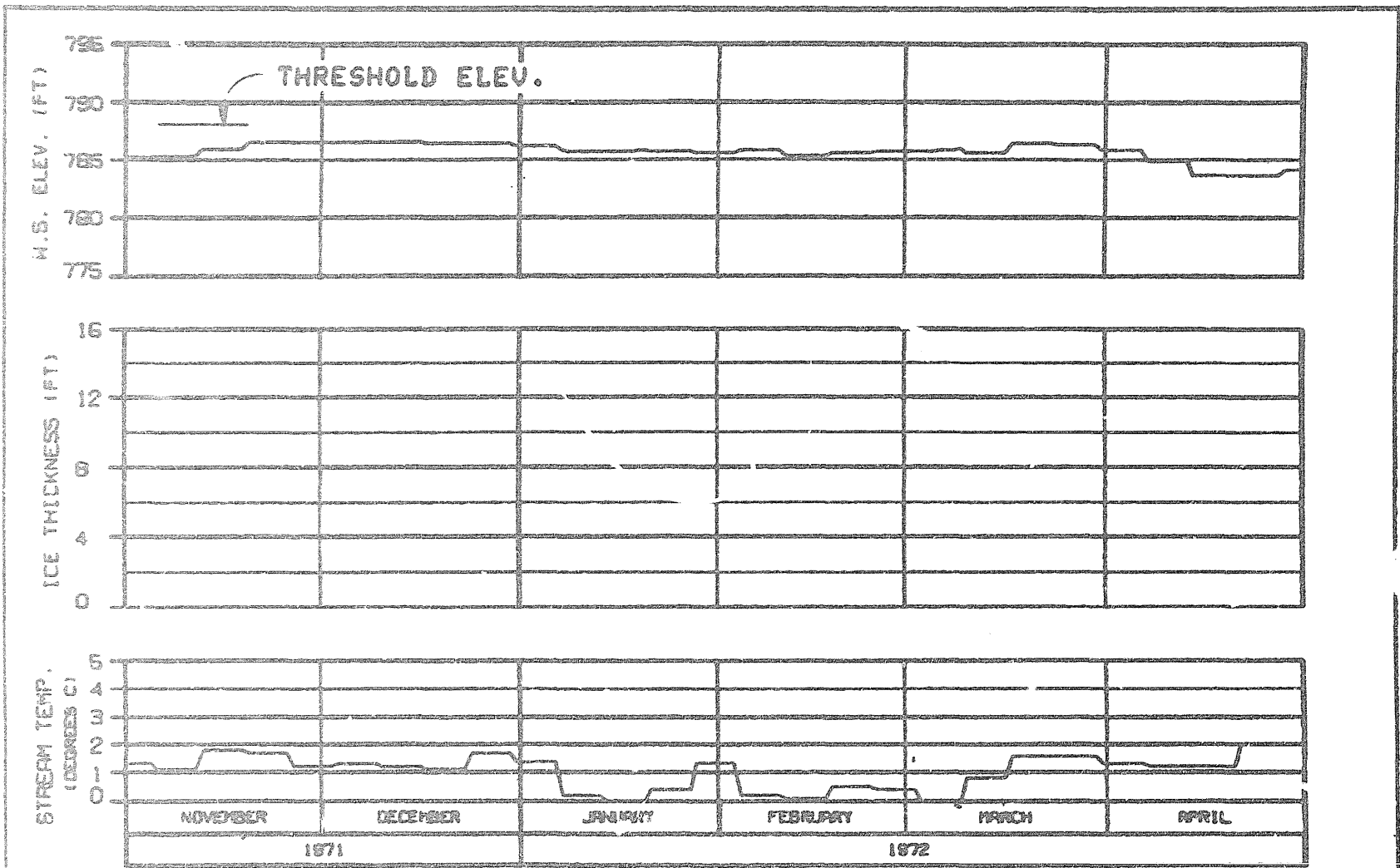


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
OWNER - ALASKA	DATE 04	NOV. 1972



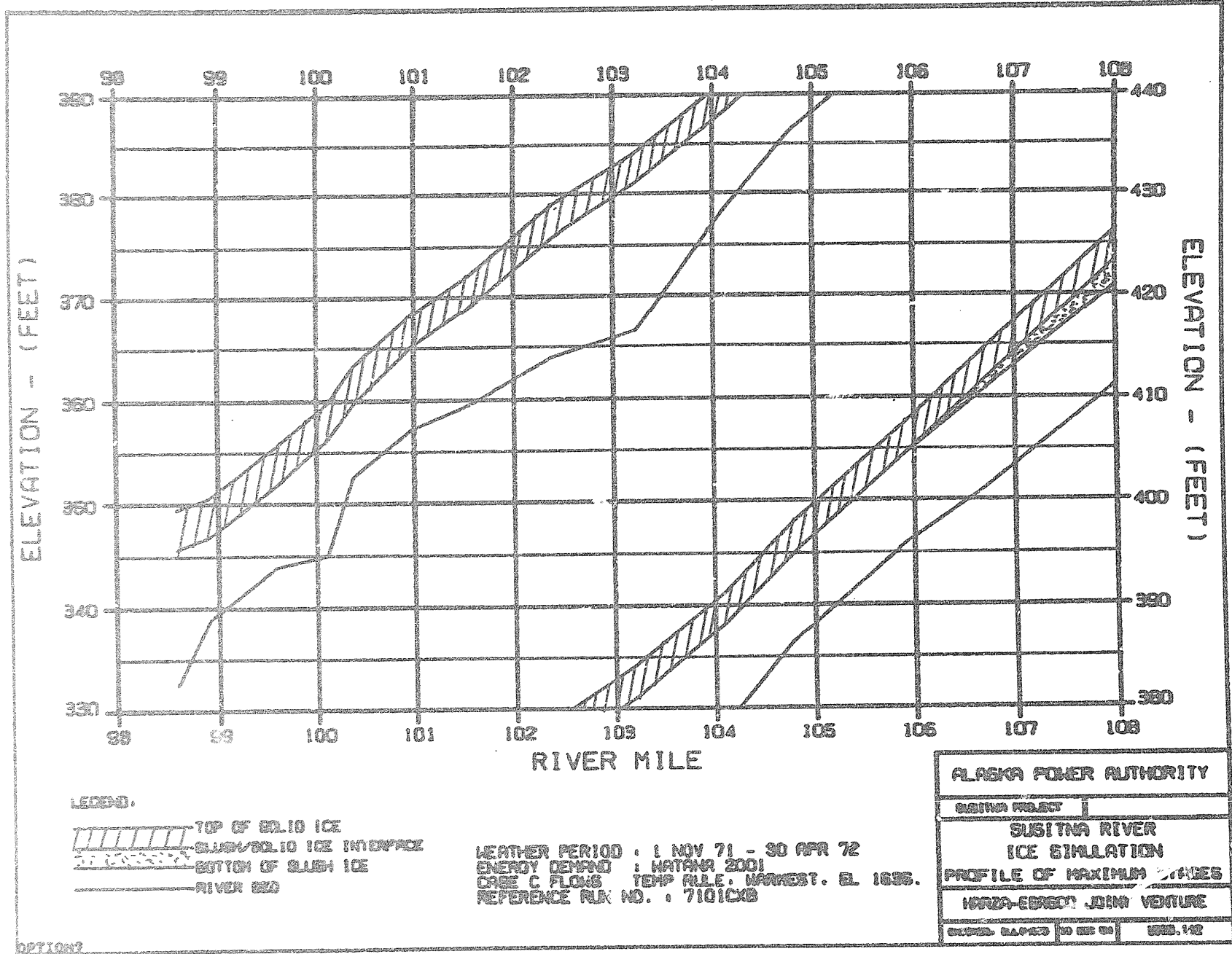
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

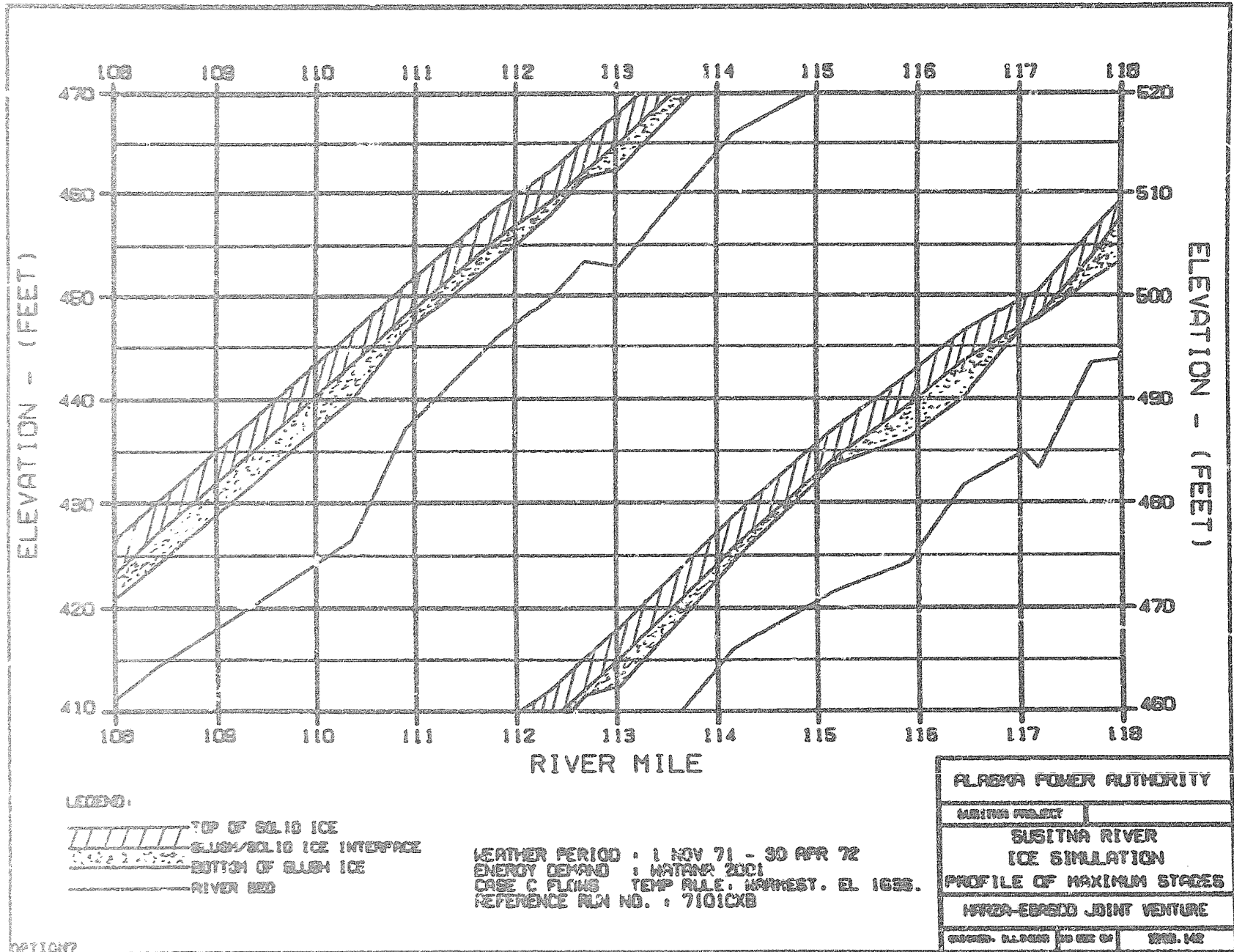
ICE THICKNESS LEGEND:
 ----- TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

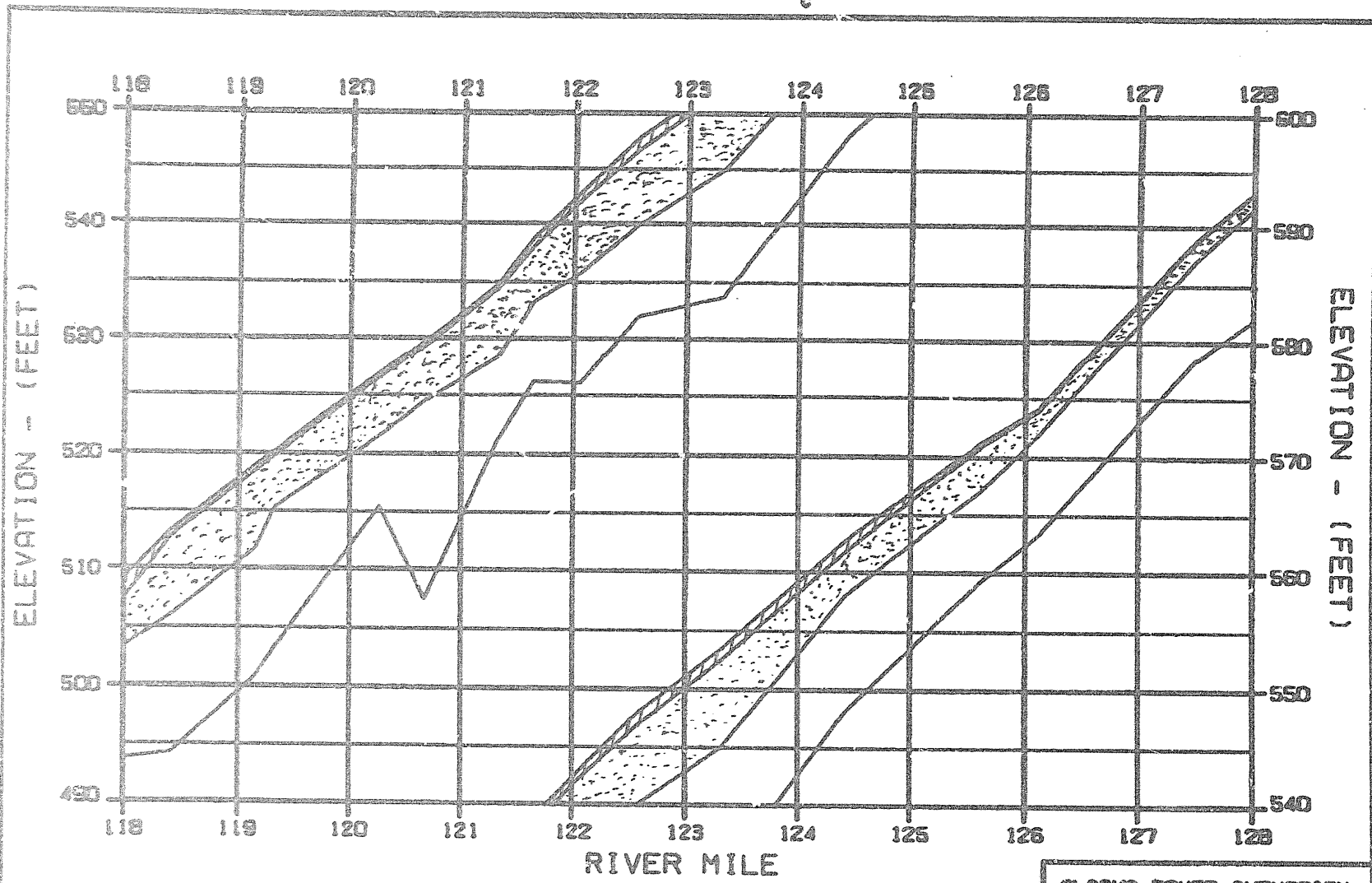
WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS INTAKE 1800. APPROACH 1500.
 REFERENCE RUN NO. : 7101CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACCO JOINT VENTURE		
CHARTS. 04-0420	14 DEC 72	ISS. 142





EXHIBIT O







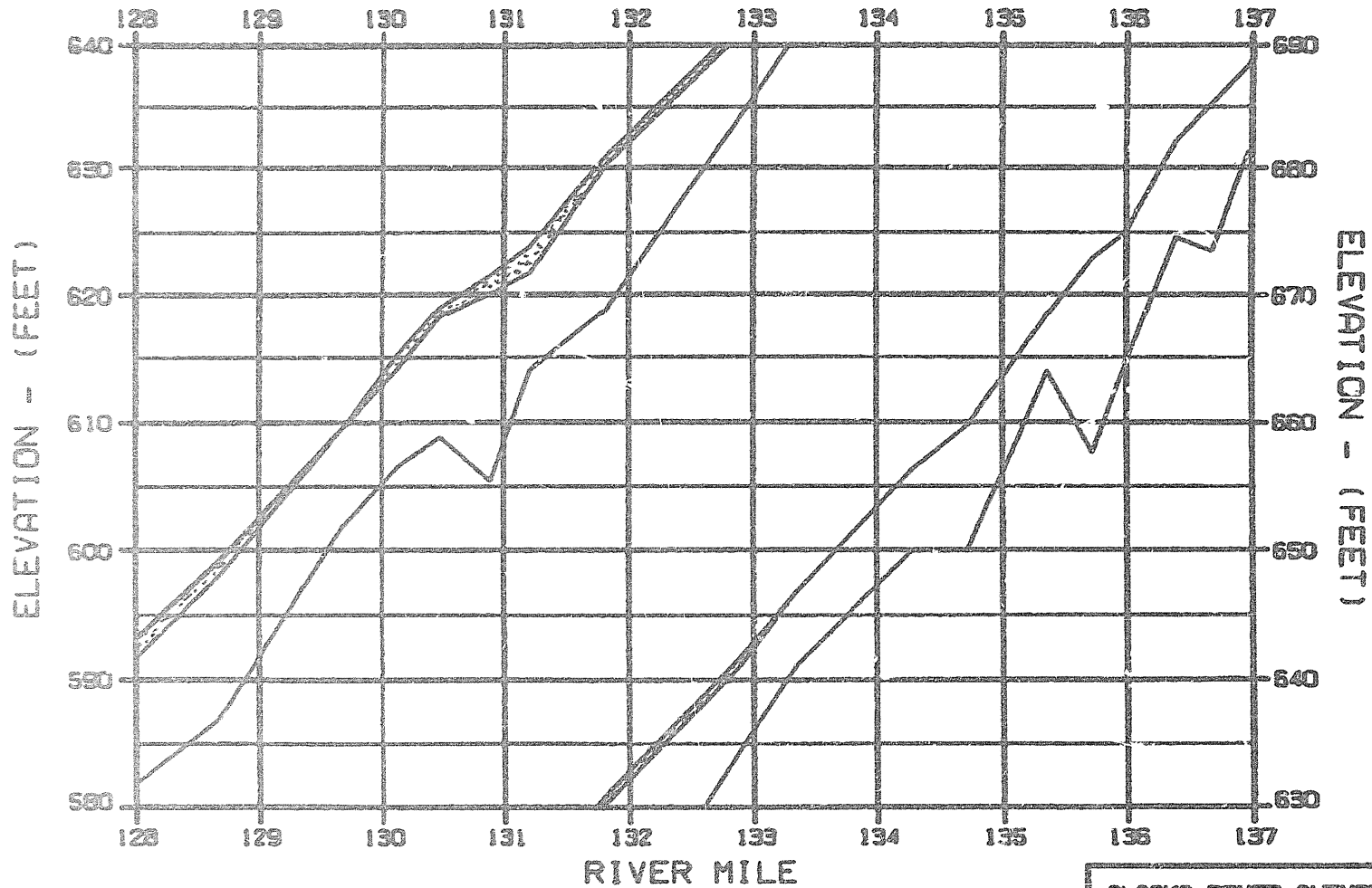
LEGEND.

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



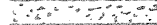
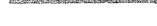
WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE, WAREST. EL 1635.
 REFERENCE RUN NO. : 7101XB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WRDA-EBROD JOINT VENTURE		
CHIEF: GLENN	IN CH: CH	ISS: 148

OPTION?

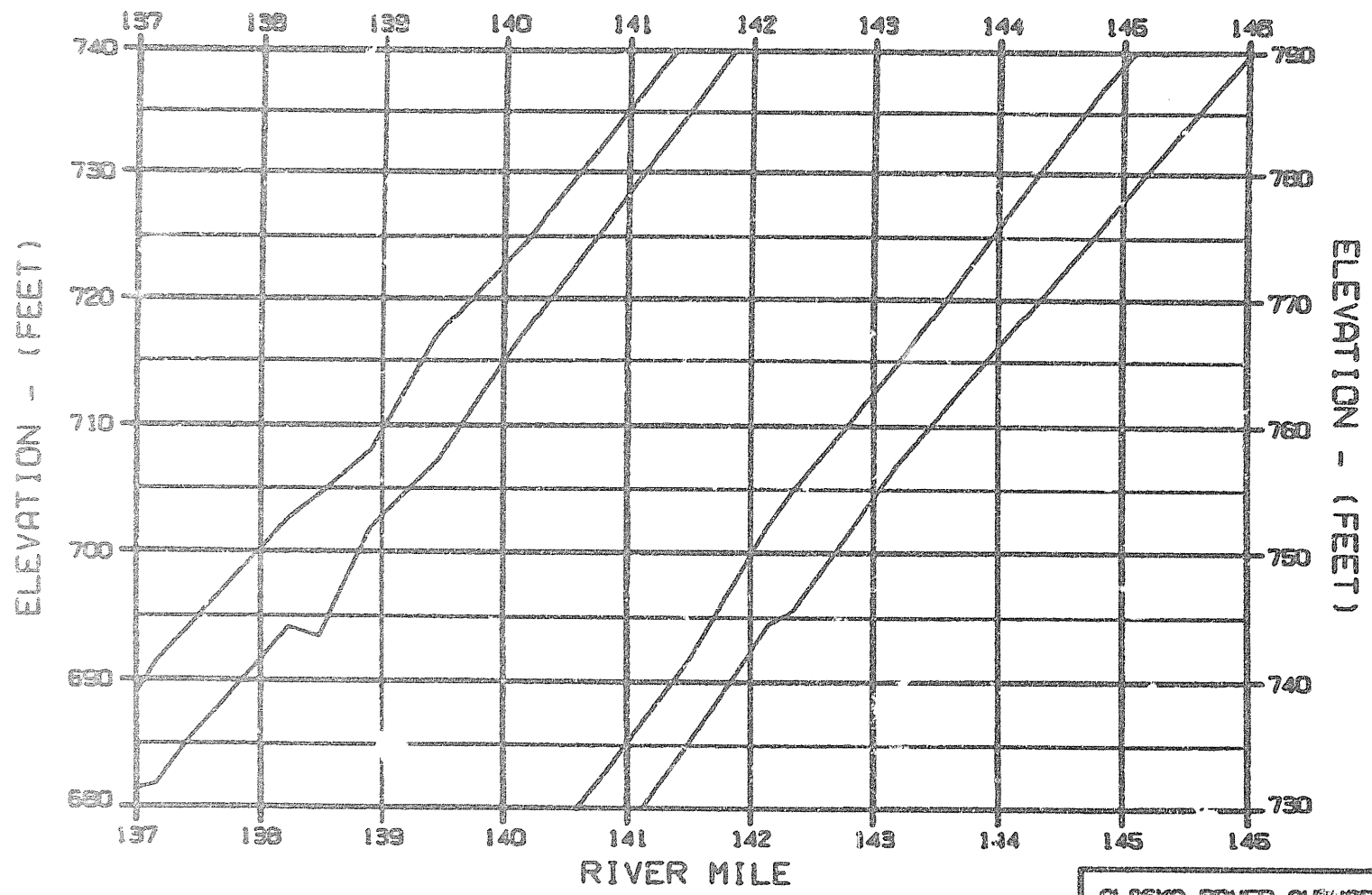


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATINA 2001
 CASE C FLOWS TEMP ALLE, WAINEST, EL 1635.
 REFERENCE RUN NO. : 7101CX8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-GRACO JOINT VENTURE	
DESIGN: 21-0000	DATE: 01
BY: 142	1980.142

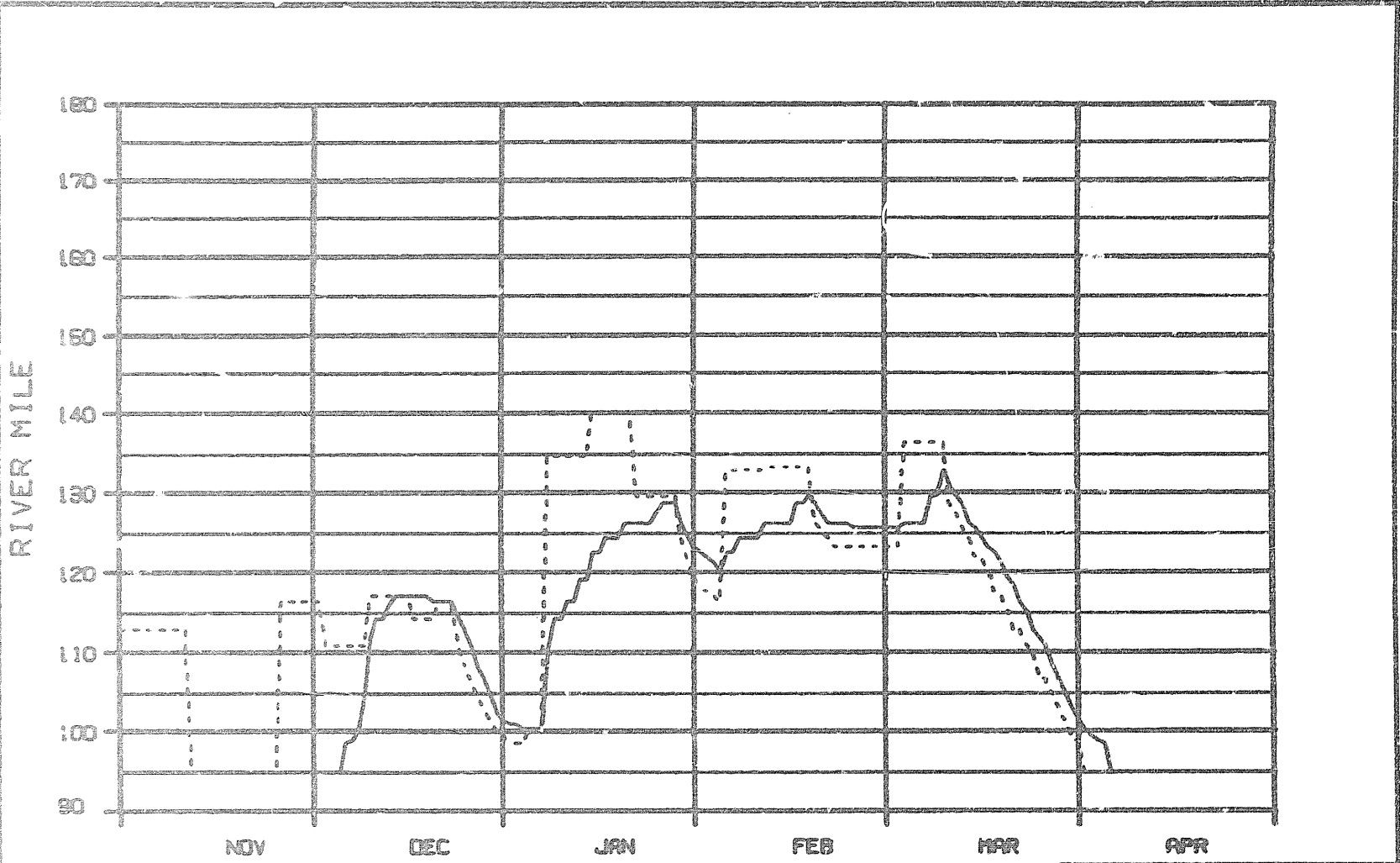


LEGEND:

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

WEATHER PERIOD : 1 NOV 71 - 30 MAR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS : T.E.P. RULE, HARVEST. EL. 1625.
 REFERENCE RUN NO. : 7101XB

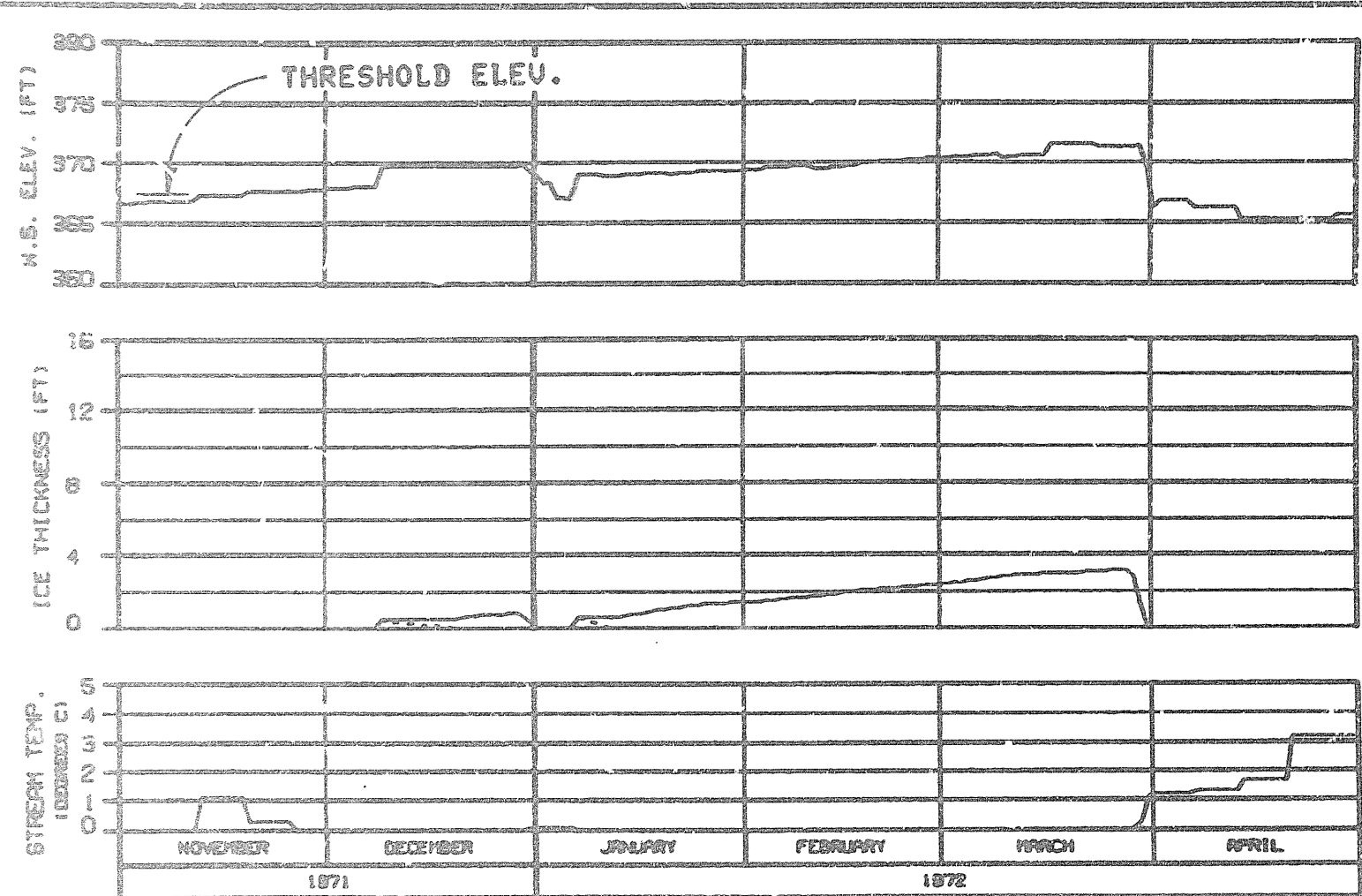
ALASKA POWER AUTHORITY		
DESIGN PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
NARDA-EDRACO JOINT VENTURE		
DESIGN NO.	DATE	1975.143



LEGEND:
 — ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 FLOW CASE C TEMP RULE : WARMEST. EL 1636
 REFERENCE RUN NO. : 7101CX8

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM	
WARSA-EBASCO JOINT VENTURE	
DATE: 11/28/72	BY: J. W. G.
SCALE: 1" = 10 MI	FIG. 142



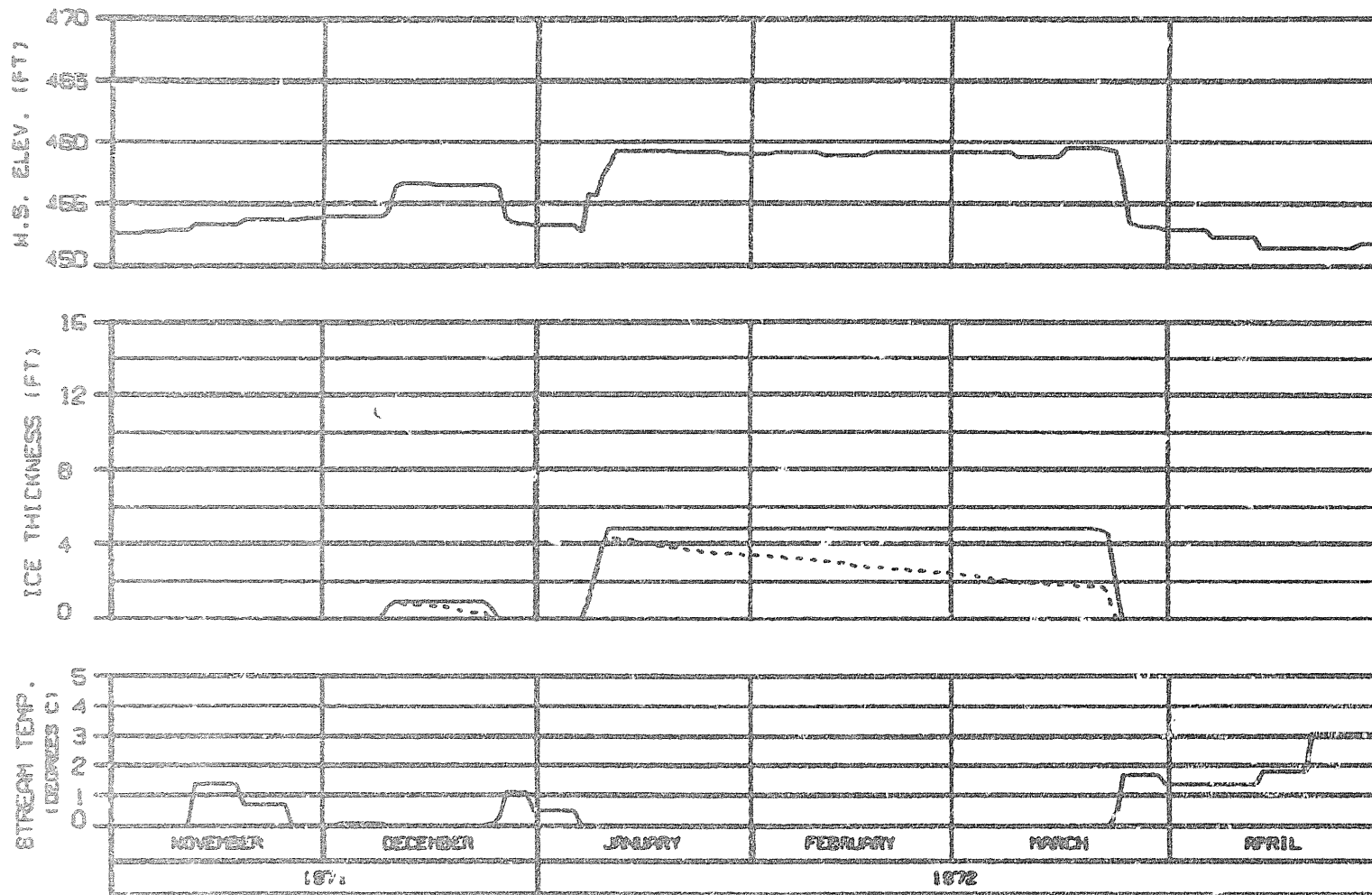
HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101CX8

ALASKA POWER AUTHORITY		
SUBJECT PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
NARDA-EBASCO JOINT VENTURE		
DESIGNED BY	DATE	REVISION
GEORGE S. LARSEN	NOV 71	001

OPTION 7



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

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1536.
 REFERENCE RUN NO. : 7101CX8

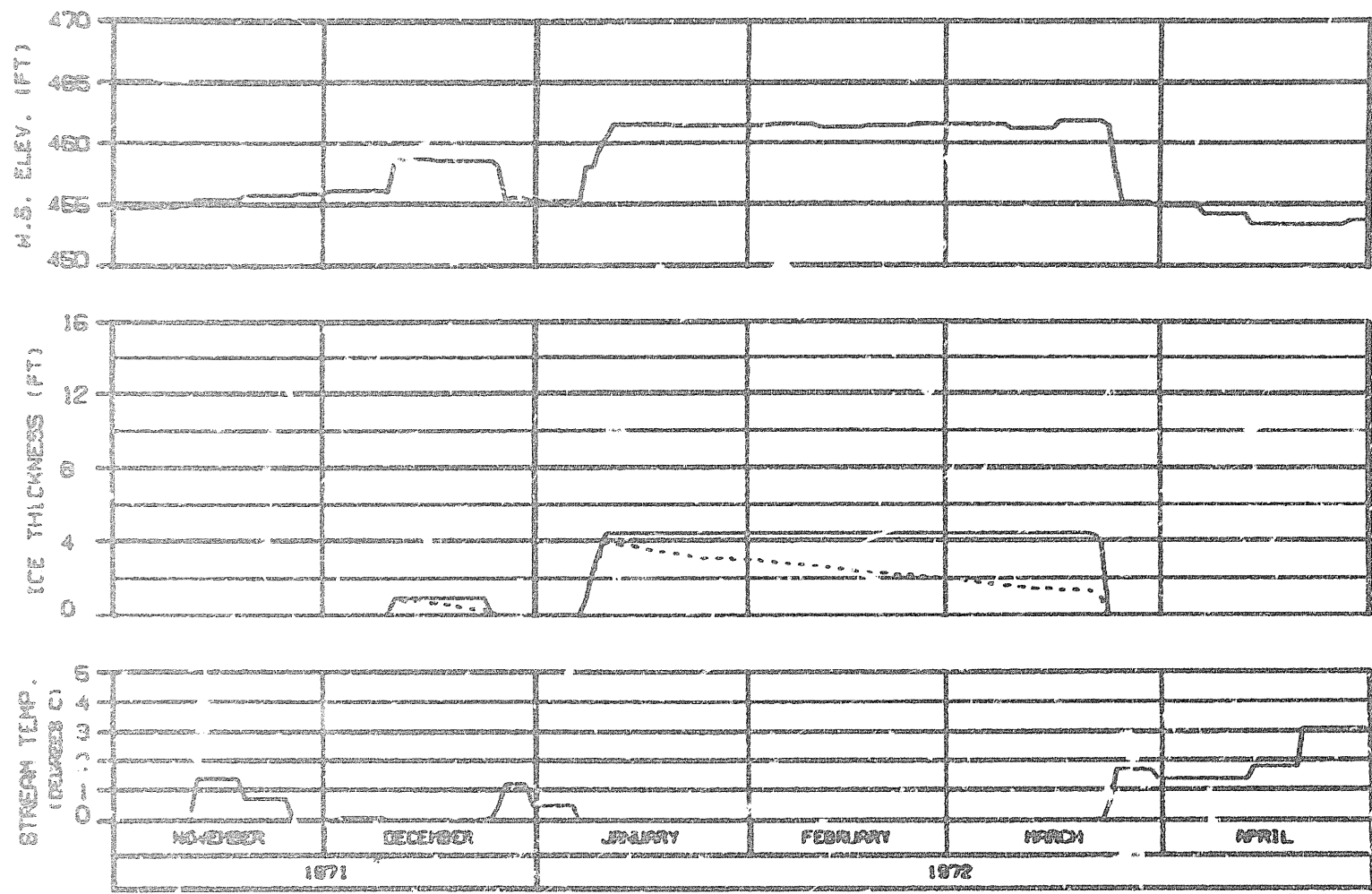
ALASKA POWER AUTHORITY

GASINA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

HYDRA-ENERGEO JOINT VENTURE

CHUCK. H. HARRIS JR. CHIEF OF STAFF FEB. 1972

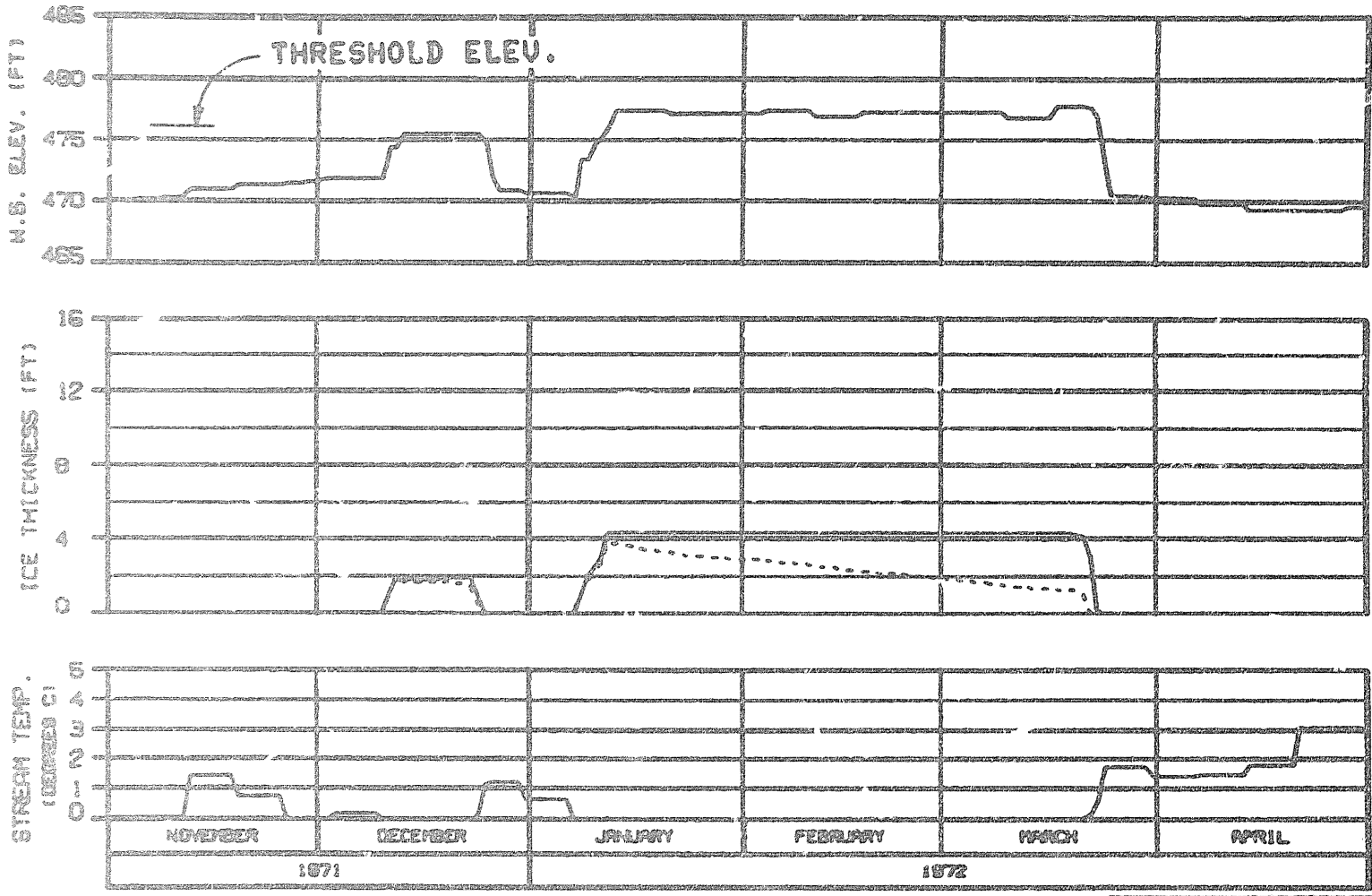


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101X8

ALASKA POWER AUTHORITY	
SUBJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARA-EGASCO JOINT VENTURE	
CHGDR: GADGETS	IN USE ON
	SEP. 1982

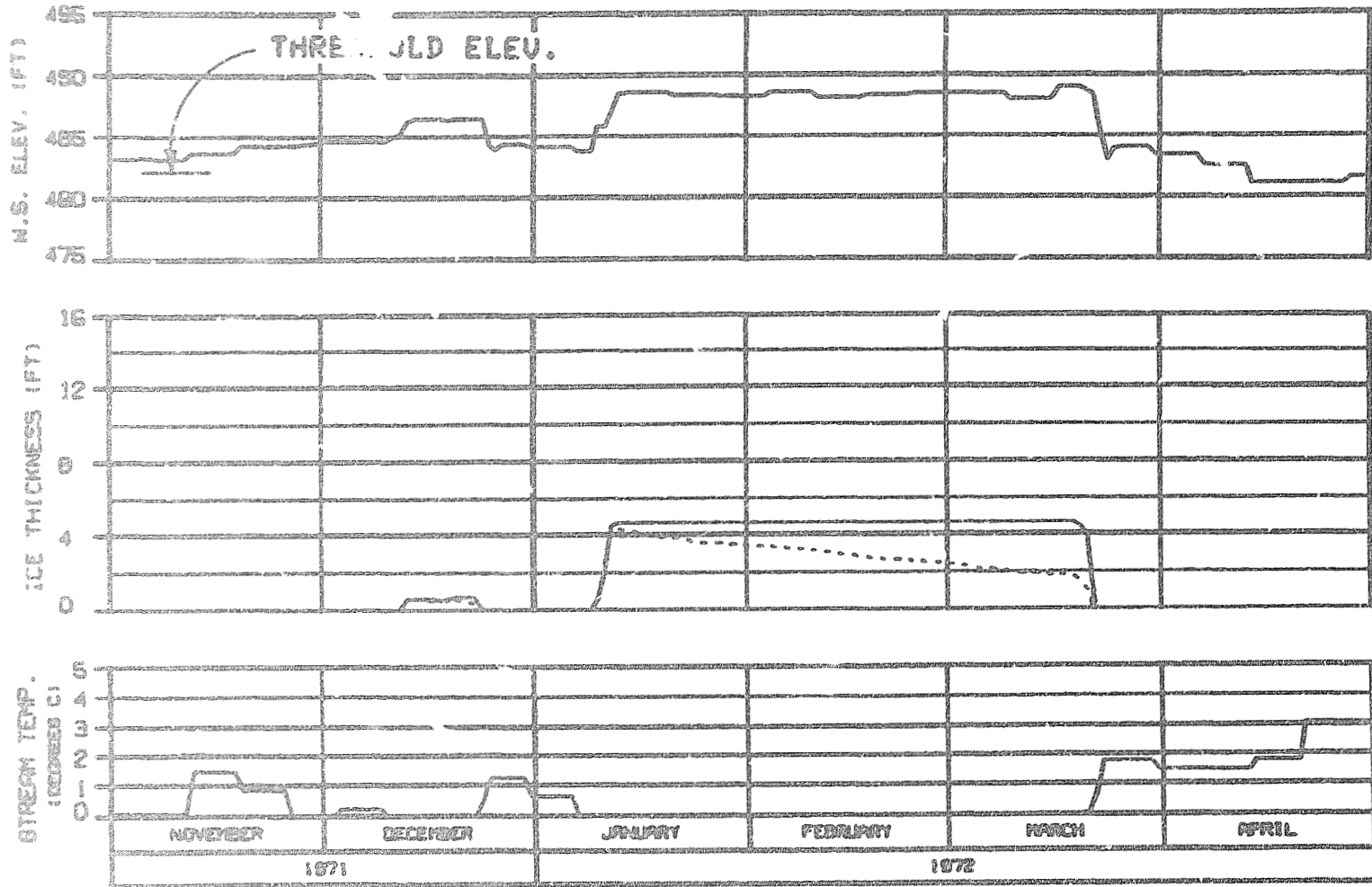


ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 - - - - - BLUE COMPONENT

HEAD OF SLOUGH 8
 RIVER MILE : 114.10

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL. 1636.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARA-EDBROD JOINT VENTURE		
OWNER: A.P.A.	DESIGNER: W.A.	DATE: 1972

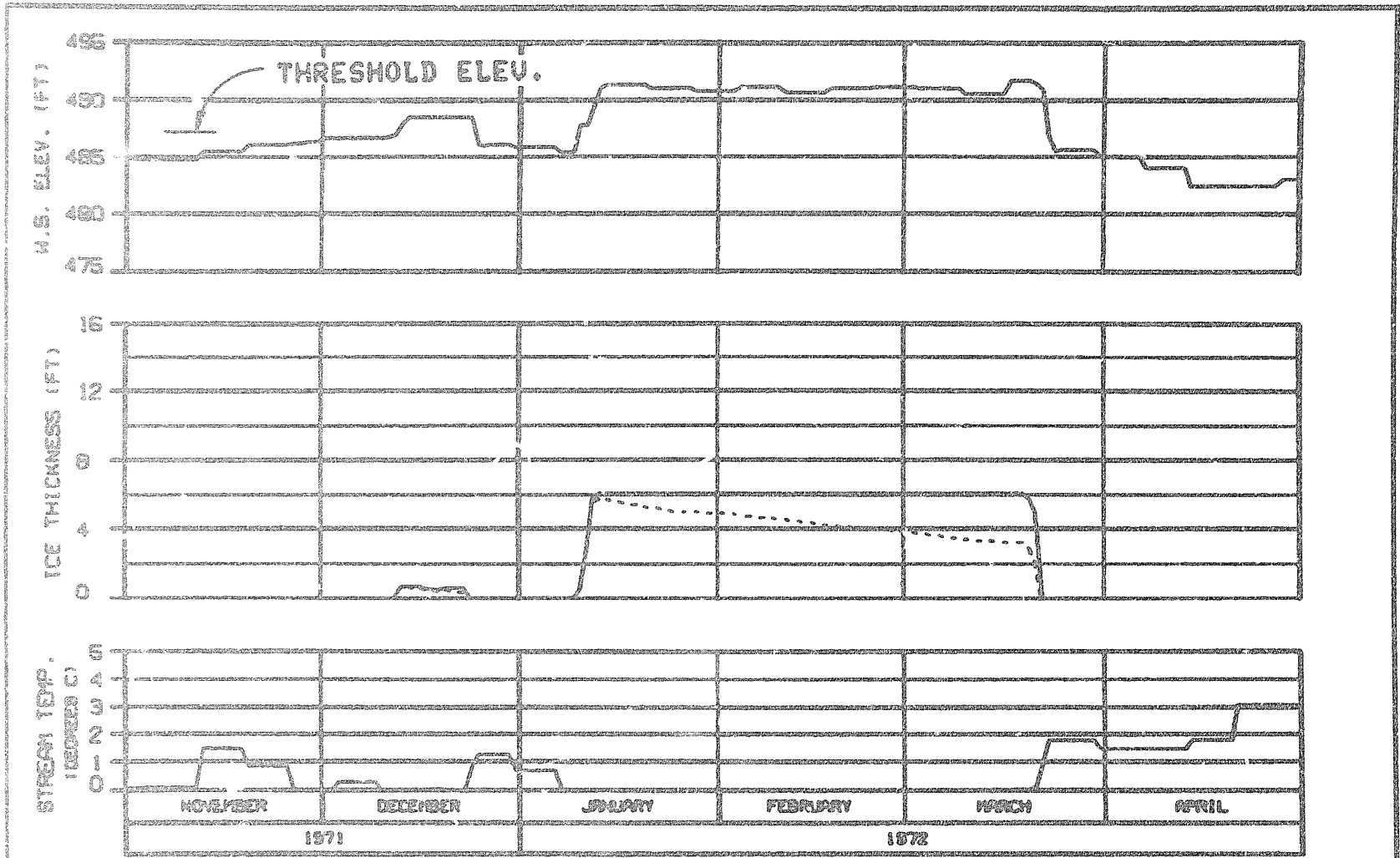


SIDE CHANNEL MSII
 RIVER MILE : 115.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 710100

FLORIDA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WATANA-ENRICO JOINT VENTURE	
DATE: 11/08/72	BY: J. W. W.
NO. 102	2020.142

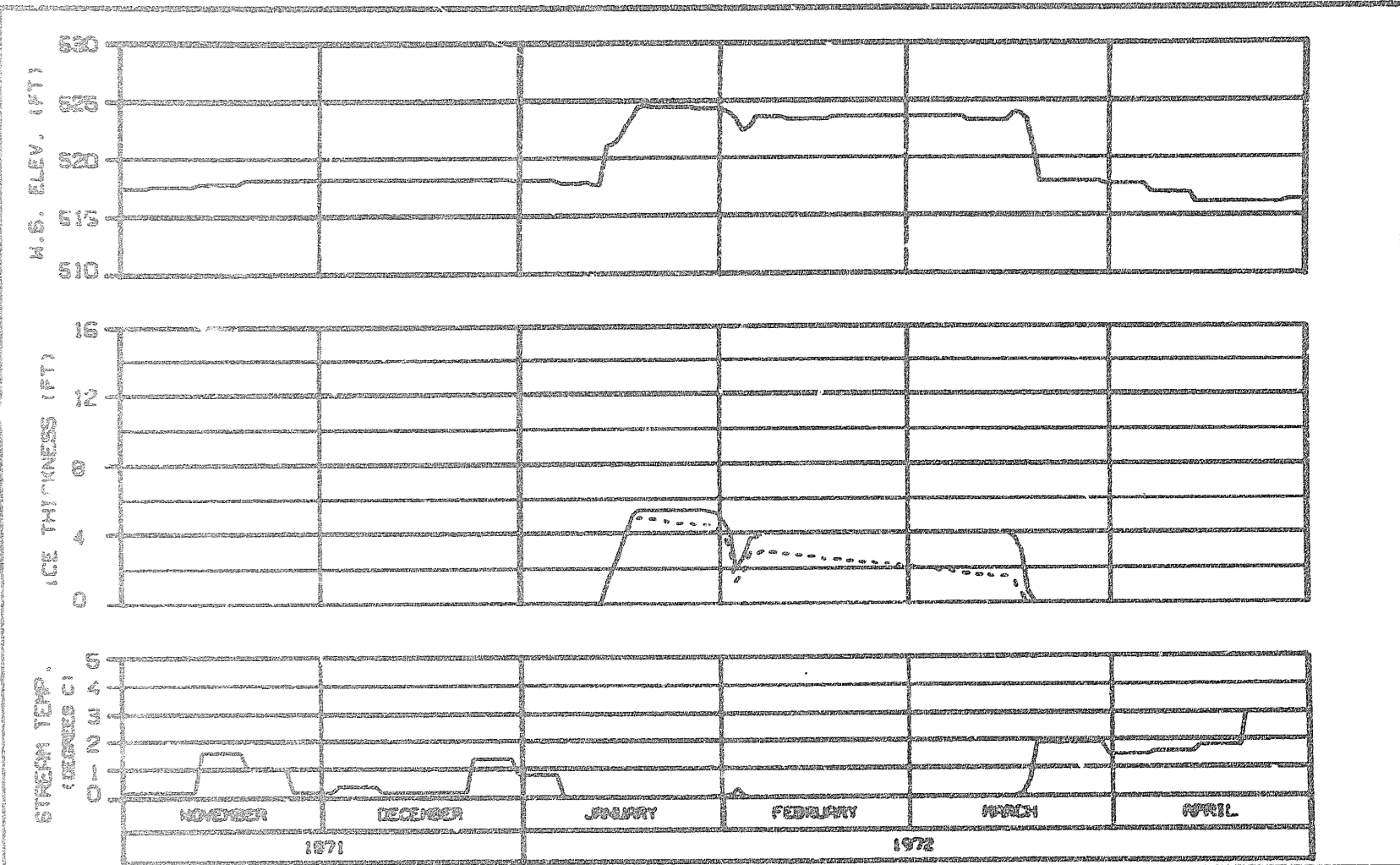


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL. 1636.
 REFERENCE RUN NO. : 7101CKB

ALASKA POWER AUTHORITY	
SUSTITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WANDA-EDSICO JOINT VENTURE	
DESIGN: ALASKA POWER AUTHORITY	DATE: 1972

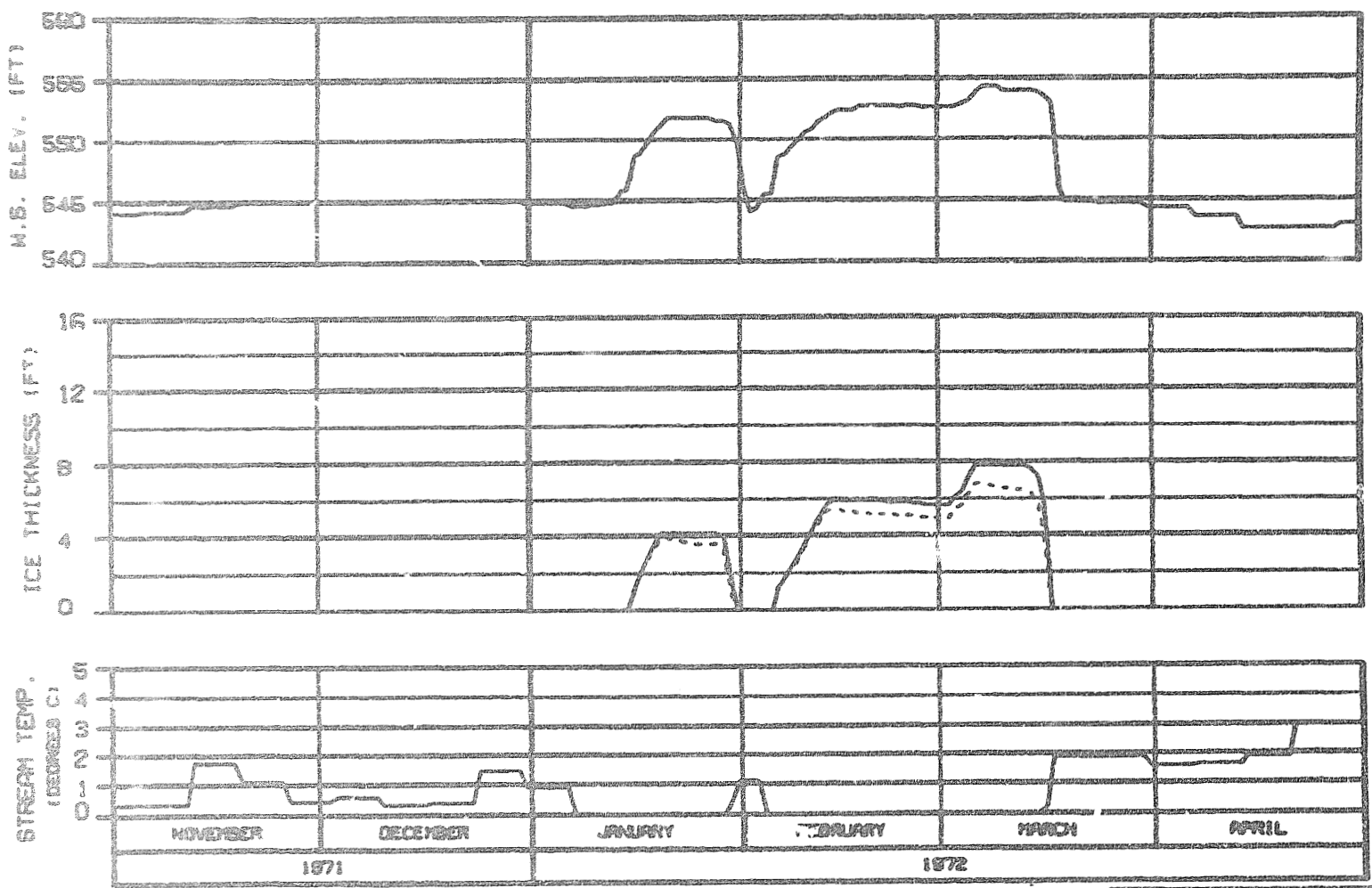


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 BLUEB. COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1636.
 REFERENCE RUN NO. : 71D1CX8

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
HAFSA-ERAPCO JOINT VENTURE		
ENGINEER: CLAYTON	DESIGNER: GIBSON	DRAWN: MC

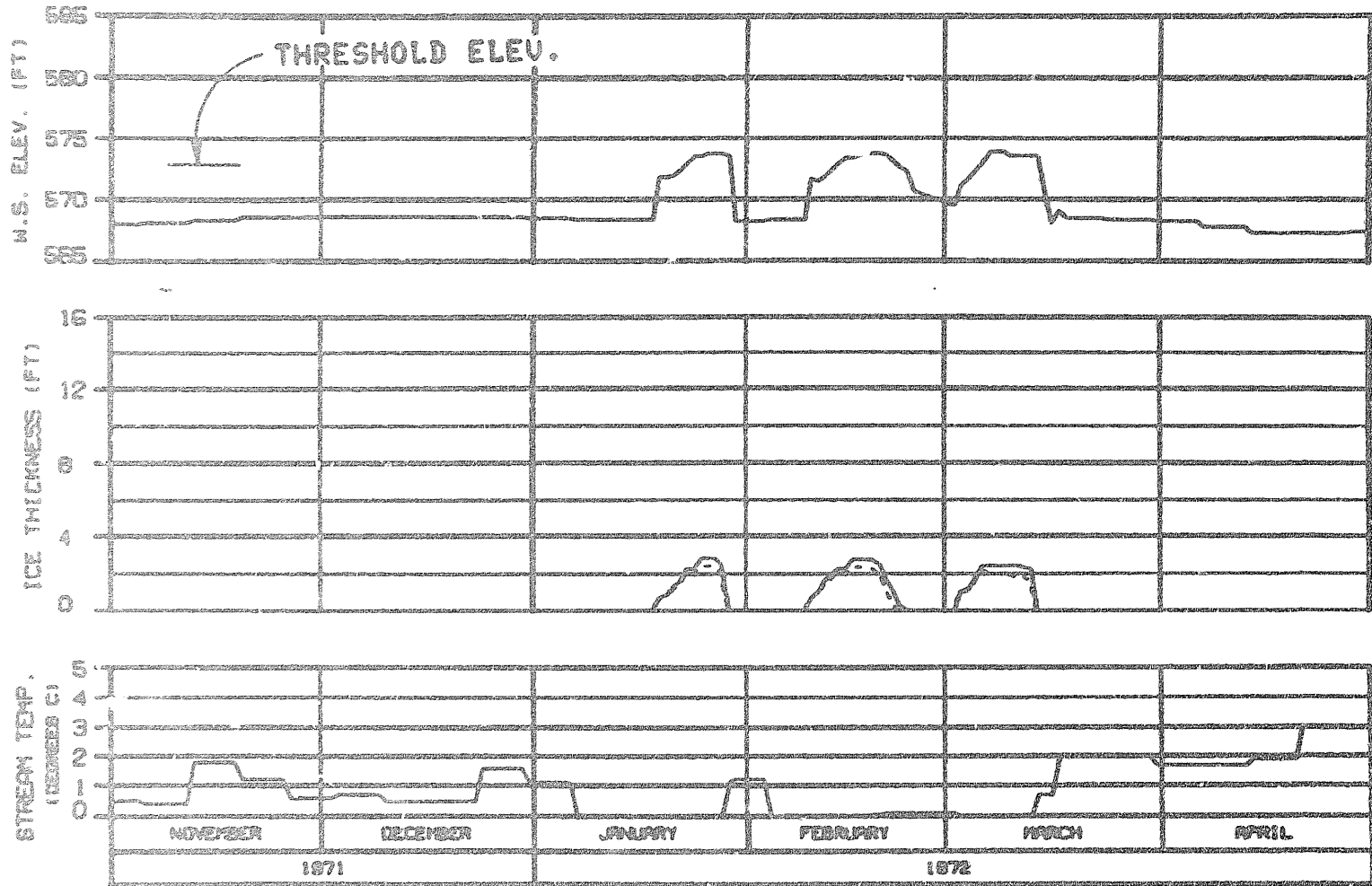


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101X8

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SLUITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-ERBOLD JOINT VENTURE	
OWNER: ALASKA POWER AUTHORITY	DATE: 1972.042



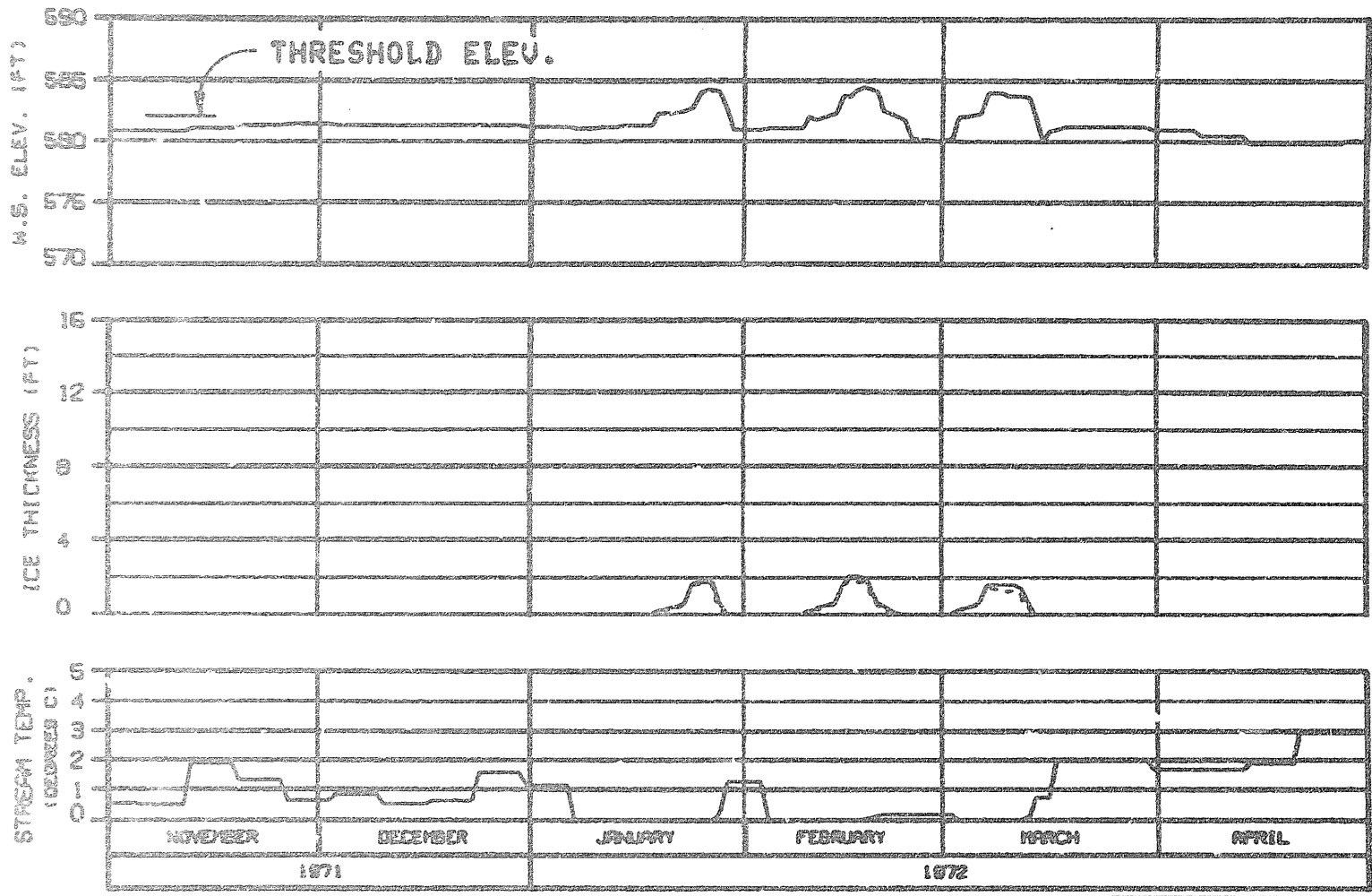
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 (SLUSH) COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL. 1636.
 REFERENCE RUN NO. : 7101CX8

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EDBROO JOINT VENTURE	
PROJECT NO. 611-01-010	NO. 0223 01A
1982.1.42	



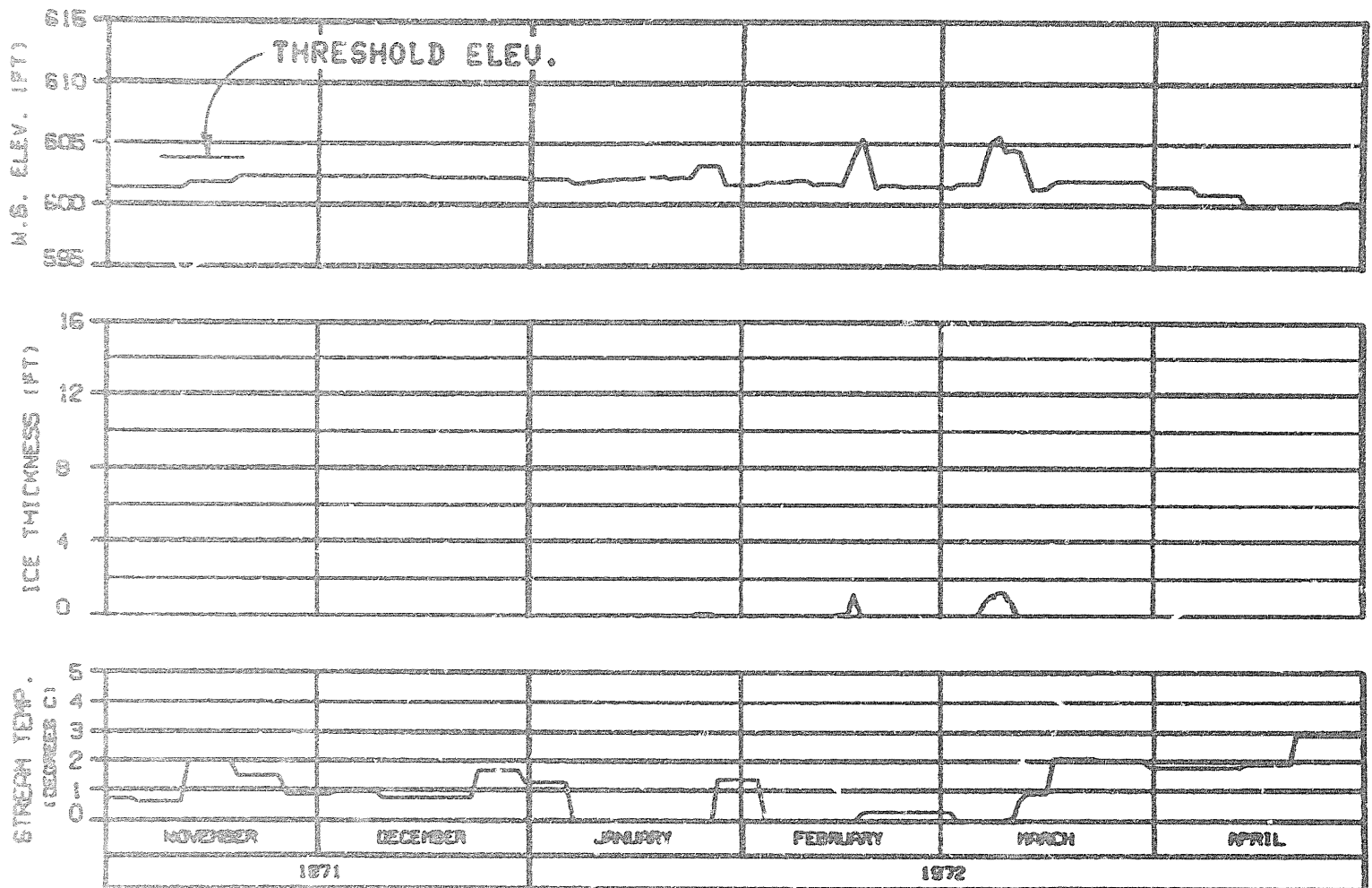
HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1636.
 REFERENCE RUN NO. : 7101XB

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARA-EBASCO JOINT VENTURE		
DESIGNED: G. L. BROWN	15 DEC 71	1000.142



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

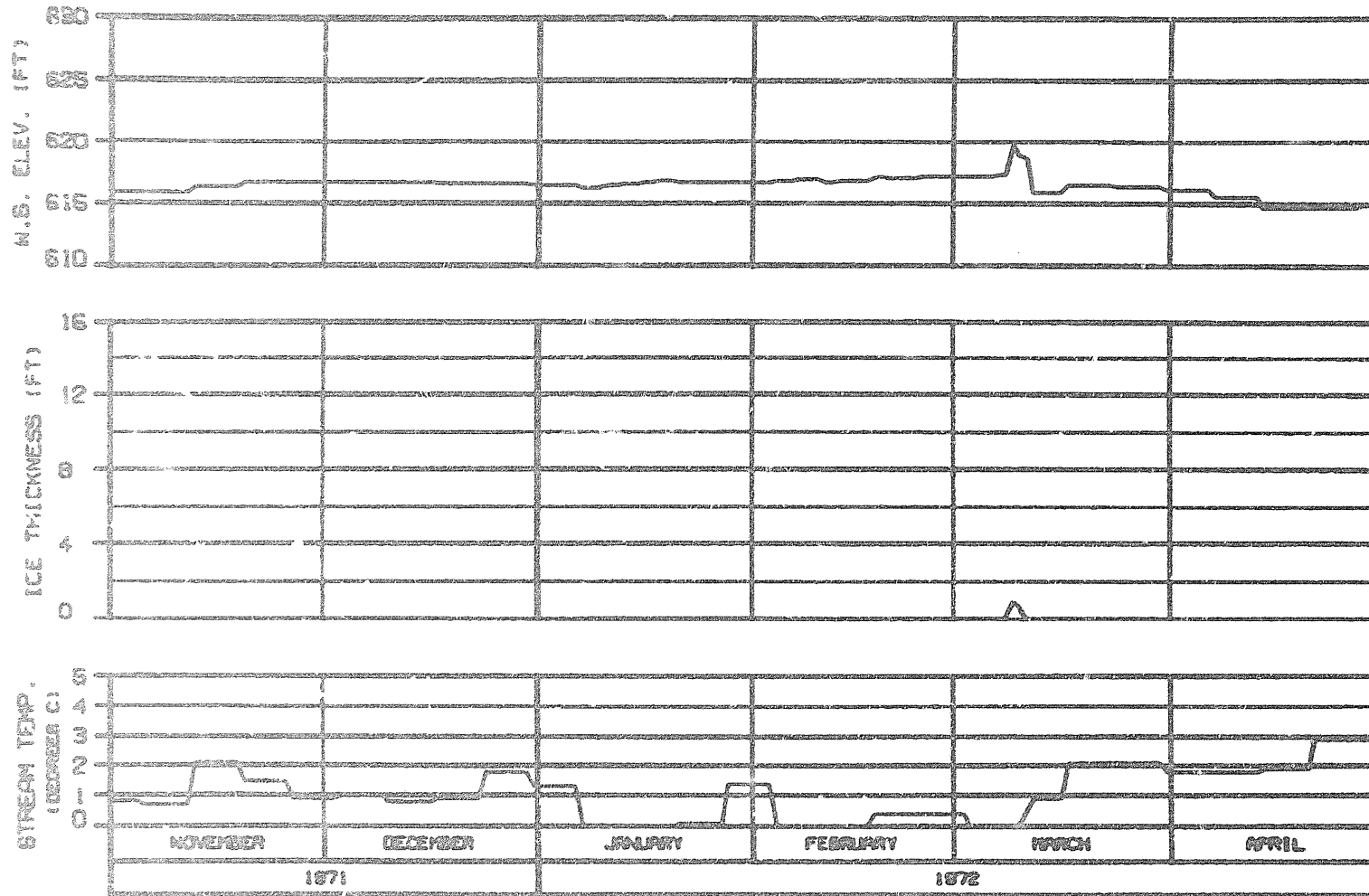
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY	
SUBMITTAL PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBSCO JOINT VENTURE	
REVISED: 04.02.72	FIG. NO. 142

OPTION?

OPTION#



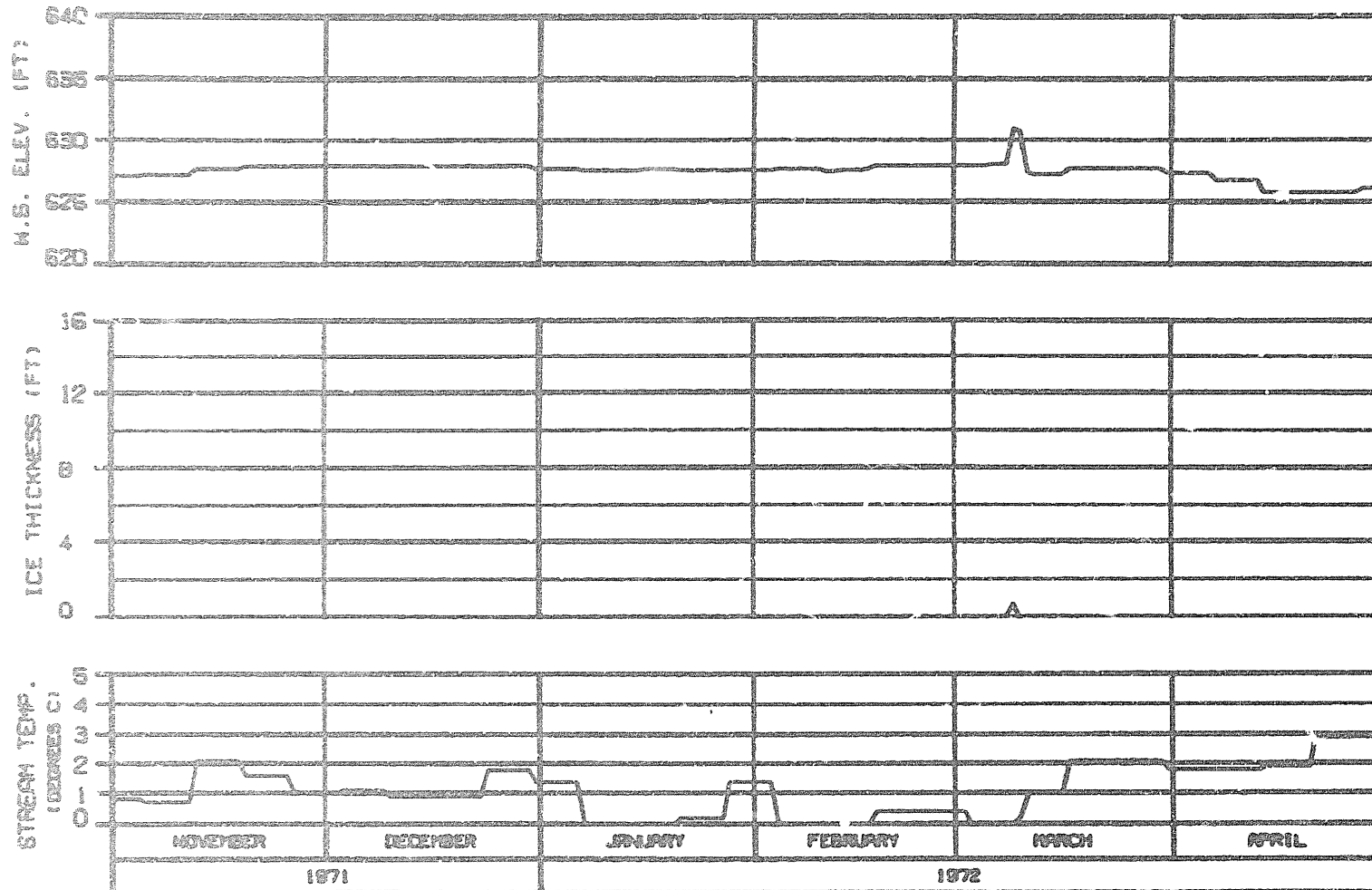
ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101CX9

ALASKA POWER AUTHORITY	
OWNER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGN: 8/1/82	NO. 82-03
	1982.142

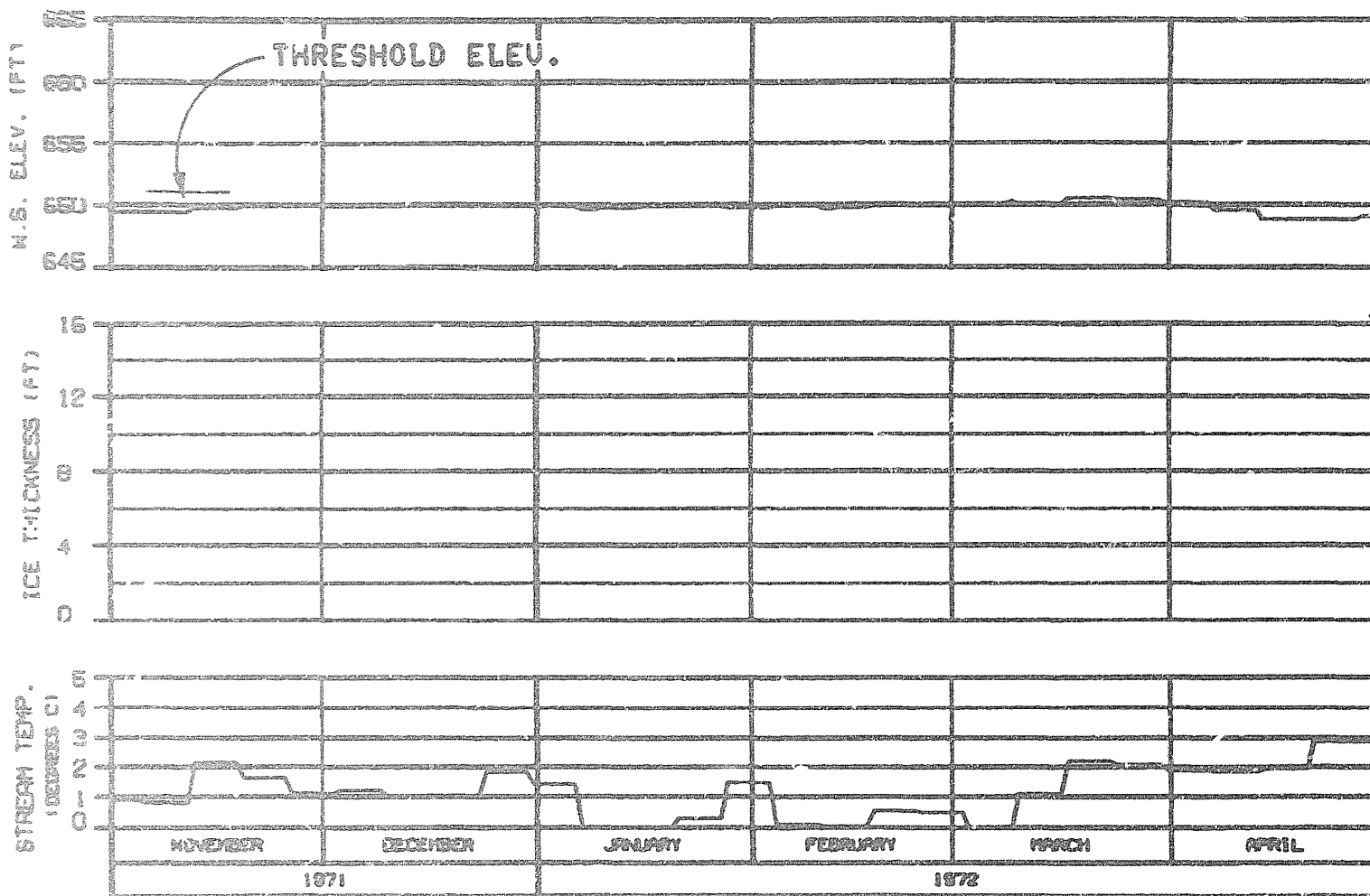


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUBITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRACO JOINT VENTURE		
DATE: 01.08.72	TO: 02.01.72	REV. 142

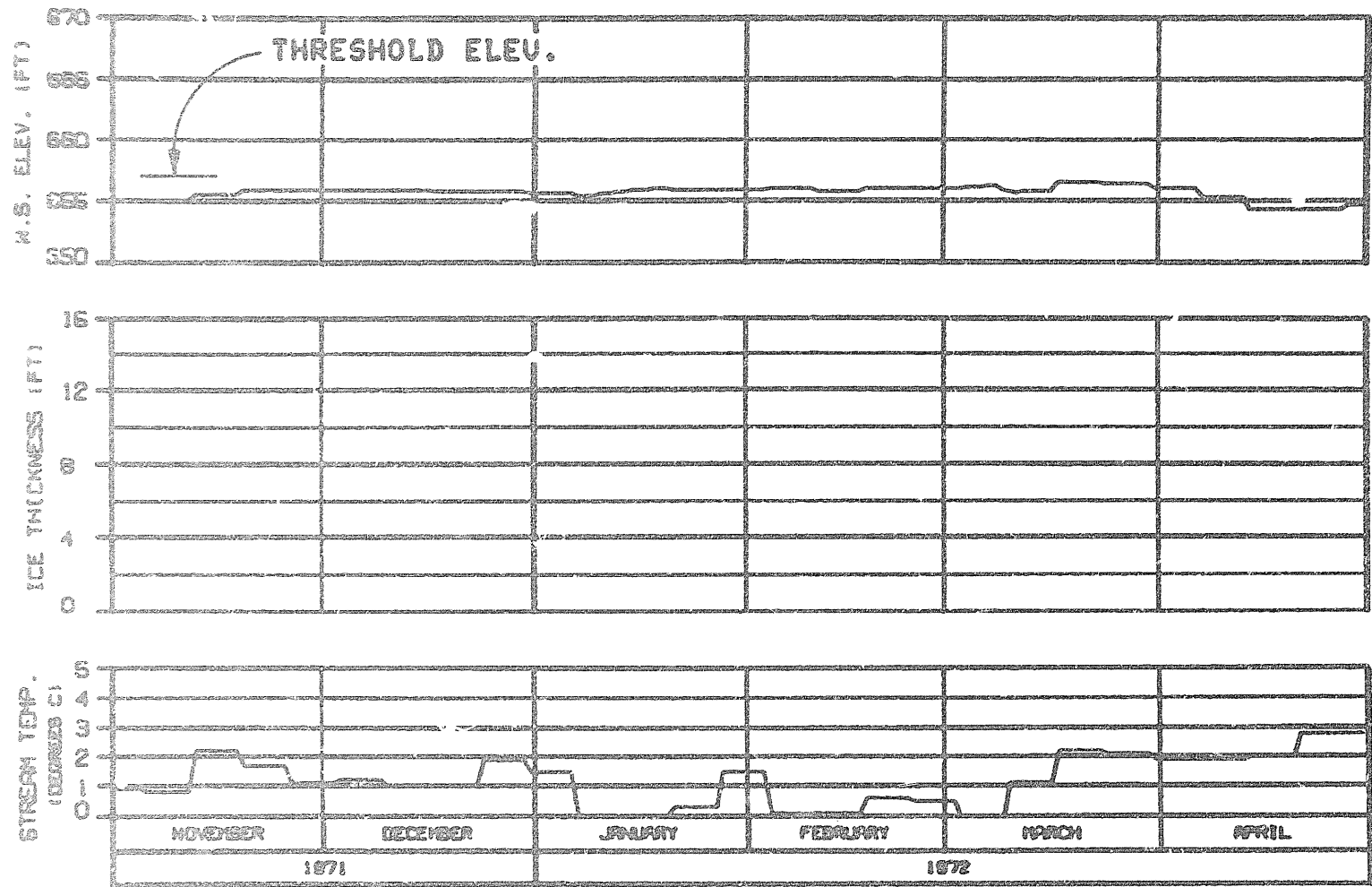


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP RULE : HARVEST. EL 1536.
 REFERENCE RUN NO. : 71D1C8

ALASKA POWER AUTHORITY	
CUSTOMER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EDBECO JOINT VENTURE	
DESIGNED BY: 7-278	REVISED BY: 10-282 (2)
PAGE: 148	

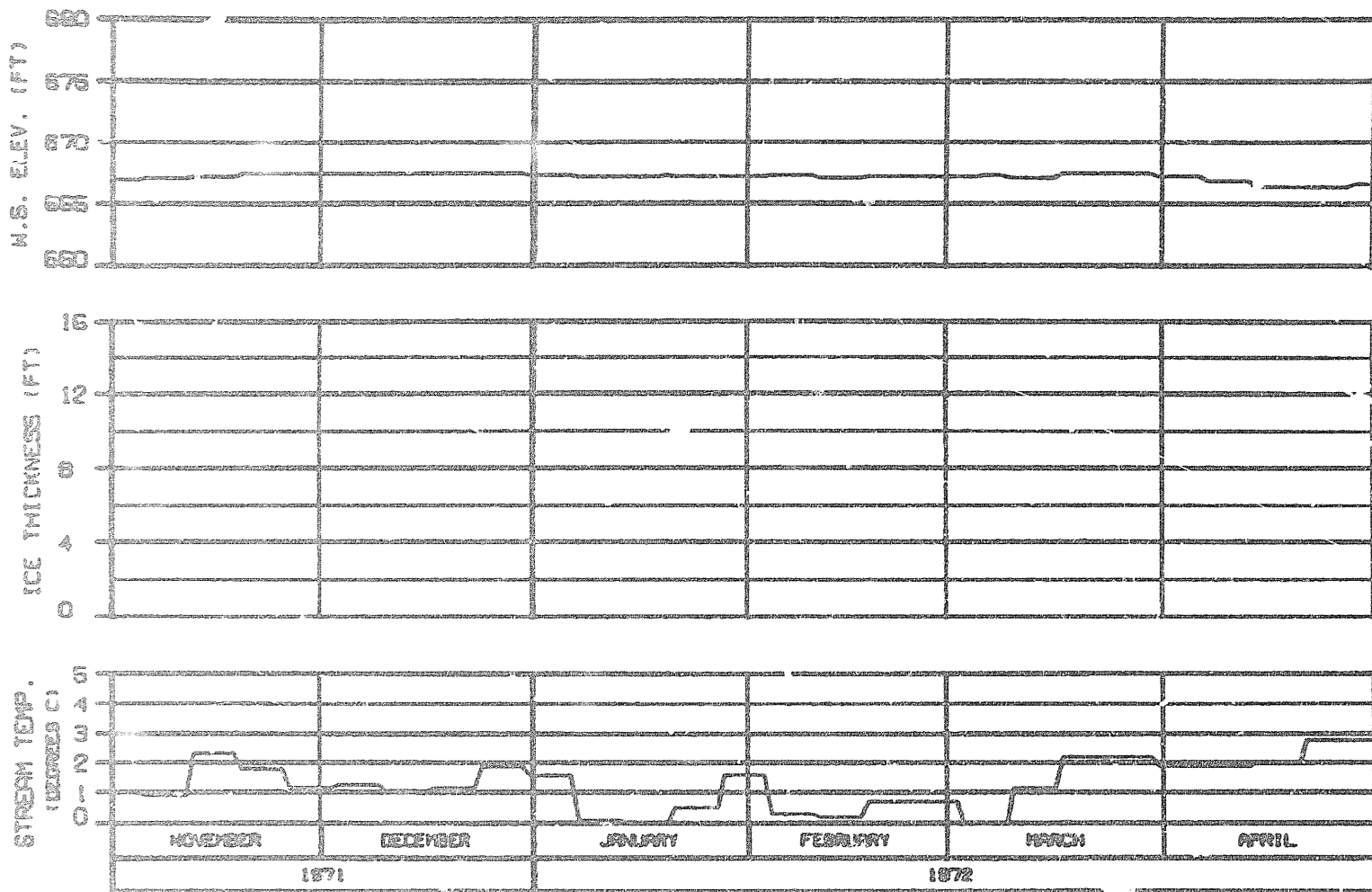


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : HATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1635.
 REFERENCE RUN NO. : 71010XB

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDBACCO JOINT VENTURE		
DESIGNED BY	DATE	1972, 148

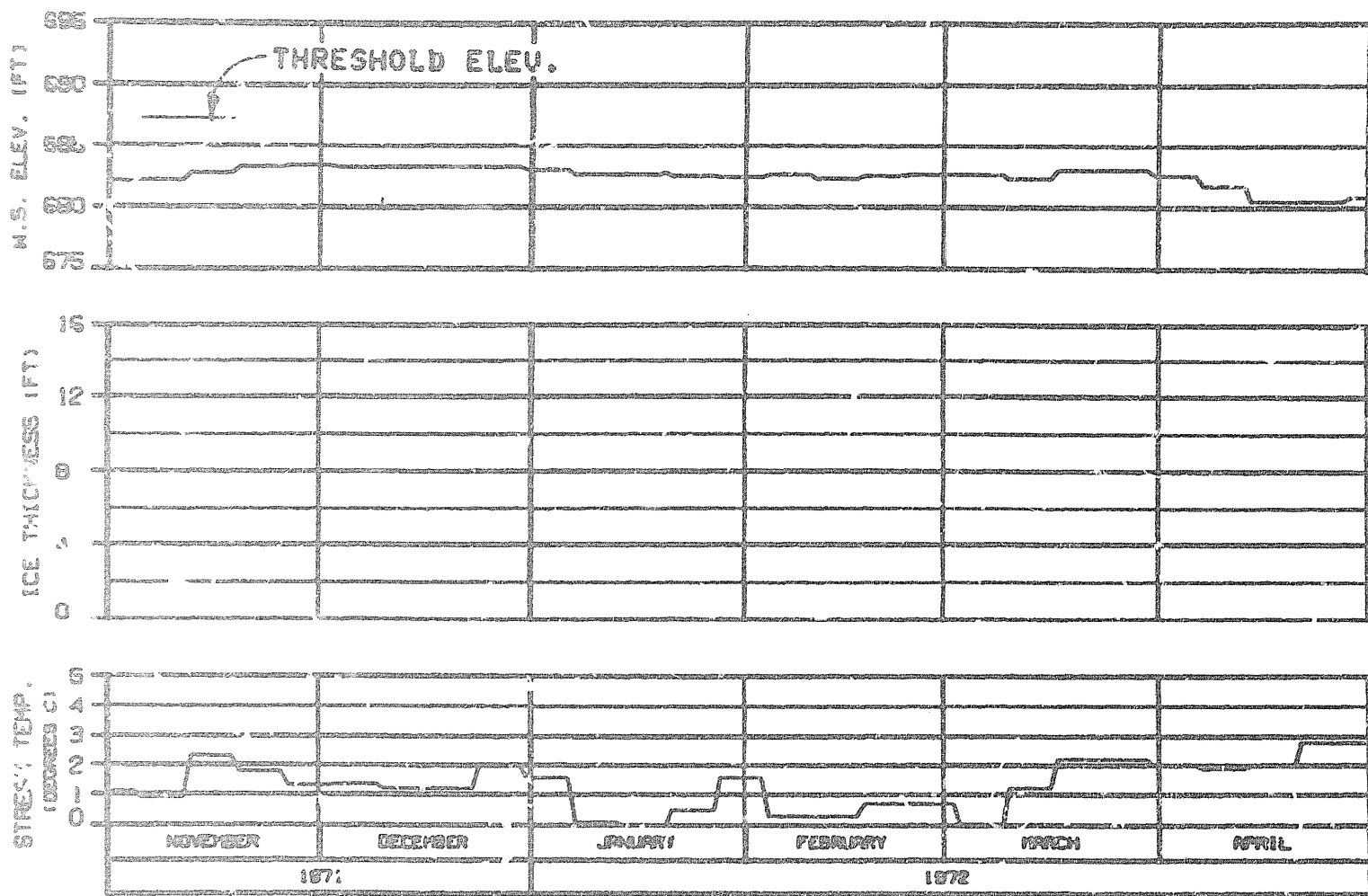


SIDE CHANNEL D/S OF SLOUGH 11
 RIVER MILE : 135.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - 2' IN COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP FILE : HARVEST. EL 1636.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY	
SUSTINA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARDA-EBERSCO JOINT VENTURE	
DATE: 01.04.72	BY: JSC/CS
PAGE 142	

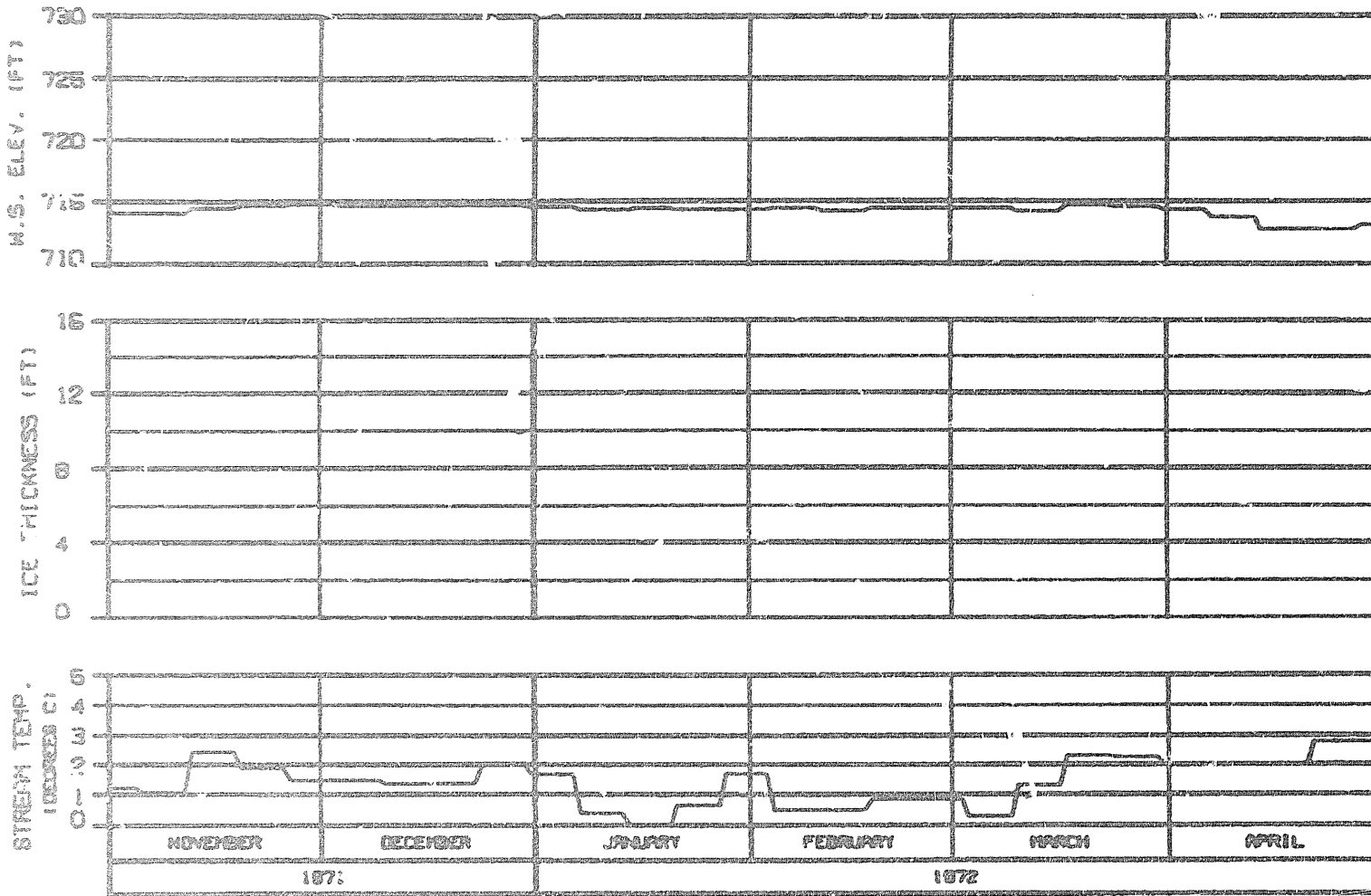


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CHSE C FLOWS TEMP RULE : HARVEST. EL 1636.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
NORDA-EBASCO JOINT VENTURE	
DESIGNED BY: []	DATE: []

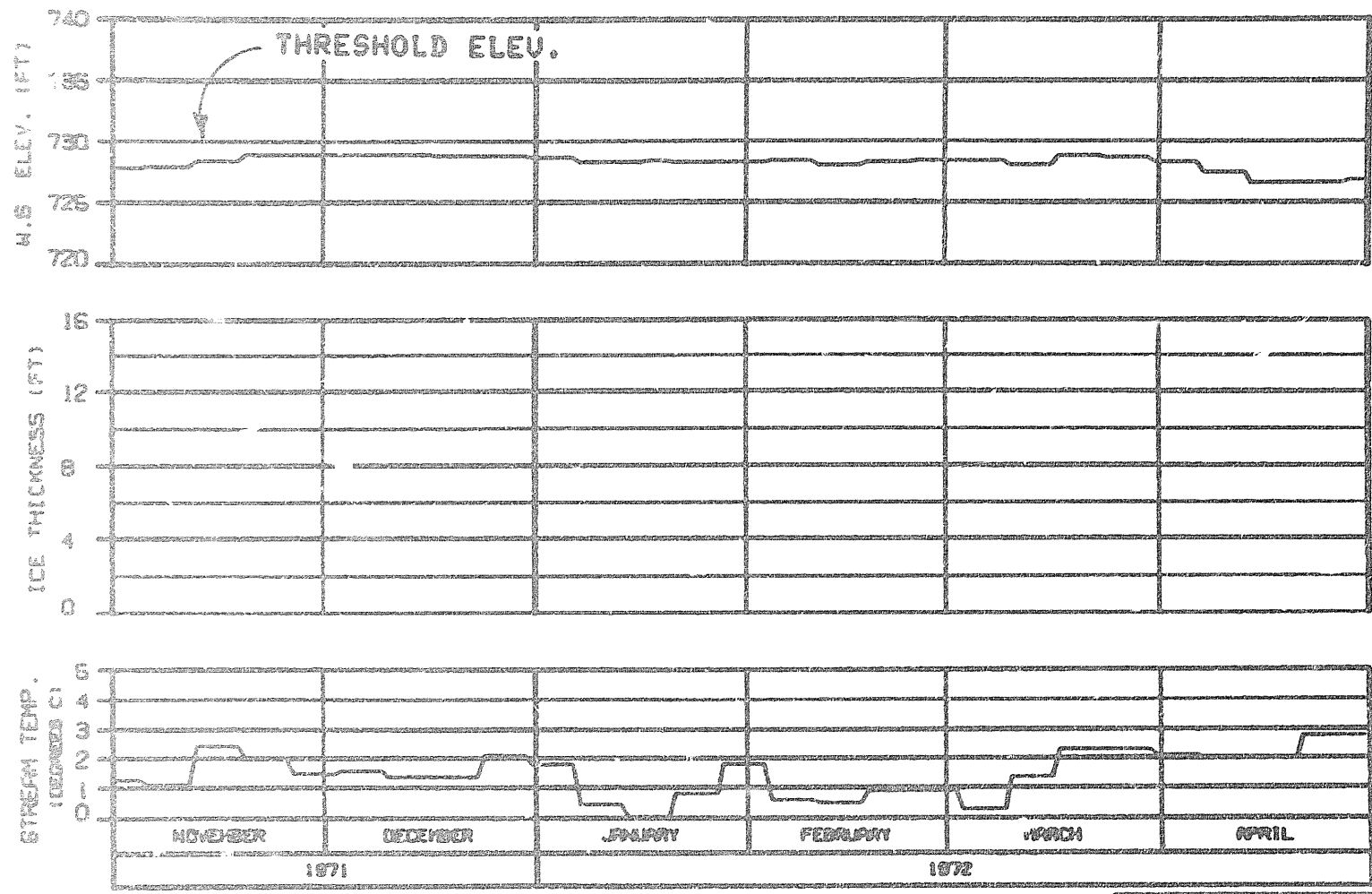


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : WATANA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1636.
 REFERENCE R/M NO. : 7101CXB

ALASKA POWER AUTHORITY	
GLACIER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARDA-EBASCO JOINT VENTURE	
DESIGNED - D.A. GARDNER	30 OCT 72
	1020.142

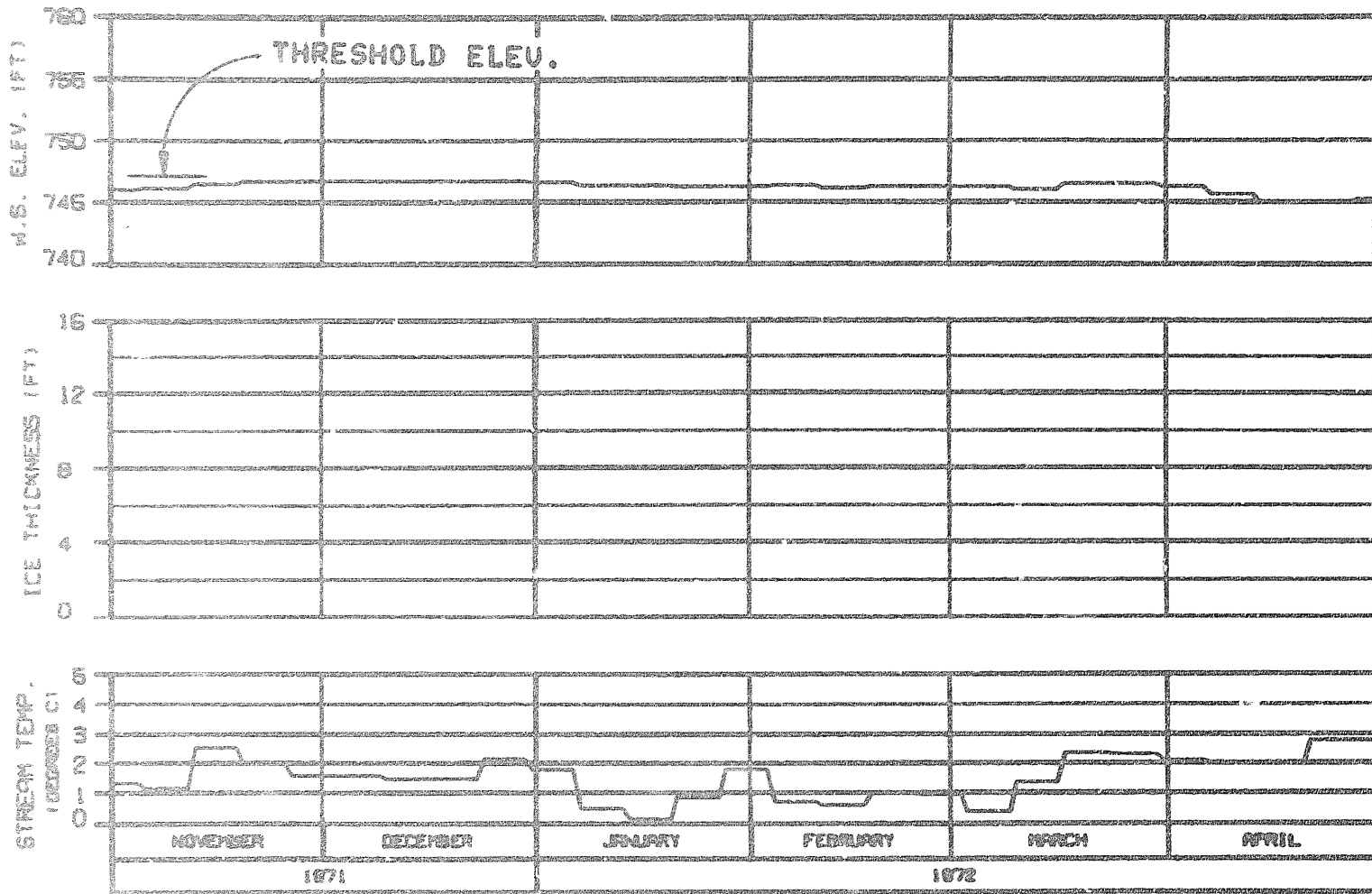


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATAMA 2001
 CASE C FLOWS TEMP RULE : WARMEST. EL 1696.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY		
BASELINE PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBRACO JOINT VENTURE		
DESIGNED: G. BARNES	10 (REV. 00)	ISS. 102

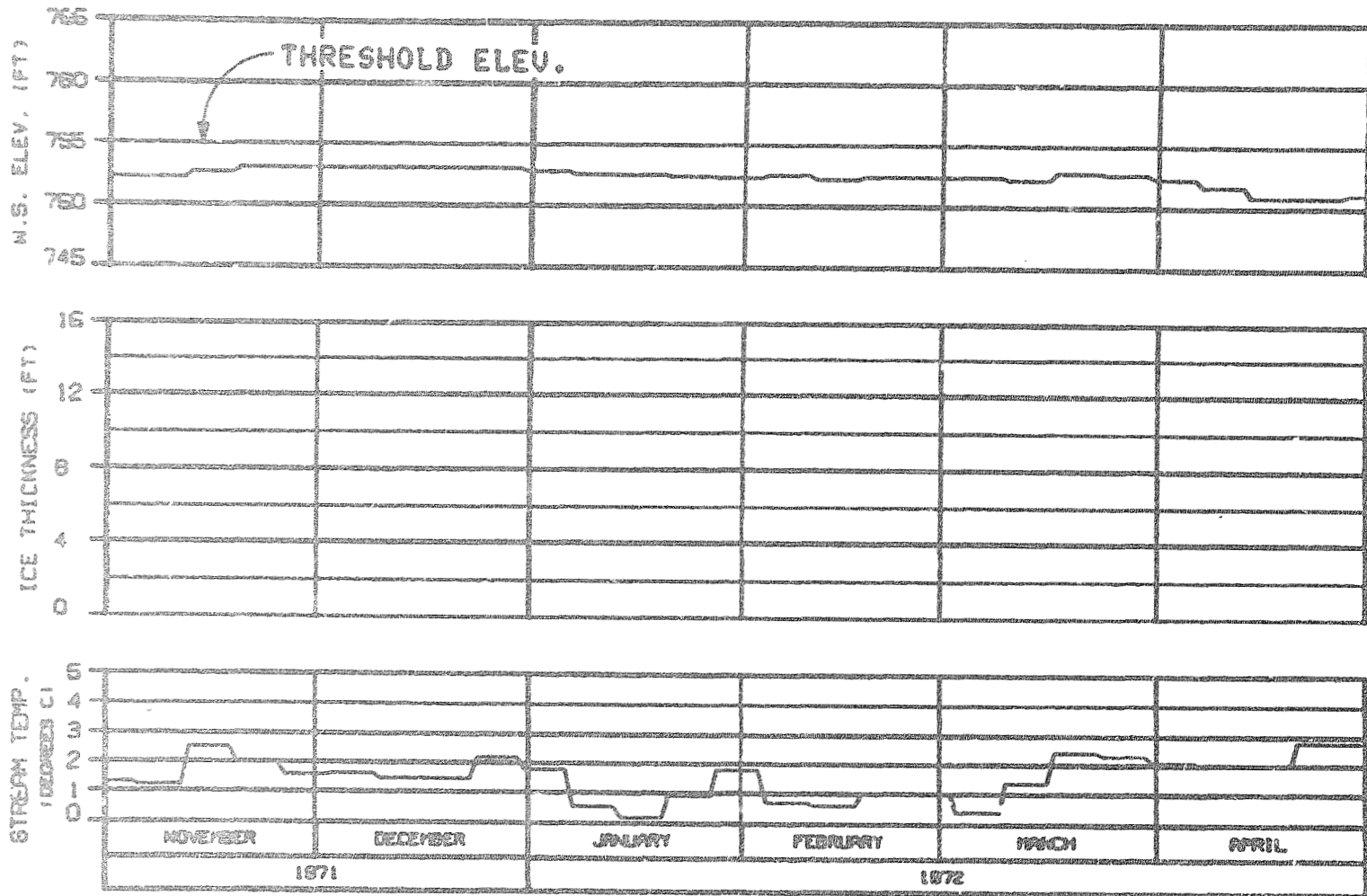


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - 6" COMPONENT

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : HARMEST. EL 1536.
 REFERENCE RUN NO. : 7101CXB

ALASKA POWER AUTHORITY	
GUIDING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EDRACD JOINT VENTURE	
DATE: 01.06.82	BY: 02.01
	5700.142

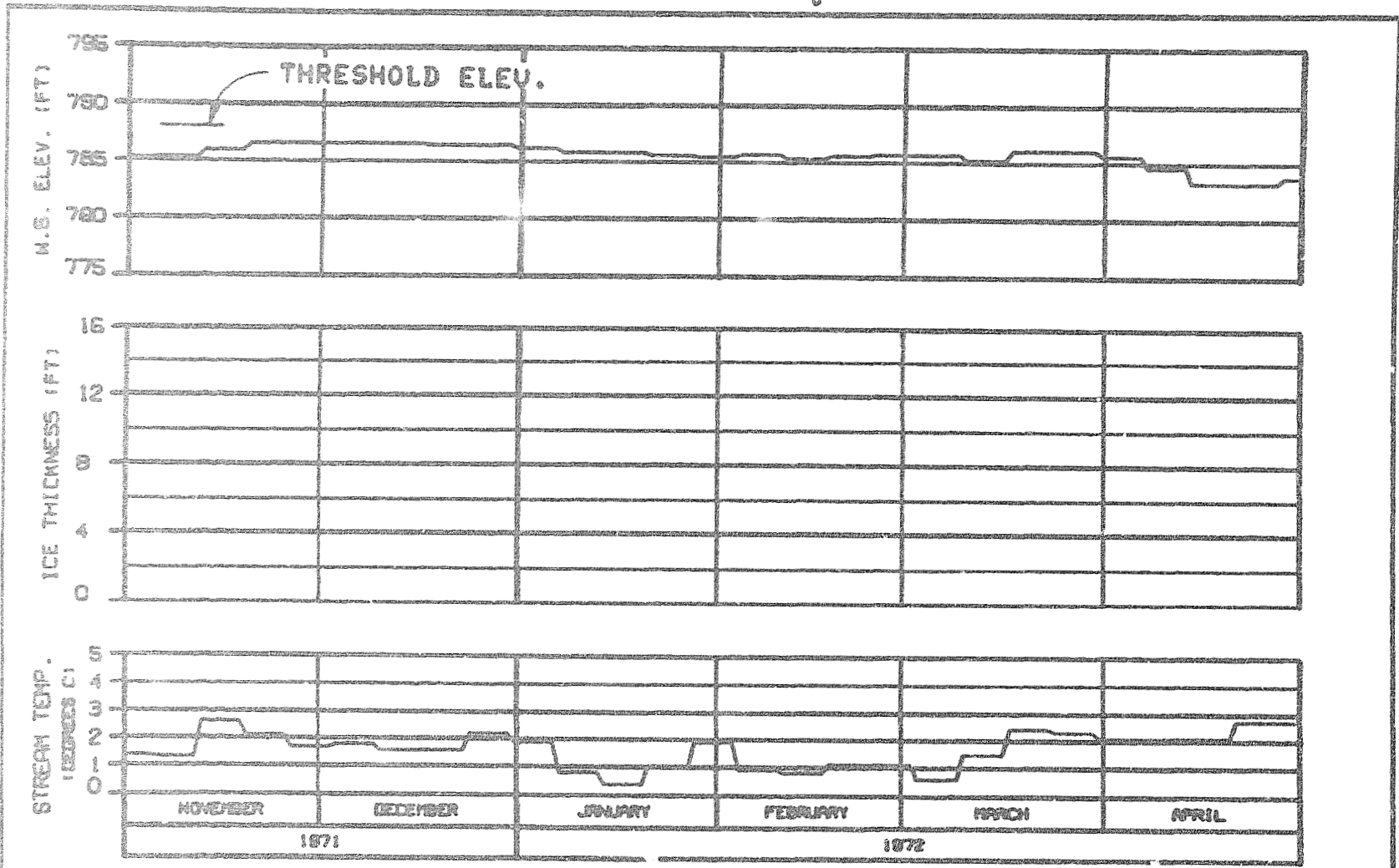


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : MATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 71D1CX8

ALAGNA POWER AUTHORITY		
DESIGN PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRACO JOINT VENTURE		
DESIGN. DATES	NO. OF DGS	NO. OF LKS



ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

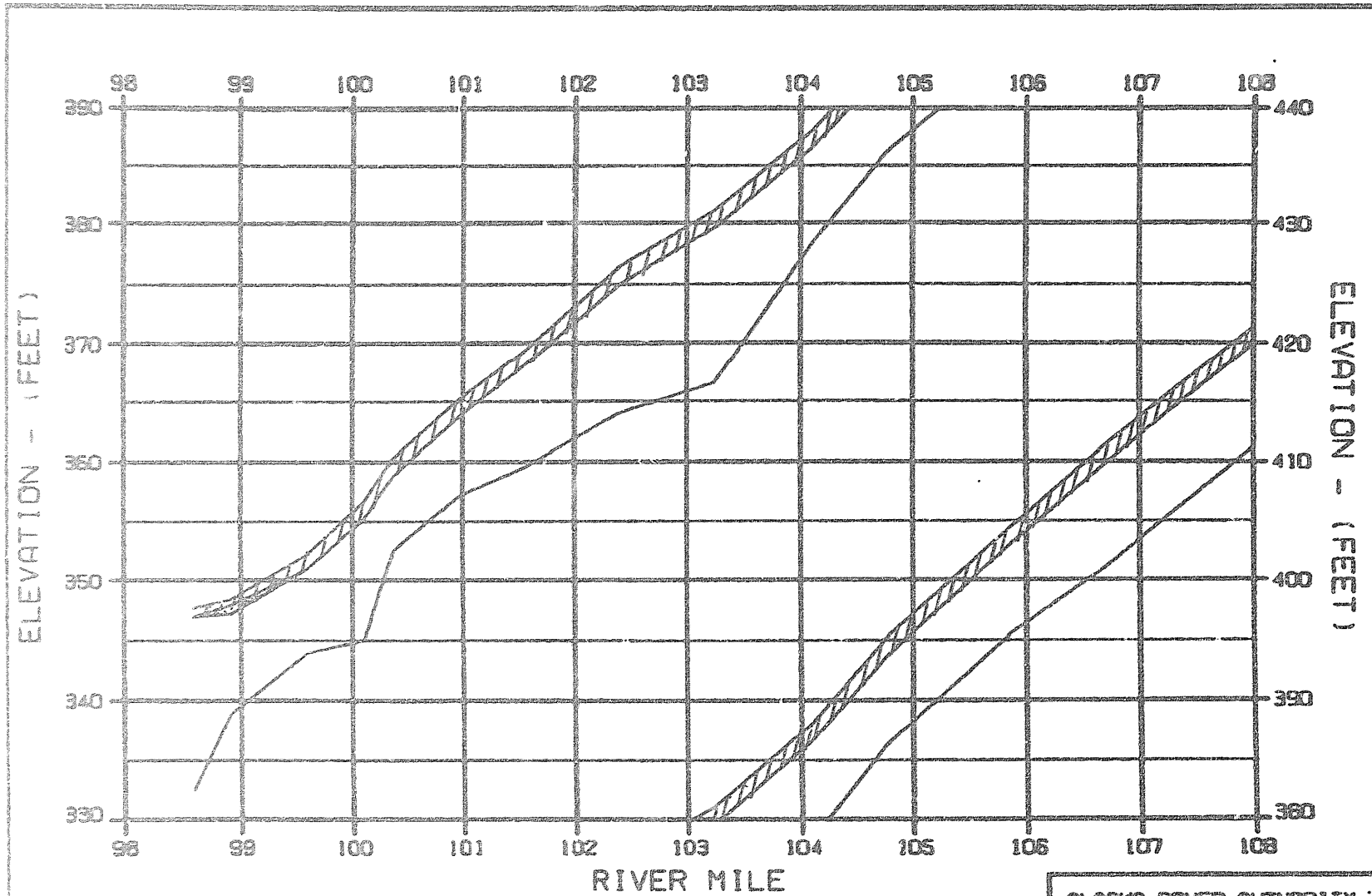
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

WEATHER PERIOD : 1 NOV 71 - 30 APR 72
 ENERGY DEMAND : NATANA 2001
 CASE C FLOWS TEMP FILE : WARMEST. EL 1636.
 REFERENCE RUN NO. : 7101CX8



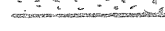

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EDGECO JOINT VENTURE	
DATE: 01/08/82	BY: 001/04
PAGE 102	

OPTION?

EXHIBIT P



LEGEND:

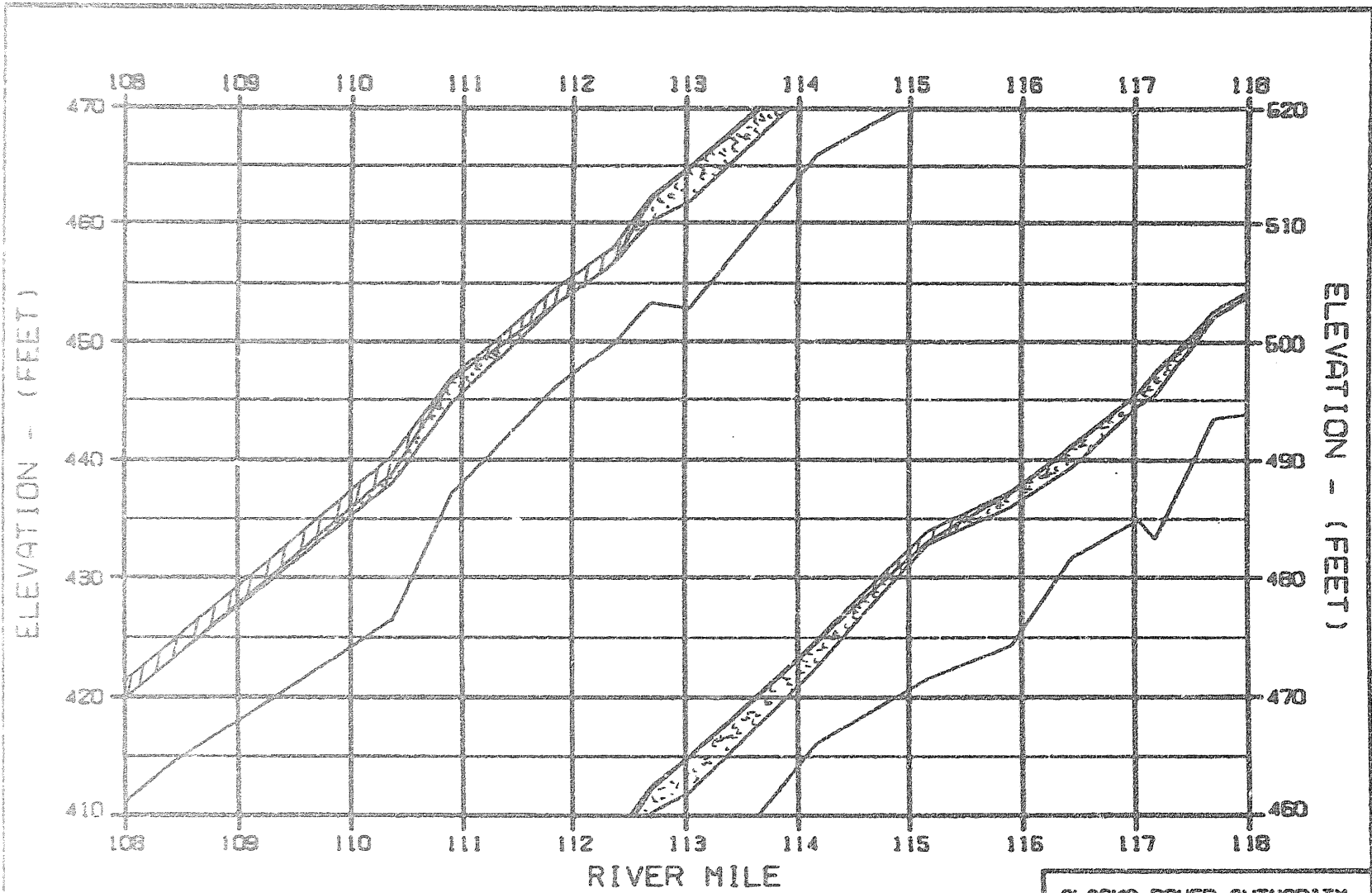
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

LEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EBASCO JOINT VENTURE	
DESIGNER: BLDG 55	DATE: 01 JUN 82
DRAWING NO.: 1020.142	

OPTION?

C



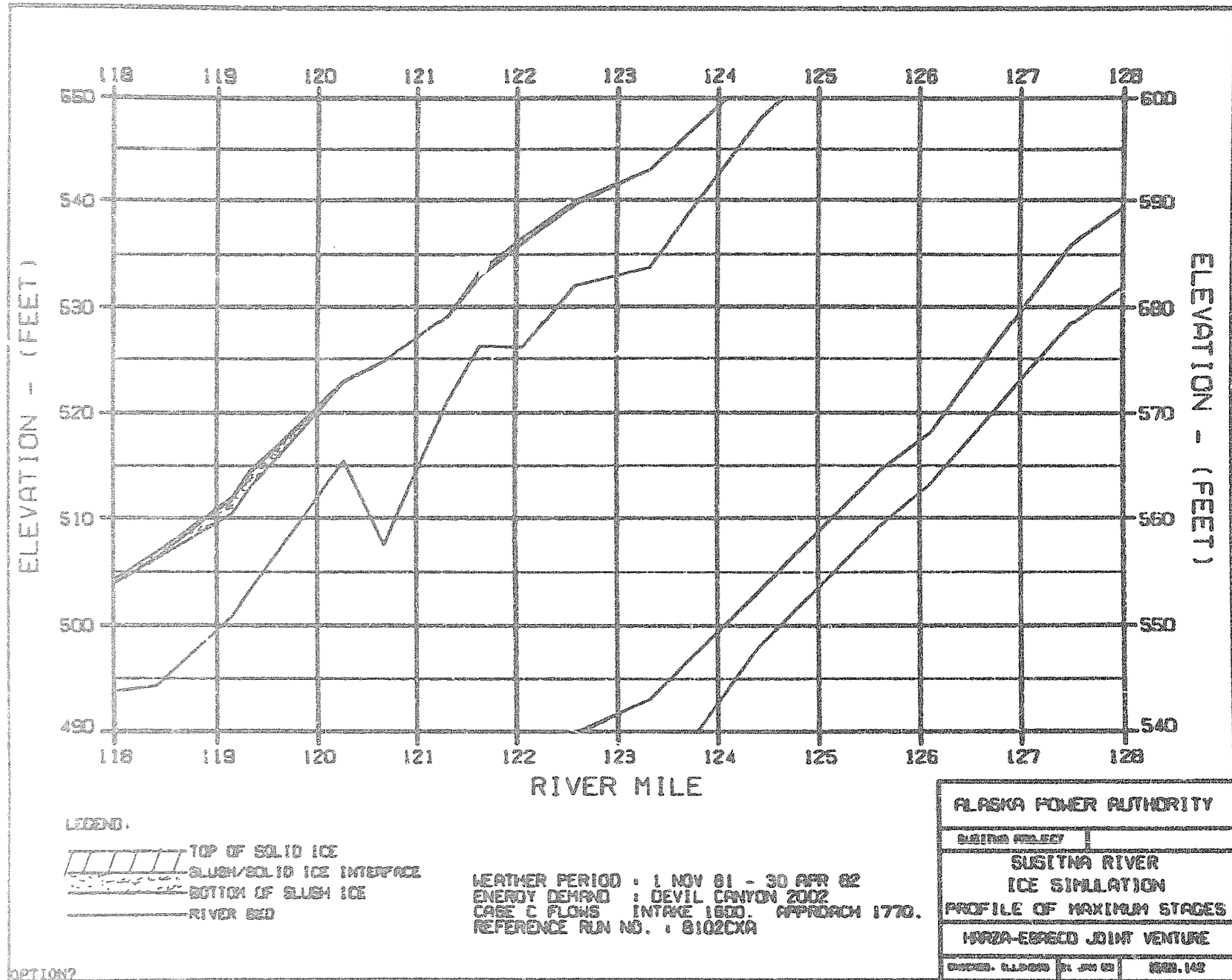
LEGEND:

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

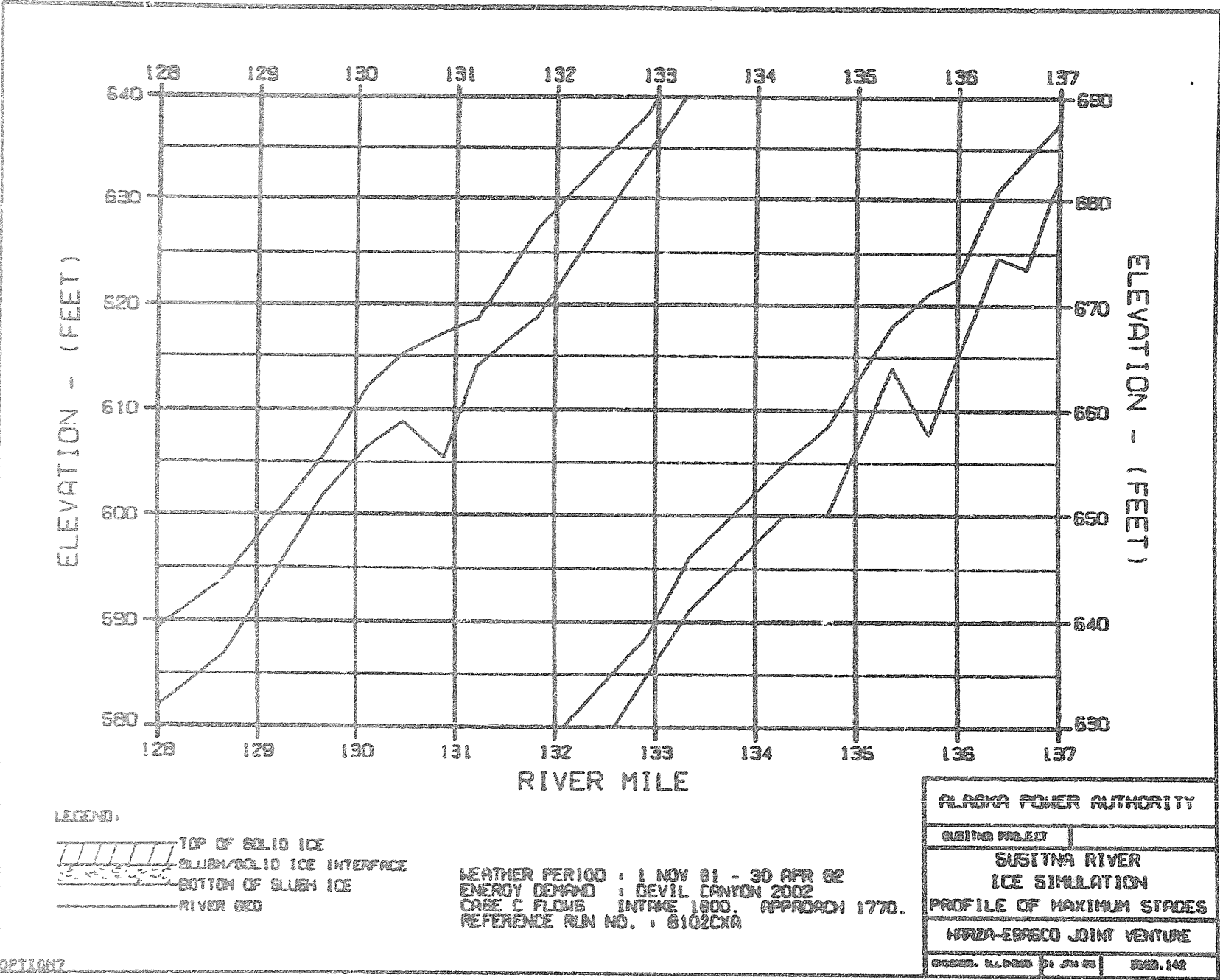
WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 0102CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBRACO JOINT VENTURE	
DATE: 01/20/02	BY: JAC
1000.142	

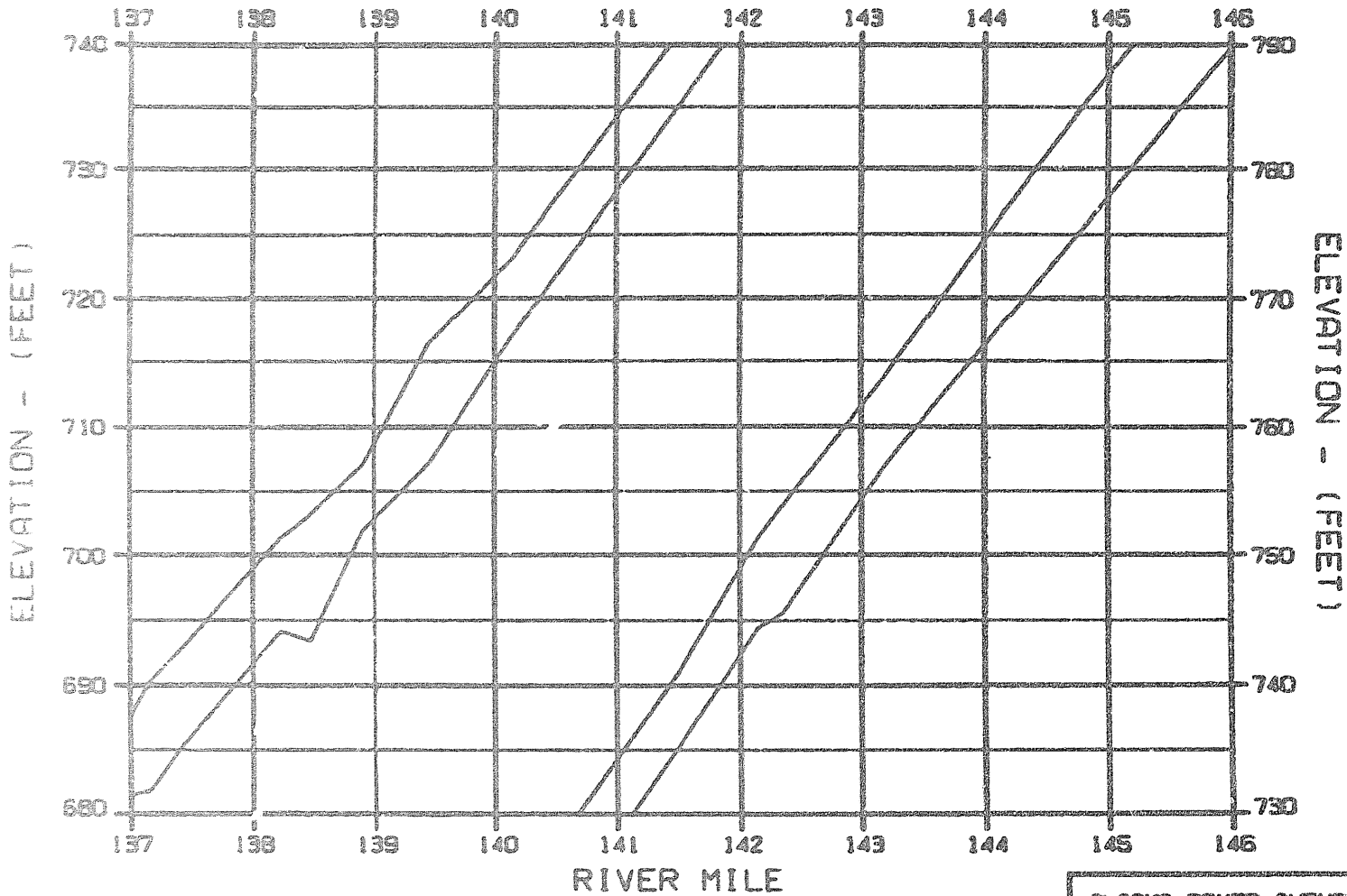
OPTION?






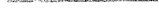
OPTION?



OPTION?

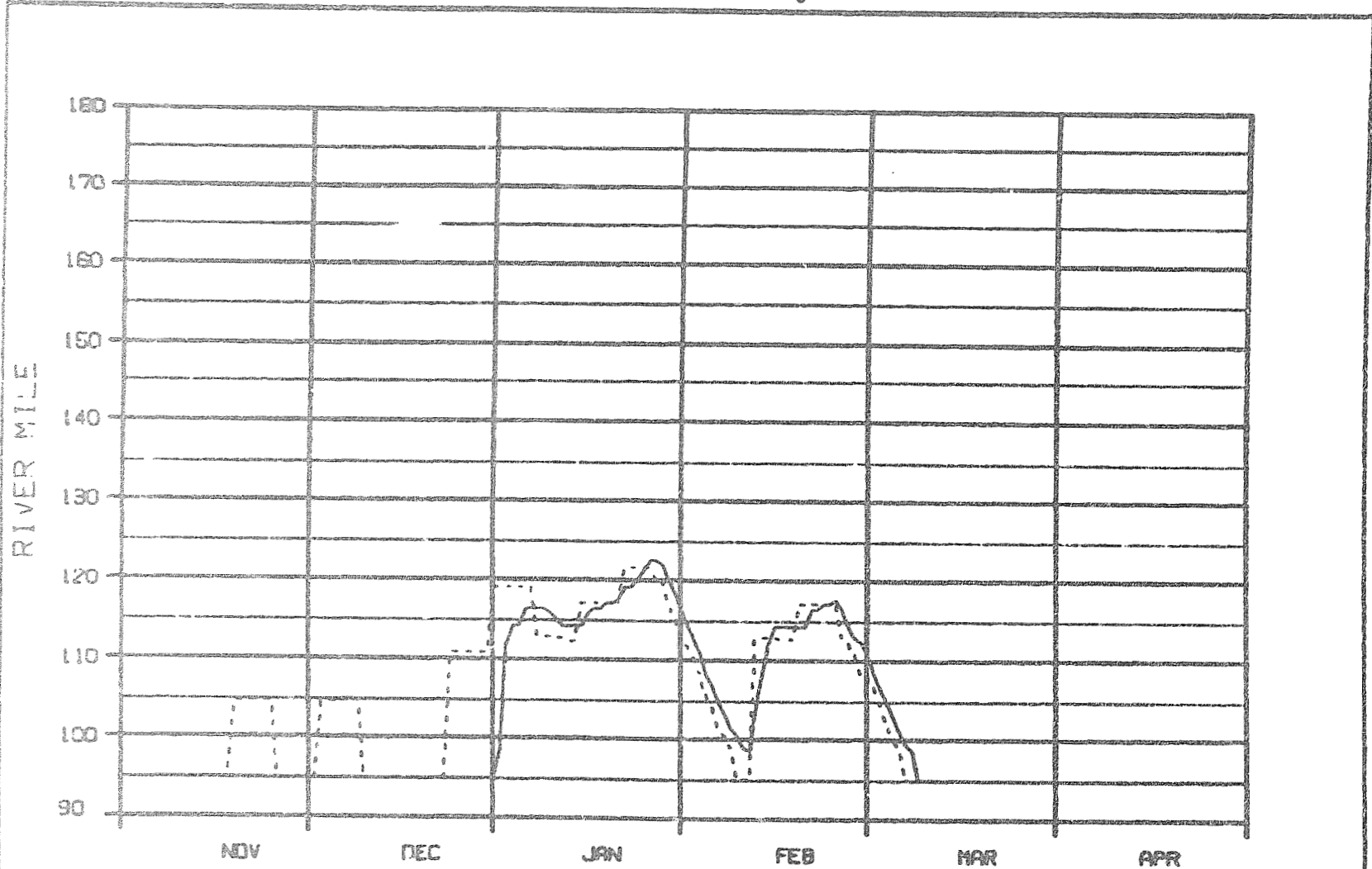


LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY.	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARZA-ENRSCO JOINT VENTURE	
DESIGN: 01/20/82	1788.142



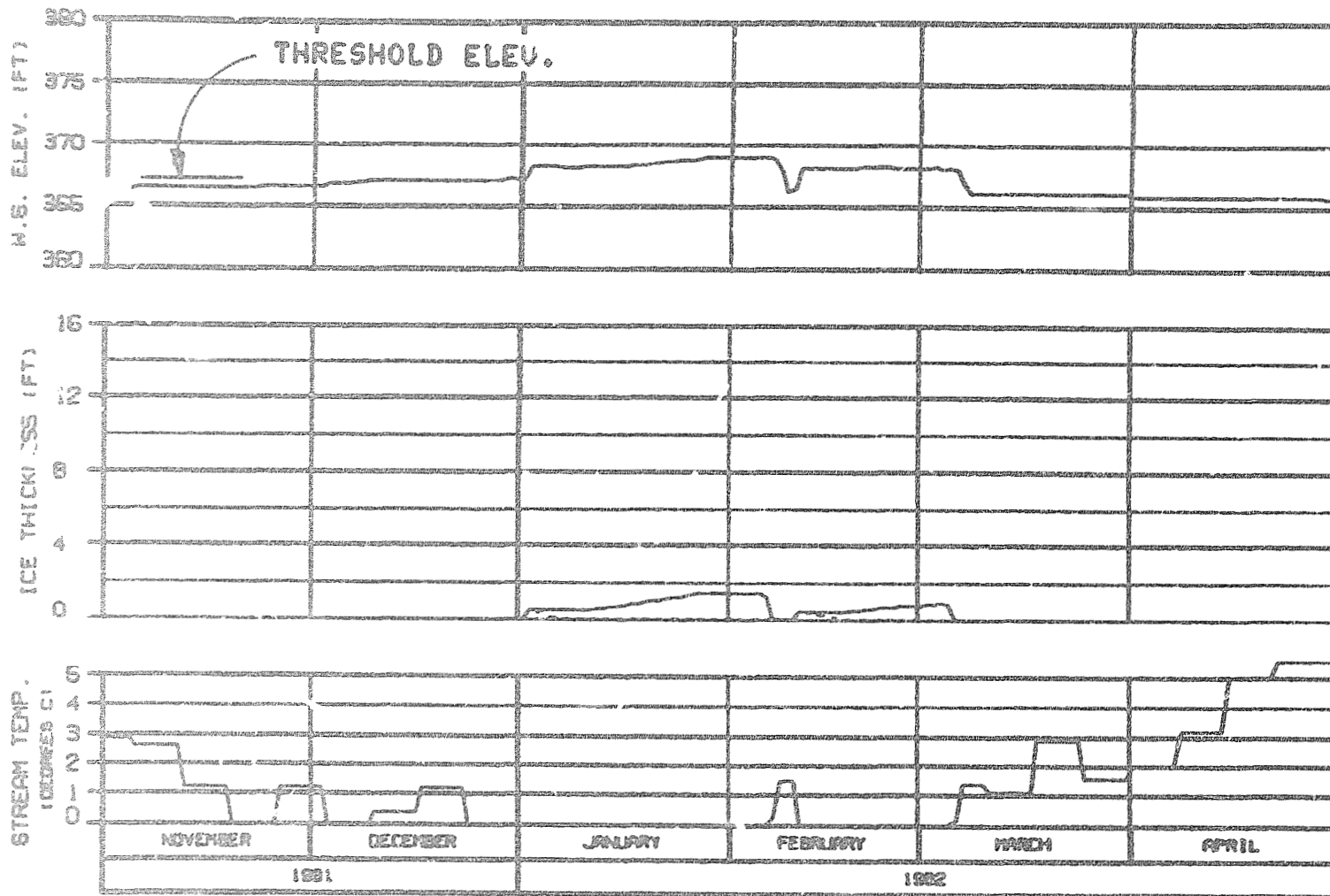
LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE C INTAKE 1800, APPROACH 1770.
 REFERENCE RUN NO. : 8102CA

OPTION2

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
& ZERO DEGREE ISOTHERM		
WARZA-EBERD JOINT VENTURE		
DATE:	BY:	NO.:
02/02/82	JA	142



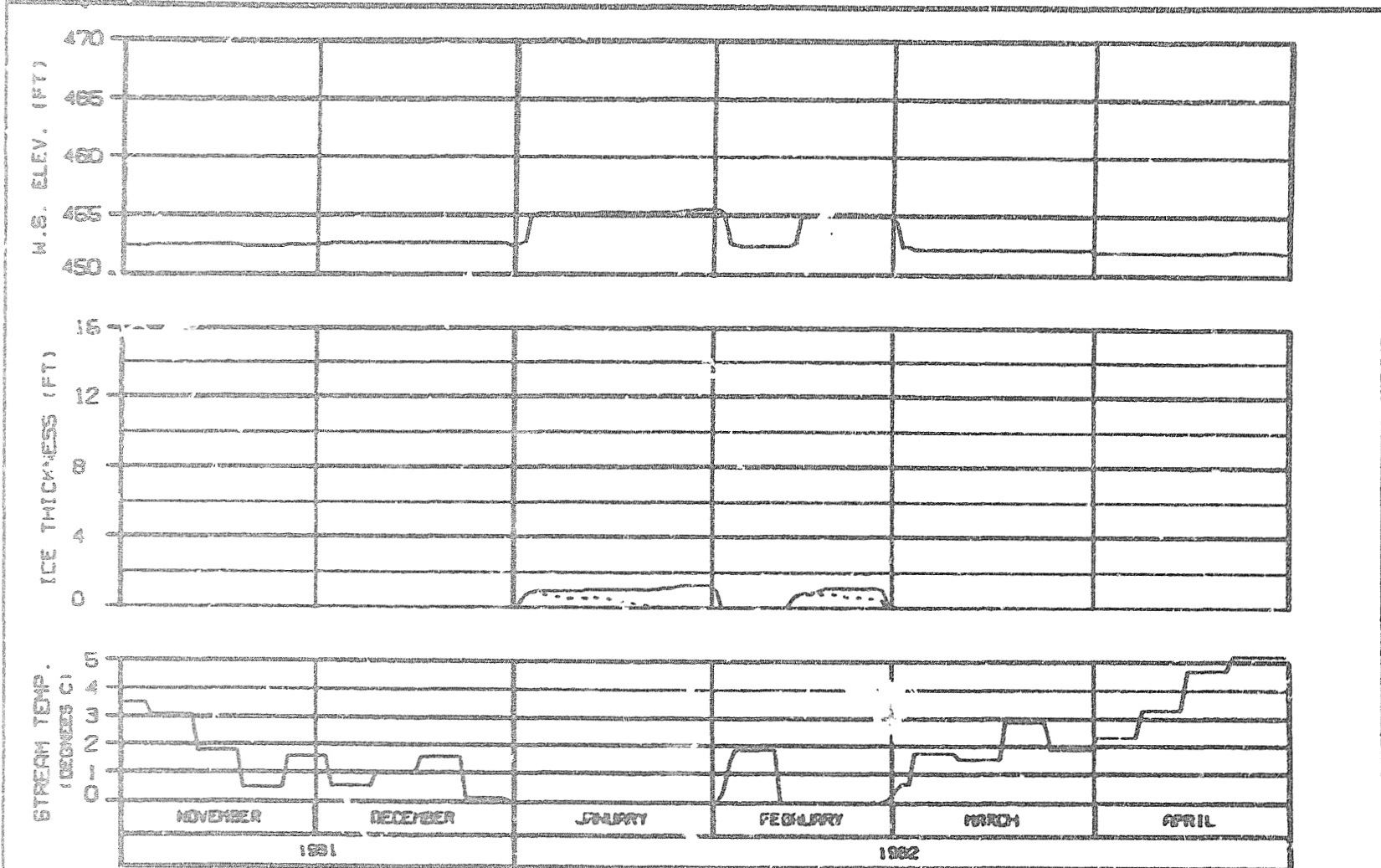
HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 810200A

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DATE: 01 JUN 92	1992.142

OPTION#

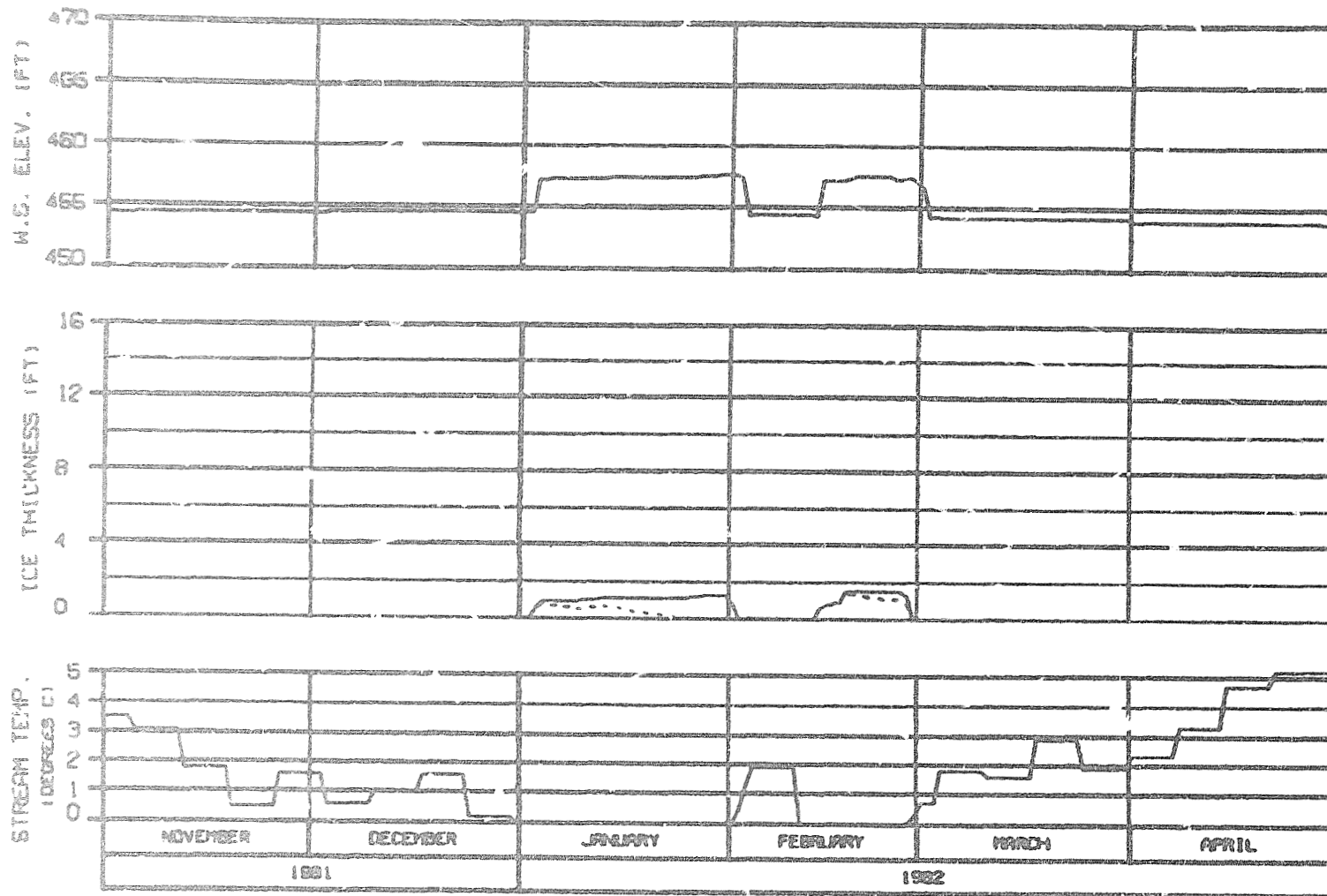


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 0102CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRILCO JOINT VENTURE	
DATE: 01/08/82	BY: JAC
DRAW: 142	

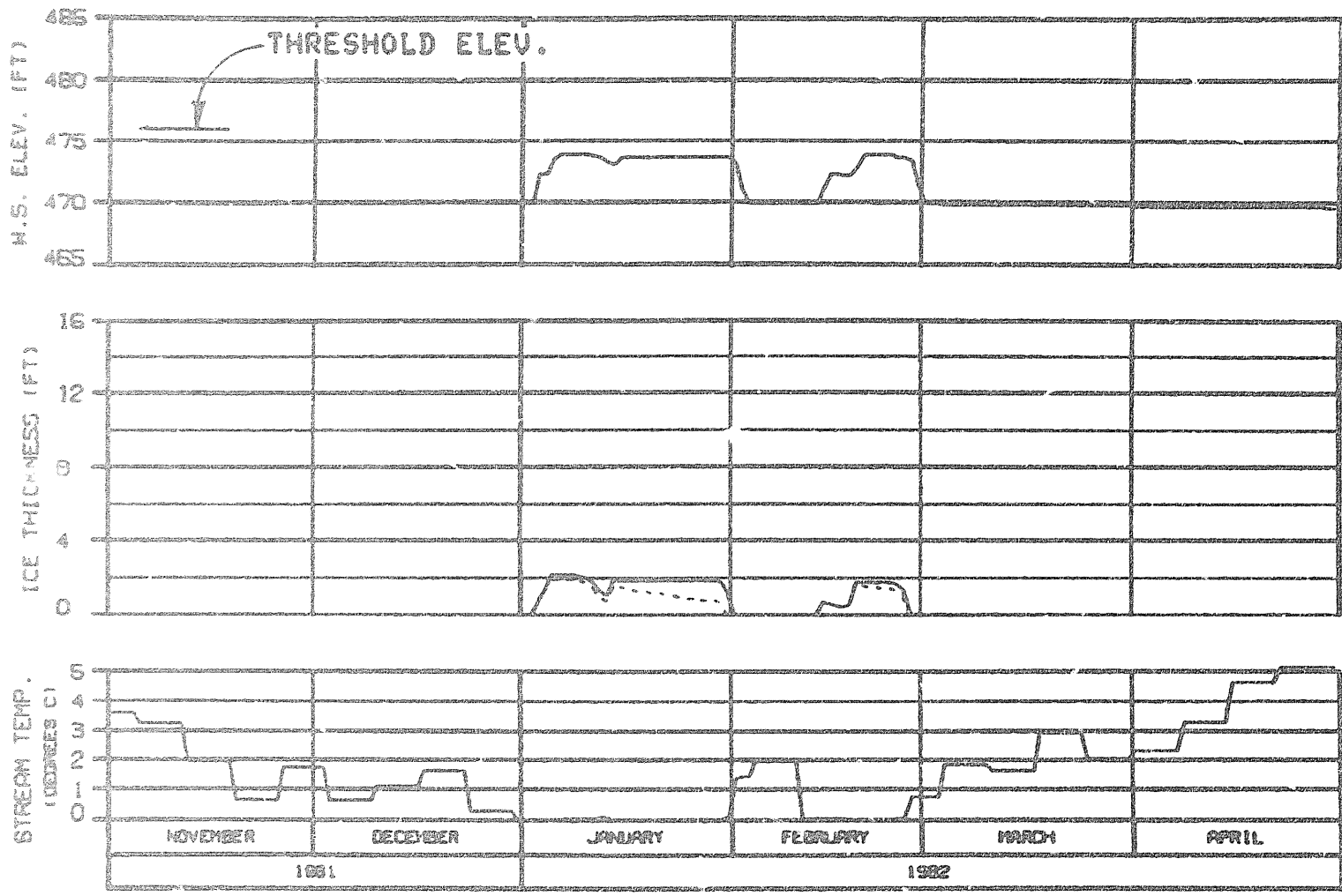


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 01 JUN 82	SPR. 142

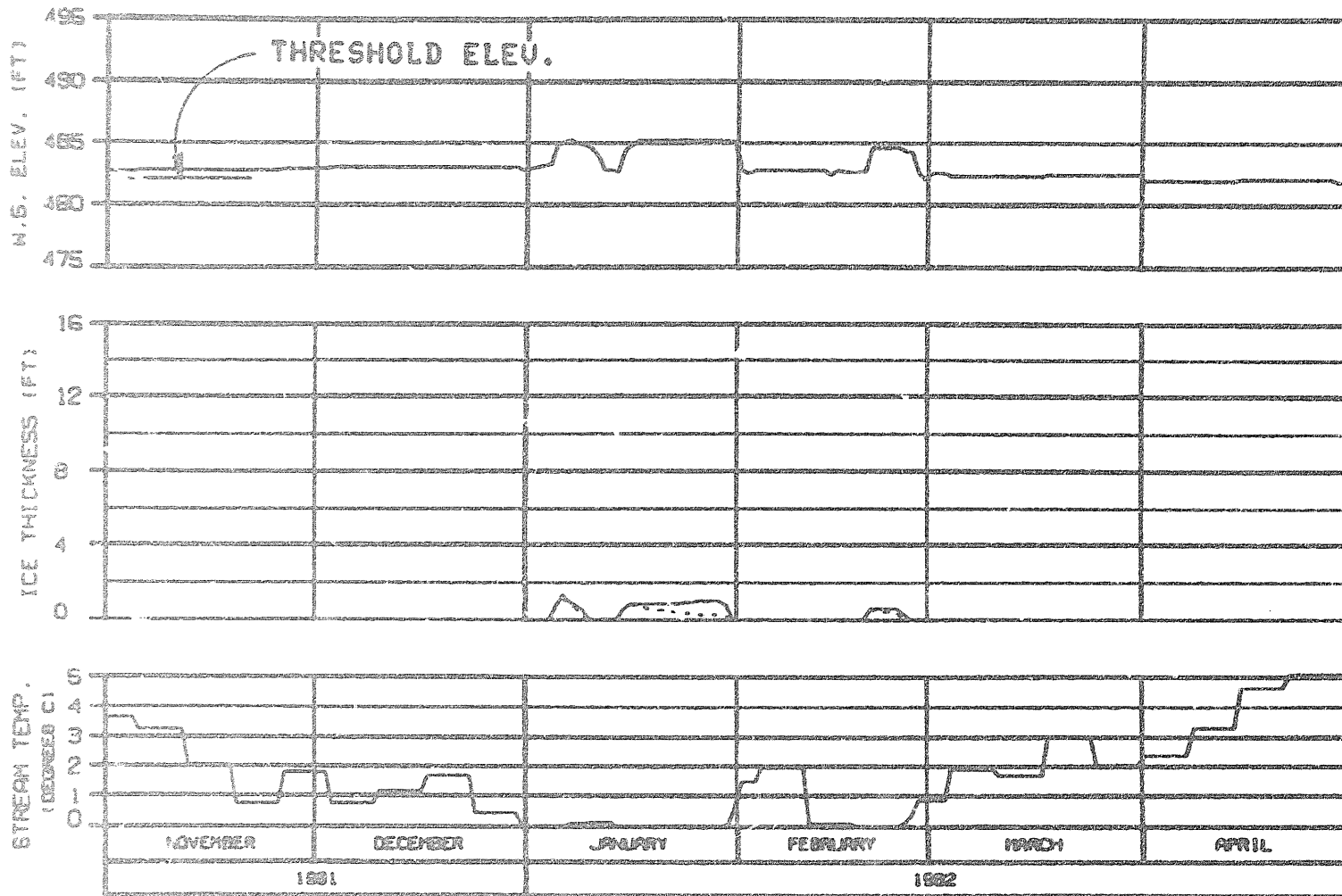


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 81020XA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EDASCO JOINT VENTURE	
ORDER: 01-0000	21 JAN 83 1070.142

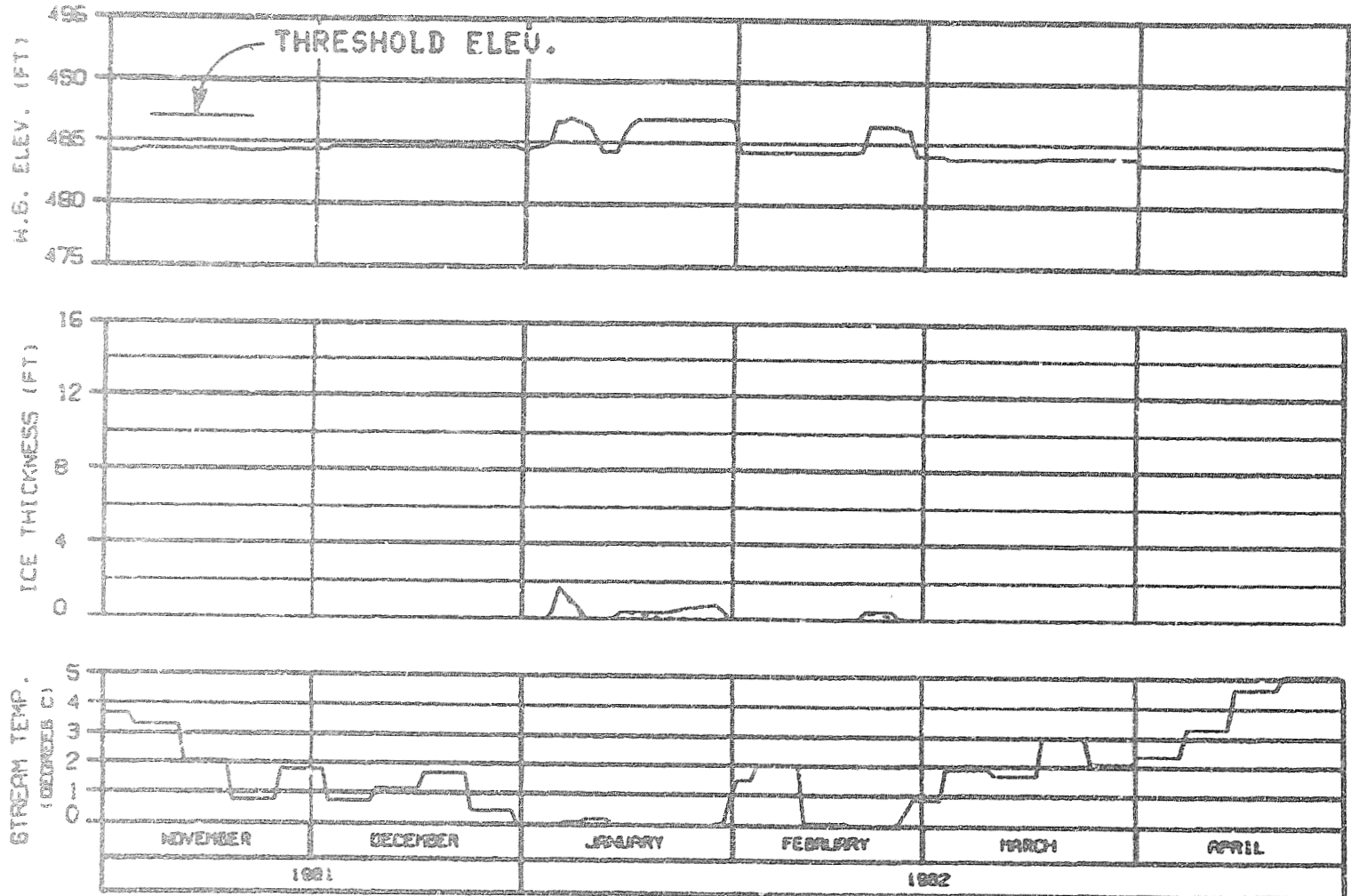


SIDE CHANNEL MSII
 RIVER MILE : 115.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800, APPROACH 1770.
 REFERENCE RUN NO. : 8102DKA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBRSCO JOINT VENTURE	
DATE: 01/08/82	1200.142

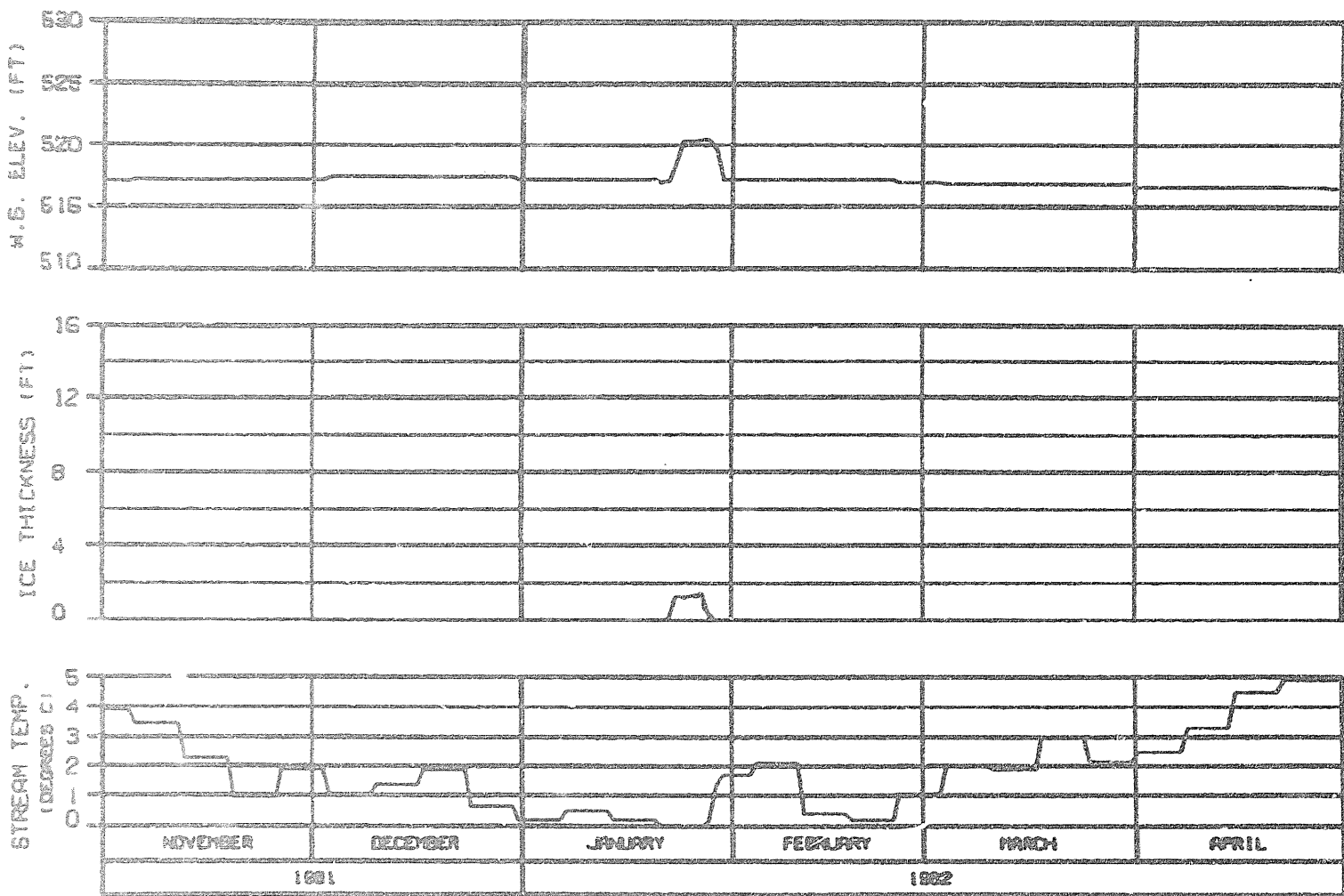


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EGRECO JOINT VENTURE		
DESIGNED: D.L. GARDNER	BY: J.M. GIBSON	DATE: 08.14.82

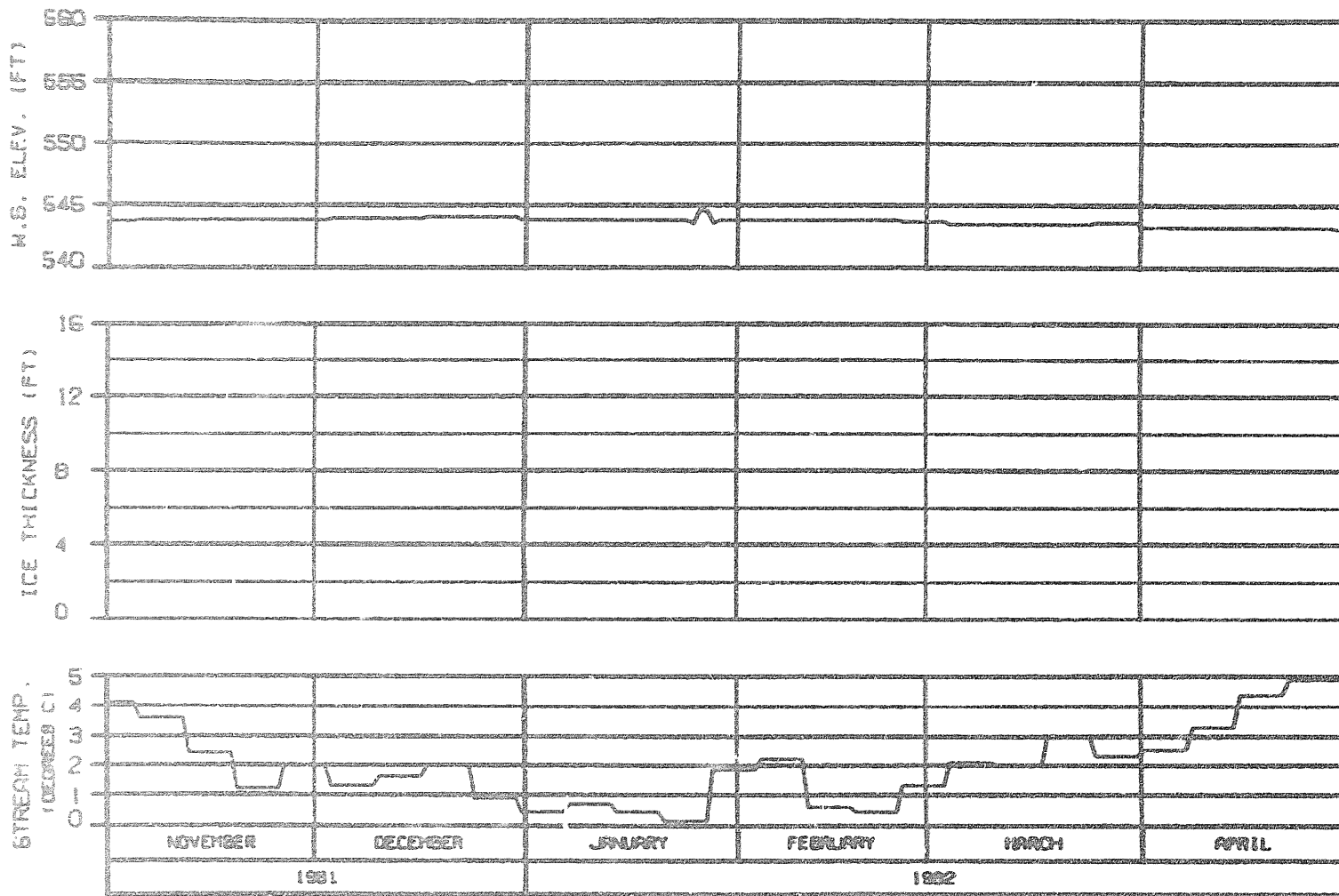


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTS - ALASKA	81 JAN 82
	8201.142

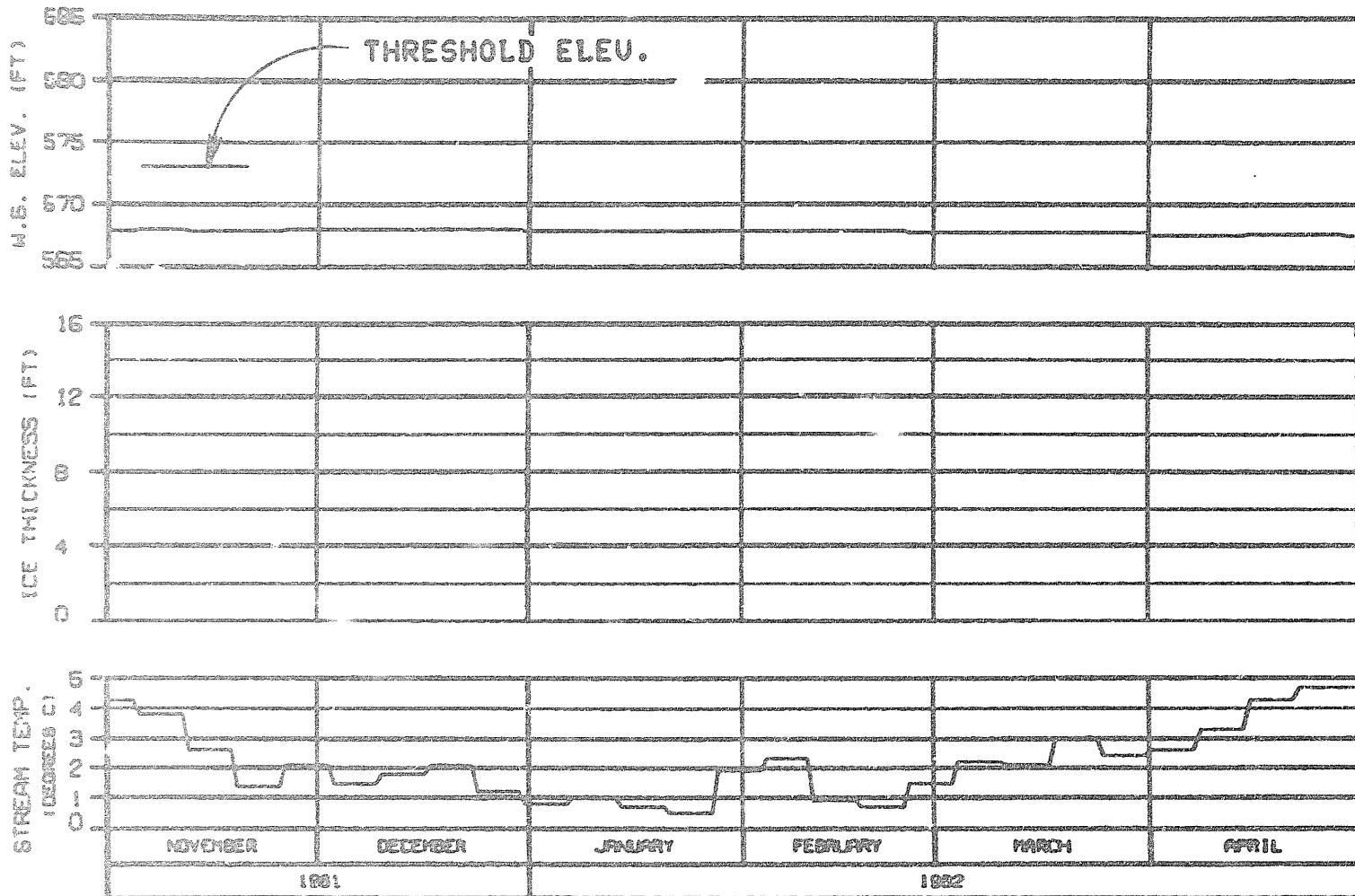


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARCO-EBASCO JOINT VENTURE	
DATE: 11/11/81	1000.142

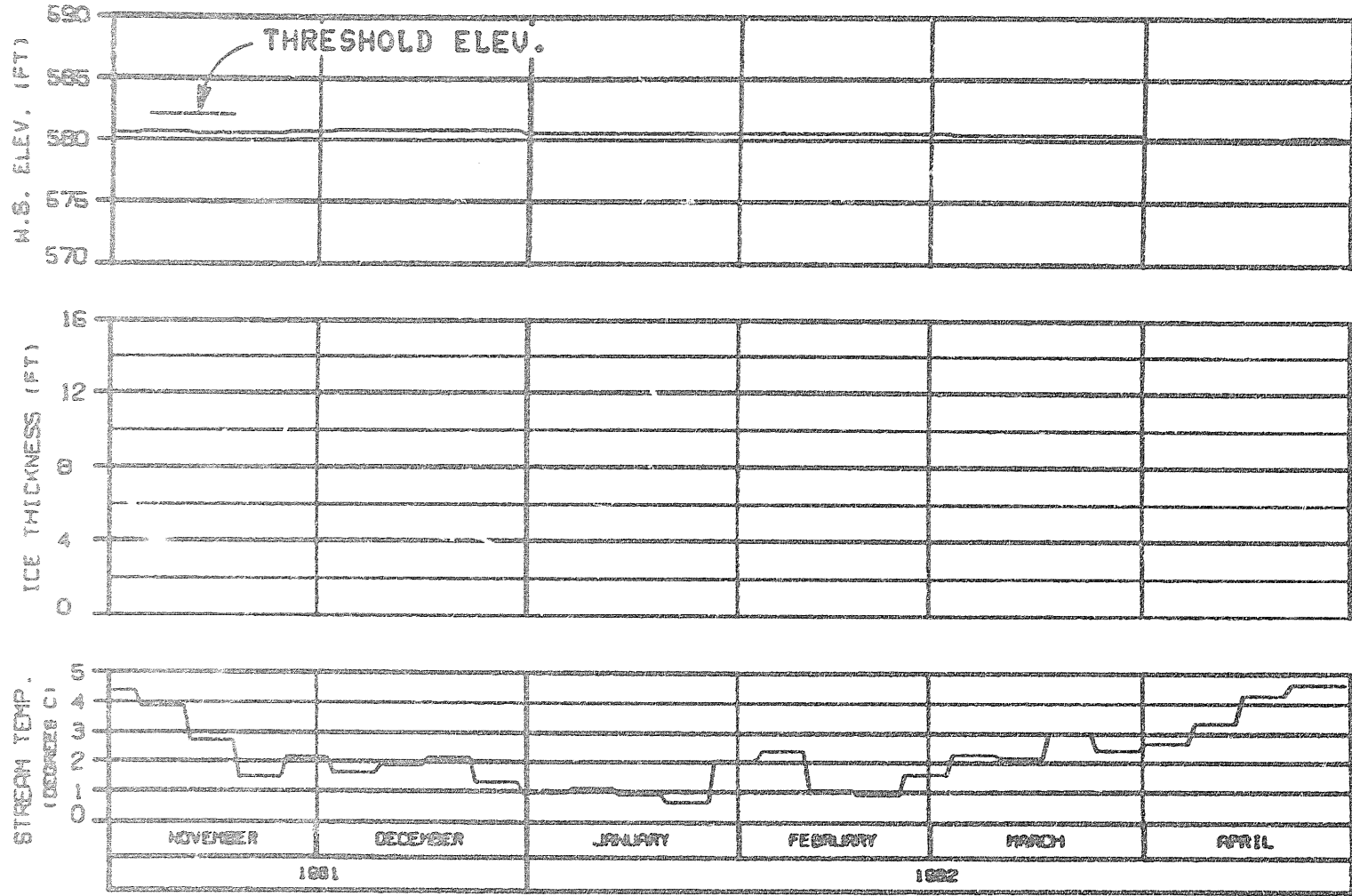


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 GLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
GUSITNA PROJECT	
GUSITNA RIVER ICE SIMULATION TIME HISTORY	
WAPDA-EBASCO JOINT VENTURE	
CHART NO. ALP-8007	REV. 03
888.142	

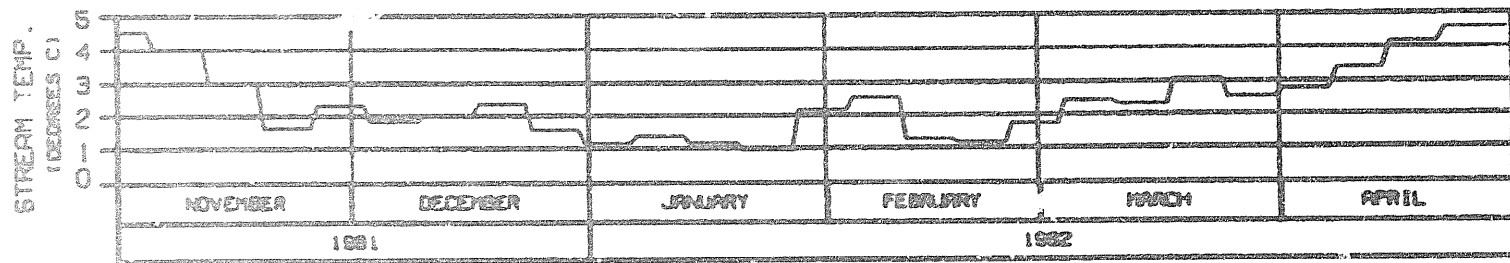
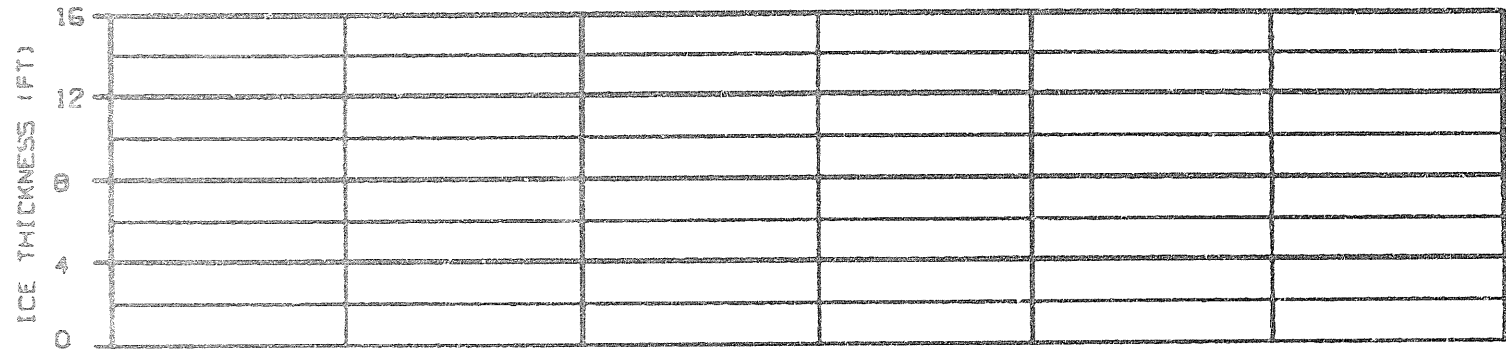
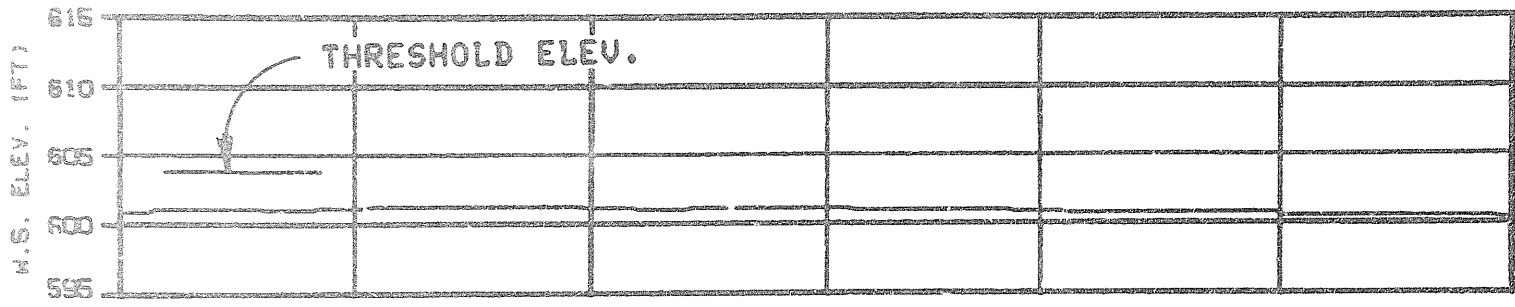


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EGASCO JOINT VENTURE	
ORDER: 01.0000 01 JAN 00	0001.148



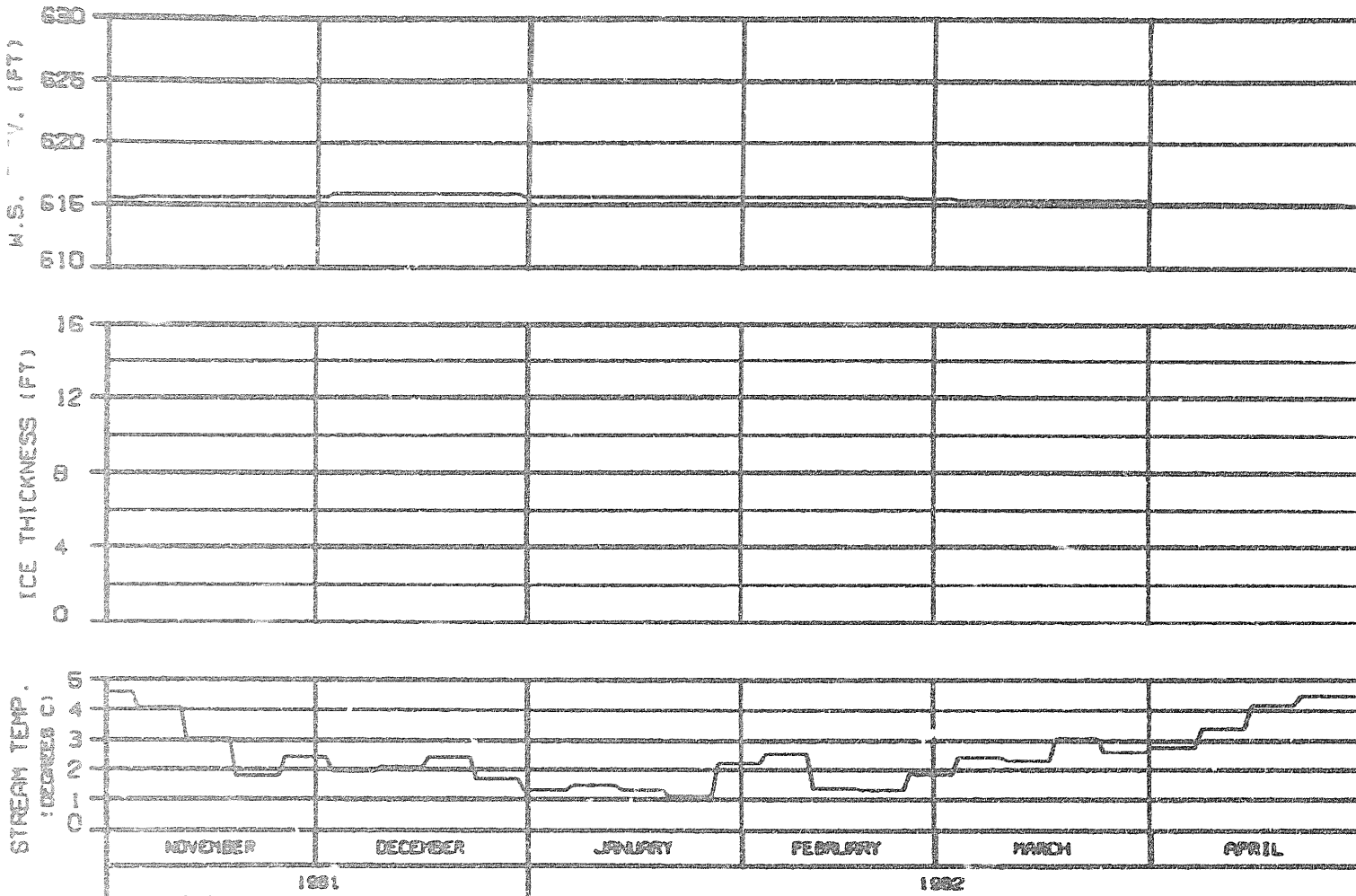
HEAD OF SLOUGH 9
 RIVER MILE : 129.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
NORZA-ERBOD JOINT VENTURE	
DATE: 11/20/82	BY: JAC
PAGE: 142	

OPTION 9

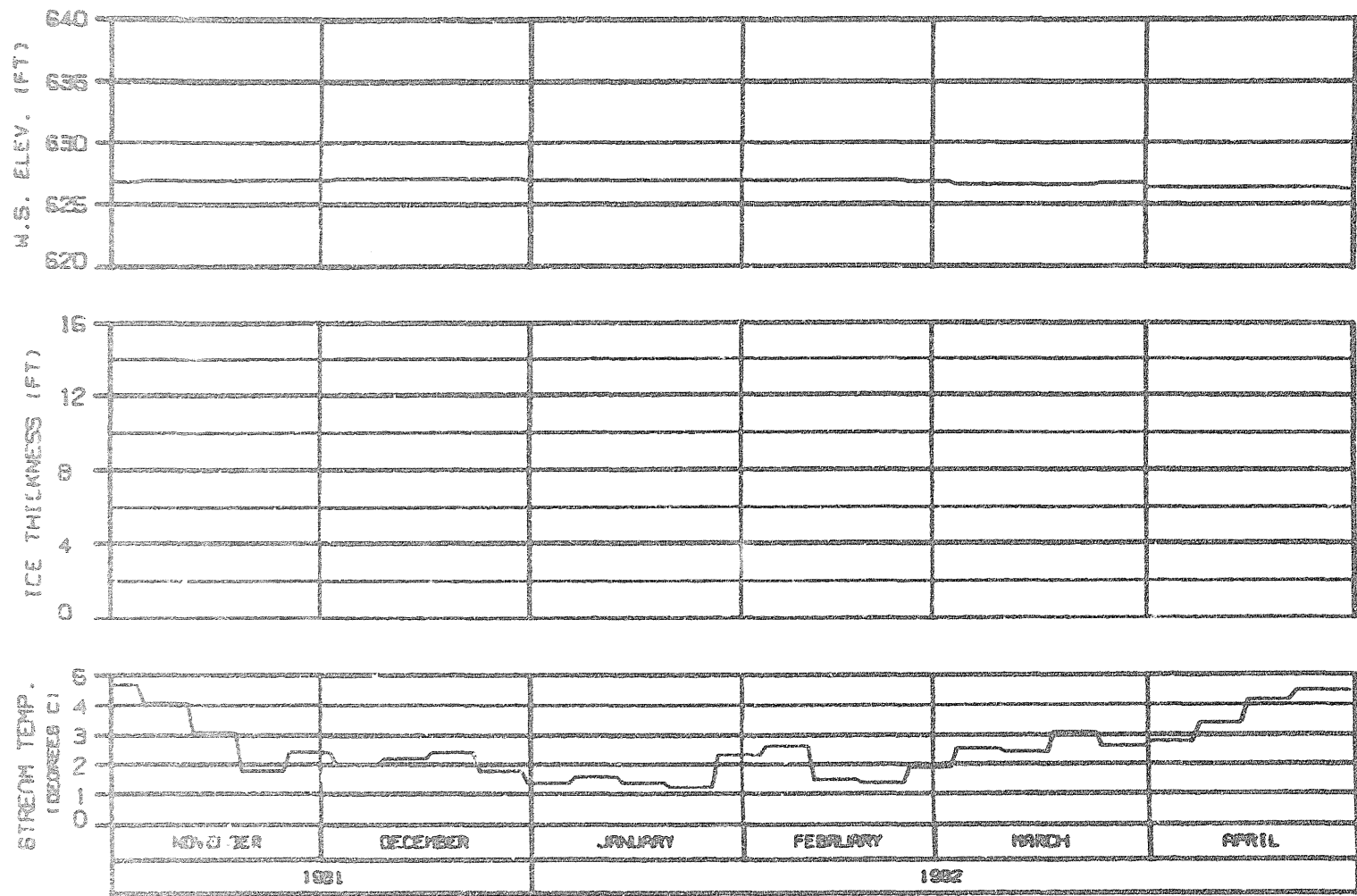


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 81020XA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-ERASCO JOINT VENTURE		
DATE: 01/08/82	BY: JAC	0005.142

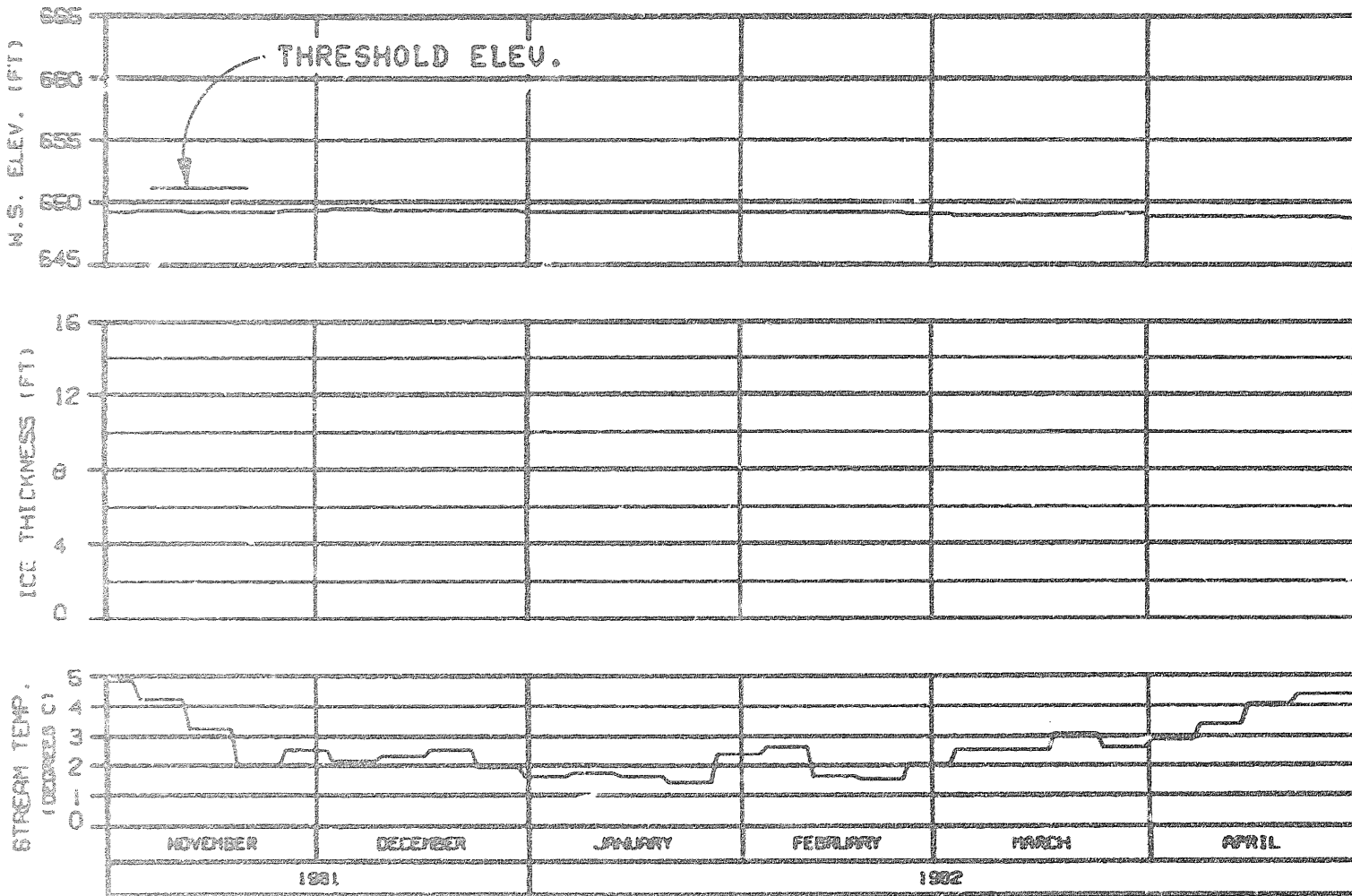


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

PLASMA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARDI-EBASCO JOINT VENTURE	
DATE: 01.08.82	BY: JFM/MS
ISSUE: 1.02	

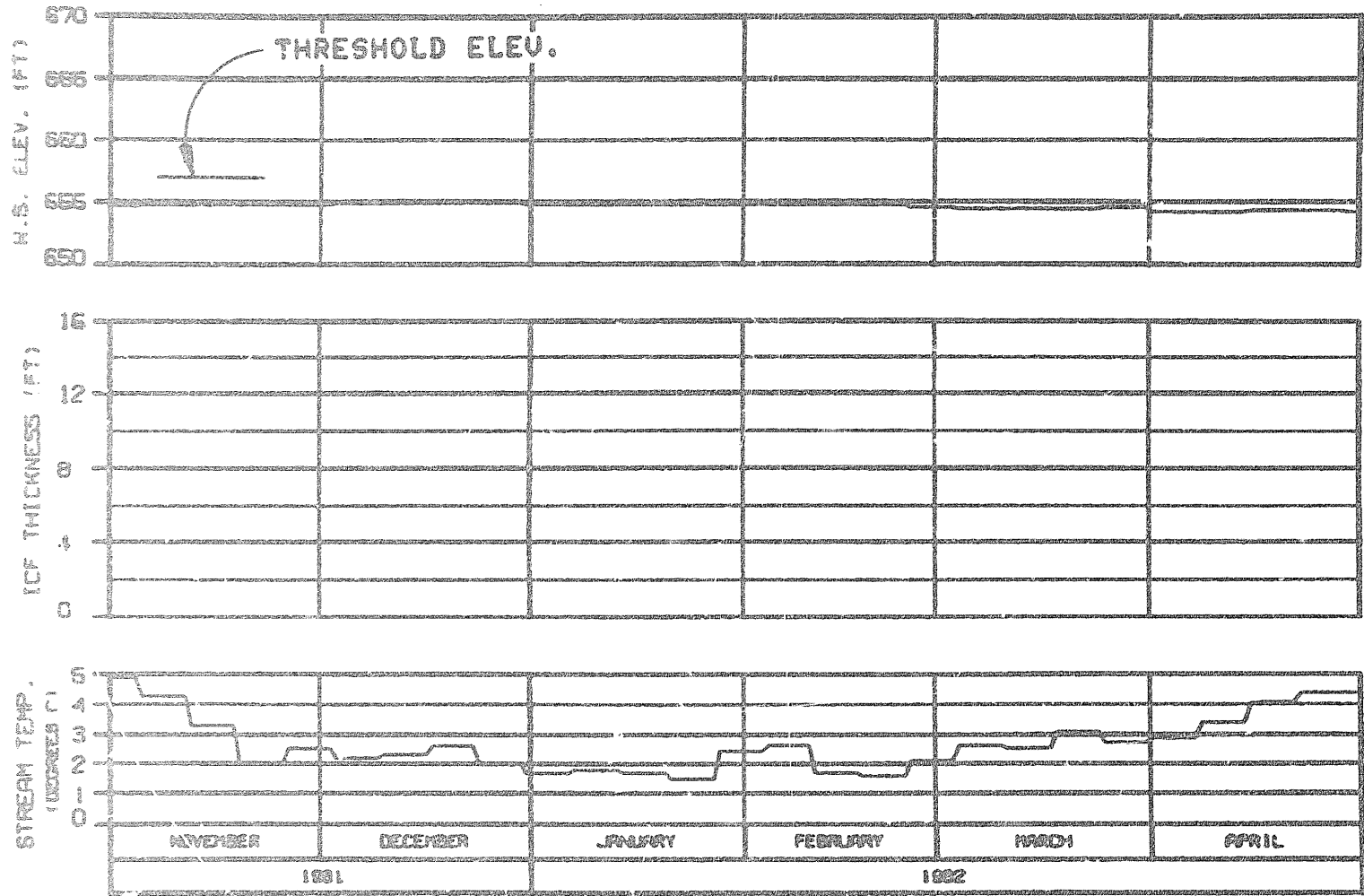


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROXCH 1770.
 REFERENCE RUN NO. : 81020XA

ALASKA POWER AUTHORITY	
GUSTINA PROJECT	
SLUITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EGASDD JOINT VENTURE	
03/28/82 08:00 AM	5528.142

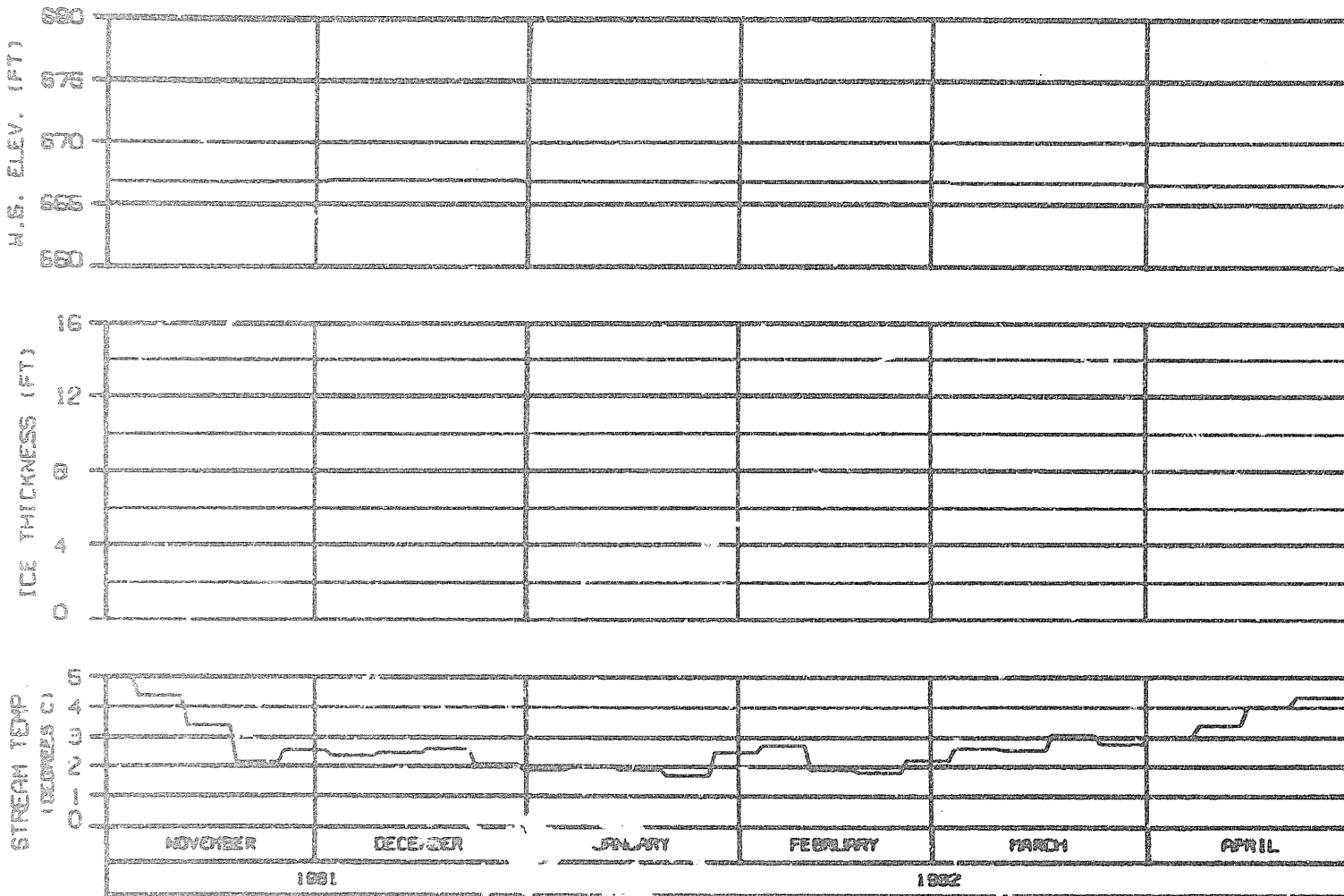


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUBSTATION PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EDASCO JOINT VENTURE	
CHIEF: RALPH D. JR. JR. JR.	1988.142



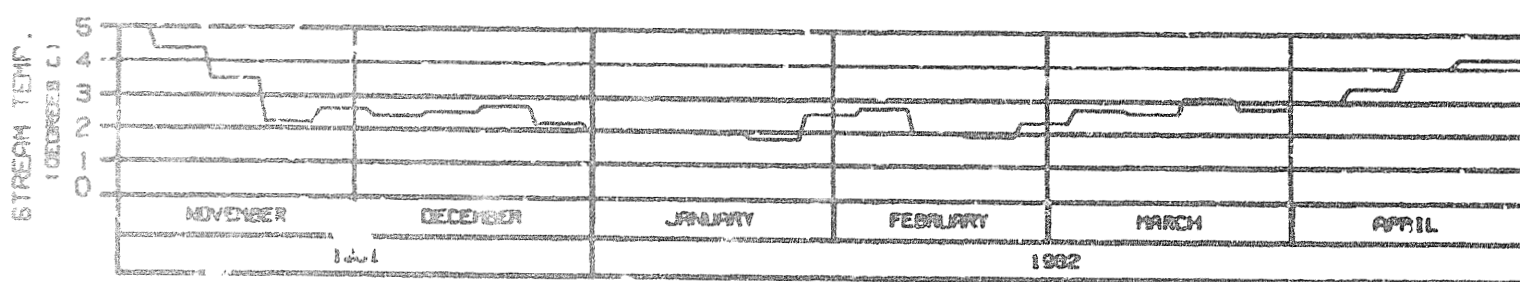
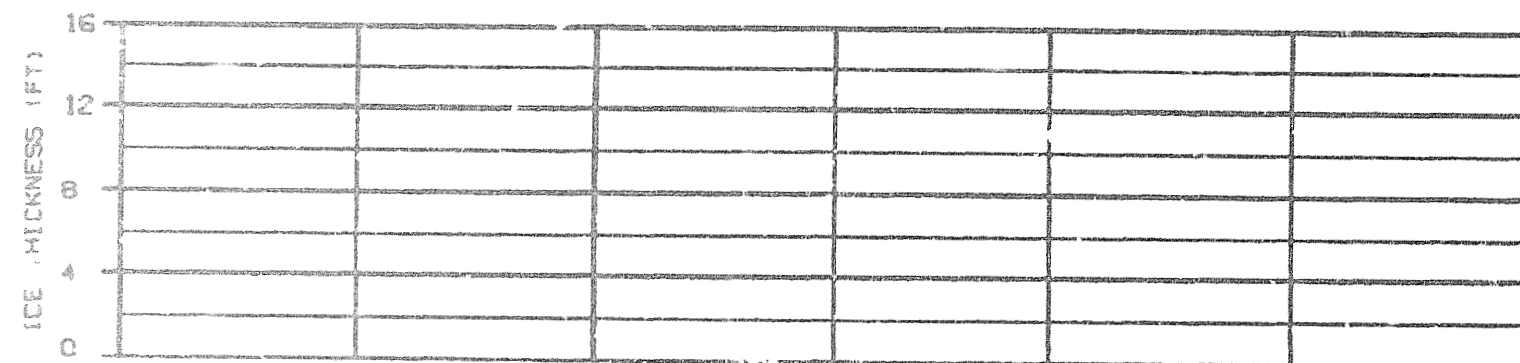
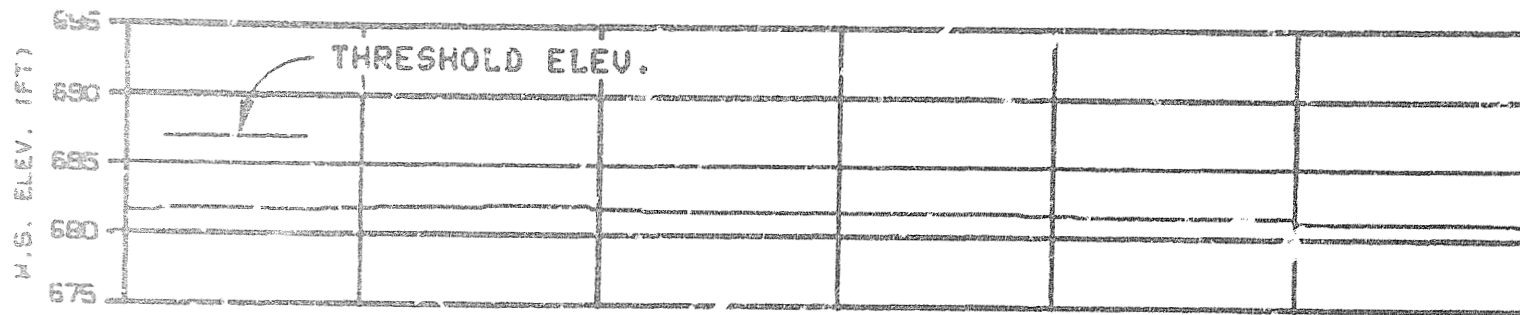
SIDE CHANNEL D/S OF SLOUGH 11

RIVER MILE : 135.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WRZA-EBASCO JOINT VENTURE	
OWNER: ALASKA	DATE: 1982.148

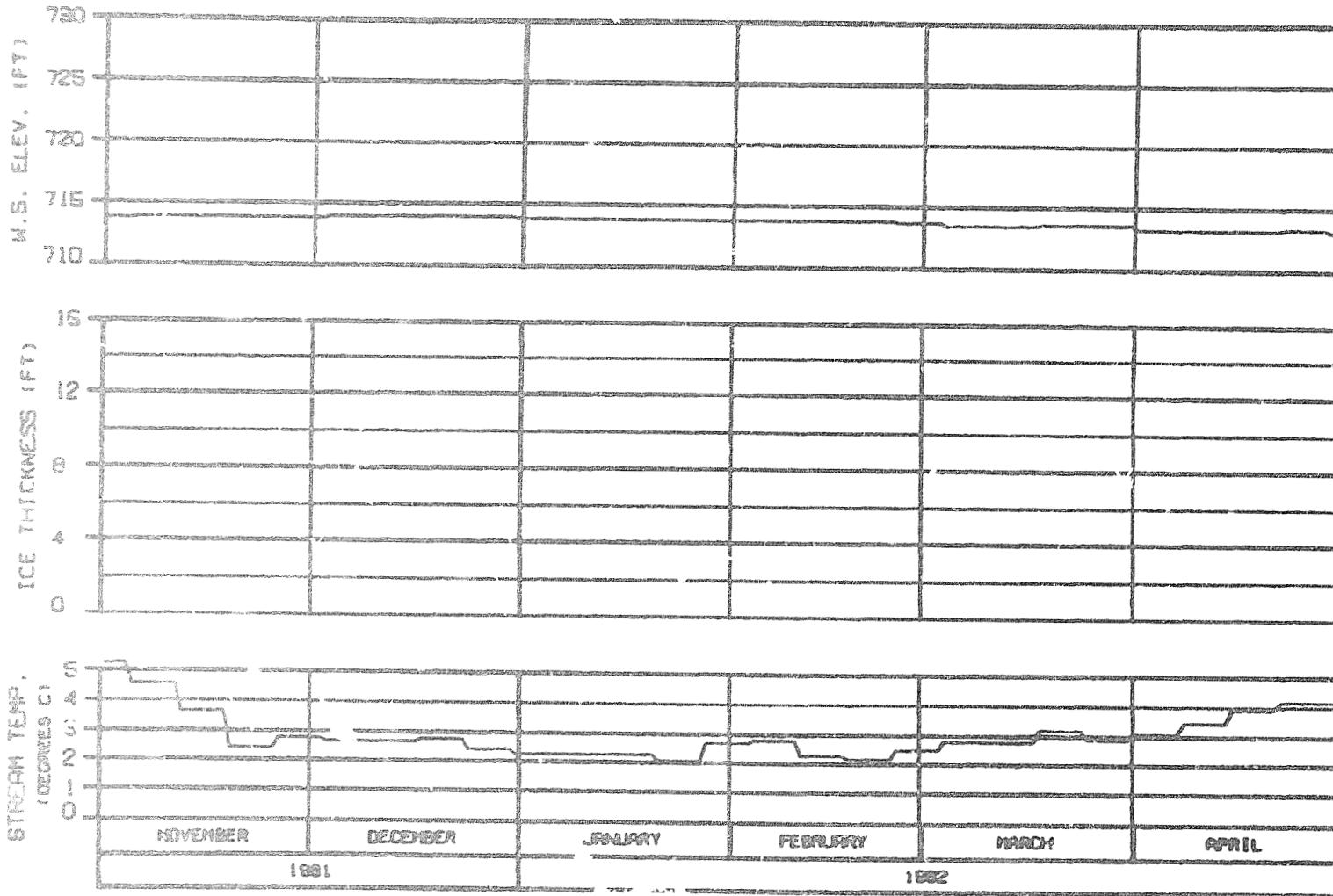


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS INTAKE 1800, APPROACH 1770.
 REFERENCE RUN NO. : 81020XA

ALASKA POWER AUTHORITY	
PROJECT NO.	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EDBROO JOINT VENTURE	
DESIGNED BY	DATE
DRAWN BY	DATE

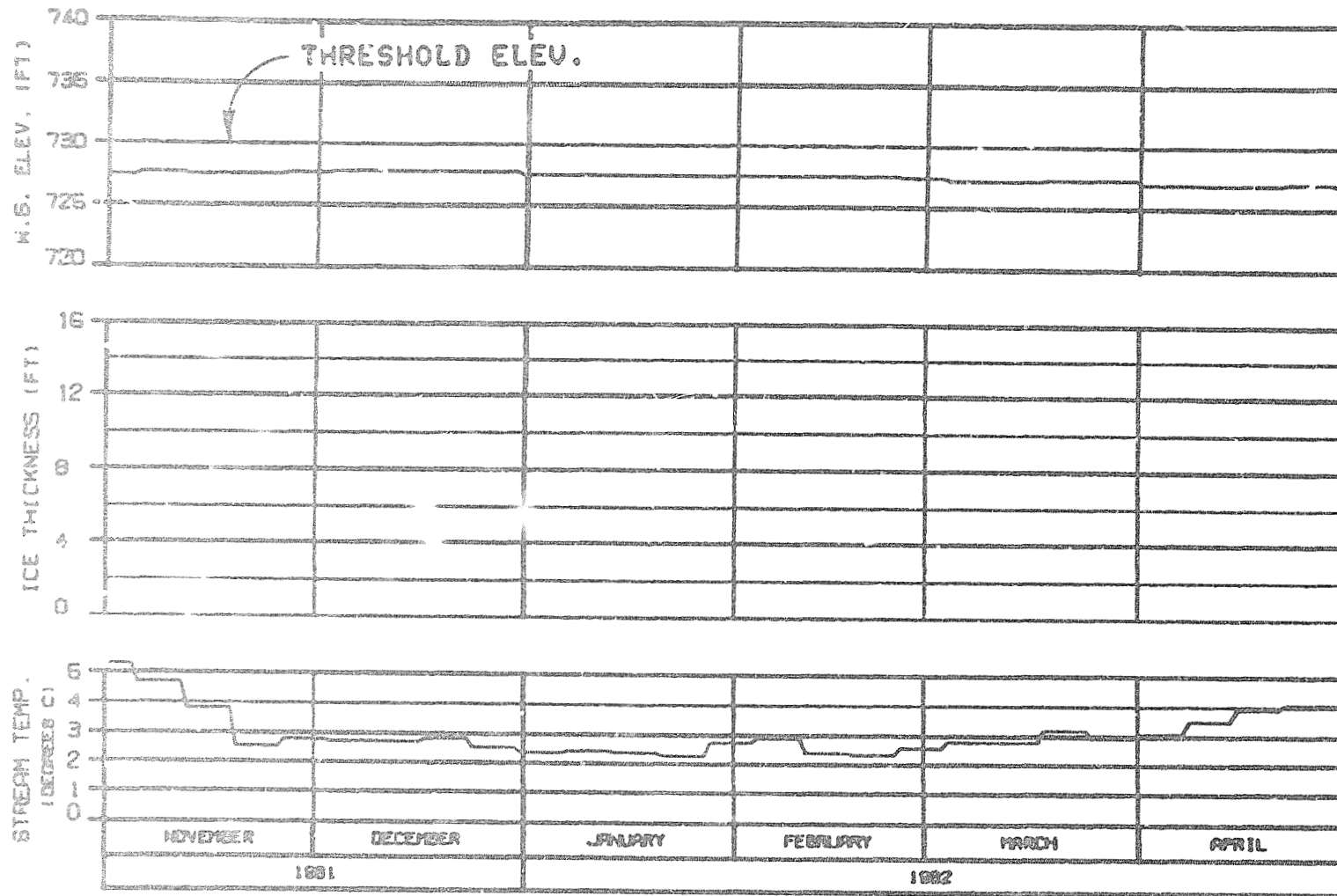


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CKA

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED -	DRAWN -	DATE
ALBRO	DA	JUN 82
		2002.142

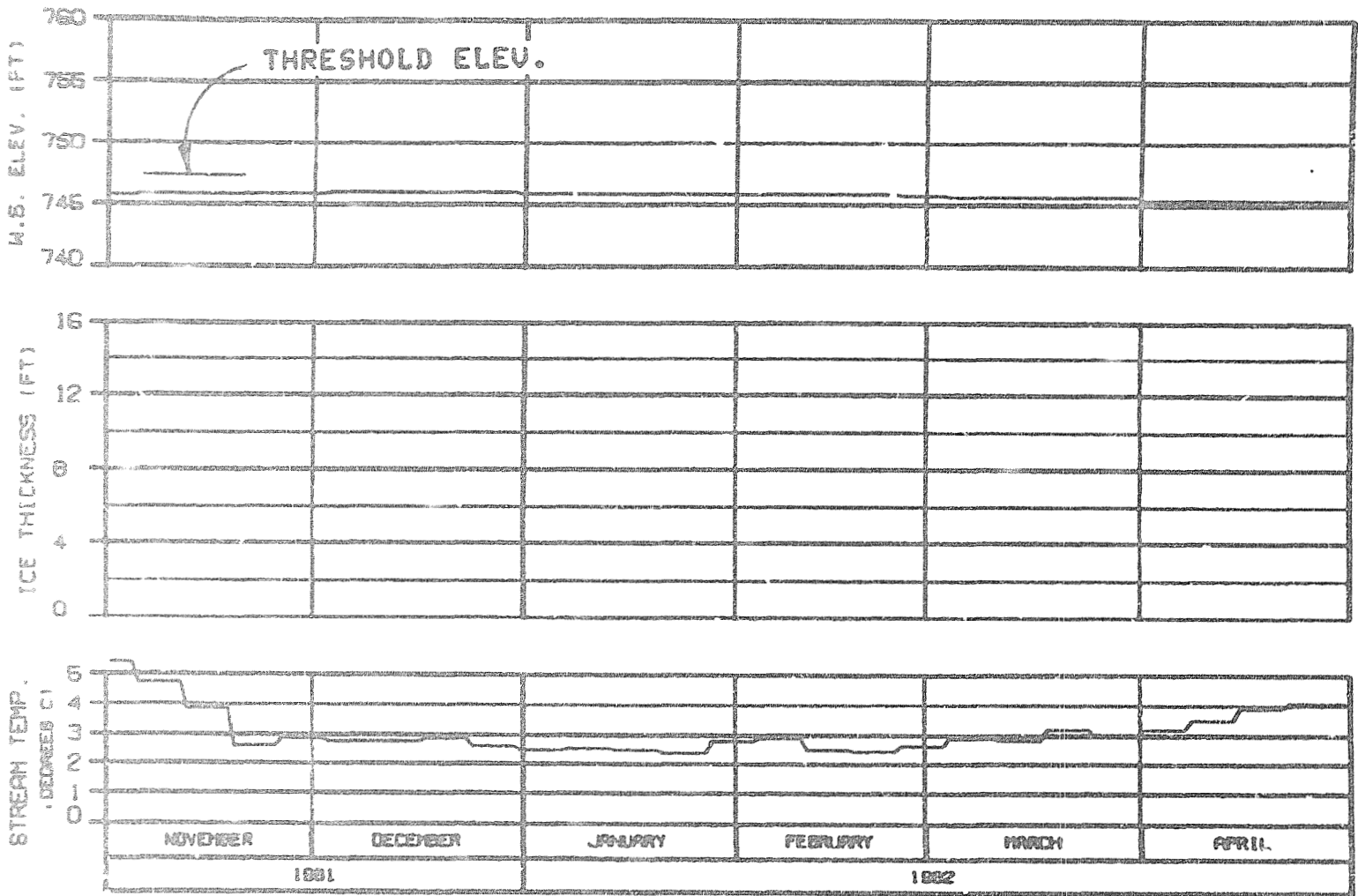


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1870. APPROACH 1770.
 REFERENCE RUN NO. : 8107CXA

ALASKA POWER AUTHORITY	
SLISTNA PROJECT	
SLISTNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBAGOD JOINT VENTURE	
ENGINEER: ALANSON ST JOHN	DATE: 1982.142

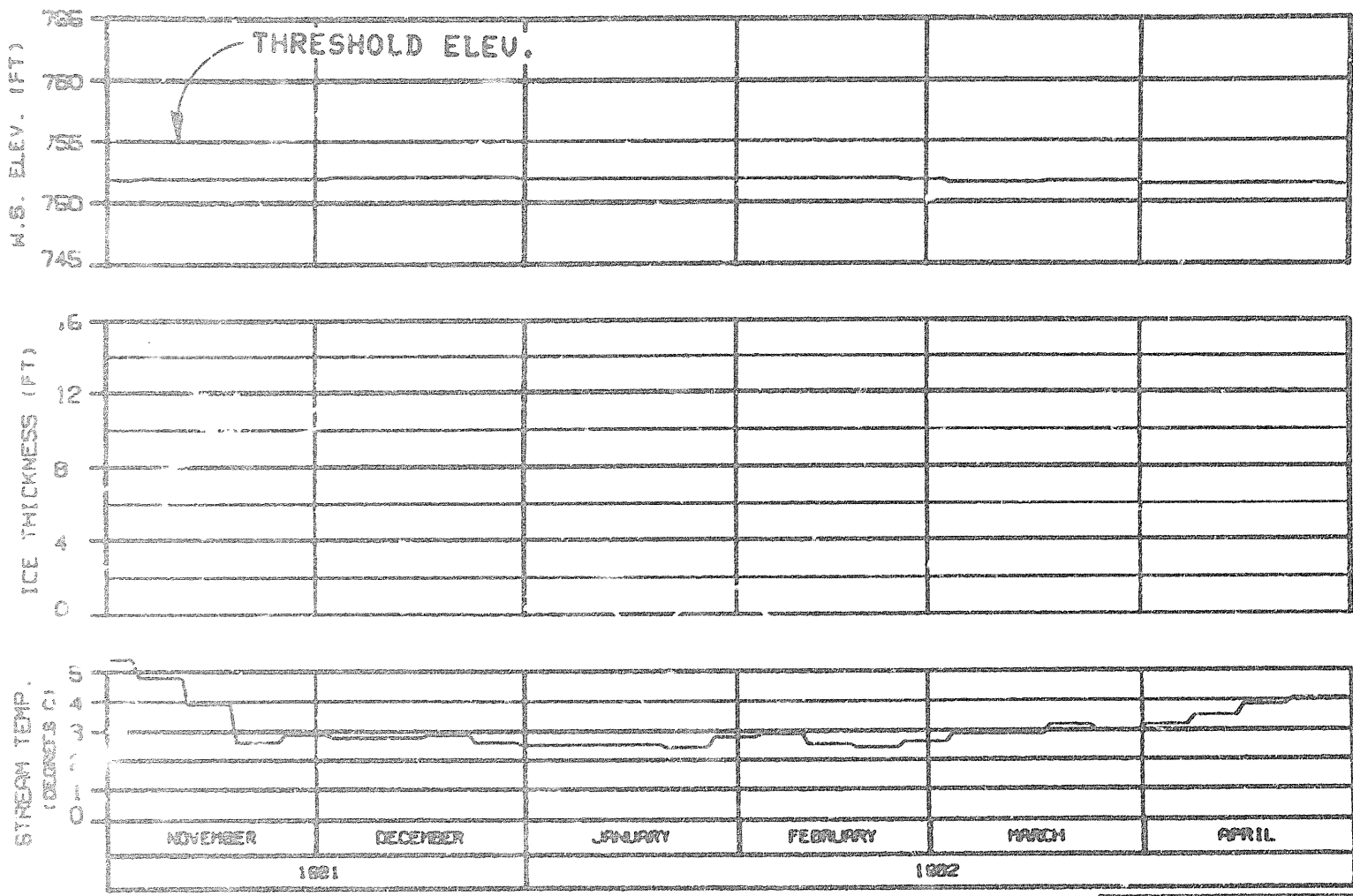


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

ICE THICKNESS LEGEND:
 ----- TOTAL THICKNESS
 - - - - - SLURM COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CKA

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBRARD JOINT VENTURE	
DESIGN. DATED 01 JAN 82	FIG. 142

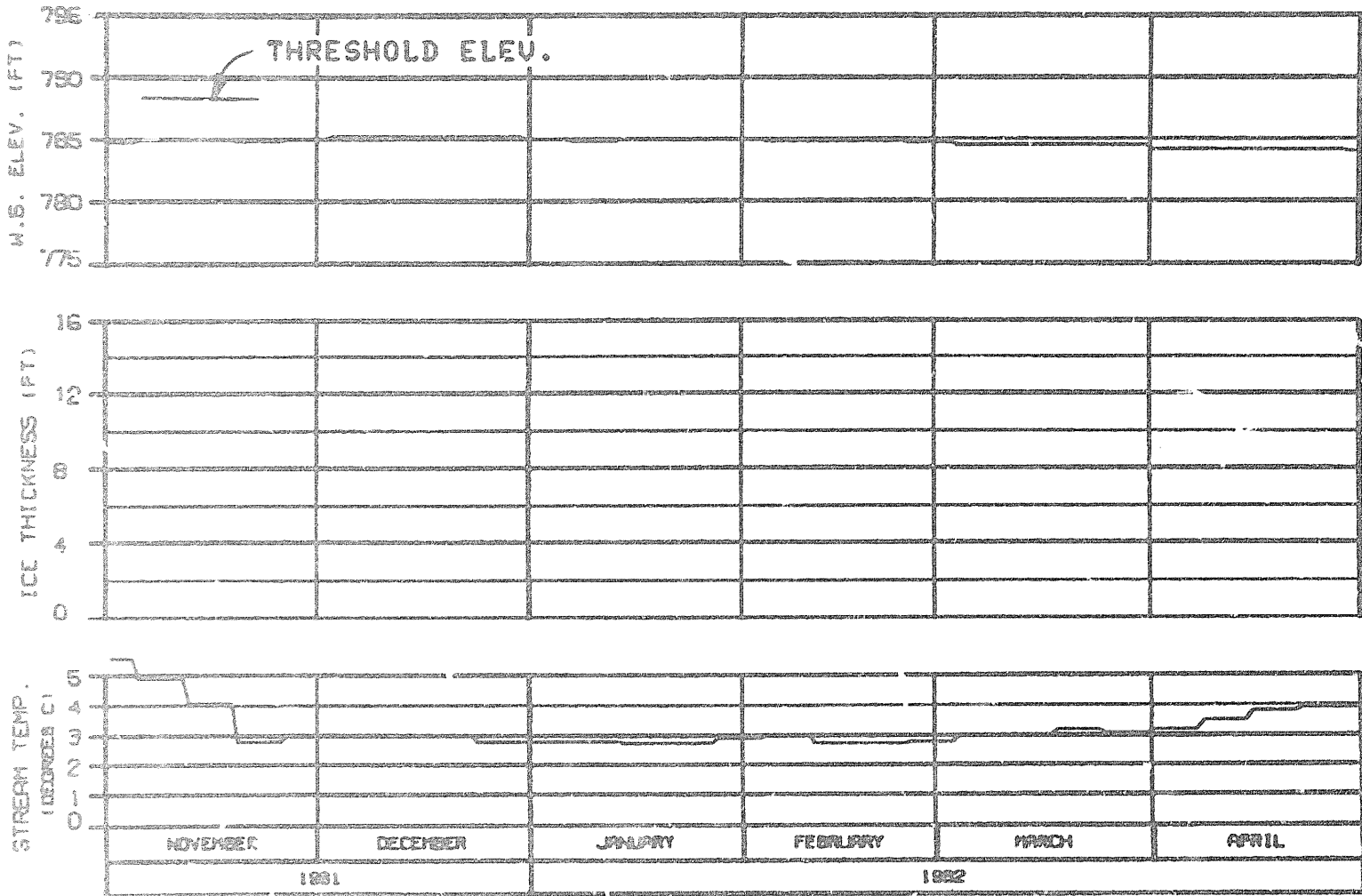


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 8102CXA

ALASKA POWER AUTHORITY	
SUSTITNA PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
DESIGN: RALPH G. ST. JOHN	ISSUE: 102



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

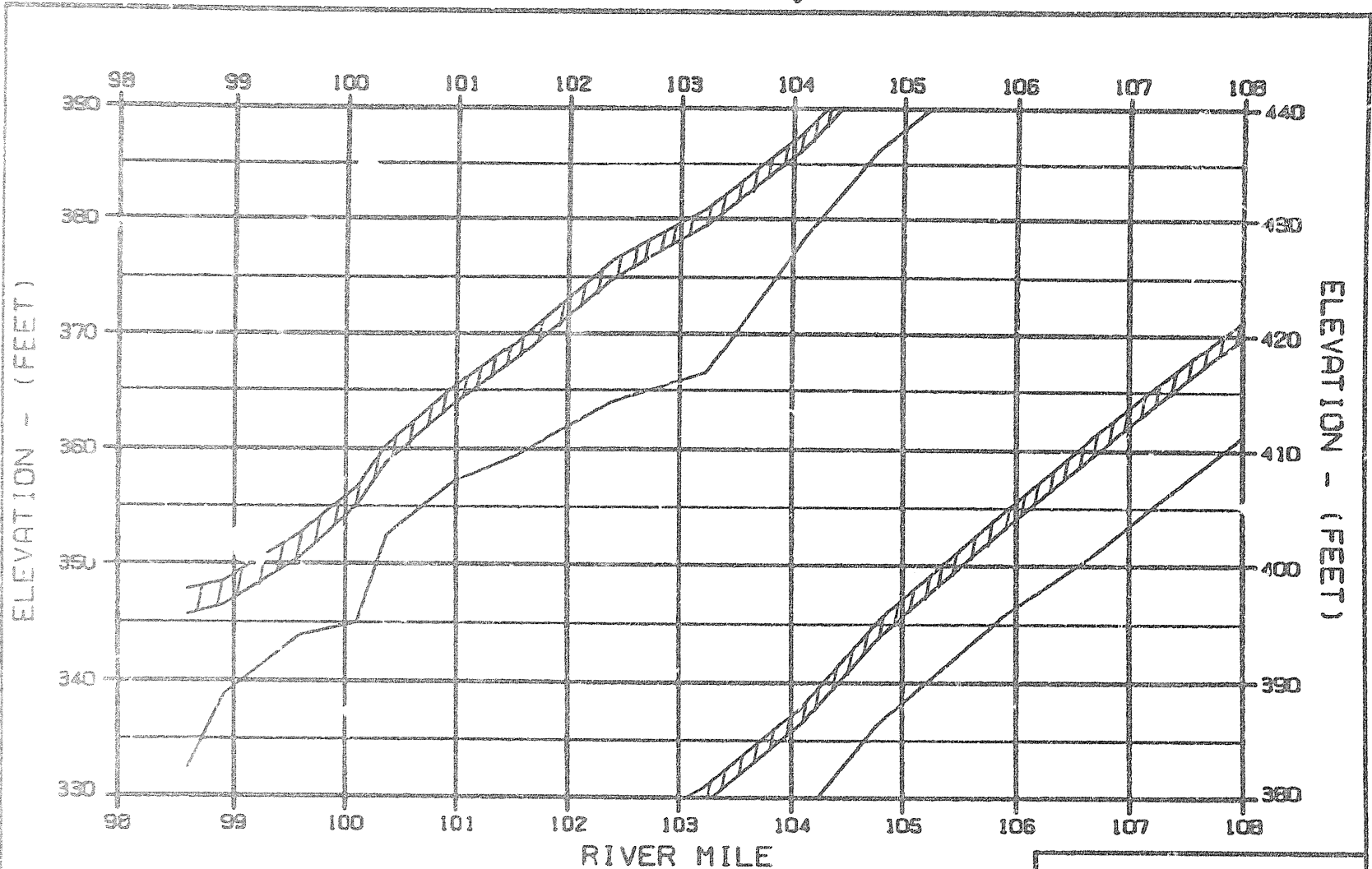
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAYON 2002
 CASE C FLOWS INTAKE 1800. APPROACH 1770.
 REFERENCE RUN NO. : 0102CXA



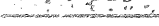

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGRECO JOINT VENTURE	
DATE: 04/04/82	BY: JAC
1982.142	

EXHIBIT Q

C



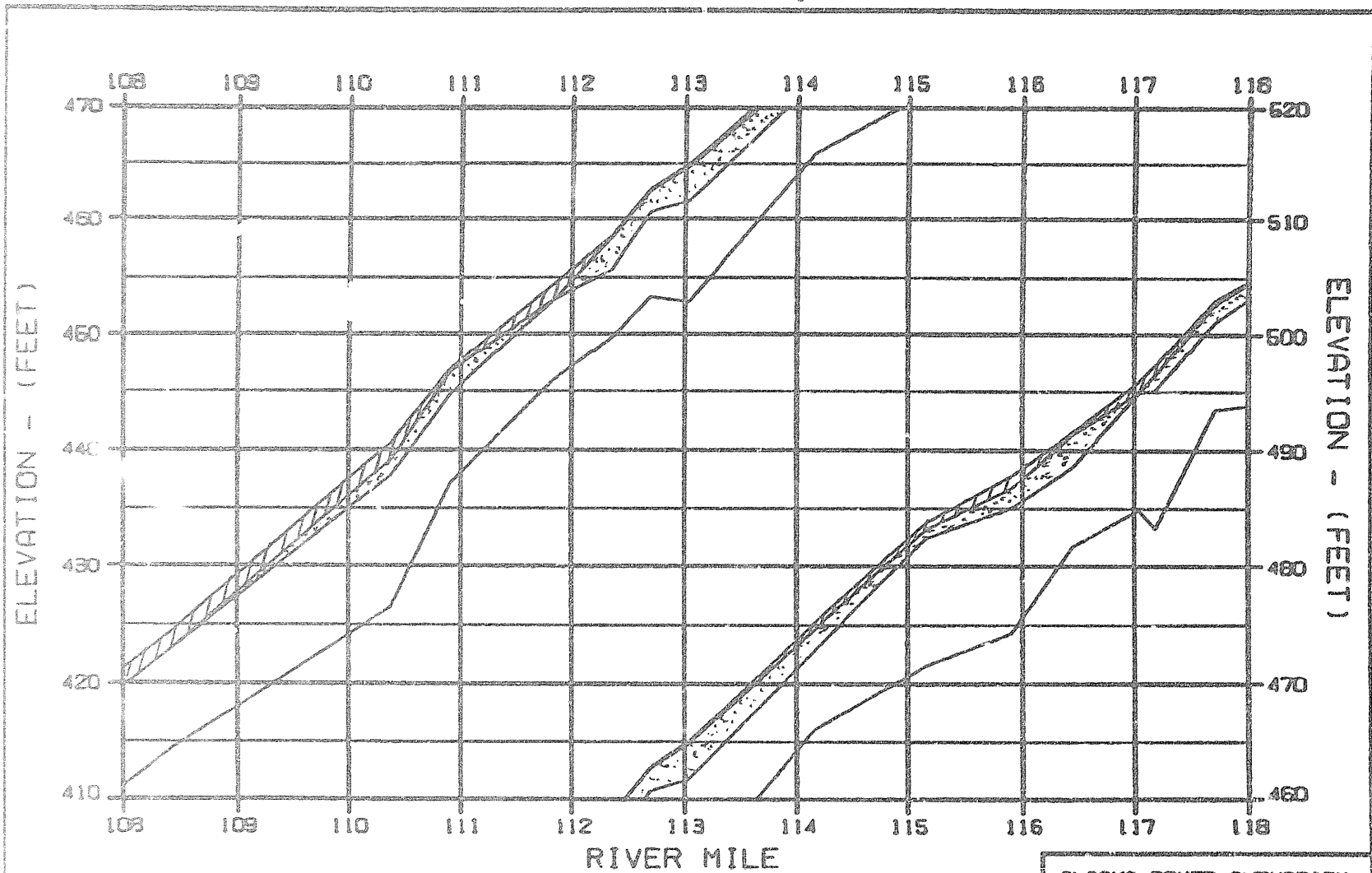
LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING NATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102C41

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
HARZA-EBASCO JOINT VENTURE	
ENGINEER: D.L. FRENCH	DATE: FEB 03
1000-140	

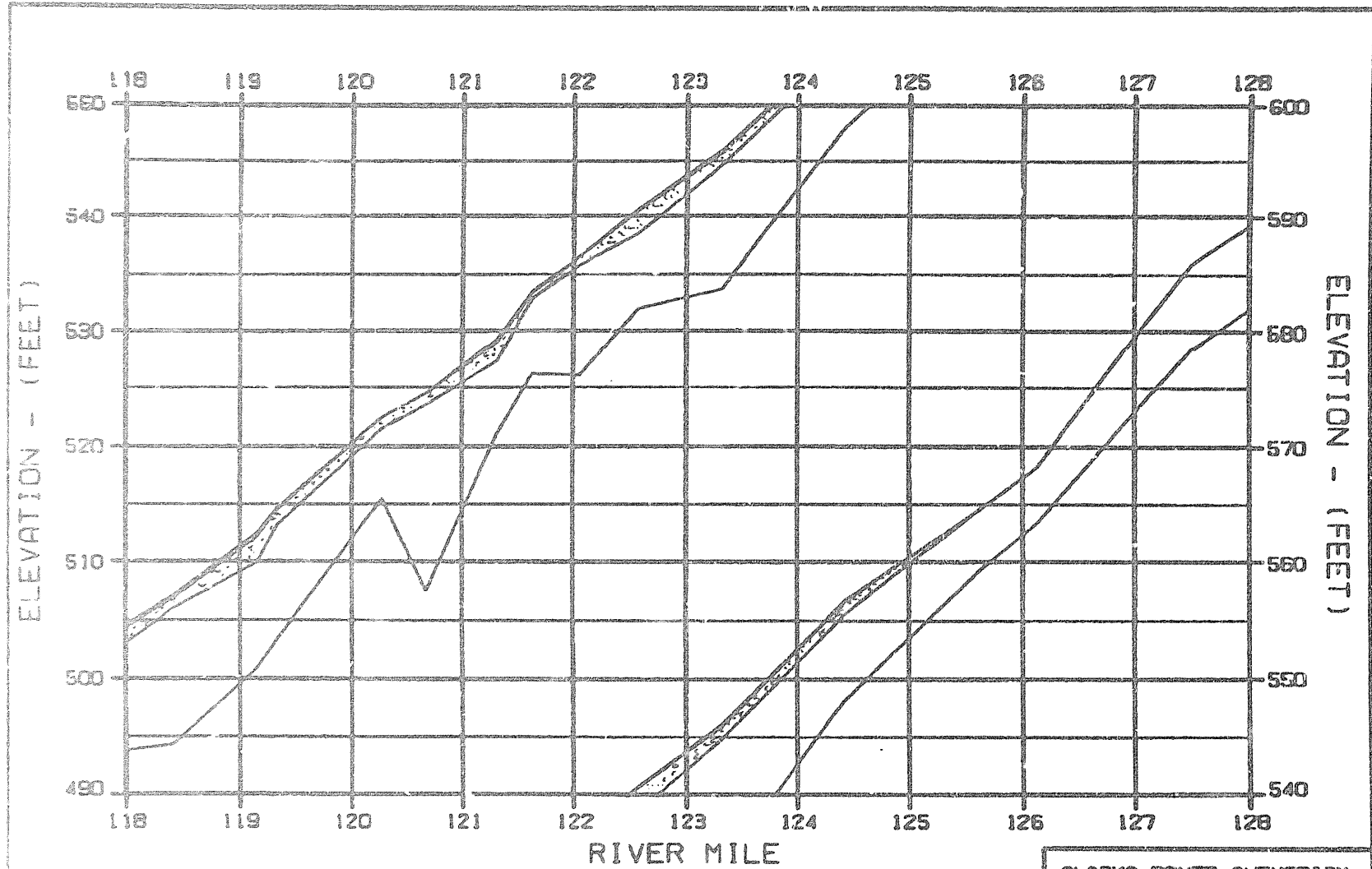
OPTION?



LEGEND:
 [Hatched Area] TOP OF SOLID ICE
 [Dotted Line] SLUSH/SOLID ICE INTERFACE
 [Dashed Line] BOTTOM OF SLUSH ICE
 [Solid Line] RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102CHM

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: WADSWORTH	DRAWN BY: [Blank]
DATE: 1/92	SCALE: 1/4" = 100'

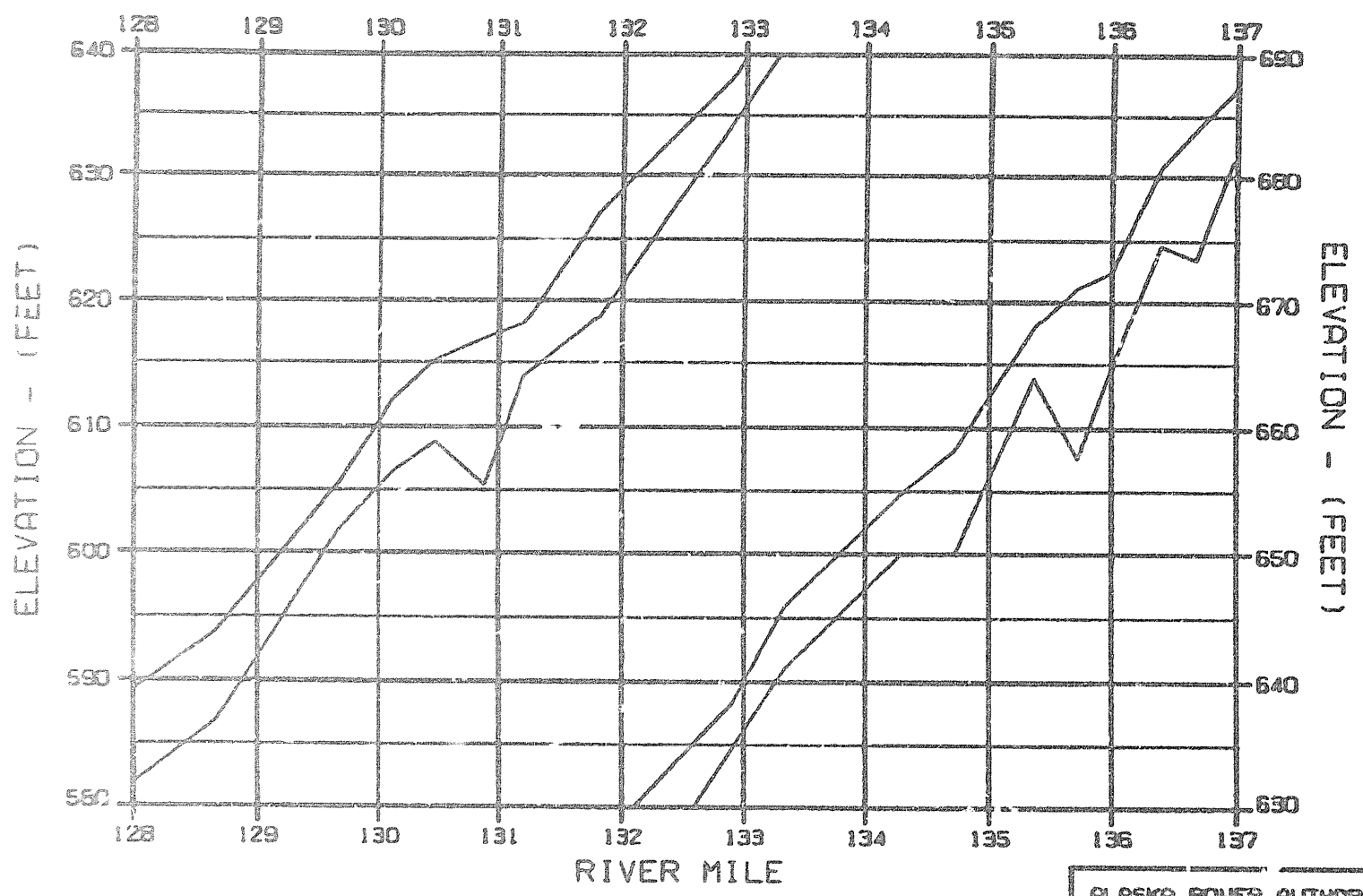


LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOW TEMP. WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 010204H

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
DATE: 02.07.02	BY: JES/MS	FIG. 142



LEGEND:

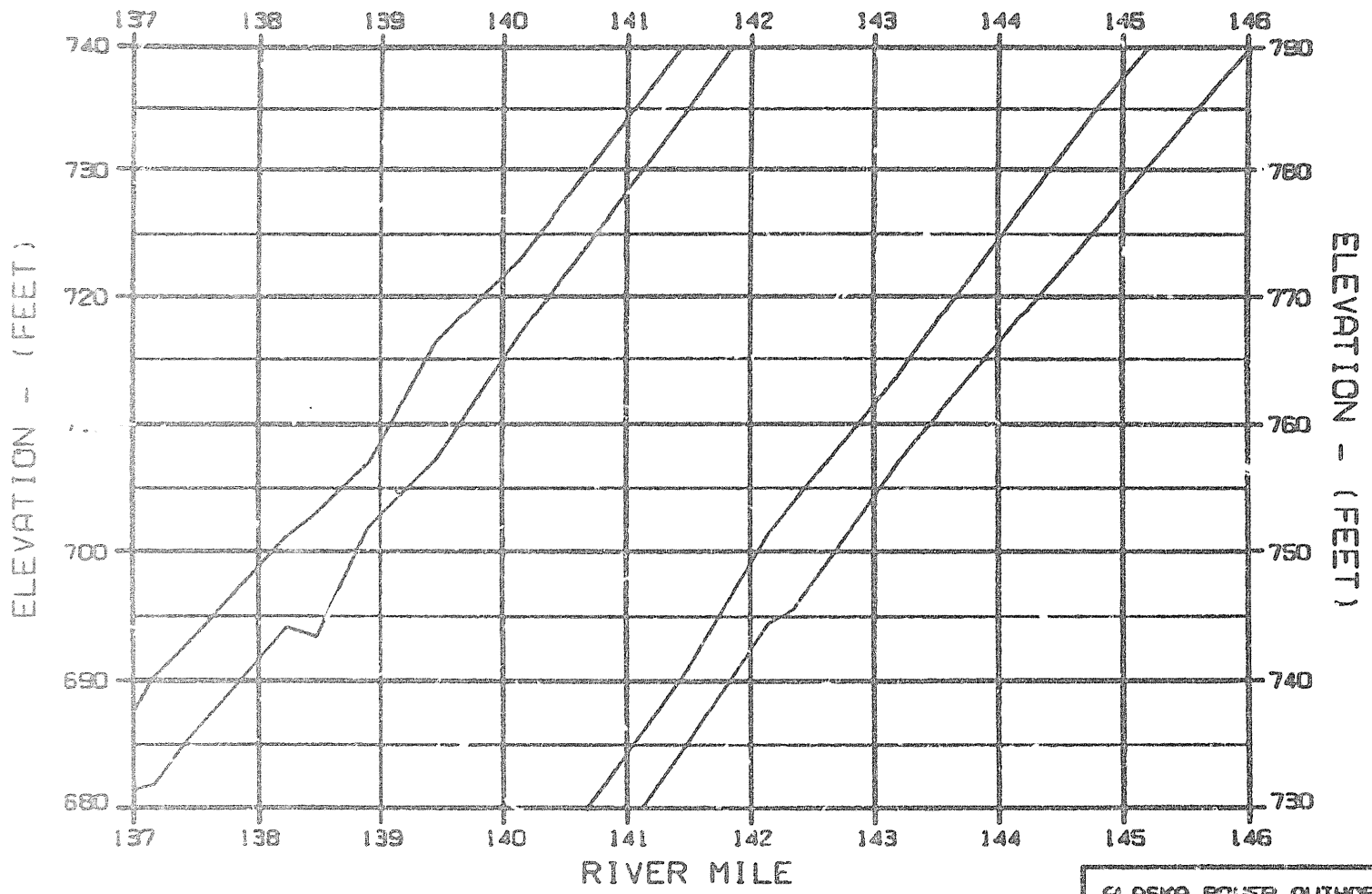
- TOP OF SOLID ICE
- SLUSH/SOLID ICE INTERFACE
- BOTTOM OF SLUSH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102CWH

ALASKA POWER AUTHORITY		
SUBMITTA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-EBASCO JOINT VENTURE		
DESIGNED: ALLIANCE	BY: PWS	ON: 10/20/02

OPTION?

c



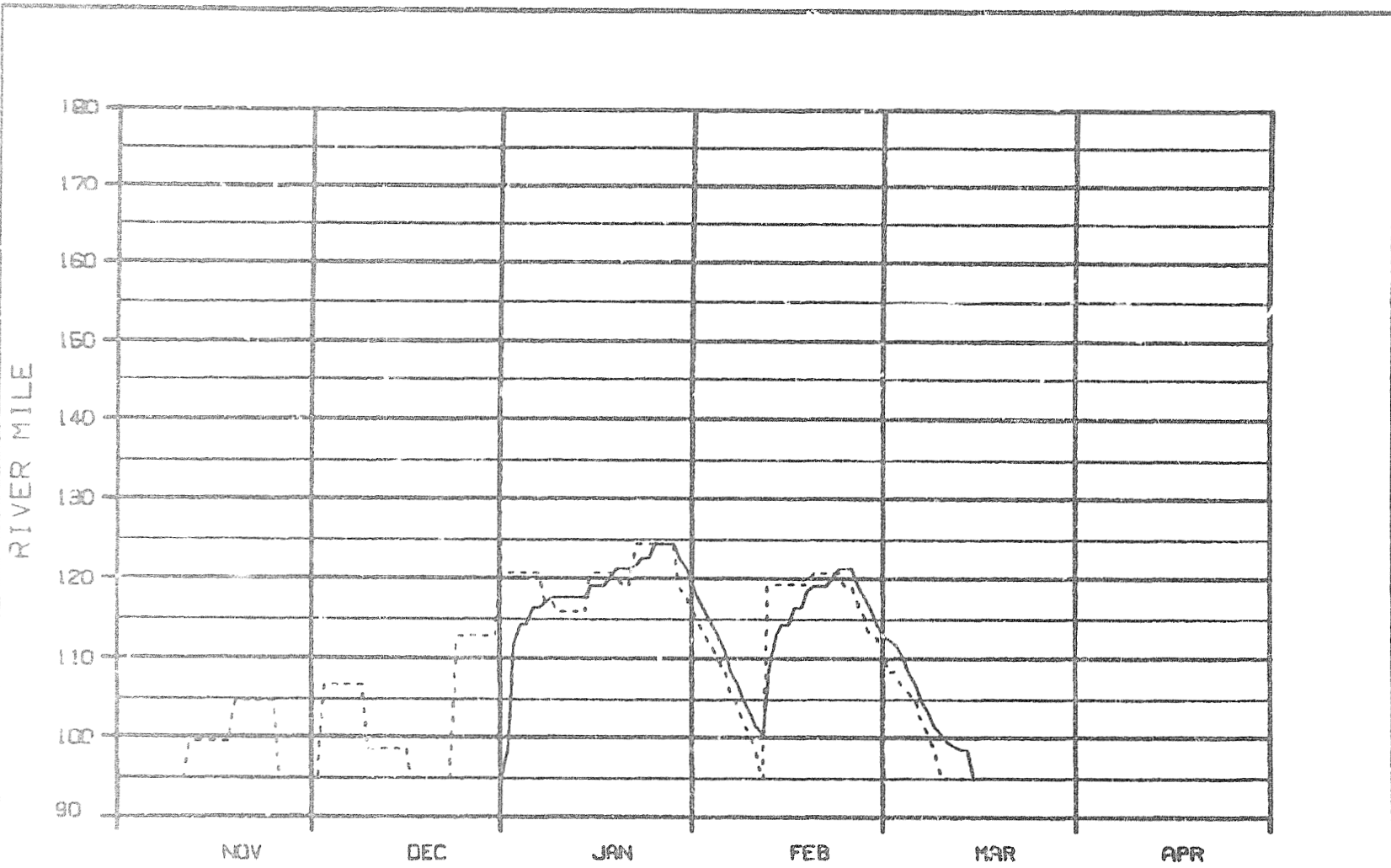
LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2302
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING NATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102CWH

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBASCO JOINT VENTURE	
ENGINEER - ILLUMINATED	DATE - 10/22/02

OPTION?

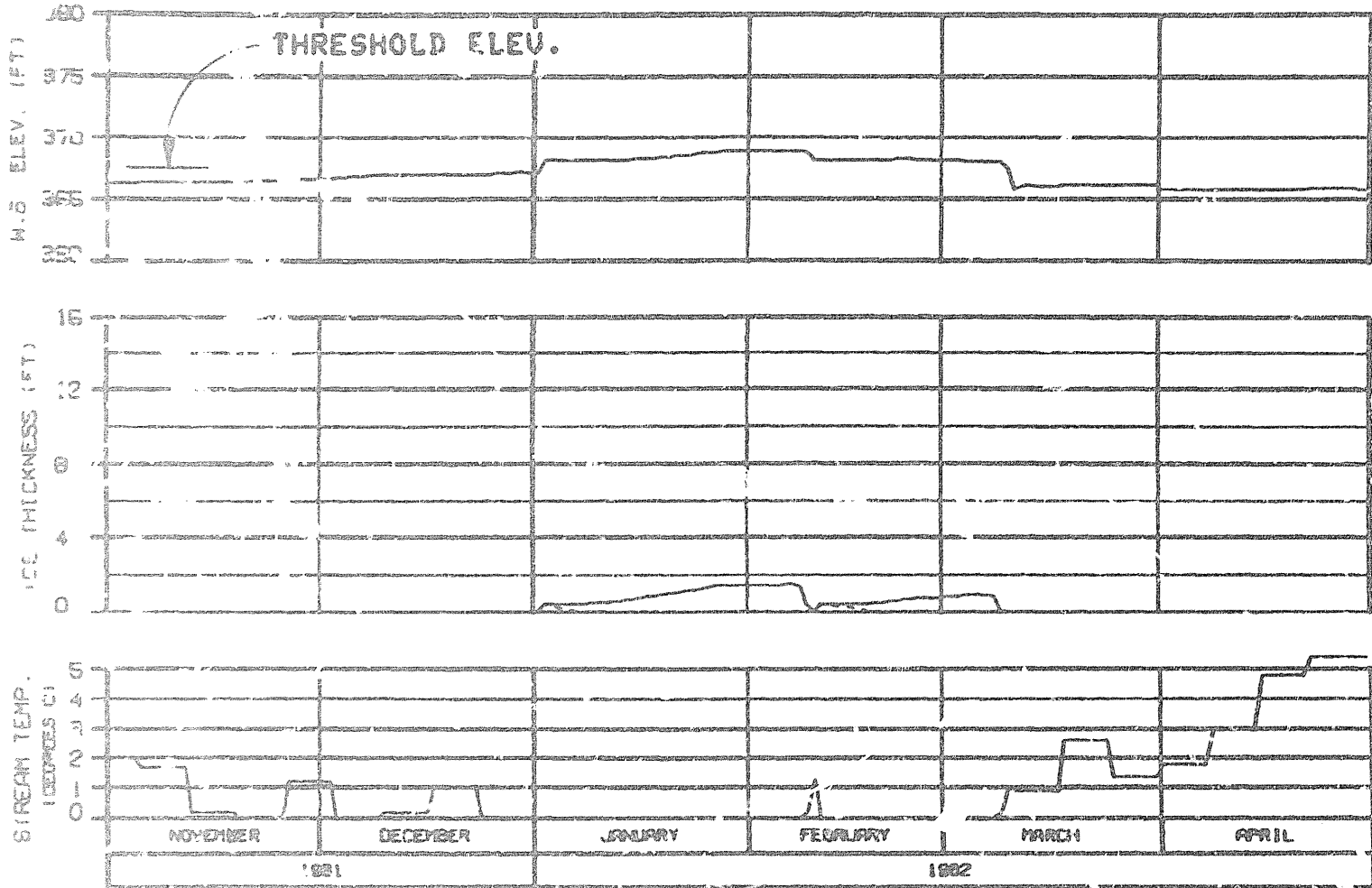


LEGEND
 — ICE FRONT
 - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE C TEMP: WARMEST WATER
 EXSITING MATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 0102004

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
WARZA-EBASCO JOINT VENTURE		
CHGREQ. ALASKA	0 FEB 82	1349.142

SP11DM2

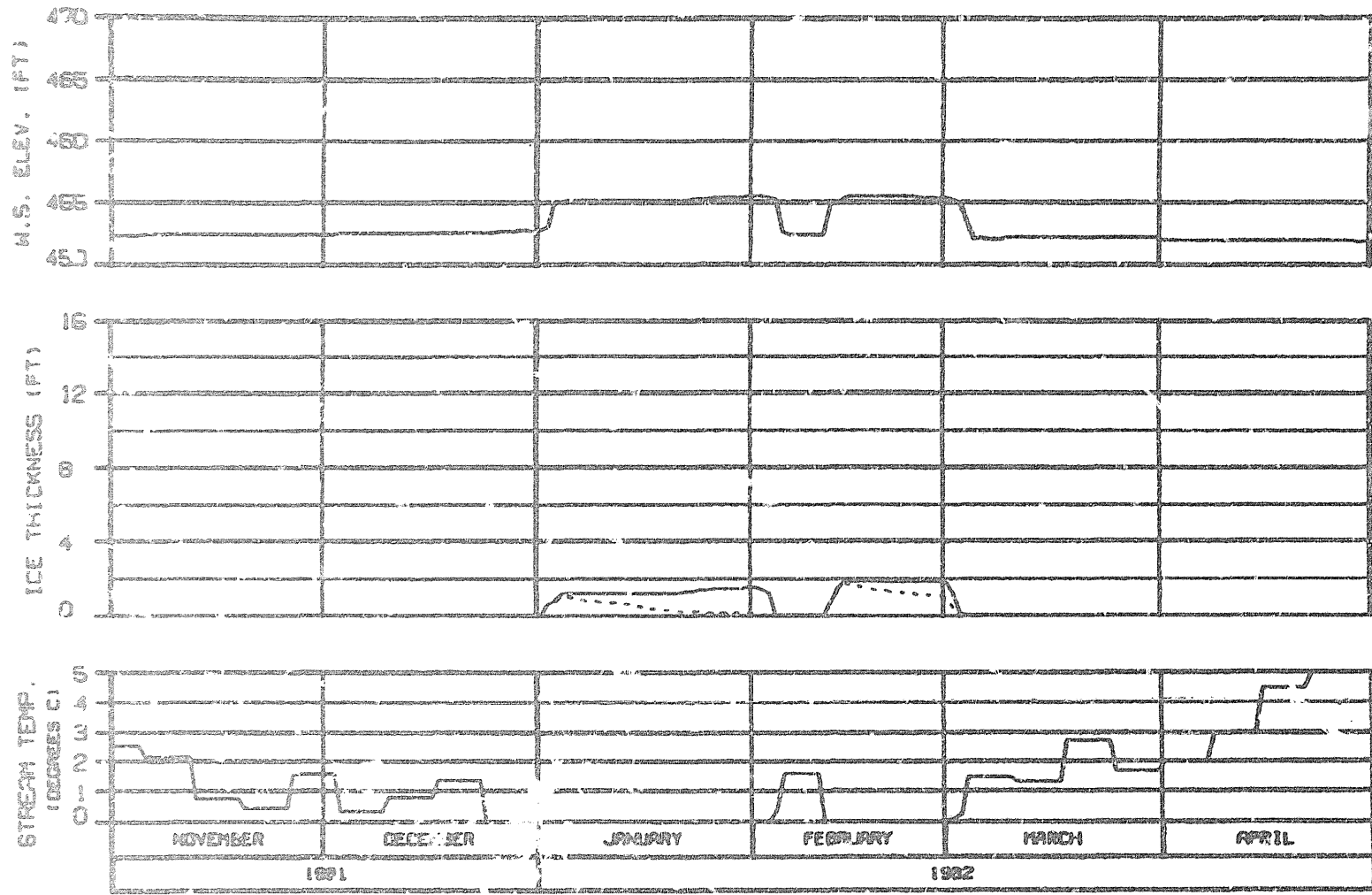


HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CMH

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSTYNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED - ELLIOTT	DRAWN BY -
NOV 81	1982.247

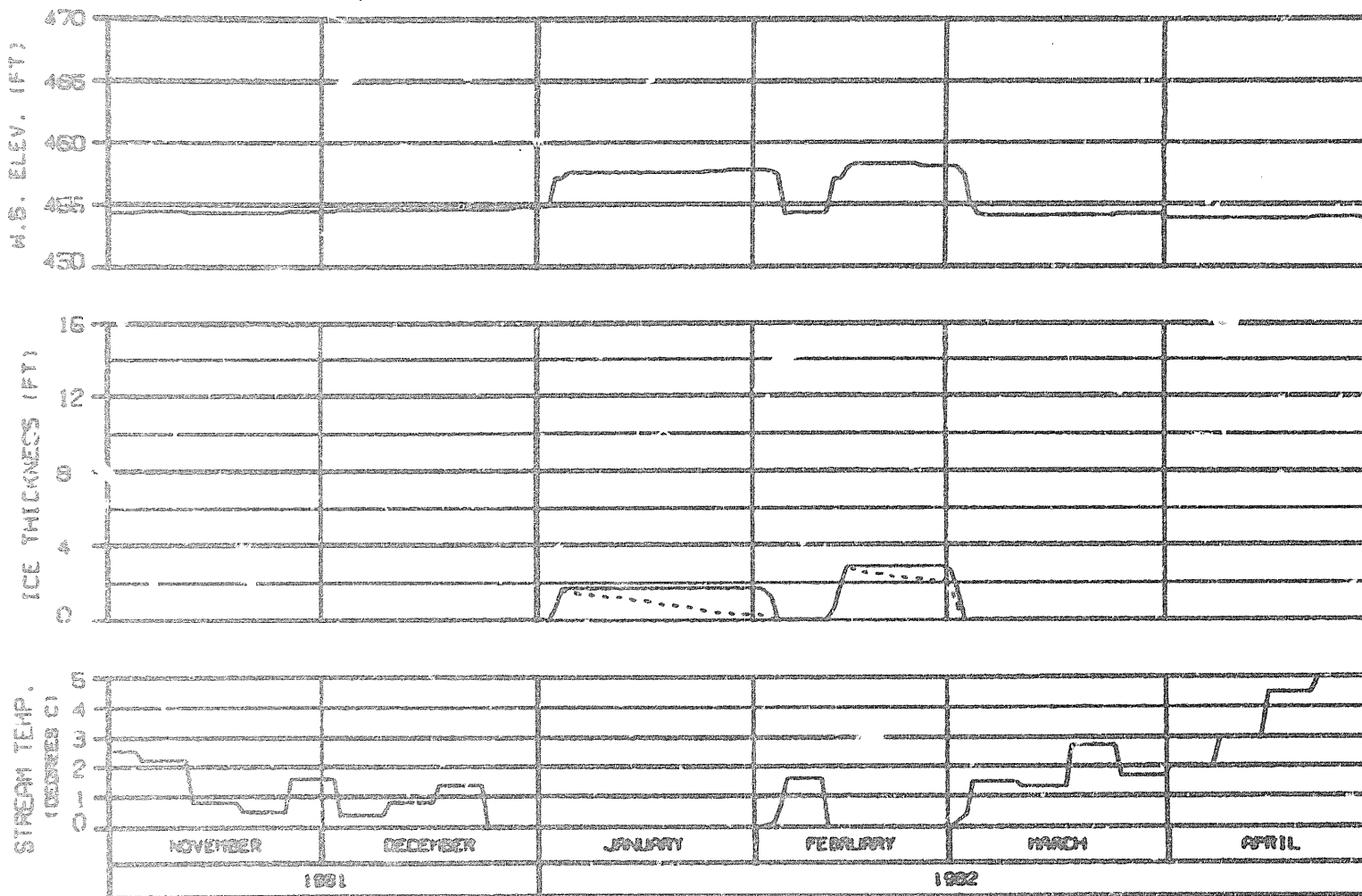


**SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00**

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CWM

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARJA-EGASCO JOINT VENTURE	
DATE: 8/10/82	BY: JEP/ED
PAGE: 14E	

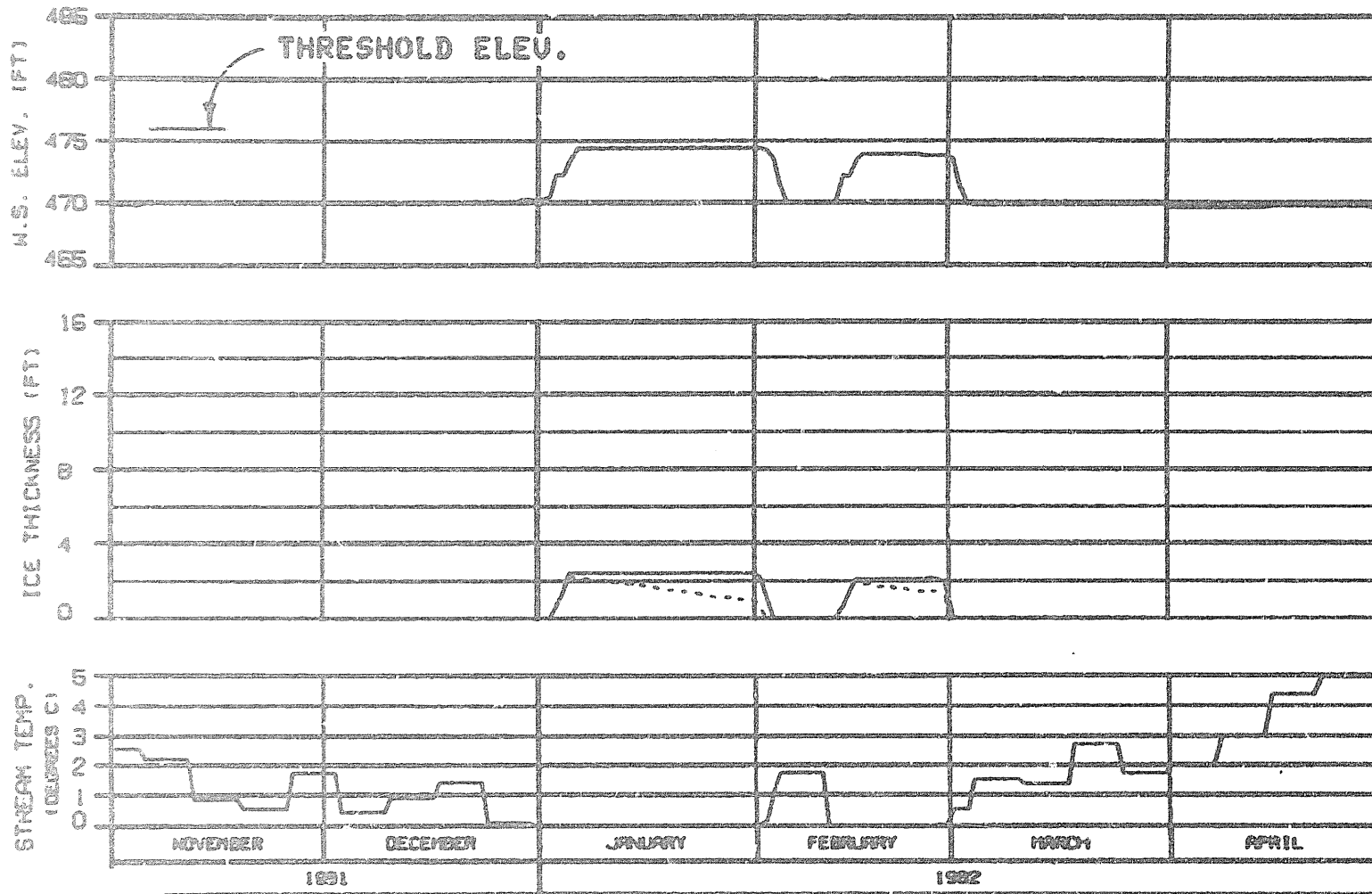


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING NATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CWH

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARA-EGASCO JOINT VENTURE	
REVISED: 01.09.92	0 FEB 92
1992.148	

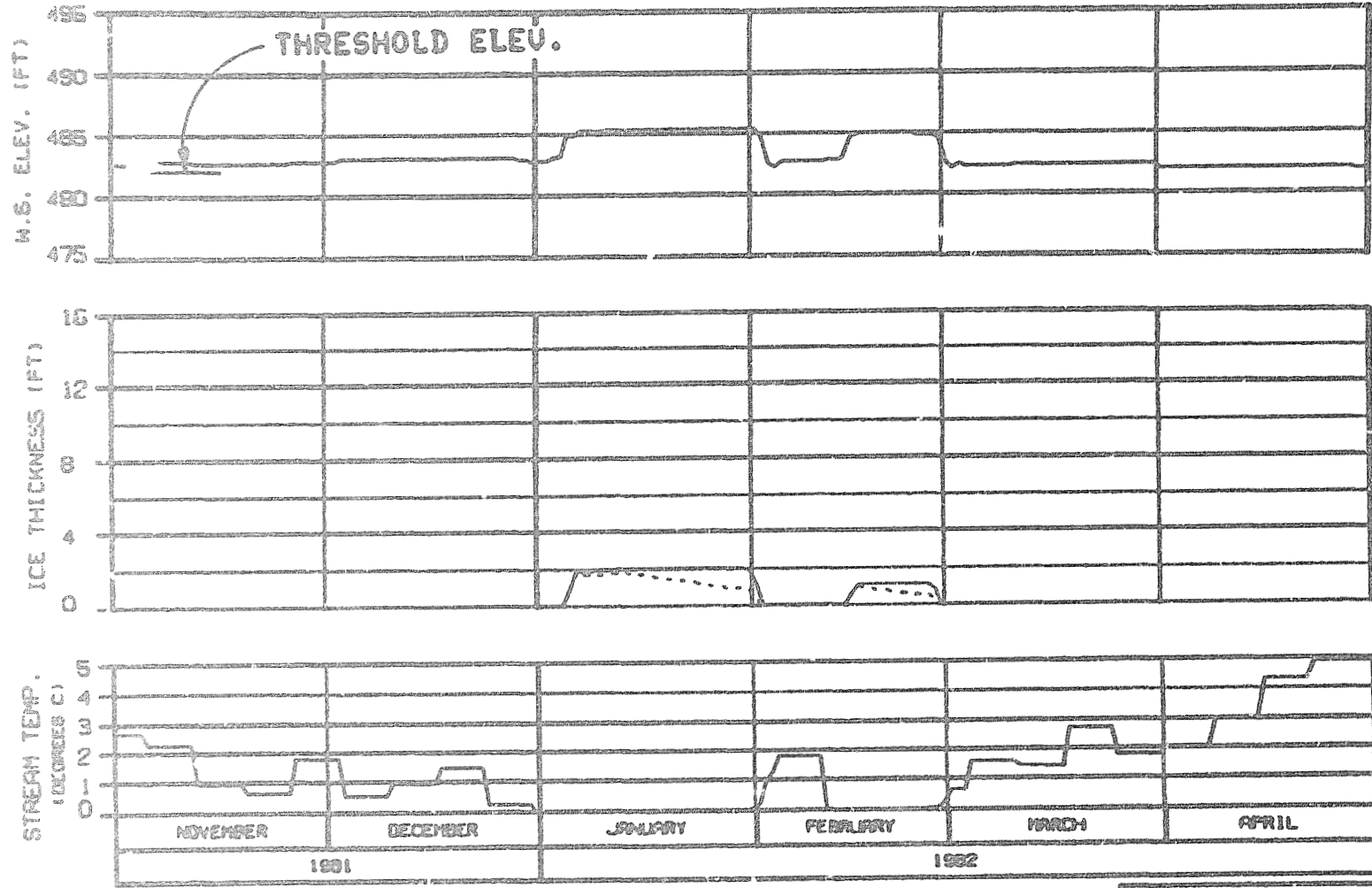


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 810204H

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
PROJECT: 810204H	5 FEB 02
1000.142	

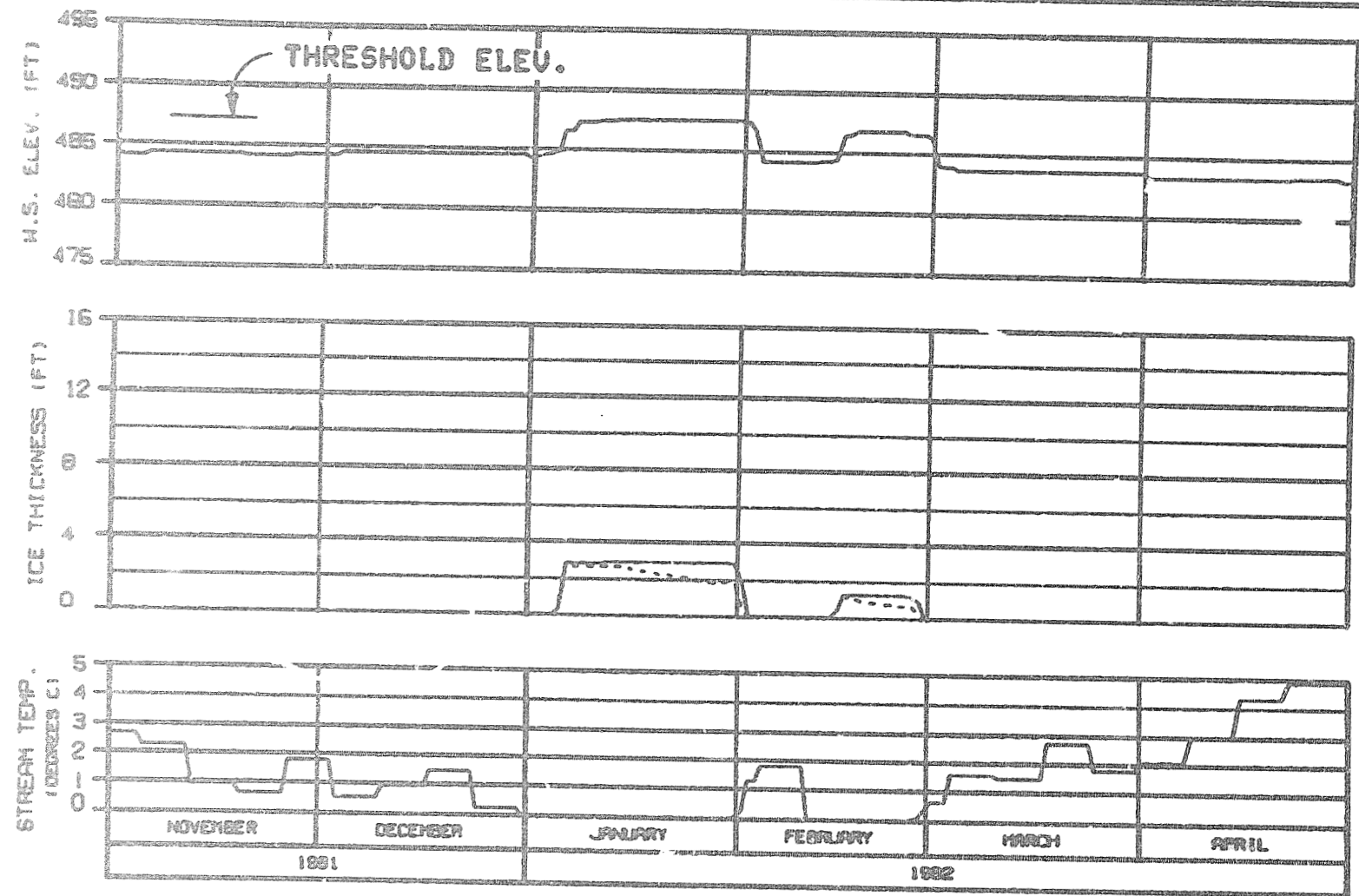


SIDE CHANNEL MSII
 RIVER MILE : 115.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUISH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 810ZCWH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRARD JOINT VENTURE		
DESIGNED BY	DATE	NO.
BLAND	FEB 82	888-142

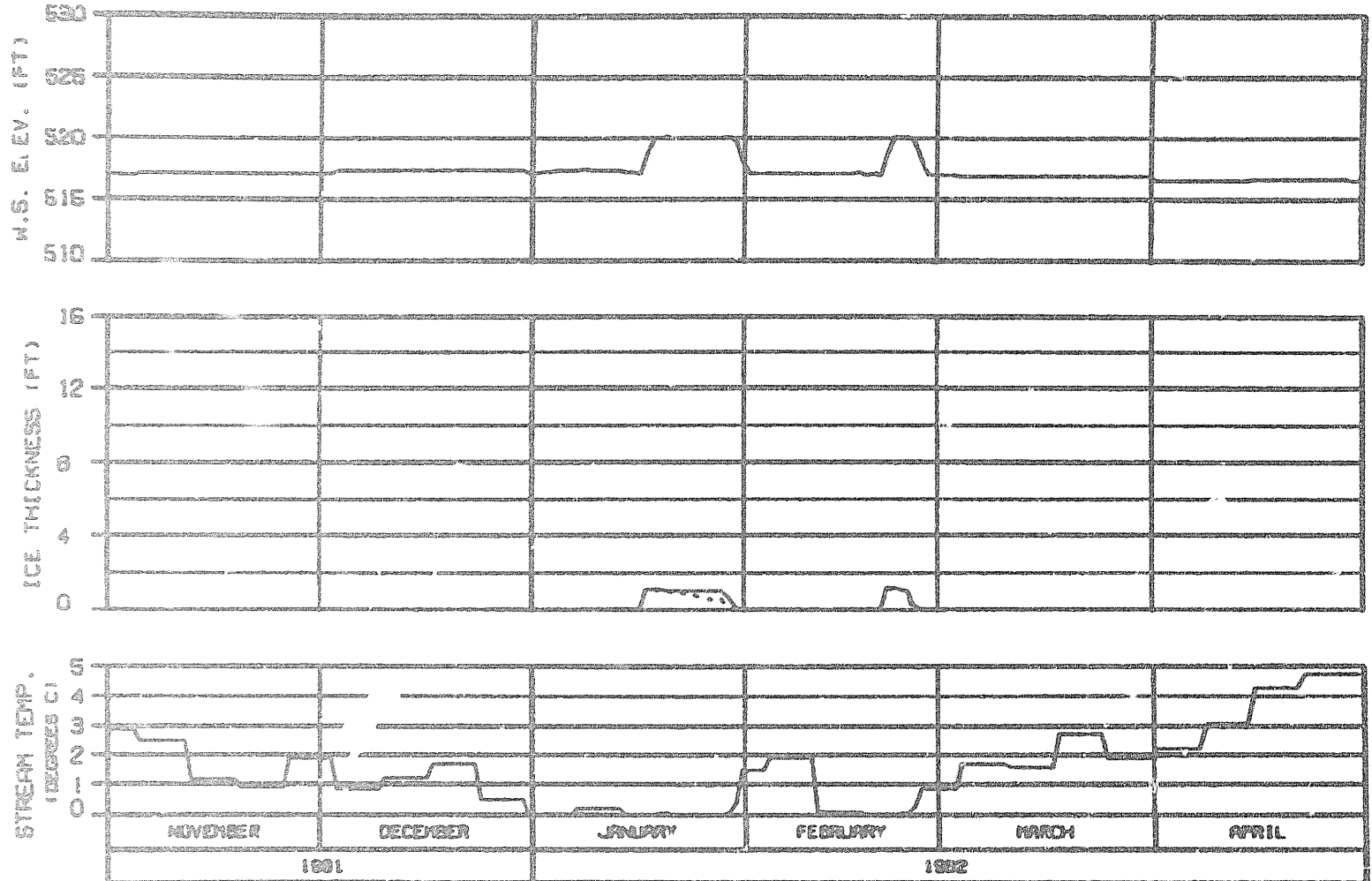


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 810204H

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 04-23-82	BY: JEB	NO. 142

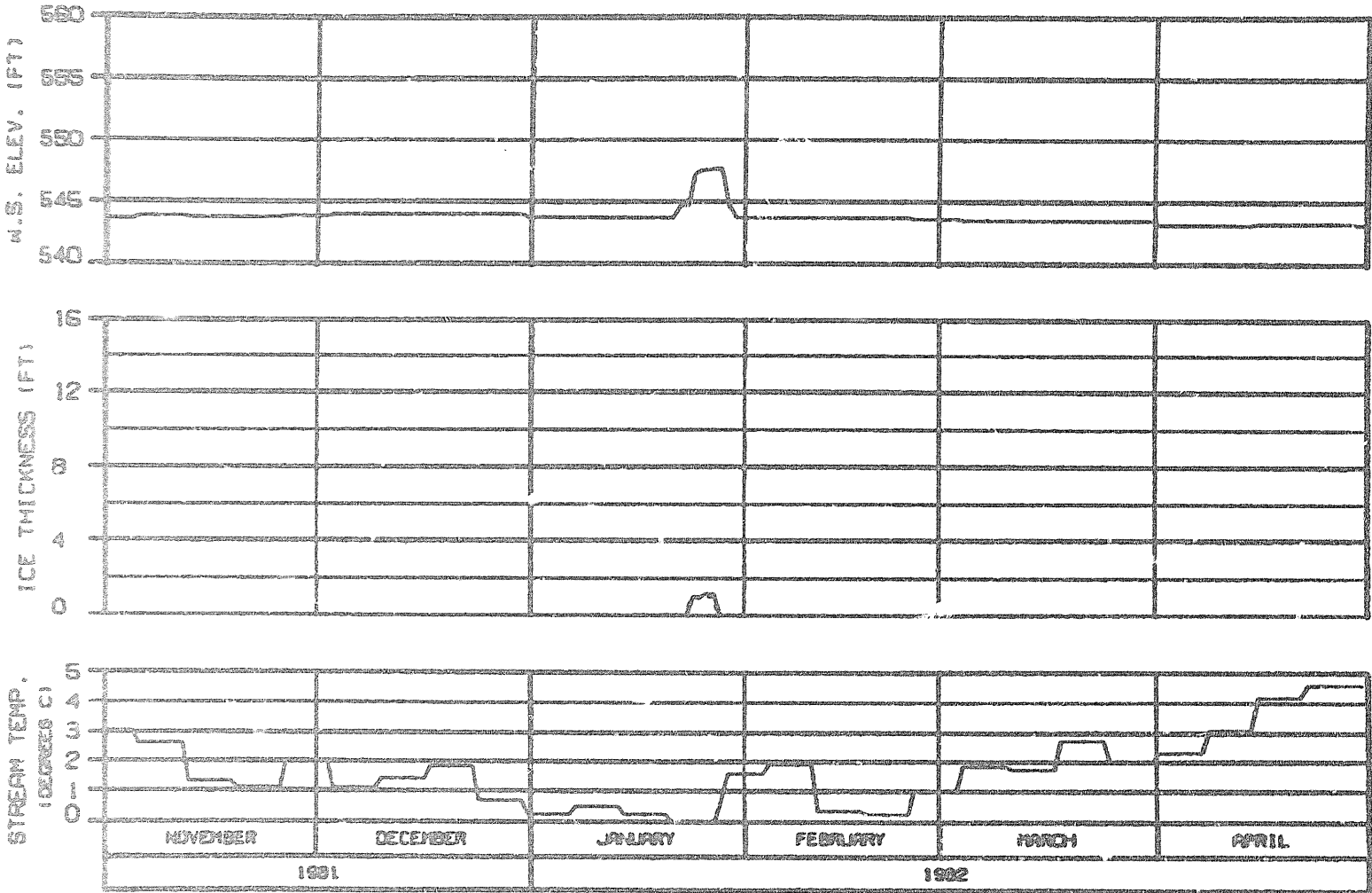


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102CWH

ALASKA POWER AUTHORITY		
CUSTOMER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARREN-BASED JOINT VENTURE		
CRASH. ALP003	0 FEB 01	1000.142

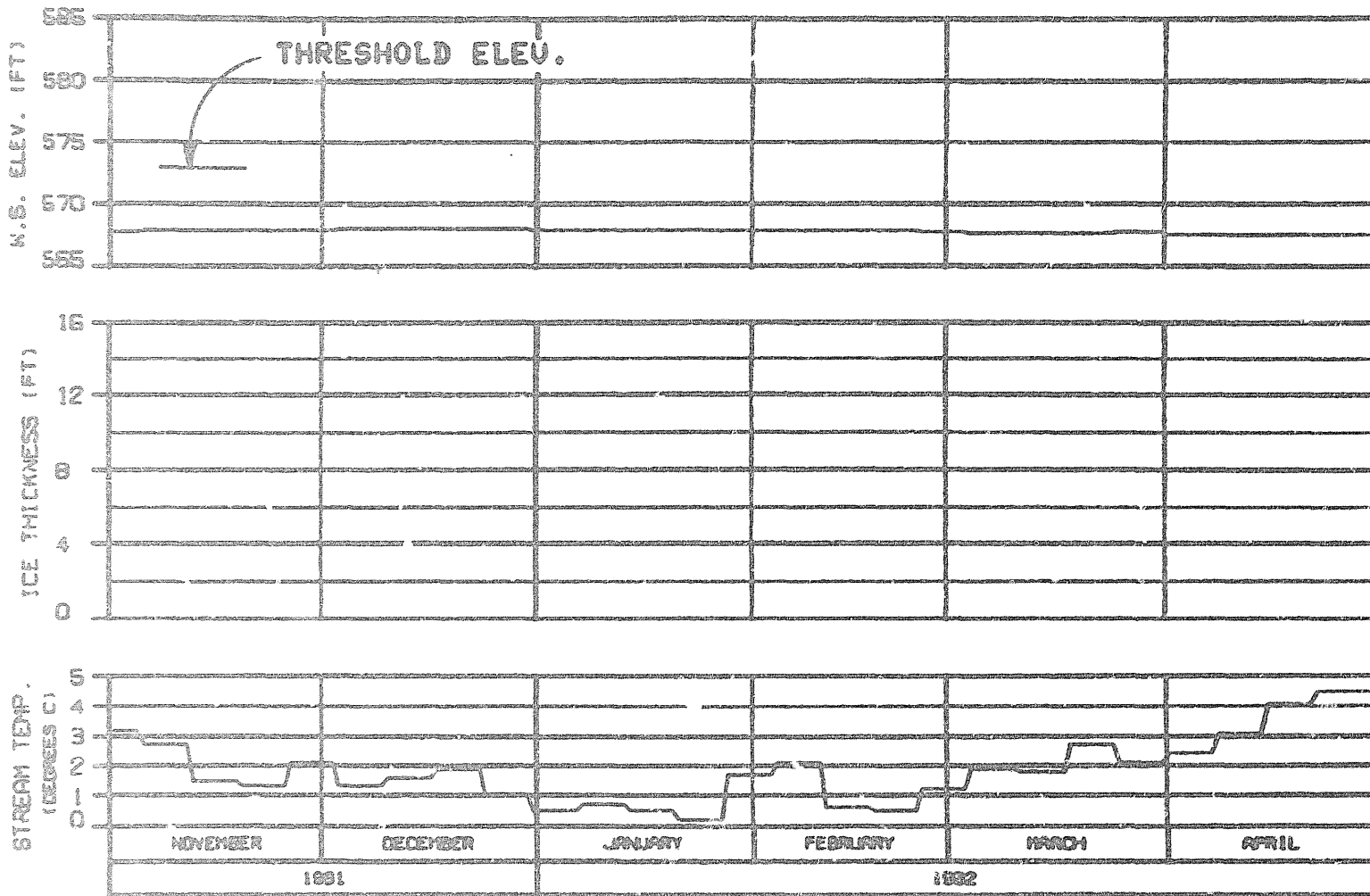


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CWH

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-ERASCO JOINT VENTURE		
DATE: 01/08/02	0 00 00	000.142



HEAD OF SLOUGH 8A (WEST)

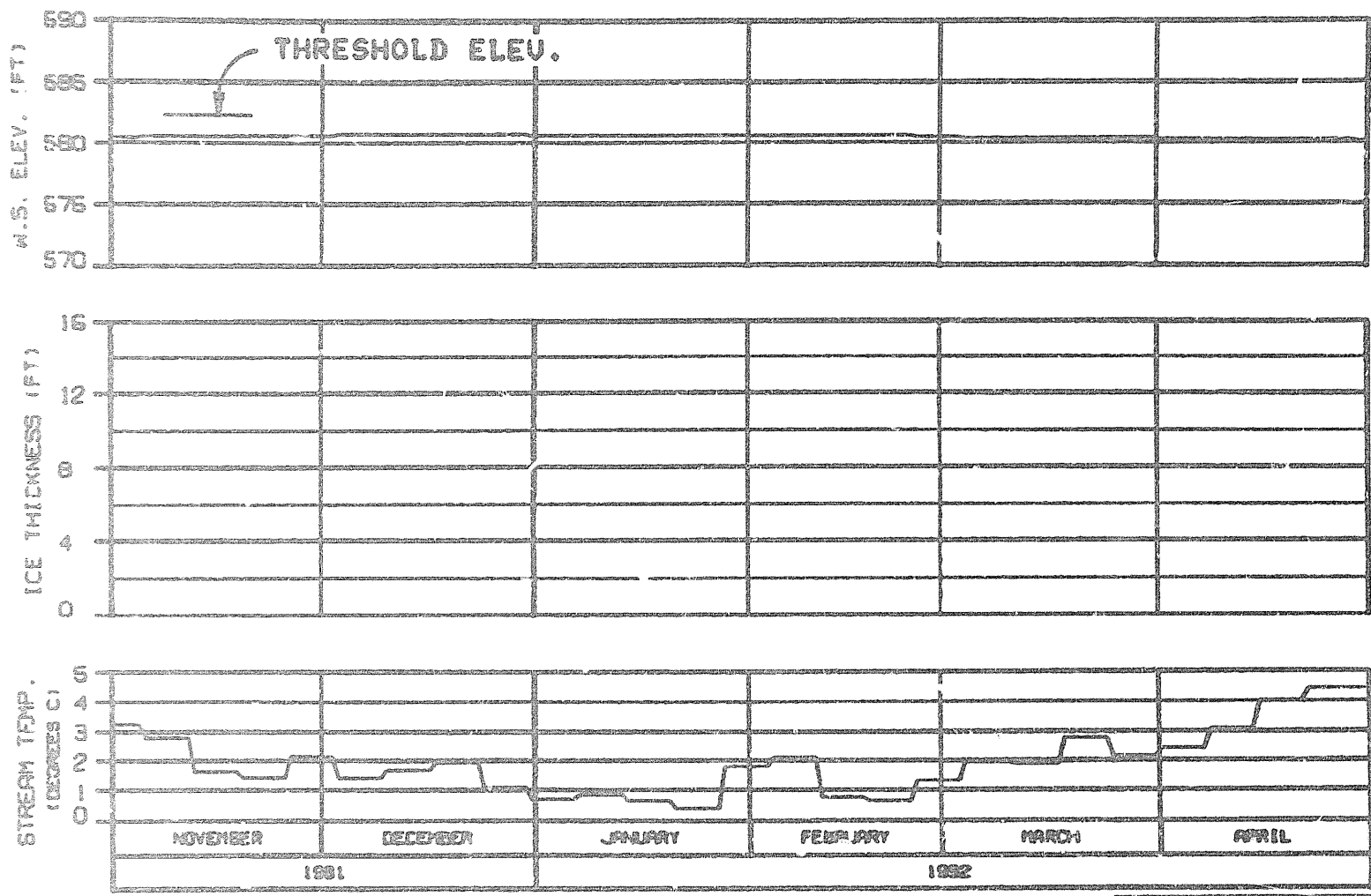
RIVER MILE : 126.10

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: HARVEST WATER
 EXISTING NATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CM

ALASKA POWER AUTHORITY	
GLORIA FALLEN	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHECKED: ALLAN BIRD	8 FEB 82
	ISSUE: 143

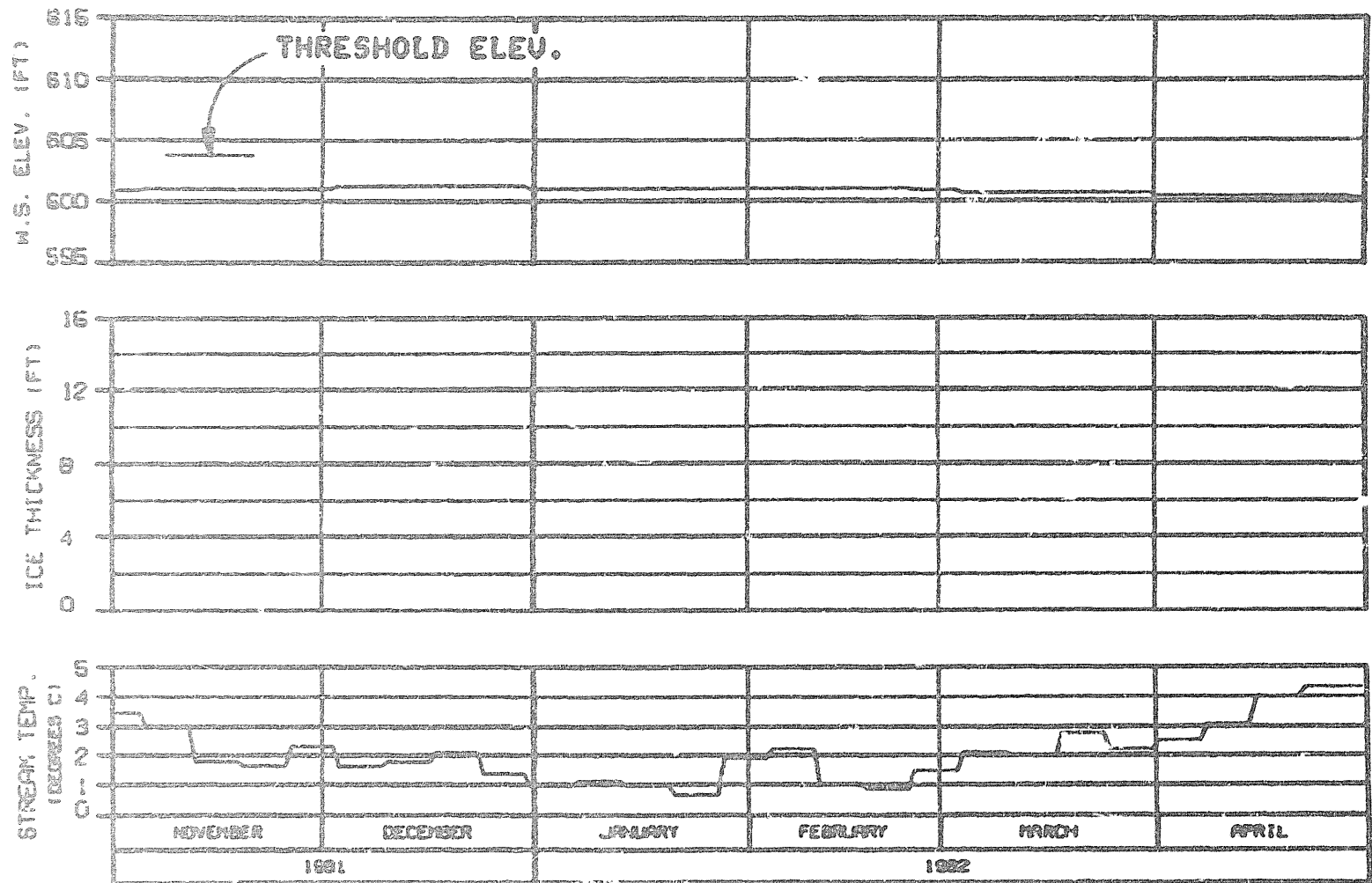


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 810204H

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NARZA-ERASCO JOINT VENTURE		
DESIGNED -	DRAWN BY -	DATE -
810204H	8 APR 82	1982.142



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

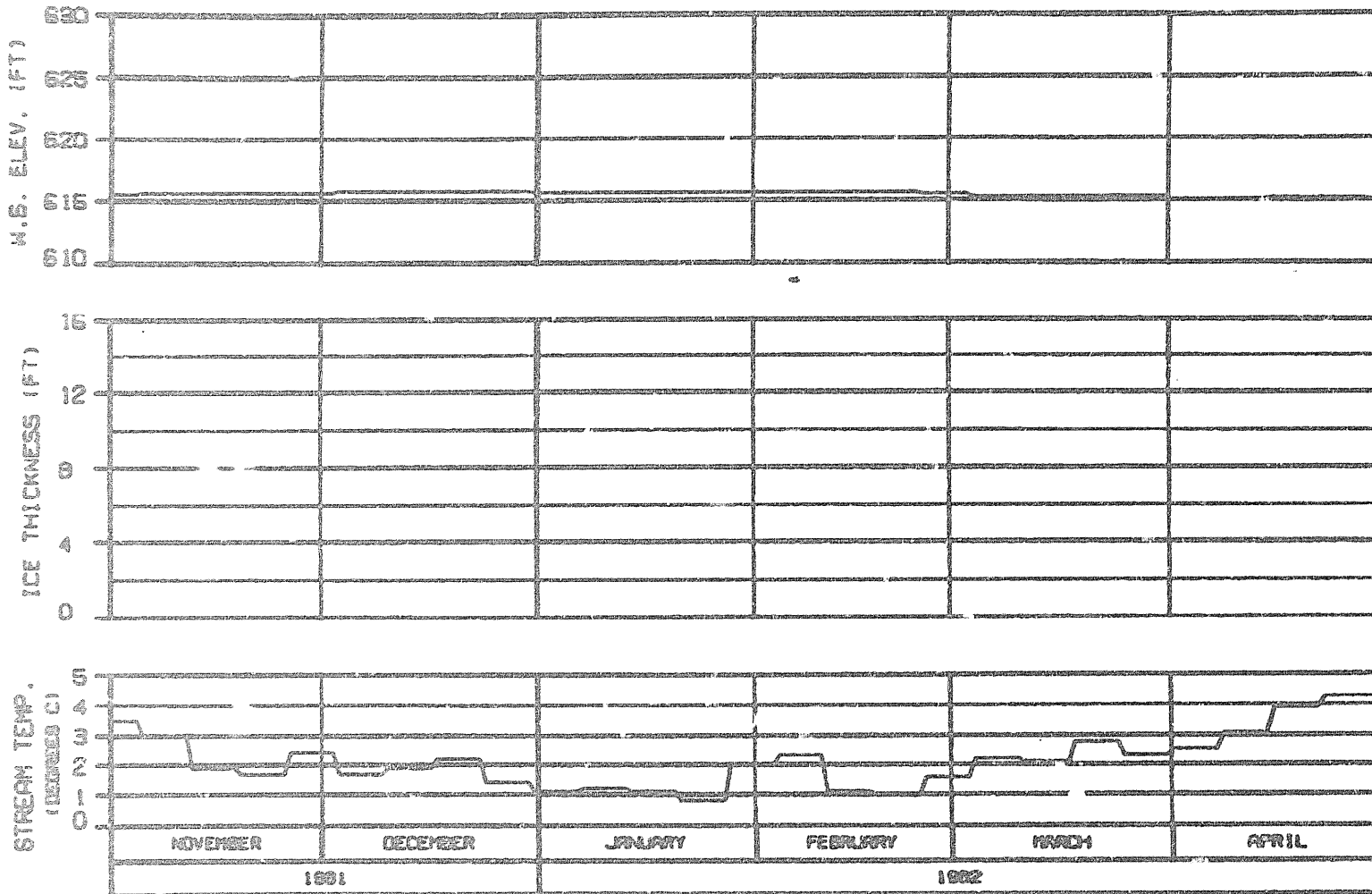
ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 EXISTING NATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 010204H

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-BASCO JOINT VENTURE	
CHARGE: 010204H	0 FEB 82
	USER: 148

00710M7

OPTION?



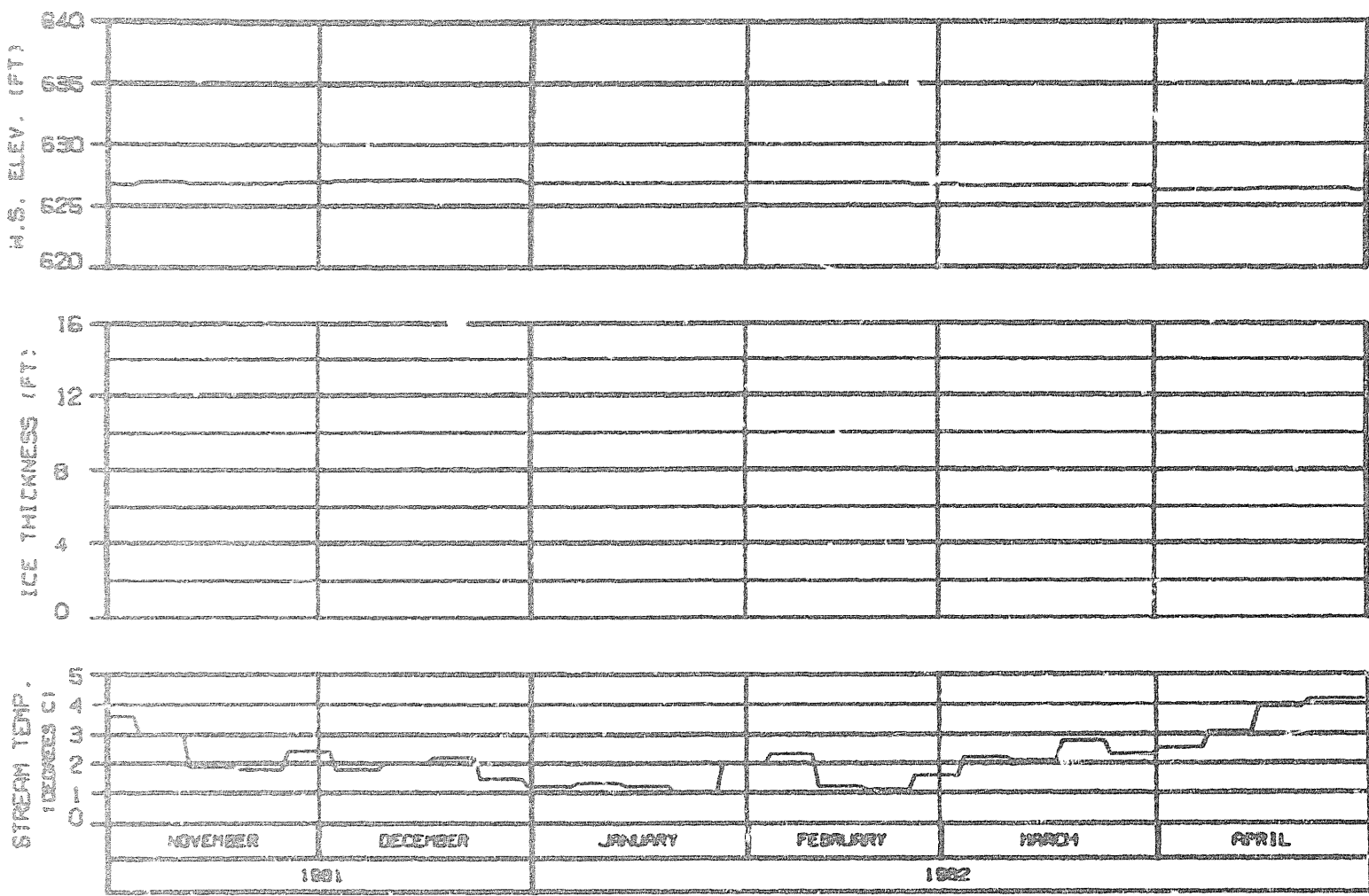
SIDE CHANNEL U/S OF SLOUGH 9

RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 0102041

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARSA-EBASCO JOINT VENTURE	
CHARTER: 01-00010	0 FEB 02
0000.148	

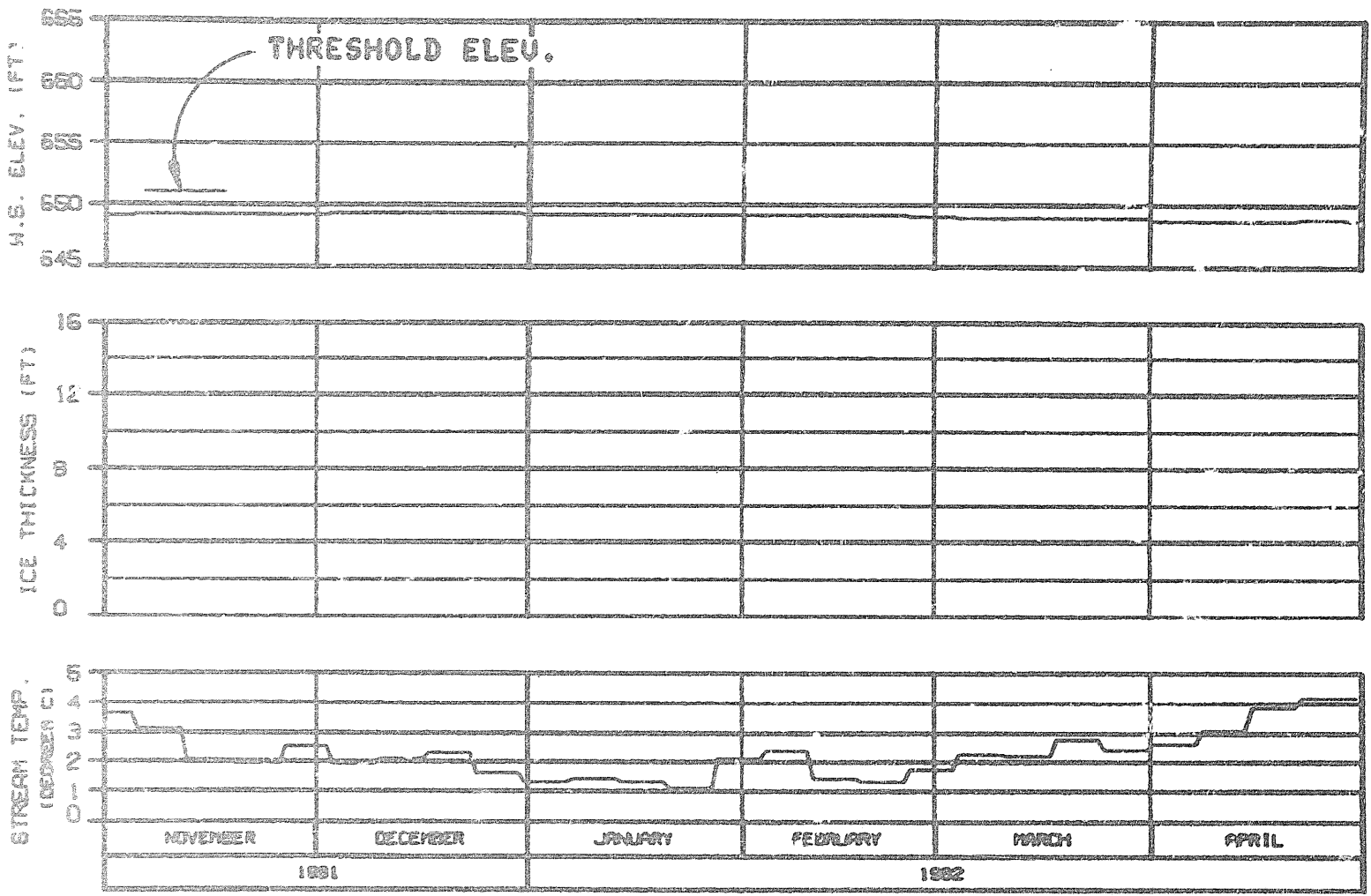


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING NATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 91020WH

ALASKA POWER AUTHORITY	
SLITNA PROJECT	
SLITNA RIVER ICE SIMULATION TIME HISTORY	
NARPA-EBROD JOINT VENTURE	
CHARGE: 11A0990	6 FEB 92
1300.148	

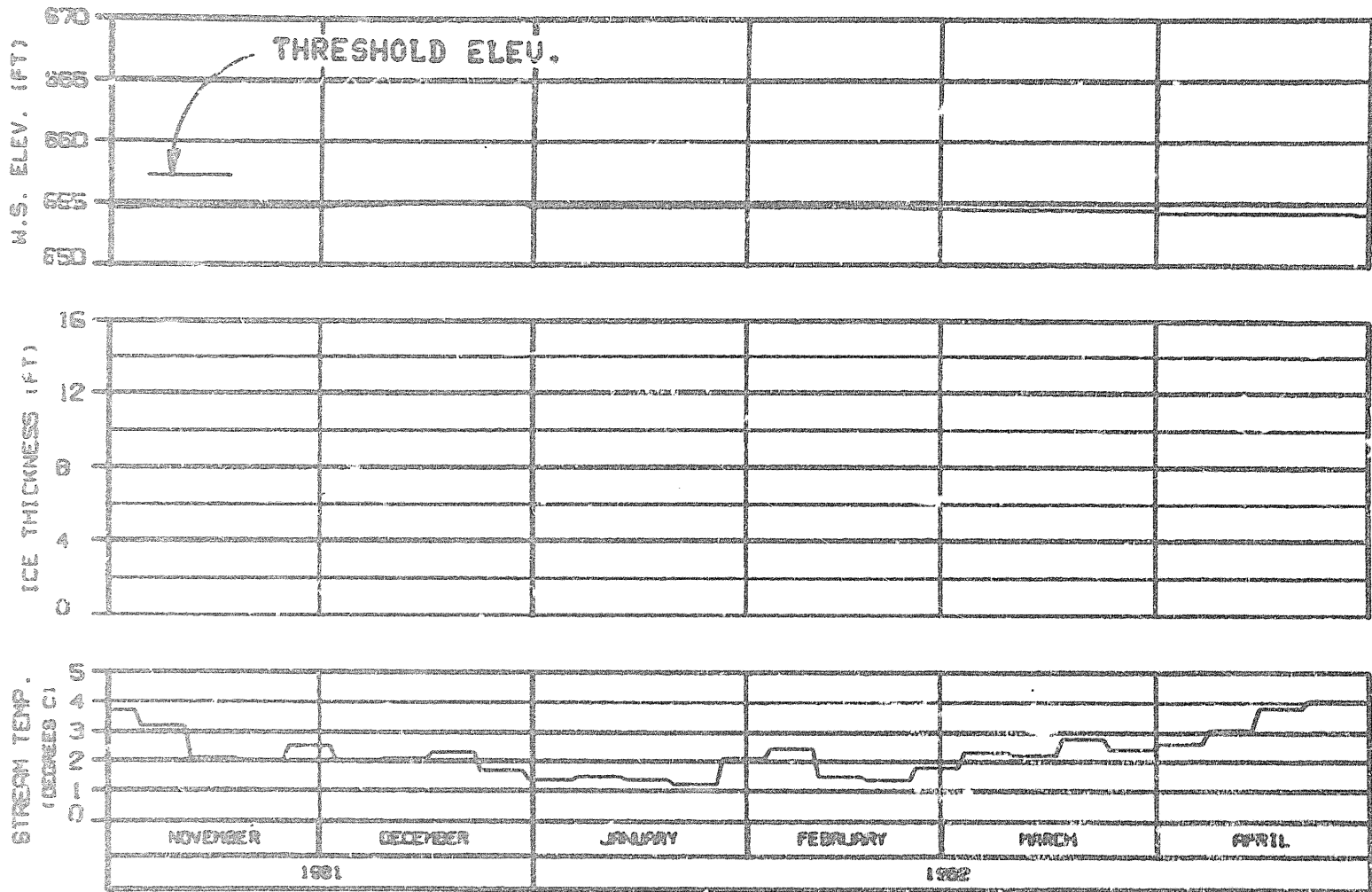


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 9102CWH

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBERSCO JOINT VENTURE		
DESIGNED - GARDNER	DRAWN -	NOV. 1992

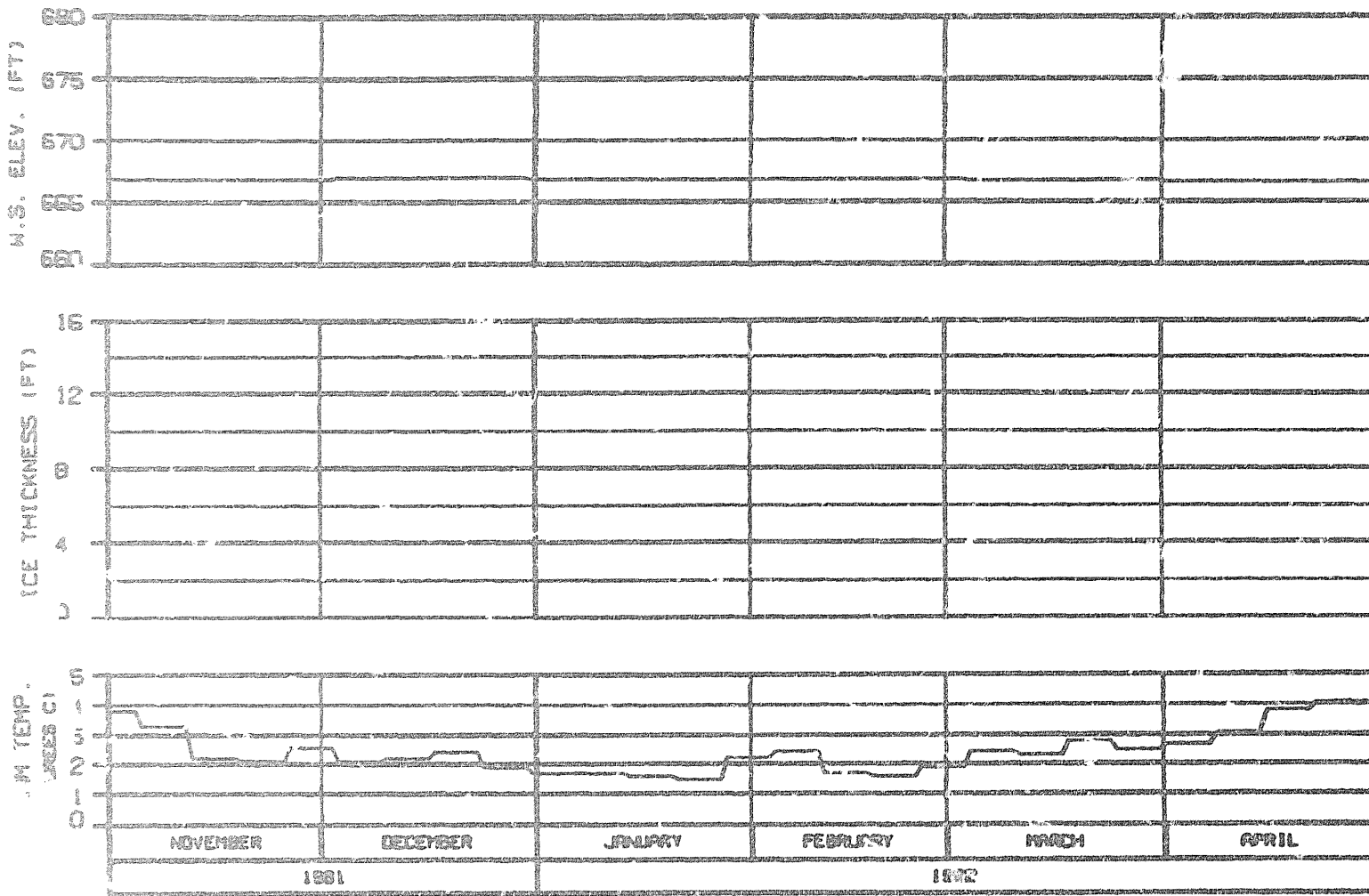


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING NATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 0102CAN

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSTITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
SUSTITNA RIVER JOINT VENTURE	
DATE	1988.142

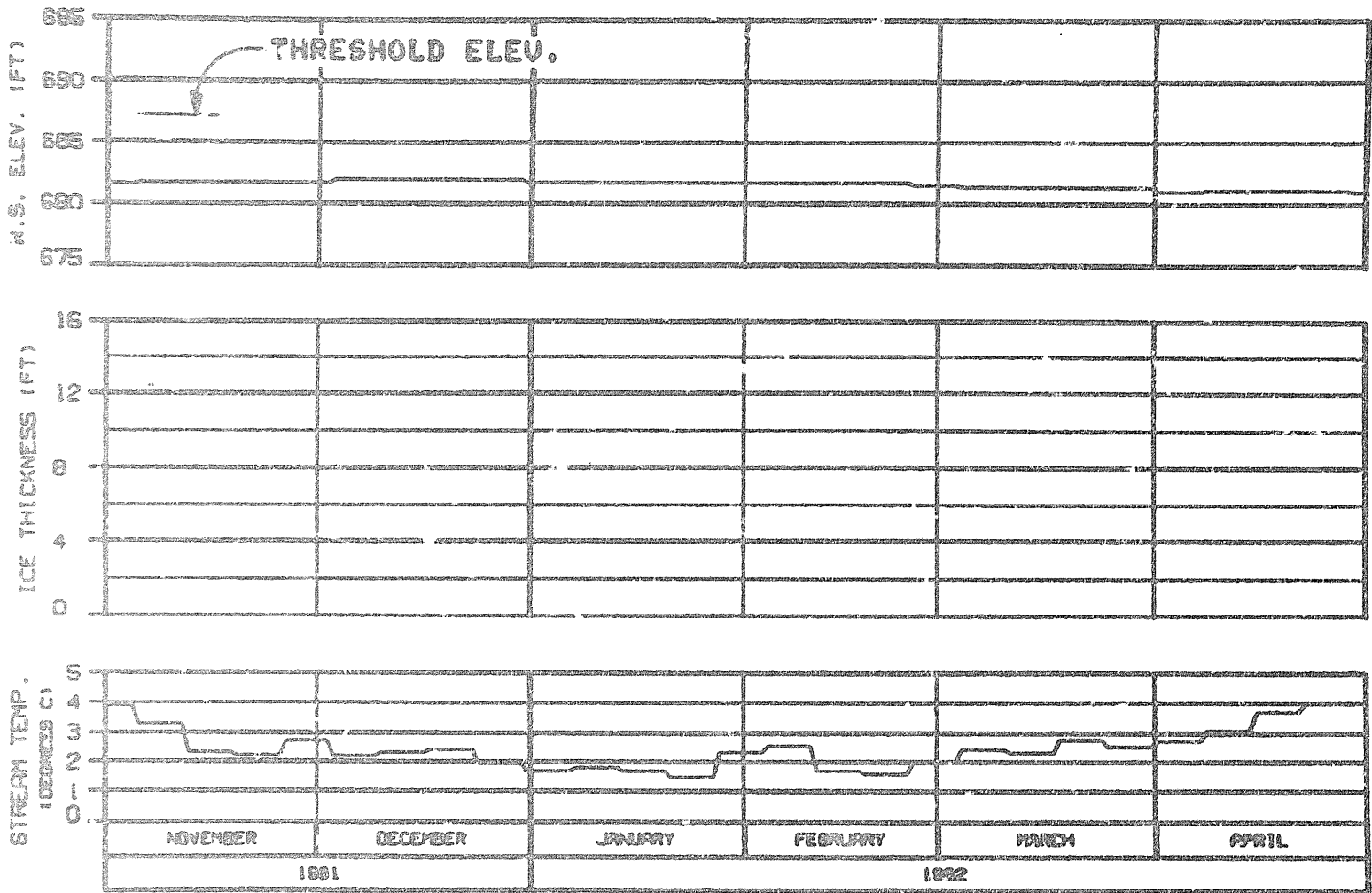


SIDE CHANNEL D/S OF SLOUGH 11
RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CAN ON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE, HIGH O.C. CONE
 REFERENCE RUN NO. : 8102044

ALASKA POWER AUTHORITY	
ENGINEER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
NORZA-ERASCO JOINT VENTURE	
CHARTED: 04-20-82	0 000 00
SHEET 142	

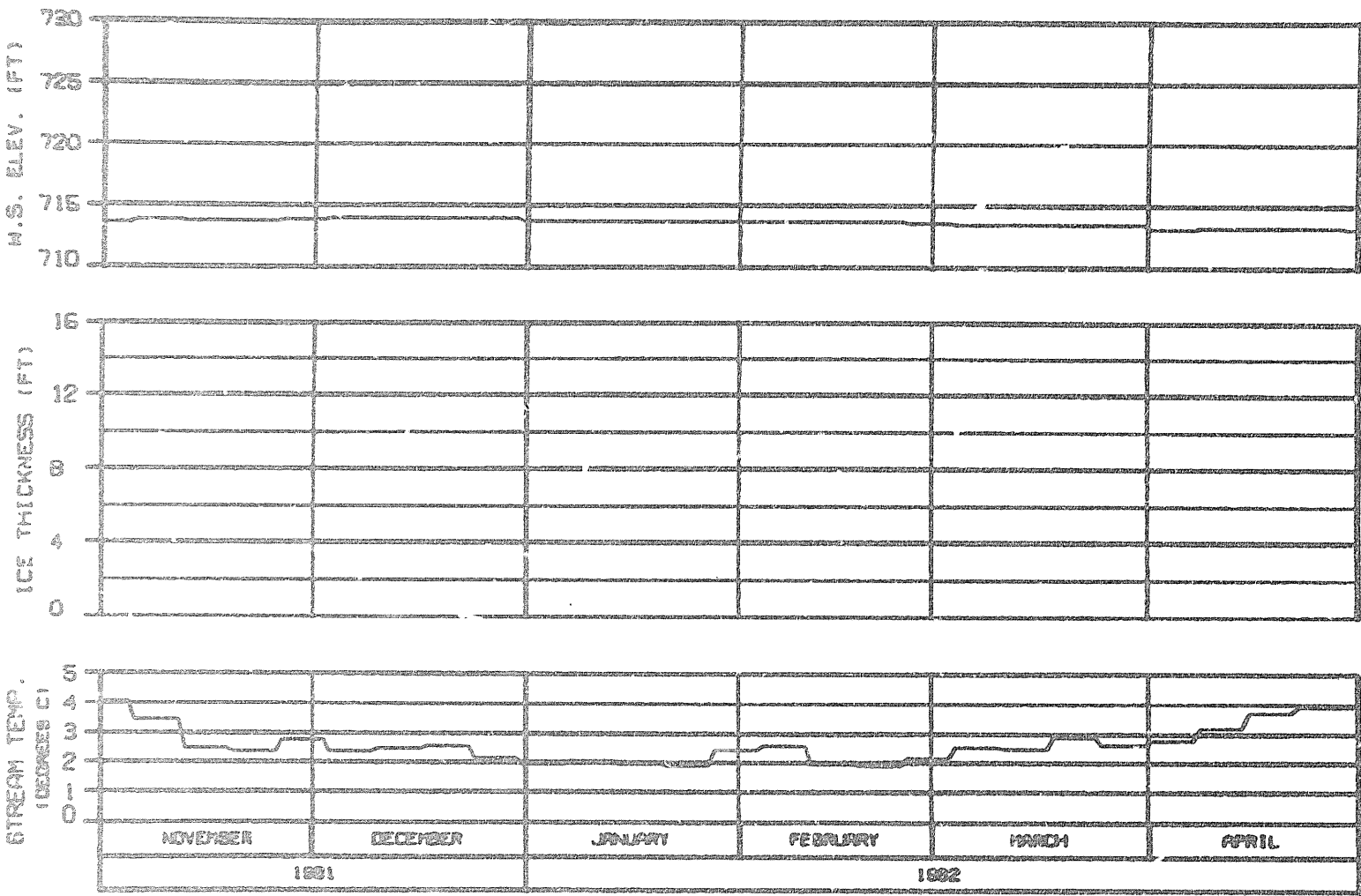


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CM

ALASKA POWER AUTHORITY	
STATION FILED	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WATANA-ENBROO JOINT VENTURE	
ENGINEER: ALLISON	8 FEB 92
	1000.042

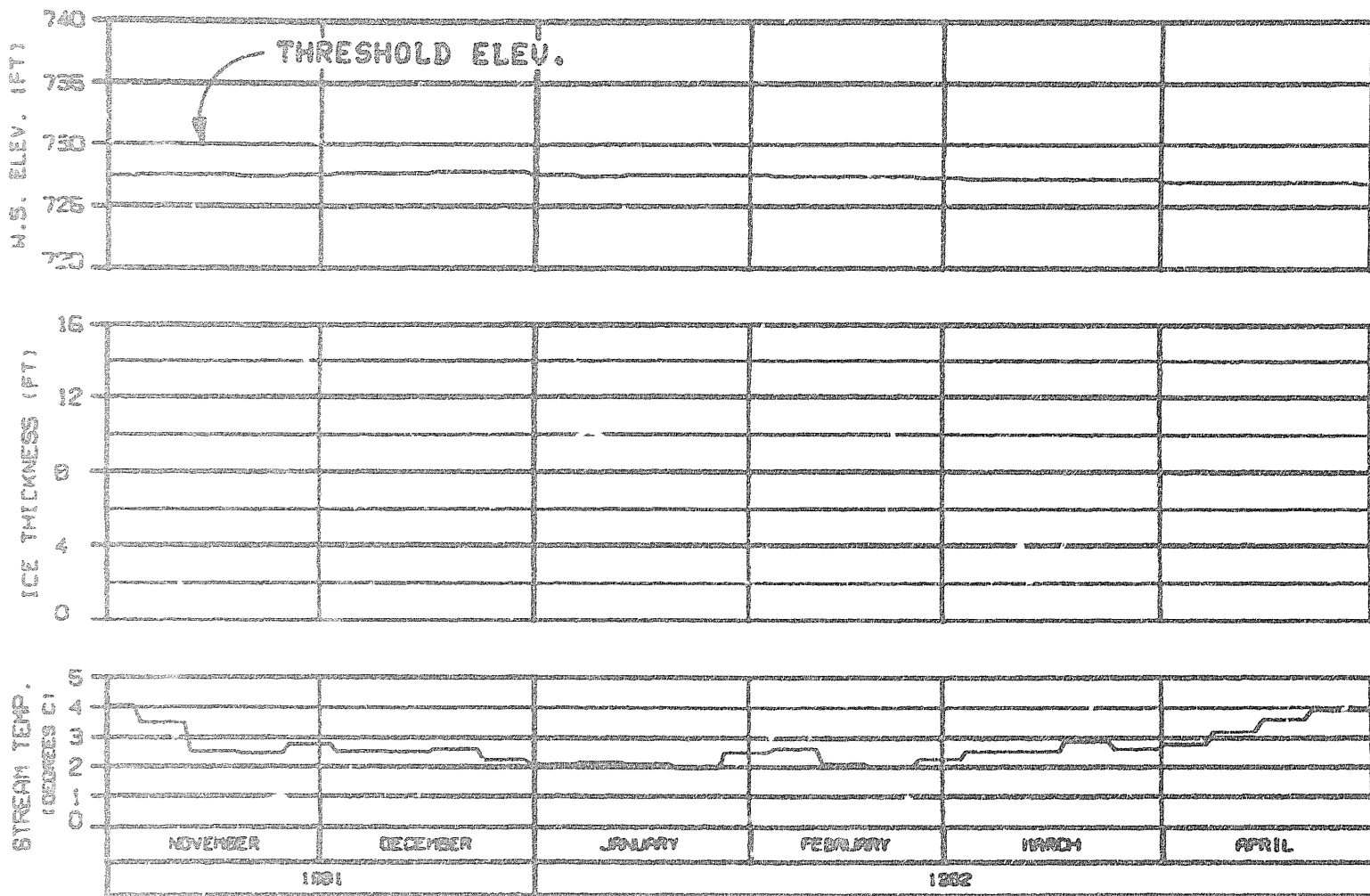


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CWH

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SLISTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERASCO JOINT VENTURE	
0180425 - 01.00000	0 FEB 82 0925.145

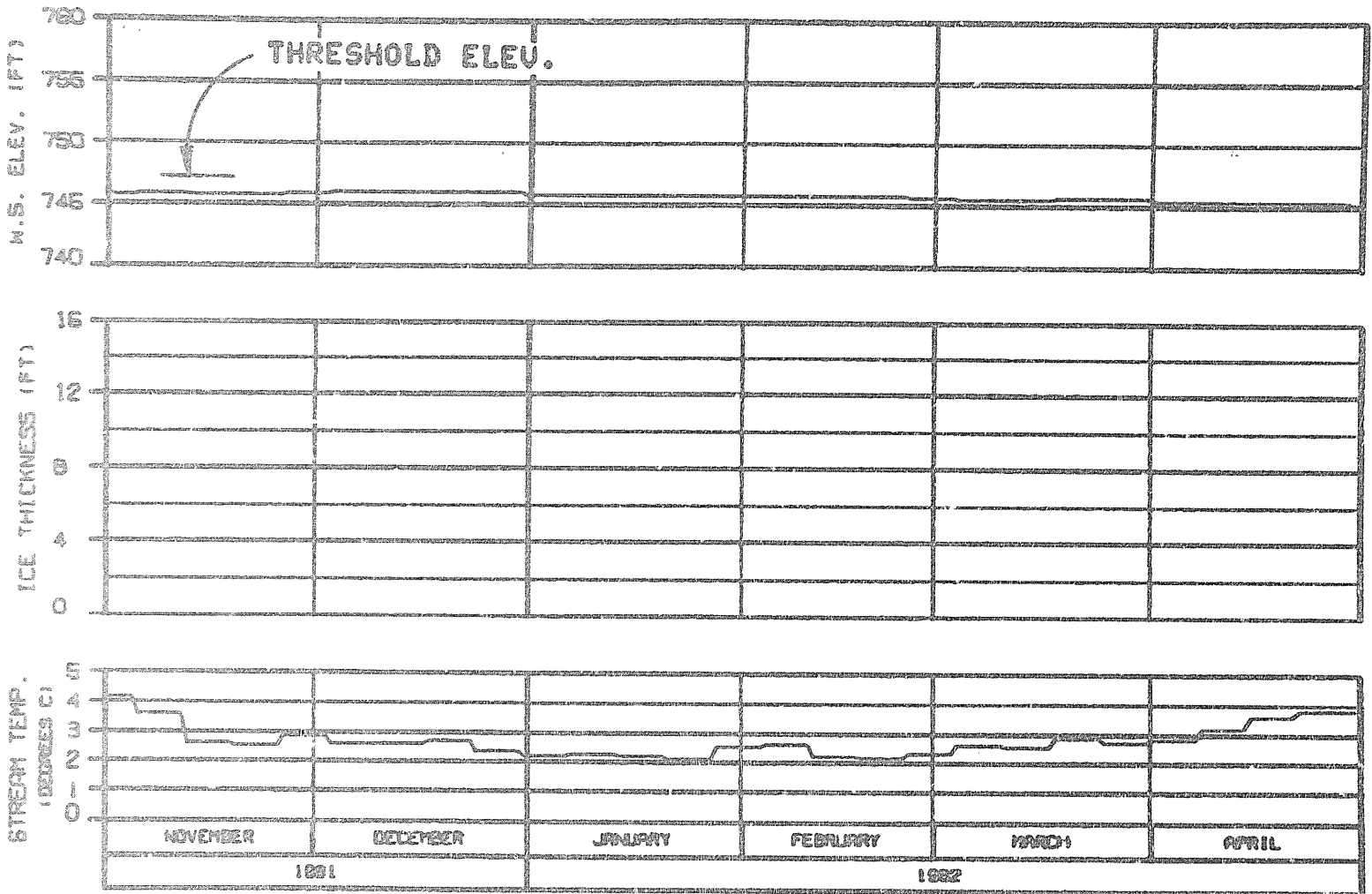


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 20
 RIVFR MILE : 140.50

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 810204H

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
NARZA-EBRARD JOINT VENTURE	
CONTROL FILE NO	0 FEB 82
	ISS. 148

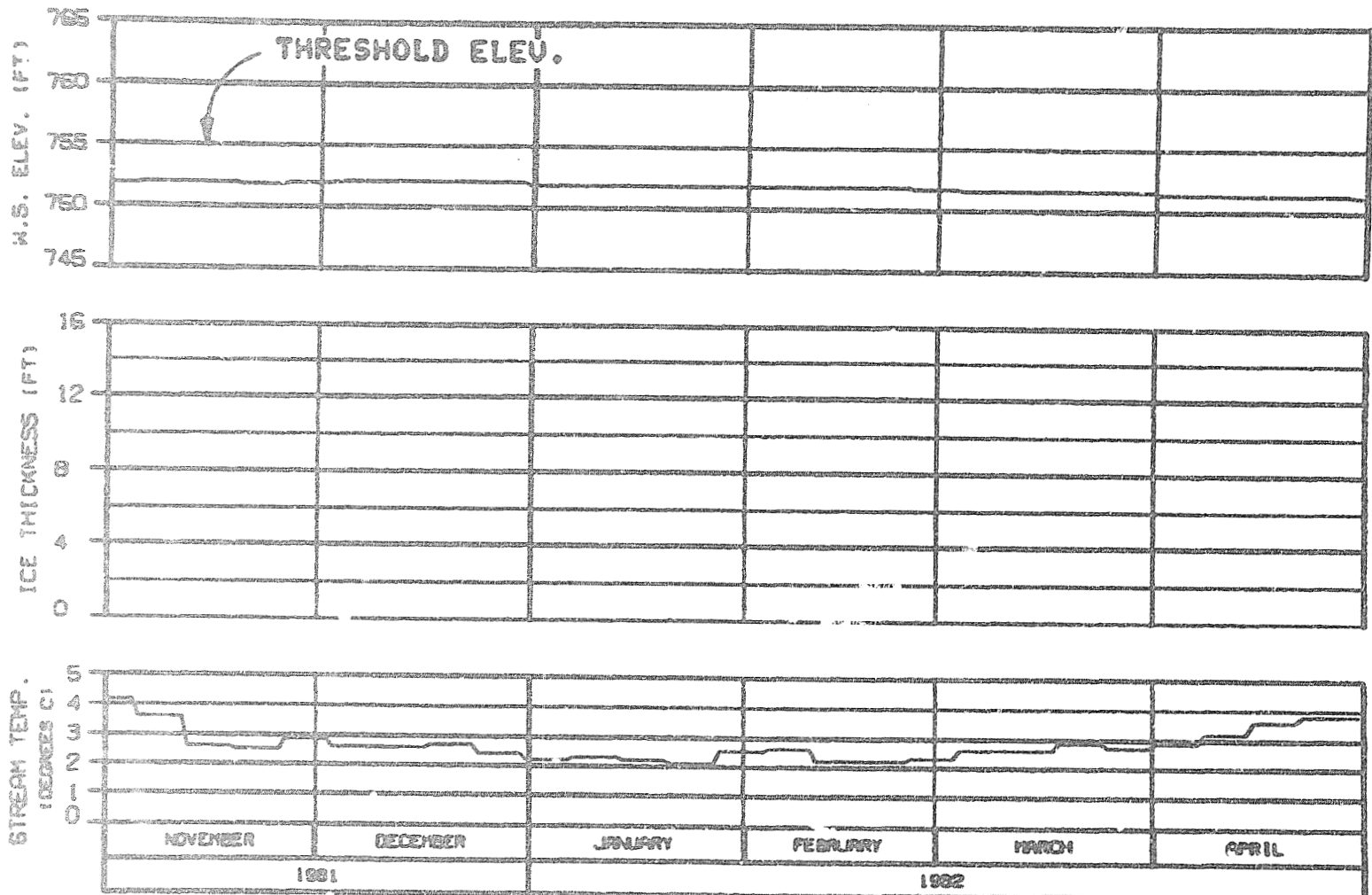


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING MATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 8102CWH

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
APRA-EBRACO JOINT VENTURE	
CHARTS, ALL PAGES	0 031 03
PAGE 148	

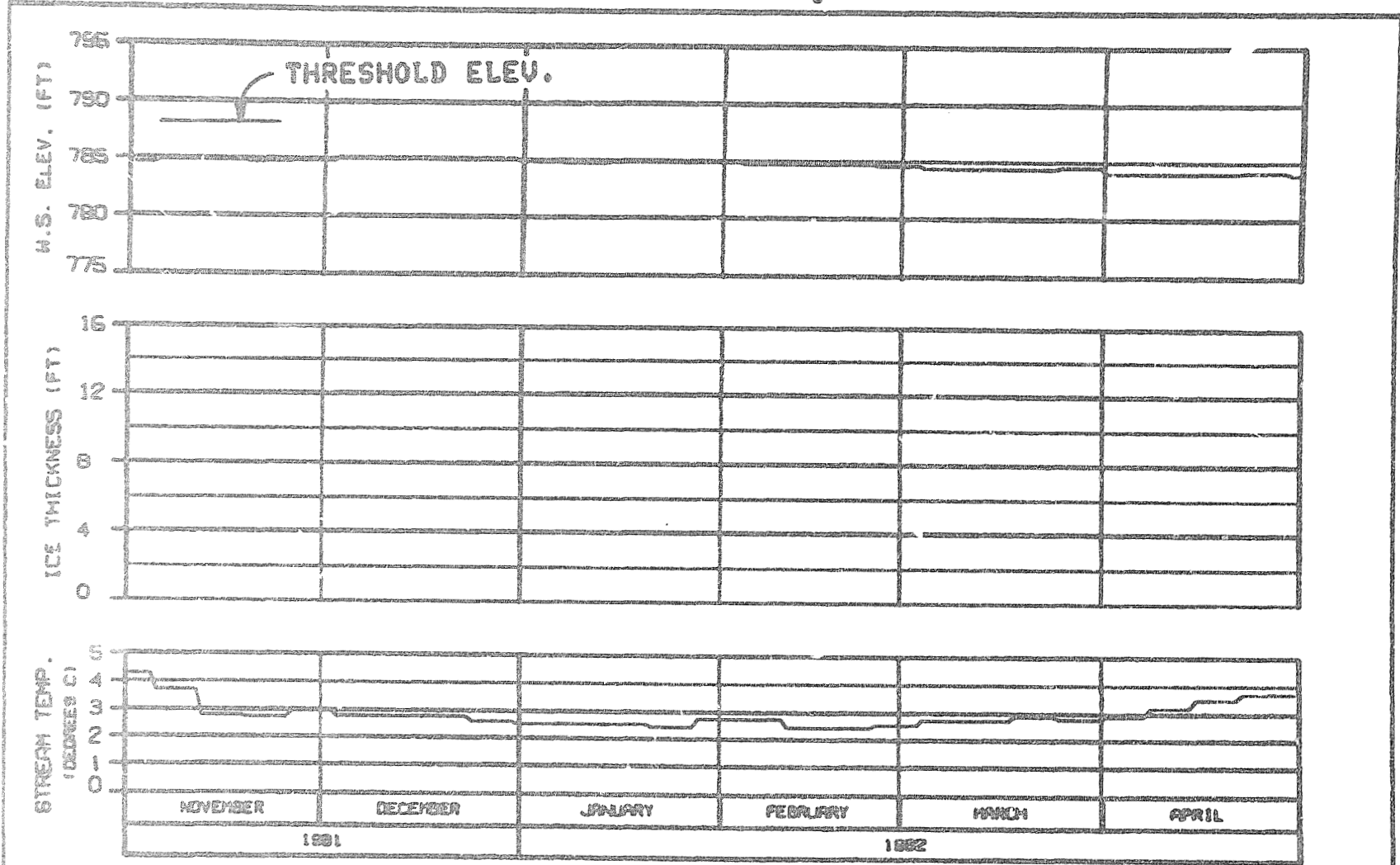


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 EXISTING WATANA INTAKE. HIGH D.C. CONE
 REFERENCE RUN NO. : 810ZCH

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARMA-EBRISCO JOINT VENTURE		
PROJECT: 71A-00270	D. FREDERICK	1982.142



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

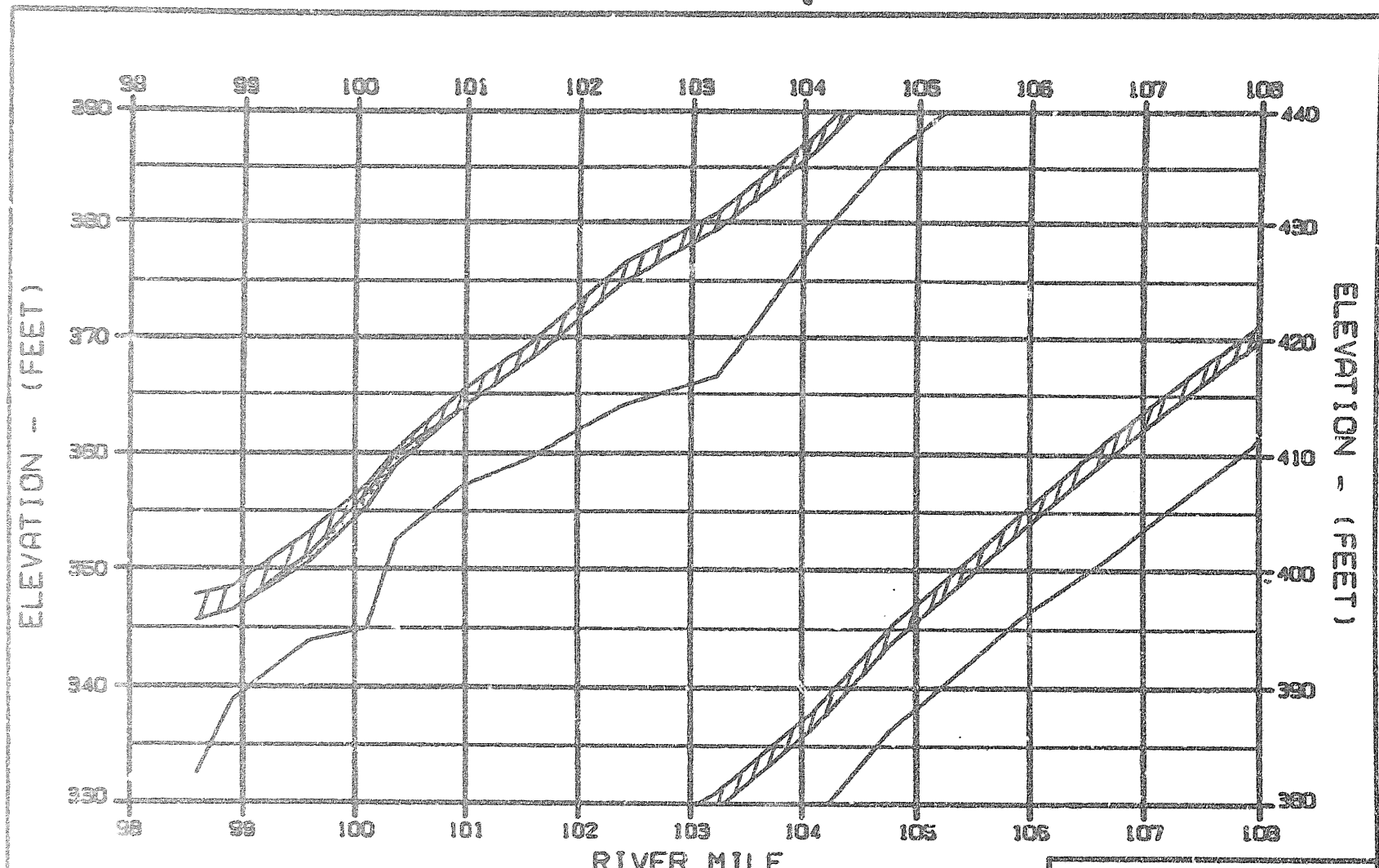
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 EXISTING WATANA INTAKE, HIGH D.C. CONE
 REFERENCE RUN NO. : 810204H

ALASKA POWER AUTHORITY		
EXISTING PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EGASCO JOINT VENTURE		
DATE: 01/08/82	BY: G. S. S.	REV: 142

OPTION?

EXHIBIT R

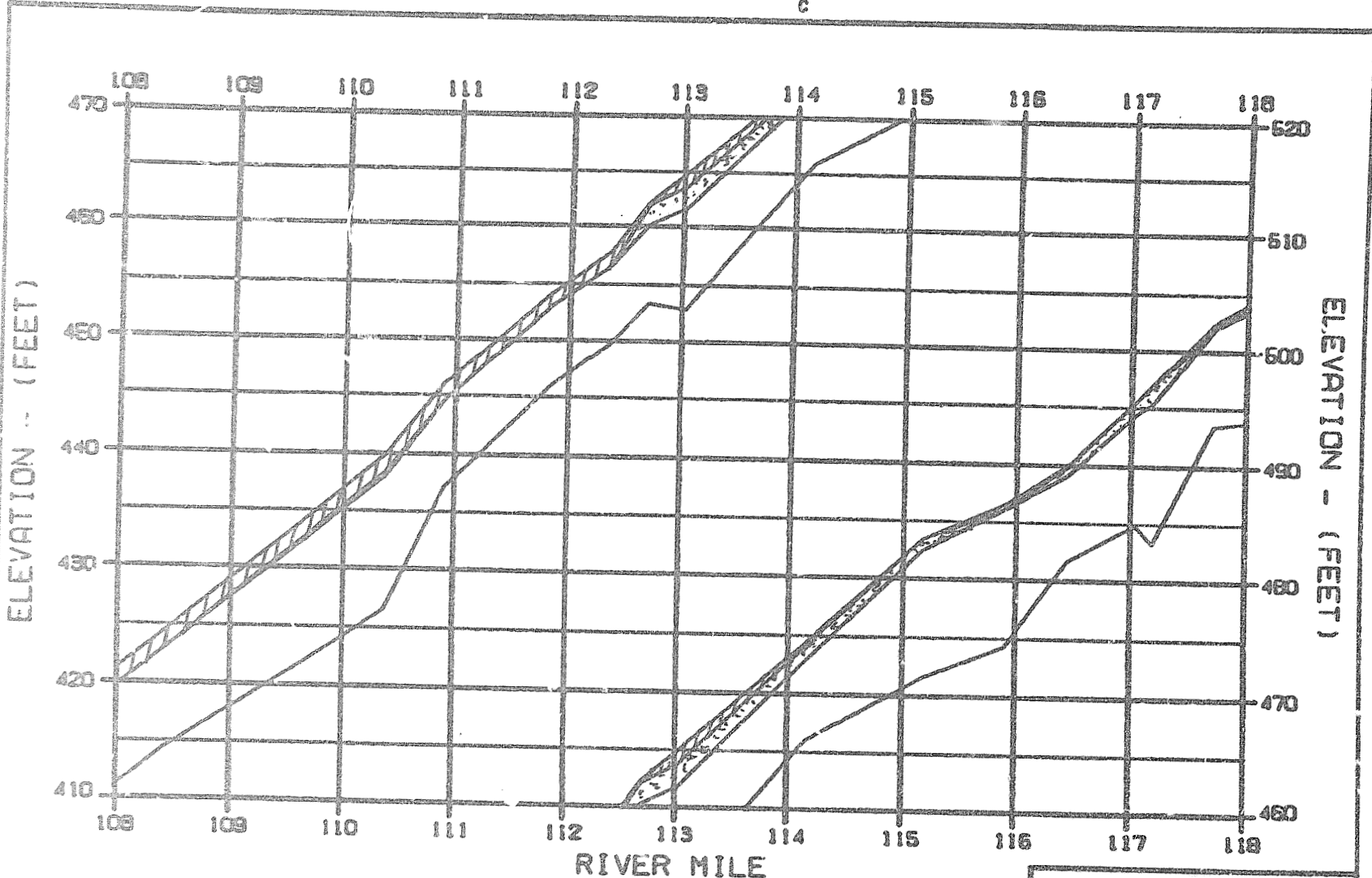


LEGEND:
 [Hatched Area] TOP OF SOLID ICE
 [Dashed Line] SLUSH/SOLID ICE INTERFACE
 [Dotted Line] BOTTOM OF SLUSH ICE
 [Solid Line] RIVER BED





WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1000, HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CMH

ALASKA POWER AUTHORITY		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
NARDA-EGASCO JOINT VENTURE		
CONTR. 01-0000	0 000 00	2001.MR

OPTION?



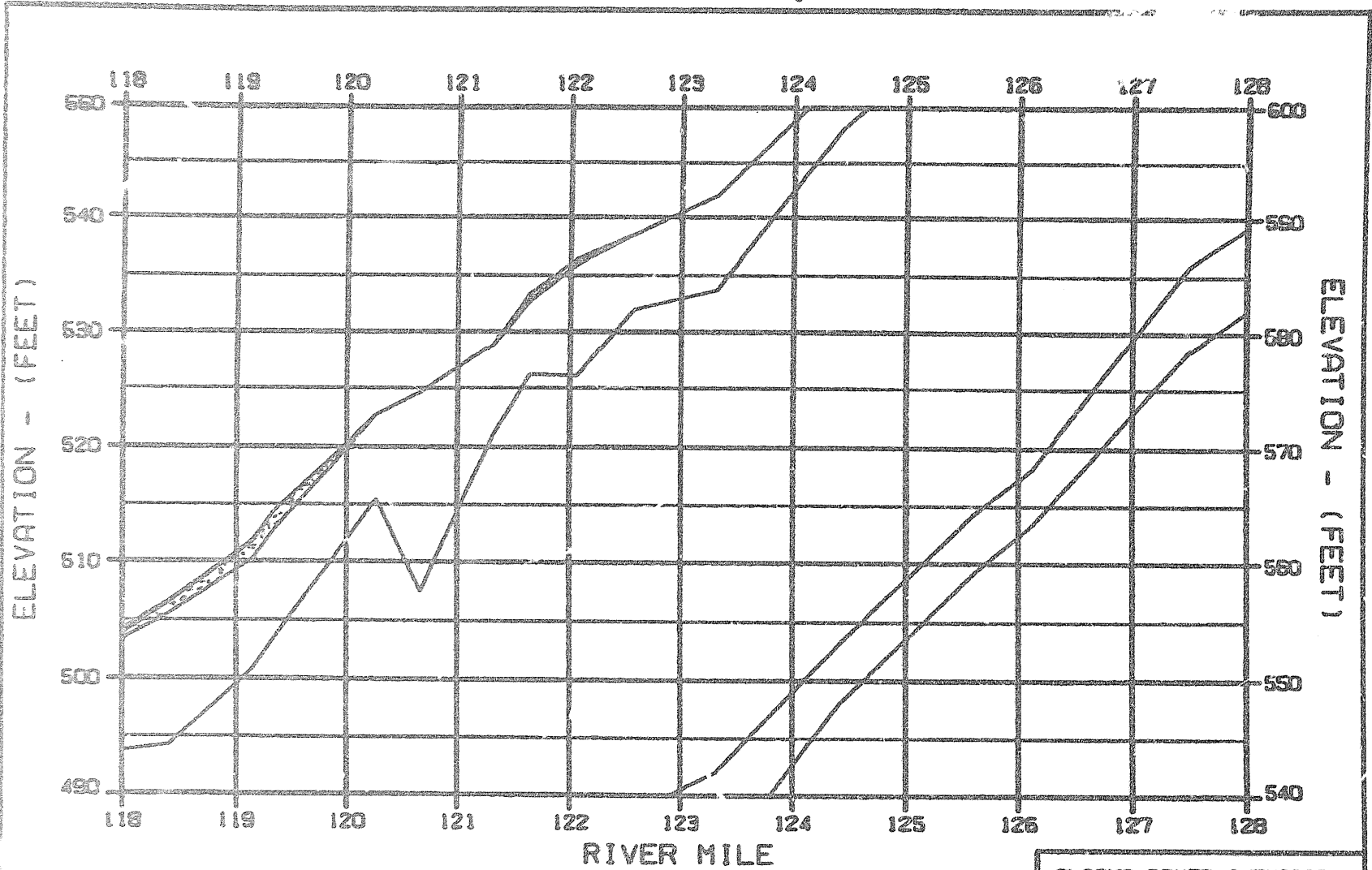
LEGEND:

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





WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CM

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EDRSCO JOINT VENTURE	
DESIGN: G.L. SUTTON	DATE: 02 FEB 82
	SCALE: 1:40

02710M7



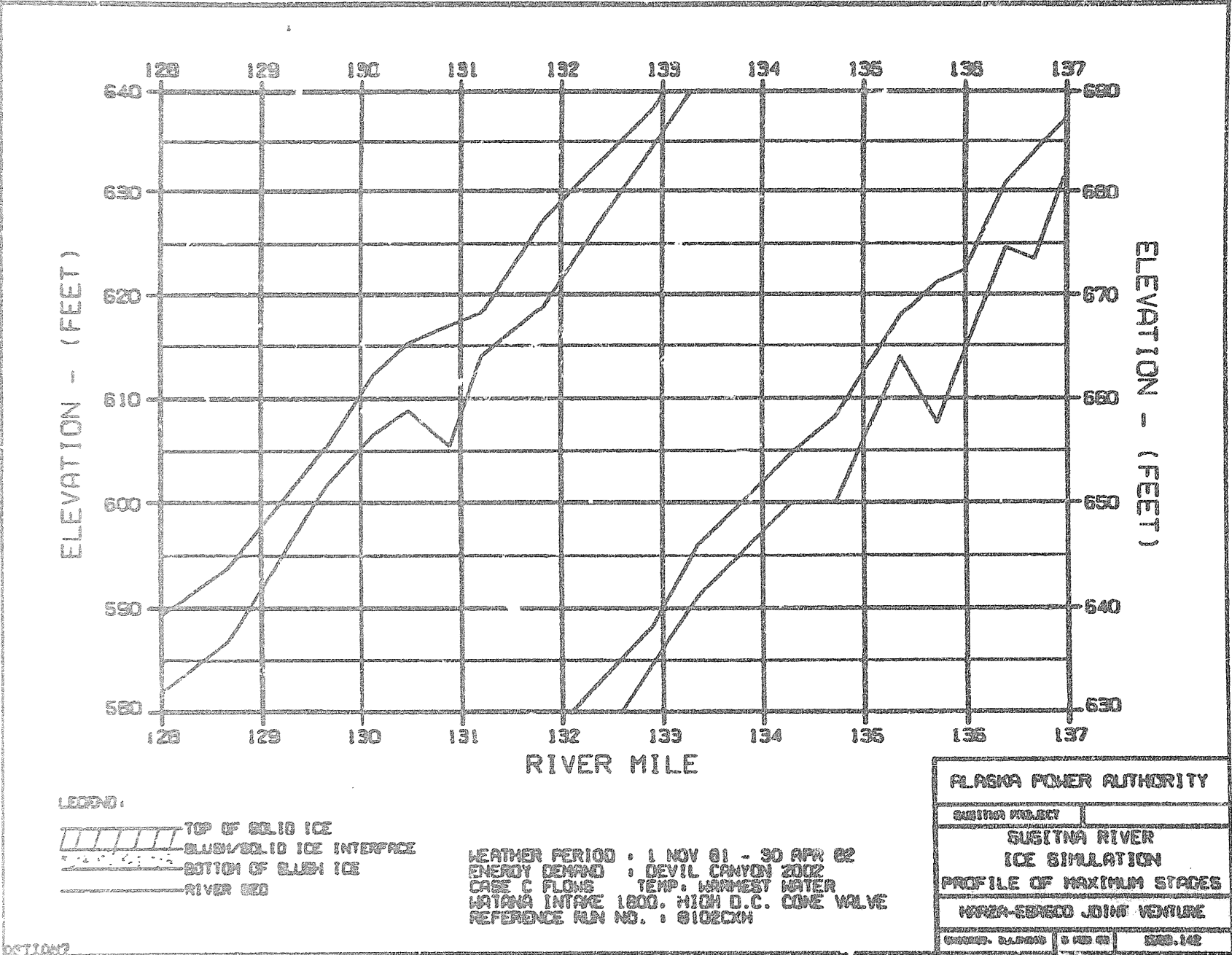
LEGEND:

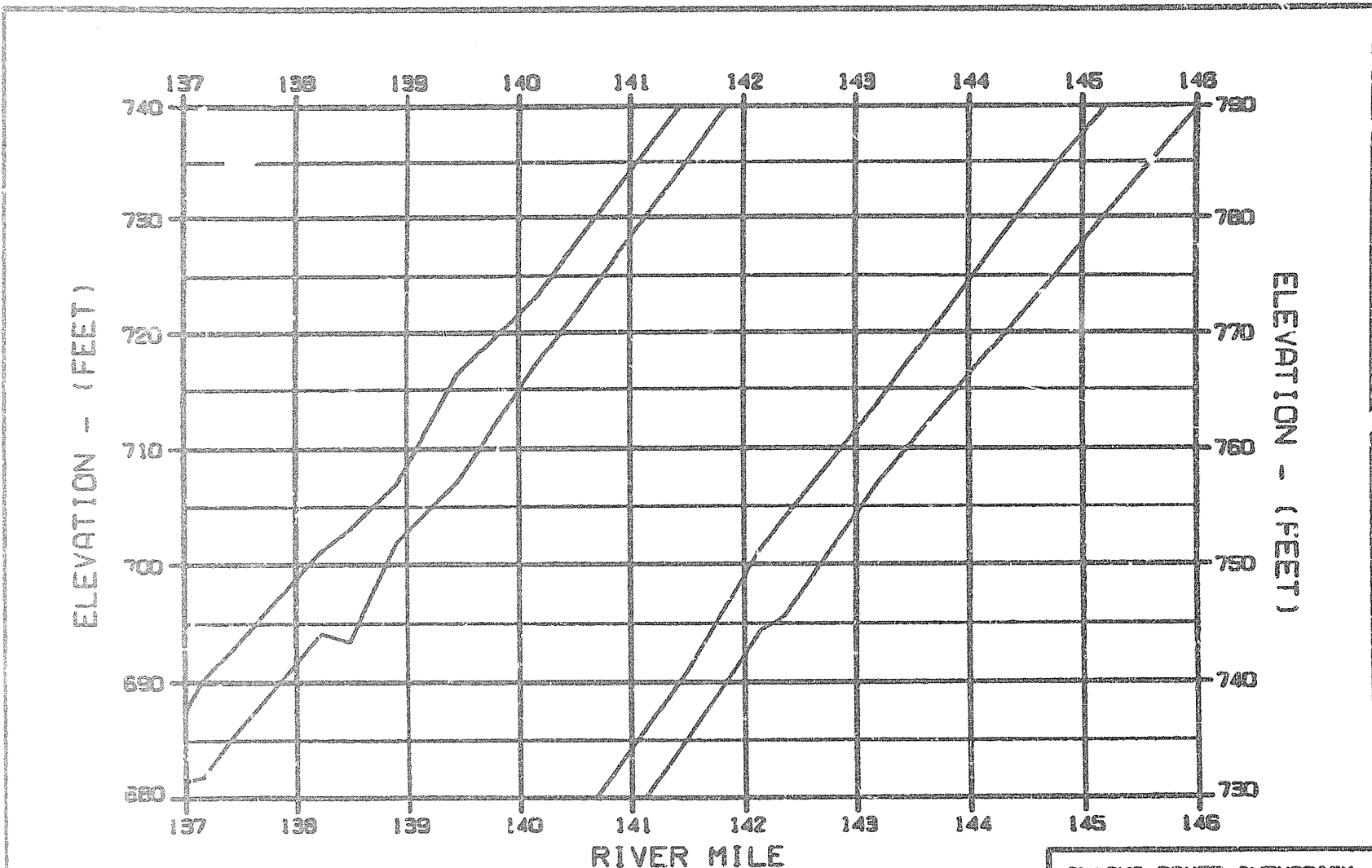
-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 MATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE PLAN NO. : 0102CKW

ALASKA POWER AUTHORITY		
DESIGNED PROJECT		
SUSTINNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARDA-ERBECO JOINT VENTURE		
DESIGNED: ALASKA	DATE: 07 FEB 82	1000.142

OPTION?



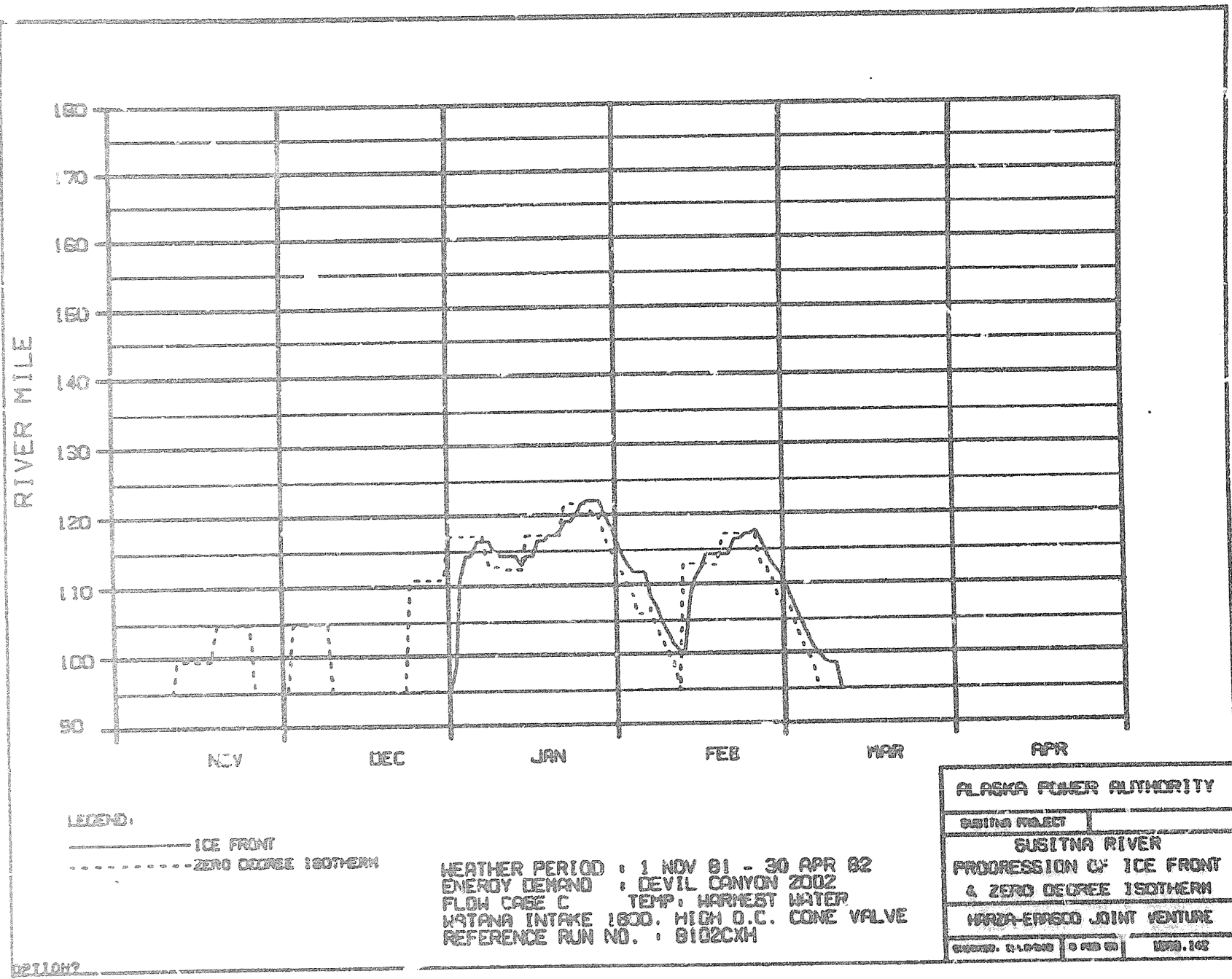


LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1000. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CKH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
DESIGNED - G. J. ...	DRAWN - G. J. ...	1998.142

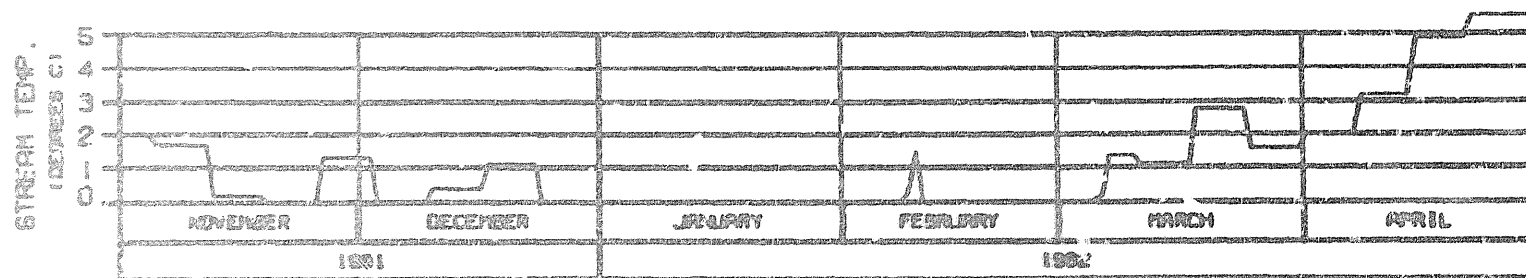
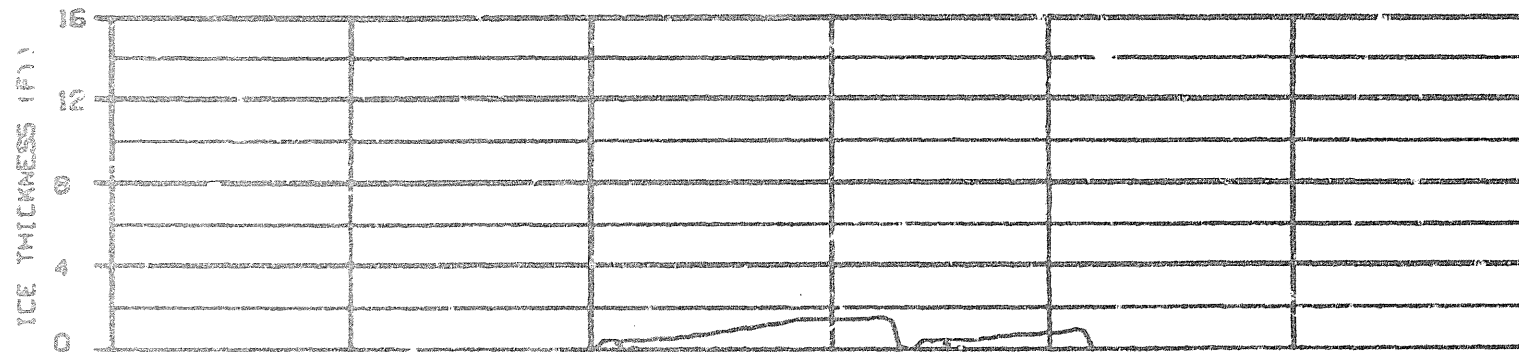
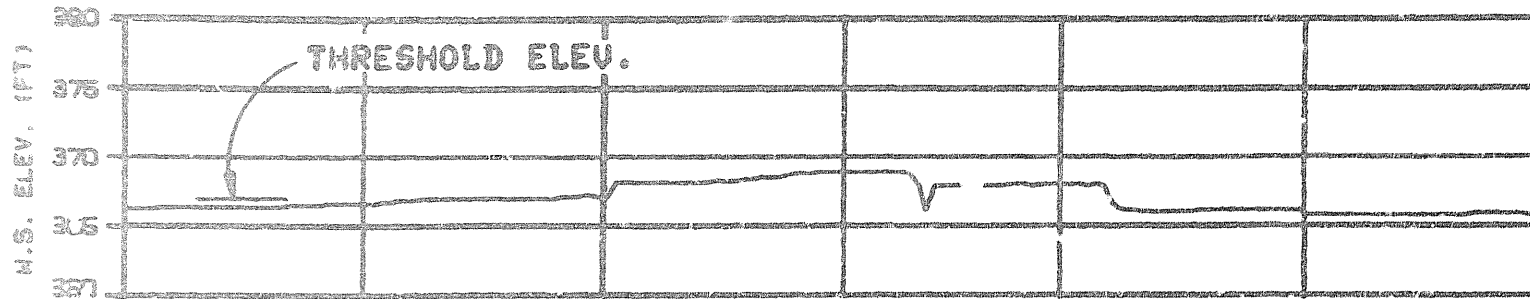


LEGEND:
 — ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE C TEMP: WARMEST WATER
 WATANA INTAKE 1800, HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
WARDA-EMASCO JOINT VENTURE		
DATE: 01/04/82	BY: JED/EN	REV: 002

021108?



HEAD OF WHISKERS SLOUGH

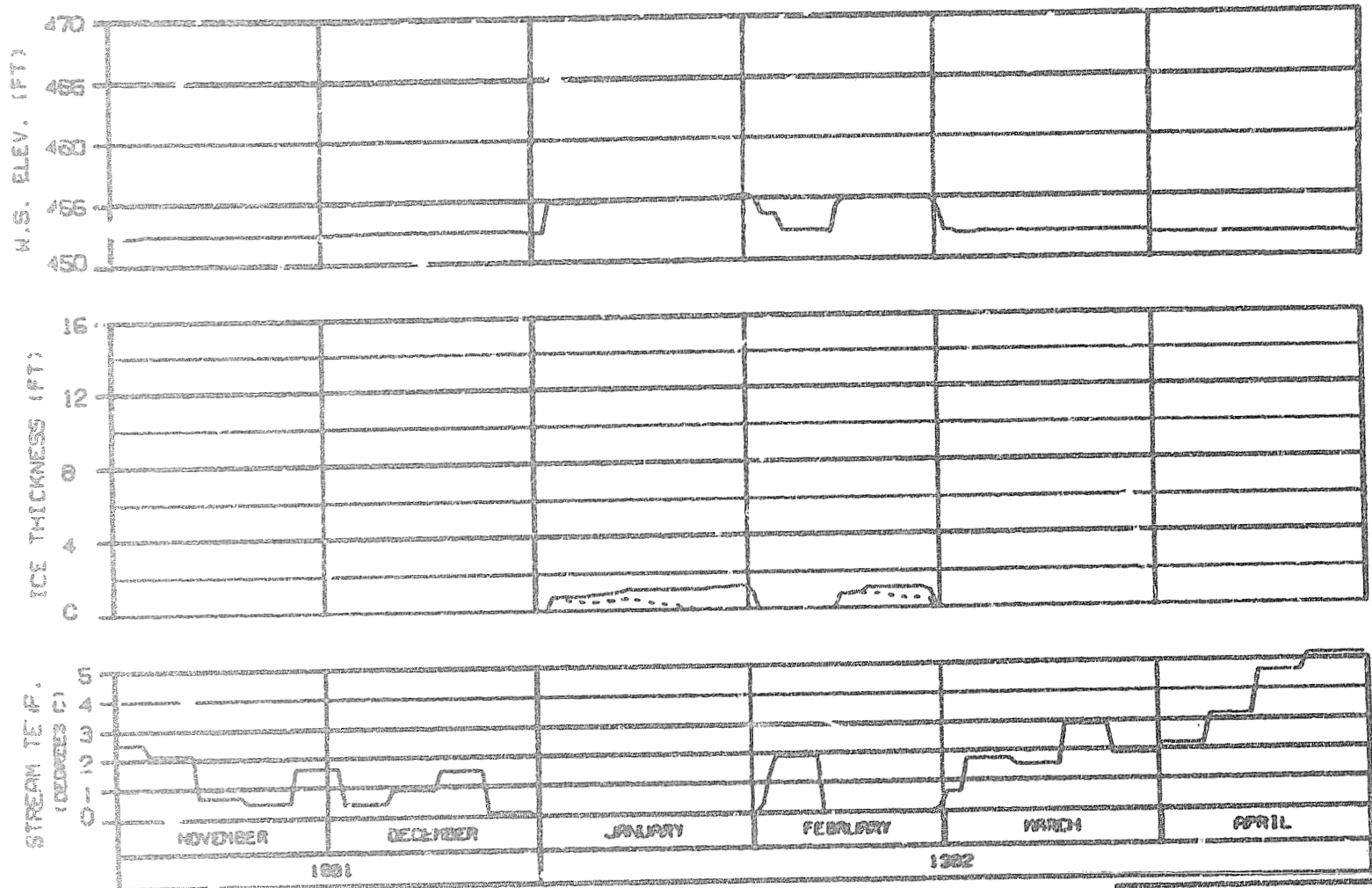
RIVER MILE : 101.50

ICE THICKNESS LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 NATANA INTAKE 1800, HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CXH

ALASKA POWER AUTHORITY	
GRAND PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARRA-EBRECO JOINT VENTURE	
DATE: 01-0-02	0 000 00
PAGE: 1-02	

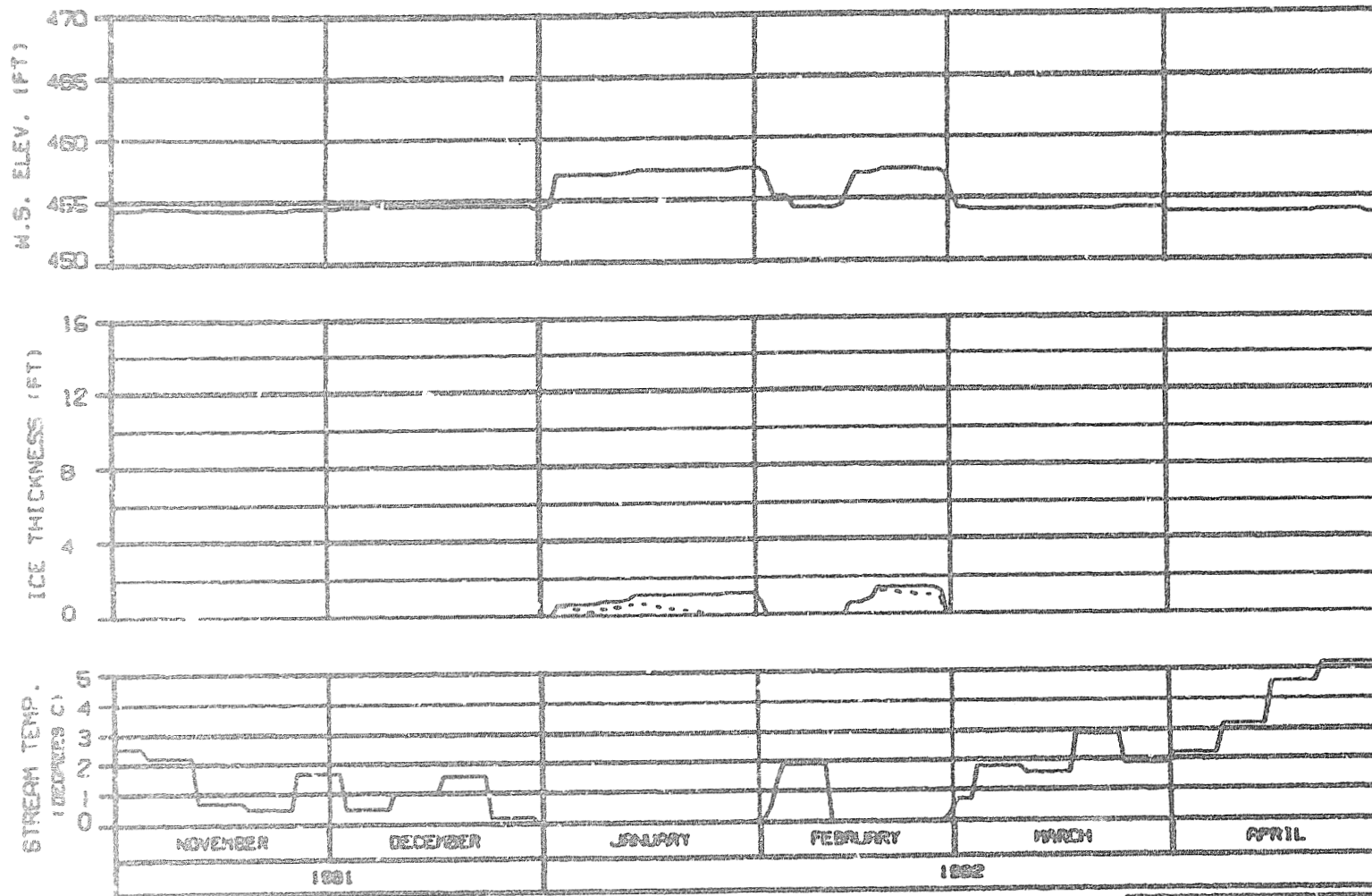


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. HARVEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRARD JOINT VENTURE		
DESIGNED: G.L. WARD	DRAWN BY: G. PER. CO.	1980.042

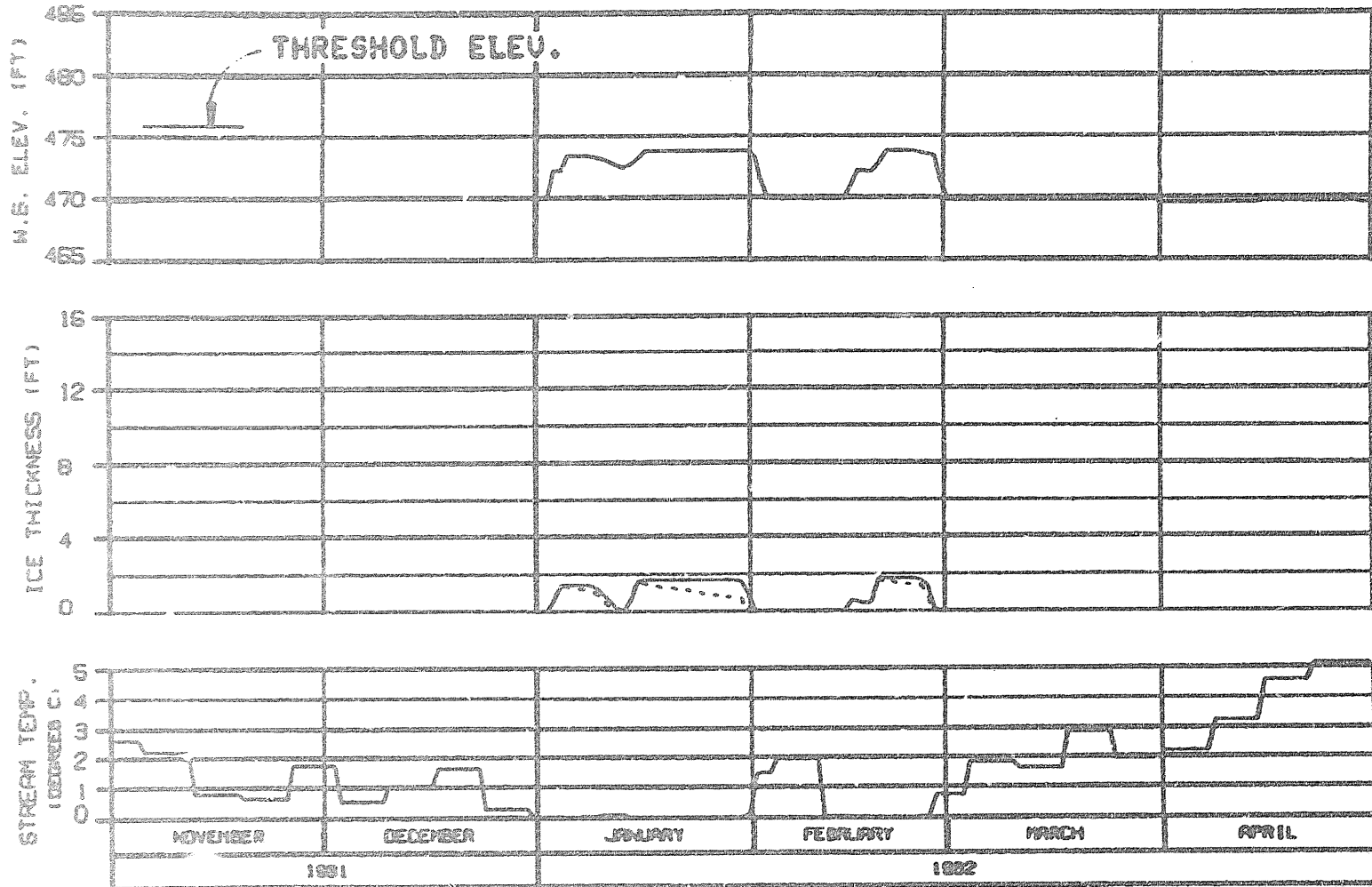


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 01020X

ALASKA POWER AUTHORITY	
OSIWA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBROO JOINT VENTURE	
CHUCKER - BARRON	0 FEB 82
	0802.142

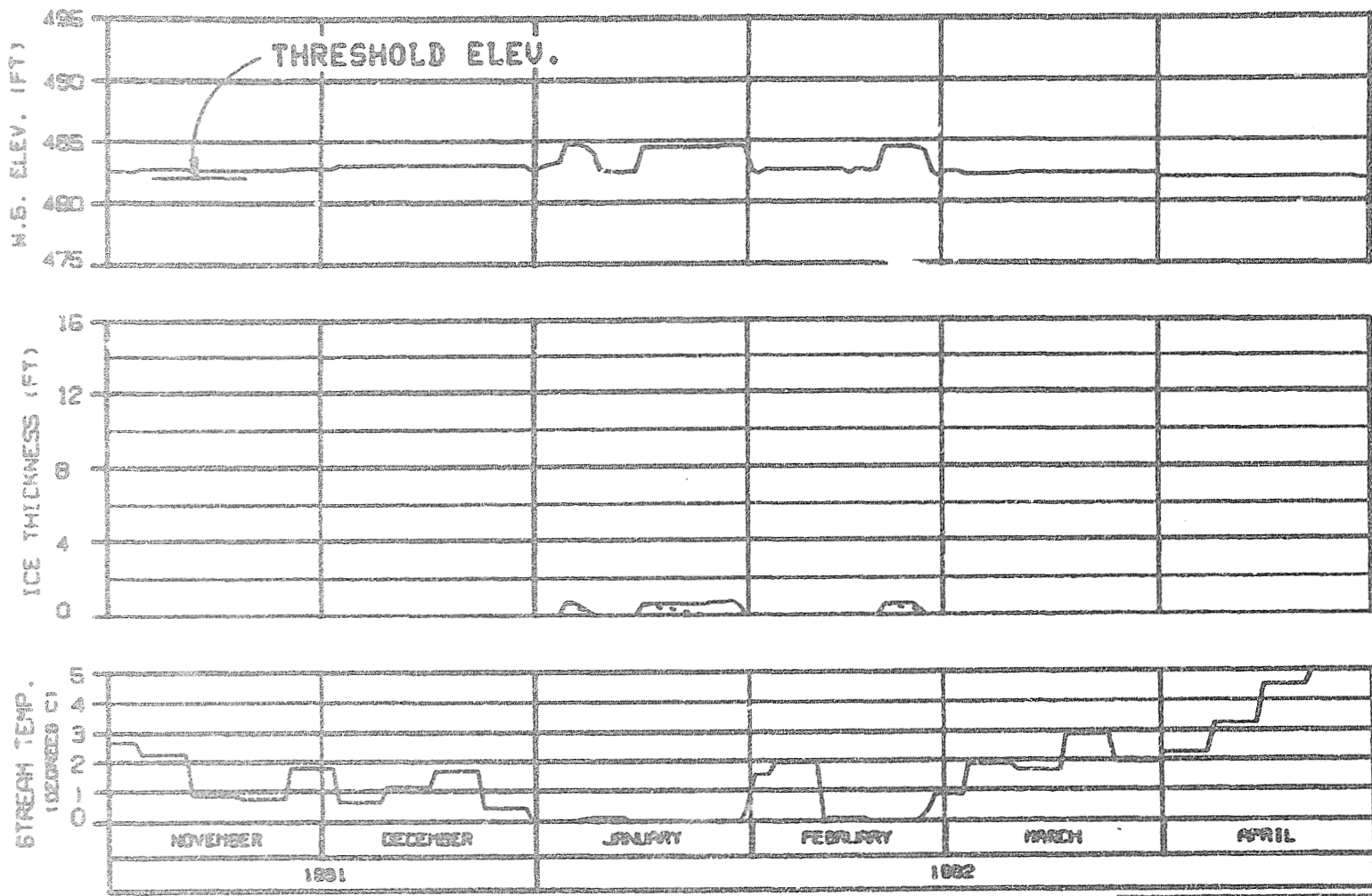


**HEAD OF SLOUGH 8
RIVER MILE : 114.10**

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 NATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY	
CASINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
04 JUN 82 09 00	0 102 CXH 1000.102

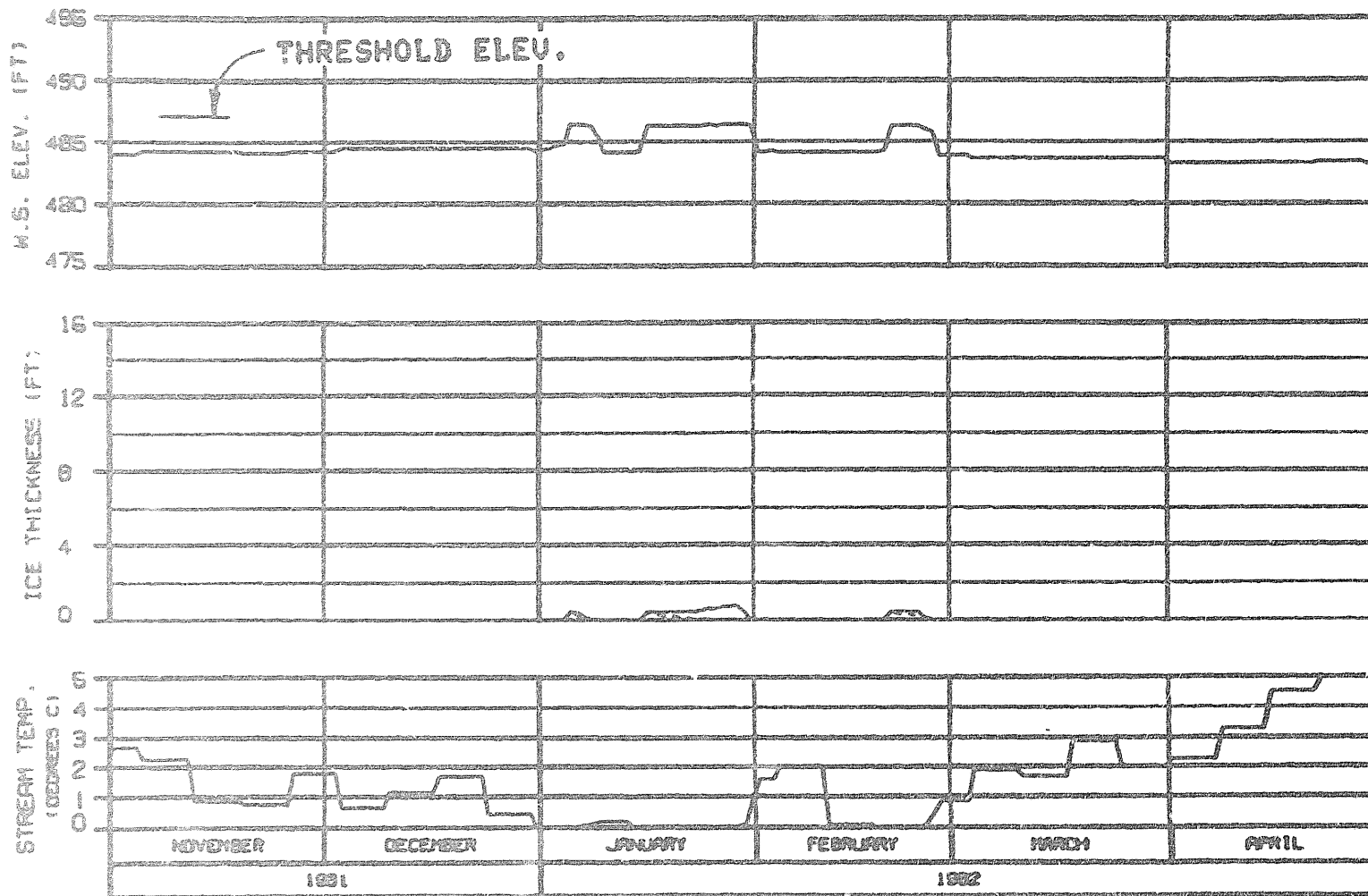


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUEH COMPONENT

SIDE CHANNEL MSII
 RIVER MILE : 115.50

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CXH

ALASKA POWER AUTHORITY		
SUBMITTA PROJECT		
SUSTITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRACD JOINT VENTURE		
ENGINEER: ALLAN BIRD	DATE: 02 FEB 92	1000.142



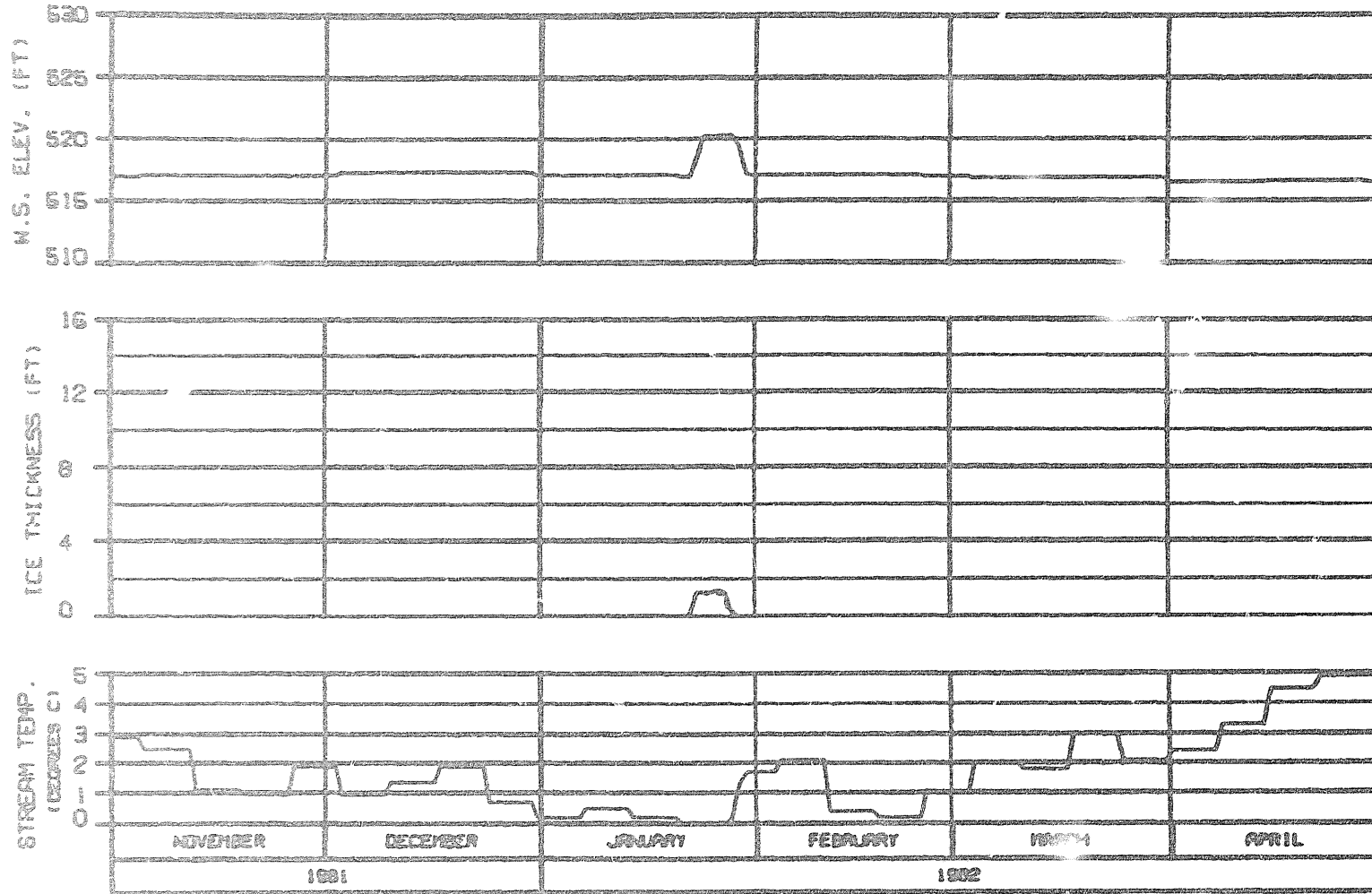
ICE THICKNESS LEGEND:

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

HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1600. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBERCO JOINT VENTURE		
DATE: 01/08/82	0 FEB 82	1982.142

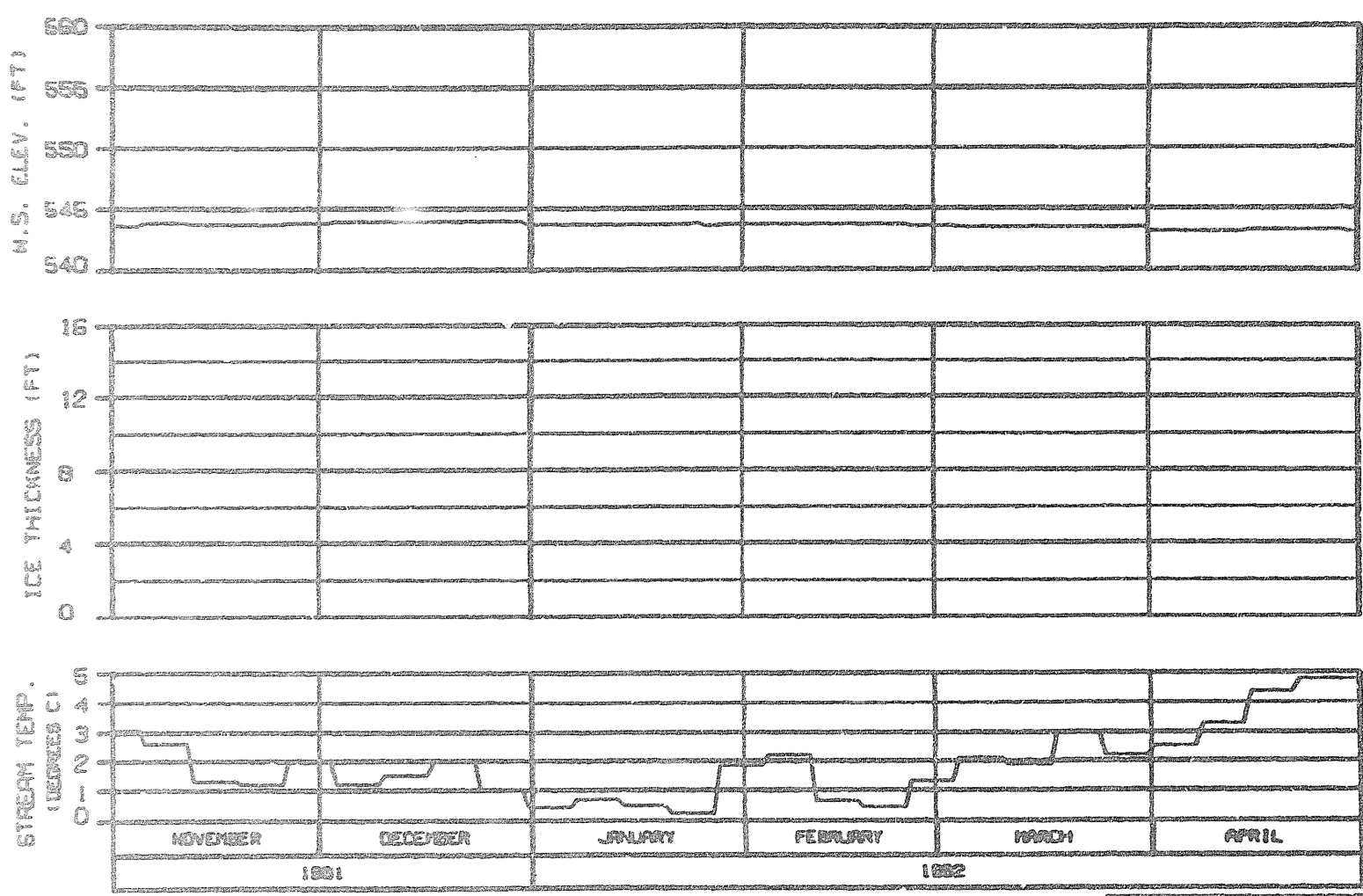


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 SLUSH COMPONENT

RIVER MILE : 120.00

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 MATANA INTAKE '900. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SLUITNA PROJECT		
SLUITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHUCK. BLANCHET	8 APR 82	028.142

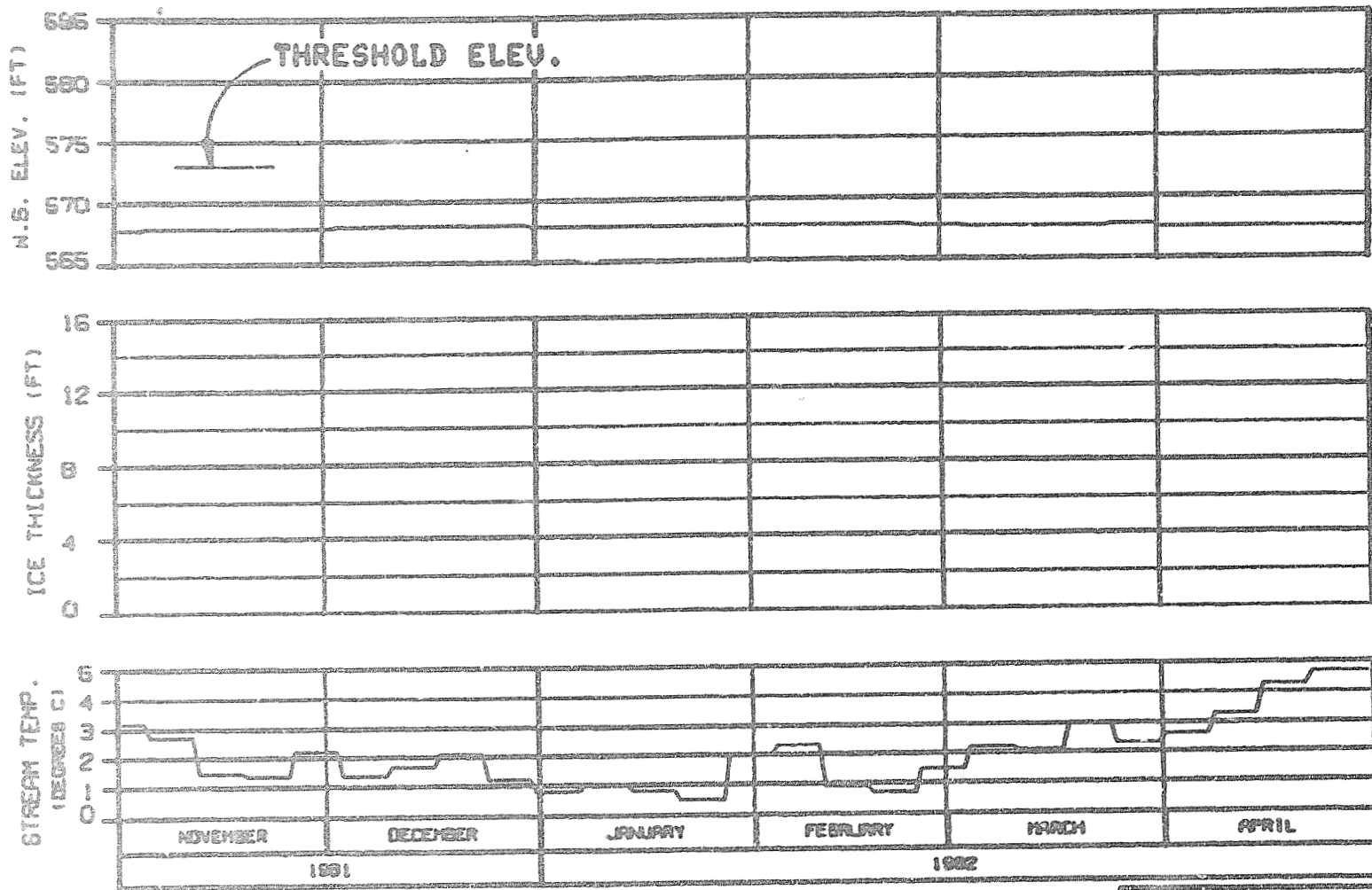


HEAD OF MOOSE SLOUGH
RIVER MILE : 123.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY	
GLACIER PROJECT	
SLISTNA RIVER ICE SIMULATION TIME HISTORY	
WARRA-EBRARD JOINT VENTURE	
DESIGN: ALP/MD	0 FEB 82
	2002.142

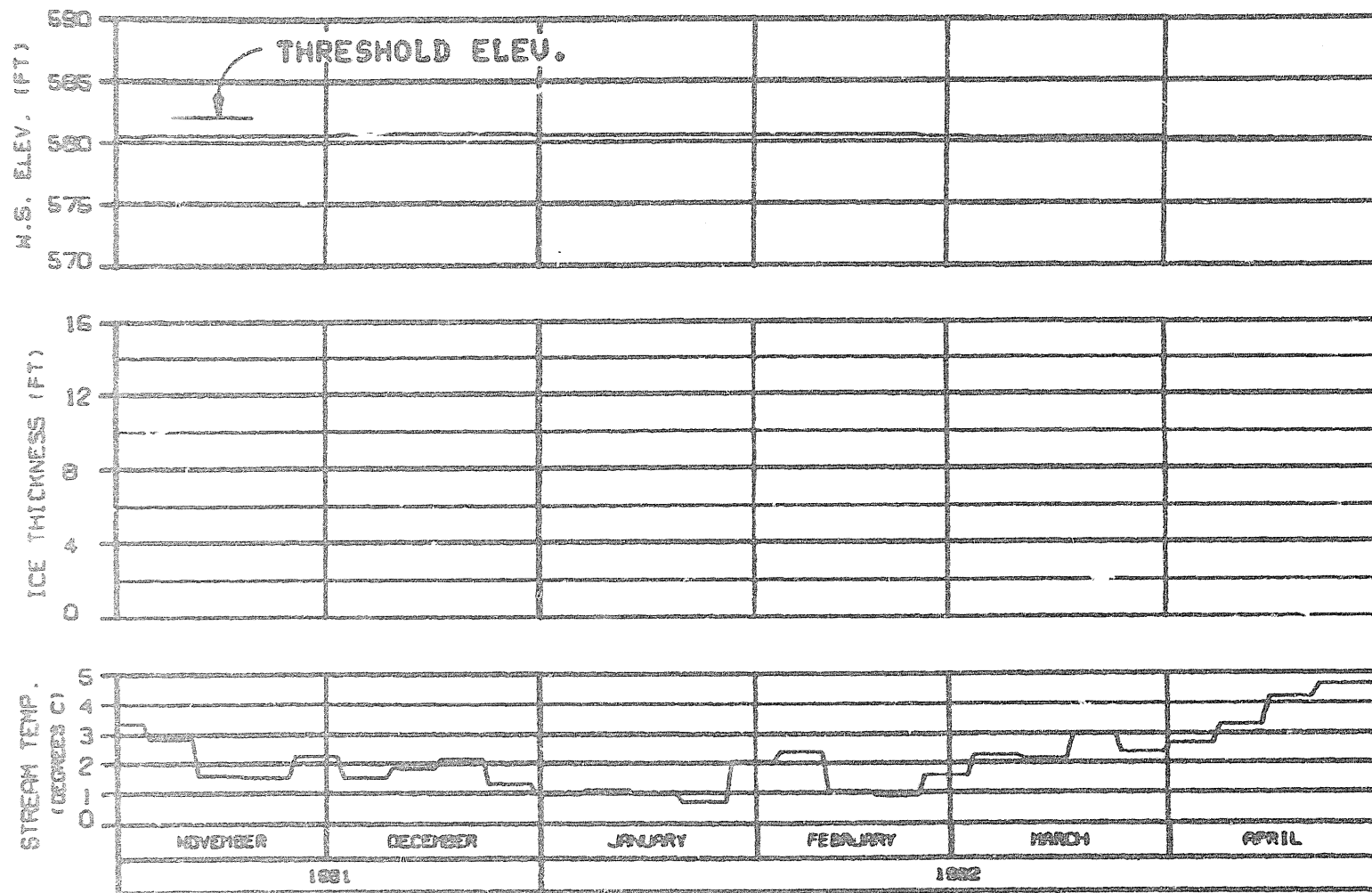


HEAD OF SLOUGH 8A (WEST)
 RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 NATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CXH

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EGASCO JOINT VENTURE		
000000 - 04/05/82	0 FEB 82	0000.142

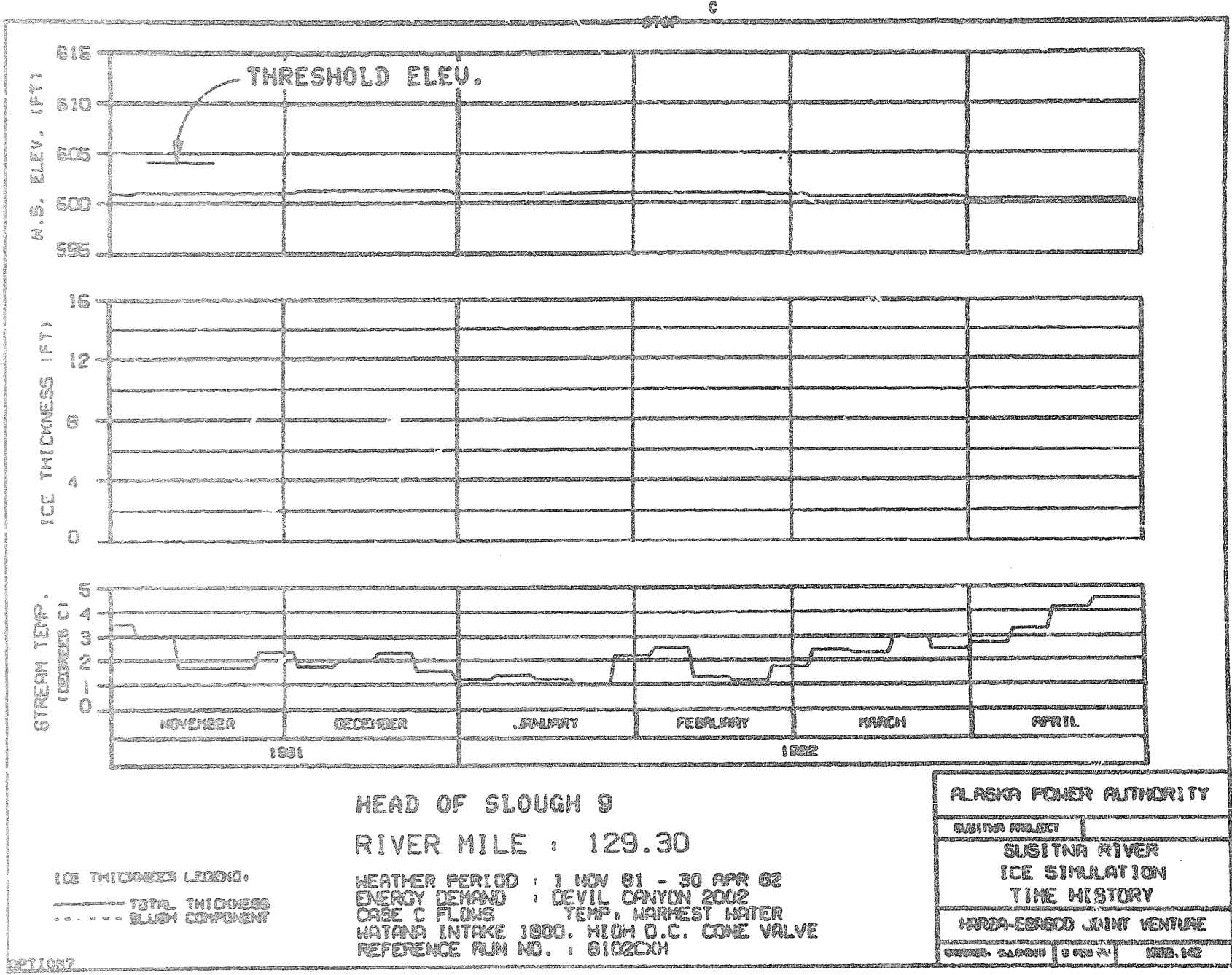


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

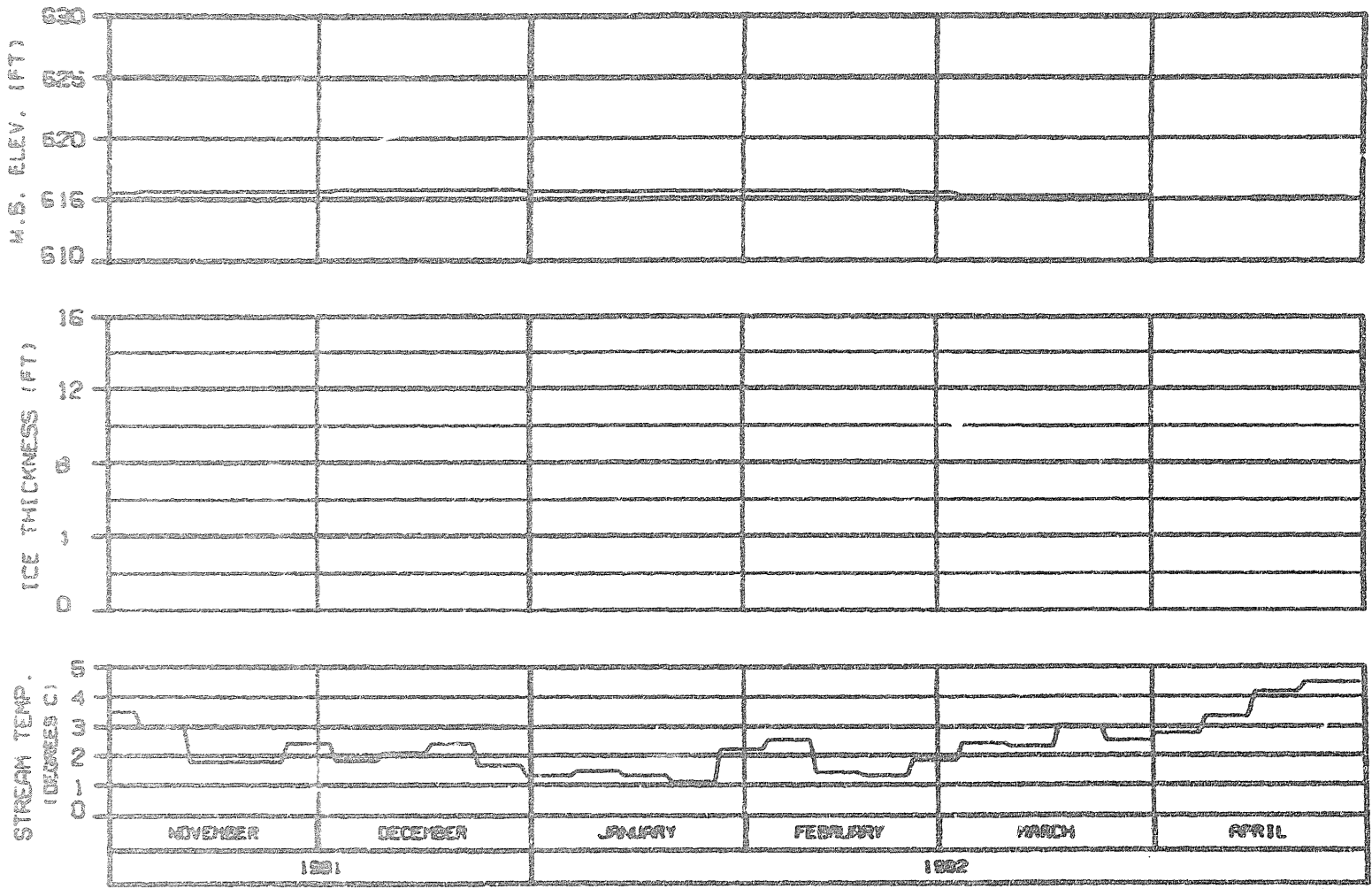
ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 MATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARD-EDGECOM JOINT VENTURE	
DESIGNED BY	8 FEB 82
DRAWN BY	8202.142



OPTION?

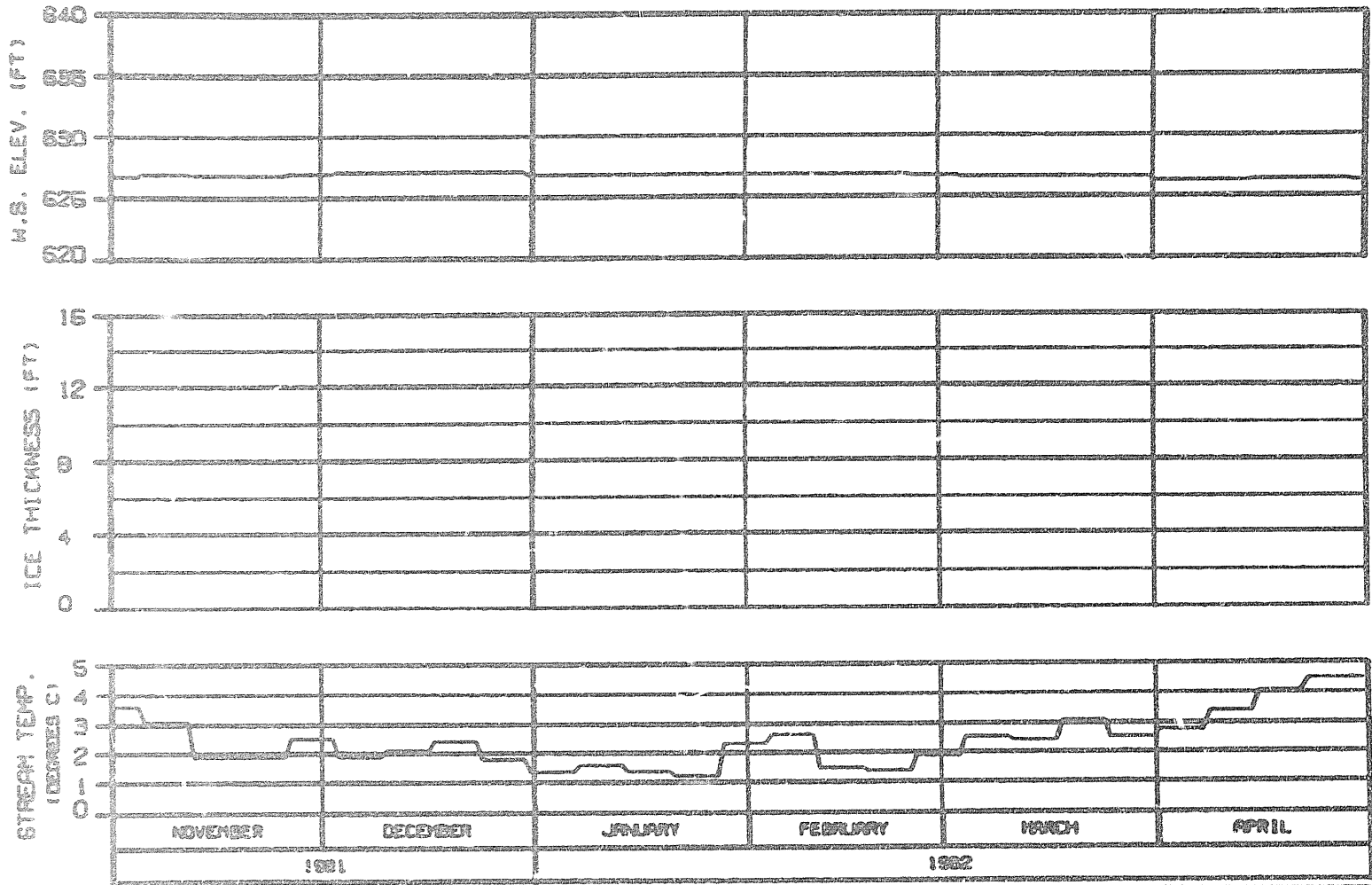


ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 BLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
GUSTINA PROJECT		
GUSTINA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EDASCO JOINT VENTURE		
CHARGE: 8102CXH	DATE: 0 FEB 92	ISS: 142

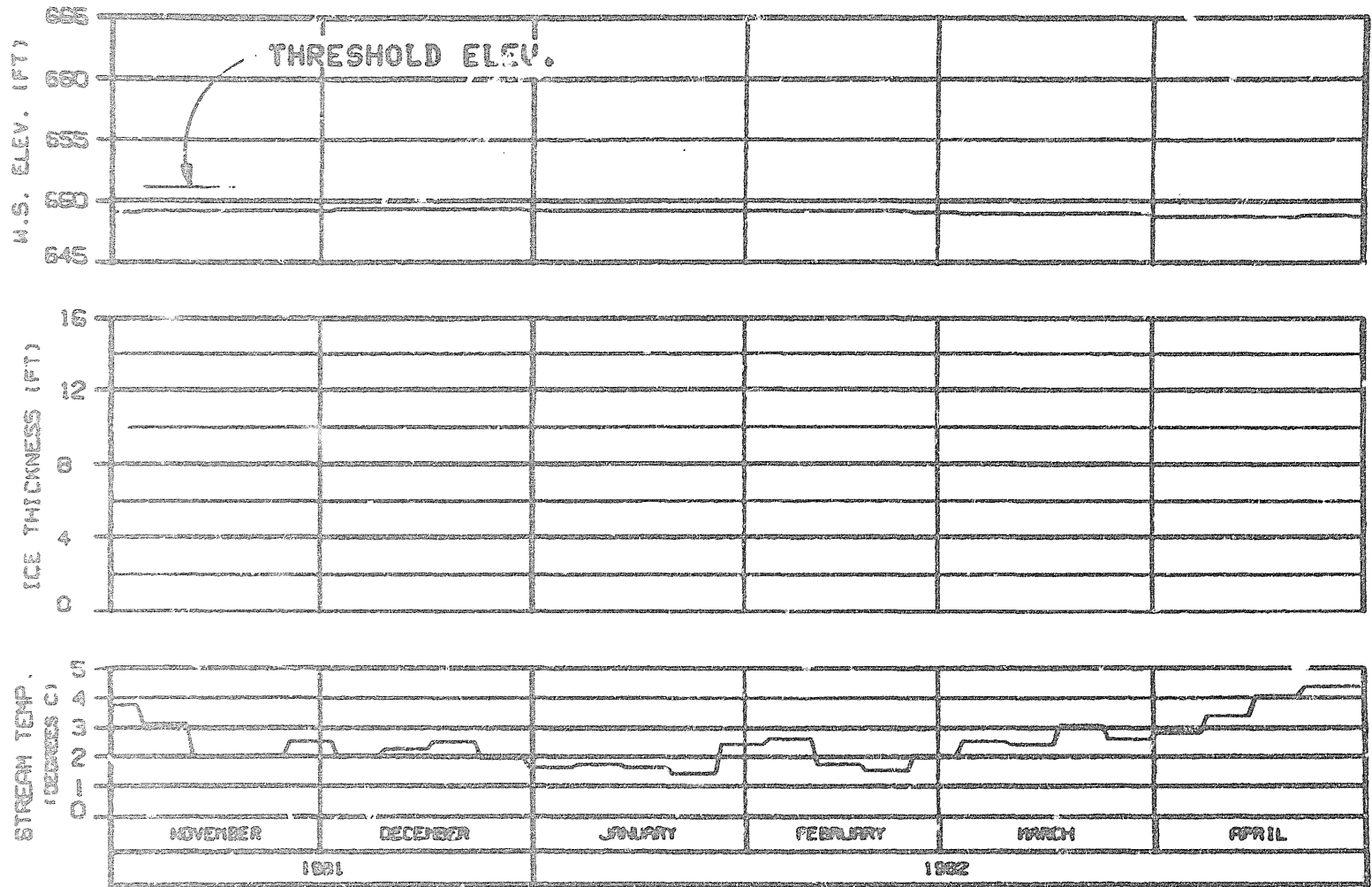


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUEH COMPONENT

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CXH

ALASKA POWER AUTHORITY		
DISTRICT PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
MURZA-EBERCO JOINT VENTURE		
DESIGNED: G.L. HARRIS	DRAWN BY: D. FERGUSON	DATE: MAR 82

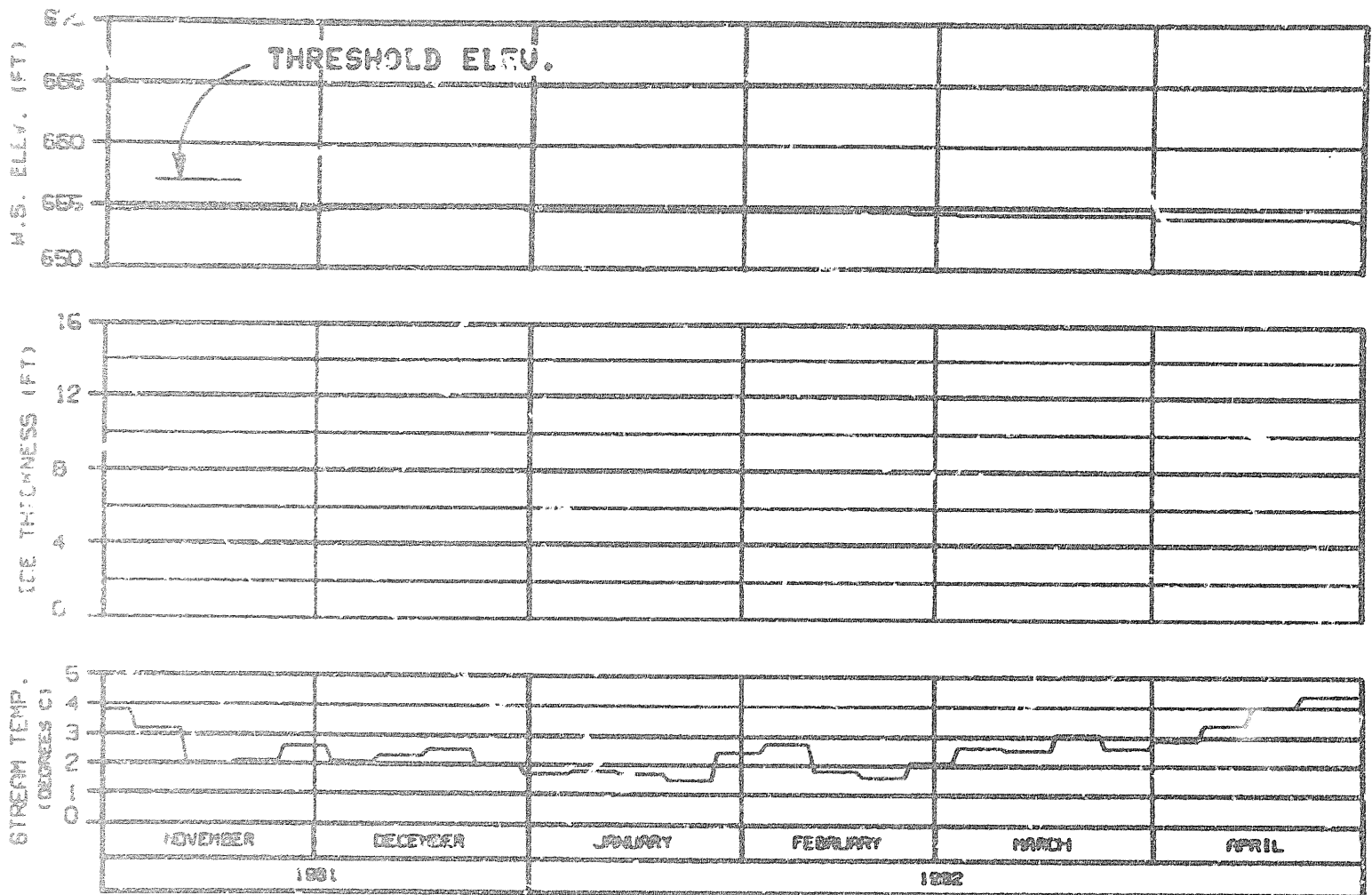


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 0102CXH

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ENERSCO JOINT VENTURE	
GROUP, ALP-800	9 FEB 82
	1000.142

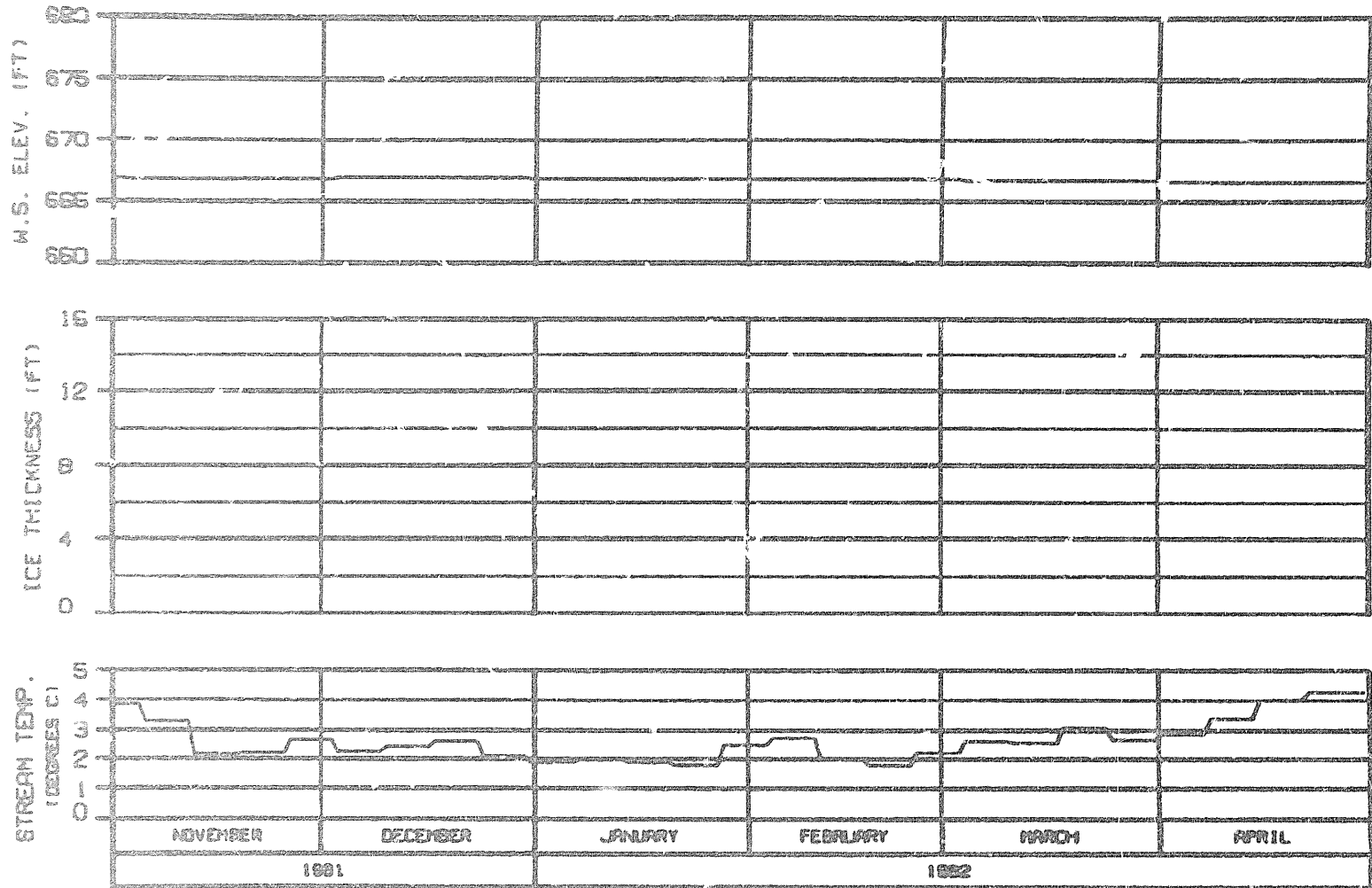


SIDE CHANNEL U/S OF SLOUGH 19
RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 MATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE PLAN NO. : B102CXH

ALASKA POWER AUTHORITY		
SUBMITTA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WAPZA-EBRACO JOINT VENTURE		
DATE: 11/28/81	BY: JES	FIG. 14C

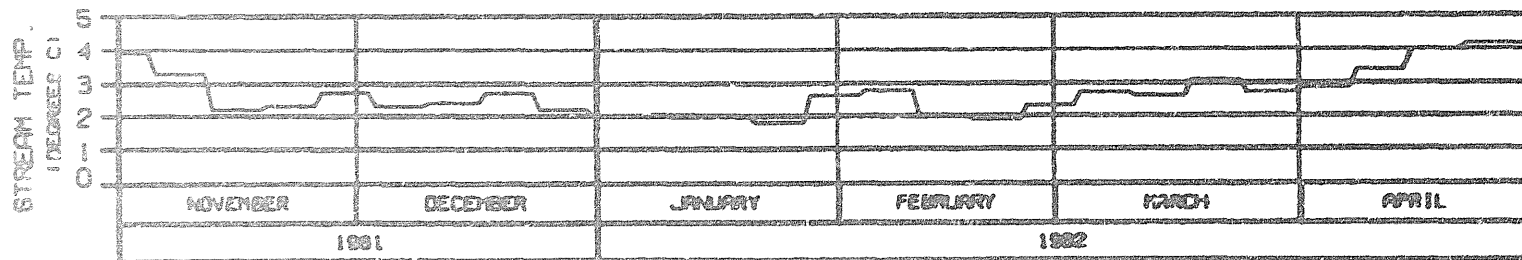
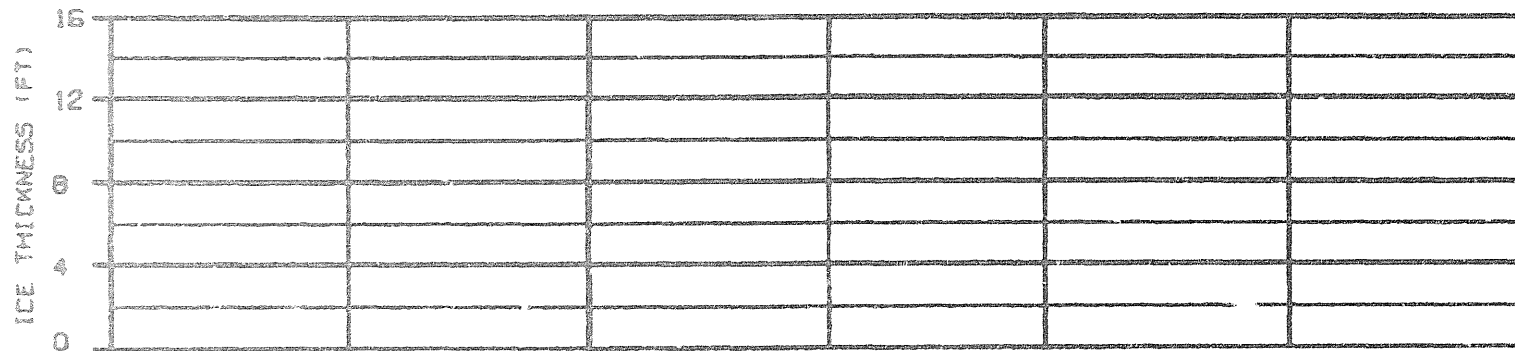
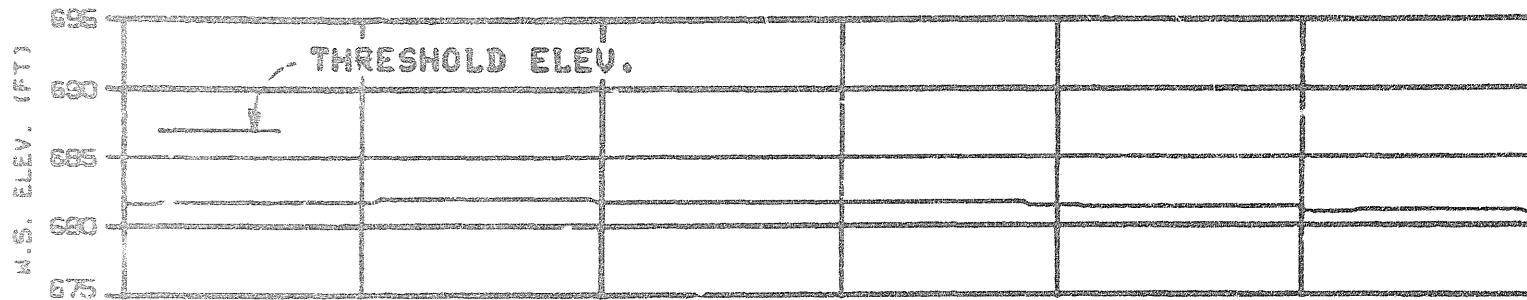


SIDE CHANNEL D/S CF SLOUGH 11
 RIVER MILE : 135.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP, WARMEST WATER
 NATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102DXH

ALASKA POWER AUTHORITY		
INSTINA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
MARSA-CORASCO JOINT VENTURE		
START: 01.00.00	0 FEB 82	1200.142

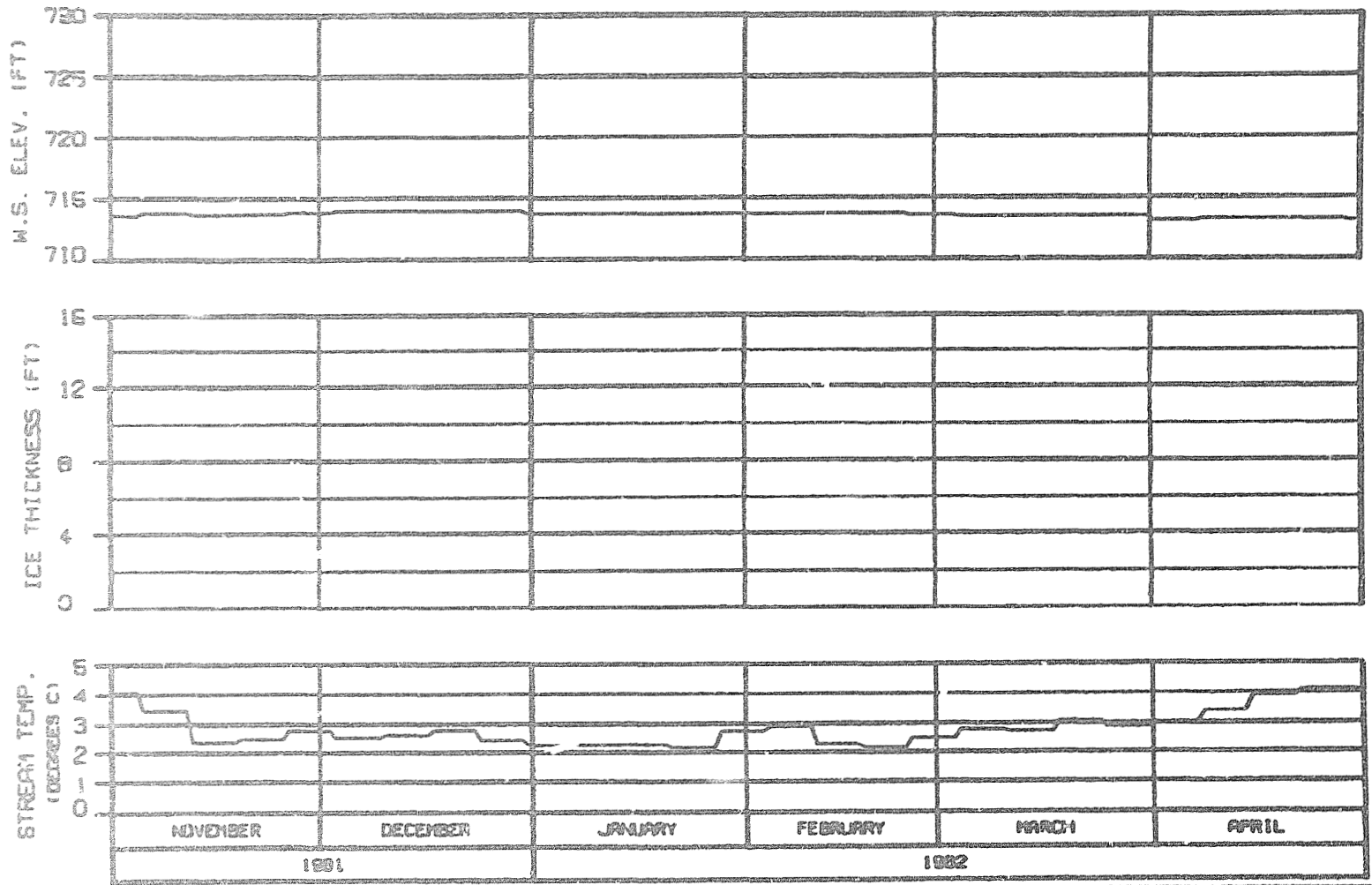


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 NATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBAGOD JOINT VENTURE	
ENGINEER: GILBERTO	DRAWN BY: 142

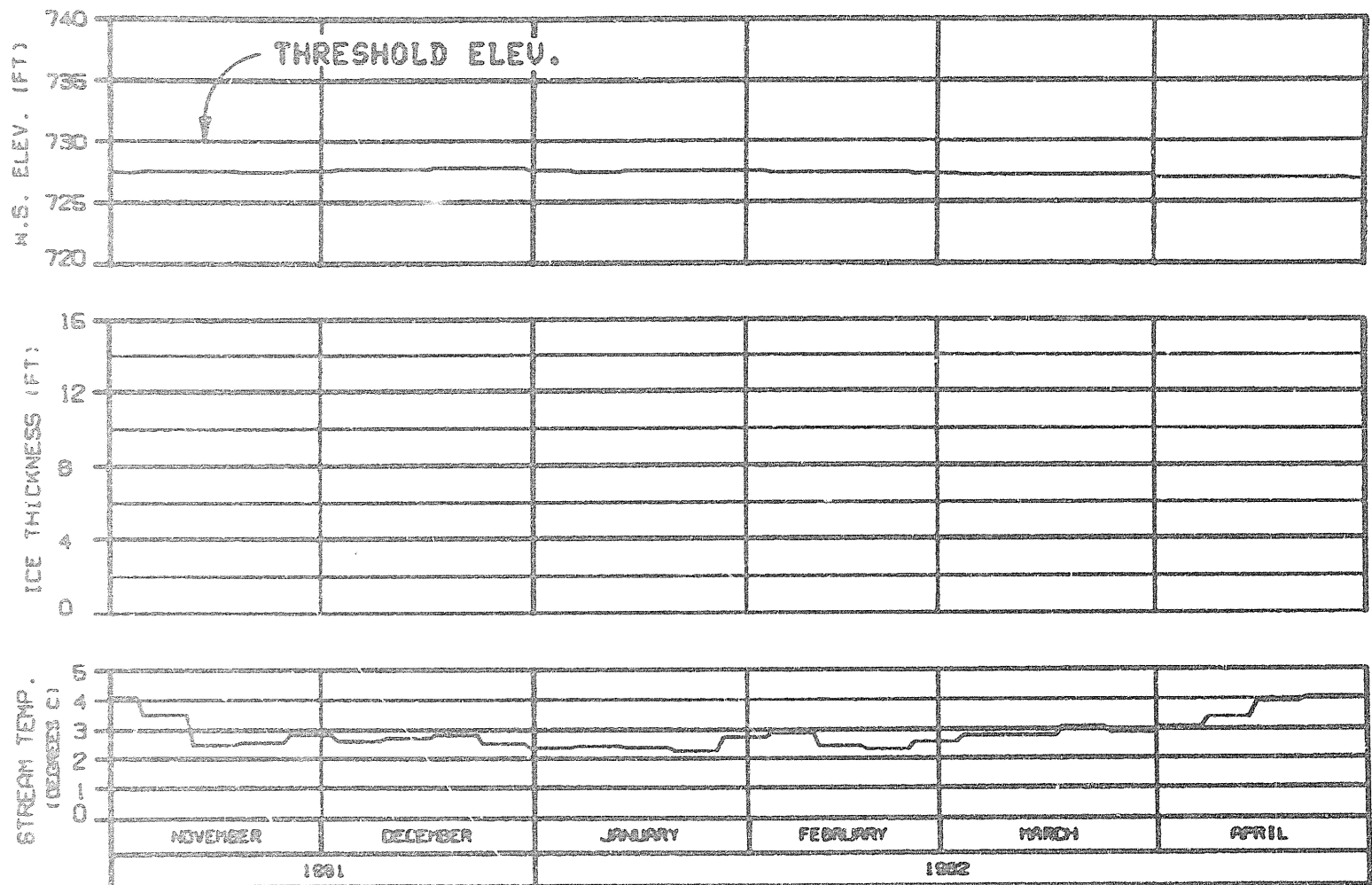


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
REVISED -	DATE	BY
DRAWN -		1000.142

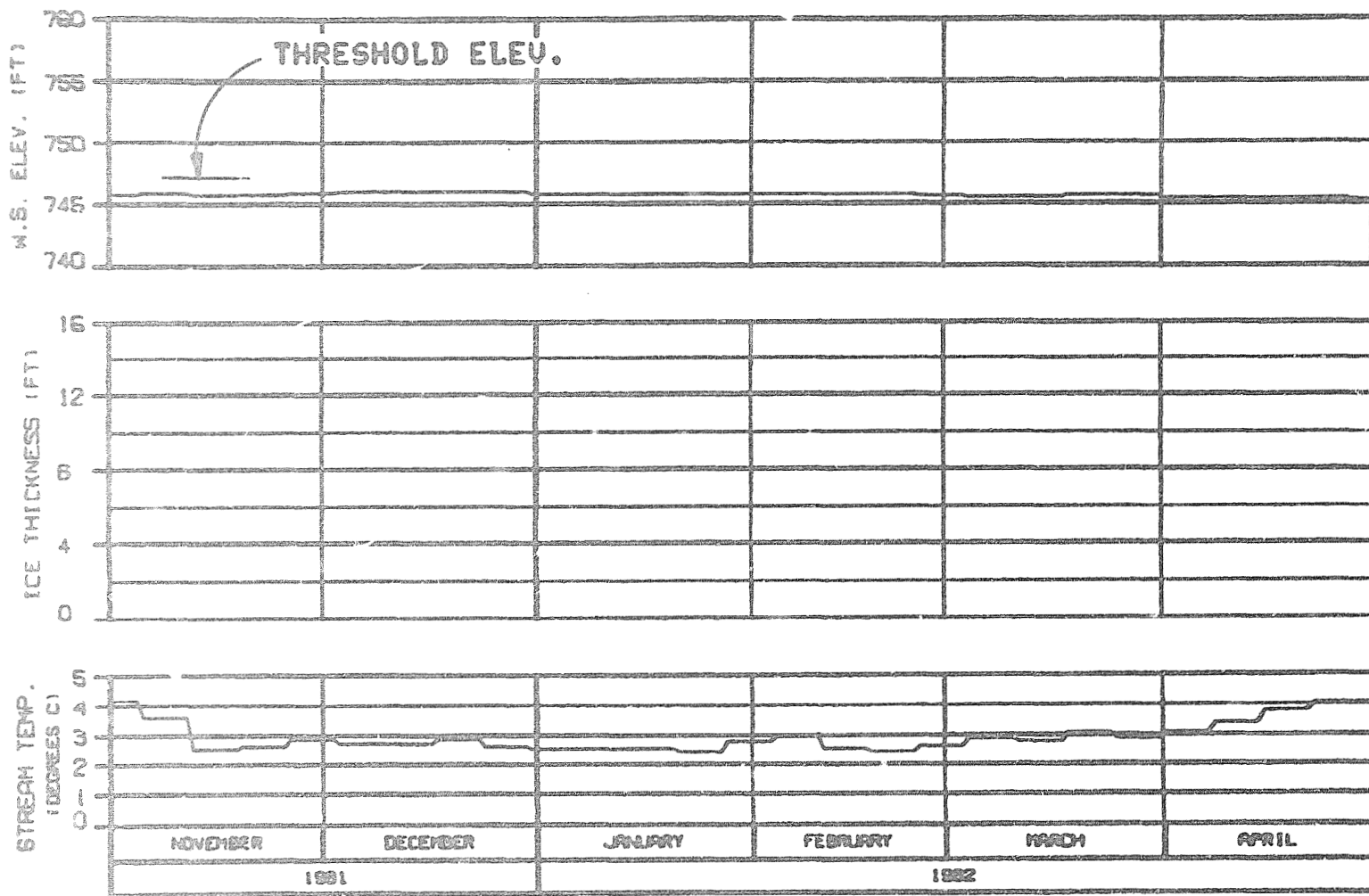


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRACO JOINT VENTURE	
CHARGE: 01-0000	5 FEB 82
1989.142	

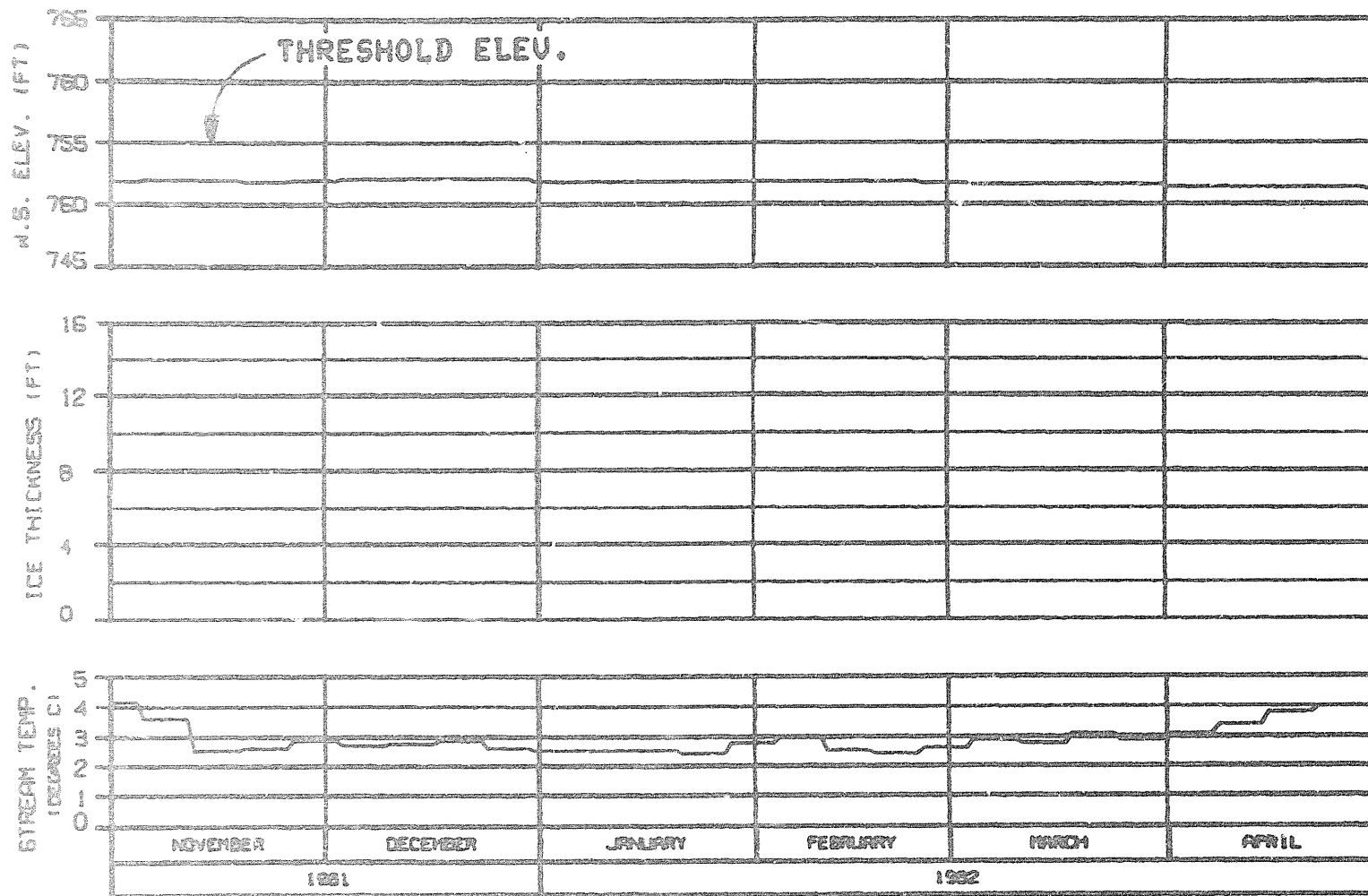


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP. WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
DESIGNED BY	DATE	PROJECT NO.
		1982-142

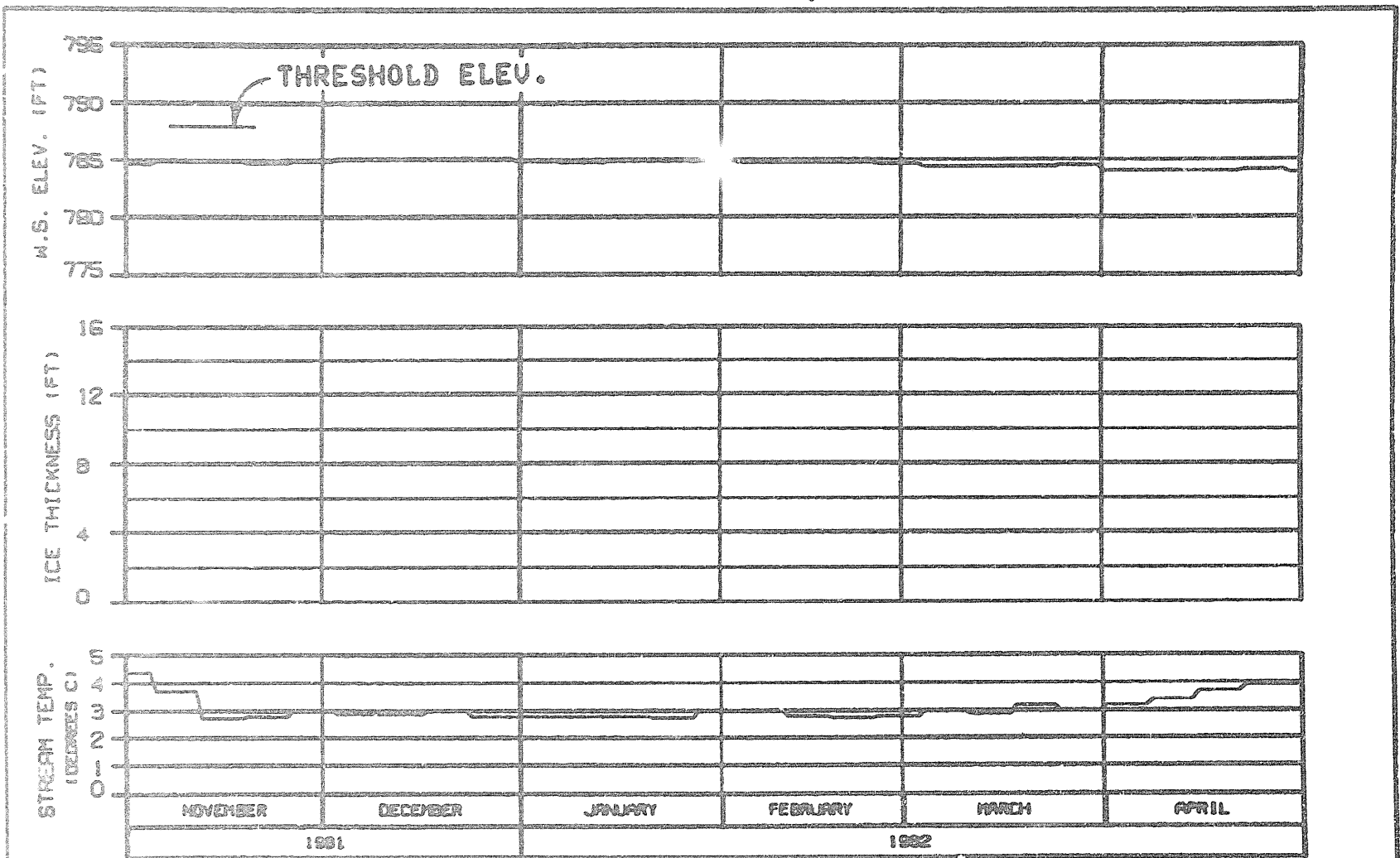


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 21
 RIVER MILE : 142.20

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANA INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CXH

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBRSCO JOINT VENTURE		
DESIGNED: B.L. POPE	DRAWN: G. FRED CO.	NOV. 1982



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

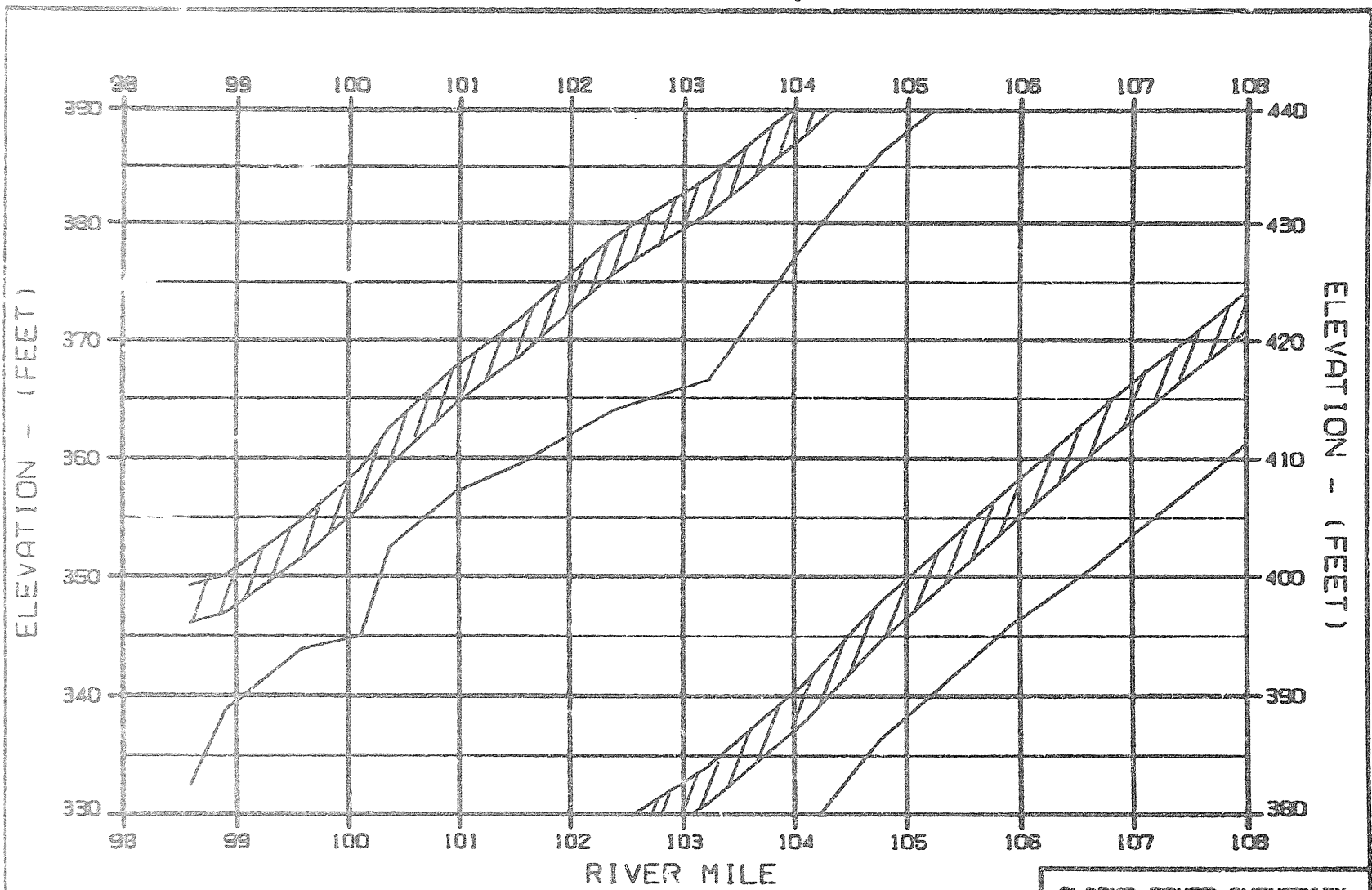
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT



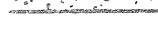

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE C FLOWS TEMP: WARMEST WATER
 WATANAI INTAKE 1800. HIGH D.C. CONE VALVE
 REFERENCE RUN NO. : 8102CKH

ALASKA POWER AUTHORITY	
SUSTITNA PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBAGCO JOINT VENTURE	
DESIGNED - G.L.P. 02/92	10 FEB 92
10000-149	

OPTION?

EXHIBIT S



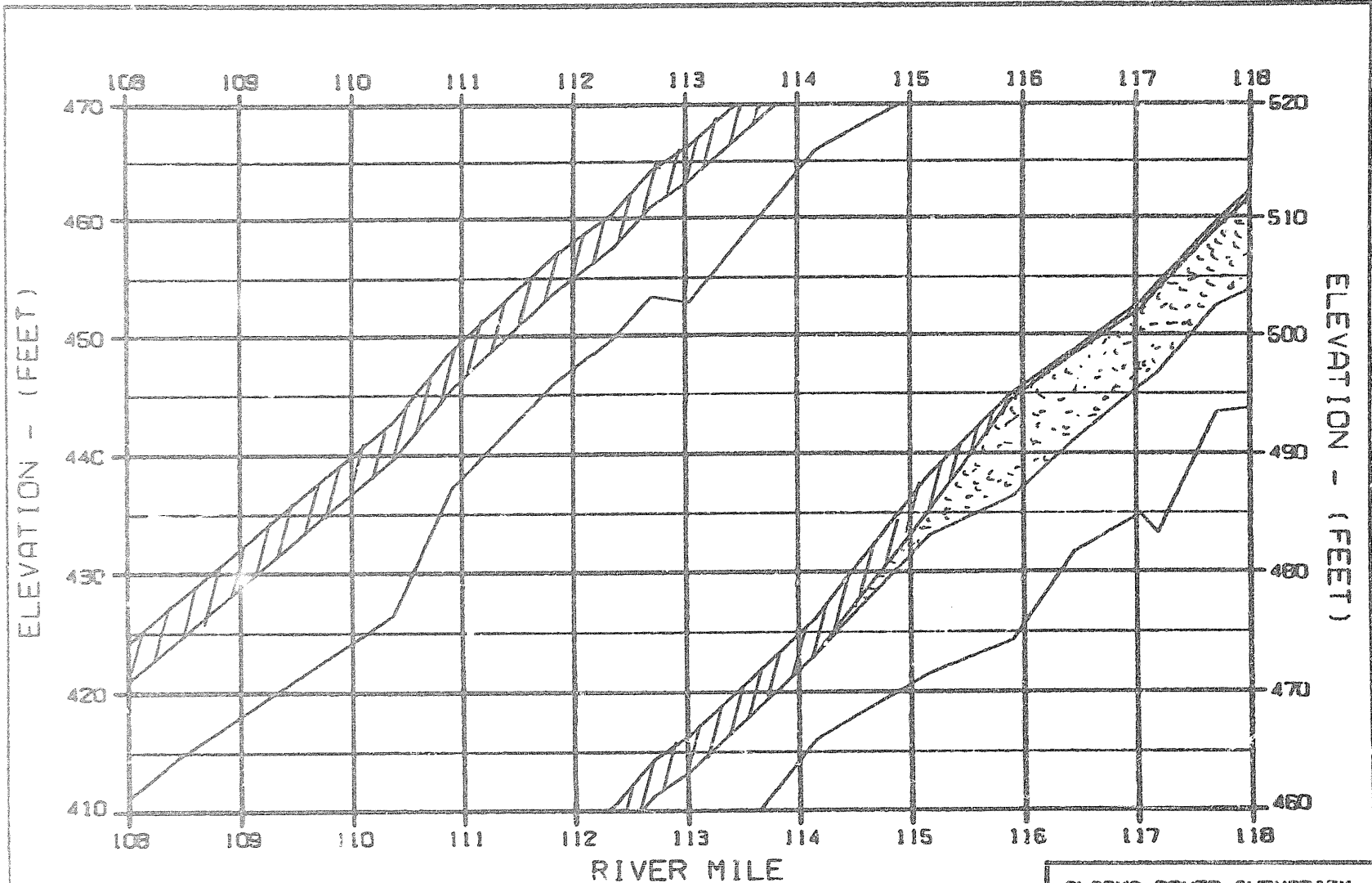
LEGEND:
 TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 BOTTOM OF SLUSH ICE
 RIVER BED

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. : 0101ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
CHECKED: ALLIANCE	BY: HED GIB	1000.142

OPTION?

C



ELEVATION - (FEET)

ELEVATION - (FEET)

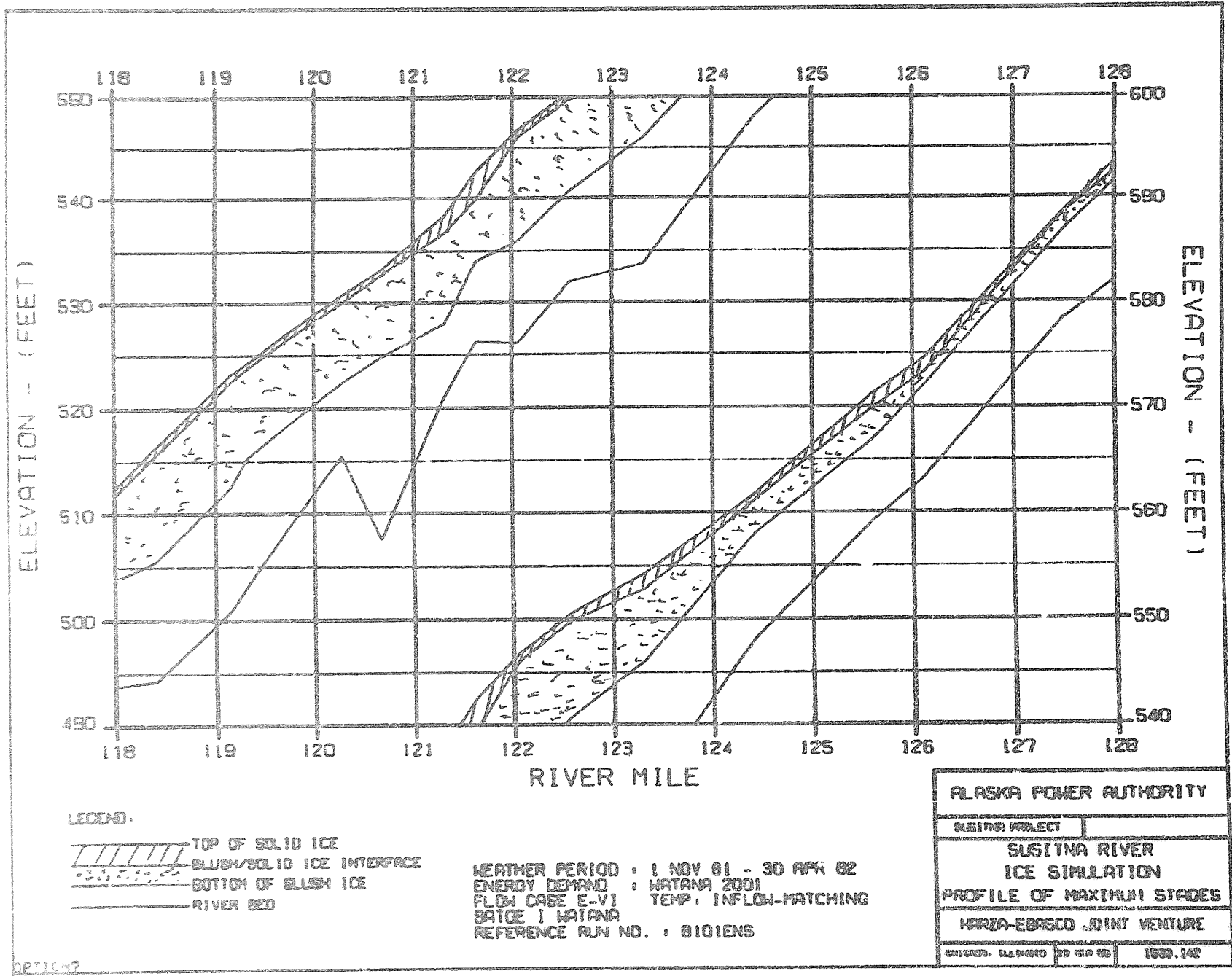
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : MATANA 2001
 FLOW CASE E-V1 TEMP. INFLOW-MATCHING
 SATOE I MATANA
 REFERENCE RUN NO. : 0101ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EDASCO JOINT VENTURE	
DESIGN: ELLIOTT 78 APR 82	1000.142

OPTION?

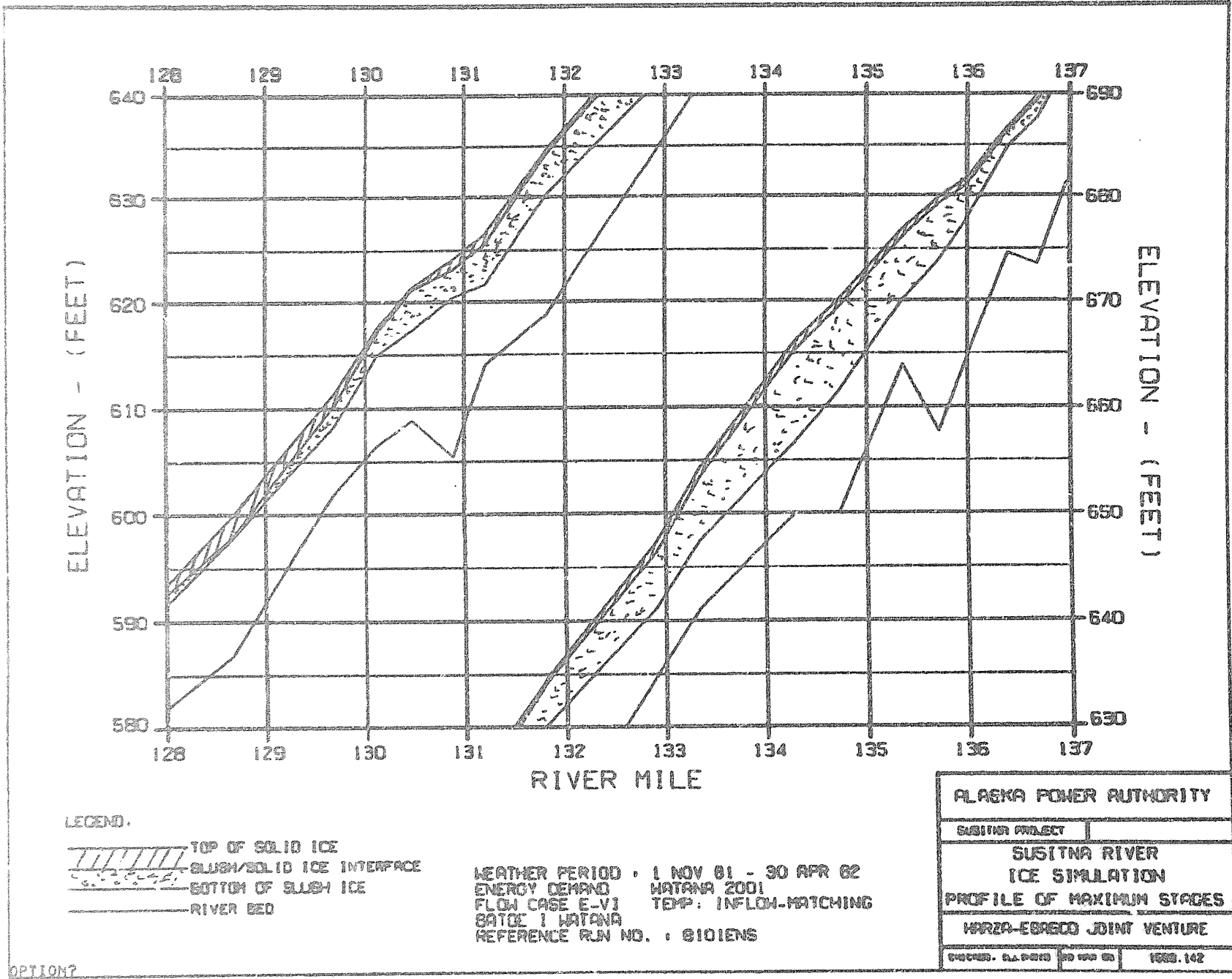


LEGEND:

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

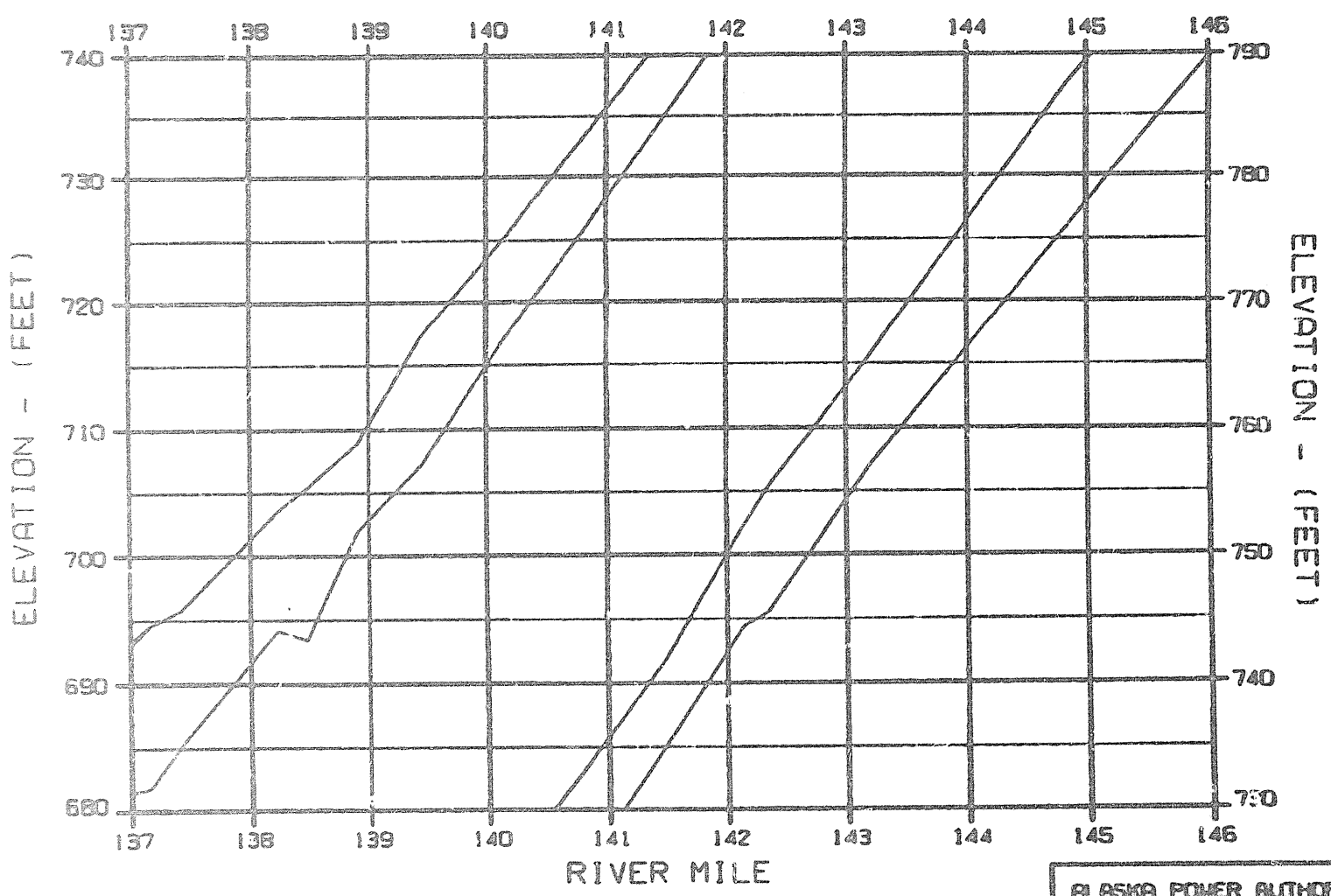
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 FLOW CASE E-V) TEMP. INFLOW-MATCHING
 SATCE 1 WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-ENSCO JOINT VENTURE		
CONTR. NUMBER	NO. OF SHEETS	DATE
10000-142	10	1982.142



OPTION?

c



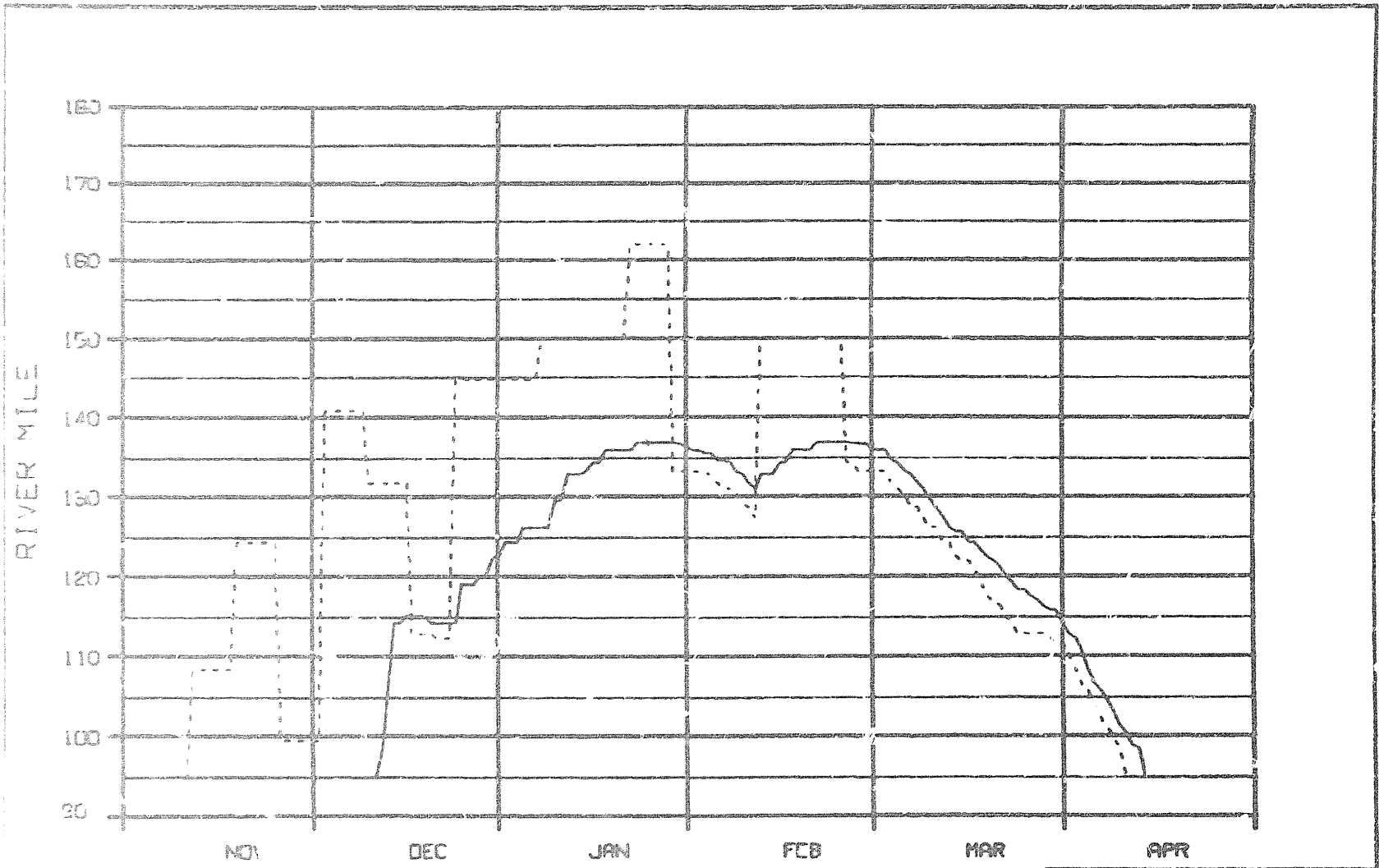
LEGEND:

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

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EBASCO JOINT VENTURE		
DATE: 04/01/82	BY: GED/ES	3643.142

OPTION?



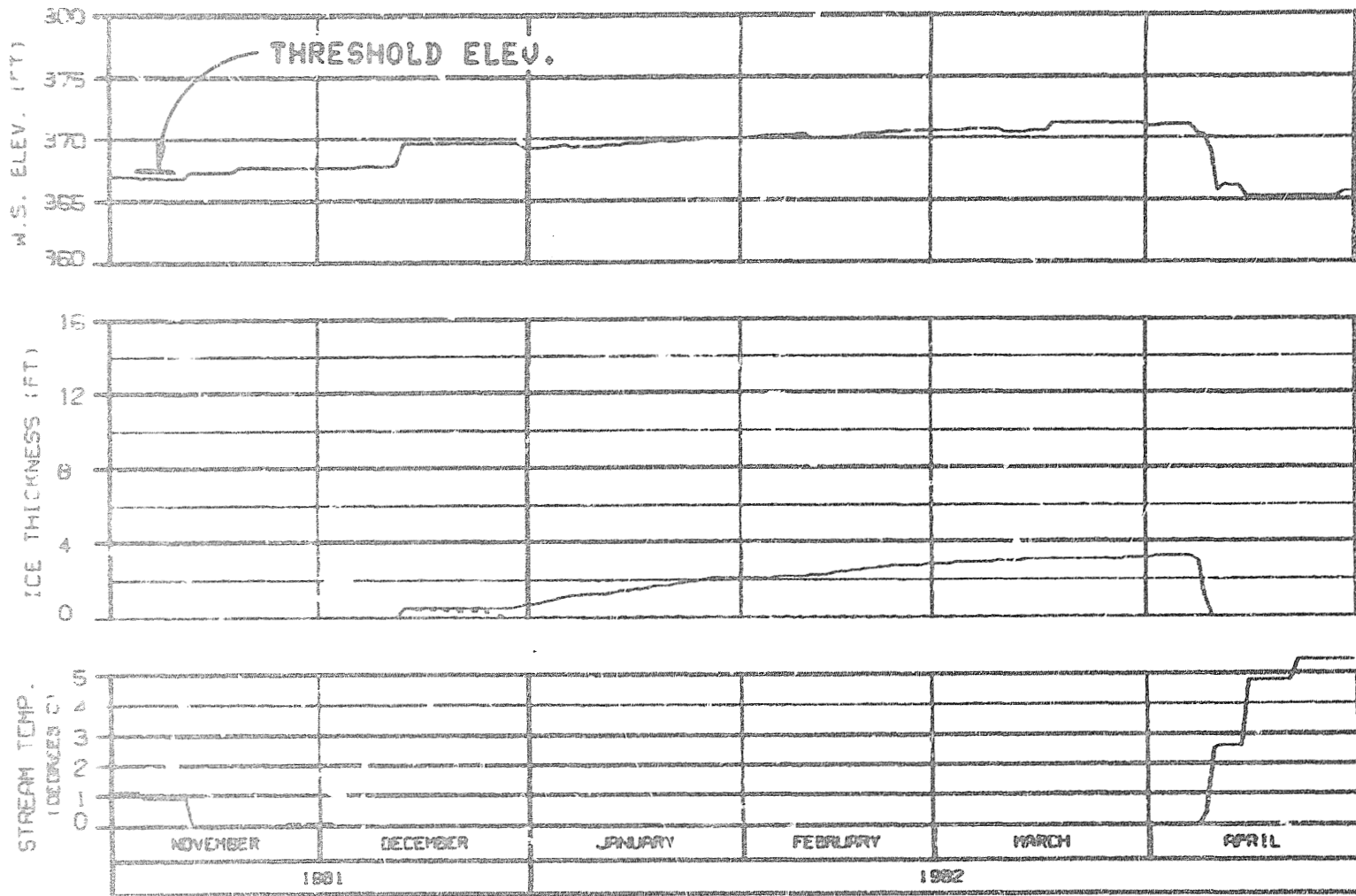
LEGEND

- ICE FRONT
- ZERO DEGREE ISOTHERM

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

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT		
& ZERO DEGREE ISO THERM		
WARZA-EBASCO JOINT VENTURE		
DATE: 11/10/81	BY: JPD/MS	1023.142

DETAILS



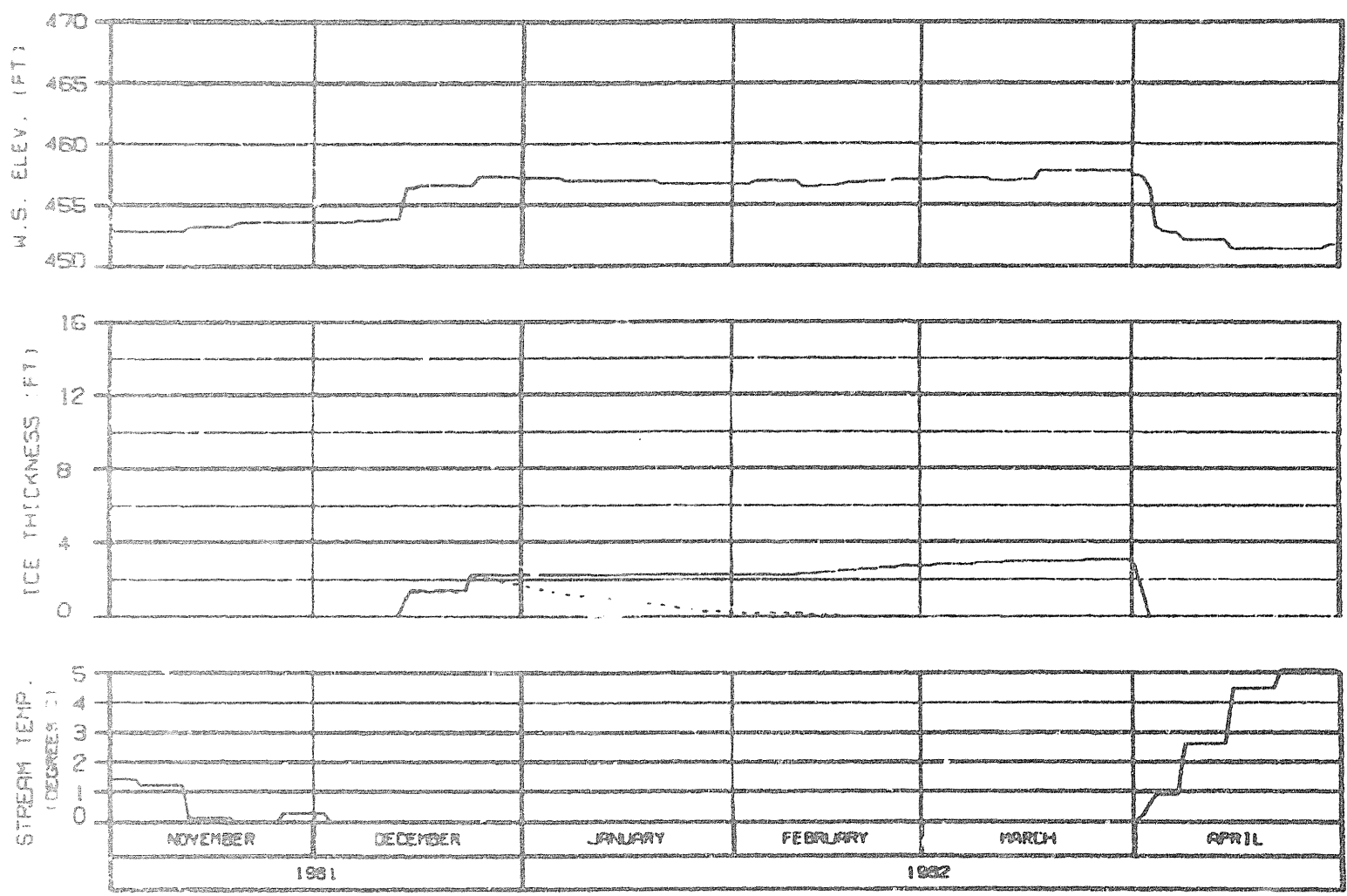
HEAD OF WHISKERS SLOUGH

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		
SLEIPNER PROJECT		
SUKTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHART NO. 142	DATE 04/01/82	1000.142



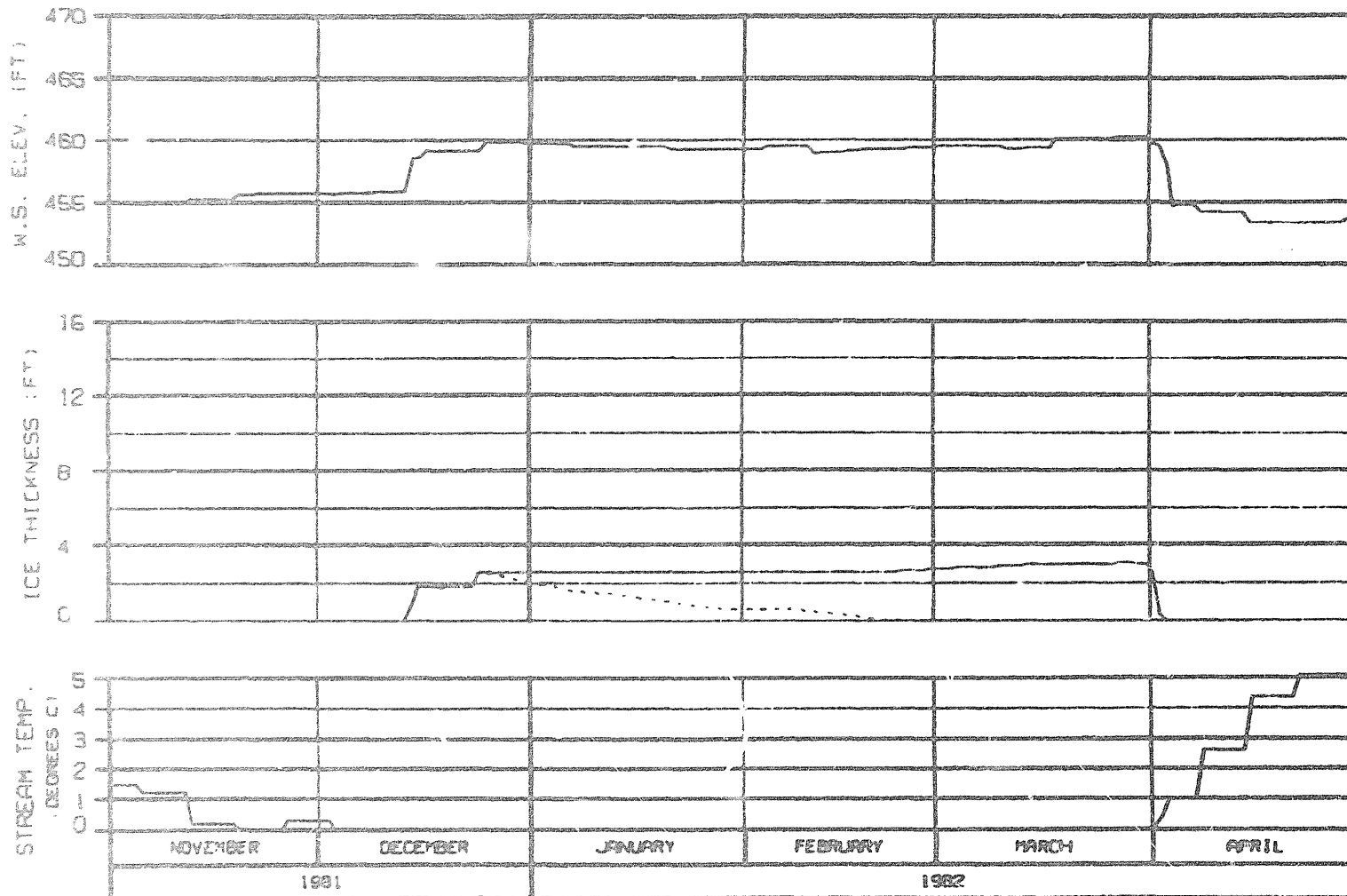
SIDE CHANNEL AT HEAD OF GASH CREEK

RIVER MILE : 112.00

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : A10LENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DATE: 01.11.82	1563.142

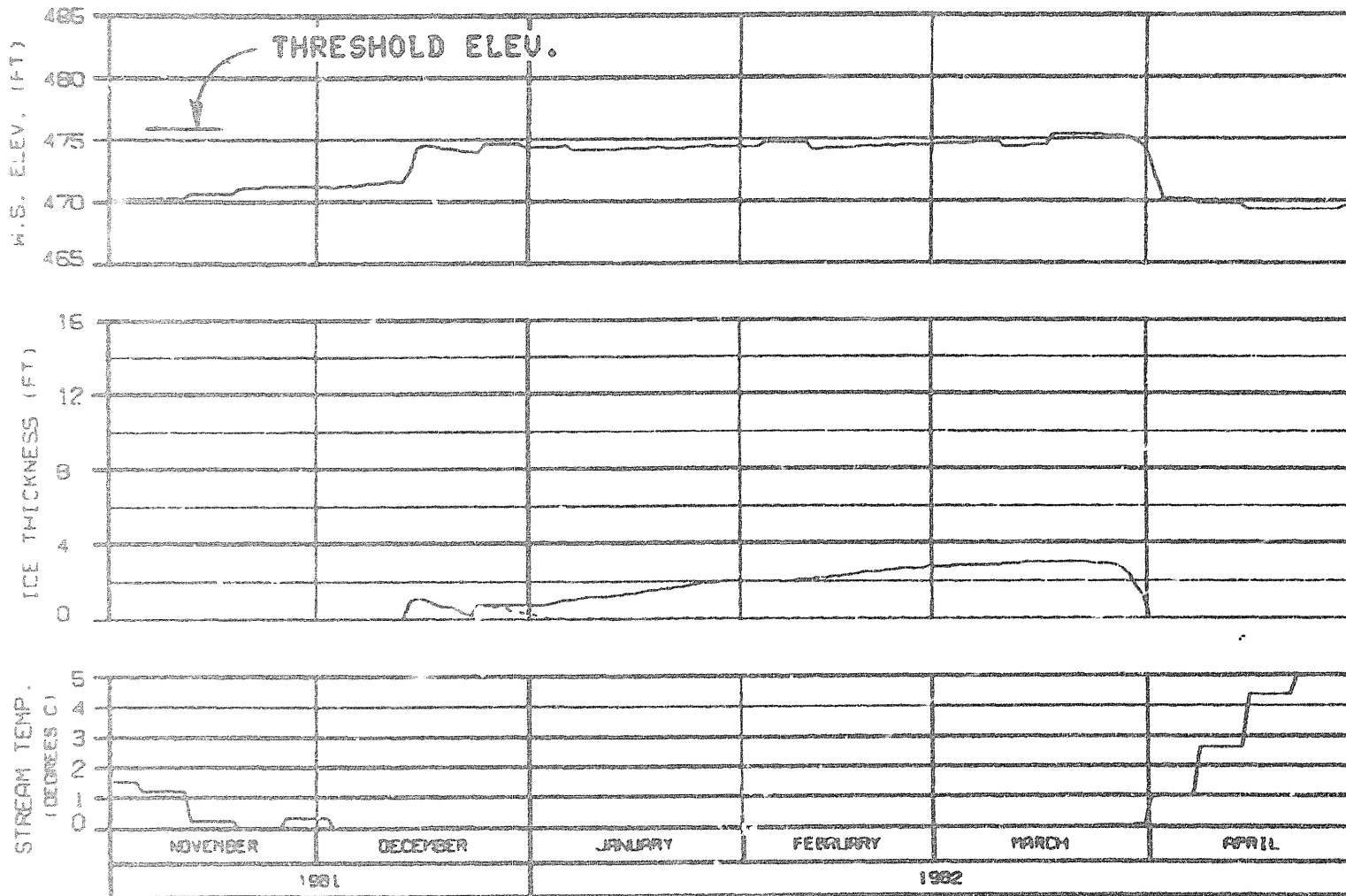


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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 I WATANA
 REFERENCE RUN NO. : 8101ENS

ASKA POWER AUTHORITY	
THIS PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE	BY



THRESHOLD ELEV.

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. : 8101ENS

ALASKA POWER AUTHORITY

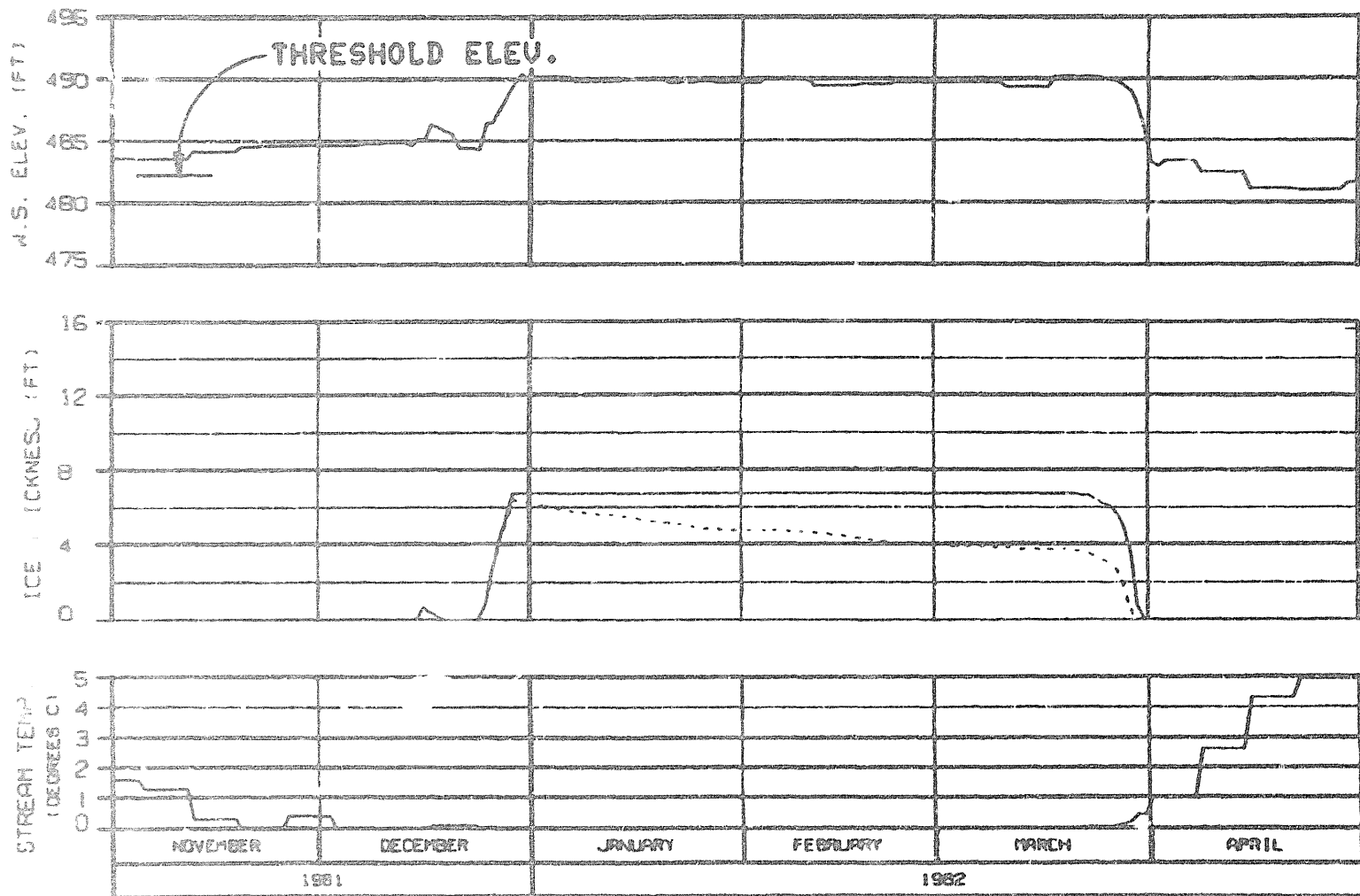
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CHIEF, ALASKA POWER AUTHORITY

1553.142



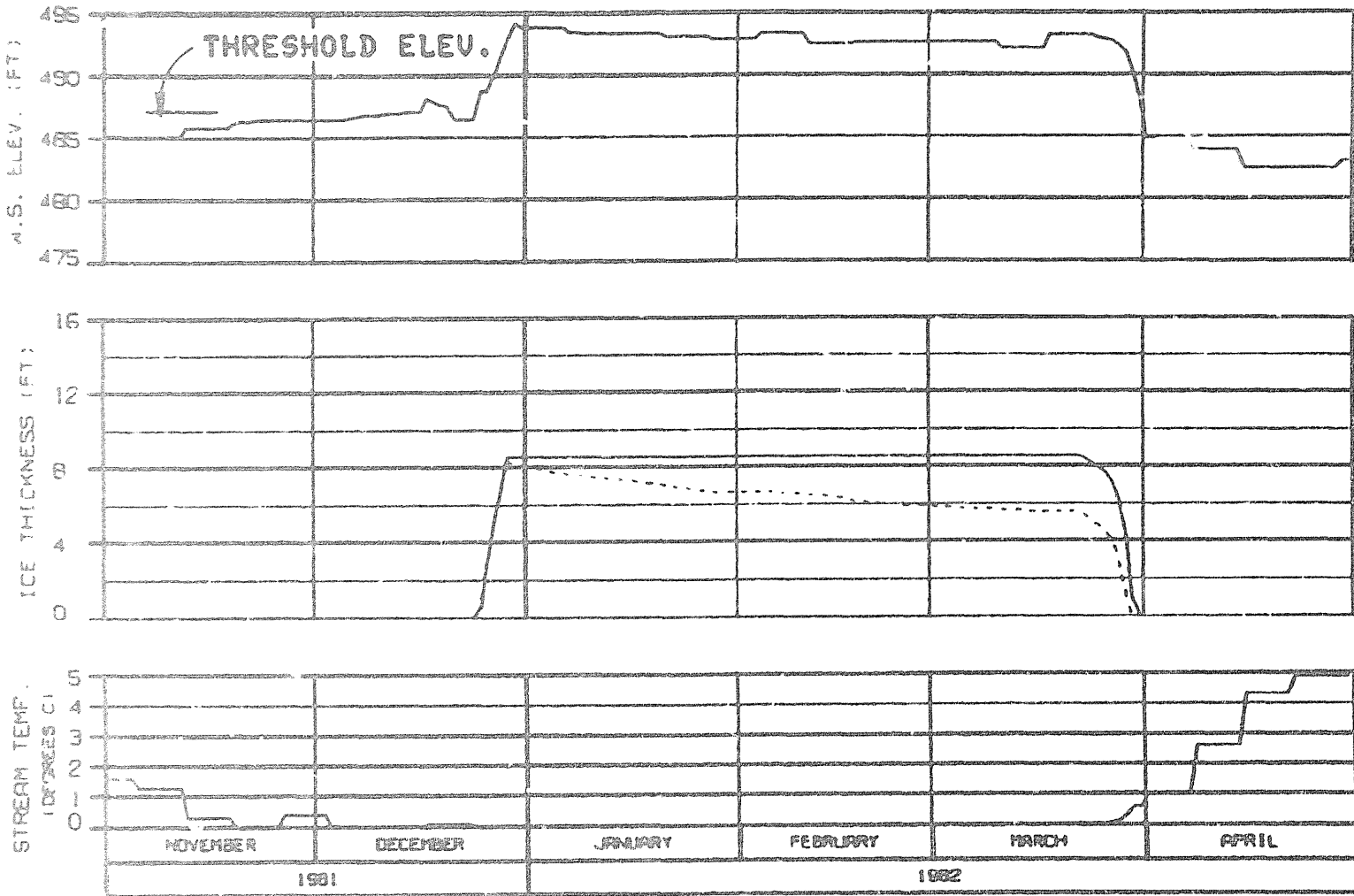
SIDE CHANNEL MSII
 RIVER MILE : 115.50

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 I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60610	1663.142

OPTION 7

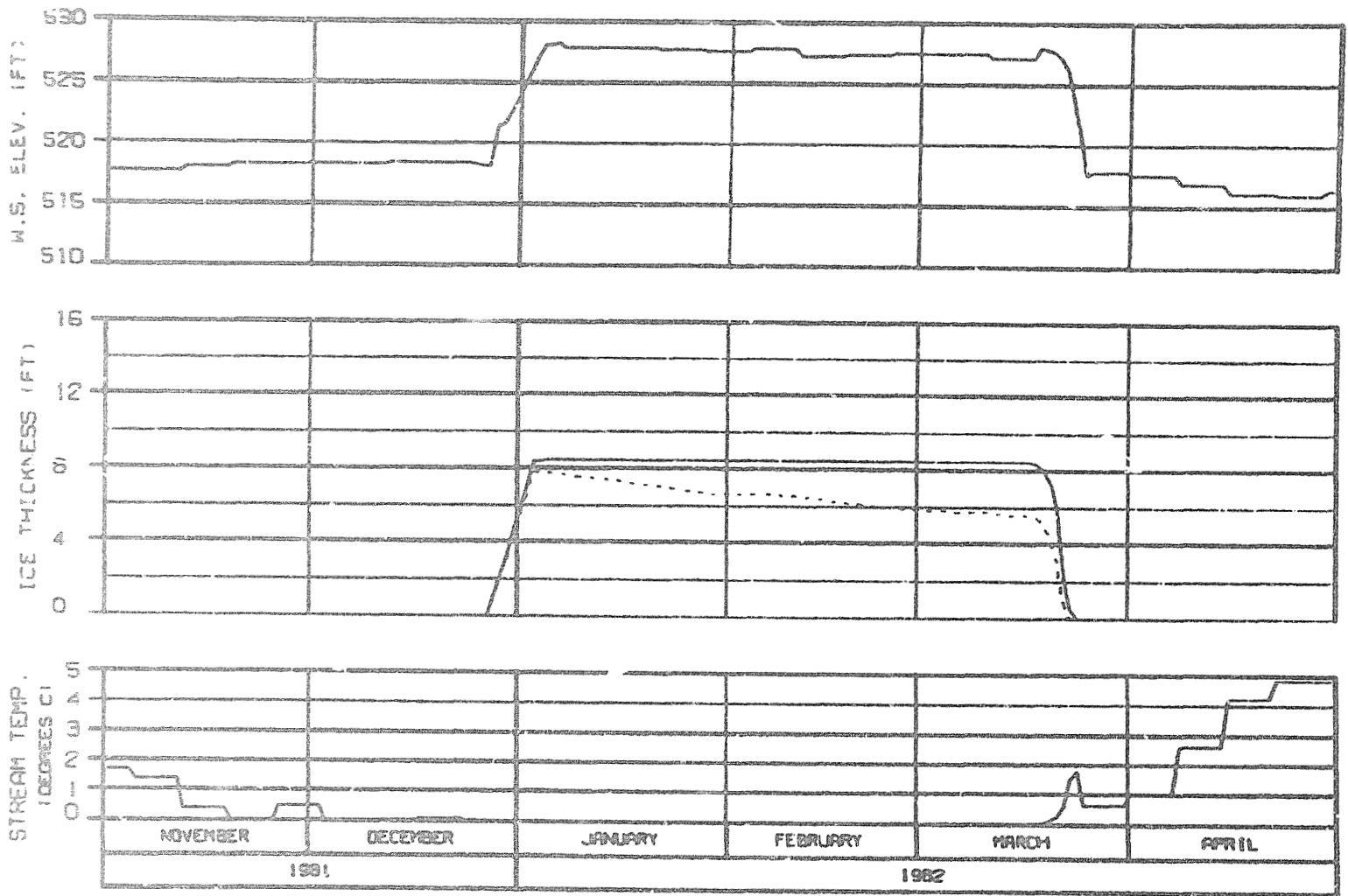


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

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	
SUBMITTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILL 60610	PO BOX 65
1982.142	

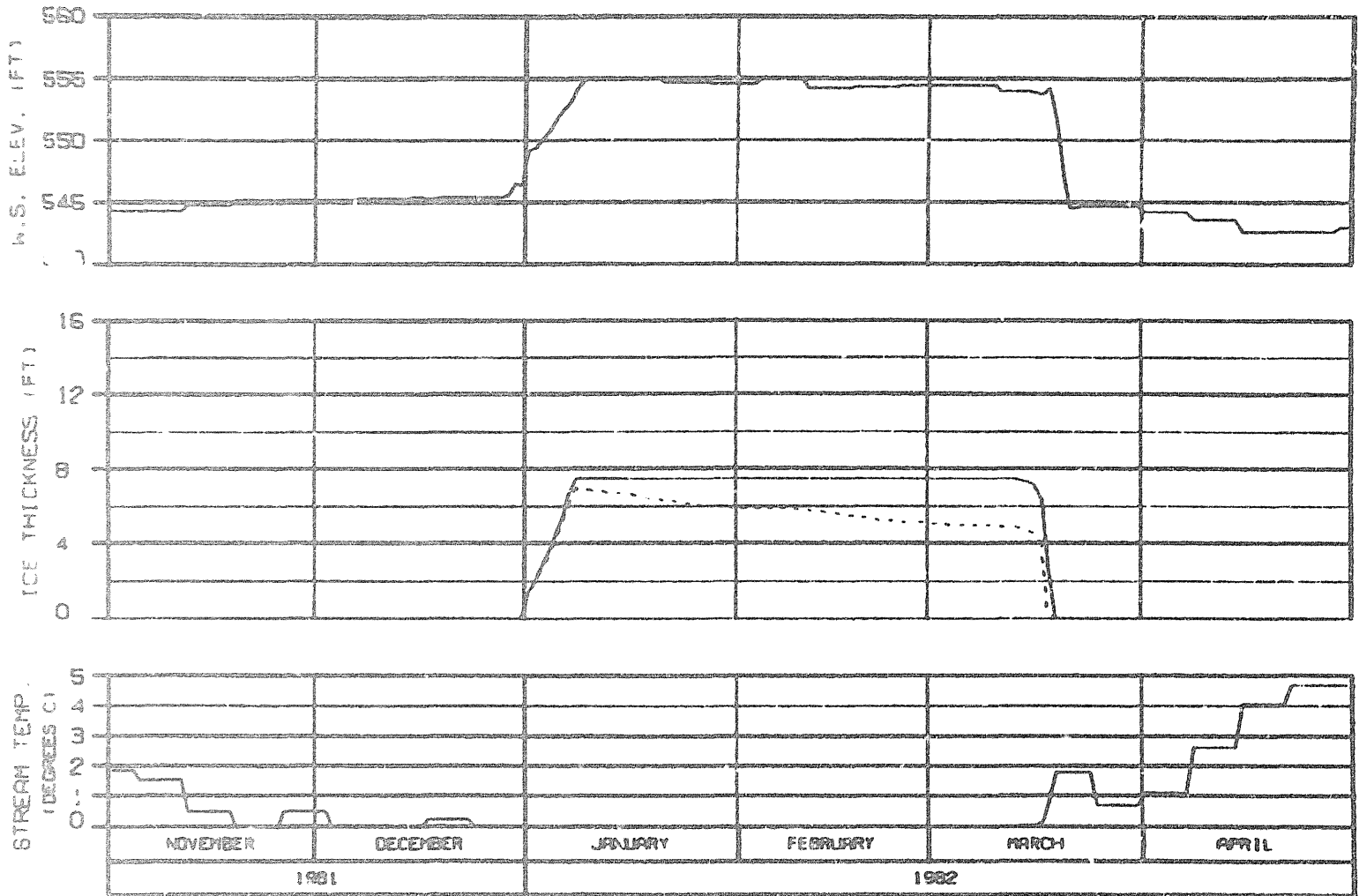


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - SLUSH COMPONENT

RIVER MILE : 120.00

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

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EWASCO JOINT VENTURE		
CHICAGO, ILL 60610	DD WPA 82	1653.142



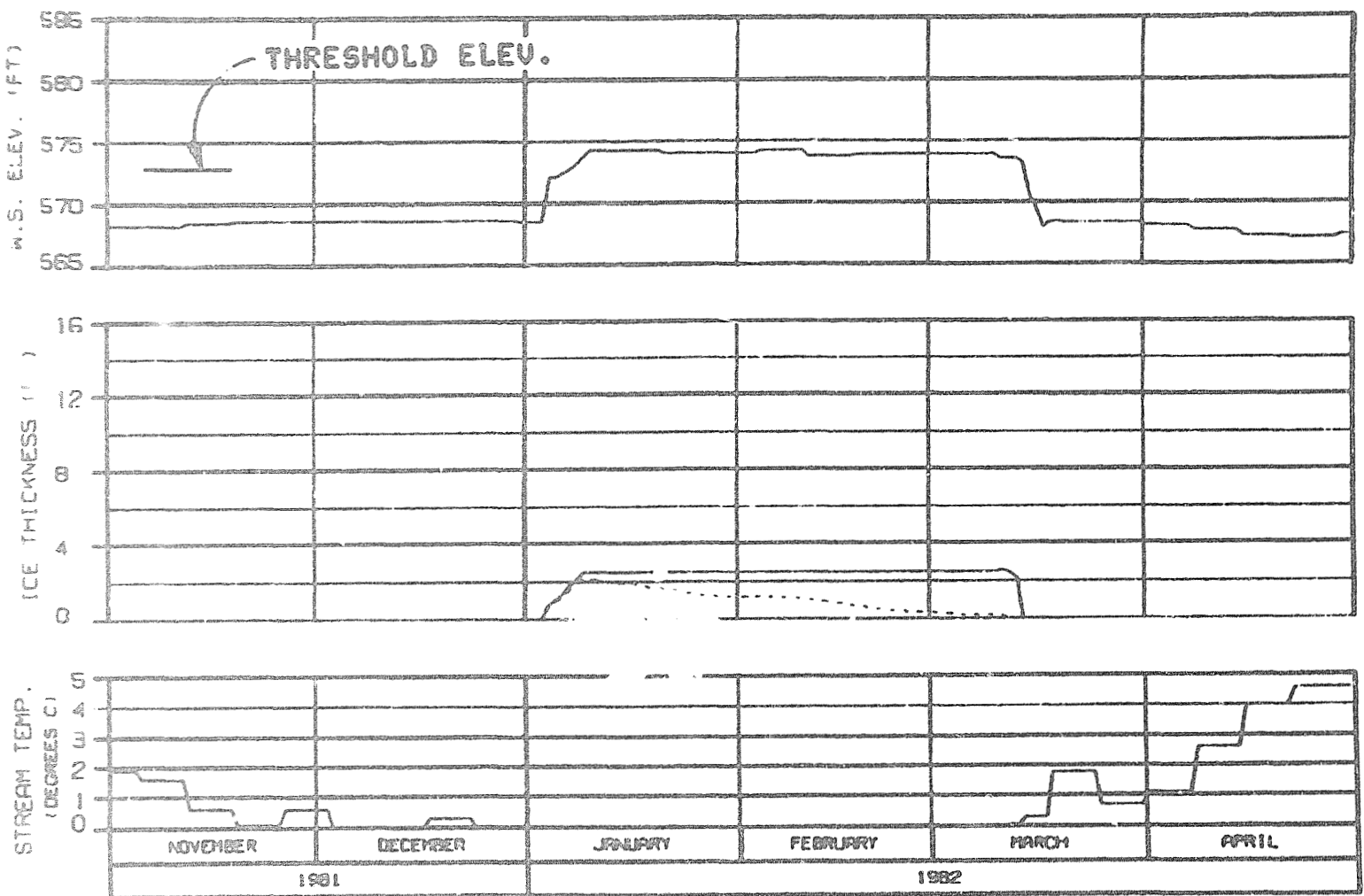
HEAD OF MOOSE SLOUGH

RIVER MILE : 123.50

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : 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		
CHIEF: D.L. HART	NO. OF PGS	1563.142



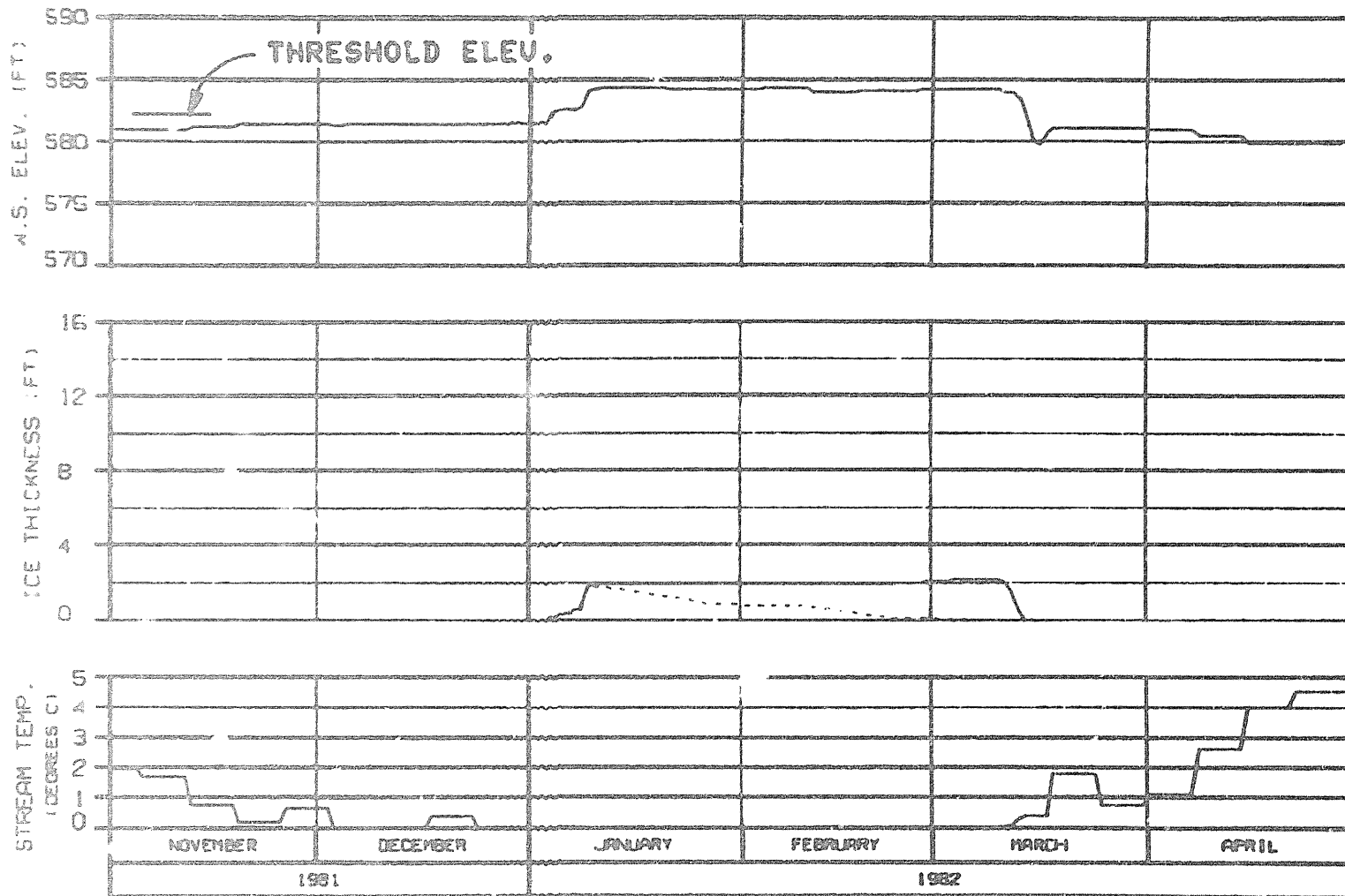
HEAD OF SLOUGH 8A (WEST)

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	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
CHIEF: ILLIUM	1663.142



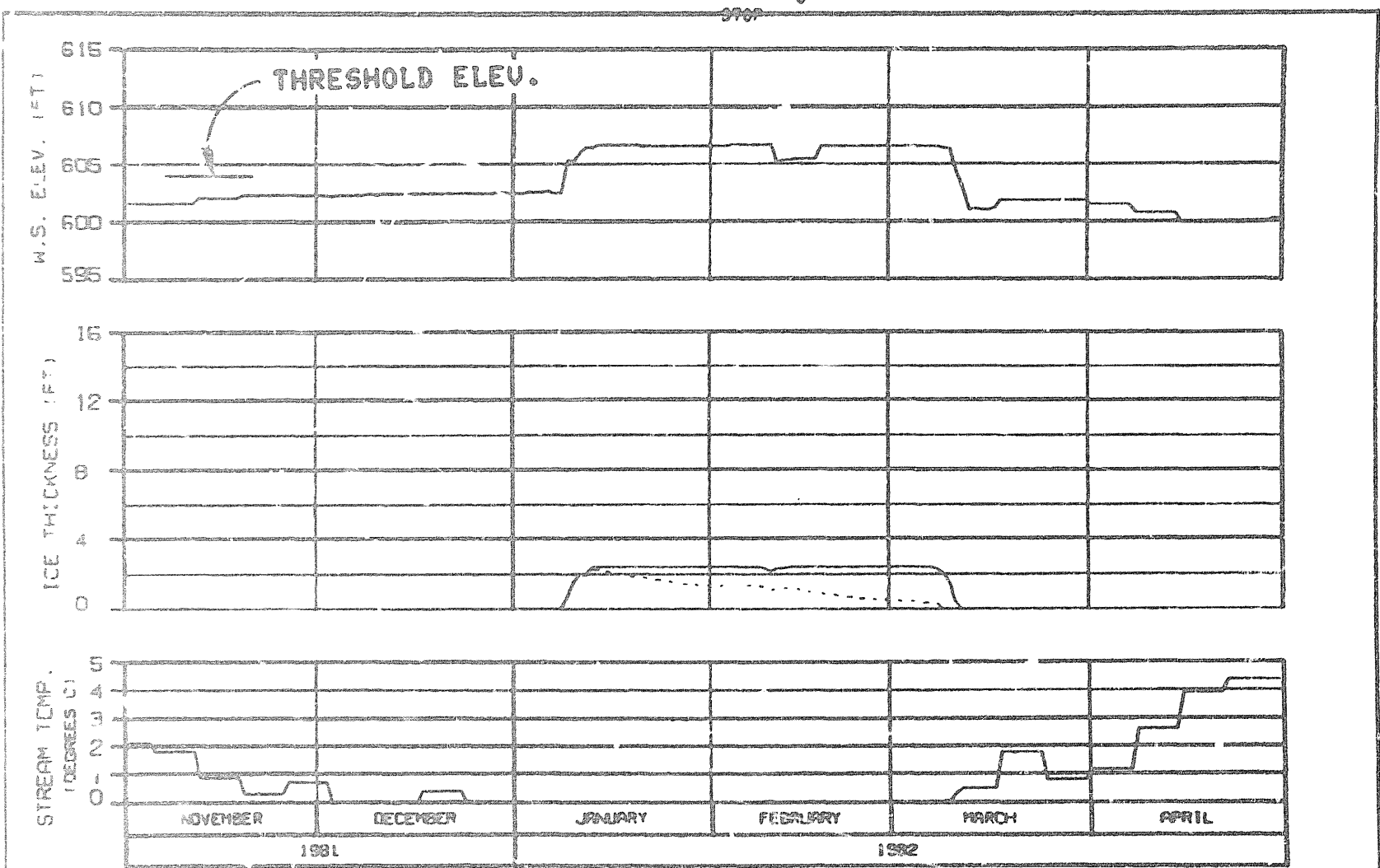
HEAD OF SLOUGH 8A (EAST)

RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
ENERGY DEMAND : WATANA 2001
CASE E-VI FLOWS TEMP: INFLOW-MATCHING
STAGE I WATANA
REFERENCE RUN NO. : BIDLENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHIEF: ALL DATA TO APR 92	1663.142



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

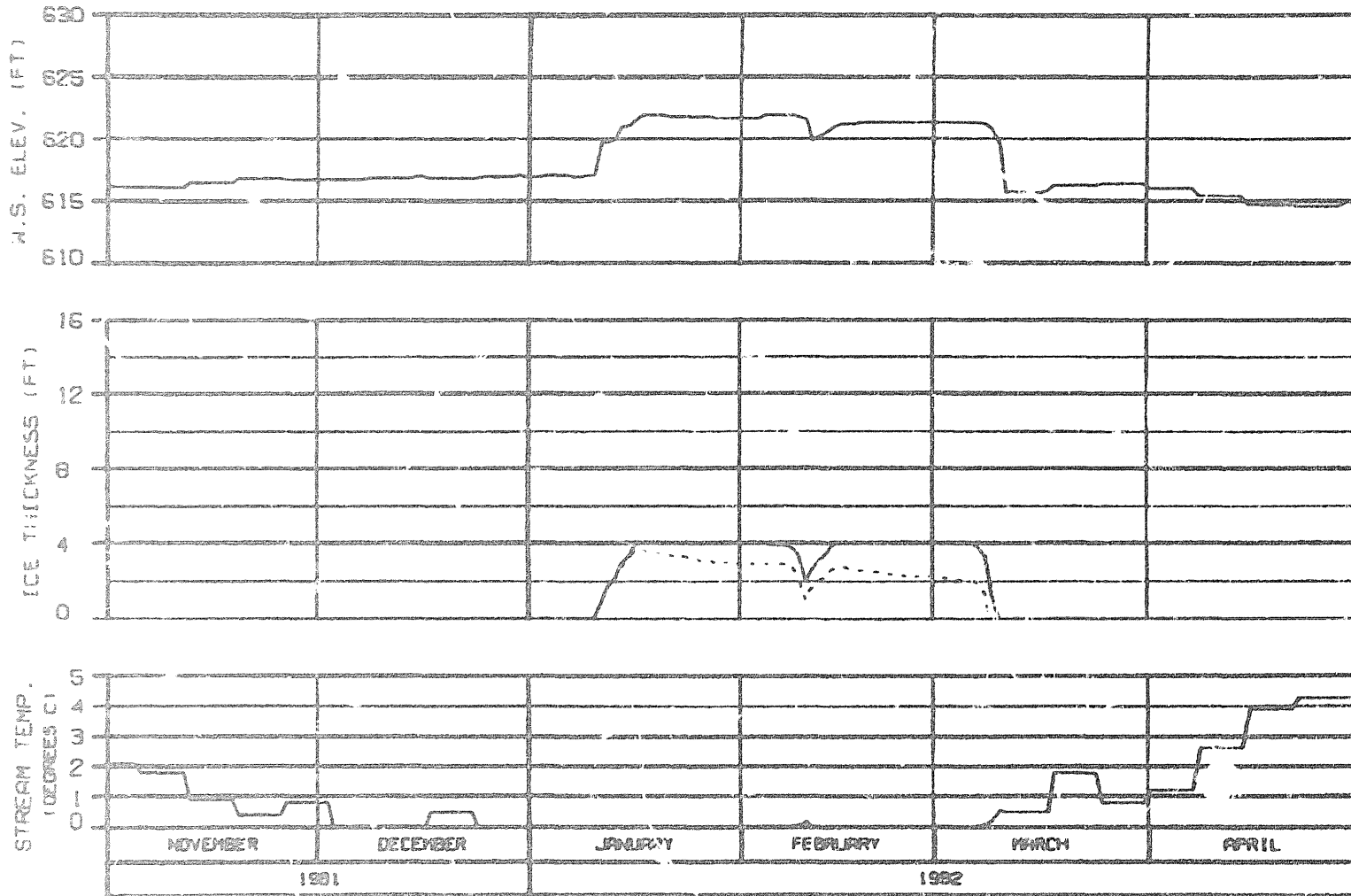
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
HERZA-EBASCO JOINT VENTURE		
CHIEF: ALP010	RD 004 03	1983.142

SECTION 2

OPTION?

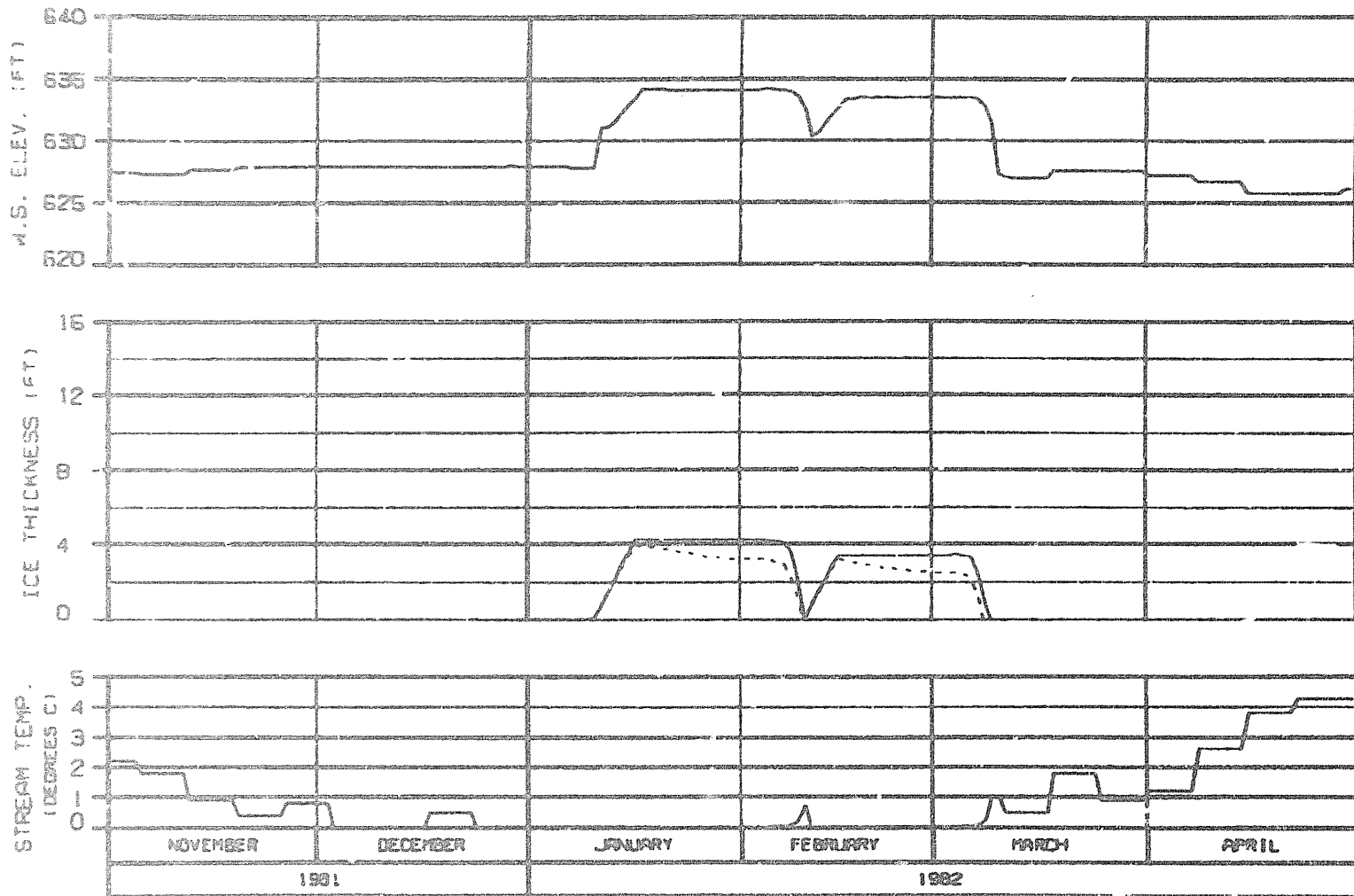


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

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

ALASKA POWER AUTHORITY		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDASCO JOINT VENTURE		
CHIEF, ILLINOIS	ED ASCO	1588.142

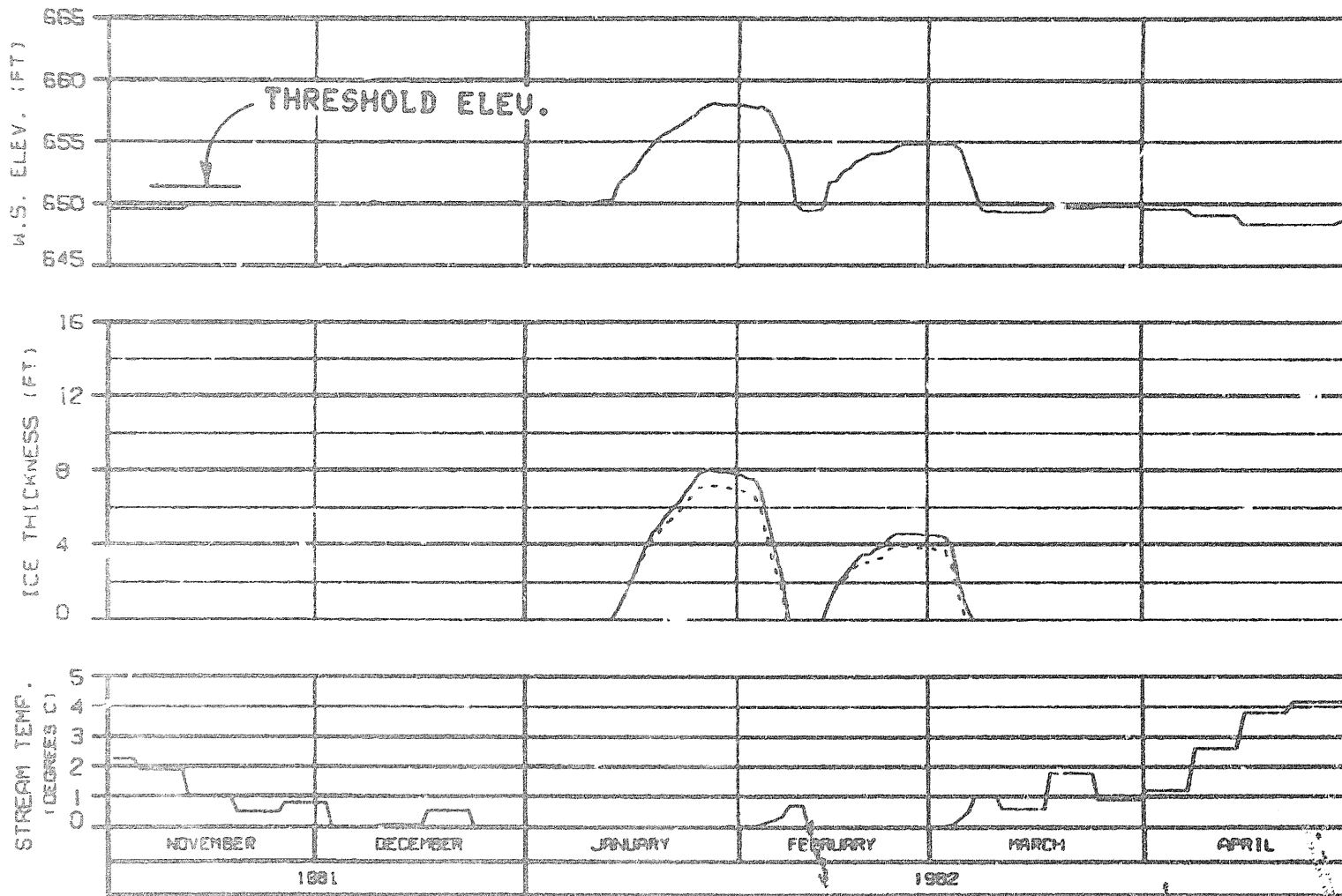


SIDE CHANNEL U/S OF 4TH JULY CREEK
RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SUB-ICE 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	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CREATED: 8/11/81	1600.142

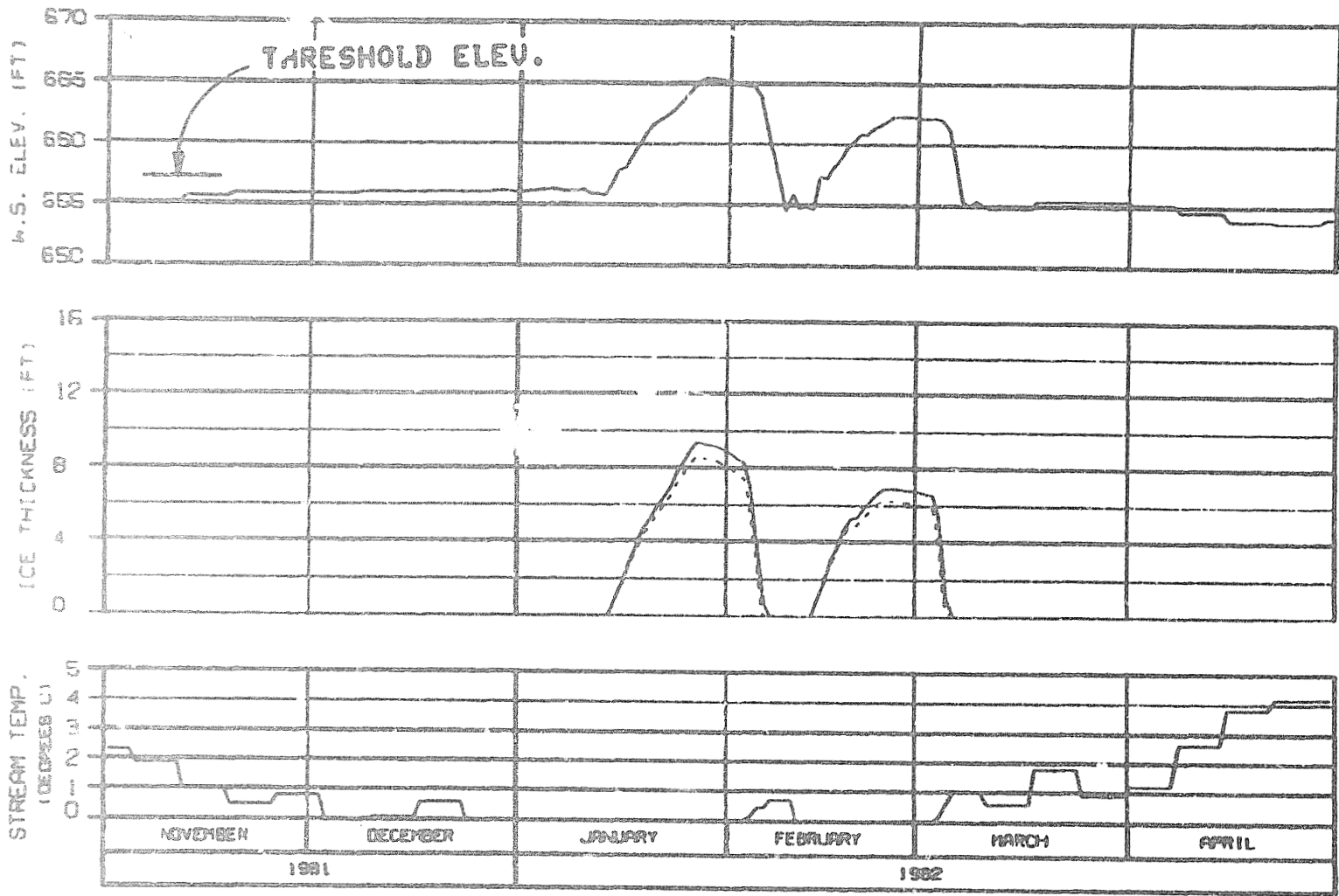


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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. : 810LENS

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHIEF: S. L. HART	1982.142

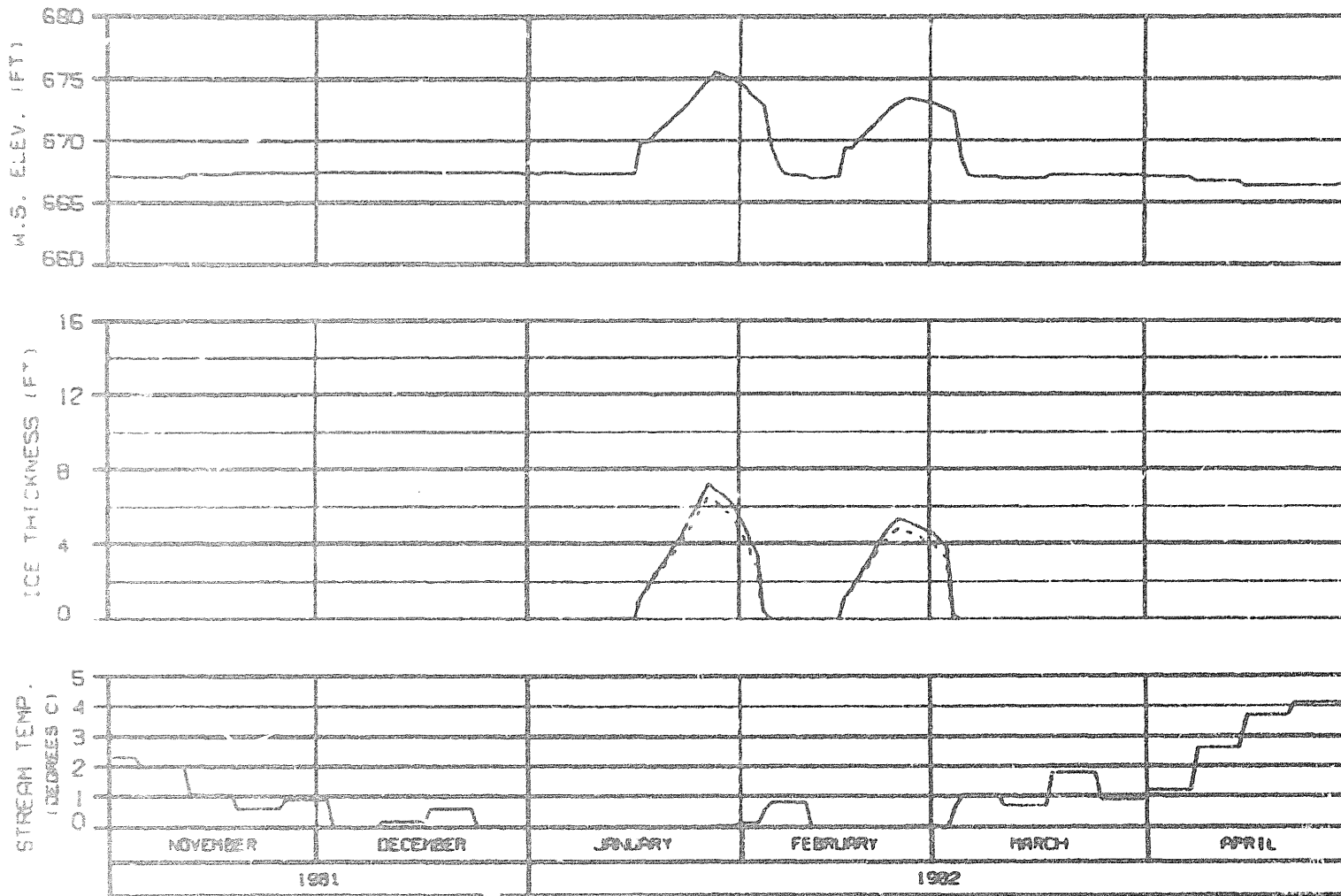


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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 I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHARGE NO. 81-04510	RD 409 82	1558.142

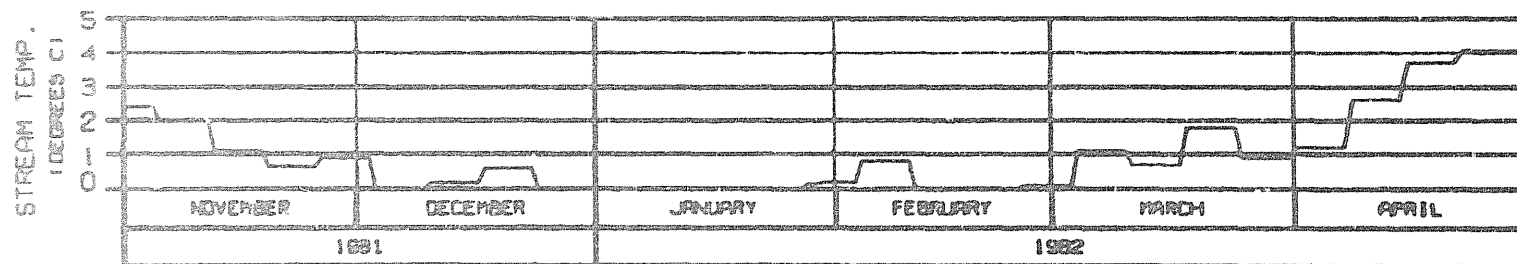
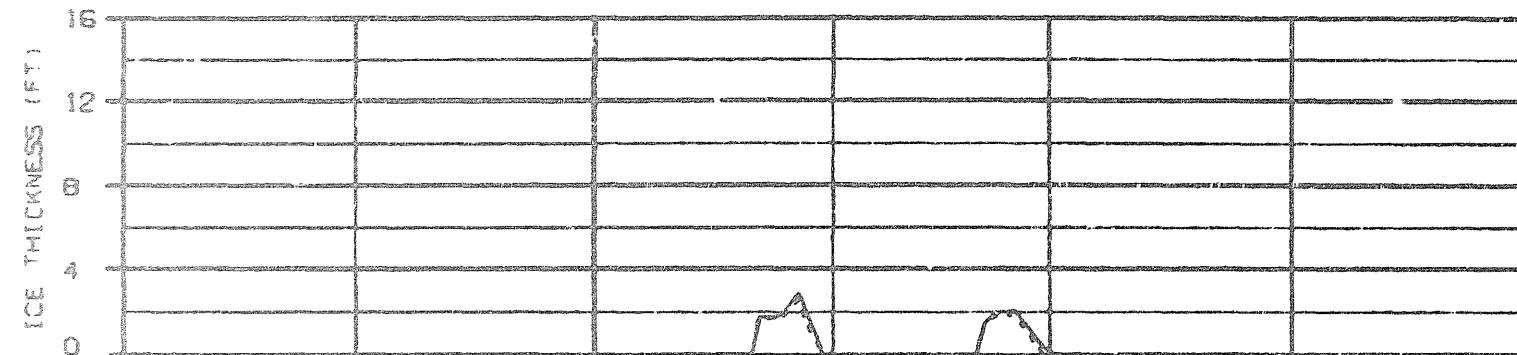
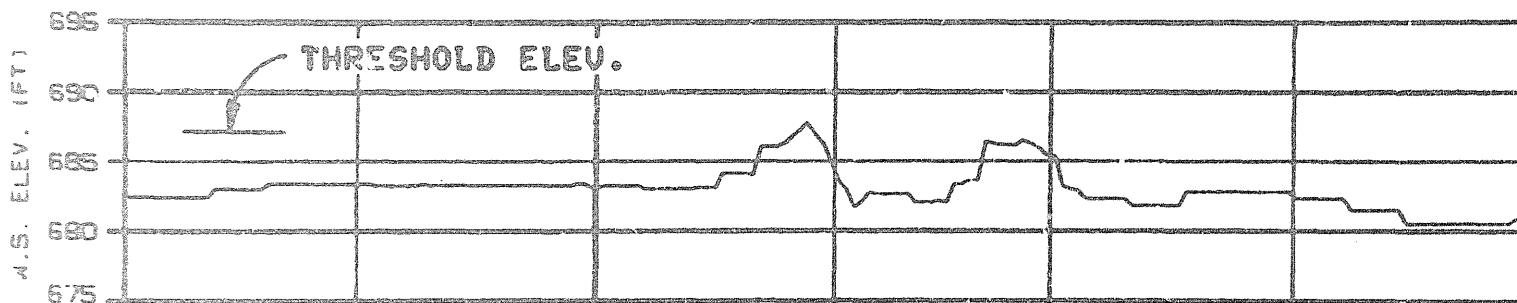


SIDE CHANNEL D/S OF SLOUGH 11
RIVER MILE : 135.30

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 I WATANA
 REFERENCE RUN NO. : 8101ENS

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EDRASC JOINT VENTURE		
DRAWN: B.L.T-816	BY: W.C. 82	1583.142

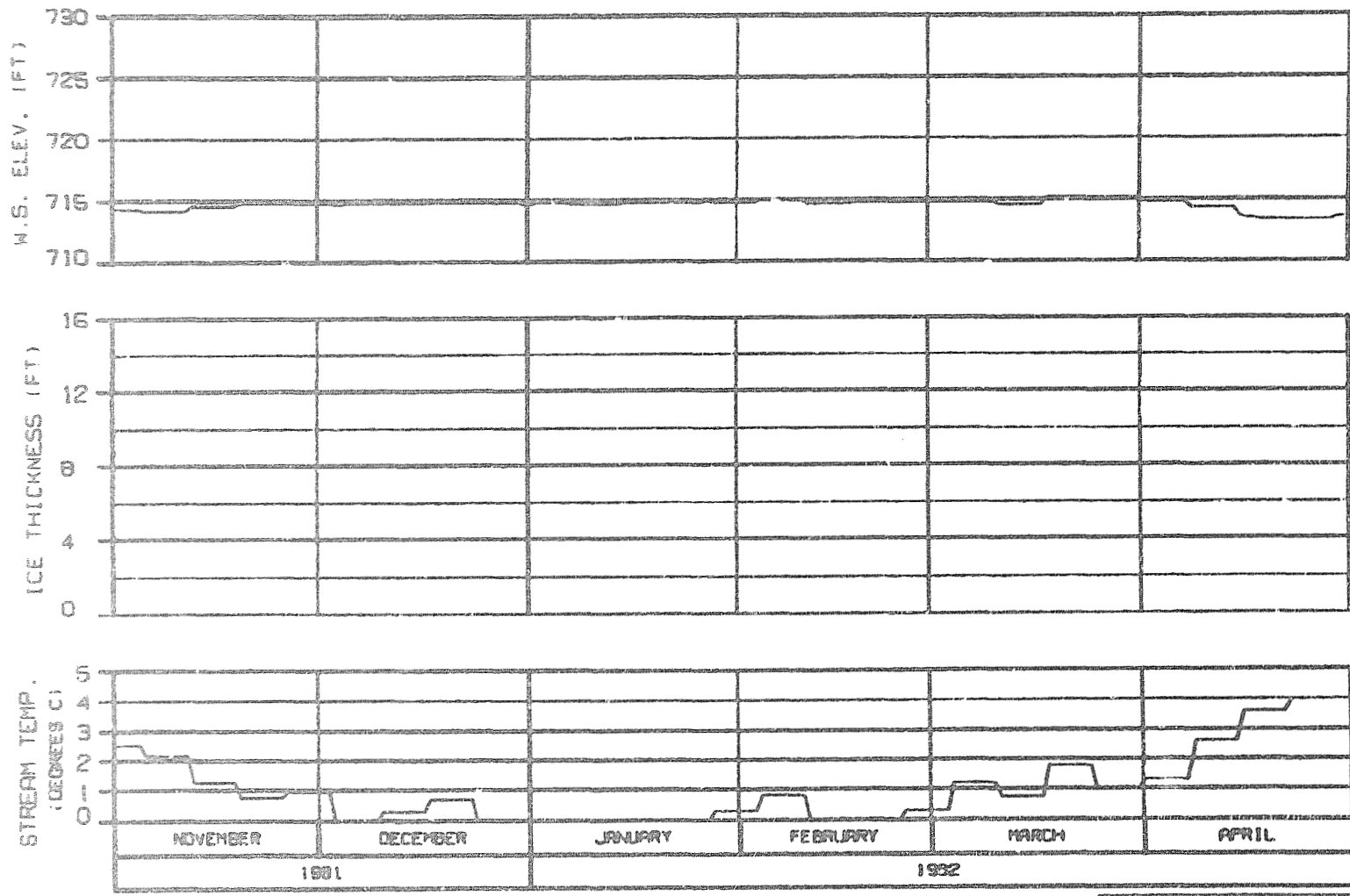


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHIEF ENGINEER	1553.102

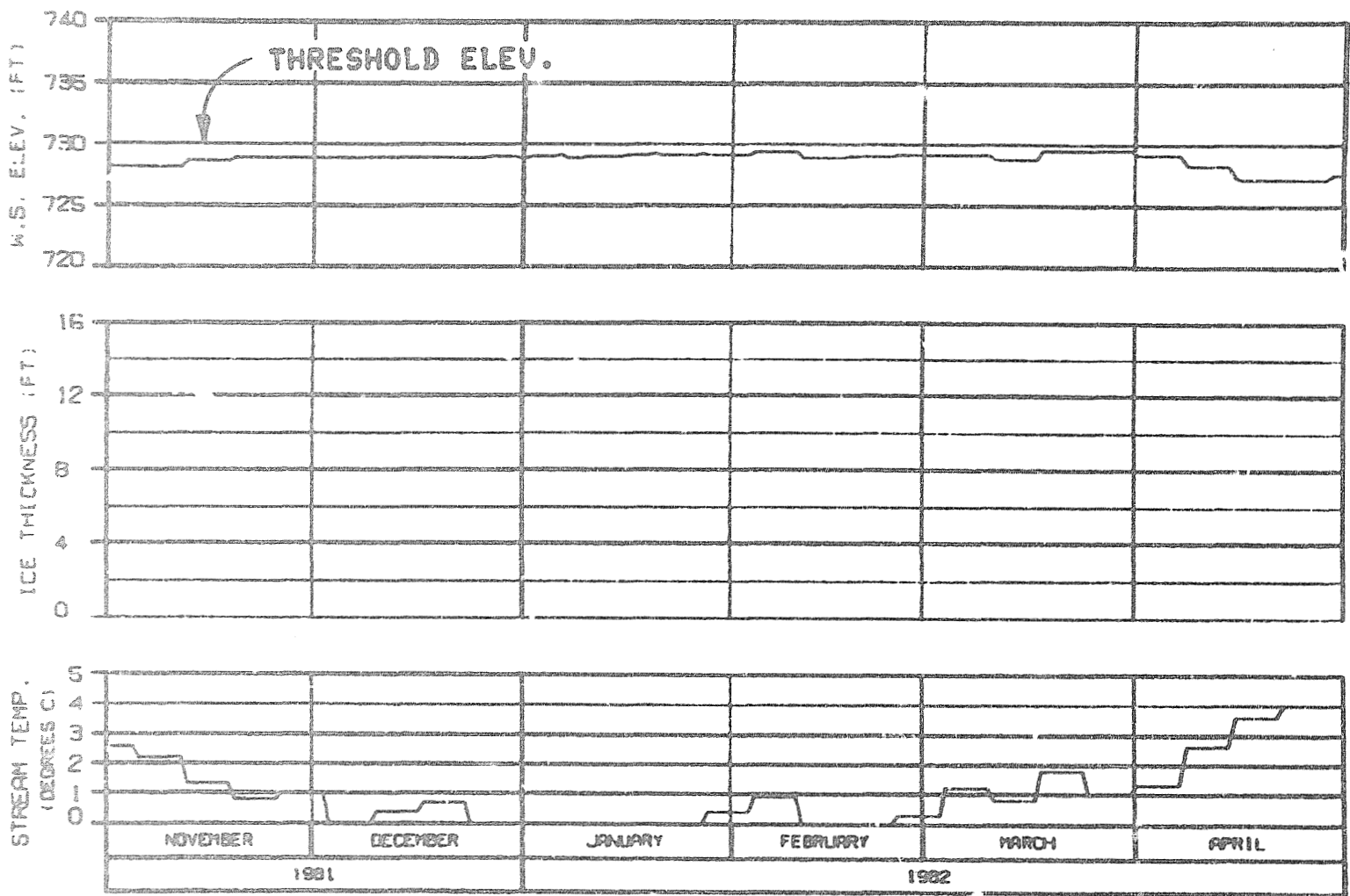


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
CHARGED: 11.11.81	BY: 10/19/82	1553.142

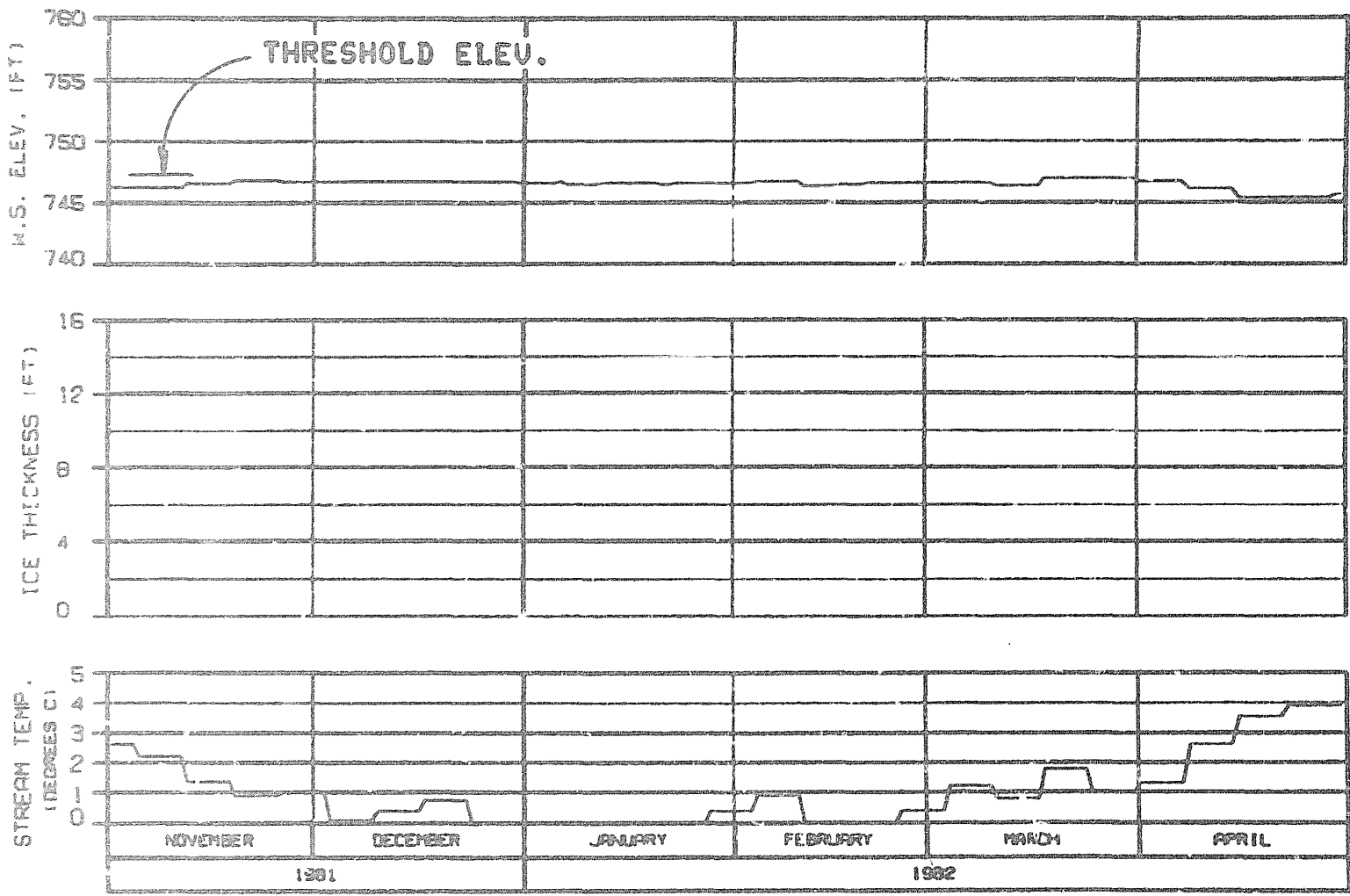


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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 I WATANA
 REFERENCE R IN NO. : 8101ENS

ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
UNCLASS. REPORT	1563.142

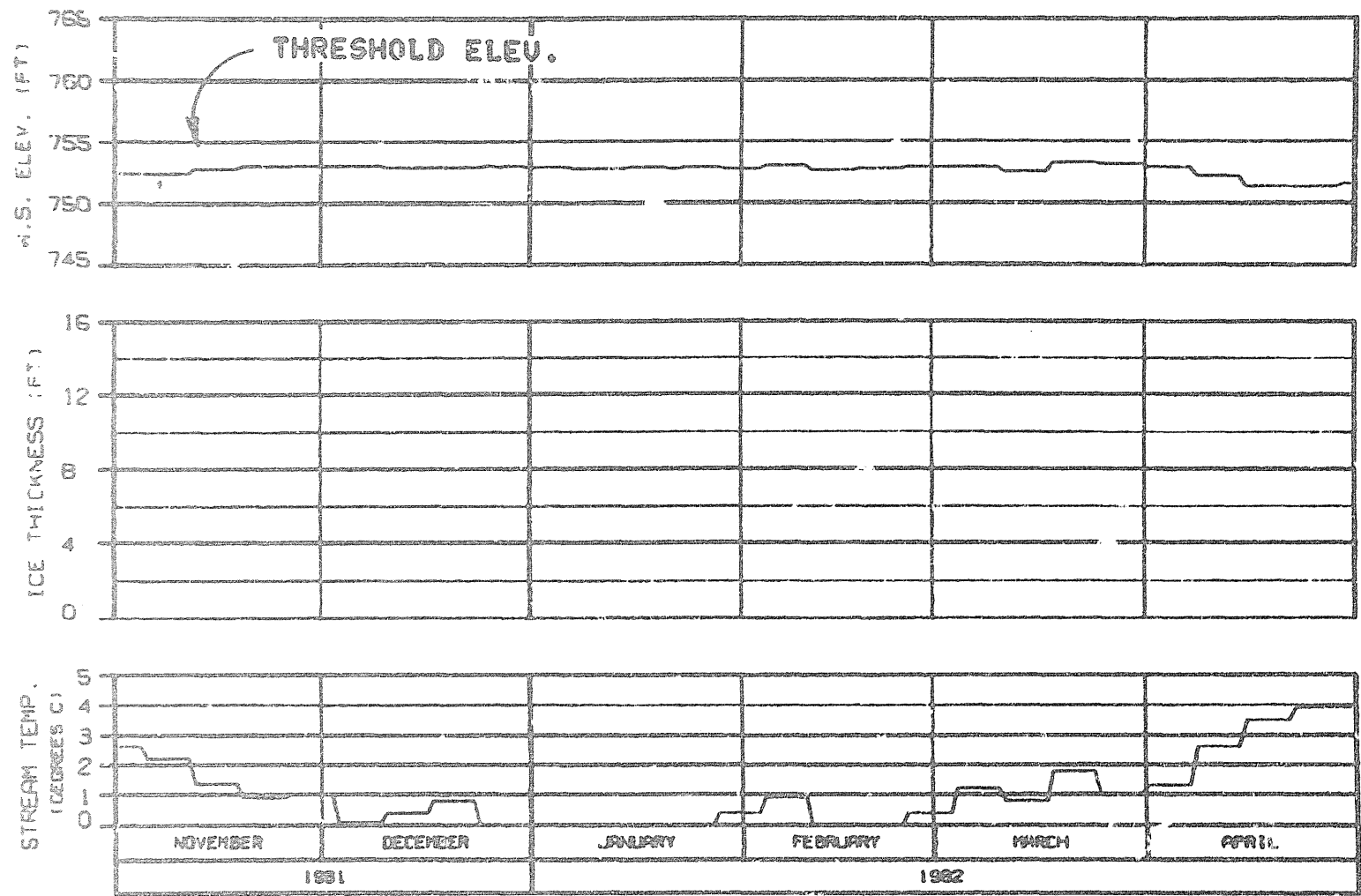


HEAD OF SLOUGH 21
 RIVER MILE : 141.80

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		
SUBJECT PROJECT		
SLUITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CHICAGO, ILLINOIS	20 APR 82	1583.142

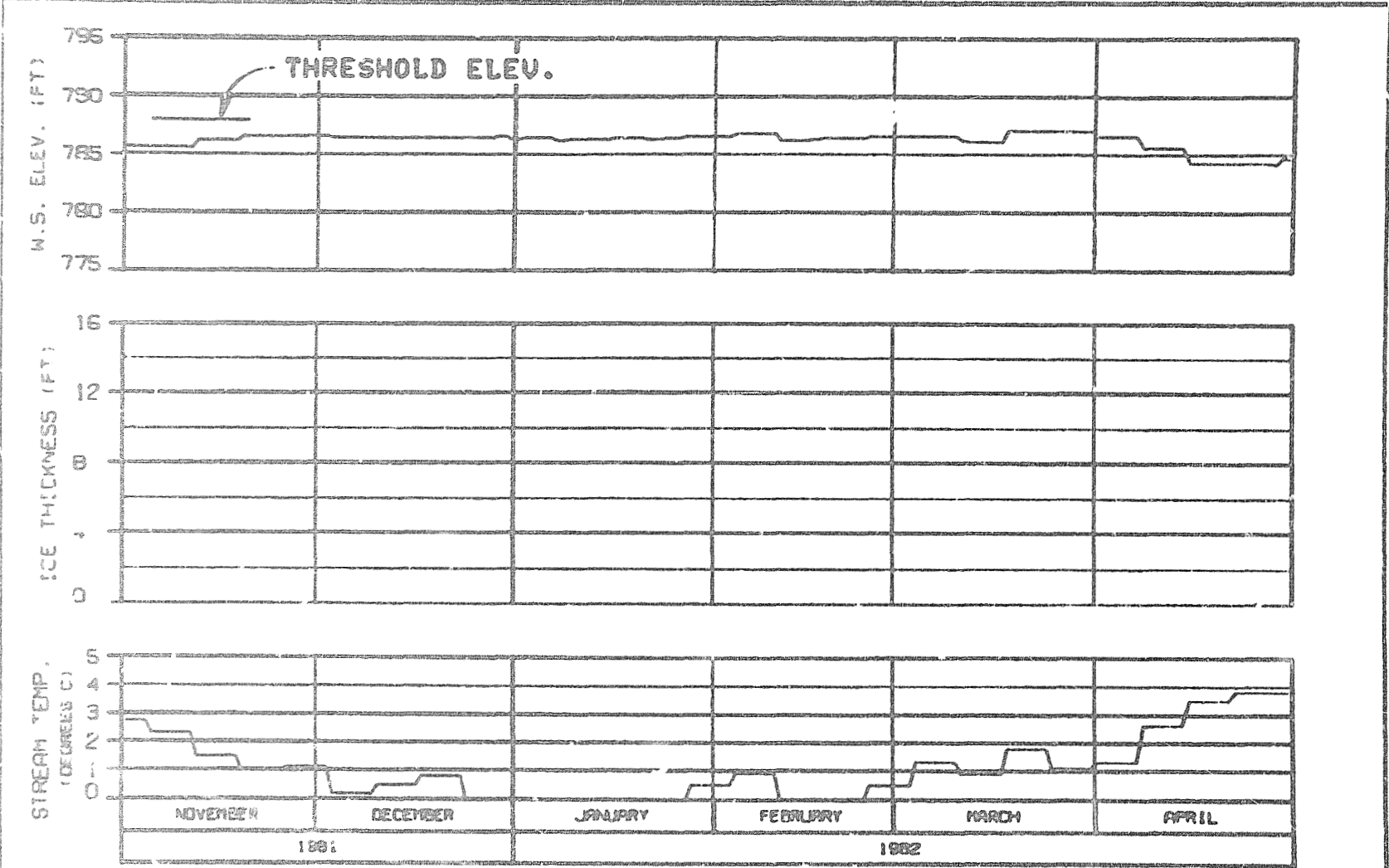


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : WATANA 2001
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE I WATANA
 REFERENCE RUN NO. : 8101EN6

ALASKA POWER AUTHORITY		
SUBMITTED PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 01.11.92	BY: JWB	1653.142



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

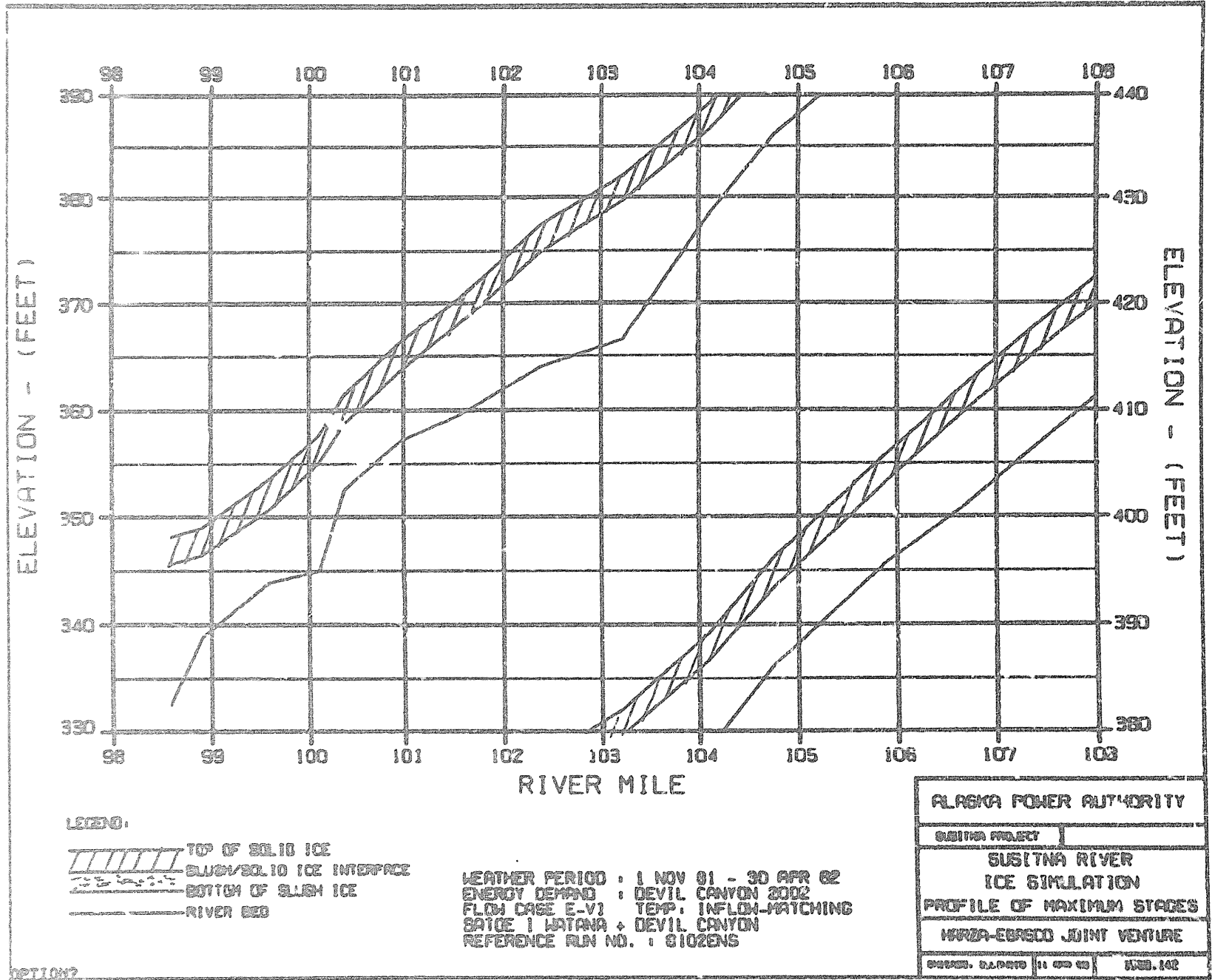
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

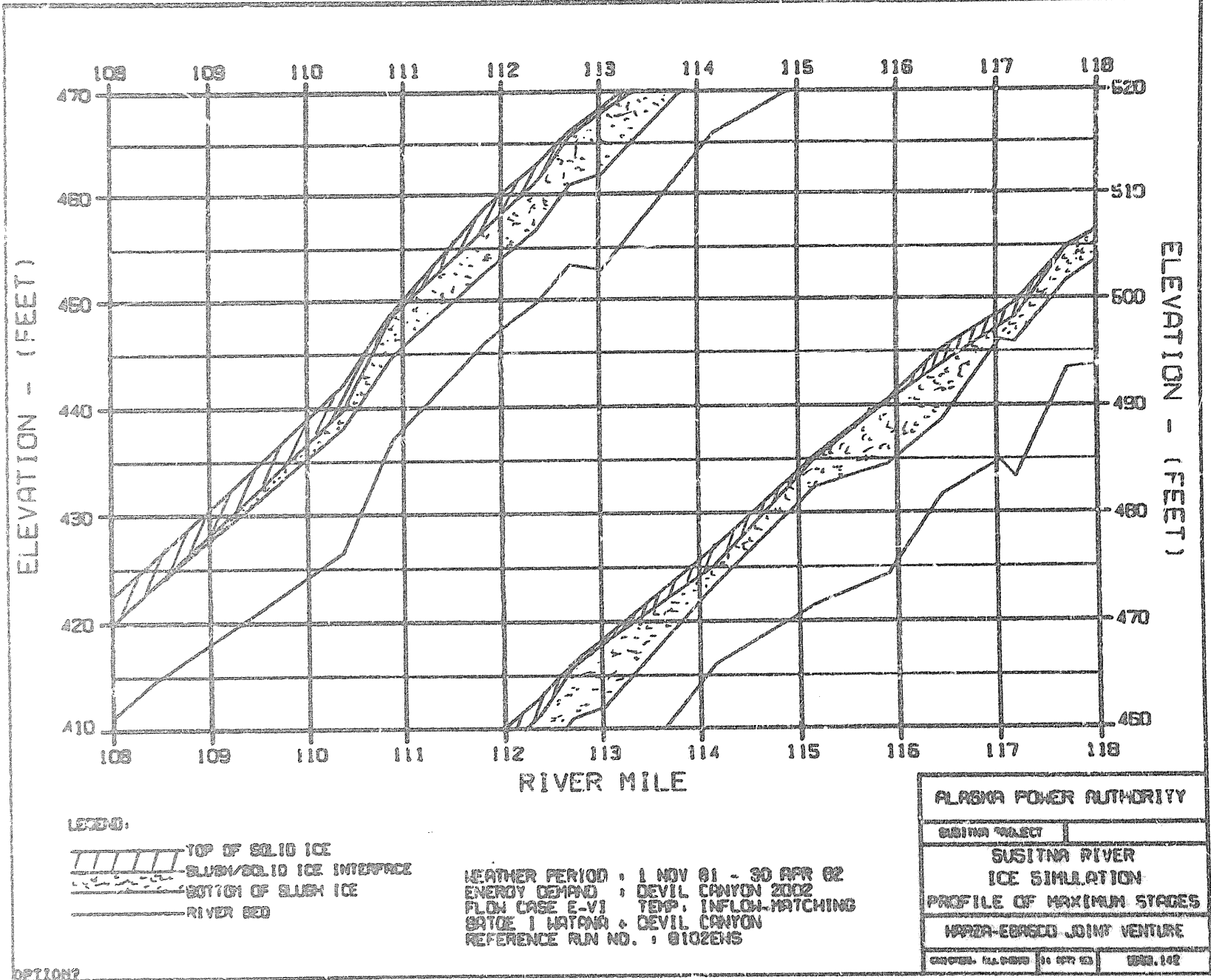
ALASKA POWER AUTHORITY	
SUBMITTER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHART NO. 8101ENS	1503.142

OPTION?

EXHIBIT T



50' DRAWDOWN
 2 LEVELS



ELEVATION - (FEET)

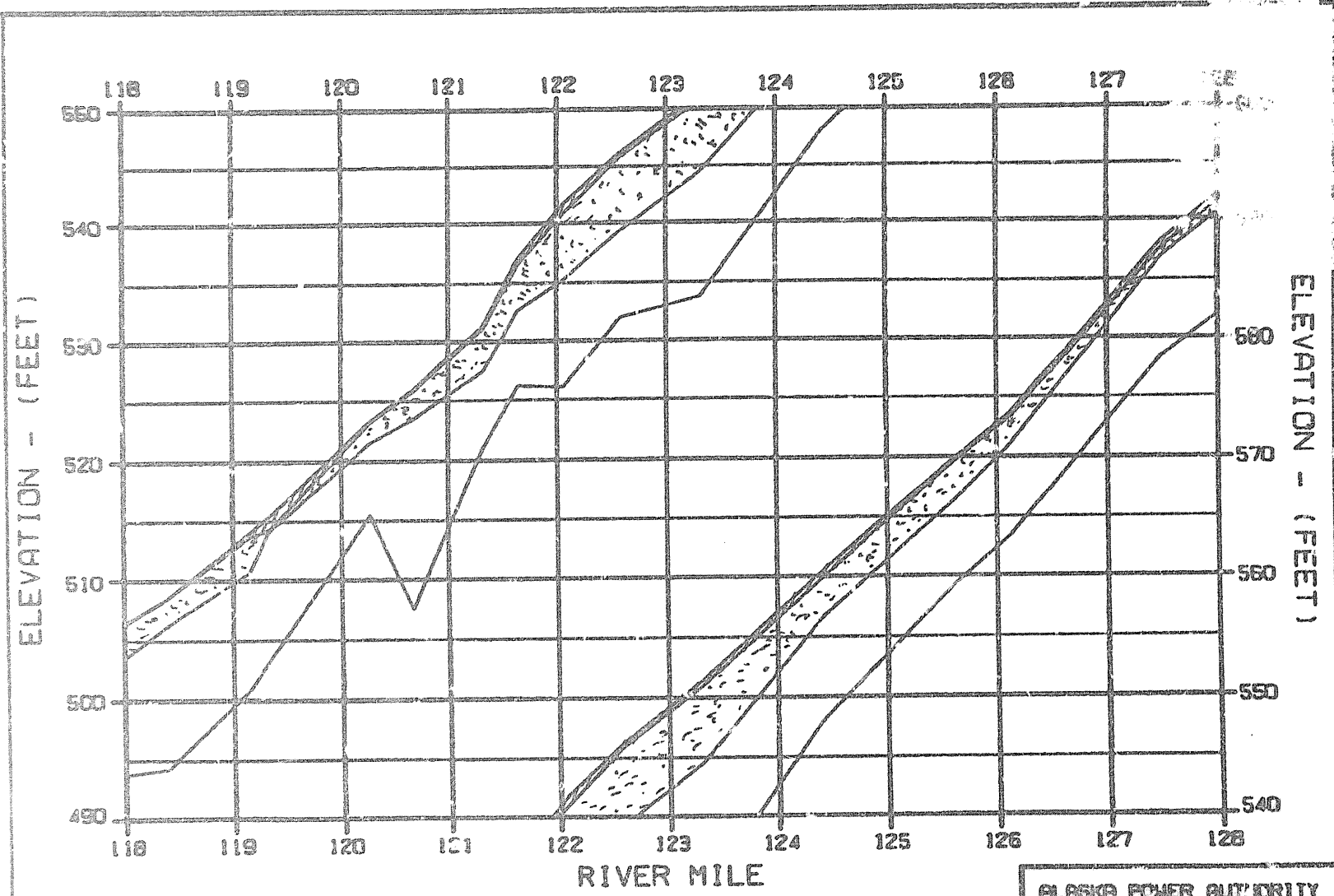
ELEVATION - (FEET)

LEGEND:
 - - - - - TOP OF SOLID ICE
 SLUSH/SOLID ICE INTERFACE
 _____ BOTTOM OF SLUSH ICE
 _____ RIVER BED



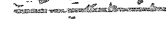

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW MATCHING
 SATOE I MATANA & DEVIL CANYON
 REFERENCE RUN NO. : 0102ENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARDA-EGANCO JOINT VENTURE	
DATE: 11/10/02	BY: JRS
SCALE: 1:1000	FIG. 102

OPTION?

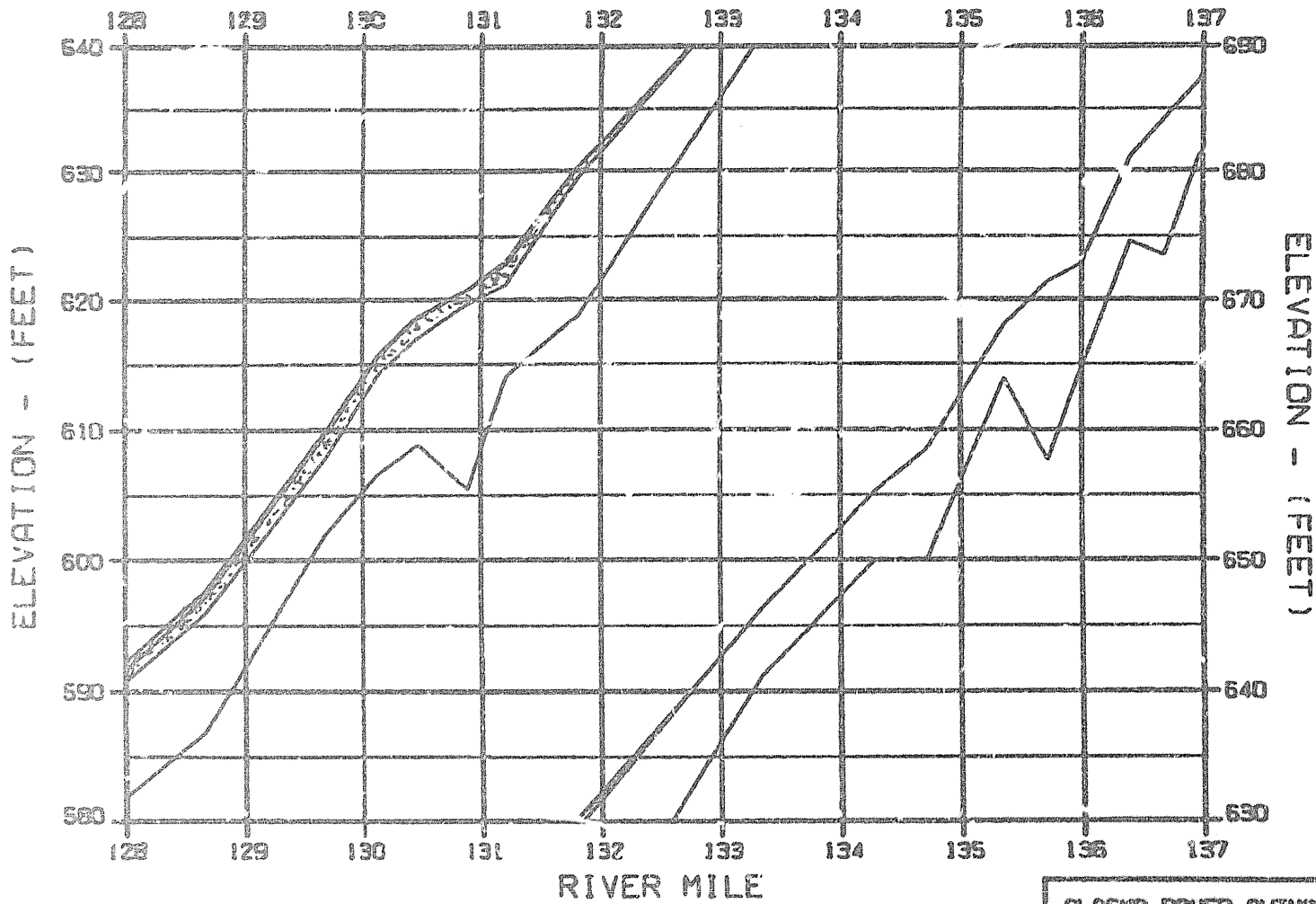


LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-V1 TEMP. INFLOW-MATCHING
 SITE 1 MONTANA * DEVIL CANYON
 REFERENCE RUN NO. : 010ZENS

ALASKA POWER AUTHORITY	
STARTING PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARDA-EDRSCO JOINT VENTURE	
ORDER: 04009	11 APR 02
	1500.142



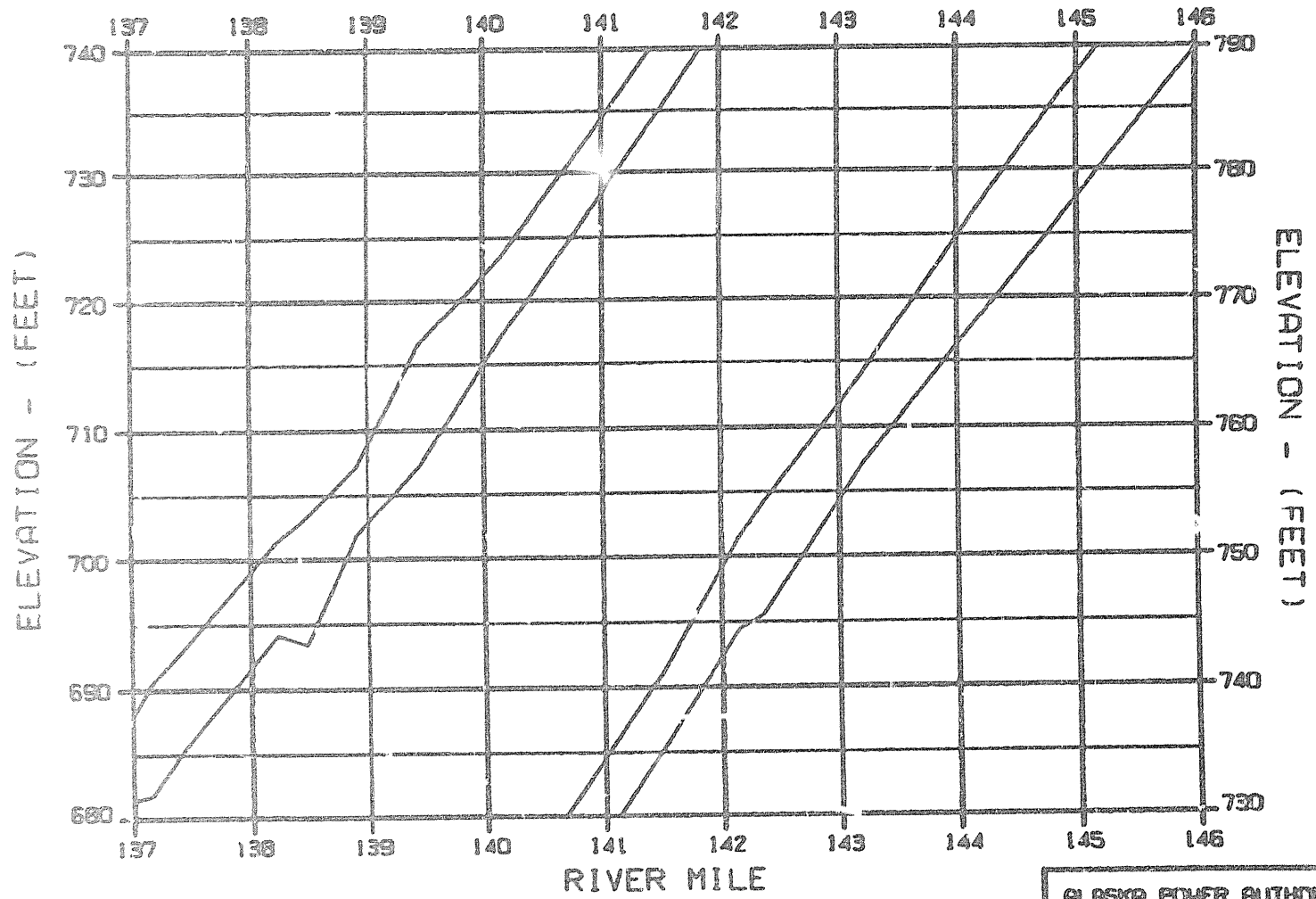
LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP: INFLOW-MATCHING
 SATOE I NATANA : DEVIL CANYON
 REFERENCE RUN NO. : 0102ENS

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARSA-EROSCO JOINT VENTURE	
DATE: 01.09.02	REV: 00
PAGE: 148	

OPTION?

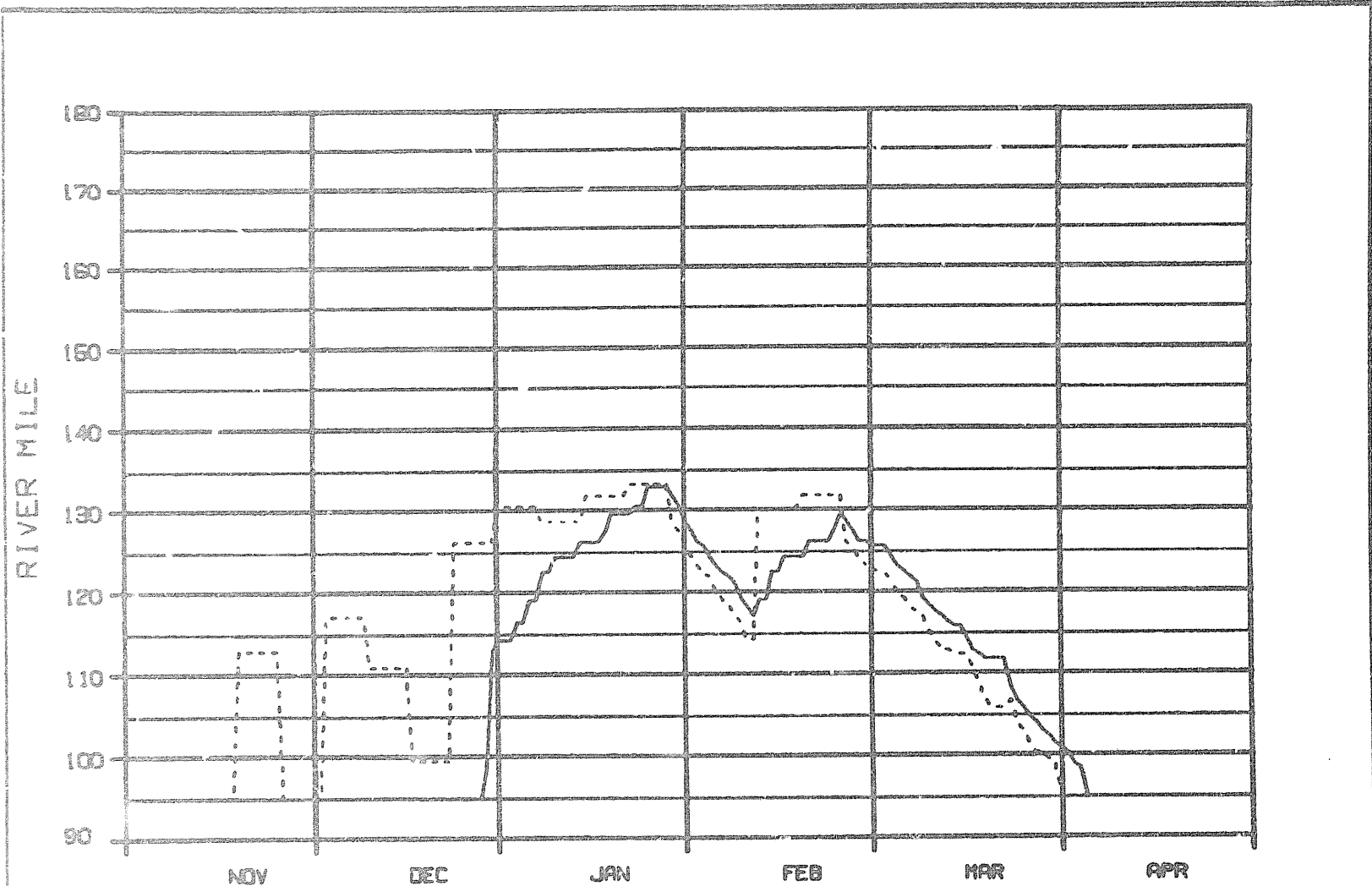


LEGEND:

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

LEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 BATOE 1 WATANA & DEVIL CANYON
 REFERENCE NUM NO. : 0102ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-EGASCO JOINT VENTURE		
DESIGNED: ALP/PTD	31 APR 83	1610.142

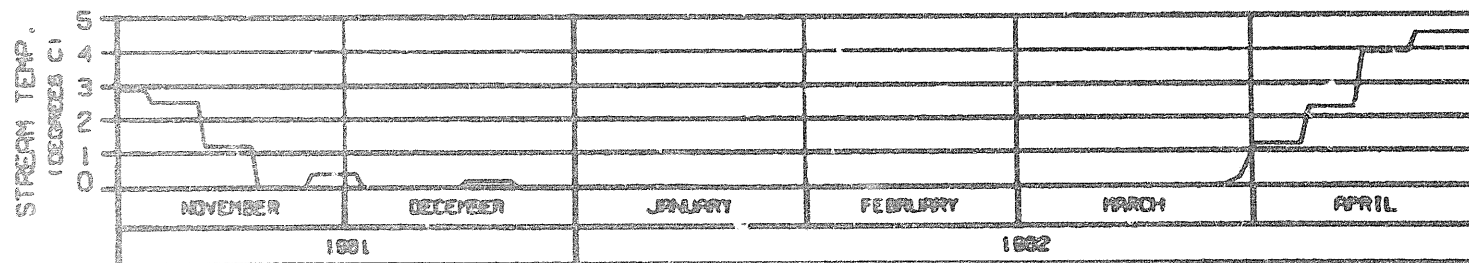
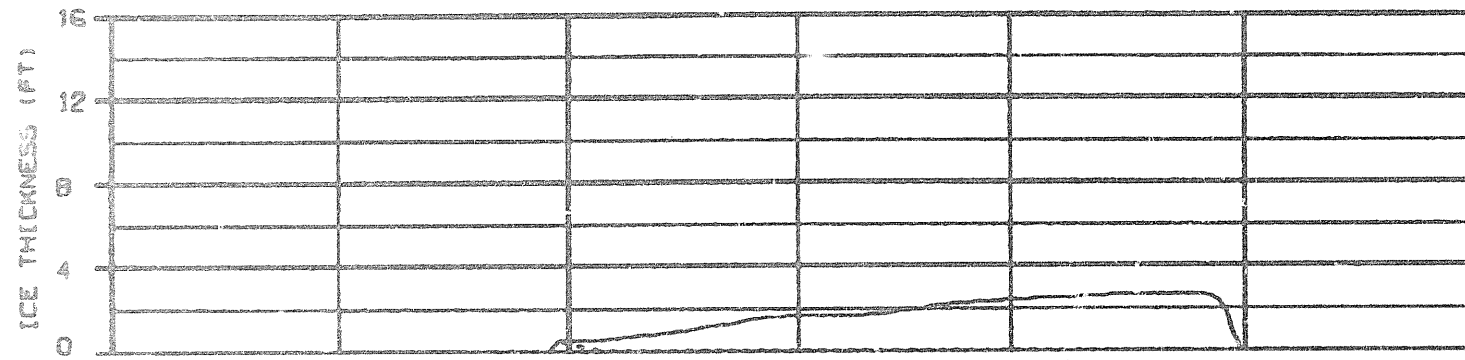
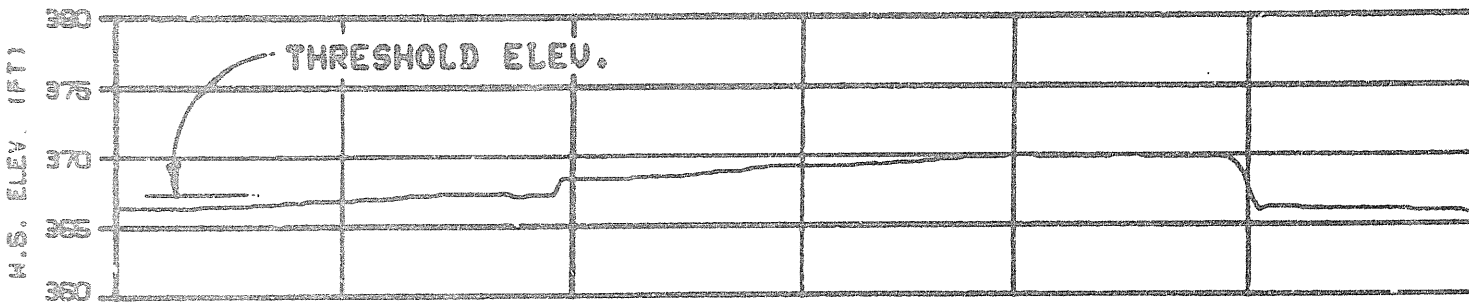


LEGEND:
 — ICE FRONT
 - - - - - ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING.
 STAGE I WATANA & DEVIL CANYON
 REFERENCE RUN NO. : 0102ENS

ALASKA POWER AUTHORITY		
GLACIA PROJECT		
SUSITNA RIVER		
PROGRESSION OF ICE FRONT & ZERO DEGREE ISOTHERM		
MARZA-EBASCO JOINT VENTURE		
DATE: 04/20/02	BY: JWS	1000.142

OPTION?

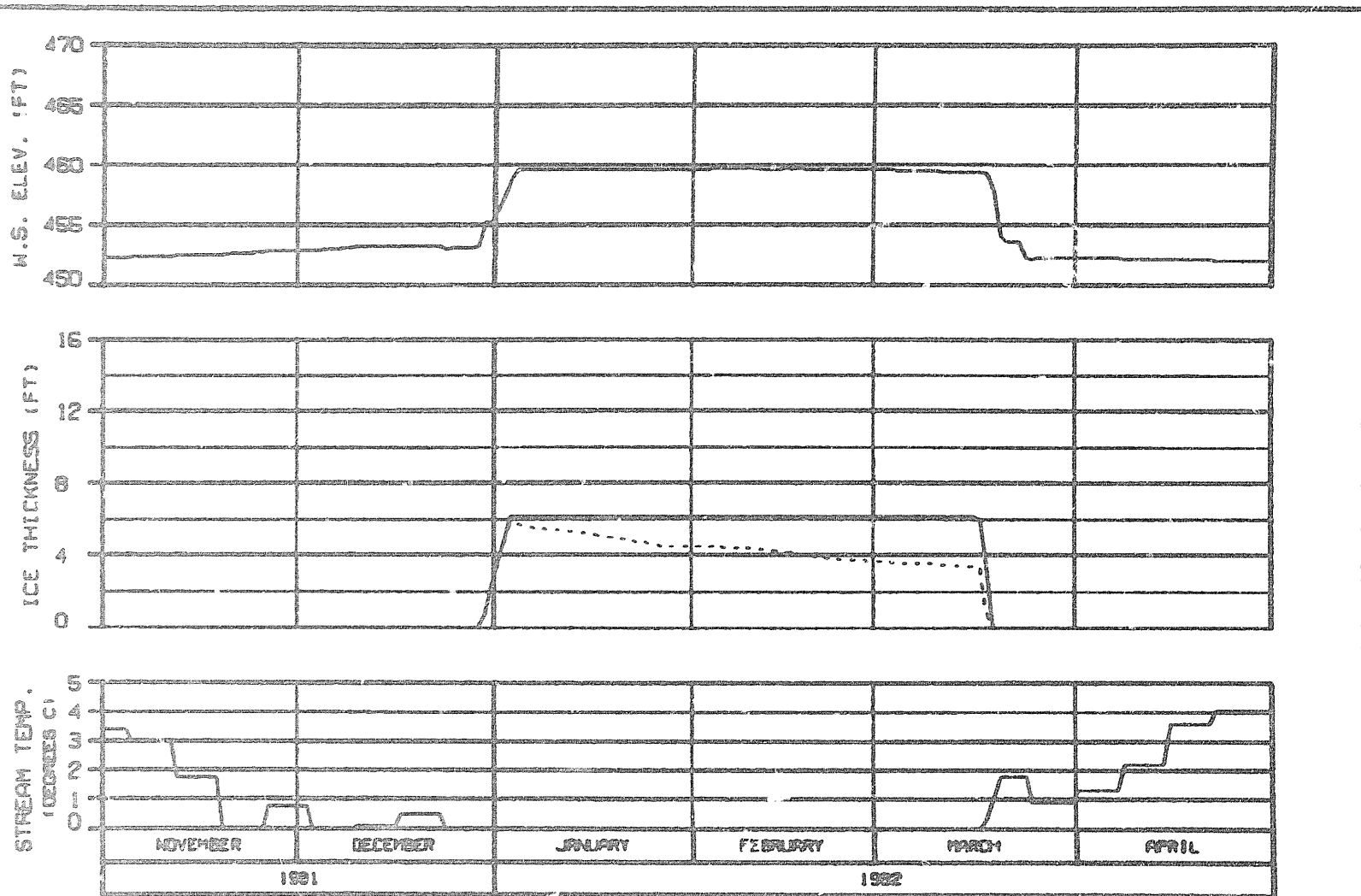


HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

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

ALASKA POWER AUTHORITY	
GLACIER PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EGASCO JOINT VENTURE	
CHARTER - 11/10/81	1008.142

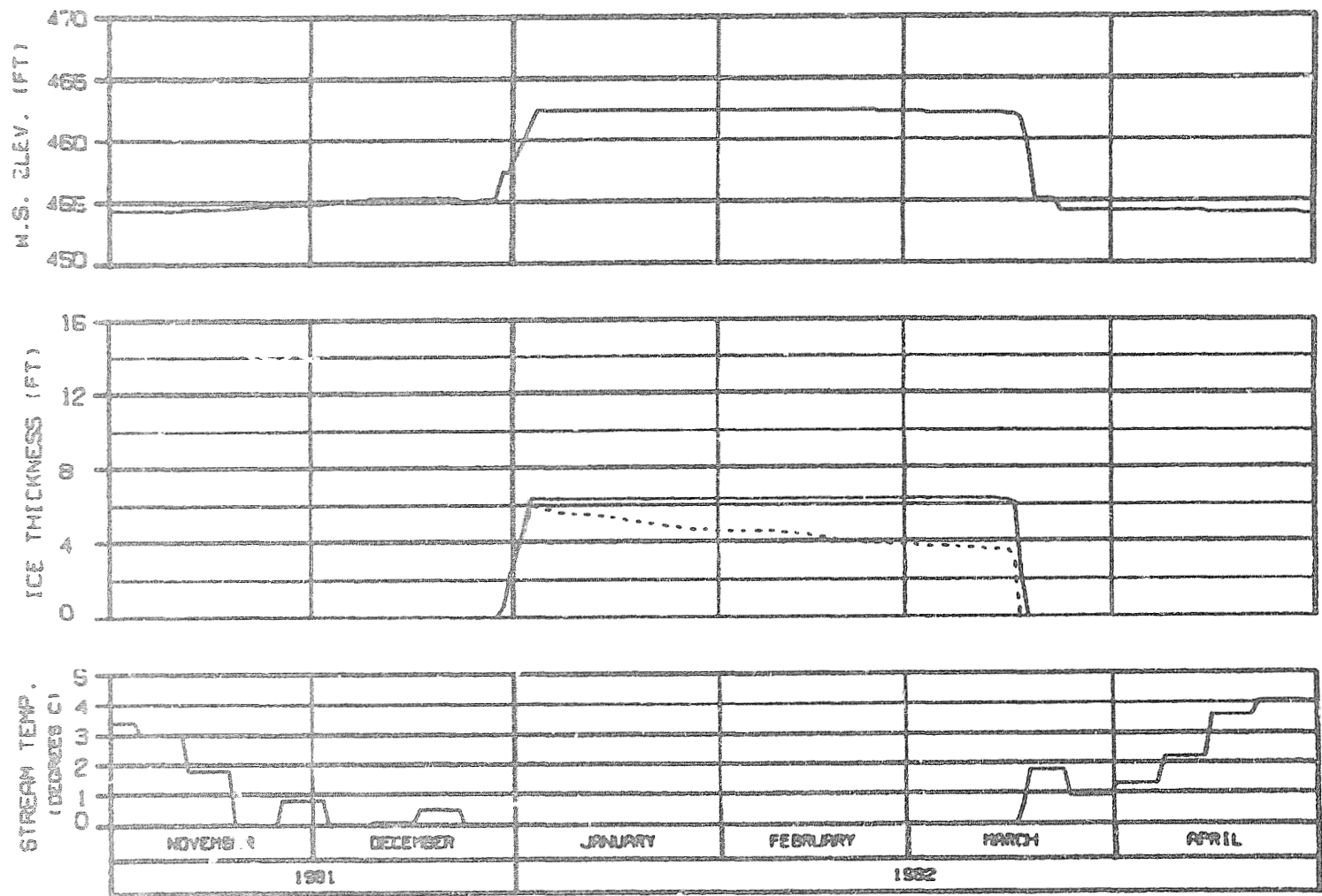


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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 I WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 810ZENS

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGN - 44-0000	71 470 82
	1800.142

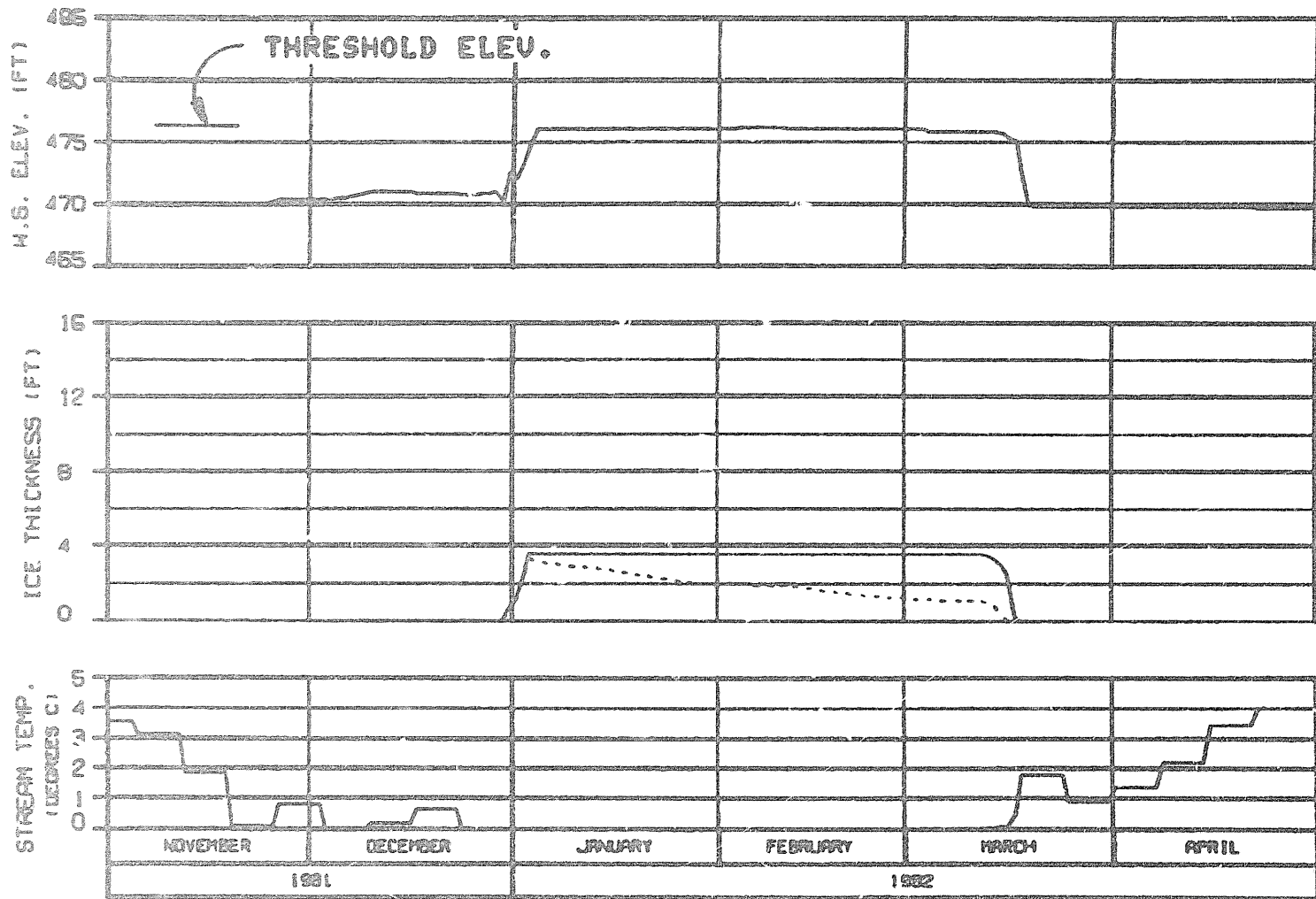


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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 I WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY		
SUBJECT PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DATE: 04/28/82	BY: []	1088.142

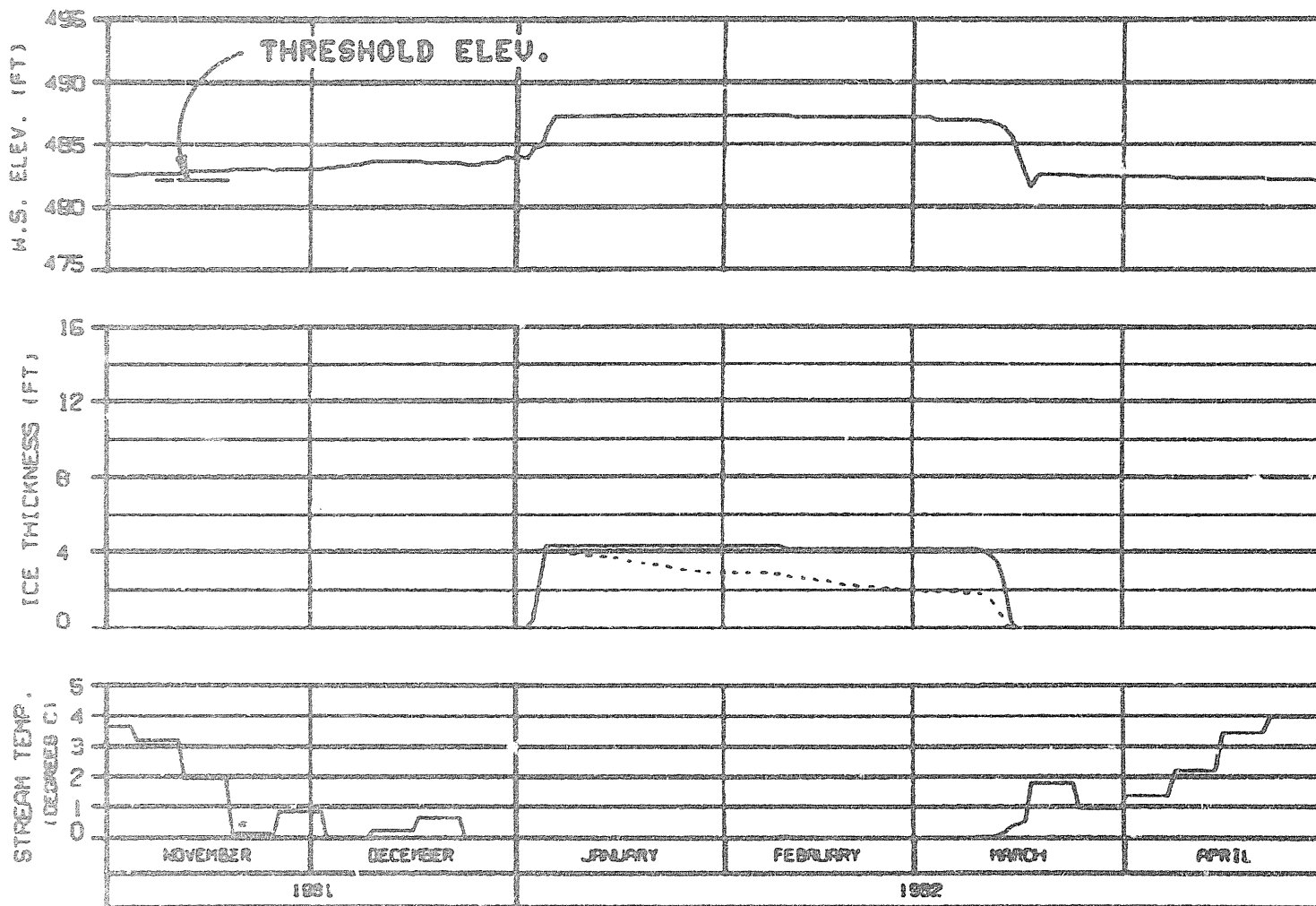


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARDA-EBRSCO JOINT VENTURE	
DESIGNED - ALASKA	BY 81 APR 82
	1800.142

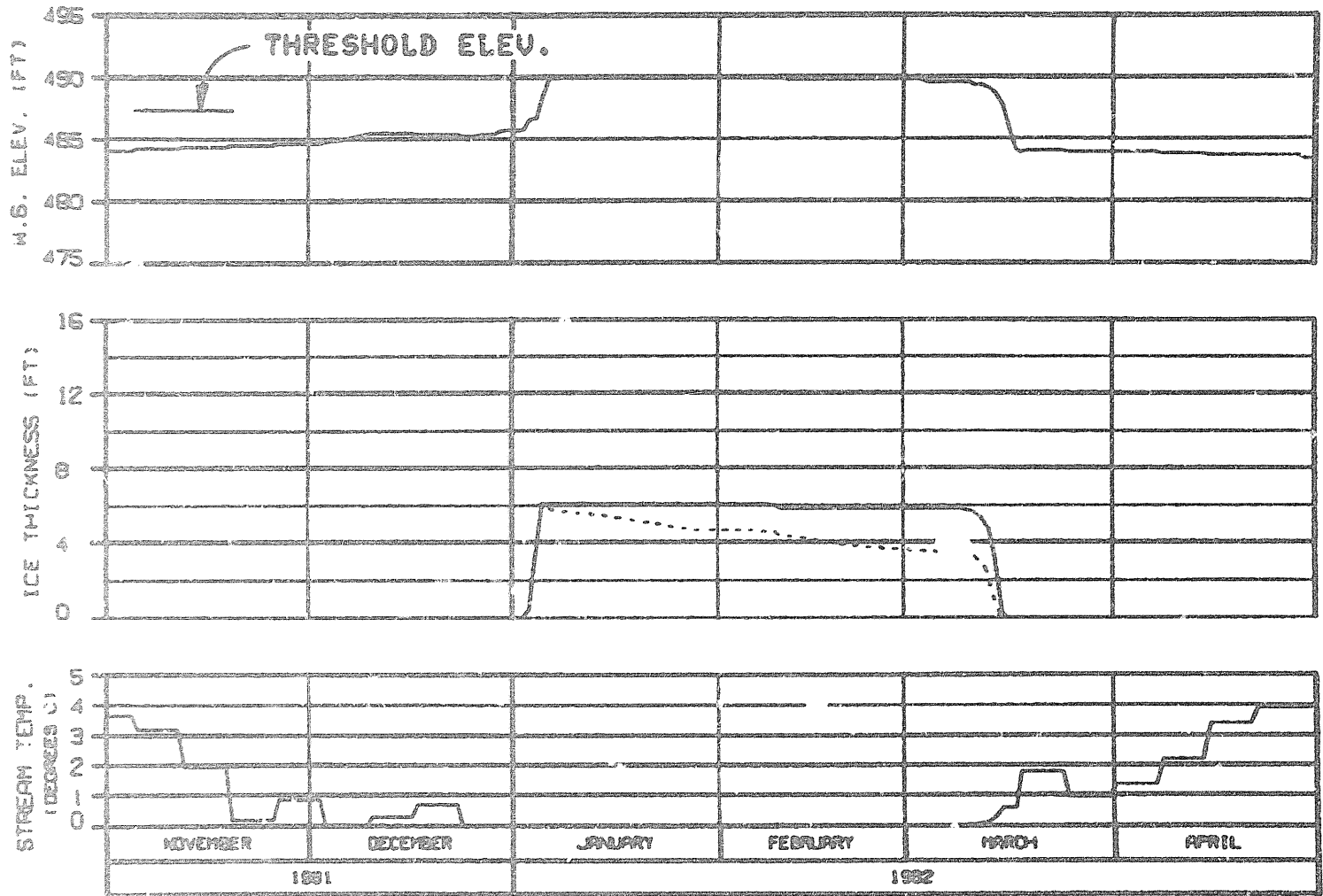


SIDE CHANNEL MSII
RIVER MILE : 115.50

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

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

ALASKA POWER AUTHORITY	
DATA SUBJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 11 APR 82	1002.142

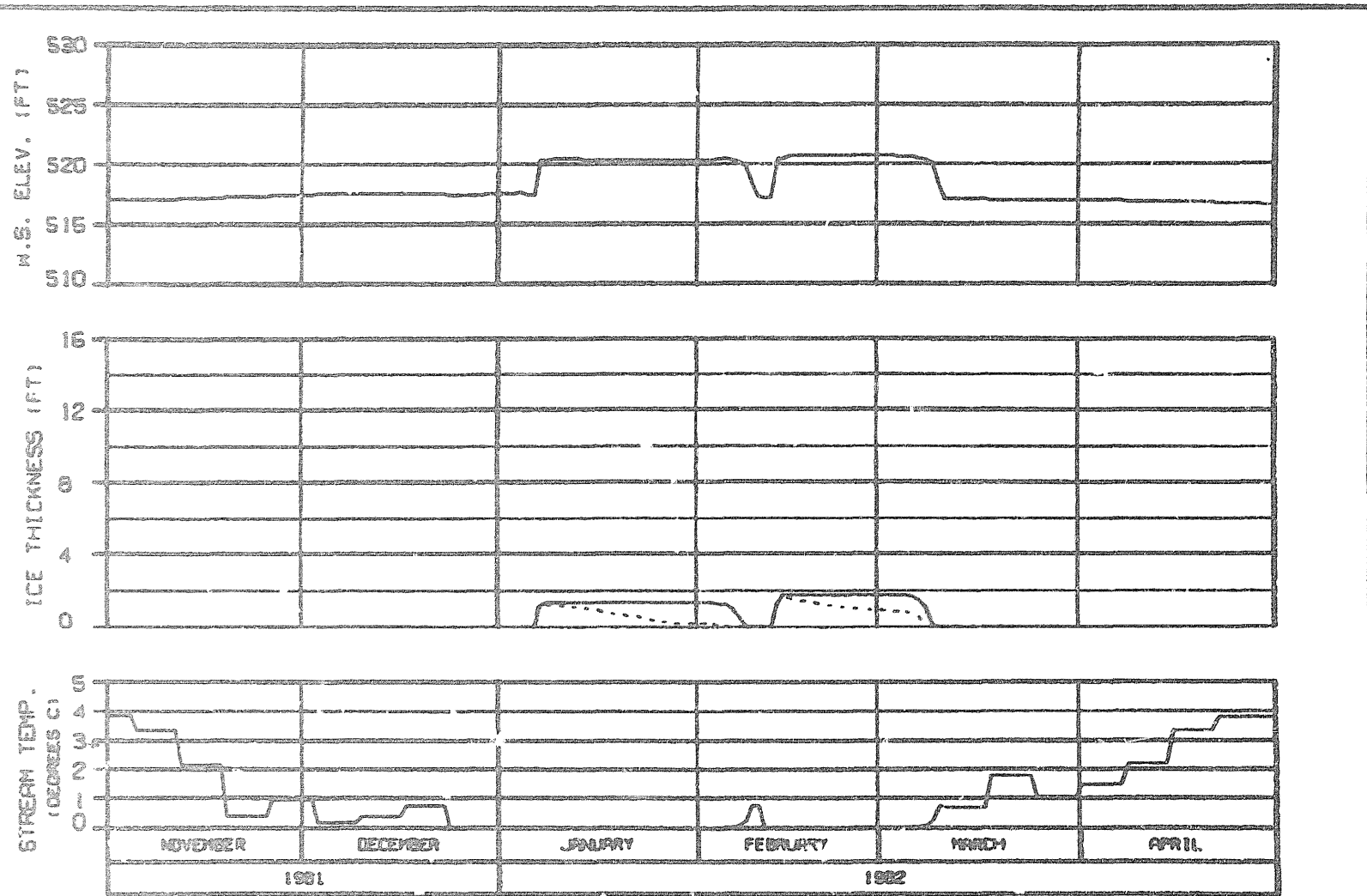


HEAD OF SIDE CHANNEL MSII
 RIVER MILE : 115.90

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-77 FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 NATANA + DEVIL CANYON
 REFERENCE RUN NO. : BIOZENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NARZA-EBASCO JOINT VENTURE		
DESIGNED - G. L. BENTON	01 APR 82	1023.142

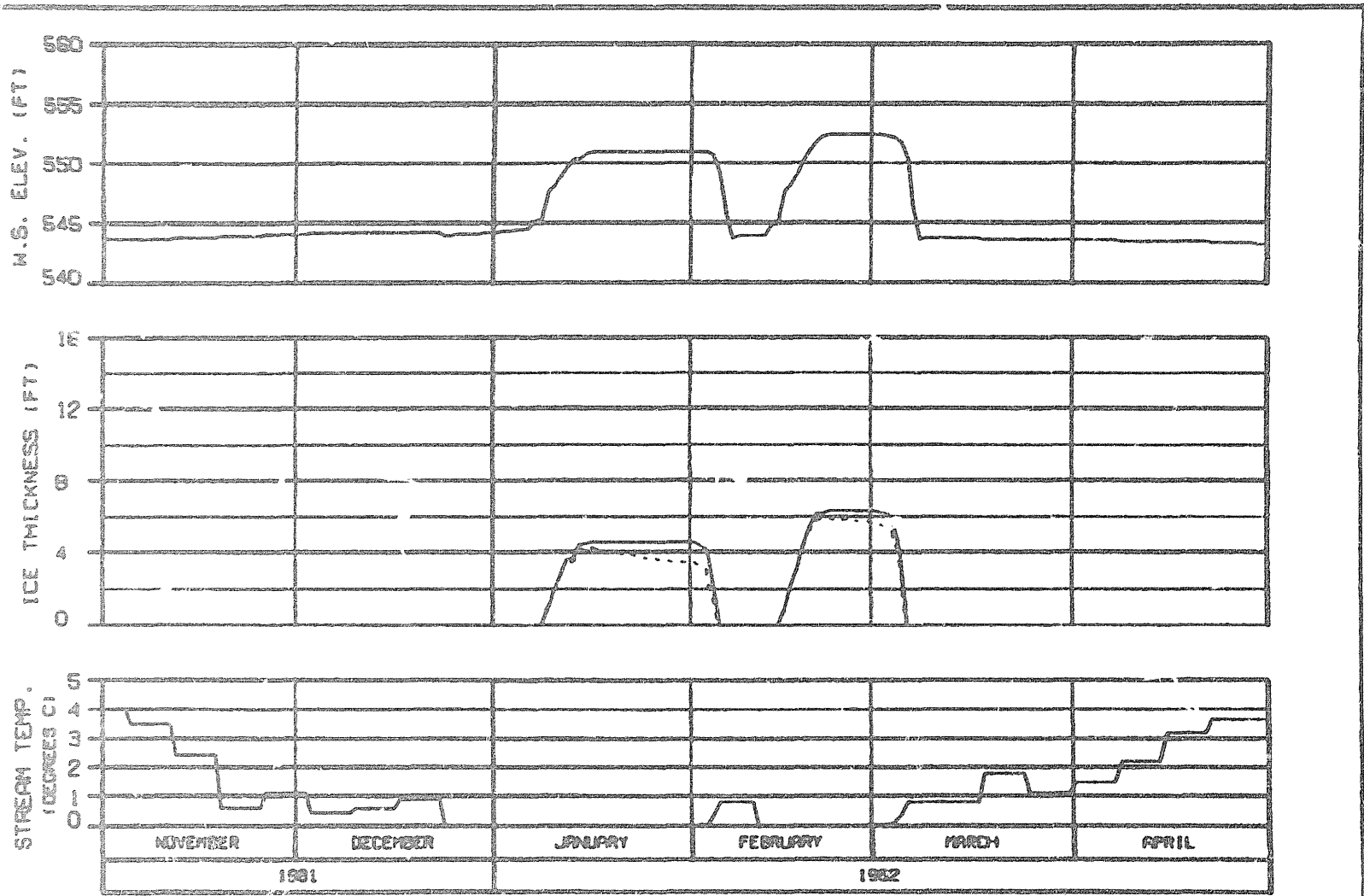


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUSH COMPONENT

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 NATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HARZA-EBASCO JOINT VENTURE	
WORKS. PLACETS	31 APR 82 1888.142

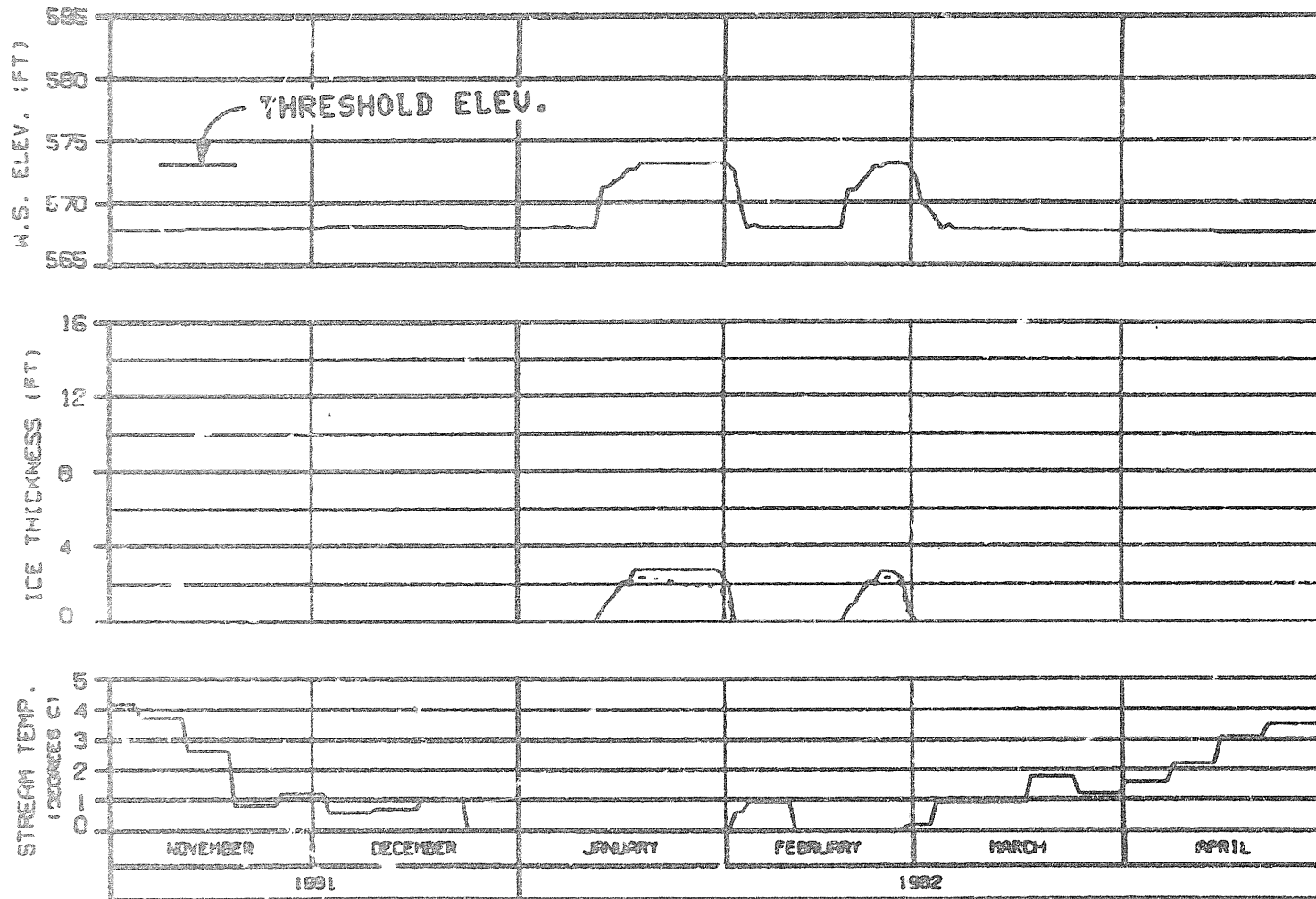


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
NARZA-EPASCO JOINT VENTURE		
DESIGNED: G.L. PUGH	31 7'3 82	1992.142



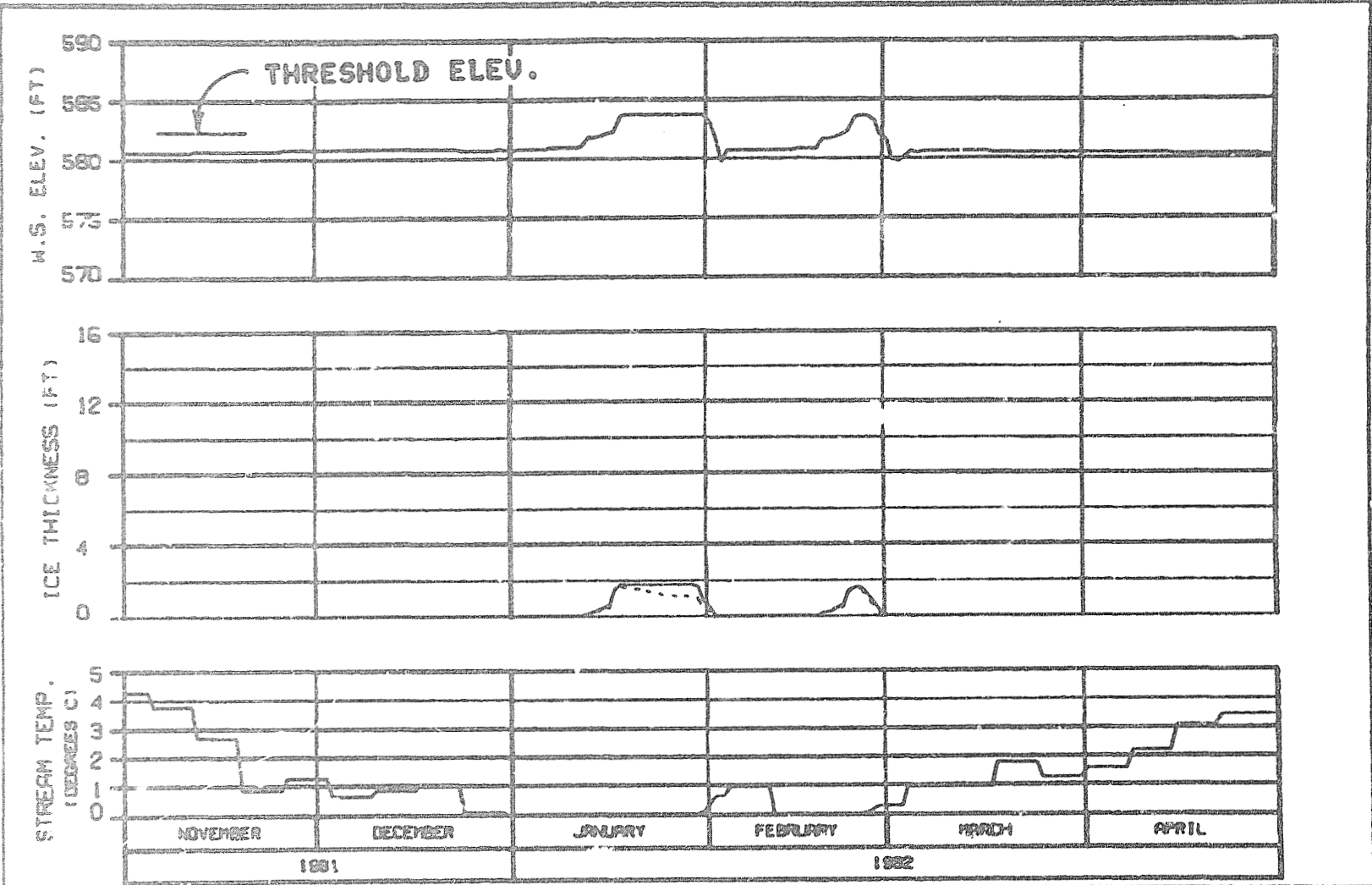
HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 NATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102EN6

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SUSTITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBROO JOINT VENTURE	
CHANGES - ALL DATED	11 APR 92 1589.148



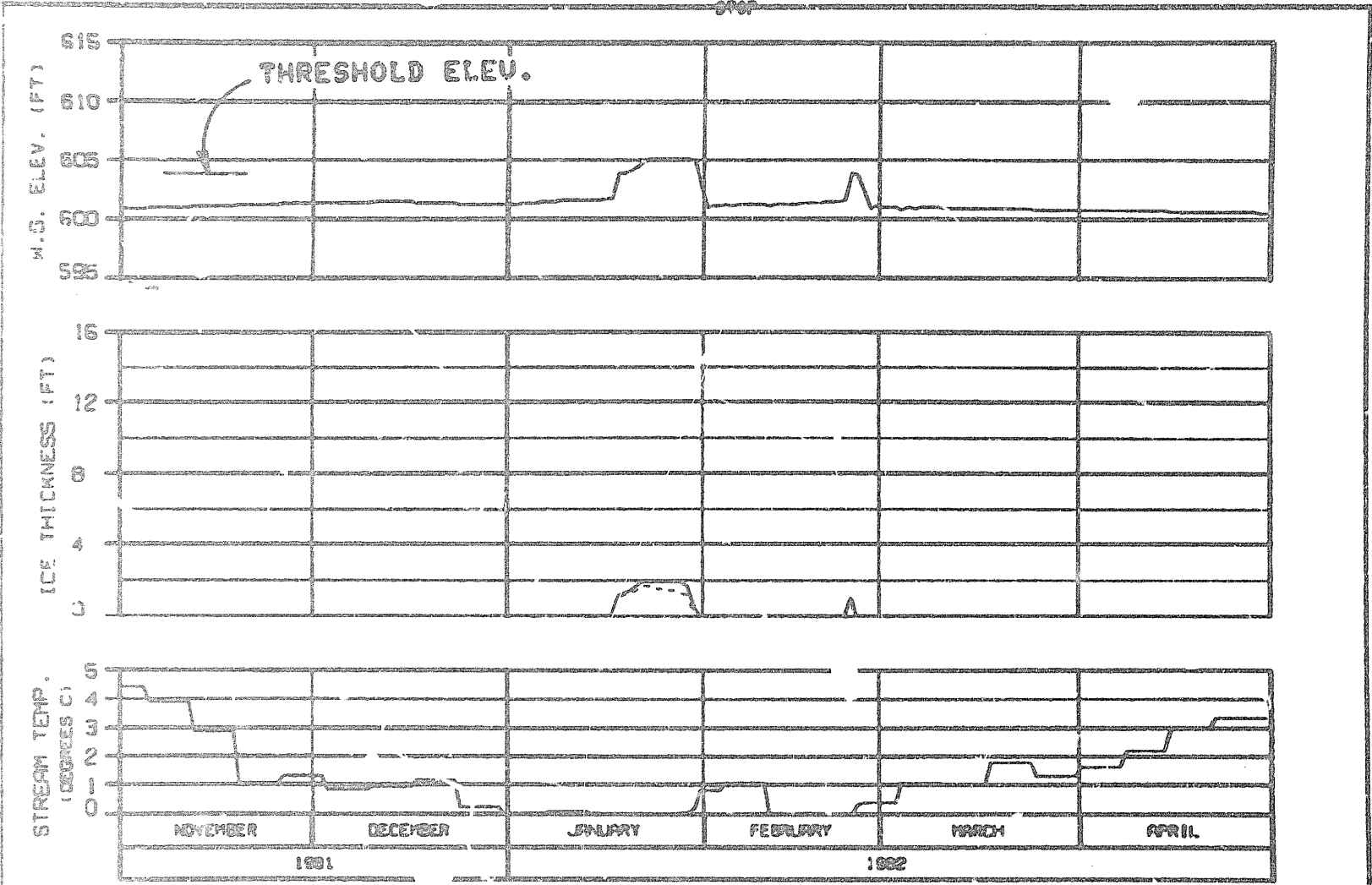
HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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	
GAUTHIER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRACCO JOINT VENTURE	
CHARTED: 8-2-82	11 APR 82
	1982.142

C



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

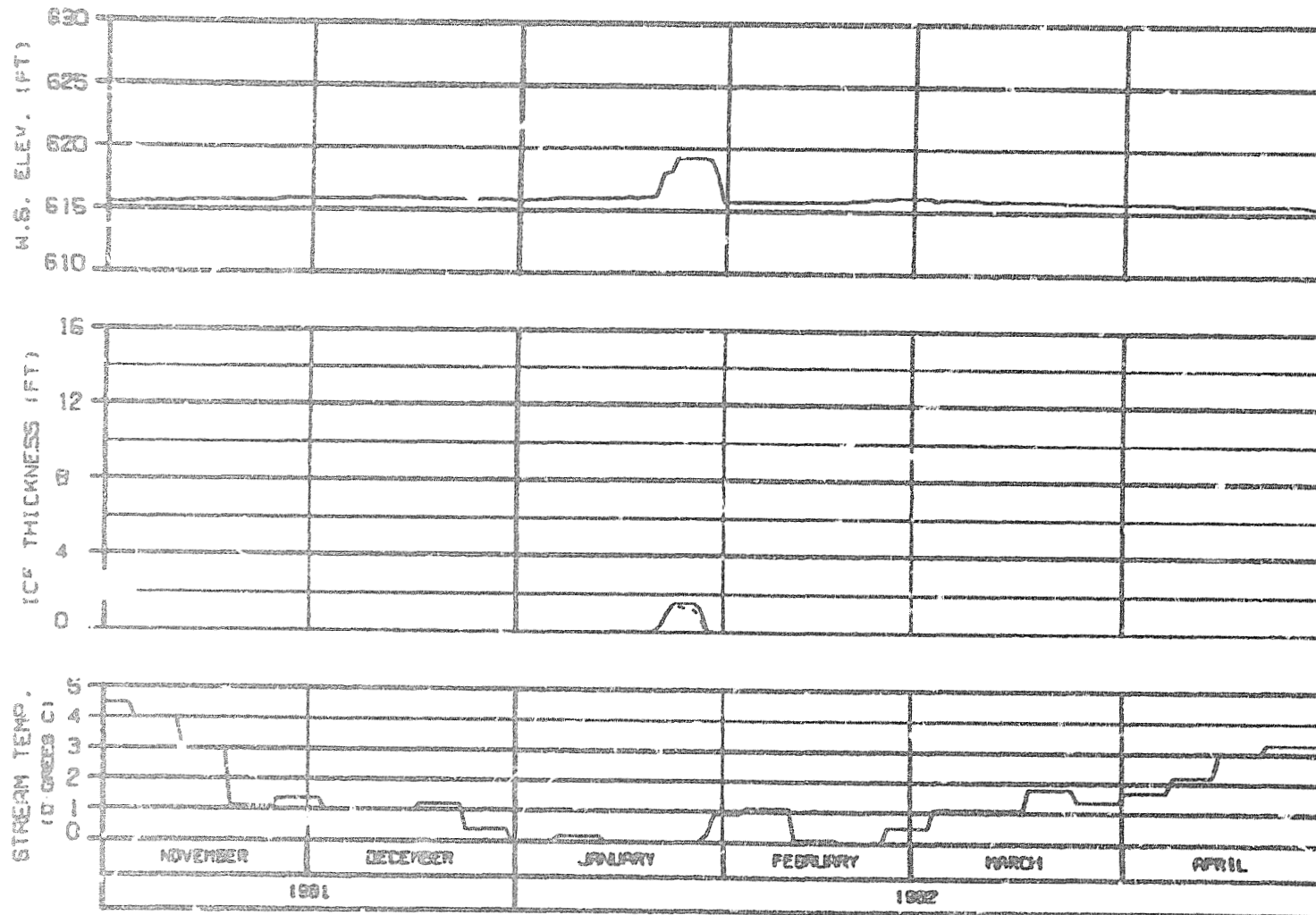
ICE THICKNESS LEGEND:
 - - - - - TOTAL THICKNESS
 BLUSH COMPONENT

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. : 810ZENS

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
DATE: 01.08.02	BY: JPM/BJ
PAGE: 142	

0271017

OPTION 9

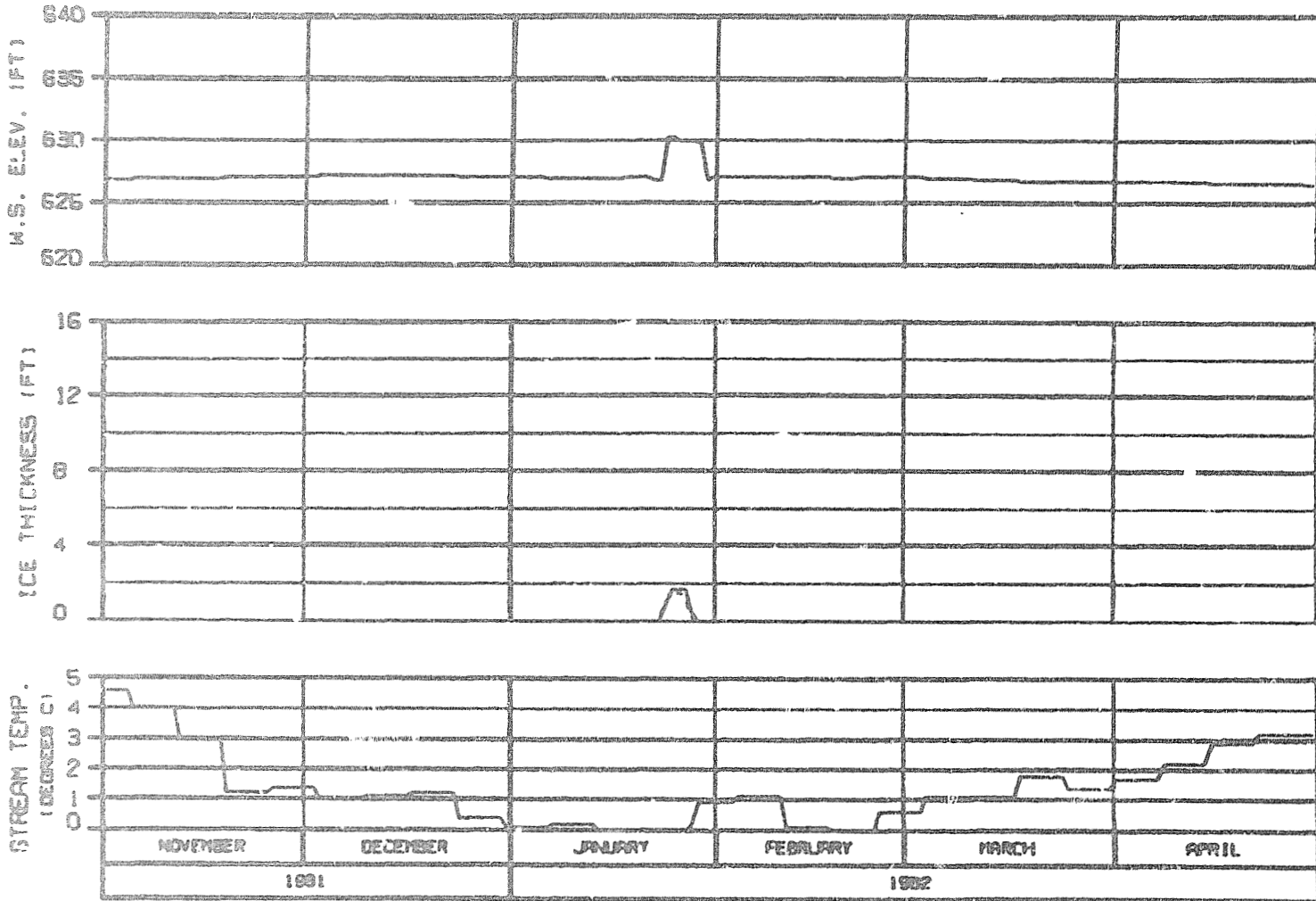


SIDE CHANNEL U/S OF SLOUGH 9
RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 010298

ALASKA POWER AUTHORITY		
PLANNING PROJECT		
SUSTINA RIVER		
ICE SIMULATION		
TIME HISTORY		
HERZA-EBERD JOINT VENTURE		
DATE: 01/04/92	BY: JWB	NO. 142

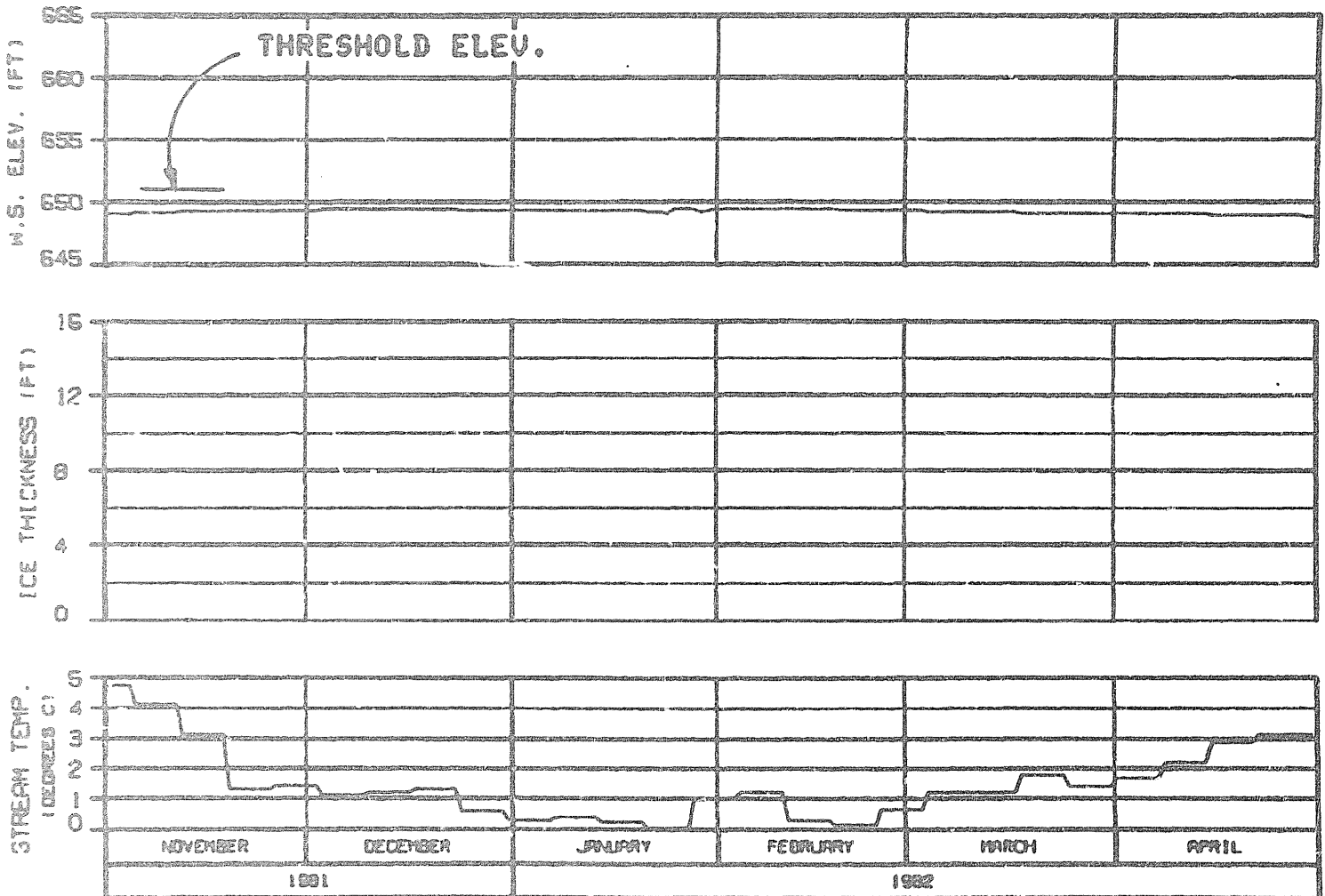


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 NATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZ-EBASCO JOINT VENTURE	
CHICAGO, ILL. 60610	11 070 00
1992.142	

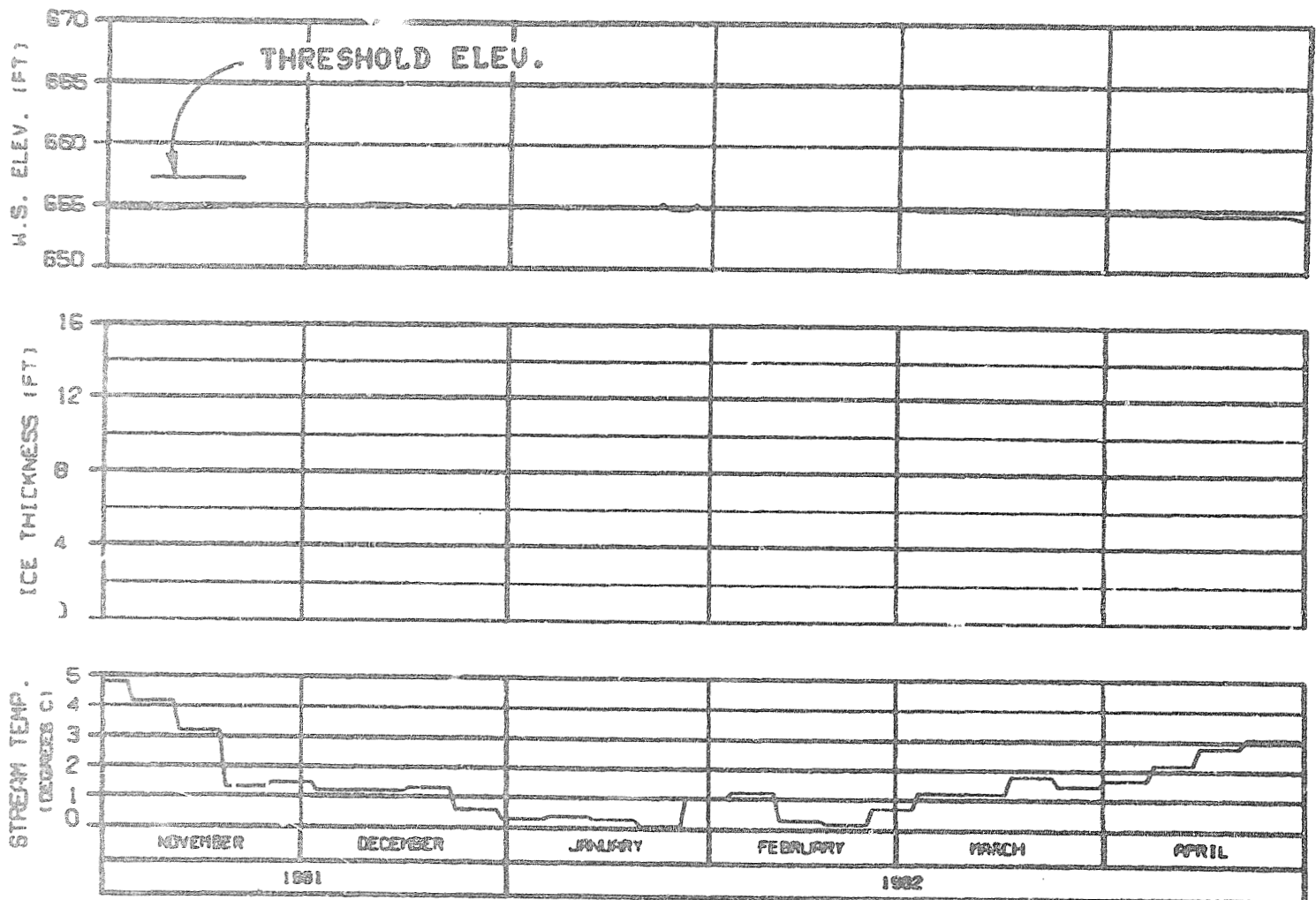


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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, INFLW-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	
DESIGNED - BILL HARRIS	11 APR 82
	1000.142

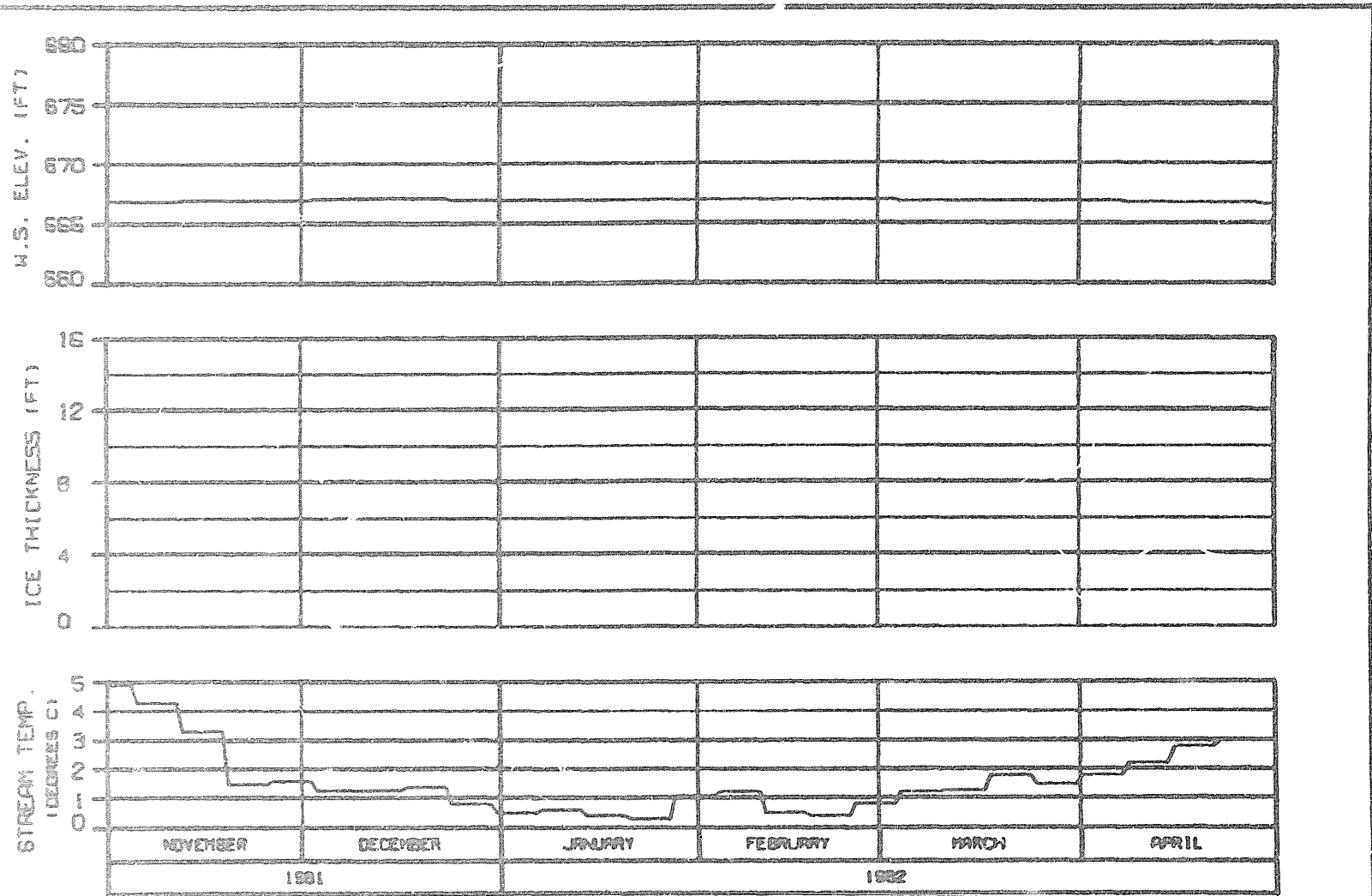


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

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

ALASKA POWER AUTHORITY	
SUBITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
HYDRA-EBASCO JOINT VENTURE	
PROJECT: 81-0010	SI 474 03
1898.142	

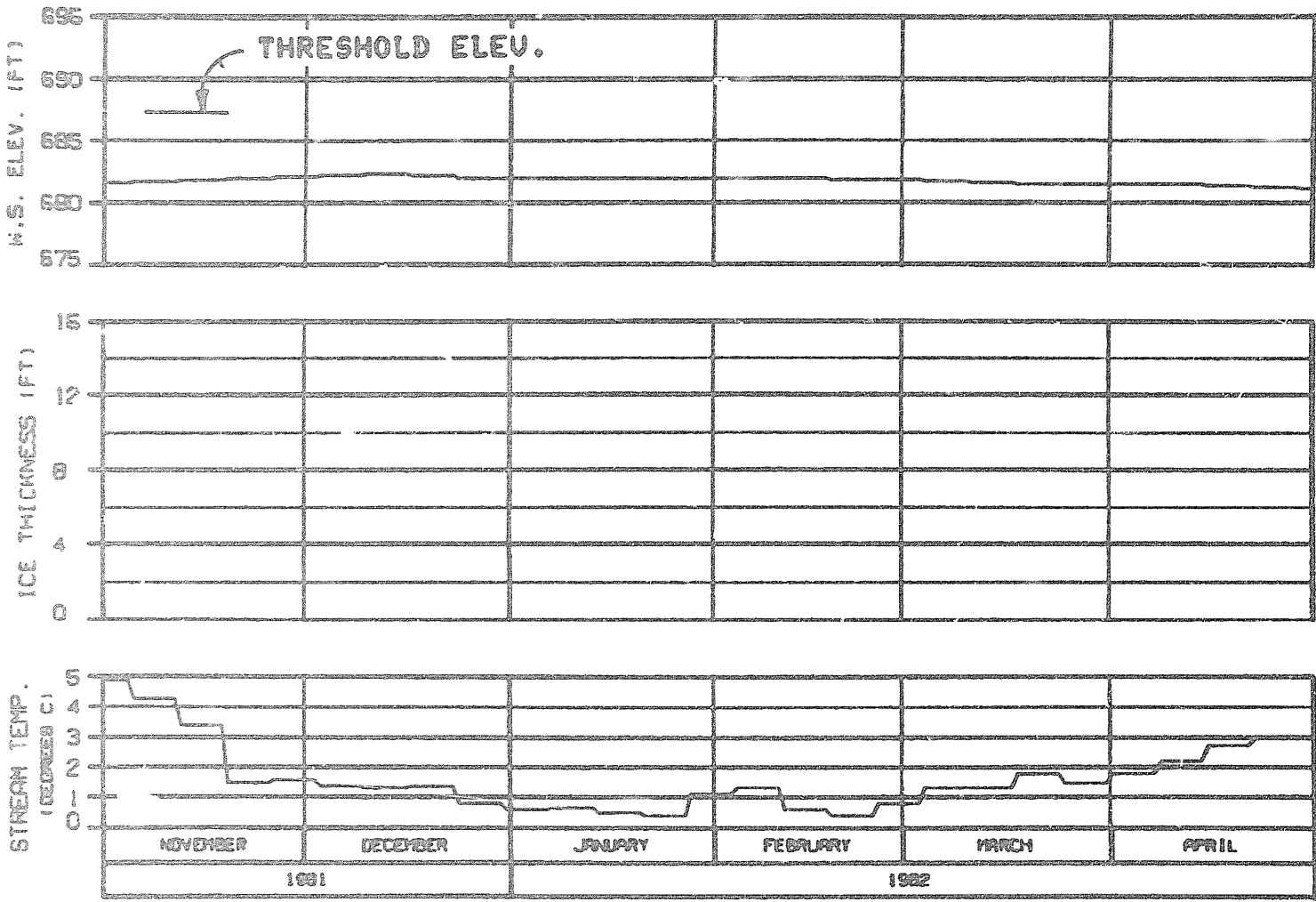


SIDE CHANNEL D/S OF SLOUGH 11
RIVER MILE : 135.30

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

WEATHER PERIOD : 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	
WARZA-EBASCO JOINT VENTURE	
CHANGES - 01 APR 82	1000.142

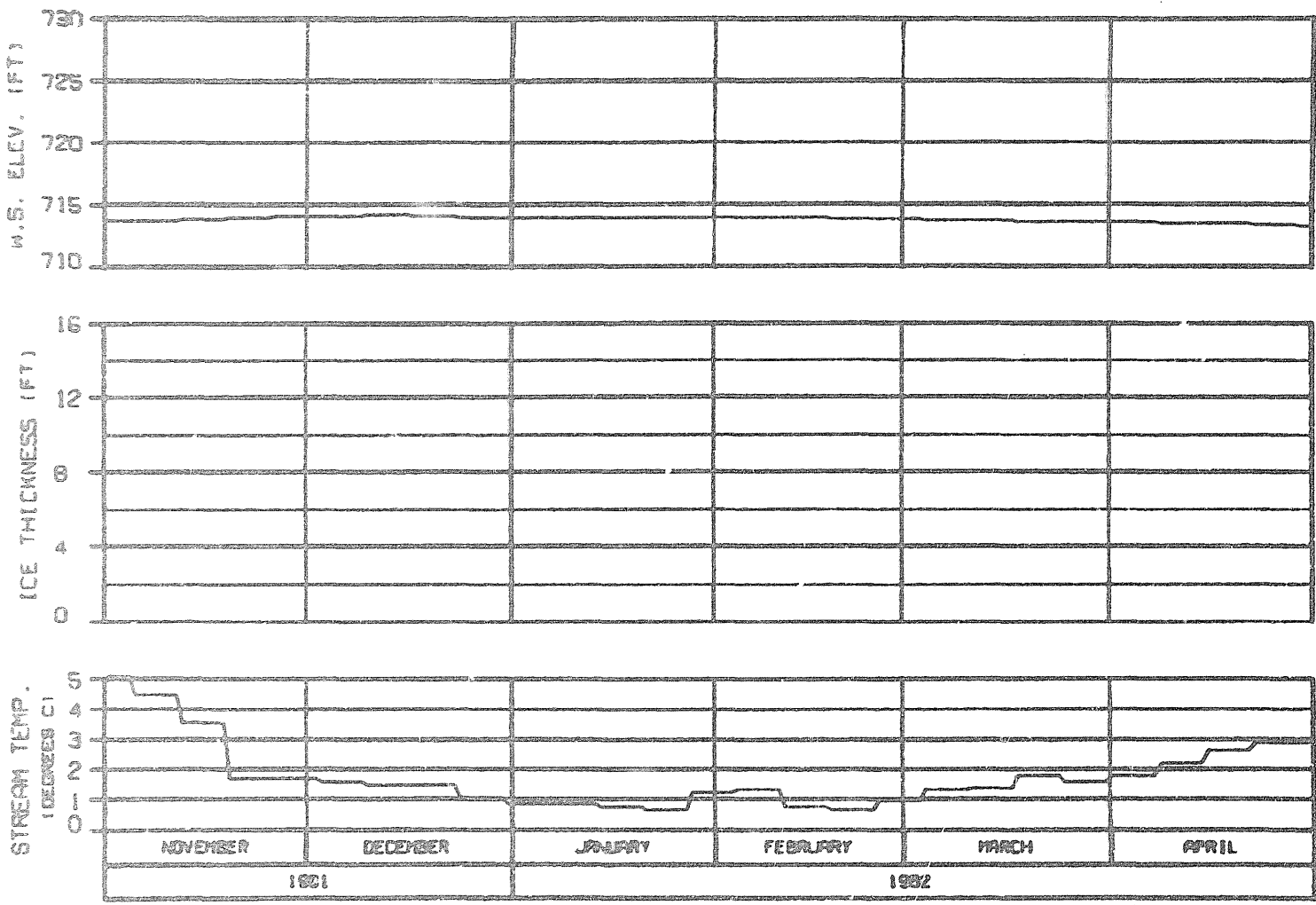


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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	
DESIGN. B. BROWN (11 APR 82)	1088.142

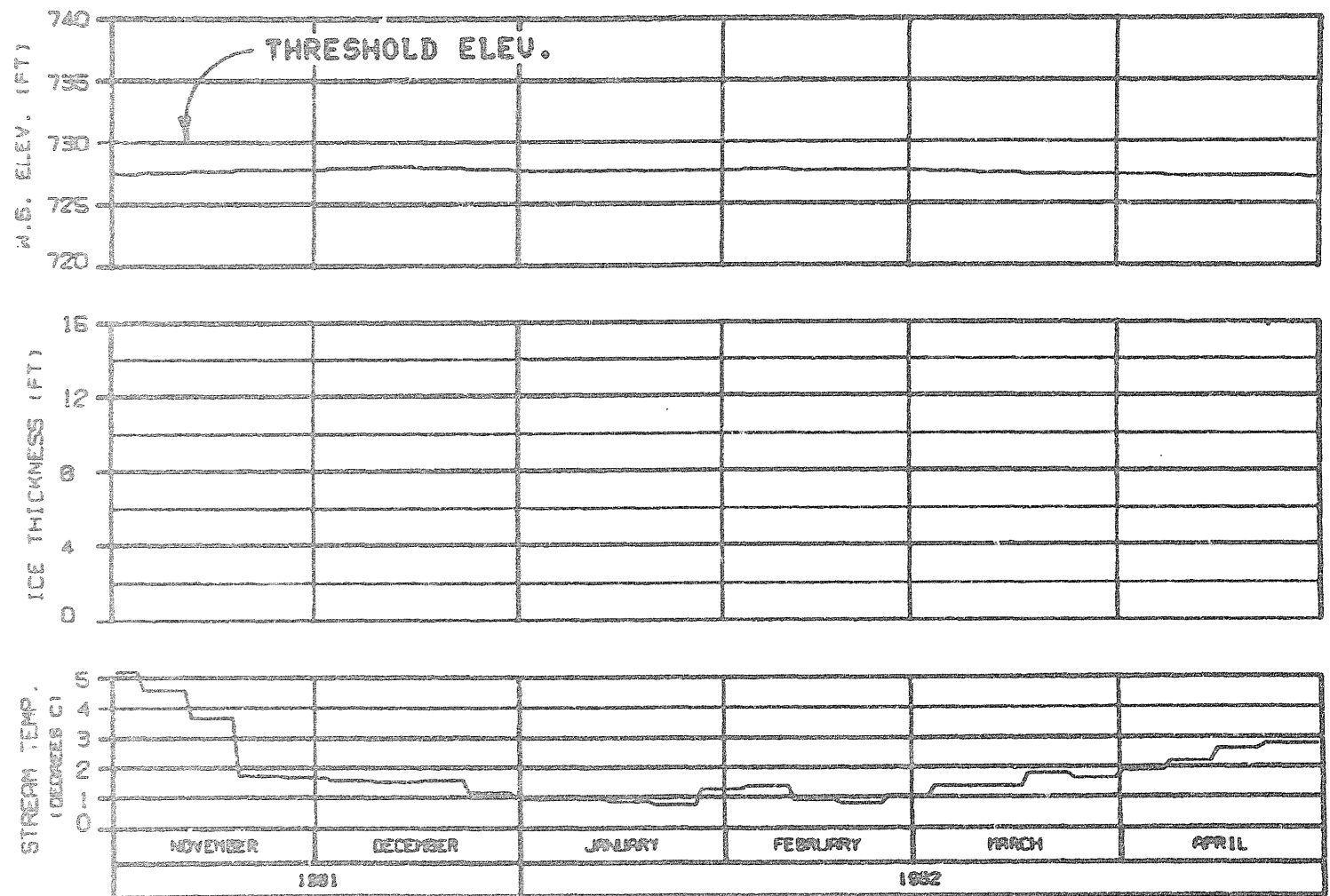


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 810ZENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED BY: G.L.DAVIS	DATE: 01 APR 82	PROJECT NO.: 1520.142

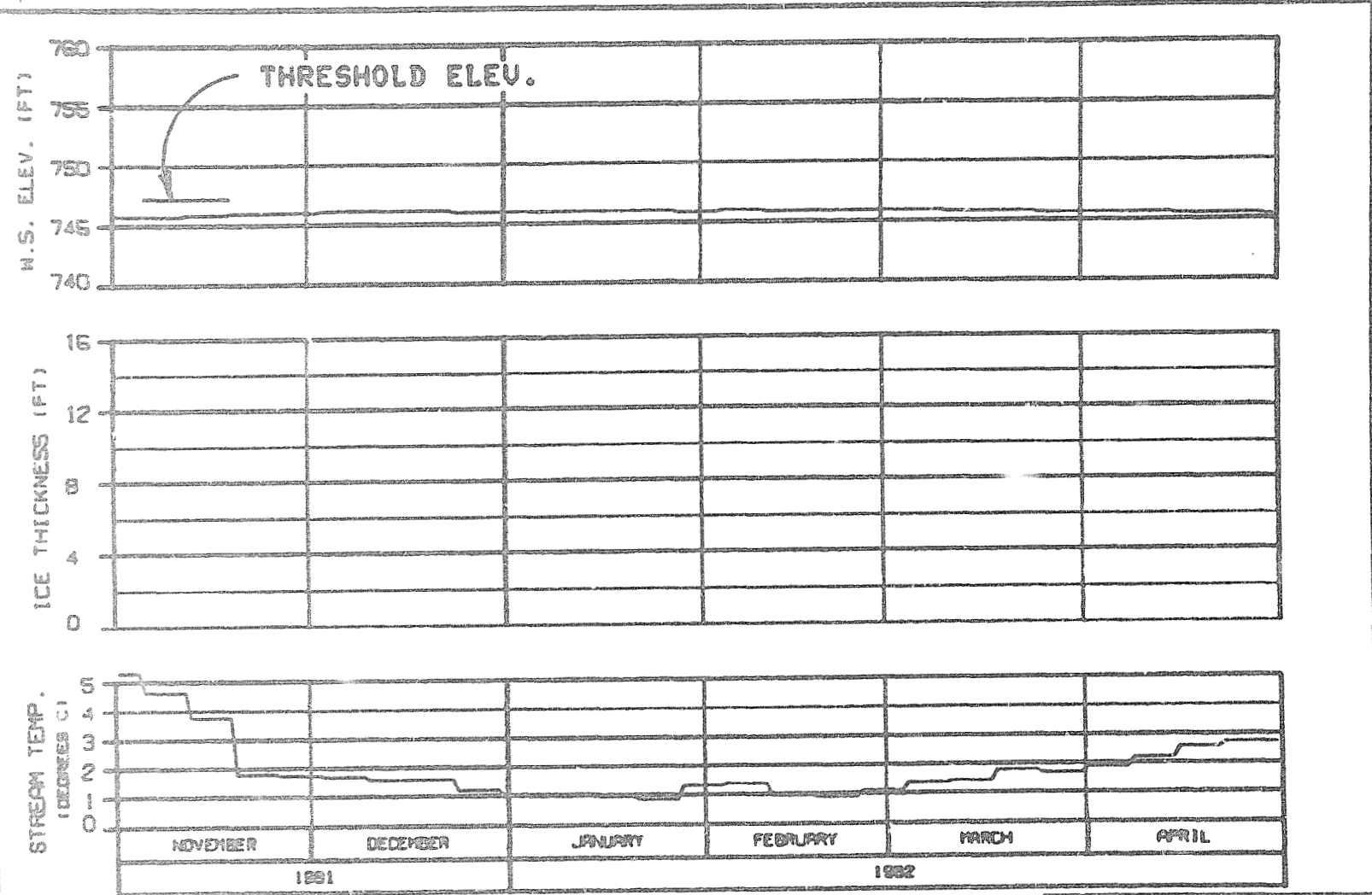


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE I MATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
SWANSON, BLANDY	01 APR 92	1008.142

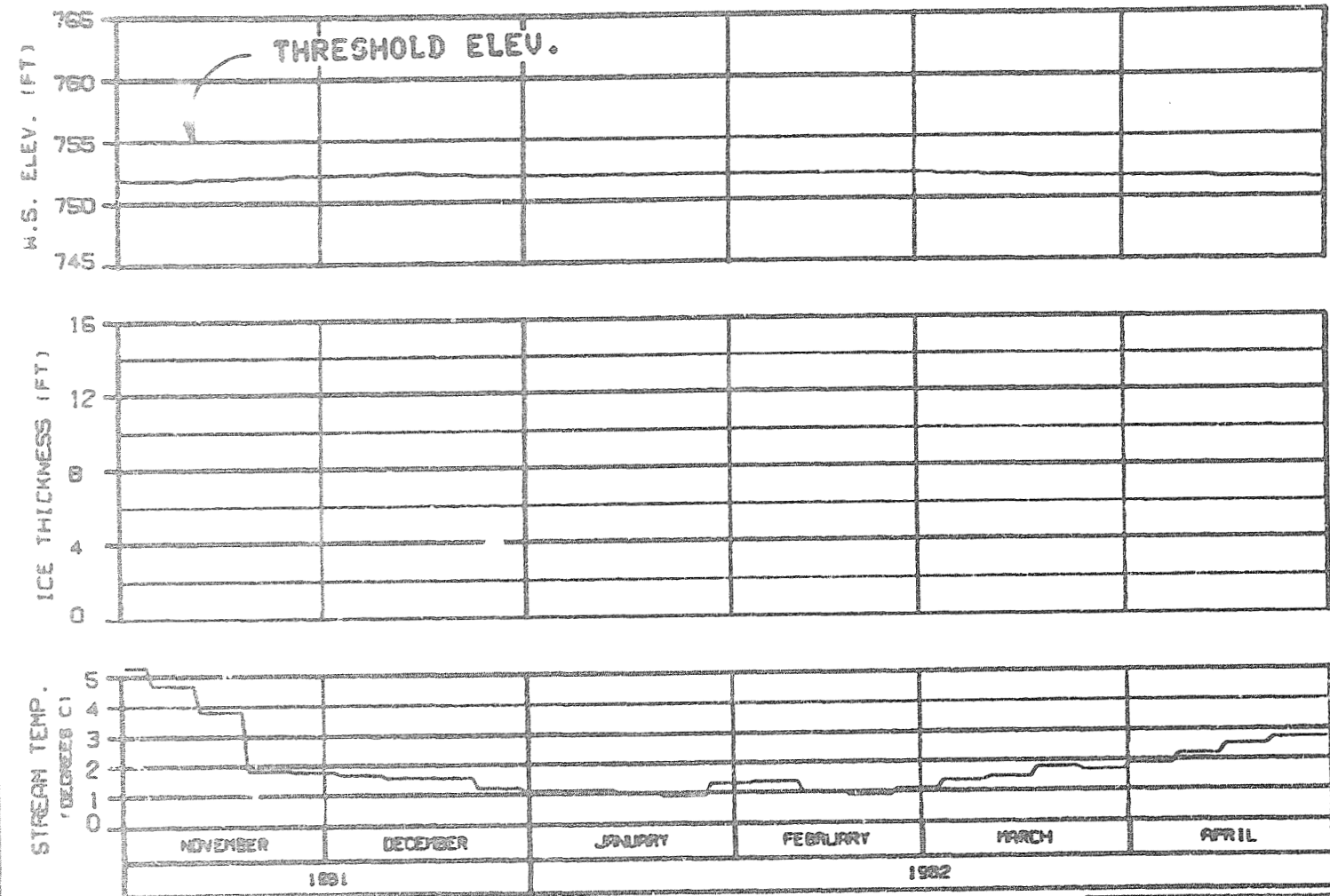


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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 NATANA + DEVIL CANYON
 REFERENCE RUN NO. : 8102ENS

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNER: ALASKA	DATE: 11 APR 82	1288.142



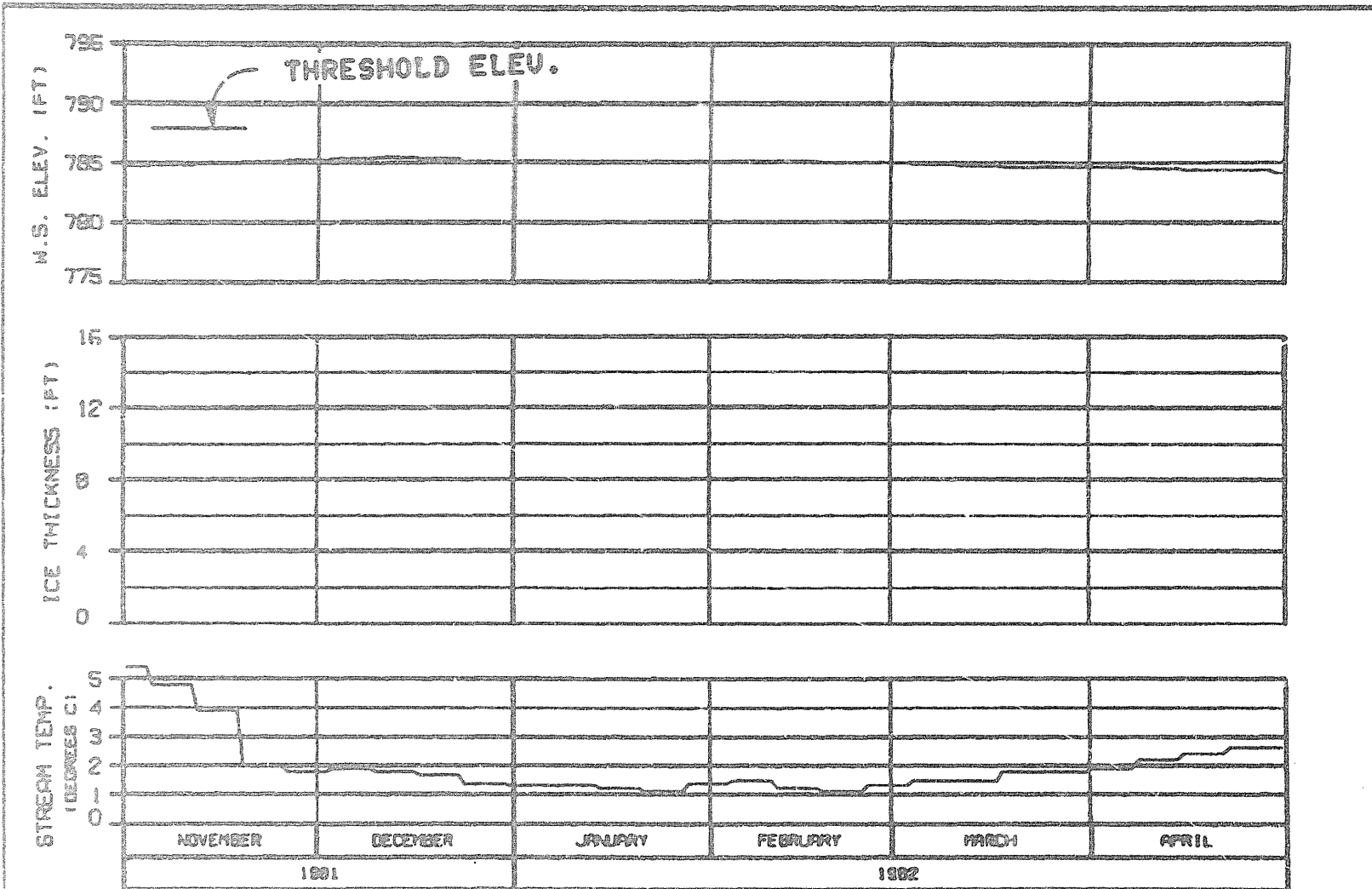
HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 ENERGY DEMAND : DEVIL CANYON 2002
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON
 REFERENCE RUN NO. : 9102ENS

ALASKA POWER AUTHORITY	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WAPDA-EBASCO JOINT VENTURE	
CHICAGO, ILLINOIS	1500.142

c



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

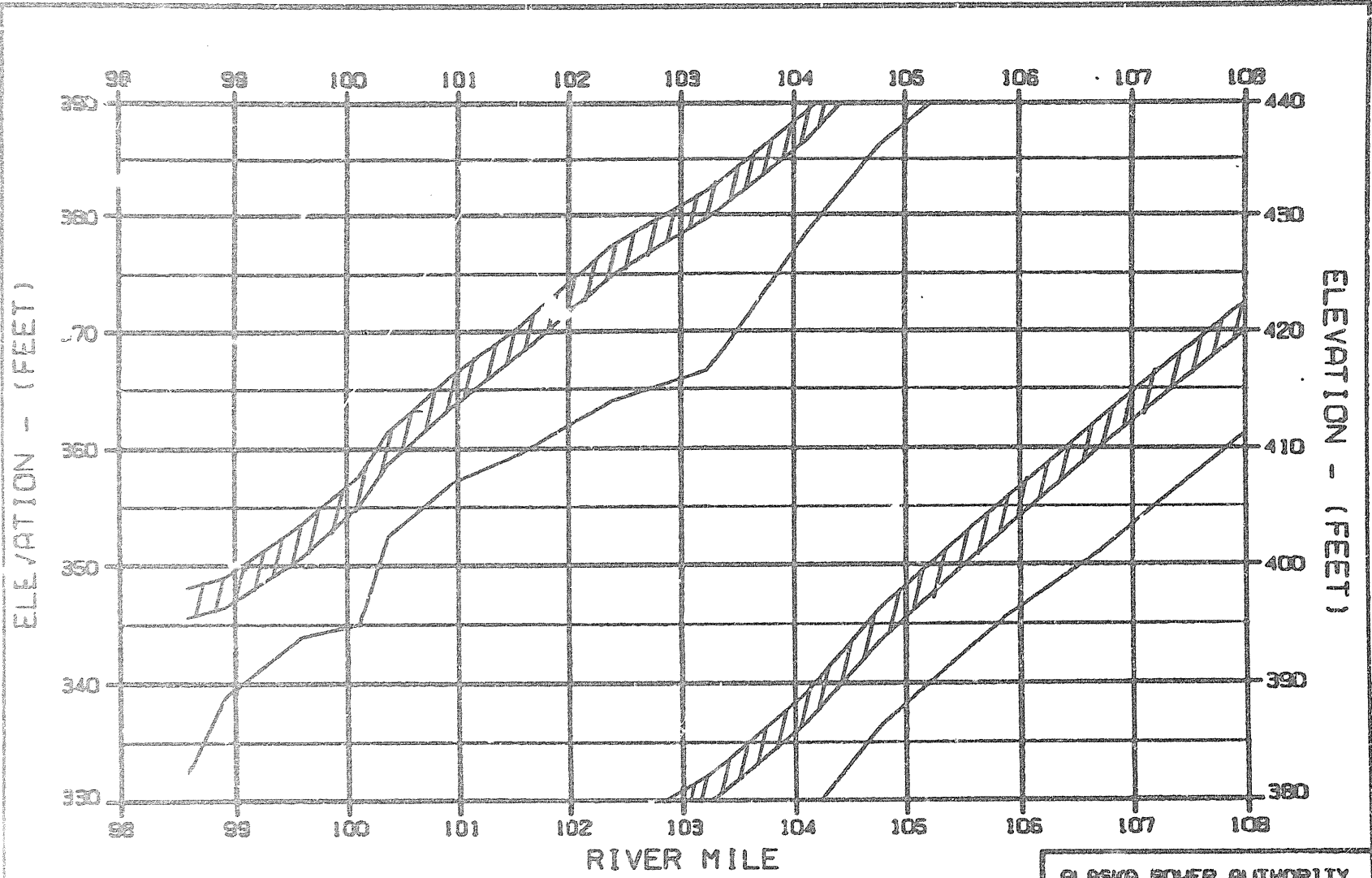
HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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	
SUBJECT PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DRAWN - G.L.M.H.T.	DATE 01 APR 82
1002.142	

OPTION?

EXHIBIT U







ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

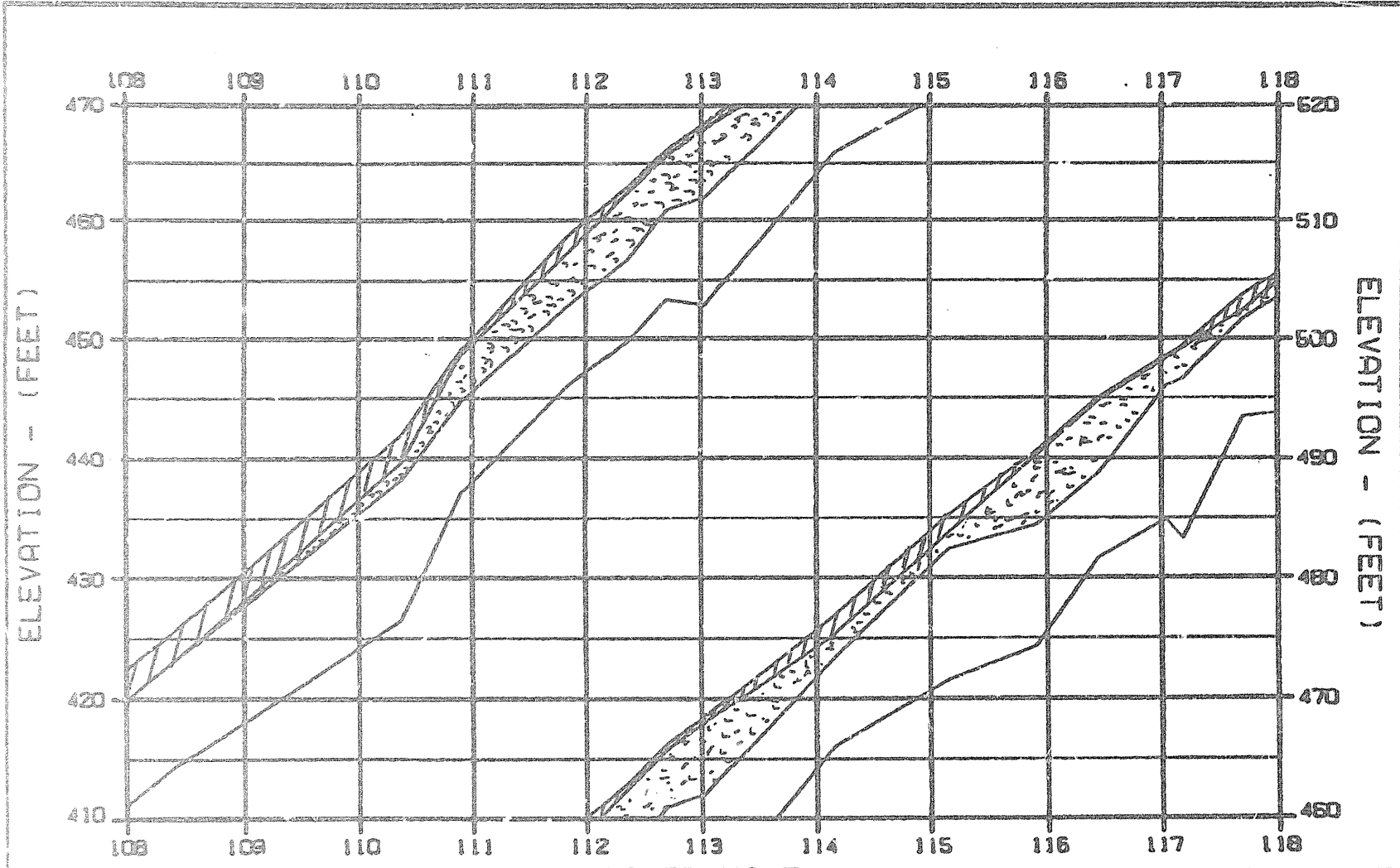
LEGEND:

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

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 STAGE 1 WATANA + DEVIL CANYON, 2002
 FLOW CASE E-VI, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAINAGE
 REFERENCE RUN NO. : 0102ENU

ALASKA POWER AUTHORITY	
SUBMITTAL PROJECT	
SUBITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EDRSCO JOINT VENTURE	
DATE: 01/03/02	BY: JAC

C



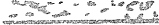



ELEVATION - (FEET)

ELEVATION - (FEET)

RIVER MILE

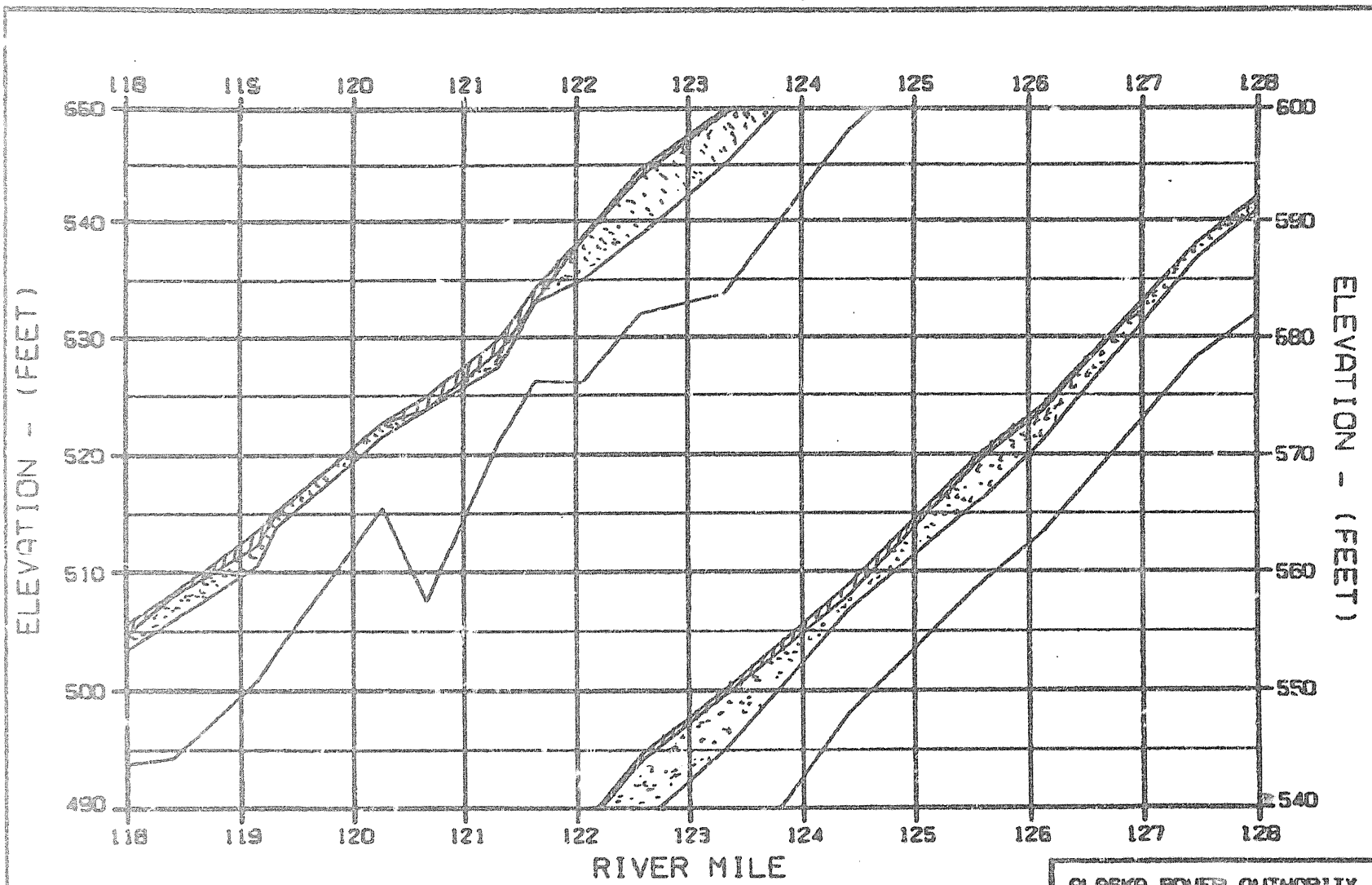
LEGEND:

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 WATANA + DEVIL CANYON, 2002
 FLOW CASE E-V1, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. CRAWDOWN
 REFERENCE RUN NO. : 8102ENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EBASCO JOINT VENTURE	
CREATED: 11/1/82	REV: 02
FIG. 142	



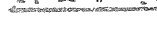

0211012



ELEVATION - (FEET)

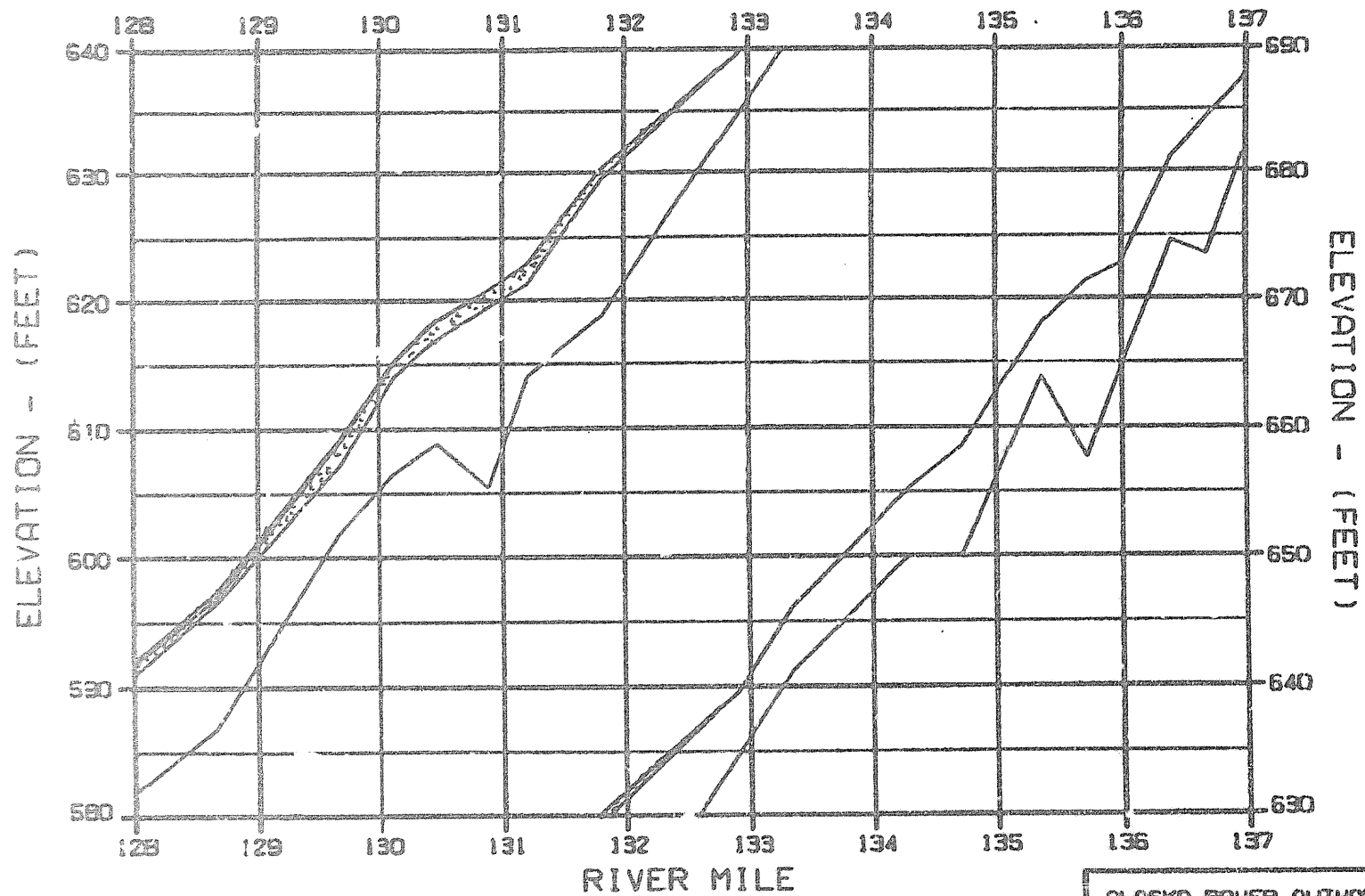
ELEVATION - (FEET)

LEGEND:





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

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. DRAINDOWN
 REFERENCE RUN NO. : 0102ENU

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
WARZA-GRASCO JOINT VENTURE		
CHANGED, ALLOWED	BY APR 83	1983, 142



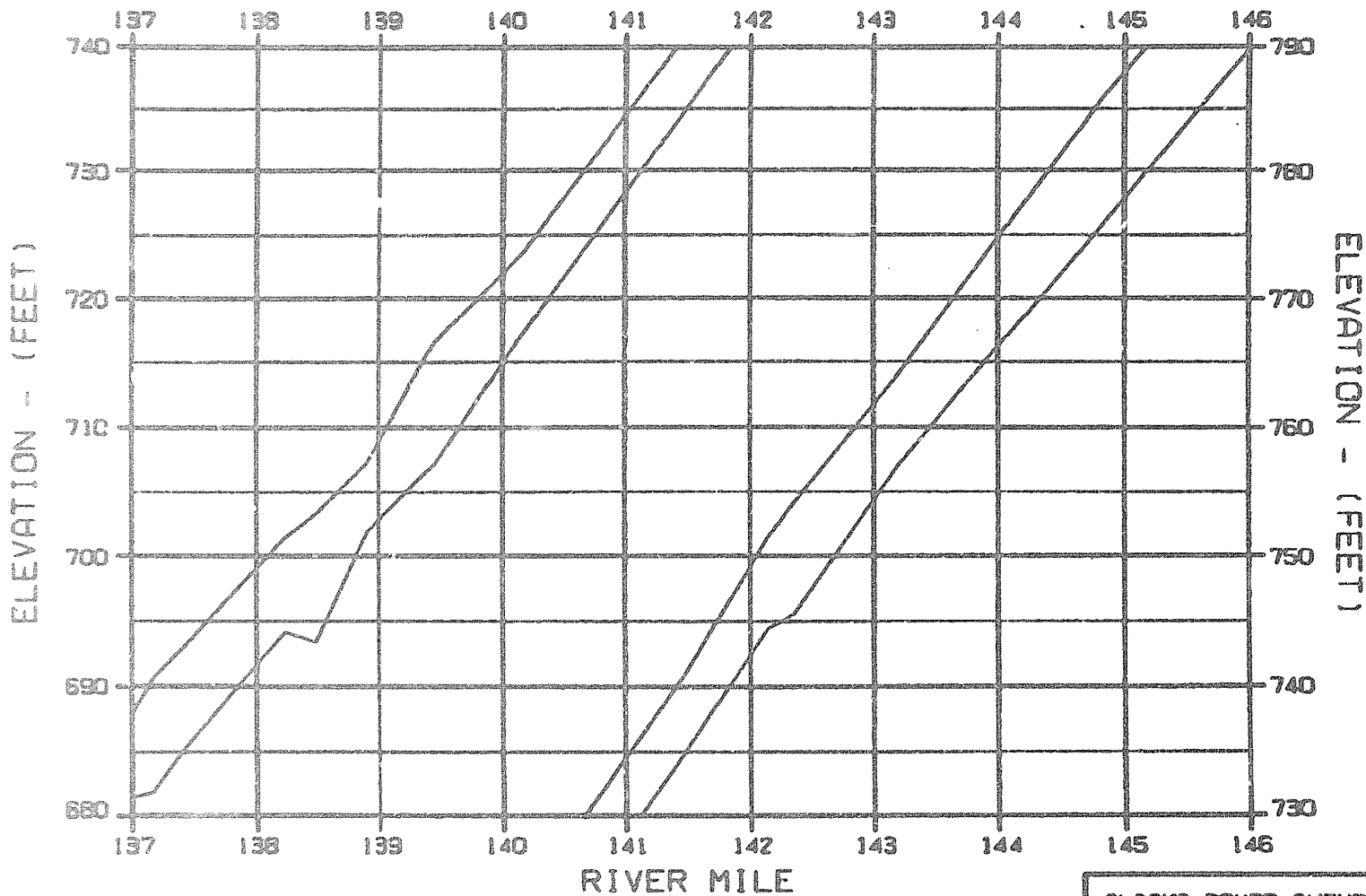
LEGEND.

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





WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 STAGE 1 WATANA + DEVIL CANYON, 2002
 FLOW CASE E-VI, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 0102ENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
MARZA-EDSICO JOINT VENTURE	
DESIGNED BY	1520.142

OPTION 2



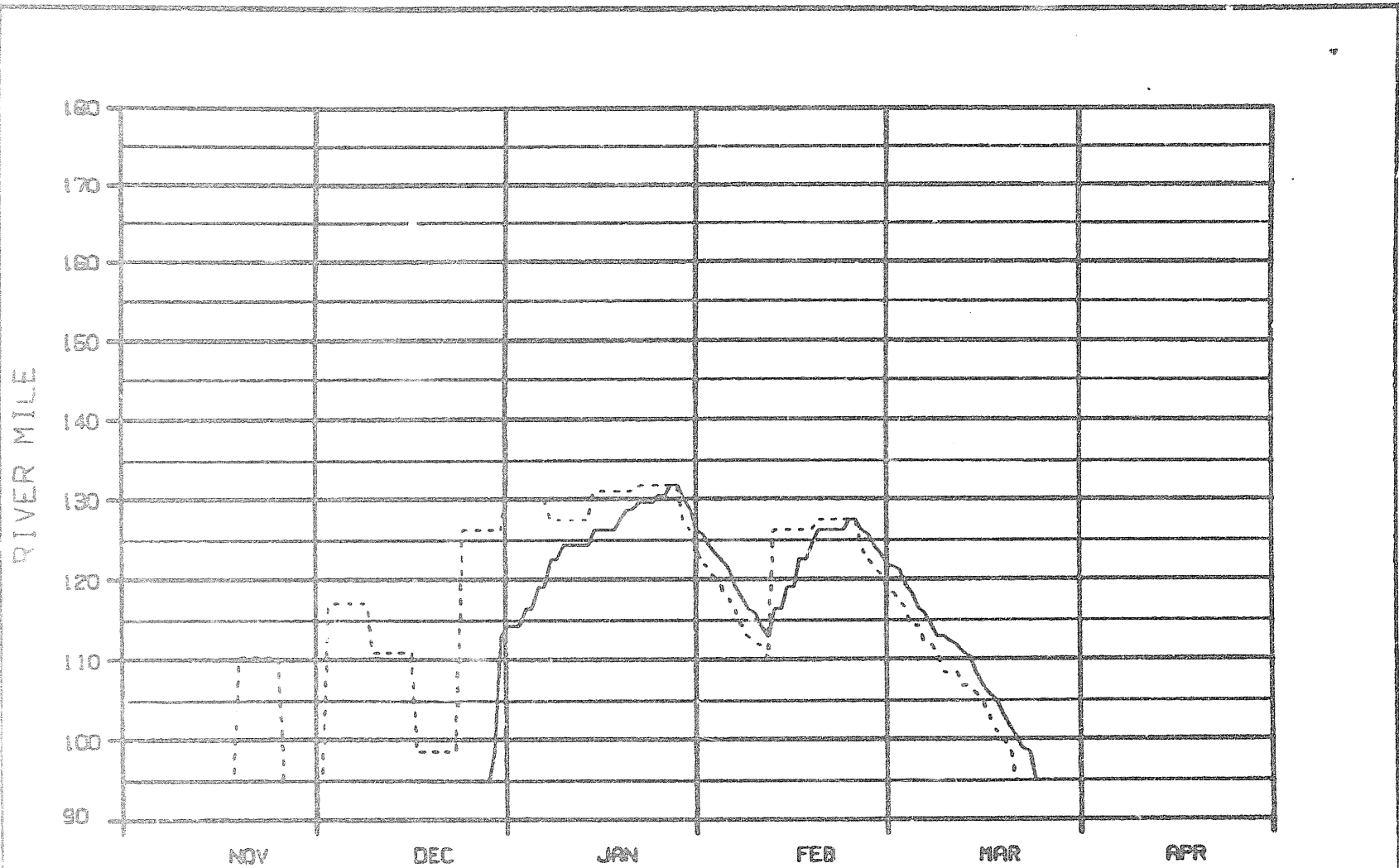
LEGEND:

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 STAGE 1 NATANA + DEVIL CANYON, 2002
 FLOW CASE E-VI, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAIN-DOWN
 REFERENCE RUN NO. : 0102ENU

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION PROFILE OF MAXIMUM STAGES		
WARZA-EGASCO JOINT VENTURE		
CHORES - DAMS	24 APR 93	1552.142

OPTION 2

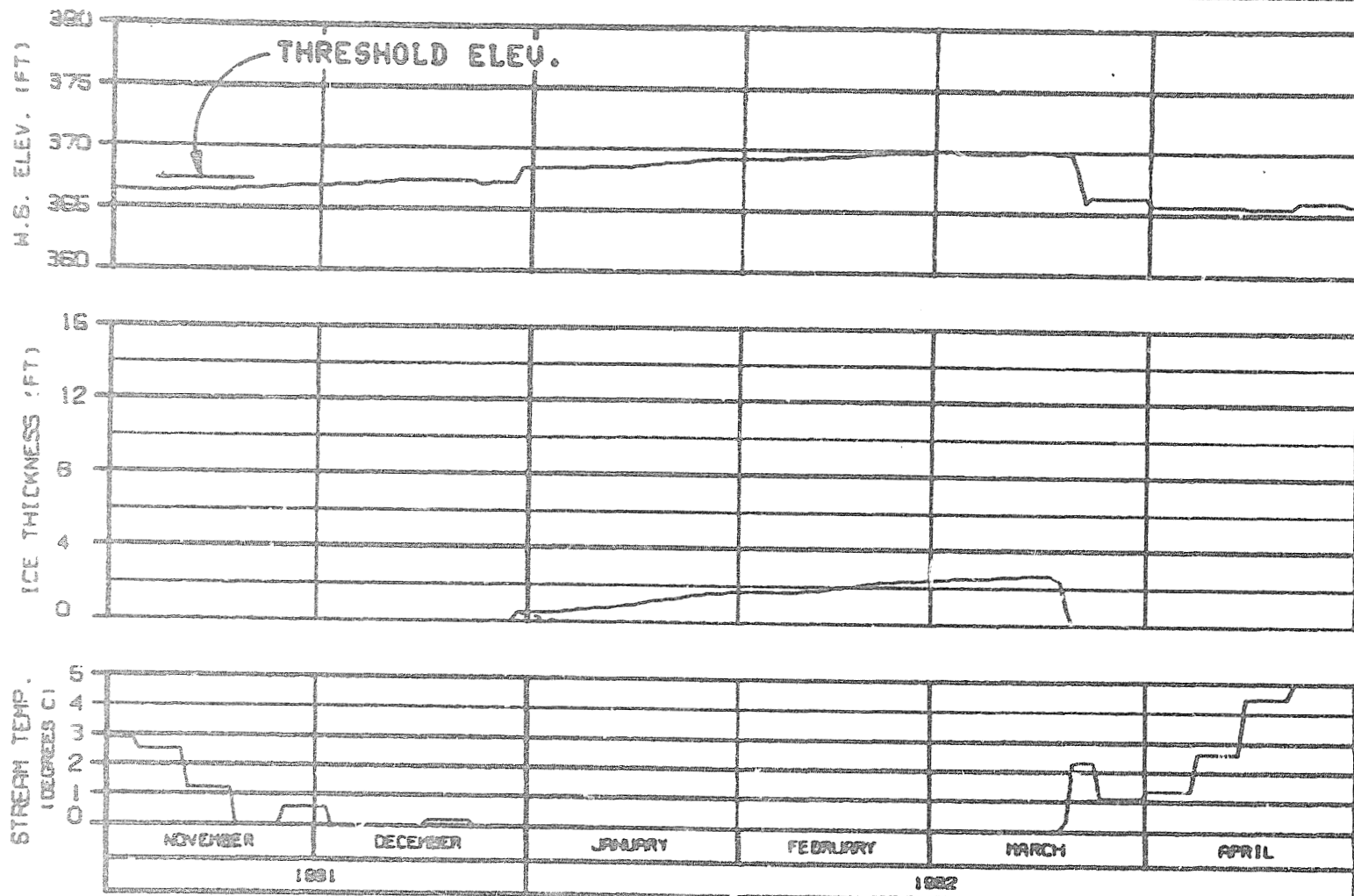


LEGEND:

- ICE FRONT
- ZERO DEGREE ISOTHERM

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 1 MATANA + 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-FORSLD JOINT VENTURE	
DATE: 11/19/82	REV: 1-1

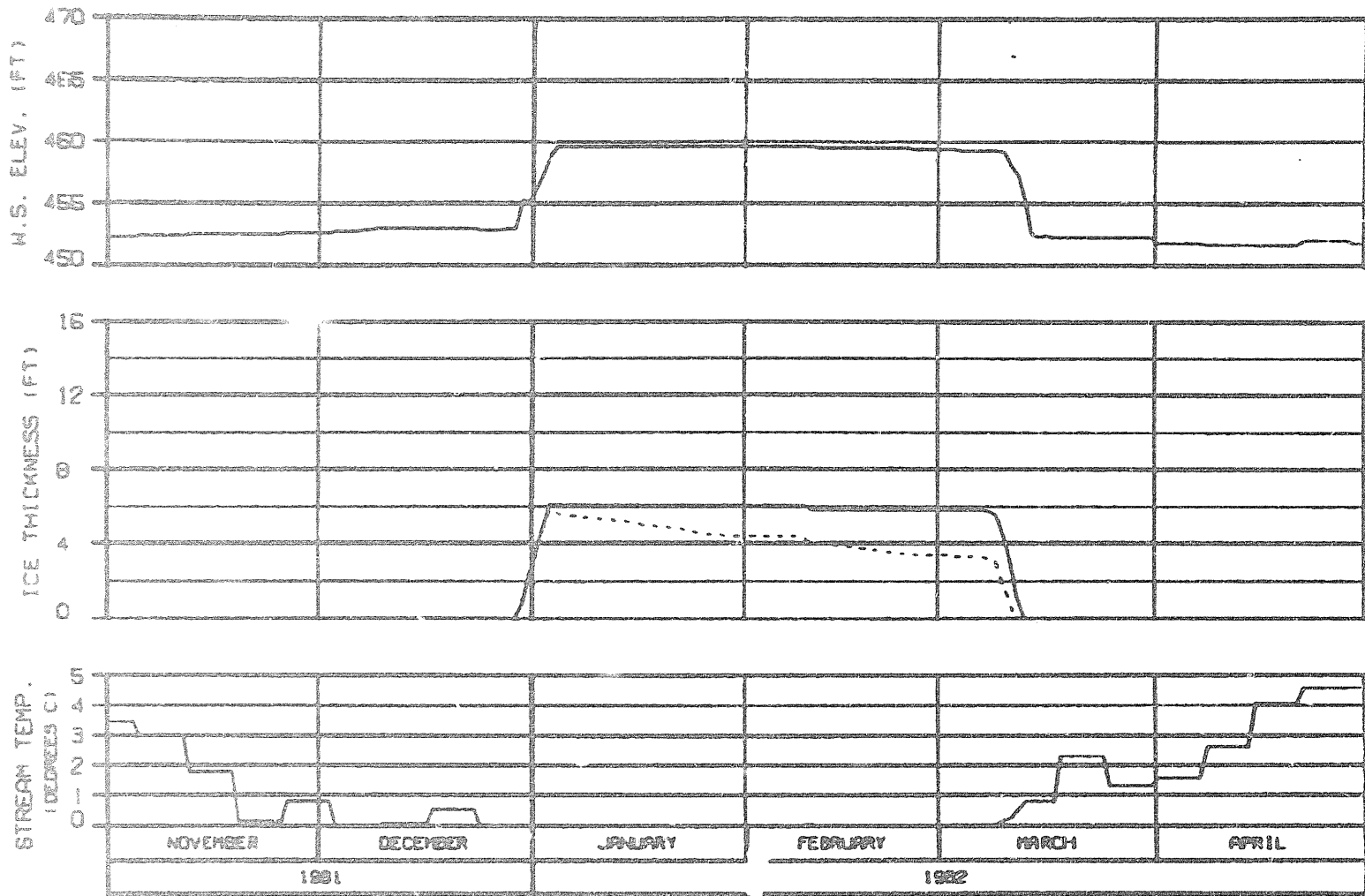


HEAD OF WHISKERS SLOUGH
RIVER MILE : 101.50

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. : 8102ENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-ERASCO JOINT VENTURE	
CHART NO. 1528-142	DATE 02/15/82

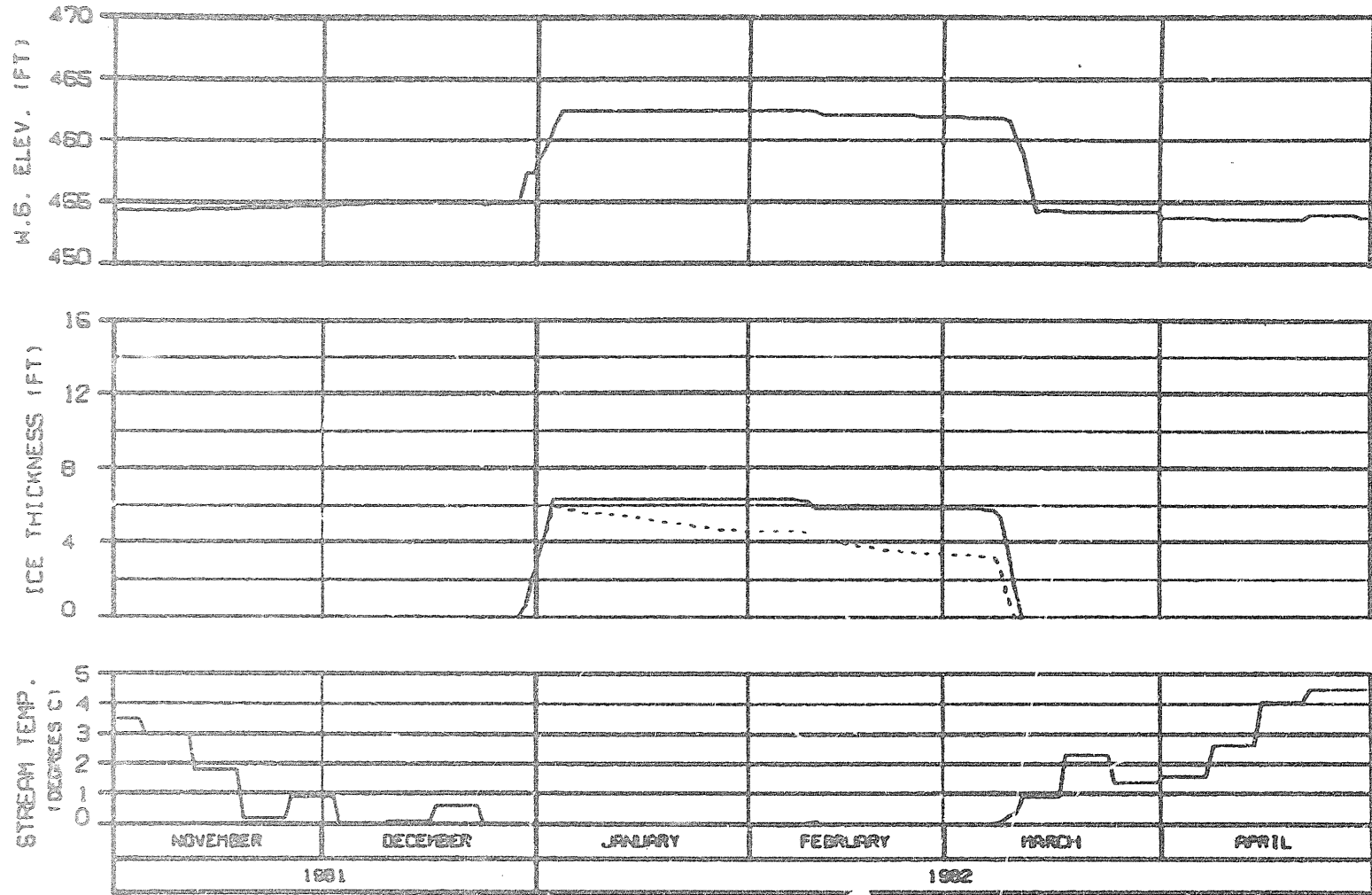


SIDE CHANNEL AT HEAD OF GASH CREEK
RIVER MILE : 112.00

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	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
CHART NO. 11-01010	REV. 03
1982.142	

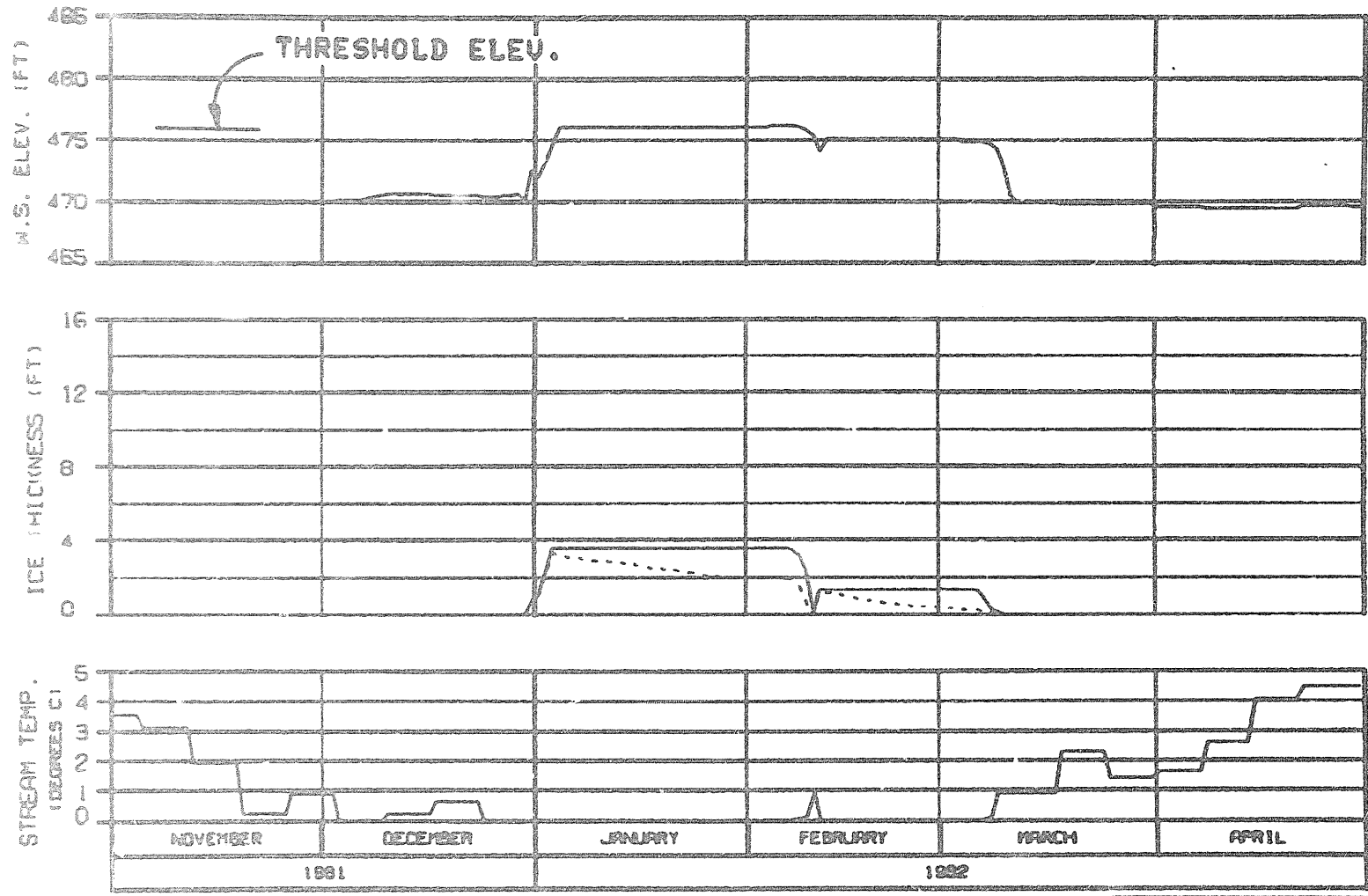


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

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. : 010ZENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CONTRACT NO. 81-04-010	1599.142

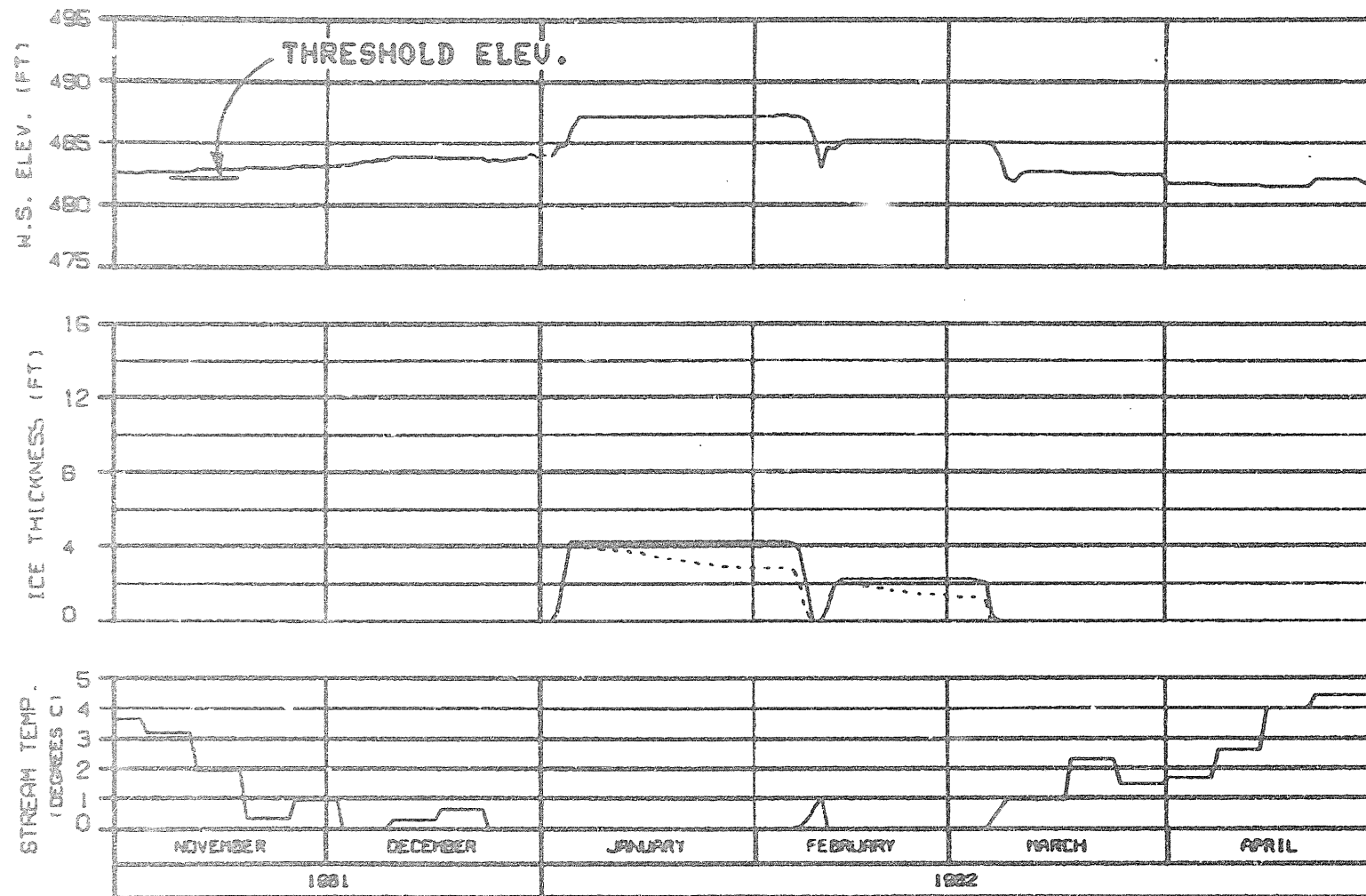


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BLUISH 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. : 810ZENU

ALASKA POWER AUTHORITY		
GUSITNA PROJECT		
SLISTNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
DESIGN. DATED	BY	NO. 148

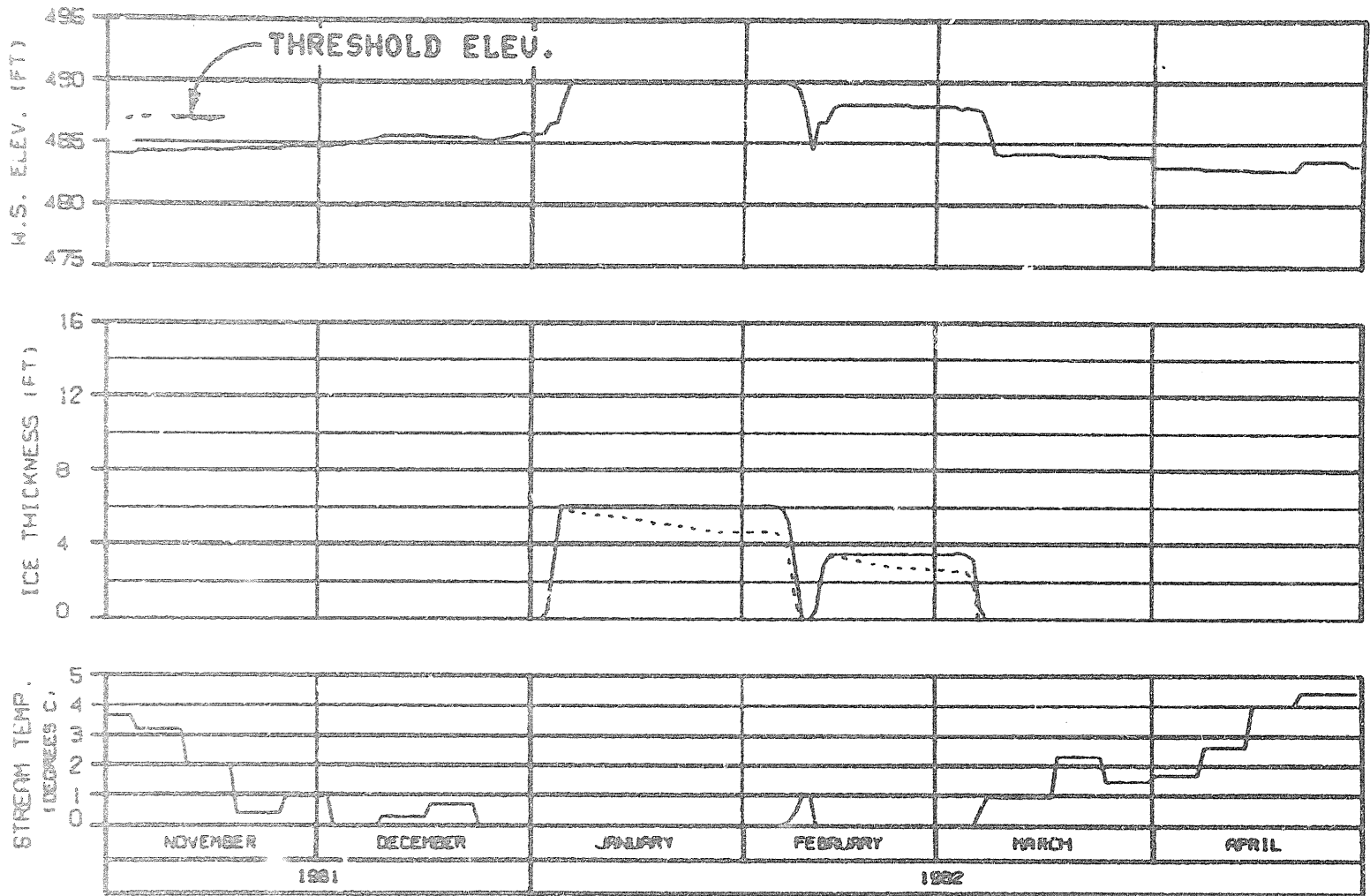


SIDE CHANNEL MSII
 RIVER MILE : 115.50

ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 - - - - - BLOOM 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. : 810ZENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBRACO JOINT VENTURE	
DESIGN: B.L. DAVIS	FILE NO: 82
1563.142	



HEAD OF SIDE CHANNEL NSII
 RIVER MILE : 115.90

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

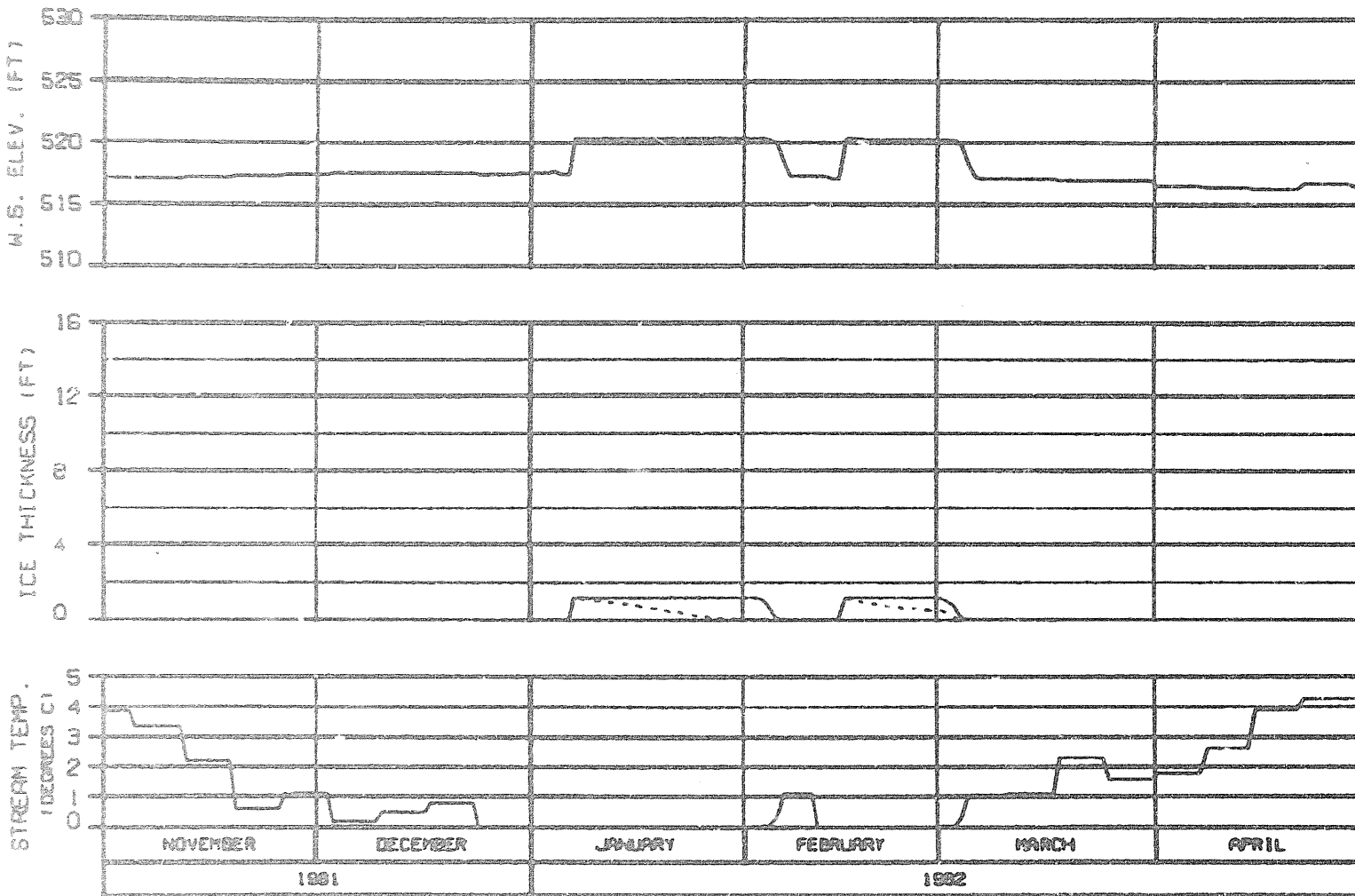
SUSITNA PROJECT

SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

CUSTOMER: 6162010 24 APR 82

1863.142

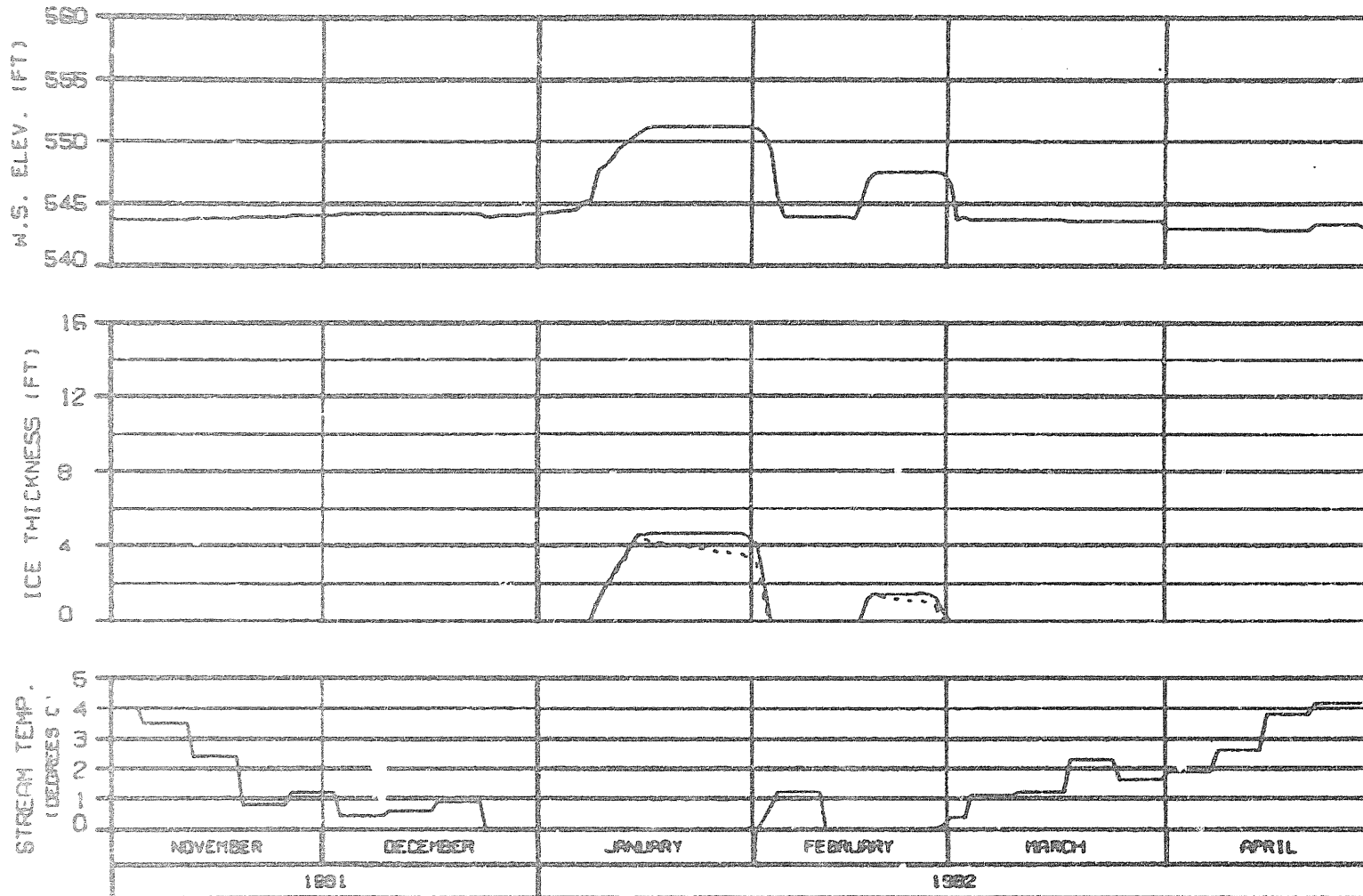


RIVER MILE : 120.00

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. : 810ZENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DESIGNED - B.L. DUNN	1583.142

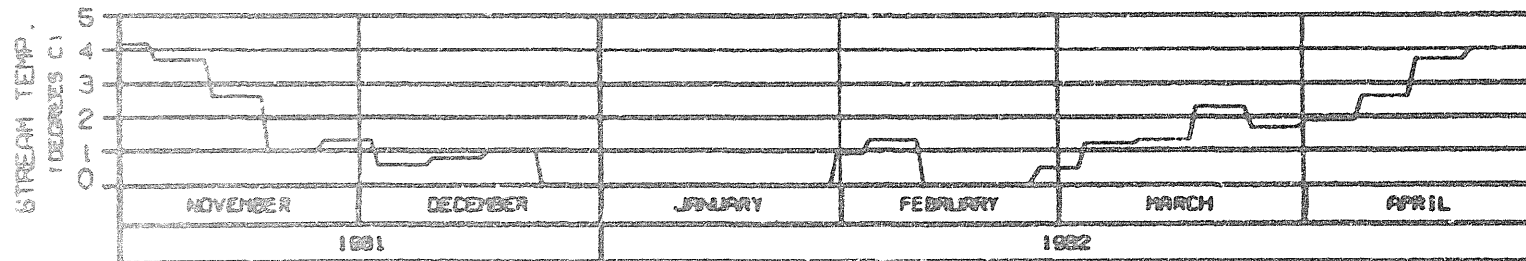
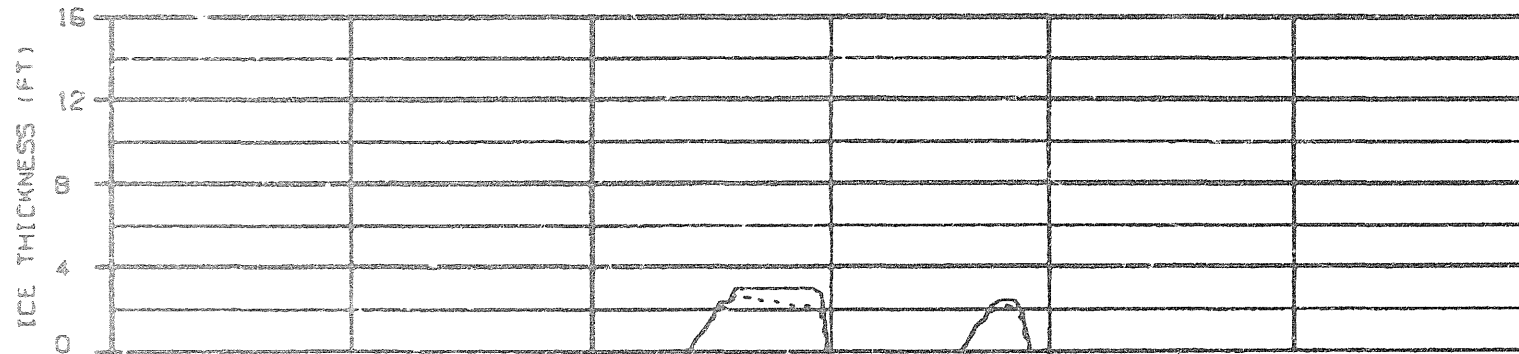
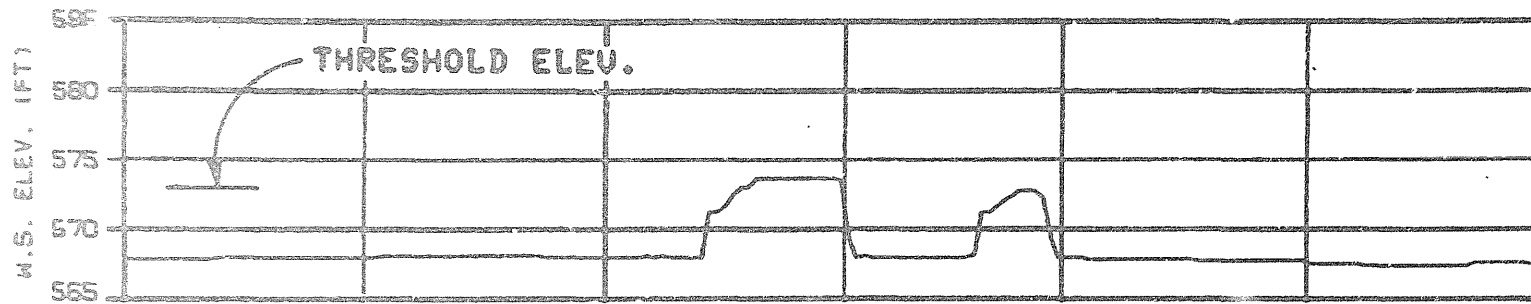


HEAD OF MOOSE SLOUGH
 RIVER MILE : 123.50

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

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

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHANGED - ALL PARTS	1003.148



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

HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

WEATHER PERIOD : 1 NOV 61 - 30 APR 62
 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

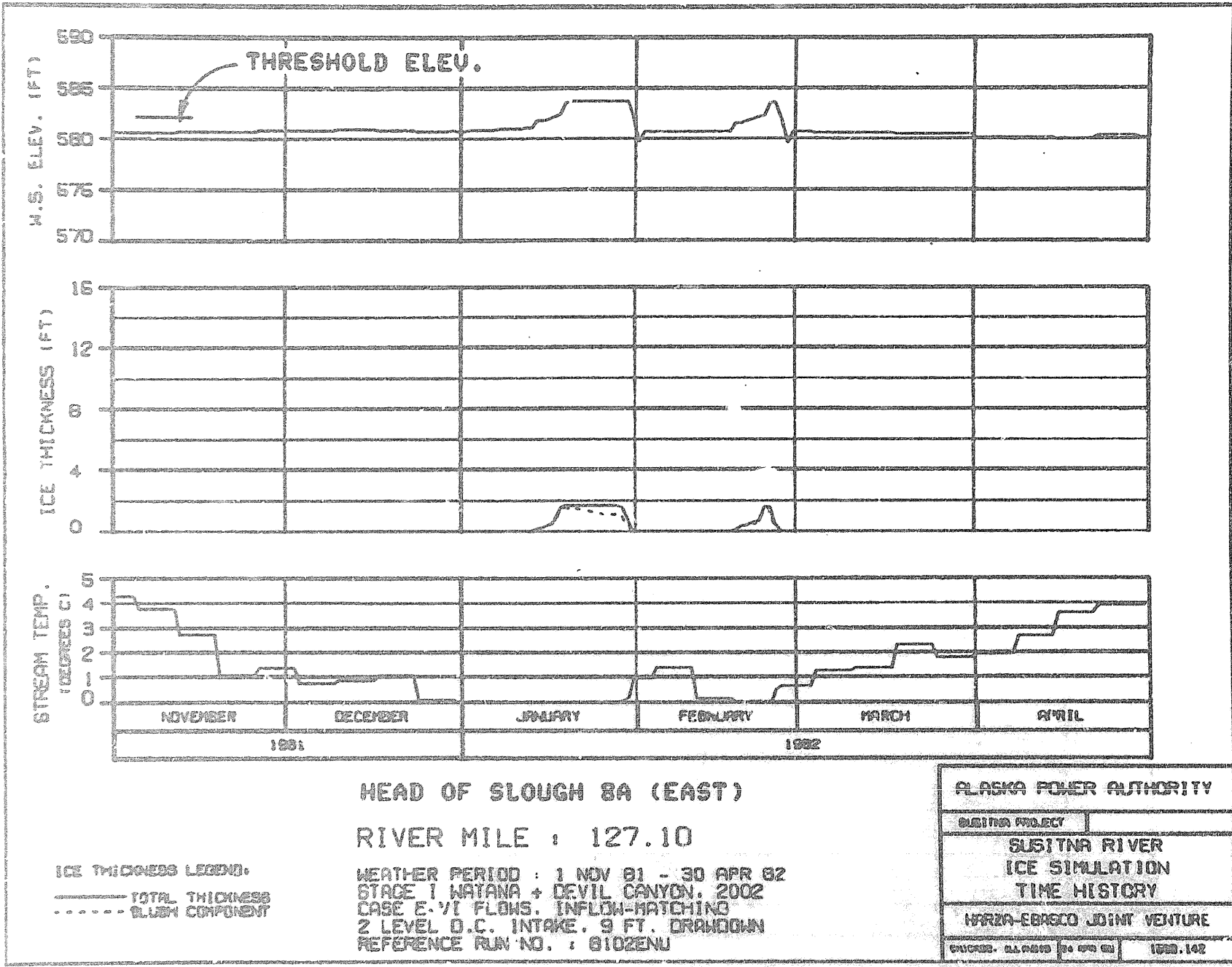
SUSITNA PROJECT

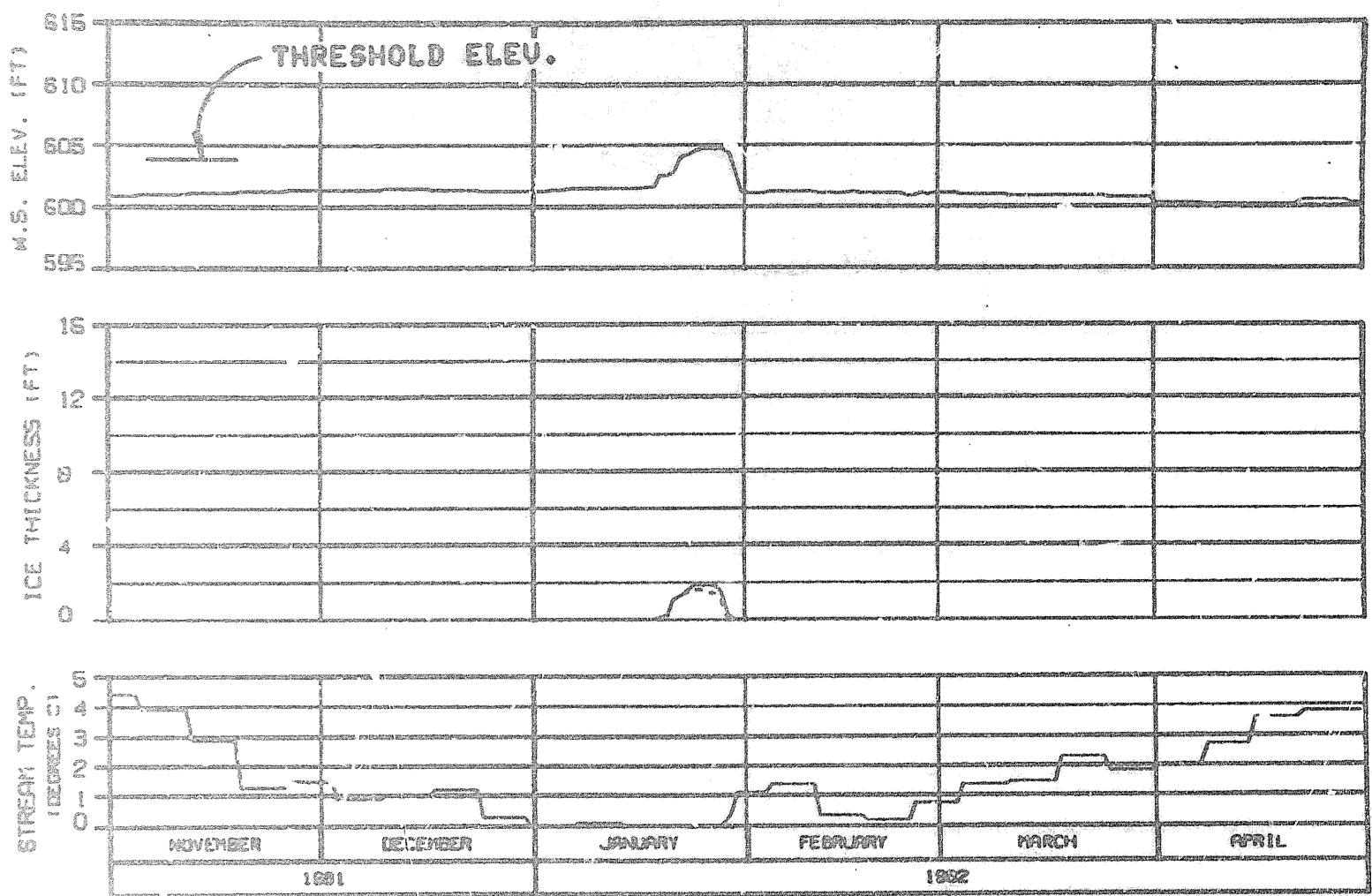
SUSITNA RIVER
 ICE SIMULATION
 TIME HISTORY

WARZA-EBASCO JOINT VENTURE

DRAWING NUMBER: 810ZENU

ISSUE: 148





HEAD OF SLOUGH 9
 RIVER MILE : 129.30

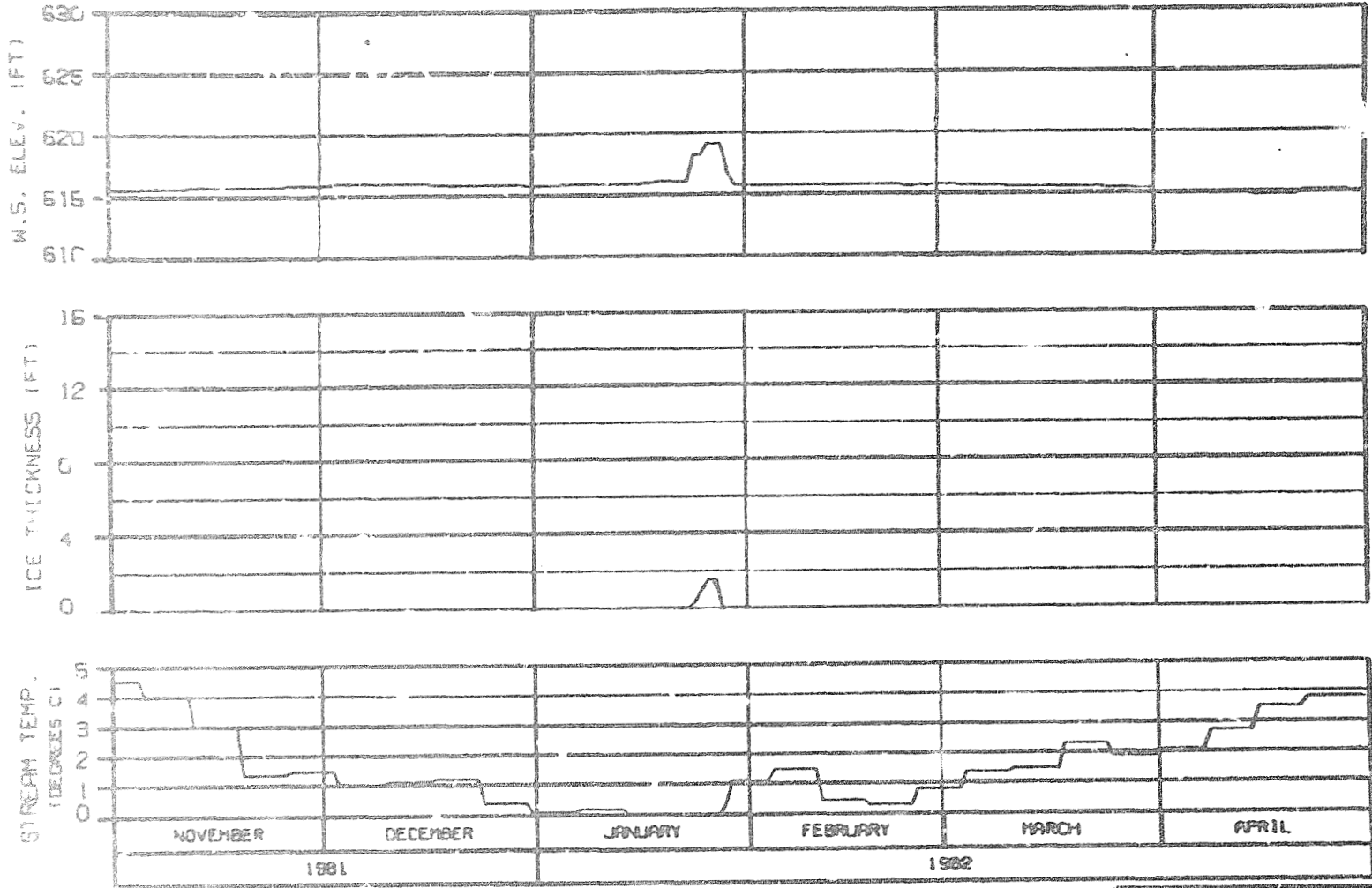
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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. : 810ZENU

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHANGES: ALL PAGES	1889.142

OPTION?

OPTION:

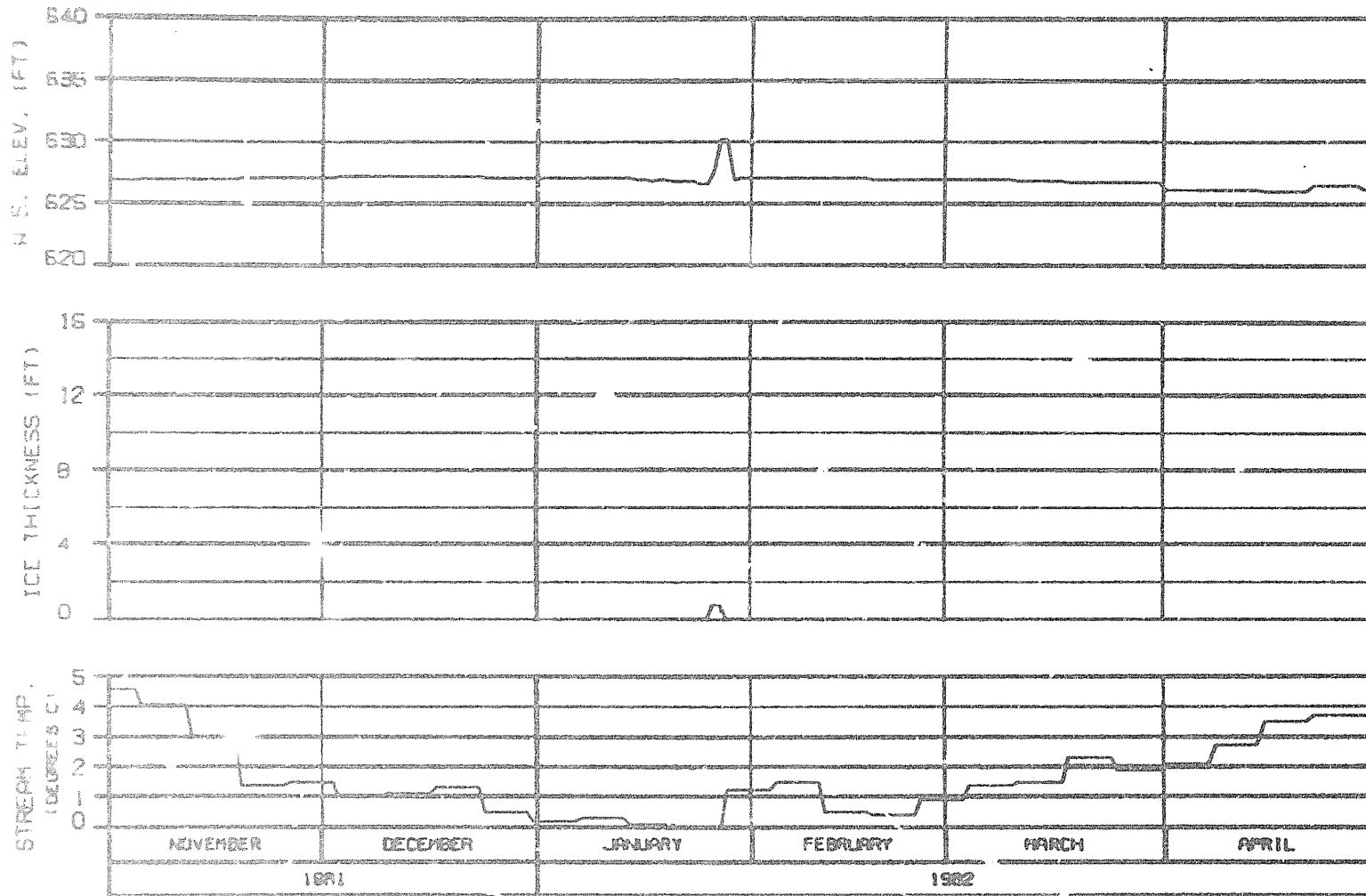


SIDE CHANNEL U/S OF SLOUGH 9
RIVER MILE : 130.60

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 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	
WARZA-EBASCO JOINT VENTURE	
CHICAGO, ILLINOIS	1563.142

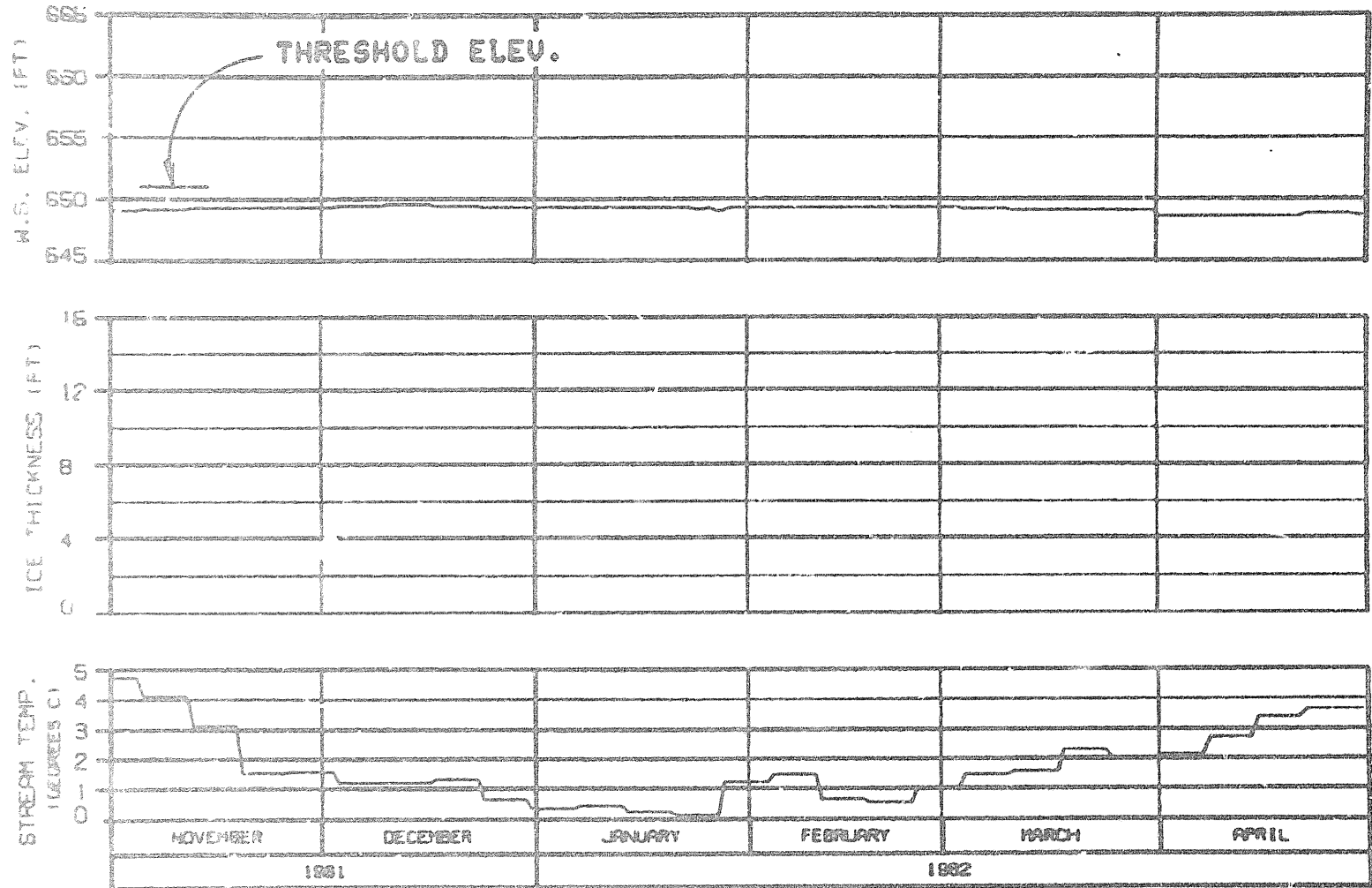


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - GLUSH 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. : 810ZENU

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
CONTRACT NO. 81-0810	DATE 07/83	ISSUE 142

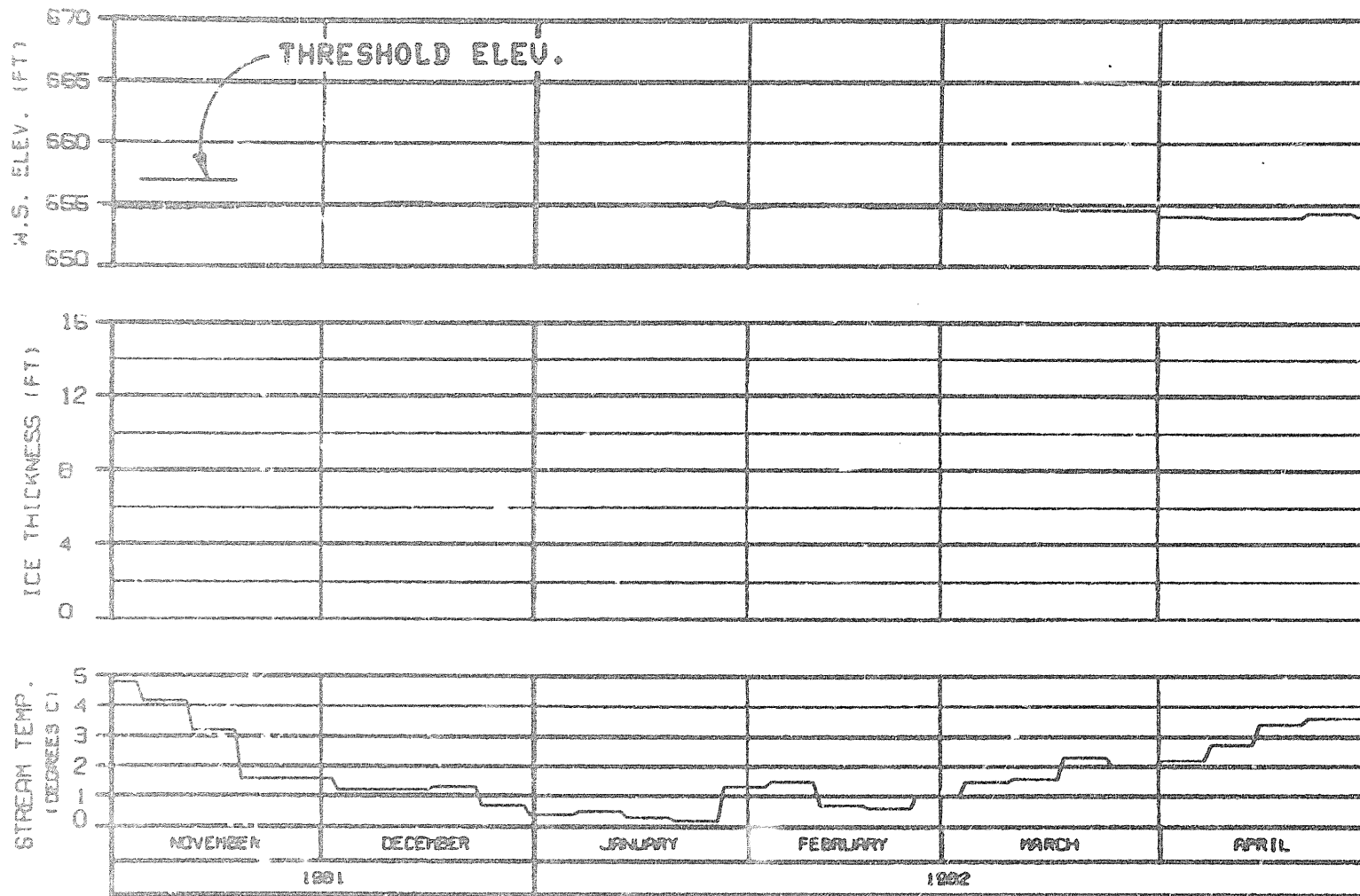


HEAD OF SLOUGH 9A
RIVER MILE : 133.70

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. : 810ZENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 11/28/82	1000.142

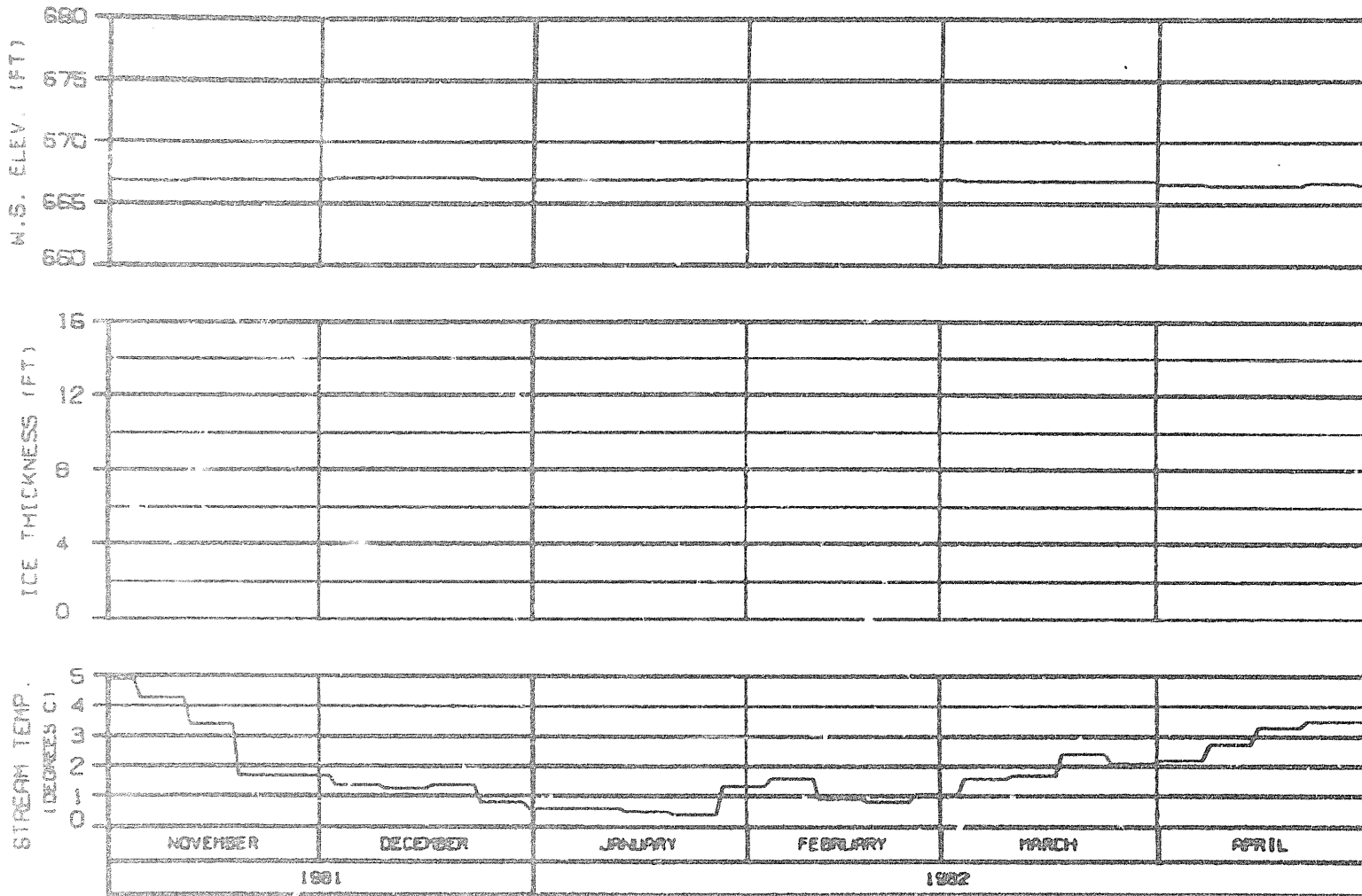


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 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	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DESIGNED BY: [blank]	1000-142

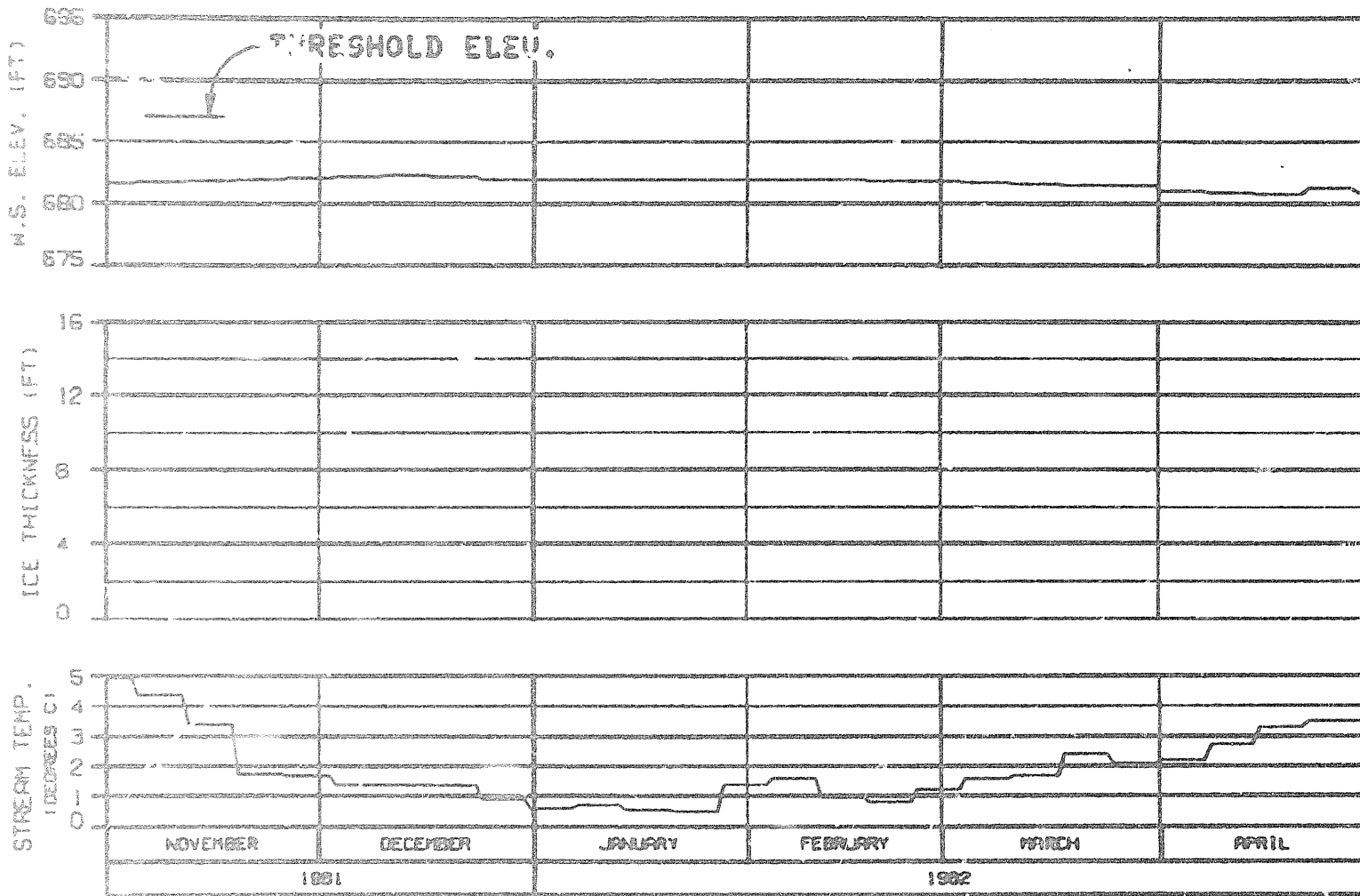


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - B.LUSH COMPONENT

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		
WARZA-EBASCO JOINT VENTURE		
CHANGES - ALL DATED	BY	NO.
		1588.142

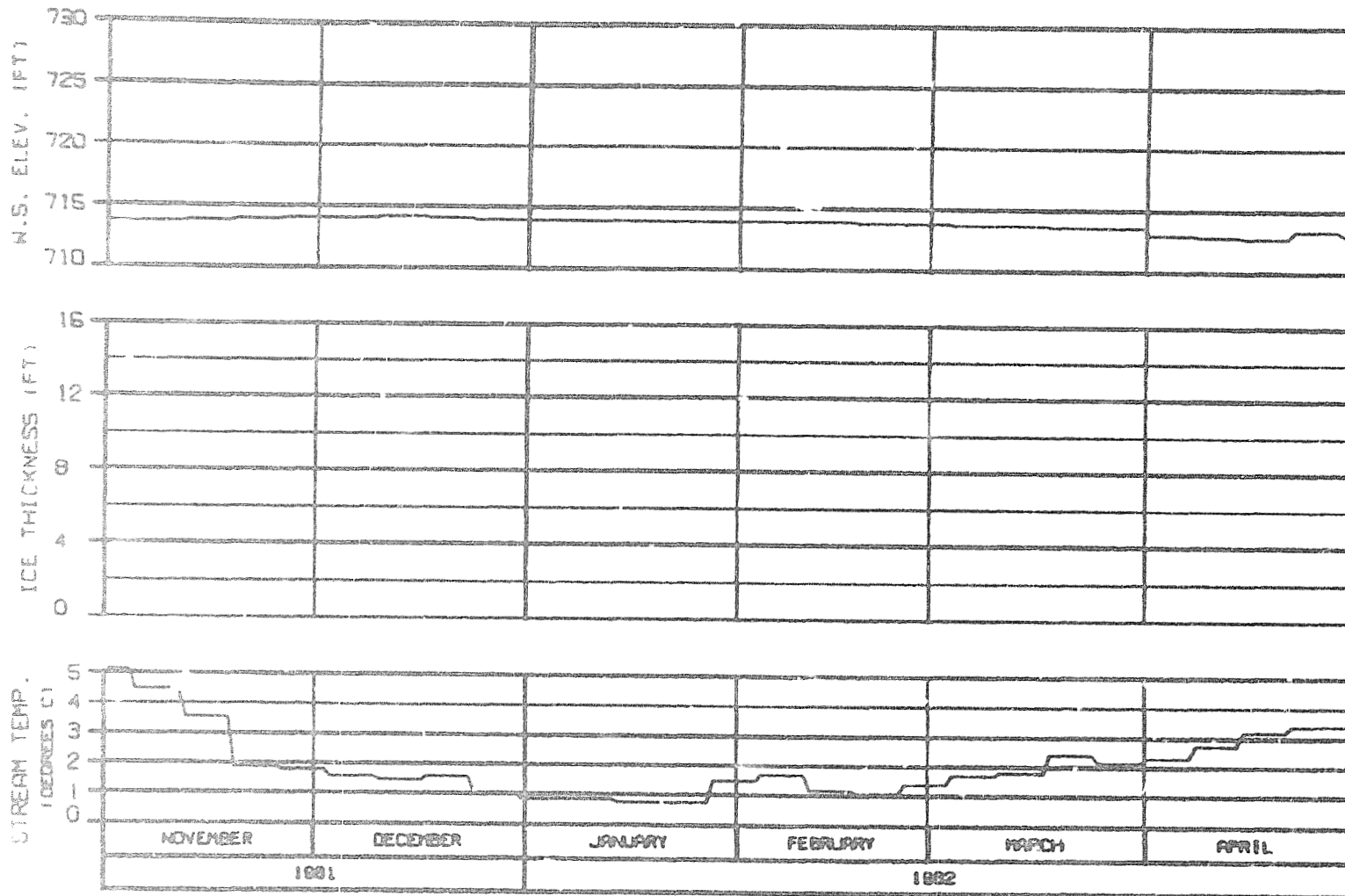


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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. : 810ZENU

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EBASCO JOINT VENTURE		
PROJECT: 0110002	24 APR 82	1052.142

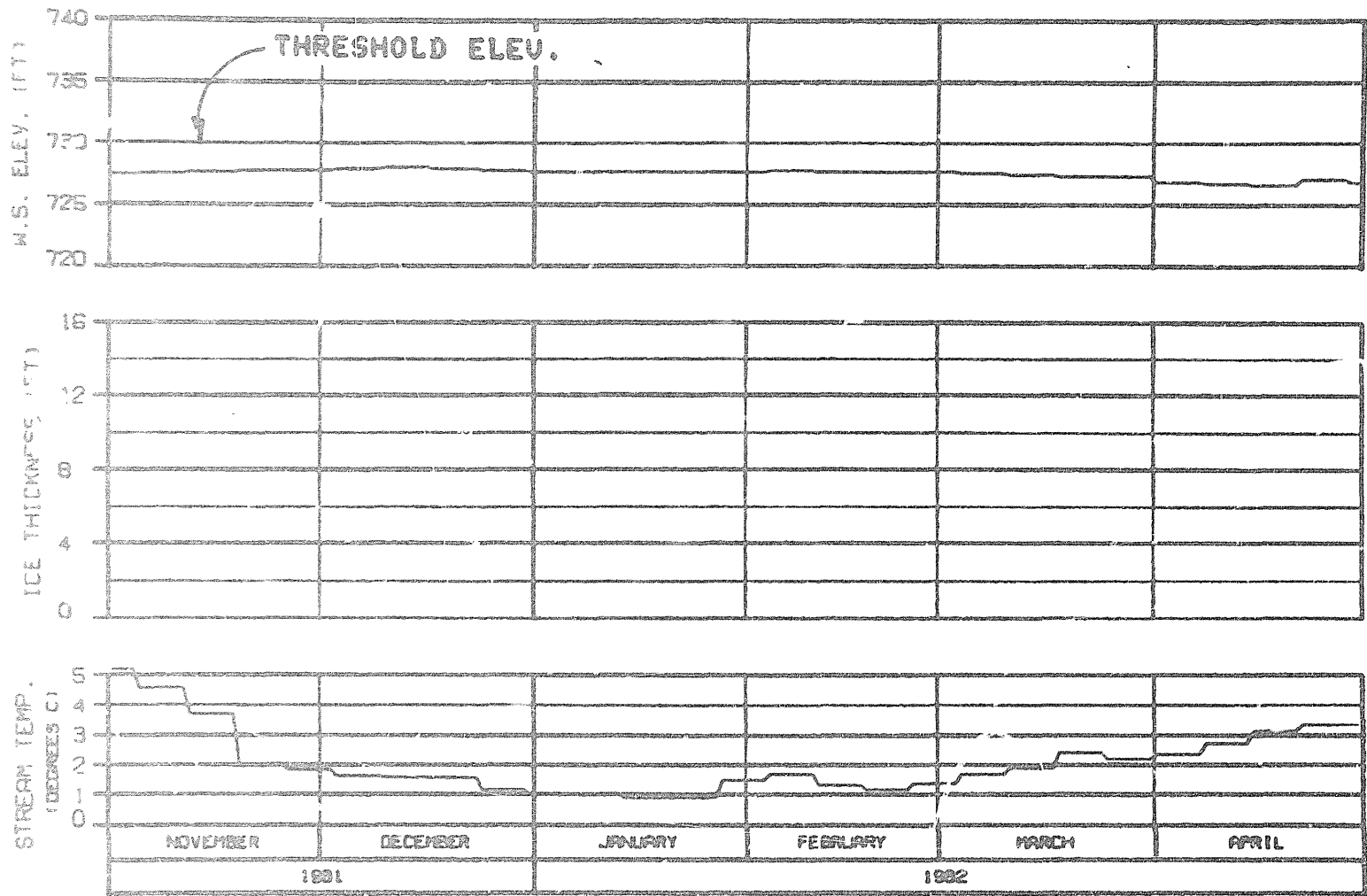


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

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. DRAINDOWN
 REFERENCE RUN NO. : 810ZENU

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE PLOT. 04 APR 82	ISS. 142

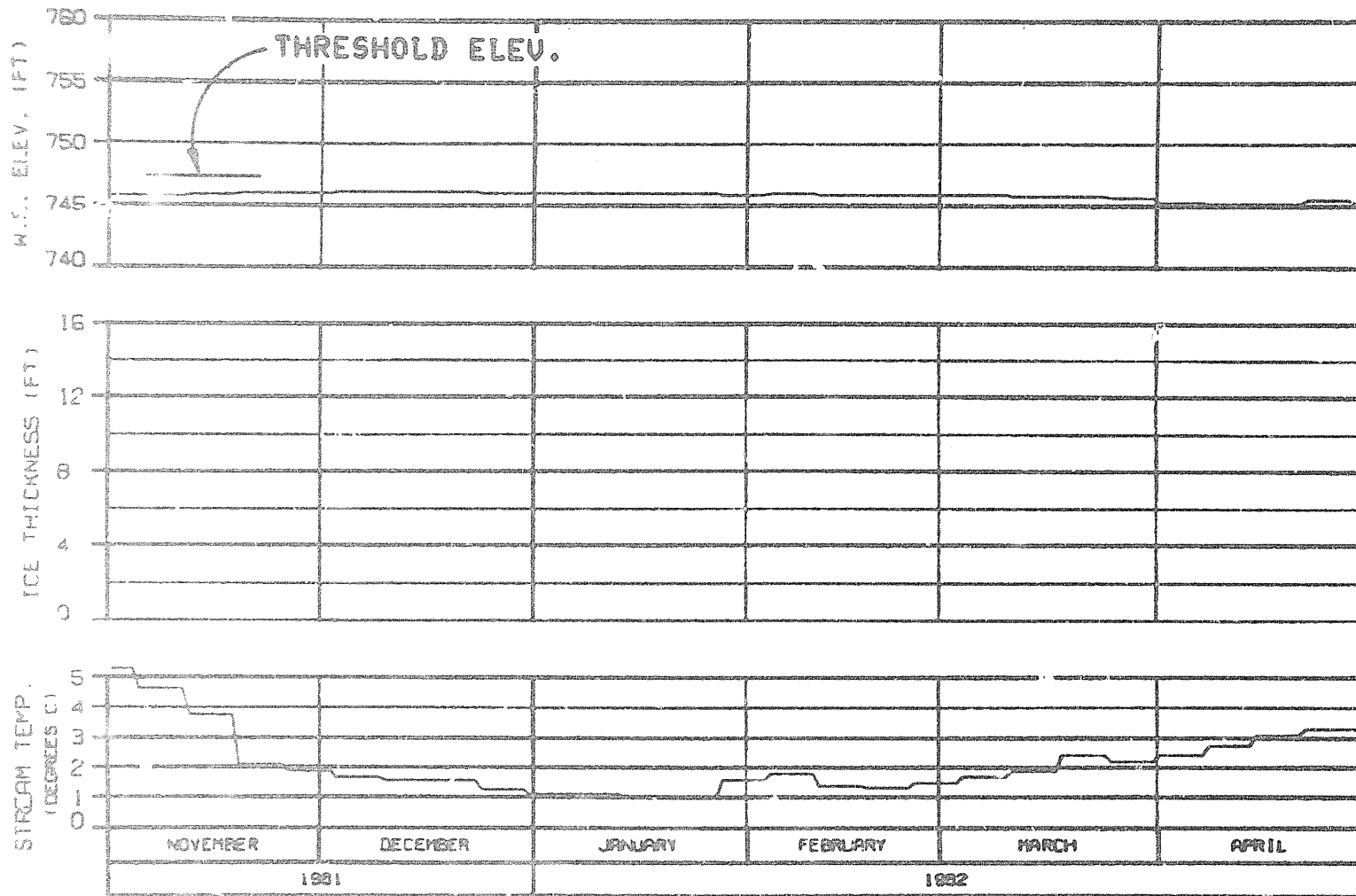


HEAD OF SLOUGH 20
 RIVER MILE : 140.50

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

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

ALASKA POWER AUTHORITY	
DATA PROJECT	
SUSTINA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
ENGRS. 01.0010	1589.142

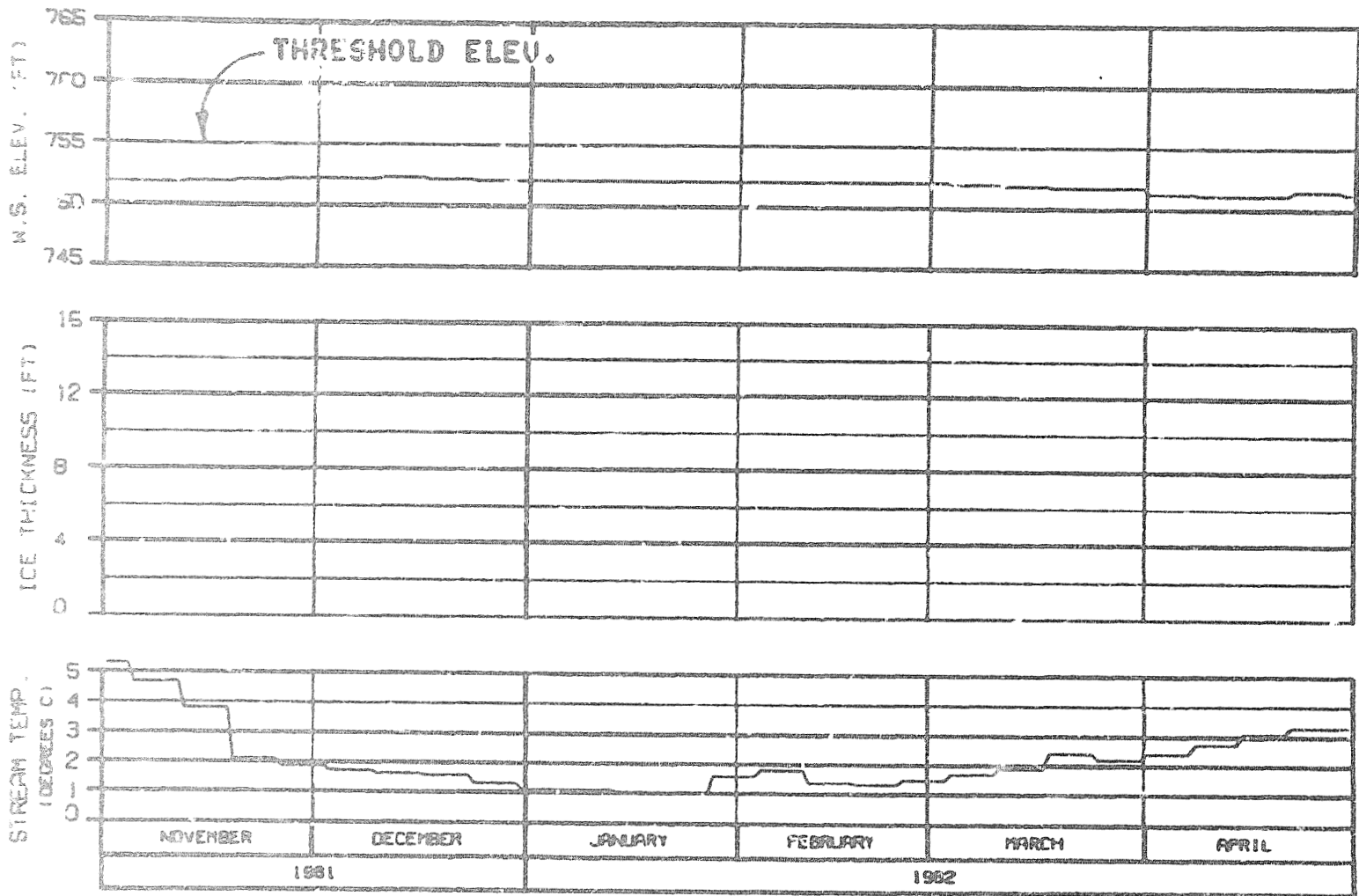


SLOUGH 21 (ENTRANCE A6)
 RIVER MILE : 141.80

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. : 810ZENU

ALASKA POWER AUTHORITY		
SUSTINA PROJECT		
SUSTINA RIVER ICE SIMULATION TIME HISTORY		
HARZA-EBASCO JOINT VENTURE		
ENCLOSURE	DATE	NO.
		1000.142

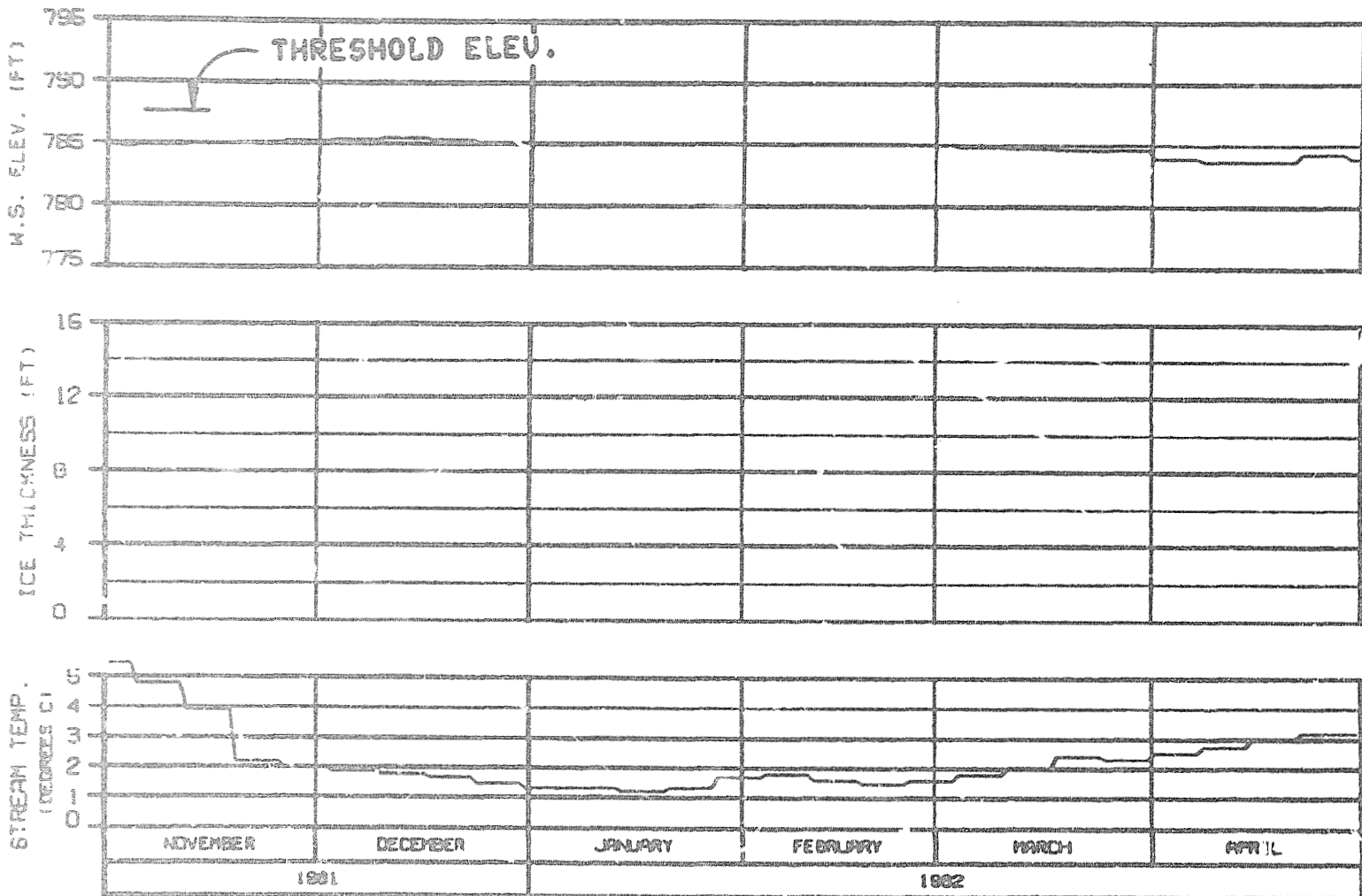


HEAD OF SLOUGH 21
 RIVER MILE : 142.20

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE 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		
WARZA-EBASCO JOINT VENTURE		
CHENGU. 11.10.82	24 APR 82	1563.142



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

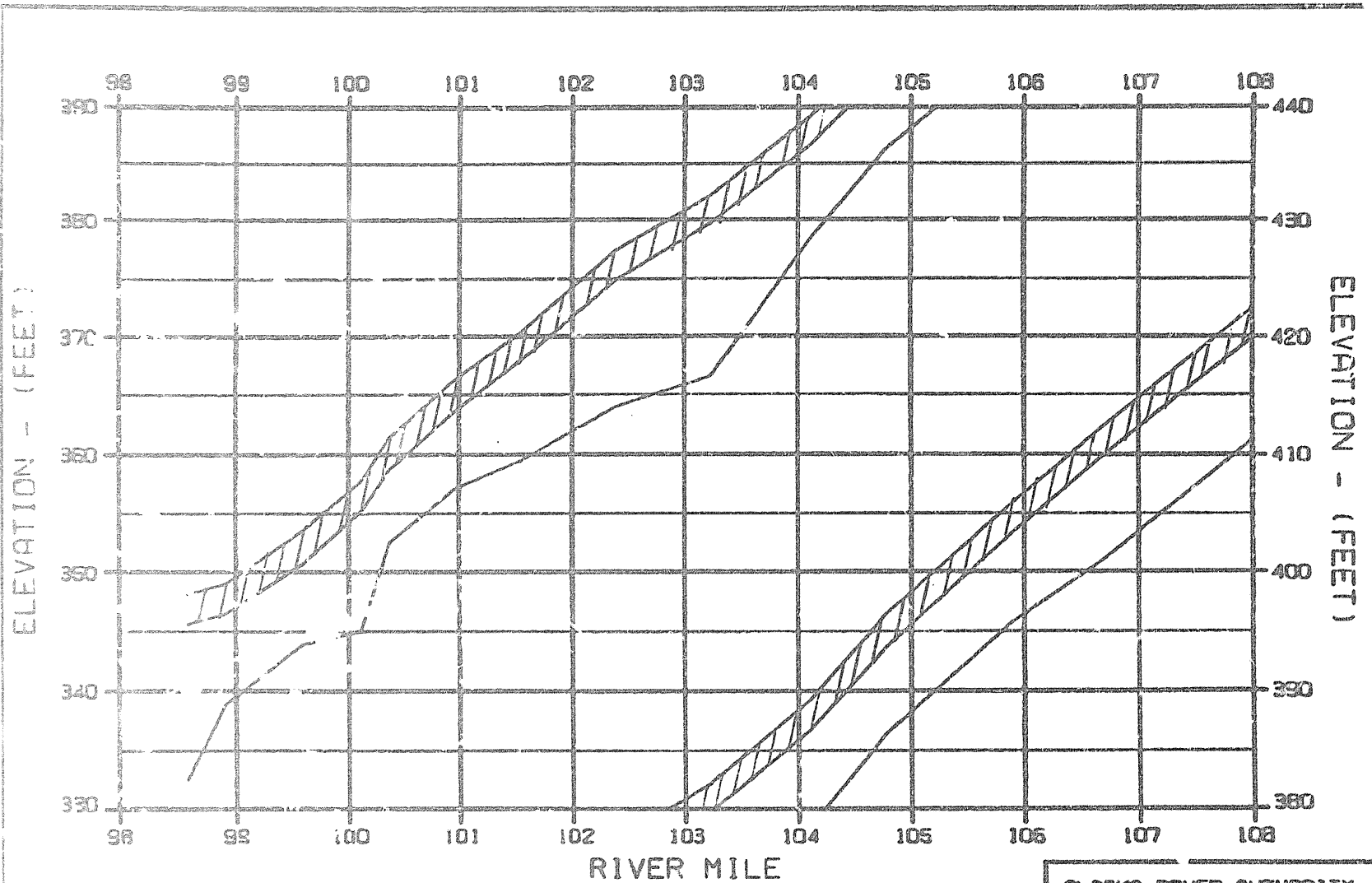
WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 STAGE I WATANA + DEVIL CANYON, 2002
 CASE E-VI FLOWS, INFLOW-MATCHING
 2 LEVEL D.C. INTAKE, 9 FT. DRAWDOWN
 REFERENCE RUN NO. : 810ZENU

ALASKA POWER AUTHORITY	
DESIGN PROJECT	
SLUITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHARTERED - 11/11/80	ISSUED - 1/82

OPTION?

EXHIBIT V

C



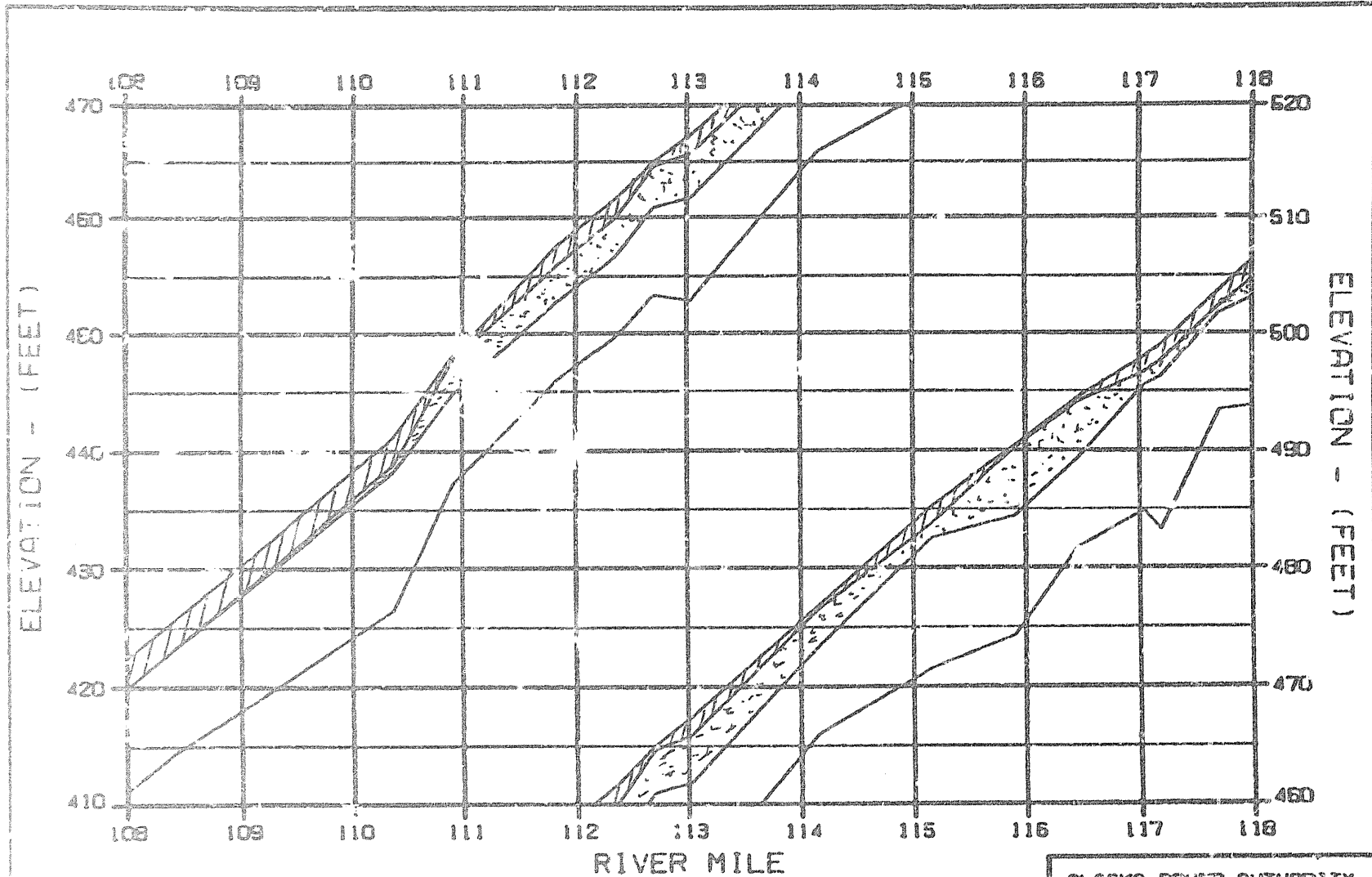
LEGEND:
 [Hatched Area] TOP OF SOLID ICE
 [Dashed Line] USH/SOLID ICE INTERFACE
 [Solid Line] BOTTOM OF USH ICE
 [Dotted Line] RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 SATOE I NATANA & DEVIL CANYON
 3 LEVEL D.C. INTAKE. 60 FT. DRAWDOWN
 REFERENCE RUN NO. : 810ZENT



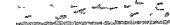

ALASKA POWER AUTHORITY	
SUBINA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
NARVA-EBASCO JOINT VENTURE	
DESIGN. NO. 0010	ISS. NO. 142

OPTION?

c



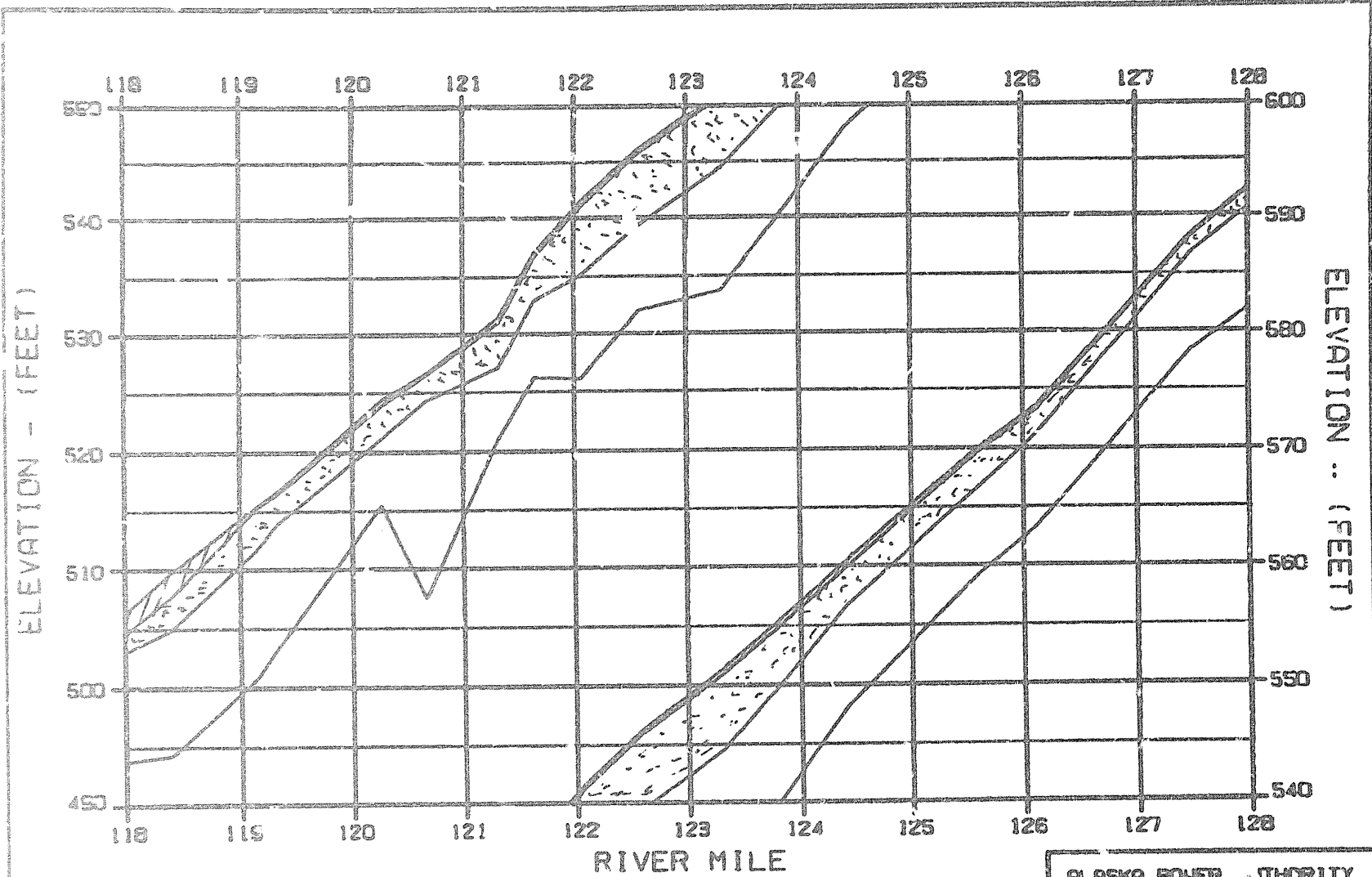
LEGEND:

-  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-V1 TEMP: INFLOW-MATCHING
 SATOE I WATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE, 50 FT. CROWDOWN
 REFERENCE RUN NO. : 0102ENT

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-EBRACO JOINT VENTURE		
DESIGNED -	PLANNED BY	10/24/82

SECTION 7



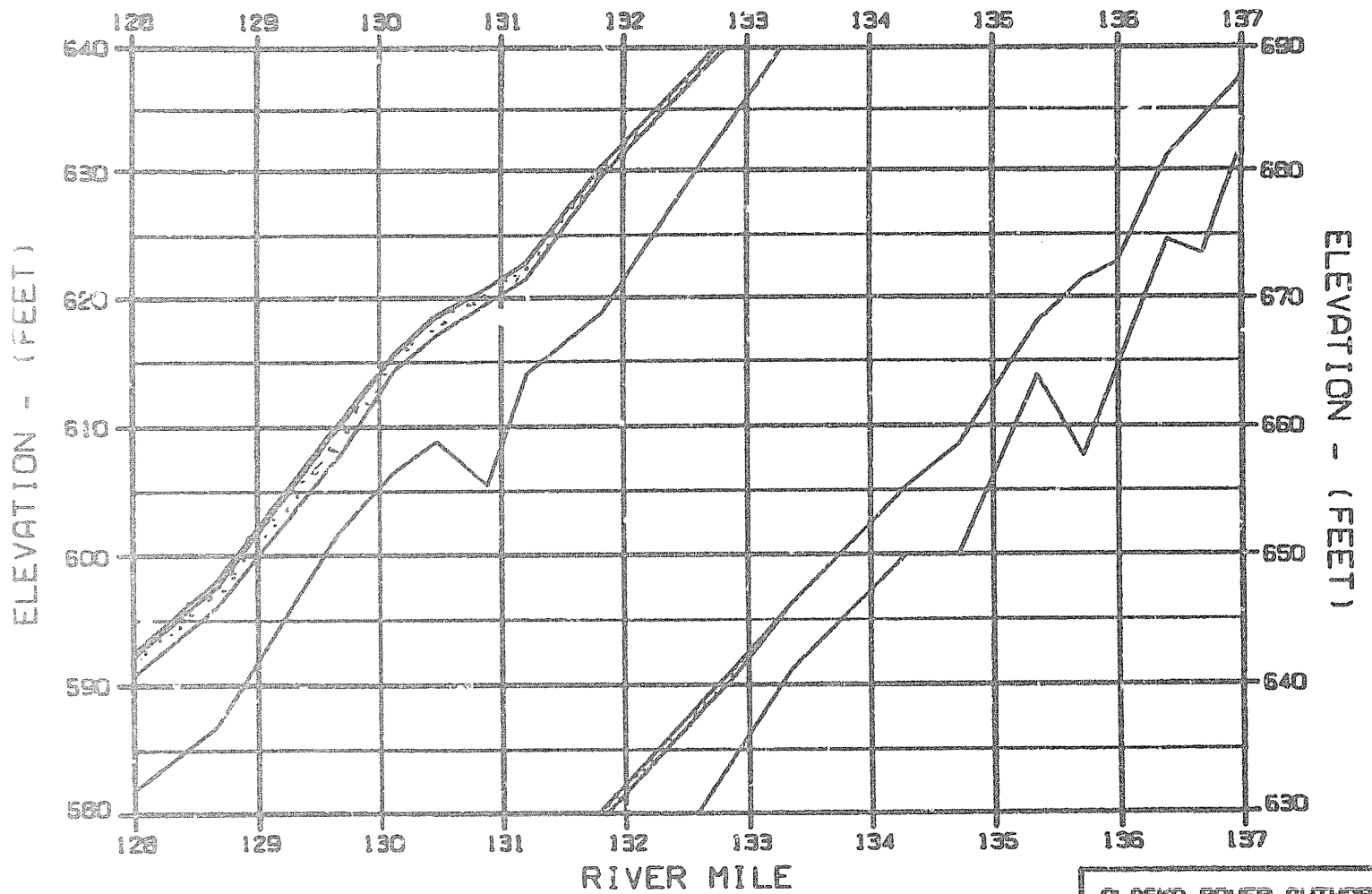
LEGEND:

- TOP OF SOLID ICE
- BLUE/WHITE ICE INTERFACE
- BOTTOM OF BLUISH ICE
- RIVER BED



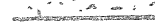

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-VI TEMP. INFLOW-MATCHING
 SATOE I WATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE, 60 FT. DRAWDOWN
 REFERENCE RUN NO. : 0102NT

ALASKA POWER AUTHORITY	
SUBMITTA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARA-EMASCO JOINT VENTURE	
ENGINEER: BLANKENBUSH	DATE: APR 82
1982.148	

OPTION 7

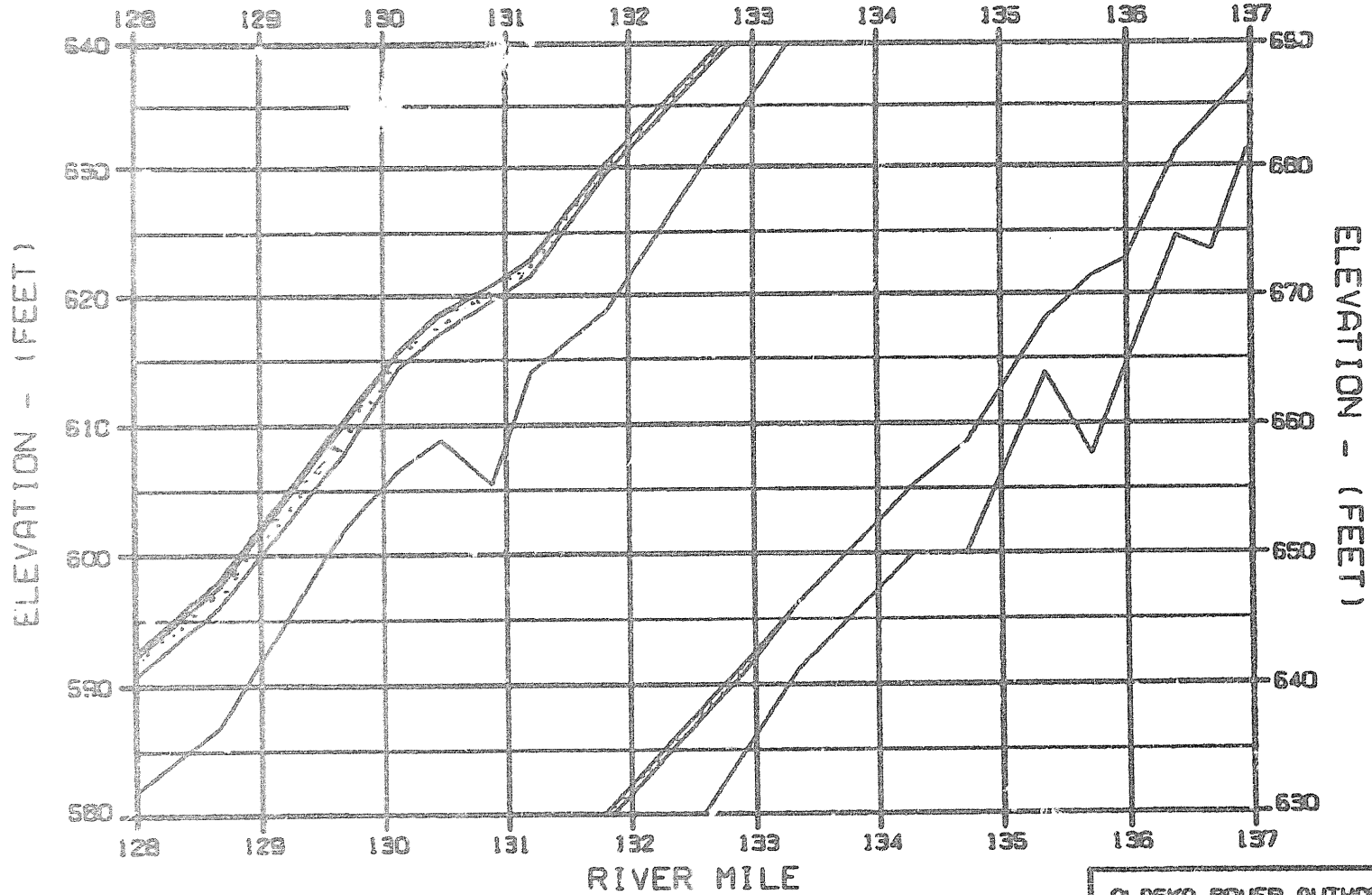


LEGEND:



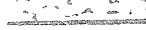

-  TOP OF SOLID ICE
-  SLUSH/SOLID ICE INTERFACE
-  BOTTOM OF SLUSH ICE
-  RIVER BED

LEATHER PERIOD : 1 NOV 01 - 30 APR 02
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-V1 TEMP. INFLW-MATCHING
 SATGE 1 NATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 010ZENT

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER		
ICE SIMULATION		
PROFILE OF MAXIMUM STAGES		
MARZA-ERAGCO JOINT VENTURE		
CHIEF	DATE	NOV 01 02
10000	142	

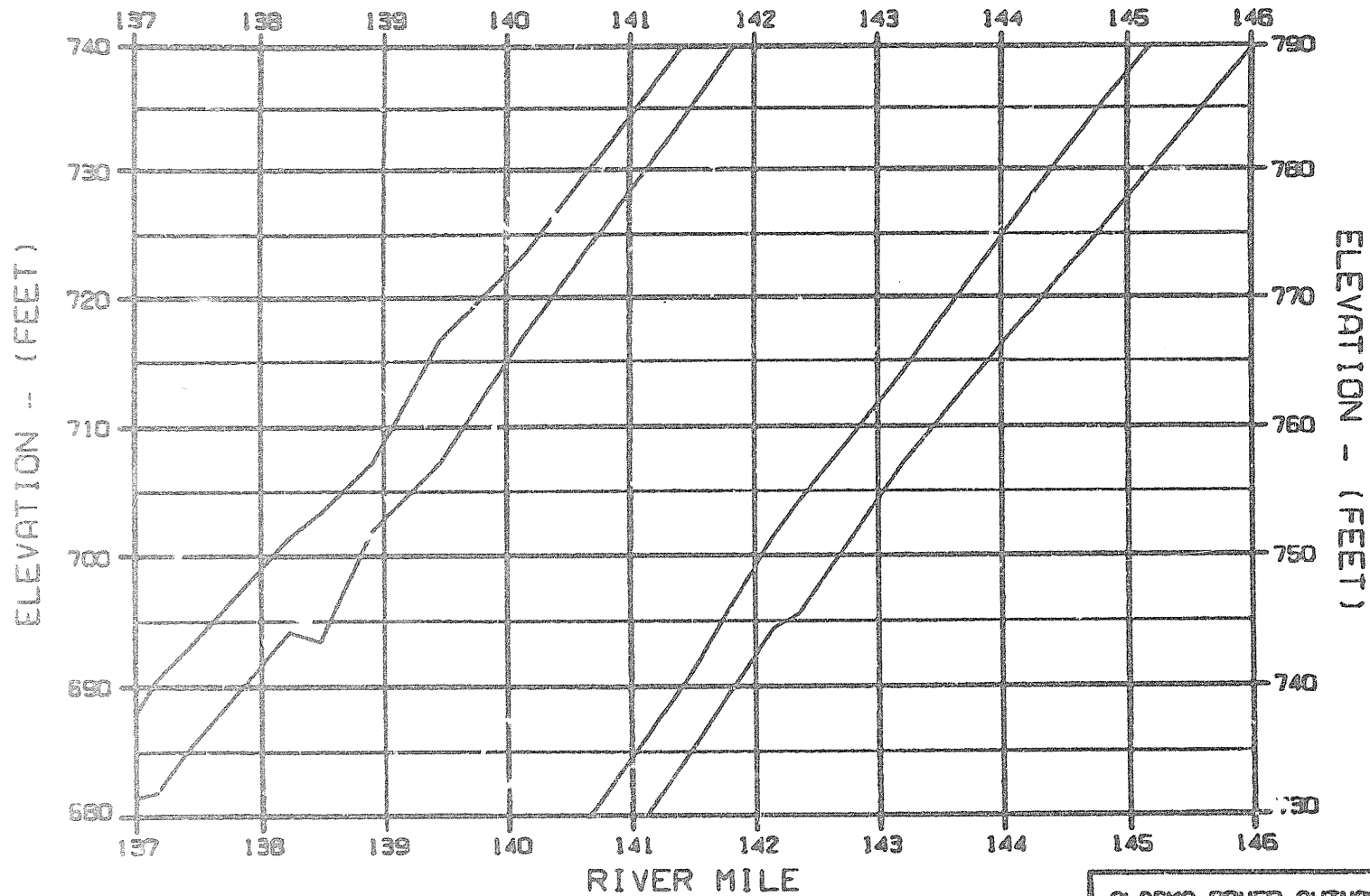


LEGEND:

-  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-V1 TEMP. INFLOW-MATCHING
 BATOE I NATANA + DEVIL CANYON
 3 LEVEL D.C. INTAKE. 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 0102ENT

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EGASCO JOINT VENTURE	
DESIGNED BY: J. J. ...	DATE: 1982.142

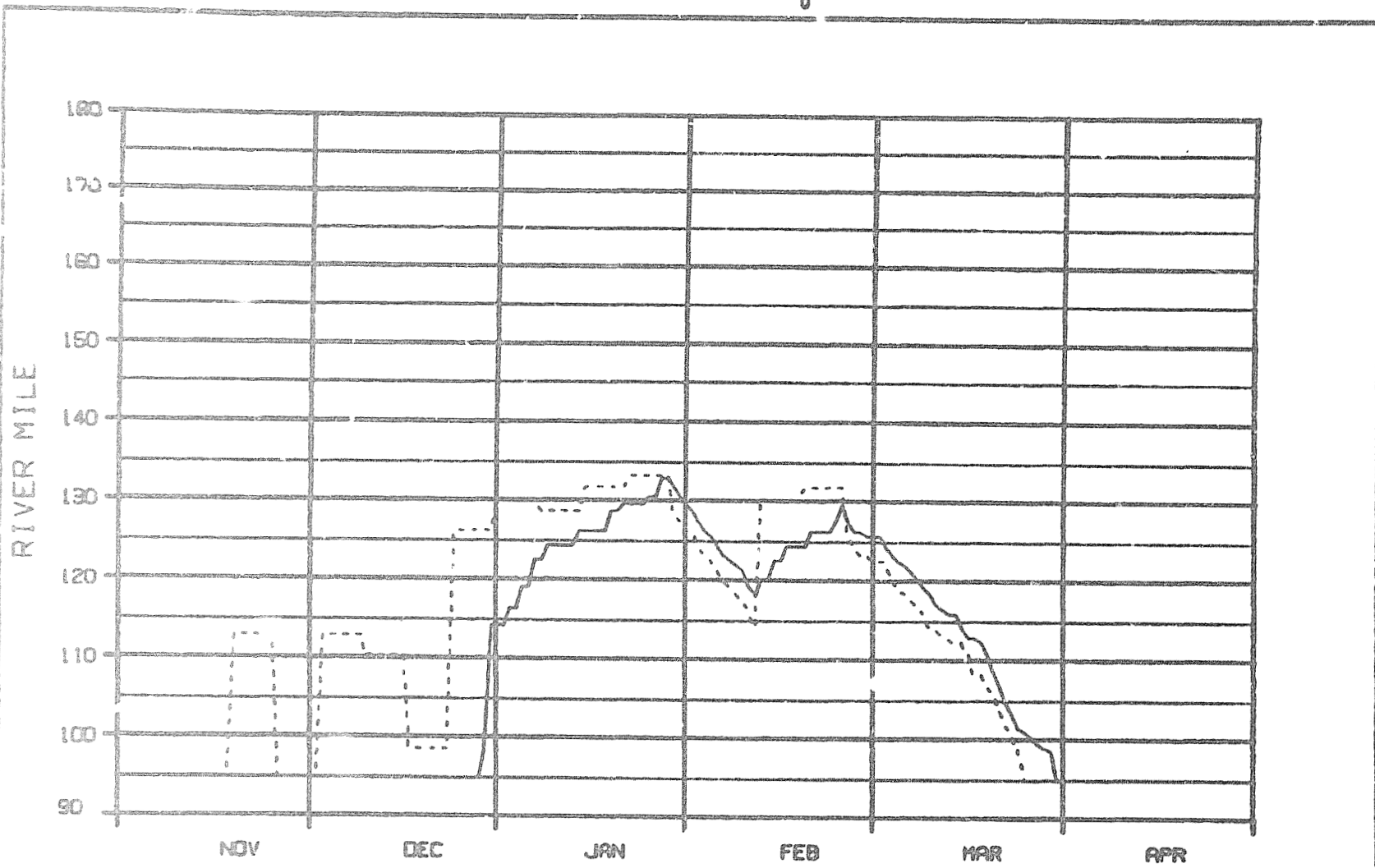


LEGEND:

- TOP OF SOLID ICE
- BLUE/SOLID ICE INTERFACE
- BOTTOM OF BLUISH ICE
- RIVER BED

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 ENERGY DEMAND : DEVIL CANYON 2002
 FLOW CASE E-V1 TOP. INFLOW-MATCHING
 SATOE I NATANA : DEVIL CANYON
 3 LEVEL D.C. INTAKE, 60 FT. DRAWDOWN
 REFERENCE RUN NO. : 0102ENT

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
PROFILE OF MAXIMUM STAGES	
WARZA-EBRSCO JOINT VENTURE	
DESIGNED: 6/1/82	1523.142

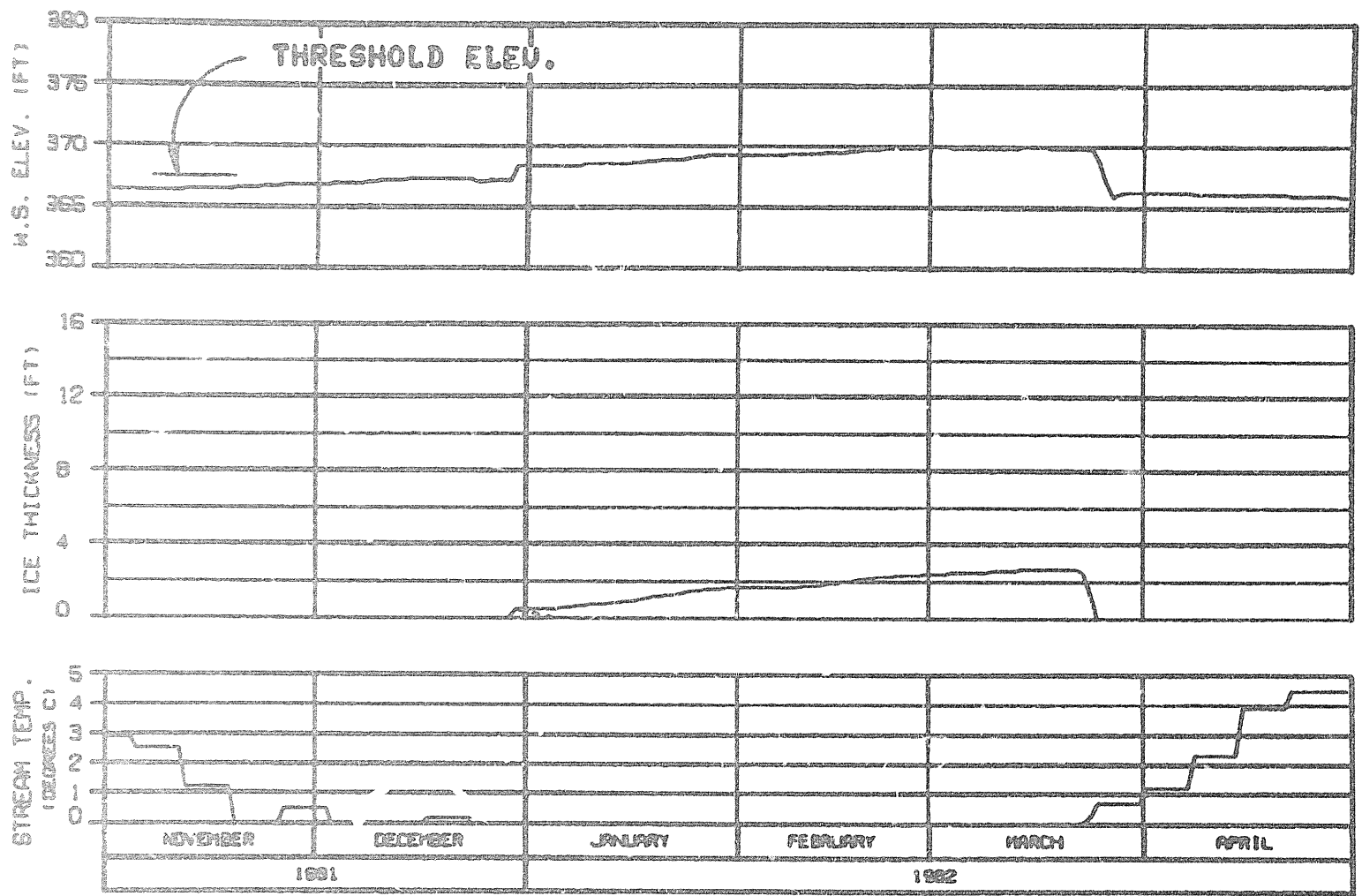


LEGEND.

- ICE FRONT
- - - - - ZERO DEGREE ISOTHERM

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

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
PROGRESSION OF ICE FRONT	
& ZERO DEGREE ISOTHERM	
WARZA-EBASCO JOINT VENTURE	
DESIGNED: G.L. DAVIS	10 APR 82
	1088.142

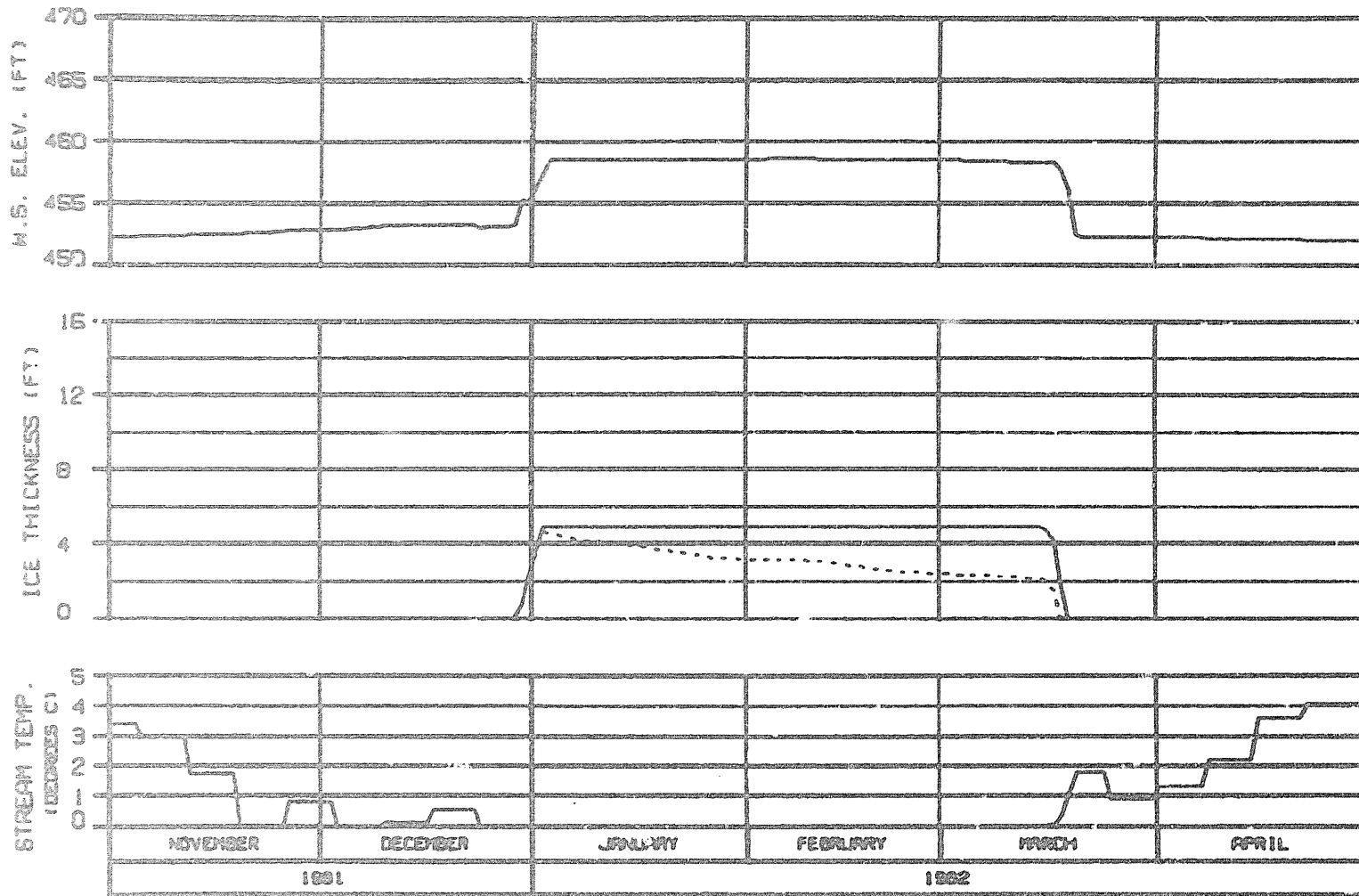


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 SLUSH COMPONENT

HEAD OF WHISKERS SLOUGH
 RIVER MILE : 101.50

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 CASE E-VI FLOWS TEMP. INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON. 2002 DEMAND
 3 LEVEL D.C. INTAKE. 50 FT. ORANDOHN
 REFERENCE RUN NO. : 9102ENT

ALASKA POWER AUTHORITY		
SUBMITTAL PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EDASCO JOINT VENTURE		
DESIGNED - G.L. PETERSON	10 APR 92	1000.142

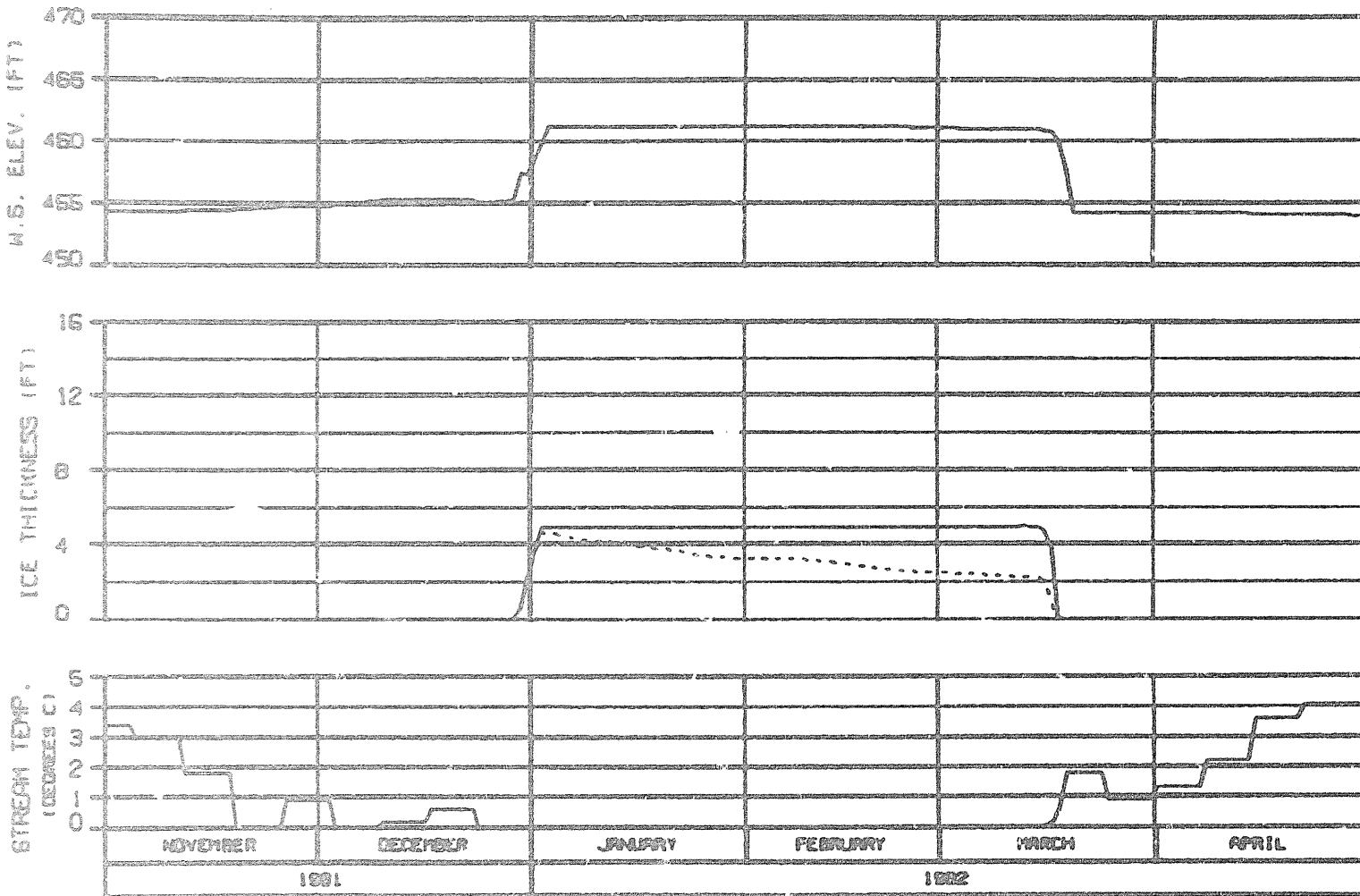


ICE THICKNESS LEGEND:
 ———— TOTAL THICKNESS
 - - - - - BUSH COMPONENT

SIDE CHANNEL AT HEAD OF GASH CREEK
 RIVER MILE : 112.00

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE I WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAINDOWN
 REFERENCE RUN NO. : 0102ENT

ALASKA POWER AUTHORITY		
SUSITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
MARZA-EDASCO JOINT VENTURE		
DATE: 04/05/02	NO: 100	1000.142

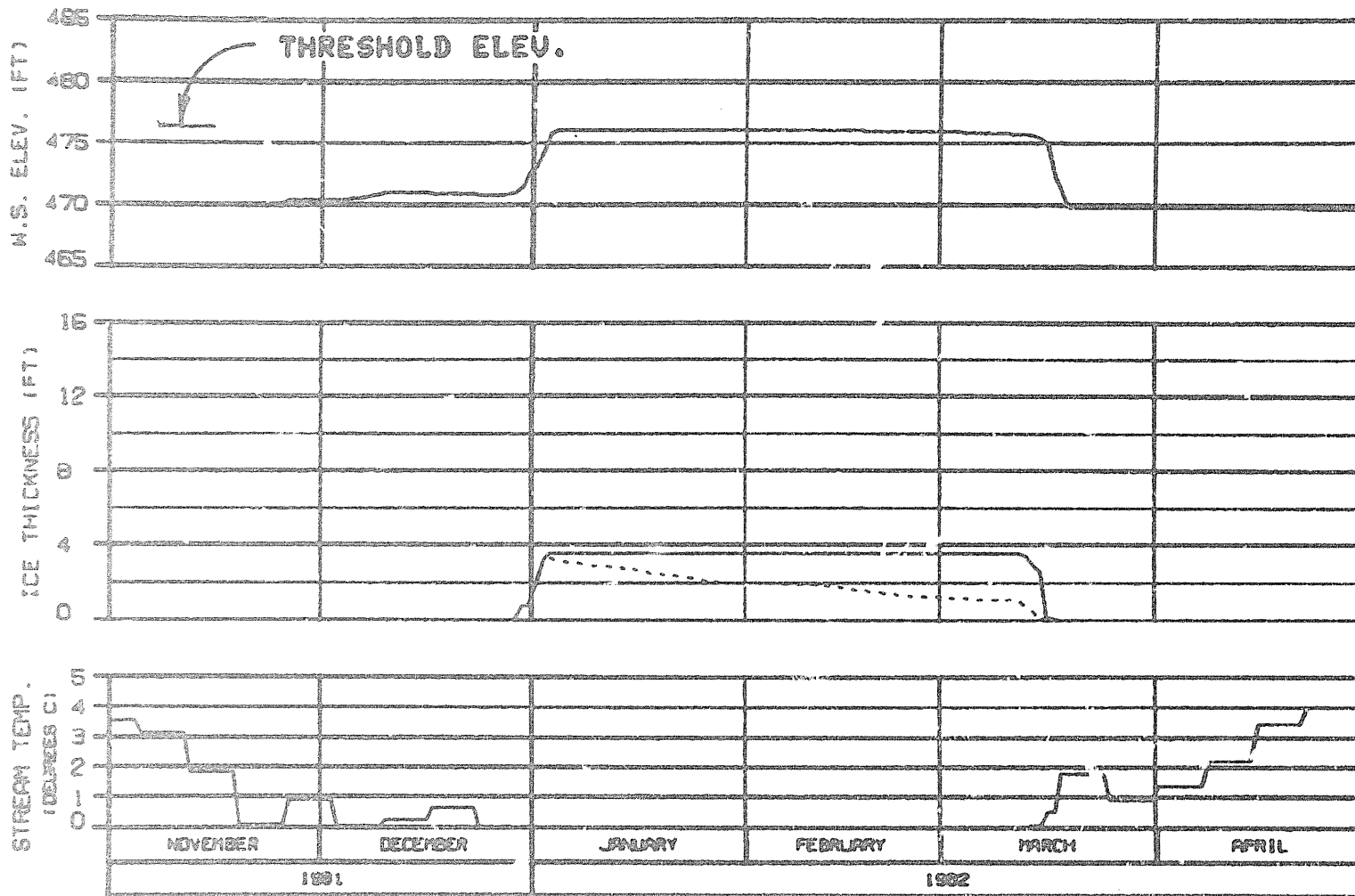


MOUTH OF SLOUGH 6A
 RIVER MILE : 112.34

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - G. ICH 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	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EGASCO JOINT VENTURE	
00000	01.0000 10 APR 82 1000.142

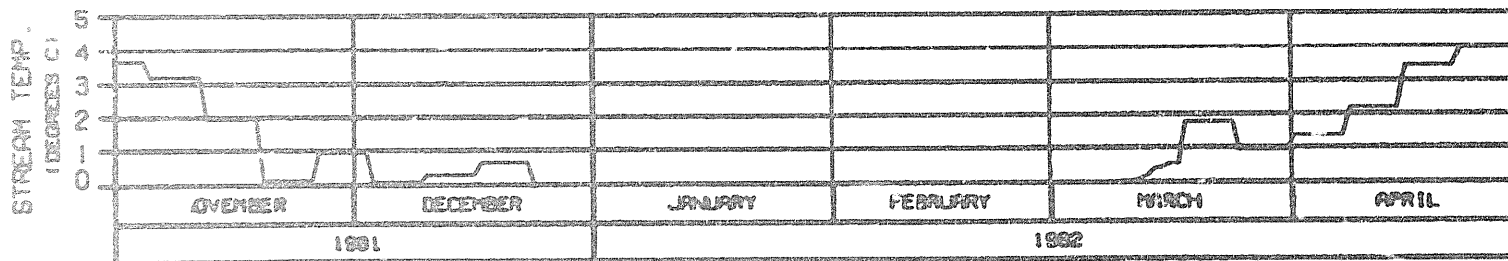
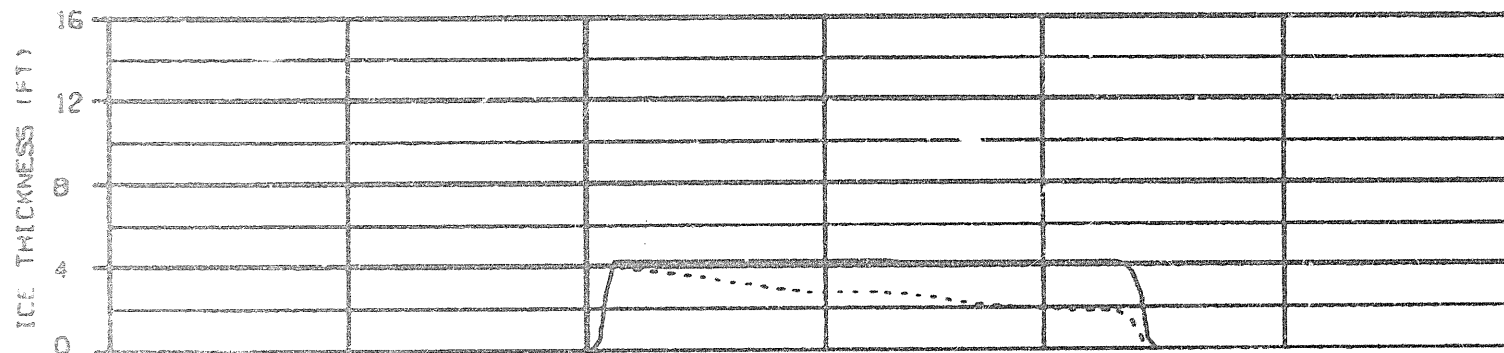
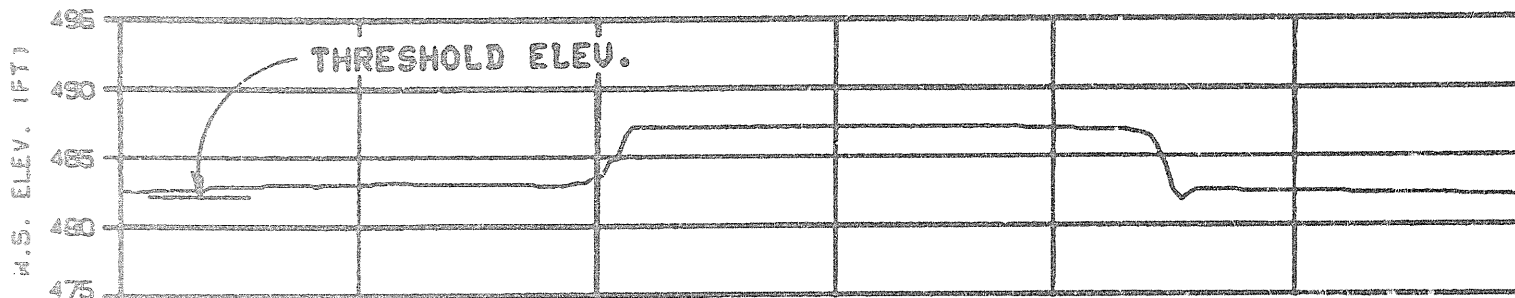


HEAD OF SLOUGH 8
 RIVER MILE : 114.10

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	
SUSTINA PROJECT	
SUSTINA RIVER ICE SIMULATION TIME HISTORY	
HAZA-EDBECO JOINT VENTURE	
DATE: 11.19.82	BY: JRM/CM
DRAWING NO.: 142	



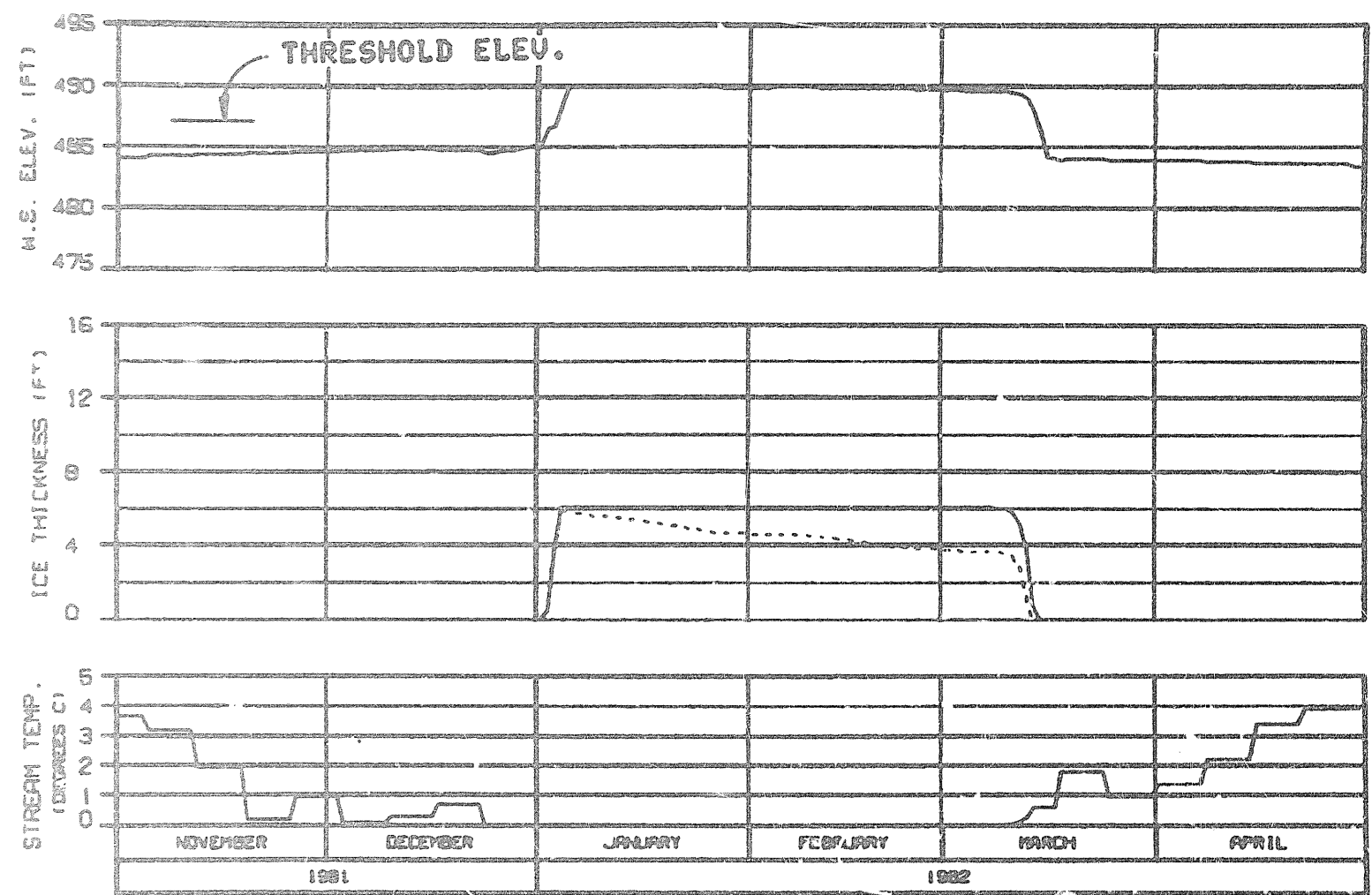
SIDE CHANNEL MSII

RIVER MILE : 115.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 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		
WARZA-EBASCO JOINT VENTURE		
DATE: 04/09/92	10 500 00	1000.142

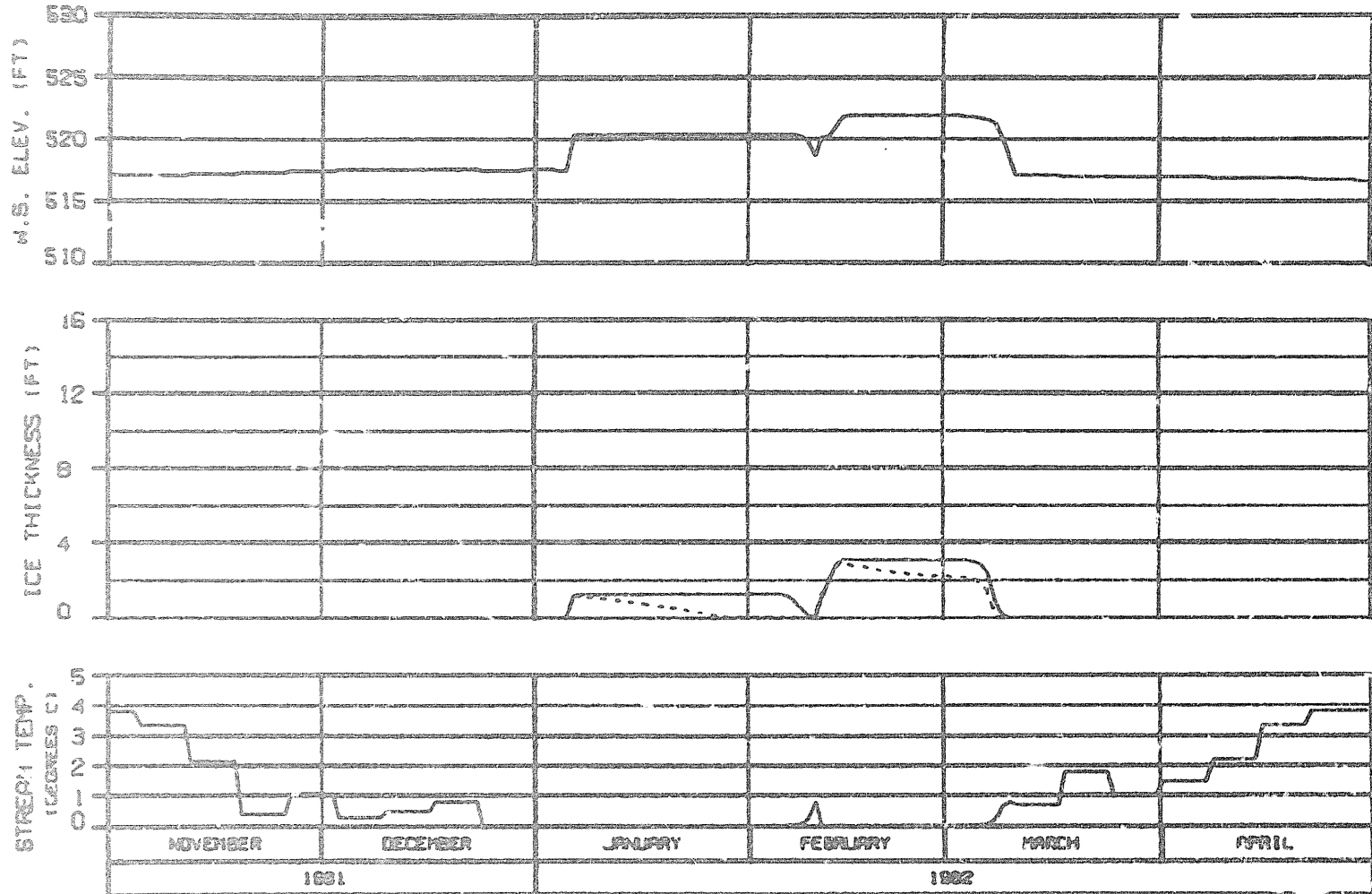


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 ······ SUB COMPONENT

HEAD OF SIDE CHANNEL NSII
 RIVER MILE : 115.90

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE I WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAINDOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY	
EXISTING PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
HANZA-CORASCO JOINT VENTURE	
OPERATION: 01/11/2003	10 APR 92
828.142	

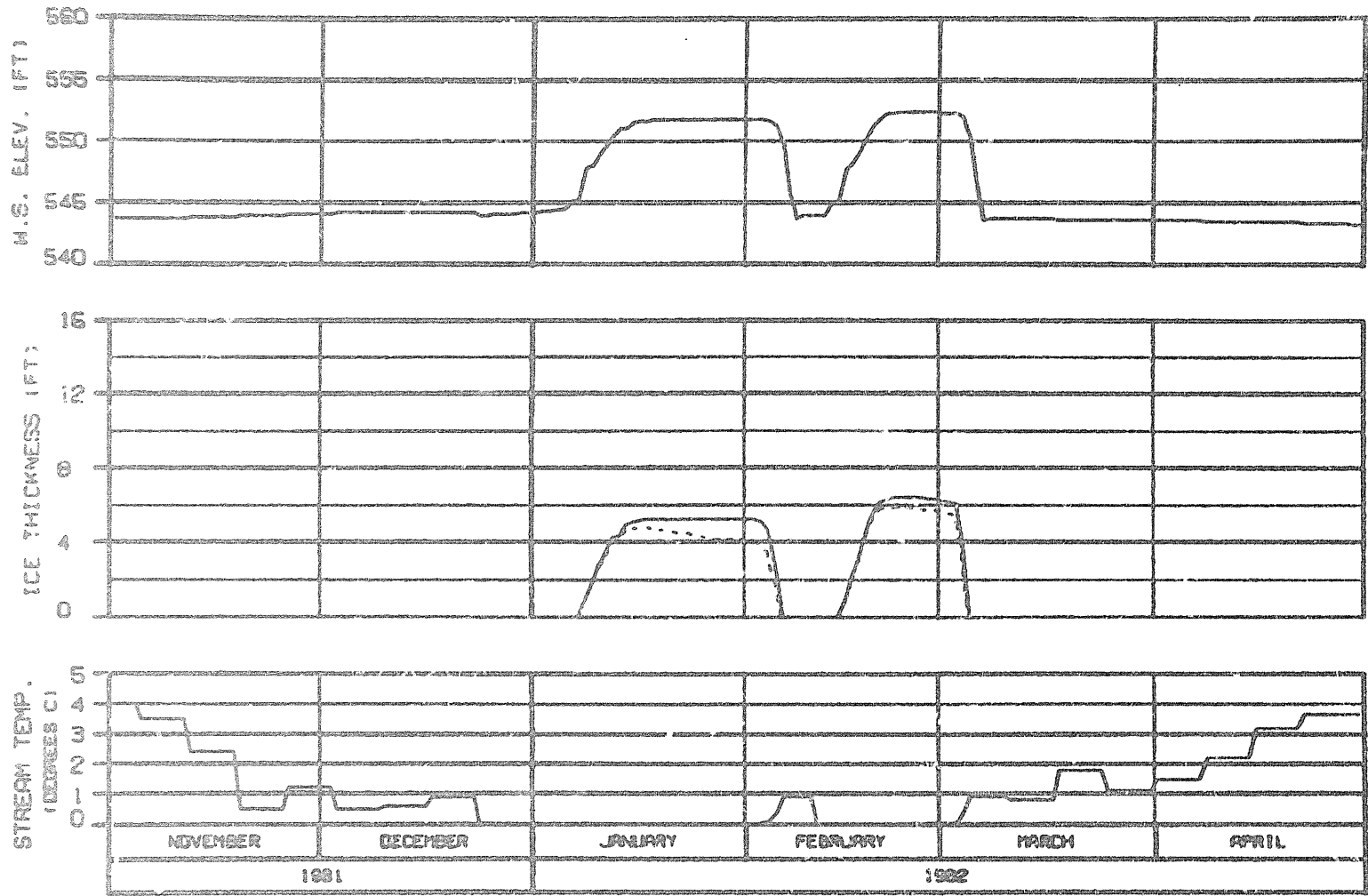


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - BUSH COMPONENT

RIVER MILE : 120.00

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. : 8102ENT

ALASKA POWER AUTHORITY	
GABITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBRECO JOINT VENTURE	
DATE: 11/20/82	1000.142

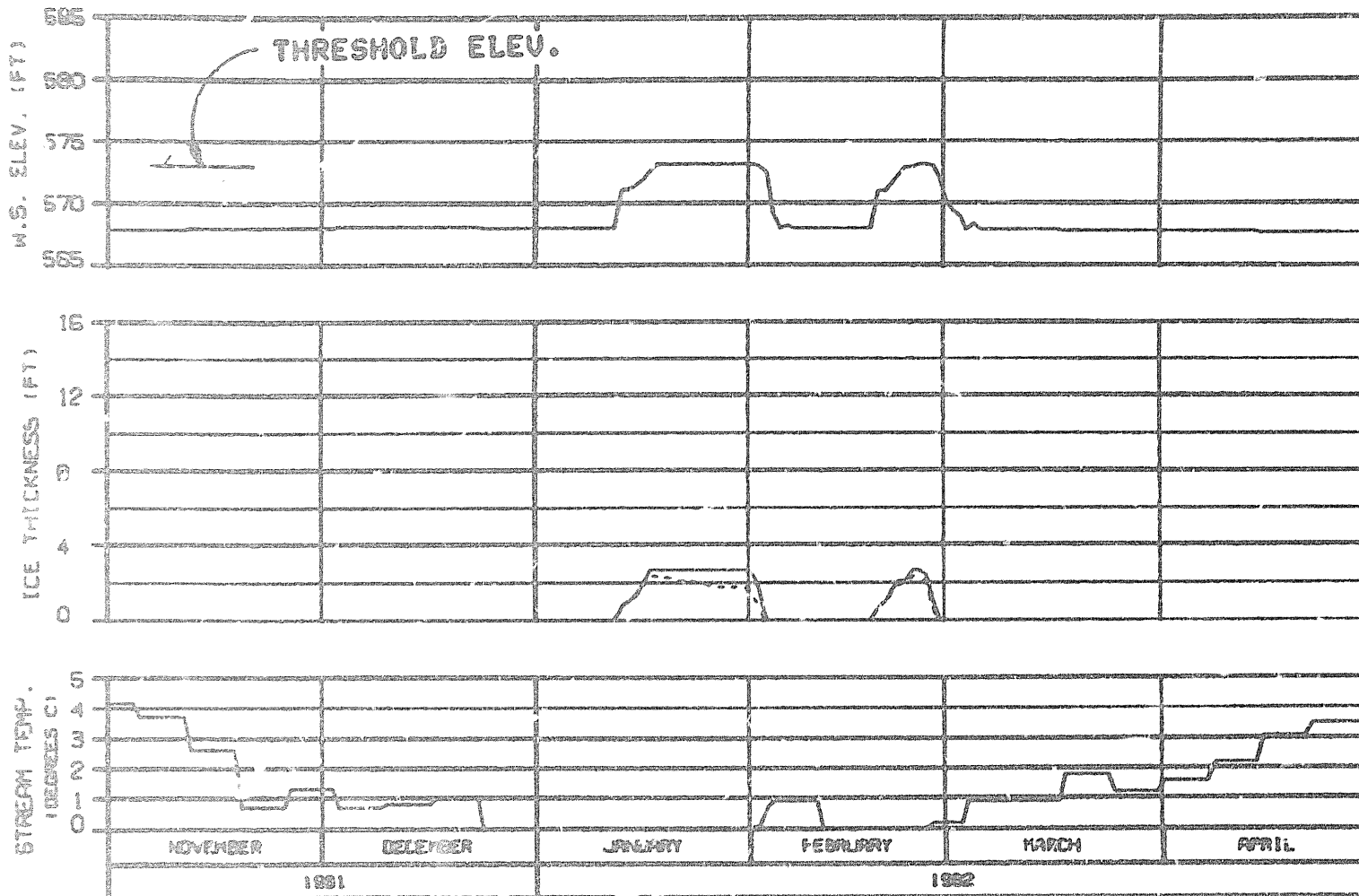


HEAD OF MOOSE SLOUGH
RIVER MILE : 123.50

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. ORANDOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER	
ICE SIMULATION	
TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
CHART NO. 10000	10000.142



HEAD OF SLOUGH 8A (WEST)

RIVER MILE : 126.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 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

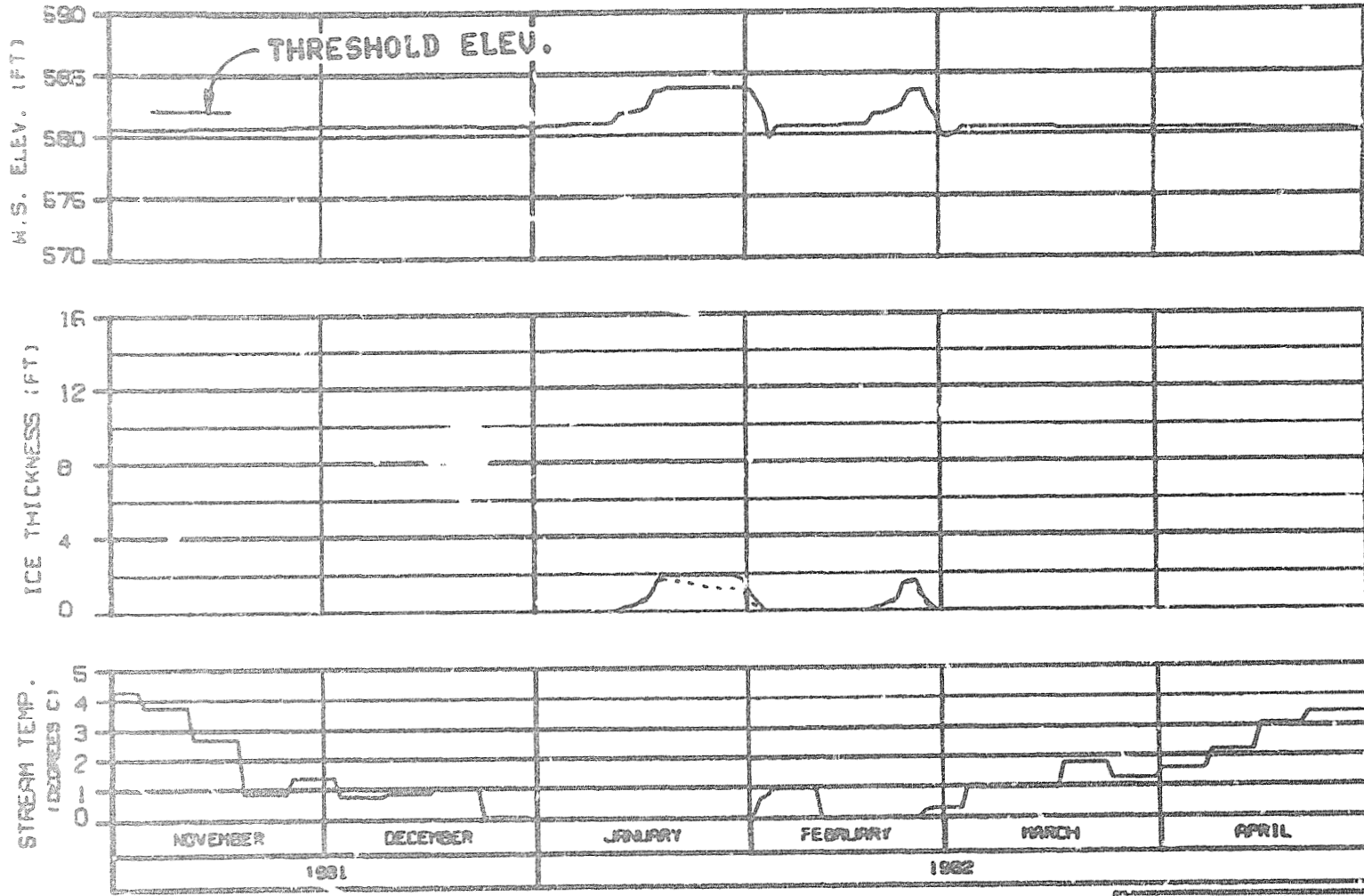
ICE SIMULATION

TIME HISTORY

WARD-EMSCO JOINT VENTURE

CHARTERED BY: 01-0000 10 FEB 82

USER: 142

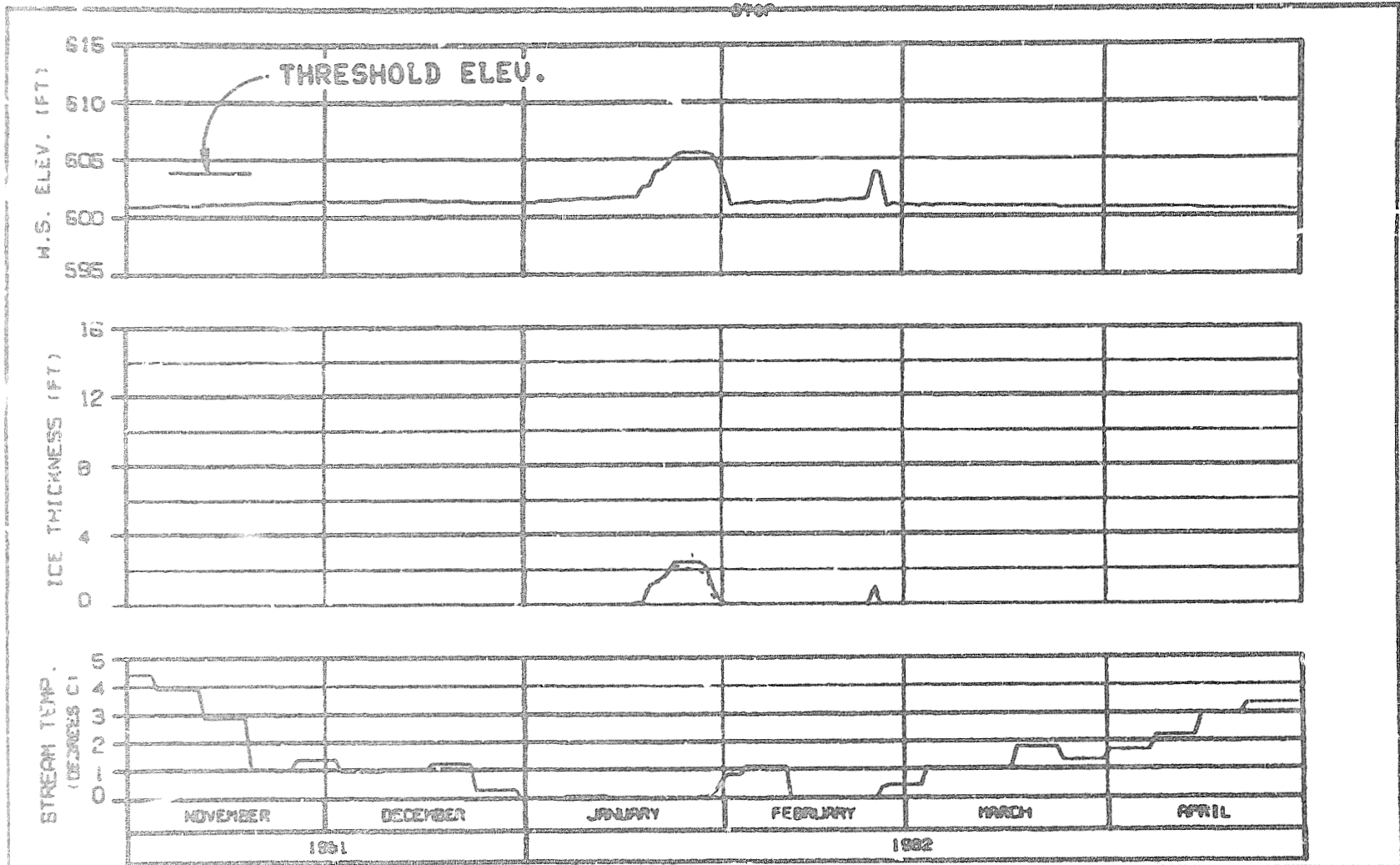


HEAD OF SLOUGH 8A (EAST)
 RIVER MILE : 127.10

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 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	
WARZA-EDASCO JOINT VENTURE	
DESIGNED: D.L. HARRIS	18 APR 82
	8203.149



HEAD OF SLOUGH 9
 RIVER MILE : 129.30

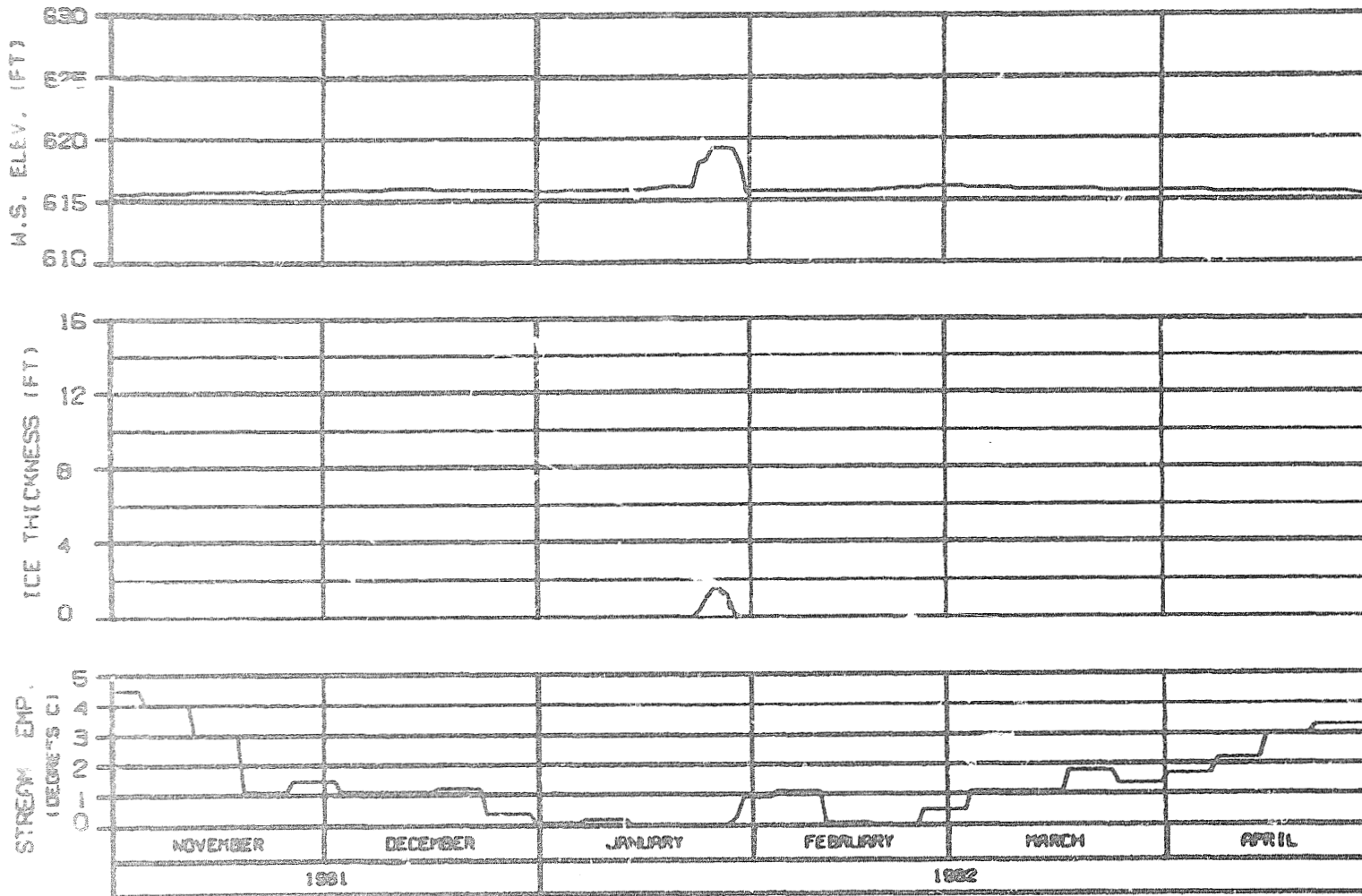
ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 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. : 8102ENT

ALASKA POWER AUTHORITY		
SUBMITTER PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NARZA-EGASCO JOINT VENTURE		
DATE PLOTTED	BY WHOM	ISSUE NO.
		1992.142

OPTION?

OPTION?

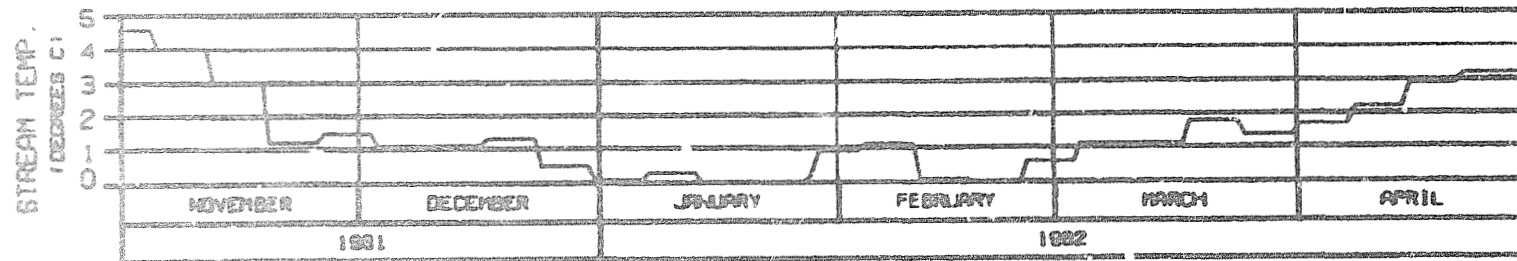
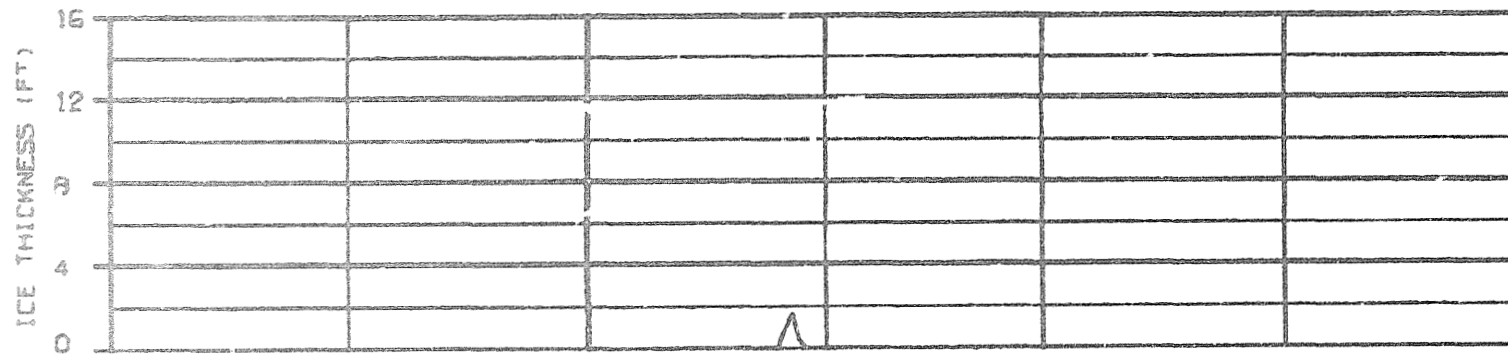
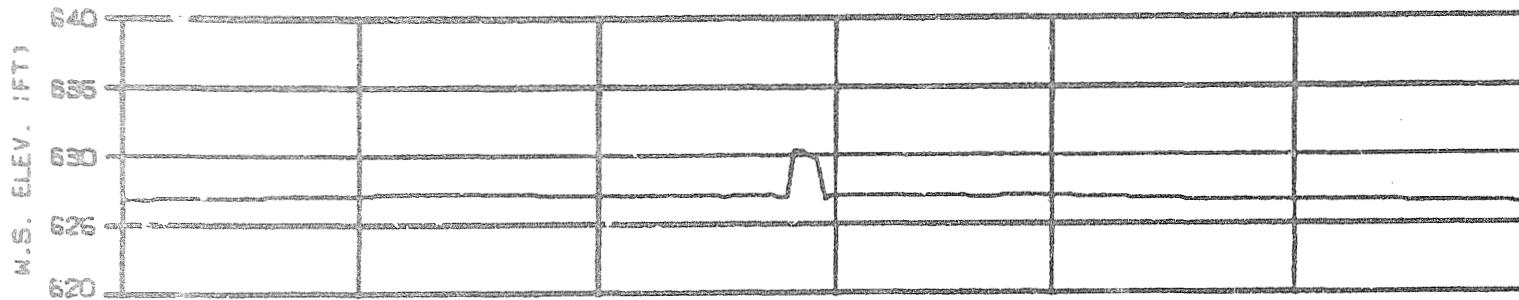


SIDE CHANNEL U/S OF SLOUGH 9
 RIVER MILE : 130.60

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 O.C. INTAKE, 50 FT. DRAWDOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY		
SUBMITTA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
NARZA-ENERCO JOINT VENTURE		
DESIGNER: D.L. PERRY	DATE: 07/10/82	PROJECT: 142

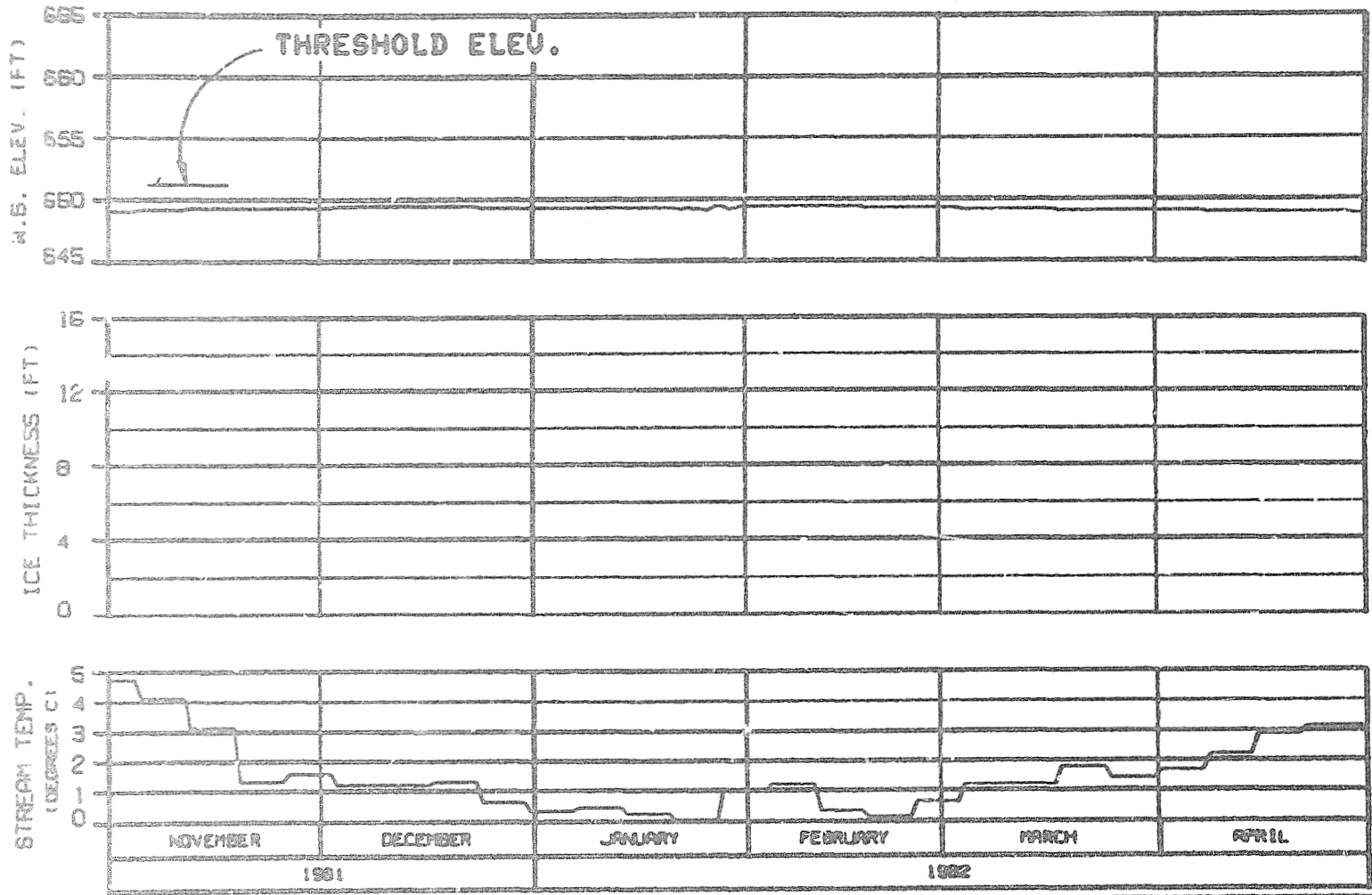


SIDE CHANNEL U/S OF 4TH JULY CREEK
 RIVER MILE : 131.80

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 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	
WARZA-EBASCO JOINT VENTURE	
CHARGE - ALLIED	10 APR 92
	1000.142

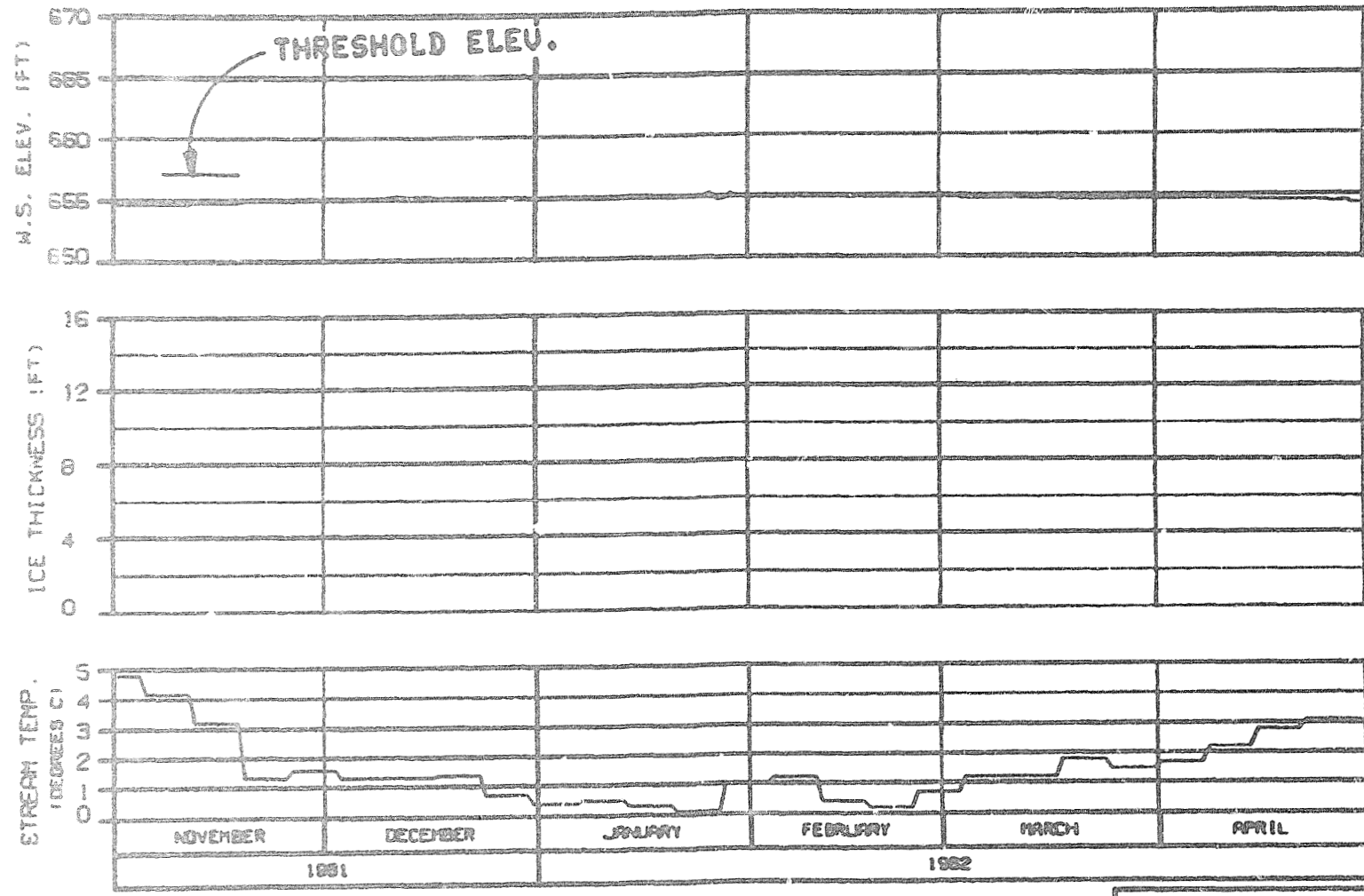


HEAD OF SLOUGH 9A
 RIVER MILE : 133.70

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

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

ALASKA POWER AUTHORITY	
GLINA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EGASCO JOINT VENTURE	
ORDER: 84-000	1808-142

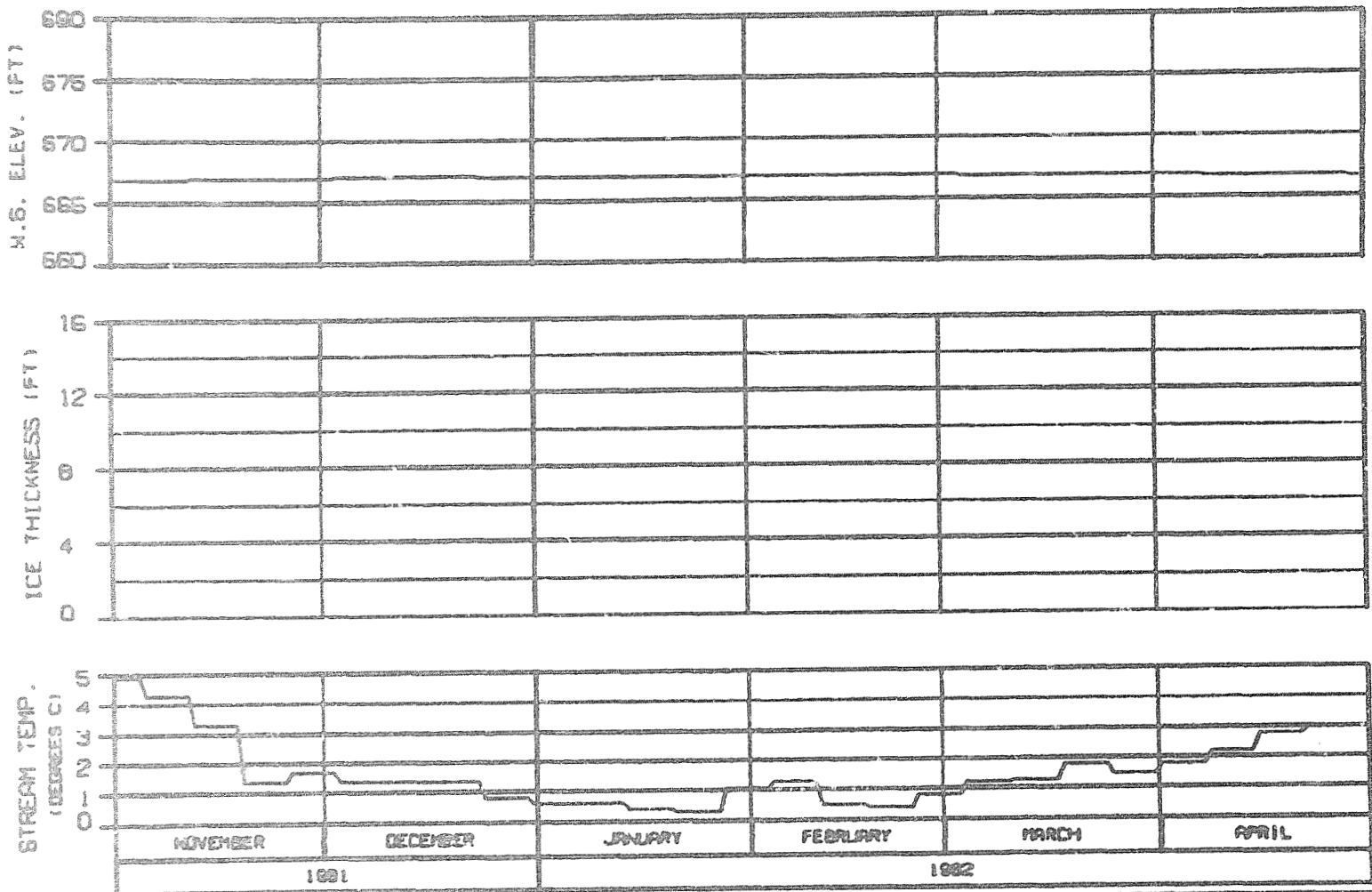


SIDE CHANNEL U/S OF SLOUGH 10
 RIVER MILE : 134.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - 2/31 COMPONENT

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 MATANA + 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-EBRACO JOINT VENTURE		
DESIGNED: R. L. BROWN	17 APR 82	1000.142

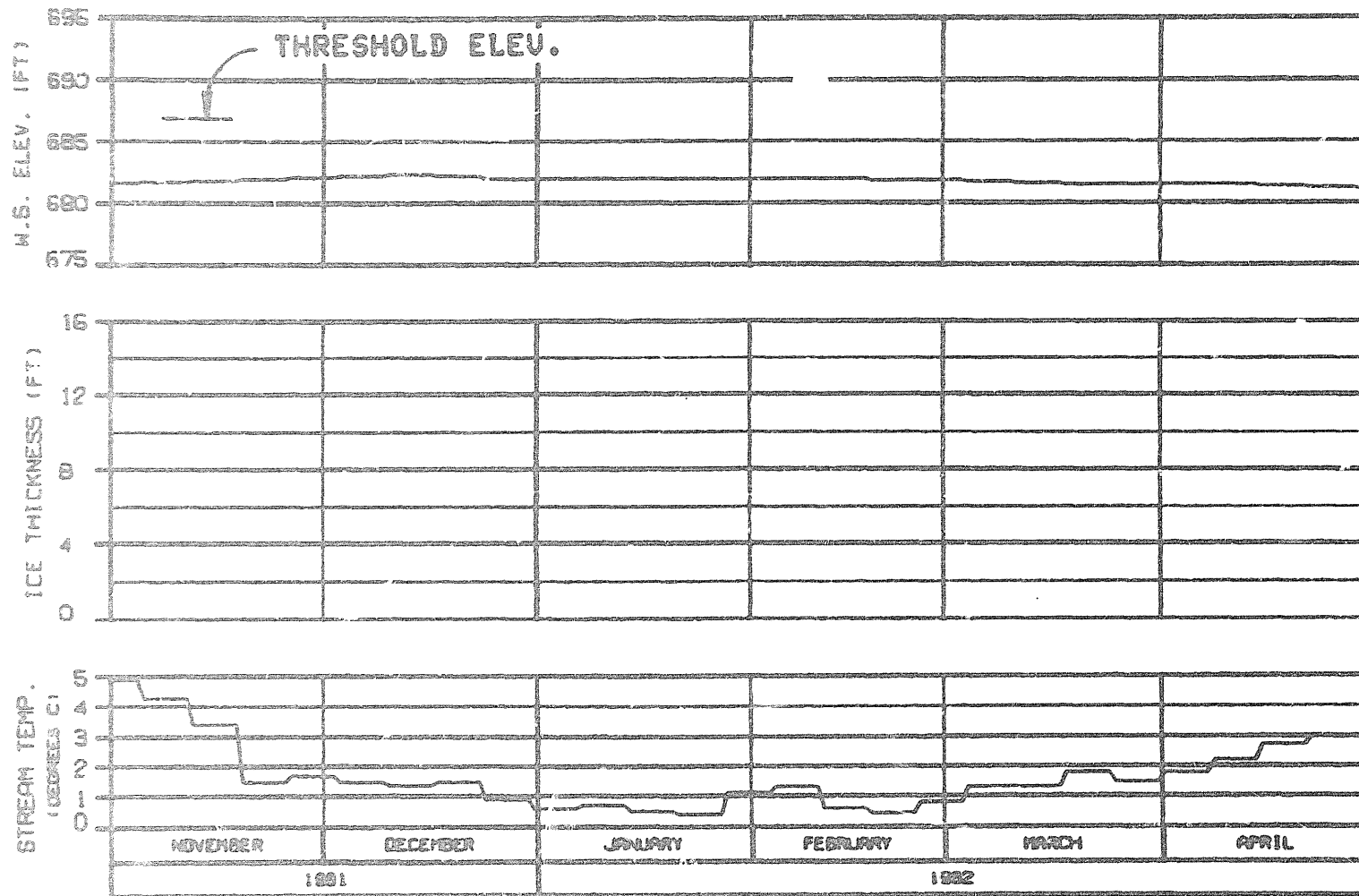


ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 - - - - - SLUSH COMPONENT

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 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		
SUBITNA PROJECT		
SUSITNA RIVER ICE SIMULATION TIME HISTORY		
WARZA-EBASCO JOINT VENTURE		
DESIGNED BY: G.L. GIBBS	DATE: 08 APR 92	PROJECT NO.: 1000.142

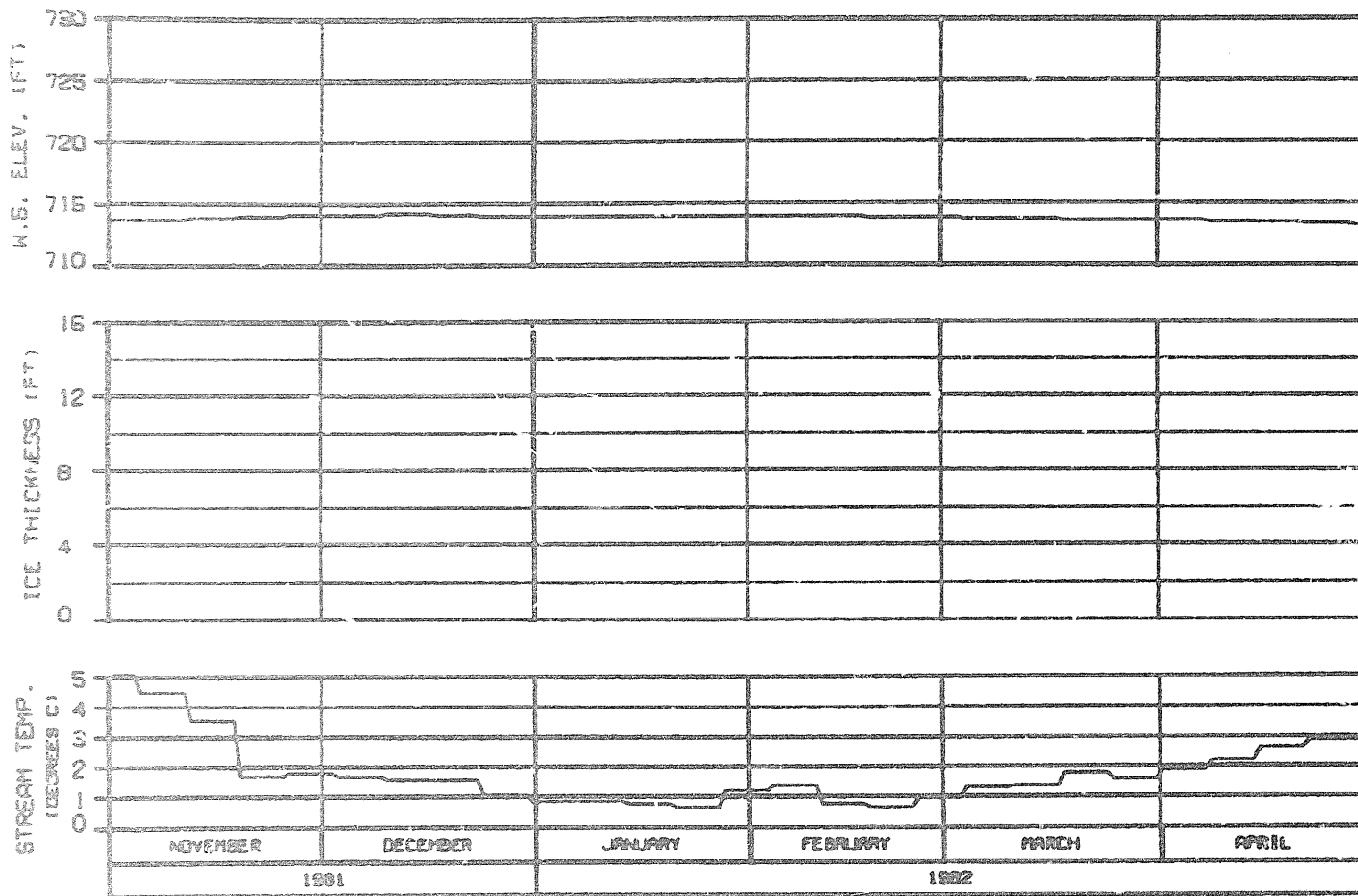


HEAD OF SLOUGH 11
 RIVER MILE : 136.50

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. DRAINDOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EDBROO JOINT VENTURE	
DATE: 04/02/92	10 APR 92
1000.142	

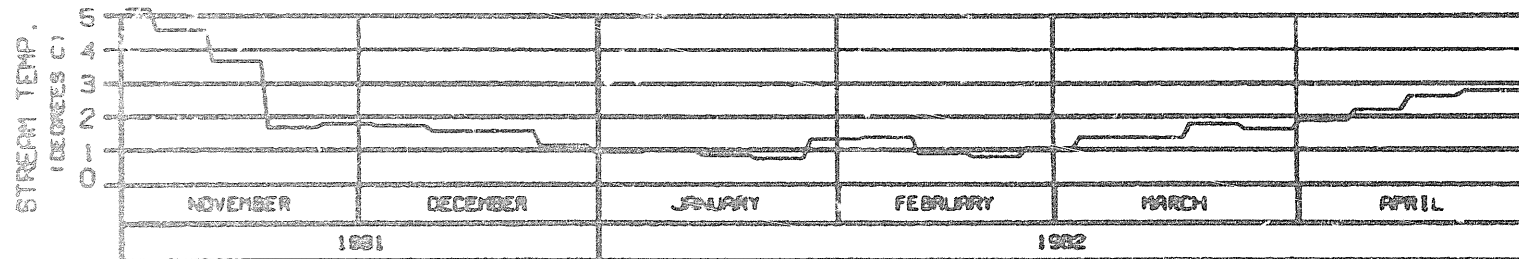
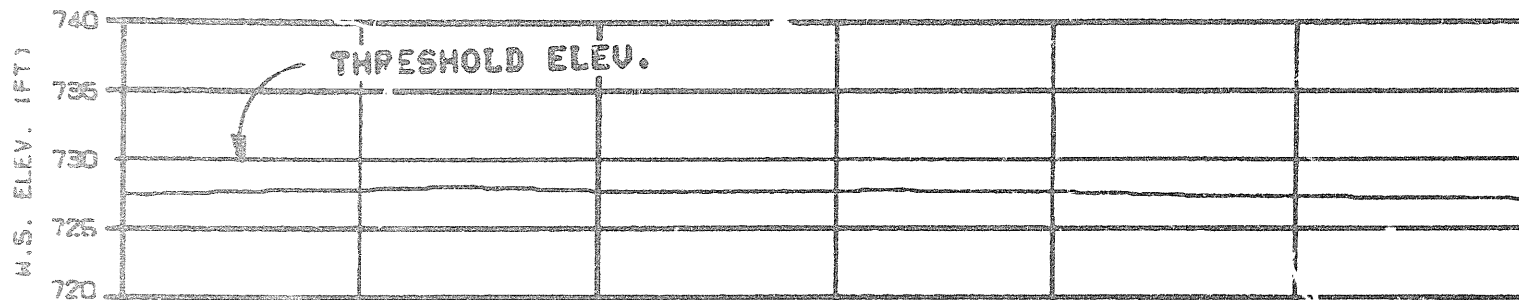


HEAD OF SLOUGH 17
 RIVER MILE : 139.30

ICE THICKNESS LEGEND:
 ——— TOTAL THICKNESS
 BLUEN COMPONENT

WEATHER PERIOD : 1 NOV 01 - 30 APR 02
 CASE E-VI FLOWS TEMP, INFLOW-MATCHING
 STAGE 1 WATANA + DEVIL CANYON, 2002 DEMAND
 3 LEVEL D.C. INTAKE, 50 FT. URADOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY	
GLACIER PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
MARZA-EBASCO JOINT VENTURE	
DATE: 01 APR 02	1000.142



HEAD OF SLOUGH 20

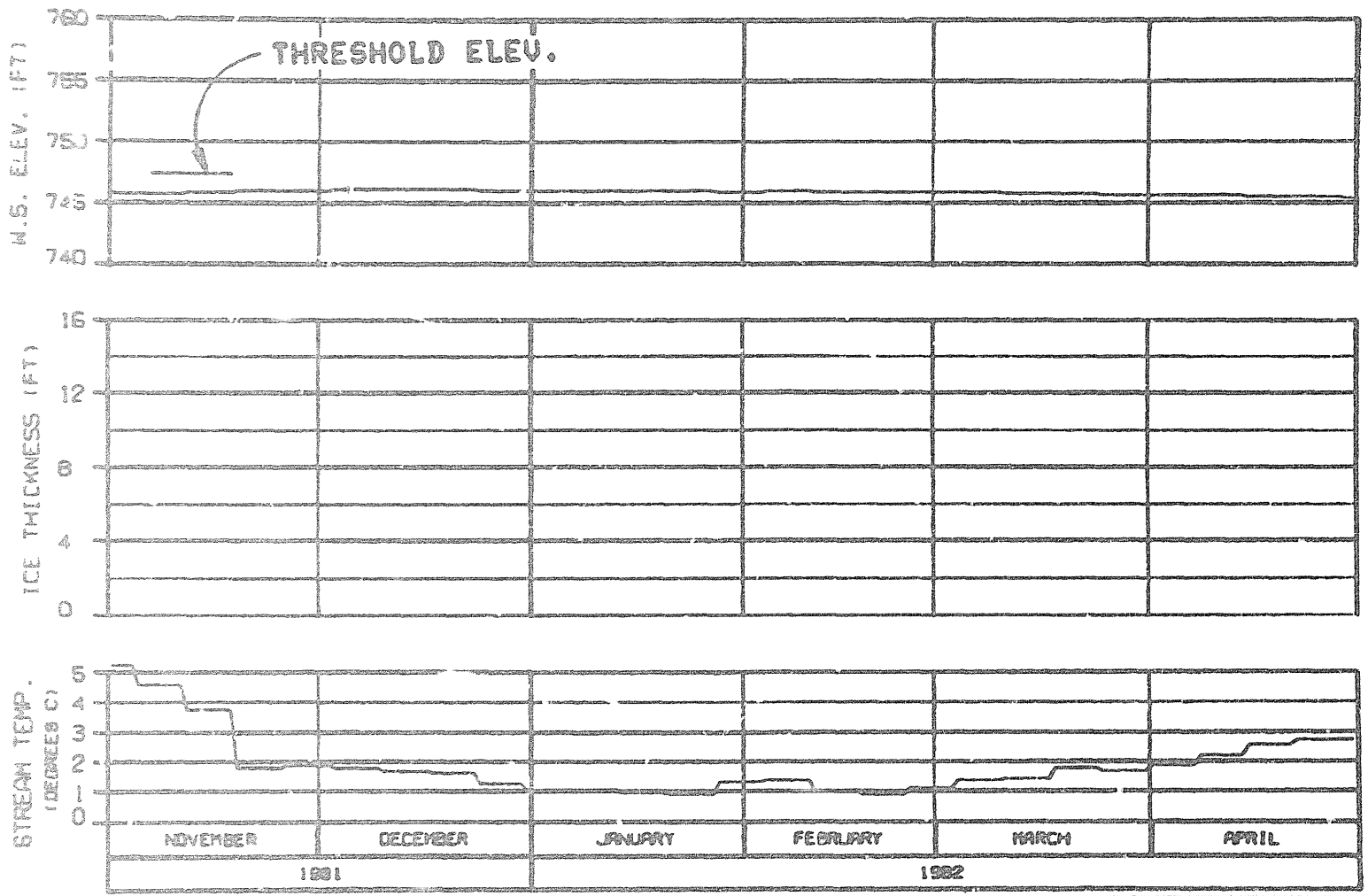
RIVER MILE : 140.50

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	
WARZA-EBASCO JOINT VENTURE	
MODEL - ALP818	NO 818 81
	1981.142

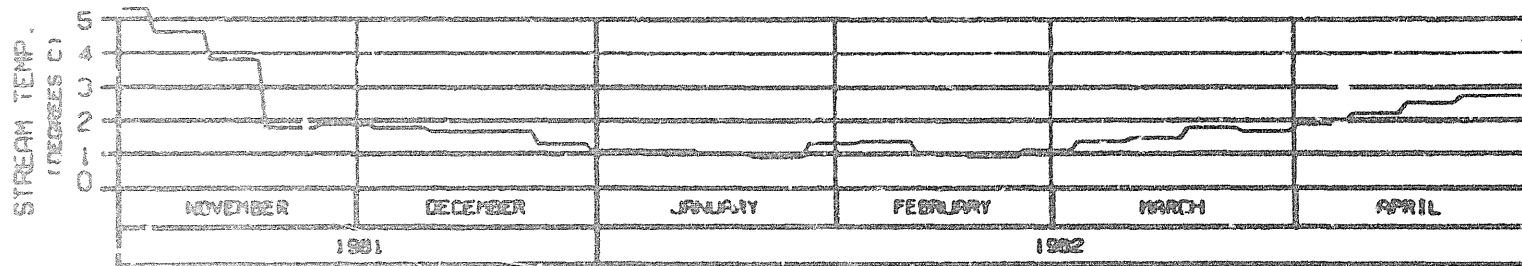
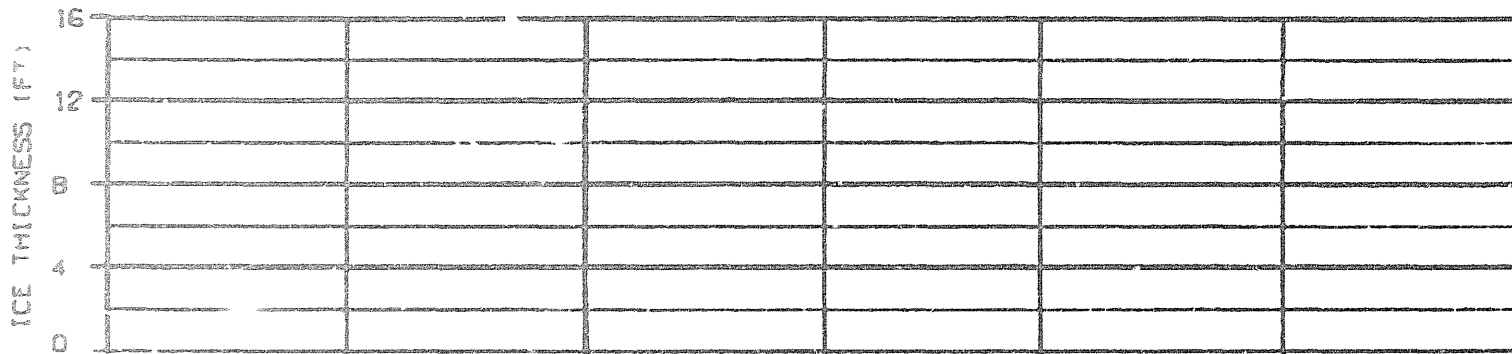
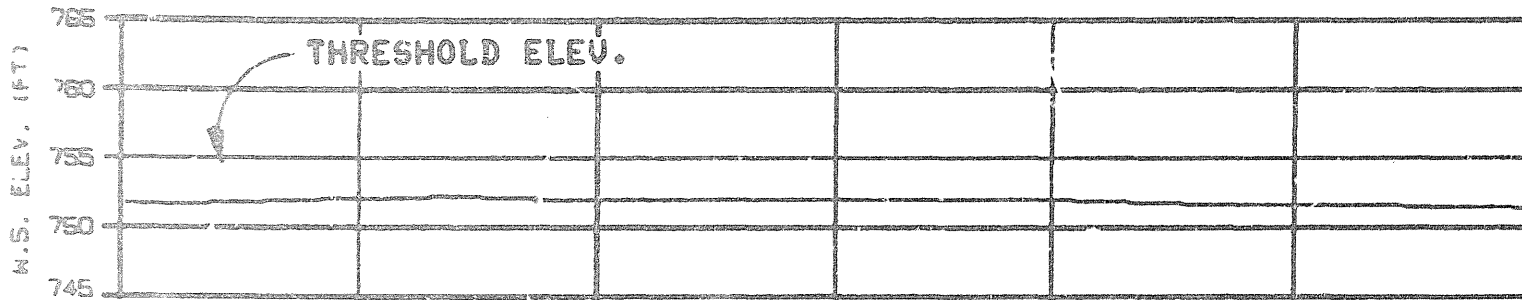


SLOUGH 21 (ENTRANCE AS)
 RIVER MILE : 141.80

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

WEATHER PERIOD : 1 NOV 81 - 30 APR 82
 CASE E-VI FLOWS TEMP: INFLOW-MATCHING
 STAGE 1 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		
CHART NO. 8-1-8003	10 00 00	1020.142

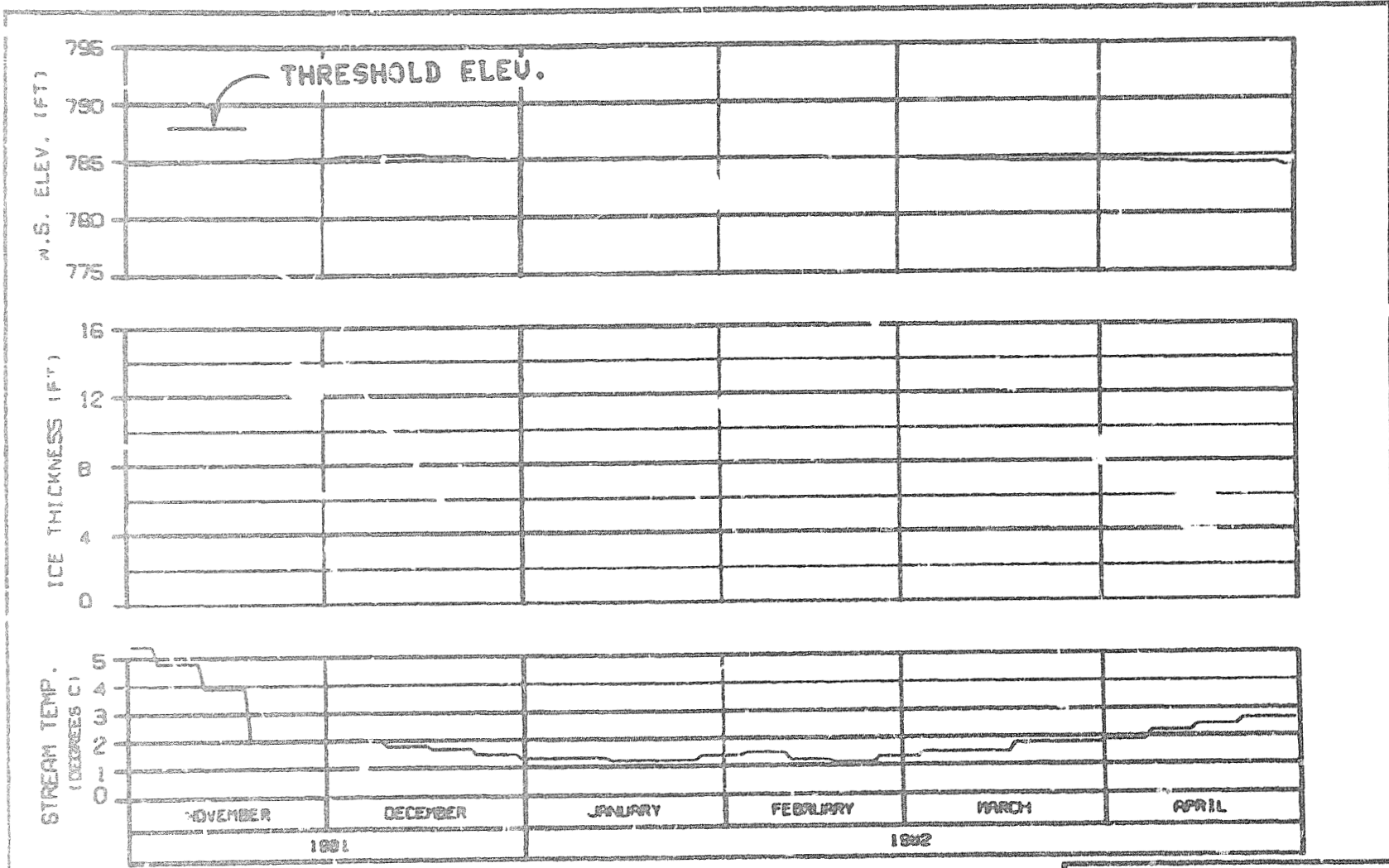


HEAD OF SLOUGH 21
 RIVER MILL : 142.20

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. DRAINDOWN
 REFERENCE RUN NO. : 810ZENT

ALASKA POWER AUTHORITY	
SUSITNA PROJECT	
SUSITNA RIVER ICE SIMULATION TIME HISTORY	
WARZA-EBASCO JOINT VENTURE	
DATE: 10 APR 82	1000.142



HEAD OF SLOUGH 22
 RIVER MILE : 144.80

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

WEATHER PERIOD : 1 NOV 91 - 30 APR 92
 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. : 6102ENT

ALASKA POWER AUTHORITY	
SUBJECT PROJECT	
SLASITNA RIVER ICE SIMULATION TIME HISTORY	
WAZA-EBASCO JOINT VENTURE	
DATE: 11/01/92	BY: [signature]

OPTION?