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SUSITNA HYDROELECTRIC PROJECT

FEDERAL ENERGY REGULATORY COMMISSION
PROJECT No. 7114

LOWER SUSITNA RIVER AGGRADATION STUDY: FIELD DATA

R&M

R & M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

FINAL REPORT

UNDER CONTRACT TO

HARZA-EBASCO
SUSITNA JOINT VENTURE

JUNE 1985
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Susitna File No. 4.2.2.1

SUSITNA HYDROELECTRIC PROJECT

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FIELD DATA

Report by
William S. Ashton
R&M Consultants, Inc.

Under Contract to
Harza-Ebasco Susitna Joint Venture

Prepared for
Alaska Power Authority

Final Report
June 1985

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ACKNOWLEDGMENTS

This study was conducted under contract to the Harza-Ebasco Susitna Joint Venture. Funding was provided by the Alaska Power Authority in conjunction with studies pertaining to the continuing environmental impact assessment for the proposed Susitna Hydroelectric Project.

Carl Schoch (R&M) located all the 1984 cross-sections and collected most of the stage-discharge data. Bob Butera and Dave Bjerklie, both of R&M collected the remaining stage-discharge data. Chip Green (R&M) assisted in collecting the bed material samples.

The river cross-sections were surveyed by L. Nicholson, W. Rice and R. Sousa (all of R&M). Mike Schoder (R&M) reduced the field data notes, computer plotted the cross-sections and wrote Section 4.

The pilots of Air Logistics were very helpful and took in good humor having their helicopters turned into dump trucks. Granville Couey (Frank Moolin & Associates) was helpful in scheduling a helicopter on short notice.

My thanks to Steve Bredthauer and Chip Green, both of R&M, for reviewing and editing this report, to Barb Estus for typing and Orlan Paraoan for drafting the figures for the report.

1.0 EXECUTIVE SUMMARY

The data presented herein were collected for use in construction and calibration of the sediment transfer model being developed to analyze potential with-project aggradation downstream of the Chulitna-Susitna-Talkeetna confluence. River cross-sections, stage-discharge measurement and bed material were collected at nine, nine and eight lower river cross-sections, respectively. The cross-sections between the Chulitna-Susitna-Talkeetna Rivers confluence and the Parks Highway bridge were surveyed during September 1984, the stage-discharge measurements were measured June through October 1984 and the bed material samples were collected during October 1984. The change in channel geometry at River Mile (RM) 98.0 and RM 97.1 is illustrated by comparing river cross-section surveys in 1980, 1982 and 1984.

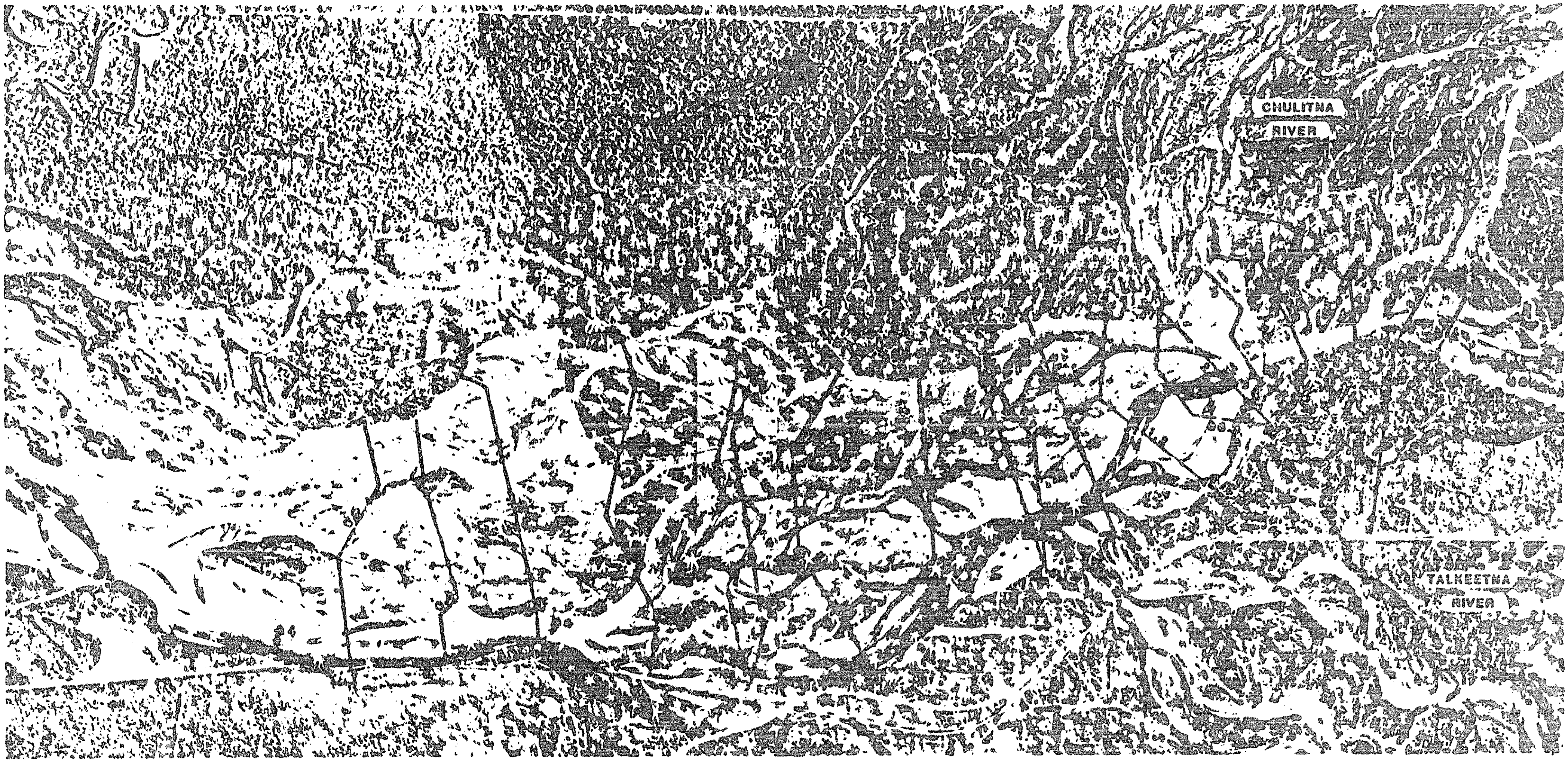
The lateral and longitudinal variation of bed material particle size distribution within this section of the river is relatively uniform, with some variation at the downstream side of gravel bars and at freshly exposed gravel bars.

Five of the seven armor layer samples are biased towards the larger particle sizes because the surface was frozen during sampling, thereby making it difficult to sample the complete armor layer. Two unfrozen armor layer samples are considered representative of the armor layer.

2.0 SCOPE OF STUDY

Approximately 80 percent of the total sediment load in the Susitna River below Talkeetna originates in the Chul: a and Talkeetna Rivers. Regulation of flood and high flows by the Susitna Hydroelectric Project will reduce the sediment discharge capacity of the lower Susitna River. The total sediment load will not be reduced proportionately and aggradation of sediments in the lower Susitna River is expected to occur. Potential impacts resulting from this aggradation would be elevation of water levels near the town of Talkeetna, at tributary mouths and at the upstream end of side channel complexes. The results of the sediment study (FY84) presented in "Susitna Hydroelectric Project - Reservoir and River Sedimentation" identified the potential for aggradation but did not sufficiently define the temporal and spatial distribution of the aggradation. Modelling studies are being conducted to provide a better estimate of the potential impact of the with-project flow regime on the sediment transport below the Chulitna-Susitna-Talkeetna Rivers confluence. This report presents the stage-discharge, bed material and cross-section data collected for construction and calibration of the sediment transfer model.

R&M Consultants conducted hydrographic surveys of the Susitna River in 1980 and 1982 (R&M, 1981 and R&M, 1982). These cross-sections were primarily collected for computer modelling of water surface profiles using the HEC-2 program and computer modelling of with-project ice conditions using the ICESIM program. For the 1980 and 1982 surveys river cross-sections were given the designation Lower River Cross-Section with a number, i.e., LRX 0.7. The numbering started with 0.3 downstream of Talkeetna and increased in the upstream direction. For the 1984 surveys the initials LRX are used to indicate lower river cross-sections and the number is the river mile designation. The locations of the 1984 cross-sections were changed slightly during field location and survey therefore the LRX number does not necessarily correspond to the actual river mile. LRX 98.0, 97.1 and 95.9 are approximately the same location as LRX 2.0, 1.0 and 0.7, respectively (Figure 2.1). Calibration data included water surface elevations for selected cross-sections at different flow rates and bed material and armor layer samples at eight cross-sections.



LEGEND

● LOCATION OF BED MATERIAL SAMPLE

△ LOCATION OF STAGE DISCHARGE MEASUREMENTS

LOWER SUSITNA RIVER
AGGRADATION STUDY
LOCATION MAP OF CROSS-SECTIONS
OF THE LOWER SUSITNA RIVER
SEE TEXT FOR EXPLANATION OF
NUMBERING SYSTEM

FIGURE 2.1 1 OF 3

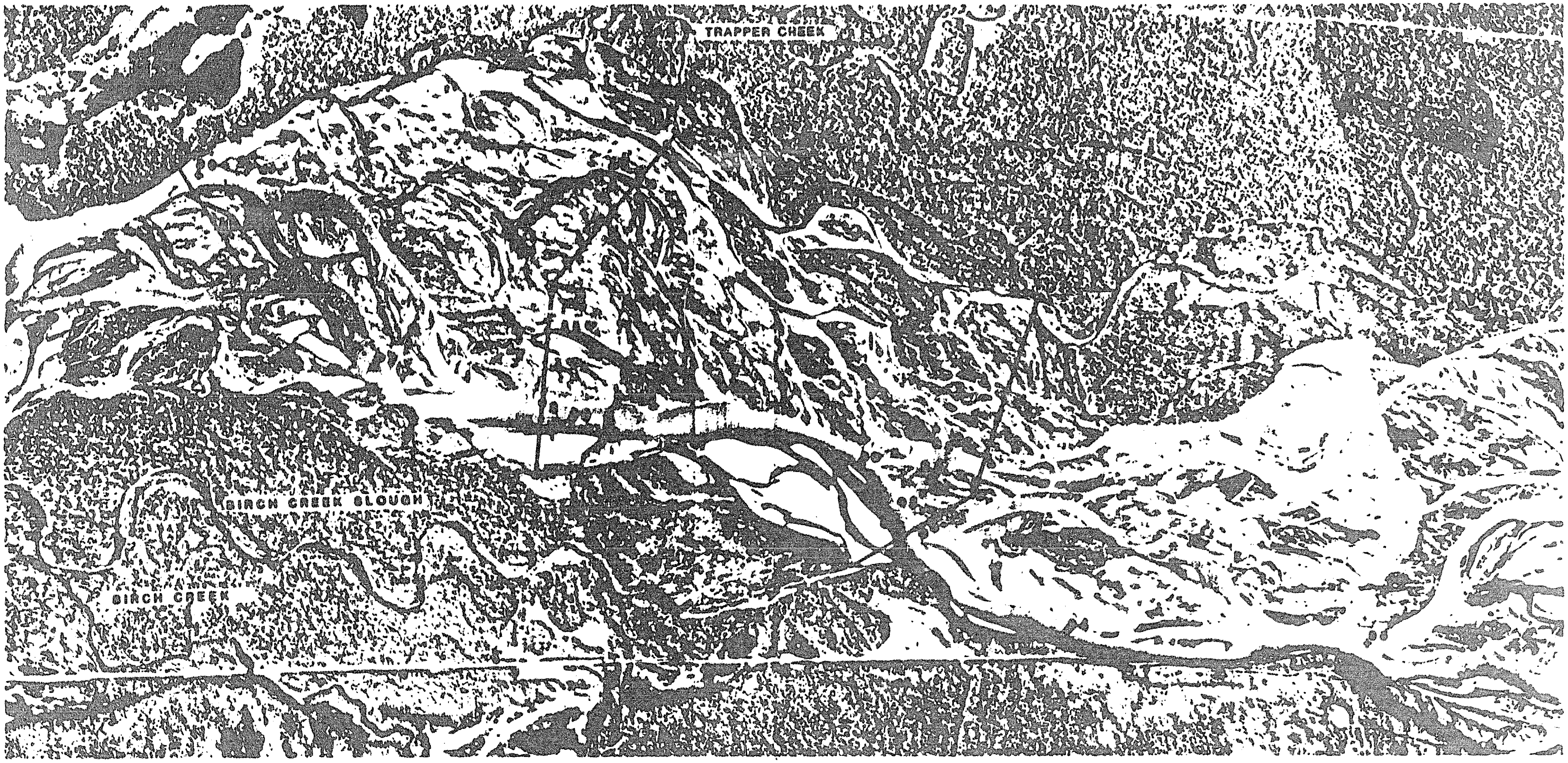
ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

LOWER SUSITNA RIVER

DATE OF PHOTOGRAPHY SEPT 16, 1983
SCALE 1" = 2000'
SHEET 2 OF 20
DATE 2-7-84

R&M CONSULTANTS INC.

HARZA-EBASCO
SUSITNA JOINT VENTURE



LEGEND

● LOCATION OF BED MATERIAL SAMPLE

△ LOCATION OF STAGE DISCHARGE MEASUREMENTS

LOWER SUSITNA RIVER
AGGRADATION STUDY,
LOCATION MAP OF CROSS-SECTIONS
OF THE LOWER SUSITNA RIVER
SEE TEXT FOR EXPLANATION OF
NUMBERING SYSTEM

FIGURE 2.1 2 OF 3

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

LOWER SUSITNA RIVER

DATE OF PHOTOGRAPHY SEPT 16, 1983
SCALE 1" = 2000'
SHEET 3 OF 30
DATE 2-7-84

R&M CONSULTANTS INC.

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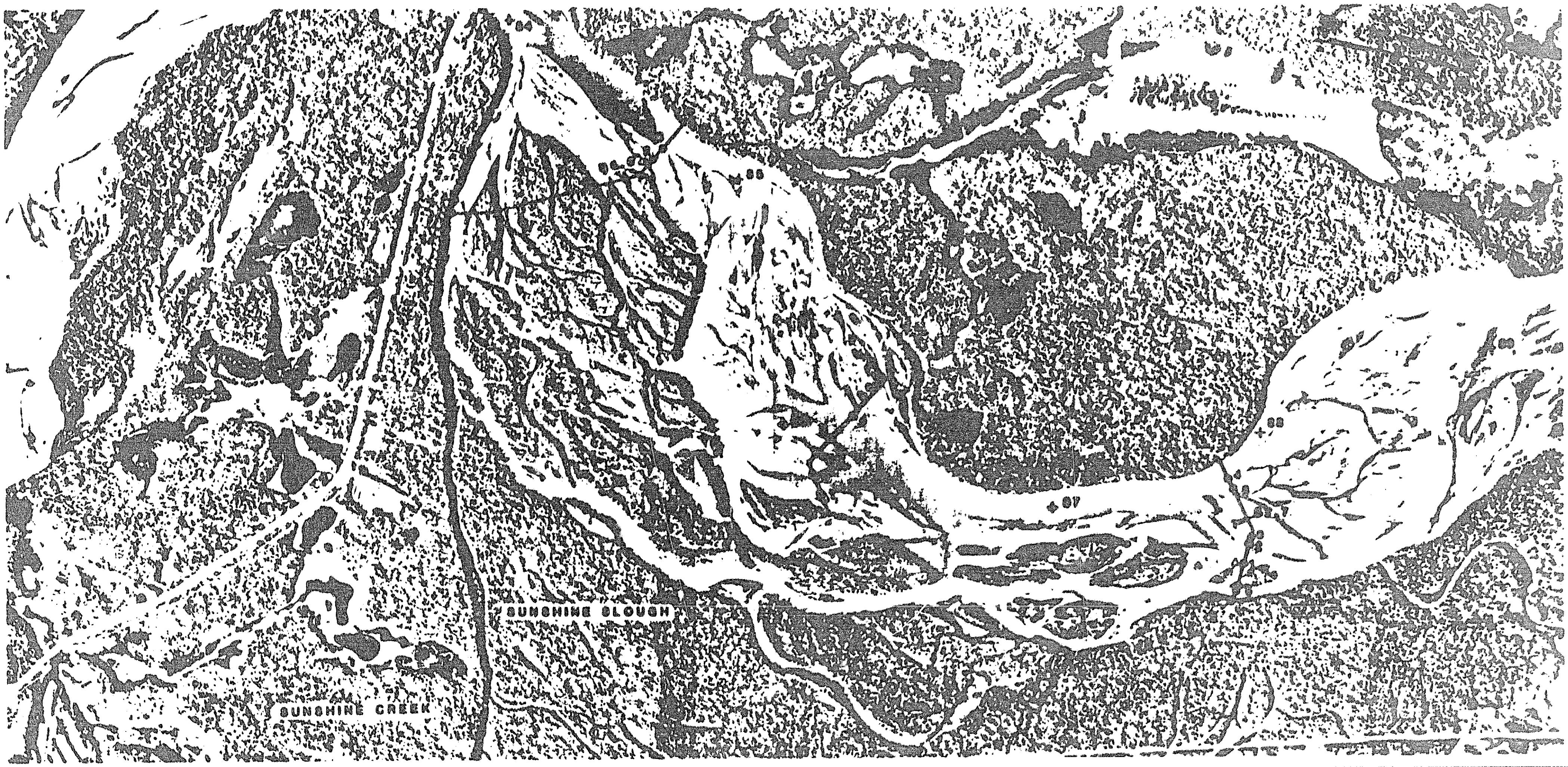
SUSITNA JOINT VENTURE



LEGEND

⊗ LOCATION OF BED MATERIAL SAMPLE

△ LOCATION OF STAGE DISCHARGE MEASUREMENTS

LOWER SUSITNA RIVER
AGGRADATION STUDY
LOCATION MAP OF CROSS-SECTIONS
OF THE LOWER SUSITNA RIVER
SEE TEXT FOR EXPLANATION OF
NUMBERING SYSTEM

FIGURE 2.1 3 OF 3

ALASKA POWER AUTHORITY
SUSITNA HYDROELECTRIC PROJECT

LOWER SUSITNA RIVER

DATE OF PHOTOGRAPHY SEPT 16, 1983
SCALE 1" = 2000'
SHEET 4 OF 28
DATE 2-7-84

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3.0 BED MATERIAL SAMPLING

3.1 Sampling Methods

Sample sites were initially selected on the September 16, 1983 aerial photography, with a discharge at Sunshine of 21,100 cfs, at or near eight cross-sections surveyed by R&M Consultants in 1984. These cross-sections are approximately at River Mile (RM) 97.1, 95.9, 93.1, 91.8, 90.6, 87.7, 86.3 and 84.6. Sample sites were selected across the river as well as down the river to determine the spatial variation in bed material particle size distribution. Sample sites were selected to be representative of the gravel bar or bank in the local area of the cross-section.

During sampling we flew along the cross-section twice at approximately 200 feet above the ground surface to confirm the sample site selection or to select new sites. At some cross-sections there were new channels which were formed this year and at other cross-sections the shapes of the bars had changed since the 1983 aerial photography. No samples were taken underwater due to freezing temperatures prior to and during the sampling period. We selected four to seven sample sites per cross-section, at the waters edge of each major channel, in dry channels, and on gravel bars to provide samples across the river. Each specific sampling site was selected after walking the area to ensure the representative nature of the sample site.

For some cross-section sites the representative location selected was not on the cross-section line, so the location nearest the line was selected. Test holes were dug if there was uncertainty of the representativeness of the area. Photographs of each sample site were taken from the ground and the air looking upstream at the site.

After an area was selected it was marked off, photographed and the material within the area collected for gradation analyses. For each cross-section one surface sample was taken of a well developed armor layer. The surface material was frozen due to freezing temperatures prior to and during the sampling period. A pry bar was used to loosen the surface material for collection. Depending on the sample location and the thickness of frozen surface material, bed material samples were taken from 0.4 feet to 2.0 feet below the bed surface.

At five of the seven armor layer sites the surface was frozen, precluding the measurement of the armor layer thickness and the embedment coefficient as described by Ettema (1984). For the two unfrozen armor layer samples, the armor layer thickness was sampled, but the embedment coefficient was not measured. The frozen armor layer samples are biased towards the larger particle sizes due to the sampling methods.

The particle size analyses were conducted in accordance with ASTM specification D-422. The sample weights ranged form 42 lbs. to 190 lbs. depending on particle sizes in the sample.

The discharge was 10,700 cfs at Sunshine during the bed material sampling (Table 3.1). Water surface elevations at selected cross-sections are presented in Table 3.2 and the location of water surface readings are shown in Figure 2.1. All discharges listed in Table 3.1 and 3.2 are provisional USGS data.

Table 3.1 Discharge of the Susitna River at Sunshine for dates of Survey and Bed Material Sampling

Date	Mean Daily Discharge (cfs)[1]
09/11/84	23,500
09/13/84	22,700
09/15/84	22,300
09/16/84	21,000
09/18/84	20,900
09/19/84	28,400
09/26/84	19,000
09/27/84	18,300
10/16/84	11,500
10/17/84	11,500
10/18/84	11,000

[1] All discharge values are provisional USGS records and are subject to revision.

TABLE 3.2 Stage-Discharge Measurements for Surveyed Cross-Sections on the Lower Susitna River, 1984

Water Surface Elevation (ft)

Date Discharge[2] (cfs)	6-14 67,800	7-28 77,700	8-15 46,000	8-27 79,700	9-5 25,400	9-11 23,500	9-16 20,400	10-3 18,400
River Mile[3]								
LRX 2 (98.0)	-	-	-	-	-	339.0	338.4	337.3
LRX 1 (97.1)	-	-	-	-	-	333.2	332.9	232.3
LRX 0.7 (95.9)	-	-	-	-	-	-	323.7	322.8
93.1	313.0	314.0	311.7	-	310.6	-	310.0	309.4
91.8	303.1	304.1	302.8	-	302.2	-	301.4	301.0
90.6	294.9	-	-	296.6	294.6	-	293.7	293.3
87.7	282.4	283.5	280.6	282.8	279.2	-	277.5	276.3
86.3	275.7	276.9	274.6	276.1	272.9	-	272.2	271.7
84.6	266.6	267.4	264.9	267.8	263.2	-	261.7	261.6

1. All water surface elevations are tied into mean sea level project.

2. Provisional mean daily discharge at the U.S.G.S. Sunshine streamgage (No. 15292780).

3. Location of stage reading are shown on Figure 2.1.

4. The water surface elevations for all the 1984 cross-sections surveyed in 1984 are listed in the survey notes, Appendix B.

3.2 Sample Site Descriptions

Sample descriptions are presented by river mile in downstream order. The sample locations are identified in Figure 2.1 and on the river cross-section profile plots. Generally the sampling started on the east bank and progressed to the west bank. Usually the armor layer sample has the highest sample number for the cross-section. For some cross-sections sample sites were skipped because of time constraints. For RM 90.6, 87.7 and 84.6 no west bank samples were taken because there was no place to land the helicopter. For each sample site there is a description of the site based on field observations and particle size analyses, and two photos showing the sample site from the ground and air. At the end of the description of each river mile section are the particle gradation curves and the river cross-sections showing the sample site locations. The river cross-sections are plotted looking downstream with the east bank on the left. The depths (feet) given in the sample descriptions were measured from the surface down into the sample hole. Armor layer samples are plotted together with the bed material sample taken below it or nearby. Tables with the results of particle size analyses and a description of the Unified Soil Classification System are included in Appendix A.

River Mile 97.1

Sample 1

The sample site was on the east bank of the east channel just downstream of the Susitna-Talkeetna confluence (Photo 3.1, 3.2 and Figure 3.1). The gravel was frozen from the surface to 0.4 feet, sampled from 0.5 feet to 1.6 feet and there was no water in the hole. The sand is coarser than at the west bank sites due to the influence of the bed material from the Talkeetna River. The sample is a well graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.2).

PHOTO 3.1
Looking upstream at Susitna-Talkeetna confluence Sample 1 RM97.1 is on the east bank of the east channel. The Susitna River enters from the left and the Talkeetna River enters from the right.

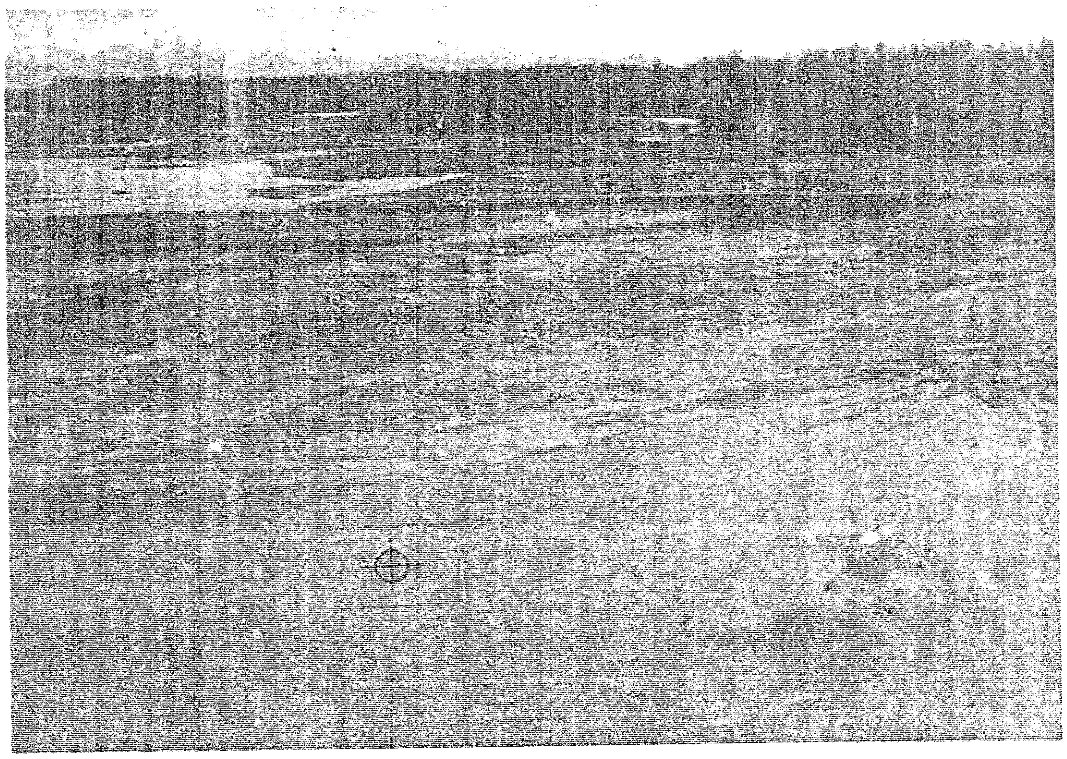

PHOTO 3.2
View looking upstream at Susitna-Talkeetna confluence. Sample 1, RM97.1 is located in the lower left corner of the photograph. The Susitna River enters from the left and the Talkeetna River enters from the right.

River Mile 97.1

Sample 2

The sample site was on the west bank of the east channel just downstream of the Susitna-Talkeetna confluence (Photo 3.3, 3.4 and Figure 3.1). The gravel was frozen from the surface to 0.4 feet, sampled from 0.5 feet to 1.4 feet and water was at 1.2 feet. The sand is finer than at sample 1, the influence of the bed material from the Talkeetna River is probably less. There was a well developed armor layer with coarse gravel and cobbles. Based on field observations the sample is representative of the armor layer minus the fines. This sample is a well graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.2).

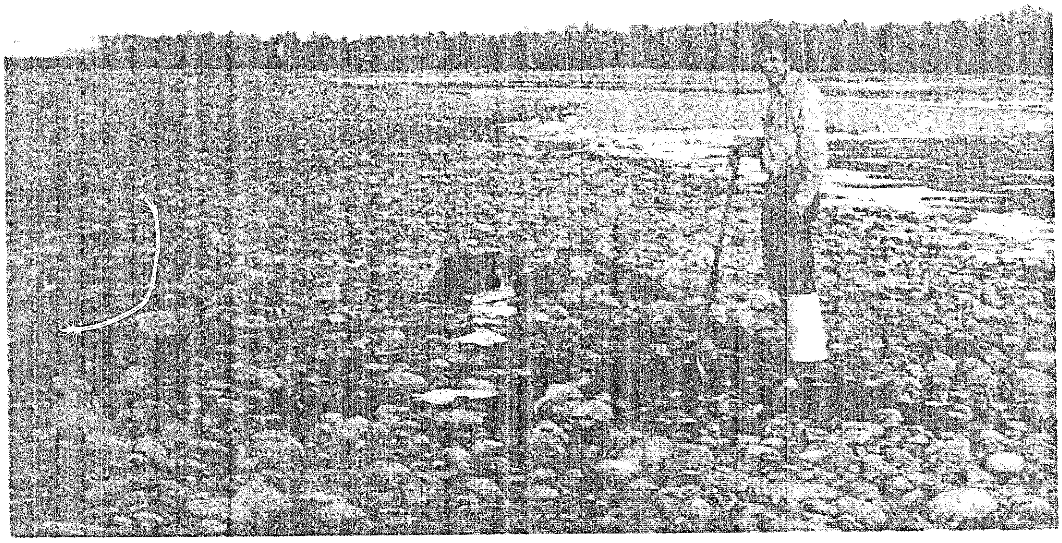

PHOTO 3.3
Looking up the Susitna River adjacent to the Susitna-Talkeetna confluence. Sample 2 RM 97.1 is located on the west bank of the east channel. Notice coarse surface material.

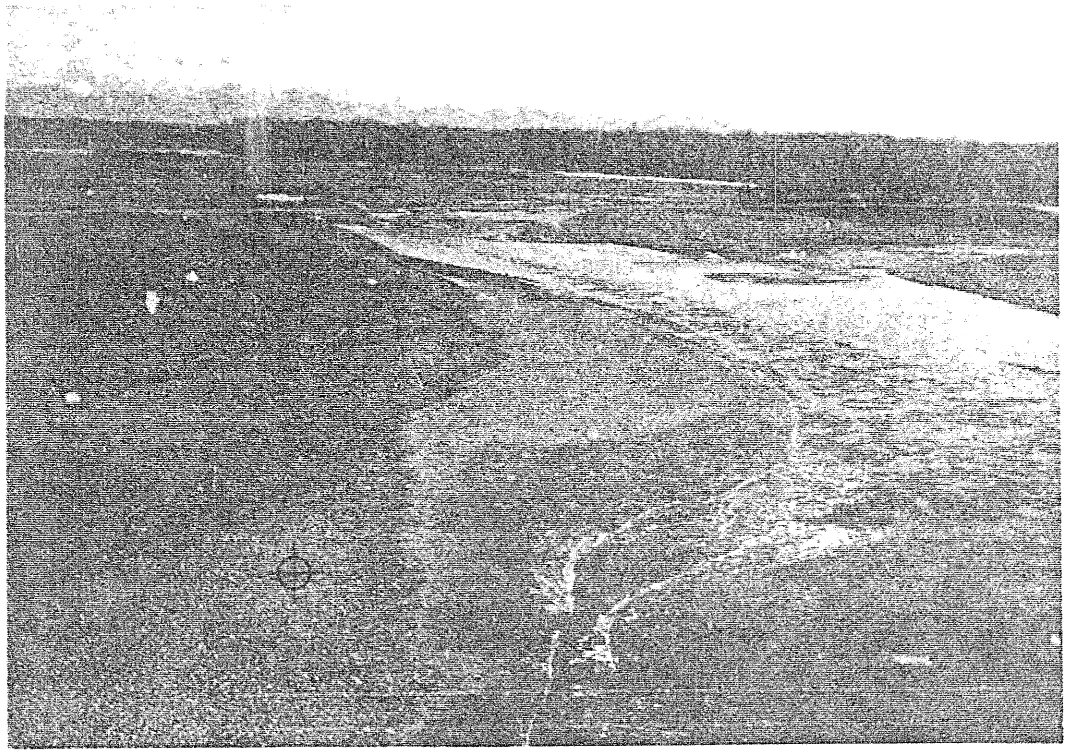

PHOTO 3.4
View looking upstream at Susitna-Talkeetna confluence. Sample 2, RM 97.1, is located in the lower left corner of photograph. The Susitna River enters from the left and the Talkeetna River enters from the right. The Chulitna-Susitna confluence is in the upper left of photograph.

River Mile 97.1

Sample 3

The sample site was in a high water channel near the middle of the river which has water at flows of 37,500 cfs at Sunshine and higher (Photo 3.5, 3.6 and Figure 3.1). The gravel was frozen from the surface to 0.4 feet, sampled from 0.4 feet to 1.4 feet and there was no water in the hole. There was a well developed armor layer. The sample is a poorly-graded gravel-sand mixture with few fines, is not representative of the armor layer but is representative of the local area (Figure 3.2).

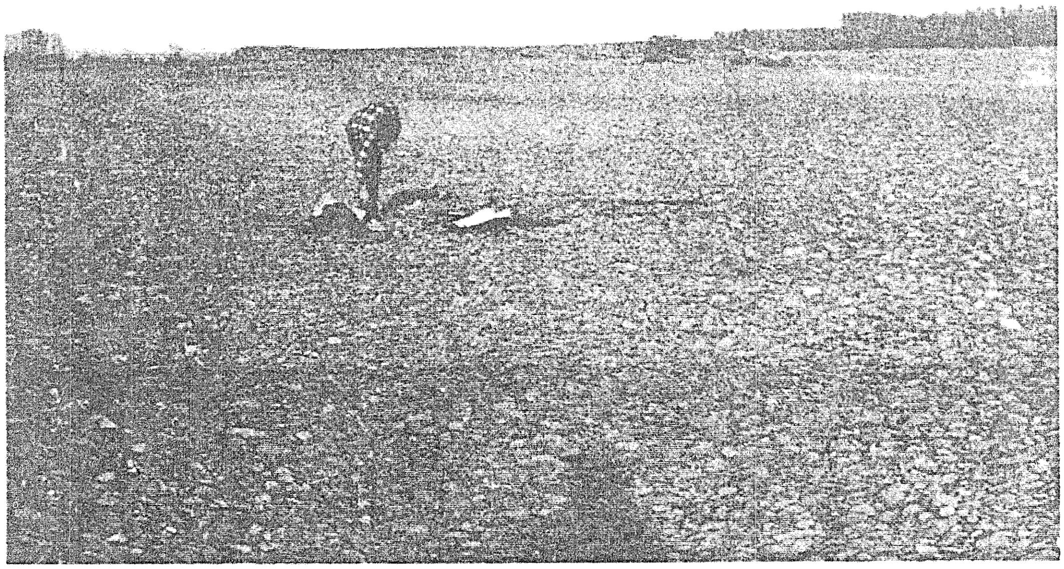

PHOTO 3.5
Looking upstream in a dry channel at Sample 3, RM 97.1. The channel has a well developed armor layer.

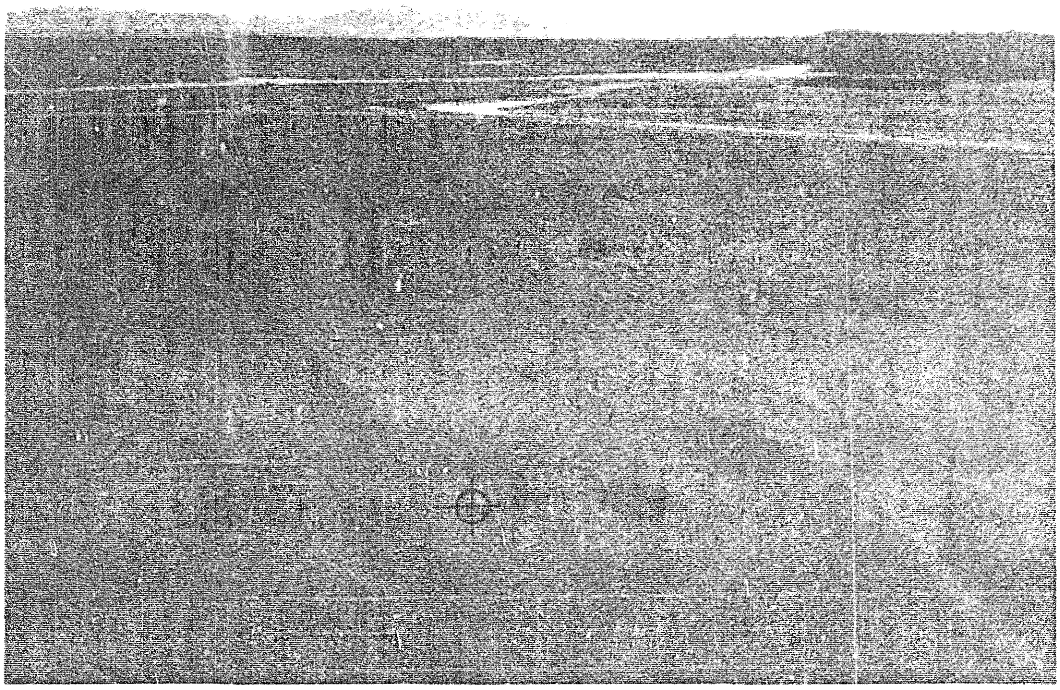

PHOTO 3.6
View looking up the dry channel. Sample 3, RM 97.1, is located in the lower middle of the photograph. The Chulitna-Susitna confluence is in the upper middle of photograph.

River Mile 97.1

Sample 4

The sample site was on the east bank of the west channel (Photo 3.7, 3.8 and Figure 3.1). The river bed was frozen from the surface to 0.4 feet, the sample was taken from 0.4 feet to 1.3 feet and there was water at 1.2 feet. There was a well developed armor layer Based on field observations the sample is representative of the armor layer minus the fines. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.3).

PHOTO 3.7
Looking up the west channel at Sample 4, RM 97.1, on the east bank. The bank has a well developed armor layer.

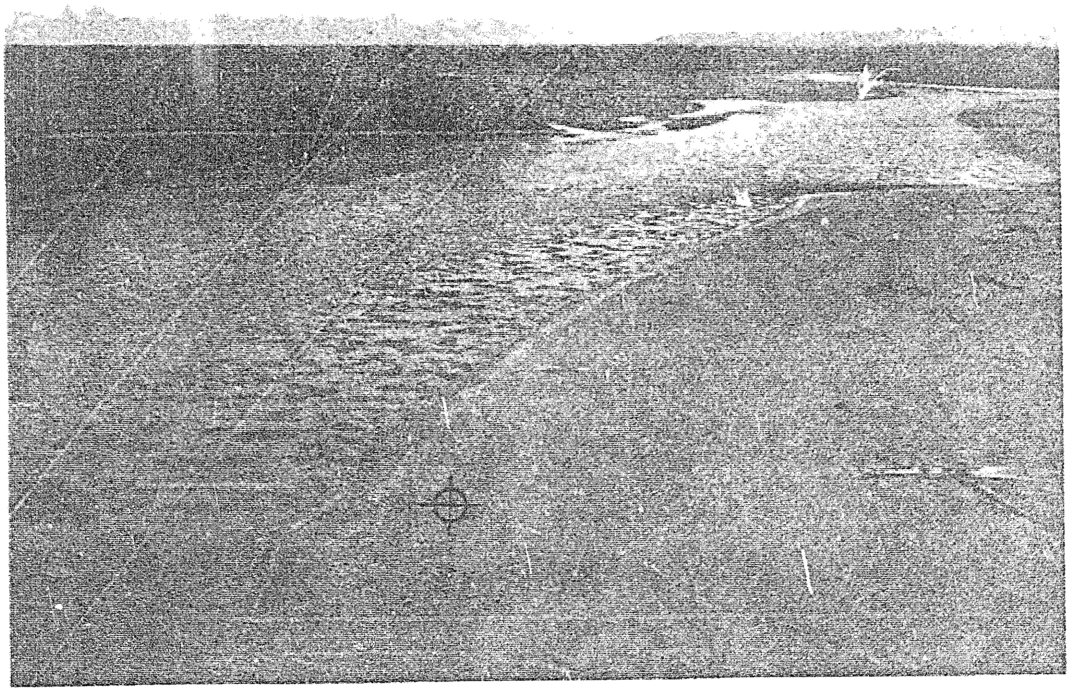

PHOTO 3.8
View looking up the west channel. Sample 4, RM 97.1, is located in the lower middle of the photograph. The armor layer sample, Sample 6, was collected 20 feet upstream of Sample 4.

River Mile 97.1

Sample 5

The sample site was on the west bank of the west channel (Photo 3.9, 3.10 and Figure 3.1). The bank material was frozen from the surface to 0.3 feet, sampled from 0.4 feet to 1.0 feet and water was at 1.0 feet. The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.3).

PHOTO 3.9
Looking upstream along the west bank of the west channel at Sample 5, RM 97.1.

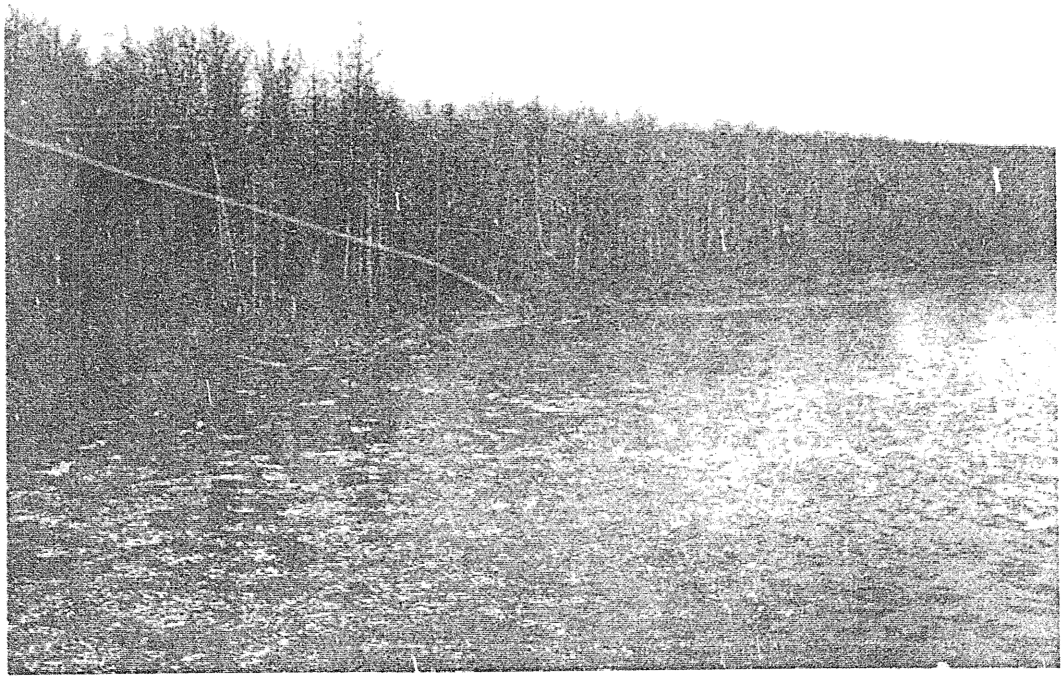

PHOTO 3.10
View looking at the west bank of the west channel. The flow is from right to left. Sample 5, RM 97.1, is located in the lower left corner of the photograph.

River Mile 97.1

Sample 6

The armor layer sample for this cross-section was collected near sample 4 on the east bank of the west channel (Photo 3.8, 3.11 and Figure 3.1). The gravel was frozen therefore some gravel was lost in chipping it free. Some frozen sand in the armor layer was collected. However the sample is biased because of the low amount of fines collected. The sample is a poorly-graded gravel and is representative of the local area (Figure 3.3).

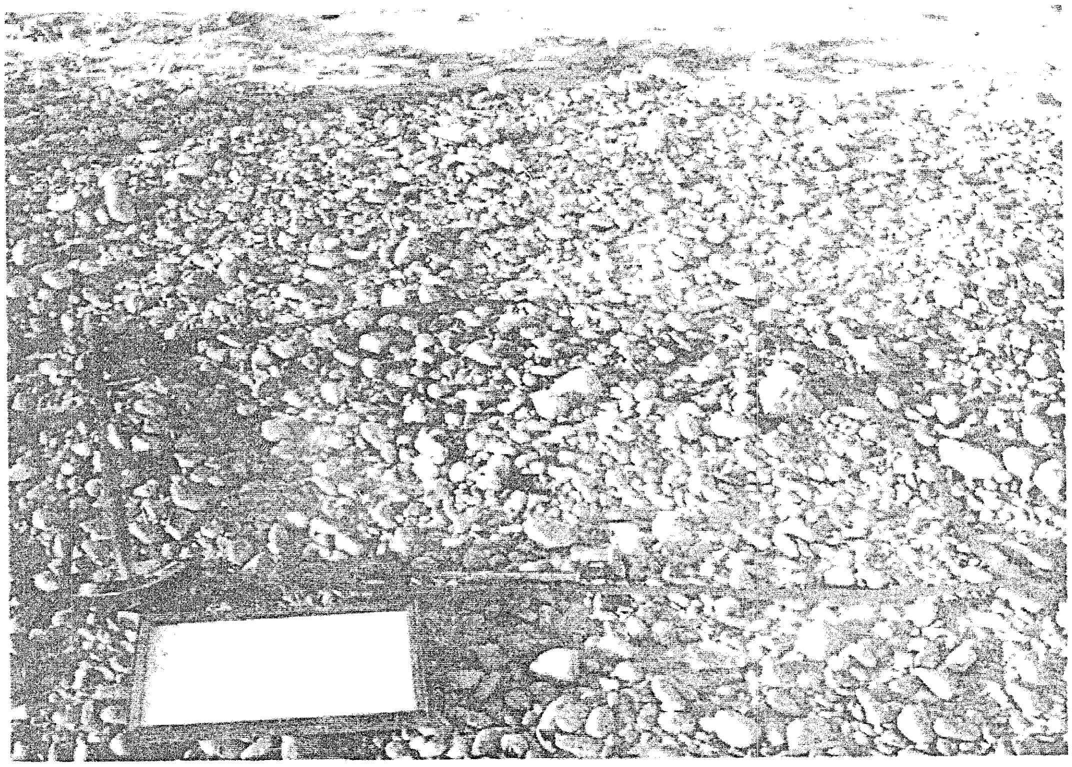

PHOTO 3.11

Sample 6, RM 97.1, armor layer. Flow is from right to left. Sample was taken from the area outlined.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 97.1

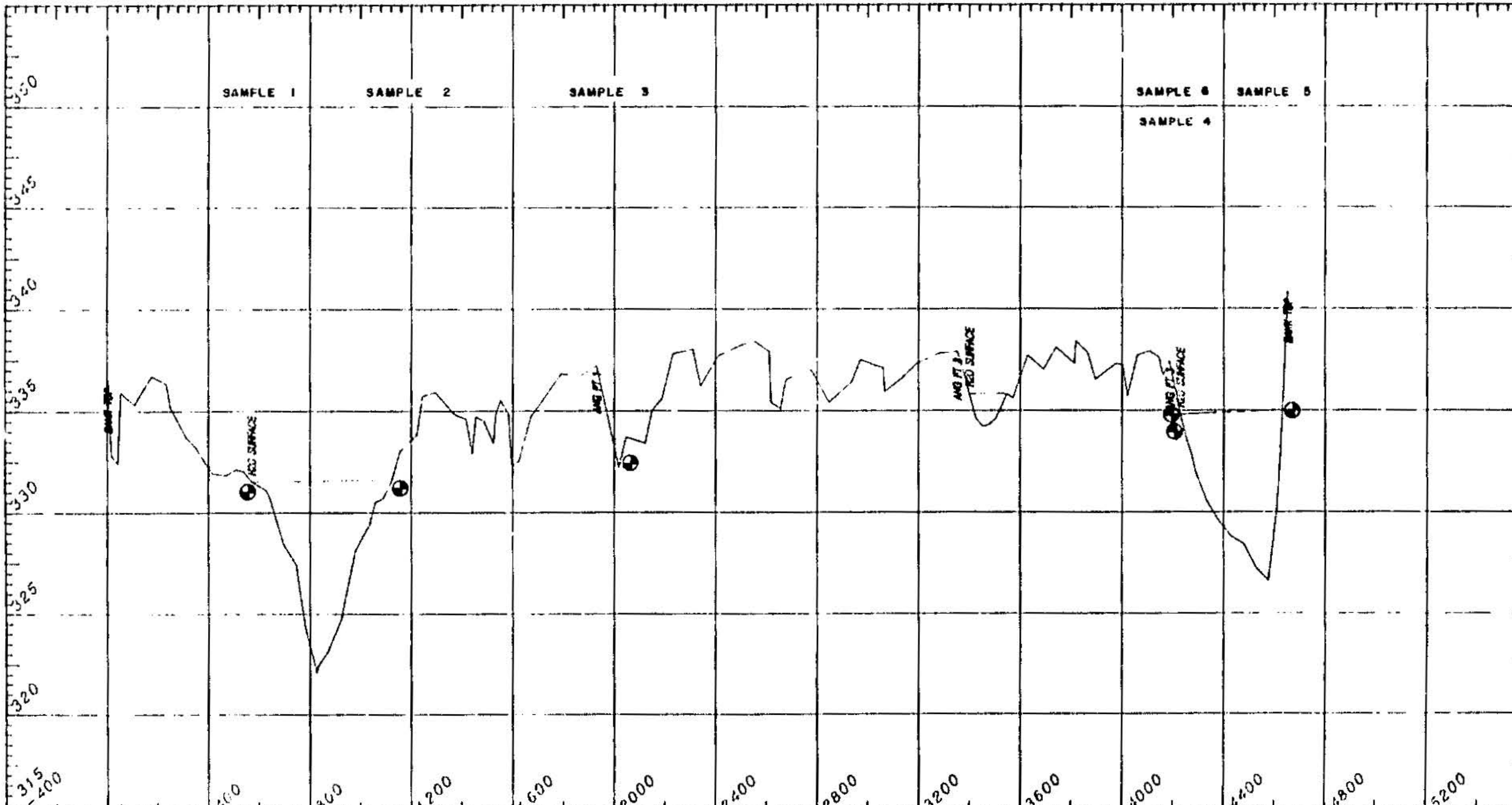

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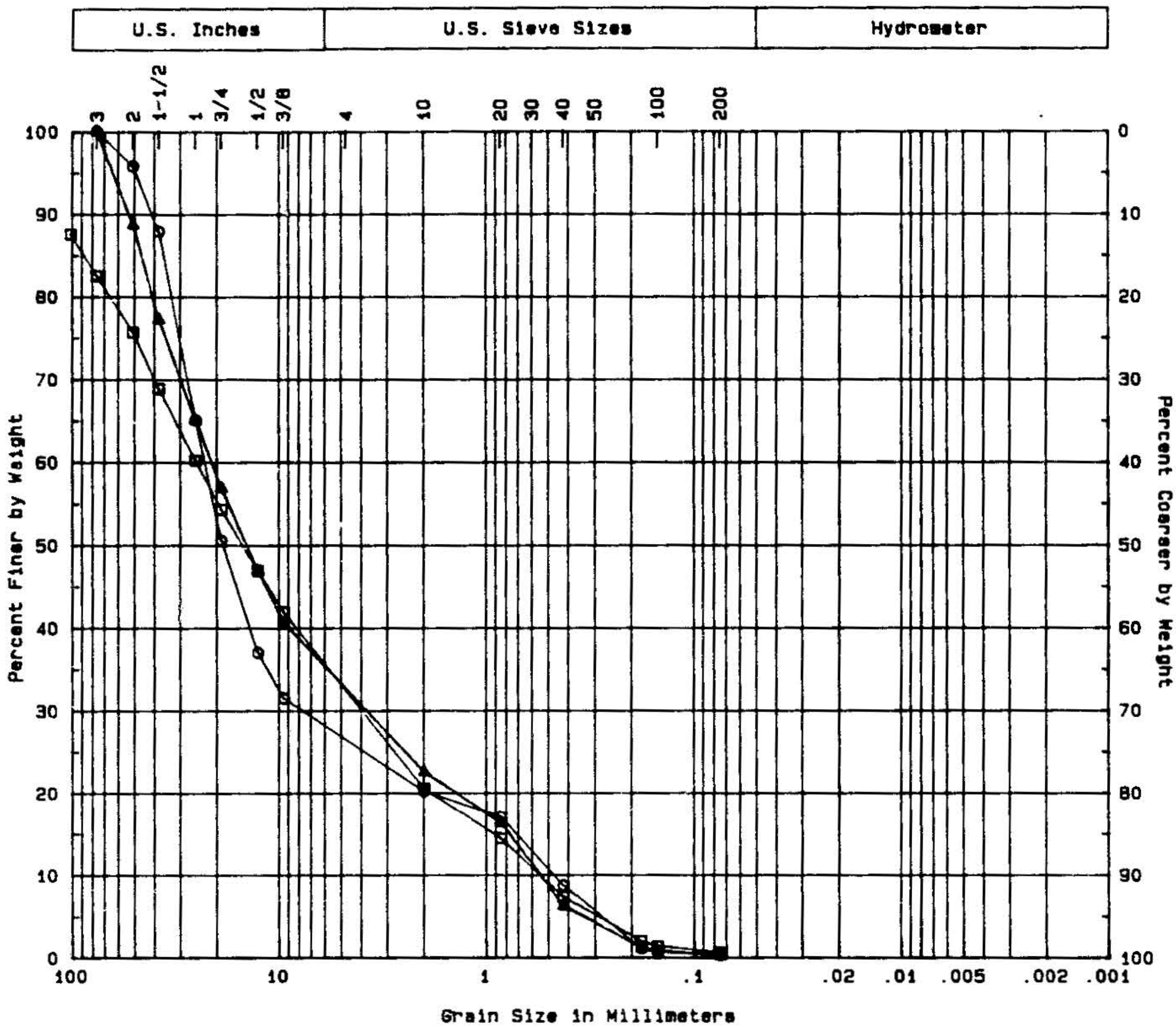
FIGURE 3.1

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR

HARZA-EBASCO

SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	97.1	1	.5-1.6	39	1.2				GW	
□	97.1	2	.5-1.4	46	1.2				GW	
○	97.1	3	.4-1.4	49	5.6				GP	

DWN
CKD
DATE 11-84
SCALE

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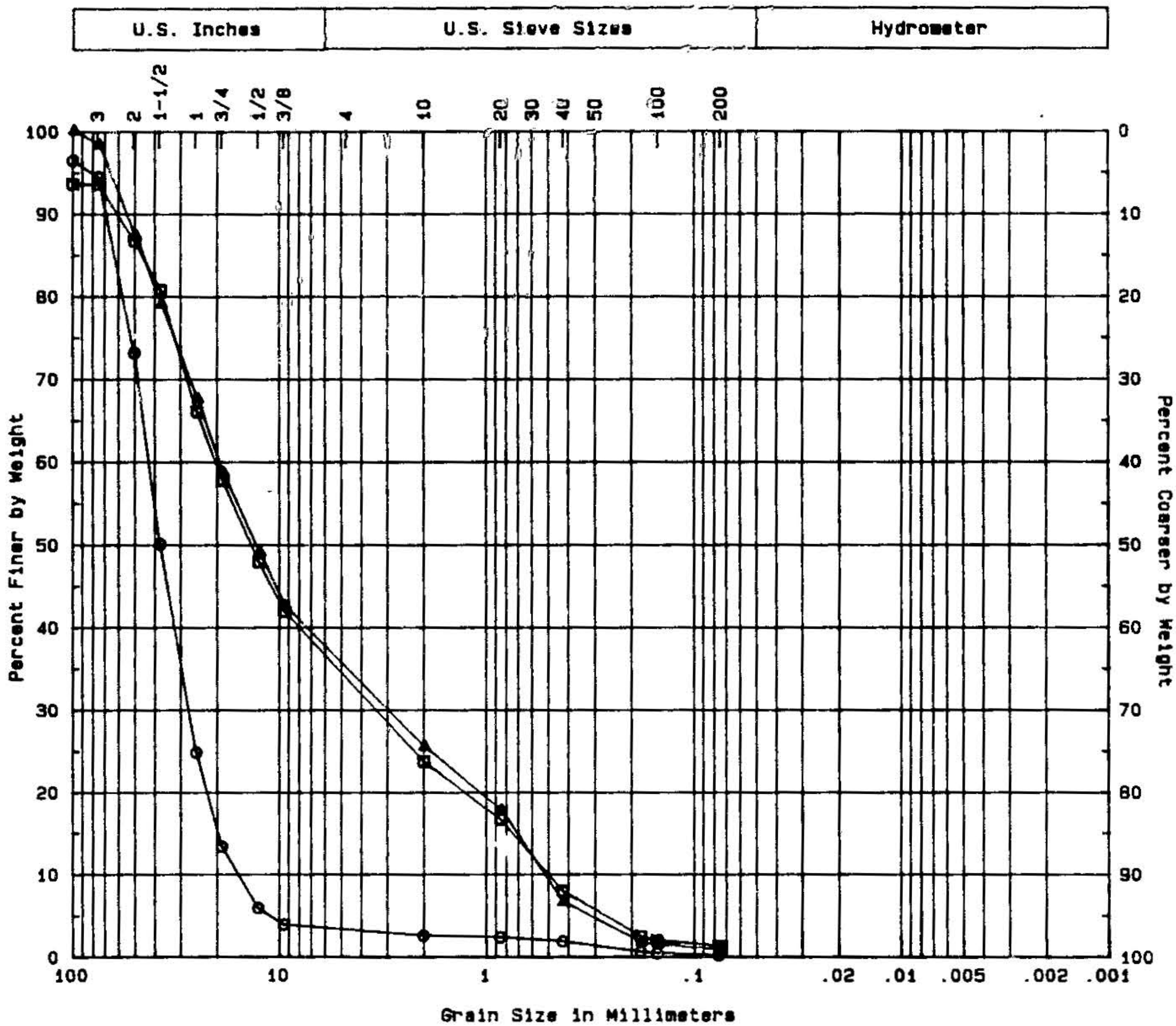
SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 97.1

FB.
GRID.
PROJ. NO.
DWG NO 3.2



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	97.1	4	.4-1.3	38	.9				GP	
□	97.1	5	.4-1	41	1.1				GW	
○	97.1	6	Armor	3	1.1				GP	

DWN
CKD
DATE 11-84
SCALE

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 97.1

FB
GRID
PROJ.NO
DWG NO 3.3

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River Mile 95.9

Sample 1

The sample site was on the west bank of the east channel (Photo 3.12, 3.13 and Figure 3.4). The gravel was frozen from the surface to 0.4 feet, sampled from 0.8 feet to 1.5 feet deep and water was 1.2 feet below the surface. The armor layer was well developed. Based on field observations the sample is representative of the armor layer minus the fines. The sand in this sample is coarse, similar to the sand in Sample 1 RM 97.1. The sample is a poorly-graded gravel-sand mixture with no fines and is representative of the local area (Figure 3.5).

River Mile 95.9

Sample 2

No sample was taken due to time constraints.

PHOTO 3.12
Looking upstream along the west bank of the east channel at Sample 1, RM 95.9.

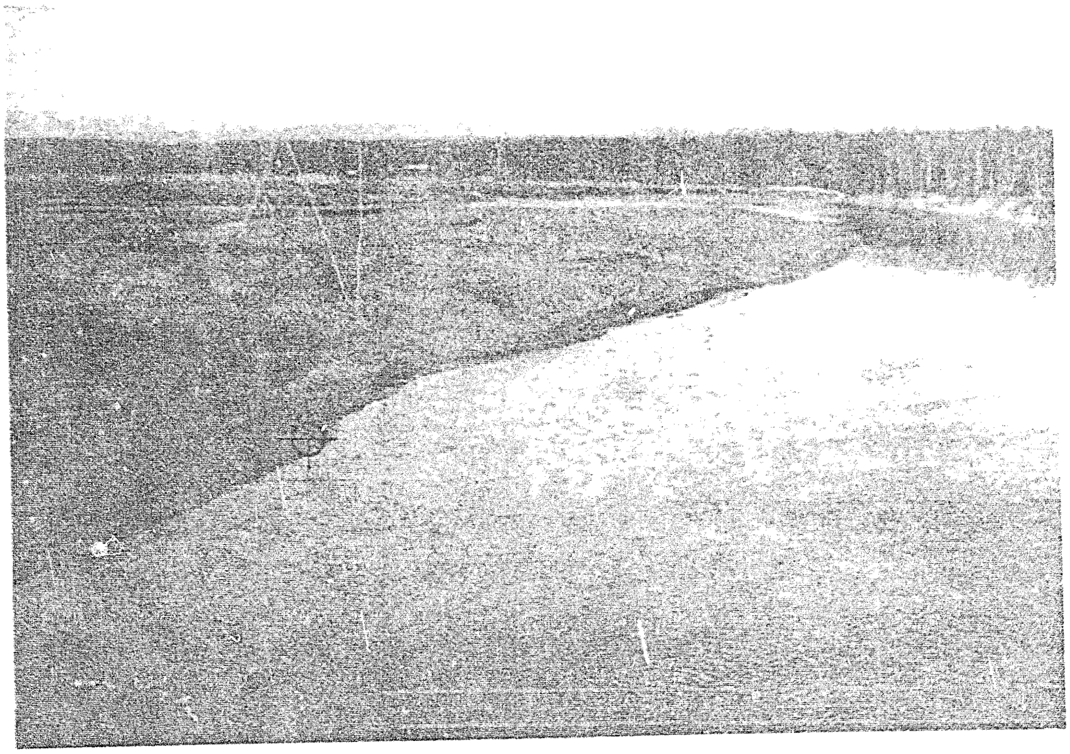


PHOTO 3.13
View looking upstream at Sample 1, RM 95.9, along the west bank of the east channel. Sample site is located in the lower left corner.

River Mile 95.9

Sample 3

The sample site was on the west bank of the main west channel (Photo 3.14, 3.15 and Figure 3.4). The gravel was frozen from the surface to 0.4 feet, the sample was taken from 0.6 to 1.5 feet and there was no water in the hole. Based on field observations the sample is representative of the armor layer minus the fines. The surface in the area was well armored (Photo 3.14). The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.6).

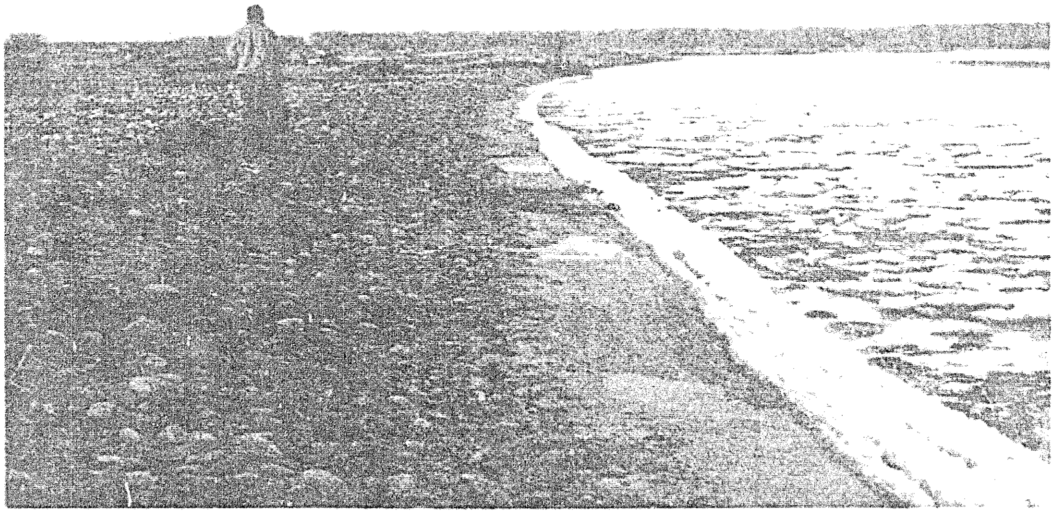


PHOTO 3.14

Looking upstream along west bank of main west channel at Sample 3, RM 95.9. The surface has a well developed armor layer. Sample site is located on the right side of the person.

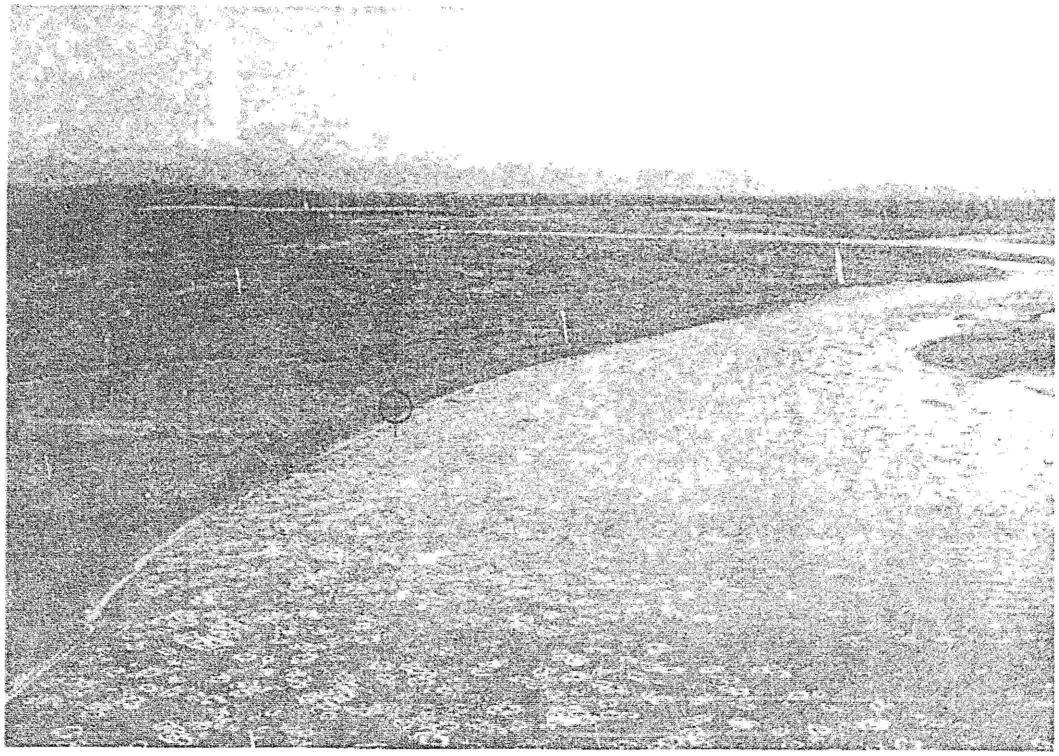


PHOTO 3.15

View looking upstream along the west bank of main west channel. Sample 3, RM 95.9, is located in the left center of the photograph. The Chulitna-Susitna confluence is the top middle of photograph.

River Mile 95.9

Sample 4

The sample site was on the east bank of an island in a minor east channel (Photo 3.16, 3.17 and Figure 3.4). The material was frozen from the surface to 0.3 feet, the sample was taken from 0.4 feet to 1.4 feet and water was at 1.3 feet. The armor layer was moderately developed (Photo 3.16). The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.5).

PHOTO 3.16

Looking upstream along east bank of island in minor east channel at Sample 4, RM 95.9. The surface has a moderately developed armor layer. The sample site is located on the left side of the person.

PHOTO 3.17

Aerial photo looking upstream, Sample 4, RM 95.9 is located in left center of photograph and Sample 7, RM 95.9 is located in middle center.

River Mile 95.9

Sample 5

The sample site was on the east bank of a minor west channel (Photo 3.18, 3.19 and Figure 3.4). The gravelly sand was frozen from the surface to 0.2 feet. The sample was taken from 1.4 feet to 2.5 feet. This is a depositional area consisting mainly of sands and fine gravel. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.6).

PHOTO 3.18
Looking upstream along east bank of a minor west channel at Sample 5. RM 95.9. This is a depositional area.

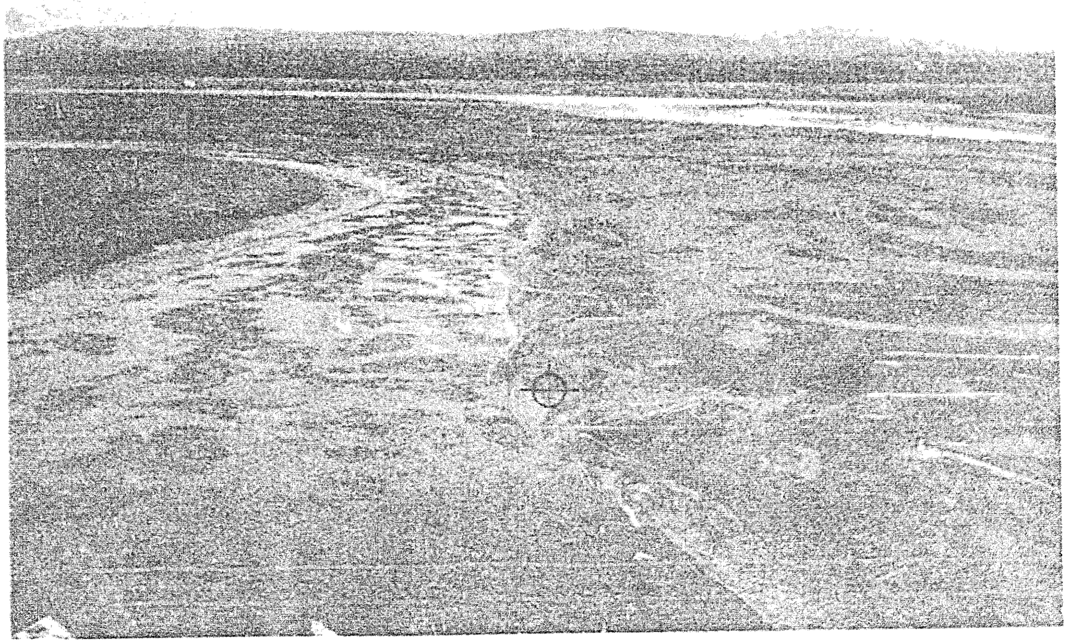


PHOTO 3.19
View looking upstream at Sample 5, RM 95.9, along the east bank of minor west channel. Sample site is located in the middle center of photograph.

River Mile 95.9

Sample 6

The area sampled was on the west bank of a minor west channel (Photo 3.20, 3.21 and Figure 3.4). The gravel was frozen from the surface to 0.3 feet, sampled from 0.7 feet to 1.5 feet, and there was no water in the hole. The surface area was armored (Photo 3.20). The sample is a well graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.6).

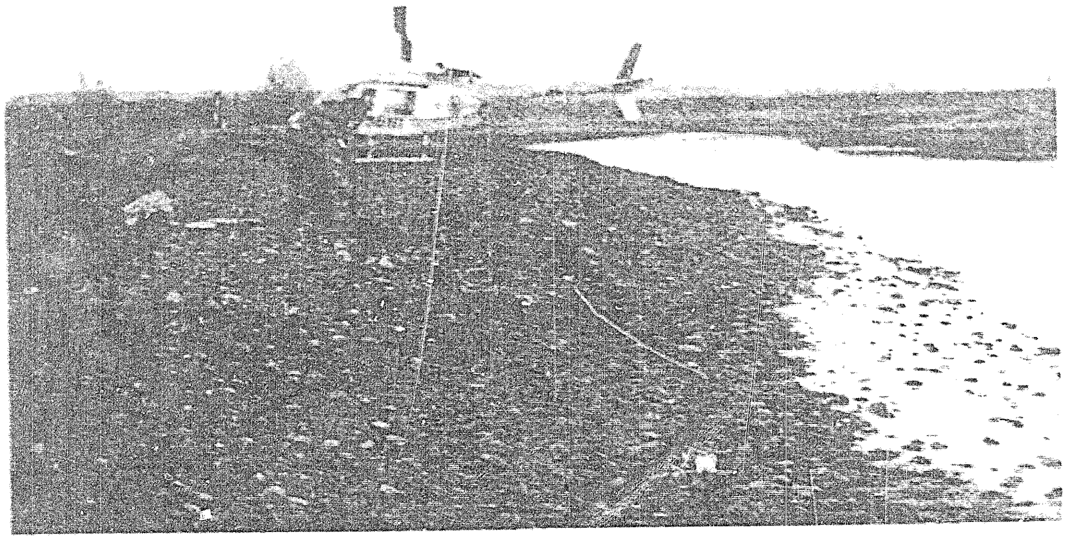


PHOTO 3.20
Looking upstream along west bank of a minor west channel at Sample 6, RM 95.9.

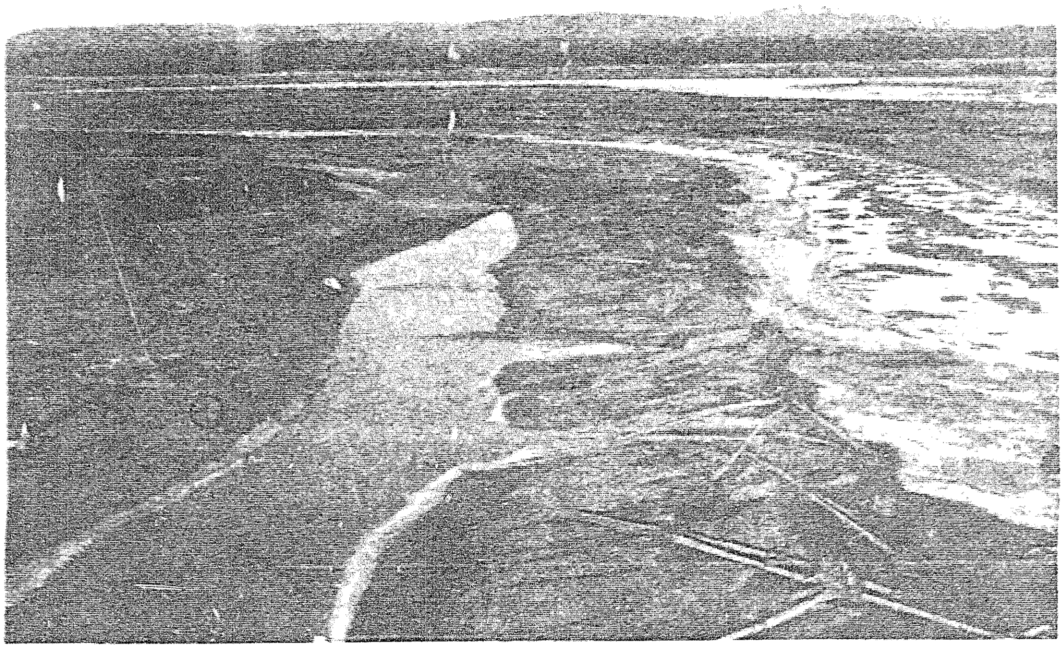


PHOTO 3.21
View looking upstream at Sample 6, RM 95.9, along west bank of a minor west channel. Sample site is in lower left of photograph.

River Mile 95.9

Sample 7

Collected the armor layer sample near sample 4 on an island in a minor east channel (Photo 3.17, 3.22 and Figure 3.4). The surface was frozen, therefore some gravel was lost in chipping it free. The sample is biased because of the low amount of fines collected. The sample is a well-graded gravel with few sands and no fines and is representative of the armor layer in this area (Figure 3.5). Based on field observations sample 4, minus the fines, appeared representative of the armor layer.

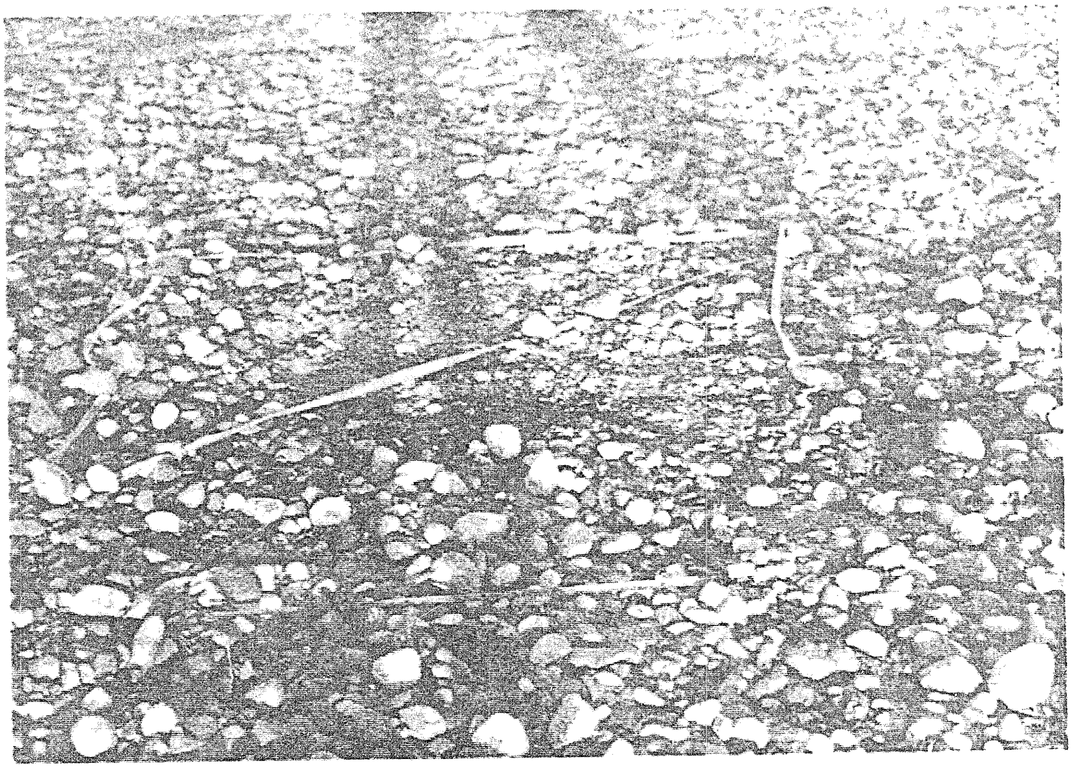
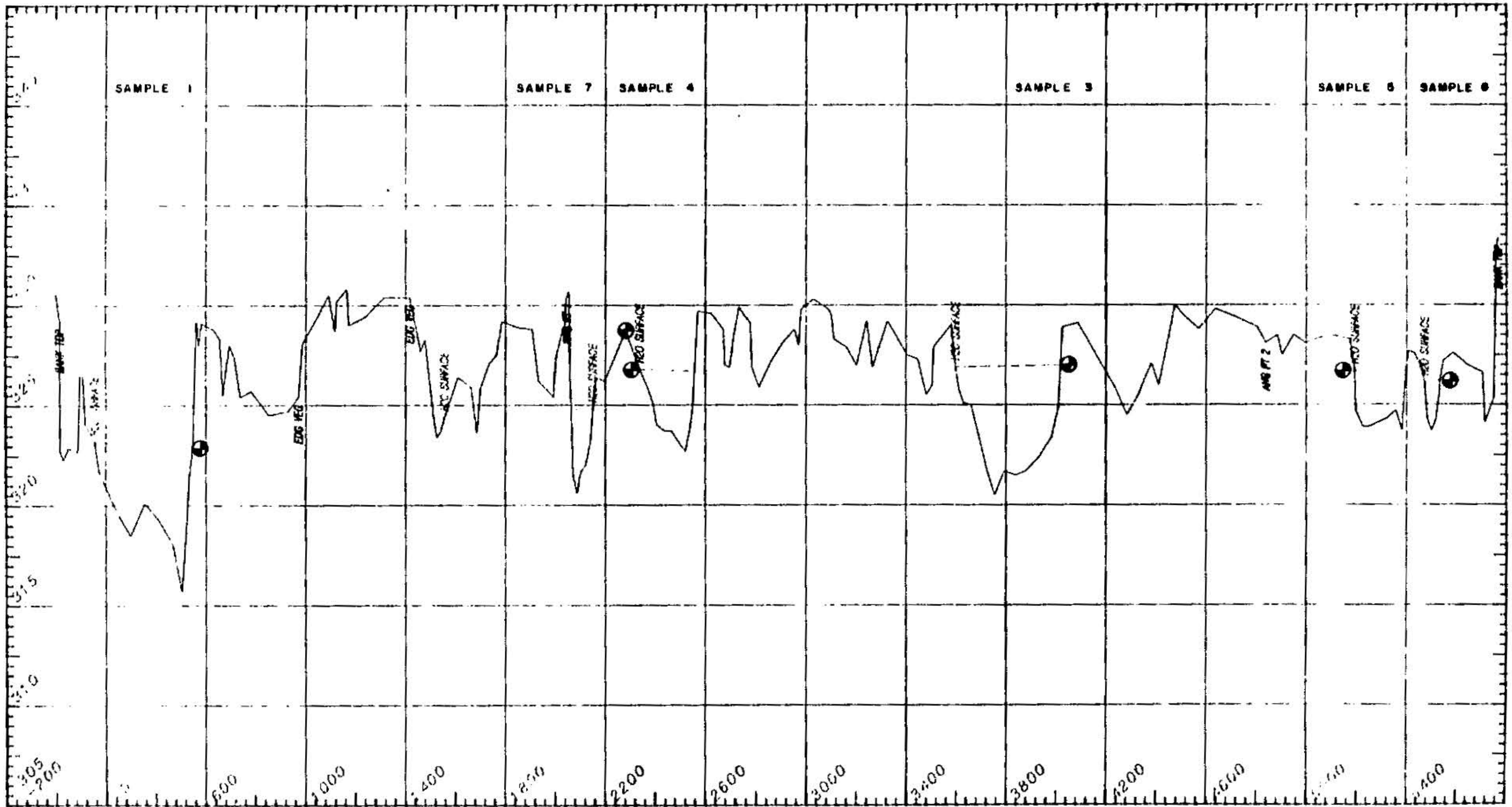


PHOTO 3.22

Armor layer, Sample 7, RM 95.9. Flow is from left to right. Flagging delineates sample area. Photograph taken after sampling because of low light levels during sampling.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 95.9



PREPARED BY

R&M CONSULTANTS, INC.

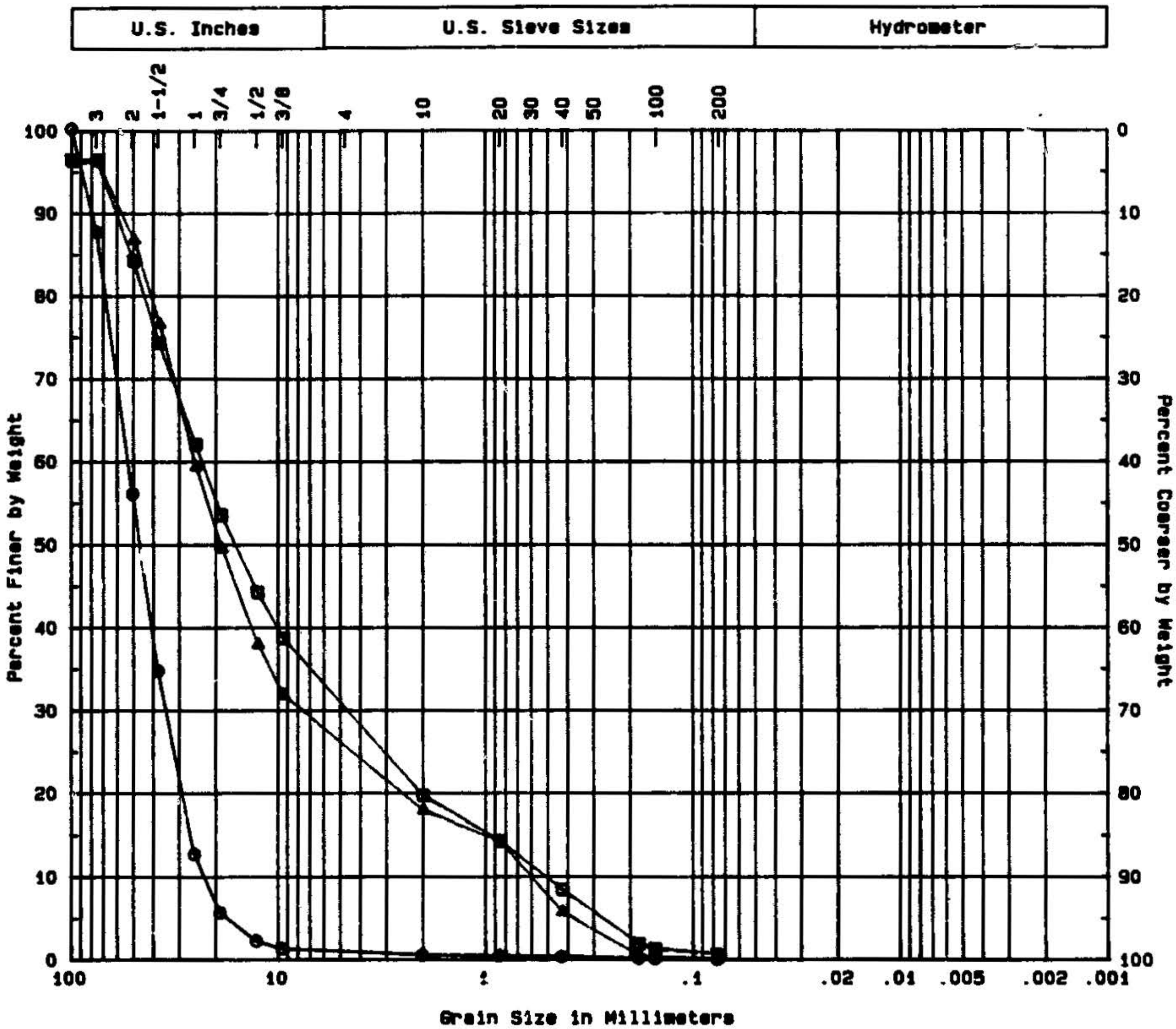
FIGURE 3.4

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR

HARZA-EBASCO

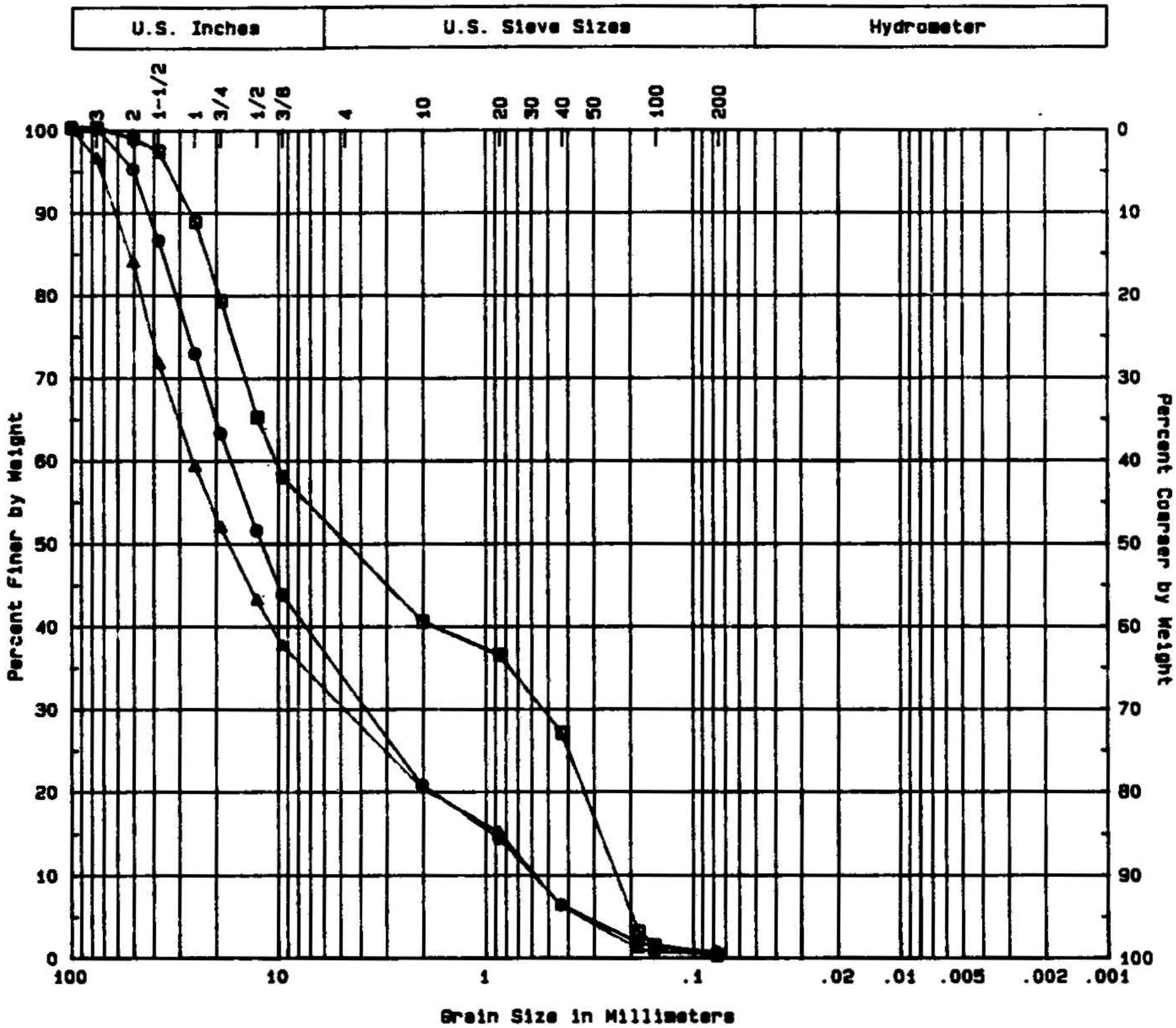
SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	95.9	1	.8-1.5	43	3.9				GP	
◻	95.9	4	.5-1.2	47	1.8				GW	
○	95.9	7	Armor	2	1				GP	

DWN. CKD. DATE. 11-84 SCALE	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY RIVER MILE 95.9	F.B. GRID. PROJ. NO. DWG. NO. 3.5



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	95.9	3	.6-1.5	46	1.6				GW	
□	95.9	5	1.4-2.5	45	.1				GP	
○	95.9	6	.7-1.5	30	1.4				GW	

DWN.
CKD.
DATE 11-84
SCALE

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 95.9

F.B.
GRID.
PROJ. NO.
DWG. NO. 3.6

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River Mile 93.1

Sample 1

The sample site was on the east bank of the east channel (Photo 3.23, 3.24 and Figure 3.7). The site was frozen from the surface to 0.3 feet, was frozen, the area sampled was from 0.5 feet to 1.5 feet and there was no water in the hole. There was a well developed armor layer (Photo 3.23). The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.8).

PHOTO 3.23
Looking upstream along east bank of east channel. Sample 1, RM 93.1, is located in the lower left corner of the photograph.

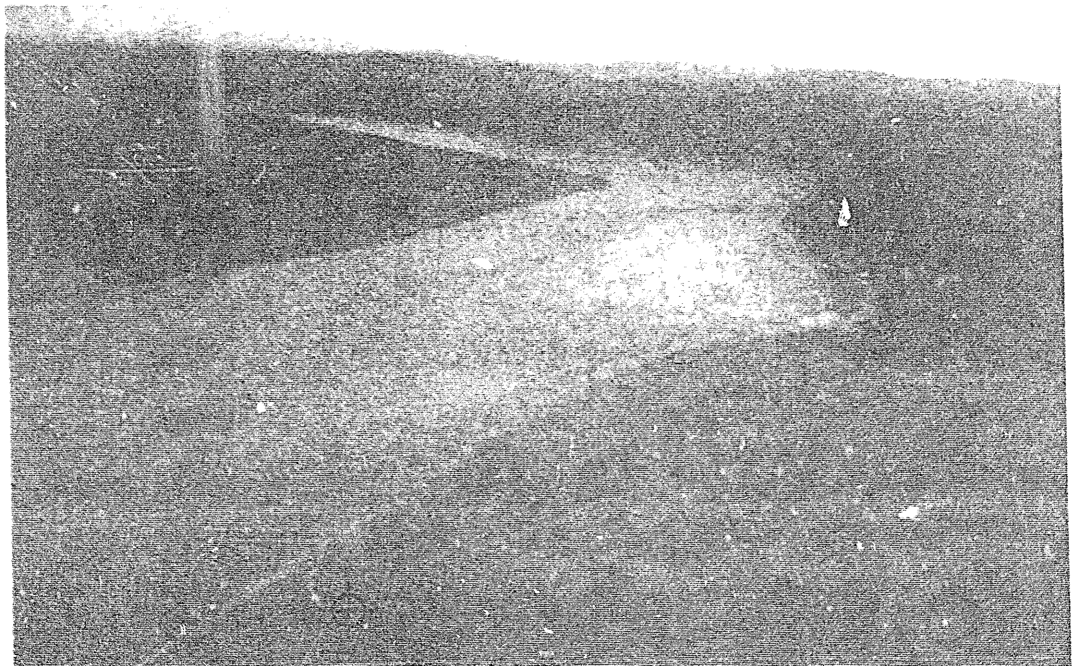


PHOTO 3.24
Aerial view looking upstream along east bank of east channel. Sampl ., RM 93.1, is located in the lower left corner of the photograph.

River Mile 93.1

Sample 2

The sample site was on the west bank of the east channel (Photo 3.25, 3.26 and Figure 3.7). The digging was easy because the surface material was not frozen. The sample was taken 1.0 feet to 1.5 feet below the surface at the middle of the hole, with water at 1.5 feet. Several test pits dug in the area indicated that this site was representative of the local area. The sample is a poorly-graded gravelly sand with no fines (Figure 3.8).

PHOTO 3.25
Looking upstream along west bank of east channel at Sample 2, RM 93.1. Height from water surface to top of gravel bar is four feet.

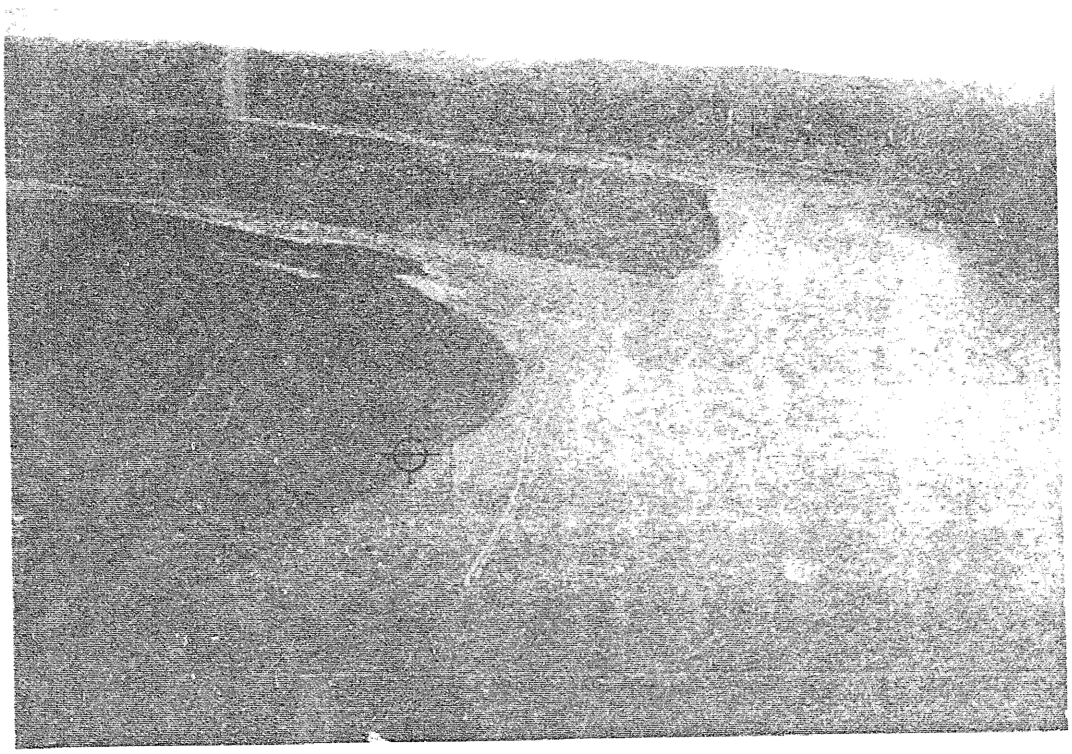


PHOTO 3.26
View looking upstream along west bank of east channel. Sample 2, RM 93.1, is located in the left center of the photograph.

River Mile 93.1

Sample 3

Collected the armor layer sample 70 feet east of Sample 4, on the east bank of the west channel (Photo 3.27, 3.28, and Figure 3.7). This sample is representative of the armor layer and is not bias towards the larger sizes, as the surface layer was not frozen during sampling. The sample is a well-graded gravel with sand and a few fines (Figure 3.9).

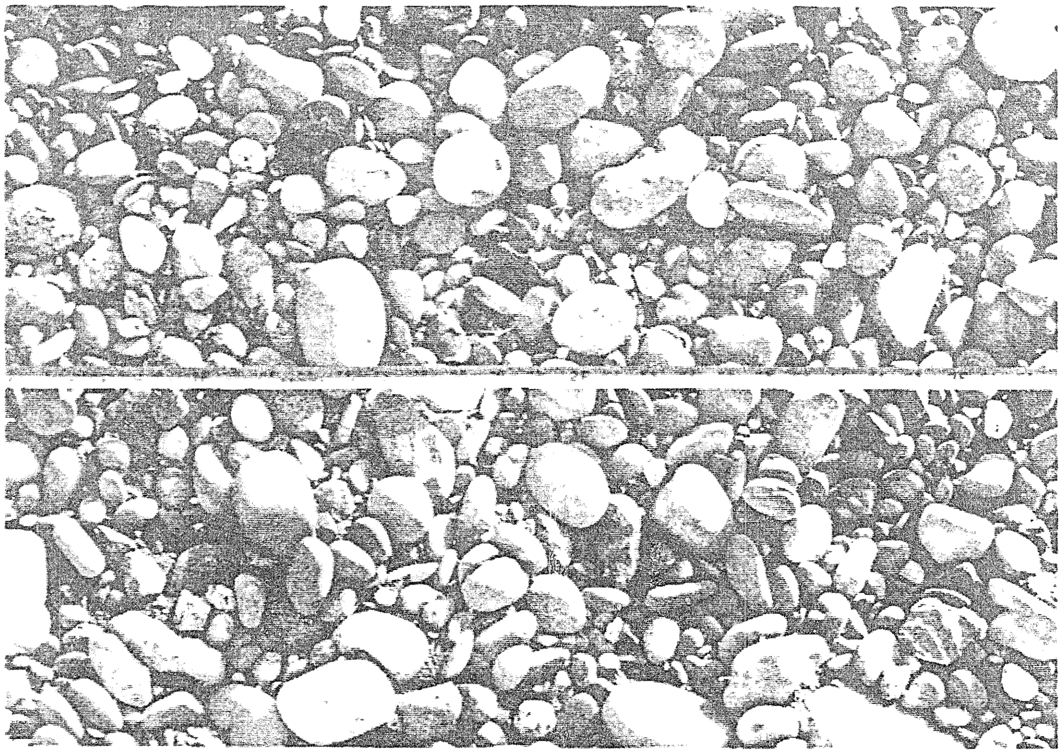


PHOTO 3.27
Armor layer Sample 3, RM 93.1. Notice larger gravel on the surface with few fines around them. The direction of flow is from the bottom to the top.

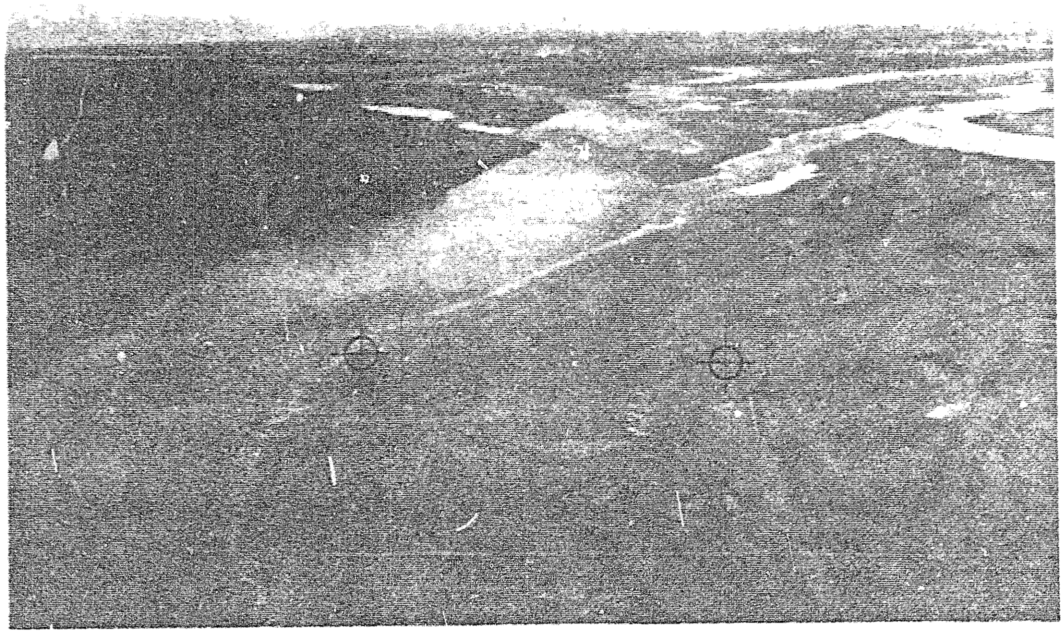


PHOTO 3.28
Looking upstream along the east bank of the west channel. Sample 3, RM 93.1, is located in the middle center of the photograph and Sample 4 is located to the left of Sample 3.

River Mile 93.1

Sample 4

The sample site was on the east bank of the west channel (Photo 3.28, 3.29 and Figure 3.7). The surface material was thawed, the sample was taken from 0.4 feet to 1.3 feet and water was at 1.3 feet. The area was well armored. The sample is a well-graded gravel-sand mixture with few fines (Figure 3.9), and is representative of the local area.

PHOTO 3.29
Looking upstream along the east bank of west channel at Sample 4, RM 93.1.

River Mile 93.1

Sample 5

The sample site was on the west bank of the west channel (Photo 3.30, 3.31 and Figure 3.7). The surface material was not frozen, the sample was taken from 0.5 feet to 1.2 feet and there was no water in the hole. The area was well armored, and the sample was representative of the local area. The sample is a poorly-graded gravel-sand mixture with few fines (Figure 3.9).

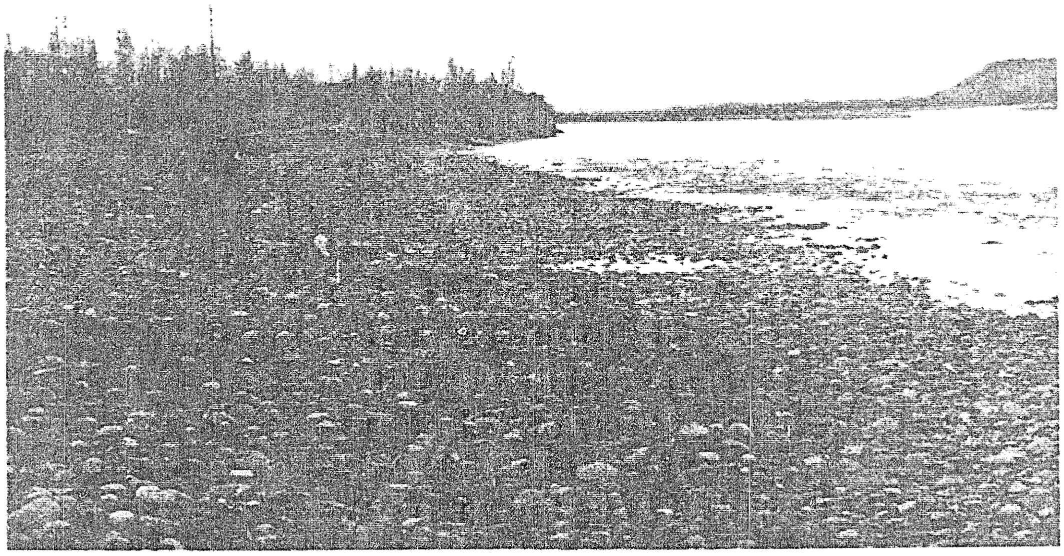


PHOTO 3.30
Looking upstream along the west bank of the west channel at Sample 5, RM 93.1.

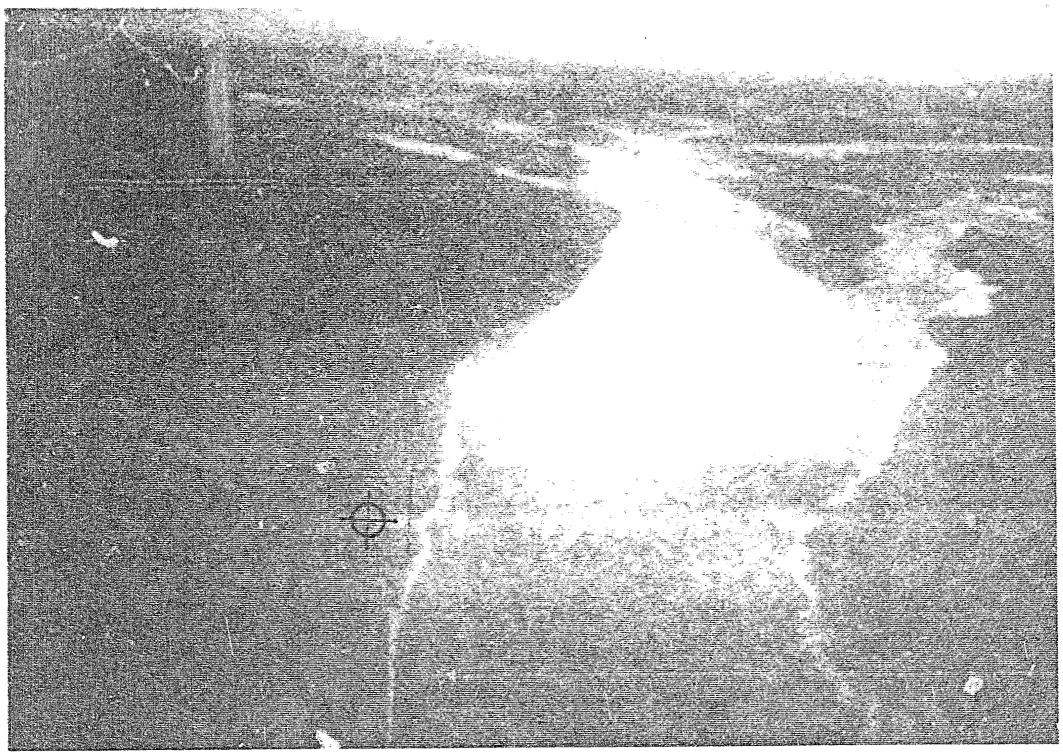
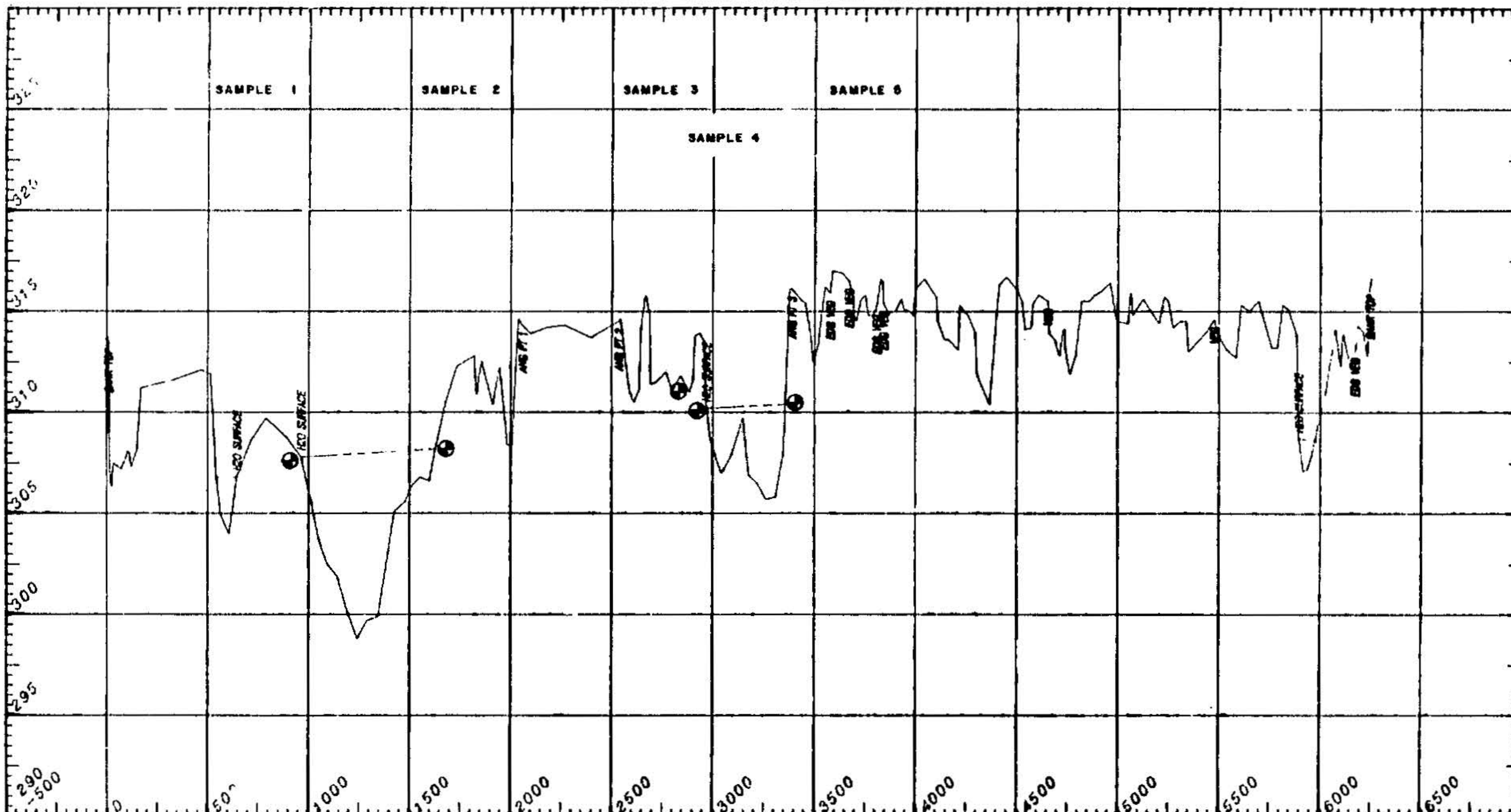


PHOTO 3.31
Looking upstream along the west bank of the west channel. Sample 5, RM 93.1, is located in left middle of the photograph.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 93.1



PREPARED BY

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

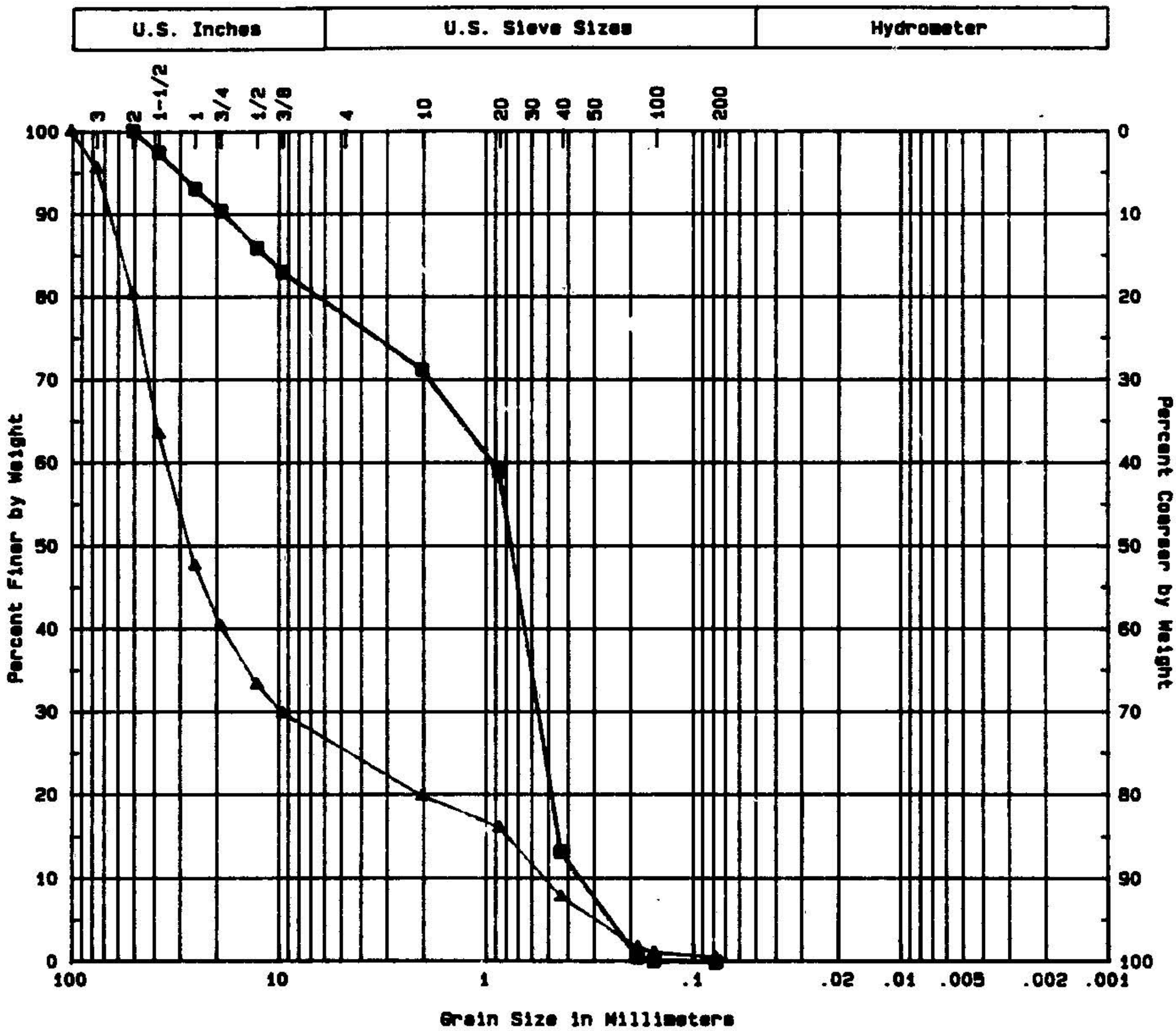
FIGURE 3.7

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR:

HARZA-EBASCO

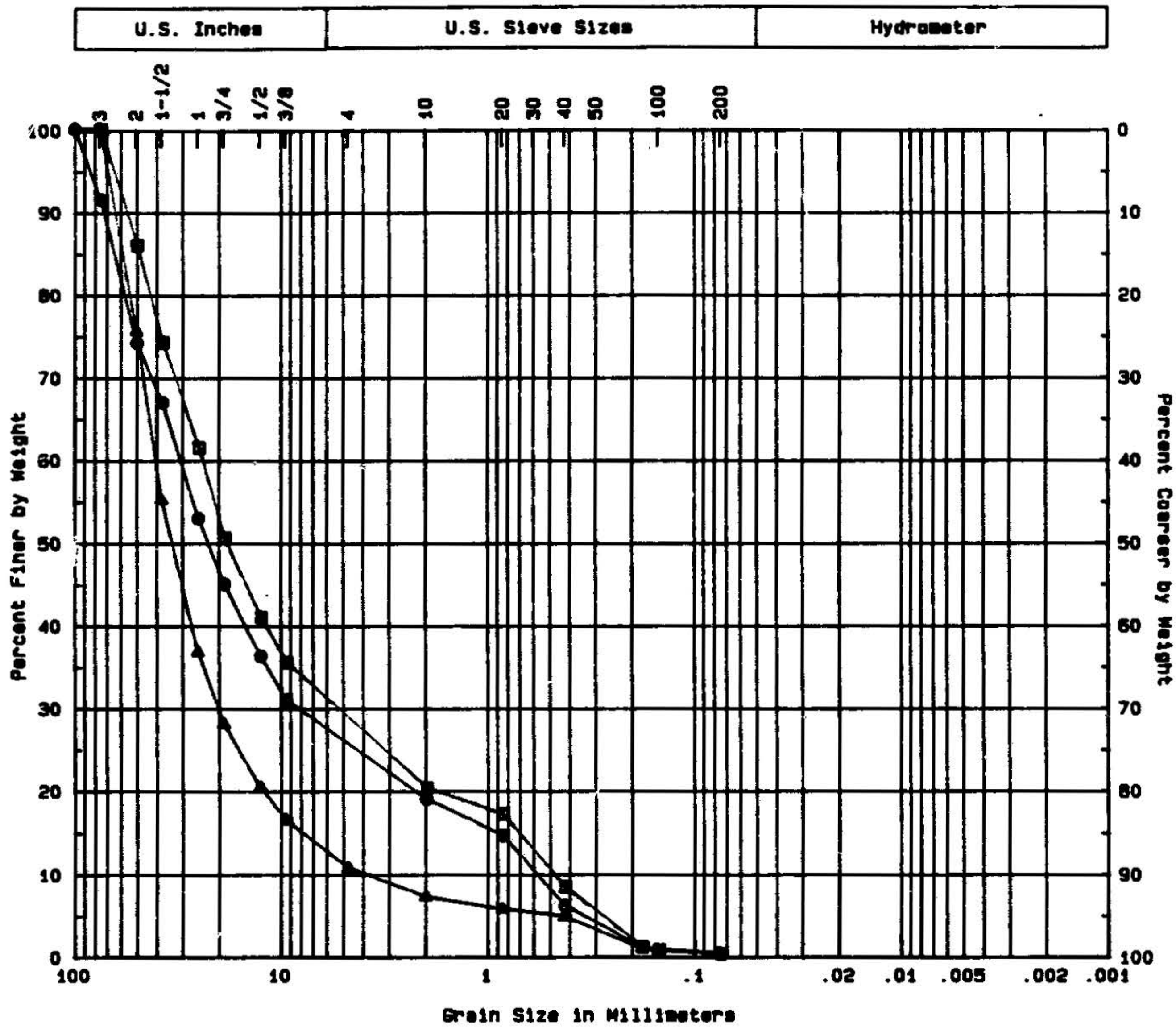
SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	93.1	1	.5-1.5	69	5.3				GP	
□	93.1	2	1-1.5	3	1				SP	

DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY RIVER MILE 93.1	F.B.
CKD.			GRID.
DATE. 11-84			PROJ. NO.
SCALE		55	DWG. NO. 3.8



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	93.1	3	Armor	11	2.6				GW	
□	93.1	4	.4-1.3	51	2.5				GW	
○	93.1	5	.5-1.2	54	3.9				GP	

DWN.	
CKD.	
DATE	11-84
SCALE	

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 93.1

F.B.	
GRID	
PROJ. NO.	
DWG. NO.	3.9

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River Mile 91.8

Sample 1

The sample site was on the east bank of the east channel (Photo 3.32, 3.33 and Figure 3.10). The material was frozen from the surface to 0.8 feet, the sample was taken from 0.8 feet to 1.6 feet and water was at 1.0 feet. The armor layer was well developed (Photo 3.32). The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.11).

PHOTO 3.32
Looking upstream along east bank of the east channel at Sample 1, RM 91.8. The surface has a well developed armor layer.

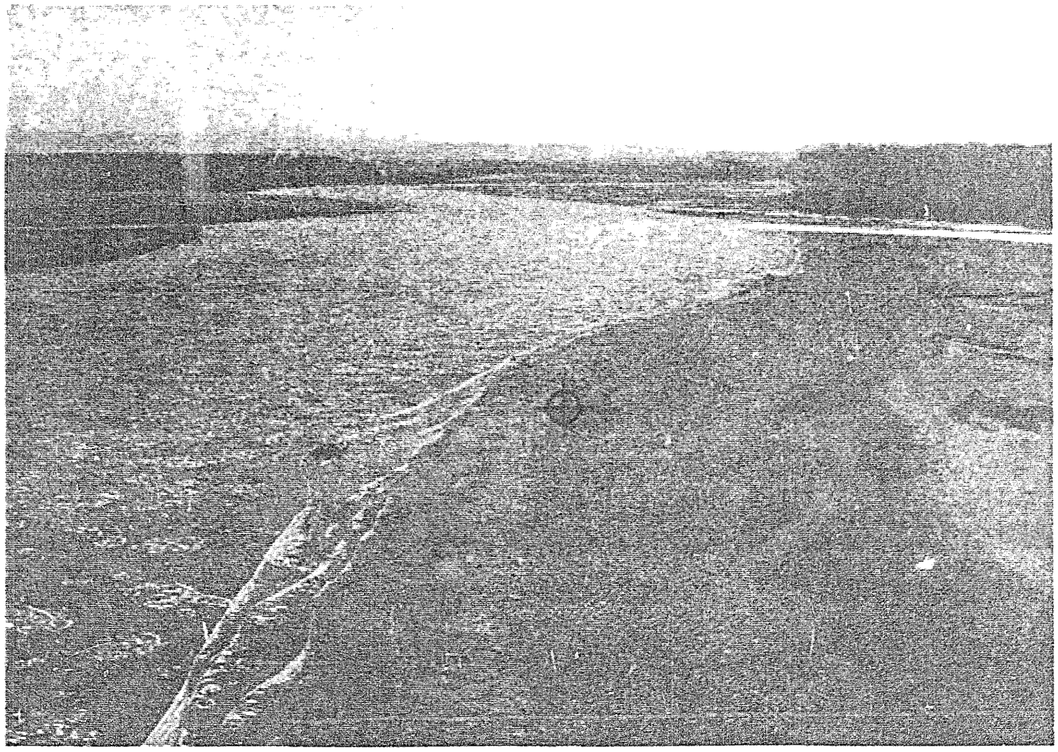

PHOTO 3.33
Aerial photo looking upstream Sample 1, RM 91.8 is located in the center of photograph.

River Mile 91.8

Sample 2

The sample site was on the west bank of the east channel (Photo 3.34, 3.35 and Figure 3.10). The material was frozen from the surface to 0.4 feet, the sample was taken from 1.0 feet to 1.9 feet and water was at 1.9 feet. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.11).

PHOTO 3.34
Looking upstream along west bank of the east channel at Sample 2, RM 91.8. The surface has a moderately developed armor layer.

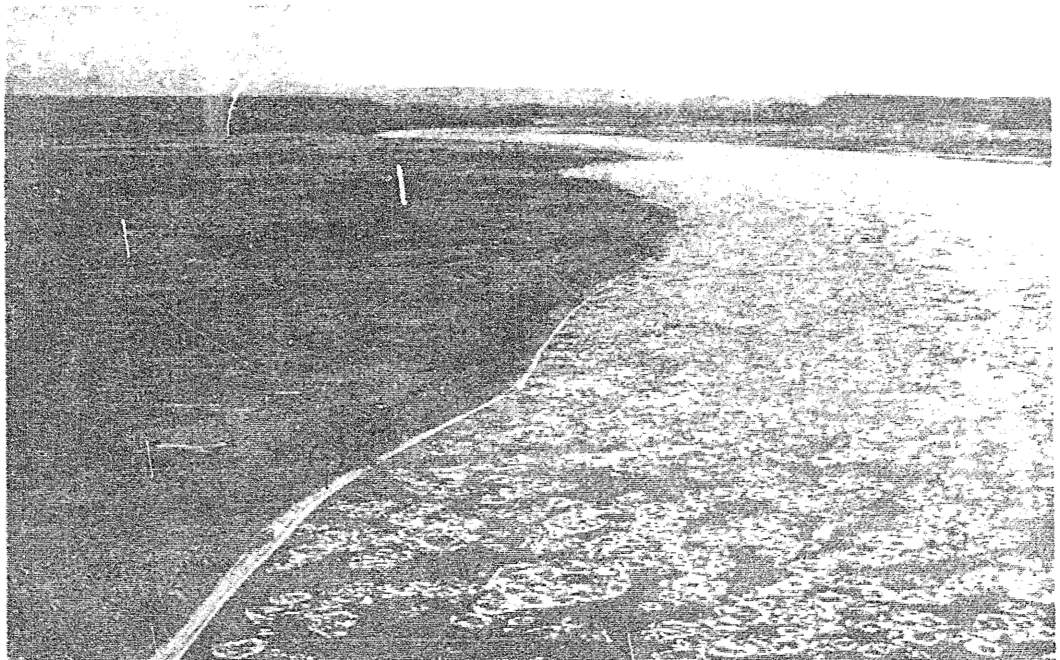

PHOTO 3.35
Aerial photo looking upstream Sample 2, RM 91.8 is located in left center of photograph.

River Mile 91.8

Sample 3

The sample site was in a high water channel near the middle of the cross-section (Photo 3.36, 3.37, and Figure 3.10). The material was frozen from the surface to 0.4 feet, the sample was taken from 0.6 feet to 1.4 feet, and water was at 1.3 feet. The armor layer was well developed (Photo 3.36). The armor layer sample for this cross-section, Sample 6, was taken above Sample 3. The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.11).

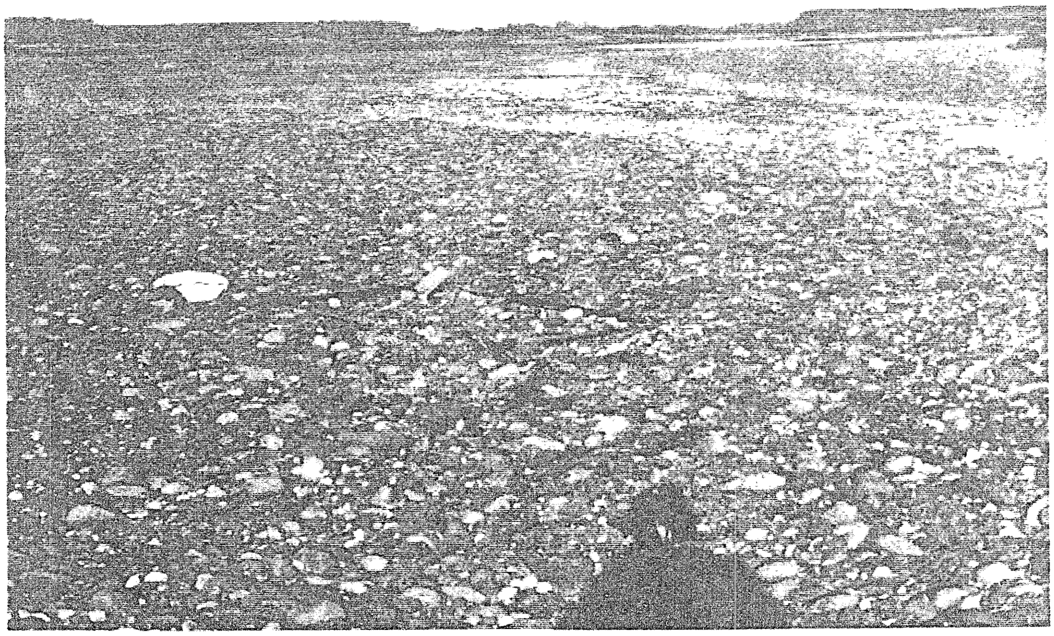

PHOTO 3.36

Looking upstream in the high water channel near the middle of the cross-section at Sample 3, RM 91.8. The surface has a well developed armor layer. The sample site is located in the area marked by shovels, Sample 6, the armor layer sample, was taken prior to taking Sample 3.

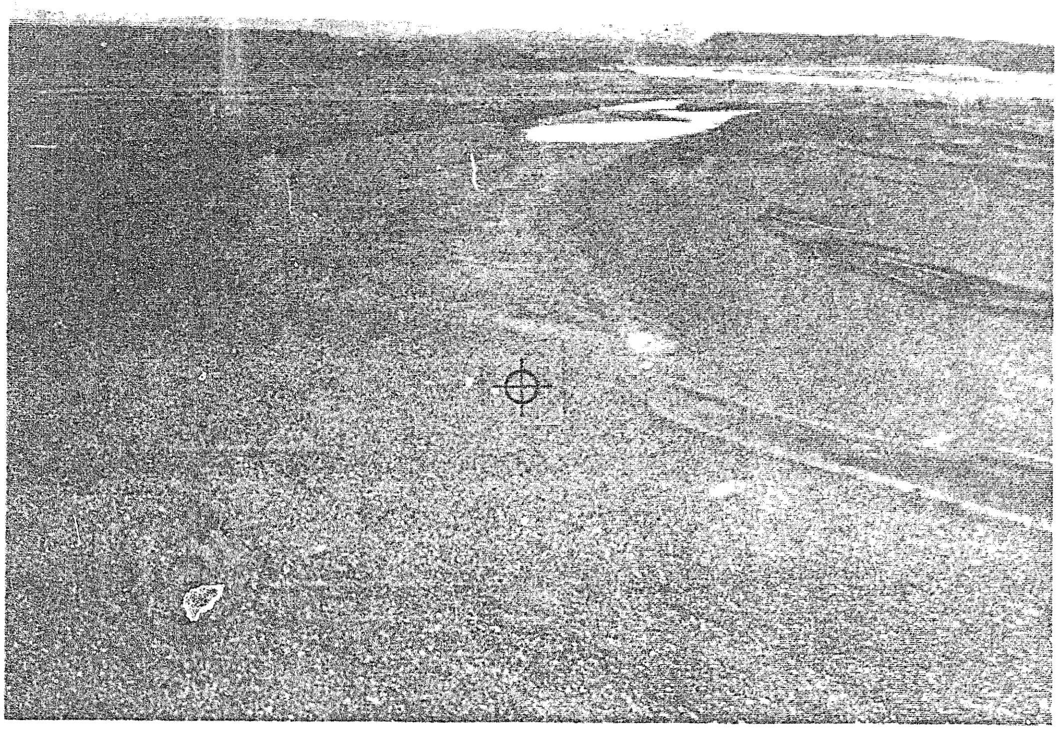

PHOTO 3.37

Aerial photo looking upstream Sample 3, RM 91.8 is located in the center of the photograph.

River Mile 91.8

Sample 4

The sample site was on the west bank of the third channel from western limit of river channel (Photo 3.38, 3.39, and Figure 3.10). The material was frozen from the surface to 0.3 feet, the sample was taken from 0.7 feet to 1.3 feet, and water was at 1.1 feet. The armor layer was well developed (Photo 3.38). Based on field observations the sample minus the fines is representative of the local armor layer. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.12).

PHOTO 3.38
Looking upstream along west bank of third channel from western limit of river channel at Sample 4, RM 91.8. The surface has a developed armor layer.

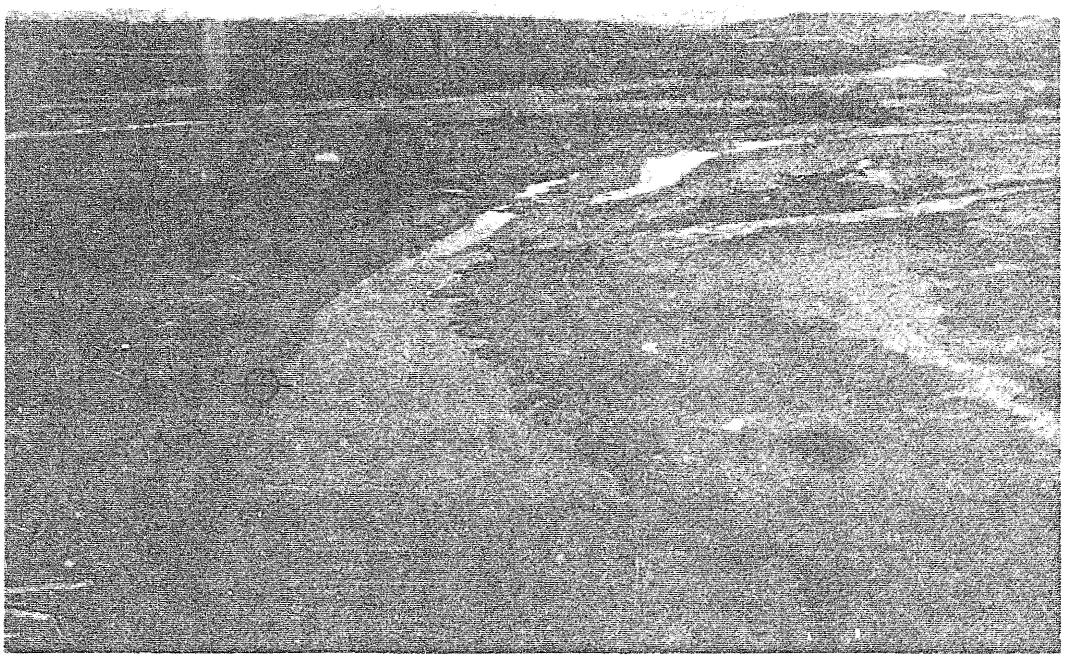

PHOTO 3.39
Aerial photo looking upstream Sample 4, RM 91.8 is located in left center of photograph.

River Mile 91.8

Sample 5

The sample site was on the west bank of the second channel from western limit of river channel (Photo 3.40, 3.41 and Figure 3.10). The material was frozen from the surface to 0.3 feet, the sample was taken from 0.8 feet to 1.6 feet, and water was at 1.0 feet. The armor layer was moderately developed (Photo 3.40). The sample material was loosely packed relative to other samples at this cross-section. Alaska Fish & Game Instream Flow Incremental Methodology Study Site, Trapper Creek side channel, is 1000 feet downstream of this sample site. The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.12).

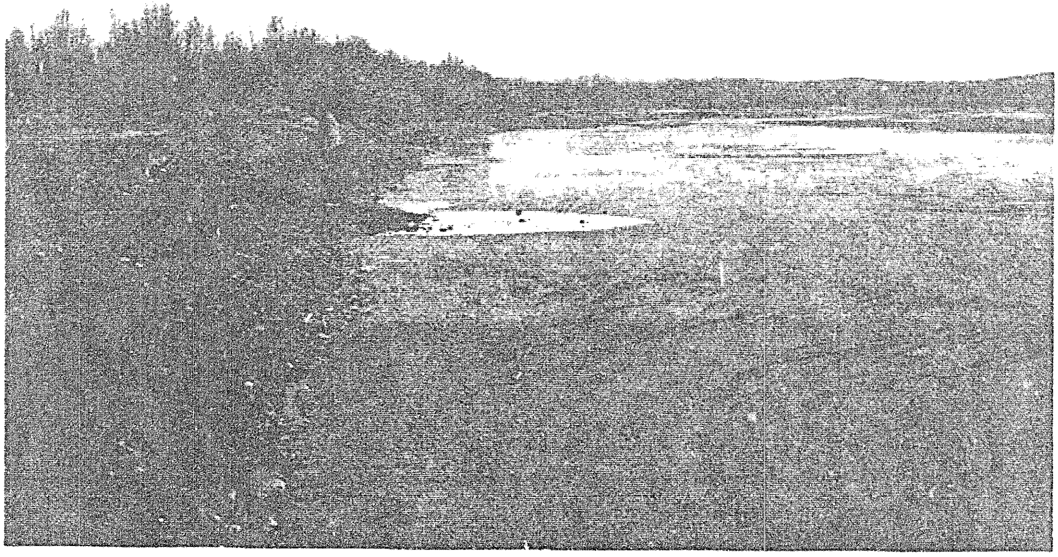

PHOTO 3.40

Looking upstream along west bank of second channel from western limit of river channel at Sample 5, RM 91.8. The surface has a moderately developed armor layer.

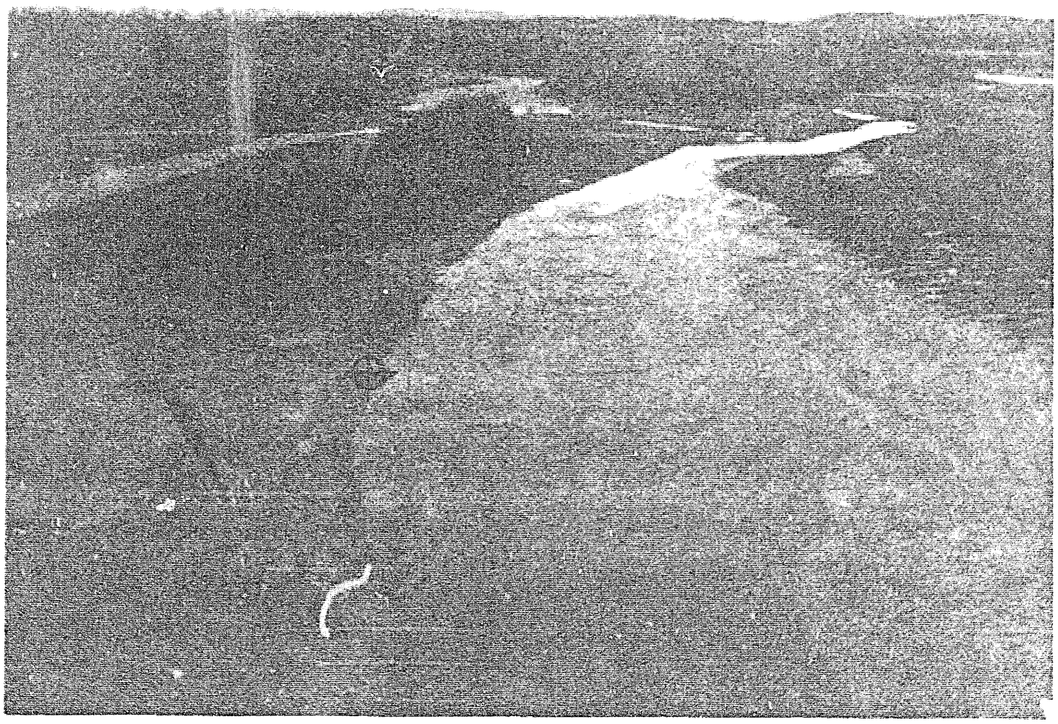

PHOTO 3.41

Aerial photo looking upstream, Sample 5, RM 91.8 is located in left center of photograph.

River Mile 91.8

Sample 6

Collected the armor layer sample over Sample 3 in a high water channel near the middle of the cross-section (Photo 3.37, 3.42 and Figure 3.10). The surface was frozen, therefore some gravel was lost in chipping it free. Because of the low amount of fines collected, the sample is biased towards the larger sizes. The sampe is a poorly-graded gravel with few sands and no fines, and is representative of the armor layer in this area (Figure 3.11). Based on field observations, sample 3 minus the fines appeared representative of the armor layer.

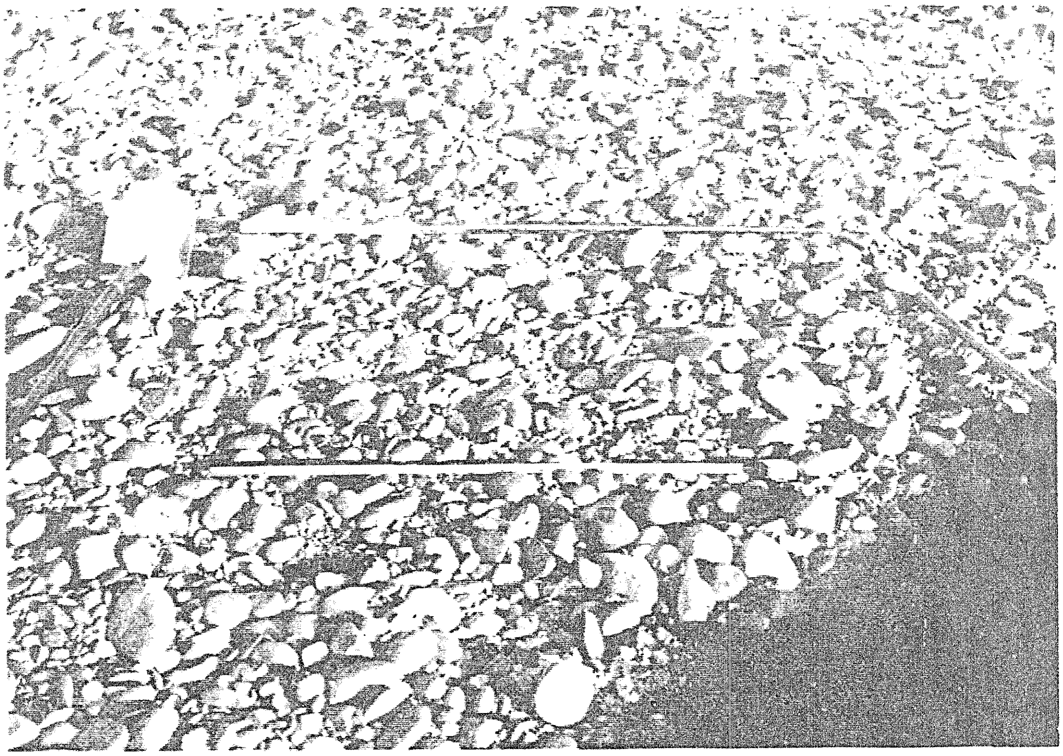

PHOTO 3.42
Armor layer, Sample 6, RM 91.8. Flow is from left to right. Shovels delineate the sample area.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 91.8

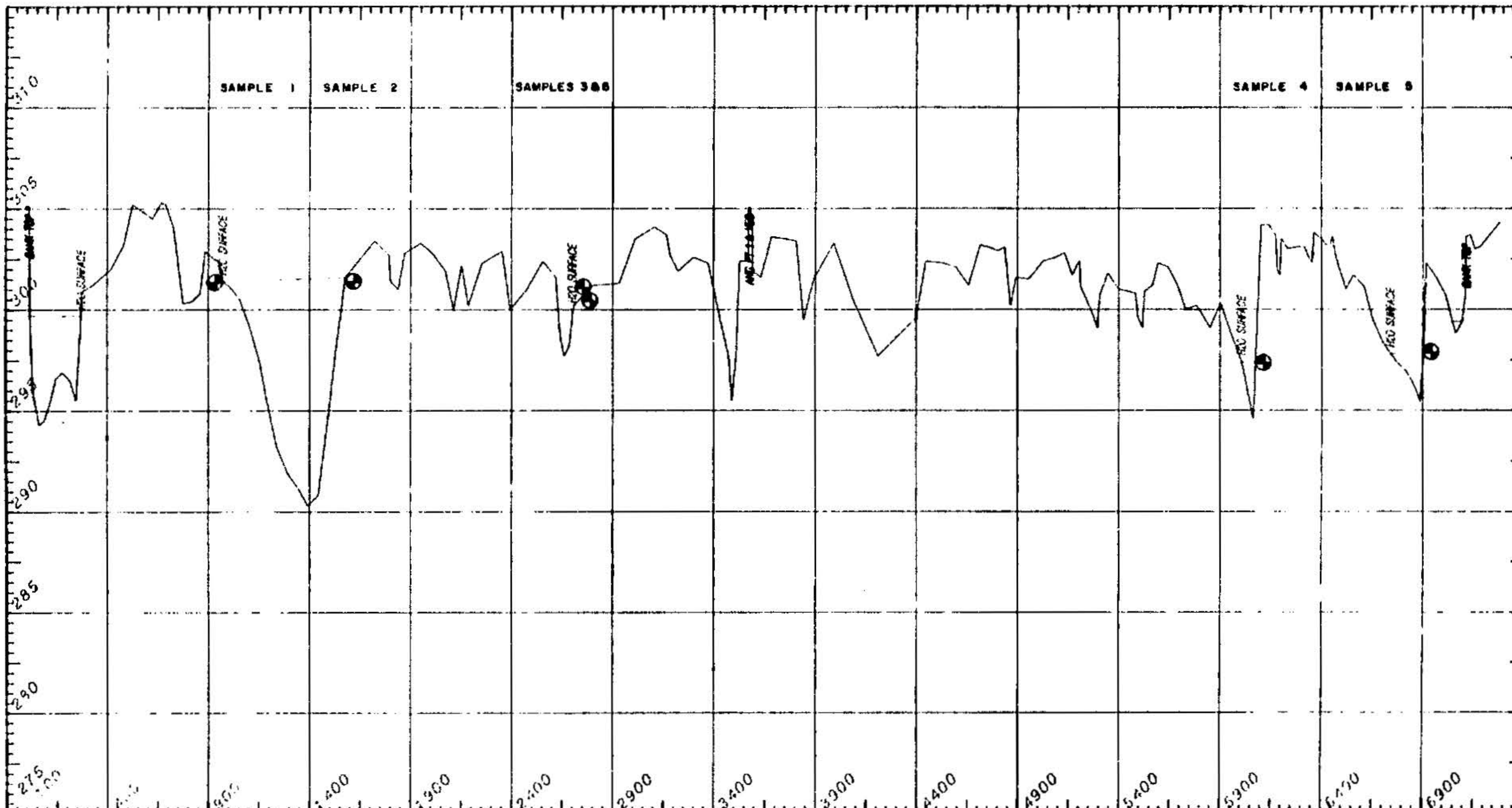

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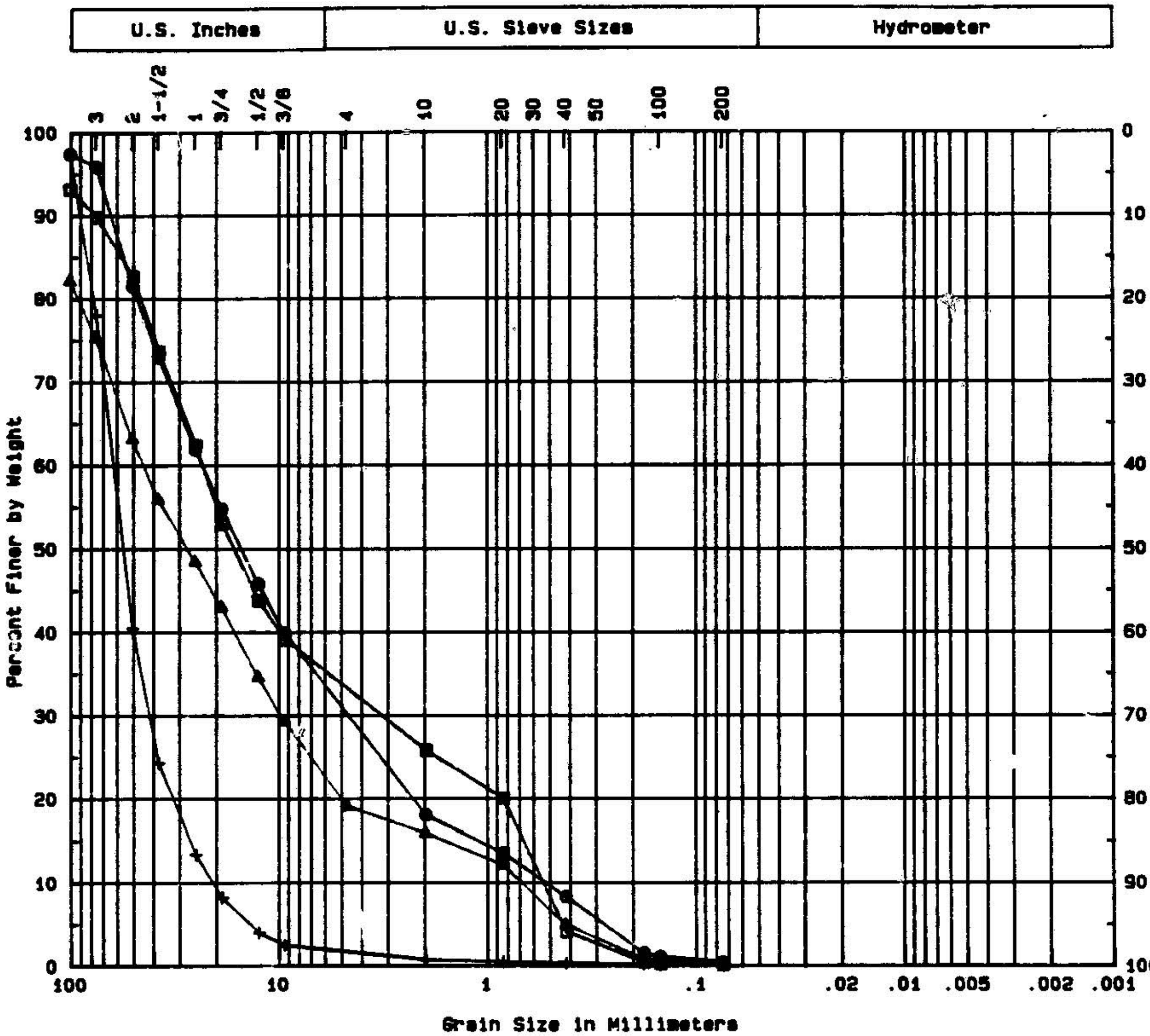
FIGURE 3.10

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR

HARZA-EBASCO

SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	91.8	1	.8-1.6	65	3.2				GP	
□	91.8	2	1-1.9	43	.8				GP	
o	91.8	3	.6-1.4	45	1.8				GW	
+	91.8	6	Armor	3	1.3				GP	

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DATE 11-84
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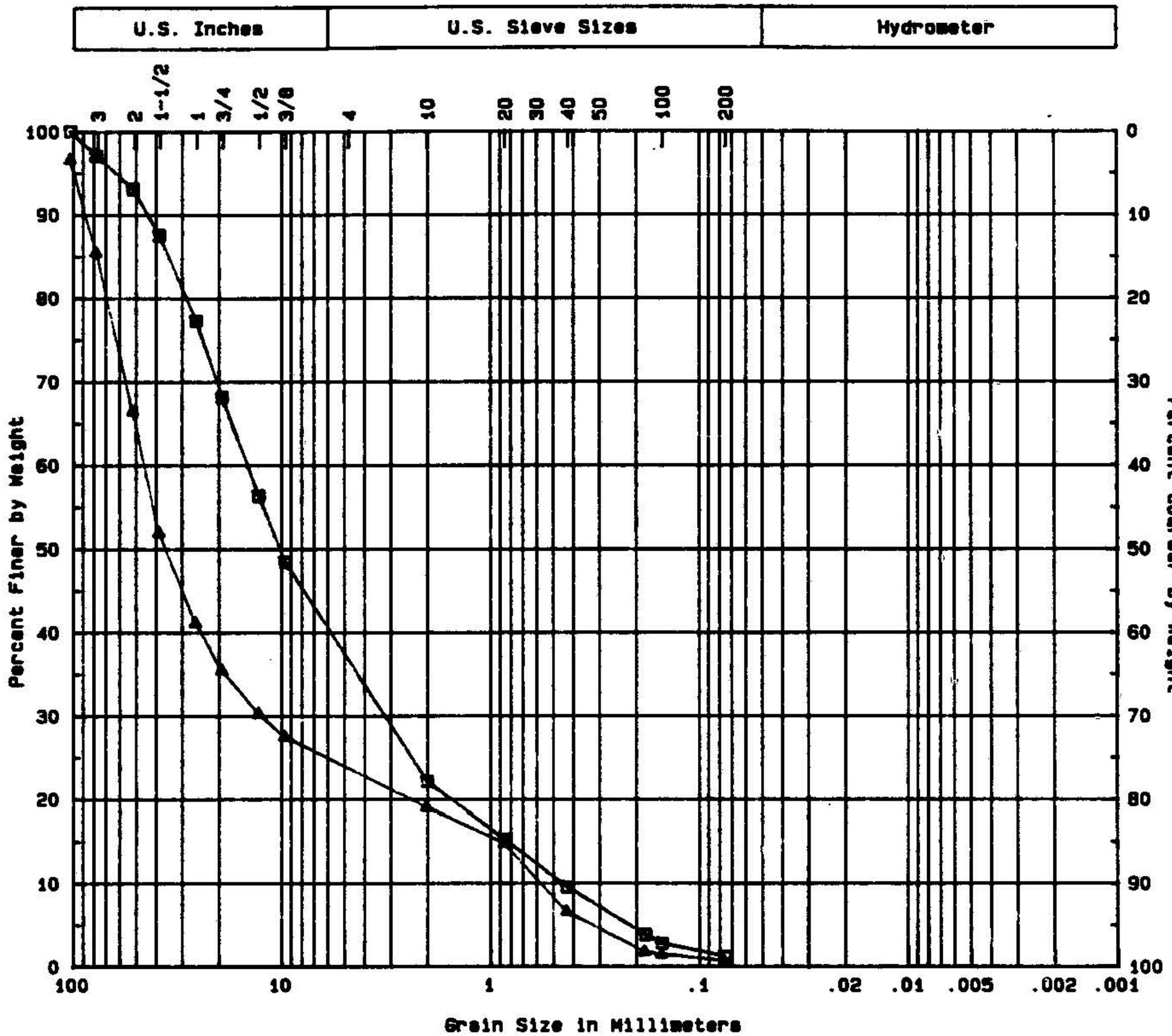
SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 91.8

F.B.
GRID.
PROJ. NO.
DWG. NO. 3.11



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	91.8	4	.7-1.3	79	6				GP	
□	91.8	5	.8-1.6	32	1.6				GW	

DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY RIVER MILE 91.8	F.B.
CKD.			GRID.
DATE. 11-84			PROJ.NO.
SCALE			DWG.NO. 3.12

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River Mile 90.6

Sample 1

The sample site was on the east bank of the east channel (Photo 3.43, 3.44 and Figure 3.13). The river bed was frozen from the surface to 0.4 feet, the sample was taken from 0.5 feet to 1.0 feet, and water was at 0.4 feet. This is an active cutbank at higher flows. There is 3.5 feet of silty-sand overlaying the gravel layer. The top of the bank is 4.5 feet above the top of the sample hole. The sample was taken 150 feet upstream of the cross-section because the silt-sand deposits at the cross-section were not representative of the gravel in the river bottom. The sample is a well-graded gravel-sand mixture with few large gravels and few fines, and is representative of the gravel underlying the silt-sand bank (Figure 3.14).

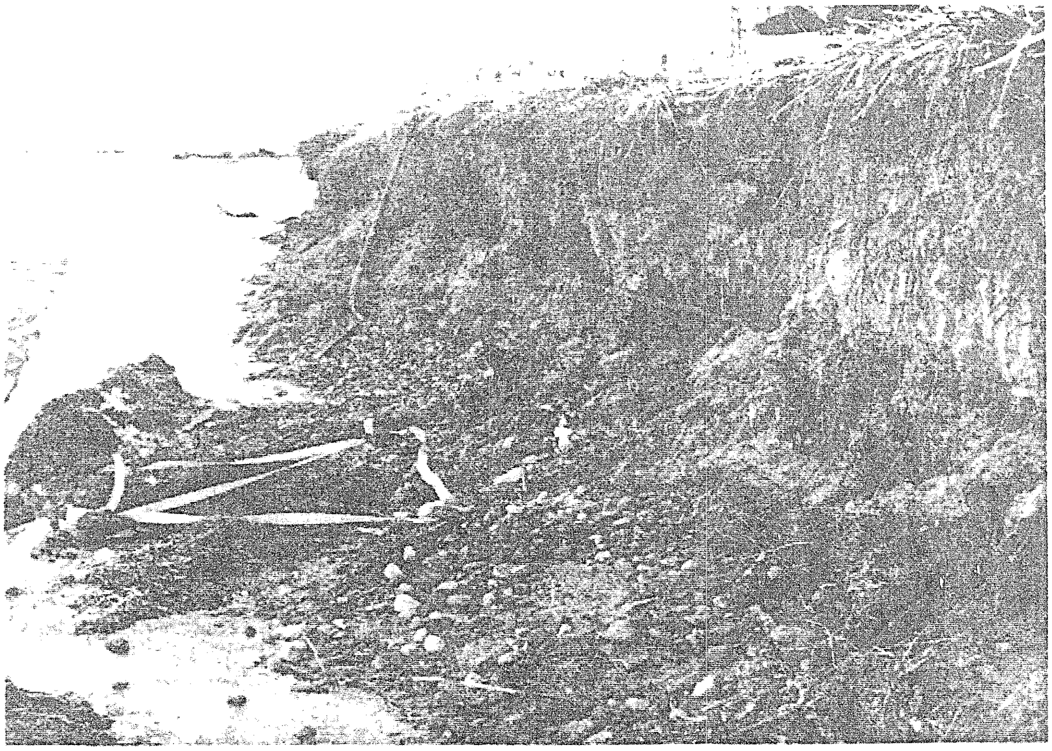

PHOTO 3.43
Looking upstream along east bank of the east channel at Sample 1, RM 90.6. The sample site is 4.5 feet below the top of the bank.

PHOTO 3.44
Aerial photo looking upstream Sample 1, RM 90.6 is located in right center of photograph.

River Mile 90.6

Sample 2

The sample site was on the west bank of the east channel (Photo 3.45, 3.46 and Figure 3.13). The material was frozen from the surface to 0.4 feet, the sample was taken from 0.6 feet to 1.4 feet and water was at 0.8 feet. The armor layer was well developed (Photo 3.45). The armor layer sample, sample 5, was collected 30 feet west of Sample 2. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.14).

Sample 3

Sample 3 was not collected due to time constraints.

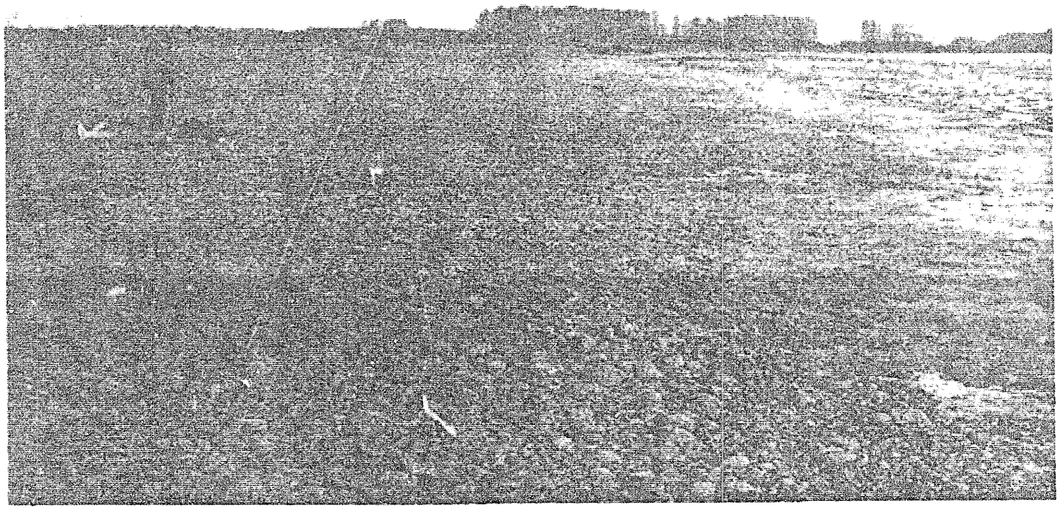

PHOTO 3.45
Looking upstream along west bank of the east channel at Sample 2, RM 90.6. The surface has a well developed armor layer.

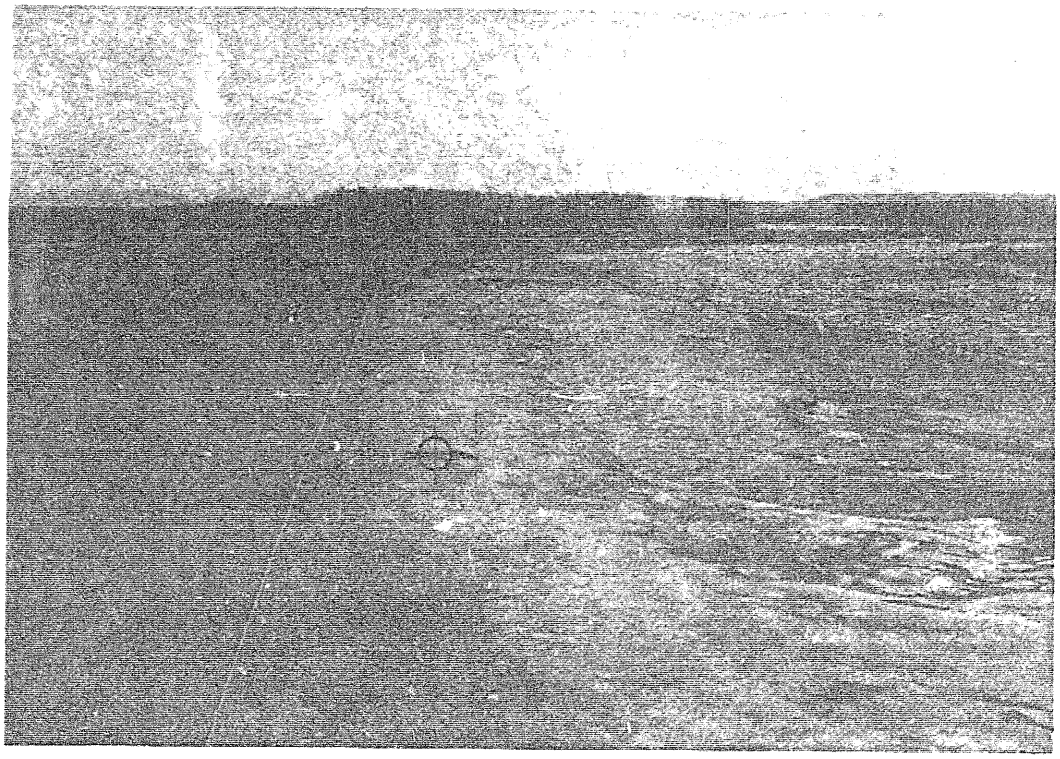

PHOTO 3.46
Aerial photo looking upstream Sample 2 RM 90.6 is located in left center of photograph. The armor layer sample, Sample 5, is located 30 feet to the left, or west of Sample 2.

River Mile 90.6

Sample 4

The sample site was on the east bank of the west channel (Photo 3.47, 3.48 and Figure 3.13). The river bed was frozen from the surface to 0.4 feet, the sample was taken from 0.4 feet to 1.0 feet, and water was at 0.7 feet. The armor layer was moderately developed. The sample is a well-graded gravel-sand mixture with few fines, and is representative of the local area (Figure 3.14).

PHOTO 3.47
Looking upstream along the east bank of the west channel at Sample 4, RM 90.6. The surface has a moderately developed armor layer.

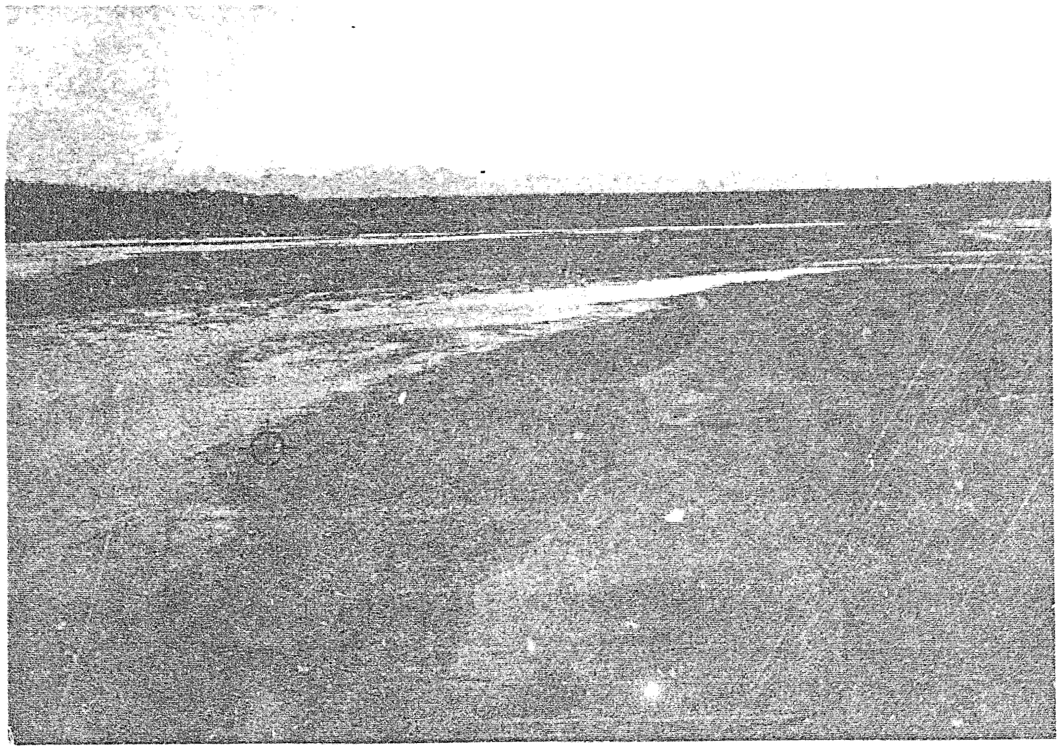

PHOTO 3.48
View looking up the west channel Sample 4, RM 90.6, is located in the lower left of the photograph.

River Mile 90.6

Sample 5

The armor layer sample was collected 30 feet west of Sample 2 on the west bank of the east channel (Photo 3.46, 3.49 and Figure 3.13). The surface was frozen therefore some gravel was lost in chipping it free. The sample is bias because of the low amount of fines collected. The sample is a poorly-graded gravel with few sands and no fines and is representative of the armor layer in this area (Figure 3.14). Based on field observations Sample 2, minus the fines, appeared representative of the armor layer.

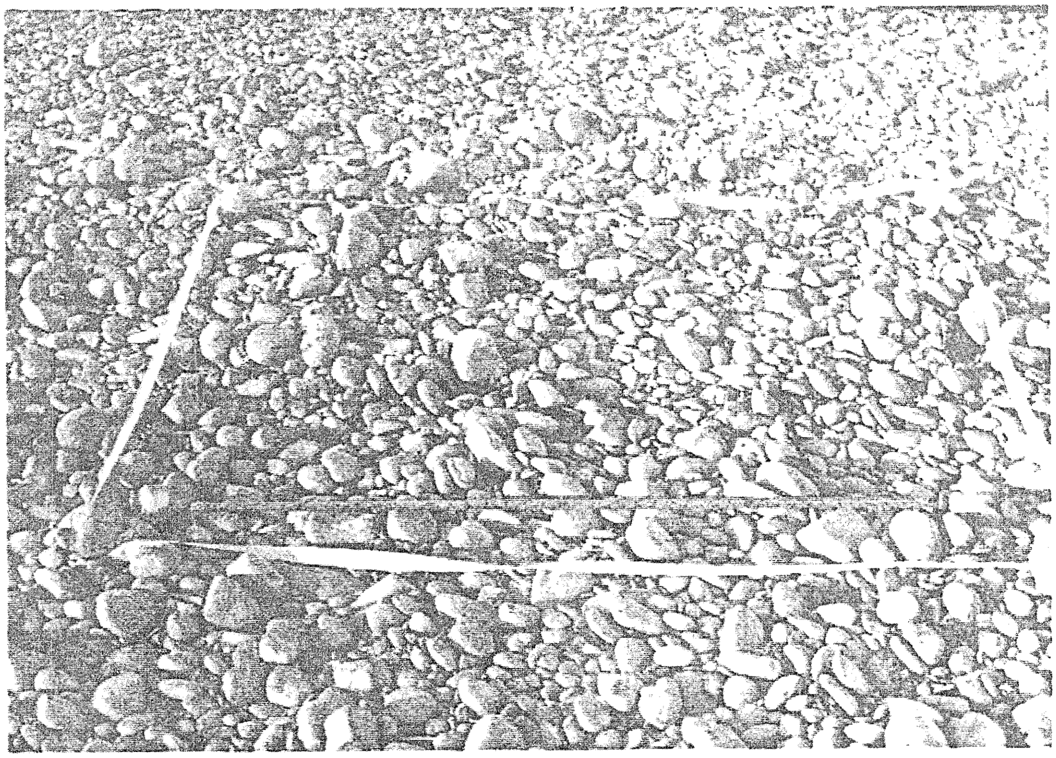

PHOTO 3.49

Armor layer, Sample 5, RM 90.6. Flow is from right to left. Flagging delineates sample area.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 90.6

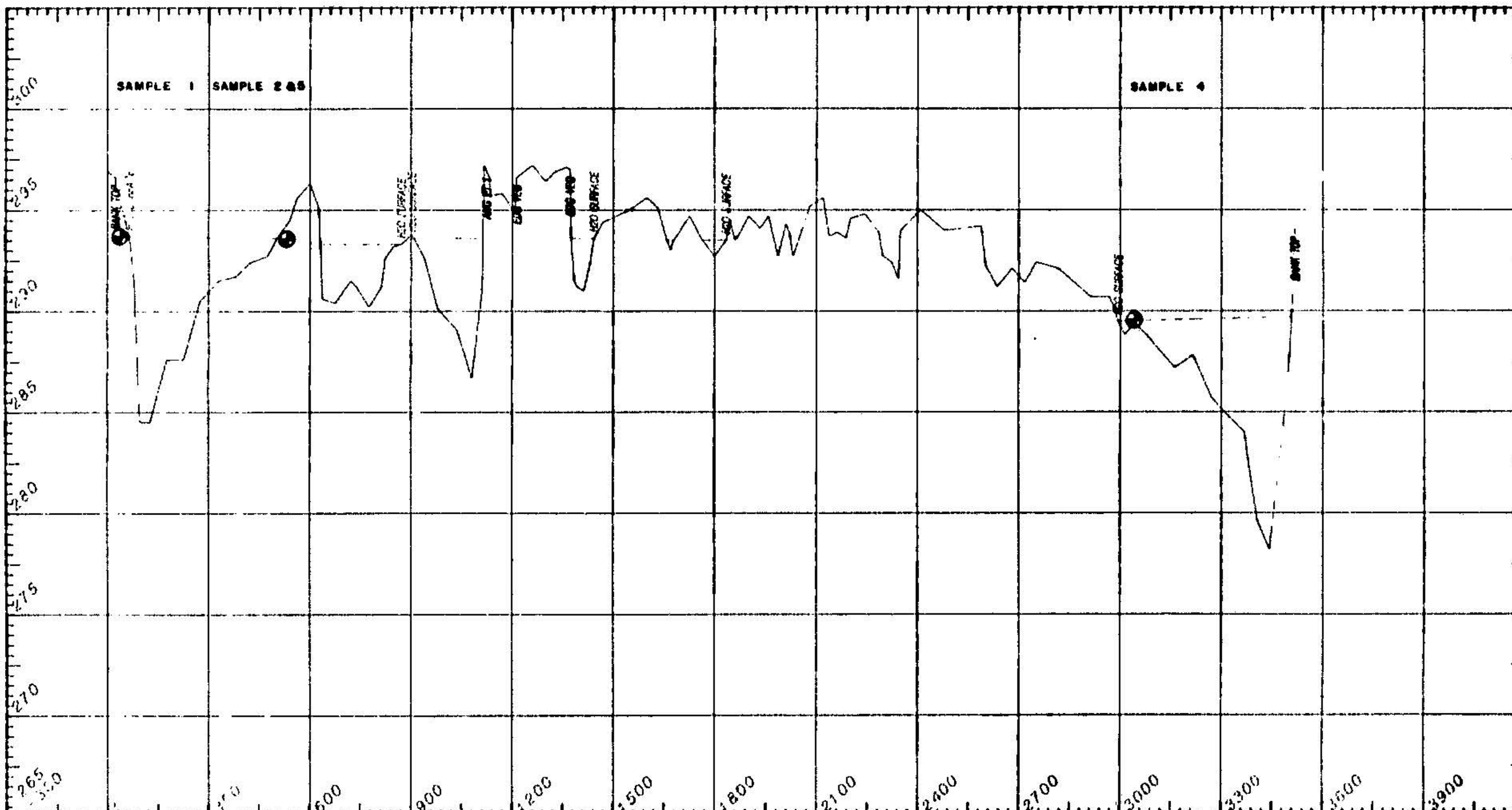

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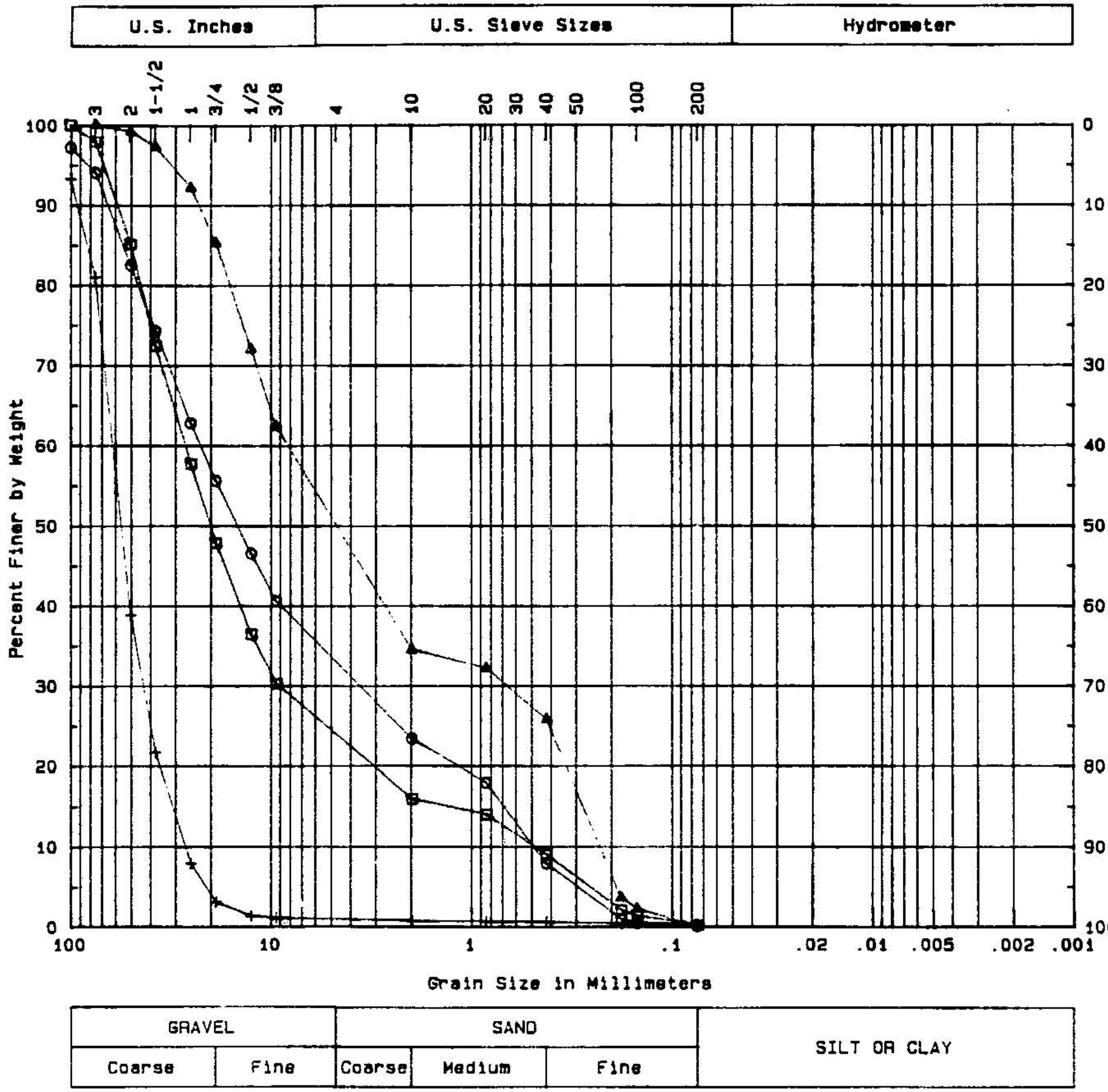
FIGURE 3.13

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE



Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	90.6	1	.5-1	36	.2				GP	
□	90.6	2	.6-1.4	57	6.5				SP	
O	90.6	4	.4-1	47	1.2				GW	
+	90.6	5	Armor	2	1.1				GP	

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 90.6

FB	
GRID	
PROJ NO	
DWG NO	3.14

River Mile 87.7

Sample 1

The sample site was on the east bank of the east channel (Photo 3.50, 3.51 and Figure 3.15). The gravel was frozen from the surface to 0.3 feet, the sample was taken from 0.6 feet to 2.0 feet and there was no water in the hole. The armor layer was well developed (Photo 3.50). The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.16).

PHOTO 3.50

Looking upstream along east bank of the east channel at Sample 1, RM 87.7. The surface has a well developed armor layer.

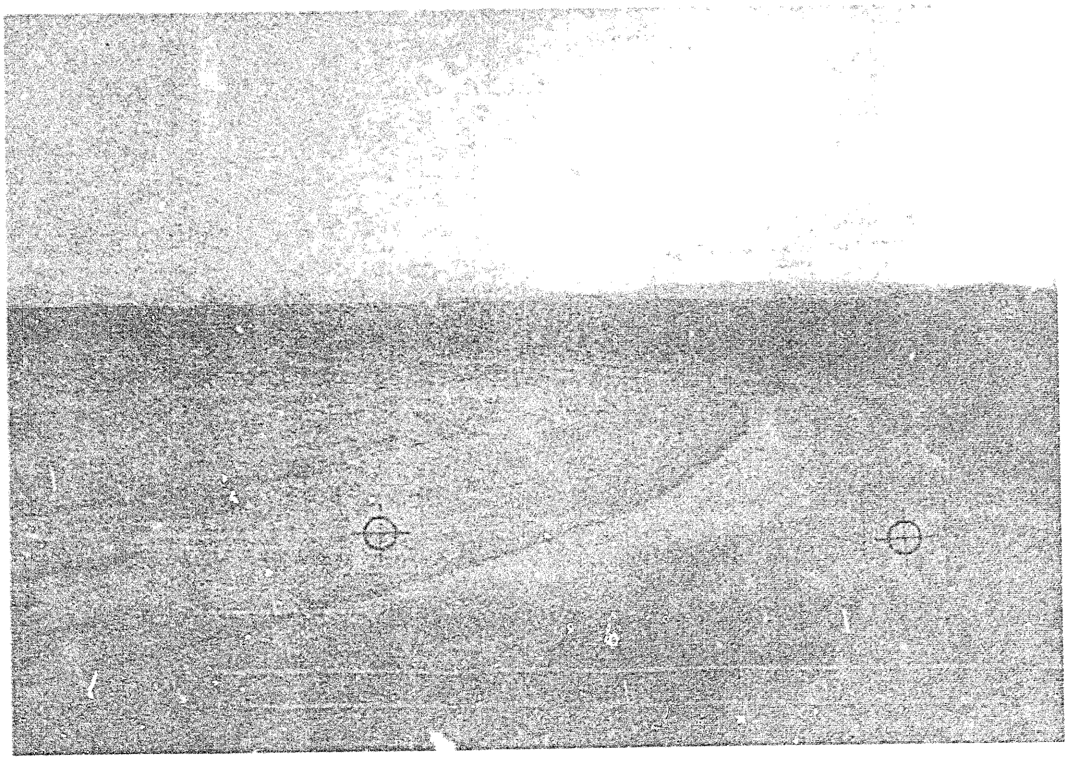

PHOTO 3.51

Aerial photo looking upstream Sample 1, RM 87.7 is located in lower right of photog[illegible]h and Samples 2 and 6 are located in the lower left of photograph. (Sample 6 is the armor layer sample and was collected 20 feet to the left of [illegible]e 2.

River Mile 87.7

Sample 2

The sample site was on the west bank of the east channel (Photo 3.51, 3.52 and Figure 3.15). The material was frozen from the surface to 0.3 feet, the sample was taken from 0.5 feet to 1.0 feet and there was no water in the hole. The armor layer was marginally developed. The sample is a poorly-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.16).

PHOTO 3.52

Looking upst am along west bank of the east channel at Sample 2, RM 87.7. The urface has a marginally developed armor layer. The armor layer sample, Sample 6, was collected 20 feet to the left of Sample 2.

River Mile 87.7

Sample 3

The sample site was in a high water channel approximately 100 feet east of the west channel (Photo 3.53, 3.54 and Figure 3.15). The material was frozen from the surface to 0.3 feet, the sample was taken from 0.6 feet to 2.0 feet and water was at 0.8 feet. The armor layer was poorly developed. In the field the sample looked well mixed and did not appear to be in a depositional area. The sample is a poorly-graded gravelly sand with few fines and is representative of the local area (Figure 3.17).

PHOTO 3.53

Looking upstream in a dry channel app.oximately 100 feet east of the west channel at Sample 3, RM 87.7. The sample site is located on the right side of the person.

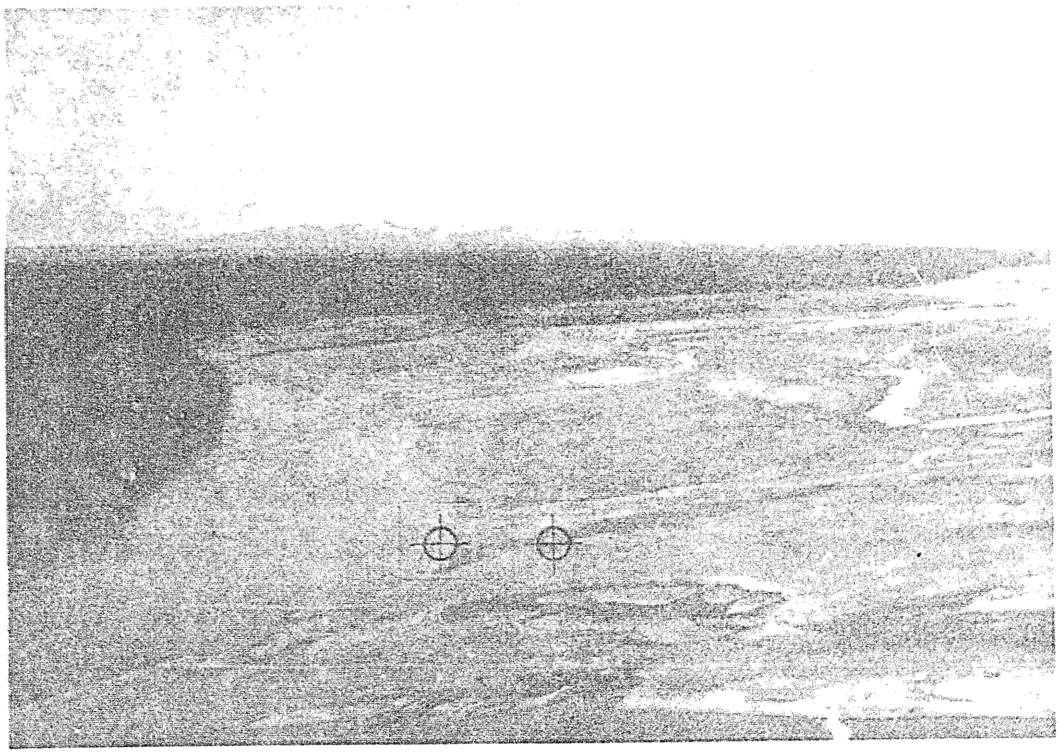

PHOTO 3.54

Aerial photo looking upstream Sample 3, RM 87.7 is located in lower center of photograph. Sample 4 is located to the left of Sample 3.

River Mile 87.7

Sample 4

The sample site was on the east bank of the west channel (Photo 3.54, 3.55 and Figure 3.15). The gravel was frozen from the surface to 0.3 feet, the sample was taken from 0.5 feet to 1.5 feet and water was at 0.6 feet. The sample site is at the downstream face of a dune face. The sample is a poorly-graded gravelly sand with few fines and is representative of the local area (Figure 3.17).

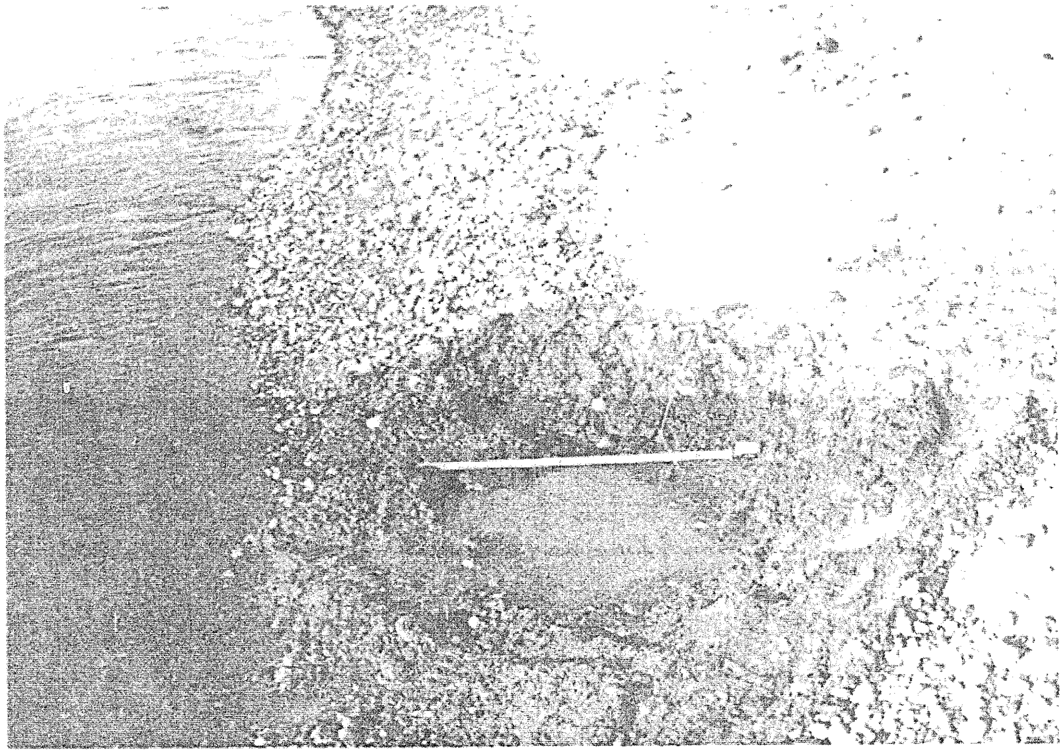

PHOTO 3.55
Looking at Sample 4, RM 87.7, on the east bank of the west channel.

River Mile 87.7

Sample 5

The sample site was in the middle of Sunshine Slough (Photo 3.56, 3.57 and Figure 3.15). The gravel was frozen from the surface to 0.5 feet, the sample was taken from 0.5 feet to 1.5 feet and there was no water in the hole. The armor layer was moderately developed (Photo 3.56). The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.16).

PHOTO 3.56
Looking upstream in Sunshine Slough at Sample 5, RM 87.7. The surface has a moderately developed armor layer.

PHOTO 3.57
Aerial photo looking upstream Sample 5, RM 87.7 is located in the left center of photograph.

River Mile 87.7

Sample 6

The armor layer sample was collected near Sample 2 on the west bank of the east channel (Photo 3.51, 3.52 and Figure 3.15). The surface was frozen, therefore some gravel was lost in chipping it free. Because of the low amount of fines collected, the sample is biased towards the larger sizes. The sample is a well-graded gravel-sand mixture with few fines and is representative of the armor layer in this area (Figure 3.16). Based on field observations Sample 2, minus the fines, appeared representative of the armor layer.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 87.7

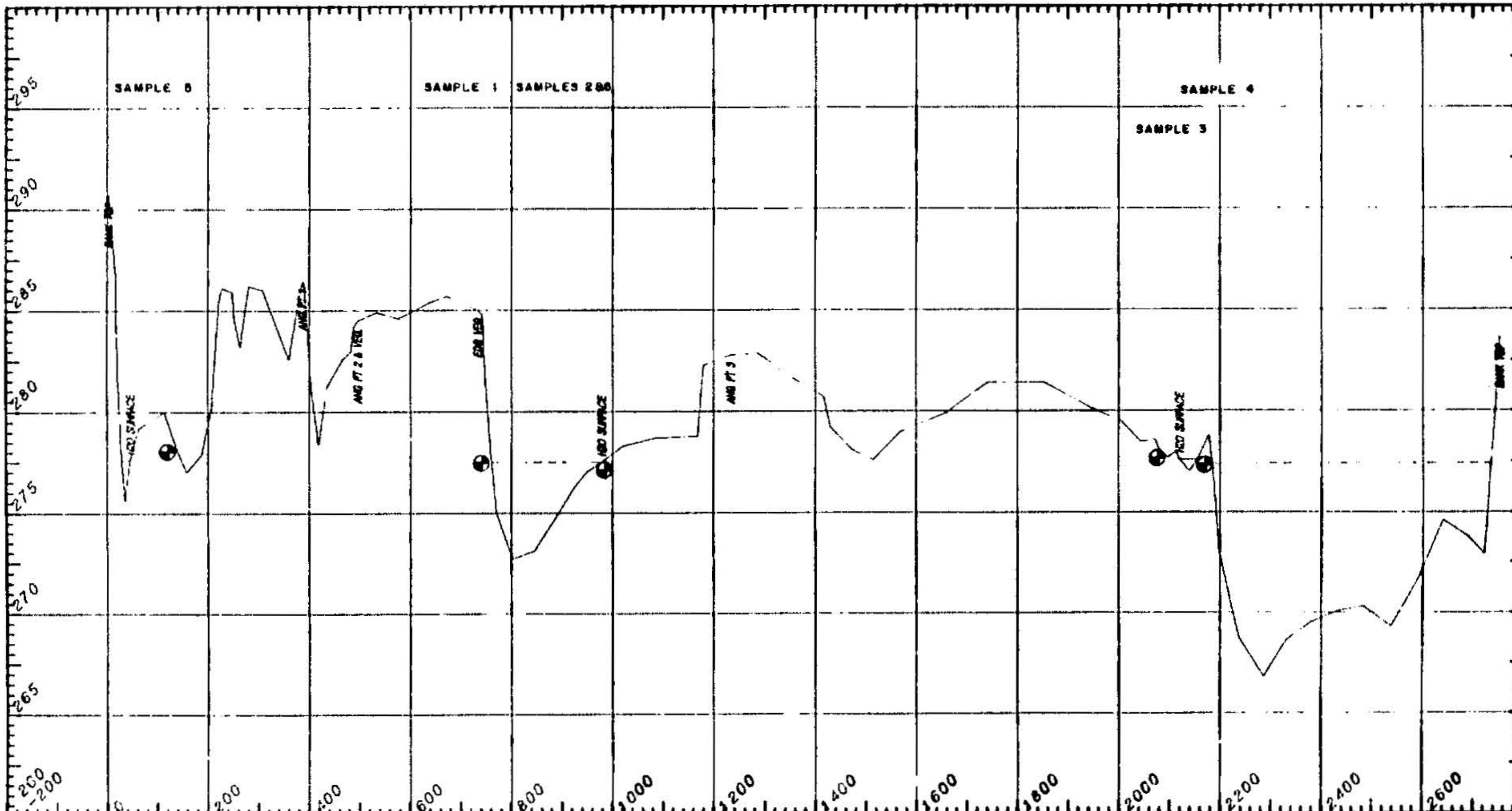

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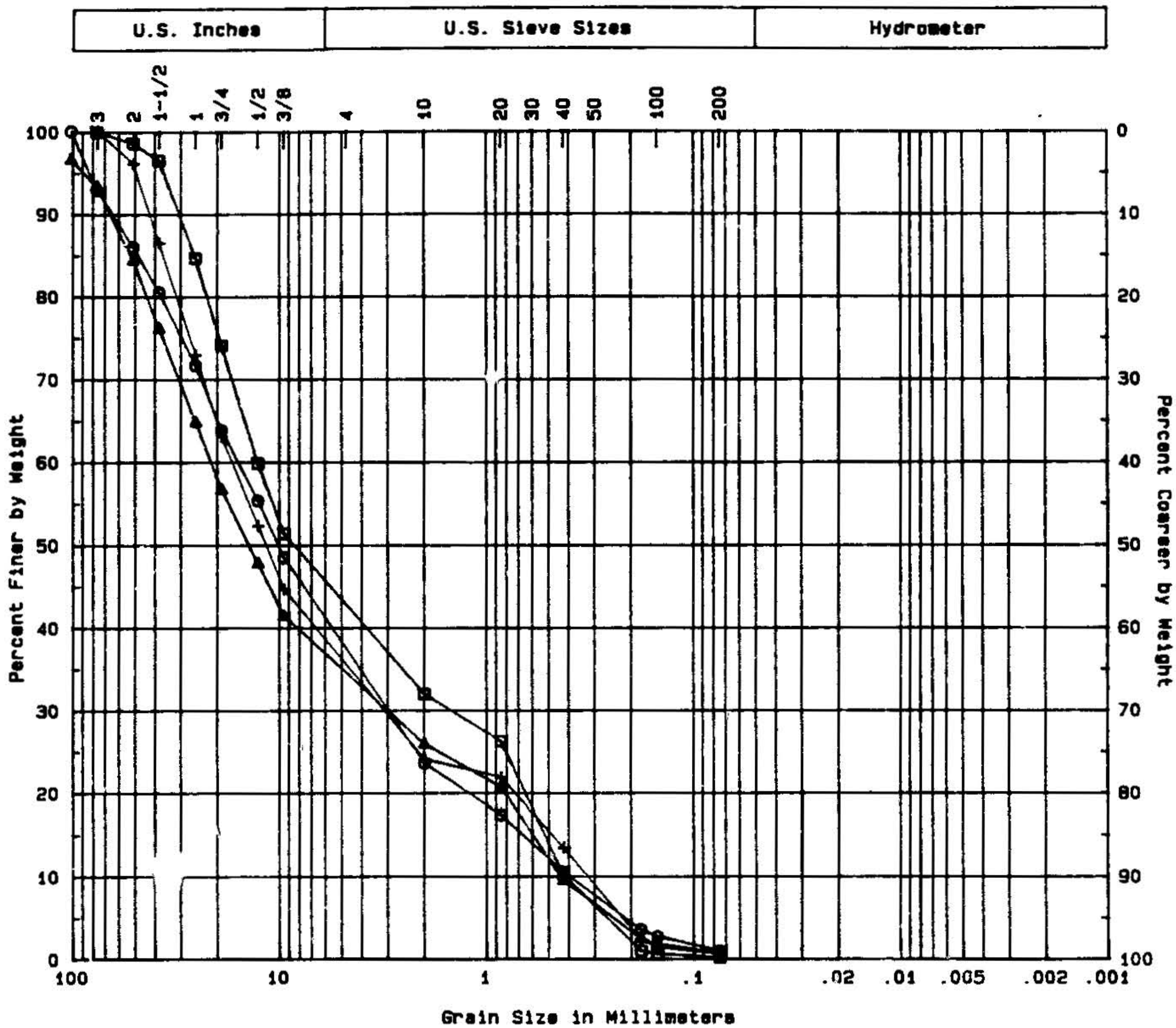
FIGURE 3.18

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	87.7	1	.6-2	49	1				GP	
□	87.7	2	.5-1	31	.4				GP	
○	87.7	5	.5-1.5	40	1.4				GW	
+	87.7	6	Armor	52	1.8				GW	

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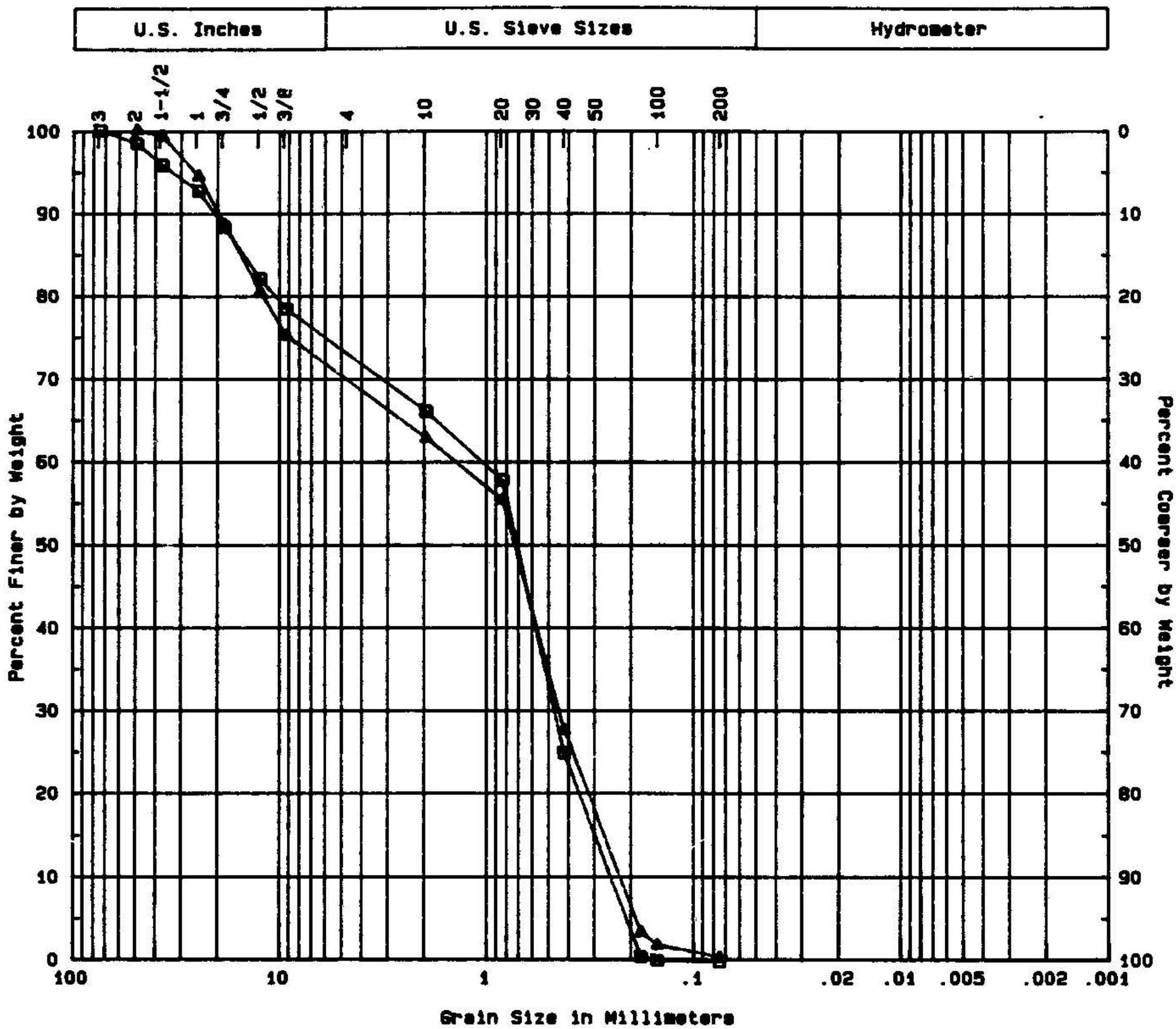
SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 87.7

96

FB.
GRID.
PROJ.NO.
DWG.NO. 3.16



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▵	87.7	3	.6-2	6	.6				SP	
◻	87.7	4	.5-1.5	4	.8				SP	

DWN.
CKD.
DATE. 11-84
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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 87.7

97

F.B.
GRID.
PROJ. NO.
DWG. NO. 3.17

River Mile 86.3

Sample 1

The sample site was on the east bank of the east channel (Photo 3.58, 3.59 and Figure 3.18). The surface was not frozen, the sample was taken from 0.7 feet to 1.3 feet and there was no water in the hole. The armor layer was well developed (Photo 3.58). The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.19).

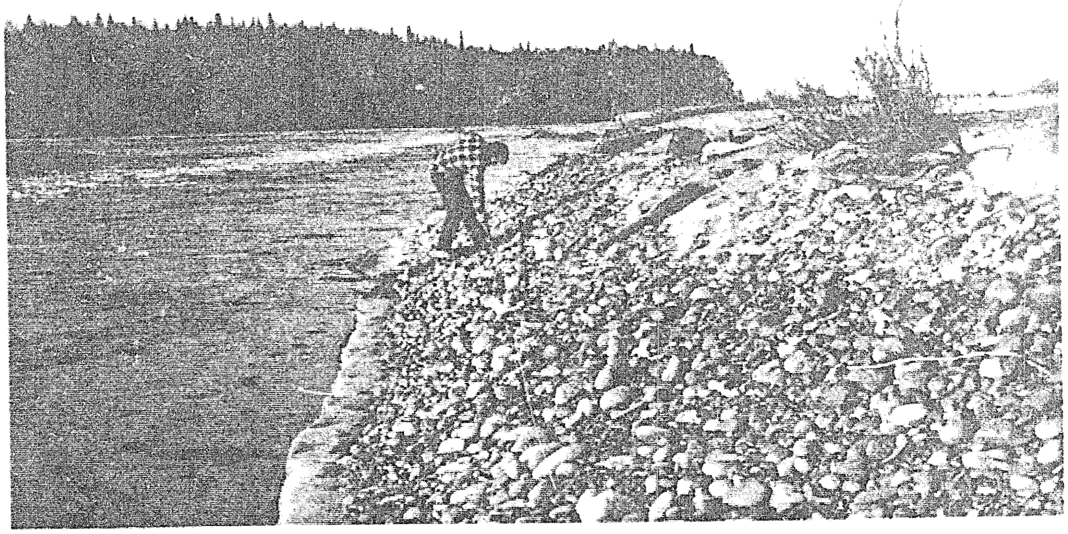

PHOTO 3.58
Looking upstream along east bank of the east channel at Sample 1, RM 86.3.

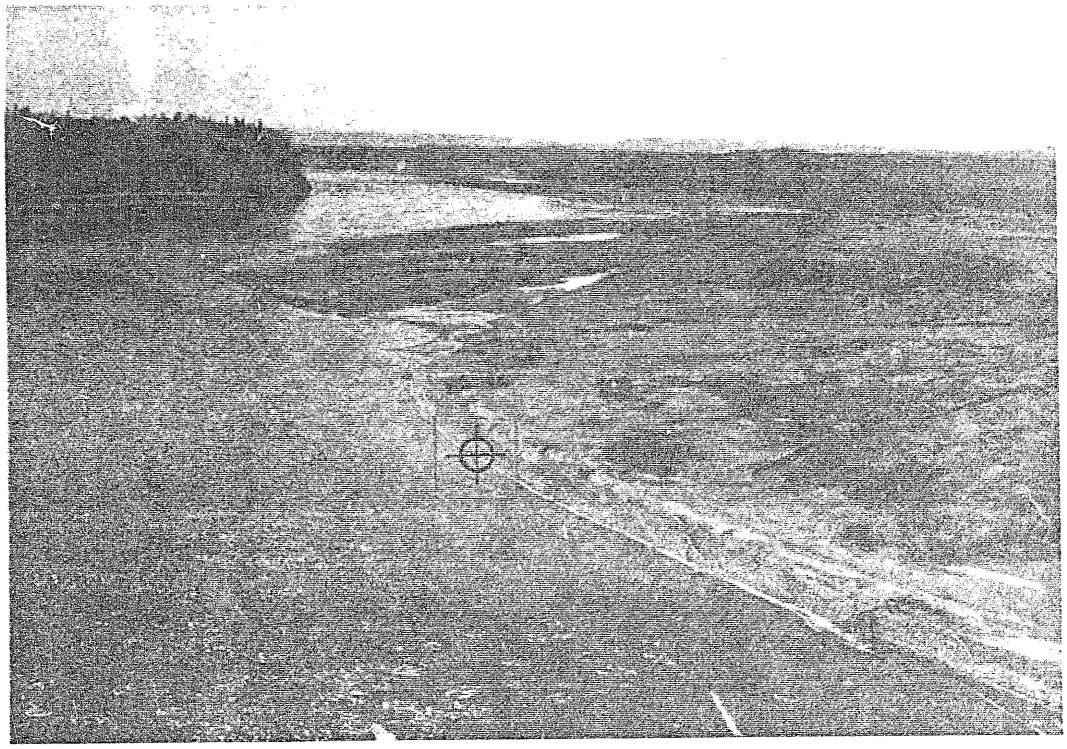

PHOTO 3.59
Aerial photo looking upstream Sample 1, RM 86.3 is located in middle center of photograph.

River Mile 86.3

Sample 2

The sample site was on the west bank of the east channel (Photo 3.60, 3.61 and Figure 3.18). The surface was not frozen, the sample was taken from 0.7 feet to 1.3 feet below the surface and there was no water in the hole. The surface appeared to be a depositional area of sand, with no silt, on top of the gravel-sand mixture. The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.19).

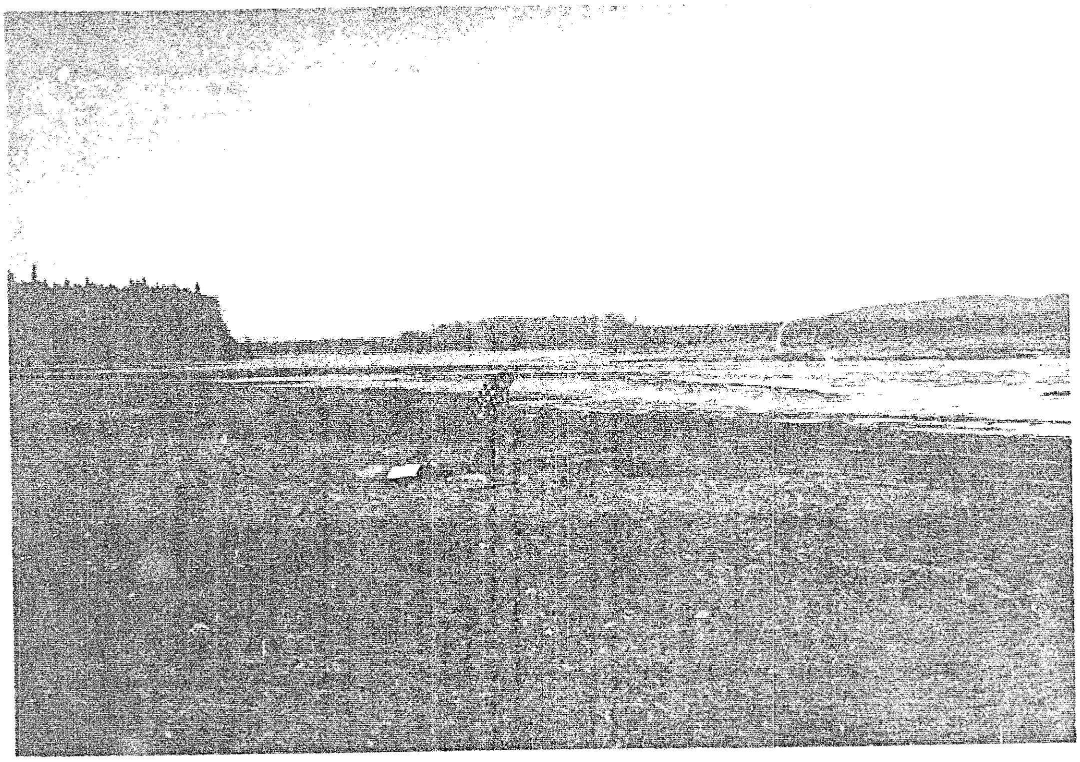

PHOTO 3.60

Looking upstream along west bank of the east channel at Sample 2, RM 86.3.

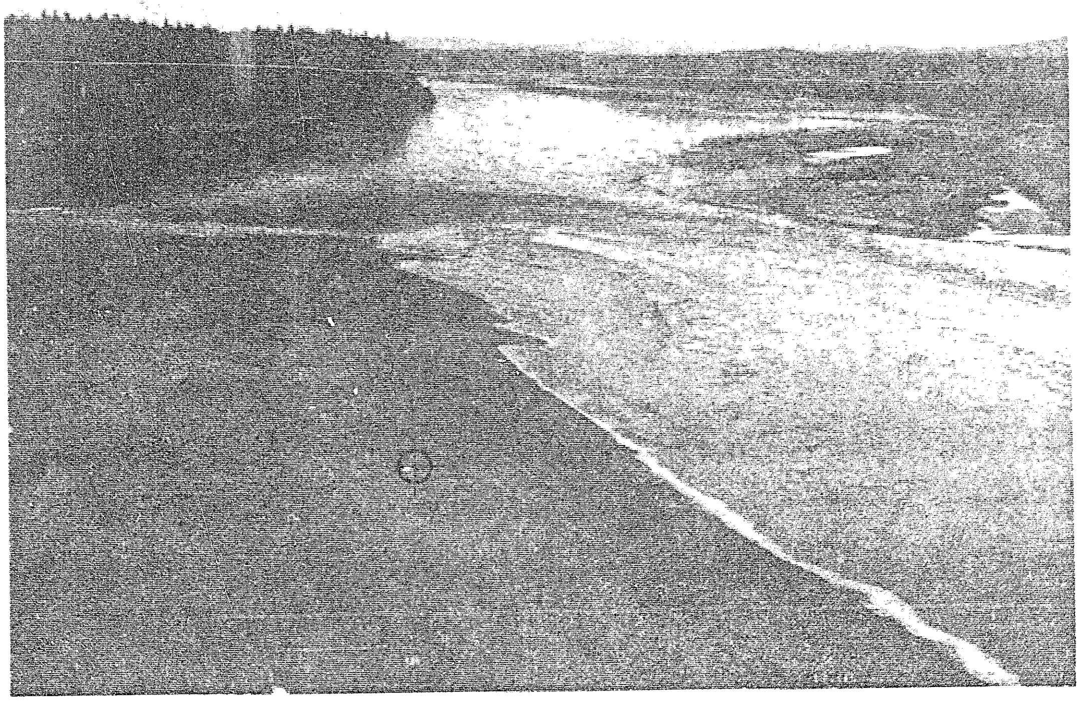

PHOTO 3.61

Aerial photo looking upstream. Sample 2, RM 86.3 is located in lower left of the photograph.

River Mile 86.3

Sample 3

The sample site was on the east bank of the west channel (Photo 3.62, 3.63 and Figure 3.18). The surface was not frozen, the sample was taken from 0.5 feet to 1.3 feet below the surface and water was at 1.5 feet. The armor layer was moderately developed (Photo 3.62). The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.20).

PHOTO 3.62
Looking upstream along east bank of the west channel at Sample 3, RM 86.3. The surface has a moderately developed armor layer.

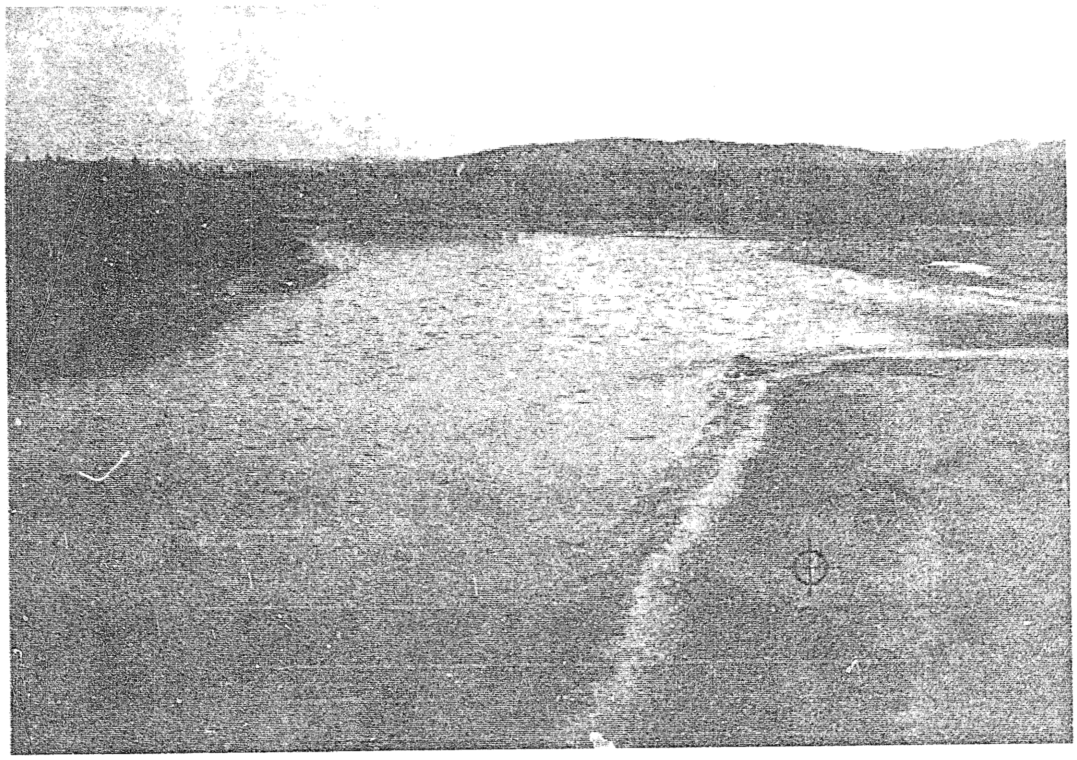

PHOTO 3.63
Aerial photo looking upstream. Sample 3, RM 86.3 is located in lower right of the photograph.

River Mile 86.3

Sample 4

The sample site was on the west bank of the west channel (Photo 3.64, 3.65 and Figure 3.18). The surface was not frozen, the sample was taken from 0.6 feet to 1.4 feet below the surface and there was no water in the hole. There was a well developed armor layer. Based on field observations the sample, minus the fines, is representative of the armor layer. The sample is a poorly-graded gravel-sand mixture with no fines and is representative of the local area (Figure 3.19).

PHOTO 3.64
Looking upstream along the west bank at Sample 4, RM 86.3. The bank has a well developed armor layer.

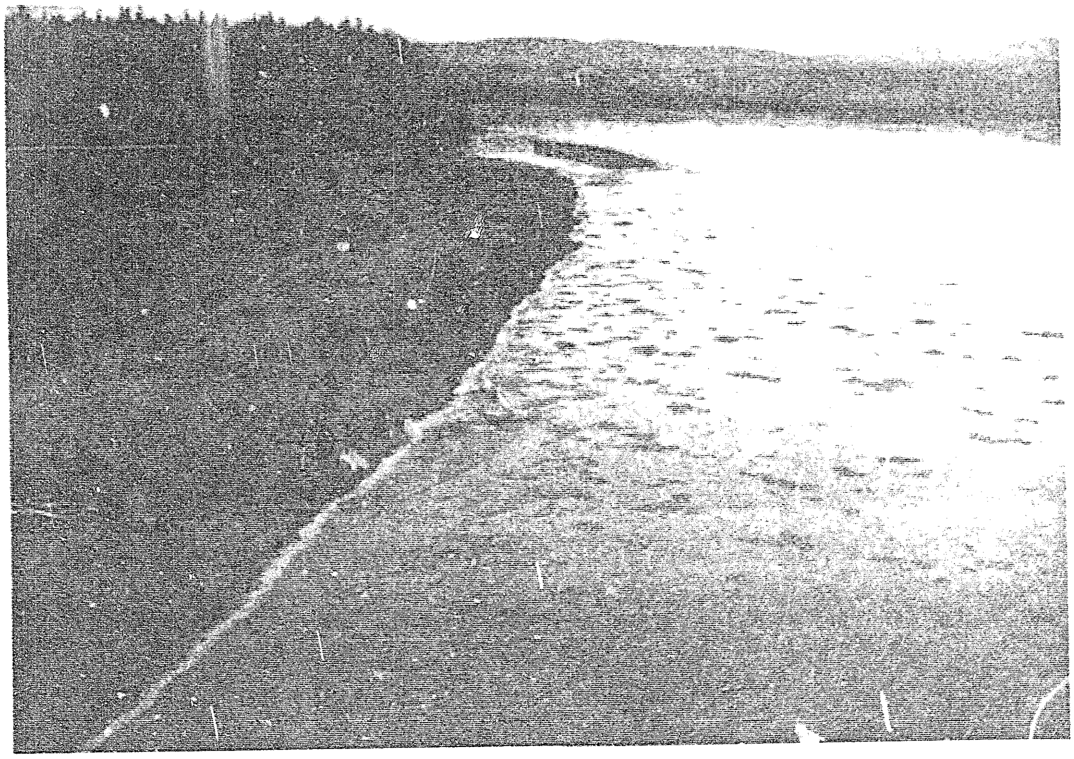

PHOTO 3.65
View looking up the west channel. Sample 4, RM 86.3, is located in the lower left of the photograph.

River Mile 86.3

Sample 5

Armor layer sample was collected in a high water channel near the middle of the cross-section (Photo 3.66, 3.67 and Figure 3.18). This sample is representative of the armor layer and is not biased because the sample was not frozen during sampling. The sample is a poorly-graded gravel with few sands and fines (Figure 3.20).

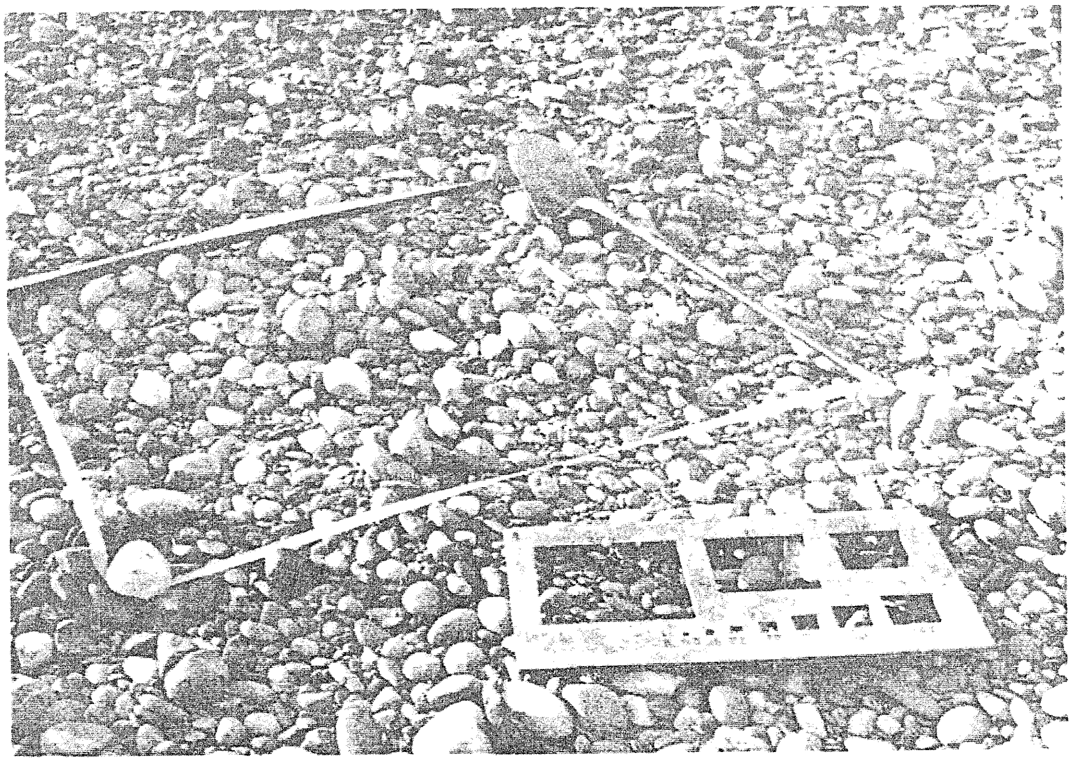

PHOTO 3.66
Armor layer, Sample 5, RM 86.3. Flow is from right to left. Shovel and flagging delineate sample area.

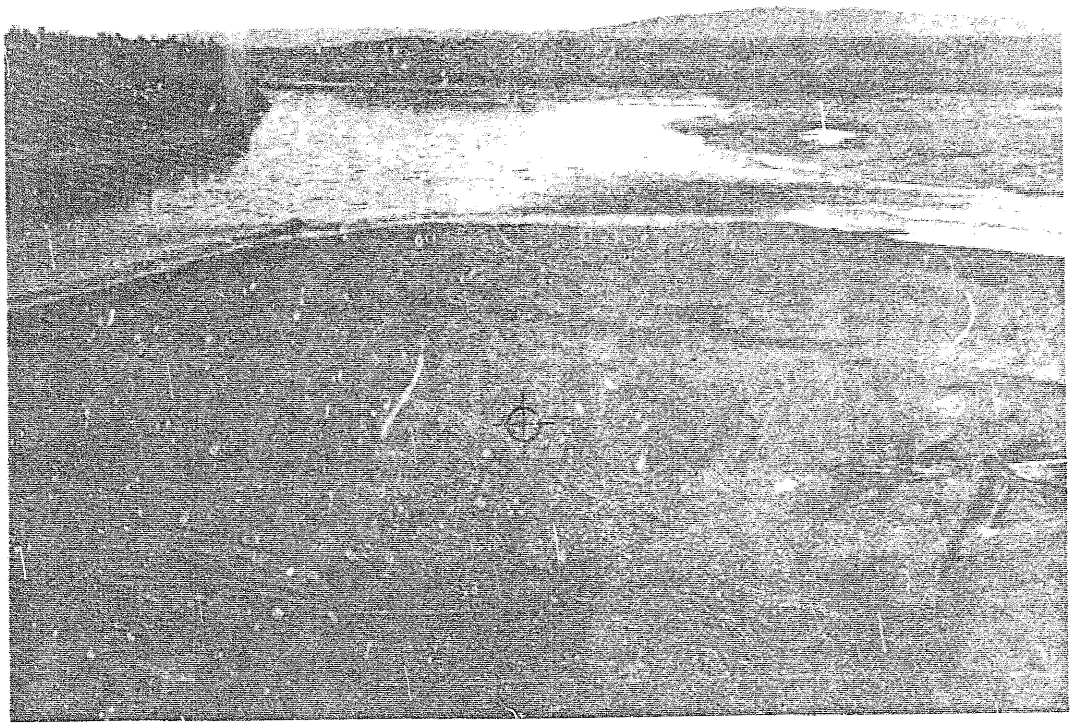

PHOTO 3.67
View lc c tream at the armor layer sample near the middle of the cross-s mple 5, RM 86.3 is located in the middle of the photogra

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 86.3

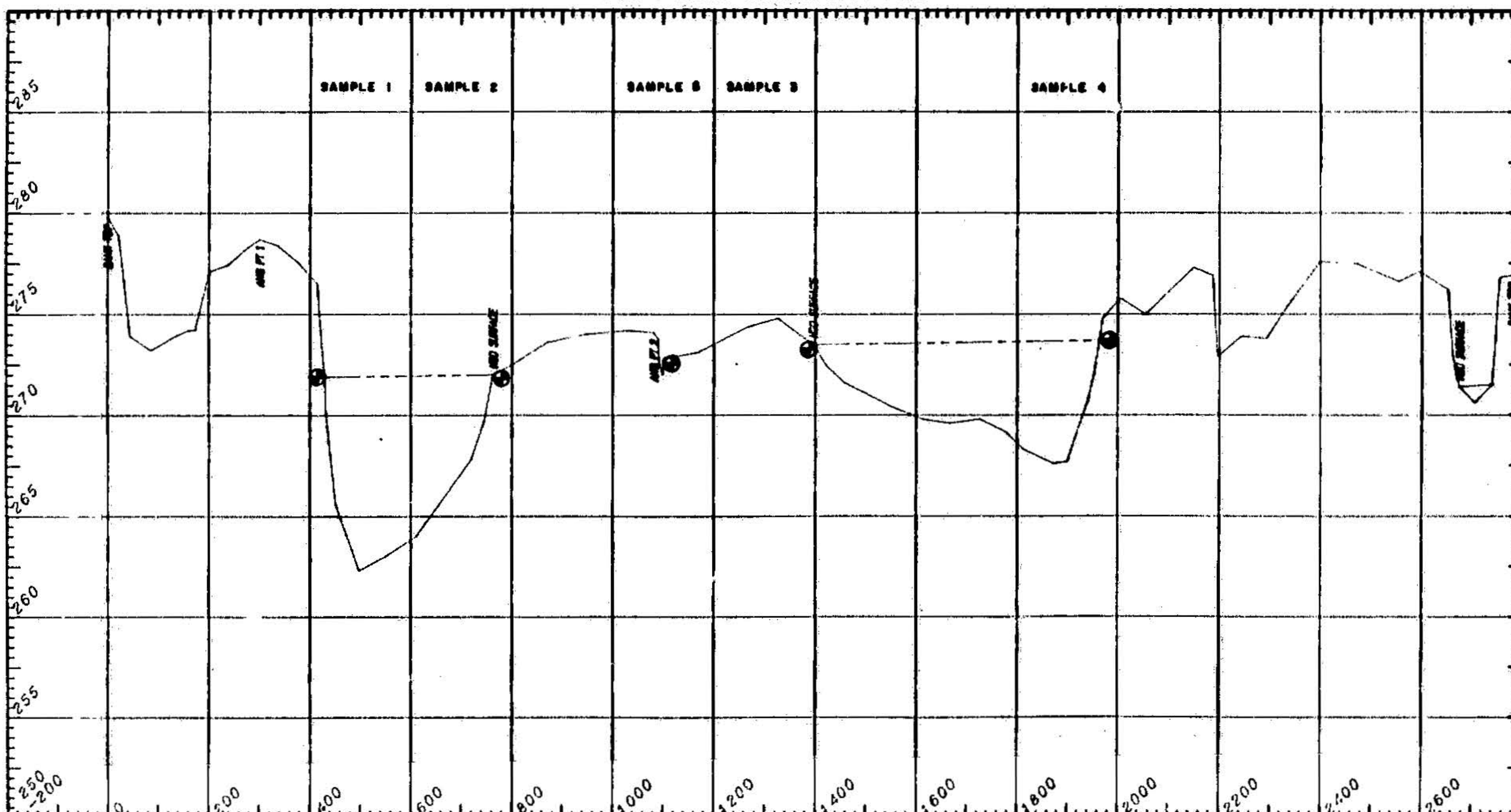

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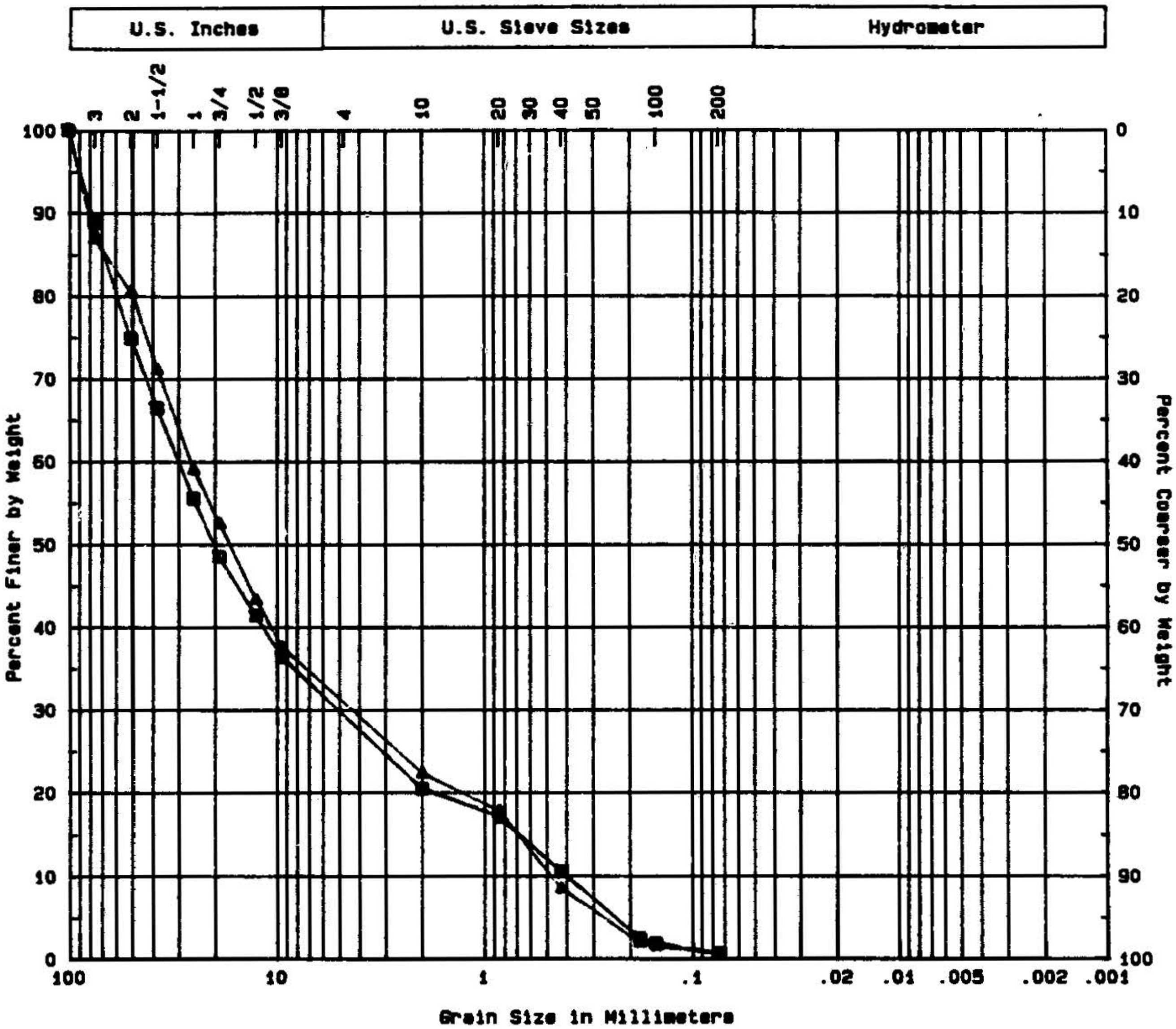
FIGURE 3.18

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR

HARZA-EBASCO

SUSITNA JOINT VENTURE



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	86.3	1	.7-1.3	55	1.5				GW	
□	86.3	2	.7-1.3	76	2.2				GW	

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SUSITNA
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AGGRADATION STUDY
RIVER MILE 86.3

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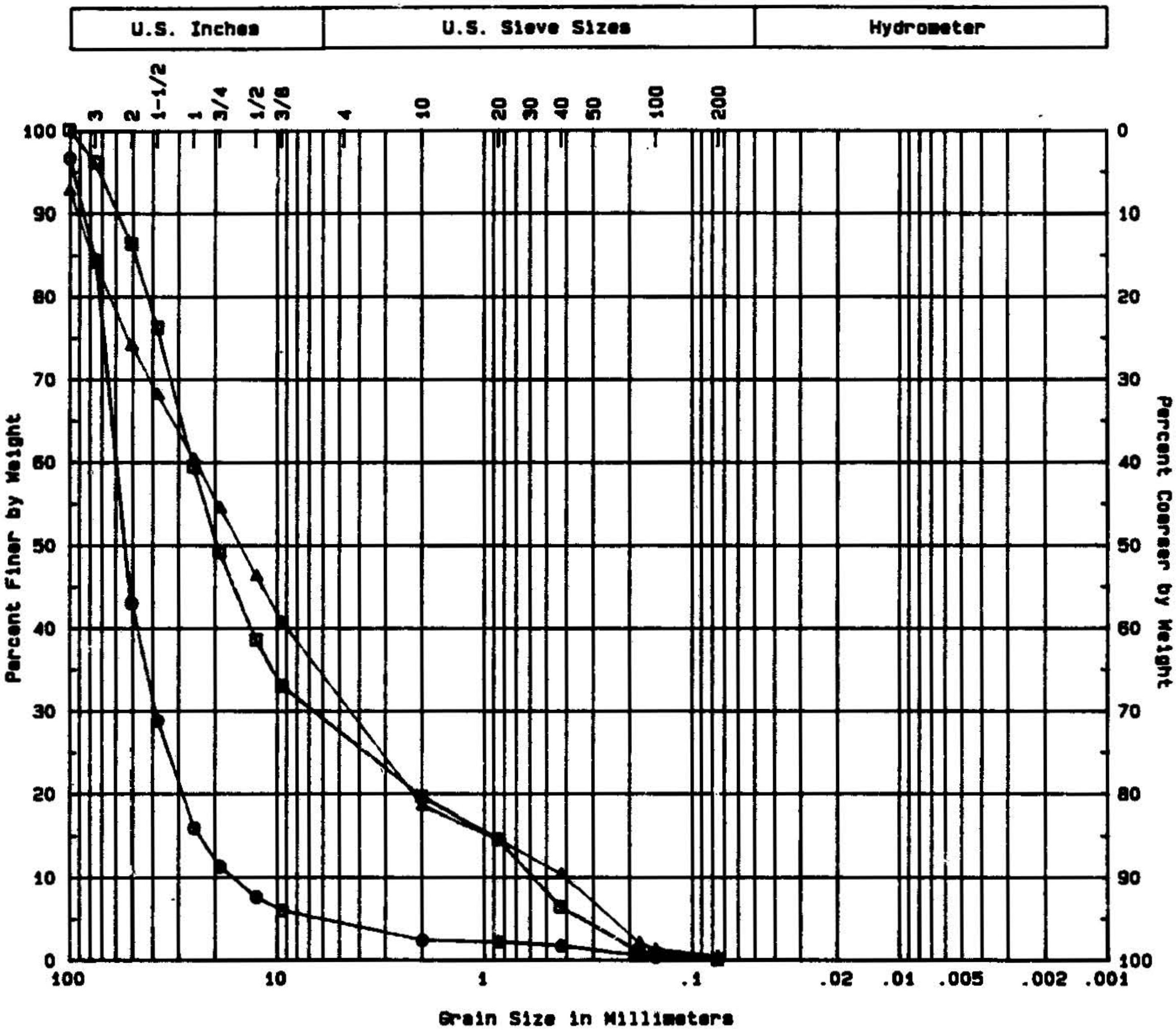
PROJ. NO.	
DWG. NO.	3.19



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	86.3	3	.5-1.3	62	2				GW	
□	86.3	4	.6-1.4	45	3				GP	
○	86.3	5	Armor	4	1.5				GP	

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 86.3

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PROJ.NO.
DWG.NO. 3.20

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River Mile 84.6

Sample 1

The sample site was in the middle of the Sunshine Slough (Photo 3.68, 3.69 and Figure 3.21). The river bed was frozen from the surface to 0.6 feet, the sample was taken from 0.6 feet to 1.2 feet and there was no water in the hole. There was a well developed armor layer with some silt covering it. Based on field observations the sample, minus the fines, is representative of the armor layer. The sample is a well-graded gravel-sand mixture with few fines and is representative of the local area (Figure 3.22).

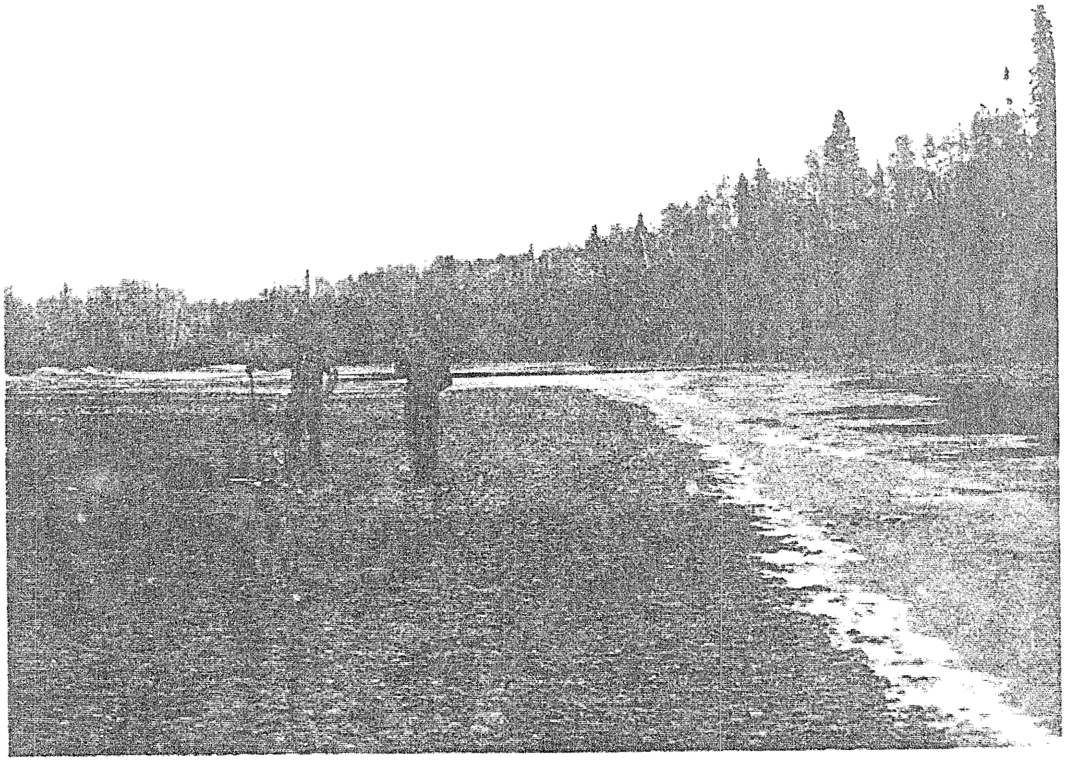

PHOTO 3.68
Looking upstream in the middle of Sunshine Slough at Sample 1, RM 84.6.

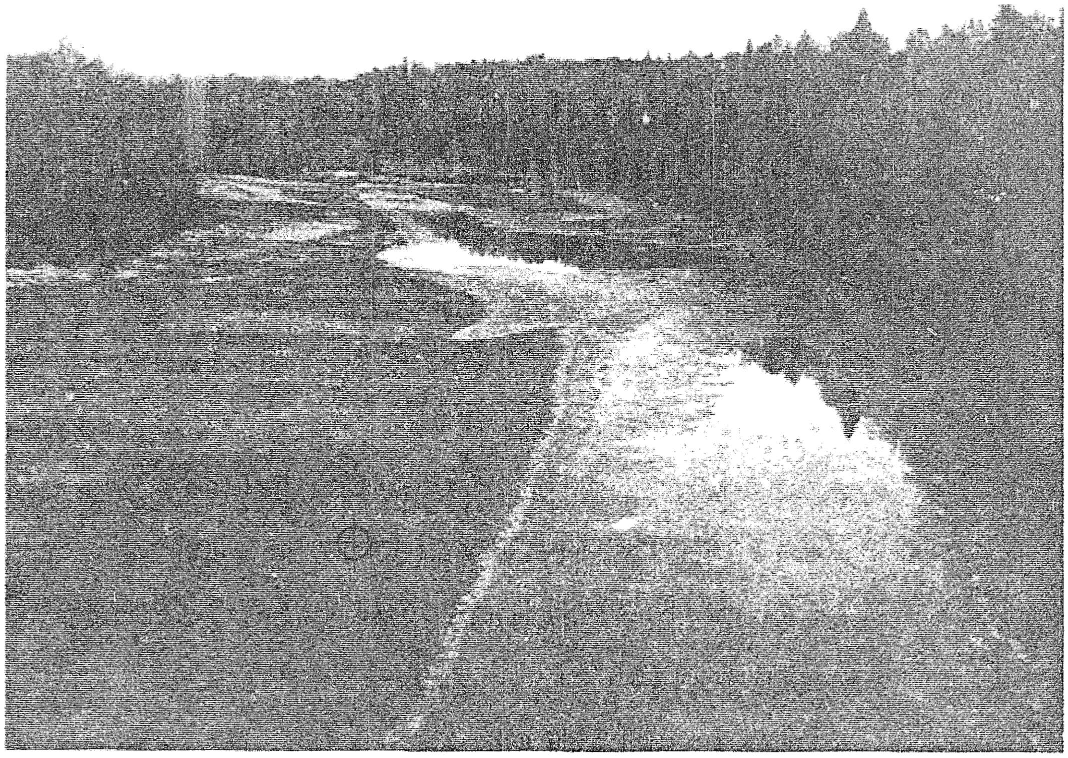

PHOTO 3.69
Aerial photo looking upstream. Sample 1, RM 84.6 is located in lower left center of photograph.

River Mile 84.6

Sample 2

The sample site was in a high water channel (Photo 3.70, 3.71 and Figure 3.21). The river bed was frozen from the surface to 0.3 feet, the sample was taken from 1.0 feet to 1.7 feet, and there was no water in the hole. This is a depositional area with sand on the surface with some gravel. Test pits in the area showed that Sample 2 is representative of the local area. The sample is a well-graded gravel-sand mixture with few fines (Figure 3.22).

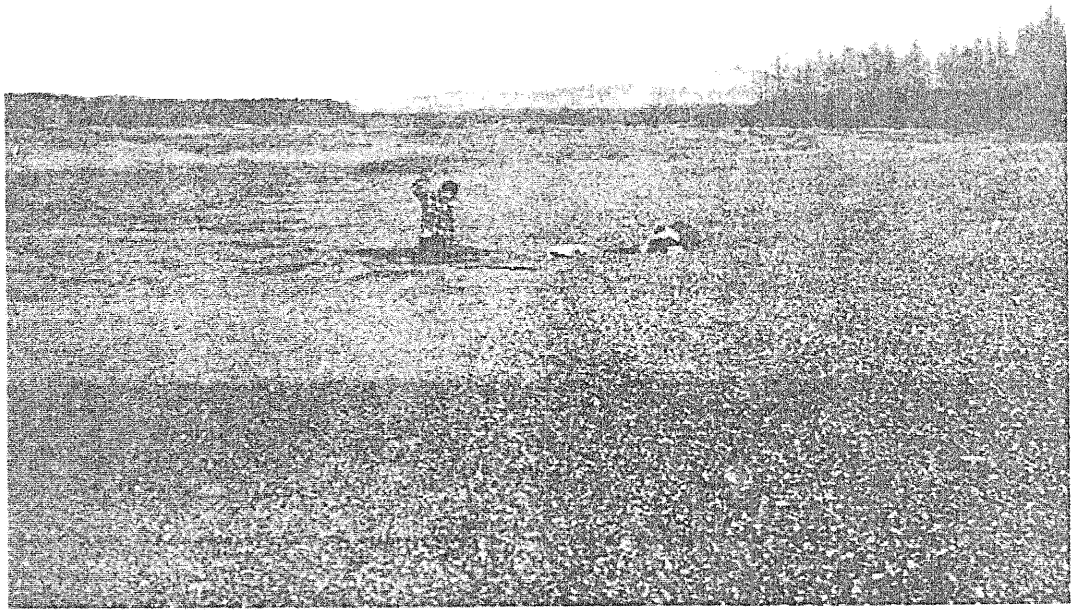

PHOTO 3.70
Looking upstream in a high water channel at Sample 2, RM 84.6.

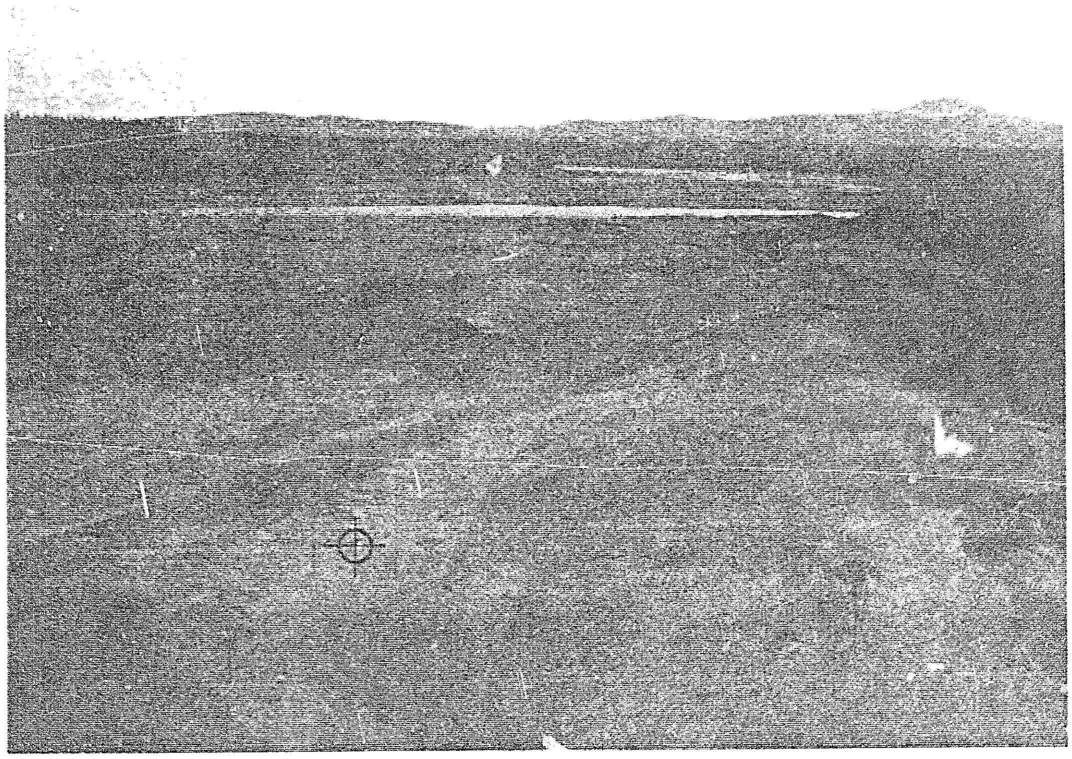

PHOTO 3.71
Aerial photo looking upstream. Sample 2, RM 84.6 is located in left center of photograph.

River Mile 84.6

Sample 3

The sample site was on the east bank of the west channel (Photo 3.72, 3.73 and Figure 3.21). The river bed was frozen from the surface to 0.3 feet, the sample was taken from 1.2 feet to 1.8 feet, and there was no water in the hole. The site is on the downstream side of a gravel bar. The surface material is sand with some silt over a gravel-sand mixture (Figure 3.22).

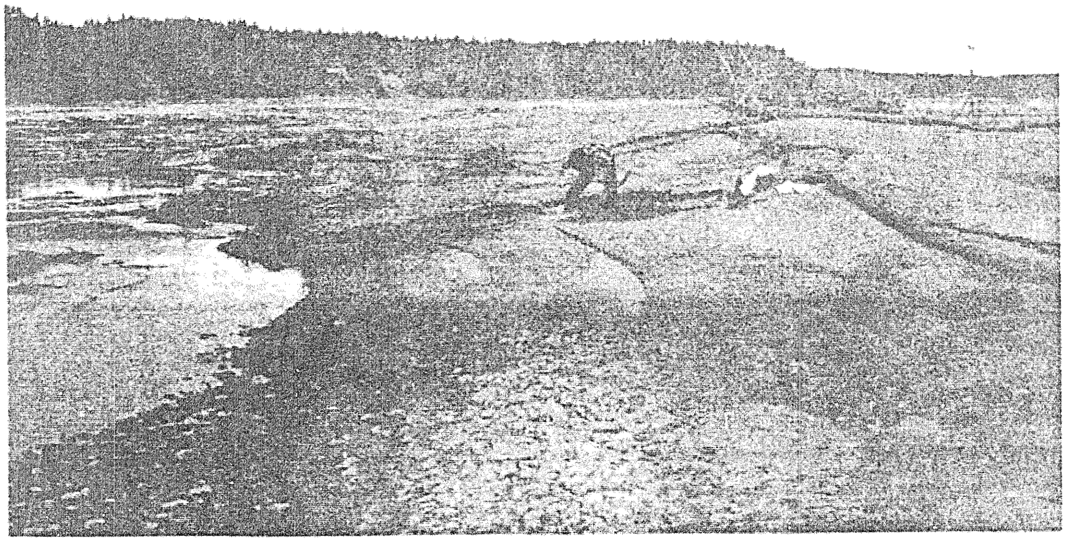

PHOTO 3.72
Looking upstream along east bank of west channel at Sample 3, RM 84.6. The sample site is on the downstream side of a bar with sand and some silt overlying a gravel-sand mixture.

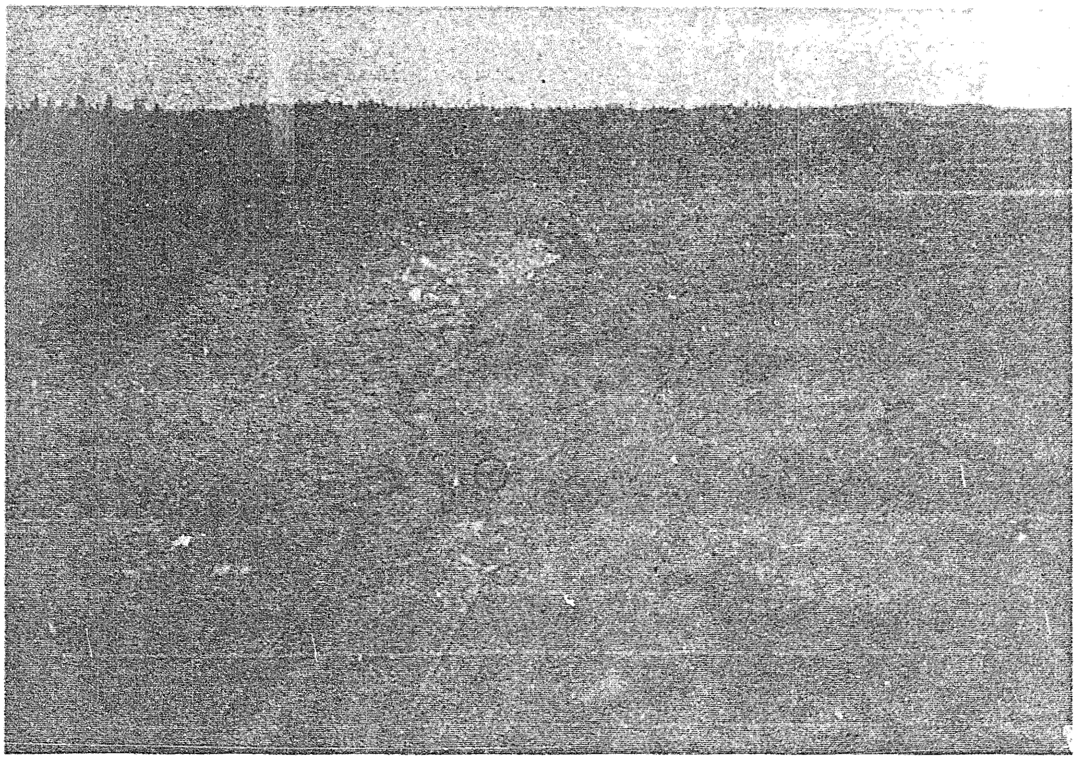

PHOTO 3.73
Aerial photo looking upstream. Sample 3, RM 84.6 is located in left center of photograph.

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 84.6

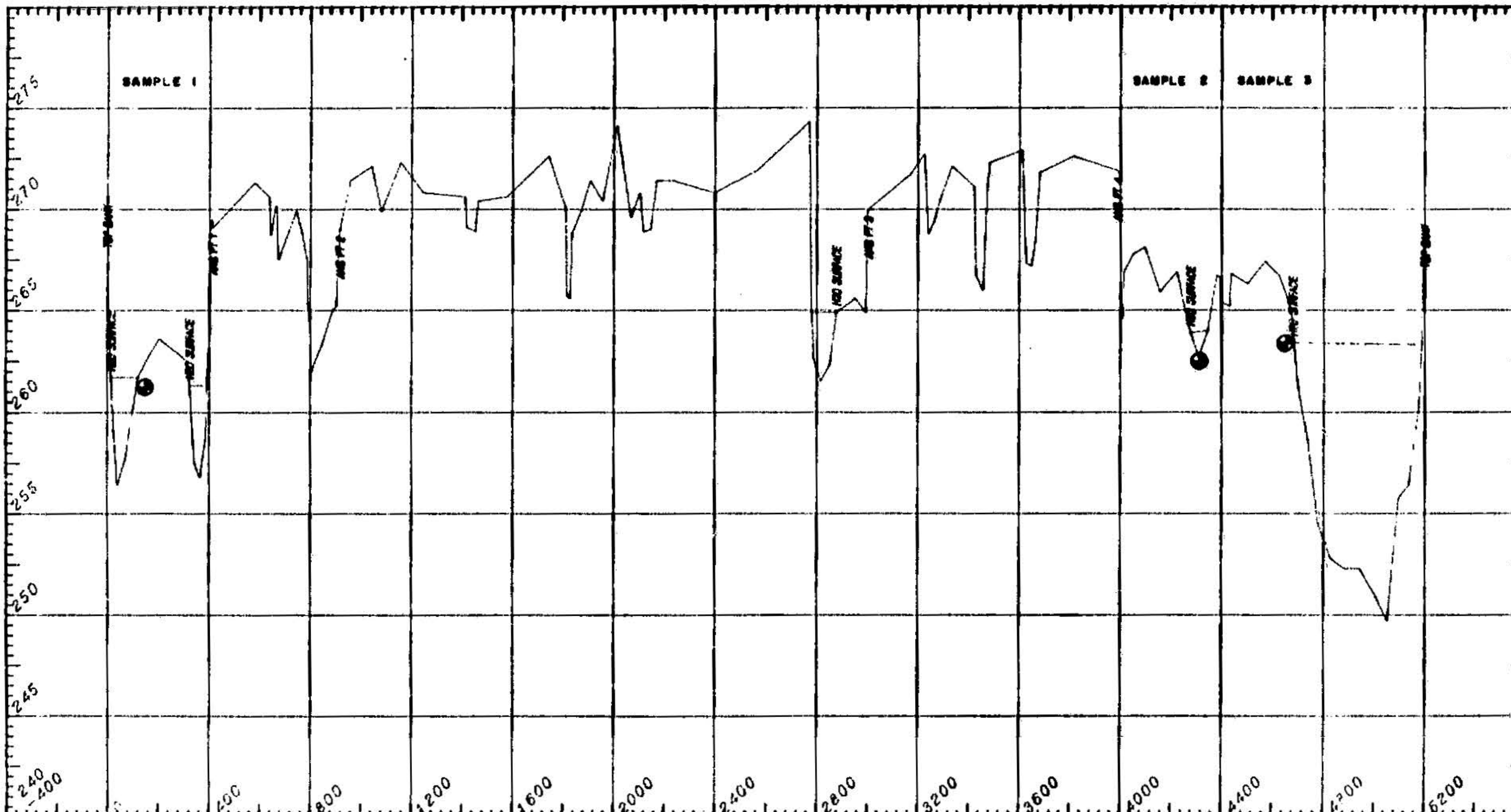

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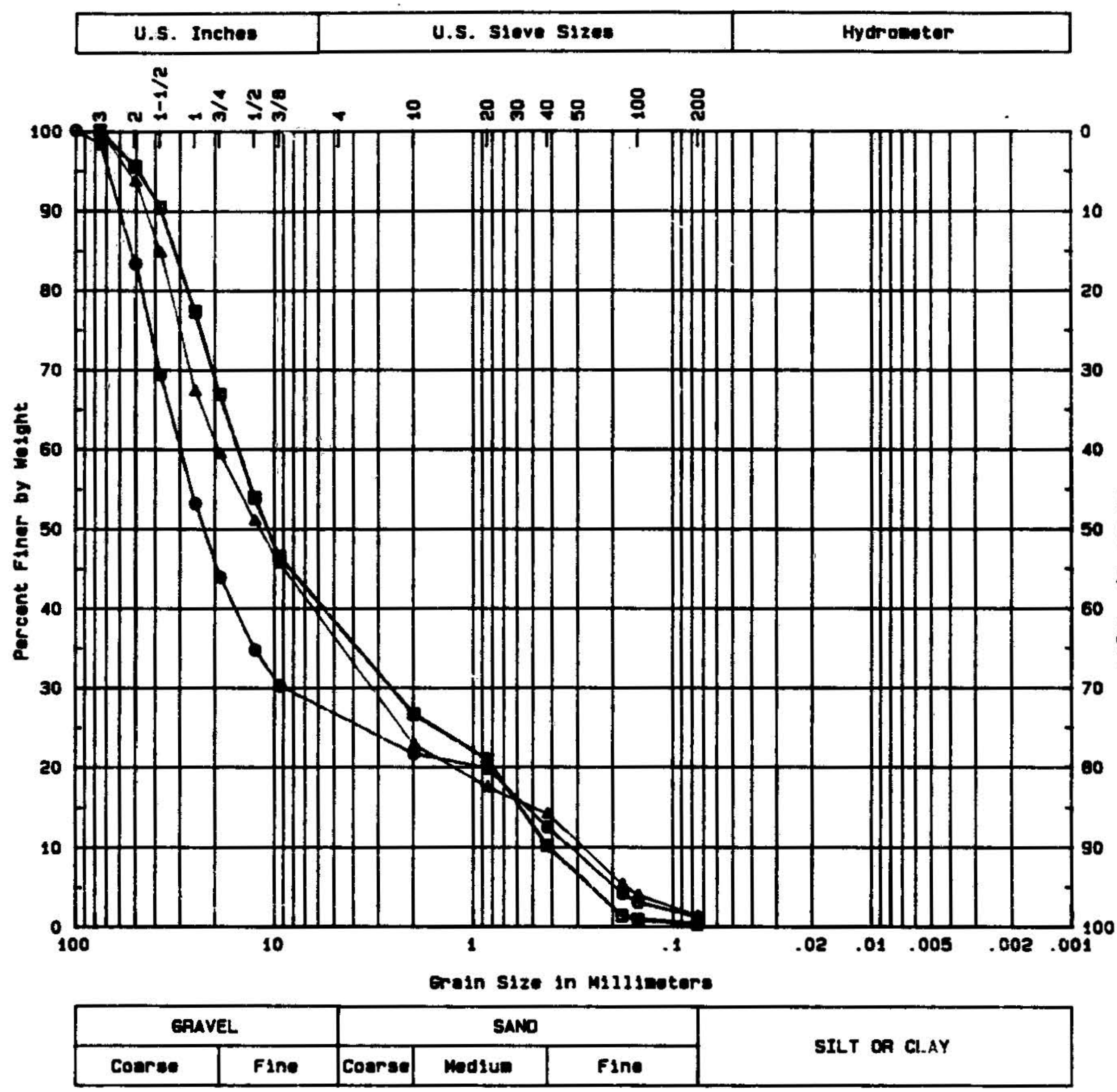
FIGURE 3.21

BED MATERIAL SAMPLE SITE LOCATIONS

PREPARED FOR:

HARZA-EBASCO
SUSITNA JOINT VENTURE



Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	84.6	1	.6-1.2	69	1.9				GW	
□	84.6	2	1-1.7	37	1.1				GW	
○	84.6	3	1.2-1.8	93	8.5				GP	

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SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
RIVER MILE 84.6

F.B.
GRID
PROJ.NO.
DWG.NO. 3.22

3.3 SUMMARY COMMENTS

Users of the bed material data should be aware of the difficulties encountered in obtaining representative armor layer samples. Representative samples could not be collected at five of the seven armor layer sample sites because the surface material was frozen. These five samples are biased towards the larger sizes. The two unfrozen samples, Sample 3 RM 93.1 and Sample 5 RM 86.3, sampled the complete armor layer and are representative. The armor layer at RM 87.7 was marginally developed, which would explain why it has a high percentage of fines. The armor layer samples are plotted together for comparison (Figure 3.23 and 3.24).

The samples are grouped together in the sample descriptions to examine the lateral variation in sediment size. For comparison of the longitudinal variation along the river, samples are grouped in the downstream direction according to the east bank of the main east channel; the west bank of the main east channel; the east bank of the main west channel; and the west bank main of the west channel. For cross-sections where there is only one main channel, the samples were plotted with both groups.

Two of the samples from the east bank of the main east channel do not follow the general trend (Figures 3.25 and 3.26). Sample 1 RM 91.8 is coarser than the rest of the group. The sample had cobbles and coarse gravel and appeared representative of the surface material. Sample 1 RM 90.6 has the largest percentage of fines in the group. This sample was taken in a area with an active cutbank. It appeared that the river had not had a chance to rework the material and move the smaller material downstream.

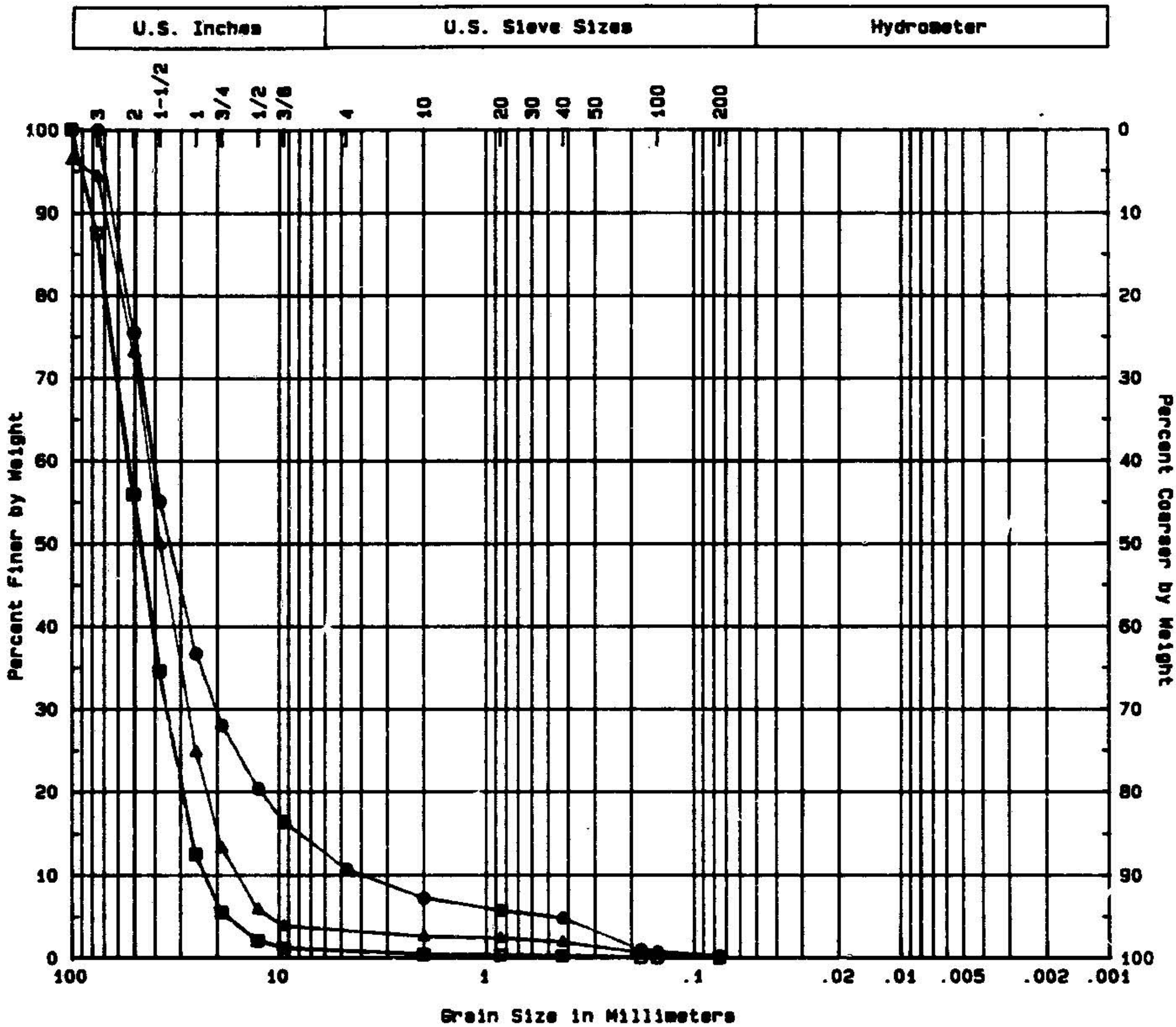
Two of the samples from the west bank of the main east channel do not follow the general trend (Figures 3.27 and 3.28). Sample 2 RM 93.1 has the largest percentage of fines in the group. The sample site is in a depositional area on the downstream end of a gravel bar. Sample 2 RM

87.7 also has more fines than the general trend. Like Sample 2, RM 93.1, it is in a depositional area on the downstream end of a gravel bar.

One of the samples from the east bank of the main west channel does not follow the general trend (Figures 3.29 and 3.30). Sample 4 RM 87.7 has the largest percentage of fines in the group. The sample site is in a depositional area on the downstream end of a gravel bar. It is interesting to note that Sample 4, RM 93.1 also in a depositional area on the downstream side of a gravel bar, follows the general trend.

All of the west bank west main channel samples follow the general trend (Figure 3.31).

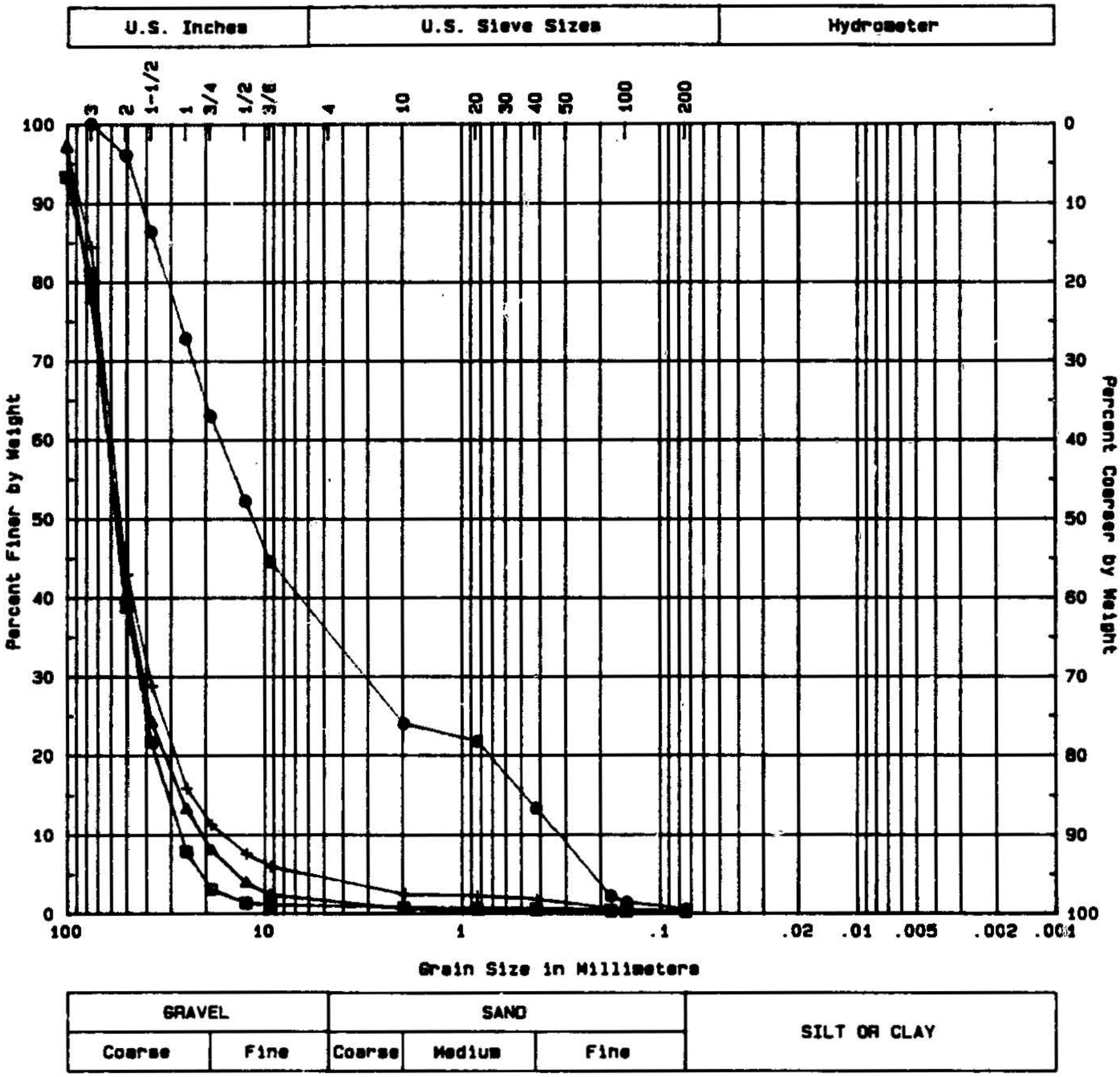
The trend in gradation is fairly close for most of the sample sites. There is some variation of the samples based on position of the gravel bars and for the coarser gravels (+3"). Some sites have no +3" gravels but do match the trend for the fine gravel and sands.



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	97.1	6	Armor	3	1.1				GP	
□	95.9	7	Armor	2	1				GP	
○	93.1	3	Armor	11	2.6				GW	

DWN	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT	F.B.
CKD		AGGRADATION STUDY	GRID
DATE 11-84		ARMOR LAYER SAMPLES 1 OF 2	PROJ. NO
SCALE	122		DWG. NO 3.23



Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
▲	91.8	6	Armor	3	1.3				GP	
□	90.6	5	Armor	2	1.1				GP	
O	87.7	6	Armor	52	1.8				GW	
+	86.3	5	Armor	4	1.5				GP	

DWN.
CKD.
DATE. 11-84
SCALE

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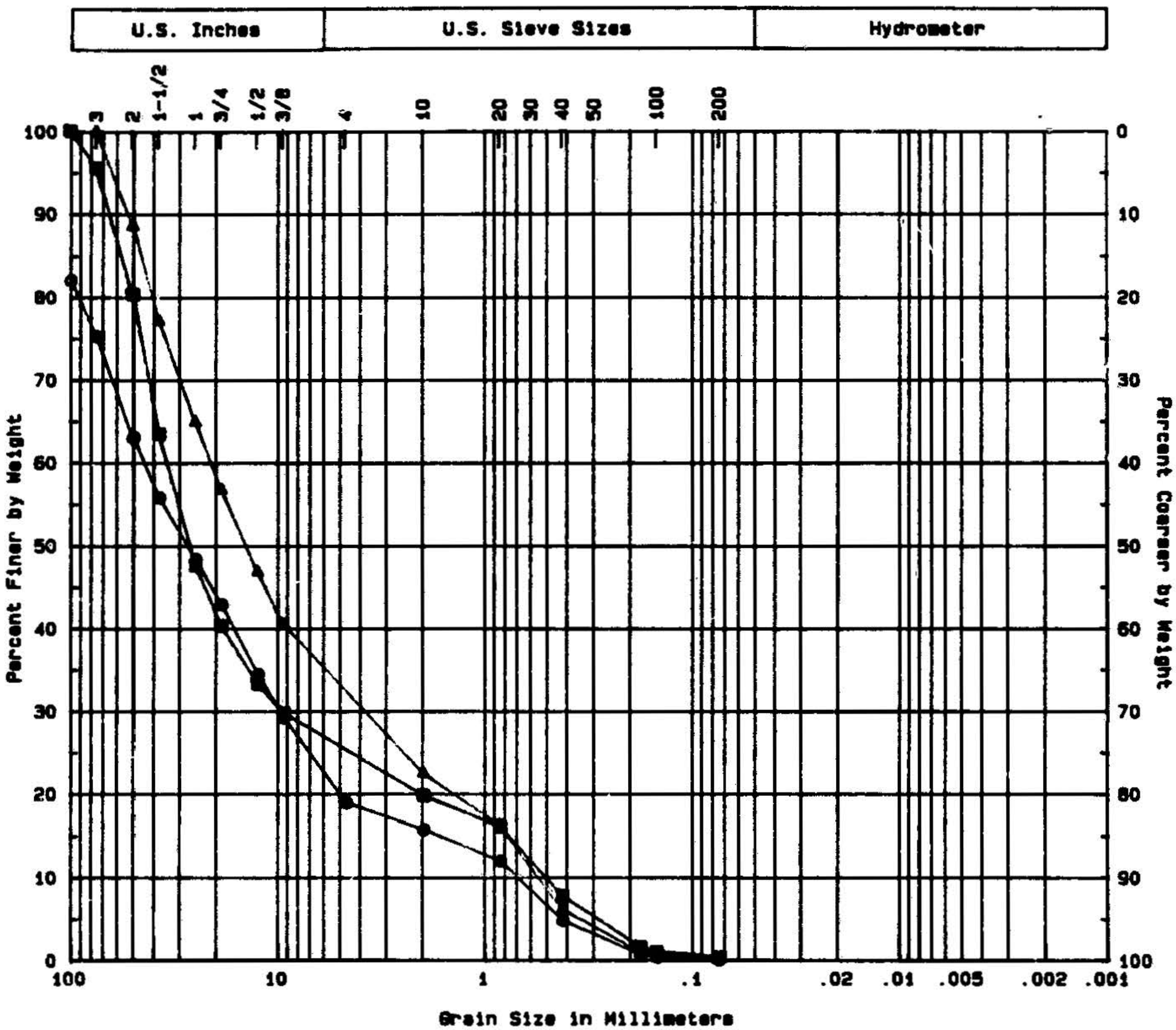
123

SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY
ARMOR LAYER SAMPLES 2 OF 2

F.B.
GRID.
PROJ. NO.
DWG. NO 3.24



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	97.1	1	.5-1.6	39	1.2				GW	
□	93.1	1	.5-1.5	69	5.3				GP	
O	91.8	1	.8-1.6	65	3.2				GP	

SAMPLES FROM THE EAST BANK OF THE MAIN EAST CHANNEL (1 OF 2)

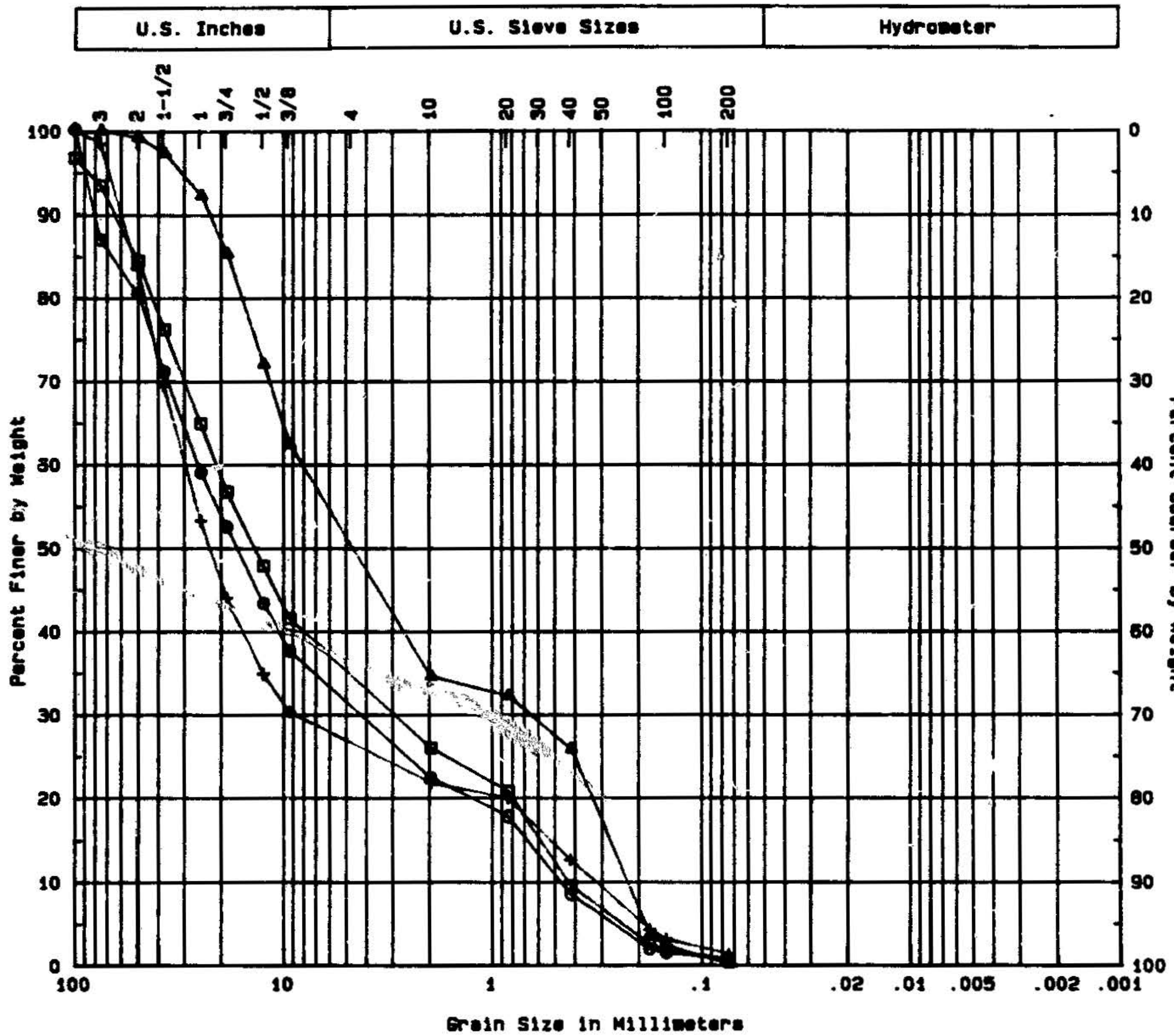
DWN.	
CKD.	
DATE.	11-84
SCALE	

R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

124

SUSITNA
HYDROELECTRIC PROJECT
AGGRADATION STUDY

FB.	
GRID.	
PROJ.NO.	
DWG.NO.	3.25

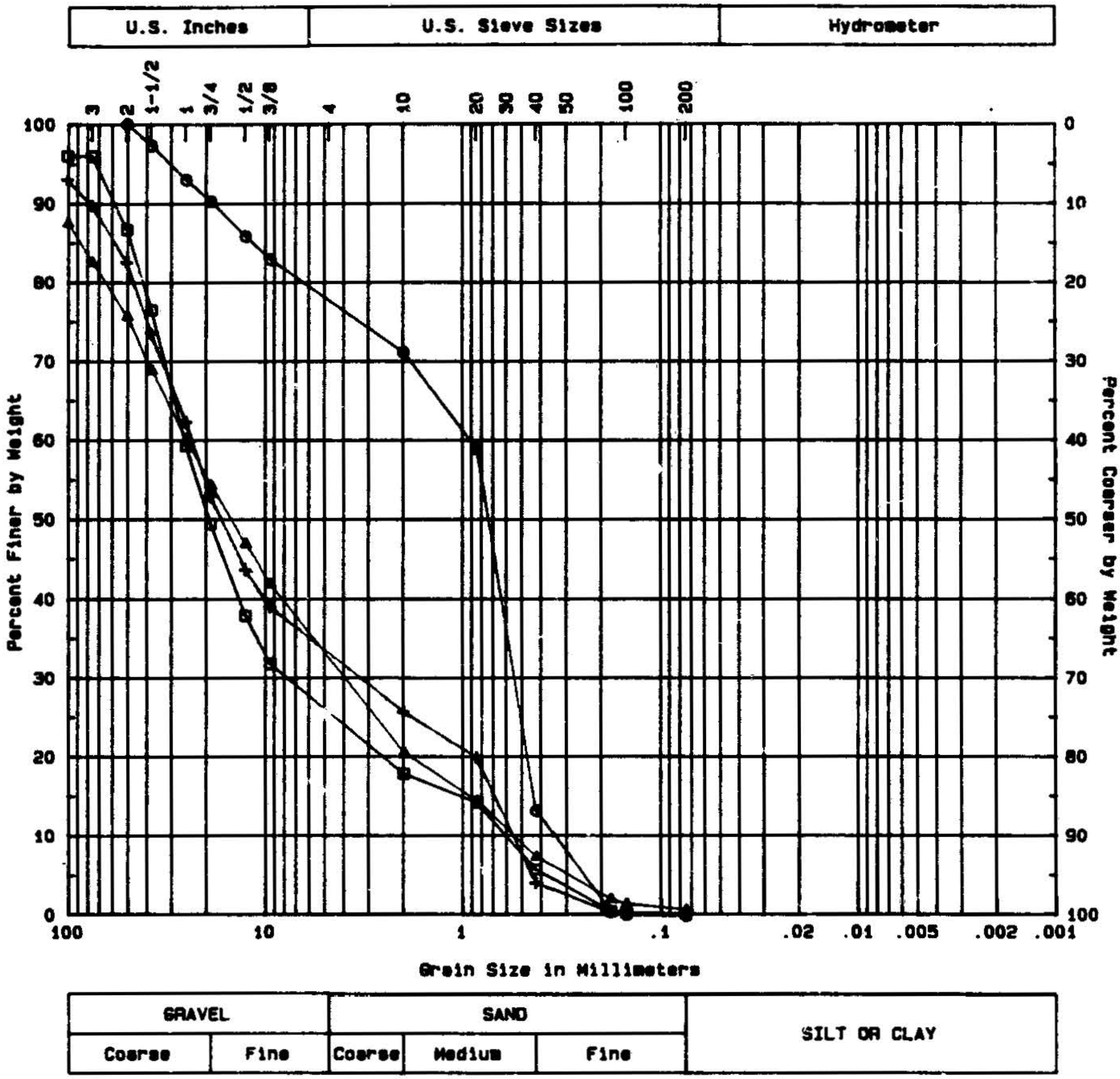


GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	90.6	1	.5-1	36	.2				GP	
□	87.7	1	.6-2	49	1				GP	
○	86.3	1	.7-1.3	55	1.5				GW	
+	84.6	3	1.2-1.8	93	8.5				GP	

SAMPLES FROM THE EAST BANK OF THE MAIN EAST CHANNEL (2 OF 2)

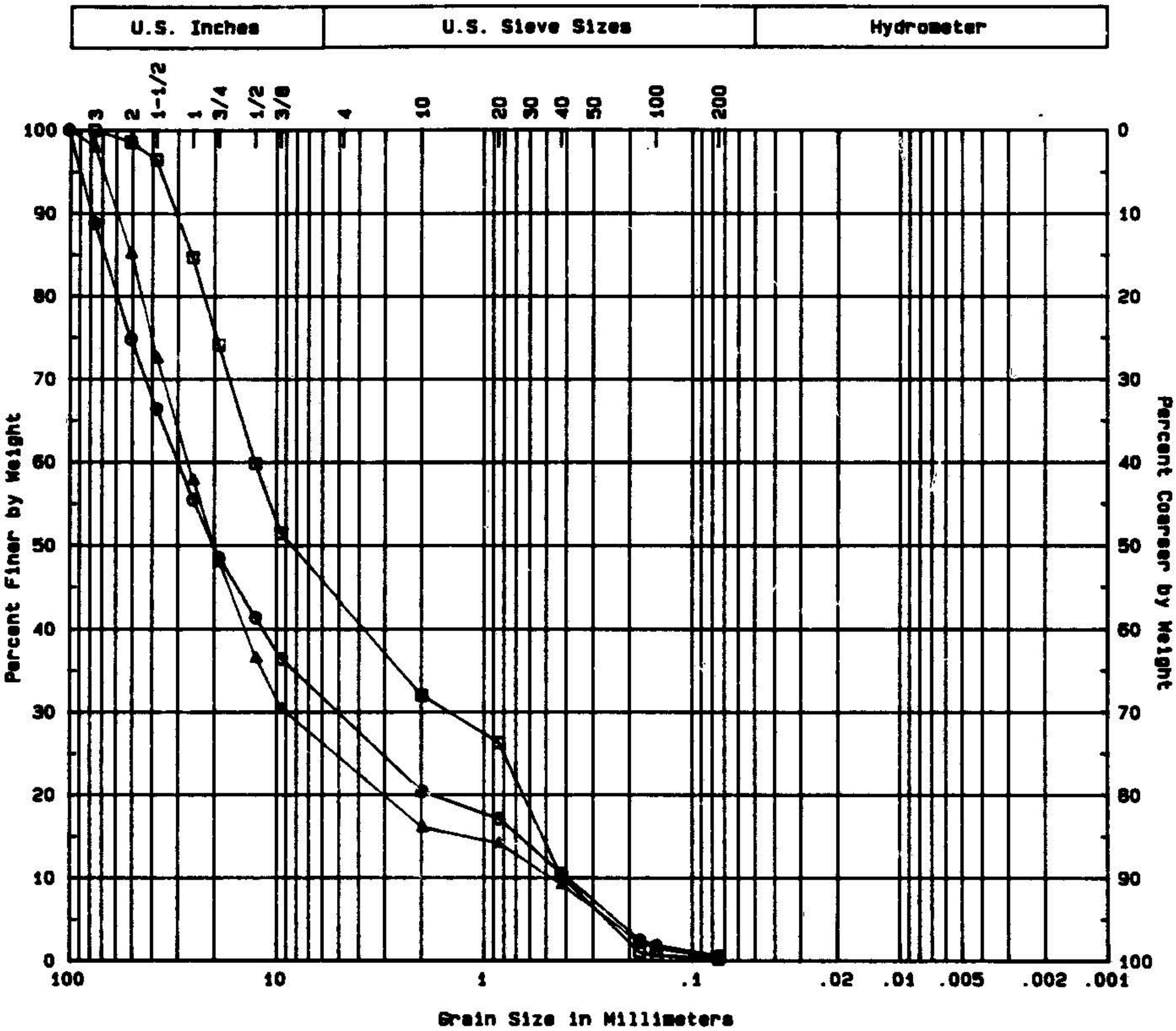
DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY	F.B.
CKD.			GRID.
DATE. 11-84			PROJ. NO.
SCALE	125		DWG. NO. [illegible].26



Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	97.1	2	.5-1.4	46	1.2				GW	
□	95.9	1	.8-1.5	43	3.9				GP	
○	93.1	2	1-1.5	3	1				SP	
+	91.8	2	1-1.9	43	.8				GP	

SAMPLES FROM THE WEST BANK OF THE MAIN EAST CHANNEL (1 OF 2)

DWN. CKD. DATE 11-84 SCALE	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS 126	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY	F.B. GRID PROJ. NO. DWG. NO. 3.27

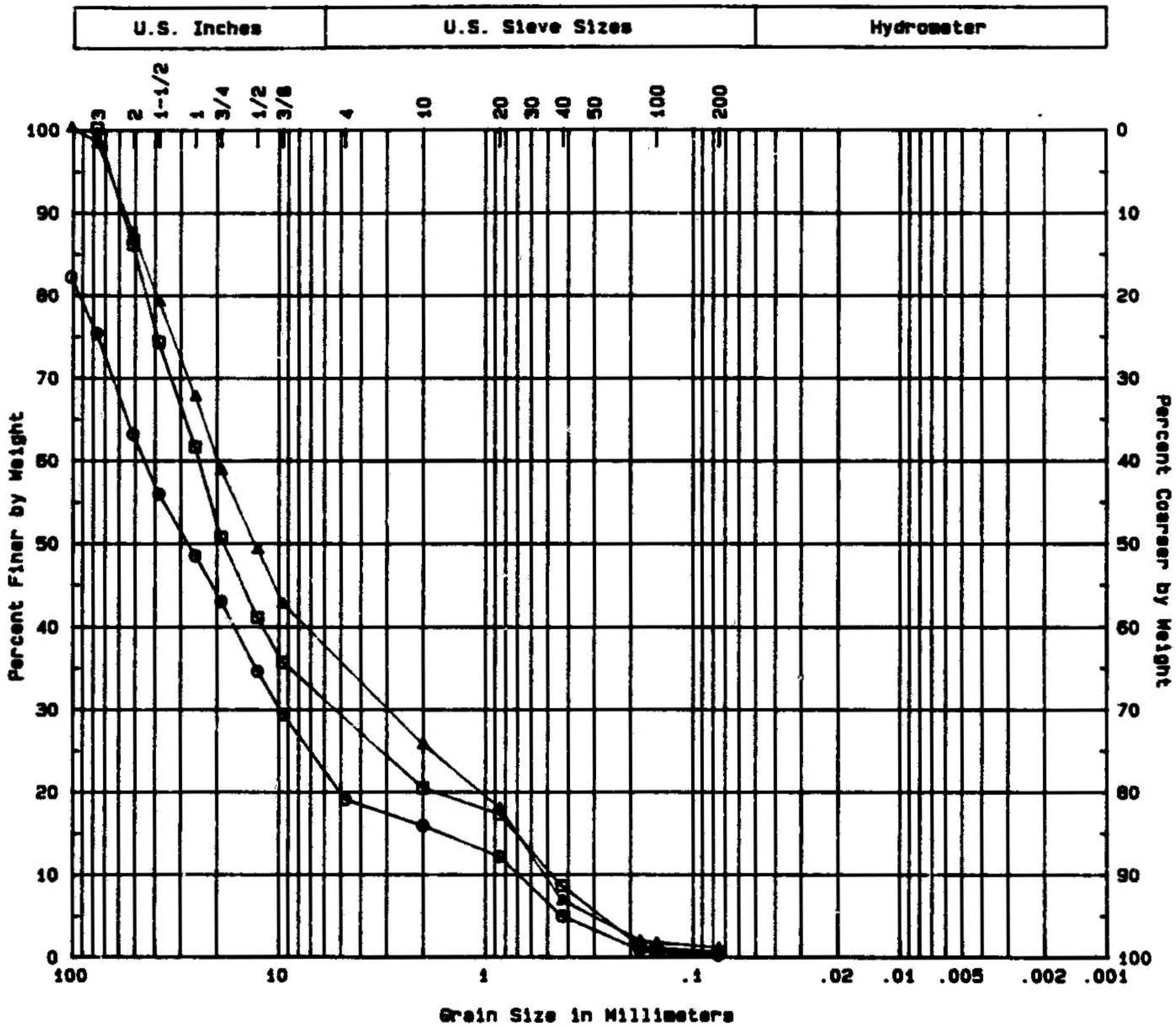


GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	90.6	2	.6-1.4	57	6.5				GP	
□	87.7	2	.5-1	31	.4				GP	
O	86.3	2	.7-1.3	76	2.2				GW	

SAMPLES FROM THE WEST BANK OF THE MAIN EAST CHANNEL (2 OF 2)

DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY	F.B.
CKD.			GRID.
DATE. 11-84			PROJ. NO.
SCALE	127		DWG. NO. 3.28

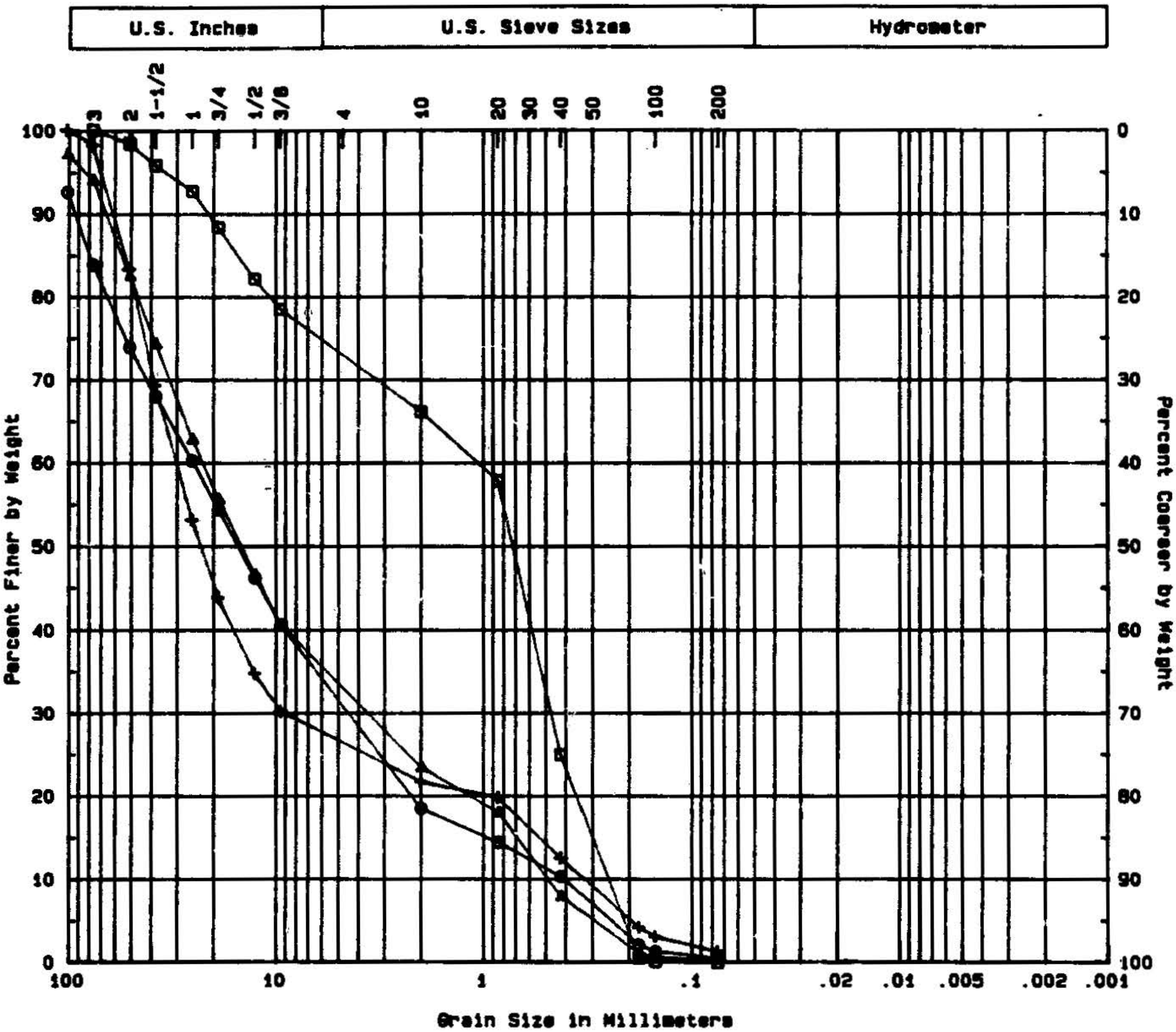


GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
Δ	97.1	4	.4-1.3	38	.9				GP	
□	93.1	4	.4-1.3	51	2.5				GW	
O	91.8	1	.8-1.6	65	3.2				GP	

SAMPLES FROM THE EAST BANK OF THE MAIN WEST CHANNEL (1 OF 2)

DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY	F.B.
CKD.			GRID.
DATE. 11-84			PROJ. NO.
SCALE	128		DWG. NO. 3.29



GRAVEL		SAND			SILT OR CLAY
Coarse	Fine	Coarse	Medium	Fine	

Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	90.6	4	.4-1	47	1.2				GW	
□	87.7	4	.5-1.5	4	.8				SP	
○	86.3	3	.5-1.3	62	2				GW	
+	84.6	3	1.2-1.8	93	8.5				GP	

SAMPLES FROM THE EAST BANK OF THE MAIN WEST CHANNEL (2 OF 2)

DWN.
CKD.
DATE. 11-84
SCALE

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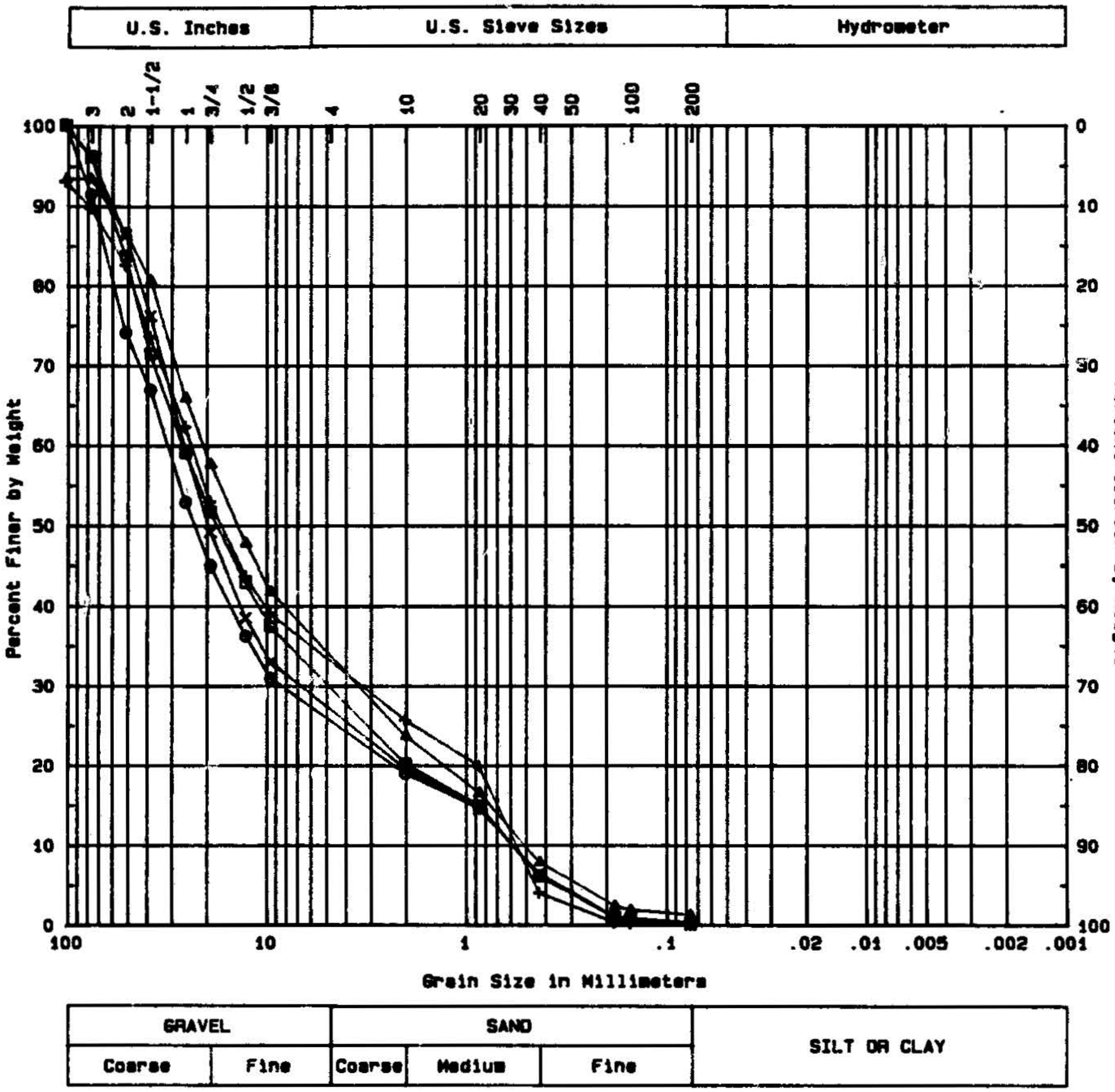
SUSITNA HYDROELECTRIC PROJECT
AGGRADATION STUDY

F.B.
GRID.
PROJ.NO.
DWG.NO. 3.30



Sample Identification				Classification Data					Unified Class	Remarks
Sym	Hole	Samp	Depth	Cu	Cz	LL	PI	% Org		
△	97.1	5	.4-1	41	1.1				GW	
□	95.9	3	.6-1.5	46	1.6				GW	
○	93.1	5	.5-1.2	54	3.9				GP	
+	91.8	2	1-1.9	43	.8				GP	
×	86.3	4	.6-1.4	45	3				GP	

SAMPLES FROM THE WEST BANK OF THE MAIN WEST CHANNEL (1 OF 1)

DWN.	R&M CONSULTANTS, INC. ENGINEERS GEOLOGISTS PLANNERS SURVEYORS	SUSITNA HYDROELECTRIC PROJECT AGGRADATION STUDY	F.B.
CKD.			GRID.
DATE. 11-84			PROJ. NO.
SCALE	130		DWG. NO. 3.31

4.0 LOWER RIVER SURVEYS

4.1 Survey Descriptions

Nine survey cross-sections of the Susitna River channel at river miles 98.0, 97.1, 95.9, 93.1, 91.8, 90.6, 87.7, 86.3, and 84.6 were obtained in September 1984. These cross-sections are identified by a prefix of LRX, i.e., LRX 84.6. The plan view of the cross-section locations are shown in Figure 2.1. Profiles are shown in Section 4.2 which follows. Summarized field notes are presented in Appendix B, with a glossary of terms, and list of benchmarks.

The survey observations were obtained using conventional survey techniques on the banks and exposed bars, utilizing an automatic level and rod. A combination of the same techniques and use of a calibrated weighted line were used in the river channels. End points and cross-section angle points were monumented with a 5/8" x 30" rebar with a 2" aluminum cap marked with the LRX designation and bank side (example, "LRX 84.6 LB" is cross-section at river mile 84.6 left bank end point). All cross-sections were tied vertically with third-order differential levels to the N.G.S. M.S.L datum network (same vertical datum as previous Susitna River cross-sections).

4.2 River Cross-Section Profile Plots

This section compiles a summary of plots for each cross-section which were surveyed in 1984. Included in this section are selected lower river cross-sections surveyed in 1980 and 1982 and re-plotted in the format of the 1984 surveys. The cross-sections are plotted looking downstream with the east bank on the left. The plots are indexed from the up-river cross-section LRX 98.0 downstream to LRX 84.6, and chronologically from 1980 to 1984 where applicable. The cross-section angle points, edge of vegetation and water surfaced are labeled on the 1984 plots.

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 3.1

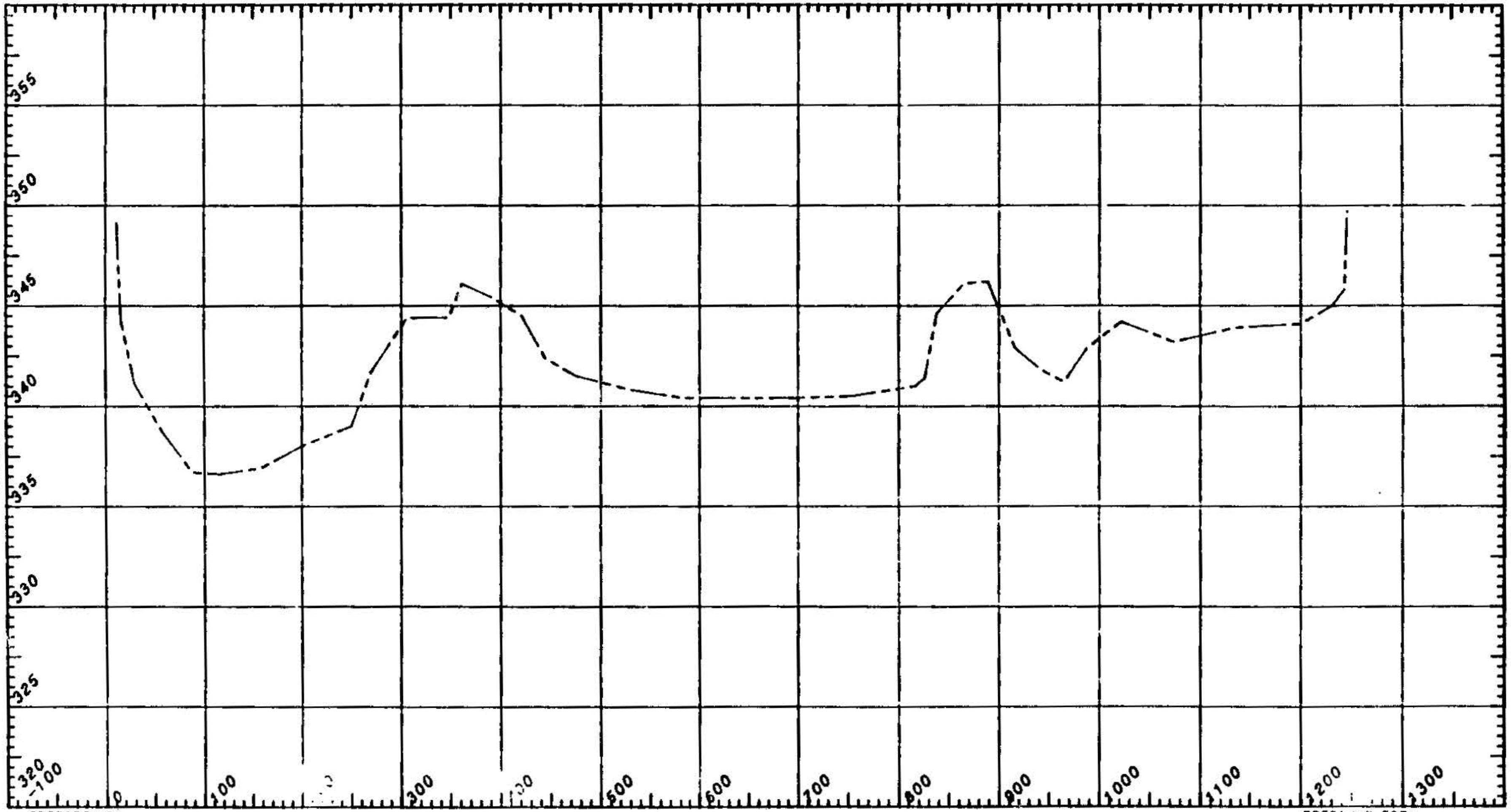


FIGURE 4.1

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SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1980 cross section LRX 3

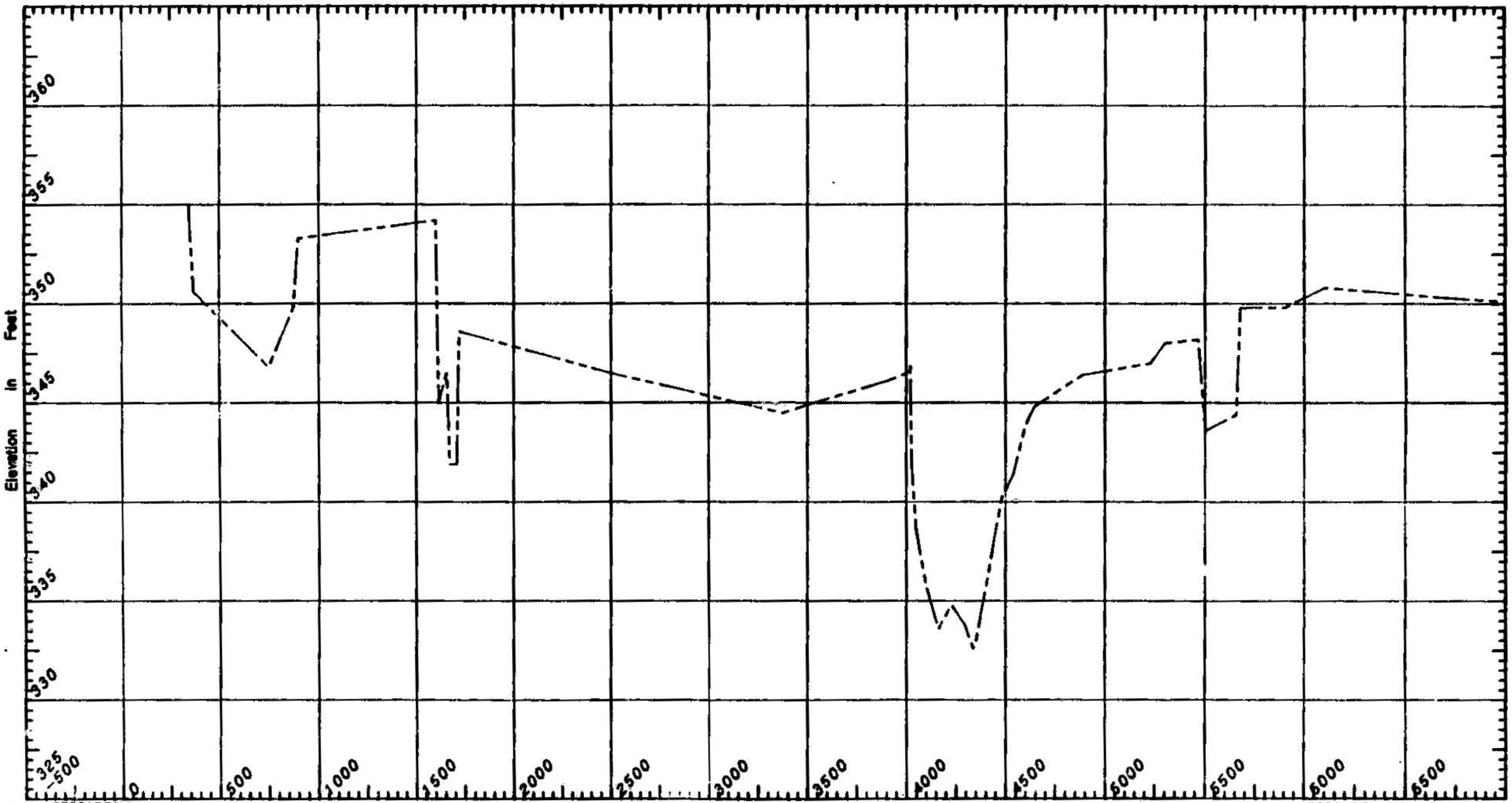

FIGURE 4.2

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PREPARED FOR:

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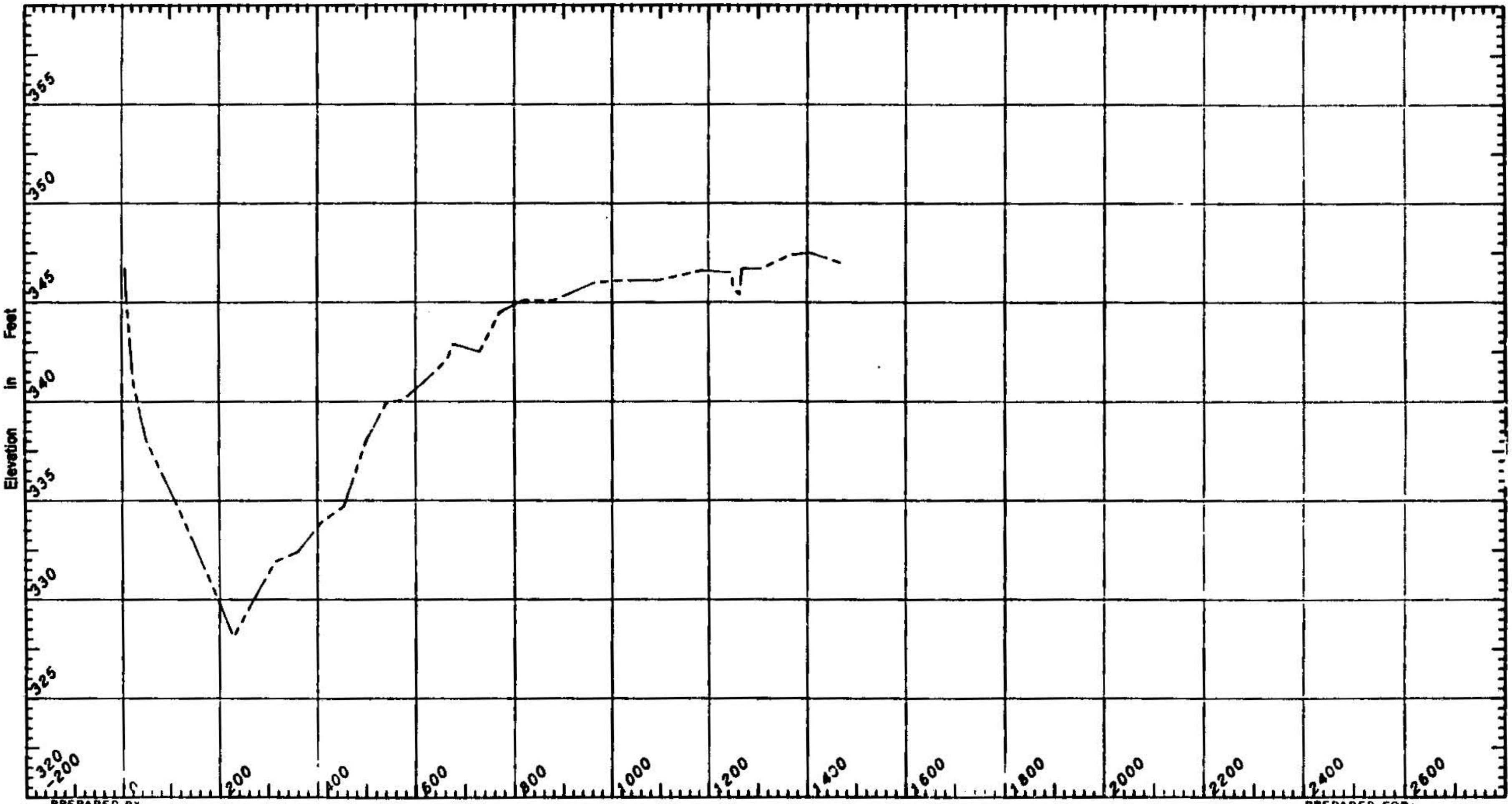
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 3



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.3

PREPARED FOR:

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SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 2.3

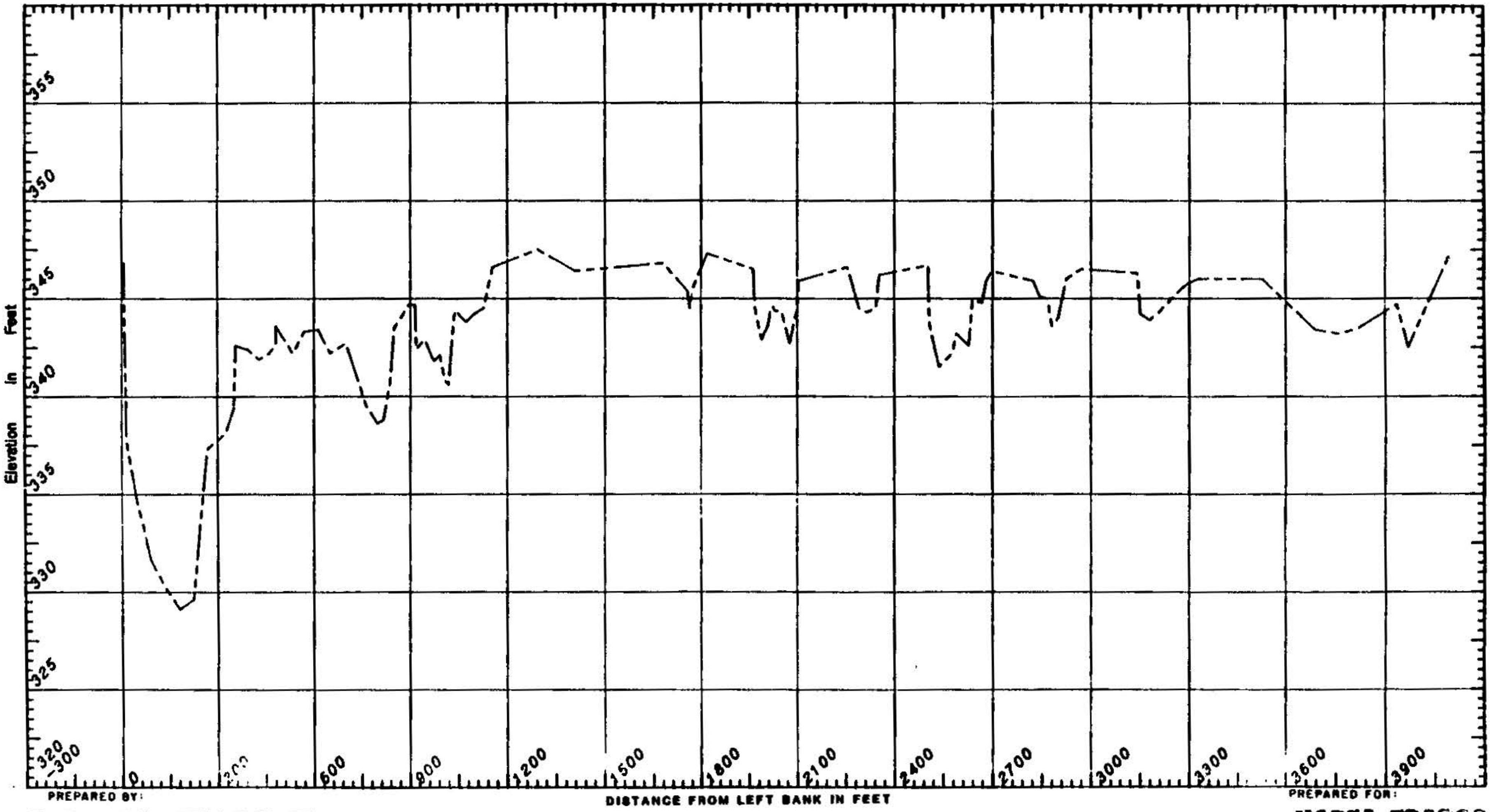

FIGURE 4.4

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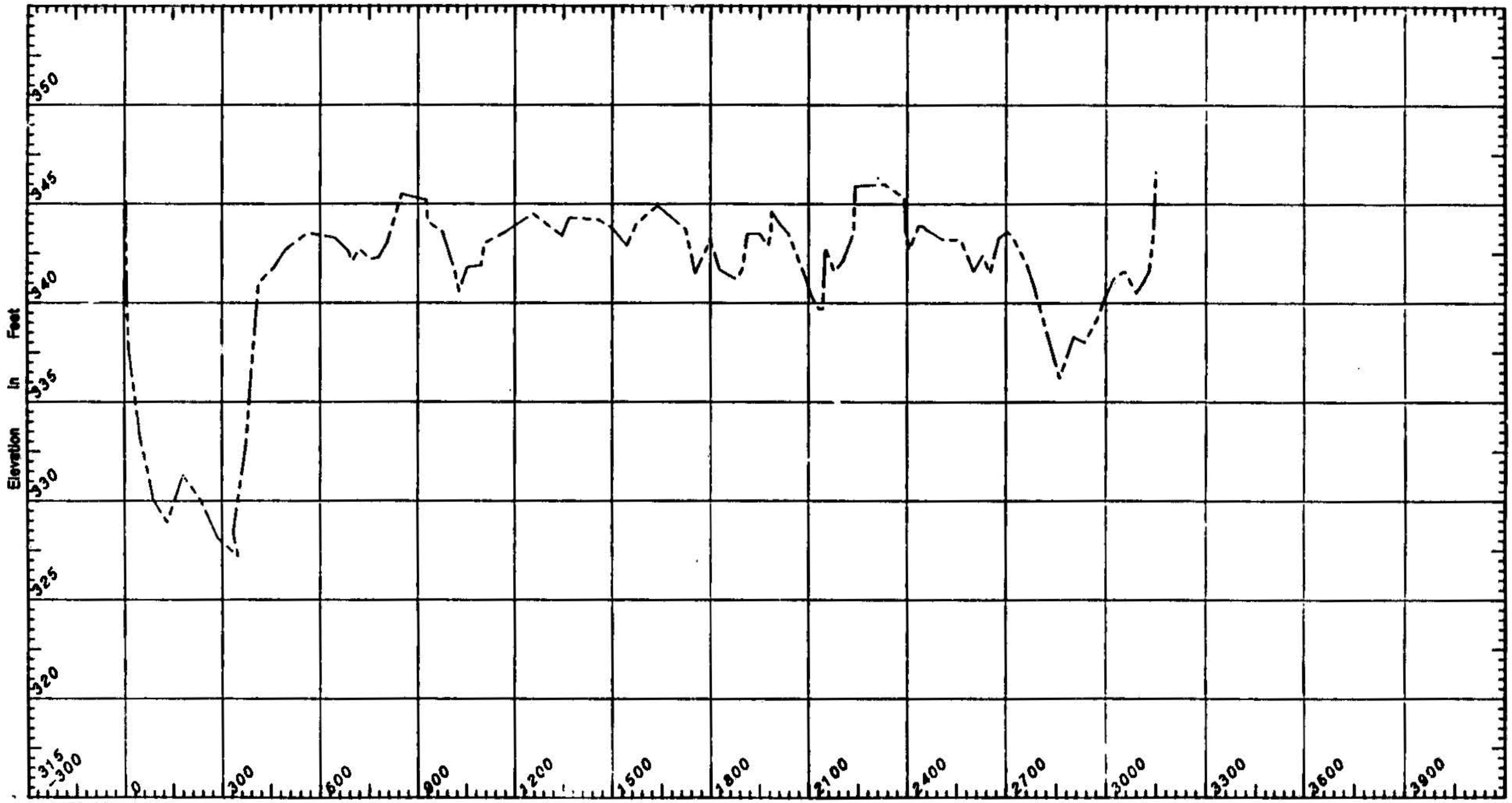
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 2.2



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.8

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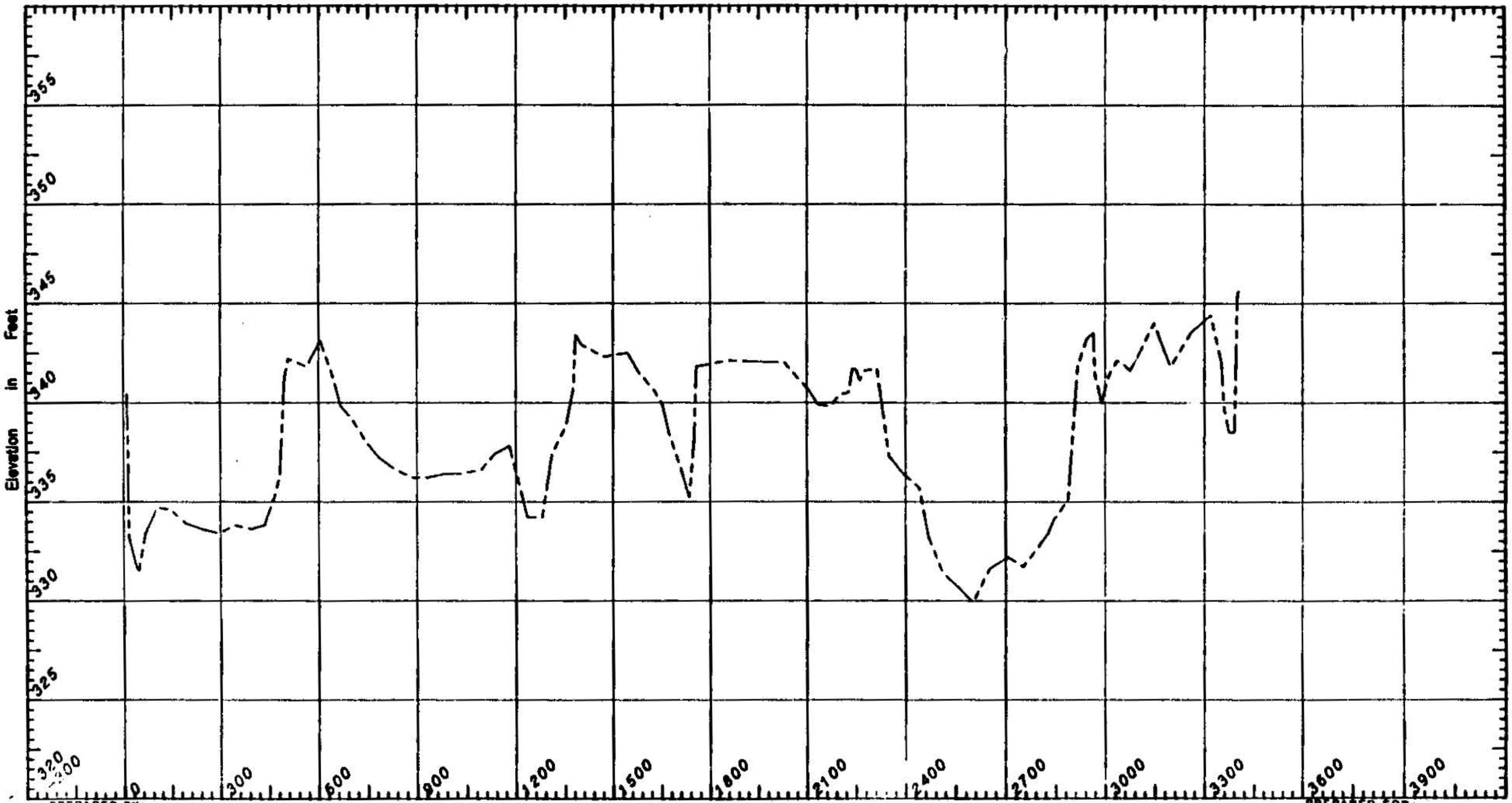
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 2.1



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.6

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SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1980 cross section LRX 2

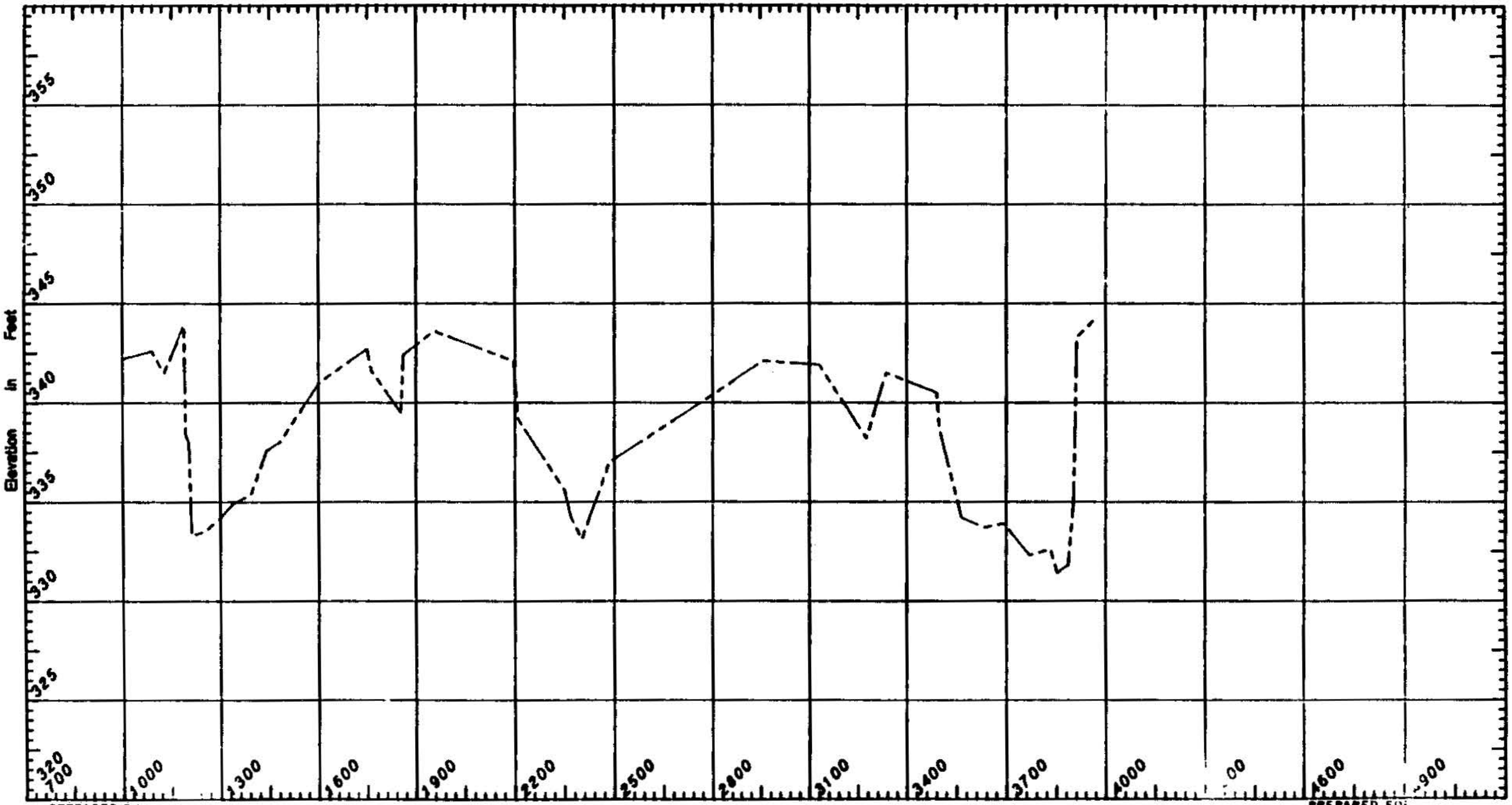

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FIGURE 4.7

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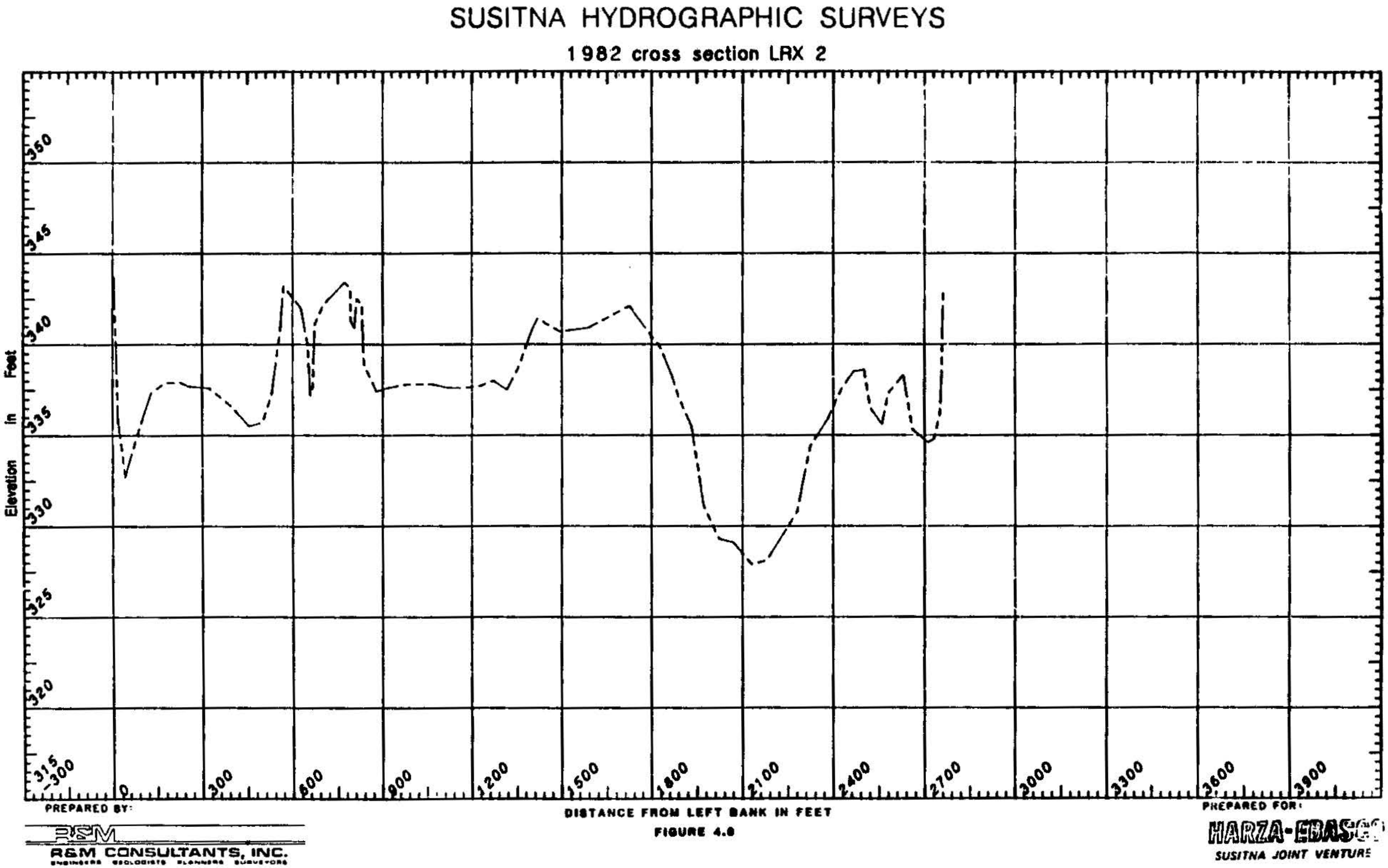
SUSITNA JOINT VENTURE



SUSITNA HYDROGRAPHIC SURVEYS
1982 cross section LRX 2
Elevation in Feet
360
345
340
335
330
325
320
315
-300
0
300
600
900
1200
1500
1800
2100
2400
2700
3000
3300
3600
3900
DISTANCE FROM LEFT BANK IN FEET
PREPARED BY:
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PREPARED FOR:
HARZA-EBASCO
SUSITNA JOINT VENTURE

FIGURE 4.8

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 98.0

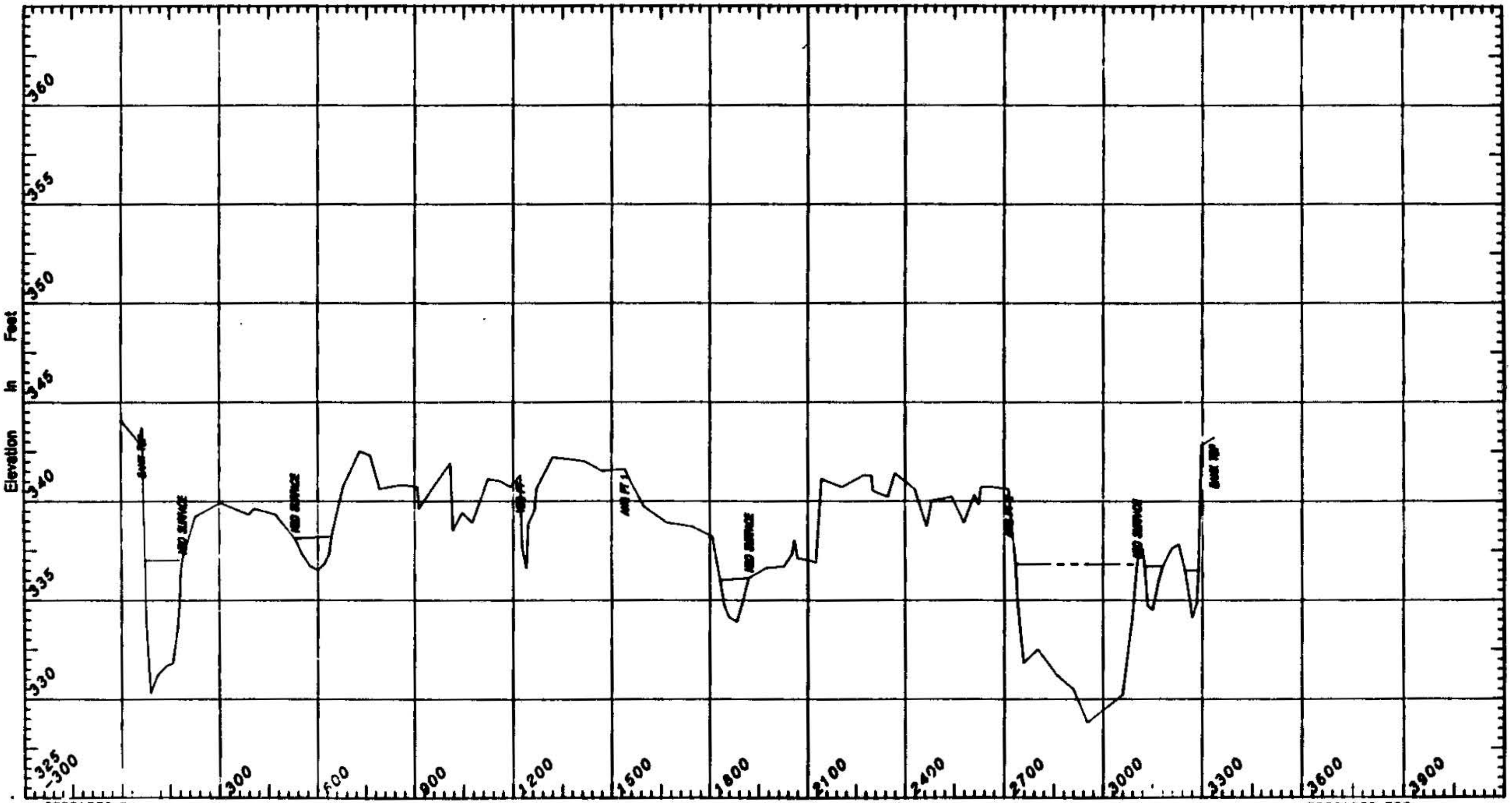

FIGURE 4.8

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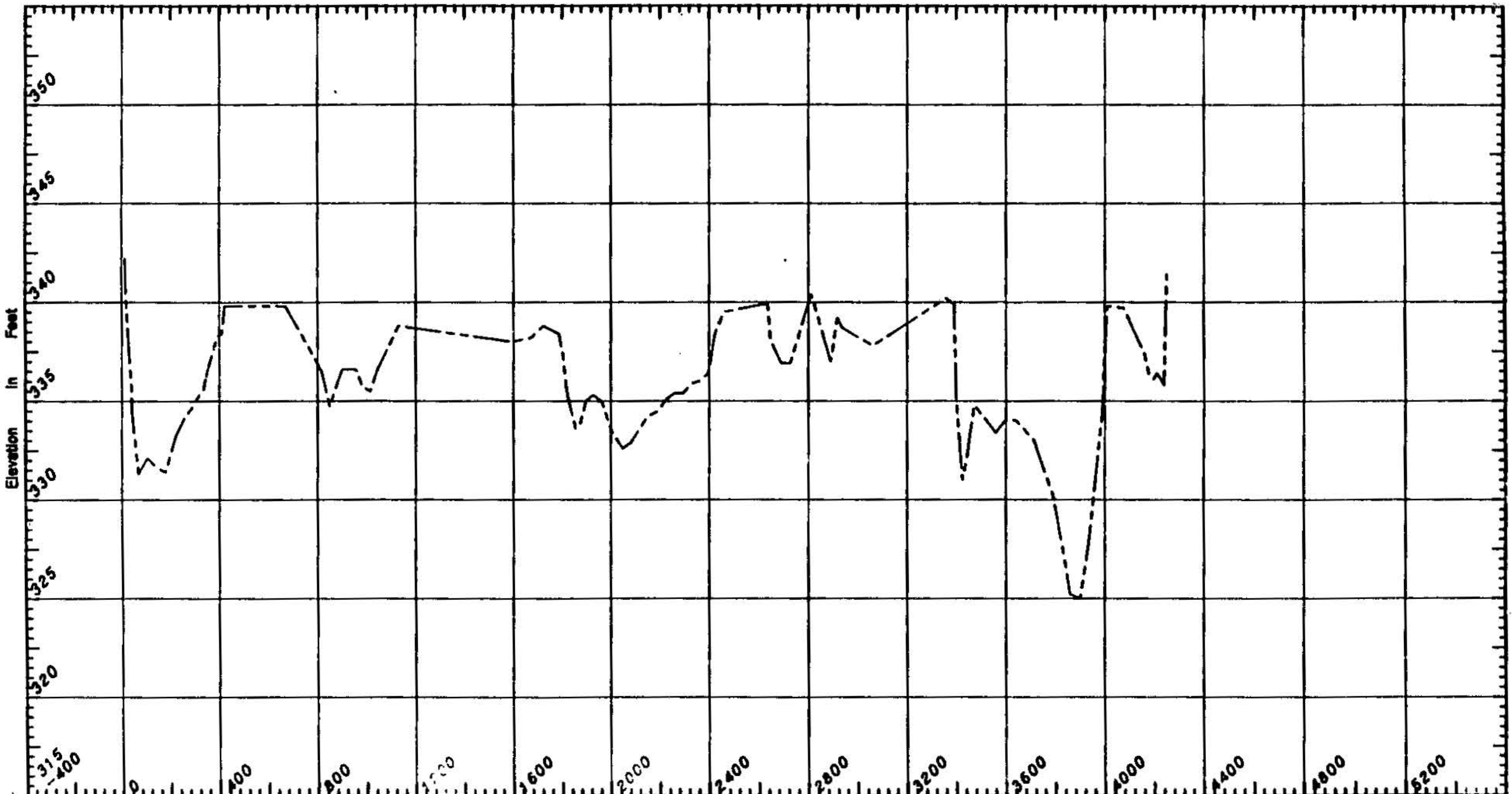
SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 1.2



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DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.10

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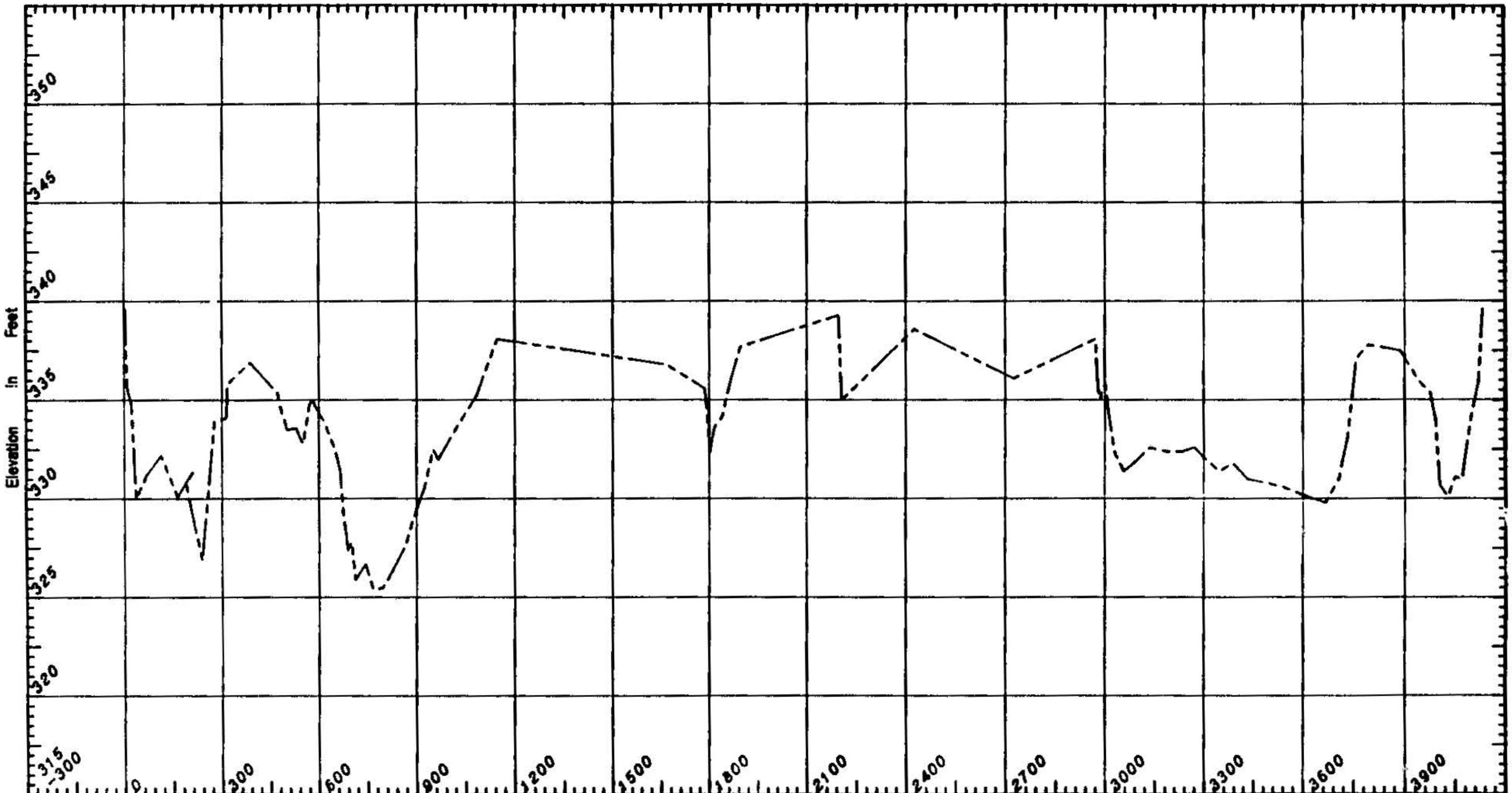
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 1.1



DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.11

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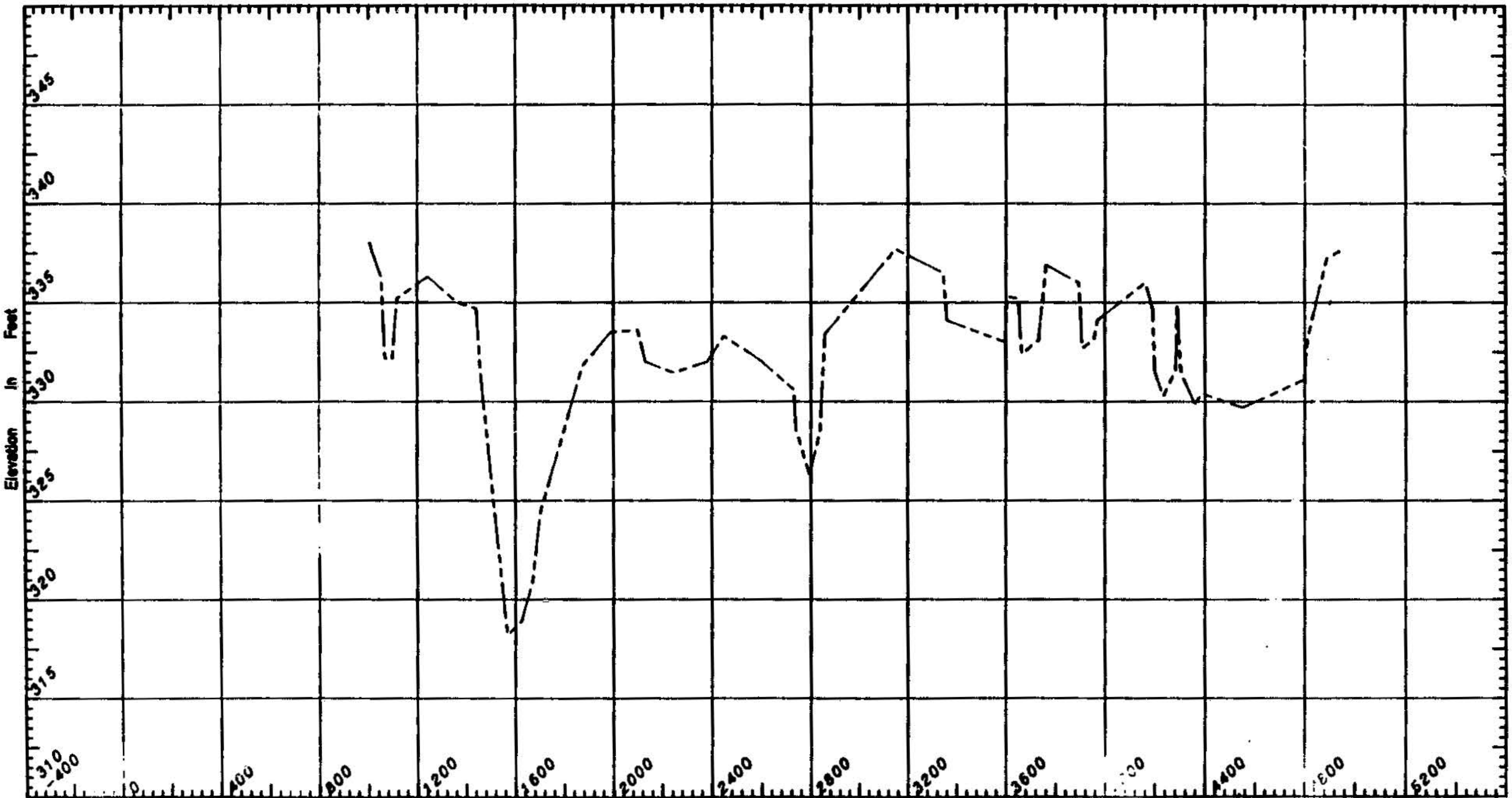
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1980 cross section LRX 1



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DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.12

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SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 1

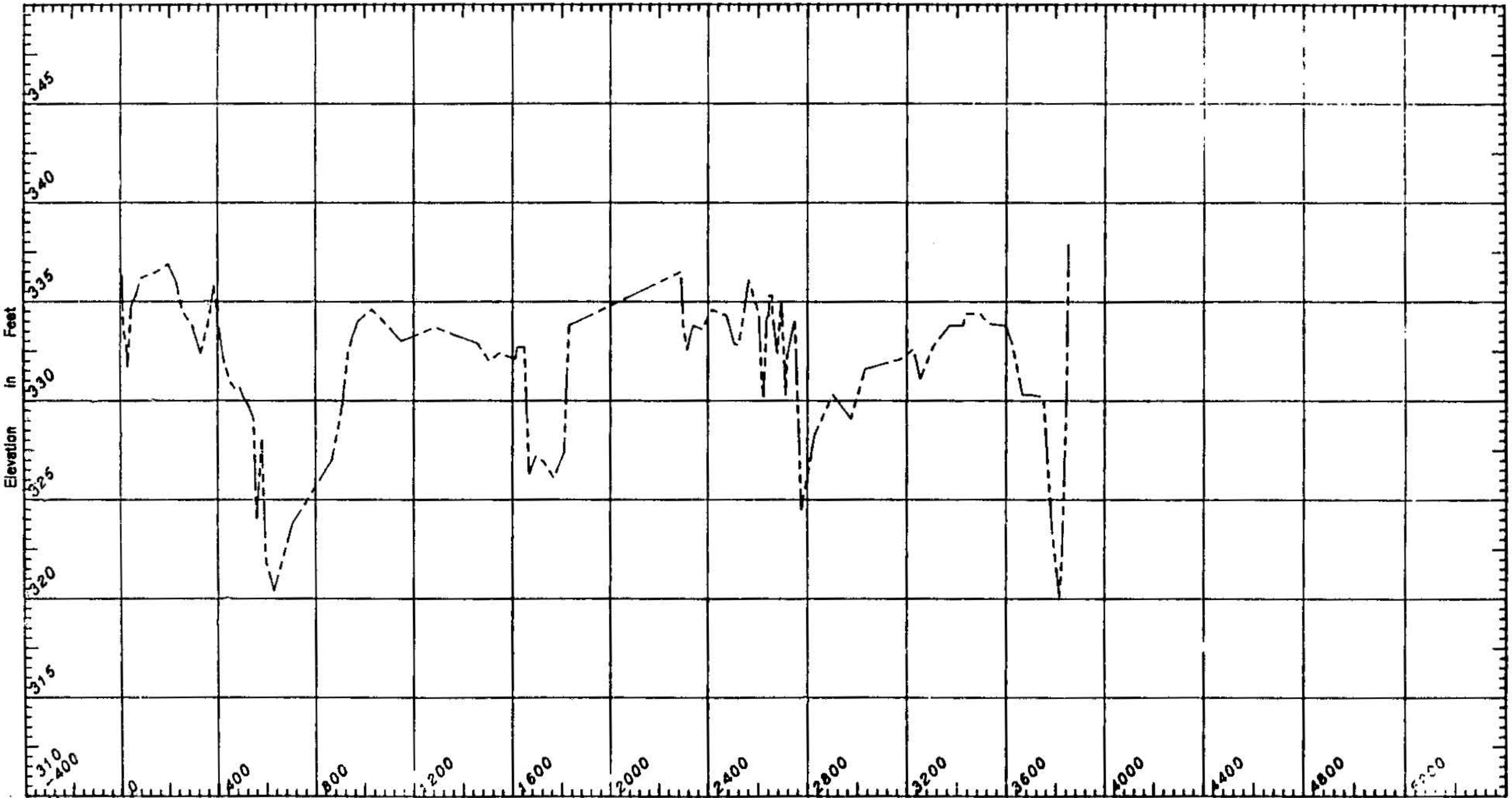

FIGURE 4.13

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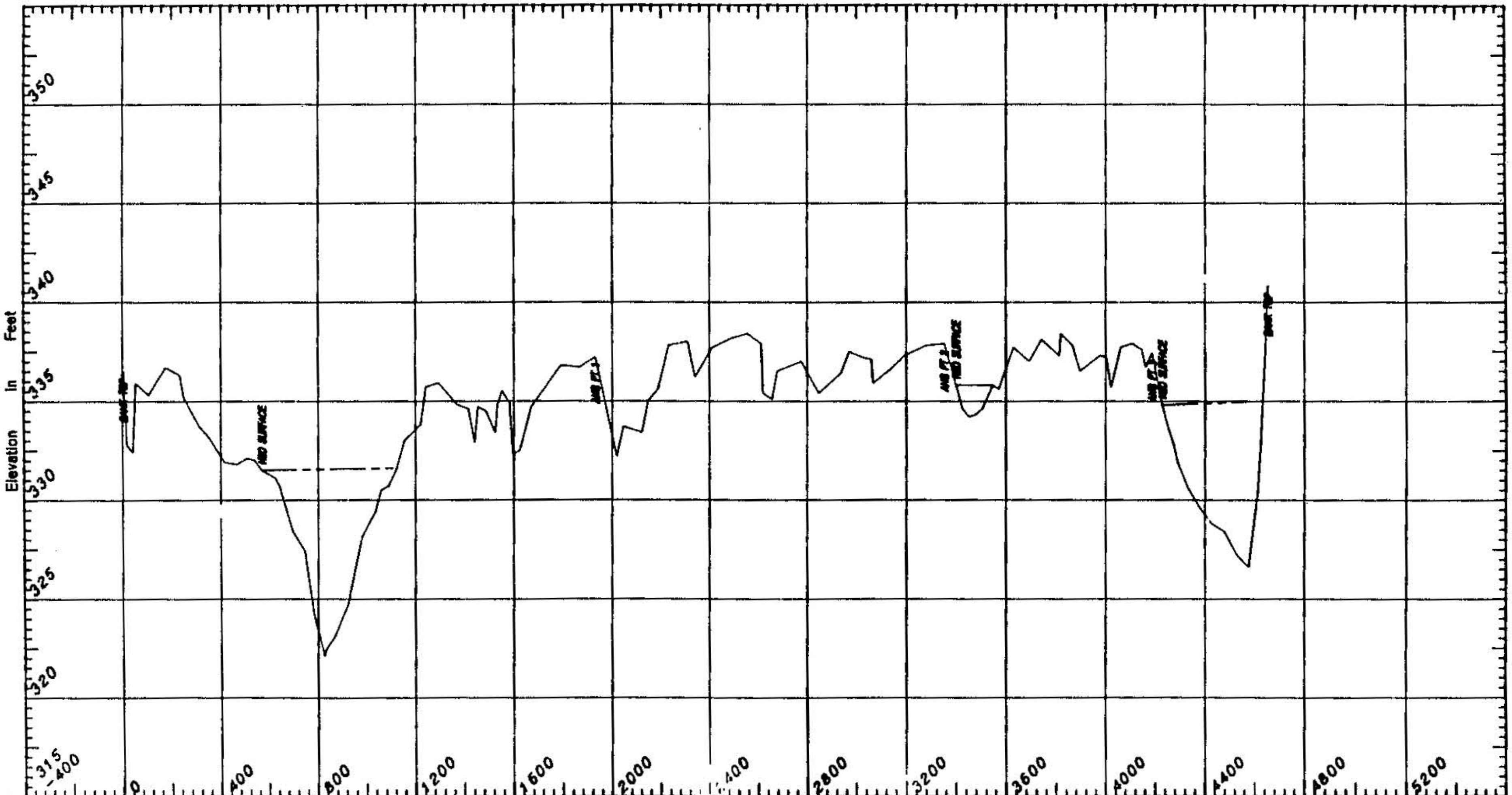
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 97.1



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.14

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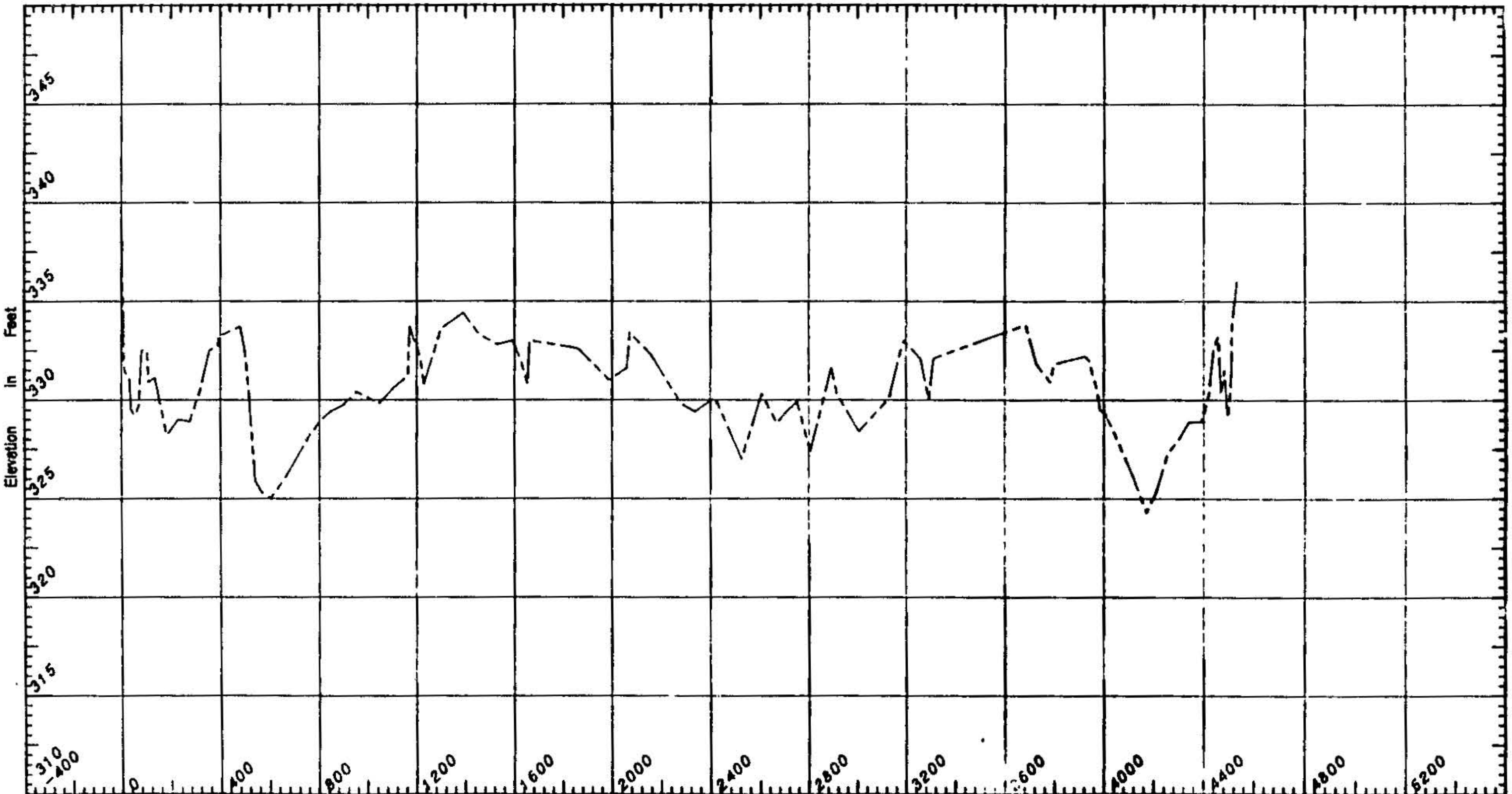
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.9



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.16

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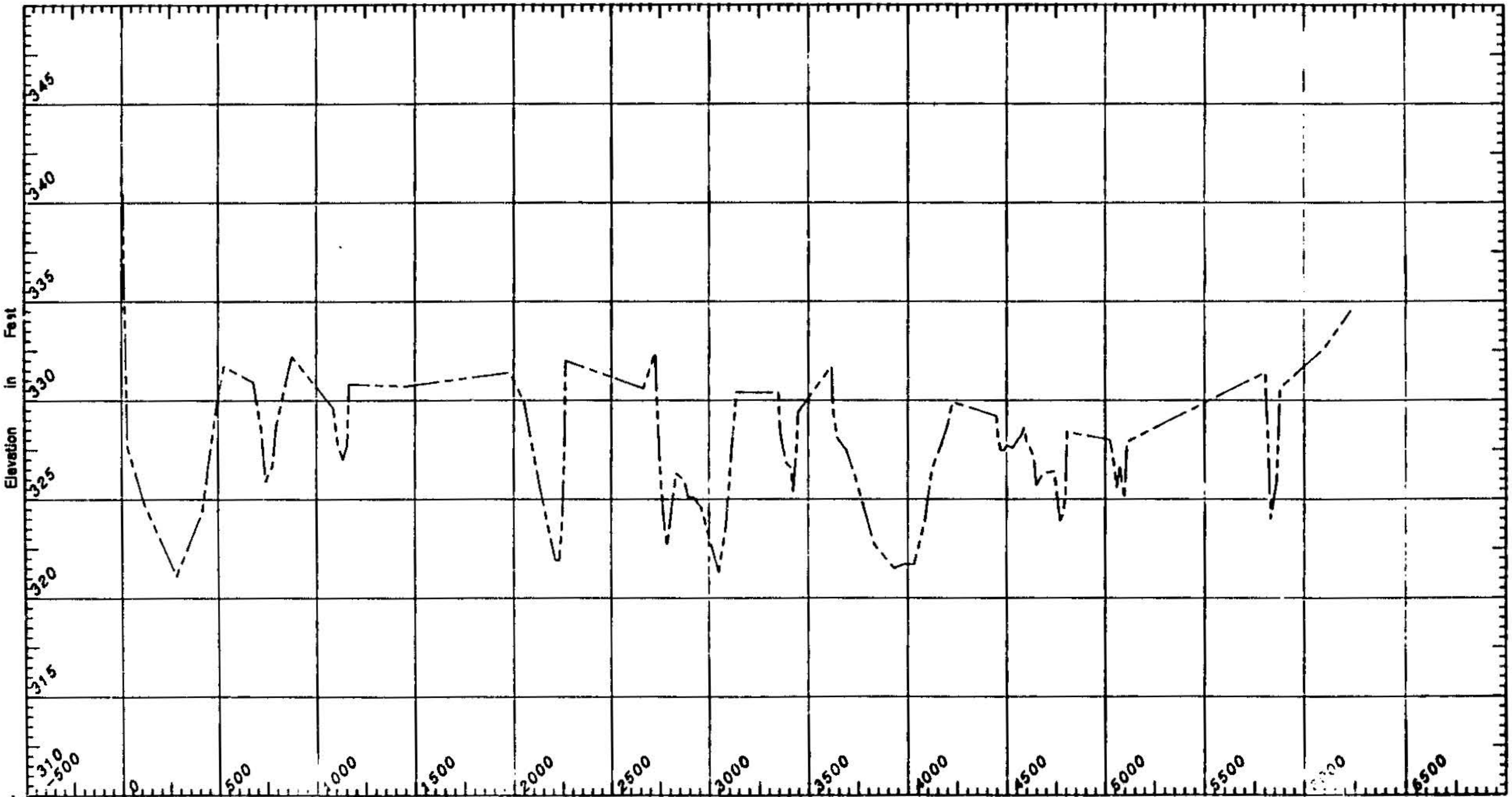
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.8



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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.18

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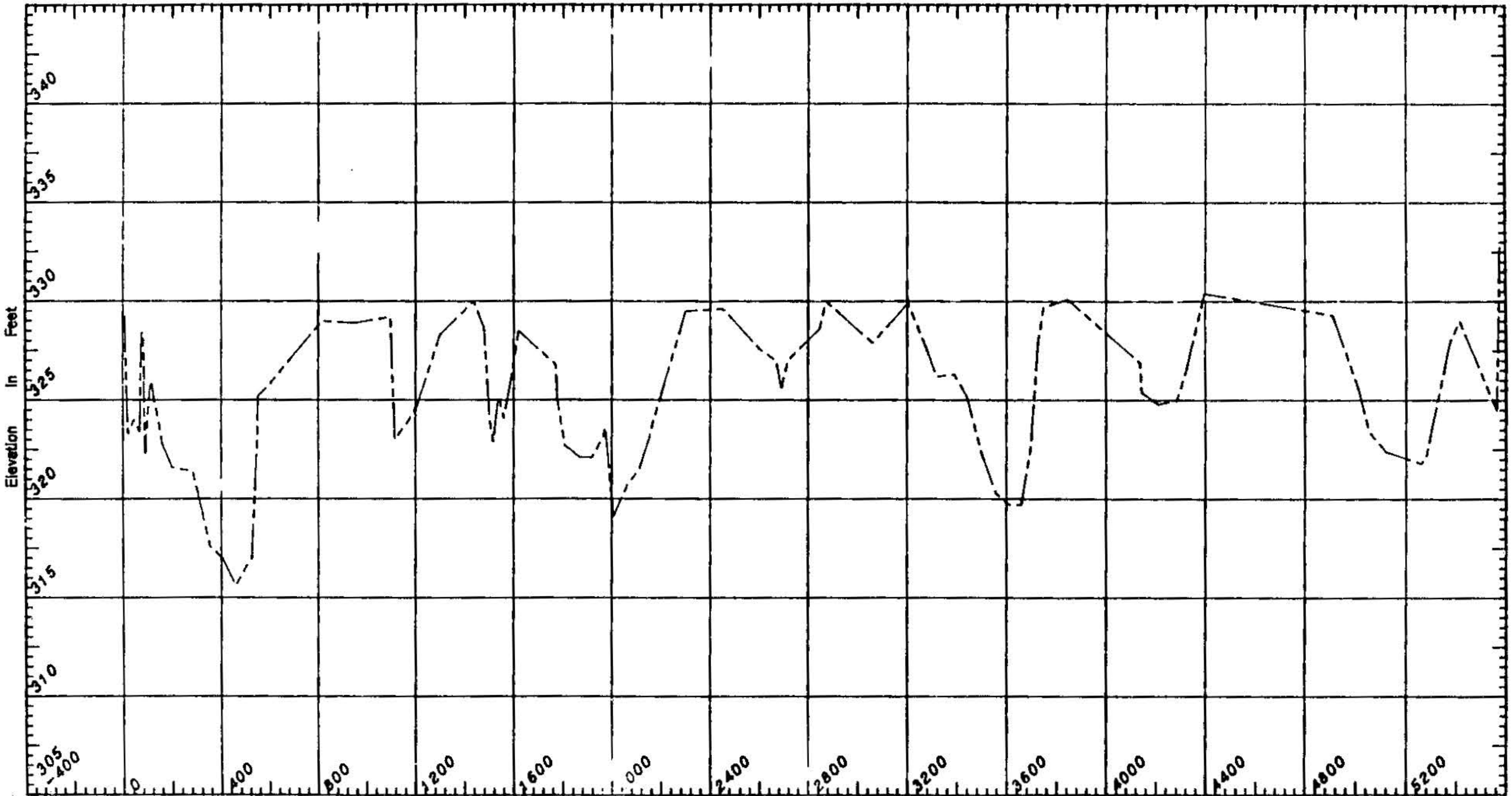
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.7



PREPARED BY

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ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.17

PREPARED FOR:

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SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 95.9

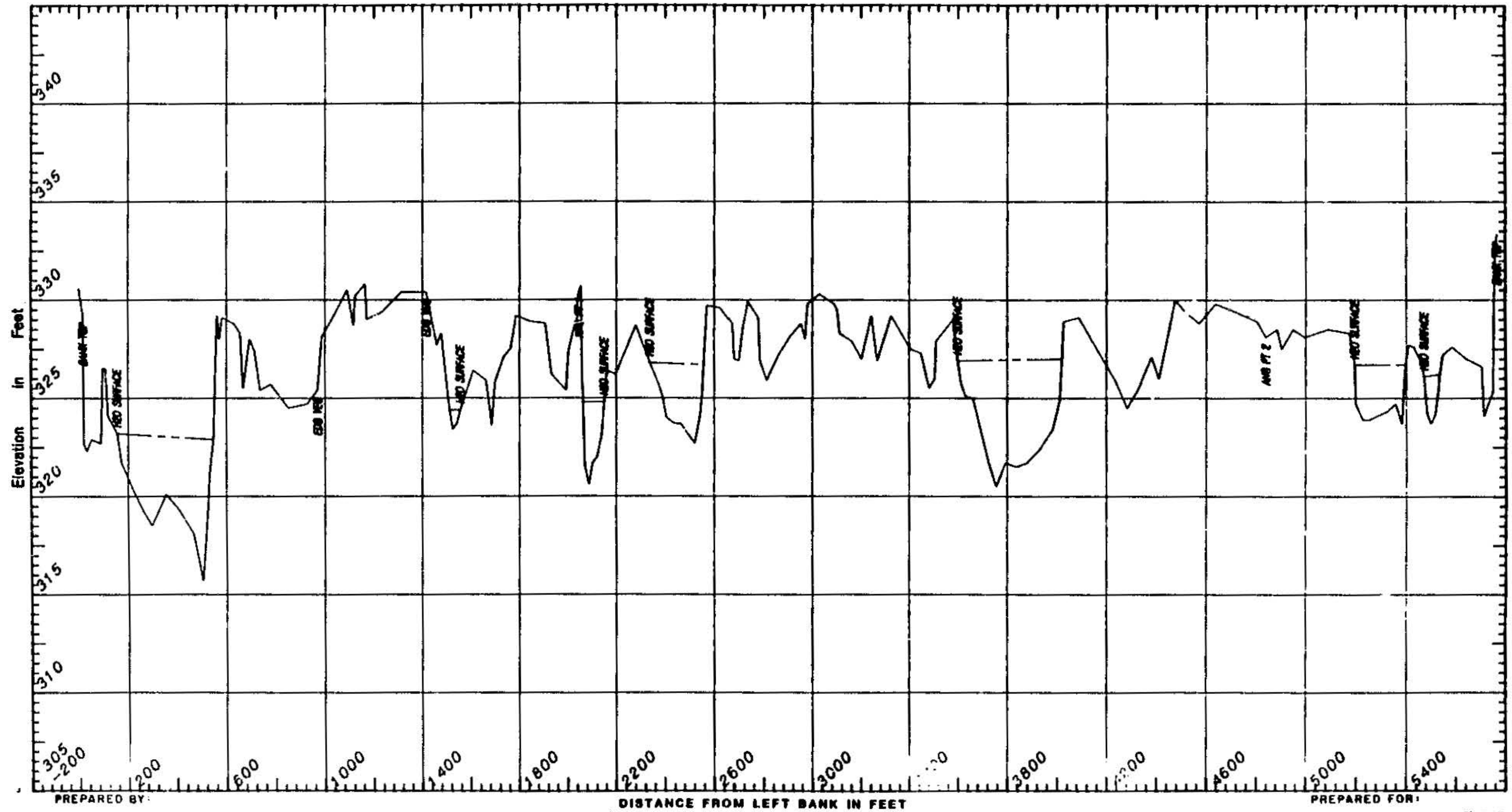

FIGURE 4.18

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PREPARED FOR:

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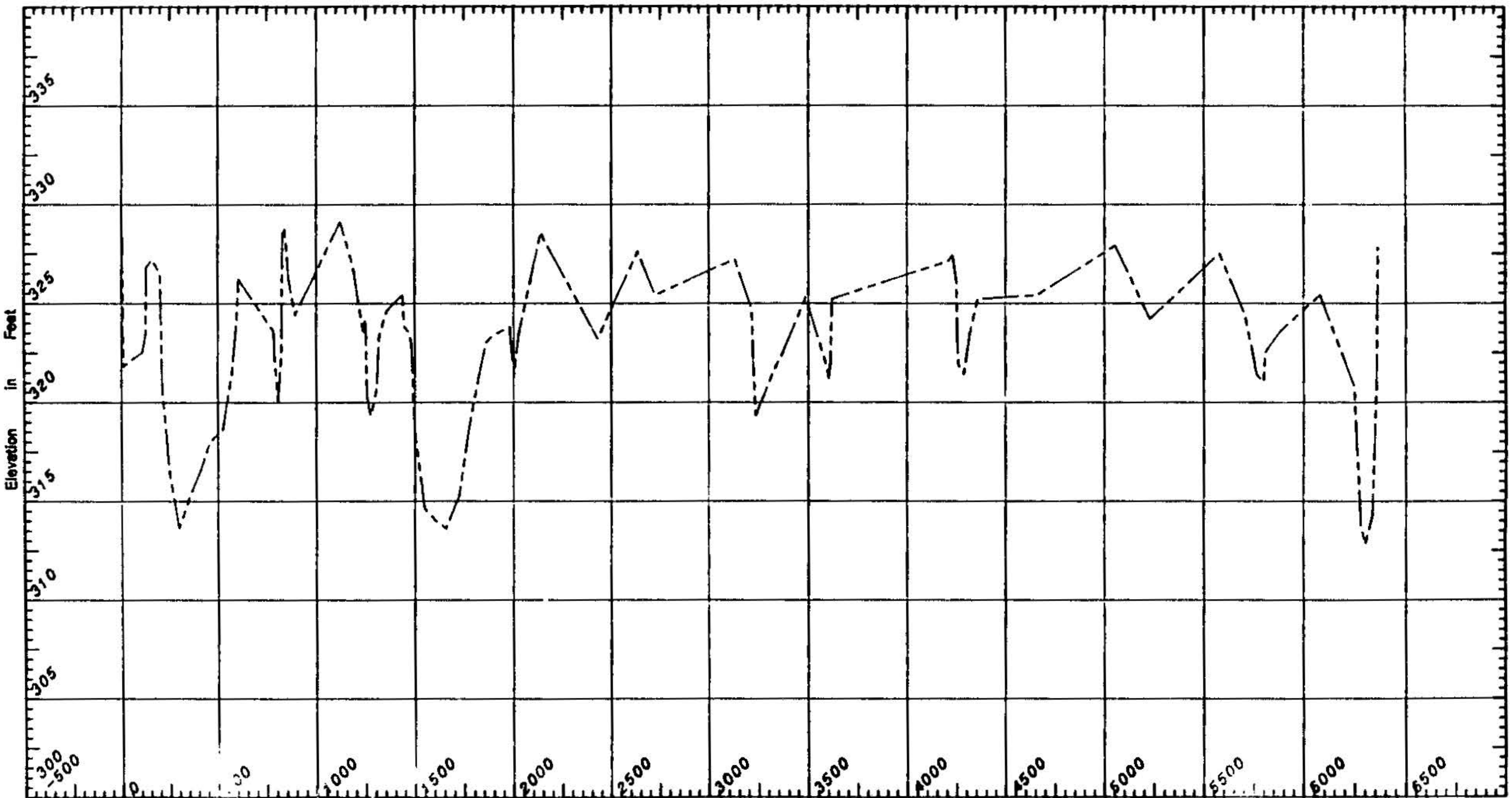
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.6



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DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.10

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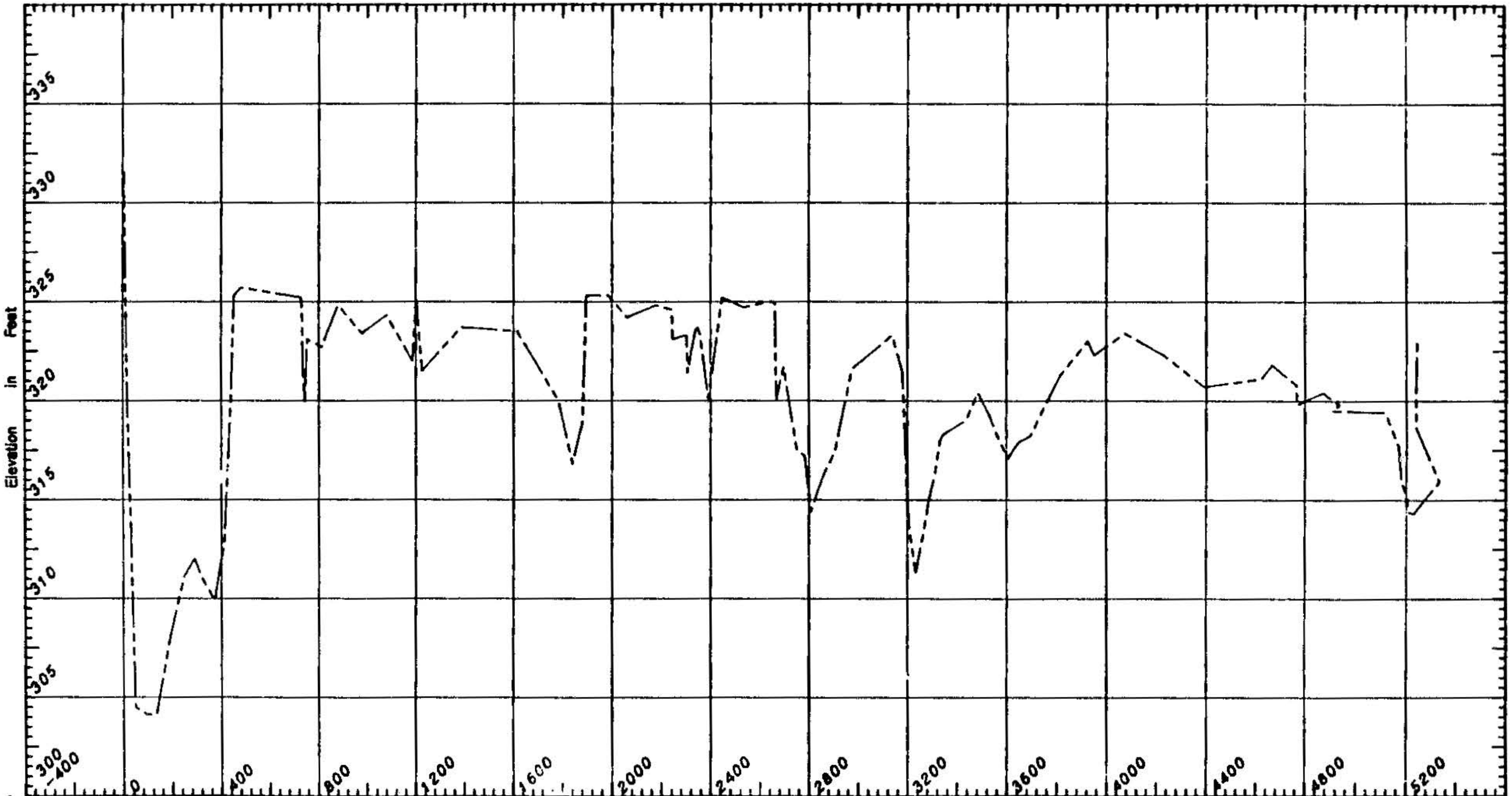
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.5



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DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.20

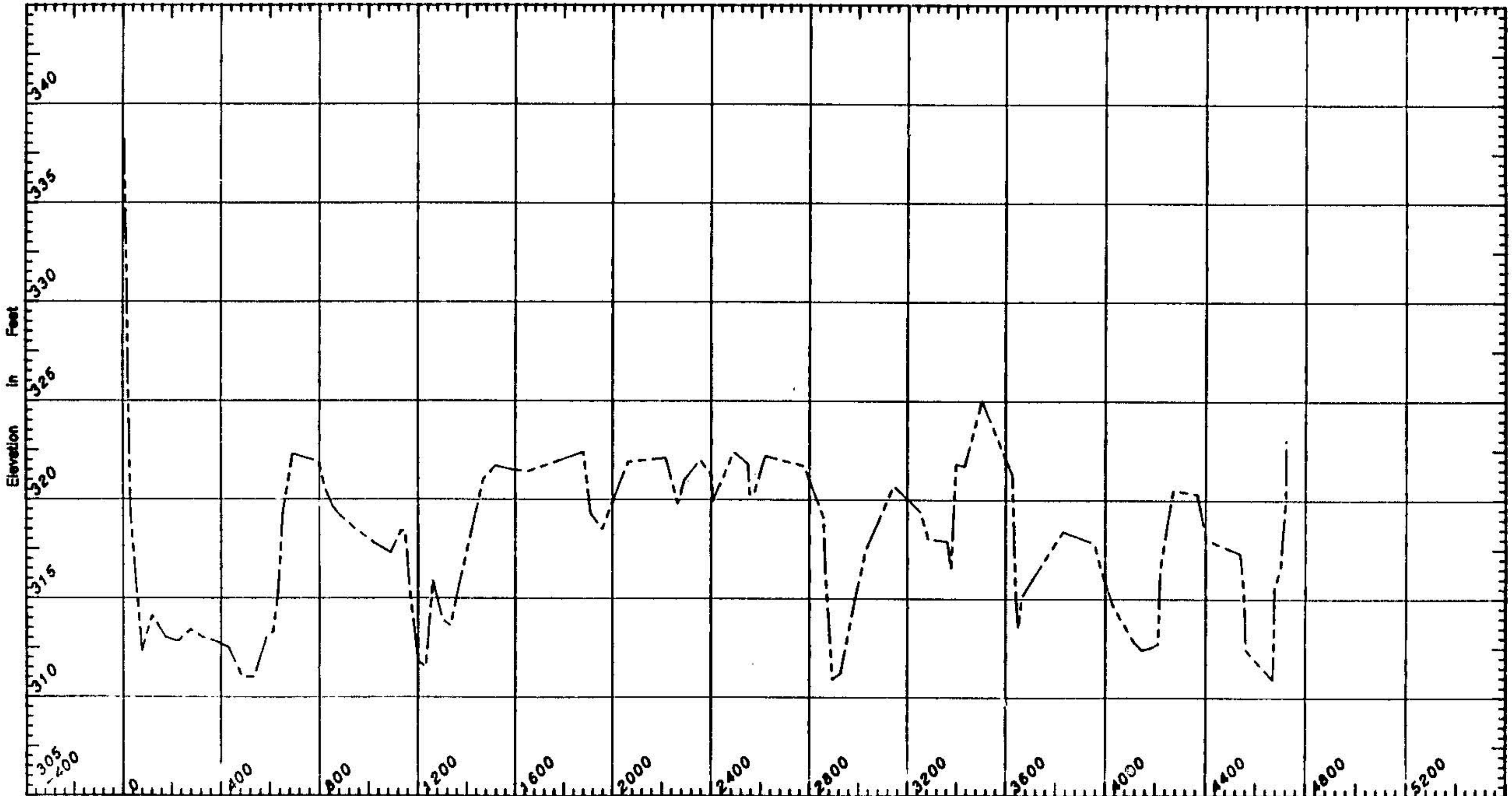
PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.4



DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.21

PREPARED BY:

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

PREPARED FOR

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1982 cross section LRX 0.3

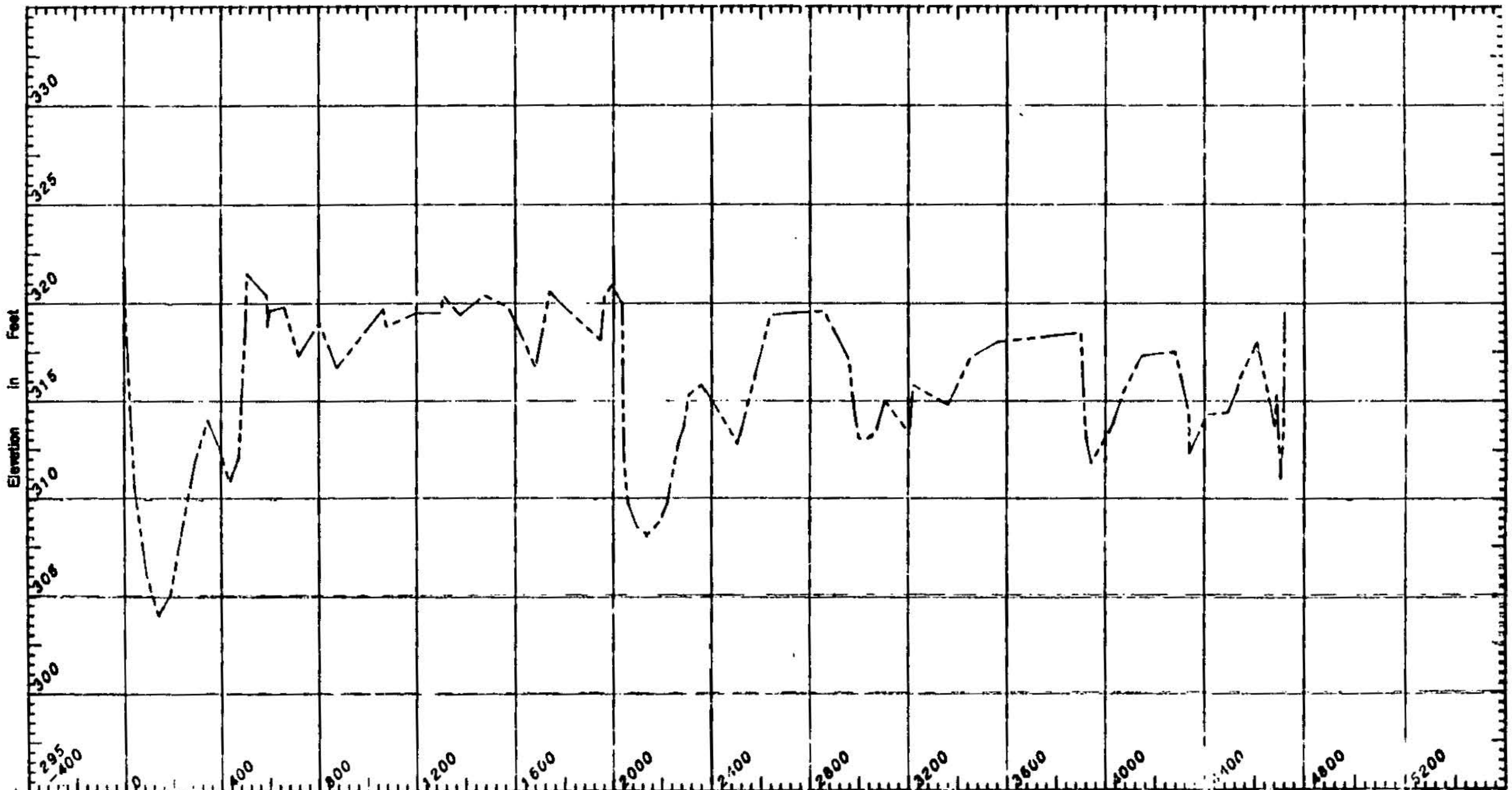


FIGURE 4.28

PREPARED BY

R&M CONSULTANTS, INC.

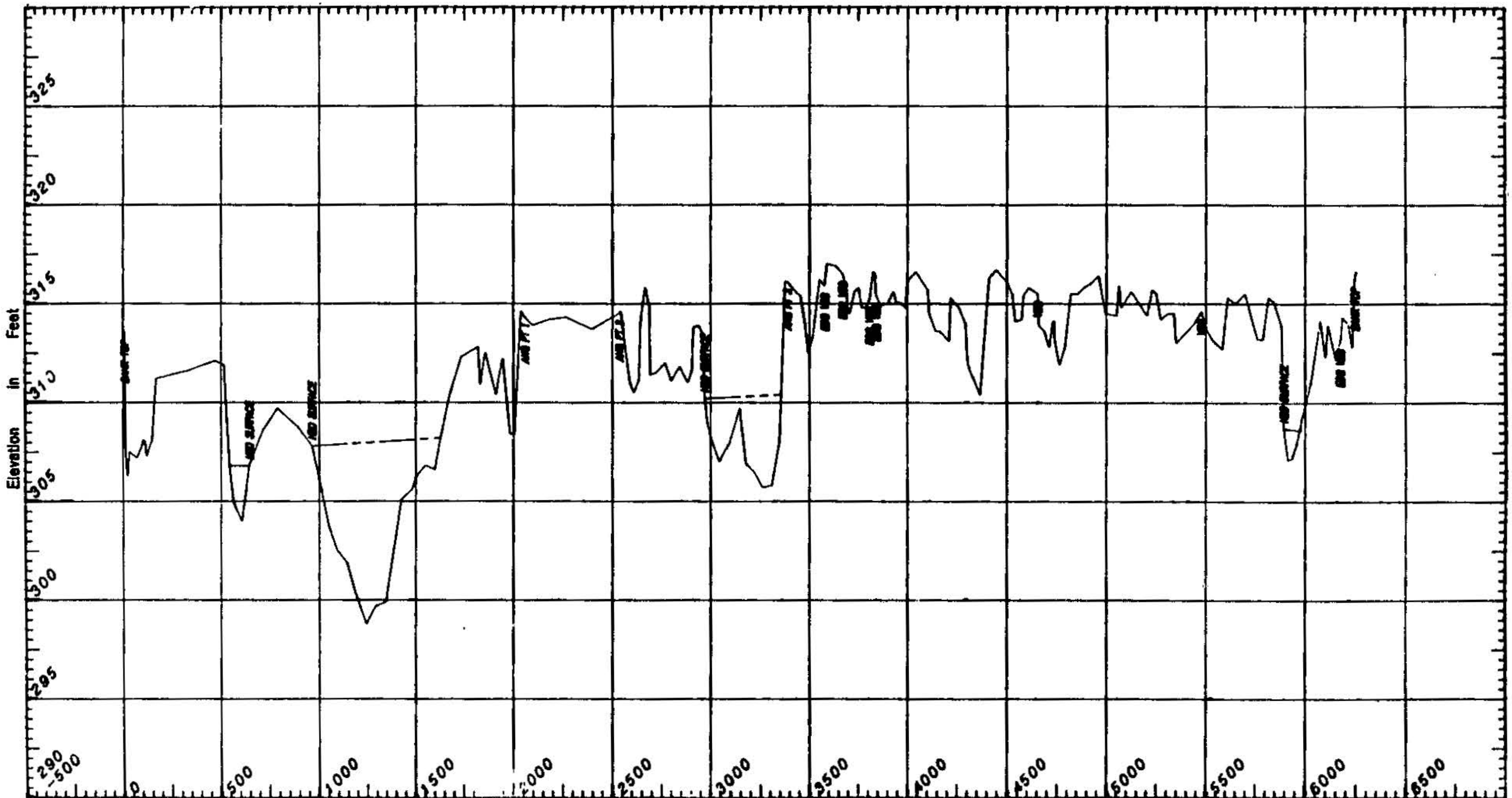
PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 93.1



PREPARED BY:

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.23

PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 91.8

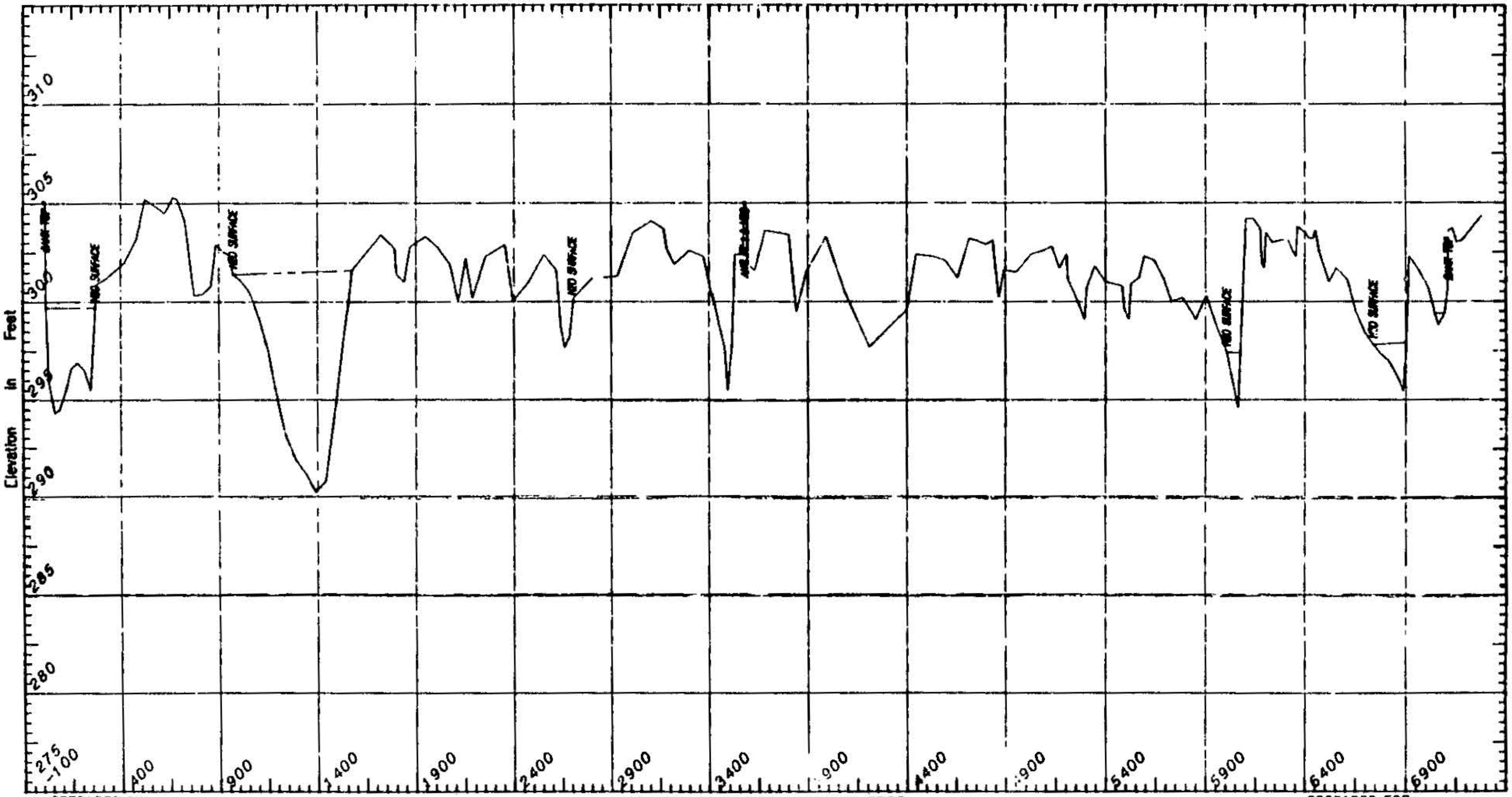


FIGURE 4.24

PREPARED BY:

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 90.6

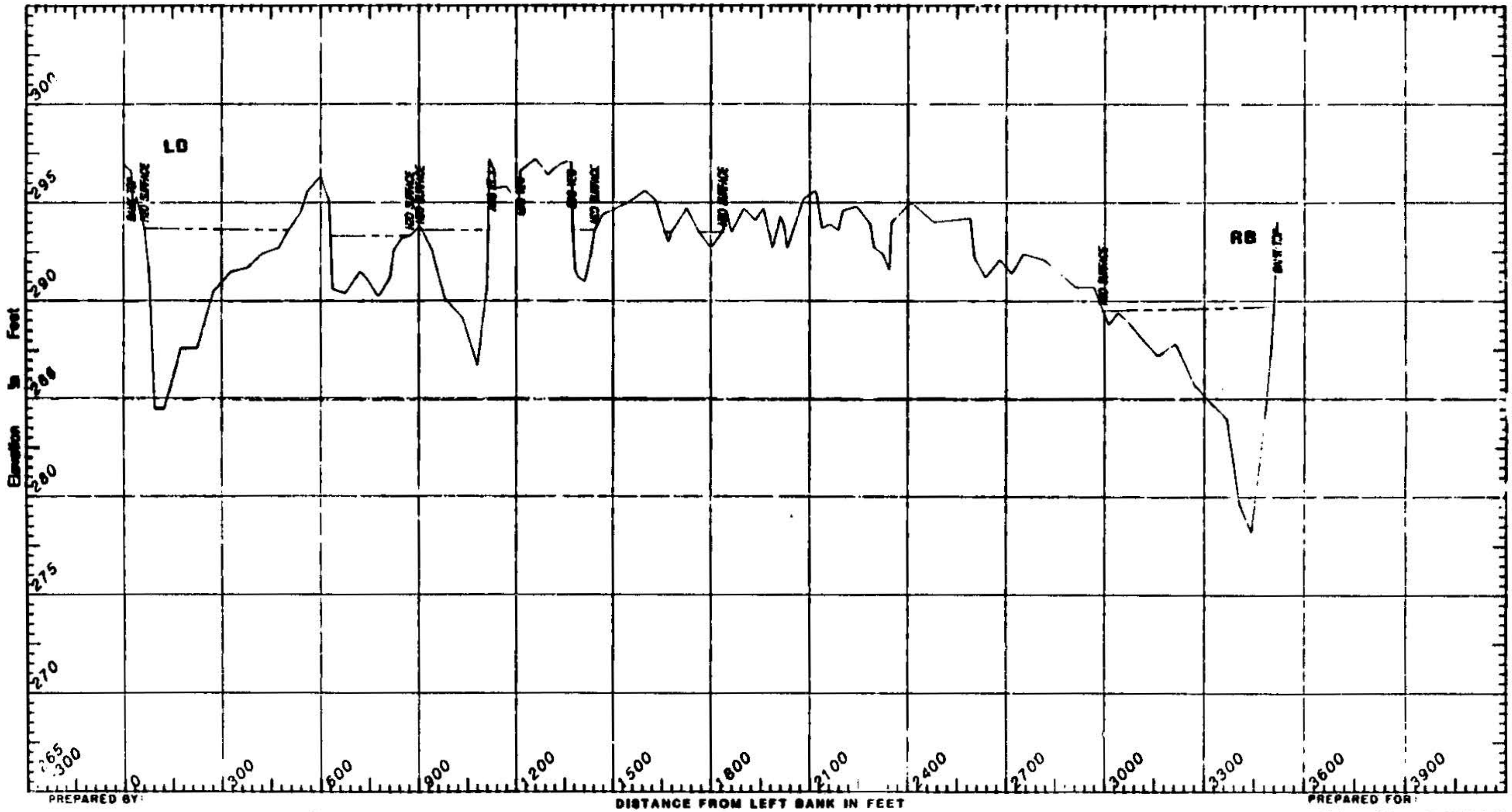


FIGURE 4.25

PREPARED BY:
R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

PREPARED FOR:
HARZA-EBASCO
SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 87.7

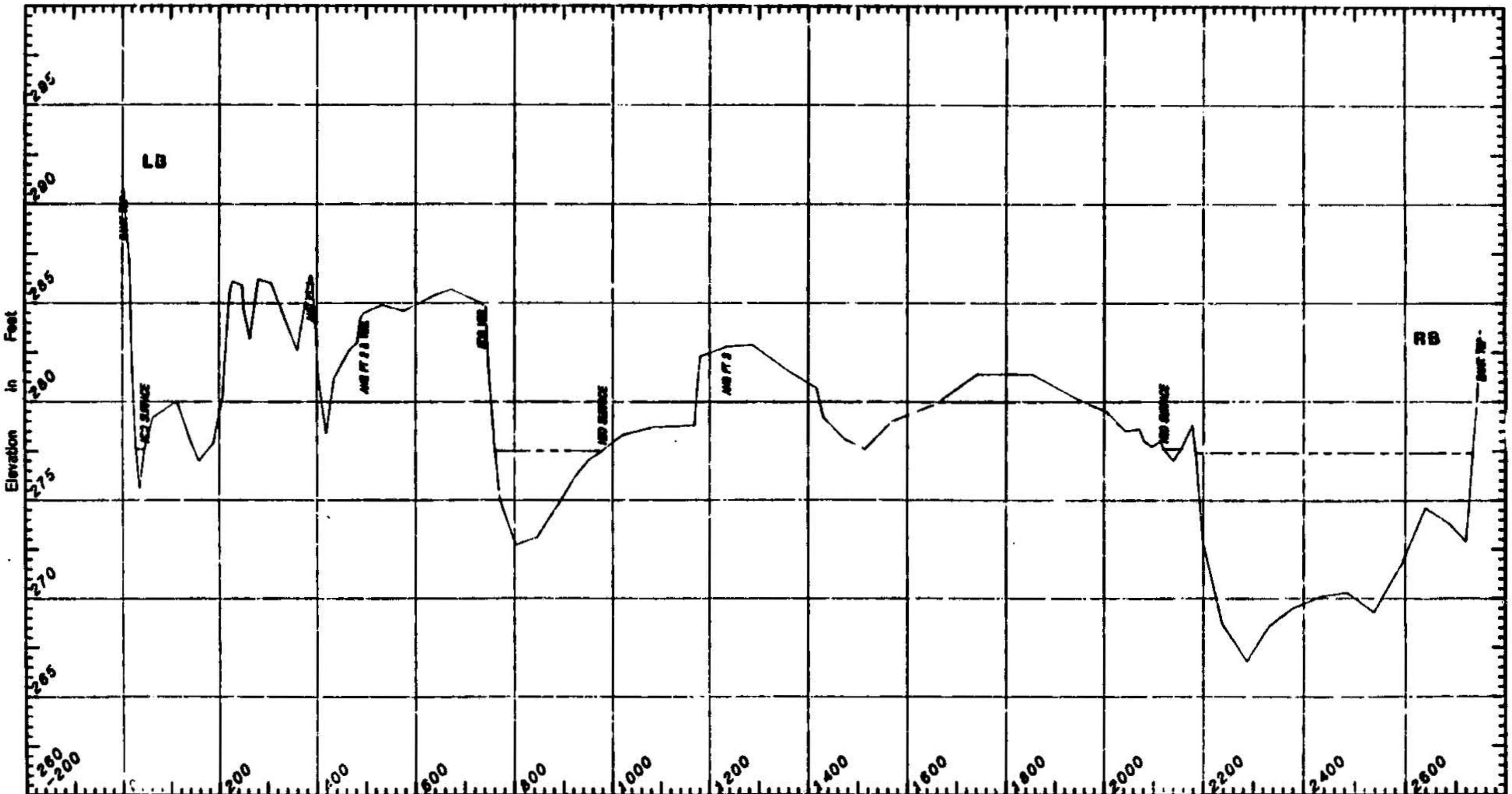


FIGURE 4.26

PREPARED BY

R&M CONSULTANTS, INC.

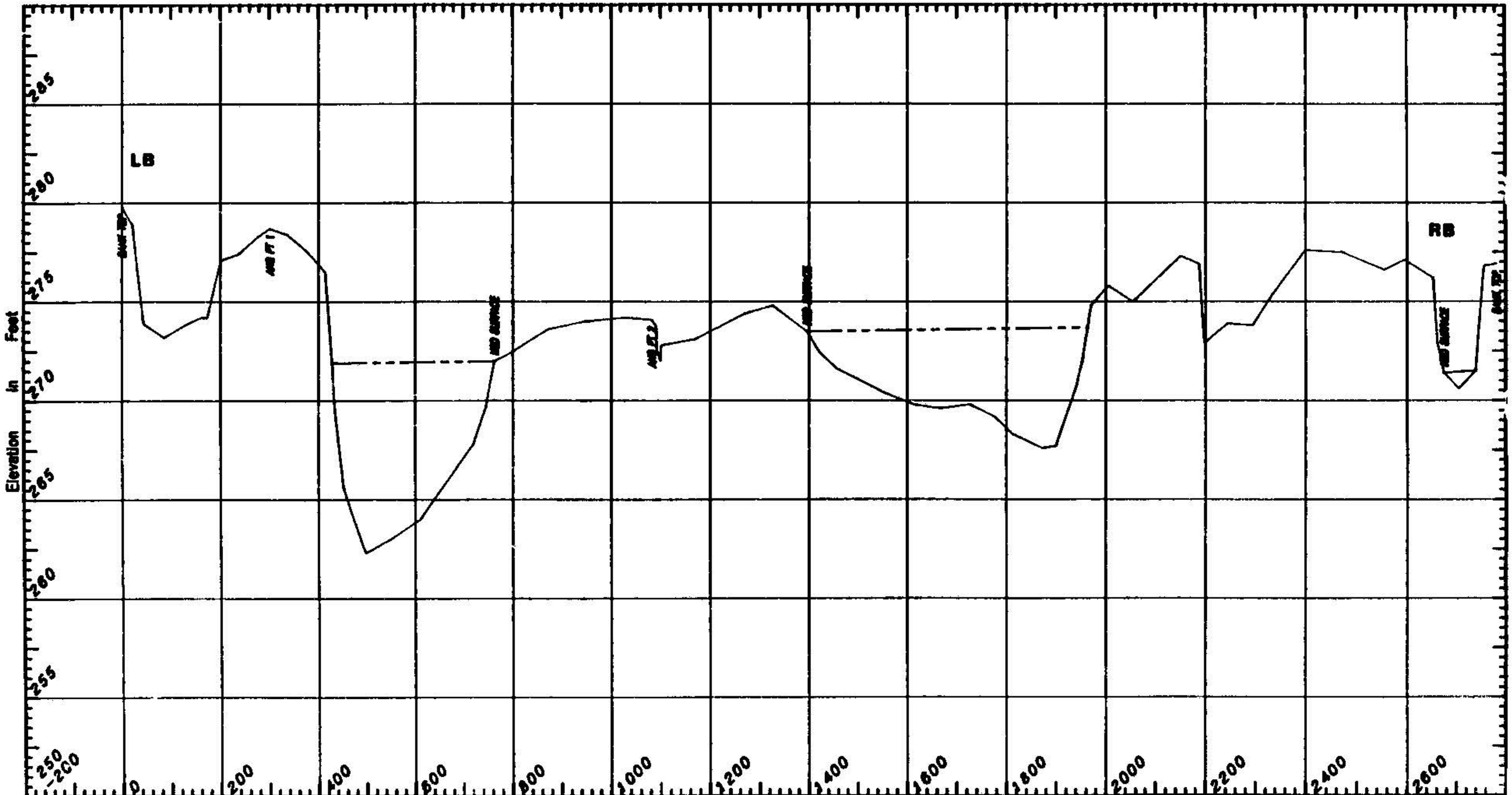
PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 86.3



PREPARED BY:

R&M CONSULTANTS, INC.

ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.27

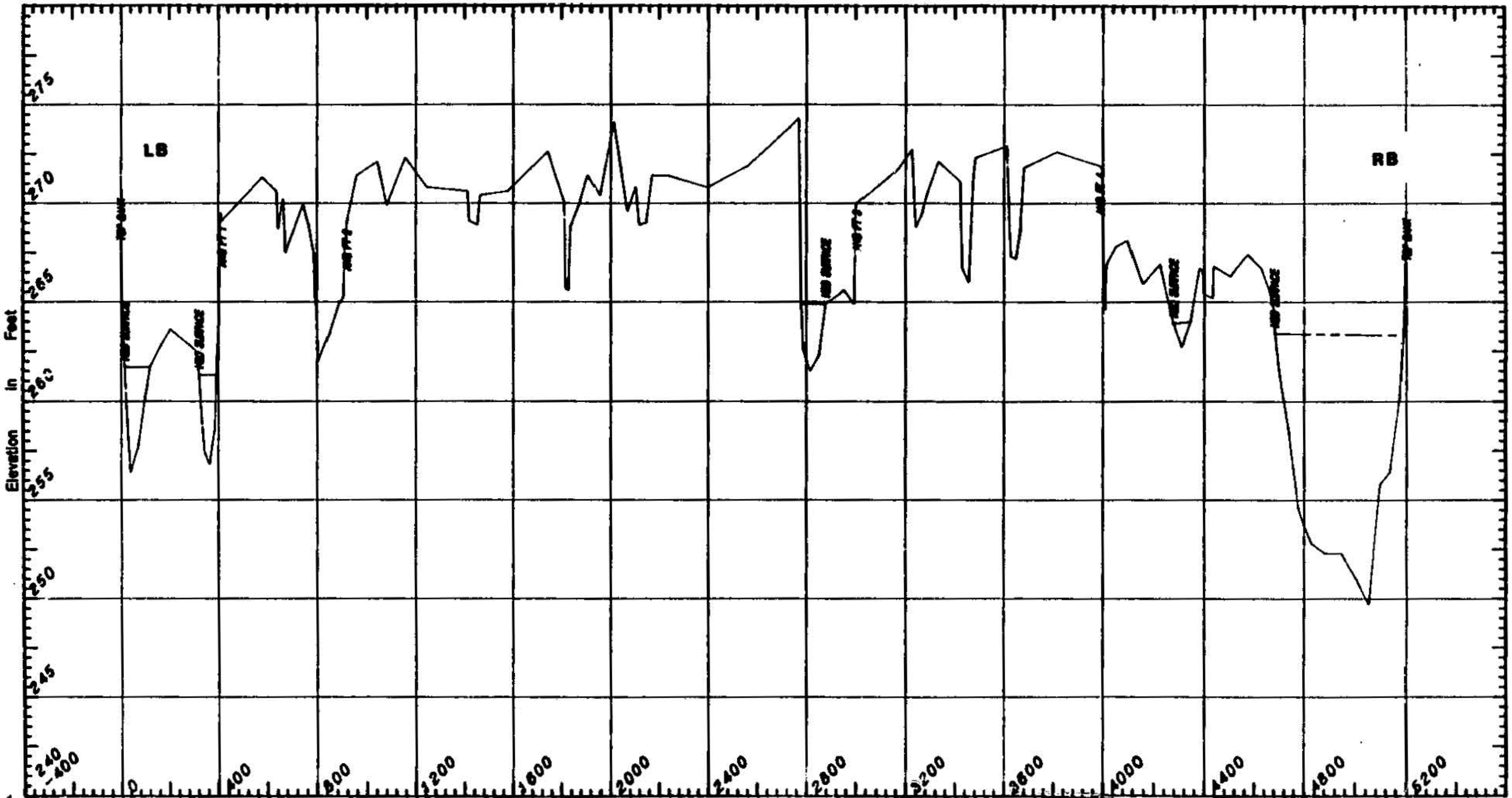
PREPARED FOR:

HARZA-EBASCO

SUSITNA JOINT VENTURE

SUSITNA HYDROGRAPHIC SURVEYS

1984 cross section LRX 84.6



PREPARED BY
R&M CONSULTANTS, INC.
ENGINEERS GEOLOGISTS PLANNERS SURVEYORS

DISTANCE FROM LEFT BANK IN FEET

FIGURE 4.28

PREPARED FOR:
HARZA-EBASCO
SUSITNA JOINT VENTURE

APPENDIX B

River Cross Section Data

Included in this appendix are summarized field notes for the 1984 cross-section surveys, a glossary of abbreviated terms, and a list of vertical benchmarks established at each cross-section.

GLOSSARY OF ABBREVIATED TERMS

ALCAP - 2" Aluminum Cap set on a 5/8" rebar with cross-section identification marking.

ANGL PT - Angle point in horizontal alignment marked by a 5/8" rebar.

BRK - Break in slope

E VEG - Edge of vegetation

GS - Ground shot on even slope

POL - Point on line of horizontal alignment

L EOW,
R EOW - Left or right edge of water surface

RIV BOT - Elevation in submerged channel

TOE - Base of a slope

TOP - Top of a slope

R&M CONSULTANTS
TEMPORARY BENCHMARKS
ESTABLISHED FOR 1984 LOWER RIVER CROSS-SECTIONS

Monument Description	Identification	Elevation
R&M Rebar & Alcap, left bank @ RM 84.6	LRX 84.6 LB	270.56
R&M Rebar & Alcap, right bank @ RM 84.6	LRX 84.6 RB	269.69
R&M Rebar & Alcap, left bank @ RM 86.3	LRX 86.3 LB	279.83
R&M Rebar & Alcap, right bank @ RM 86.3	LRX 86.3 RB	277.09
R&M Rebar & Alcap, left bank @ RM 87.7	LRX 87.7 LB	290.85
R&M Rebar & Alcap, right bank @ RM 87.7	LRX 87.7 RB	283.67
R&M Rebar & Alcap, left bank @ RM 90.6	LRX 90.6 LB	296.93
R&M Rebar & Alcap, right bank @ RM 90.6	LRX 90.6 RB	293.96
R&M Rebar & Alcap, left bank @ RM 91.8	LRX 91.8 LB	305.34
R&M Rebar & Alcap, right bank @ RM 91.8	LRX 91.8 RB	304.47
R&M Rebar & Alcap, left bank @ RM 93.1	LRX 93.1 LB	313.96
R&M Rebar & Alcap, right bank @ RM 93.1	LRX 93.1 RB	316.79
R&M Rebar & Alcap, left bank @ RM 95.9	LRX 13	330.54
R&M Rebar & Alcap, right bank @ RM 95.9	LRX 95.9 RB	333.27
R&M Rebar & Alcap, left bank @ RM 97.1	LRX - 1	336.33
R&M Rebar & Alcap, right bank @ RM 97.1	LRX 97.1 RB	340.97
R&M Rebar & Alcap, left bank @ RM 98.0	LRX 98.0 LB	344.07
R&M Rebar & Alcap, right bank @ RM 98.0	LRX 98.0 RB	343.57

SUSITNA HYDROGRAPHIC SURVEYS
cross section LRX 98.9

Date of Survey: SEPTEMBER 28. 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	344.070	ALCAP 99.0 LB
2	58.500	342.900	GS
3	64.000	343.700	TOP OF BANK
4	74.000	337.000	L EOW
5	78.000	334.100	RIV BOT
6	92.000	330.300	RIV BOT
7	113.000	331.200	RIV BOT
8	142.000	331.700	RIV BOT
9	160.000	331.800	RIV BOT
10	174.000	333.500	RIV BOT
11	180.000	334.300	RIV BOT
12	183.000	336.200	RIV BOT
13	188.000	337.000	R EOW
14	227.000	339.200	BRK
15	303.000	339.900	BRK
16	387.000	339.300	BRK
17	407.000	339.600	BRK
18	471.000	339.600	GS
19	529.000	338.100	L EOW
20	552.000	337.300	RIV BOT
21	576.000	336.700	RIV BOT
22	600.000	336.500	RIV BOT
23	620.000	336.900	RIV BOT
24	635.000	337.600	RIV BOT
25	642.000	338.200	R EOW
26	677.000	340.700	BRK
27	729.000	342.500	TOP
28	761.000	342.400	BRK
29	791.000	340.600	BRK
30	859.000	340.800	GS
31	908.000	340.700	BRK
32	912.000	339.600	BRK
33	1009.000	341.200	BRK
34	1016.000	338.500	BRK
35	1045.000	339.400	BRK
36	1076.000	338.900	BRK
37	1123.000	341.100	BRK
38	1160.000	341.000	POL
39	1192.000	340.700	GS
40	1222.000	341.300	TOP E VEG
41	1227.000	337.700	TOP
42	1241.000	336.600	TOE
43	1246.000	338.800	TOP
44	1265.000	339.500	BRK
45	1271.000	340.600	BRK
46	1320.000	342.200	BRK
47	1366.000	342.100	GS
48	1416.000	342.000	GS
49	1470.000	341.500	GS
50	1538.000	341.600	ANGL PT 1

51	1599.000	339.700	BRK
52	1668.000	338.700	GS
53	1744.000	338.700	GS
54	1807.000	338.200	TOP
55	1832.000	336.000	L EOW
56	1845.000	334.700	RIV BOT
57	1860.000	334.100	RIV BOT
58	1883.000	333.900	RIV BOT
59	1899.000	334.800	RIV BOT
60	1919.000	336.100	R EOW
61	1971.000	336.600	GS
62	2027.000	336.700	GS
63	2051.000	337.300	TOE
64	2059.000	338.000	TOP
65	2069.000	337.100	BRK
66	2125.000	336.900	TOE
67	2142.000	341.100	TOP
68	2207.000	340.700	BRK
69	2274.000	341.300	GS
70	2297.000	341.300	BRK
71	2302.000	340.500	BRK
72	2348.000	340.200	BRK
73	2369.000	341.400	BRK
74	2429.000	340.600	BRK
75	2466.000	338.700	BRK
76	2481.000	340.000	BRK
77	2542.600	340.200	POL 2
78	2579.000	338.900	BRK
79	2610.000	340.300	BRK
80	2623.000	339.800	BRK
81	2630.000	340.700	BRK
82	2665.000	340.700	BRK
83	2712.000	340.600	ANGL PT 2
84	2734.000	336.800	L EOW
85	2740.000	334.800	RIV BOT
86	2758.000	331.800	RIV BOT
87	2802.000	332.500	RIV BOT
88	2859.000	331.200	RIV BOT
89	2909.000	330.500	RIV BOT
90	2952.000	328.800	RIV BOT
91	3014.000	329.600	RIV BOT
92	3060.000	330.200	RIV BOT
93	3089.000	334.000	RIV BOT
94	3103.000	336.700	R EOW
95	3108.000	337.600	TOP
96	3120.000	337.600	TOP
97	3127.000	336.700	L EOW
98	3136.000	334.700	RIV BOT
99	3151.000	334.500	RIV BOT
100	3168.000	336.000	RIV BOT
101	3180.000	336.700	R EOW
102	3207.000	337.600	BRK
103	3228.000	337.500	BRK
104	3247.000	336.500	L EOW
105	3263.000	334.800	RIV BOT
106	3269.000	334.100	RIV BOT
107	3283.000	334.800	RIV BOT
108	3288.000	336.500	R EOW
109	3296.000	342.800	TOP
110	3332.900	343.200	ALCAP 98.0 RB

Water surface data:

1	74.000	337.000	L EOW
2	188.000	337.000	R EOW
3	529.000	0.000	
4	527.000	338.100	L EOW
5	642.000	338.200	R EOW
6	1832.000	0.000	
7	1832.000	336.000	L EOW
8	1919.000	336.100	R EOW
9	2734.000	0.000	
10	2734.000	336.800	L EOW
11	3103.000	336.900	R EOW
12	3127.000	0.000	
13	3127.000	336.700	L EOW
14	3180.000	336.700	R EOW
15	3247.000	0.000	
16	3247.000	336.500	L EOW
17	3288.000	336.500	R EOW
MIN	0.000	328.800	
MAX	3332.900	344.070	

SUSITNA HYDROGRAPHIC SURVEYS
cross section LRX 97.1

Date of Survey: SEPTEMBER 27, 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	336.300	ALCAP LRX 1
2	3.000	336.500	TOP
3	19.000	332.800	TOE
4	43.000	332.400	TOE
5	55.000	335.900	TOP
6	108.000	335.300	TOP
7	177.000	336.700	BRK
8	234.000	336.300	BRK
9	250.000	335.200	BRK
10	313.000	333.700	GS
11	350.200	333.200	POL 1 & GS
12	385.000	332.500	L EDW
13	417.000	331.900	RIV BOT
14	466.000	331.800	RIV BOT
15	509.000	332.100	RIV BOT
16	539.000	332.600	R EDW
17	570.000	331.500	L EDW
18	626.000	331.100	RIV BOT
19	643.000	330.900	RIV BOT
20	666.000	329.700	RIV BOT
21	697.000	328.400	RIV BOT
22	746.000	327.400	RIV BOT
23	784.000	324.200	RIV BOT
24	828.000	322.100	RIV BOT
25	832.000	322.400	RIV BOT
26	870.000	323.100	RIV BOT
27	923.000	324.900	RIV BOT
28	977.000	328.100	RIV BOT
29	1035.000	329.400	RIV BOT
30	1059.000	330.500	RIV BOT
31	1090.000	330.700	RIV BOT
32	1124.000	331.600	R EDW
33	1155.000	333.000	BRK
34	1221.000	333.800	TOE
35	1243.000	335.700	TOP
36	1293.600	335.900	POL 2
37	1372.000	334.800	BRK
38	1415.000	334.600	BRK
39	1441.000	332.900	TOE
40	1454.000	334.700	TOP
41	1486.000	334.500	BRK
42	1524.000	333.400	TOE
43	1532.000	334.800	TOP
44	1551.000	335.500	BRK
45	1582.000	334.900	TOP
46	1596.000	332.300	TOE
47	1624.000	332.500	BRK
48	1670.000	334.700	BRK
49	1791.000	336.300	BRK
50	1866.000	336.700	GS

51	1929.300	337.200	ANG PT 1
52	2017.000	332.200	TOE
53	2046.000	333.700	BRK
54	2122.000	333.400	TOE
55	2148.000	335.000	BRK
56	2189.000	335.600	TOP
57	2231.000	337.800	BRK
58	2310.000	338.000	BRK
59	2341.000	336.200	BRK
60	2412.000	337.700	BRK
61	2496.000	338.200	GS
62	2555.000	338.400	GS
63	2611.000	337.900	TOP
64	2619.000	335.400	TOE
65	2655.000	335.100	BRK
66	2677.000	336.500	BRK
67	2776.000	337.000	GS
68	2847.000	335.400	GS
69	2937.000	336.100	BRK
70	2971.000	337.500	BRK
71	3029.200	337.200	POL 3
72	3060.000	337.100	TOP
73	3066.000	335.900	TOE
74	3137.000	336.600	TOE
75	3173.100	337.300	BRK
76	3279.000	337.900	BRK
77	3351.200	337.200	ANG PT 2
78	3392.000	336.700	BRK
79	3400.000	335.000	L EOW
80	3426.000	334.600	RIV BOT
81	3452.000	334.200	RIV BOT
82	3478.000	334.300	RIV BOT
83	3505.000	334.600	RIV BOT
84	3548.000	335.300	R EOW
85	3572.000	[illegible]	BRK
86	3630.000	[illegible]	BRK
87	3692.000	337.100	BRK
88	3741.000	338.100	BRK
89	3813.000	337.300	BRK
90	3819.000	338.400	BRK
91	3866.000	337.800	BRK
92	3896.000	336.500	BRK
93	3978.000	337.300	BRK
94	4002.000	337.200	BRK
95	4022.000	335.700	BRK
96	4061.000	337.700	BRK
97	4108.000	337.700	BRK
98	4145.000	337.600	BRK
99	4161.000	336.700	BRK
100	4187.200	337.400	ANG PT 3
101	4229.000	334.800	L EOW
102	4256.000	333.500	RIV BOT
103	4272.000	332.900	RIV BOT
104	4291.000	331.900	RIV BOT
105	4336.000	330.500	RIV BOT
106	4379.000	329.600	RIV BOT
107	4428.000	328.800	RIV BOT
108	4477.000	328.400	RIV BOT
109	4530.000	327.200	RIV BOT
110	4577.000	326.600	RIV BOT

111	4611.000	330.300	RIV BOT
112	4625.000	333.000	RIV BOT
113	4632.000	335.000	R EOW
114	4652.900	340.800	ALCAP LRx 92 1

Water surface data:

1	385.000	332.500	L EOW
2	539.000	332.200	R EOW
3	570.000	0.000	
4	570.000	331.500	L EOW
5	1124.000	331.600	R EOW
6	3400.000	0.000	
7	3400.000	335.800	L EOW
8	3548.000	335.800	R EOW
9	4229.000	0.000	
10	4229.000	334.800	L EOW
11	4632.000	335.000	R EOW

MIN	0.000	322.100
MAX	4652.900	340.800

SUSITNA HYDROGRAPHIC SURVEYS
cross section LRX 25.9

Date of Survey: SEPTEMBER 26, 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	330.540	ALCAP LRX 17
2	16.000	329.200	TOP
3	18.000	322.700	TOE
4	31.000	322.300	BRK
5	52.000	322.700	BRK
6	87.000	322.700	TOE
7	97.000	326.500	TOP
8	108.000	326.500	TOP
9	117.000	324.100	TOE
10	155.000	323.200	L EDW
11	173.000	321.700	RIV BOT
12	191.000	321.200	RIV BOT
13	225.000	320.200	RIV BOT
14	261.000	317.300	RIV BOT
15	299.000	318.500	RIV BOT
16	354.000	320.100	RIV BOT
17	409.000	317.300	RIV BOT
18	466.000	318.100	RIV BOT
19	504.000	315.700	RIV BOT
20	526.000	319.600	RIV BOT
21	532.000	321.200	RIV BOT
22	547.000	322.900	R EDW
23	561.000	329.200	TOP
24	570.000	328.000	BRK
25	582.000	329.100	BRK
26	629.000	328.800	BRK
27	655.000	328.300	BRK
28	667.000	325.500	BRK
29	693.500	328.000	POL & BRK
30	713.000	327.400	TOP
31	737.000	325.400	TOE
32	780.000	325.700	BRK
33	851.000	324.500	BRK
34	928.000	324.700	GS
35	970.000	325.400	TOE ED VEG
36	986.000	328.100	TOP
37	1045.000	329.400	BRK
38	1090.000	330.500	BRK
39	1115.000	328.700	TOE
40	1122.000	330.200	TOP
41	1163.000	330.800	TOP
42	1171.000	329.000	TOE
43	1235.000	329.400	GS
44	1313.000	330.400	GS
45	1415.500	330.400	POL & TOP
46	1457.000	327.700	TOE
47	1477.000	328.300	BRK
48	1512.000	324.400	L EDW
49	1525.000	323.400	RIV BOT
50	1541.000	323.700	RIV BOT

51	1556.000	324.400	R EOW
52	1610.000	326.400	BRK
53	1662.000	325.900	BRK
54	1685.000	323.600	BRK
55	1699.000	325.900	BRK
56	1735.000	327.100	TOE
57	1763.000	327.500	BRK
58	1785.000	329.200	TOP
59	1846.000	329.200	GS
60	1906.000	328.800	TOP
61	1933.000	326.200	TOE
62	1993.000	325.400	TOE
63	2002.000	327.400	BRK
64	2031.000	328.900	BRK
65	2036.000	328.100	TOE
66	2041.000	330.100	TOP
67	2044.900	330.400	ANG PT 1
68	2054.000	330.700	TOP
69	2058.000	326.700	TOE
70	2063.000	324.800	L EOW
71	2067.000	323.100	RIV BOT
72	2071.000	321.500	RIV BOT
73	2087.000	320.600	RIV BOT
74	2102.000	321.700	RIV BOT
75	2121.000	322.000	RIV BOT
76	2139.000	323.100	RIV BOT
77	2150.000	324.800	R EOW
78	2162.000	326.400	TOP
79	2197.000	326.200	BRK
80	2280.000	328.700	GS
81	2337.000	326.900	L EOW
82	2371.000	325.800	RIV BOT
83	2389.000	325.100	RIV BOT
84	2405.000	324.000	RIV BOT
85	2438.000	323.700	RIV BOT
86	2464.000	323.700	RIV BOT
87	2496.000	323.100	RIV BOT
88	2520.000	322.700	RIV BOT
89	2540.000	324.000	RIV BOT
90	2550.000	325.200	RIV BOT
91	2556.000	326.700	R EOW
92	2567.000	329.700	TOP
93	2622.000	329.600	BRK
94	2671.000	328.800	TOP
95	2678.000	327.000	TOE
96	2698.000	326.900	BRK
97	2713.000	328.500	BRK
98	2734.000	329.900	TOP
99	2776.000	329.100	TOP
100	2783.000	326.900	TOE
101	2812.000	325.900	GS
102	2860.000	327.200	BRK
103	2905.000	328.100	BRK
104	2953.000	328.800	BRK
105	2970.000	328.000	TOE
106	2980.000	329.800	TOP
107	3028.900	330.300	POI 2
108	3089.000	327.800	GS
109	3101.000	329.500	BRK
110	3111.000	328.300	TOE

111	3162.000	327.900	GS
112	3202.000	327.000	TOE
113	3242.000	329.200	TOP
114	3266.000	326.900	BRK
115	3325.000	329.200	BRK
116	3405.000	327.500	GS
117	3447.000	327.300	GS
118	3481.000	325.500	BRK
119	3505.000	326.000	BRK
120	3510.000	327.900	BRK
121	3579.700	329.000	POL 3 & TOP
122	3598.000	326.900	L EOW
123	3613.000	325.700	RIV BOT
124	3630.000	325.100	RIV BOT
125	3660.000	325.000	RIV BOT
126	3727.000	321.600	RIV BOT
127	3755.000	320.500	RIV BOT
128	3793.000	321.700	RIV BOT
129	3838.000	321.500	RIV BOT
130	3878.000	321.700	RIV BOT
131	3931.000	322.400	RIV BOT
132	3982.000	323.400	RIV BOT
133	4010.000	324.900	RIV BOT
134	4019.000	327.000	R EOW
135	4025.000	328.900	TOP
136	4087.000	329.100	GS
137	4165.000	327.400	GS
138	4235.000	325.900	BRK
139	4283.000	324.500	BRK
140	4329.000	325.500	BRK
141	4381.000	327.100	BRK
142	4411.000	326.000	BRK
143	4475.000	330.000	BRK
144	4507.700	327.500	POL 4 & GS
145	4570.000	328.000	BRK
146	4637.000	329.800	BRK
147	4716.000	329.400	GS
148	4803.000	328.900	GS
149	4837.500	328.100	ANG PT 2
150	4884.000	328.500	BRK
151	4903.000	327.500	BRK
152	4942.000	328.500	BRK
153	4997.000	328.100	BRK
154	5087.000	328.500	GS
155	5172.000	328.300	TOP
156	5193.000	326.700	L EOW
157	5197.000	324.700	RIV BOT
158	5225.000	323.900	RIV BOT
159	5251.000	323.900	RIV BOT
160	5284.000	324.100	RIV BOT
161	5320.000	324.300	RIV BOT
162	5357.000	324.700	RIV BOT
163	5392.000	323.700	RIV BOT
164	5397.000	326.700	R EOW
165	5408.200	327.700	POL 5 & GS
166	5430.000	327.600	BRK
167	5462.000	326.800	BRK
168	5472.000	326.100	L EOW
169	5484.000	324.200	RIV BOT
170	5499.000	323.700	RIV BOT

171	5516.000	324.200	RIV BOT
172	5529.000	325.400	RIV BOT
173	5534.000	326.200	R EOW
174	5546.000	327.200	TOP
175	5585.000	327.600	BRK
176	5642.000	227.000	GS
177	5704.000	326.600	BRK
178	5712.000	324.100	BRK
179	5748.000	325.300	TOP
180	5757.000	332.500	TOP
181	5764.600	333.300	AP CAP [illegible]

water surface data:

1	155.000	323.200	L EOW
2	547.000	322.900	R EOW
3	1512.000	0.000	
4	1512.000	324.400	L EOW
5	1556.000	324.400	R EOW
6	2063.000	0.000	
7	2063.000	324.800	L EOW
8	2150.000	324.800	R EOW
9	2337.000	0.000	
10	2337.000	326.800	L EOW
11	2556.000	326.700	R EOW
12	3598.000	0.000	
13	3598.000	326.900	L EOW
14	4017.000	327.000	R EOW
15	5193.000	0.000	
16	5173.000	326.700	L EOW
17	5397.000	326.700	R EOW
18	5472.000	0.000	
19	5472.000	326.100	L EOW
20	5534.000	326.200	R EOW
MIN	0.000	315.700	
MAX	5764.600	333.300	

SUSITNA HYDROGRAPHIC SURVEY
Cross section LRX 7[illegible].1

Date of Survey: SEPTEMBER 11 1984

Cross section data:

			DESCRIPTION
1	0.000	[illegible]	[illegible]
2	8.000	313.500	
3	14.000	307.100	L EOW
4	24.000	304.300	LW PT
5	34.000	307.500	L EOW
6	72.000	307.200	RIV BOT
7	92.000	307.000	TOE
8	103.000	308.100	TOP
9	112.000	308.000	TOE
10	122.000	307.300	GS
11	139.000	308.100	TOE
12	170.000	311.200	TOP
13	244.000	311.100	GS
14	327.000	311.600	GS
15	468.000	312.100	GS
16	514.000	311.900	TOP
17	543.000	306.900	L EOW
18	565.000	304.900	RIV BOT
19	607.000	304.000	RIV BOT
20	626.000	305.300	RIV BOT
21	644.000	306.800	R EOW
22	715.000	308.600	GS
23	787.000	309.700	GS
24	887.000	308.000	GS
25	962.000	307.300	L EOW
26	990.000	306.600	RIV BOT
27	1009.000	305.700	RIV BOT
28	1051.000	303.700	RIV BOT
29	1092.000	302.500	RIV BOT
30	1142.000	301.900	RIV BOT
31	1188.000	300.300	RIV BOT
32	1242.000	298.800	RIV BOT
33	1291.000	299.700	RIV BOT
34	1345.000	299.900	RIV BOT
35	1425.000	305.100	RIV BOT
36	1481.000	305.600	RIV BOT
37	1506.000	306.300	RIV BOT
38	1551.000	306.800	RIV BOT
39	1598.000	306.600	RIV BOT
40	1628.000	308.000	R EOW
41	1673.000	310.500	GS
42	1735.000	312.300	BRK
43	1820.000	312.300	TOP
44	1830.000	310.900	TOE
45	1857.000	312.500	TOP
46	1912.000	310.400	BRK
47	1946.000	312.200	TOP
48	1984.000	308.400	TOE
49	2006.000	308.400	TOE
50	2038.000	314.600	TOP

51	2058.100	314.300	ANG PT 1
52	2097.000	313.900	GS
53	2182.000	314.200	GS
54	2266.000	314.300	GS
55	2376.000	313.700	GS
56	2534.600	314.500	ANG PT 2
57	2542.000	314.600	TOP
58	2589.000	311.000	TOE
59	2610.000	310.500	GS
60	2636.000	311.100	TOE
61	2644.000	314.100	TOP
62	2667.000	315.800	BRK
63	2687.000	314.700	TOP
64	2692.000	311.400	TOE
65	2721.000	311.500	GS
66	2769.000	312.000	GS
67	2799.000	311.100	BRK
68	2842.000	311.800	GS
69	2885.000	311.000	GS
70	2904.000	311.600	TOE
71	2912.000	313.800	TOP
72	2937.200	313.900	POL 1
73	2958.000	313.500	TOP
74	2969.000	310.200	L EOW
75	2987.000	308.800	RIV BOT
76	3007.000	308.000	RIV BOT
77	3045.000	307.000	RIV BOT
78	3090.000	307.700	RIV BOT
79	3145.000	309.700	RIV BOT
80	3177.000	306.900	RIV BOT
81	3217.000	306.500	RIV BOT
82	3261.000	305.700	RIV BOT
83	3308.000	305.800	RIV BOT
84	3347.000	308.000	RIV BOT
85	3356.000	310.400	R EOW
86	3376.000	316.100	TOP
87	3387.200	316.100	ANG PT 3
88	3439.000	315.500	BRK
89	3454.000	315.400	TOP
90	3478.000	314.000	TOE
91	3495.000	312.500	GS
92	3517.000	313.300	TOE
93	3552.000	316.700	TOP
94	3578.000	315.700	GS
95	3589.000	317.000	GS
96	3635.000	316.900	BRK
97	3670.000	316.500	GS
98	3691.000	315.700	TOP
99	3695.000	314.800	TOE
100	3707.000	314.500	TOE
101	3731.000	315.600	TOP
102	3752.000	315.800	TOP
103	3766.000	314.800	TOE
104	3790.000	314.800	TOE
105	3808.000	315.200	TOP
106	3827.000	316.600	BRK
107	3835.000	316.500	GS
108	3842.000	315.400	GS
109	3867.000	314.700	BRK
110	3901.000	315.000	TOE

111	3931.000	315.600	TOP
112	3943.000	315.100	TOE
113	3969.000	315.000	GS
114	3992.000	314.800	TOE
115	4000.000	316.100	TOP
116	4044.000	316.600	BRK
117	4104.000	315.700	TOP
118	4111.000	314.500	TOE
119	4144.000	313.600	GS
120	4165.000	313.600	GS
121	4213.000	313.100	TOE
122	4217.000	315.300	TOP
123	4261.000	314.800	GS
124	4295.000	314.000	TOP
125	4306.000	311.200	TOE
126	4330.000	311.300	GS
127	4368.000	310.400	TOE
128	4414.000	316.300	TOP
129	4449.000	316.700	TOP
130	4500.000	316.100	GS
131	4527.000	315.500	TOP
132	4543.000	314.100	TOE
133	4574.000	314.200	TOE
134	4582.000	315.400	TOP
135	4610.000	315.800	BRK
136	4655.000	315.500	TOP
137	4662.000	313.900	TOE
138	4687.000	313.600	GS
139	4713.000	312.800	TOE
140	4732.000	314.100	TOP
141	4737.000	314.100	TOP
142	4739.000	313.200	TOE
143	4765.000	311.200	GS
144	4793.000	312.800	TOE
145	4822.000	315.500	TOP
146	4858.000	315.500	GS
147	4887.000	315.800	GS
148	4920.000	316.000	GS
149	4961.000	316.400	BRK
150	4997.000	314.500	GS
151	5052.000	314.100	GS
152	5063.000	315.900	BRK
153	5075.000	314.900	BRK
154	5126.000	315.600	BRK
155	5171.000	314.900	GS
156	5206.000	314.400	BRK
157	5231.000	315.700	BRK
158	5250.000	315.500	GS
159	5274.000	314.200	BRK
160	5310.000	314.500	GS
161	5339.000	314.500	GS
162	5350.000	313.000	GS
163	5442.000	314.000	GS
164	5478.000	314.600	GS
165	5502.000	313.700	GS
166	5540.000	313.100	GS
167	5585.000	312.700	BRK
168	5611.000	315.300	BRK
169	5652.000	315.000	GS
170	5697.000	315.500	BRK

171	5742.000	313.200	BRK
172	5770.000	313.200	GS
173	5817.000	315.300	BRK
174	5843.000	315.100	BRK
175	5883.000	313.900	GS
176	5894.000	308.700	L EOW
177	5917.000	307.100	RIV BOT
178	5937.000	307.200	RIV BOT
179	5956.000	307.900	RIV BOT
180	5974.000	308.600	R EOW
181	5982.000	309.100	GS
182	6027.000	311.000	TOE
183	6074.000	314.100	GS
184	6100.000	312.300	BRK
185	6111.000	313.900	BRK
186	6150.000	312.200	GS
187	6172.000	313.100	TOE
188	6182.000	314.300	TOP
189	6211.000	314.000	BRK
190	6233.000	312.800	TOE
191	6244.000	316.200	TOP
192	6250.300	316.600	ALCAP LRX RM 93.1

Water surface data:

1	543.000	306.800	L EOW
2	644.000	306.800	R EOW
3	762.000	0.000	
4	762.000	307.800	L EOW
5	1628.000	308.200	R EOW
6	2967.000	0.000	
7	2969.000	310.200	L EOW
8	3356.000	310.400	R EOW
9	5894.000	0.000	
10	5874.000	308.700	L EOW
11	5974.000	308.600	R EOW

MIN	0.000	298.800
MAX	6250.300	317.000

SUSITNA HYDROGRAPHIC SURVEYS
1984 cross section LRX 91.8

Date of Survey: SEPTEMBER 13 1984

POINT	'X'	'Y'	DESCRIPTION
Cross section data:			
1	0.000	305.100	ALCAP LRX RM 91.8
2	15.000	305.100	TOP
3	19.000	299.700	L EOW
4	34.000	295.900	RIV BOT
5	65.000	294.300	RIV BOT
6	90.000	294.500	RIV BOT
7	119.000	295.400	RIV BOT
8	148.000	296.600	RIV BOT
9	180.000	296.900	RIV BOT
10	216.000	296.500	RIV BOT
11	247.000	295.500	RIV BOT
12	271.500	299.700	R EOW
13	276.000	300.900	TOP
14	327.000	301.200	GS
15	418.000	302.000	BRK
16	481.000	303.200	GS
17	525.000	305.200	BRK
18	625.000	304.500	BRK
19	667.000	305.300	GS
20	688.000	305.200	BRK
21	727.000	304.100	TOP
22	775.000	300.300	TOE
23	817.000	300.400	GS
24	859.000	300.800	TOE
25	884.000	302.900	TOP
26	927.000	302.500	GS
27	950.000	302.400	BRK
28	971.000	301.400	L EOW
29	1009.000	301.100	RIV BOT
30	1055.000	300.300	RIV BOT
31	1087.000	299.600	RIV BOT
32	1102.000	299.200	RIV BOT
33	1150.000	297.500	RIV BOT
34	1187.000	295.500	RIV BOT
35	1237.000	293.200	RIV BOT
36	1290.000	291.900	RIV BOT
37	1345.000	291.100	RIV BOT
38	1390.000	290.300	RIV BOT
39	1442.000	290.800	RIV BOT
40	1493.000	294.800	RIV BOT
41	1534.000	298.400	RIV BOT
42	1554.000	299.800	RIV BOT
43	1575.000	301.600	R EOW
44	1721.000	303.400	GS
45	1792.000	302.700	TOP
46	1800.000	301.400	TOE
47	1839.000	301.000	TOE
48	1870.000	302.800	TOP
49	1949.000	303.300	GS
50	2007.000	302.800	BRK

51	2072.000	301.900	GS
52	2113.000	300.000	BRK
53	2152.000	302.200	BRK
54	2186.000	300.200	BRK
55	2253.000	302.300	GS
56	2353.000	302.900	BRK
57	2393.000	300.000	BRK
58	2475.000	301.000	GS
59	2554.000	302.400	GS
60	2618.000	301.600	TOP
61	2640.000	298.700	TOE
62	2660.000	297.700	GS
63	2685.000	298.200	TOE
64	2707.000	300.200	TOP
65	2802.000	301.200	GS
66	2932.000	301.300	BRK
67	3010.000	303.500	GS
68	3105.900	304.100	POL 1
69	3166.000	303.700	TOP
70	3183.000	302.700	TOE
71	3223.000	301.900	GS
72	3300.000	302.600	GS
73	3372.000	302.300	BRK
74	3428.000	299.700	GS
75	3474.000	297.700	GS
76	3490.000	295.500	GS
77	3511.000	297.200	TOE
78	3528.000	302.400	TOP
79	3571.000	302.400	TOE
80	3573.000	304.900	TOP
81	3576.900	305.100	ANG PT 1
82	3590.000	304.500	TOP
83	3592.000	301.900	TOE
84	3630.000	301.600	BRK
85	3682.000	303.600	GS
86	3753.000	303.500	GS
87	3804.000	303.400	BRK
88	3842.000	299.500	BRK
89	3891.000	301.500	GS
90	3990.000	303.300	GS
91	4086.000	300.500	GS
92	4210.000	297.700	BRK
93	4309.000	298.700	GS
94	4399.000	299.600	BRK
95	4446.000	302.400	BRK
96	4532.000	302.300	GS
97	4594.000	302.100	BRK
98	4657.000	301.200	BRK
99	4715.000	303.200	BRK
100	4753.400	303.100	POL 2
101	4802.000	302.900	GS
102	4835.000	303.100	TOP
103	4865.000	300.200	TOE
104	4892.000	301.600	BRK
105	4953.000	301.500	GS
106	5026.000	302.400	BRK
107	5091.000	302.600	GS
108	5131.000	302.800	BRK
109	5169.000	301.700	GS
110	5204.000	302.400	TOP

111	5212.000	301.100	TOE
112	5261.000	300.000	GS
113	5295.000	299.100	TOE
114	5305.000	300.700	TOP
115	5345.000	301.800	BRK
116	5399.000	301.000	GS
117	5482.000	300.800	TOP
118	5494.000	299.600	TOE
119	5516.000	299.100	TOE
120	5527.000	300.900	TOP
121	5567.000	301.200	BRK
122	5593.000	302.300	BRK
123	5642.000	302.100	GS
124	5689.000	301.200	BRK
125	5730.000	300.000	GS
126	5785.000	300.200	GS
127	5850.000	299.100	BRK
128	5903.000	300.300	TOP
129	5957.000	298.700	BRK
130	6006.000	297.400	L EOW
131	6034.000	296.000	RIV BOT
132	6063.000	294.600	RIV BOT
133	6074.000	297.400	R EOW
134	6102.000	304.200	TOP
135	6138.400	304.200	POL 3
136	6173.000	303.700	TOP
137	6182.000	301.900	TOE
138	6194.000	301.700	TOE
139	6201.000	303.500	TOP
140	6233.000	303.000	GS
141	6281.000	303.100	GS
142	6316.000	303.100	BRK
143	6334.000	302.600	BRK
144	6354.000	302.300	TOE
145	6361.000	303.800	TOP
146	6399.000	303.500	GS
147	6421.000	303.200	BRK
148	6443.000	303.200	BRK
149	6452.600	303.600	POL 4
150	6472.000	302.500	BRK
151	6519.000	301.000	BRK
152	6556.000	301.700	GS
153	6610.000	301.100	BRK
154	6651.000	299.500	GS
155	6698.000	298.400	GS
156	6739.000	297.800	L EOW
157	6778.000	297.300	RIV BOT
158	6813.000	297.000	RIV BOT
159	6847.000	296.400	RIV BOT
160	6870.000	295.900	RIV BOT
161	6887.000	295.400	RIV BOT
162	6902.000	297.900	R EOW
163	6915.000	302.300	TOP
164	6963.000	301.600	GS
165	7011.000	300.700	TOP
166	7044.000	299.400	L EOW
167	7061.000	298.800	RIV BOT
168	7093.000	299.400	R EOW
169	7107.000	300.600	TOE
170	7112.000	303.600	TOP

171	7134.000	303.700	BRK
172	7155.000	303.000	GS
173	7182.000	303.100	GS
174	7279.500	304.300	ALCAP LRX RM 91.9

Water surface data:

1	19.000	299.700	L EOW
2	271.500	299.700	R EOW
3	971.000	0.000	
4	971.000	301.400	L EOW
5	1575.000	301.600	R EOW
6	2618.000	0.000	
7	2618.000	300.000	APROX L EOW
8	2700.000	300.000	APROX R EOW
9	6006.000	0.000	
10	6006.000	297.400	L EOW
11	6074.000	297.400	R EOW
12	6739.000	0.000	
13	6739.000	297.800	L EOW
14	6902.000	297.900	R EOW
15	7044.000	0.000	
16	7044.000	299.400	L EOW
17	7093.000	299.400	R EOW

MIN	0.000	290.300
MAX	7279.500	305.300

****************************** CROSS-SECTION PLOT ******************************

SUSITNA HYDROGRAPHIC SURVEYS
1984 cross section LRX 90.6

Date of Survey: SEPTEMBER 15, 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	296.900	ALCAP LRX RM 90.6
2	23.000	296.600	TOP
3	31.000	294.200	TOE
4	39.000	295.300	BRK
5	65.000	293.700	L EOW
6	79.000	291.500	RIV BOT
7	96.000	284.500	RIV BOT
8	126.000	284.500	RIV BOT
9	176.000	287.600	RIV BOT
10	226.000	287.600	RIV BOT
11	275.000	290.500	RIV BOT
12	329.000	291.500	RIV BOT
13	379.000	291.700	RIV BOT
14	423.000	292.400	RIV BOT
15	474.000	292.700	RIV BOT
16	503.000	293.600	R EOW
17	540.000	294.500	GS
18	561.000	295.600	BRK
19	599.000	296.300	GS
20	626.000	295.100	TOP
21	631.000	293.300	L EOW
22	637.000	290.600	RIV BOT
23	675.000	290.400	RIV BOT
24	721.000	291.500	RIV BOT
25	738.000	291.200	RIV BOT
26	776.000	290.200	RIV BOT
27	812.000	291.200	RIV BOT
28	823.000	292.600	RIV BOT
29	849.000	293.200	RIV BOT
30	872.000	293.300	R EOW
31	903.000	293.800	GS & L EOW
32	940.000	292.600	RIV BOT
33	980.000	290.100	RIV BOT
34	1035.000	289.100	RIV BOT
35	1080.000	286.700	RIV BOT
36	1110.000	290.800	RIV BOT
37	1114.000	293.600	R EOW
38	1117.000	297.200	TOP
39	1123.900	296.900	ANG PT 1
40	1132.000	296.600	TOP
41	1135.000	295.700	TOE
42	1169.000	295.800	GS
43	1208.000	294.900	TOE
44	1213.000	296.600	TOP
45	1260.000	297.200	GS

****************************** CROSS-SECTION PLOT ******************************

SUSITNA HYDROGRAPHIC SURVEYS
1984 cross section LRX 90.6

Date of Survey: SEPTEMBER 15, 1984

POINT	'X'	'Y'	DESCRIPTION
Cross section data:			
1	0.000	296.900	ALCAP LRX RM 90.6
2	23.000	296.600	TOP
3	31.000	294.200	TOE
4	39.000	295.300	BRK
5	65.000	293.700	L EOW
6	79.000	291.500	RIV BOT
7	96.000	284.500	RIV BOT
8	126.000	284.500	RIV BOT
9	176.000	287.600	RIV BOT
10	226.000	287.600	RIV BOT
11	275.000	290.500	RIV BOT
12	329.000	291.500	RIV BOT
13	379.000	291.700	RIV BOT
14	423.000	292.400	RIV BOT
15	474.000	292.700	RIV BOT
16	503.000	293.600	R EOW
17	540.000	294.500	GS
18	561.000	295.600	BRK
19	599.000	296.300	GS
20	626.000	295.100	TOP
21	631.000	293.300	L EOW
22	637.000	290.600	RIV BOT
23	675.000	290.400	RIV BOT
24	721.000	291.500	RIV BOT
25	738.000	291.200	RIV BOT
26	776.000	290.200	RIV BOT
27	812.000	291.200	RIV BOT
28	823.000	292.600	RIV BOT
29	849.000	293.200	RIV BOT
30	872.000	293.300	R EOW
31	903.000	293.800	GS & L EOW
32	940.000	292.600	RIV BOT
33	980.000	290.100	RIV BOT
34	1035.000	289.100	RIV BOT
35	1080.000	286.700	RIV BOT
36	1110.000	290.800	RIV BOT
37	1114.000	293.600	R EOW
38	1117.000	297.200	TOP
39	1123.900	296.900	ANG PT 1
40	1132.000	296.600	TOP
41	1135.000	295.700	TOE
42	1169.000	295.800	GS
43	1208.000	294.900	TOE
44	1213.000	296.600	TOP
45	1260.000	297.200	GS

106	3271.000	285.700	RIV BOT
46	1298.000	296.400	GS
47	1329.000	296.900	GS
48	1362.100	297.100	POL 1
49	1371.000	297.000	TOP
50	1375.000	293.600	L EOW
51	1383.000	291.500	RIV BOT
52	1392.000	291.200	RIV BOT
53	1412.000	291.000	RIV BOT
54	1430.000	292.300	RIV BOT
55	1443.000	293.600	R EOW
56	1469.000	294.400	BRK
57	1546.000	295.000	GS
58	1599.000	295.600	BRK
59	1631.000	295.100	TOP
60	1659.000	293.500	L EOW
61	1670.000	293.000	LW PT
62	1679.000	293.500	R EOW
63	1726.000	294.700	BRK
64	1764.000	293.500	L EOW
65	1800.000	292.700	LW PT
66	1835.000	293.500	R EOW
67	1845.000	294.500	TOP
68	1861.000	293.500	BRK
69	1899.000	294.700	GS
70	1933.000	294.100	BRK
71	1958.000	294.700	BRK
72	1986.000	292.700	BRK
73	2010.000	294.300	BRK
74	2021.000	293.800	GS
75	2031.000	292.700	BRK
76	2081.000	295.200	GS
77	2119.000	295.600	TOP
78	2138.000	293.700	TOE
79	2162.000	293.900	GS
80	2188.000	293.600	TOE
81	2202.000	294.600	TOP
82	2243.600	294.800	POL 2
83	2285.000	293.900	TOP
84	2297.000	292.700	TOE
85	2323.000	292.400	BRK
86	2343.000	291.600	TOE
87	2350.000	294.000	TOP
88	2409.000	295.000	BRK
89	2479.000	294.000	GS
90	2590.000	294.200	TOP
91	2602.000	292.200	TOE
92	2636.000	291.200	GS
93	2680.000	292.100	BRK
94	2717.000	291.400	TOE
95	2751.000	292.400	TOP
96	2815.000	292.100	GS
97	2912.000	290.700	GS
98	2968.400	290.700	POL 3
99	2995.000	289.500	L EOW
100	3013.000	288.800	RIV BOT
101	3042.000	289.400	RIV BOT
102	3078.000	288.800	RIV BOT
103	3112.000	288.100	RIV BOT
104	3161.000	287.200	RIV BOT
105	3215.000	287.800	RIV BOT

46	1298.000	296.400	GS
47	1329.000	296.900	GS
48	1362.100	297.100	POL 1
49	1371.000	297.000	TOP
50	1375.000	293.600	L EOW
51	1383.000	291.500	RIV BOT
52	1392.000	291.200	RIV BOT
53	1412.000	291.000	RIV BOT
54	1430.000	292.300	RIV BOT
55	1443.000	293.600	R EOW
56	1469.000	294.400	BRK
57	1546.000	295.000	GS
58	1599.000	295.600	BRK
59	1631.000	295.100	TOP
60	1659.000	293.500	L EOW
61	1670.000	293.000	LW PT
62	1679.000	293.500	R EOW
63	1726.000	294.700	BRK
64	1764.000	293.500	L EOW
65	1800.000	292.700	LW PT
66	1835.000	293.500	R EOW
67	1845.000	294.500	TOP
68	1861.000	293.500	BRK
69	1899.000	294.700	GS
70	1933.000	294.100	BRK
71	1958.000	294.700	BRK
72	1986.000	292.700	BRK
73	2010.000	294.300	BRK
74	2021.000	293.800	GS
75	2031.000	292.700	BRK
76	2081.000	295.200	GS
77	2119.000	295.600	TOP
78	2138.000	293.700	TOE
79	2162.000	293.900	GS
80	2188.000	293.600	TOE
81	2202.000	294.600	TOP
82	2243.600	294.800	POL 2
83	2285.000	293.900	TOP
84	2297.000	292.700	TOE
85	2323.000	292.400	BRK
86	2343.000	291.600	TOE
87	2350.000	294.000	TOP
88	2409.000	295.000	BRK
89	2479.000	294.000	GS
90	2590.000	294.200	TOP
91	2602.000	292.200	TOE
92	2636.000	291.200	GS
93	2680.000	292.100	BRK
94	2717.000	291.400	TOE
95	2751.000	292.400	TOP
96	2815.000	292.100	GS
97	2912.000	290.700	GS
98	2968.400	290.700	POL 3
99	2995.000	289.500	L EOW
100	3013.000	288.900	RIV BOT
101	3042.000	289.400	RIV BOT
102	3078.000	288.800	RIV BOT
103	3112.000	288.100	RIV BOT
104	3161.000	287.200	RIV BOT
105	3215.000	287.800	RIV BOT

106	3271.000	285.700	RIV BOT
107	3319.000	284.800	RIV BOT
108	3367.000	284.000	RIV BOT
109	3406.000	279.600	RIV BOT
110	3442.000	278.200	RIV BOT
111	3483.000	284.500	RIV BOT
112	3500.000	287.700	RIV BOT
113	3507.000	289.700	R EOW
114	3516.400	294.000	ALCAP LPX RM 90.6

Water surface data:

1	65.000	293.700	L EOW
2	503.000	293.600	R EOW
3	631.000	0.000	
4	631.000	293.300	L EOW
5	872.000	293.300	R EOW
6	903.000	0.000	
7	903.000	293.600	L EOW
8	1114.000	293.600	R EOW
9	1375.000	0.000	
10	1375.000	293.600	L EOW
11	1443.000	293.600	R EOW
12	1659.000	0.000	
13	1659.000	293.500	L EOW
14	1679.000	293.500	R EOW
15	1764.000	0.000	
16	1764.000	293.500	L EOW
17	1835.000	293.500	R EOW
18	2995.000	0.000	
19	2995.000	289.500	L EOW
20	3507.000	289.700	

MIN	0.000	278.200
MAX	3516.400	297.200

Maximum 'X' scale : 1" = 502 (for 8.5 by 11 format)
Maximum 'Y' scale : 1" = 4 (for 8.5 by 11 format)

106	3271.000	285.700	RIV BOT
107	3319.000	284.800	RIV BOT
108	3367.000	284.000	RIV BOT
109	3406.000	279.600	RIV BOT
110	3442.000	278.200	RIV BOT
111	3483.000	284.500	RIV BOT
112	3500.000	287.700	RIV BOT
113	3507.000	289.700	R EOW
114	3516.400	294.000	ALCAP LPX RM 90.6

Water surface data:

1	65.000	293.700	L EOW
2	503.000	293.600	R EOW
3	631.000	0.000	
4	631.000	293.300	L EOW
5	872.000	293.300	R EOW
6	903.000	0.000	
7	903.000	293.600	L EOW
8	1114.000	293.600	R EOW
9	1375.000	0.000	
10	1375.000	293.600	L EOW
11	1443.000	293.600	R EOW
12	1659.000	0.000	
13	1659.000	293.500	L EOW
14	1679.000	293.500	R EOW
15	1764.000	0.000	
16	1764.000	293.500	L EOW
17	1835.000	293.500	R EOW
18	2995.000	0.000	
19	2995.000	289.500	L EOW
20	3507.000	289.700	

MIN	0.000	278.200
MAX	3516.400	297.200

Maximum 'X' scale : 1" = 502 (for 8.5 by 11 format)
Maximum 'Y' scale : 1" = 4 (for 8.5 by 11 format)

****************************** CROSS-SECTION PLOT ******************************

SUSITNA HYDROGRAPHIC SURVEYS
1984 cross section LRX 87.7

Date of Survey: SEPTEMBER 16, 1984

POINT	'X'	'Y'	DESCRIPTION

Cross section data:

1	0.000	290.600	ALCAP LRX RM 87.7
2	2.000	290.700	TOP
3	16.000	287.100	BRK
4	21.000	281.700	BRK
5	28.000	278.000	TOE
6	29.000	277.600	L EOW
7	36.000	275.600	BOT
8	46.000	277.600	R EOW
9	63.000	279.200	GS
10	113.000	280.000	BRK
11	141.000	278.000	BRK
12	158.000	277.000	LW PT
13	188.000	277.900	BRK
14	207.000	280.200	TOE
15	222.000	285.500	TOP
16	228.000	286.100	BRK
17	248.000	285.700	TOP
18	252.000	284.600	TOE
19	264.000	283.200	TOE
20	281.000	286.200	TOP
21	308.000	286.000	BRK
22	360.000	282.600	BRK
23	386.000	286.300	ANG PT 1
24	387.000	286.400	TOP
25	398.000	283.600	BRK
26	402.000	281.400	TOE
27	419.000	278.400	LW PT
28	435.000	281.200	BRK
29	466.000	282.400	BRK
30	482.000	283.000	TOE
31	488.000	284.200	TOP
32	495.500	284.500	ANG PT 2
33	533.000	284.900	GS
34	576.000	284.600	GS
35	609.000	285.000	GS
36	638.600	285.400	POL 1
37	673.000	285.700	GS
38	733.500	285.000	POL 2
39	742.000	284.800	TOP
40	748.000	281.600	BRK
41	761.000	277.500	L EOW
42	771.000	275.000	RIV BOT
43	803.000	272.700	RIV BOT
44	846.000	273.100	RIV BOT
45	889.000	274.800	RIV BOT

46	[illegible]	[illegible]	[illegible]
47	950.000	277.000	RIV BOT
48	979.000	277.500	R EOW
49	1021.000	278.300	GS
50	1085.000	278.700	GS
51	1169.000	278.800	TOE
52	1181.000	282.300	TOP
53	1232.900	282.800	ANG PT 3
54	1286.000	282.900	GS
55	1364.000	281.500	GS
56	1417.000	280.700	TOP
57	1431.000	279.200	TOE
58	1474.000	278.100	GS
59	1515.000	277.600	TOE
60	1569.000	279.000	GS
61	1659.000	279.900	GS
62	1742.000	281.400	TOP
63	1804.000	281.400	GS
64	1853.000	281.400	BRK
65	1949.000	280.100	GS
66	2005.300	279.500	POL 3
67	2044.000	278.500	GS
68	2072.000	278.600	TOP
69	2082.000	278.000	L EOW
70	2097.000	277.700	RIV BOT
71	2114.000	278.000	R EOW
72	2120.000	277.600	L EOW
73	2140.000	277.000	RIV BOT
74	2156.000	277.600	R EOW
75	2178.000	278.800	TOP
76	2185.000	277.400	L EOW
77	2200.000	272.800	RIV BOT
78	2238.000	268.700	RIV BOT
79	2287.000	266.800	RIV BOT
80	2331.000	268.600	RIV BOT
81	2379.000	269.500	RIV BOT
82	2434.000	270.100	RIV BOT
83	2484.000	270.300	RIV BOT
84	2538.000	269.300	RIV BOT
85	2594.000	271.800	RIV BOT
86	2640.000	274.600	RIV BOT
87	2688.000	273.800	RIV BOT
88	2721.000	272.200	RIV BOT
89	2726.000	274.300	RIV BOT
90	2733.000	277.200	R EOW
91	2744.000	280.400	TOE
92	2750.900	283.600	ALCAP LRX RM 87.7

Water surface data:

1	29.000	277.600	L EOW
2	46.000	277.600	R EOW
3	761.000	0.000	
4	761.000	277.500	L EOW
5	979.000	277.500	R EOW
6	2120.000	0.000	
7	2120.000	277.600	L EOW
8	2156.000	277.600	R EOW
9	2185.000	0.000	
10	2185.000	277.400	L EOW
11	2733.000	277.400	R EOW

MIN	0.000	266.800
MAX	2750.900	290.700

Maximum 'X' scale : 1" = 393 (for 8.5 by 11 format)
Maximum 'Y' scale : 1" = 5 (for 8.5 by 11 format)

SUSITNA HYDROGRAPHIC SURVEYS
cross section LRX 86.3

Date of Survey: SEPTEMBER 18, 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	279.800	ALCAP LRX RM 86.3
2	22.000	278.900	TOP
3	45.000	273.900	TOE
4	86.000	273.200	BRK
5	134.000	273.900	GS
6	161.000	274.200	BRK
7	174.000	274.300	TOE
8	202.000	277.100	TOP
9	237.000	277.400	GS
10	278.000	278.300	BRK
11	300.800	278.700	ANG PT 1
12	336.000	278.400	BRK
13	375.000	277.600	BRK
14	415.000	276.500	BRK
15	429.000	271.900	L EOW
16	434.000	269.600	RIV BOT
17	452.000	265.600	RIV BOT
18	498.000	262.300	RIV BOT
19	550.000	263.000	RIV BOT
20	611.000	264.000	RIV BOT
21	720.000	267.800	RIV BOT
22	746.000	269.700	RIV BOT
23	763.000	272.000	R EOW
24	795.000	272.400	GS
25	871.000	273.600	GS
26	946.000	274.000	GS
27	1028.000	274.200	GS
28	1081.500	274.100	ANG PT 2
29	1090.000	273.800	TOP
30	1092.000	272.600	TOE
31	1099.000	272.000	TOE
32	1101.000	272.800	TOP
33	1169.000	273.100	GS
34	1269.000	274.400	GS
35	1326.000	274.800	BRK
36	1396.000	273.500	L EOW
37	1423.000	272.400	RIV BOT
38	1458.000	271.600	RIV BOT
39	1498.000	271.100	RIV BOT
40	1553.000	270.400	RIV BOT
41	1613.000	269.800	RIV BOT
42	1666.000	269.600	RIV BOT
43	1726.000	269.800	RIV BOT
44	1776.000	269.200	RIV BOT
45	1813.000	268.300	RIV BOT
46	1872.000	267.600	RIV BOT
47	1900.000	267.700	RIV BOT
48	1941.000	270.700	RIV BOT
49	1953.000	272.000	RIV BOT
50	1964.000	273.700	R EOW

51	1970.000	274.800	TOP
52	2005.000	275.800	BRK
53	2055.000	275.000	BRK
54	2149.900	277.300	POL 1
55	2187.000	276.900	TOP
56	2198.000	272.900	TOE
57	2244.000	273.900	GS
58	2294.000	273.800	TOE
59	2335.000	275.400	BRK
60	2400.000	277.600	TOP
61	2471.000	277.500	GS
62	2555.000	276.600	GS
63	2595.000	277.100	GS
64	2653.000	276.200	TOP
65	2662.000	272.900	TOE
66	2675.000	271.400	L EOW
67	2706.000	270.600	RIV BOT
68	2740.000	271.500	R EOW
69	2756.000	276.800	TOP
70	2780.100	276.900	ALCAP LRX RM 86.2

water surface data:

1	429.000	271.900	L EOW
2	763.000	272.000	R EOW
3	1396.000	0.000	
4	1396.000	273.500	L EOW
5	1964.000	273.700	R EOW
6	2675.000	0.000	
7	2675.000	271.300	L EOW
8	2740.000	271.500	R EOW

MIN	0.000	262.300
MAX	2780.100	279.800

****************************** CROSS-SECTION PLOT ******************************

SUSITNA HYDROGRAPHIC SURVEYS
1984 cross section LRX 84.6

Date of Survey: SEPTEMBER 19, 1984

Cross section data:

POINT	'X'	'Y'	DESCRIPTION
1	0.000	270.600	AI CAP LRX RM 84.6
2	3.000	265.800	TOE
3	16.000	261.700	L EOW
4	26.000	259.100	RIV BOT
5	40.000	256.400	RIV BOT
6	72.000	257.200	RIV BOT
7	100.000	260.100	RIV BOT
8	107.000	260.500	RIV BOT
9	122.000	261.700	R EOW
10	163.000	262.700	GS
11	205.000	263.600	BRK
12	275.000	262.900	GS
13	311.000	262.500	TOP
14	322.000	261.300	L EOW
15	334.000	258.900	RIV BOT
16	345.000	257.400	RIV BOT
17	365.000	256.800	RIV BOT
18	386.000	258.600	RIV BOT
19	393.000	261.300	R EOW
20	394.000	262.000	BRK
21	403.000	263.900	TOE
22	407.000	269.500	TOP
23	414.300	269.100	ANG PT 1
24	579.000	271.300	GS
25	637.000	270.600	TOP
26	643.000	268.700	TOE
27	664.000	270.200	TOP
28	674.000	267.500	TOE
29	744.000	269.900	GS
30	764.000	267.000	BRK
31	787.000	267.500	TOP
32	792.000	265.200	BRK
33	799.000	264.600	BRK
34	804.000	262.000	TOE
35	847.000	263.300	GS
36	889.000	265.000	GS
37	904.000	265.200	TOE
38	911.000	268.000	TOP
39	914.000	268.000	BRK
40	917.400	269.000	ANG PT 2
41	958.000	271.400	GS
42	1042.000	272.100	BRK
43	1082.000	269.900	GS
44	1157.000	272.300	GS
45	1247.000	270.800	GS

46	1412.000	270.600	GS
47	1419.000	269.100	TOE
48	1453.000	268.900	TOE
49	1464.000	270.400	TOP
50	1577.000	270.600	GS
51	1742.000	272.600	GS
52	1810.000	270.100	TOP
53	1816.000	265.700	TOE
54	1828.000	265.600	TOE
55	1836.000	268.800	TOP
56	1871.000	269.900	GS
57	1907.000	271.400	GS
58	1956.000	270.400	BRK
59	2013.000	274.100	BRK
60	2068.000	269.600	BRK
61	2103.000	270.800	TOP
62	2118.000	268.900	TOE
63	2147.000	269.000	TOE
64	2170.000	271.400	TOP
65	2233.000	271.400	GS
66	2398.000	270.800	GS
67	2563.000	271.900	GS
68	2728.000	273.800	GS
69	2769.000	274.300	TOP
70	2780.000	264.900	L EOW
71	2788.000	262.600	RIV BOT
72	2816.000	261.500	RIV BOT
73	2851.000	262.300	RIV BOT
74	2878.000	264.900	R EOW
75	2934.000	265.400	GS
76	2951.000	265.600	BRK
77	2994.000	264.900	TOE
78	3000.000	269.800	TOP
79	3003.800	270.000	ANG PT 3
80	3169.000	271.700	GS
81	3225.000	272.700	TOP
82	3241.000	268.800	TOE
83	3265.000	269.400	TOE
84	3286.000	270.400	TOP
85	3334.000	272.100	GS
86	3422.000	271.100	TOP
87	3430.000	266.700	TOE
88	3457.000	266.000	TOE
89	3475.000	271.200	TOP
90	3484.000	272.300	GS
91	3612.000	272.900	TOP
92	3628.000	267.300	TOE
93	3649.000	267.200	GS
94	3665.000	268.500	TOE
95	3681.000	271.800	TOP
96	3814.000	272.600	GS
97	3987.900	271.900	ANG PT 4
98	3998.000	271.700	TOP
99	4004.000	265.200	TOE
100	4009.000	264.600	BRK
101	4014.000	266.200	TOP
102	4052.000	267.800	GS
103	4097.000	268.100	BRK
104	4157.000	265.900	BRK
105	4224.000	266.900	TOP

106	4277.000	263.900	L EOW
107	4311.000	262.700	RIV BOT
108	4346.000	264.000	R EOW
109	4381.000	266.700	TOP
110	4395.000	266.600	TOP
111	4398.000	265.400	TOE
112	4433.000	265.200	TOE
113	4437.000	266.800	TOP
114	4503.000	266.300	BRK
115	4572.000	267.400	BRK
116	4627.000	266.700	POL
117	4658.000	265.700	BRK
118	4681.000	264.500	TOP
119	4684.000	263.400	L EOW
120	4700.000	261.500	RIV BOT
121	4737.000	258.700	RIV BOT
122	4779.000	254.500	RIV BOT
123	4829.000	252.800	RIV BOT
124	4882.000	252.300	RIV BOT
125	4944.000	252.300	RIV BOT
126	5003.000	251.000	RIV BOT
127	5053.000	249.700	RIV BOT
128	5098.000	255.800	RIV BOT
129	5137.000	256.400	RIV BOT
130	5177.000	260.200	RIV BOT
131	5189.000	263.300	R EOW
132	5201.400	267.600	ALCAP LRX RM 84.6

Water surface data:

1	16.000	261.700	L EOW
2	122.000	261.700	R EOW
3	322.000	0.000	
4	322.000	261.300	L EOW
5	393.000	261.300	R EOW
6	2780.000	0.000	
7	2780.000	264.900	L EOW
8	2878.000	264.900	R EOW
9	4277.000	0.000	
10	4277.000	263.900	L EOW
11	4346.000	264.000	R EOW
12	4681.000	0.000	
13	4681.000	263.400	L EOW
14	5189.000	263.300	R EOW

MIN	0.000	249.700
MAX	5201.400	274.300

Maximum `X' scale : 1" = 743 (for 8.5 by 11 format)
Maximum `Y' scale : 1" = 5 (for 8.5 by 11 format)

RIVER CROSS SECTION NOTES FOR 1980 and 1982

The following computer files was used in HEC-2 and ICESIM modelling (R&M, 1981; R&M, 1982). The file starts at LRX 0.3 and progresses upstream. The LRX number is in the second column of the X1 card.

LISTING OF RIVER CROSS SECTIONS

EXPLANATION OF LISTING

X1 Card: Specified cross section geometry

- Field 1: Cross section identification
- Field 2: Total number of stations on next GR cards
- Field 3: Station, left bank of channel
- Field 4: Station, right bank of channel
- Field 5: Length of reach left over bank, between current cross section and next downstream cross section
- Field 6: Length of reach right over bank
- Field 7: Length of reach main channel

X2 Card: Specifies change in discharge

X3 Card: Artificial levees at specified station

NC Card: "n" values and contraction and expansion coefficients

GR Card: Specifies elevation and station of each point in a cross section used to describe the ground profile

- Field 1: Elevation of cross section point 1 at station 1
- Field 2: Station of cross section point 1
- Field 3: Elevation cross section point 2 at station 2
- ... continued using up to 100 points

For more detailed explanation, refer to HEC-2 Users Manual.

```
DATA FILE FOR ICESIM
T1                       SUSITNA HYDROELECTRIC PROJECT
T2                 SUBTASK 3.06 HYDRAULIC AND ICE STUDIES
T3           SUSITNA RIVER-LOWER REACH (DEVIL CANYON TO TALKEETNA)
X1    0.3      90     02    4726     00      00     00      00     00     00
GR  321.8       2  318.8       7  317.3      15  315.0      23  310.5     43
GR  306.1      93  304.0     142  305.1     190  308.7     245  311.9    294
GR  314.0     345  312.5     395  310.8     435  312.1     472  317.2    492
GR  318.3     498  321.5     506  320.4     588  318.8     590  319.6    599
GR  319.8     660  317.3     719  319.0     802  316.7     875  319.7   1063
GR  318.8    1076  319.5    1198  319.5    1298  320.4    1308  319.4   1376
GR  320.4    1475  319.8    1571  318.8    1607  316.7    1682  320.6   1739
GR  319.9    1790  318.1    1946  320.3    1962  320.9    1991  320.0   2036
GR  313.7    2040  311.7    2045  309.7    2061  308.5    2098  308.1   2138
GR  308.7    2188  309.7    2222  311.4    2246  312.8    2267  313.7   2290
GR  315.3    2310  315.8    2361  313.3    2485  312.8    2503  313.3   2516
GR  319.4    2639  319.5    2731  319.6    2858  317.1    2958  315.4   2971
GR  313.1    2999  313.0    3025  313.4    3066  315.0    3104  313.6   3188
GR  313.6    3205  315.8    3219  314.8    3360  317.2    3451  318.0   3562
GR  318.5    3900  315.5    3910  313.2    3920  311.8    3942  313.8   4029
GR  315.5    4074  317.3    4147  317.5    4280  314.5    4334  312.3   4338
GR  314.3    4410  314.4    4491  315.5    4526  316.2    4541  318.0   4608
GR  313.7    4680  315.3    4687  311.1    4704  313.1    4714  319.5   4720
X1    0.4     100     04    4727   1700    1100   1700      00     00     00
GR  338.2       4  330.8      16  319.3      30  312.3      77  314.1    120
GR  313.0     175  312.8     225  313.4     277  313.0     325  312.8    379
GR  312.5     430  311.0     487  311.0     535  313.0     586  313.3    613
GR  315.2     632  319.2     650  322.3     691  321.9     796  320.6    821
GR  319.6     855  319.2     882  318.5     945  317.8    1021  317.3   1088
GR  318.2    1124  318.4    1130  318.4    1148  317.9    1151  315.3   1168
GR  311.8    1201  311.5    1233  315.9    1261  313.9    1301  313.6   1333
GR  316.3    1380  318.3    1417  321.0    1467  321.7    1518  321.5   1585
GR  321.4    1650  322.4    1879  319.3    1910  318.5    1957  321.9   2063
GR  322.1    2215  319.8    2265  321.0    2292  322.0    2356  321.2   2402
GR  319.9    2407  322.4    2488  321.8    2548  320.3    2554  320.2   2570
GR  322.2    2618  321.7    2777  319.1    2857  316.5    2864  310.9   2894
GR  311.2    2927  313.2    2958  315.3    2992  316.5    3015  317.4   3029
GR  320.7    3144  319.4    3252  318.0    3285  317.9    3363  316.5   3378
GR  321.8    3398  321.7    3433  325.0    3503  321.3    3626  315.0   3641
GR  313.5    3650  315.1    3665  315.9    3703  318.4    3831  317.8   3956
GR  316.5    3983  314.7    4030  313.5    4084  312.8    4116  312.4   4146
GR  312.5    4180  312.7    4211  316.5    4221  320.5    4271  320.3   4365
GR  318.0    4402  317.3    4537  315.4    4552  312.4    4562  310.9   4668
GR  312.9    4673  315.5    4674  316.5    4699  320.1    4720  323.0   4720
X1    0.5     100     03    5241   1900    1200   1920      00     00     00
GR  331.5       3  320.1      17  304.5      48  304.1      95  304.1    134
GR  307.8     187  311.1     248  312.0     290  310.9     326  309.9    372
GR  312.8     412  317.1     428  320.3     440  325.3     452  325.7    481
GR  325.2     728  324.5     732  321.8     734  320.1     743  323.1    753
GR  322.7     812  324.8     879  323.4     977  324.3    1078  322.0   1186
GR  325.1    1201  321.5    1225  323.7    1387  323.5    1615  320.0   1782
GR  318.3    1813  316.8    1840  318.5    1872  318.8    1879  325.3   1895
GR  325.3    1984  324.2    2058  324.8    2177  324.6    2240  323.1   2245
GR  323.3    2301  321.4    2305  323.8    2342  323.4    2355  320.1   2391
GR  325.2    2447  324.7    2531  325.0    2641  324.9    2660  321.3   2663
GR  320.1    2667  321.7    2696  317.5    2751  317.2    2783  314.4   2808
GR  316.4    2864  317.4    2905  321.6    2975  322.9    3101  323.3   3137
GR  322.6    3153  321.5    3178  318.0    3191  315.0    3199  313.5   3208
GR  311.3    3232  313.0    3260  315.1    3288  316.2    3310  318.0   3331
GR  318.3    3345  319.0    3436  320.4    3484  319.3    3529  318.2   3563
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GR	317.1	3606	317.9	3648	318.2	3694	321.3	3816	323.0	3925
GR	322.3	3952	323.4	4075	322.3	4230	320.7	4392	321.1	4622
GR	321.8	4665	320.8	4764	319.8	4767	320.4	4871	319.8	4934
GR	319.5	4906	319.4	5116	317.7	5169	315.9	5181	315.3	5199
GR	314.4	5207	314.3	5229	315.9	5332	318.6	5237	323.1	5241
X1	0.6	98	02	6362	2250	3200	2380	00	00	00
GR	328.3	2	323.5	7	321.8	12	322.2	62	322.5	109
GR	323.4	125	326.8	129	327.2	159	326.5	201	323.7	206
GR	320.7	212	316.4	250	313.6	299	315.2	356	316.6	413
GR	318.0	461	318.6	525	321.4	571	324.1	597	326.2	606
GR	323.6	784	322.4	788	320.0	808	322.4	824	328.5	829
GR	328.8	840	326.2	861	324.4	894	329.1	1121	326.9	1185
GR	323.4	1239	324.1	1247	323.3	1251	320.3	1256	319.3	1275
GR	320.6	1305	323.3	1318	324.6	1357	325.4	1436	323.8	1445
GR	323.6	1465	323.0	1482	318.5	1499	314.6	1550	314.0	1605
GR	313.6	1657	315.2	1724	319.3	1785	321.6	1830	323.0	1860
GR	323.4	1900	323.8	1981	323.4	1982	321.4	2002	323.4	2025
GR	328.6	2139	328.2	2154	323.2	2428	327.6	2635	325.4	2725
GR	327.2	3127	324.7	3214	322.5	3219	319.3	3234	320.3	3274
GR	321.7	3330	322.4	3366	325.3	3486	321.8	3591	321.2	3601
GR	321.9	3609	325.2	3617	327.1	4204	327.4	4228	326.1	4248
GR	323.3	4253	321.9	4259	321.4	4287	323.4	4316	325.2	4358
GR	325.4	4657	327.9	5053	324.2	5230	327.5	5577	324.4	5705
GR	322.4	5745	321.4	5762	321.0	5797	322.5	5806	323.6	5886
GR	325.4	6078	320.8	6246	318.8	6255	313.8	6279	312.8	6301
GR	314.2	6335	320.7	6356	327.8	6362				
X1	0.7	99	05	5578	1700	2200	2050	00	00	00
GR	329.2	5	325.4	14	323.3	20	324.0	44	323.4	69
GR	325.4	71	328.4	76	328.4	81	327.2	85	325.3	86
GR	322.8	89	322.3	92	324.1	100	325.6	111	325.8	115
GR	325.8	118	325.2	125	323.8	147	322.8	159	321.6	199
GR	321.4	284	317.6	353	317.0	404	315.6	459	316.6	504
GR	317.0	525	322.8	548	325.2	552	325.7	593	329.0	815
GR	328.9	951	329.2	1096	325.0	1109	323.0	1116	324.0	1174
GR	324.7	1206	328.3	1300	330.0	1437	328.7	1478	325.5	1494
GR	324.0	1502	322.9	1516	325.2	1538	324.1	1560	325.8	1586
GR	328.5	1619	326.8	1770	325.1	1776	322.7	1809	322.1	1869
GR	322.1	1919	323.1	1963	323.6	1972	319.1	2008	320.7	2063
GR	321.5	2112	323.1	2153	323.9	2167	325.3	2201	329.5	2300
GR	329.6	2452	327.6	2600	327.0	2668	325.6	2691	327.0	2718
GR	328.6	2847	330.0	2872	327.9	3061	329.9	3203	327.7	3275
GR	326.2	3319	326.3	3390	325.2	3440	322.3	3500	320.3	3558
GR	319.7	3612	319.7	3660	322.6	3696	327.8	3725	329.7	3748
GR	330.1	3845	326.9	4136	326.6	4137	325.4	4143	324.8	4209
GR	325.0	4283	326.6	4324	330.4	4396	329.3	4906	325.7	5007
GR	323.4	5054	322.4	5119	321.8	5259	322.1	5279	325.8	5340
GR	328.0	5377	329.0	5416	324.5	5563	333.0	5578		
X1	0.8	100	05	6226	2700	2000	1950	00	00	00
GR	340.4	5	329.7	27	327.7	30	324.8	118	321.1	284
GR	324.3	416	329.5	490	331.7	530	330.9	681	328.6	721
GR	325.9	744	326.7	780	328.7	799	332.2	878	329.6	1087
GR	327.7	1110	327.0	1136	327.7	1156	330.8	1166	330.7	1454
GR	331.4	1980	329.9	2053	327.8	2092	325.6	2133	324.2	2163
GR	321.9	2213	321.9	2233	324.2	2249	327.9	2259	332.0	2263
GR	330.6	2664	332.4	2724	327.4	2746	324.1	2768	322.6	2787
GR	326.3	2831	326.0	2871	325.1	2895	325.1	2919	324.6	2958
GR	321.3	3049	323.6	3085	327.9	3117	330.4	3138	330.4	3347
GR	328.8	3353	328.1	3361	326.8	3388	326.6	3411	325.4	3422
GR	327.5	3440	328.9	3445	329.4	3448	331.7	3614	329.5	3622
GR	328.1	3642	327.5	3688	326.2	3733	322.7	3830	321.5	3930

GR	321.7	3980	321.7	4030	323.9	4085	326.5	4120	327.7	4167
GR	328.7	4199	329.4	4213	329.9	4228	329.2	4447	328.2	4453
GR	327.3	4473	327.7	4500	327.6	4530	328.3	4577	328.6	4586
GR	327.9	4600	327.2	4634	325.7	4649	326.3	4685	326.4	4740
GR	323.9	4770	324.2	4785	325.1	4797	327.9	4804	328.4	4805
GR	328.0	5022	327.4	5035	325.6	5058	326.6	5074	325.0	5097
GR	327.5	5109	327.9	5110	331.4	5802	330.6	5804	327.8	5816
GR	324.0	5829	325.8	5859	330.6	5878	332.6	6096	334.5	6226
X1	0.9	99	01	4531	2400	1450	2550	00	00	00
GR	338.0	1	332.2	8	331.4	13	331.2	31	329.5	39
GR	329.2	53	329.7	70	332.5	81	332.5	104	330.9	109
GR	331.1	136	328.2	182	329.0	230	328.9	275	330.5	318
GR	332.5	356	332.7	388	333.2	393	333.7	480	332.7	497
GR	330.7	513	325.9	540	325.3	568	325.0	603	325.9	655
GR	328.2	760	329.0	810	329.4	846	329.7	895	330.4	952
GR	330.1	999	329.8	1044	330.7	1113	331.2	1163	333.7	1171
GR	332.4	1208	331.9	1216	330.8	1230	333.6	1300	334.4	1390
GR	333.3	1456	332.8	1532	333.0	1592	332.0	1626	330.8	1655
GR	333.0	1662	332.6	1860	331.0	1988	331.6	2060	333.4	2072
GR	332.3	2156	329.8	2280	329.4	2337	330.1	2417	328.9	2458
GR	327.0	2524	330.3	2605	328.8	2668	329.3	2700	329.9	2750
GR	327.4	2805	331.6	2892	330.3	2915	328.4	3005	329.8	3110
GR	330.2	3131	332.3	3172	333.0	3191	332.1	3257	330.0	3292
GR	332.1	3311	333.8	3684	331.8	3728	330.9	3783	331.8	3797
GR	332.2	3924	332.0	3939	330.6	3971	329.5	3984	329.3	4006
GR	327.7	4063	326.3	4111	324.3	4171	325.3	4209	327.3	4253
GR	327.9	4295	328.9	4340	328.9	4389	330.3	4420	332.6	4438
GR	333.2	4455	332.1	4460	330.3	4468	331.5	4480	329.1	4494
GR	330.7	4505	332.1	4509	333.7	4510	336.2	4531		
X1	1	100	03	3851	1380	1300	2180	00	00	00
GR	336.3	3	333.7	11	332.7	24	331.7	30	333.7	39
GR	334.7	43	335.3	63	336.2	86	336.5	150	336.9	195
GR	336.0	229	334.5	255	333.8	295	332.6	324	332.4	330
GR	333.8	359	335.8	385	333.9	400	332.0	425	330.9	453
GR	330.6	472	330.7	489	330.2	504	329.8	524	329.1	547
GR	323.9	560	328.0	582	321.9	598	320.4	630	323.8	707
GR	327.0	867	329.8	910	332.5	933	334.0	972	334.6	1029
GR	334.1	1070	333.0	1150	333.7	1288	333.3	1368	332.9	1457
GR	332.0	1505	332.4	1546	332.1	1611	332.7	1618	332.7	1648
GR	326.3	1668	327.2	1696	326.9	1728	326.1	1768	327.4	1810
GR	333.8	1829	336.5	2288	333.8	2298	332.6	2314	333.8	2340
GR	333.6	2376	334.6	2416	334.3	2472	332.9	2503	332.8	2520
GR	334.3	2541	336.1	2562	334.4	2602	331.0	2614	330.2	2622
GR	334.2	2634	334.3	2643	335.3	2645	335.3	2656	334.4	2657
GR	332.4	2677	334.9	2693	334.3	2696	330.3	2711	332.1	2714
GR	334.1	2748	324.5	2776	328.3	2829	330.3	2902	329.1	2974
GR	331.6	3031	332.1	3174	332.6	3226	331.1	3254	332.7	3304
GR	333.8	3371	333.8	3425	334.4	3438	334.4	3493	333.9	3529
GR	333.8	3597	332.9	3624	330.3	3665	330.3	3704	330.2	3751
GR	323.8	3785	320.1	3817	322.3	3828	330.4	3845	337.9	3851
X1	1.1	92	03	4132	1620	1110	1540	00	00	00
GR	339.6	3	335.6	10	334.9	23	333.1	28	330.0	38
GR	331.2	69	332.2	114	330.1	164	331.5	214	330.8	189
GR	326.9	239	333.9	277	334.1	314	334.8	316	335.8	317
GR	336.9	389	335.4	472	334.7	481	333.5	503	333.6	529
GR	332.8	551	334.8	571	335.0	581	334.7	589	333.9	617
GR	332.6	647	331.5	664	329.3	674	327.4	689	327.8	700
GR	325.9	712	326.7	743	325.4	767	325.5	797	326.3	824
GR	327.6	865	328.8	886	330.5	923	332.5	951	332.0	966
GR	333.5	1018	335.2	1082	338.1	1146	336.8	1666	335.6	1785

GR	334.8	1790	332.4	1802	333.6	1815	334.2	1839	335.3	1854
GR	337.7	1894	339.3	2195	335.0	2205	338.6	2425	336.1	2724
GR	338.1	2970	336.2	2975	335.4	2980	335.0	2985	335.6	2993
GR	335.8	3000	334.6	3008	332.4	3028	331.4	3056	331.8	3086
GR	332.6	3136	332.4	3186	332.4	3232	332.6	3271	332.0	3305
GR	331.4	3346	331.8	3386	331.0	3432	330.8	3491	330.6	3541
GR	330.2	3599	329.8	3664	331.0	3704	333.0	3729	337.1	3756
GR	337.8	3793	337.5	3885	336.0	3939	335.4	3974	334.1	3990
GR	330.7	4003	330.1	4028	331.1	4049	331.0	4070	334.1	4097
GR	335.9	4120	339.6	4132						
X1	1.2	96	12	4249	2150	1380	1590	00	00	00
GR	342.2	12	340.6	16	338.6	25	335.6	40	334.3	43
GR	331.3	69	332.1	106	331.6	145	331.4	180	333.2	222
GR	334.3	265	334.6	287	335.2	314	335.6	336	336.8	359
GR	337.9	384	338.3	398	338.4	410	339.8	423	339.8	671
GR	336.5	817	334.7	850	335.7	875	336.6	901	336.6	956
GR	335.7	983	335.5	1015	336.6	1044	338.8	1130	338.0	1594
GR	338.2	1673	338.8	1722	338.4	1786	337.4	1802	335.7	1816
GR	335.1	1825	333.6	1856	333.9	1876	335.0	1898	335.3	1927
GR	335.0	1962	333.4	2005	332.6	2049	332.9	2082	333.6	2118
GR	334.2	2149	334.5	2192	335.1	2227	335.4	2260	335.4	2297
GR	335.8	2322	335.9	2333	336.0	2360	336.4	2397	338.4	2425
GR	339.5	2457	339.9	2622	339.9	2635	338.2	2646	337.8	2657
GR	336.9	2692	336.9	2727	340.4	2811	337.0	2890	339.2	2917
GR	338.7	2937	337.8	3061	340.2	3359	339.9	3392	337.8	3395
GR	335.0	3400	331.0	3426	332.3	3445	334.8	3472	333.4	3559
GR	334.1	3603	334.0	3641	333.0	3713	331.7	3749	330.3	3789
GR	327.5	3829	325.2	3859	325.0	3899	327.8	3934	330.8	3959
GR	334.3	3989	338.0	4001	339.8	4011	339.7	4077	337.4	4159
GR	336.3	4179	336.1	4196	336.4	4210	336.1	4227	335.8	4238
GR	341.4	4249								
X1	2	73	03	2762	1460	1080	1680	00	00	00
GR	343.7	3	340.3	10	335.8	18	332.7	43	335.3	90
GR	337.3	130	337.9	177	337.9	230	337.7	255	337.6	324
GR	336.6	397	335.5	456	335.7	500	337.3	530	340.9	559
GR	343.2	570	342.0	627	340.0	649	337.2	658	337.4	665
GR	340.0	671	341.1	673	342.2	703	343.4	772	343.1	792
GR	341.3	793	340.9	806	342.5	814	342.2	831	341.1	832
GR	338.9	837	337.4	879	337.6	917	337.7	952	337.8	987
GR	337.8	1022	337.8	1067	337.6	1122	337.6	1172	337.7	1227
GR	338.0	1272	337.5	1317	338.8	1357	340.6	1396	341.4	1419
GR	340.7	1494	340.9	1588	342.1	1724	339.8	1830	338.3	1867
GR	337.1	1890	335.5	1932	331.1	1972	329.3	2022	329.1	2069
GR	327.9	2130	328.1	2180	330.8	2281	334.4	2324	335.9	2382
GR	337.6	2429	338.5	2467	338.6	2502	336.5	2521	335.6	2561
GR	337.3	2581	338.3	2631	335.3	2661	334.6	2711	334.8	2731
GR	336.1	2750	338.1	2756	342.8	2762				
X1	2.1	100	10	3399	540	1675	515	00	00	00
GR	340.4	10	337.8	14	333.2	17	331.4	46	333.4	68
GR	334.7	105	334.6	145	333.9	195	333.6	245	333.4	295
GR	333.8	345	333.6	395	333.8	435	335.3	466	336.3	481
GR	341.2	496	342.2	508	341.8	563	343.1	605	341.4	641
GR	339.8	668	339.2	700	338.0	745	337.2	785	336.6	835
GR	336.2	885	336.2	930	336.4	985	336.4	1035	336.6	1095
GR	337.4	1135	337.8	1180	334.2	1235	334.2	1280	337.4	1310
GR	338.8	1353	340.7	1376	343.4	1383	342.9	1402	342.3	1472
GR	342.5	1544	341.5	1580	340.7	1623	339.9	1652	338.4	1673
GR	336.5	1712	335.2	1735	338.1	1750	341.4	1756	341.8	1757
GR	342.1	1858	342.0	2032	341.8	2040	340.7	2101	339.9	2134
GR	339.8	2170	340.4	2201	340.5	2227	341.7	2239	341.7	2247

GR	334.8	1790	332.4	1802	333.6	1815	334.2	1839	335.3	1854
GR	337.7	1894	339.3	2195	335.0	2205	338.6	2425	336.1	2724
GR	338.1	2970	336.2	2975	335.4	2980	335.0	2985	335.6	2993
GR	335.8	3000	334.6	3008	332.4	3028	331.4	3056	331.8	3086
GR	332.6	3136	332.4	3186	332.4	3232	332.6	3271	332.0	3305
GR	331.4	3346	331.8	3386	331.0	3432	330.8	3491	330.6	3541
GR	330.2	3599	329.8	3664	331.0	3704	333.0	3729	337.1	3756
GR	337.8	3793	337.5	3885	336.0	3939	335.4	3974	334.1	3990
GR	330.7	4003	330.1	4028	331.1	4049	331.0	4070	334.1	4097
GR	335.9	4120	339.6	4132						
X1	1.2	96	12	4249	2150	1380	1590	00	00	00
GR	342.2	12	340.6	16	338.6	25	335.6	40	334.3	43
GR	331.3	69	332.1	106	331.6	145	331.4	180	333.2	222
GR	334.3	265	334.6	287	335.2	314	335.6	336	336.8	359
GR	337.9	384	338.3	398	338.4	410	339.8	423	339.8	671
GR	336.5	817	334.7	850	335.7	875	336.6	901	336.6	956
GR	335.7	983	335.5	1015	336.6	1044	338.8	1130	338.0	1594
GR	338.2	1673	338.8	1722	338.4	1786	337.4	1802	335.7	1816
GR	335.1	1825	333.6	1856	333.9	1876	335.0	1898	335.3	1927
GR	335.0	1962	333.4	2005	332.6	2049	332.9	2082	333.6	2118
GR	334.2	2149	334.5	2192	335.1	2227	335.4	2260	335.4	2297
GR	335.8	2322	335.9	2333	336.0	2360	336.4	2397	338.4	2425
GR	339.5	2457	339.9	2622	339.9	2635	338.2	2646	337.8	2657
GR	336.9	2692	336.9	2727	340.4	2811	337.0	2890	339.2	2917
GR	338.7	2937	337.8	3061	340.2	3359	339.9	3392	337.8	3395
GR	335.0	3400	331.0	3426	332.3	3445	334.8	3472	333.4	3559
GR	334.1	3603	334.0	3641	333.0	3713	331.7	3749	330.3	3789
GR	327.5	3829	325.2	3859	325.0	3899	327.8	3934	330.8	3959
GR	334.3	3989	338.0	4001	339.8	4011	339.7	4077	337.4	4159
GR	336.3	4179	336.1	4196	336.4	4210	336.1	4227	335.8	4238
GR	341.4	4249								
X1	2	73	03	2762	1460	1080	1680	00	00	00
GR	343.7	3	340.3	10	335.8	18	332.7	43	335.3	90
GR	337.3	130	337.9	177	337.9	230	337.7	255	337.6	324
GR	336.6	397	335.5	456	335.7	500	337.3	530	340.9	559
GR	343.2	570	342.0	627	340.0	649	337.2	658	337.4	665
GR	340.0	671	341.1	673	342.2	703	343.4	772	343.1	792
GR	341.3	793	340.9	806	342.5	814	342.2	831	341.1	832
GR	338.9	837	337.4	879	337.6	917	337.7	952	337.8	987
GR	337.8	1022	337.8	1067	337.6	1122	337.6	1172	337.7	1227
GR	338.0	1272	337.5	1317	338.8	1357	340.6	1396	341.4	1419
GR	340.7	1494	340.9	1588	342.1	1724	339.8	1830	338.3	1867
GR	337.1	1890	335.5	1932	331.1	1972	329.3	2022	329.1	2069
GR	327.9	2130	328.1	2180	330.8	2281	334.4	2324	335.9	2382
GR	337.6	2429	338.5	2467	338.6	2502	336.5	2521	335.6	2561
GR	337.3	2581	338.3	2631	335.3	2661	334.6	2711	334.8	2731
GR	336.1	2750	338.1	2756	342.8	2762				
X1	2.1	100	10	3399	540	1675	515	00	00	00
GR	340.4	10	337.8	14	333.2	17	331.4	46	333.4	68
GR	334.7	105	334.6	145	333.9	195	333.6	245	333.4	295
GR	333.8	345	333.6	395	333.8	435	335.3	466	336.3	481
GR	341.2	496	342.2	508	341.8	563	343.1	605	341.4	641
GR	339.8	668	339.2	700	338.0	745	337.2	785	336.6	835
GR	336.2	885	336.2	930	336.4	985	336.4	1035	336.6	1095
GR	337.4	1135	337.8	1180	334.2	1235	334.2	1280	337.4	1310
GR	338.8	1353	340.7	1376	343.4	1383	342.9	1402	342.3	1472
GR	342.5	1544	341.5	1580	340.7	1623	339.9	1652	338.4	1673
GR	336.5	1712	335.2	1735	338.1	1750	341.4	1756	341.8	1757
GR	342.1	1858	342.0	2032	341.8	2040	340.7	2101	339.9	2134
GR	339.8	2170	340.4	2201	340.5	2227	341.7	2239	341.7	2247

GR	341.6	2251	341.1	2261	341.6	2276	341.7	2313	337.3	2349
GR	336.4	2392	335.7	2441	333.2	2469	331.4	2512	330.7	2557
[redacted]	329.9	2602	331.6	2652	332.2	2707	331.7	2752	332.7	2797
[redacted]	333.4	2827	334.2	2847	334.2	2850	335.1	2887	341.8	2916
GR	343.2	2943	343.5	2963	341.4	2968	340.0	2989	341.3	3009
GR	342.1	3035	342.0	3051	341.6	3075	342.1	3092	344.0	3148
[redacted]	341.8	3197	343.5	3258	344.4	3319	342.0	3352	339.7	3359
GR	338.5	3374	338.5	3390	341.9	3395	345.4	3399	345.6	3403
X1	2.2	95	04	3149	835	680	1055	00	00	00
[redacted]	345.1	4	341.7	7	337.8	13	333.2	49	330.1	90
GR	328.9	134	331.3	182	330.0	237	328.1	288	327.2	348
GR	328.3	333	332.7	373	337.0	393	341.0	413	341.8	461
[redacted]	342.7	496	343.4	552	343.5	573	343.3	645	342.6	687
[redacted]	342.1	698	342.7	721	342.2	754	342.3	779	343.0	805
GR	345.5	850	345.2	926	344.1	930	343.6	975	341.6	1014
GR	340.6	1027	341.8	1053	341.9	1096	343.0	1104	343.5	1162
[redacted]	344.5	1257	343.4	1345	344.3	1368	344.2	1459	343.8	1498
GR	342.9	1544	344.0	1573	344.9	1637	343.7	1722	341.5	1751
GR	343.2	1798	341.7	1828	341.4	1857	341.2	1879	341.7	1897
[redacted]	343.5	1912	343.5	1950	342.9	1976	343.5	1984	344.6	1986
[redacted]	343.9	2016	343.5	2038	341.4	2088	340.3	2111	339.7	2131
GR	339.7	2143	342.8	2150	341.6	2178	342.1	2204	343.5	2236
GR	345.9	2241	346.0	2331	345.3	2391	343.7	2394	342.7	2406
[redacted]	343.9	2434	343.9	2447	343.7	2459	343.2	2508	343.2	2562
GR	341.6	2601	342.4	2629	341.5	2651	343.3	2678	343.6	2704
GR	343.4	2717	342.0	2760	340.9	2783	336.2	2861	338.3	2903
[redacted]	338.0	2936	339.2	2974	340.4	3000	341.3	3026	341.6	3056
GR	340.5	3091	341.0	3110	341.6	3129	343.5	3142	346.6	3149
X1	2.3	100	07	4101	945	1500	1015	00	00	00
[redacted]	346.8	7	342.3	11	337.7	16	334.5	50	331.6	94
[redacted]	330.2	138	329.1	181	329.6	224	337.3	268	338.1	325
GR	339.4	352	342.6	357	342.4	395	341.9	430	342.1	456
GR	342.6	482	343.6	482	342.2	535	343.3	570	343.4	614
[redacted]	342.2	651	342.7	700	339.5	764	338.6	799	338.8	817
GR	340.7	838	343.5	851	344.1	875	344.7	896	344.7	915
GR	344.2	916	342.4	920	342.9	945	341.8	974	342.1	993
[redacted]	340.8	1008	340.6	1020	344.1	1036	344.4	1044	344.1	1054
GR	343.8	1074	344.2	1098	344.5	1127	346.6	1155	347.5	1294
GR	346.4	1409	346.8	1679	345.4	1755	344.5	1763	345.5	1774
[redacted]	347.3	1820	346.5	1963	344.5	1968	342.9	1989	343.6	2009
[redacted]	344.4	2018	344.6	2024	344.4	2029	344.3	2052	342.7	2077
GR	344.4	2099	345.9	2105	346.6	2255	344.5	2292	344.3	2316
GR	344.5	2344	346.2	2354	346.7	2505	345.7	2506	343.7	2509
[redacted]	341.5	2539	342.2	2579	343.2	2592	342.6	2629	344.9	2640
GR	344.8	2670	345.9	2682	346.4	2700	345.9	2824	345.1	2844
GR	345.0	2867	343.6	2881	344.0	2901	346.0	2926	346.5	2969
[redacted]	346.3	3142	344.2	3152	343.9	3180	344.3	3208	345.5	3278
[redacted]	345.8	3301	346.0	3330	346.0	3529	343.4	3690	343.2	3763
GR	343.5	3821	344.7	3935	343.2	3960	342.5	3970	347.4	4101
[redacted]	3	34	06	1681	740	1550	880	00	00	00
[redacted]	346.7	6	344.1	13	340.9	24	338.0	52	334.6	118
GR	330.9	182	328.1	229	330.1	273	331.9	314	332.4	360
GR	333.9	408	334.7	454	338.0	499	339.9	540	340.1	576
[redacted]	341.0	618	342.1	664	342.9	677	342.5	730	344.5	770
GR	345.1	818	345.1	880	346.0	965	346.1	1016	346.1	1094
GR	346.6	1185	346.5	1246	345.7	1250	345.4	1263	346.7	1268
[redacted]	346.7	1307	347.4	1366	347.5	1406	347.0	1467		
[redacted]	3.1	40	12	1246	885	740	860	00	00	00
GR	349.1	12	344.2	17	341.1	30	338.7	58	336.7	88
GR	336.6	116	336.9	158	338.0	200	339.0	250	341.7	270

GR	343.5	294	344.4	306	344.4	348	346.1	361	345.4	392
GR	344.5	421	342.4	444	341.5	475	340.8	530	340.4	584
GR	340.4	650	340.4	695	340.5	755	341.0	817	341.4	826
GR	344.6	838	346.1	865	346.2	889	345.2	897	342.9	916
GR	341.8	942	341.2	965	342.9	988	344.2	1022	343.2	1074
GR	343.9	1134	344.1	1200	345.0	1231	345.8	1243	349.7	1246
X1	3.2	42	11	1467	970	750	950	00	00	00
GR	350.0	11	347.9	15	345.7	26	342.8	44	342.3	69
GR	342.5	113	341.8	159	341.8	204	341.9	259	341.9	309
GR	342.4	362	344.4	450	345.2	493	344.7	569	343.5	624
GR	341.3	676	340.3	723	338.9	763	338.9	797	340.9	824
GR	343.1	839	345.4	847	348.5	858	349.6	939	349.9	1008
GR	349.7	1040	350.4	1059	350.0	1104	348.1	1107	346.4	1115
GR	345.2	1121	345.2	1152	343.8	1203	342.7	1232	342.8	1259
GR	344.2	1273	345.1	1319	344.8	1370	345.3	1415	342.8	1448
GR	346.3	1459	351.0	1467						
X1	3.3	36	09	1258	905	890	890	00	00	00
GR	352.6	9	348.7	12	347.3	18	345.1	27	342.7	65
GR	341.0	105	340.5	155	341.8	210	343.4	257	344.5	273
GR	347.0	291	347.2	306	347.3	311	347.2	316	346.0	361
GR	344.8	411	344.4	446	344.5	462	344.2	500	343.9	555
GR	345.1	610	343.9	665	343.7	718	344.0	760	345.8	807
GR	344.8	855	346.9	909	345.8	937	346.7	963	345.6	1031
GR	343.9	1058	345.2	1091	346.0	1136	346.7	1166	347.3	1185
GR	350.6	1258								
X1	3.4	37	05	1634	1135	450	1100	00	00	00
GR	360.4	5	351.7	8	349.1	15	346.7	22	343.8	72
GR	342.8	115	342.9	160	344.4	210	345.1	262	346.0	344
GR	347.6	401	348.6	452	348.5	479	348.9	507	350.0	538
GR	349.7	605	348.5	610	346.7	630	346.0	668	346.7	695
GR	348.6	716	350.1	779	350.5	856	349.3	884	348.0	913
GR	347.0	941	348.0	974	350.8	986	353.1	1012	352.7	1054
GR	351.5	1059	352.6	1065	351.9	1076	351.4	1109	351.0	1116
GR	350.5	1122	353.1	1147						
X1	4	68	00	2722	1325	1350	1020	00	00	00
GR	352.3	0	349.8	7	347.5	15	347.1	40	346.7	67
GR	347.3	88	347.3	127	346.4	170	346.6	217	345.2	263
GR	346.6	303	346.6	333	348.2	336	349.8	373	350.2	393
GR	351.4	419	351.4	437	352.0	443	353.6	479	354.6	509
GR	354.7	718	353.8	724	352.1	730	351.4	733	348.8	754
GR	346.7	778	345.6	823	345.2	868	344.9	918	344.9	966
GR	348.2	1005	351.5	1018	352.7	1055	353.0	1098	352.3	1167
GR	350.8	1199	350.1	1243	348.8	1273	349.1	1319	349.2	1360
GR	351.0	1378	352.5	1404	350.5	1452	348.3	1466	350.2	1471
GR	354.2	1476	354.2	1483	354.2	2148	352.7	2163	350.9	2166
GR	350.4	2173	350.9	2184	353.3	2221	352.7	2294	353.4	2315
GR	352.0	2358	350.8	2387	348.3	2401	346.0	2468	346.7	2505
GR	348.4	2535	346.8	2566	344.0	2595	343.6	2647	344.3	2697
GR	347.2	2710	350.8	2717	354.9	2722				
X1	4.1	100	00	2568	1605	950	1270	00	00	00
GR	355.0	19	351.8	27	352.7	50	352.5	74	355.3	81
GR	355.3	92	353.3	121	351.4	147	350.1	172	348.9	193
GR	348.1	233	348.1	275	349.2	315	349.1	324	351.3	352
GR	351.7	382	351.4	412	350.1	438	349.8	460	351.3	519
GR	350.7	533	351.5	540	352.7	541	353.1	551	351.4	561
GR	350.4	569	351.4	578	354.3	594	355.2	694	354.8	767
GR	353.3	769	352.8	810	352.4	832	353.3	860	354.4	872
GR	355.0	920	353.7	945	355.2	983	354.8	1022	353.5	1024
GR	351.8	1031	350.9	1051	351.5	1075	351.9	1093	351.1	1124
GR	348.7	1188	346.5	1233	348.6	1297	350.9	1328	351.1	1430

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  82/09/24. 14.45.50.
 PROGRAM   SUSLRX

T1    SUSITNA HYDROELECTRIC PROJECT (SUBTASK 3.06 HYDRAULIC AND ICE STUDIES)
T2  Q=9700 CFS. STARTING W.S.E. @ LRX-3 = 344.0. FLOWS AREA-COMPENSATED
T3          MIDDLE SUSITNA RIVER--FOR FLOWS BELOW 20,000 CFS
J1       0       2       0       0       0       0     0.0    9700   344.0  1.0000
J2       1              -1                       0       0                      15
J3      38      43       1      26       8      33      17      25       4      53
J3      54
NC     .08     .08    .040     0.1     0.3
GT       4    9990
X1       3      43    4000    5674
X3      10                    1600
GR 354.9       345   350.6     370   346.8     750   349.8     875   353.3     900
GR 354.2      1600   345.0    1615   346.5    1657   341.9    1672   341.9    1708
GR 348.6      1720   346.5    2500   344.5    3375   344.9    3500   345.8    3800
GR 346.1      3900   345.5    4000   346.9    4018   342.0    4024   338.6    4048
GR 335.7      4101   333.6    4162   334.8    4227   333.8    4295   332.6    4337
GR 332.8      4348   340.2    4481   341.4    4539   343.9    4600   344.8    4643
GR 346.4      4885   346.6    5002   347.0    5229   348.0    5301   348.2    5463
GR 343.6      5502   344.4    5654   349.8    5674   349.8    5900   350.8    6100
GR 350.3      6700   350.1    7000   351.6    7400
X1       4      77    3077    5799    5220    3400    5270
GR 366.1      0900   359.4    0910   361.5    1080   362.2    2000   362.4    2550
GR 364.3      3000   364.8    3077   353.2    3093  348.23    3115   347.2    3125
GR 347.5      3159   346.2    3175   346.2    3189   345.2    3239   344.4    3271
GR 344.0      3306   346.9    3380  348.20    3404   351.0    3492   352.8    3553
GR 353.4      3614   354.0    3645   352.0    3652   354.5    3665  355.24    3676
GR 353.8      3690  350.40    3695   349.6    3706   348.2    3717   349.4    3747
GR 347.7      3774   346.3    3849   345.5    3905   347.4    3959   349.2    3979
GR350.34      3991   351.8    4017   353.3    4028   353.5    4031   352.8    4153
GR350.74      4205   350.4    4224  350.88    4270   351.8    4340   350.9    4376
GR 350.3      4393   349.9    4416   350.3    4436  350.99    4449   351.6    4469
GR350.56      4494   348.6    4501   349.1    4509  350.58    4512   353.3    4515
GR354.05      4519   354.3    4700   354.5    4900   355.0    5100  354.31    5202
GR 352.6      5218   350.6    5229   349.6    5246   350.6    5258   352.9    5266
GR 353.3      5350  350.31    5429   349.0    5499   348.5    5556   344.5    5657
GR 344.4      5718   345.7    5763   346.9    5778  350.50    5792   355.2    5799
GR 355.0      5832   356.1    6300
X1       5      61    6045    7476    4700    4700    4650
X3      10
GR 374.5      0000   367.8    0010   371.0    0050   371.3    1600   366.5    4600
GR 362.4      5000   364.3    5035   362.5    5100   361.0    5106   359.0    5110
GR 356.9      5121  355.76    5138   354.4    5158   353.7    5177   354.0    5230
GR 353.8      5284   353.9    5325   354.5    5345   355.1    5361   354.6    5374
GR355.90      5391   356.8    5454   357.9    5498   359.4    5556   359.6    5616
GR 363.0      5627  362.15    5775   361.4    5875   363.4    5936   361.5    5953
GR 362.1      5971   362.4    6040   361.9    6045   358.1    6048  355.40    6054
GR 353.2      6071   353.0    6087   353.2    6108  355.43    6139   356.7    6168
GR 355.9      6216   356.7    6234   358.6    6260   359.2    6338  358.21    6497
GR 357.8      6565   357.5    6623   356.2    6697   353.5    6847   354.9    6987
GR 354.9      7062   353.1    7097   352.6    7134   353.8    7142  357.47    7257
GR 359.1      7363   361.8    7367   359.8    7461   366.2    7476   365.5    7526
GR 369.7      8500
X1       6      44    6528    7696    3330    3190    3190
X3      10
GR 381.2      0340   377.0    0345   377.6    1890   376.1    3000   374.3    4500
GR 369.2      6000   370.4    6104   364.4    6114   359.9    6177   364.3    6246
GR 364.2      6294   361.8    6350   360.1    6395   359.1    6413   360.1    6442
```

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	2.71	95	#10	.171	27
1-1/2	5.75	90	#16	---	---
1	13.575	77	#20	.299	21
3/4	19.81	67	#30	---	---
1/2	27.57	54	#40	.537	10
3/8	31.995	47	#50	---	---
#4	39.23	34	#60	---	---
PAN	20.645		#80	.733	1.5
			#100	.744	1
TOTAL	59.875		#200	.756	.5
			TOTAL	.767	

Project 452424, Hole 84.6, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	1.045	98	#8	---	---
2	10.195	83	#10	.048	22
1-1/2	18.755	69	#16	---	---
1	28.65	53	#20	.081	20
3/4	34.32	44	#30	---	---
1/2	39.905	35	#40	.209	13
3/8	42.675	30	#50	---	---
#4	46.2	24	#60	---	---
PAN	14.99		#80	.356	4.3
			#100	.376	3.2
TOTAL	61.19		#200	.408	1.4
			TOTAL	.432	

Project 452424, Hole 84.6, Sample 3.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	2.215	96	#4	---	---
3	9.89	84	#8	---	---
2	36.105	43	#10	.147	2.4
1-1/2	45.065	29	#16	---	---
1	53.19	16	#20	.175	2.2
3/4	56.13	11	#30	---	---
1/2	58.44	7.6	#40	.237	1.8
3/8	59.465	6	#50	---	---
#4	61.05	3.5	#60	---	---
PAN	2.195		#80	.41	.6
			#100	.426	.5
TOTAL	63.245		#200	.458	.3
			TOTAL	.497	

Large size material

5 0 100

Project 452424, Hole 86.3, Sample 5.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	1.22	94	#10	.196	27
1-1/2	2.88	85	#16	---	---
1	6.175	67	#20	.299	15
3/4	7.665	59	#30	---	---
1/2	9.25	51	#40	.364	14
3/8	10.265	46	#50	---	---
#4	12.675	33	#60	---	---
PAN	6.2		#80	.538	5.4
			#100	.564	4.1
TOTAL	18.875		#200	.615	1.5
			TOTAL	.644	

Project 452424, Hole 84.6, Sample 1.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	4.695	93
3	10.255	84
2	16.57	74
1-1/2	20.305	68
1	25.235	60
3/4	28.965	54
1/2	34.185	46
3/8	37.725	41
#4	45.49	28
PAN	18.06	
TOTAL	63.55	
Large size material		
5	**0**	**100**

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
#4	---	---
#8	---	---
#10	.18	19
#16	---	---
#20	.254	15
#30	---	---
#40	.329	10
#50	---	---
#60	---	---
#80	.48	2.2
#100	.495	1.4
#200	.51	.5
TOTAL	.52	

Project 452424, Hole 86.3, Sample 3.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100
3	2.445	96
2	8.52	86
1-1/2	14.84	76
1	25.335	59
3/4	31.72	49
1/2	38.35	39
3/8	41.805	33
#4	46.98	25
PAN	15.46	
TOTAL	62.44	

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
#4	---	---
#8	---	---
#10	.171	20
#16	---	---
#20	.344	15
#30	---	---
#40	.621	6.6
#50	---	---
#60	---	---
#80	.805	1.2
#100	.816	.9
#200	.838	.2
TOTAL	.846	

Project 452424, Hole 86.3, Sample 4.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	7.33	87	#8	---	---
2	10.89	80	#10	.091	22
1-1/2	16.105	71	#16	---	---
1	22.83	59	#20	.174	18
3/4	26.445	52	#30	---	---
1/2	31.575	43	#40	.344	8.5
3/8	34.735	38	#50	---	---
#4	40.435	27	#60	---	---
PAN	15.205		#80	.464	2
			#100	.472	1.5
TOTAL	55.64		#200	.488	.7
			TOTAL	.5	

Project 452424, Hole 86.3, Sample 1.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	4.925	89	#8	---	---
2	11.145	75	#10	.138	21
1-1/2	14.865	67	#16	---	---
1	19.73	56	#20	.221	17
3/4	22.84	49	#30	---	---
1/2	25.995	41	#40	.386	11
3/8	28.21	36	#50	---	---
#4	32.83	26	#60	---	---
PAN	11.575		#80	.587	2.6
			#100	.604	2
TOTAL	44.405		#200	.635	.7
			TOTAL	.653	

Project 452424, Hole 86.3, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	1.51	96	#10	.138	24
1-1/2	5.14	86	#16	---	---
1	10.26	73	#20	.185	22
3/4	13.97	63	#30	---	---
1/2	18.045	52	#40	.364	13
3/8	20.945	45	#50	---	---
#4	26.255	31	#60	---	---
PAN	11.56		#80	.601	2.3
			#100	.618	1.5
TOTAL	37.815		#200	.637	.6
			TOTAL	.65	

Project 452424, Hole 37.7, Sample 6.

******************************** SIEVE ANALYSIS ********************************

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	.53	98	#10	.027	6[illegible]
1-1/2	1.41	96	#16	---	---
1	2.47	93	#20	.084	54
3/4	3.94	88	#30	---	---
1/2	6.059	82	#40	.311	29
3/8	7.285	79	#50	---	---
#4	10.125	70	#60	---	---
PAN	23.8		#80	.48	.6
			#100	.483	.1
TOTAL	33.925		#200	.484	0
			TOTAL	.484	

Project 452424, Hole 87.7, Sample 4.

******************************** SIEVE ANALYSIS ********************************

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	1.89	93	#8	---	---
2	3.75	86	#10	.251	24
1-1/2	5.2	81	#16	---	---
1	7.56	72	#20	.396	17
3/4	9.64	64	#30	---	---
1/2	11.91	55	#40	.557	11
3/8	13.735	49	#50	---	---
#4	17.505	34	#60	---	---
PAN	9.17		#80	.72	3.6
			#100	.74	2.8
TOTAL	26.675		#200	.781	1
			TOTAL	.805	

Project 452424, Hole 87.7, Sample 5.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	.89	99	#10	.103	32
1-1/2	2.18	97	#16	---	---
1	9.62	85	#20	.202	24
3/4	16.25	74	#30	---	---
1/2	25.245	60	#40	.481	19
3/8	30.535	52	#50	---	---
#4	39	38	#60	---	---
PAN	23.975		#80	.64	1.2
			#100	.647	.7
TOTAL	62.975		#200	.655	.3
			TOTAL	.66	

Project 452424, Hole 87.7, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	---	---	#8	---	---
2	0	100	#10	.042	63
1-1/2	.505	99	#16	---	---
1	3.625	94	#20	.12	55
3/4	7.38	89	#30	---	---
1/2	[illegible].68	80	#40	.409	29
3/8	16.06	75	#50	---	---
#4	21.405	67	#60	---	---
PAN	43.365		#80	.663	3.4
			#100	.679	1.9
TOTAL	64.77		#200	.694	.5
			TOTAL	.699	

Project 452424, Hole 87.7, Sample 3.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	2.71	97
3	5.29	93
2	12.355	84
1-1/2	18.815	76
1	27.705	65
3/4	34.105	57
1/2	41.12	48
3/8	46.185	41
#4	53.935	31
PAN	24.74	
TOTAL	78.675	

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
#4	---	---
#8	---	---
#10	.105	26
#16	---	---
#20	.204	21
#30	---	---
#40	.418	9.5
#50	---	---
#60	---	---
#80	.552	2.5
#100	.566	1.8
#200	.586	.7
TOTAL	.6	

Large size material

5 0 100

Project 452424, Hole 87.7, Sample 1.

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	1.75	97	#4	---	---
3	3.66	94	#8	---	---
2	10.705	82	#10	.122	25
1-1/2	15.69	74	#16	---	---
1	22.685	63	#20	.221	18
3/4	27.07	56	#30	---	---
1/2	32.61	47	#40	.406	8
3/8	36.23	41	#50	---	---
#4	42.635	30	#60	---	---
PAN	18.355		#80	.533	1.1
			#100	.541	.7
TOTAL	60.99		#200	.548	.3
			TOTAL	.553	

Project 452424, Hole 90.6, Sample 4.

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	3.54	93	#4	---	---
3	9.885	81	#8	---	---
2	31.735	39	#10	.054	.8
1-1/2	40.62	22	#16	---	---
1	47.76	7.9	#20	.092	.7
3/4	50.235	3.1	#30	---	---
1/2	51.15	1.3	#40	.13	.6
3/8	51.285	1.1	#50	---	---
#4	51.385	.9	#60	---	---
PAN	.458		#80	.231	.4
			#100	.254	.4
TOTAL	51.843		#200	.298	.3
Large size material					
5	**0**	**100**	TOTAL	.458	

Project 452424, Hole 90.6, Sample 5.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	2.71	95	#10	.171	27
1-1/2	5.75	90	#16	---	---
1	13.575	77	#20	.298	21
3/4	19.81	67	#30	---	---
1/2	27.57	54	#40	.537	10
3/8	31.995	47	#50	---	---
#4	39.23	34	#60	---	---
PAN	20.645		#80	.733	1.5
			#100	.744	1
TOTAL	59.875		#200	.756	.5
			TOTAL	.767	

Pr ject 452424, Hole 84.6, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	1.045	98	#8	---	---
2	10.195	83	#10	.048	22
1-1/2	18.755	69	#16	---	---
1	28.65	53	#20	.081	20
3/4	34.32	44	#30	---	---
1/2	39.905	35	#40	.209	13
3/8	42.675	30	#50	---	---
#4	46.2	24	#60	---	---
PAN	14.99		#80	.356	4.3
			#100	.376	3.2
TOTAL	61.19		#200	.408	1.4
			TOTAL	.432	

Project 452424, Hole 84.6, Sample 3.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	2.215	96	#4	---	---
3	9.89	84	#8	---	---
2	36.105	43	#10	.147	2.4
1-1/2	45.065	29	#16	---	---
1	53.19	16	#20	.175	2.2
3/4	56.13	11	#30	---	---
1/2	58.44	7.6	#40	.237	1.8
3/8	59.465	6	#50	---	---
#4	61.05	3.5	#60	---	---
PAN	2.195		#80	.41	.6
			#100	.426	.5
TOTAL	63.245		#200	.458	.3
Large size material			TOTAL	.497	
5	**0**	**100**			

Project 452424, Hole 86.3, Sample 5.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	1.22	94	#10	.196	23
1-1/2	2.88	85	#16	---	---
1	6.175	67	#20	.299	19
3/4	7.665	59	#30	---	---
1/2	9.25	51	#40	.364	14
3/8	10.265	46	#50	---	---
#4	12.675	33	#60	---	---
PAN	6.2		#80	.538	5.4
			#100	.564	4.1
TOTAL	18.875		#200	.615	1.5
			TOTAL	.644	

Project 452424, Hole 84.6, Sample 1.

************************************ SIEVE ANALYSIS ************************************

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	4.695	93	#4	---	---
3	10.255	84	#8	---	---
2	16.57	74	#10	.18	19
1-1/2	20.305	68	#16	---	---
1	25.235	60	#20	.254	15
3/4	28.965	54	#30	---	---
1/2	34.185	46	#40	.329	10
3/8	37.725	41	#50	---	---
#4	45.49	28	#60	---	---
PAN	18.06		#80	.48	2.2
			#100	.495	1.4
TOTAL	63.55		#200	.51	.5
Large size material					
5	**0**	**100**	TOTAL	.52	

Project 452424, Hole 86.3, Sample 3.

************************************ SIEVE ANALYSIS ************************************

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	2.445	96	#8	---	---
2	8.52	86	#10	.171	20
1-1/2	14.84	76	#16	---	---
1	25.335	59	#20	.344	15
3/4	31.72	49	#30	---	---
1/2	38.35	39	#40	.621	6.6
3/8	41.805	33	#50	---	---
#4	46.98	25	#60	---	---
PAN	15.46		#80	.805	1.2
			#100	.816	.9
TOTAL	62.44		#200	.838	.2
			TOTAL	.846	

Project 452424, Hole 86.3, Sample 4.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	7.33	87	#8	---	---
2	10.89	80	#10	.091	2[illegible]
1-1/2	16.105	71	#16	---	---
1	22.83	59	#20	.174	18
3/4	26.445	52	#30	---	---
1/2	31.575	43	#40	.344	8.[illegible]
3/8	34.735	38	#50	---	---
#4	40.435	27	#60	---	---
PAN	15.205		#80	.464	2
			#100	.472	1.5
TOTAL	55.64		#200	.488	.7
			TOTAL	.5	

Project 452424, Hole 86.3, Sample 1.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	4.925	89	#8	---	---
2	11.145	75	#10	.138	21
1-1/2	14.865	67	#16	---	---
1	19.73	56	#20	.221	17
3/4	22.84	49	#30	---	---
1/2	25.995	41	#40	.386	11
3/8	28.21	36	#50	---	---
#4	32.83	26	#60	---	---
PAN	11.575		#80	.587	2.6
			#100	.604	1
TOTAL	44.405		#200	.635	.7
			TOTAL	.653	

Project 452424, Hole 86.3, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	1.51	96	#10	.138	24
1-1/2	5.14	86	#16	---	---
1	10.26	73	#20	.185	22
3/4	13.97	63	#30	---	---
1/2	18.045	52	#40	.364	13
3/8	20.945	45	#50	---	---
#4	26.255	31	#60	---	---
PAN	11.56		#80	.601	2.3
			#100	.618	1.5
TOTAL	37.815		#200	.637	.6
			TOTAL	.65	

Project 452424, Hole 87.7, Sample 6.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	.53	98	#10	.027	65
1-1/2	1.41	96	#16	---	---
1	2.47	93	#20	.084	53
3/4	3.94	88	#30	---	---
1/2	6.055	82	#40	.311	25
3/8	7.285	79	#50	---	---
#4	10.125	70	#60	---	---
PAN	23.8		#80	.48	.6
			#100	.483	.1
TOTAL	33.925		#200	.484	0
			TOTAL	.484	

Project 452424, Hole 87.7, Sample 4.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	0	100	#4	---	---
3	1.89	93	#8	---	---
2	3.75	86	#10	.251	24
1-1/2	5.2	81	#16	---	---
1	7.56	72	#20	.396	17
3/4	9.64	64	#30	---	---
1/2	11.91	55	#40	.557	11
3/8	13.735	49	#50	---	---
#4	17.505	34	#60	---	---
PAN	9.17		#80	.72	3.6
			#100	.74	2.8
TOTAL	26.675		#200	.781	1
			TOTAL	.805	

Project 452424, Hole 87.7, Sample 5.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	0	100	#8	---	---
2	.89	99	#10	.103	32
1-1/2	2.18	97	#16	---	---
1	9.62	85	#20	.202	26
3/4	16.25	74	#30	---	---
1/2	25.245	60	#40	.481	10
3/8	30.535	52	#50	---	---
#4	39	38	#60	---	---
PAN	23.975		#80	.64	1.2
			#100	.647	.7
TOTAL	62.975		#200	.655	.3
			TOTAL	.66	

Project 452424, Hole 87.7, Sample 2.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	---	---	#4	---	---
3	---	---	#8	---	---
2	0	100	#10	.042	63
1-1/2	.505	99	#16	---	---
1	3.625	94	#20	.12	55
3/4	7.38	89	#30	---	---
1/2	12.68	80	#40	.409	28
3/8	16.06	75	#50	---	---
#4	21.405	67	#60	---	---
PAN	43.365		#80	.663	3.4
			#100	.679	1.9
TOTAL	64.77		#200	.694	.5
			TOTAL	.699	

Project 452424, Hole 87.7, Sample 3.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	2.71	97
3	5.29	93
2	12.355	84
1-1/2	18.815	76
1	27.705	65
3/4	34.105	57
1/2	41.12	48
3/8	46.105	41
#4	53.935	31
PAN	24.74	
TOTAL	78.675	

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
#4	---	---
#8	---	---
#10	.105	26
#16	---	---
#20	.204	21
#30	---	---
#40	.418	9.5
#50	---	---
#60	---	---
#80	.552	2.5
#100	.566	1.8
#200	.586	.7
TOTAL	.6	

Large size material

5 0 100

Project 452424, Hole 87.7, Sample 1.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	1.75	97	#4	---	---
3	3.66	94	#8	---	---
2	10.705	82	#10	.122	23
1-1/2	15.69	74	#16	---	---
1	22.685	63	#20	.221	18
3/4	27.02	56	#30	---	---
1/2	32.61	47	#40	.406	8
3/8	36.23	41	#50	---	---
#4	42.635	30	#60	---	---
PAN	18.355		#80	.533	1.1
			#100	.541	.7
TOTAL	60.99		#200	.548	.3
			TOTAL	.553	

Project 452424, Hole 90.6, Sample 4.

SIEVE ANALYSIS

SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING	SIEVE SIZE	CUMULATIVE WEIGHT	% PASSING
4	3.54	93	#4	---	---
3	9.885	81	#8	---	---
2	31.735	39	#10	.054	.8
1-1/2	40.62	22	#16	---	---
1	47.76	7.9	#20	.097	.7
3/4	50.235	3.1	#30	---	---
1/2	51.15	1.3	#40	.13	.6
3/8	51.285	1.1	#50	---	---
#4	51.385	.9	#60	---	---
PAN	.458		#80	.231	.4
			#100	.254	.4
TOTAL	51.843		#200	.298	.3
Large size material					
5	0	100	TOTAL	.458	

Project 452424, Hole 90.6, Sample 5.