

CHANNEL MODIFICATION FOR FISH PASSAGE
ON
UMATILLA RIVER

Supplement To Final Report 1985

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ABSTRACT

This report summarizes the construction work that was accomplished during the period of June to September 1986 to complete the channel modifications for fish passage in the lower Umatilla River below Threemile Dam.

Modifications to the channel were initially designed and constructed by the U.S. Army Corps of Engineers, Walla Walla District (CORPS) under Interagency Agreement No. DE-A179-84-BP15807, Project NO. 83-434 dated February 1, 1984. Abnormally high riverflows and other design problems resulted in several construction deficiencies.

A review team consisting of representatives of the Oregon Department of Fish and Wildlife (ODFW), Umatilla Indian Tribe, U.S. Bureau of Reclamation (USBR), CORPS, and Bonneville Power Administration (BPA) conducted a field inspection of the modified channel during July 1985. The team identified additional work items necessary to complete the fish passage from the Columbia River to Threemile Dam.

The BPA funded the CORPS to complete the design and construction of the project under Interagency Agreement No. DE-A179-*86-BP61383, Project 83-434 dated January 23, 1986.

The CORPS prepared plans and specifications for completion and awarded a construction contract to Coyote Corporation Contractors and Engineers, Spokane, Washington. Notice to Proceed with the work was given on June 9, 1986. Construction work included rock excavation from existing weirs, concrete weir construction where needed, miscellaneous concrete placement to prevent fish access to dead-end side channels, and construction of two jump pools. A modification to the contract deleted the two jump pools and provided additional channel improvement.

Mr. Dave Carey, ODFW who was the technical advisor on the previous contract was again assigned to the project in the same capacity. Mr. James Bongers, CORPS, was the Contracting Officer's Representative.

The contract was completed on September 5, 1986. The modified channel will now allow the upstream movement of adult anadromous salmonid anticipated in mid-September 1986.

**CHANNEL MODIFICATION FOR FISH PASSAGE
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SUPPLEMENT TO FINAL REPORT 1985

1. INTRODUCTION

a. Background

The CORPS was awarded BPA Agreement No. DE-AI79-84-BP15807, Project No. 83-434, on February 1, 1984, to modify portions of the streambed in the Umatilla River between Threemile Dam and the Columbia River. The CORPS designed, contracted, and inspected the construction work which was started in August 1984 and completed in November 1984.

In the final report to BPA it was recommended that a followup inspection field trip be made of the constructed channel by representatives from the various agencies involved. A review team consisting of representatives of the ODFW Umatilla Indian Tribe, USBR, CORPS, and BPA conducted a field inspection of the modified channel during July 1985. The team identified additional work and corrective actions needed as a result of construction deficiencies and higher than normal water levels during the construction period.

The work described in this report is the completion of the final phase of channel modification for fish passage on the lower Umatilla River. Portions of the previously excavated bedrock channel were modified to enhance fish passage during low streamflow periods resulting from irrigation withdrawals.

b. Description of the Construction Area

The Unatilla River below Threenile Dam (see Plates 1 and 2) flows directly on Columbia River basalt. The stream gradient from the dam to the river mouth is less than 1 percent. Average streamflows below the dam range from less than 40 cfs from July through September to about 1,000 cfs in March and April. Flows are often less than 2 cfr in July and August during the irrigation season.

Following the channel modifications in 1984, the river experienced a high flow of approximately 13,000 cfs during the spring runoff in February 1986. The riverbed was relatively flat in areas that had no natural or constructed channel as a result of the high flows and scouring process. Some of these areas required rock excavation to widen and deepen existing channels. The two jump pools (see Photos 29 and 30) were deleted because the area was scoured during high streamflow, causing the channel flow to change and thereby eliminating the need for the jump pools. Small side channels to the major existing channel became more readily identified following the high streamflow period and concrete was placed in these areas to block them off to the upstream migrating fish during low flow periods.

c. Geology

The regional topography and geology are presented in the April 1985 Final Report.

2. CONSTRUCTION

3. General

The CORPS prepared contract documents, advertised for bids, and awarded contract No. DACW68-86-C-0046 for the channel modification completion work on May 27, 1986, to Coyote Corporation Contractors and Engineers, Spokane, Washington. The contract amount was \$89,850. They

received the Notice to Proceed on June 9, 1986, with a completion date of October 7, 1986. The contract work consisted of rock excavation for jump pools, miscellaneous rock excavation from existing rock weirs and channel improvement, constructing concrete weirs, and placing miscellaneous concrete to prevent fish access to dead-end side channels.

The contract was completed September 5, 1986, in time for the anticipated returning fish run. The area above the contracted work area is yet to be modified under future planning by the USBR.

The CORPS field inspection was administered by Mr. James Bongers, Civil Engineer, under the direction of Mr. Dave Opbroeck, Chief of Construction, and Mr. Gary Willard, Area Engineer, all from Snake River Area Office (SRAO).

b. Construction Progress

A preconstruction meeting was held with the contractor on June 6, 1986, at the SRAO. On July 1, 1986, representatives of the CORPS, ODFW and the Project Manager from Coyote Corporation met onsite to view the location and discuss the various structures required of this contract. The riverflow at the time of the site visit was low and at this reduced flow it was easy to ascertain the work required to complete this phase of the construction. Discussions with Mr. Dave Carey, ODFW indicated that the two jump pools located at station 59+85 and station 59+45 would not be required. Instead he wanted to substitute a 3-foot-wide by 1-foot-deep channel. The channel would be constructed between stations 29+50 and 46+50 and stations 98+00 and 100+00 as designated by Mr. Carey and agreed to by onsite field personnel.

It was recommended to the Area Engineer, SRAO, that, negotiations with the contractor be initiated to determine if the work deemed necessary by Mr. Carey could be undertaken and completed at no cost to the Government. After final discussions of the changes required with the contractors, Mr. Carey designed the new channel work while in the field

and established all weir top elevations to insure maximum fish passage upriver to Threenile Dam

Coyote Corporation began site mobilization on July 2, 1986. On July 7, the contractor commenced working on the concrete weirs and miscellaneous rock excavation. His equipment consisted of an MF50C loader/backhoe and an MF450S excavator hoe ram. The hoe ram was track mounted which made it very mobile and, therefore, eliminated the need to have gravel backfill to provide access for his equipment. The contractor used sandbags to divert the riverflow. Gas engine pumps were used to dewater the work areas where necessary. Jackhammers were used to drill holes for grouting the steel anchor bars in bedrock. The concrete was transported directly to the weir placements by local ready-mix trucks.

On July 28, 1986, the contractor signed a Modification Agreement (Case 1, see Appendix A) to delete the two 20-foot by 20-foot by 5-foot jump pools and replace them with access channel improvements between the stations described above. This work commenced immediately and was accomplished with the hoe ram and loader/backhoe.

The contract work progressed in a timely manner. There were no major delays due to unusual weather or high waterflows. The contract was completed ahead of schedule on September 5, 1986.

c. Final Costs

Original Contract Amount	\$89,850
Case 1 - No Increase or Decrease to Original Contract	0
Final Contractor's Cost	\$63,905

3. CONCLUSIONS

There were no fish runs in progress at the time the channel modifications were completed on September 5, 1986. At that time the riverflow was less than 2 cfs. Later information received from ODFW indicated that at flows of 80 cfs there was no evidence of a fish run; however, when flows reached 150 to 160 cfs both steelhead and salmon were observed arriving at the Threemile Dam fish ladder. Stanfield Irrigation District reported a flow at the gauging station of 164 cfs for October 2, 1986. The channel modifications appear to be providing satisfactory passageway for the returning species. The numbers of returning fish will be the best measure for analyzing the success of the completed fish passageway (see Appendix B for additional information from ODFW).

4. RECOMMENDATIONS

An inspection should be made of the entire modified channel following the high flows during the spring runoff. ODFW personnel should check the concrete weirs for any damage and the new channel should be examined for any concentrated deposits of rocks, gravel, or debris. The research data compiled by Ray Hartlerode, ODFW as part of the Boyd Evaluation Project (referenced in Appendix B) should be studied to determine if weir No. 6 is a barrier to adult fish passage.

5. ACKNOWLEDGMENTS

I would like to thank the ODFW Salem Office, for the assistance of Mr. Dave Carey, who again provided the necessary expertise to complete the modification of the fish passageway.

Special appreciation is given to CORPS employees--Mr. Tom Holt for photography; technical assistance, review, and advice provided by Mr. Tilden E. McDowell, Chief of Geology Section, and supervision by Mr. Fred J. Mklancic, Chief, Geotechnical Branch.

The work was accomplished under the direction of the District Engineer, Colonel James B. Royce; Mr. Larry Cheney served as Project Coordinator for the CORPS; and Mr. Tom Vogel, BPA, was Project Mnager.

6. REFERENCES

a. Nigro, Anthony A. and David L. Ward. "Evaluation of Lower Umatilla River Channel Mbdifications below Three Mile Dam" Columbia River Section of the Oregon Department of Fish and Wildlife. Annual Report to Bonneville Power Administration, 1984. (Agreement DE-AI79-84-BP15807), 38 pp.

b. Sanguine, William L. "Channel Mbdification for Fish Passage on Umatilla River." U.S. Army Corps of Engineers, Walla Walla, Washington. Final Report to Bonneville Power Administration. 1985. (Agreement DE-AI79-84-BP15807). 25 pp.

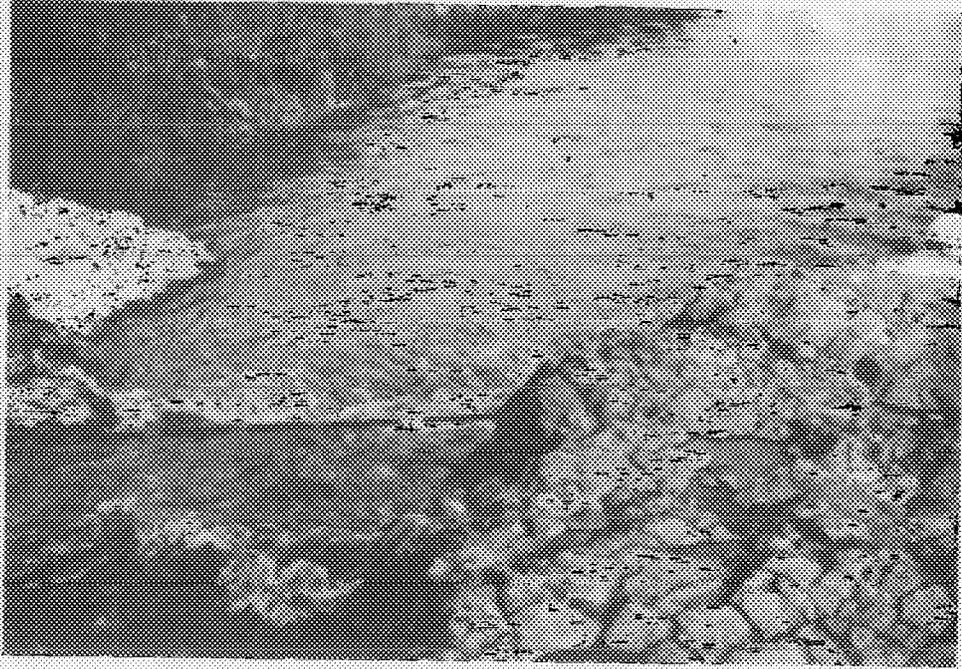


PHOTO 1: WEIR NO. 1 STA. 116+80 PRIOR TO CONSTRUCTION

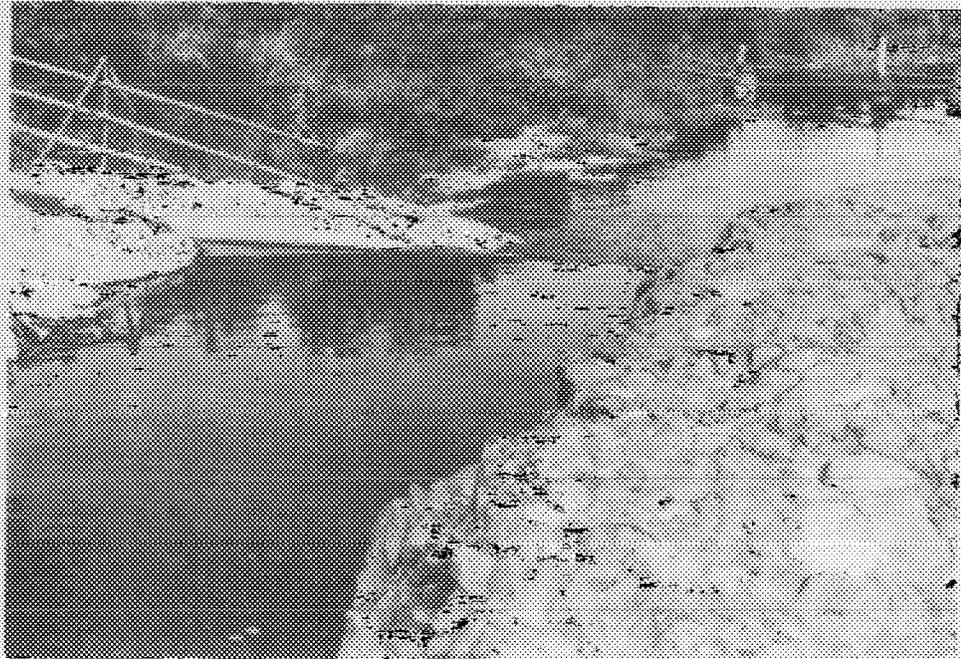


PHOTO 2: WEIR NO. 1 AS CONSTRUCTED

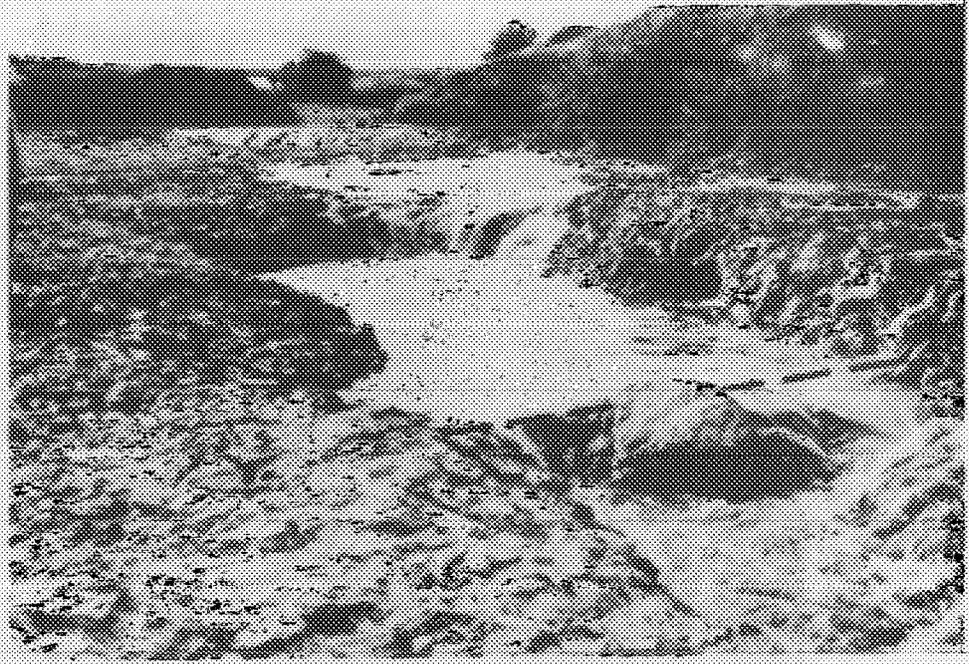


PHOTO 3: WEIR NO. 2 STA. 116+25 PRIOR TO CONSTRUCTION

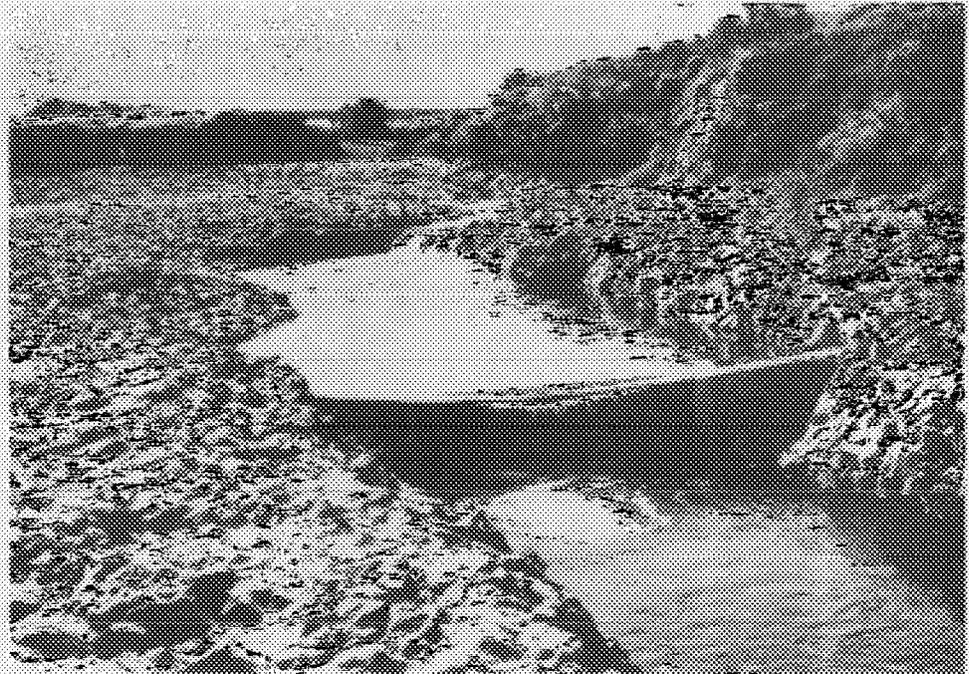


PHOTO 4: WEIR NO. 2 AS CONSTRUCTED

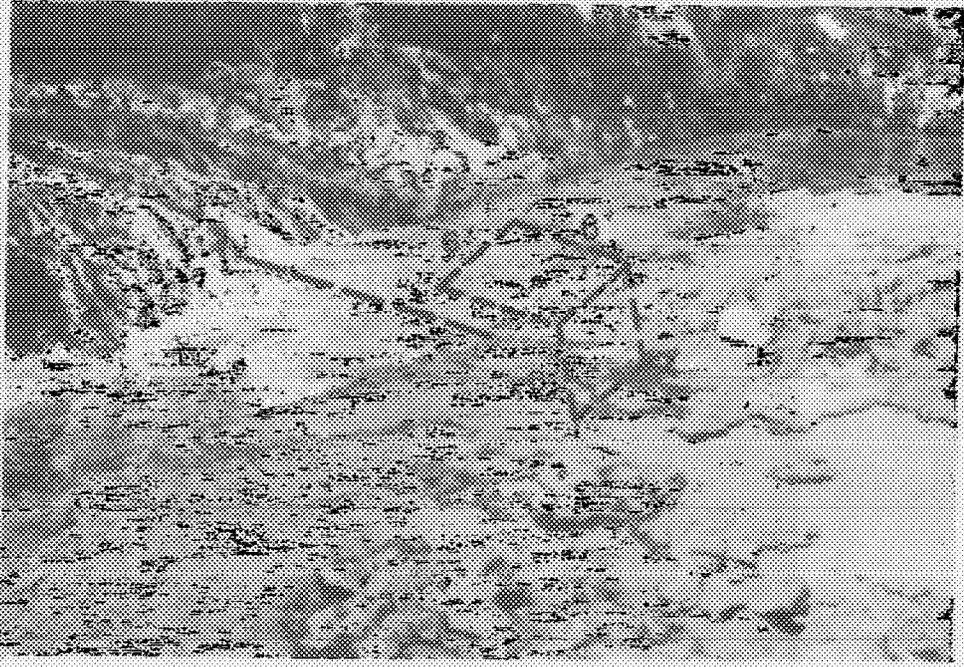


PHOTO 5: WEIR NO. 3 STA. 114+27 AND 6'x 6'x6'
JUMP POOL STA. 114+28 PRIOR TO CONSTRUCTION

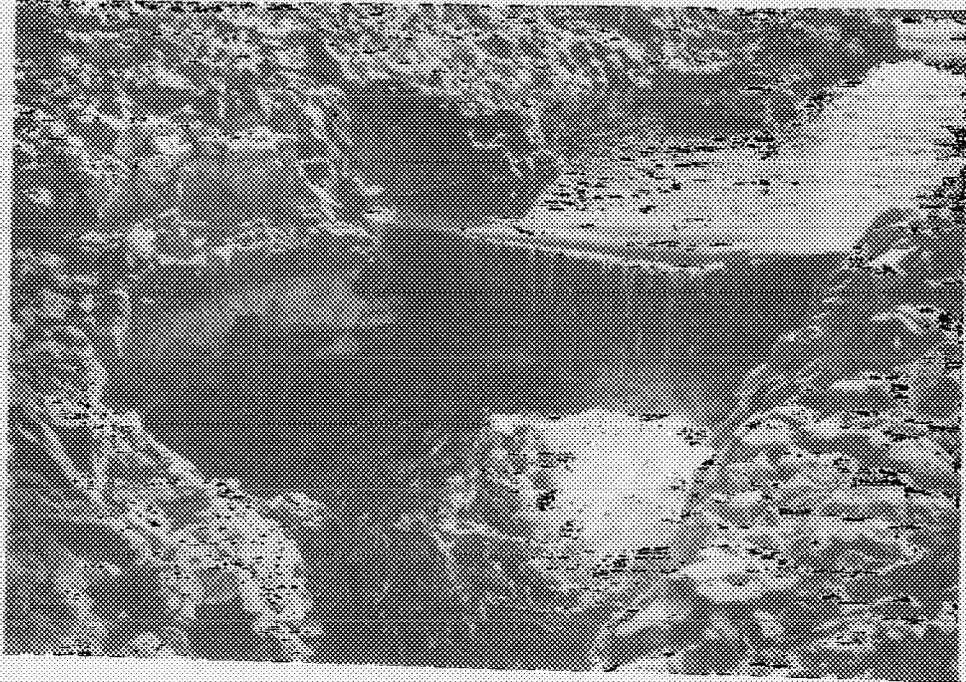
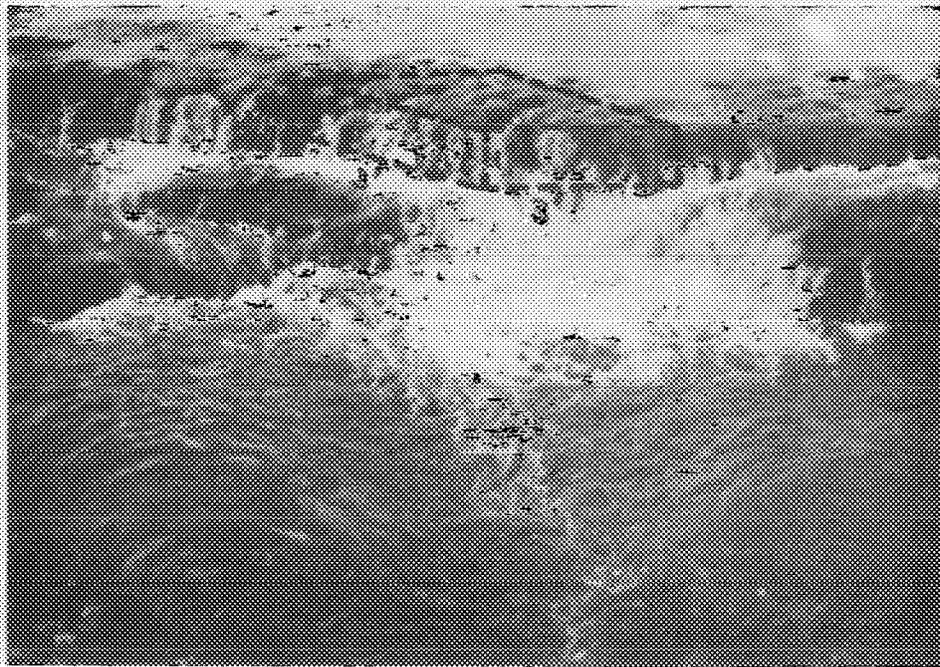


PHOTO 6: WEIR NO. 3 AND JUMP POOL AS
CONSTRUCTED



**PHOTO 7: REMOVE 3'x3'x1' ROCK STA. 113+50
PRIOR TO CONSTRUCTION**

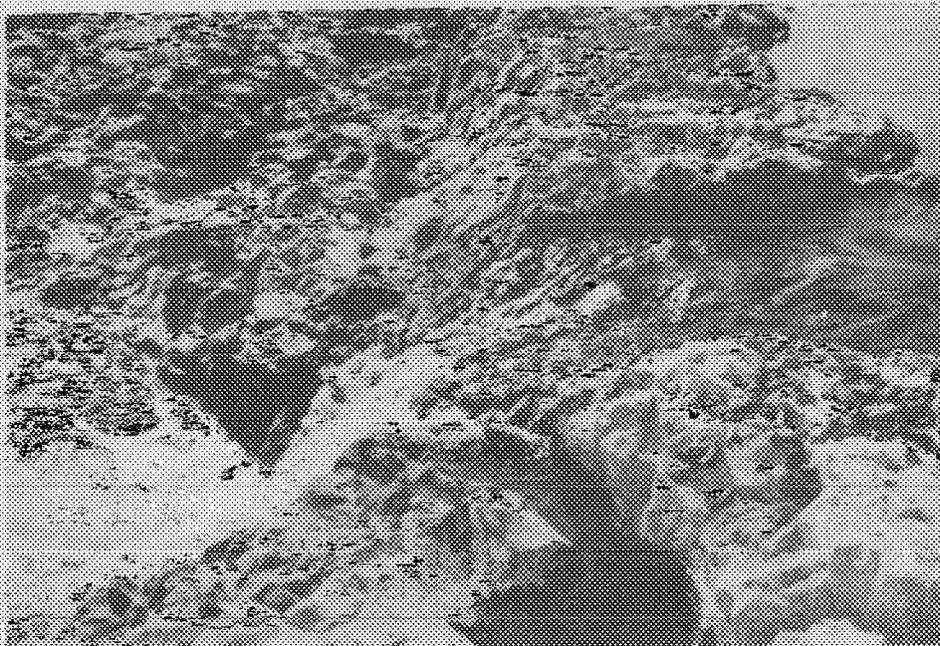


PHOTO 8: ROCK REMOVAL AS CONSTRUCTED



PHOTO 9: WEIR NO. 4 STA. 108+00 PRIOR TO CONSTRUCTION

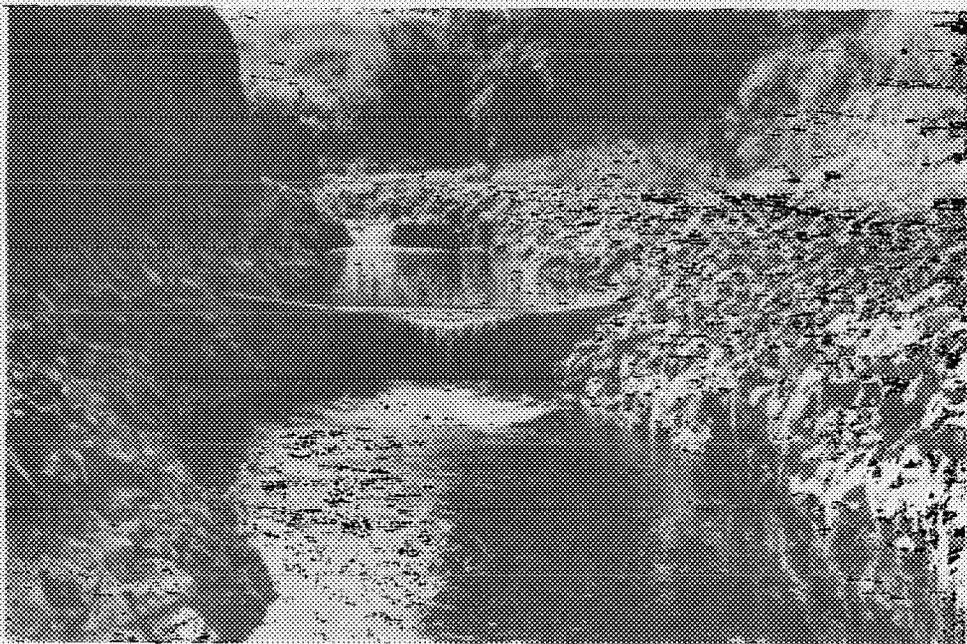


PHOTO 10: WEIR NO. 4 AS CONSTRUCTED

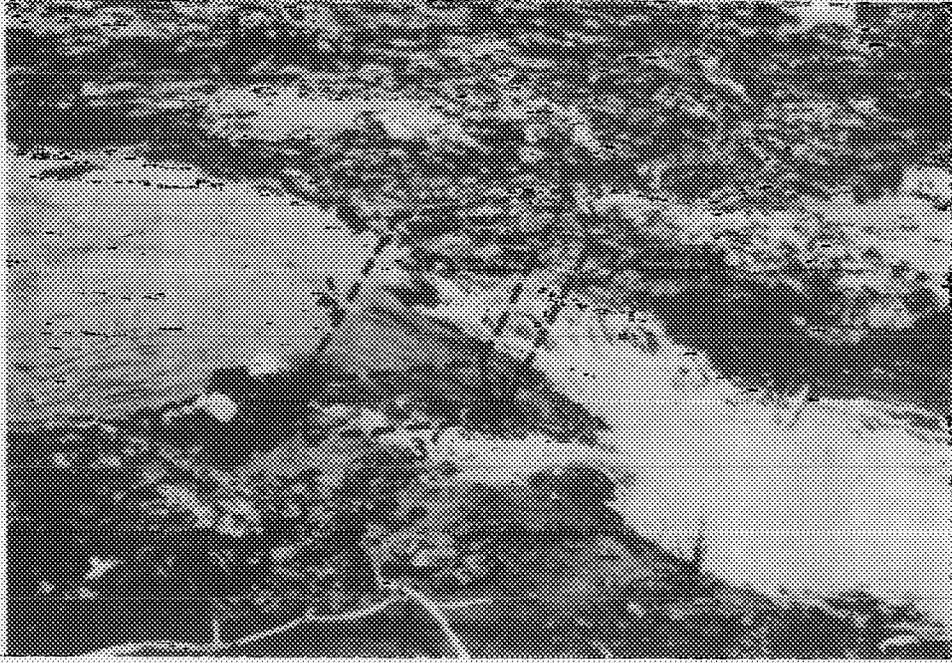


PHOTO 11: REMOVE 3'x3'x1' ROCK STA. 83+50
PRIOR TO CONSTRUCTION

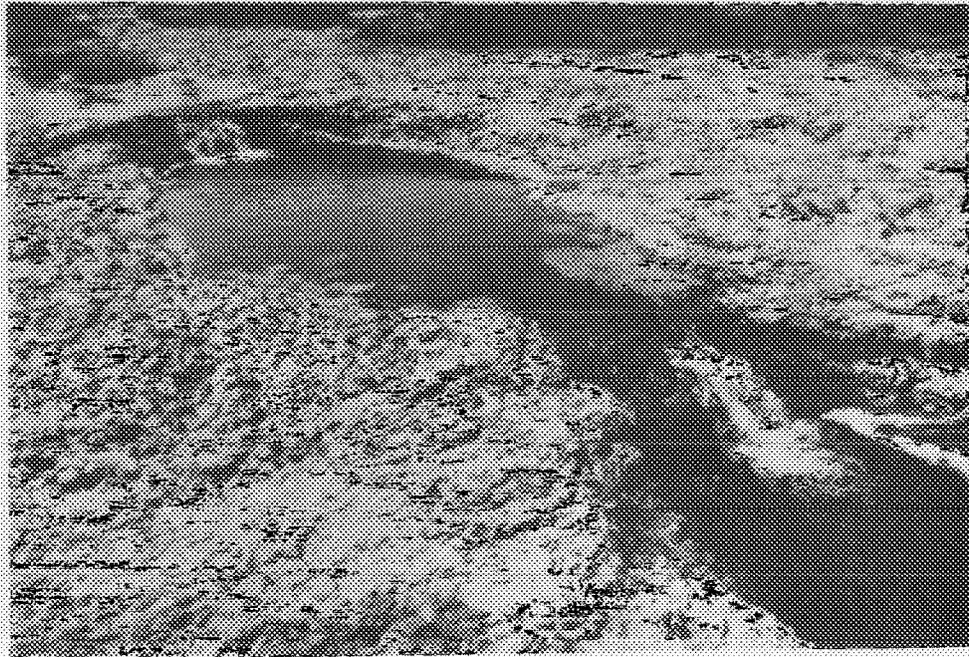


PHOTO 12: ROCK REMOVAL AS CONSTRUCTED

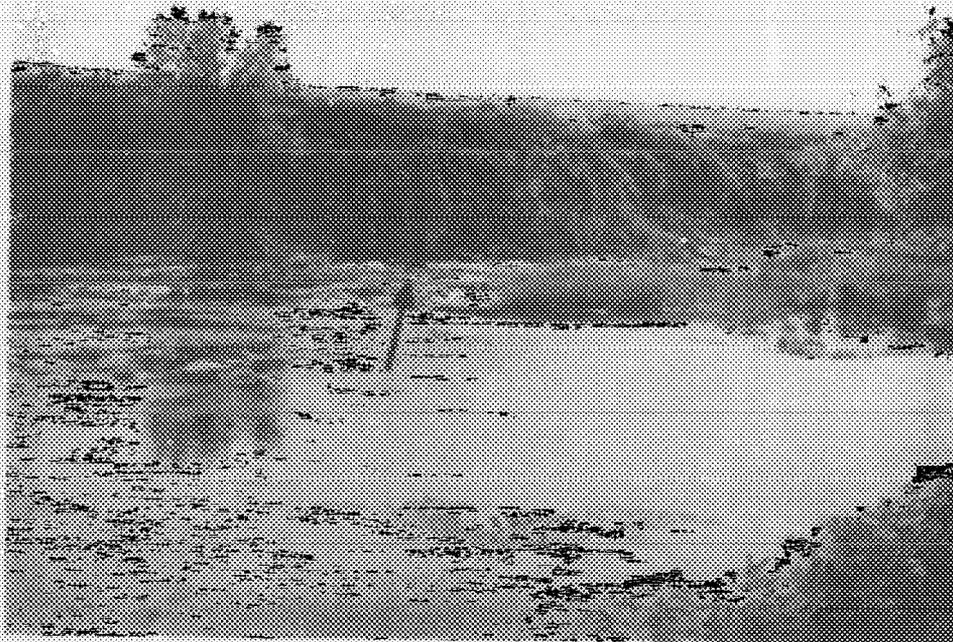


PHOTO 13: REMOVE GRAVEL AND CONSTRUCT
WEIR NO. 5 STA. 81+00 PRIOR TO CONSTRUCTION

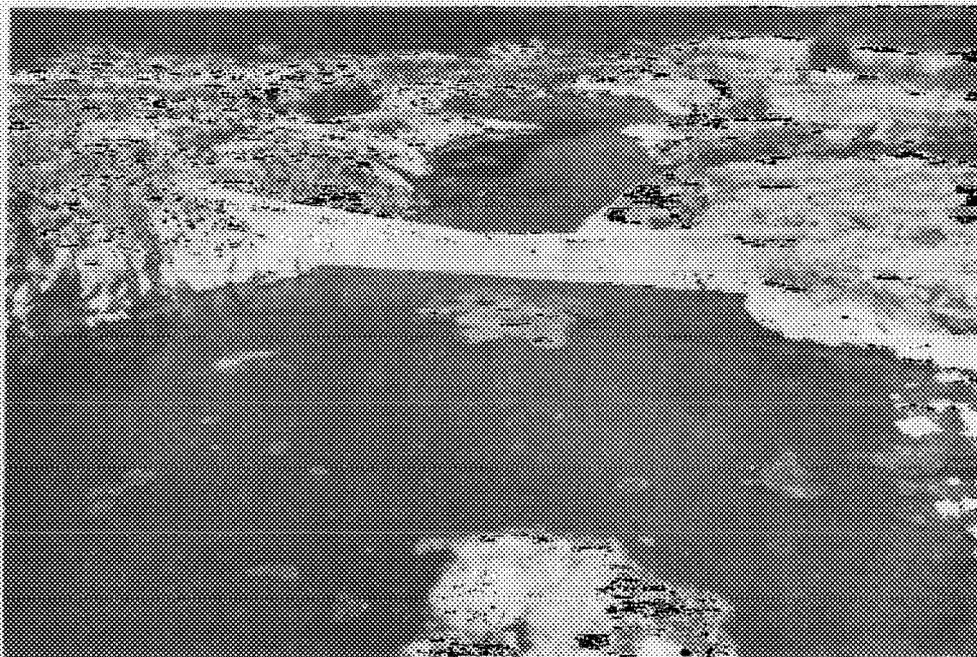


PHOTO 14: WEIR NO. 5 AS CONSTRUCTED AND
GRAVEL REMOVED FROM CHANNEL DOWNSTREAM
OF WEIR.

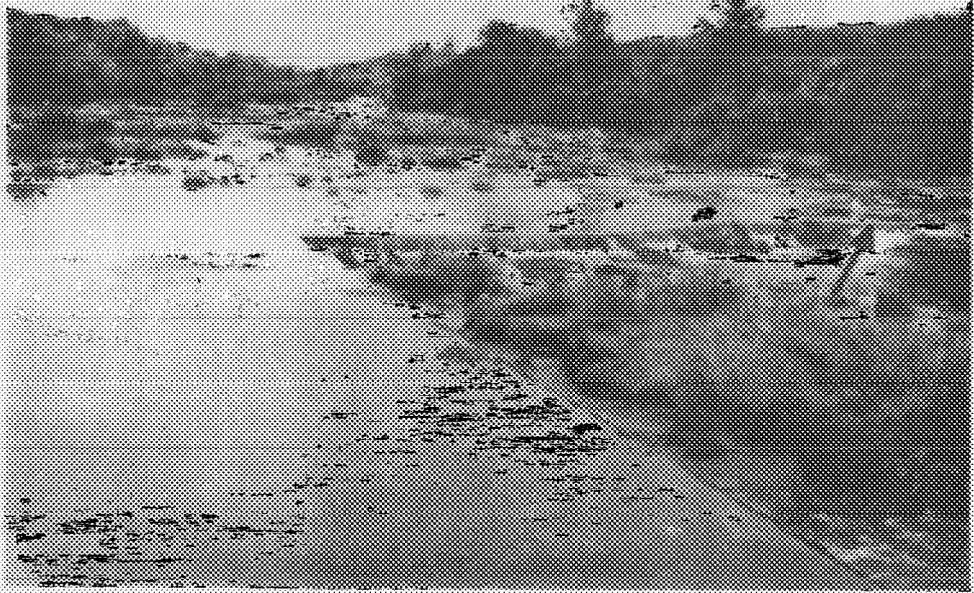


PHOTO 15: CONSTRUCT STOP LOG STA. 80+65
PRIOR TO CONSTRUCTION

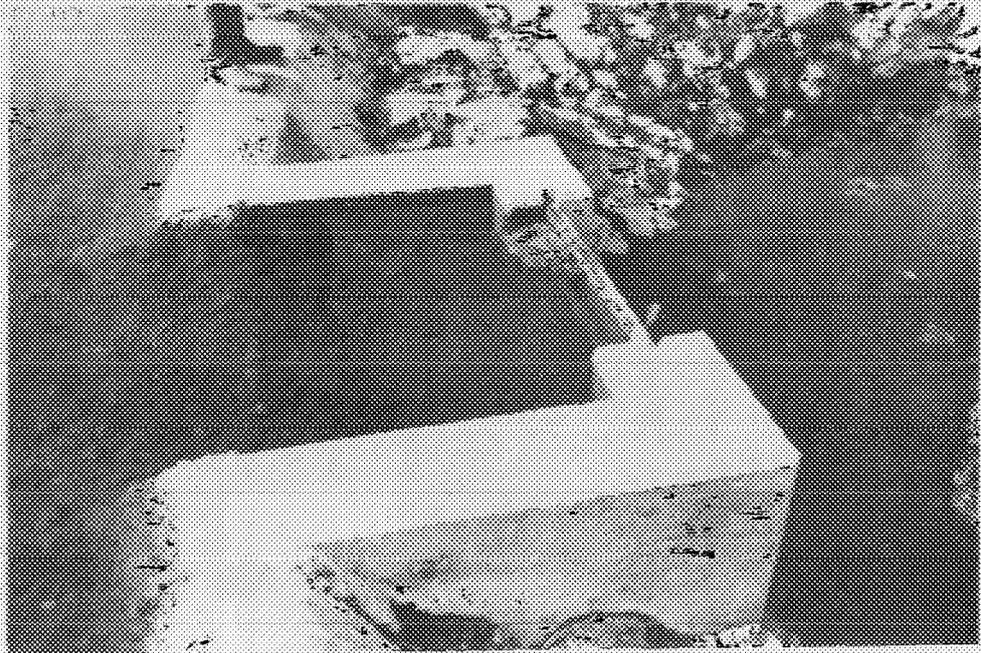


PHOTO 16: STOP LOG STRUCTURE AS
CONSTRUCTED

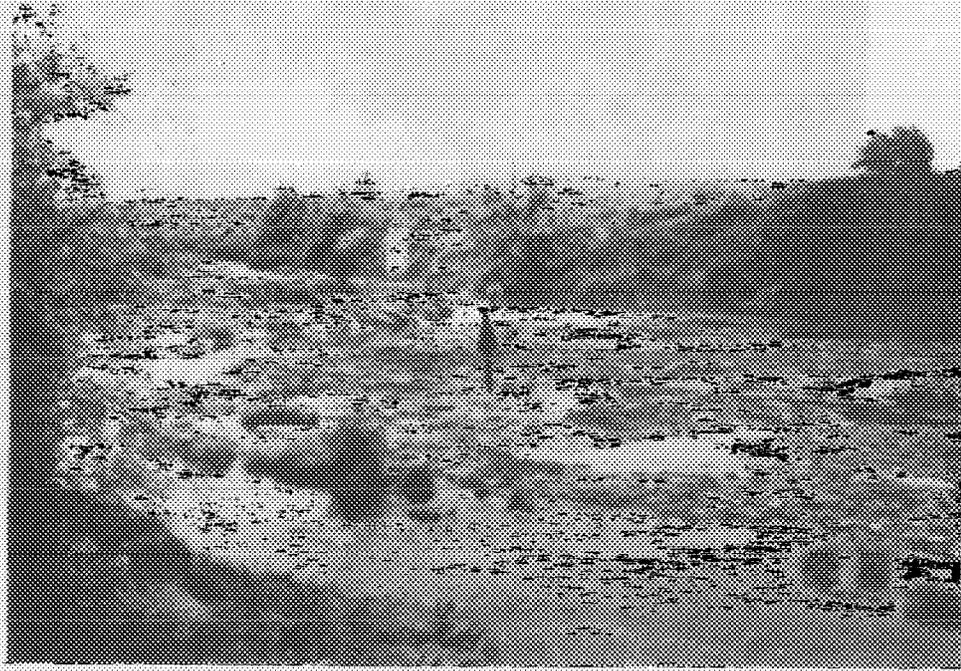


PHOTO 17: REMOVE 3'x3'x1' ROCK STA. 78+20

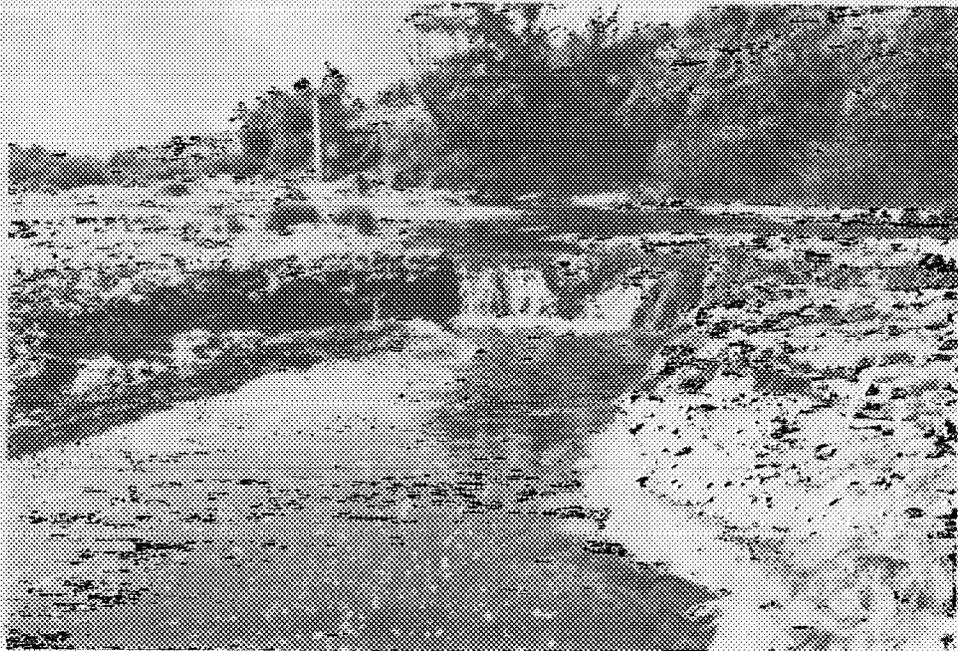


PHOTO 18: ROCK REMOVAL AS CONSTRUCTED



PHOTO 19: WEIR NO. 6 STA. 61+30 PRIOR TO CONSTRUCTION

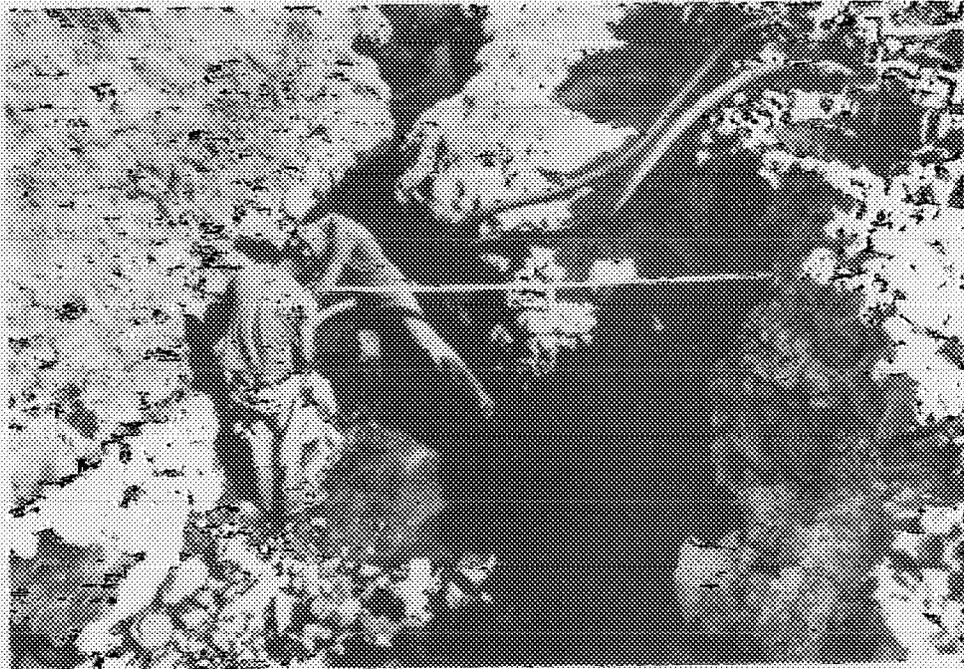


PHOTO 20: WEIR NO. 6 BEING CONSTRUCTED (SETTING STEEL)

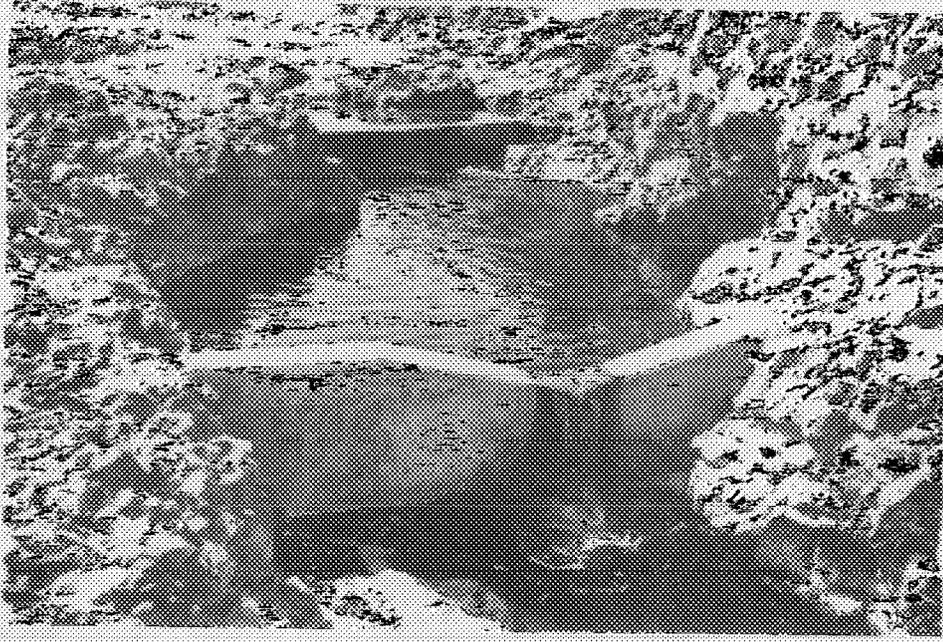


PHOTO 21: WEIR NO. 6 AS CONSTRUCTED

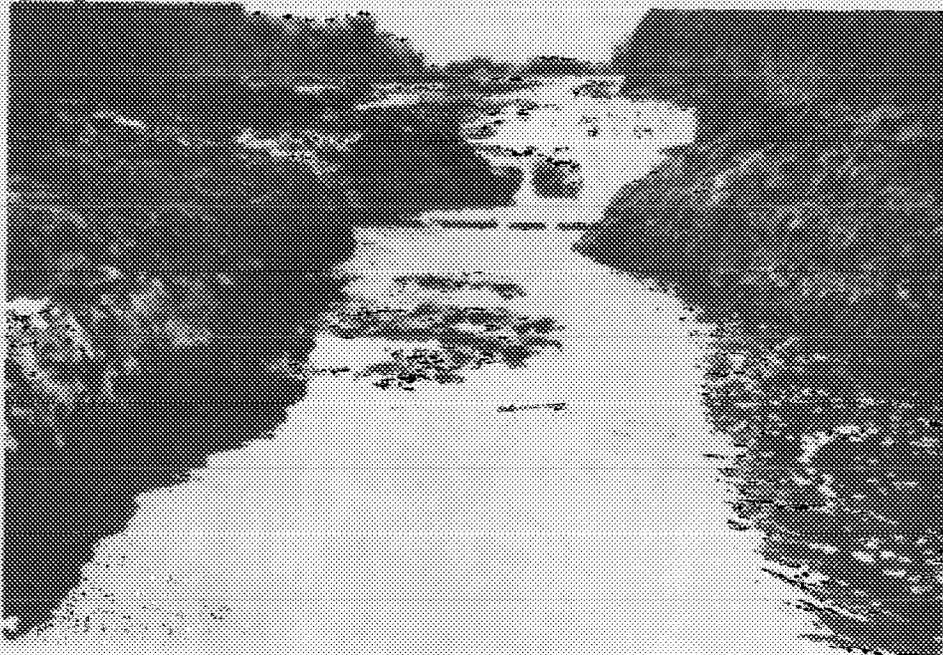


PHOTO 22: WEIR NO. 7 STA. 61+00 PRIOR TO CONSTRUCTION

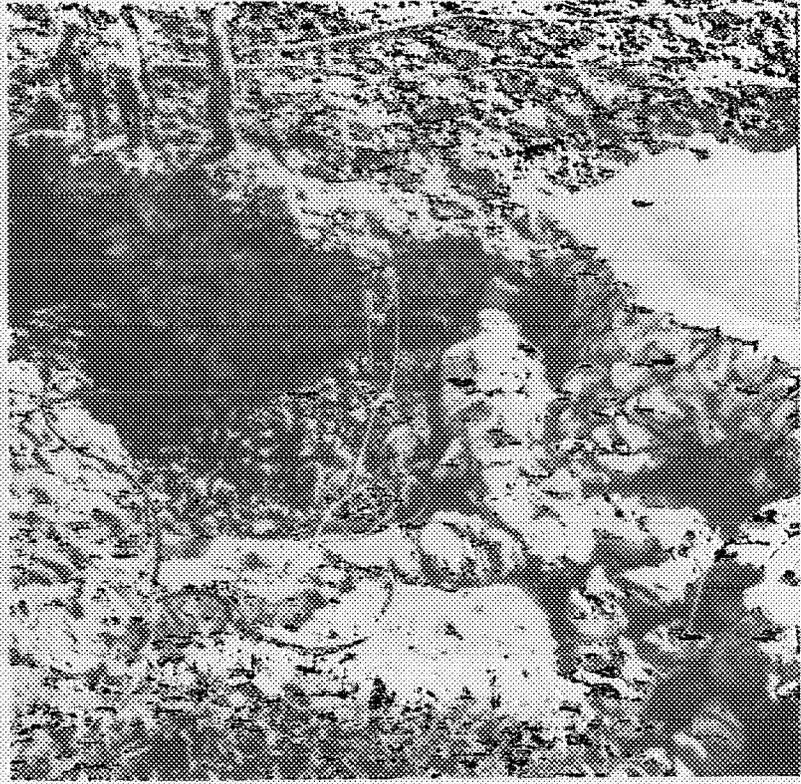


PHOTO 23: FOUNDATION PREPARATION
FOR WEIR NO. 7

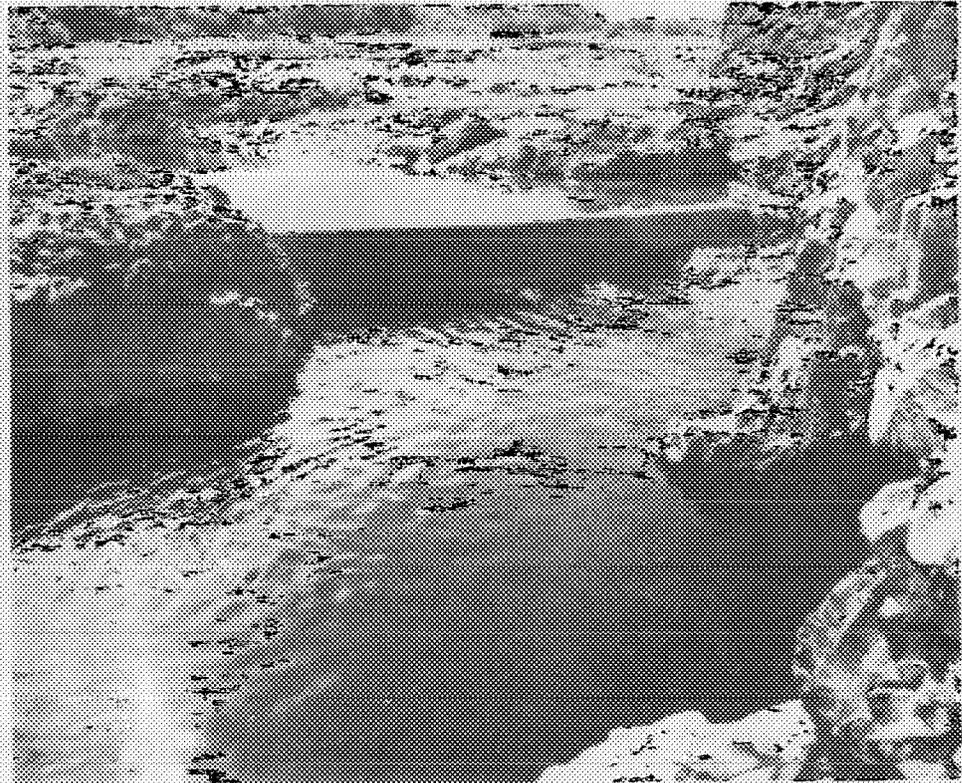


PHOTO 24: WEIR NO. 7 AS CONSTRUCTED



PHOTO 25: EXCAVATE 3'x5'x4' ROCK STA. 60+75

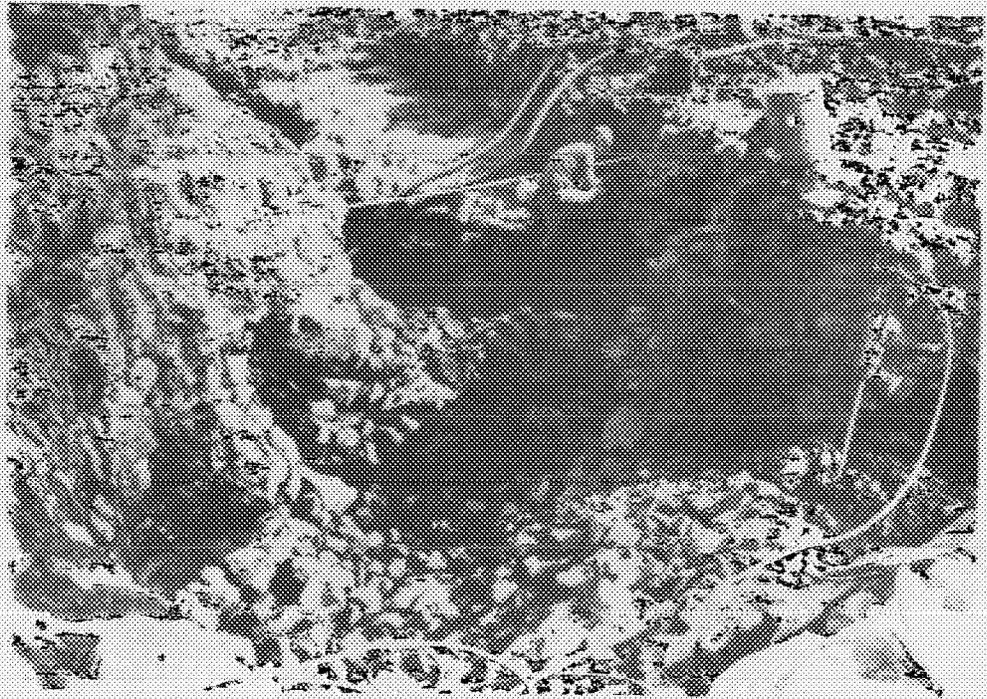


PHOTO 26: ROCK AT STA. 60+75 WAS REMOVED
TO PROVIDE FOUNDATION FOR WEIR NO. 7

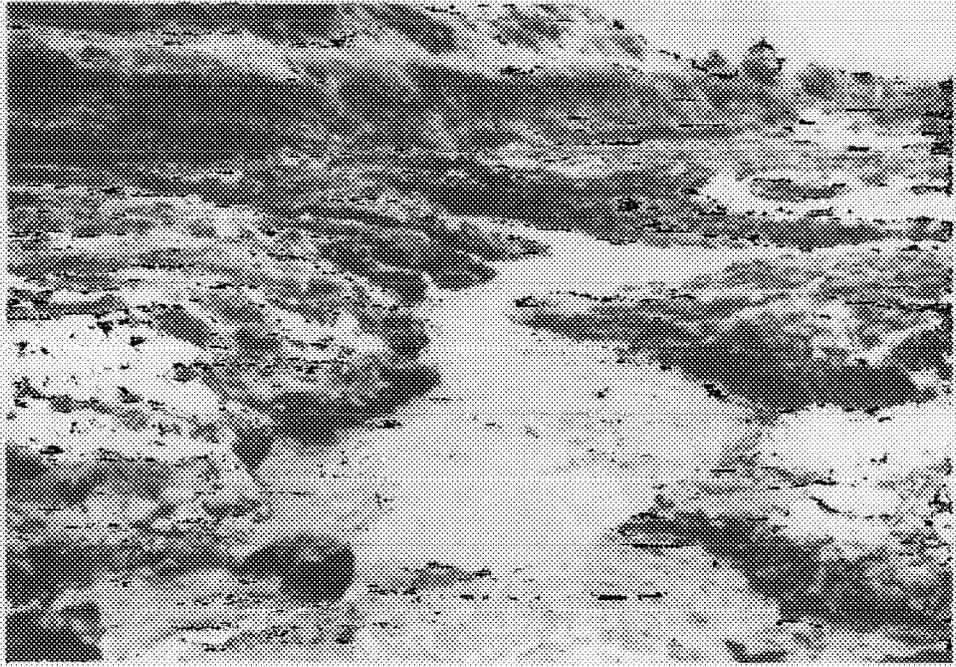


PHOTO 27: REMOVE 3 LOOSE BOULDERS
BETWEEN STA. 60+90 TO 60+80 PRIOR TO
CONSTRUCTION

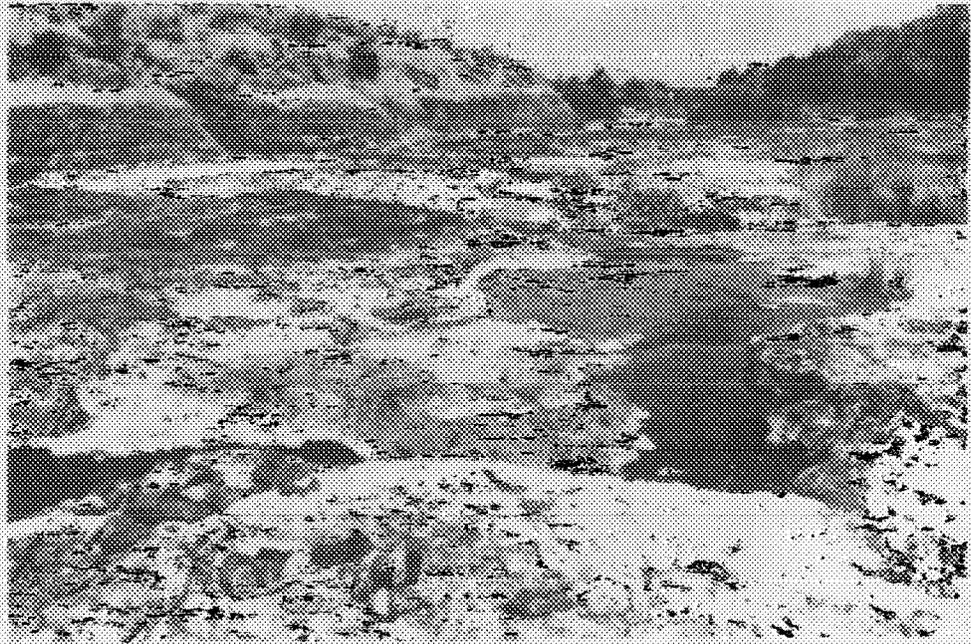


PHOTO 28: CHANNEL AFTER REMOVAL OF
LOOSE BOULDERS

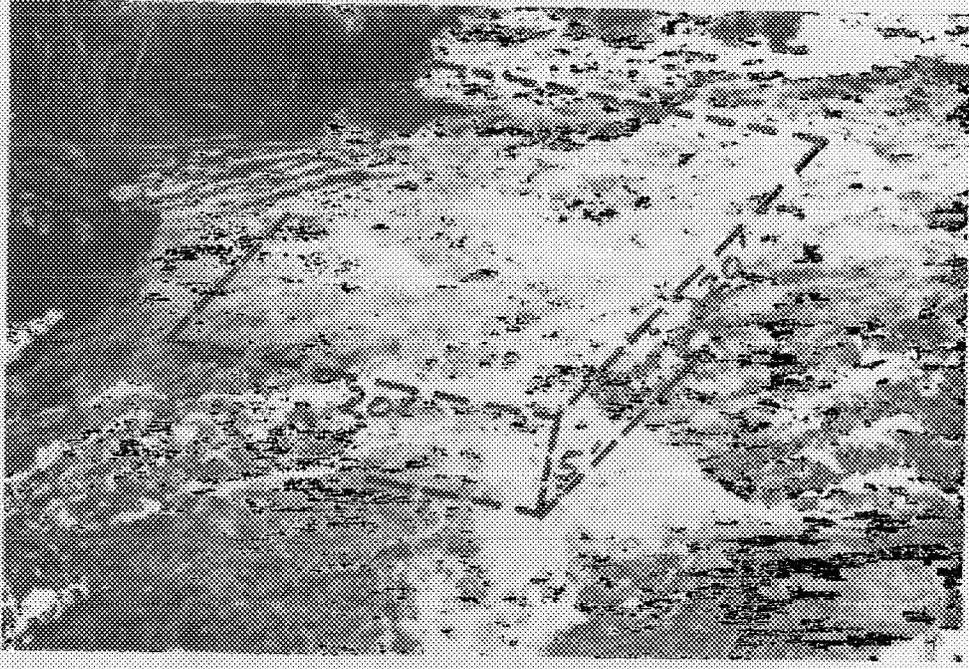


PHOTO 29: EXCAVATE 20'x20'x5' JUMP POOL
STA. 59+85 PRIOR TO CONSTRUCTION

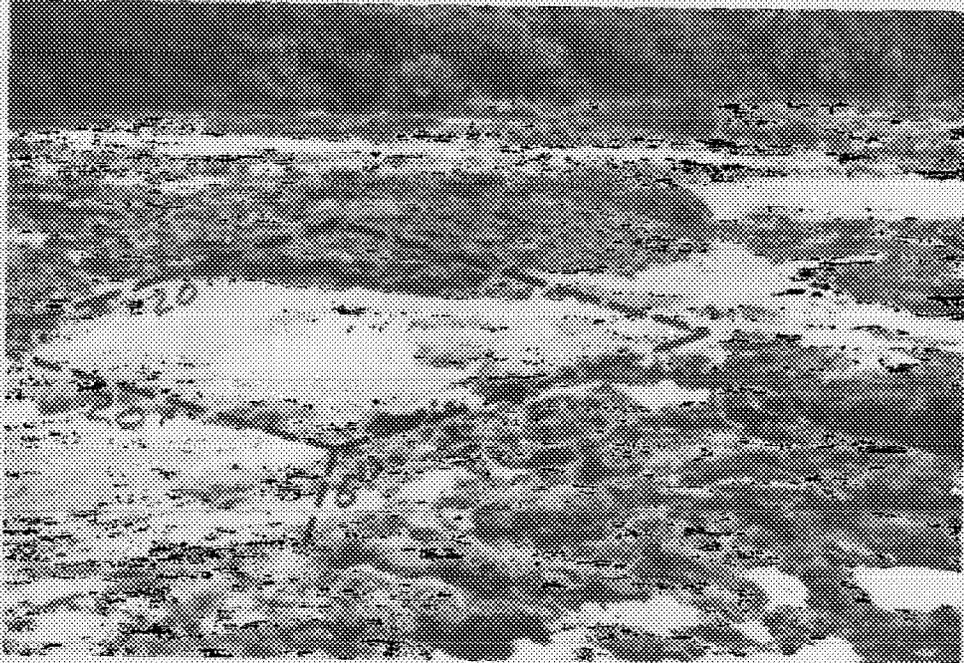


PHOTO 30: EXCAVATE 20'x20'x5' JUMP POOL
STA. 59+45 PRIOR TO CONSTRUCTION
NOTE: THE ABOVE JUMP POOLS WERE DELETED

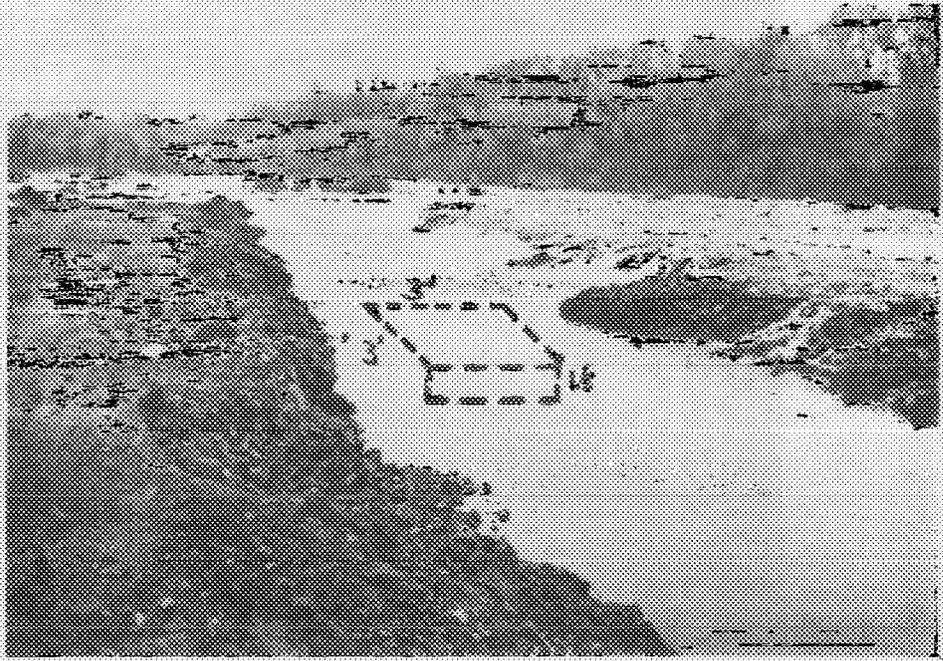


PHOTO 31: EXCAVATE 3'x3'x1.5' ROCK
STA. 51+50

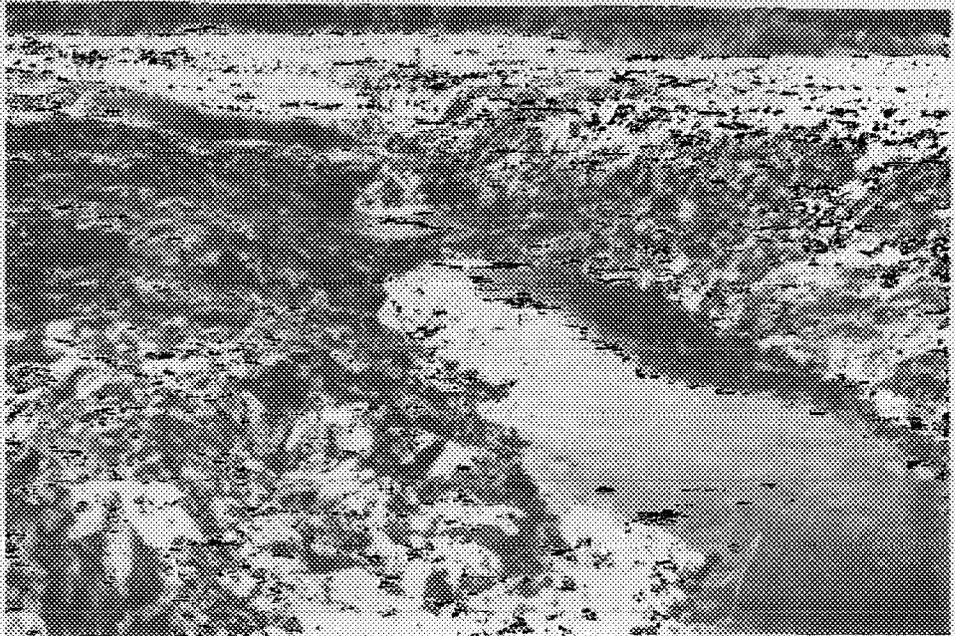


PHOTO 32: ROCK REMOVAL AT STA. 51+50
AS CONSTRUCTED

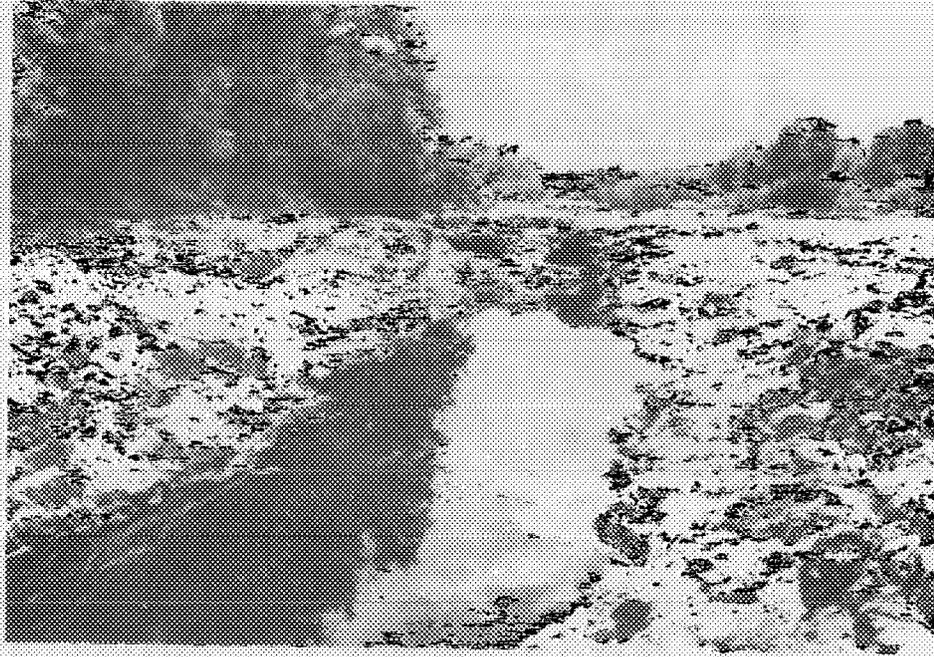


PHOTO 33: WEIR NO. 8 STA. 11+00 (CENTER OF PICTURE) PRIOR TO CONSTRUCTION



PHOTO 34: WEIR NO. 8 AS CONSTRUCTED

MISCELLANEOUS PHOTOS

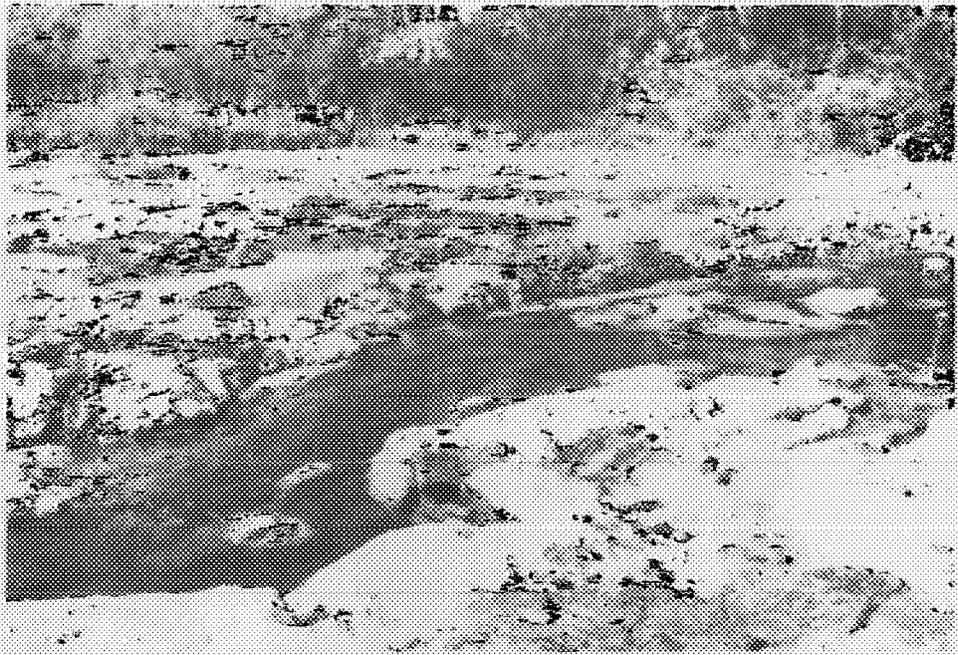


PHOTO 35: CONCRETE PLUGS PLACED AT
STA. 46+50 TO BLOCK SIDE CHANNELS

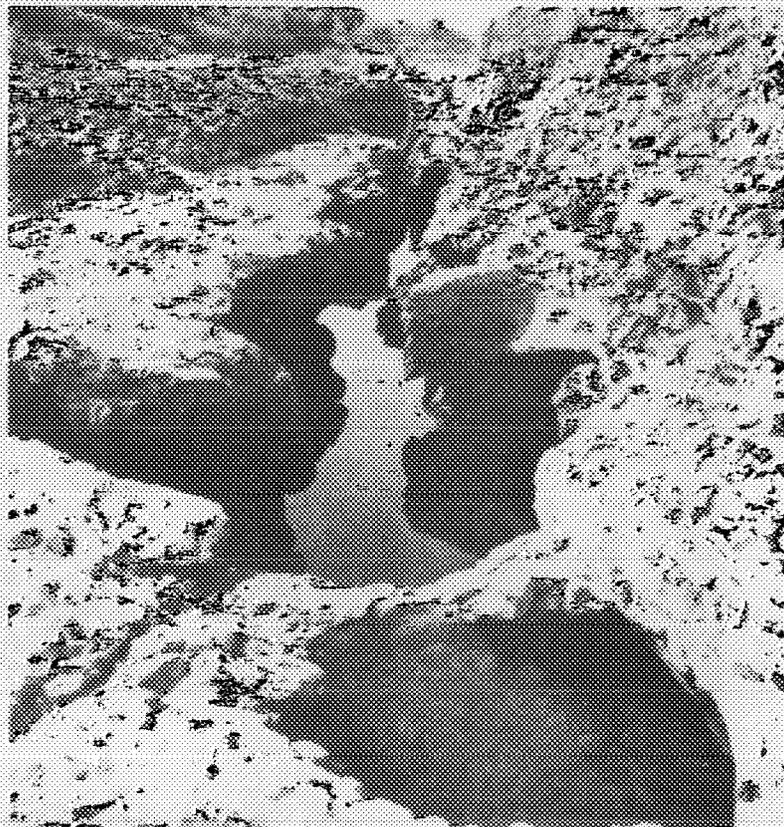


PHOTO 36: RIVER WORN CHANNEL
BELOW WEIRS 6 AND 7.

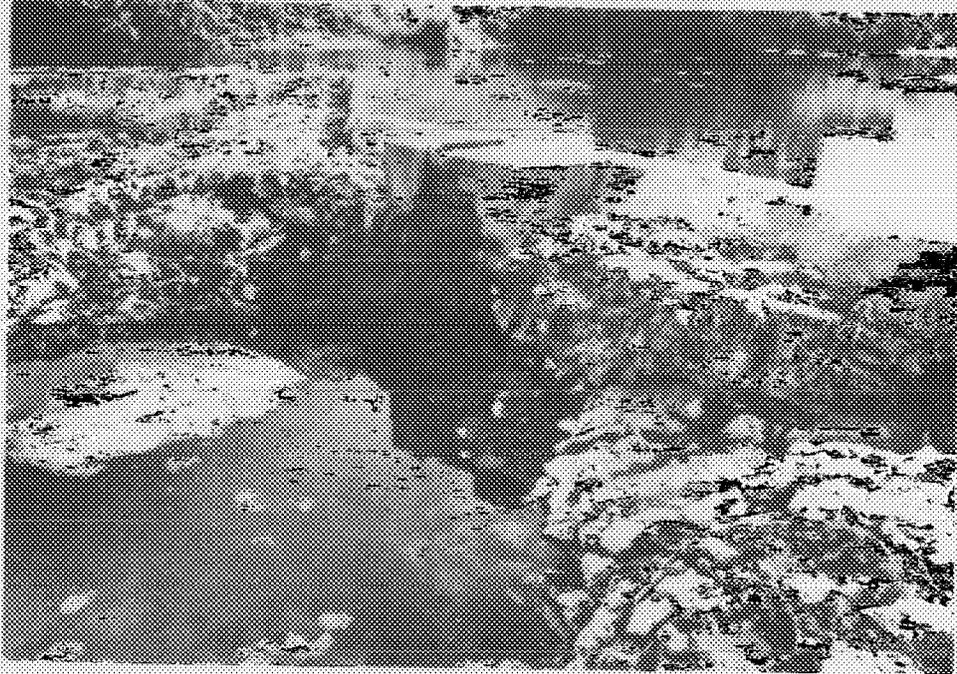


PHOTO 37: VIEW OF STOP LOG STRUCTURE AT
BROWNELL DAM



PHOTO 38: VIEW LOOKING UPSTREAM FROM
CHINAMAN'S HOLE AT WEIRS 1 AND 2

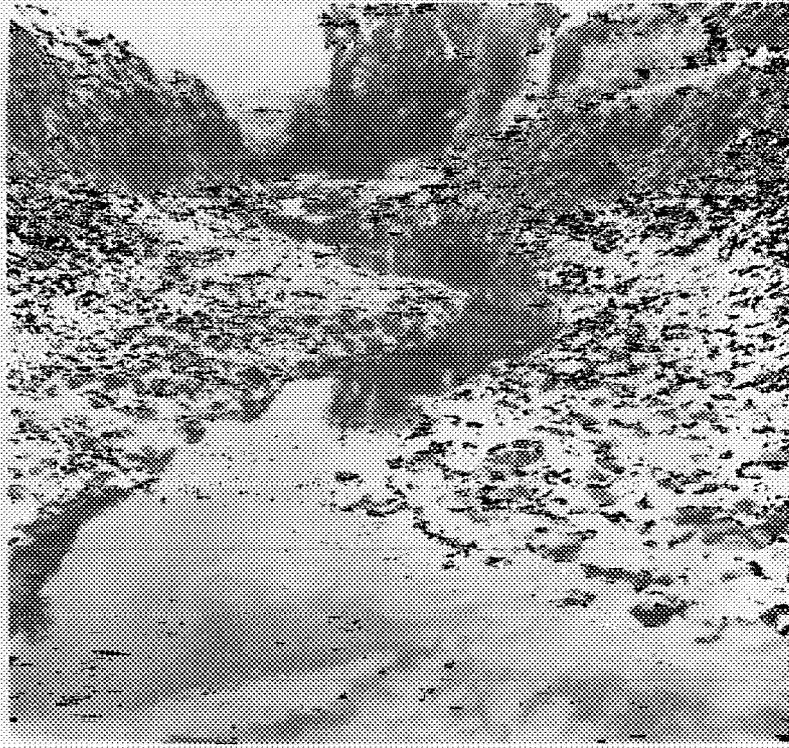


PHOTO 39: LOOKING UPSTREAM
TOWARD WEIR NO. 4.

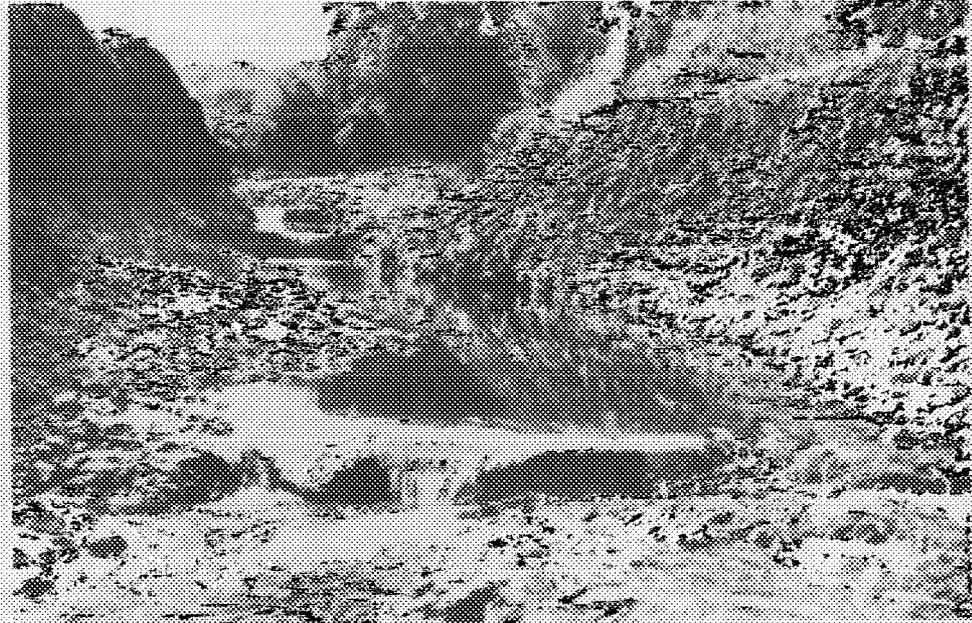


PHOTO 40: NOTE CONCRETE FILL IN FOREGROUND
PLACED TO RAISE JUMP POOL BELOW WEIR NO. 4

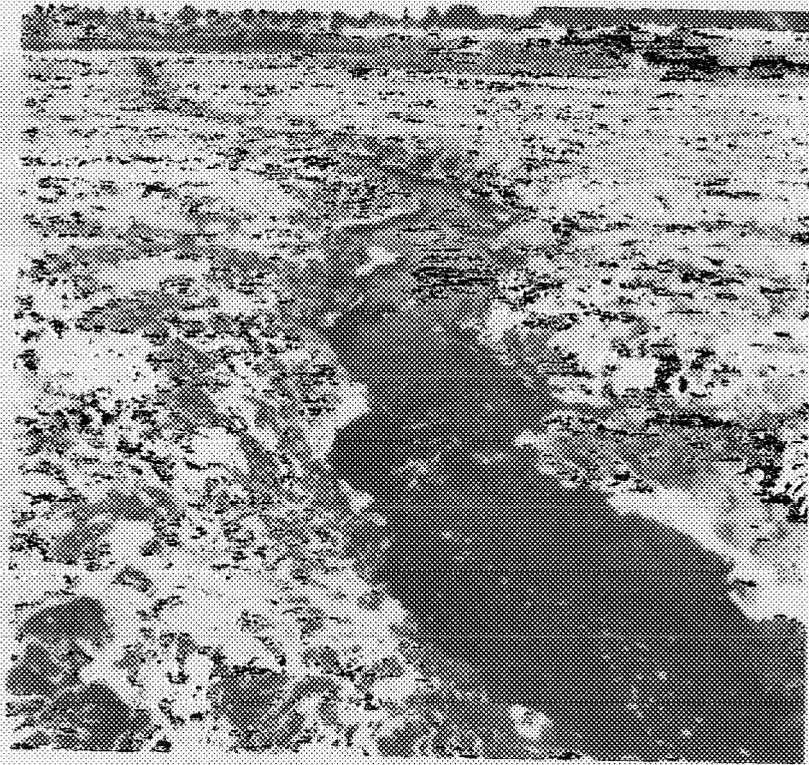


PHOTO 41: LOOKING DOWNSTREAM FROM
STA. 98+00. THIS SECTION OF CHANNEL
WAS DEEPEMED AND WIDENED WITH A HOE RAM.

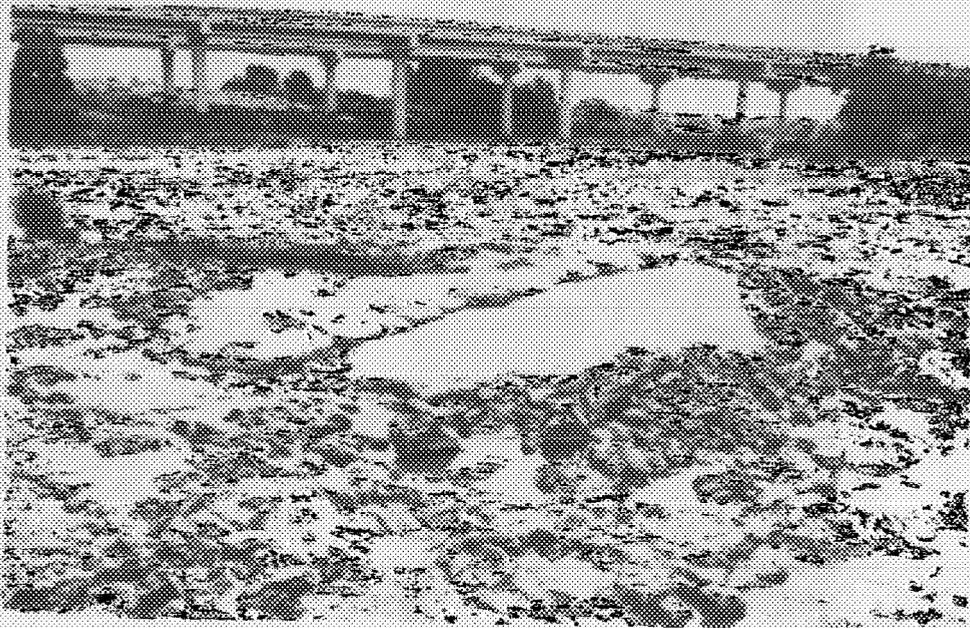


PHOTO 42: MISCELLANEOUS CONCRETE FILL
PLACED TO BLOCK SIDE CHANNEL

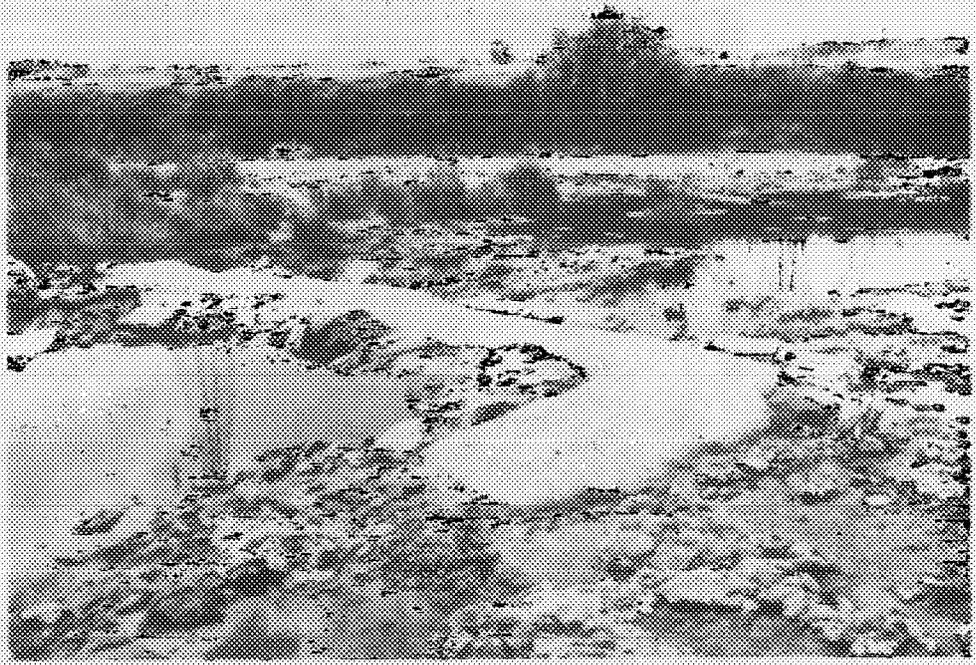


PHOTO 43: A SIDE CHANNEL NEAR STA. 98+25
BLOCKED OFF WITH CONCRETE

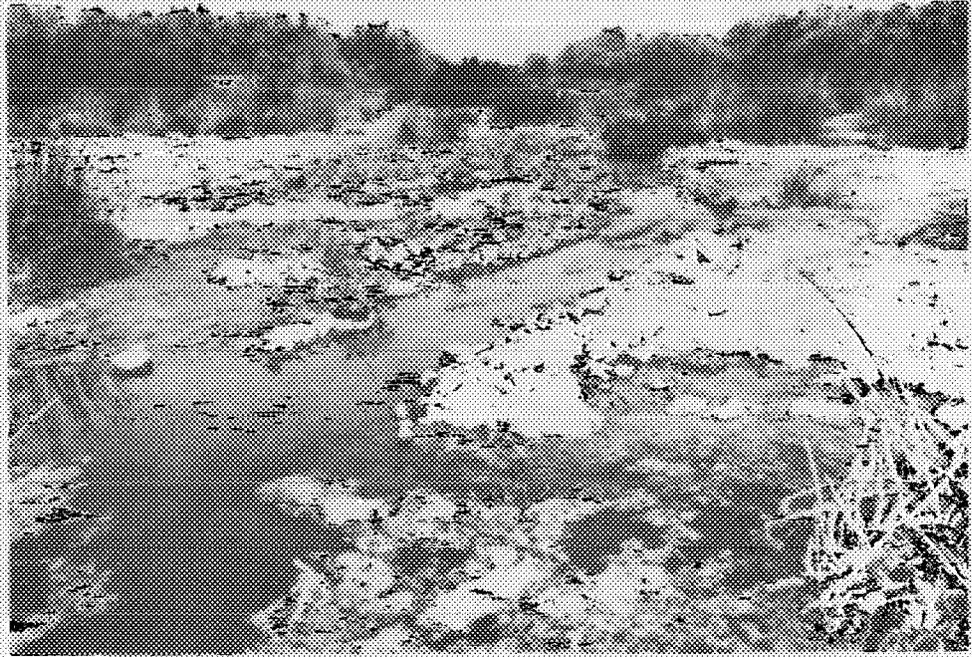


PHOTO 44: VIEW OF CHANNEL DOWNSTREAM
OF STA. 29+50 AS CONSTRUCTED WITH HOERAM.

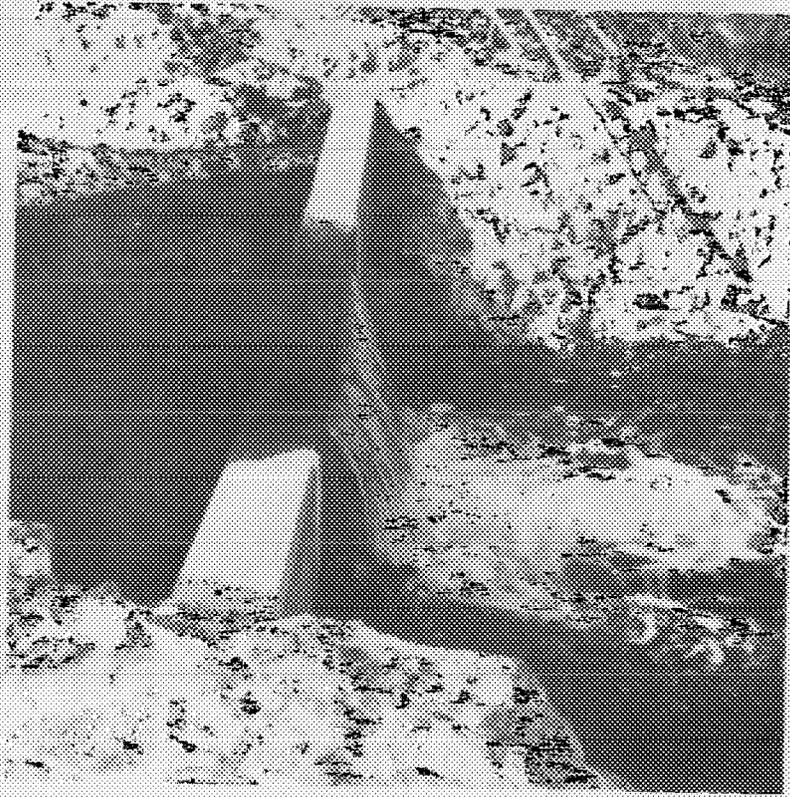


PHOTO 45: SIDE VIEW OF WEIR NO. 1

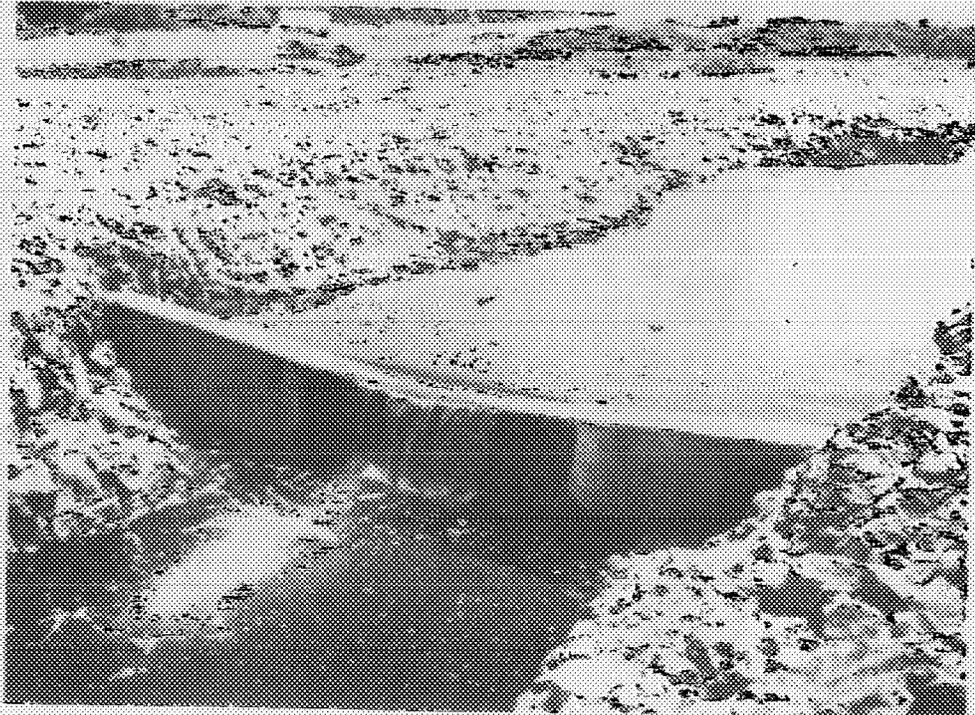


PHOTO 46: CLOSE VIEW OF WEIR NO. 2

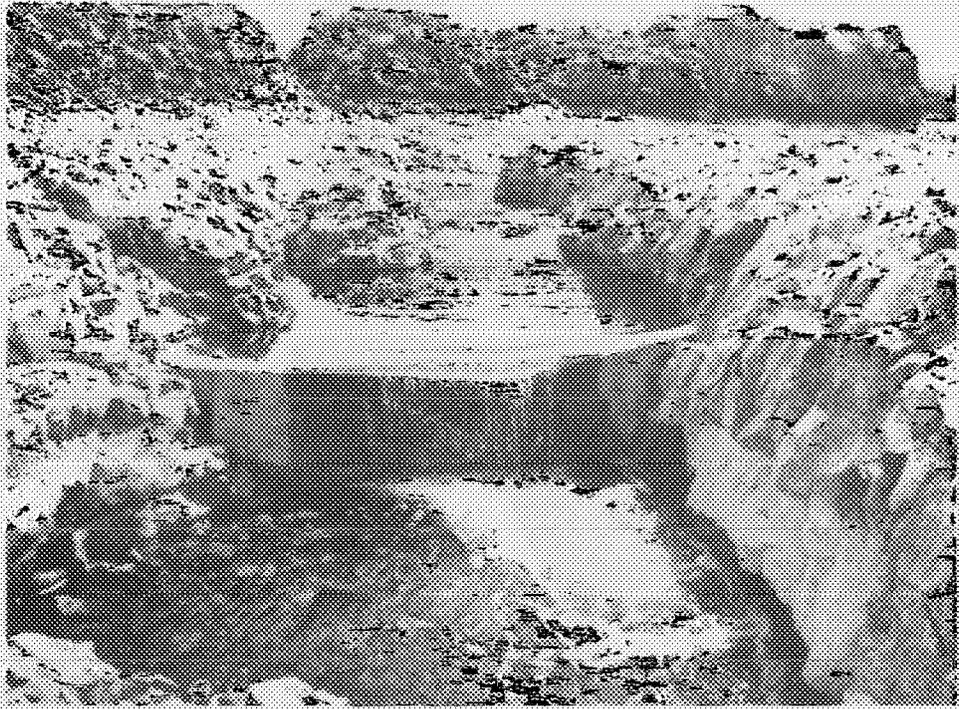


PHOTO 47: LOOKING UPSTREAM AT WEIR NO. 3

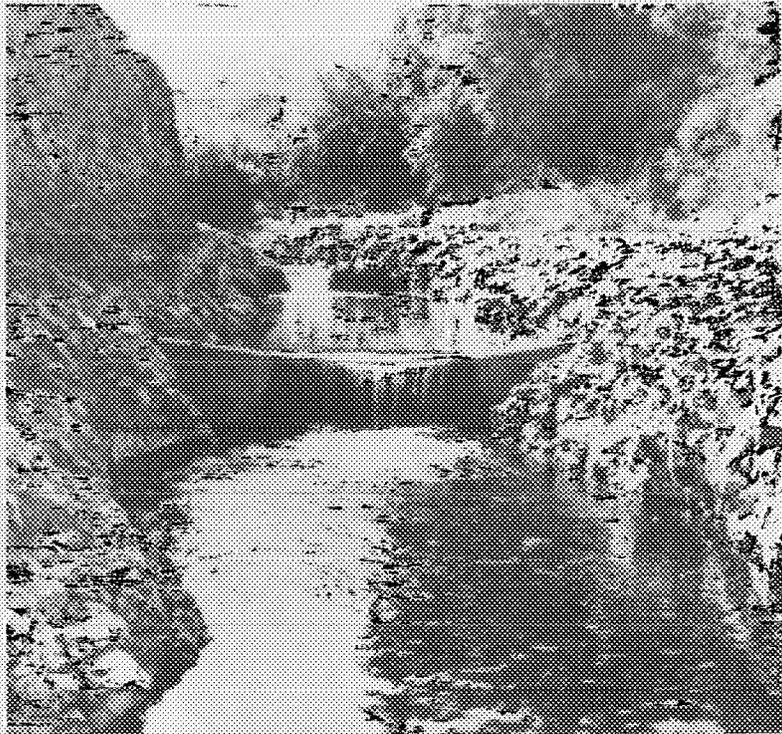


PHOTO 48: VIEW OF WEIR NO. 4 AND
BLASTED WEIR ABOVE IT

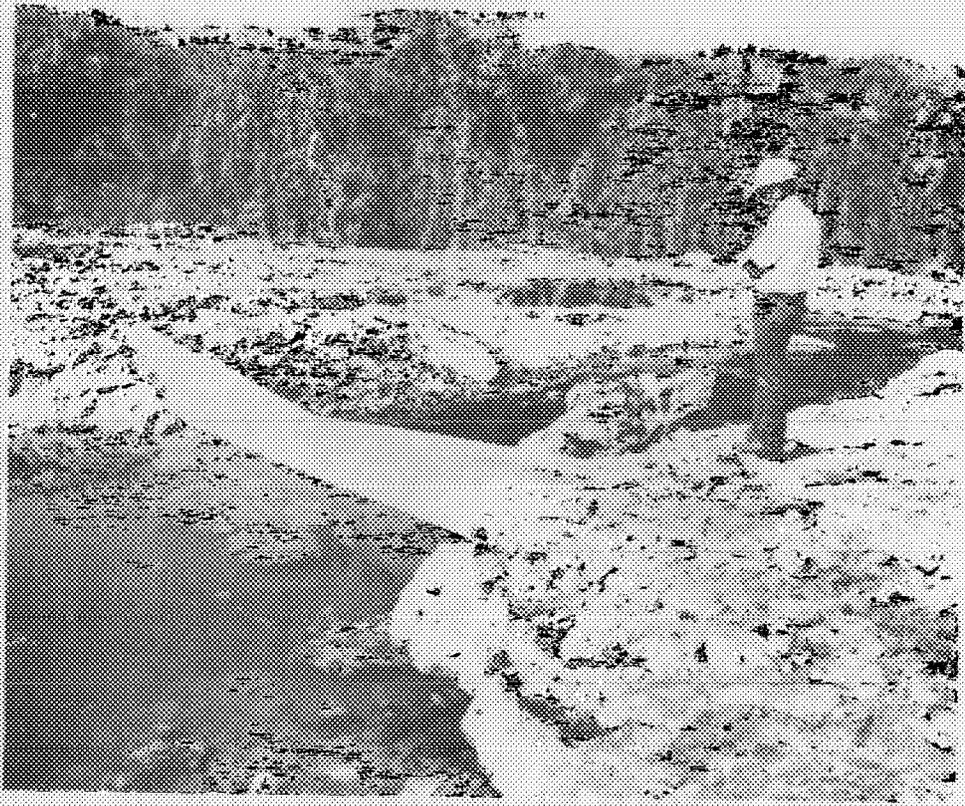


PHOTO 49: OBLIQUE VIEW OF WEIR NO. 5

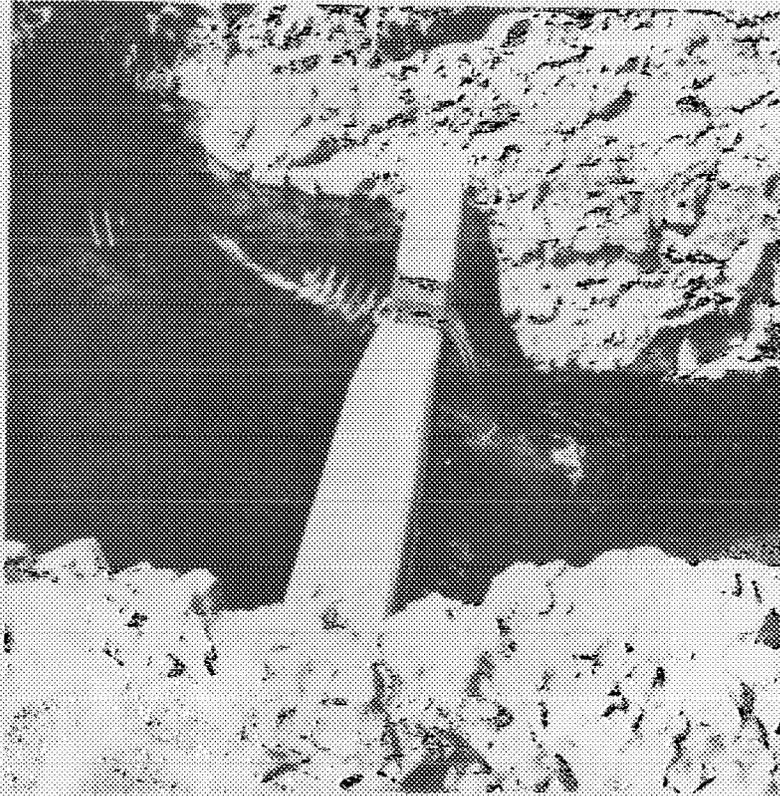


PHOTO 50: SIDE VIEW OF WEIR NO. 6



PHOTO 51: UPSTREAM VIEW OF WEIRS 6 AND 7

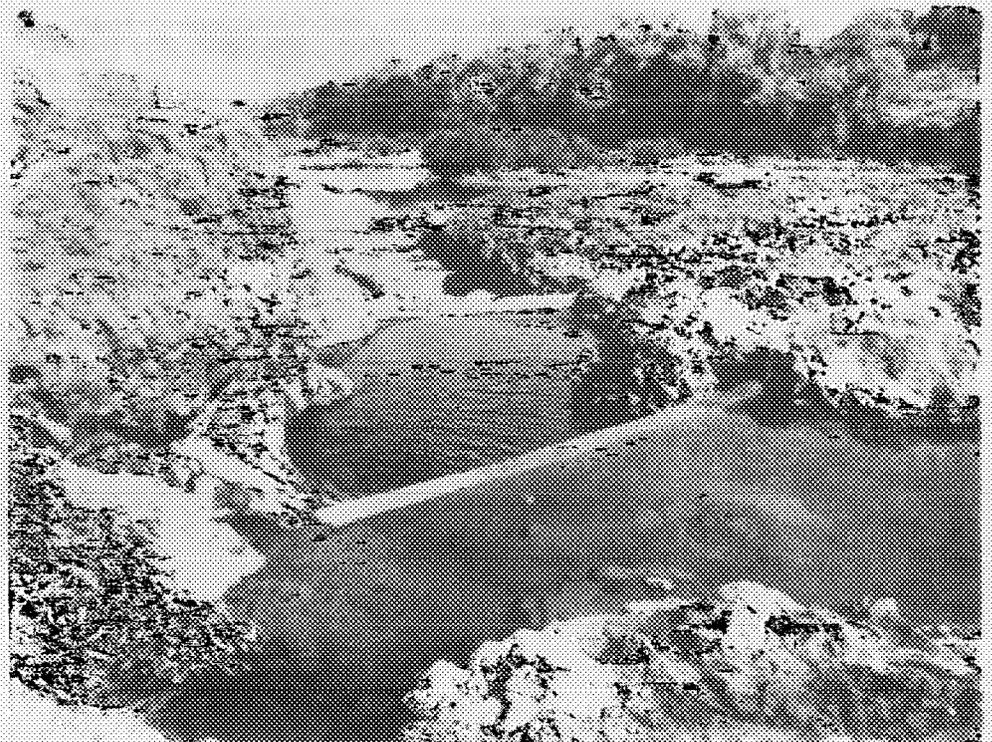


PHOTO 52: DOWNSTREAM VIEW OF WEIRS 7 AND 6

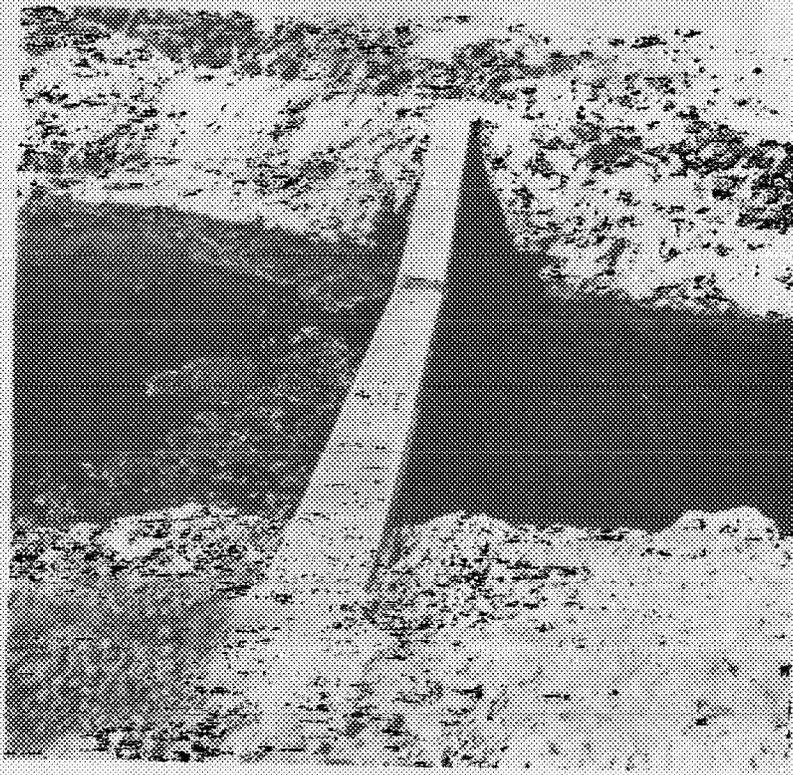


PHOTO 53: SIDE VIEW OF WEIR NO. 8

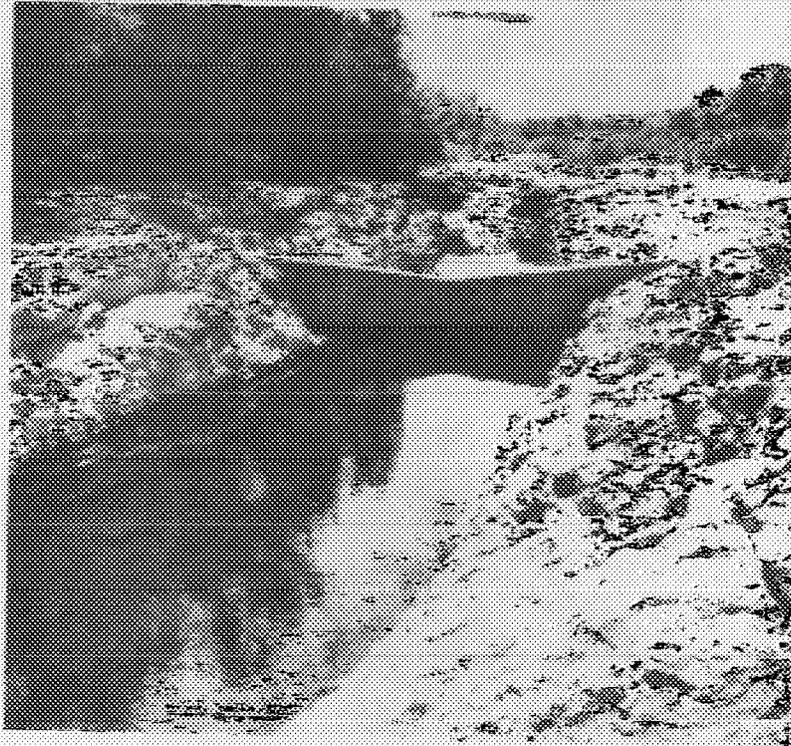


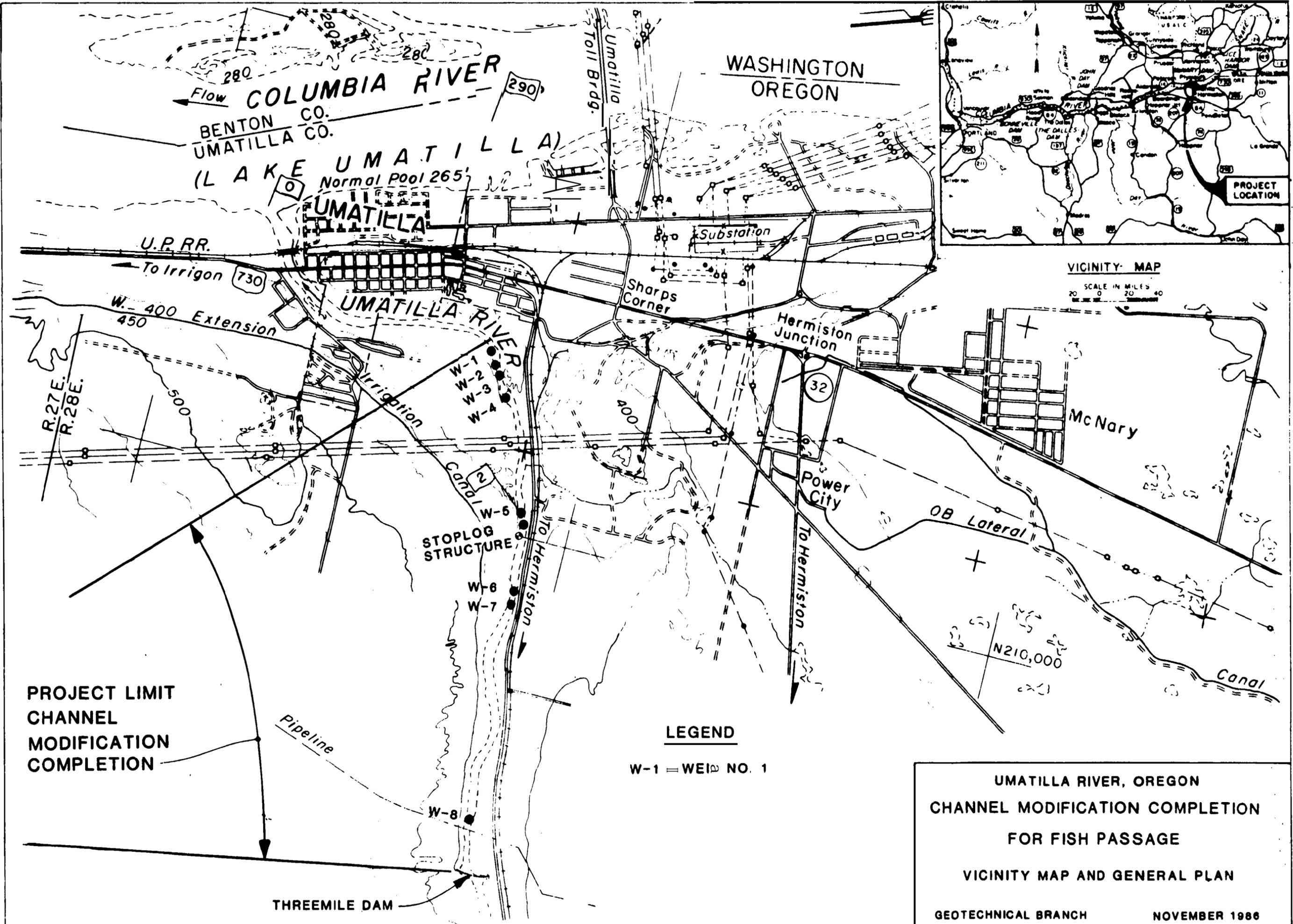
PHOTO 54: VIEW LOOKING UPSTREAM
AT WEIR NO. 8

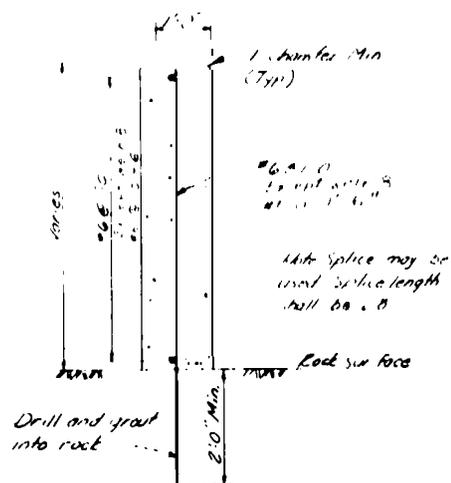


PHOTO 55: CHANNEL DEEPENED AND WIDENED
WITH HOERAM AT STA. 58+00

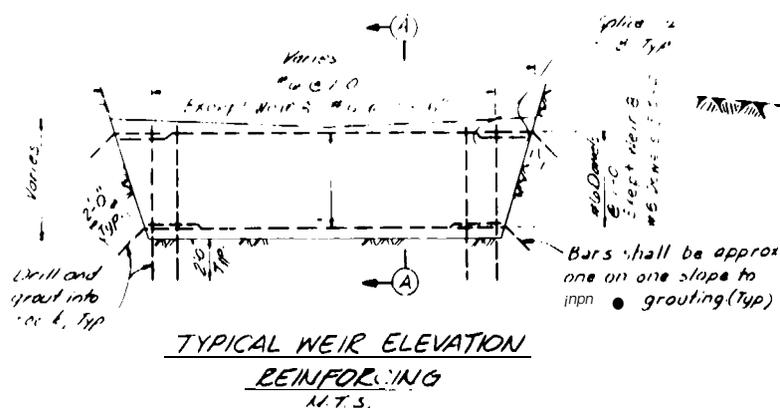


PHOTO 56: CHANNEL DEEPENED AND
WIDENED WITH HOERAM RIGHT OF STA. 46+00

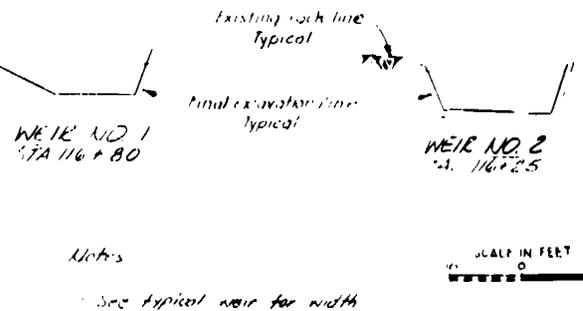




SECTION A
SCALE IN FEET



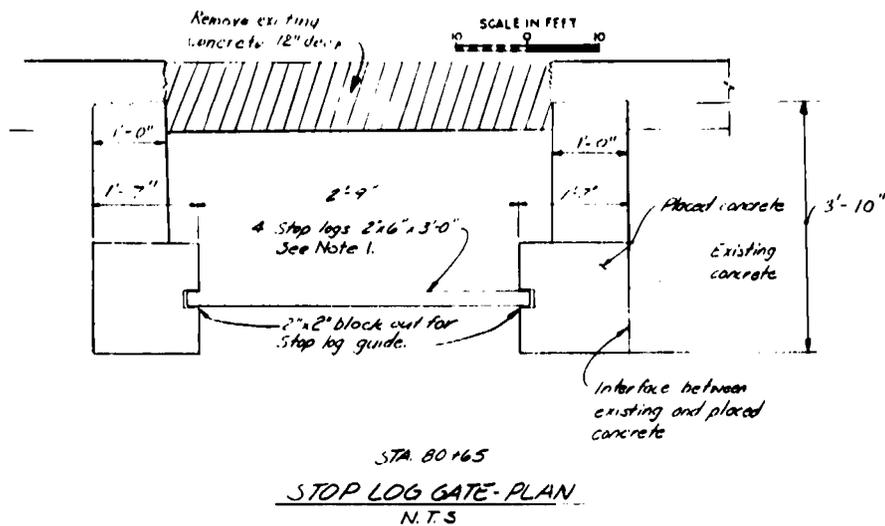
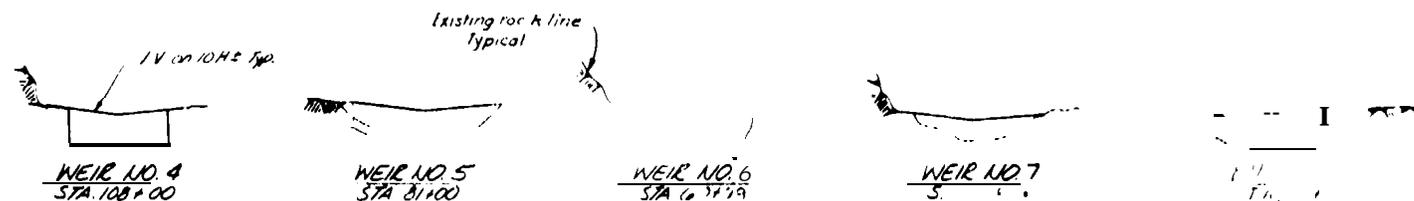
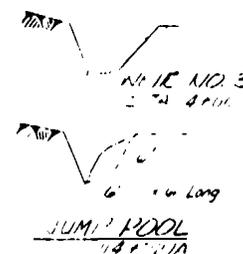
TYPICAL WEIR ELEVATION REINFORCING
N.T.S.



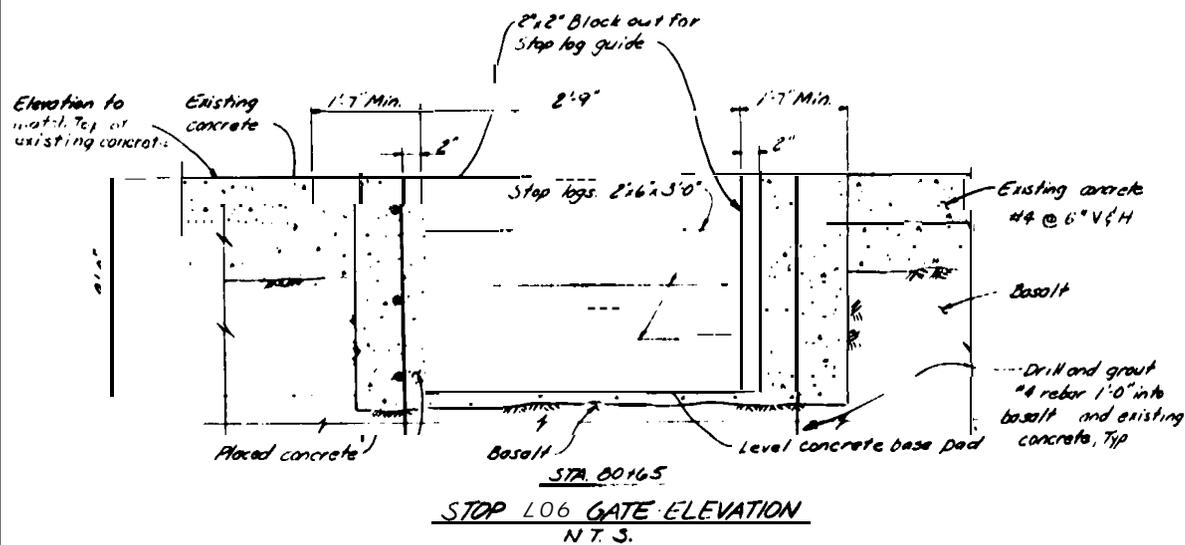
WEIR NO 1
STA 116+80

WEIR NO 2
STA 116+25

Notes: See typical weir for width



STOP LOG GATE - PLAN
N.T.S.



STOP LOG GATE ELEVATION
N.T.S.

A		AS CONSTRUCTED.	
U. S. ARMY ENGINEER DISTRICT WALLA WALLA, WASHINGTON			
UMATILLA RIVER, OREGON CHANNEL MODIFICATION COM. FOR FISH PASSAGE			
DETAILS			
SCALE AS SHOWN		INV. NO 86-B-36	
11		UR-1-12/11	

APPENDIX A

CASE 1

CONTRACT MODIFICATION PROPOSAL AND ACCEPTANCE

(Modification of less than \$50,000)
For use of this form, sec CR 1180-1-1

1. ISSUING OFFICE Walla Walla District, Corps of Engineers	2. CONTRACT NO. DACW68-86-C-0046	3. MODIFICATION NO. P00001 (Case N
--	--	---

4. TO (Contractor) COYOTE CORPORATION CONTRACTORS AND ENGINEERS P. O. Box 7250 Spokane, WA 99907-0250	5. PROJECT LOCATION AND DESCRIPTION Channel Modification Completion for Fish Passage, Umatilla River, Umatilla County, Oregon
---	--

~~6. A proposal is requested for making the hereinafter described change in accordance with specification and drawing revisions cited herein or listed in attachment hereto. Submit your proposal in space indicated on page 2, attach detailed breakdown of prime and subcontract costs. (See the clause of this contract entitled, "Modification Proposals - Price Breakdown") DO NOT start work under this proposed change until you receive a copy signed by the Contracting Officer or a directive to proceed.~~

~~_____ Date _____ Signature _____~~

7. DESCRIPTION OF CHANGE: Pursuant to the clause of this contract entitled, "Changes", the contractor shall furnish all plant, labor and and perform all work necessary to accomplish the following described work:

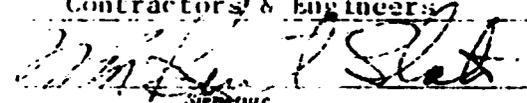
- a. Delete the requirement for construction of jump pools at Stations **59+45**, 59+85 and 114+34.
- b. Provide channel improvement between approximate Stations 29+50 and 47+50 and between approximate Stations 98+00 and 100+00. Channel improvements include removal of reaches of solid rock, widening and/or deepening of existing channel, and removal of high spots and protrusions in the existing channel to provide a final minimum channel width of 3-feet wide by 1-foot deep. Channel excavation may be required at some locations to divert water into the rain channel from small pools and other channels. The primary objective is to develop a channel between the above stated stations and excavation shall not be performed to divert water from sidechannels or pools until the Contractor has assured himself that the entire length of rain channel will be excavated and the total excavation will not exceed the estimated 1,075 linear feet.

The changed or additional work stated herein shall be performed in accordance with the applicable portions of the contract specifications and as directed in the field by the Authorized Representative of the Contracting Officer.

It is agreed that as a result of the changed or additional work required herein, adjustment in the contract amount will be made as follows:

(Continued on page 1a)

Except as hereby Modified, all terms and conditions of said contract as heretofore Modified remain unchanged and in full force and effect.

The foregoing modification is hereby accepted: CONTRACTOR Coyote Corporation Contractors & Engineers BY  July 22 1966 Wm. Kent Staley, Secretary Date Typed Name and Title	UNITED STATES OF AMERICA  Signature GARY F. WILLARD Resident Contracting Officer Date Typed Name and Title
--	---

Modification No. P00001, (Case No. 1)
 Contract No. DACW68-86-C-0046

BLOCK NO. 7 (Cont'd):

		INCREASE AND DECREASE (Existing and New Items)			
Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
					Increase Decrease
2.	Rock Excavation for Jump Pools				
	a. First 100 Cubic Yds	100	C.Y.	125.00	12,500.00
	b. Over 100 Cubic Yds	120	C.Y.	75.00	9,000.00
8.	Rock Excavation for Channel (Case No. 1)	1,075	L.F.	20.00	21,500.00
*New Item	TOTAL INCREASE AND DECREASE				\$21,500.00 \$21,500.00
TOTAL NET					\$ 0

Accordingly, Schedule No. DACW68-86-C-0046 is hereby revised as follows:

Item No.	Description	Estimated Quantity	Unit	Unit Price	Estimated Amount
2.	Deleted				
8.	Rock Excavation for (Case N 1)	1,075	L.F.	\$20.00	\$21,500.00

MEASUREMENT AND PAYMENT: Rock excavation for jump pools is totally deleted and credit is hereby taken for the estimated quantity at the stated contract price under payment Item No. 2 as full compensation for that deleted work. Rock excavation for channel will be measured for payment as the linear feet of channel constructed and computed on the basis that three cubic feet of material removed is equivalent to one linear foot of channel construction. Payment therefor will be made at the above stated unit price for Item No. 8. Said price and payment shall constitute full compensation for all labor, equipment and materials and for any other costs incurred in satisfactorily excavating the main channel, and portions of side channels as

(Continued on page 1b)

Modification No. P00001, (Case No. 1)
Contract No. DACW88-86C-0046

BLOCK NO. 7 (Cont'd):

applicable, as described herein. It is understood and agreed that the Contractor shall not exceed the estimated quantity established herein and that any quantity excavated in excess of the estimated quantity will be at the Contractor's expense unless otherwise directed in writing by the Authorized Representative of the Contracting Officer. payment Item No. 8 established herein shall not be subject to variation in quantity as set forth in Contract Clause 6, VARIATION IN ESTIMATED QUANTITY.

It is understood and agreed that pursuant to the above, the contract amount and time for performance remains unchanged.

The contractor hereby accepts the foregoing adjustment as a final and complete equitable adjustment in full accord and satisfaction of all past present and future liability originating under any clause in the contract by reason of the facts and circumstances giving rise to this modification.

CONTRACT MODIFICATION PROPOSAL AND ACCEPTANCE (Page)

ISSUING OFFICE	V Contract NO.	10 MODIFICATION NO.
Walla Walla District, Corps of Engineers	DACW68-86-0046	P00001 (Case No. 1)

I. CONTRACTOR'S PROPOSAL---CHANGE IN CONTRACT PRICE

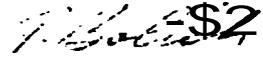
(Detailed breakdown, attach additional sheets as necessary)

NOTE: SIGN AND RETURN ORIGINAL AND COPIES; RETAIN ONE COPY FOR YOUR FILE

NET INCREASE	NET DECREASE	CALANDER DAYS INCREASE
\$ 0	1 \$	0 DAYS

(Proposal)

See Contractor's Sere Letter No. 15, dated 22 July 1986



FLOYD F. BOLICH

TYPED NAME AND

SIGNATURE

APPENDIX B

LETTER FROM OREGON DEPARTMENT OF FISH AND WILDLIFE



Department of Fish and Wildlife

506 SW MILL STREET, P.O. BOX 59, PORTLAND, OREGON 97207

October 27, 1986

**Tilden McDowell
U. S. Army Corps of Engineers
Building 602 City-County Airport
Walla Walla, WA 99362**

Dear Mr. McDowell:

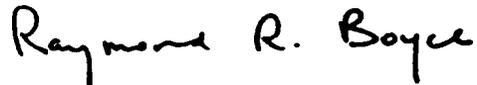
Dave Carey of our Department has completed inspections of lower Umatilla River Channel Modifications below Three Mile Falls Dam as specified under Contract Number DACW68-86-M 3154. All modifications including weirs, jump pools, concrete placements, and channel excavations were done satisfactorily according to contract specifications. There is still, however, a passage problem below weir 6 (Station 61 + 30) which will require additional channel work. On October 13, when Dave Carey made final inspections, river flow was 150 cfs and the weir was creating a 5-ft drop which appeared impassable for adult salmon and steelhead. On October 15, Ray Hartlerode, ODFW Research Biologist studying adult fish passage in the Umatilla as part of the Boyd Evaluation Project, observed several adult salmon and steelhead jumping at the weir unable to pass. Approximately 130 salmon and steelhead have successfully migrated past the weir according to our trap records at Three Mile Falls Dam. We feel that these fish passed the weir at flow higher or lower than 150 cfs. At higher flows (>150 cfs), passage of adults would be possible at a side channel by the weir. At lower flows (<150 cfs) passage would be possible due to reduced velocities at the weir.

While it is uncertain if the weir is a barrier to adults, it is clear that the weir causes delay in the upstream migration of adults which is undesirable. This is especially true for fall chinook due to the short time between migration and spawning (sometimes only one month). In order to provide adequate upstream conditions for adults under all flow conditions it is recommended that 3 or 4 large boulders (3 tons/each) are placed in the pool below the weir or another weir is constructed. This will decrease the drop, reduce velocities, and increase pool depth. This work should be completed next summer prior to the start of the fall chinook migration period (September).

Tilden McDowell
October 27, 1986
Page 2

Two other weirs (Stations 51 + 50 and 13 + 00) may present passage problems, although no delays of fish have been observed. No additional work at these weirs is recommended at this time.

Sincerely,



Raymond R. Boyce
Staff Fish Biologist

rrp
C Korn Nigro
 Willis Williams
 Neubauer Hartlerode
 Carey

D2-22