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**REHABILITATION OF ECONOMIC FACILITIES AND SERVICES
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The Louis Berger Group Inc.

**SARDEH IRRIGATION SYSTEM/
DAM CONDITION ASSESSMENT
REPORT**

Location: Andar District Ghazni Province

Date of assessment: May 05-06, 2003

Submitted to: Garrett Hitchcock

Prepared by: Eng. Sayed Abrar

Date: May 14, 2003

Sardeh Irrigation System Condition Assessment

On May 04, 2003, I traveled to Ghazni province along with engineer Habiburahman and arrived in Ghazni at 11:10AM. We met Mr. Gholam Mohammad Zia Rawan, the director of irrigation of Ghazni province. After explaining the purpose of our trip to him, he said that they are responsible for Zana Khan and Sultan Dams and other irrigation projects, but not for the Sardeh Irrigation System. This system has its own individual office, director and management team in Andar District. On May 5, 2003 we met Acting Governor Khial Mohammad and Deputy Governor Mr. Allayar to explain the purpose of our trip to them too. The Deputy Governor sent one of his security guards with us. The same day we met Mr. Mohammad Nawab, Director of the Sardeh Irrigation System. After meeting two officials from the project, he joined us to the job site, and visited the dam and its related structures. On Tuesday May 06, 2003, we and the director of the Sardeh Irrigation System visited the main canal and its two sub canals, branches, roads, and buildings. This concludes a brief explanation of our field review.

Background and existing condition:

The Sardeh Irrigation System located is in Andar District, 44 km southeast of the Ghazni City. It is located at the GPS coordinates of lat N 33 17' 33.35" long E 68 38' 03.19" with elevation of 1925 msl.

The feasibility studies and preliminary survey of the system started in 1960. In 1963 the implementation works started and were completed in 1967 year by the Soviet Union and became operational. The system consists of an earth dam, intake, spillway, and the main canal, which is divided in two branches, the right bank (21.5Km) and the left bank(30Km). It has a total length 51.5 km with 200km branch canals, 147 km of collector network, 95 km drainage network, 288 irrigation structures on the canals, and roads, as well as an administration, maintenance, and operation compound.

This system provides irrigation water for 15,200 hectares of agricultural land which belong to the government (11,000 hectares) and residents of Andar Districts (4,280 hectares).

Problem areas requiring immediate attention are as follows:

Dam

The Sardeh Irrigation System Dam on Jilga River is an earth dam with rock facing on the upstream side, 460 meters long, 8 meters wide at the crest, 200 meters at the bottom, and 30.2 meters high. It has a 32 km long reservoir with maximum storage capacity 259 million cubic meters and normal storage capacity 165 million cubic meters. The dam has

one tower intake with four gate valves cum regulators, one tower spillway with sluice gate, and an emergency over flow. The maximum water level is 1929 msl and the normal water level is 1927 msl. The source of water for this dam is Jilga River.

The reservoir is surrounded by mountains and hills. We were told that silt and sediment occasionally fills the reservoir during flooding and peak run-off and decreases its storage capacity. The water level during the inspection time was about 6 meters below from the crest of the dam. The dam and its related structures need minor repairs.

Spillway

They manage flood water by two types of spillways controls: a trough gate well and an uncontrolled emergency trough spillway crest. They are functioning. The discharge capacity of the spillway is 50 cubic meters per second. The spillway tower has an access bridge. The spillway tower and its bridge need repairing.

Intake

There are four installed intake valves with a total 15.2 cubic meter discharge capacity (two of them are reserve valves). The valves are functioning but need repair as do the intake tower and its bridge.

Main Canal

The main canal is 900 meters long has a trapezoidal cross section and is lined with stone masonry. The discharge capacity of the canal is 15.2 cubic meters per second. The main canal is located on the left bank. After 900 meters, it divides into two other main canals to the right and left. The canal's stone masonry lining is partially damaged and needs to be repaired. The left bank needs to be extended in height in order to prevent loose materials from falling in to the canal.

Left Canal

The 30 Km long canal is unlined with trapezoidal a cross section measuring 3 meters at the bottom, 15 meters at the top width, and approximately 3 to 5 meters deep. Its discharge capacity of 8 cubic meters per second irrigates 8,400 hectares of agricultural lands via 17 sub canals. The sedimentation has accumulated along the canal and varies from 30 cm to 100 cm deep and needs to be removed. The left embankments were partially destroyed by flood and needs to be repaired because the flood flows in the canal. There are some necessary structures like bridges, intakes, regulators, drains, etc. on the canal which need repairs and regular maintenance. The earth canal slopes are partially destroyed and need protection and compaction.

Right Canal

The right 21.5 km long canal is unlined with trapezoidal cross section measuring 3 meters at the bottom, 15 meters at the top width, and is approximately 3 to 5 meters deep. Its discharge capacity of 7.2 cubic meters per second irrigates 6,800 hectares agricultural lands through 12 sub canals. The condition of this canal is like the left canal and also needs repairs. At the beginning, less than one km of the canal is lined with stone and cement mortar. It is partially destroyed and need repairs. There are some necessary structures on the canal which are needed to be repaired or replaced as well as regular maintenance. The canal crosses the river via a siphon. We were told tat the siphon needs to be repaired and cleaned.

Roads

The roads along the bank of the canals and other related roads are partially damaged need repairs and graveling.

Maintenance and operation compounds

The system central office is located in Chardiwal village of Andar District. It has administration and workshops offices, a guest house, 16 living blocks containing 38 apartments, two spare parts stores, a swimming pool, water reservoir, fuel and oil stocks, and the canalization system. These buildings have to be repaired.

Machineries, equipments and spare parts

The projects have numerous type of machinery (we were told that 27 machines are functioning) but they need repairs, fuel, and oil. One or two generators are needed for repairing the equipment, gates, power supply, and other project needs. Machinery, equipment, and spare parts are scattered about and should be collected and stored properly for future use.

Communication system

There is no communication system at the project. It is very essential for such a big and important irrigation system to have one for emergencies.

Gates

There are many different sized damaged regulators and gates which were not repaired or maintained.

Project Staff

We were told that there are 326 officials and workers employed on the project in different departments like administration, accounting, planning, agriculture, personnel, rehabilitation, commodities, services, workshops, machinery, mapping, maintenance operation, communication, security, and relations with local communities

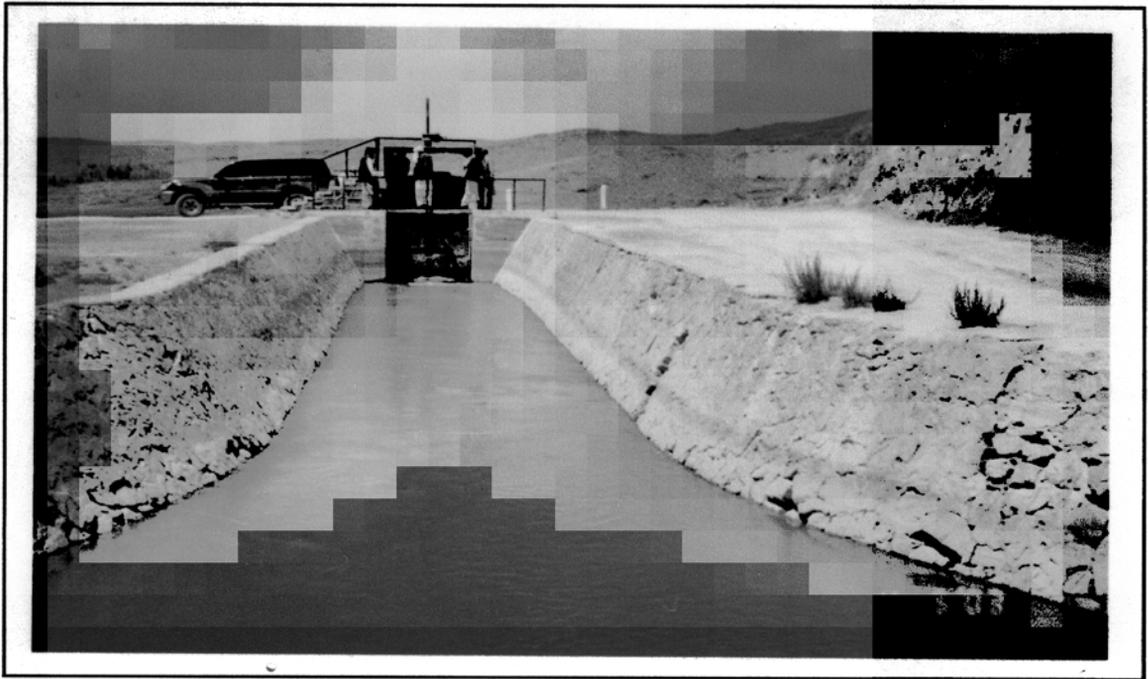
Recommendations:

- All the above mentioned repair works are very important they have to be done.
- The project system must be completely operable again because it will be one of the main income sources for both the government and residents.
- The Ministry of Agriculture is role very important. It should manage the agricultural production with collaboration of Irrigation Ministry staff there.
- The purpose of the project is to increase the agricultural production in the country but the small Agriculture Department in the system will need additional staff after the system is repaired.

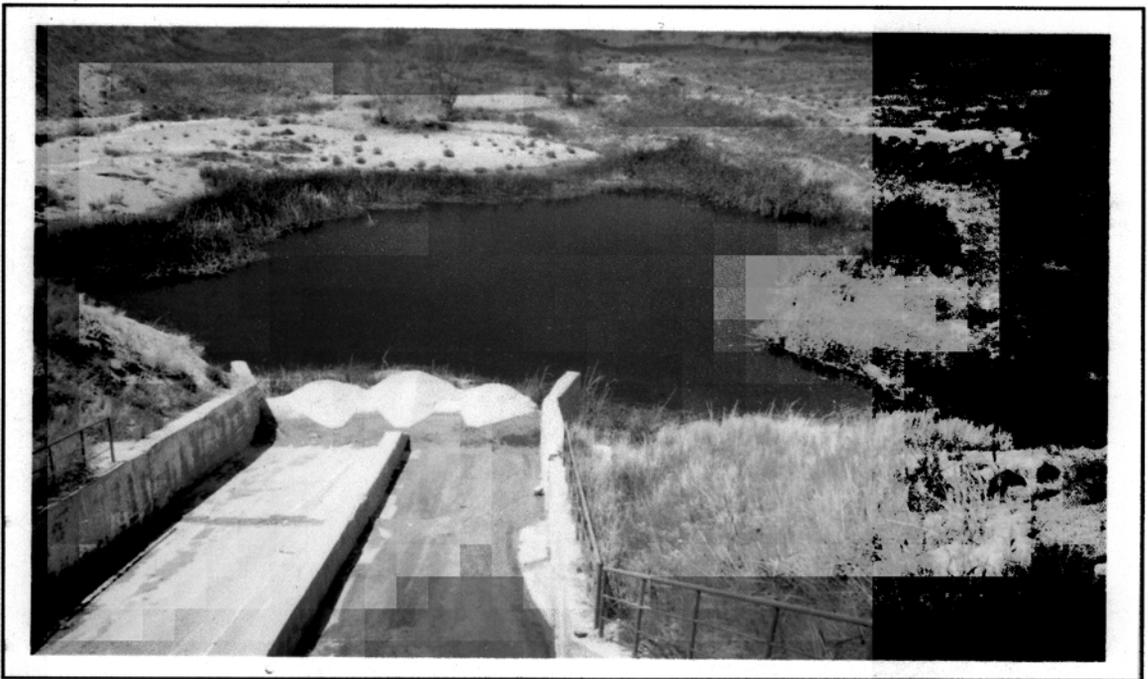
Rehabilitation cost

According to the Irrigation Ministry's assessment mission report, all the rehabilitation and improvement work mentioned above will cost approximately USD 2,006,208.

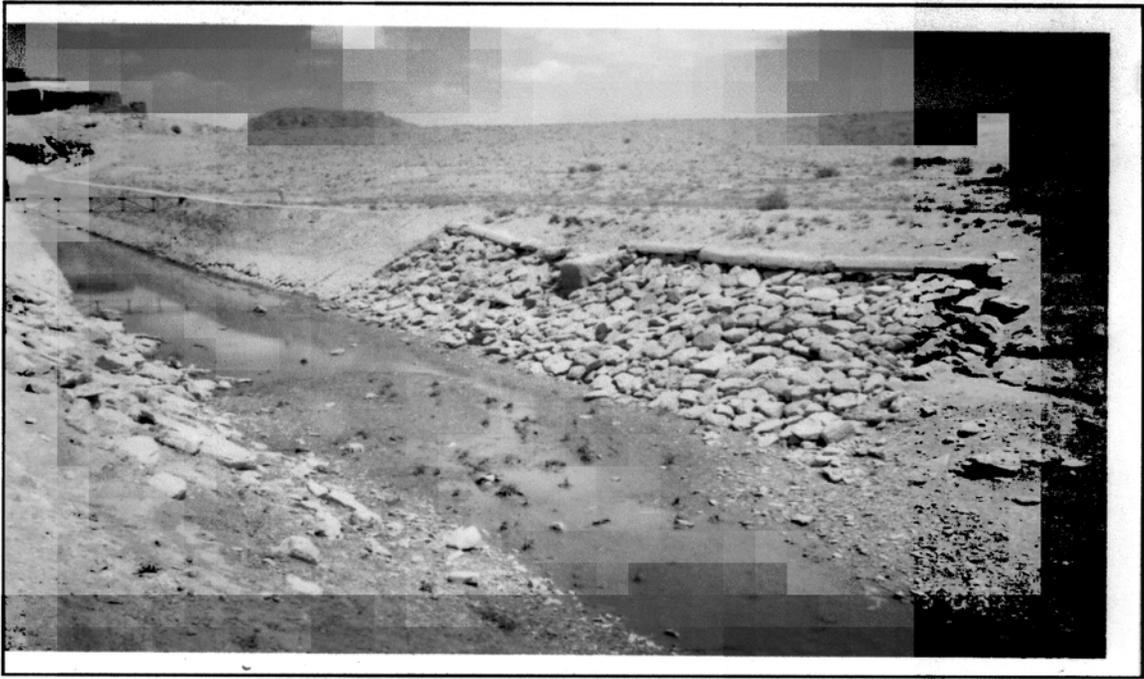
Attachments:**Pictures****Drawing****Ghazni Map shows the dam location**



The right branch of main canal needs pointing and stone masonry.



The main canal spillway.



Left canal needs repairs.



Sardeh Earth Dam intake tower



Right branch of main canal needs repair and cleaning.



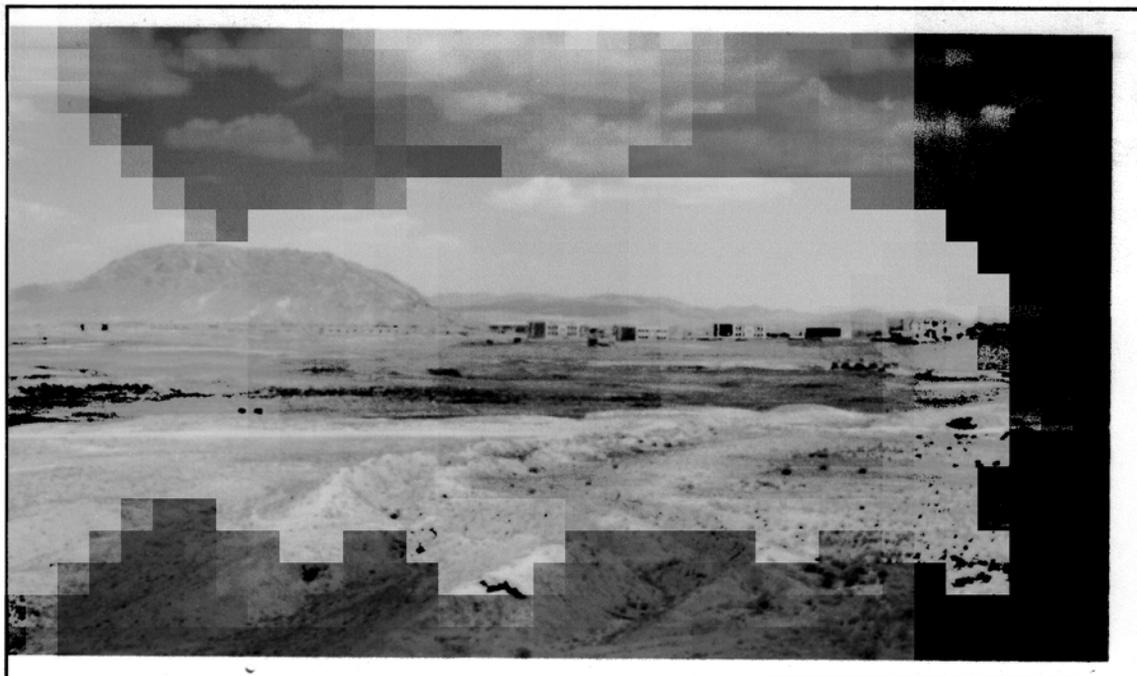
Main canal needs repair and additional stone masonry.



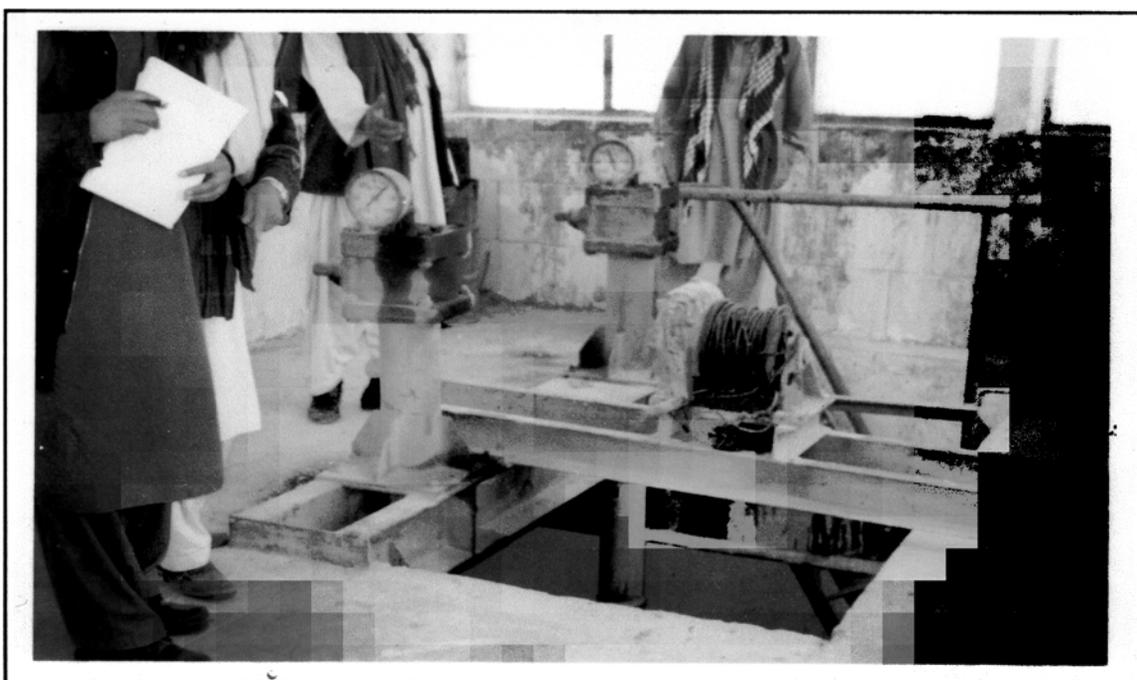
The gates on the left branch of the main canal need repair and cleaning.



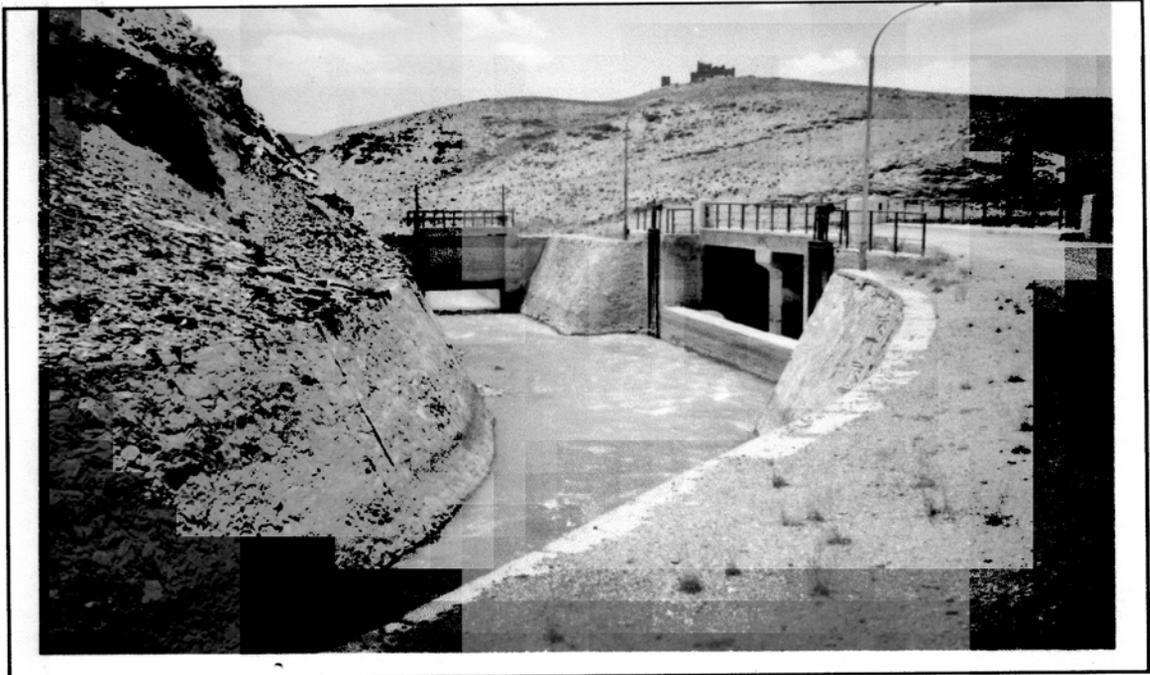
Before there was a gate. Now people use stone as a diversion dam.



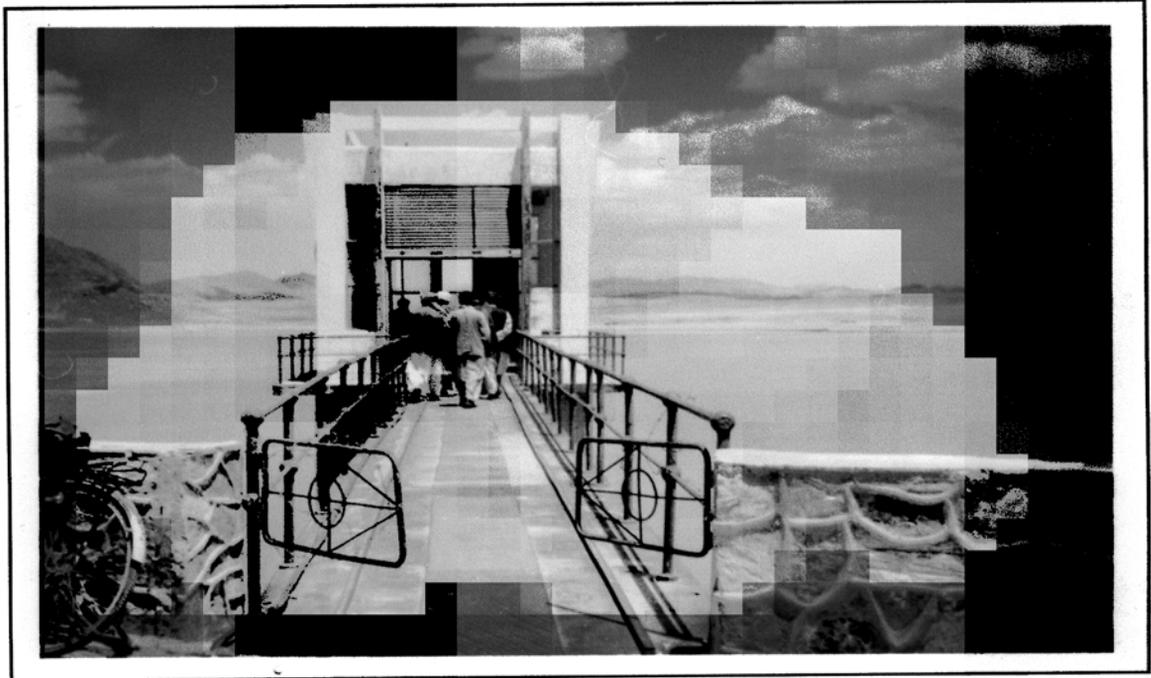
Dam related buildings.



Spillway gate valves



Main canal spillway and its gate



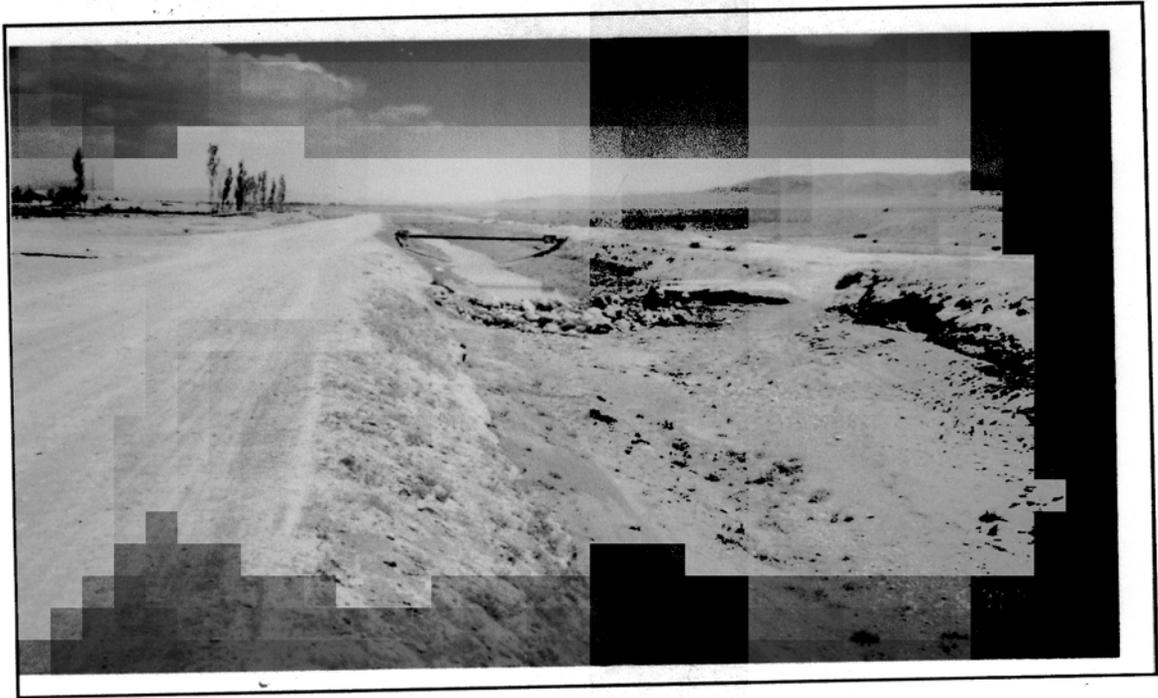
Spillway's access bridge and tower



Canals bank destroyed by flood.



Canals bank destroyed by flood.



The farmers placed stone in place of the destroyed gate



The left bank of the canal destroyed by flood.



Left main canal needs cleaning and repair.



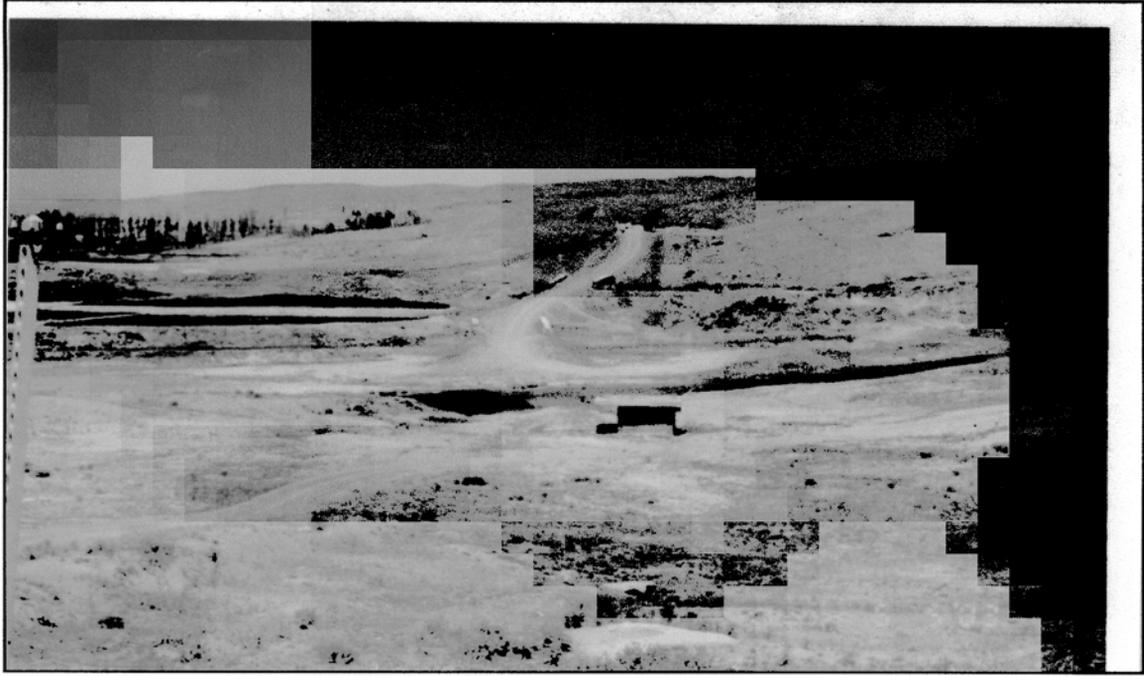
Upstream view of Sardeh Earth Dam.



Left main canal needs cleaning and repair.



Upstream view of Sardeh Earth Dam.



Left canal siphon.