

APPLICATION
OF
State Water Conservation Board
OF THE
STATE OF MONTANA
TO
THE INTERNATIONAL
JOINT COMMISSION



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FOR THE APPROVAL OF DAM AND RESERVOIR
ON EAST FORK OF POPLAR RIVER IN DANIELS
COUNTY, MONTANA

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STATE WATER CONSERVATION BOARD
Capitol Building
HELENA, MONTANA

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NAEGELE PRINTING CO., HELENA, MONT.



**APPLICATION OF STATE WATER CONSERVATION BOARD
TO THE INTERNATIONAL JOINT COMMISSION FOR
THE APPROVAL OF DAM AND RESERVOIR ON EAST
FORK OF POPLAR RIVER IN DANIELS COUNTY,
MONTANA.**

**TO THE HONOURABLE THE INTERNATIONAL JOINT
COMMISSION, OTTAWA, CANADA, and Washington, D. C.**

THE UNDERSIGNED, the State Water Conservation Board of the State of Montana, hereinafter called the Applicant, respectfully represents:

The dam and reservoir plans propose to back water to the Canadian border. There will undoubtedly be flood periods when the backwater curve will affect the river across the border, and, therefore, in order to be safe and take all necessary precautions, we are respectfully submitting this application for the necessary permit.

I. PLAN

(a) The large map of the project shows the location of the irrigable area, the dam site, and the flooded reservoir area. In one corner is a key map, showing the location of the project within the State of Montana.

(b) The map entitled "Details of Dam" will give the necessary data for plan of reservoir and river extending up into Canada.

(c) At the time of making the surveys we did not anticipate that a profile of the river would be necessary, and we regret very much not being able to furnish the same. However, the topography of the reservoir site shows the contour lines and their elevations which should serve the same purpose. Also on the same drawing you will note that the natural water surface in the river, at the boundary on June 19, 1935, was 2419.5 feet; while at the dam site on June 22, 1935, the water surface was 2395.3. This gives a difference of 24.2 feet in elevation between the two points. The fall of the river is so

uniform that for practical purposes it would not be out of order to consider the profile as a straight line between these two elevations.

(d) Drawing shows "Details of Spillway and Chute" and the discharge curve and spillway capacity. It is planned to construct an open spillway without controlling gates of any kind.

(e) Drawing showing control works.

II. SUPPORTING STATEMENT

(a) The East Fork of Poplar River Flood Control Project, in Daniels County, Montana, is being sponsored by the State (Montana) Water Conservation Board; and an application has been filed by it with the Public Works Administration for funds to build the project. The Project is known in the P. W. A. files as Montana Docket No. 1063-R.

(b) It is proposed to build this dam and reservoir on the East Fork of Poplar River to irrigate a tract of land extending from the dam down to the confluence of the middle fork of Poplar River and for a limited distance up said middle fork. (See Project Map).

The normal flow of the river, during the summer months, is not sufficient to insure crops; but by having stored water in reserve in the critical months of July and August, it will insure a water supply. When the reservoir is filled the water surface will stand at an elevation of 2420 feet, flooding an area of 1064 acres, and having a capacity of 7564 acre feet. This will supply supplemental irrigation water for 5700 acres of irrigable land.

(c) As stated above, the reservoir when full will have a capacity of 7564 acre feet and flood an area of 1064 acres. It is impossible to predict any fixed calendar of the flooded area and volume of the reservoir for different seasons of the year, due to the fact that the East Fork of Poplar River is subject to intermittent floods throughout the season caused by heavy rains and cloudbursts. At the beginning of the irrigation season, each spring the reservoir will undoubtedly be filled. It

is assumed that, before the reservoir is emptied in the fall, summer floods will add more water to the storage and raise the level of the lake at the time irrigation water is being withdrawn.

(d) The dam will be an earth-fill structure with a pervious cutoff wall and drain trench. The crest width will be 20 feet, and the maximum length 1018 feet. The side slopes are 3 to 1, 4 to 1, and 5 to 1 on the upstream face; and 2 to 1 on the downstream face. The upstream face will be riprapped with 24 inches of rock and gravel. The elevation of the top of the dam will be 2430 feet, thus giving it a maximum height of 38.7 feet. The spillway crest will be at an elevation of 2420 feet, thus giving a free-board of 10 feet.

(e) The spillway is an open concrete lined channel cut into the natural hill side which forms one abutment of the dam. There are no control gates or obstructions of any kind to retard the natural flow through the spillway. The crest width is 100 feet, and decreases to a width of 32 feet at an elevation of 2390 feet. The side walls will be cast on a slope of $1\frac{1}{2}$ to 1. Cutoff walls will be located across the spillway at the upstream toe, the spillway crest, and at the end of the apron.

(f) The outlet works for regulating the flow of water from the reservoir, will consist of a 48-inch metal corrugated pipe conduit. The operating tower will also be of corrugated metal pipe, 72 inches in diameter. The gate will be a 48-inch sliding type. Reinforced concrete will be used for the inlet and outlet, control chamber, and cutoff walls. (See drawing of Control Works). It is possible that when final construction drawings are completed, concrete may be substituted for corrugated pipe. However, this is a detail which we presume has no bearing with you in considering this application.

(g) The flow records on this stream are quite meager. The U. S. Geological Survey and the Canadian Government have a joint gauging station at the International boundary and partial data are available for the years 1931 to 1935, inclusive. These are for the months of March through October. During the months of November to February, inclusive, the

stream is frozen over most of the time and the flow for this period has not been recorded. The error caused by entirely neglecting this part of the annual flow is inconsequential. The table below was compiled from data secured from the U. S. Geological Survey.

**TOTAL MONTHLY DISCHARGE IN ACRE FEET
EAST FORK OF POPLAR RIVER**

At the International Boundary

Year	March	April	May	June	July	August	Sept.	Oct.	Total
1931	411 (12 to 31)	508	258	146	124	105	255	259	2066
1932	2210	1000	306	192	172	1410	265	313	5868
1933	1680	768	373	970	508	207	167	124	5297
1934	935	666	240	109	44	61	152	214	2421
1935	3040	428	341	634	376	178	109		5106

MONTHLY MEAN FLOW

In Acre Feet for the Period of Record

	March	April	May	June	July	August	Sept.	Oct.	Total
	1655	674	404	410	245	392	190	288	4198
			1931	1932	1933	1934	1935		1931 to 1935, Inc.
Maximum Instantaneous Discharge (Sec. Ft.)			36.9	975*	105	21.2			975*
Maximum Daily Discharge (Acre Feet)			39	667	208	42	693†		693†
Maximum Weekly Discharge (Acre Feet)**			139	1128	664	215	2089		2089

*NOTE: August 13, 1932.

†NOTE: March 18, 1935.

**NOTE: Highest seven consecutive days.

No records of high water marks are available to the State Water Conservation Board that would indicate a higher flow than that of August 13, 1935. The flows recorded for the five years average 4150 acre feet per year. However, these were unusually dry years and larger average flows could conservatively be expected for the normal years. Furthermore, a larger area is tributary to the reservoir than the 256 square miles above the gauging station at the International Boundary. The drainage area above the proposed dam has been measured from reliable maps with a planimeter as 334 square miles, or an increase of 30% over the area contributory above the gauge. A direct proportion on an area basis would indicate an average annual runoff for the period of 5,340 acre feet above

the dam instead of 4,150 acre feet at the International boundary.

(h) The elevation of the natural water surface at the International boundary at the time of the survey was 2419.5. Therefore, the reservoir when full and neglecting the back-water curve, would raise the water level one-half foot at this point.

The spillway will discharge approximately 6750 second feet with a depth of seven and one-half ($7\frac{1}{2}$) feet above the spillway crest which is almost seven times the amount any flood at maximum flow has produced during the time the stream has been gauged.

The reservoir has a storage capacity at seven and one-half ($7\frac{1}{2}$) feet above the spillway crest of 10,800 acre feet so it is very unlikely that the water will ever rise to the extreme elevation of 2427.5. The elevation of the stream bank at the boundary is 2428.5 or eight and one-half ($8\frac{1}{2}$) feet above the water level when the reservoir is full. It is presumed that water overflows the banks under present conditions during extreme floods and the proposed dam would aggravate this situation somewhat.

The topographic map shows that the ground surface, while sloping rather gently from the stream bank on the west side for a short distance north of the boundary, rises in a steep slope on both sides for the remaining distance of approximately one and one-half miles which was surveyed along the stream. A very small amount of land would be flooded for a short time if the water level rose above the elevation 2430, but as this is grazing land no harm would result.

An unimproved road on the boundary line crosses the East Fork of Poplar River on a thirty-foot wooden girder bridge. There is a possibility that this bridge will have to be raised and extended to provide sufficient waterway. We have no information at the present time as to what authorities maintain this road and bridge.

(i) The owners of the land proposed to be irrigated by this project have duly petitioned the State Water Conservation Board to construct this irrigation system and this Board has, in turn, given its approval. The surveys that have been made are sufficient to determine the main details necessary

for an application to the Public Works Administration for funds for the proposed construction. The final alignment of the proposed canals has not been run in the field nor have the exact number and locations of such structures as turnouts and farm crossings been determined. More information will be needed for proposed road and bridge changes. The detail drawings that are required for the P. W. A. application are completed. As soon as approval is made on this project the needed additional field information will be secured, final plans drawn up, and contracts let for the necessary construction. Construction will, in all probabilities, not begin before fall, 1936.

(j) The chief interests in the United States affected by the proposed construction are the land owners and tenants of the land to be irrigated. These are enthusiastically supporting the project. The Water Conservation Board knows of no individuals or groups in Canada showing any active interest, either favorable or adverse, in the proposed construction. No protests of any kind, either from Canada or the United States, have been filed with the State Water Conservation Board or with the P. W. A.

(k) The project was originally initiated by the Chamber of Commerce and farmers living in the vicinity of Scobey, Montana, and, of course, carries with it their approval. The State Board, after making preliminary surveys, determined the project to be feasible, prepared preliminary application and filed the same with the P. W. A. on August 12, 1935. Final approval by the P. W. A. is now awaiting our construction drawings which are nearly completed and will soon be ready to file with it.

WHEREFORE, THE UNDERSIGNED hereby applies to the International Joint Commission for the approval of the said works and plans thereof and of the construction of said works substantially in accordance with said plans.

Respectfully submitted,

STATE WATER CONSERVATION BOARD,

J. S. James, State Engineer.

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