

**HISTORICAL RESUME OF SUN OIL COMPANY SEISMOGRAPH  
SURVEY OF N.W.T. PERMITS 1036 THROUGH 1041 IN JULY AND AUGUST, 1958**

The planning and preparation work for the seismograph survey of the Sun Oil Company Permits 1036 through 1041 in the N.W.T. commenced during the first part of 1958.

The bulldozing work was done under contract and directed by a Sun man during the latter half of March, 1958 prior to spring breakup. Seventy-five miles of line were cut in the permit areas. A main east-west line was cut through the center of the permits starting at the Fort Liard river and running about 28 miles east. This line did not reach the east boundary of the eastern permit. Several north-south lines were cut extending to the south of the main east-west line. An additional east-west line was cut two and one-half miles south of the main east-west line. In the course of the actual seismograph survey, some of these trails were abandoned because of impossible muskeg conditions. Another trail, cut by the permit holder to the south, on the southern boundary of the Sun permits was incorporated into the Sun seismic program.

Field operations started on June 30th when the vehicles, fuel, camp equipment and supplies left fort Nelson, B. C. on two barges for the main bush camp located in the center of the western-most permit on the Fort Liard river. The vehicles consisted of five "Bombardier" track units. These track units were variously adapted to accommodate special equipment and used as: one Sewell auger drill, one combination water and shooting unit, one seismograph instrument unit, one survey unit and one utility carrier. Camp equipment consisted of radios, tents, cots, sleeping bags, kitchen requirements, food supplies and appropriate miscellaneous supplies. Fuel was stored in several large tanks on the river bank near the initial campsite and later distributed in barrels where needed. During the course of the survey, additional supplies were brought in by float equipped Cessna aircraft to the Liard river area and were then transported over land by "Bombardier" to the frequently moved campsite. Personnel were likewise moved in and out of the area from Fort Nelson by these aircraft. The distance from Fort Nelson to the permit area is about 120 air miles and takes about 70 to 80 minutes flying time.

Special personnel employed for the survey included a mechanic, mechanic's helper, cook and cook's helper. On the average eighteen men were employed in the operation after the personnel of the seismograph crew arrived.

The surface of the permit areas is gently undulating and covered with small bush in the low damp regions and tall birch and poplar in the higher well drained parts. Muskeg is general throughout the area and the ground is covered with a thick layer of moss. Where this moss is undisturbed a layer of ice varying in thickness from a few inches to several feet can be found. In the winter, the area is accessible by truck from Fort Nelson over bulldozed trials and in the summer is accessible only by river during the period of navigation extending from May to September. Throughout its course within the area the Liard River offers excellent landing facilities for small float equipped air planes.

Preliminary work from the 2nd of July through the 13th was done prior to the arrival of the regular seismograph crew. This work consisted of making sample test shots to appraise the record reflection quality. It also included a long refraction spread shot to determine the possibility of Paleozoic formations near the surface. The refraction spread gave rather negative information.

The regular personnel of the Sun Oil Company seismograph crew arrived in the camp area on July 13th and began the seismograph survey using standard field techniques. Surveying was accomplished with transit and chain. An elevation was assumed at the river landing by the initial campsite. This assumed elevation was obtained from barometer readings cross checked on several occasions with the pressure reading at Fort Nelson, B. C. A Sun Oil Company designed and built 24 channel portable instrument with magnetic tape recording was used throughout the survey. In the field recording routine, standard split spreads of 1400 - 0 - 1400 feet were employed giving continuous sub-surface coverage. Two Sun D-9 geophones per trace planted on three foot steel stakes provided very good ground coupling. Fair to good reflection records were obtained at relatively shallow depths of 20 to 40 feet using a very light charge, usually one pound.

Other than for the continual difficulties of traversing the muskeg areas and the supply distribution within the permit areas, the operation of the seismograph survey was not unusual. The crew completed 77 miles of continuous reflection work. In total, 298 locations were shot. Reasonably good seismic records were made on the average throughout the area although some local areas gave inadequate information. The seismic survey program was limited to the available trails obtained by the bulldozing program in March and the additional line on the south boundary. The satisfactory performance of the work program provided a basic reconnaissance seismograph survey of the permit areas.

The crew left the permit area by plane on August the 28th. The vehicles, tents, camp facilities and remaining supplies were left in the initial camp area when the crew departed. A separate work force supplied by the contractor, from whom the major portion of the equipment was rented, subsequently was transported into the area by plane. These men organized the removal of the stored equipment to Fort Nelson. It is unfortunate that the water level of the Liard river at this time was not sufficient to allow barge operations. The return of the equipment by land through the widespread muskeg was a difficult project and involved some hardship and considerable expense. This equipment had to be temporarily stored on the bank of the Fort Nelson river to await the winter freeze up before it was finally brought to Fort Nelson.

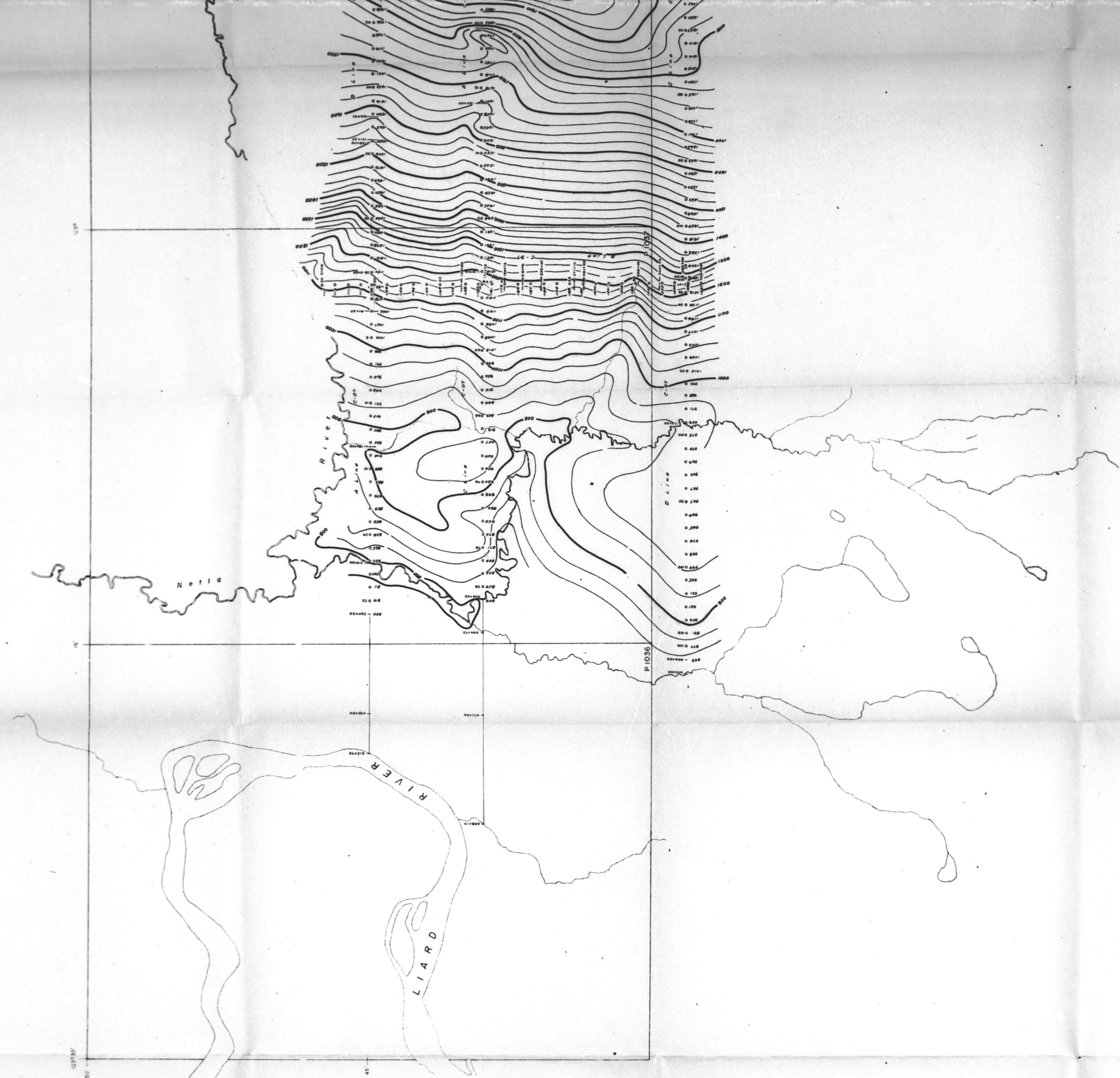
The type of operation described above, carried on in the summer months in the type of terrain obtained in the permit areas is not considered wholly efficient. This results mainly from the difficulty of traversing muskeg even with specially designed track vehicles. In this type of area, these vehicles cannot be expected to average more than five miles per hour. Bulldozed trails become treacherous when traffic over them is excessive. Frequently they become covered with mud and water to depths of two feet.

In spite of various difficulties the summer operation was considered successful. Information developed by this seismograph survey indicated subsurface situations of considerable geologic interest. In view of these findings more seismograph work is recommended to explore the balance of the permit areas and infill the large loop network obtained.

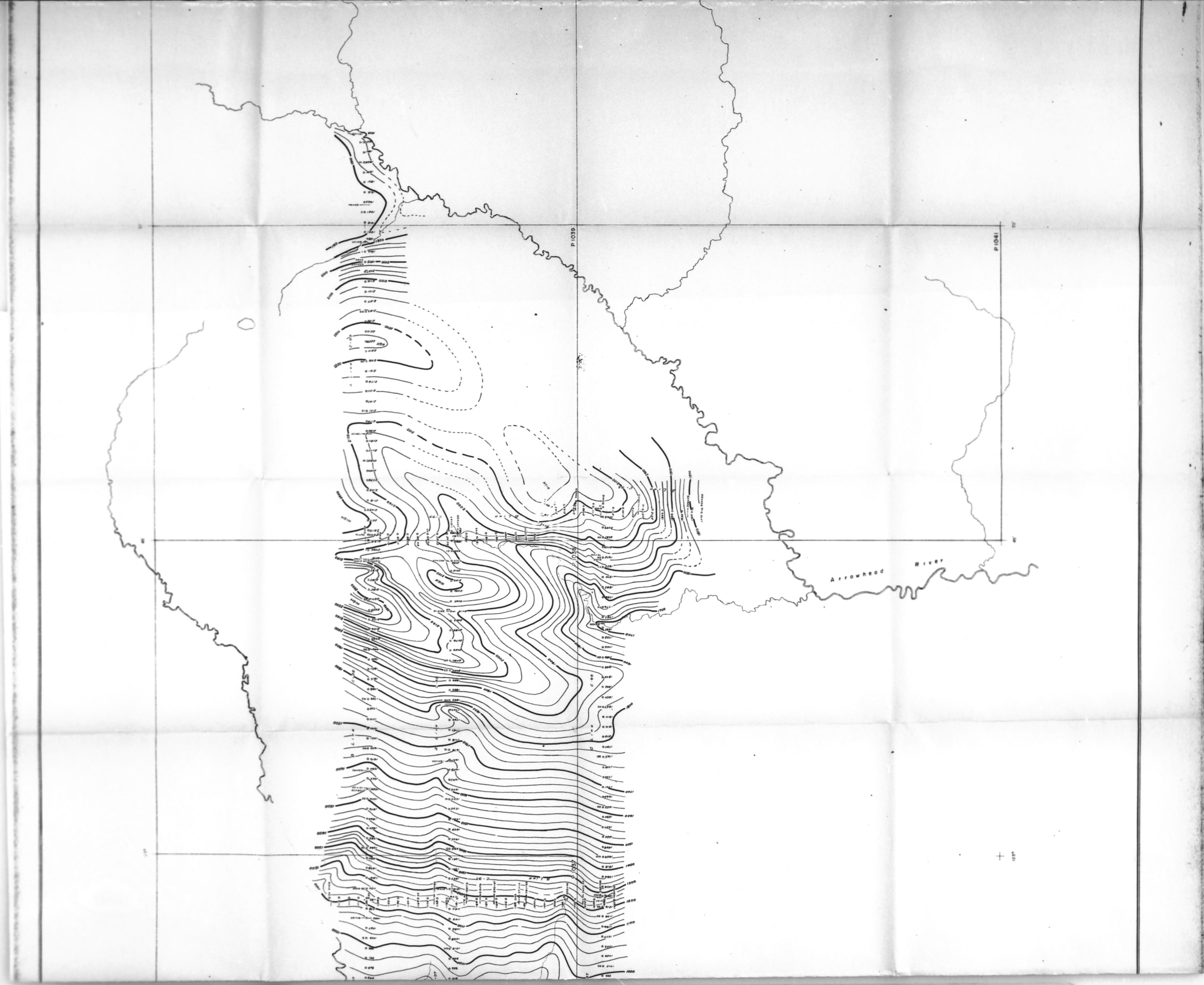
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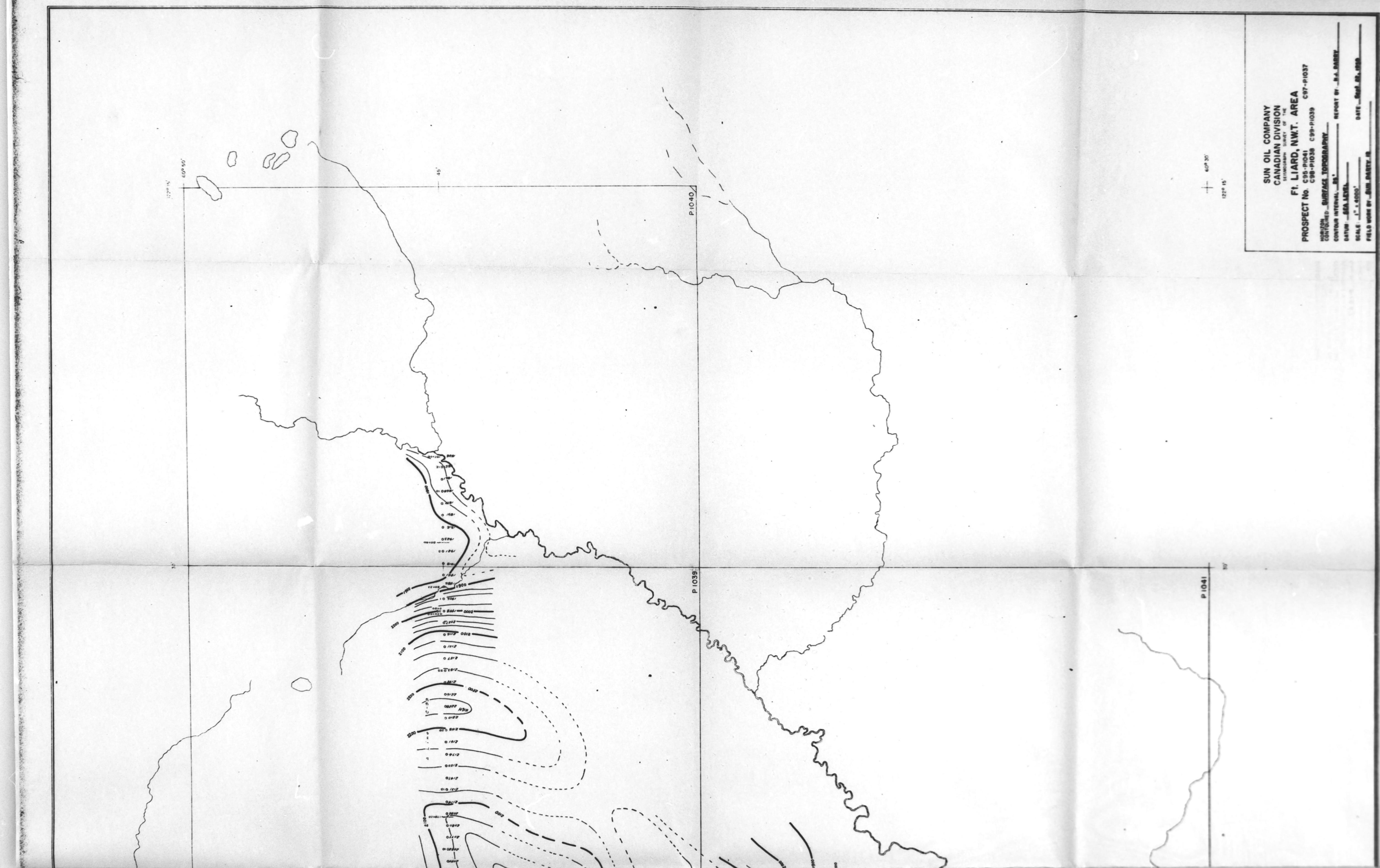
By: R. J. Koenig



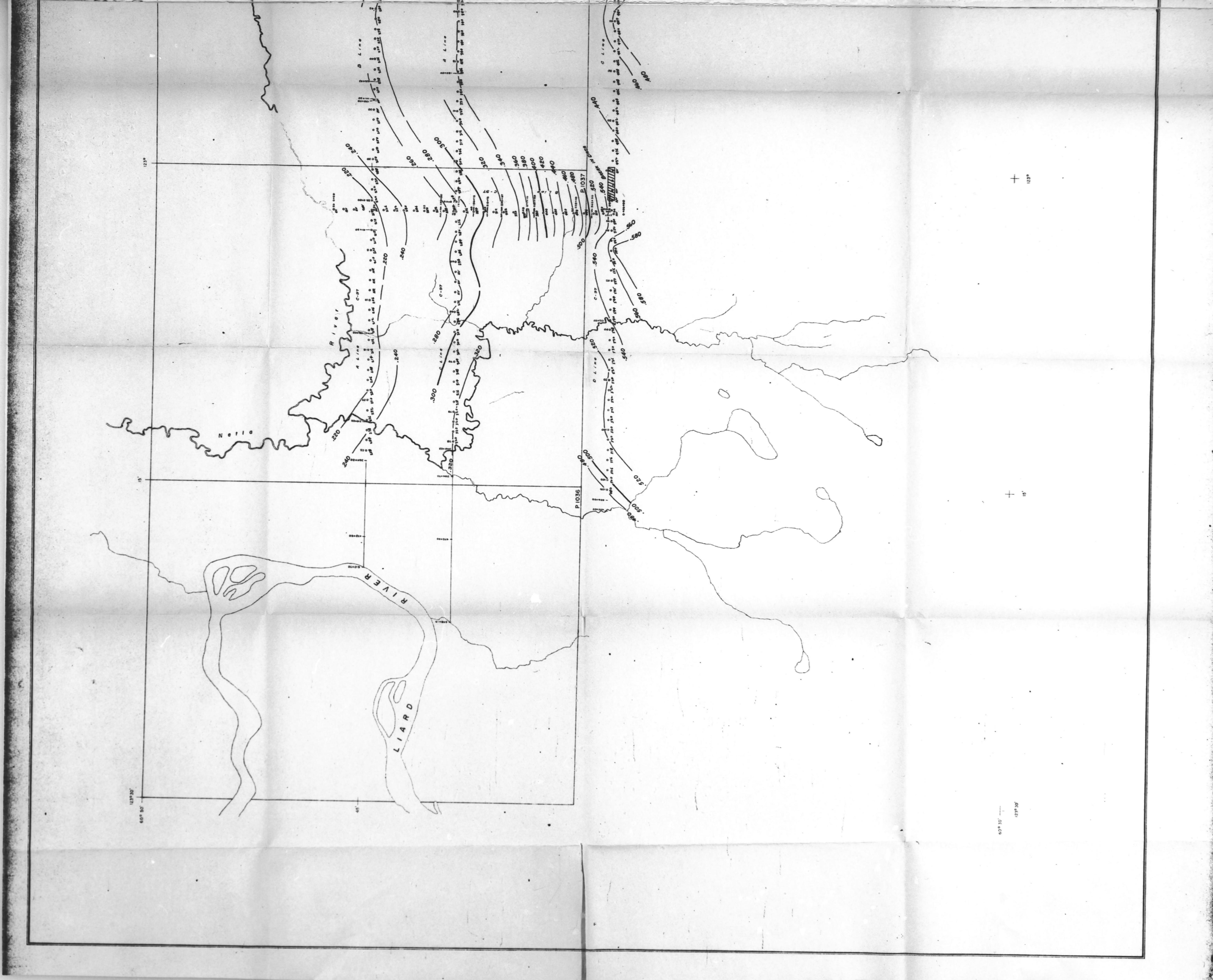
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