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NUNAVUT WATER BOARD
NUNAVUT IMALIRIYIN KATIMAYINGI

Via Email
File: NWB1NAN0208/I13 & I14

Mr. Robert Carreau
Corporate Manager, Environmental Affairs
Breakwater Resources Limited
Suite 2000, 95 Wellington Street West
Toronto, ON. M5J 2N7

June 10, 2003

Subject: Licence NWB1NAN0208 – Review of Human Health and Ecological Risk Assessment ("HHERA"), Phase II Environmental Site Assessment ("Phase II ESA") for Nanisivik Mine

Dear Mr Carreau,

The Nunavut Water Board ("NWB") received several submissions regarding the review of the above cited reports. The submissions are now available on the NWB's FTP server (ftp://ftp.nunavut.ca/nwb/CURRENT%20HEARINGS/NWB1NAN0208/CORRESPONDENCE/). The submissions are the following:

- Acres International/Dillon Consulting (Consultants for the NWB) – received June 6, 2003 (030605NWB1NANacresfinalcomments-ISTE.pdf)
- Government of Nunavut – received June 9, 2003 (030609NWB1NANgncomments-IEDE.doc)
- Indian and Northern Affairs Canada – received June 10, 2003 (030610NWB1NANdiandcomments-IMAE.doc)

CanZinco is requested, as was stated previously in the NWB's June 2, 2003 letter to the Nanisivik Distribution List, to provide a response to the comments listed in these submissions. The deadline for CanZinco's response is June 16, 2003 at 5:00 pm MST.

Any questions regarding these submissions can be directed to Philippe di Pizzo, Executive Director, NWB or to myself.

Yours truly,

Patrick Duxbury, M.Sc.
Mine Reclamation Coordinator
Nunavut Water Board

Water Resources Division
Qimugjuk Building
P.O. Box 100
Iqaluit, Nunavut
X0A 0H0

Your file - Votre référence

NWB1NAN

Our file - Notre référence

June 10, 2003

Rita Becker
Manager - Finance, Licensing and Administration
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NT
X0E 1J0

Dear Ms. Becker:

On behalf of Indian and Northern Affairs Canada (INAC), I have reviewed Canzinco Limited's *Response to Peer Review Comments* dated May 19, 2003 (hereafter referred to as the "Response"). Generally, INAC is pleased with the response as the company has incorporated our primary concerns with the Human Health and Ecological Risk Assessment (HHERA) into the reassessment. Example calculations have been provided, including an improved explanation of variable (terminology) applied. In addition, background data for the townsite has been re-valued and this is a significant factor in reducing the Soil Quality Remediation Objectives (SQROs) for the townsite. Explanations of other concerns previously identified provide a clearer understanding of the actions and decisions taken in the Risk Assessment Process followed by Jacques Whitford Environmental Limited (JWEL). However, there are some exceptions to this and the outstanding issues are summarized below.

1. Human Health Risk Assessment (HHERA) Uncertainty Analysis (Response, Comment 5, Page 13)

INAC is of the opinion that the combined exposure should be considered when different elements can impact the same organ, in this case lead and cadmium and the kidney. In cases where the impact of each single element has no known effect at the exposure experienced, it is the combined exposure that affects the organ, and the additive effects should be considered. The challenge resulting from this is that the accepted contaminant concentrations become interdependent on one another. For example, in the townsite, the lead SQRO is below the EPC; however, cadmium is also present. If additive effects are considered, the accepted lead concentration (SQRO) will be influenced by the concentration of cadmium present.

...2

2. House Dust (Response, page 38)

Under separate cover, BC Research provided comments regarding the significance of lead in house dust. The response to the Government of Nunavut states that lead in the houses is most likely a result of "tracking-in of dust from residents/ employees during the time of mine operation when ores, concentrates and tailings were being handled". This has not been verified, and an equally probable source is townsite contamination being tracked-in by not only the miner, but also other family members including children. Further consideration of this second source is required. If lead contamination in the townsite is a factor, remediation of the townsite should be sufficiently thorough to ensure that further contamination of the homes does not occur.

3. Environmental Risk Assessment (ERA) for Lemming, ERA Comment 2 (Response, page 14)

The further explanation is adequate, including the information from the Cantox (Polaris) study which demonstrated that the inhalation pathway contributed less than 1% of the lemming exposure. It should be noted that Cantox did consider inhalation as a reasonable pathway for their evaluation.

4. ERA Comment 5 (Response, page 15)

An adequate evaluation of exposure to birds based on reference criteria (HERD note 4, December 2000) regarding adult/juvenile exposures would reflect that differing health outcomes between adult and juvenile birds can be expected. Ecological risk factors were also used to set SQRO values for all contaminants (cadmium, copper, lead, and zinc) at the dock and for copper at the mine site. However, since these values are significantly above the EPC values, INAC agrees with Canzinco that further refinement of the ERA on this basis in not required.

5. ERA Comment 12 (Response, page 17)

Please refer to comments under HHERA, Comment 5. INAC believes it would be prudent to recognize that metal exposures may have additive effects on organs (like humans, animals must process contaminant metals through the liver and kidney and these organs become vulnerable to combined effects of exposure). As a minimum, Canzinco should recognize this in the ERA, and provide clear justification as to why the SQRO values are significantly above the EPC and the further step is unnecessary.

6. Sample Calculation (Response, page 37)

The sample calculation in the appendix of the Response does not provide the final step in calculating the SSTL and SQRO (the same applies to the equation in the original HHERA). This is required as it will clarify whether background soil concentrations are

being used in determining acceptable future soil concentrations of contaminants.

7. Lead as a Carcinogen comment 2 (Response, page 4)

It appears that Canzinco is not accepting the suggestion that lead is a carcinogen or could be a concern in the future, and there is significant reference to the absence of appropriate reference values needed to conduct calculations. In addition, the rating of lead as a Group 2B carcinogen by the IARC (possible human carcinogen) and a B2 carcinogen by the EPA (probable human carcinogen) has been ignored. The presence of lead in homes, lead in the townsite, and the cancer concern suggests that this should be considered. If, as has been suggested, no data is available, this uncertainty should be incorporated into these considerations.

Should you have any questions in regards to the above comments, please do not hesitate to contact me at (867) 975-4548 or by e-mail at mcchristiem@inac.gc.ca.

Sincerely,
Original signed by:

Michelle McChristie
Manager, Water Resources

Gartner Lee Limited

June 13, 2003

Mr. R. Carreau
CanZinco Ltd.
bcarreau@breakwater.ca

Dear Mr. Carreau:

Re: Nanisivik Mine, Phase 2 Environmental Site Assessment, Response to Nunavut Water Board Review Dated June 10, 2003

The Nunavut Water Board (NWB) provided additional review comments, dated June 10, 2003, on our report *Nanisivik Mine, Phase 2 Environmental Site Assessment, January 2003* (the "ESA Report"). Comments were submitted to the NWB by two organizations: Government of Nunavut (GN) and Acres International Limited (Acres) and follow from our response, dated May 19, 2003, to a previous set of regulatory review comments from a larger number of organizations.

We are pleased to see that this "second round" of review comments is of a much smaller scope than the first and take this as a positive indication that our response to the first round of comments was well received and resolved many of the questions and requests for clarification.

The purpose of the ESA investigations and the ESA report were, primarily, to provide a complete description of the local biophysical environment and the areas and contaminants of environmental concern. The ESA Report is intended to be documentary in nature to provide information that is necessary for the development of remedial plans and site specific remedial objectives.

Because of the documentary nature of the ESA Report, a primary consideration in its evaluation is the level of care and professionalism incorporated onto the research, design and execution of the investigations. We are gratified by the comments from many of the reviewers that the work was performed to an acceptable level of care and professionalism and we thank those reviewers for that recognition.

In light of the above, we feel that the remaining comments regarding the ESA Report, as provided by the NWB June 10, 2003, are focussed on finalizing the review process and that the responses provided herein could enable the NWB to "approve" the ESA report as required by the Nanisivik Water License.

Our responses to the specific elements of the latest review comments are provided below.

GN Comments

The GN letter dated June 11, 2003 does not provide a specific comment on the ESA report but, rather, defers further comment until receipt (by GN) of expert advice on public health, which is anticipated to be received prior to June 20, 2003. The reference to a public health expert and other statements in the GN letter imply that these additional comments are likely to focus on the Human Health and Ecological Risk Assessment (HHERA) that was prepared by Jacques-Whitford Environment Limited (JWEL) rather than on the ESA Report. Therefore, we do not anticipate any additional substantive additional comments on the ESA Report from the GN.

Acres Comments Re. Applicability of the 1985 Soil Data

Acres, in their letter to the NWB dated June 5, 2003, recommend that "CanZinco shall revisit one more time the issue of the 1985 background soil data, for use in the screening process of the HHERA report".

It is our view that the 1985 soil data is an important source of information that is directly relevant to both the ESA Report and the HHERA. Further, it is both appropriate and beneficial, in our view, that the data was used in these reports.

The purpose of including the 1985 soil data into the ESA Report is to provide a complete description of the environment that makes use of all of the available information. One of the important components of the 1985 soil data is to complement past and current observations and mapping of natural mineralized areas in and around the mine area. For example, the identification of a naturally mineralized area to the general northeast of the town site is based, primarily, on past and current observations and geological mapping and this first hand information is complemented and supported by the 1985 soil data.

The 1985 soil data were used as one component of the calculations of the site-specific soil quality remediation objectives (SQRO's) as described in the HHERA report prepared by JWEL. It is our understanding, from JWEL, however that the sensitivity of the end results (i.e. the SQRO's) to the 1985 soil data is relatively small; that is, that the 1985 data play a relatively minor role in the calculations. It is also our understanding that, were the 1985 soil data to be skewed high in soil

metal concentrations (as is a general comment from the reviewers), this would have the effect of reducing the calculated SQRO's because the higher soil metal concentrations would provide an artificially high "background" intake which would, in turn, reduce the allowable additional intake. This adds a degree of conservatism into the calculations.

In our view and in general, the availability of site-specific data for the closure planning process (including the calculation of SQROs) increases confidence in the plan and increases the validity of the plan as compared to other sites where generic data must be used.

It is always important that the limitations of any source of technical information be documented and understood to ensure that the data is used appropriately. In the case of the 1985 soil data, we feel that the limitations of the data have been well documented in the ESA Report as also supplemented in the May 19 response to review comments. However, the limitations of the data should not be taken as negating the benefits of employing the data as reliable, site-specific information that generally increases confidence in the closure planning process.

Acres Comments Re. Possible Alternatives to the 1985 Soil Data

Acres, in their letter to the NWB dated June 5, 2003, question whether there is alternate or "surrogate" background data that could be used in place of the 1985 data.

To our knowledge, the 1985 soil data provide the best and most comprehensive data set available to provide a quantitative characterization of local soils. The 1974 to 1976 studies that were conducted by B.C. Research Inc. provide ground cover mapping and some soil characterization (observations of physical properties) but do not provide any numerical data regarding metals in soils. Further, we are not aware of any other studies conducted by the mine owner or by other parties in the mine area that would be comparable or useful in this regard.

The use of "surrogate" data (transposed from a separate, similar location) is generally a consideration in circumstances where no site-specific information exists or where the existing site-specific information does not suit the needs of the project. It is our view that the 1985 soil data is appropriate for use at Nansivik, with due consideration of its limitations, and that there is no benefit to the project in attempting to transpose remote data from another location.

Acres Request for a Revised Executive Summary and Table of Contents

Acres, in their letter to the NWB dated June 5, 2003, request that a revised Executive Summary and Table of Contents be provided that would incorporate and compile all of the new documentation that has been generated from the review comments and responses.

We agree that the new documentation should be adequately compiled such that it is readily available in the project file. However, we have discussed with you an alternative means of accomplishing this goal and we recommend that we continue with the alternative.

We will be preparing a new report later in 2003 that documents the follow up ESA investigations that are currently being planned. In this new report, we would incorporate the new documentation and new information. This would provide an administrative benefit in that that the existing ESA Report that has already been distributed on the public registry would not require amendment and redistribution.

Closing

We trust that this letter will satisfy the review comments referenced. Please let us know if we can be of further assistance.

Sincerely,
GARTNER LEE LIMITED

(via email)

Eric Denholm
Senior Mining Consultant

BREAKWATER RESOURCES LIMITED
95 Wellington Street West, Suite 2000, Toronto ON M5J 2N7

Fax: (416) 363-1315
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bcarreau@breakwater.ca

via Email

June 16, 2003

Mr. Philippe di Pizzo
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0E-1J0

Dear Mr. di Pizzo:

Re: *Final* response to comments on Phase II Environmental Site Assessment (ESA II) and Human Health and Ecological Risk Assessment (HHERA)

As per the review schedule provided by the Nunavut Water Board ("NWB") in correspondence dated June 02, 2003, please accept this letter and the identified attachments, as CanZinco Ltd's "*final*" response to comments on the above captioned reports. The comments, which we are responding to, were contained in the following submissions:

- Acres International ("Acres"), Ramli Halim, June 6, 2003, with attachment: Dillon Consulting Ltd. ("Dillon"), Bryan Leece and Ulysses Klee, June 3, 2003, (consultants for the NWB).
- Government of Nunavut "(GN"), Susan Hardy, June 9, 2003.
- Indian and Northern Affairs Canada ("INAC"), Michelle McChristie, June 10, 2003.

In putting together this response, we have asked our consultants, Jacques Whitford Environmental Ltd. (JWEL) and Gartner Lee Limited (GLL) to review the above submissions and provide us directly with their technical comments. You will find these attached hereto and you may consider these as part of CanZinco's collaborative response. We believe you will find that we have considered all the comments brought forward and we are hopeful that we have adequately addressed these to the satisfaction of the Board.

There is however, one technical issue, which we would like to offer specific comment on, although it has been included by both GLL and JWEL in the attachments. This issue being the recurring comments on the validity and the consequence of using the 1985 geochemical soil survey as background data. Although I believe the issue is adequately addressed in the attachments, I wish to offer further support and emphasis to what has been stated.

The 1985 soil geochemistry was conducted under the direction of Mr. Ron Sutherland and Mr. Doug Dumka, both professional geologists during the exploration campaign at Nanisivik. Successful exploration at Nanisivik was largely responsible for extending the originally forecast 12 year mine life to more than 26 years. Soil geochemical sampling was critical in providing accurate targets for secondary exploration activities (including trenching and drilling) which are by nature, demanding on financial resources. It is essential therefore, that the data is accurate and reliable. And it is this accuracy and reliability which makes it suitable for inclusion in both the ESA and the HHERA. If the soil

geochemistry was broadly biased (by mining activity contamination) this would have led to unreliable secondary exploration targeting. Based on exploration success at Nanisivik, this was not the case.

I have contacted Mr. Dumka who has continued to work for Strathcona Mineral Services (the former operator of Nanisivik Mine until Breakwater bought the property in 1996) and he is in the process of compiling historic documentation to support the 1985 data. This documentation will be forwarded to the Board as it is received and will include the original surface plans with geochemical results from an area approximately 4 times the area included in the ESA (i.e. continued blanket sampling to a limit of 10 kilometres west and 6 kilometres east of the existing ESA boundaries). We expect that this additional information will provide further confirmation that the decision to include the data in our submissions was the correct one.

In closing, we would like to reiterate that we have considered all input brought forward as part of this review and we have attempted to address all reviewers' comments. As always, should you or any of the reviewers wish to discuss this or other matters relating to the Nanisivik closure, please feel free to contact me directly at 416-363-4798.

Yours sincerely,
Original signed by:

Robert Carreau
Corporate Manager, Environmental Affairs
Breakwater Resources Ltd.

cc. Bill Heath, Vice-President CanZinco Ltd.

BREAKWATER RESOURCES LIMITED
95 Wellington Street West, Suite 2000, Toronto ON M5J 2N7
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bcarreau@breakwater.ca

INTERNAL	
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June 20, 2003

Mr. Philippe di Pizzo
Executive Director
Nunavut Water Board
P.O. Box 119
Gjoa Haven, NU X0E-1J0

Dear Mr. di Pizzo:

Re: 1985 Geochemical Survey at Nanisivik

As committed to, in my letter dated June 16, 2003, please accept the attached supporting information regarding the 1985 Geochemical Survey at Nanisivik. Attached hereto are the following documents:

- Letter dated June 20, 2003 from Doug Dumka, P. Geo.
- 1:20:000 surface plan entitled "*Nanisivik Mine Property, Geochemical Survey, West Sheet*" (5 copies)
- 1:20:000 surface plan entitled "*Nanisivik Mine Property, Geochemical Survey, East Sheet*" (5 copies)

Yours sincerely,

Robert Carreau
Corporate Manager, Environmental Affairs
Breakwater Resources Ltd.

cc. Bill Heath, Vice-President CanZinco Ltd.

June 20, 2003

Robert R. Carreau, CCEP
Corporate Manager
Environmental Affairs
Breakwater Resources Ltd.
95 Wellington Street West
Suite 2000
Toronto, Ontario
M5J 2N7

Sir,

In response to your query for information regarding the soil geochemistry survey conducted in 1985 over the Nanisivik property, specifically the data contained on the two 1:20, 000 scale maps examined on June 18th, I have the following comments.

The geochemical data shown on those maps was collected as part of a property wide geological mapping exercise undertaken as a small segment of a larger PHD thesis project by Dr. Michael Neumann for the University of Heidelberg under both the supervision of Ron Sutherland and myself. The samples were taken roughly every 300 to 500 metres across the property by Dr. Neumann himself. As there is limited to no soil profile developed at Nanisivik no attempt was made to take material from a particular part of the hole. Essentially a 10 to 15 cm hole was dug using a hand spade or trowel and approximately 100 grams of material was put into a standard kraft paper geochem sample bag. Locations were determined using detailed airphotos and orthophotos purchased for this exercise. Details such as location, rock type in the area, amounts of organics if applicable etc were recorded as was standard practice with all the more detailed soil geochem programs conducted on the property.

The samples were sent to the Nanisivik assay laboratory for preparation and analysis using industry recognized protocols and techniques. Industry accepted internal quality control and assurance procedures such as the insertion of blanks and standards were also followed.

It should be noted that at Nanisivik, soil geochemistry was a good tool for finding sub-cropping sulphides containing lead and zinc. In areas such as Ocean View and K-Baseline where the sulphides outcrop naturally, values as high as 1 to 2% zinc occur in the soils at surface as they have since the last ice age. In almost all cases the higher lead and zinc values noted on the map are correlateable to known zones which gives one confidence that no significant problems occurred with the assaying of the samples from that program.

As limited exploitation was taking place outside of the main mine at this time, I am firmly of the belief that these assays represent real background values for the Nanisivik property. Of course in areas such as the tailings pond and road to the dock some minor contamination had taken place at that time.

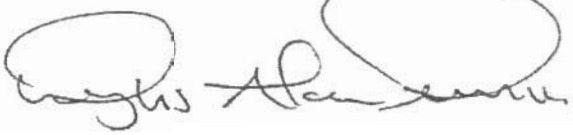
In fact a more detailed examination of the results of the survey for the area near the road to the dock and concentrate load out facility, was undertaken to determine if the large low intensity zinc anomalies noted on either side of the road were real. As the lead and zinc sulphides are almost always associated with massive pyrite at Nanisivik, geophysical surveys especially electromagnetic surveys such as TURAM and VLF-EM were used to screen for conductors. Subsequent geophysical surveys in this area failed to find any significant conductors.

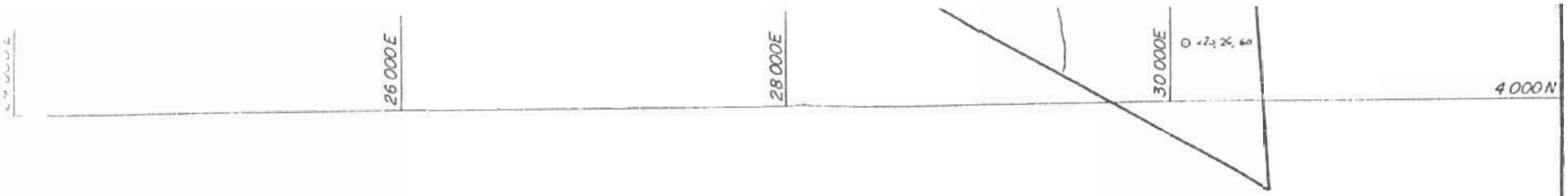
Therefore the conclusion that was reached was that the geochemical anomalies were due to dusting losses from the concentrate trucks traveling from the concentrate load out in the mill to the concentrate storage at the dock.

I hope this answers your questions.

Sincerely,

Douglas Dumka, P.Geo.





Geochem sample point

Cathod sample point

Assay in ppm : Pb, Zn, Cu.

Sphalerite

Gossan

Pyrite

Diabase (dyke)

Contamination

REV	DATE	SIGN	DESCRIPTION

NANISIVIK MINES LIMITED
NANISIVIK, NORTHWEST TERRITORIES

TITLE
NANISIVIK MINE PROPERTY
GEOCHEMICAL SURVEY
EAST SHEET

SCALE 0 1000 m
1:20 000

DATE FEB. 1986

DRAWING No.

DESIGNED

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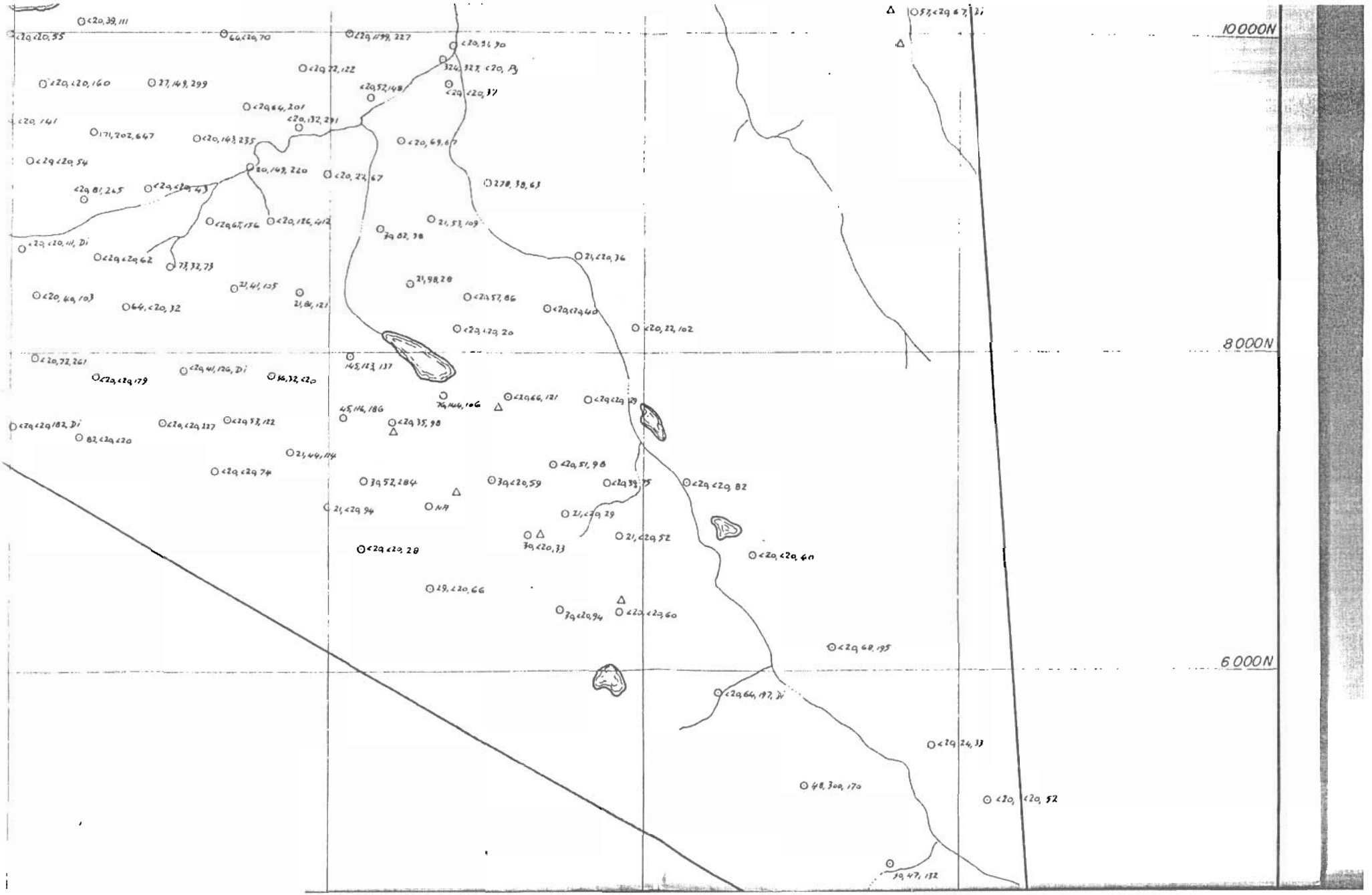
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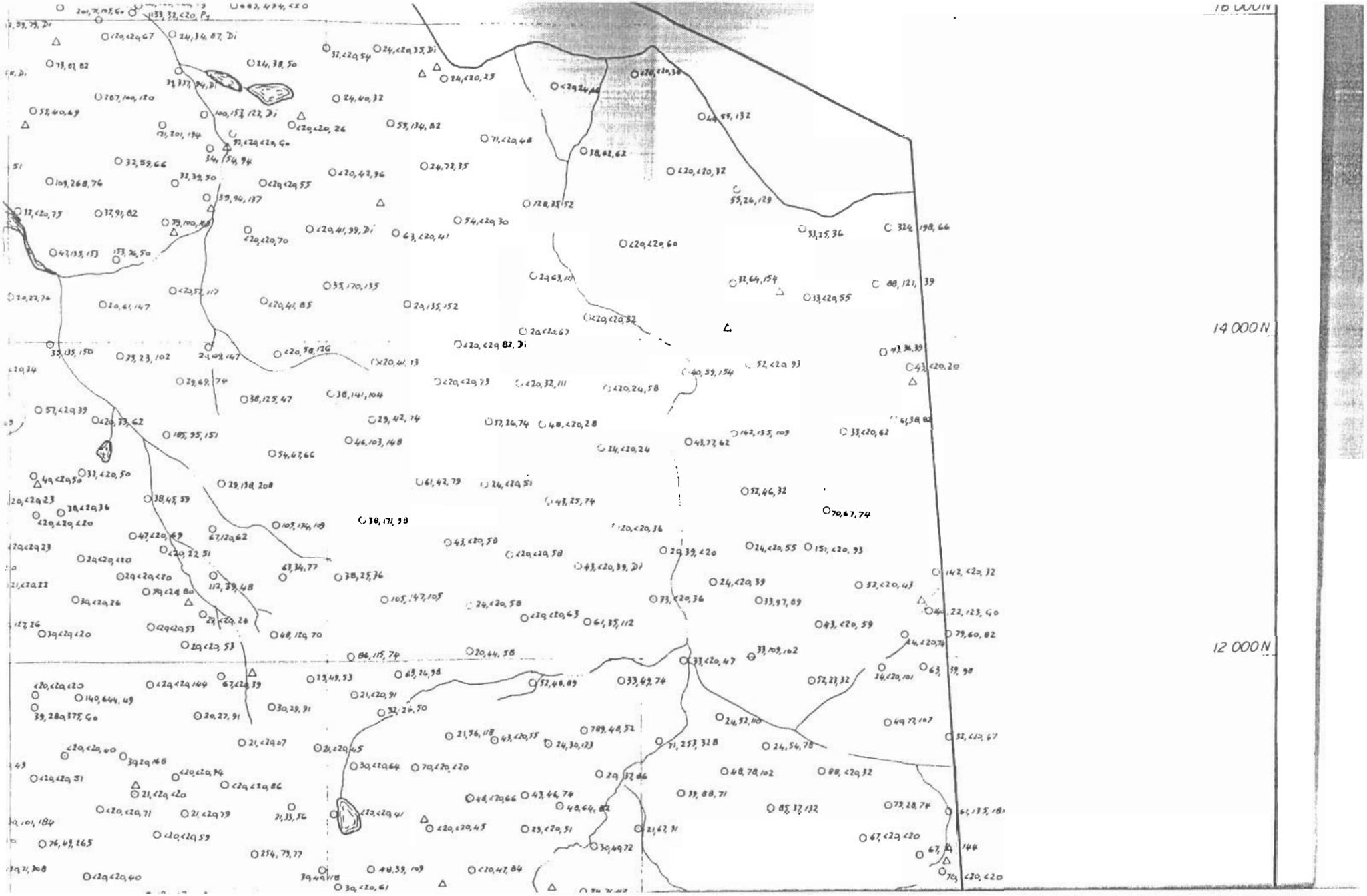
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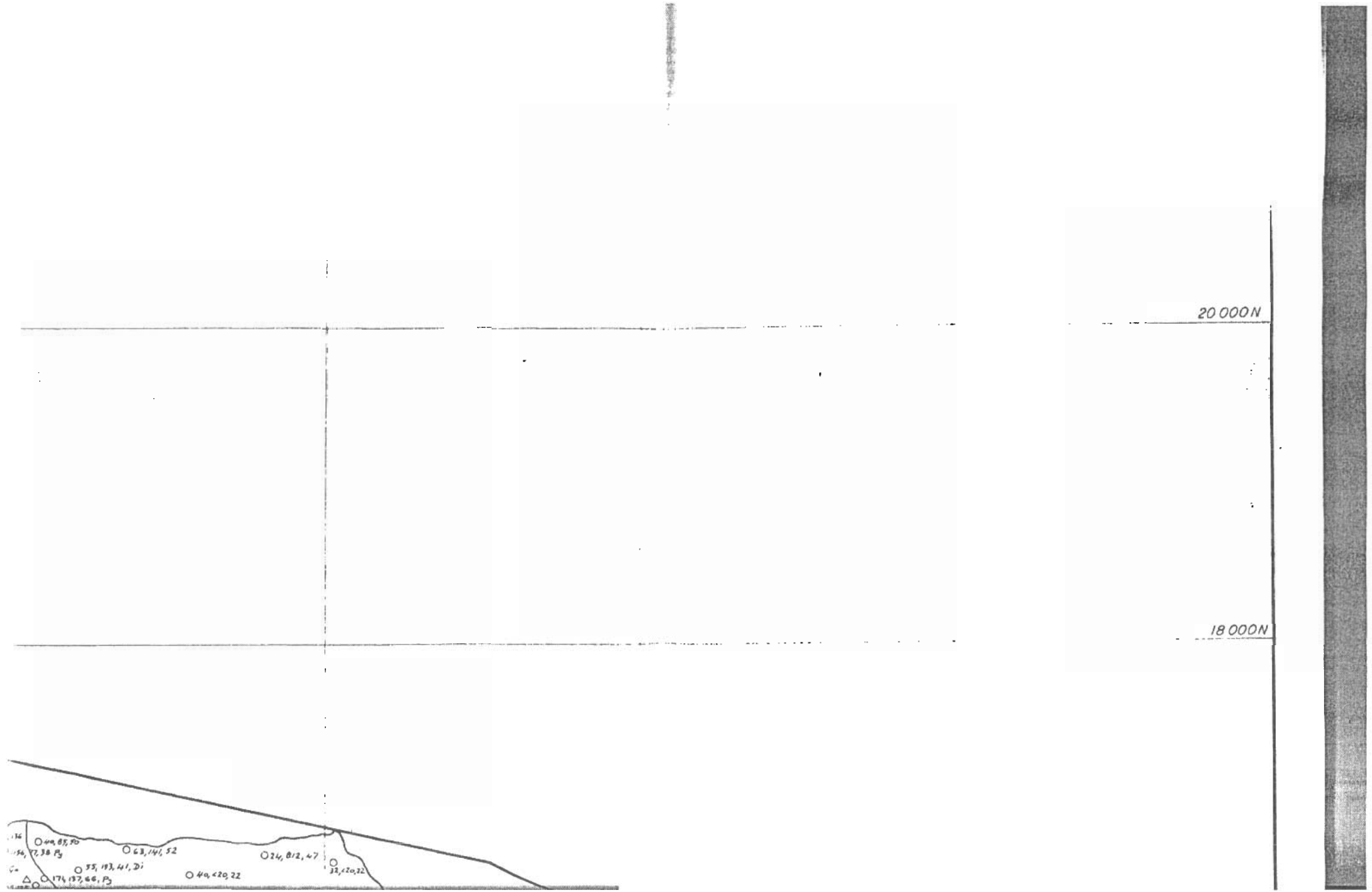
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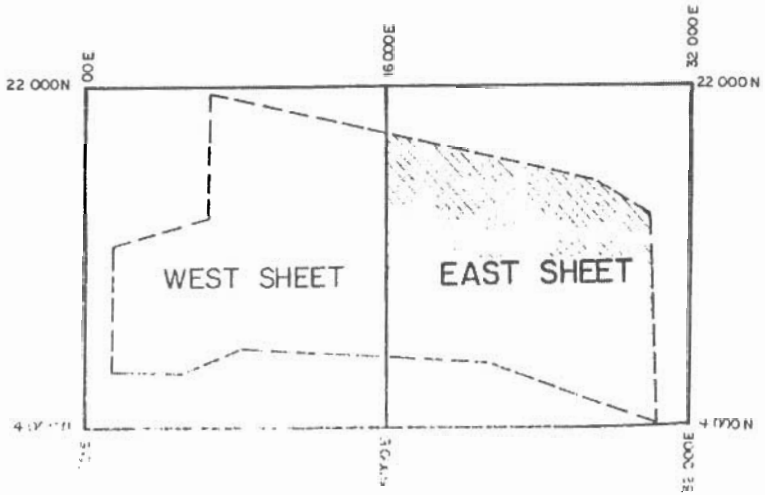
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INDEX MAP


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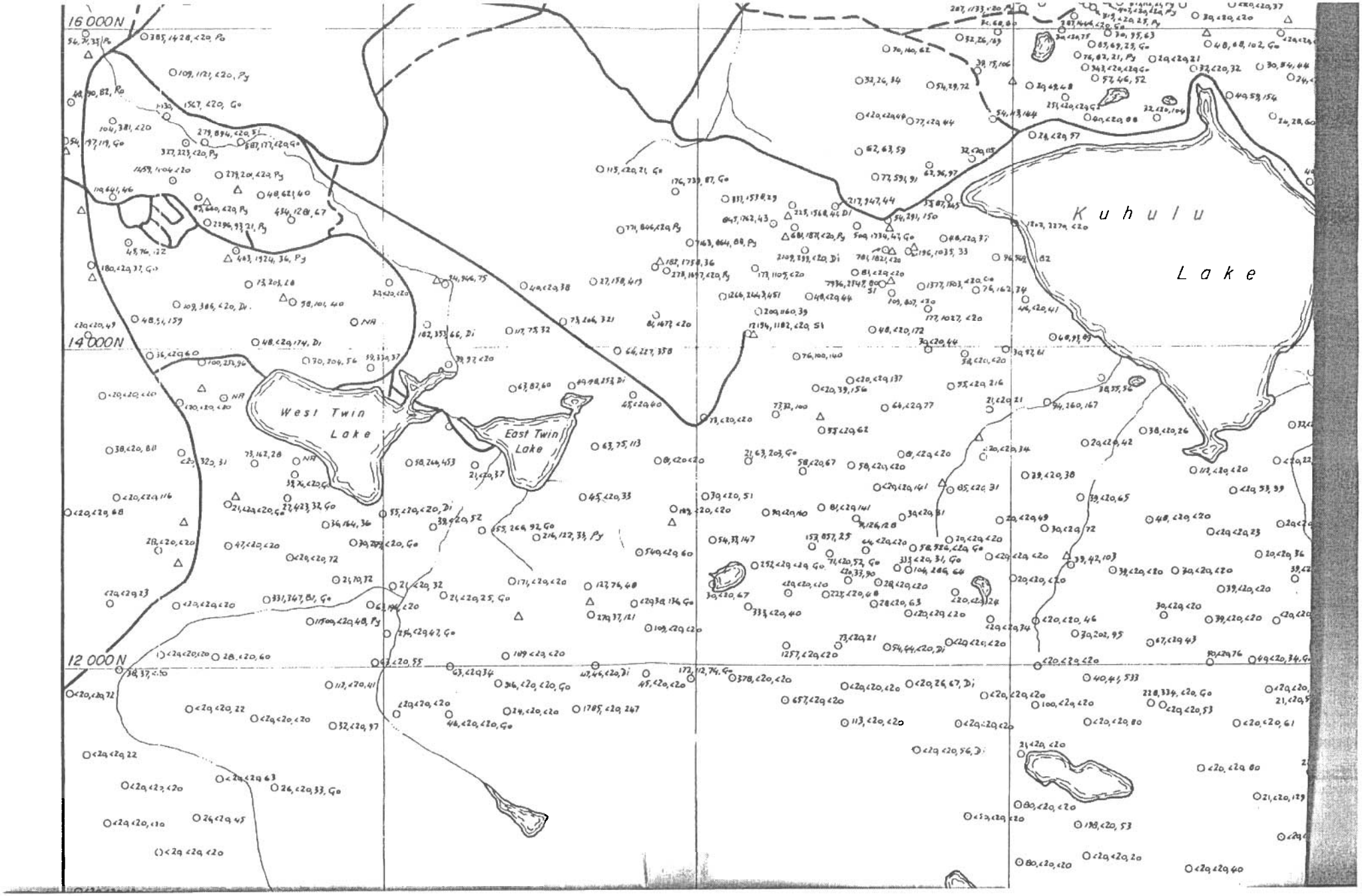
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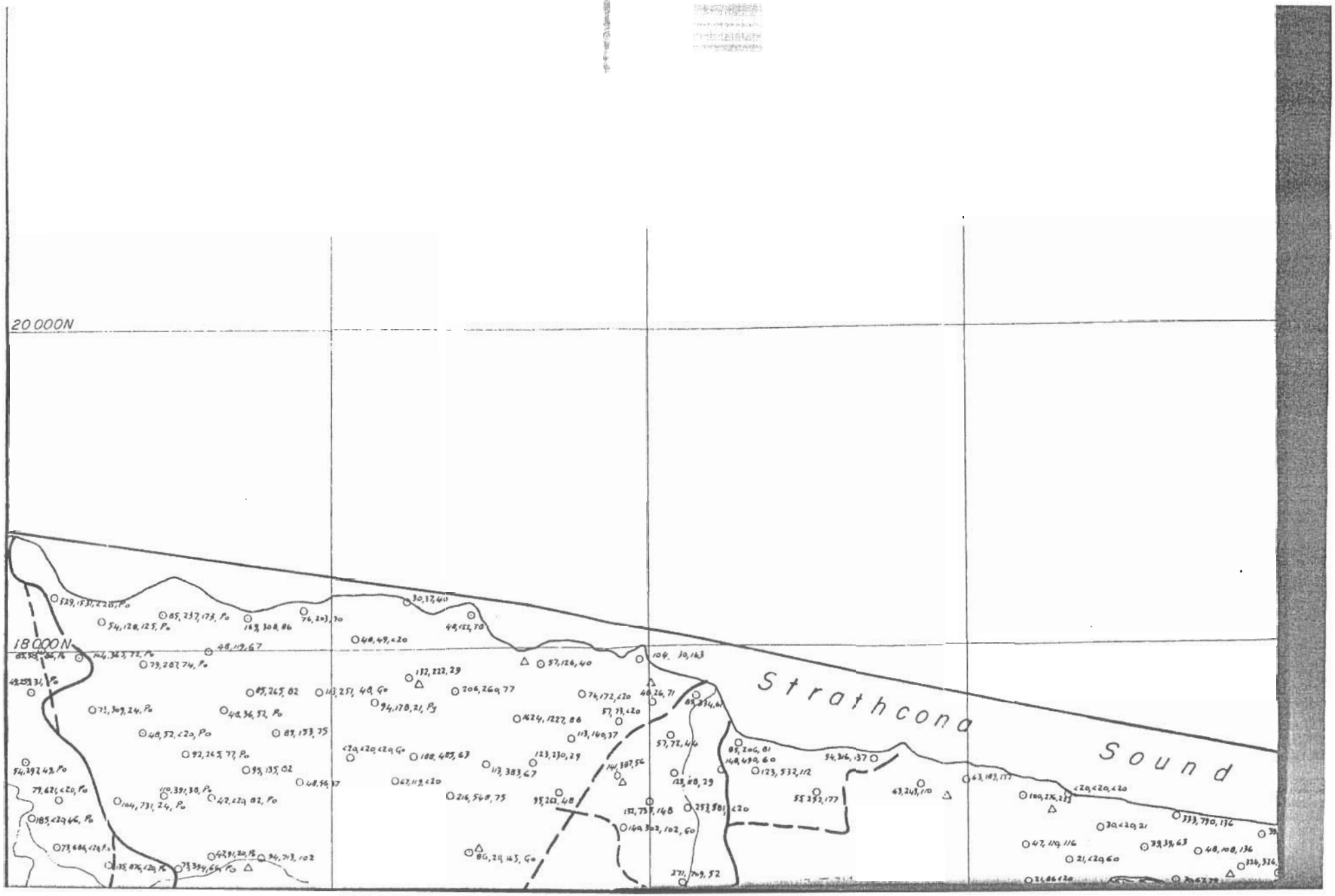
East Twin Lake
Kuhulu Lake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